A Summer Industry Internship – I Report on

"AWS CLOUD FOUNDATIONS

&

CLOUD ARCHITECTURE"

During

II Year II Semester Summer Internship

Submitted to

The Department of CSE

In partial fulfillment of the academic requirement of

Jawaharlal Nehru Technological University

For

The award of degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

By

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CERTIFICATE

This is to certify that this Summer Industry Internship – I Report on "AWS CLOUD FOUNDATION & CLOUD ARCHITECTING VIRTUAL INTERNSHIP", submitted by MULUGURI GNANA SAMHITHA (22311A05DB) in the year 2024-2025 in partial fulfillment of the academic requirements of Jawaharlal Nehru Technological University for the award of the degree of Bache lor of Technology in Computer Science and Engineering, is a bonafide work in industry internship that has been carried out during II B Tech CSE II Semester Summer, will be evaluated in III BTech CSE I Semester, under our guidance.

This report has not been submitted to any other institute or university for the award of any degree.

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has successfully completed 10 weeks

Cloud Virtual Internship

During Oct - Dec 2024

Curriculum Provided by:

aws academy

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Chief Coordinating Officer (CCO)
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INTERNSHIP GRADE B

GRADE- O (Outstanding):90-100 | E (Excellent):80-89 | A (Very Good):70-79 | B (Good): 60-69 | C (Fair): 50-59 | D (Average): 40-49 | P (Pass): 30-39 | F (Fail): Below 30

DECLARATION

I, Muluguri Gnana Samhitha (22311A05DB) student of SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY, YAMNAMPET, GHATKESAR, studying III year I semester, CSE solemnly declare that the Summer Industry Internship report, titled "AWS CLOUD FOUNDATION & CLOUD ARCHITECTURE" is submitted to SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY for partial fulfillment for the award of degree of Bachelor of technology in COMPUTER SCIENCE AND ENGINEERING.

It is declared to the best of my knowledge that the work reported does not form part of any dissertation submitted to any other University or Institute for award of any degree.

MULUGURI GNANA SAMHITHA
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I would like to express my gratitude to all the people behind the screen who helped me to alter an idea into a real application.

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Internship Title:

AWS CLOUD FOUNDATION & CLOUD ARCHITECTURE:

- Muluguri Gnana Samhitha (22311A05DB)

Training Duration: July - Nov 2024

About “AWS CLOUD FOUNDATION & CLOUD ARCHITECTING” Virtual Internship:

The AWS Cloud Foundation & Cloud Architecting Virtual Internship is a comprehensive program aimed at providing participants with both theoretical knowledge and practical experience in cloud computing using Amazon Web Services (AWS). This internship, typically spanning 8–10 weeks, introduces learners to foundational concepts of cloud computing, including cloud models, service types, and core AWS services such as EC2, S3, VPC, and RDS. The program also delves into advanced topics like designing scalable, secure, and cost-effective architectures, leveraging services such as AWS Lambda, CloudFormation, and DynamoDB.

Building on this foundation, the internship advances to AWS Cloud Architecting, which focuses on designing scalable, secure, and cost-effective cloud solutions. Participants learn to implement fault-tolerant architectures, automate infrastructure deployment using tools like AWS CloudFormation, and integrate security best practices using IAM and encryption services. They are also introduced to the AWS Well-Architected Framework, which emphasizes operational excellence, reliability, performance efficiency, and cost optimization in cloud designs.

Throughout the internship, participants engage in hands-on projects, case studies, and virtual labs that simulate real-world scenarios, preparing them to tackle industry challenges and pursue certifications like AWS Certified Cloud Practitioner and AWS Certified Solutions Architect – Associate. This program not only equips learners with technical expertise but also fosters critical thinking and problem-solving skills essential for a successful career in cloud computing.

ABSTRACT

The AWS Cloud Foundation and Cloud Architecture program provides a comprehensive introduction to the principles, tools, and practices of cloud computing, emphasizing the use of Amazon Web Services (AWS) for designing, deploying, and managing cloud-based solutions. The program begins with foundational concepts, such as the advantages of cloud computing, service models (IaaS, PaaS, SaaS), and AWS's global infrastructure. Participants gain hands on experience with essential AWS services, including EC2, S3, VPC, and RDS, learning how to build scalable and secure applications.

As the program progresses, it delves into advanced topics, focusing on designing fault-tolerant, high availability, and cost-efficient architectures. Using tools like AWS CloudFormation, participants learn to automate infrastructure deployment, while services like IAM and AWS WAF ensure robust security measures. Additionally, the program emphasizes the AWS Well Architected Framework, teaching best practices across operational excellence, security, reliability, performance efficiency, and cost optimization.

Key Words:- AWS Cloud Foundation, AWS Cloud Architecting, Cloud Computing,

AWS Services:- Amazon EC2, Amazon S3, Amazon RDS, AWS Lambda,

Amazon VPC.

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1. INTRODUCTION

The primary business drivers behind moving to the cloud include greater agility, innovation, and scale. When planning a cloud adoption strategy, the number of decisions that you need to make to stand up a production-ready cloud environment is significant. Decisions that are made early on can affect your ability to enhance and/or scale your environment in the future. This complexity has led customers to look for prescriptive guidance across the range of AWS services that can be used to create a foundational environment.

In the context of AWS Cloud Foundation and Cloud Architecting combines of two fundamental tasks:-

1. Learning Cloud Computing Basic:-
    - Understand cloud models (Public, Private, Hybrid) and service models (IaaS, PaaS, SaaS).
    - Explore the advantages of cloud computing, such as scalability, elasticity, and cost efficient.

2. Leveraging AWS Well-Architected Frame work :-
    - Implement the five pillars: Operational Excellence, Security, Reliability, Performance Efficiency, and Cost Optimization.
    - Conduct regular architecture reviews to improve systems.

