VISVESVARAYA TECHNOLOGICAL UNIVERSITY JNANA SANGAMA, BELAGAVI

Internship Report on

AWS and DEVOPS

Submitted in partial fulfillment of the requirements of the 3rd Semester in

MASTER OF COMPUTER APPLICATIONS

BY

GREESHMA P

4SN23MC017

Under the Guidance of

Internal Guide
Ms. Sharanya
Assistance Professor

External Guide
Ms. Bhargavi
DevOps Engineer and Trainer

SRINIVAS INSTITUTE OF TECHNOLOGY, VALCHIL MANGALURU

2024-25

INTERNSHIP REPORT

AWS and DEVOPS

SUBMITTED BY

GREESHMA P **USN: 4SN23MC017**

Under the Guidance of

Ms. Sharanya
Assistance Professor
Department of MCA

Ms. Bhargavi
De Engineer
Micro Degree Pvt. Ltd

Department of Master of Computer Applications

SRINIVAS INSTITUTE OF TECHNOLOGY

(Affiliated to VTU, Belagavi, Approved by AICTE, New Delhi,

Recognized by Govt. of Karnataka)

Mangaluru-574143, Karnataka

SRINIVAS INSTITUTE OF TECHNOLOGY,
VALCHIL MANGALURU

INTERNSHIP CERTIFICATE

*This is to certify that **GREESHMA P** bearing USN **4SN23MC017** has satisfactorily completed the Internship 22MCA39 entitled **AWS AND DEVOPS** in the academic year **2024-25** as prescribed by VTU for III Semester of Master of Computer Applications.*

Signature of the internal/external Guide **Signature of the HOD**

Ms. Sharanya Dr.Shashidhar kini k

Date:

Examiners **Signature**

1.

2.

<<INSERT COMPANY CERTIFICATE>>

DECLARATION

I hear by declare the Internship entitled **“AWS and DEVOPS”** which is submitted by me in the partial fulfillment of the requirements for completion of MCA degree in Srinivas Institute of Technology, Mangalore under the affiliation of Visvesvaraya Technological University, Belagavi that comprise work done during the period of internship.

I do hereby declare that all the information given above is true to be best of my knowledge and belief.

GREESHMA P

4SN23MC017

ACKNOWLEDGEMENT

First I would like to thank the **Ms. Bhargavi** for giving me the opportunity to do an internship and explore technological realm.

I also take this opportunity to express my profound gratitude and deep regards to my Seminar Guide **Ms.Sharanya.,** Professor, Department of Master of Computer Applications for his support and guidance.

I also express my heartfelt gratitude to our Principal **Dr. Shrinivasa Mayyadi**, for his kind co-operation and encouragement which helped me in the completion of this internship.

I express a deep sense of gratitude to **Dr.Shashidhar kini K** Head of the Department, MCA, for his cordial support by being as internal guide, valuable information and guidance, which helped me in completing this internship.

Thank you for the invaluable support extended to both our staff members and non-staff members. Your dedication to fostering a welcoming and collaborative environment is deeply appreciated.

GREESHMA P
4SN23MC017

PROGRAM OUTCOMES

- **PO1:** Computational Knowledge: Acquire in depth computational knowledge with an ability to apply knowledge of mathematics, computer science and management in practice.
- **PO2:** Problem Solving Skills: An ability to identify, critically analyzes, formulate and develop computer applications.
- **PO3:** Modern Tool Usage: Ability to select modern computing tools and techniques and use them with dexterity.
- **PO4:** Development Skills: An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability.
- **PO5**: Interpretation Skills: An ability to devise and conduct experiments, interpret data and provide well informed conclusions.
- **PO6**: Societal and Environmental Concern: To understand the impact of system solutions in a contemporary, global, economical, environmental, and societal context for sustainable development
- **PO7:** Professional Ethics: To function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with positive attitude
- **PO8:** Communication Efficacy: Understand and communicate effectively with the computing community and with society at large, regarding complex computing systems activities confidently and effectively by writing effective reports and design documentations by adhering to appropriate standards, make effective presentations and give / receive clear instructions
- **PO9**: Life-long Learning: An ability to appreciate the importance of goal setting and to recognize the need for life-long learning.
- **PO10:** Problem Analysis: Identify, formulate, conduct literature survey and solve complex computing problems through analysis as well as provide optimal solutions.
- **PO11:** Regularity Responsibilities: Understand and commit to cyber regulations, responsibilities, and norms of professional computing practices.
- **PO12:** Innovation and Entrepreneurship: Identify a timely opportunity for entrepreneurship and use innovation to pursue and create value addition for the betterment of the individual and society

ABSTRACT

Amazon Web Services (AWS) and DevOps are two pillars of modern software engineering that together facilitate rapid, reliable, and efficient software development and operations. AWS provides a comprehensive suite of cloud computing services, including scalable infrastructure, managed databases, machine learning capabilities, storage solutions, and networking tools. These services enable businesses to build and deploy applications with reduced overhead, cost-efficiency, and high scalability.

