

School Of Computer Science

Gujarat University



Certificate

Roll No: **30**

Seat No: _____

This is to certify that Mr. /Ms. **Ajinkya Rathod** student of MCA Semester - IV, has duly completed his / her term work for the semester ending in May 2021, in the subject of **Cloud Computing** towards partial fulfillment of his / her Degree of Masters in Computer Applications.

Date of Submission:

Internal Faculty

Head of Department

Department Of Computer Science Rollwala Computer Centre Gujarat University

MCA – IV

Subject: - Cloud Computing (CC)

Name: - Ajinkya Rathod

Roll No.: - 30 **Exam Seat No.: - _____**

**DEPARTMENT OF COMPUTER SCIENCE
ROLLWALA COMPUTER CENTRE
GUJARAT UNIVERSITY
M.C.A. – IV**

ROLL NO : 30

N A M E : Ajinkya Rathod

S U B J E C T : Cloud Computing (CC)

Q1 EC2

Ans Amazon Elastic Compute Cloud aka Amazon EC2 is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers. Amazon EC2's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environment.

Q2 Elastic Beanstalk

Ans: AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS.

You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring. At the same time, you retain full control over the AWS resources powering your application and can access the underlying resources at any time.

Q3

Iam

AWS Identity and Access Management - Iam enables you to manage access to AWS services and resources securely. Using Iam, you can create and manage AWS users and groups, and use permissions to allow and deny their access to AWS resources.

Q4

ELB

Elastic Load Balancing automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances, containers, IP addresses, Lambda functions, and virtual appliances.

It can handle the varying load of your application traffic in a single Availability Zone or across multiple Availability Zones.

Elastic Load Balancing offers four types of load balancers that all feature the high availability, automatic scaling, and robust security necessary to make your applications fault tolerant.

Q5

S3

Amazon Simple Storage Service -Amazon S3 is an object storage service that offers industry-leading scalability, data availability, security, and performance.

This means customers of all sizes and industries can use it to store and protect any amount of data for a range of use cases, such as data lakes, websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics. Amazon

S3 provides easy-to-use management features so you can organize your data and configure finely-tuned access controls to meet your specific business, organizational, and compliance requirements. Amazon S3 is designed for durability, and stores data for millions of applications for companies all around the world.

Q6

EBS

Amazon Elastic Block Store -EBS is an easy to use, high-performance, block-storage service designed for use with Amazon Elastic Compute Cloud -EC2 for both throughput and transaction intensive workloads at any scale. A broad range of workloads, such as relational and

non-relational databases, enterprise applications, containerized applications, big data analytics engines, file systems, and media workflows are widely deployed on Amazon EBS.

Q7

FSx for Lustre

Amazon FSx for Lustre is a fully managed service that provides cost-effective, high-performance, scalable storage for compute workloads. Many workloads such as machine learning, high performance computing HPC, video rendering, and financial simulations depend on compute instances accessing the same set of data through high-performance shared storage.

Powered by Lustre, the world's most popular high-performance file system, FSx for Lustre offers sub-millisecond latencies, up to hundreds of gigabytes per second of throughput, and millions of IOPS. It provides multiple deployment options and storage types to optimize cost and performance for your workload requirements.

Q8

Glacier

Amazon S3 Glacier is a secure, durable, and extremely low-cost Amazon S3 storage class for data archiving and long-term backup.

With S3 Glacier, customers can store their data cost effectively for months, years, or even decades.

S3 Glacier enables customers to offload the administrative burdens of operating and scaling storage to AWS, so they don't

have to worry about capacity planning, hardware provisioning, data replication, hardware failure detection and recovery, or time-consuming hardware migrations.

Q9

SageJaker

Amazon SageJaker is a fully managed machine learning service. With SageJaker, data scientists and developers can quickly and easily build and train machine learning models, and then directly deploy them into a production-ready hosted environment.

It provides an integrated Jupyter authoring notebook instance for easy access to your data sources for exploration and analysis, so you don't have to manage servers.

It also provides common machine learning algorithms that are optimized to run efficiently against extremely large data in a distributed environment.

With native support for bring-your-own-algorithms and frameworks, SageJaker offers flexible distributed training options that adjust to your specific workflows. Deploy a model into a secure and scalable environment by launching it with a few clicks from SageJaker Studio or the SageJaker console. Training and hosting are billed by minutes of usage, with no minimum fees and no upfront commitments.