AWS stands for Amazon Web Services, It is an expanded cloud computing platform provided by Amazon Company. AWS provides a wide range of services with a pay-as-per-use pricing model over the Internet such as Storage, Computing power, Databases, Machine Learning services, and much more. AWS facilitates for both businesses and individual users with effectively hosting the applications, storing the data securely, and making use of a wide variety of tools and services improving management flexibility for IT resources.

a. Technology Related to AWS Cloud Foundations:-

Compute Services: -

Amazon EC2 (Elastic Compute Cloud)

- Instances: Virtual machines that can be used for running applications and services. o Key Concepts: Instance types (general-purpose, compute-optimized, memory optimized), pricing models (on-demand, reserved, spot).

AWS Lambda

o Serverless compute that runs code in response to events without provisioning or managing servers.

AWS Elastic Beanstalk

- PaaS offering that simplifies the deployment of applications in multiple programming languages, handling provisioning, load balancing, and scaling automatically.

Amazon LightSail

- A simplified version of EC2 for developers looking for an easy-to-use virtual server with predictable pricing.

b. Technology Related to AWS Cloud Architecting:

Networking: -

Amazon VPC (Virtual Private Cloud):

- Creates isolated networks within AWS, enabling users to define IP ranges, subnets, route tables, and network gateways.

Elastic Load Balancing (ELB):

- Distributes incoming application traffic across multiple EC2 instances for high availability.
- Types: Application Load Balancer, Network Load Balancer, Classic Load Balancer.

Serverless Architectures:-

AWS Fargate:

- Serverless compute engine for containers, enabling containerized applications without managing servers.

Amazon Event Bridge:-

- Serverless event bus to connect different AWS services, SaaS applications, and custom sources.

c. Real-time Performance:

The real-time performance of AWS Cloud Architecture and Foundations is driven by several AWS services and best practices designed for low-latency, scalable, and resilient systems. By leveraging tools such as EC2, Lambda, DynamoDB, CloudWatch, and Event Bridge, you can build applications that react to events or user requests in near real-time. Optimizing resources, minimizing latency, and adopting serverless and event-driven architectures ensure that your AWS cloud-based applications perform efficiently and meet real-time expectations.

d. Benefits of AWS Cloud Foundation & Cloud Architecture :

1. Elastic Scaling: AWS allows businesses to scale their infrastructure up or down based on demand. Services like Amazon EC2 Auto Scaling and Elastic Load Balancing (ELB) enable automatic adjustments to computing resources to meet fluctuating needs, ensuring optimal performance during peak loads and cost-efficiency during low traffic.

2. Flexible Resource Management: With services like Amazon Elastic Beanstalk and AWS Lambda, businesses can scale applications seamlessly without worrying about managing the underlying infrastructure. This allows you to focus on innovation and growth, while AWS handles scaling.

3. Innovation with AI and Machine Learning: AWS offers powerful AI and ML services such as Amazon Sage Maker and AWS Recognition, which enable businesses to integrate advanced machine learning models and AI capabilities into their applications without needing deep expertise in these areas.

Applications of AWS Cloud Foundation & Cloud Architecture:

1. Automated Infrastructure Provisioning: With AWS CloudFormation and AWS Elastic Beanstalk, businesses can automate the provisioning and management of cloud infrastructure using code. This eliminates manual configurations, reduces human error, and ensures consistency across environments.
2. Scalable Object Storage: Amazon S3 is used to store and manage vast amounts of unstructured data. It is ideal for storing files, backups, media assets, and logs. Amazon S3 offers features such as versioning, lifecycle policies, and multi-region replication.
3. Scalable Web Applications: AWS provides highly scalable web hosting solutions using Amazon EC2, Amazon Light Sail, Elastic Load Balancer (ELB), and Amazon CloudFront. These services allow businesses to host websites and applications with low latency, automatic scaling, and high availability.
4. Data Lakes: AWS Lake Formation helps businesses build and manage secure data lakes, where structured and unstructured data can be stored, analyzed, and queried. It supports analytics and machine learning workloads.
5. Predictive Analytics: Amazon Sage Maker provides an end-to-end environment for building, training, and deploying machine learning models. Businesses use Sage Maker for predictive analytics in industries like finance, healthcare, and ecommerce.

2. LITERATURE REVIEW

A literature review is a comprehensive overview of existing research and scholarly work on a specific topic. In the context of AWS Cloud Architecture and AWS Cloud Foundations, a literature review would explore previous studies, articles, whitepapers, and industry reports about the principles, technologies, and applications related to AWS cloud services, architecture design, and cloud adoption. Here's a structure you could follow for a literature review on AWS Cloud Foundation and Cloud Architecture:

A. **AWS (Amazon Web Service)**

AWS is a cloud compiler provider. This service is a perfect example of true cloud computing that not only offers excellent cloud services but also offers privacy; integrity and availability of customer data [6]. AWS provides the required resources. IT services are available at affordable prices and no pre-investment is required on the services. The customer must pay for the services they use regularly. AWS provides flexibility depending on the number of services the customer needs. If they need more than what they want they can easily go up and if they don't need the services, they have they can close them off and stop paying. Another advantage of AWS is that it makes the job easier and faster. With traditional builds, it was difficult to upgrade the application as it takes a lot of time to find the server. But with AWS cloud computing one can use hundreds or thousands of servers without any delay. AWS, therefore, allows for faster development and feeds off the system, and allows the team to try again and again.

B. **AWS Security Process**

AWS Infrastructure: AWS infrastructure is an infrastructure that is designed or designed based on security processes that are critical to protecting customer data. AWS infrastructure contains hardware, operating software, security standards, network, and other essential resources. AWS data centers have very new structures due to their extensive knowledge of designing and building data canters. A high level of security exists during the physical access of AWS data centers. Professional security personnel is monitored for data security. They use electronic devices such as video surveillance, CCTV cameras, intruders, etc. Visitors or contractors must submit their ID signed by authorized staff and are allowed to access it if they have business needs. The location of the data centers is controlled.