DevOps, on the other hand, is a cultural and technological practice that combines software development (Dev.) and IT operations (Ops) to streamline processes, automate workflows, and foster collaboration between teams. By integrating continuous integration/continuous delivery (CI/CD), container orchestration, infrastructure as code (IaC), and monitoring, DevOps ensures faster delivery of high-quality software while maintaining stability and reliability.

The synergy between AWS and DevOps is transformational. AWS provides the flexibility and scalability required for DevOps practices, with services such as Code Pipeline, Code Build, and Code Deploy automating the CI/CD process. Tools like Elastic Container Service (ECS) and Cabernets enable effective container orchestration, while services like Cloud Formation and Terraforming simplify infrastructure provisioning. AWS's monitoring and logging tools, such as Cloud Watch and Cloud Trail, enhance observability and system reliability, crucial for the DevOps methodology.

In essence, AWS and DevOps together create a robust ecosystem that empowers organizations to innovate rapidly, deliver customer value, and remain competitive in a fast-evolving technological landscape.

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CHAPTER 1

INTRODUCTION

Amazon Web Services offers a broad set of global cloud-based products including compute, storage, databases, analytics, networking, mobile, developer tools, management tools, IoT, security, and enterprise applications: on-demand, available in seconds, with pay-as-you-go pricing. From data warehousing to deployment tools, directories to content delivery, over 200 AWS services are available. New services can be provisioned quickly, without the upfront fixed expense. This allows enterprises, start-ups, small and medium-sized businesses, and customers in the public sector to access the building blocks they need to respond quickly to changing business requirements. This whitepaper provides you with an overview of the benefits of the AWS Cloud and introduces you to the services that make up the platform.

DevOps is a collaborative approach that combines software development (Dev) and IT operations (Ops), enabling organizations to deliver high-quality software faster and more efficiently. By emphasizing automation, continuous integration, and continuous delivery, DevOps fosters a culture of collaboration, agility, and rapid innovation, transforming the way software is developed, tested, and deployed. DevOps is the combination of cultural, engineering practices and patterns, and tools that increase an organization's ability to deliver applications and services at high velocity and better quality. Over time several essential practices have emerged when adopting DevOps: Continuous Integration, Continuous Delivery, Infrastructure as Code, and Monitoring and Logging.

CHAPTER 2

ABOUT COMPANY

Micro Degree is an Ed-tech platform that offers affordable online programs to teach coding and job-ready skills in Kannada. The company's motto is to make emerging technology accessible to students and early professionals across regions, regardless of their educational backgrounds.

Their vision is to empower local engineering talent from non-metro with foundational clarity in vernacular and connect them with the right job opportunities at an affordable price. Founded in 2019, the team at Micro Degree had first-hand experience teaching emerging technology through offline boot-camp programs and effectively scaling up the cohort to the online platform. Micro Degree was one of the Winners at Startup Karnataka's flagship Elevate-Call2 program held in March '20 (Top 93 out of 1000+)

Micro Degree's training methods include: Emphasizing on relevant analogies and examples, making fundamentals strong with deep concept clarity, providing practical examples, and Offering hands-on learning. Some say that Micro Degree's training in AWS and DevOps is excellent. They also say that the trainers explain things clearly and the team provides great assistance.

CHAPTER 3

LITERATURE SURVEY

AWS (Amazon Web Services) is a comprehensive cloud computing platform that offers a wide range of services, including compute, storage, databases, networking, analytics, machine learning, and more. It has become a dominant force in the cloud computing market due to its extensive service offerings, global infrastructure, and pay-as-you-go pricing model.

Research on AWS encompasses various aspects, such as the performance and cost-effectiveness of its compute services (like EC2 and Lambda), the reliability and durability of its storage services (like S3 and EBS), the performance and scalability of its database services (like RDS and Dynamo DB), the security and isolation of its networking services (like VPC), the performance and integration of its analytics services (like Redshift and EMR), and the ease of use and performance of its machine learning services (like Sage Maker and Recognition).Key research findings include the increasing adoption of AWS across various industries, the focus on cost optimization strategies, the importance of security and compliance, the integration of AWS with other technologies, and the continuous innovation and introduction of new services. Future research directions include exploring server less computing, edge computing, quantum computing, and the advancements in AI and machine learning within the AWS ecosystem.