Q10

Recognition

Amazon Rekognition makes it easy to add image and video analysis to your applications using proven, highly scalable, deep learning technology that requires no machine learning expertise to use. With Amazon Rekognition, you can identify objects, people, text, scenes, and activities in images and videos, as well as detect any inappropriate content.

Amazon Rekognition also provides highly accurate facial analysis and facial search capabilities that you can use to detect, analyze, and compare faces for a wide variety of user verification, people counting, and public safety use cases.

With Amazon Rekognition Custom Labels, you can identify the objects and scenes in images that are specific to your business needs. For example, you can build a model to classify specific machine parts on your assembly line or to detect unhealthy plants

Amazon Rekognition Custom Labels takes care of the heavy lifting of model development for you, so no machine learning experience is required.

You simply need to supply images of objects or scenes you want to identify, and the service handles the rest.

Q11

SNS

Amazon Simple Notification Service Amazon SNS is a fully managed messaging service for both application-to-application A2A and application-to-person A2P communication

The A2A pub,sub functionality provides topics for high-throughput, push-based, many-to-many messaging between distributed systems, microservices, and event-driven serverless applications.

Using Amazon SNS topics, your publisher systems can fanout messages to a large number of subscriber systems including Amazon SQS queues, AWS Lambda functions and HTTPS endpoints, for parallel processing, and Amazon Kinesis Data Firehose.

The A2P functionality enables you to send messages to users at scale via sms, mobile push, and email.

Q12

SES

Amazon Simple Email Service SES is a cost-effective, flexible, and scalable email service that enables developers to send mail from within any application. You can configure Amazon SES quickly to support several email use cases, including transactional, marketing, or mass email communications.

Amazon SESs & flexible IP

deployment and email authentication options help drive higher deliverability and protect sender reputation, while sending analytics measure the impact of each email. With Amazon SES, you can send email securely, globally, and at scale.

Q13

Lambda

AWS Lambda is a serverless compute service that lets you run code without provisioning or managing servers, creating workload-aware cluster scaling logic, maintaining event integrations, or managing runtimes. With Lambda, you can run code for virtually any type of application or backend service - all with zero administration. Just upload your code as a ZIP file or container image, and Lambda automatically and precisely allocates compute execution power and runs your code based on the incoming request or event, for any scale of traffic.

You can set up your code to automatically trigger from 140 AWS services or call it directly from any web or mobile app.

You can write Lambda functions in your favorite language - Node.js, Python, Go, Java, and more and use both serverless and container tools, such as AWS SAM or Docker CLI, to build, test, and deploy your functions.

Q14

RDS

Amazon Relational Database Service Amazon RDS makes it easy to set up, operate, and scale a relational database in the cloud.

It provides cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups.

Q1S Cloud9

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.

Q16 Cognito

Amazon Cognito lets you add user sign-up, sign-in, and access control to your web and mobile apps quickly and easily. Amazon Cognito scales to millions of users and supports sign-in with social identity providers, such as Apple, Facebook, Google, and Amazon, and enterprise identity providers via saml 2.0 and OpenID Connect.

Q17 VPC

Amazon Virtual Private Cloud -Amazon VPC is a service that lets you launch AWS resources in a logically isolated virtual network that you define.

You have complete control over your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.

You can use both IPv4 and IPv6 for most resources in your virtual private cloud, helping to ensure secure and easy access to resources and applications.

As one of AWS's foundational services, Amazon VPC makes it easy to customize your VPC's network configuration. You can create a public-facing subnet for your web servers that have access to the internet

It also lets you place your backend systems, such as databases or application servers, in a private-facing subnet with no internet access.

Amazon VPC lets you to use multiple layers of security, including security groups and network access control lists, to help control access to Amazon EC2 instances in each subnet.

Q18 RouteS3

Amazon Route S3 is a highly available and scalable cloud Domain Name System DNS web service.

It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like www.example.com into the numeric IP addresses like 192.0.2.1 that computers use to connect to each other.

Amazon Route S3 is fully compliant with IPv6 as well.

Amazon Route S3 effectively connects user requests to infrastructure running in AWS - such as Amazon EC2 instances, Elastic Load Balancing load balancers, or Amazon S3 buckets - and can also be used to route users to infrastructure outside of AWS.