C. **Network Security**

AWS has outstanding network security as it has outstanding network configurations that are properly controlled and managed. A person can connect to the AWS access point using HTTS using the SSL (Secure Socket Layer) protocol. This process provides many security services such as protection against fraudulent messages, interference, etc. The following is the division of Amazon companies which means the division of the Amazon Production network into the Amazon Corporate network by network devices. Engineer or manager cannot directly access network devices even with configuration. They need access through the AWS ticket system.

Once authorized staff can access the AWS network with the help of a bastion host.

Real-World Applications

The real-world applications of AWS Cloud Foundation and Cloud Architecture demonstrate how businesses across various industries leverage AWS to enhance their operations, improve efficiency, and scale solutions rapidly. AWS provides a robust, secure, and flexible cloud platform that businesses can use to transform their digital infrastructure. Below are some real-world applications of AWS Cloud Foundation and Cloud Architecture:

Scalability for Traffic Spikes: E-commerce businesses often face fluctuating traffic patterns, especially during seasonal sales, Black Friday, and Cyber Monday. AWS helps e-commerce platforms scale their infrastructure in real time with services like Amazon EC2 Auto Scaling, Elastic Load Balancer (ELB), and Amazon CloudFront for content delivery.

Data Storage and Compliance: Healthcare providers use Amazon S3 and Amazon Glacier for storing and archiving patient data, medical images, and other sensitive documents while ensuring compliance with healthcare regulations such as HIPAA (Health Insurance Portability and Accountability Act).

Challenges and Opportunities

Challenges and opportunities associated with AWS Cloud Foundation and Cloud Architecture as:

1. AWS provides tools like AWS Cost Explorer, AWS Trusted Advisor, and AWS Budgets that help businesses monitor and optimize their cloud spending.
2. Using AWS's Well-Architected Framework can guide businesses in following best practices for building a secure, reliable, and efficient cloud infrastructure. 3. AWS offers a range of security services, such as AWS Identity and Access Management (IAM), AWS Shield for DDoS protection, and AWS Key Management Service (KMS) for encryption.

   Opportunities include:

   1. AWS's infrastructure enables businesses to scale their applications and workloads up or down as needed, without the limitations of traditional on-premises hardware.
   2. With Auto Scaling and Elastic Load Balancing (ELB), businesses can ensure that their cloud environment automatically adjusts to handle varying traffic loads, ensuring optimal performance.
   3. AWS also supports cutting-edge technologies such as IoT, Artificial Intelligence (AI), Blockchain, and Augmented Reality (AR).

3.CLOUD CONCEPTS OVERVIEW

3.1Introduction to cloud computing:

Cloud computing is the on-demand delivery of compute power, database, storage, applications, and other IT resources via the internet with pay-as-you-go pricing. These resources run on server computers that are located in large data centers in different locations around the world. When you use a cloud service provider like AWS, that service provider owns the computers that you are using. These resources can be used together like building blocks to build solutions that help meet business goals and satisfy technology requirements.

Traditional computing model:

In this model, organizations maintain and operate their own physical hardware, software, and data centers within their premises.

3.2Infrastructure as hardware:

In the traditional computing model, infrastructure is thought of as hardware. Hardware solutions are physical, which means they require space, staff, physical security, planning, and capital expenditure.

With a hardware solution, you must ask if there is enough resource capacity or sufficient storage to meet your needs, and you provision capacity by guessing theoretical maximum peaks. If you don't meet your projected maximum peak, then you pay for expensive resources that stay idle. If you exceed your projected maximum peak, then you don't have sufficient capacity to meet your needs. And if your needs change, then you must spend the time, effort, and money required to implement a new solution.

Figure 1.1 Infrastructure as hardware

Infrastructure as software:

By contrast, cloud computing enables you to think of your infrastructure as software. Software solutions are flexible. You can select the cloud services that best match your needs, provision and terminate those resources on-demand, and pay for what you use. You can elastically scale resources up and down in an automated fashion. With the cloud computing model, you can treat resources as temporary and disposable. The flexibility that cloud computing offers enables businesses to implement new solutions quickly and with low upfront costs. Compared to hardware solutions, software solutions can change much more quickly, easily, and cost effectively.