DevOps is a set of practices that combines software development (Dev.) and IT operations (Ops) to shorten the systems development life cycle and provide continuous delivery with high software quality. DevOps emphasizes collaboration between development and operations teams, automation of various stages of the software delivery pipeline, continuous integration and continuous delivery (CI/CD), treating infrastructure as code (IaC), and continuous monitoring and feedback. Research on DevOps covers areas such as the factors influencing its adoption, the challenges faced during implementation, the impact of DevOps on software delivery speed and quality, the evaluation of DevOps tools and technologies, the integration of security practices (DevSecOps), and the impact of organizational culture on DevOps success. Studies have shown that DevOps can significantly improve software delivery speed, reduce time to market, and increase software quality. Automation, strong collaboration, and continuous improvement are crucial for successful DevOps implementation. Future research directions include exploring the use of AI/ML in DevOps, the application of DevOps principles to edge computing and server less computing environments, and the development of effective metrics to measure the success of DevOps initiatives.

CHAPTER 4

TECHNOLOGIES STUDIED

AWS offers a vast array of technologies that can be studied. These include foundational cloud computing concepts, core AWS services like EC2 (compute), S3 (storage), and VPC (networking), as well as specialized services like Lambda (server less computing) and RDS (relational databases), AWS leverages a wide array of technologies to deliver its comprehensive cloud computing services. Here are some key areas and examples:

1. **Compute:**

- **EC2 (Elastic Compute Cloud):** Virtual servers for running applications with full control over the operating system.
- **Lambda:** Server less computing to run code in response to events without provisioning or managing servers.
- **Elastic Beanstalk:** Platform-as-a-service (PaaS) for deploying and scaling web applications.
- **ECS (Elastic Container Service) & EKS (Elastic Kubernetes Service):** Services to run and manage containers, including support for Docker and Kubernetes.

2. **Storage:**

- **S3 (Simple Storage Service):** Scalable object storage used for data archiving, backups, and web applications.
- **EBS (Elastic Block Store):** Block storage volumes for use with EC2 instances.
- **EFS (Elastic File System):** Fully managed file storage for shared access across instances.
- **Glacier:** Low-cost archival storage for long-term retention..

3. **Networking:**

- **Virtual Private Cloud (VPC):** VPC allows users to create isolated virtual networks within the AWS cloud, providing enhanced security and control over network resources.
- **Content Delivery Network (CDN):** Amazon CloudFront delivers content to users from data centres around the world, reducing latency and improving performance.

- **Load Balancing:** Elastic Load Balancing distributes traffic across multiple instances, ensuring high availability and scalability.

4. Security:

- **Identity and Access Management (IAM):** IAM allows users to control access to AWS resources through the use of roles, users, and permissions.
- **Encryption:** AWS offers various encryption options, including encryption at rest and in transit, to protect data security.
- **Security Groups and Network ACLs:** These tools allow users to control network traffic to and from their instances, enhancing security.

DevOps encompasses a wide range of technologies, each serving a specific purpose within the software development and delivery lifecycle. Here are some key categories and examples:

1. Version Control:

- **Git:** A distributed version control system that tracks changes to code over time, enabling collaboration and efficient code management. Popular Git platforms include GitHub, GitLab, and Bitbucket.

2. Continuous Integration and Continuous Delivery (CI/CD):

- **Jenkins:** A popular open-source automation server used to build, test, and deploy software.
- **GitLab CI/CD:** A built-in CI/CD pipeline within the GitLab platform, streamlining the development workflow.
- **CircleCI:** A cloud-based CI/CD platform known for its speed and ease of use.
- **Jenkins X:** A cloud-native platform that automates the delivery of Kubernetes applications.

3. Creating branches

- A branch is created from the main branch to prepare for a release.
- Only bug fixes and critical changes are made on this branch.
- Once the release is ready, it's merged back into the main branch.

CHAPTER 5

TECHNOLOGIES IMPLEMENTATION

5.1 Deploying website an AWS EC2 instances

Step 1: In the VPC Dashboard, click on Your VPCs in the left-side menu.

- Select **Create VPC** and fill the details:
- **Name tag**: A name for your VPC.
- **IPv4 CIDR block**: Specify the IP range for your VPC (e.g., `10.0.0.0/16`).
- Click on Create VPC.