You can use Amazon Route S3 to configure DNS health checks to route traffic

to healthy endpoints or to independently monitor the health of your application and its endpoints. Amazon Route 53 Traffic Flow makes it easy for you to manage traffic globally through a variety of routing types, including Latency Based Routing, Geo DNS, Geoproximity, and Weighted Round Robin - all of which can be combined with DNS Failover in order to enable a variety of low-latency, fault-tolerant architectures.

Using Amazon Route 53 Traffic Flows simple visual editor, you can easily manage how your end-users are routed to your applications endpoints - whether in a single AWS region or distributed around the globe.

Amazon Route 53 also offers Domain Name Registration you can purchase and manage domain names such as example.com and Amazon Route 53 will automatically configure DNS settings for your domains.

Q1

Create Ec2 Instance

Ans

Step 1

Sign in to the AWS Management Console and open the Amazon EC2 console

Step 2

Choose EC2 Dashboard, and then choose Launch instance.

Step 3

Choose the Amazon Linux 2 AJI.

Step 4

Choose the t2.micro instance type, as shown following, and then choose Next Configure Instance Details.

Step 5

On the Configure Instance Details page, shown following, set these values and keep the other values as their defaults.

Network - Choose the VPC with both public and private subnets that you chose for the DB instance, such as the vpc-identifier tutorial-vpc.

Subnet - Choose an existing public subnet, such as us-west-2a.

Auto-assign Public IP - Choose Enable.

Step 6

Choose Next - Add Storage.

Step 7

On the Add Storage page, keep the default values and choose

Next - Add Tags.

Step 8

On the Add Tags page, shown following, choose Add Tag, then enter Name for Key and enter tutorial-web server for Value.

Step 9

Choose Next- Configure Security Group.

Step 10

On the Configure Security Group page, shown following, choose Select an existing security group. Then choose an existing security group, such as the tutorial-security group.

make sure that the security group that you choose includes inbound rules for Secure Shell SSH and HTTP access.

Step 11

Choose Review and Launch.

Step 12

On the Review Instance Launch page, shown following, verify your settings and then choose Launch.

Step 13

On the Select an existing key pair or create a new key pair page, shown following, choose Create a new key pair and set Key pair name to tutorial-key-pair.

Step 14

Choose Download Key Pair, and then save the key pair file on your local machine. You use this key pair file to connect to your EC2 instance.

Step 15

To launch your EC2 instance, choose Launch Instances.

On the Launch Status page, shown following, note the identifier for your new EC2 instance, for example - i-0288d65fd4470b6a9.

Step 15

Choose View Instances to find your instance.

Step 16

Wait until Instance Status for your instance reads as Running before continuing.

Q2

Connect to windows instance

Step 1

Open the Amazon EC2 console

Step 2

In the navigation pane, select Instances. Select the instance and then choose Connect.

Step 3

In the Connect to instance page, choose RDP client and then choose Get password.

Step 4

Choose Browse and navigate to the private key file you created when you launched the instance. Select the file and choose Open to copy the entire contents of the file to this page.

Step 5

Choose Decrypt Password. The console displays the default administrator password for the instance in Password, replacing the Get password link shown previously. Save the password in a safe place. You need this password to connect to the instance.

Step 6

Choose Download remote desktop file. Your browser prompts you to either open or save the RDP shortcut file.

Select the option to save the file. When you have finished downloading the file, choose Cancel to return to the Instances page.

Step 7

Navigate to your downloads directory and open the RDP shortcut file.

Step 8

You might get a warning that the publisher of the remote connection is unknown. Choose Connect to continue to connect to your instance.

Step 9

The administrator account is chosen by default. Copy and paste the password that you saved previously.

Step 10

Due to the nature of self-signed certificates, you might get a warning that the security certificate could not be authenticated. Use the following steps to verify the identity of the remote computer, or simply choose Yes Windows or Continue mac OS X if you trust the certificate.

If you are using Remote Desktop Connection on a Windows computer, choose View certificate. If you are using Microsoft Remote Desktop on a Mac, choose Show Certificate.

Choose the Details tab, and scroll down to Thumbprint Windows or SHA1 Fingerprints mac OS X. This is the unique identifier for the remote computers

Security certificate.