1.3 Cloud service models:

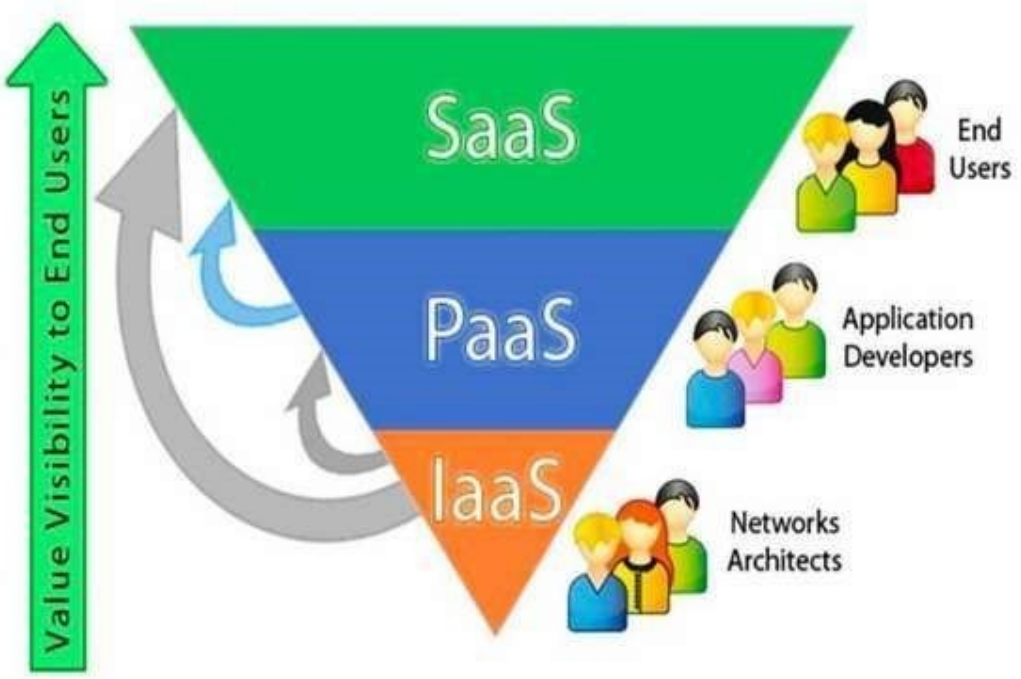

Figure 1.3 Cloud service models

3.3 Infrastructure as a service (IaaS):-

Services in this category are the basic building blocks for cloud IT and typically provide you with access to networking features, computers (virtual or on dedicated hardware), and data storage space. IaaS provides you with the highest level of flexibility and management control over your IT resources [1].

Platform as a service (PaaS):

Services in this category reduce the need for you to manage the underlying infrastructure (usually hardware and operating systems) and enable you to focus on the deployment and management of your applications.

Software as a service (SaaS):

Services in this category provide you with a completed product that the service provider runs and manages. In most cases, software as a service refers to end-user applications. With a SaaS offering,

you do not have to think about how the service is maintained or how the underlying infrastructure is managed. You need to think only about how you plan to use that particular piece of software[3].

3.4 Cloud computing deployment models:

Cloud: A cloud-based application is fully deployed in the cloud, and all parts of application run in the cloud. Applications in the cloud have either been created in the cloud or have been migrated from an existing infrastructure to take advantage of the benefits of cloud computing (see https://aws.amazon.com/what-iscloud computing/).

Hybrid: A hybrid deployment is a way to connect infrastructure and applications between cloud-based resources and existing resources that are not located in the cloud. The most common method of hybrid deployment is between the cloud and existing on- premises infrastructure.

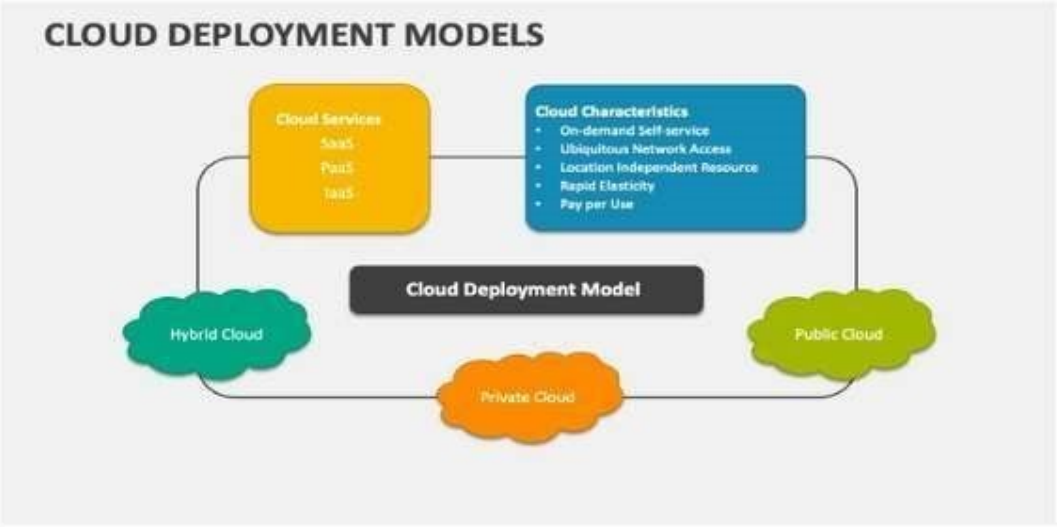

Figure 1.4 Cloud computing deployment models

3.5- Advantages of cloud computing:

Cloud computing offers a wide range of advantages for individuals, businesses, and organizations. Some of the key benefits of cloud computing include:

Cost-Efficiency: Cloud services eliminate the need for purchasing and maintaining on-premises hardware and software, reducing upfront costs.

Pay-as-You-Go: Many cloud providers offer a pay-as-you-go pricing model, allowing users to pay only for the resources they consume.

Scalability: On-Demand Resources: Cloud resources can be quickly scaled up or down to meet changing needs, ensuring efficient resource utilization.

Auto-Scaling: Many cloud platforms offer auto-scaling, which automatically adjusts resources based on traffic or demand.

Cross-Platform Compatibility: Cloud applications and data can be accessed from various devices and operating systems.

Redundancy: Cloud providers typically maintain multiple data centers and have redundancy built into their infrastructure to ensure high availability.

Professional Expertise: Cloud providers invest heavily in security measures, including encryption, identity and access management, and threat detection.

Data Versioning: Your paragraph text Some cloud services allow users to access previous versions of their files, aiding in data recovery.

File Sharing: Cloud storage services allow easy sharing of files and documents with colleagues, clients, or partners.

Development Tools: Cloud platforms provide tools and services for app development, machine learning, and IoT, fostering innovation.

Automatic Updates and Maintenance: Cloud providers handle routine updates and maintenance tasks, reducing the administrative burden on users. Cloud computing has transformed the way businesses and individuals leverage technology, offering the benefits of cost savings, agility, and innovation. However, important to select the right cloud services and configurations to best align with specific needs and security requirements.