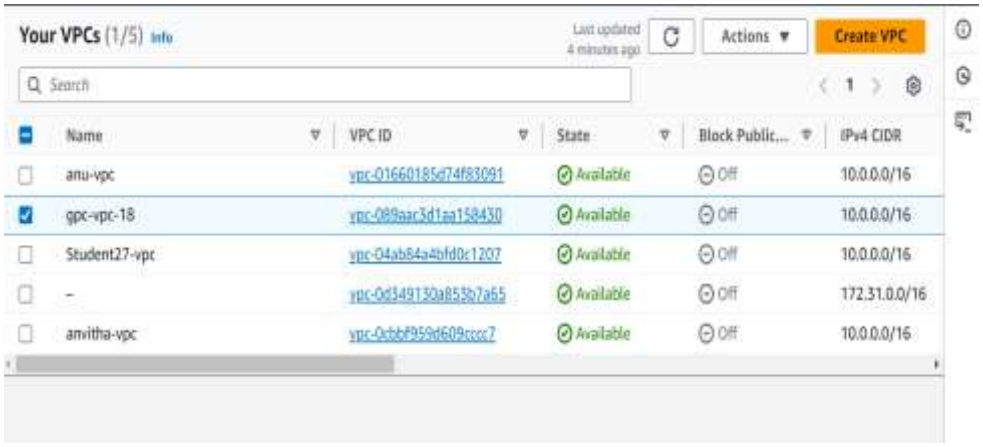

Figure 5.1.1

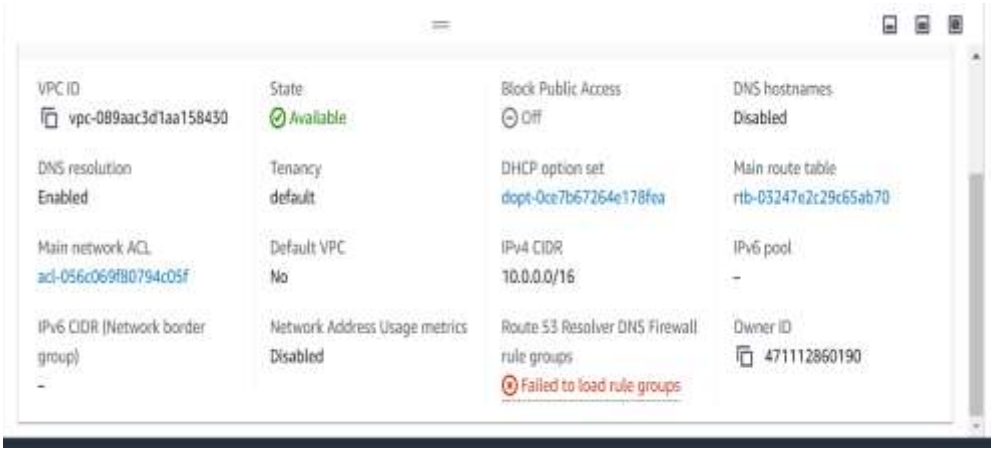

Figure 5.1.2

Step 2: Creating Internet Gateway (IGW)

- In the VPC Dashboard, select **Internet Gateways**.
- Click **Create internet gateway**, give it a name, and then attach it to your VPC.eee
- After creating the IGW, select it and choose **Attach to VPC**.

Figure 5.1

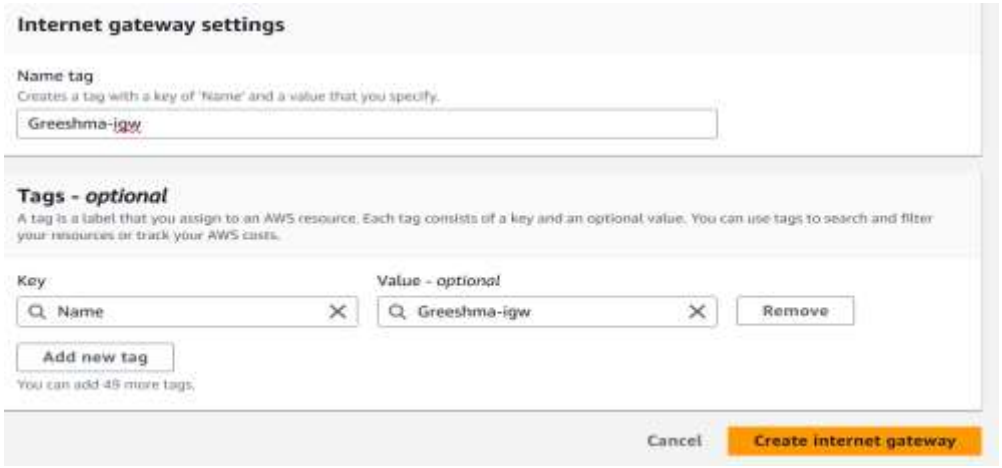

Figure 5.1.4

Step 3.Add Subnets

- Go to **Subnets** in the VPC Dashboard.
- Select **Create Subnet** and provide the following details:
  - **VPC ID**: Select the VPC you just created.
  - **Subnet name**: Give your subnet a name.
  - **Availability Zone**: Choose a specific zone or let AWS select.
  - **CIDR block**: A subset of the VPC CIDR range (e.g., `10.0.1.0/24`).