In the Amazon EC2 console, select the instance, choose Actions, Monitor and troubleshoot, Get system log.

-In the system log output, look for RDPCERTIFICATE thumbprint. If this value matches the thumbprint or fingerprint of the certificate, you have verified the identity of the remote computer.

-If you are using Remote Desktop Connection on a Windows computer, return to the Certificate dialog box and choose OK. If you are using Microsoft Remote Desktop on a Mac, return to the Verify Certificate and choose Continue.

-Windows Choose Yes in the Remote Desktop Connection window to connect to your instance.

Q 3

Connect to Linux instance

Ans:

Step 1

In a terminal window, use the ssh command to connect to the instance. You specify the path and file name of private key (.pem), the user name for your instance, and the public DNS name or IPv6 address for your instance.

For more information about how to find the private key, the user name for your instance, and the DNS name or IPv6 address for an instance. To connect to your instance, use one of the following commands.

To connect using your instance's public DNS name, enter the following command.

```
ssh -i /path/to/my-key-pair.pem my-instance-user-name  
my-instance-public-dns-name
```

Step 2

Verify that the fingerprint in the security alert matches the fingerprint that you previously obtained in Optional Get the instance fingerprint. If these fingerprints don't match, someone might be attempting an in-the-middle attack. If they match, continue to next step.

Step 3

Enter yes.

Q4

Create s3 bucket

Ans

Step 1

Sign in to amazon aws

Step 2

Under Storage and Content Delivery, choose S3 to open the Amazon S3 console.

Step 3

From the Amazon S3 console dashboard, choose Create Bucket.

Step 4

In Create a Bucket, type a bucket name in Bucket Name. The bucket name you choose must be globally unique across all existing bucket names in Amazon S3 that is, across all AWS customers.

Step 5

In Region, choose Oregon.

Step 6

Choose Create.

QS Send An Email Using SES

Ans:

Step 1:

Sign in to the AWS Management Console and open the Amazon SES console.

Step 2:

In the Navigation pane of the Amazon SES console, under Identity Management, choose Email Addresses.

Step 3 :

In the list of identities, select the check box of an address that you have successfully Verified with Amazon SES.

Step 4 :

Choose Send a Test Email.

Step 5

In the Send Test Email dialog box, for Email Format, choose Raw.

Step 6:

For the To address, type an address from the Amazon SES mailbox simulator.

Step 7

Copy and paste the following message in its entirety into the Message text box, replacing CONFIGURATION- SET-NAJE with the name of the configuration set you created in Set up Configuration Set, and replacing FROM ADDRESS with the verified address you are sending this email from.

Step 8

Choose Send Test Email.

Step 9

Repeat this procedure a few times so that you generate multiple email sending events. For a few of the emails, change the value of the campaign message tag to clothing to simulate sending for a different email campaign.

Assignment -3

Q1

Open source IASS Software ?

Ans

CloudStack

CloudStack is also an open-source IaaS platform that is specially designed for deploying and managing networks. This is now owned and developed by Apache Software Foundation.

CloudStack has an easy to use interface which is web-based. Also, it has been observed by various users that the infrastructure management capability of this IaaS platform is highly scalable.

The CloudStack IaaS platform consists of a management server that helps in managing resources like IP address, storage, etc.

Q2 Open source PaaS Software ?

Ans : Cloud Foundry

Cloud Foundry is an open source cloud computing Platform as a service PaaS software developed by VMware. It offers a faster and easier way to build, test, deploy and scale applications.

It is primarily written in Ruby.

Cloud Foundry supports a wide range of services, and offers a choice of clouds such as vSphere or vCloud, Amazon Web Services, OpenStack, Rackspace, Ubuntu, and more, and runs on either private or public infrastructure.

Cloud Foundry is an open source project and is available through a variety of private cloud distributions and public cloud instances. micro

Cloud Foundry is a free downloadable version of Cloud Foundry that can run on a

developers laptop, for developers interested in a single instance, personal PaaS on your local machine. micro Cloud Foundry is only available on Cloud Foundry v1 not v2.

Features include

Includes a self-service application execution engine.

- Automation engine for application deployment and lifecycle management.

Scriptable command line interface CLI.

- Integration with development tools to ease development and deployment processes

- Open architecture for quick development framework integration, application services interface and cloud provider interface.