4.Core AWS Services

Cloud storage is typically more reliable, scalable, and secure than traditional on premises storage systems. Cloud storage is a critical component of cloud computing because it holds the information that applications use. Big data analytics, data warehouses, the Internet of Things (IoT), databases, and backup and archive applications all rely on some form of data storage architecture.

4.1 Amazon Elastic Block Store (Amazon EBS):

Amazon EBS provides persistent block storage volumes for use with Amazon EC2instances. Persistent storage is any data storage device that retains data after power to that device is shut off. It is also sometimes called non-volatile storage. Amazon EBS enables you to create individual storage volumes and attach them to an Amazon EC2 instance:

Figure 3.1 Amazon EBS

•Volumes are automatically replicated within its Availability Zone

•It can be backed up automatically to Amazon S3 through snapshots

•Boot volumes and storage for Amazon Elastic Compute Cloud (Amazon EC2) instances

•Data storage with a file system

•Database hosts

A backup of an Amazon EBS volume is called a snapshot. The first snapshot is called the baseline snapshot. Any other snapshot after the baseline captures only what is different from the previous snapshot

4.2 Amazon Simple Storage Service (Amazon S3):

Companies need the ability to simply and securely collect, store, and analyse their data on a massive scale. Amazon S3 is object storage that is built to store and retrieve any amount of data from anywhere: websites and mobile apps, corporate applications, and data from Internet of Things (IoT) sensors or devices.

Fig:3.2 Amazon S3

Amazon S3 is object-level storage, which means that if you want to change a part of a file, you must make the change and then re-upload the entire modified file.

4.3 Amazon Elastic File System (Amazon EFS):

Amazon EFS implements storage for EC2 instances that multiple virtual machines can access at the same time. It is implemented as a shared file system that uses the Network File System (NFS) protocol.

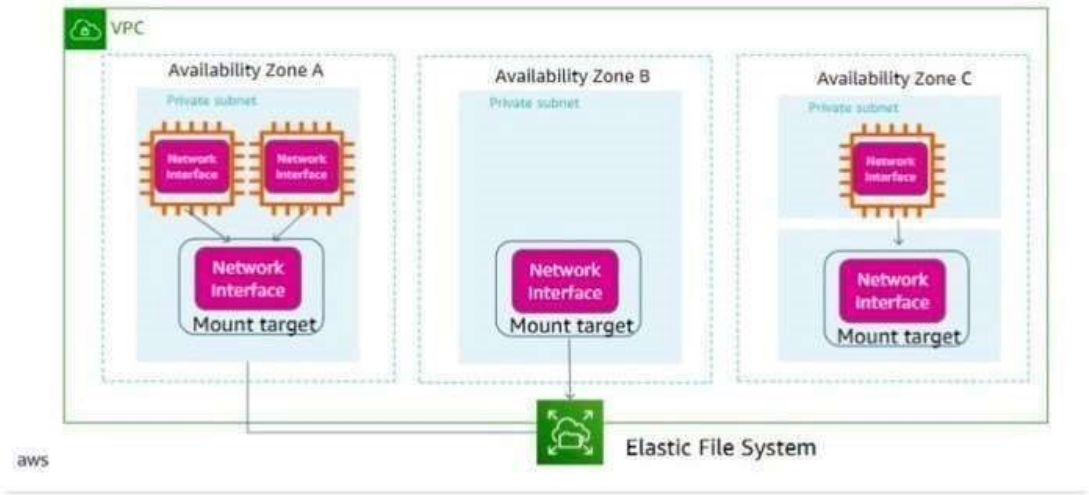

Figure 3.3 Amazon EFS

Amazon Elastic File System (Amazon EFS) provides simple, scalable, elastic file storage for use with AWS services and on-premises resources. It offers a simple interface that enables you to create and configure file systems quickly and easily.

Amazon EFS is built to dynamically scale on demand without disrupting applications it will grow and shrink automatically as you add and remove files. It is designed so that your applications have the storage they need, when they need it.

Amazon EFS provides file storage in the cloud. With Amazon EFS, you can create a file system, mount the file system on an Amazon EC2 instance, and then read and write data from to and from your file system.

4.4 Amazon S3 Glacier:

Amazon S3 Glacier is a secure, durable, and extremely low-cost cloud storage service for data archiving and long-term backup. When you use Amazon S3 Glacier to archive data, you can store your data at an extremely low cost (even in comparison to Amazon S3), but you cannot retrieve your data immediately when you want it. Data that is stored in Amazon S3 Glacier can take several hours to retrieve, which is why it works well for archiving.

There are three key Amazon S3 Glacier terms you should be familiar with:

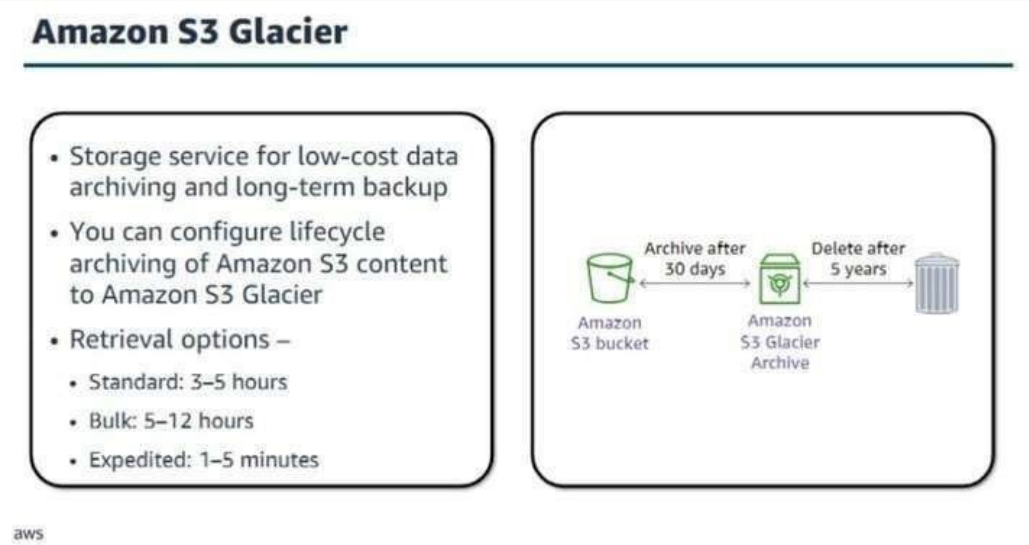

Figure 3.4 Amazon S3 Glacier

•Archive–Any object (such as a photo, video, file, or document) that you store in Amazon S3 Glacier. It is the base unit of storage in Amazon S3 Glacier. Each archive has its own unique ID and it can also have a description.