Repeat the process for create multiple subnets (public and private).

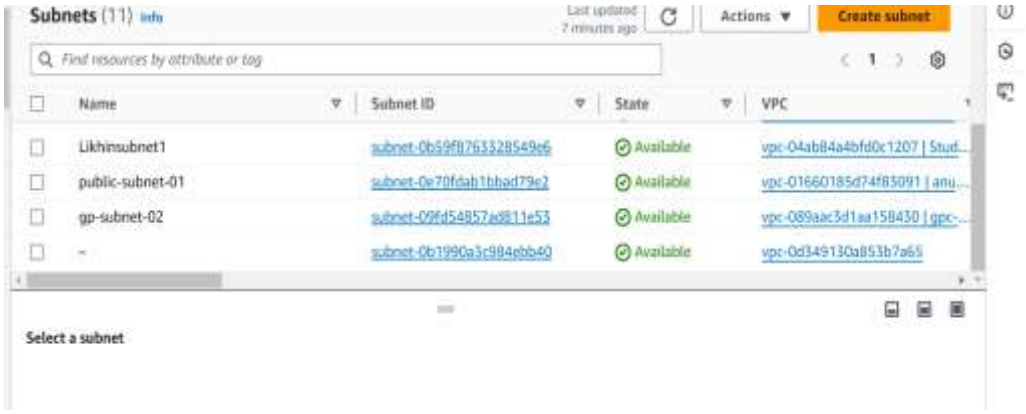

Figure 5.1.5

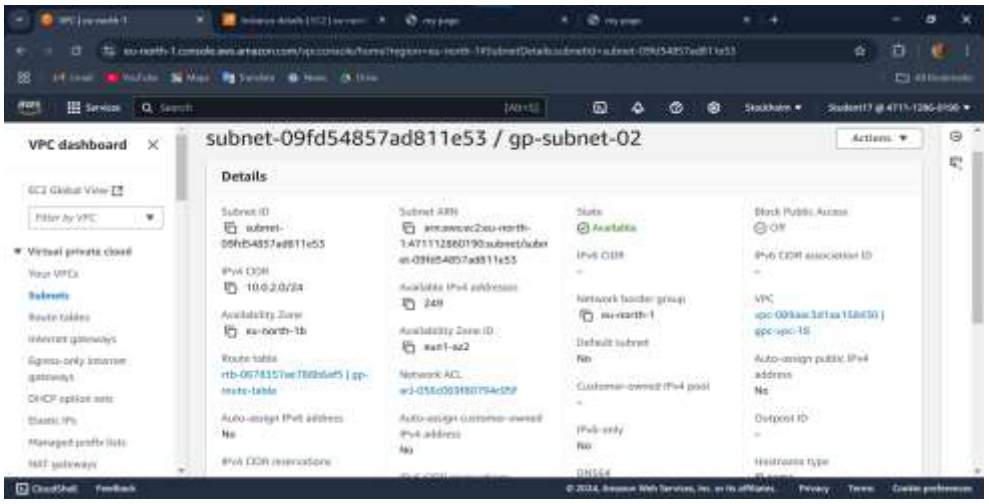

Figure 5.1.6

Step4: Set up Route Tables

- Go to **Route Tables** in the VPC Dashboard.
- Select **Create route table** and associate it with your VPC.
- Add routes:
    - For public subnets, add a route with the destination `0.0.0.0/0` (for IPv4) or `::/0` (for IPv6) and target the IGW.

Associate the route table with the public subnets.