- Supports applications written in the Jvm based Languages - Java, Ruby, Node.js, Groovy, Scala.

Supported frameworks include Spring and Play for Java, Lift for Scala, Grails for Groovy, and Rails & Sinatra for Ruby.

Application Services supported MySQL, MongoDB, vFabric Postgres, Redis, and Rabbitmq.

Q3

Ans

Open source SASS Software ?

OpenShift

It is one among the family of containerization software developed by Red Hat.

OpenShift container platform is based upon the Kubernetes.

OpenShift Online is offered as a software-as-a-service.

OpenShift includes container images allowing users to deploy frameworks and databases with one click.

Its user interface allows users to monitor the containers as well as their health.

Some of the products of OpenShift are mentioned as under:

- OpenShift Origin - Supported by application lifecycle management functionality and DevOps tools.

- OpenShift Online - Runs on AWS

- OpenShift Dedicated - It is Red Hat's private cluster offering, available on AWS, GCP, Microsoft Azure.

● Features

- continuous integration and release management.

- multiple environment support.

- choice of cloud infrastructure.

- Pod autoscaling.

- standardized developer workflow.

Q4 Open Source Cloud Simulation Software ?

Ans GreenCloud

GreenCloud is an energy-aware cloud computing data centers with a focus on cloud communications. It is sophisticated packet-level simulator.

It offers a detailed fine-grained modeling of the energy consumed by the data center IT equipment, such as computing servers, network switches, and communication links.

It is originally built at University of Luxembourg, Luxembourg.

Key-Features

- Focus on cloud networking and energy awareness
- Simulation of CPU, memory, storage and networking resources.
- Independent energy models for each type of resource

QS

Ans

Open Source Distributed System Software ?

Hadoop

The Apache Hadoop project develops open-source software for reliable, scalable, distributed computing.

The Apache Hadoop software library is a framework that allows for the distributed processing of large data sets across clusters of computers using simple programming models.

It is designed to scale up from single servers to thousands of machines, each offering local computation and storage. Rather than rely on hardware to deliver high-availability, the library itself is designed to detect and handle failures at the application layer, so delivering a highly-available service on top of a cluster of computers, each of which may be prone to failures.

Hadoop Common - The common utilities that support the other Hadoop modules.

Hadoop Distributed File System a.k.a HDFS - A distributed file system that provides high-throughput access to application data.

Hadoop YARN - A framework for job scheduling and cluster resource management.

Hadoop MapReduce - A YARN-based system for parallel processing of large data sets.

Hadoop Ozone - An object store for Hadoop.

Products

Virtual service

PaaS

Serverless Computing

Docker management

Kubernetes management

Object Storage

Archive Storage

File Storage

Global Content Delivery

managed DWH

Caching

Block Storage

NoSQL indexed

NoSQL keyvalued

Relational database

AWS

Instances

Elastic Beanstalk

Lambda

ECS

EKS

S3

Glacier

EFS

CloudFront

Redshift

ElastiCache

EBS

Dynamo DB

Dynamo DB, SimpleDB

RDS

mS Azure

VmS

Cloud Services

Azure functions

Container service

Kubernetes services

Block Blob

Archieve

Azure Files

DeLivery Network

SQL warehouse

Rediscache

Pages Blobs

Cosmo DB

Table Storage

Sql Database

Storage

GCP

Vm Instances

App engine

Cloud functions

Container Engine

Kubernetes Engine

Cloud storage

Coldline

ZFS - Avere

Cloud CDN

Big Query

Cloud CDN

Persistent disks

Cloud DataStore

FireStore

Google



Certificate of Completion

Ajinkya Rathod

Has successfully completed
Introduction to Amazon Elastic Compute Cloud (EC2)

A handwritten signature in black ink that reads "Maureen Loberger".

Director, Training and Certification

10 minutes

Duration

16 January, 2021

Completion Date



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Introduction to Serverless Development

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25 minutes

Duration

16 January, 2021

Completion Date



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Getting Started with DevOps on AWS

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Director, Training and Certification

60 minutes

Duration

8 May, 2021

Completion Date



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Introduction to AWS CodeCommit

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Director, Training and Certification

15 minutes

Duration

24 May, 2021

Completion Date



Certificate of Completion

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Introduction to AWS Fargate

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Director, Training and Certification

10 minutes

Duration

24 May, 2021

Completion Date