•Vault–A container for storing archives. When you create a vault, you specify the vault name and the Region where you want to locate the vault.

•Vault access policy –Determine who can and cannot access the data that is stored in the vault, and what operations users can and cannot perform. One vault access

5.DATABASES

5.1 Amazon Relational Database Service:

When you run your own relational database, you are responsible for several administrative tasks, such as server maintenance and energy footprint, software, installation and patching, and database backups. You are also responsible for ensuring high availability, planning for scalability, data security, and operating system (OS) installation and patching. All these tasks take resources from other items on your to-do list, and require expertise in several areas.

5.2 Amazon RDS:

Amazon RDS is a managed service that sets up and operates a relational database in the cloud. To address the challenges of running an unmanaged, standalone relational database, AWS provides a service that sets up, operates, and scales the relational database without any ongoing administration.

Amazon RDS provides cost-efficient and resizable capacity, while automating time consuming administrative tasks. Amazon RDS enables you to focus on your application.

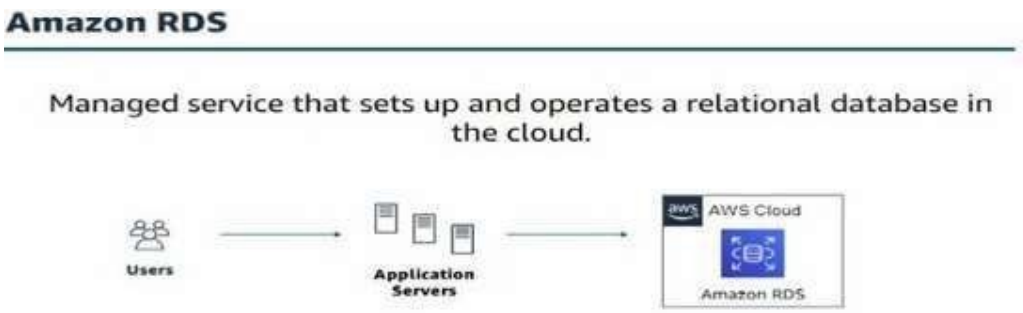

Figure 4.1 Amazon RDS

5.3 Amazon RDS DB instances:

The basic building block of Amazon RDS is the database instance. A database instance is an isolated database environment that can contain multiple user-created databases. It can be accessed by using the same tools and applications that you use with a standalone database instance.

The resources in a database instance are determined by its database instance class, and the type of storage is dictated by the type of disks.

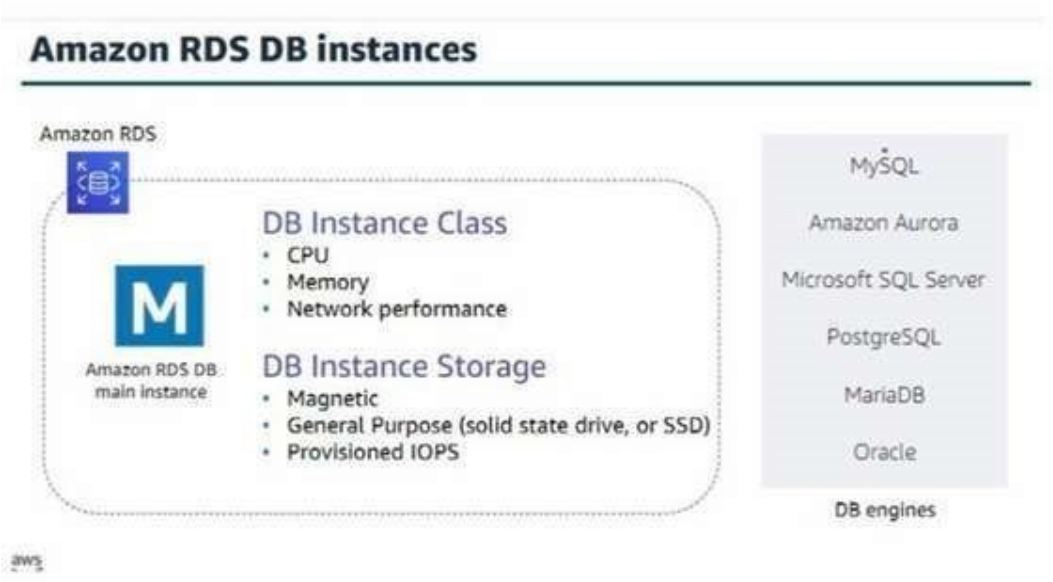

Figure 4.2 Amazon RDS DB instances

CHAPTER 6

CASE STUDY: SMALL BUSINESS WEBSITE MIGRATION TO THE CLOUD

Background: MYNTRA Crafts, a small handicrafts business, currently hosts its website on a local server. As the business expands, the owners have decided to migrate the website to the cloud for improved performance, reliability, and cost effectiveness.

Objectives:

Website Performance:
Enhance the website's responsiveness and load times for a better user experience.

Reliability:
Improve the overall reliability of the website by leveraging cloud infrastructure.