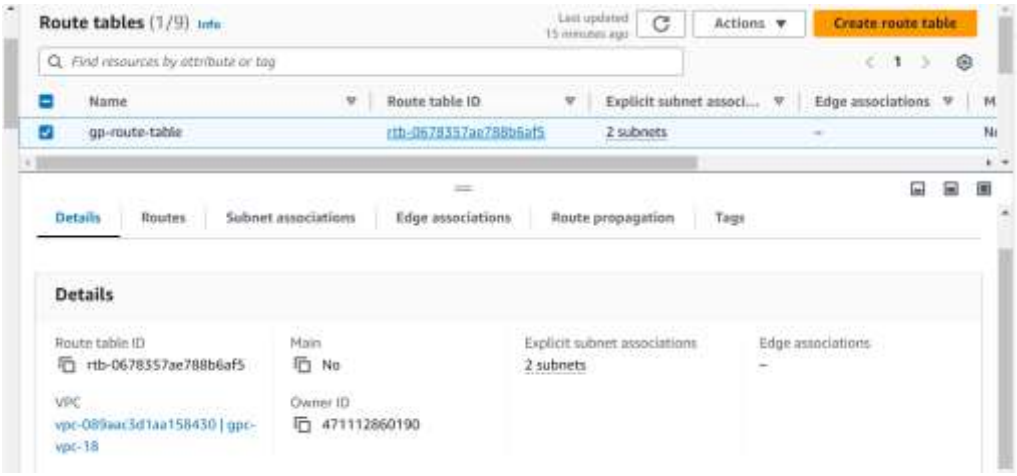

Figure 5.1.7

In a route table we edit the routes.

First go to edit routes. Choose add next add 0.0.0.0/0 and choose the internet gateway

Add you're created IGW

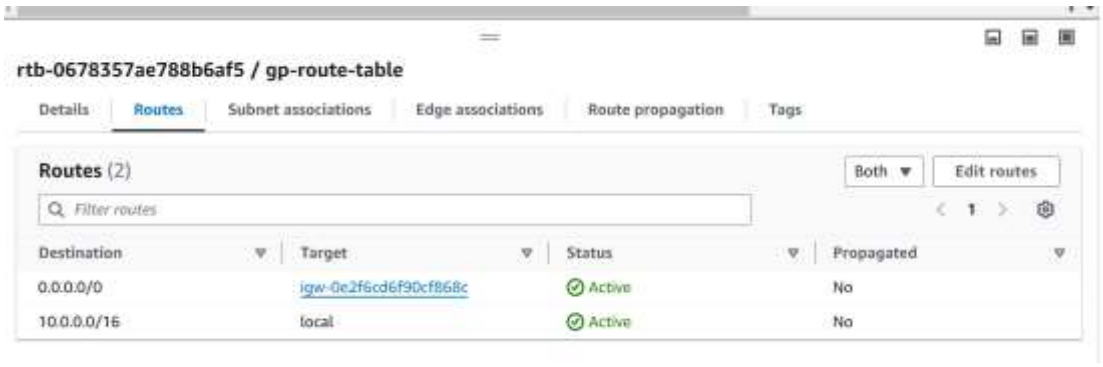

Figure 5.1.8

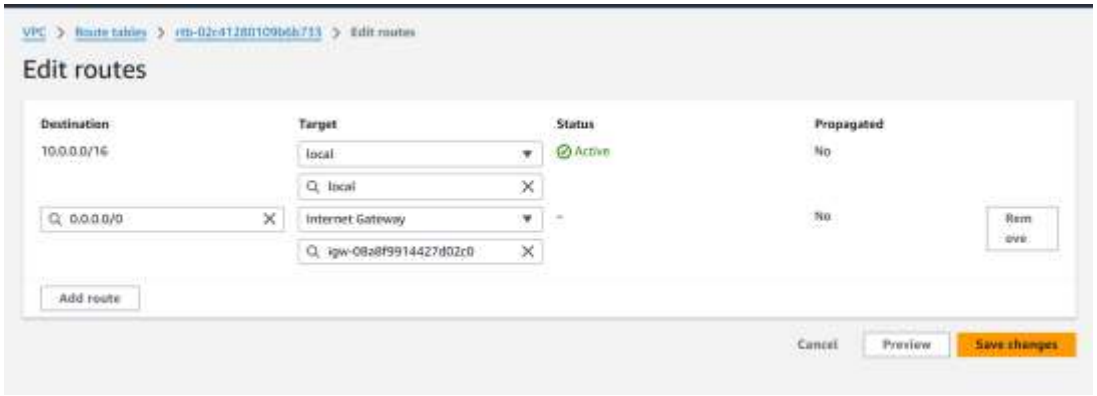

Figure 5.1.9

In a route table we edit the Subnet associations

First go to edit choose the 2 subnet we already created. Checked on it.

Click save associations.

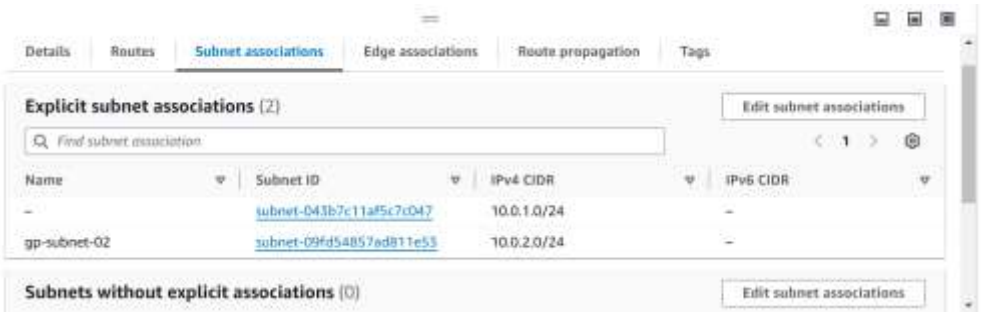

Figure 5.1.10

Create and Launch Resources

Your VPC is now ready. You can launch EC2 instances or other resources within the subnets of your VPC.