Cost Efficiency:
Optimize hosting costs while ensuring the scalability needed for potential growth.

Security:
Enhance the security posture of the website by leveraging cloud security features.

Implementation Steps:

Cloud Provider Selection:

1.Choose a cloud provider (e.g., AWS, Azure, Google Cloud) based on simplicity, cost-effectiveness, and ease of use.

2.Consider services like AWS S3 for static content hosting or a platform-as-a service (PaaS) offering for web hosting.

Enable SSL (Optional):
If you want to enable SSL, you can use AWS Certificate Manager to create an SSL certificate and then configure your Cloud Front distribution.

Assess the current website code and data structure:
Migrate static content to a cloud storage service and the dynamic parts to a cloud-based web server.

Website Code and Data Migration:

aws s3 api create-bucket --bucket MYNTRA crafts-website --region us-east-1

(#Create an S3 Bucket)

aws s3 sync website s3://MYNTRAcrafts-website

(#Upload Website Content)

aws s3 website s3://MYNTRAcrafts-website/ --index-document index.html --error- document error.html

(#Configure Bucket for Website Hosting)

aws s3api get-bucket-website --bucket MYNTRA crafts-website

(#Set Up DNS (Assuming you're using AWS Route 53)

Domain and DNS Configuration:

Update domain settings to point to the new cloud-based server. Configure DNS settings to ensure a smooth transition.

Scalability and Reliability:

1.Leverage auto-scaling features to handle traffic spikes.

2.Distribute the website components across multiple availability zones for improved reliability.

Security Implementation:

1.Implement SSL/TLS certificates for secure data transfer.

2.Configure firewalls and security groups to control access to the website.

Monitoring and Alerts:

1.Set up basic monitoring for website performance.

2.Configure alerts for any unusual activities or downtime.

Backup and Recovery:

1.Establish regular backup schedules for website data.

2.Test the backup and recovery process to ensure data integrity.

Outcome:

MYNTRA Crafts successfully migrates its website to the cloud, resulting in improved performance, reliability, and security. The owners can now easily scale the website based on business needs, and the cost-effective cloud solution allows them to focus on growing their business without worrying about infrastructure management.

7.SYSTEM IMPLEMENTATION

Language / Technology Used:-

1.Pre-Implementation Planning:
Assess the organization's needs and understand the business requirements before setting up the cloud infrastructure. Identify which AWS services are best suited for the use case.

2.Environment Setup:
Set up the foundational infrastructure on AWS to begin deploying resources like virtual machines, databases, and storage.

3.Resource Provisioning and Configuration:
Provision resources like compute instances, storage, and databases that will be used in the cloudbased application.

4.Security and Compliance Configuration:
Ensure the security and compliance of the cloud environment, especially when handling sensitive data.

5.Application Deployment and Integration:
Deploy the application and integrate it with various AWS services to ensure seamless interaction between components.

6.Monitoring and Optimization:
Continuously monitor and optimize the system to ensure it runs efficiently, securely, and at a lower cost.

7.Backup and Disaster Recovery (DR):
Implement a robust backup and disaster recovery plan to protect data.

8.INTERNSHIP EXPERIENCE

During internship my experience typically refers to the hands-on learning process that an individual gains while working in a professional environment, often as part of a formal education program. In the context of an AWS Cloud Architecting or Cloud Foundations internship, the experience can offer valuable insights into how cloud technologies and architecture are implemented in real-world settings.

Challenges Faced

While working on the Internship, we encountered several challenges.

Google Cloud Setup and Authentication.

Challenge: The code requires users to have an active Google Cloud project with billing enabled, and to have obtained and stored a Gemini API key. This setup process, including navigating the Google Cloud console, can be daunting for novice users or those unfamiliar with cloud services. Impact: Users might get stuck or frustrated during the initial setup, hindering their ability to run the code and interact with Gemini.

Challenge: While the code uses Google Cloud's Speech-to-Text API, which is generally robust, speech recognition accuracy can still be affected by factors like background noise, microphone quality, and accents. Inaccurate transcriptions can lead to misinterpretations by Gemini.

Impact: Gemini might generate nonsensical or irrelevant responses if the transcribed text is inaccurate, impacting the overall user experience.

Challenge: The code currently has limited error handling, meaning that unexpected errors or exceptions during API calls or audio processing might not be handled gracefully.

Impact: Users might encounter cryptic error messages or experience unexpected crashes, making it difficult to troubleshoot or resolve issues.

User Interface Simplicity:

Challenge: While the code provides a basic user interface with widgets for recording audio, the overall user experience could be improved with more intuitive design and visual feedback. Impact: Users might find it unclear how to interact with the code or understand the status of their requests, potentially leading to confusion or frustration.

Dependency Management:

Challenge: The code relies on specific libraries that need to be installed. Ensuring that users have the correct versions of these libraries and that they are compatible with the Colab environment can be a challenge.

Impact: Incompatibilities or missing libraries could prevent the code from running or cause unexpected errors, requiring users to troubleshoot dependencies.

CONCLUSION

In conclusion, the future of AWS Cloud Architecture and Cloud Foundations presents a dynamic and expansive landscape filled with transformative opportunities. As businesses continue to embrace the cloud for its scalability, flexibility, and cost-effectiveness, AWS will remain at the forefront of this evolution by providing advanced tools and services that cater to modern business needs. Key trends such as serverless computing, AI and machine learning integration, edge computing, and the growing importance of real-time, ensuring flexibility in infrastructure choices. The increasing focus on sustainability and eco-friendly practices within AWS further strengthens its commitment to a more data processing are shaping the future of cloud architecture. The continued evolution of AWS services will enable organizations to build highly efficient, scalable, and secure cloud environments, reducing complexity while increasing performance. Moreover, as companies shift toward hybrid cloud, multi cloud architectures, and cloud-native applications, AWS will facilitate seamless integration with diverse technologies sustainable future in the cloud computing industry. Innovations that empower businesses to deliver faster, smarter, and more personalized solutions. By adopting these advancements, organizations can not only optimize their IT infrastructure but also unlock new business opportunities and maintain a competitive edge in an increasingly digital world. As AWS services evolve, organizations that strategically leverage the latest cloud technologies will be well equipped to thrive in a rapidly changing technological landscape, ensuring long-term success and agility.

FUTURE SCOPE

The future scope of AWS Cloud Architecture and AWS Cloud Foundations is vast and continuously evolving as technology advances and business needs change. With the rapid growth of cloud computing, AWS has positioned itself as a leader in providing scalable, flexible, and cost-effective cloud solutions. As organizations increasingly migrate to the cloud, there are several key trends and developments that will shape the future of AWS cloud technologies, particularly in the realms of cloud architecture and foundations:

1. Growth of Serverless Compu ng: -

Serverless Evolution: AWS Lambda and other serverless services (e.g., Amazon Event Bridge, API Gateway) are expected to grow significantly. Serverless computing allows developers to focus on code while AWS manages infrastructure. The future will see greater abstraction of cloud infrastructure, allowing businesses to build and deploy applications even faster.

2. AI and Machine Learning Integration:-

Machine Learning Services: AWS has already introduced services like Amazon Sage Maker, which simplifies machine learning model development and deployment. In the future, expect more AI-powered solutions integrated with AWS Cloud, allowing businesses to gain deeper insights and automate decision-making processes in real time.

3. Improved Security and Privacy:-

Advanced Security Features: As cybersecurity threats grow, AWS will continue to introduce advanced security measures, ensuring that cloud environments are secure and compliant. AWS Identity and Access Management (IAM), AWS Key Management Service (KMS), and AWS Shield will likely evolve, offering more granular controls, advanced threat detection, and automated security response capabilities.

4. Cloud-Native Architectures and Microservices:-

Microservices Growth: AWS has been a key enabler of microservices architecture with services like Amazon ECS, Amazon EKS, and AWS Fargate. Cloud-native applications will continue to rely on microservices for flexibility, scalability, and fast deployment.

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3. https://docs.aws.amazon.com/eventbridge/latest/userguide/ Official AWS documentation for Event Bridge, which is designed for building real-time event-driven applications, with examples on low-latency event handling.

4. https://docs.aws.amazon.com/cloudwatch/latest/monitoring/ AWS CloudWatch is a monitoring service for AWS cloud resources, helping to track real-time performance, with built-in tools to alert and optimize infrastructure.

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APPENDIX-A: ABSTRACT

Sreenidhi Institute of Science and Technology Department of CSE Summer Industry Internship -I		
Batch No: B03		Title
Roll No	Name	
22311A05DB	MULUGURI GNANA SAMHITHA	AWS CLOUD FOUNDATIONS & CLOUD ARCHITECTURE

ABSTRACT

The real-time performance of AWS Cloud Architecture and Foundations is driven by several AWS services and best practices designed for low-latency, scalable, and resilient systems. By leveraging tools such as EC2, Lambda, DynamoDB, CloudWatch, and Event Bridge, you can build applications that react to events or user requests in near real-time. Optimizing resources, minimizing latency, and adopting serverless and event-driven architectures ensure that your AWS cloud-based applications perform efficiently and meet real-time expectations.

As the program progresses, it delves into advanced topics, focusing on designing fault tolerant, high-availability, and cost-efficient architectures. Using tools like AWS CloudFormation, participants learn to automate infrastructure deployment, while services like IAM and AWS WAF ensure robust security measures. Additionally, the program emphasizes the AWS Well-Architected Framework, teaching best practices across operational excellence, security, reliability, performance efficiency, and cost

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APPENDIX: B CORRELATION BETWEEN THE SUMMER INDUSTRY INTERNSHIP-I AND THE PROGRAM OUTCOMES

(POS), PROGRAM SPECIFIC OUTCOMES (PSOS)

Sreenidhi Institute of Science and Technology Department of CSE Summer Industry Internship -I		
Batch No: B03		Title
Roll No	Name	
22311A05DB	MULUGURI GNANA SAMHITHA	AWS CLOUD FOUNDATIONS & CLOUDARCHITECTURE

Table-1: Internship correlation with appropriate POs/PSOs (Please specify level of Correlation, H/M/L against POs/PSOs)

H	High	M	Moderate	L	Low

Sreenidhi Institute of Science and Technologyy

Department of CSE

Internship Correla on with POs/PSOs

PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO7	PO 8	PO9	PO1 0	PO1 1	PO 12	PSO 1	PS O2	PS O3
M	L	L	H	H	L	M	H	M	H	H	H	H	H	M

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APPENDIX: C DOMAIN OF INTERNSHIP AND NATURE OF INTERNSHIP

Sreenidhi Institute of Science and Technology

Department of CSE

Summer Industry Internship -I

Batch No: B03		Title
Roll No	Name	
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Batch No.	Title	Nature of Internship			
		Product	Applica on	Research	Others (please specify)
B03	AWS CLOUD FOUNDATIONS & CLOUD ARCHITECTURE		✓		

Table-2: Nature of the Internship work (Please tick ✓ Appropriate for your Internship)

Table-3: Domain of the Internship work (Please tick ✓ Appropriate for your Internship)

Batch No.	Title	Domain of the Internship				
		Ar ficial Intelligence, Machine Learning and deep learning	Computer Networks, Informa on security, Cyber security	Data warehousing Data mining, Bigdata analy c s	Cloud compu ng, Internet of things	So ware engineering, Image processing
B03	AWS CLOUD FOUNDATIONS & CLOUD ARCHITECTURE		✓		✓	

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