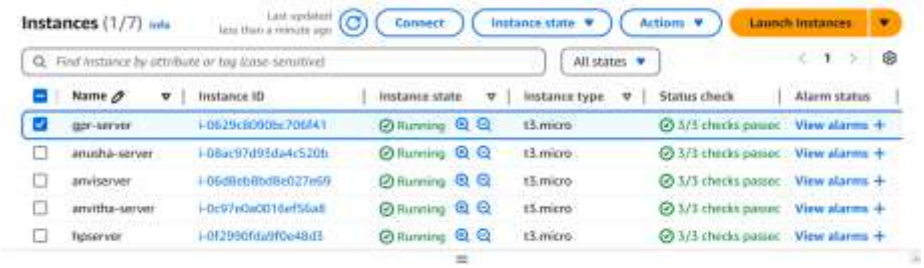

Figure 5.1.11

Figure 5.1.12

In this command prompt we install server and uploading webpage to the server.

Figure 5.1.13

Figure 5.1.14

After uploading copy the public IP to the web browser.

Figure 5.1.15

5.2 How to download and run the project from Github

Clone the Git Hub Repository

1. **Get the Repository URL**:
    - Go to the Git Hub repository page you want to download.
    - Click the green **Code** button and copy the URL (e.g., `https://github.com/username/repo.git`).
2. **Open a Terminal/Command Prompt**:
    - Navigate to the directory where you want to download the repository.

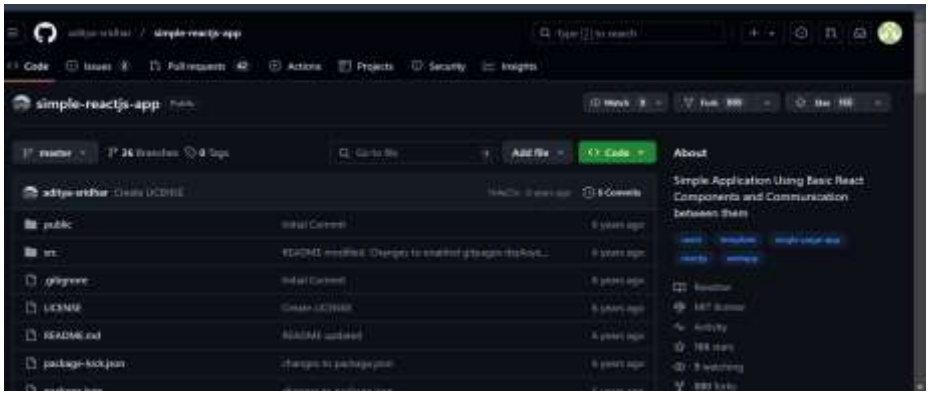

Figure 5.2.1

Check for files like README.md, INSTALL.md, or any other documentation in the root directory of the repository. These files often provide detailed instructions

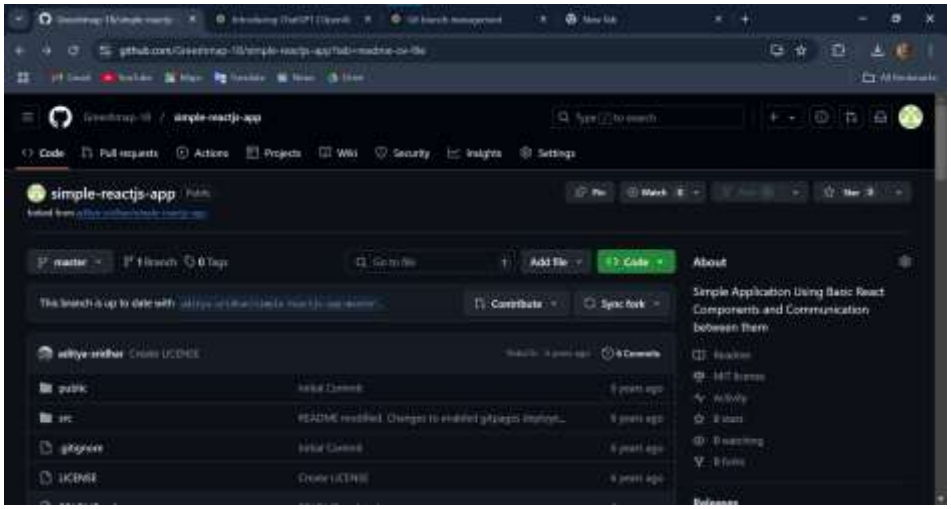

Figure 5.2.2

For Node.js Projects:

- **Install Node.js and npm.**

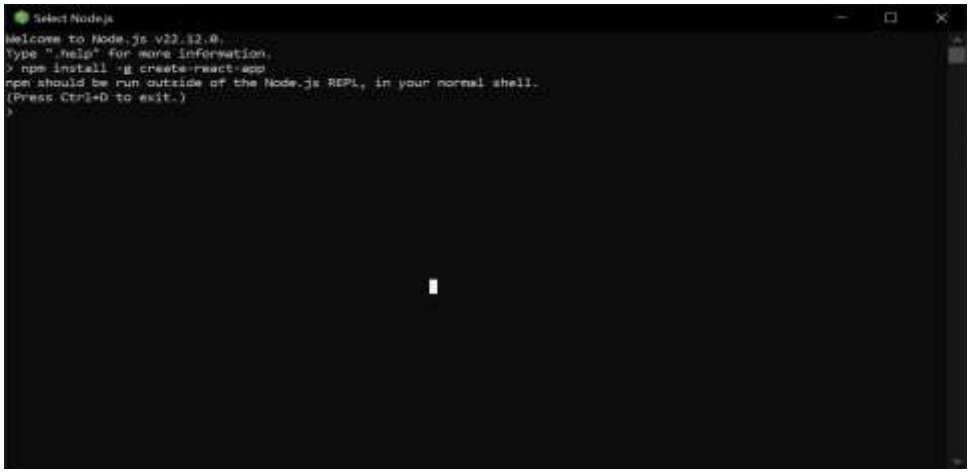

Figure 5.2.3

Figure 5.2.4

Figure 5.2.5

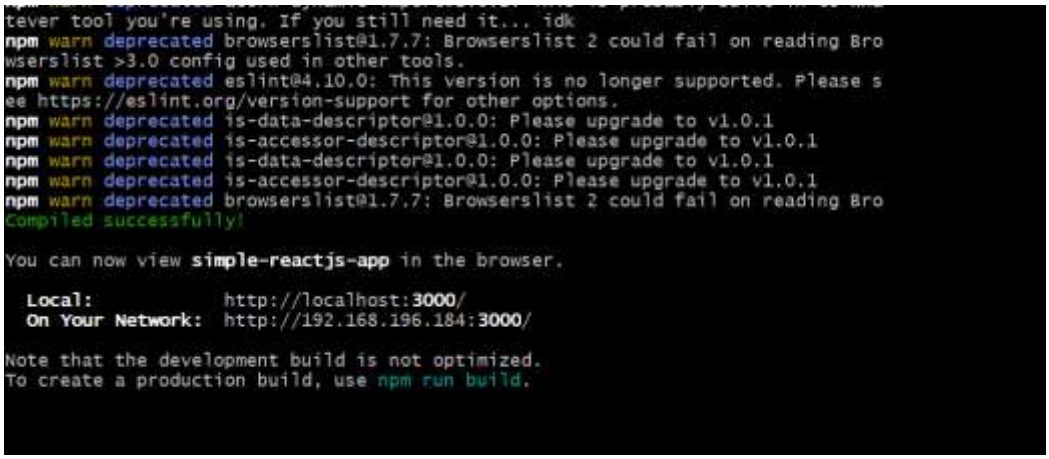

Figure 5.2.6

Figure 5.2.7

CHAPTER 6

CONCLUSION

AWS and DevOps together represent a transformative approach to building, deploying, and managing applications in the modern era. AWS provides the scalable, flexible, and reliable infrastructure necessary to support DevOps practices, while DevOps drives the cultural shift and technological automation required for rapid development and deployment. By integrating AWS's vast range of services with DevOps methodologies such as CI/CD, containerization, and infrastructure as code, organizations can achieve unparalleled efficiency, agility, and resilience in software delivery.

This synergy empowers businesses to innovate faster, enhance collaboration across teams, and ensure application reliability while minimizing operational overhead. AWS’s robust ecosystem of services complements the dynamic nature of DevOps, enabling teams to adapt quickly to changing market demands and maintain a competitive edge in today’s digital-first world. Ultimately, AWS and DevOps together provide a foundation for continuous improvement, scalability, and sustainable growth.

CHAPTER 7

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