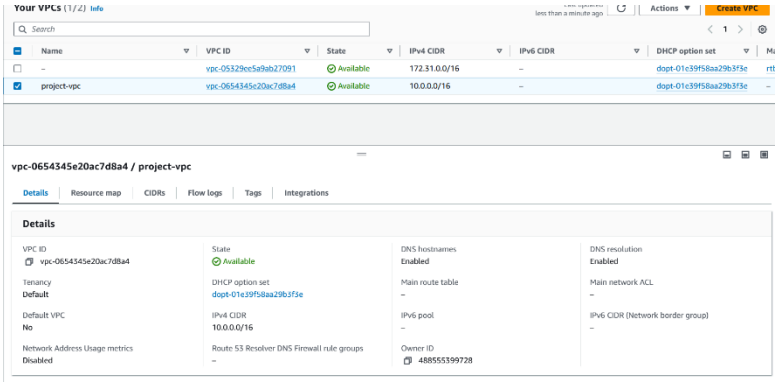
Project 1: "Building a Scalable and Secure Web Application on AWS"

Week 1: Setting Up the Foundation

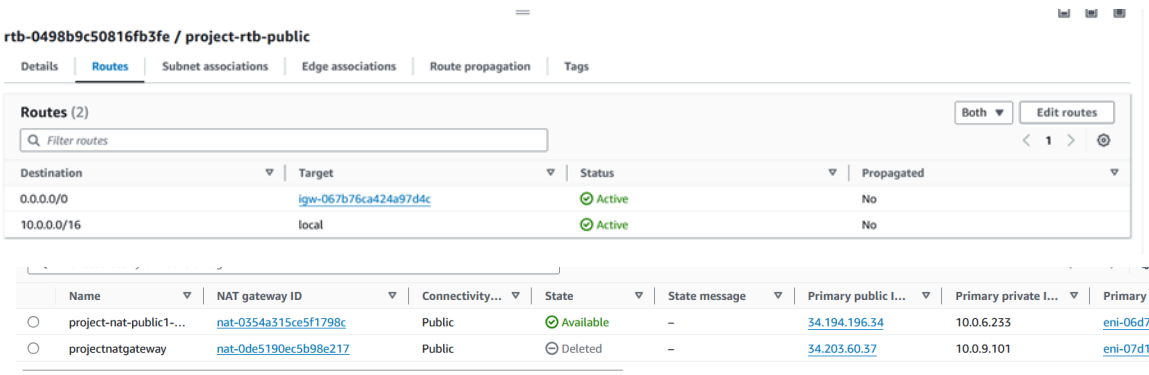
- Task: Set up the AWS environment and resources

Deliverables:

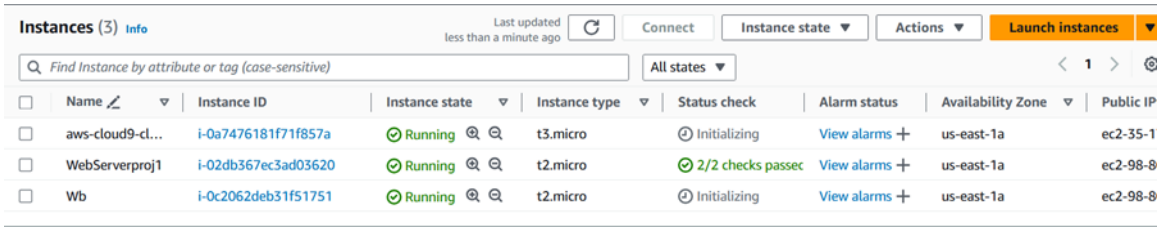
- Create a Virtual Private Cloud (VPC) with public and private subnets



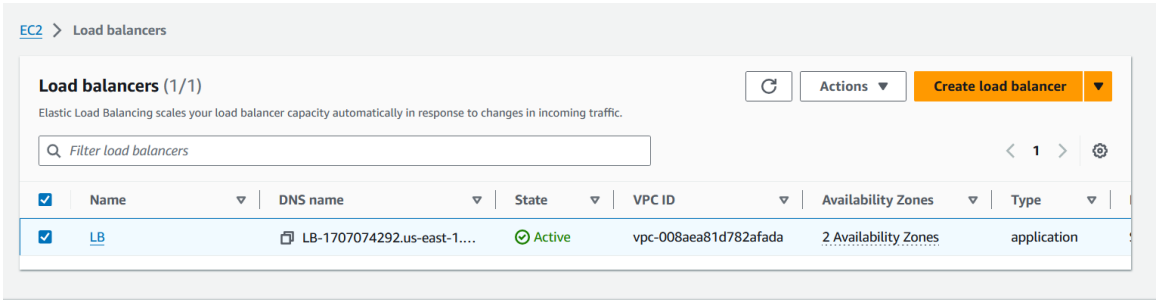
- Configure Internet Gateway and NAT Gateway for secure access.

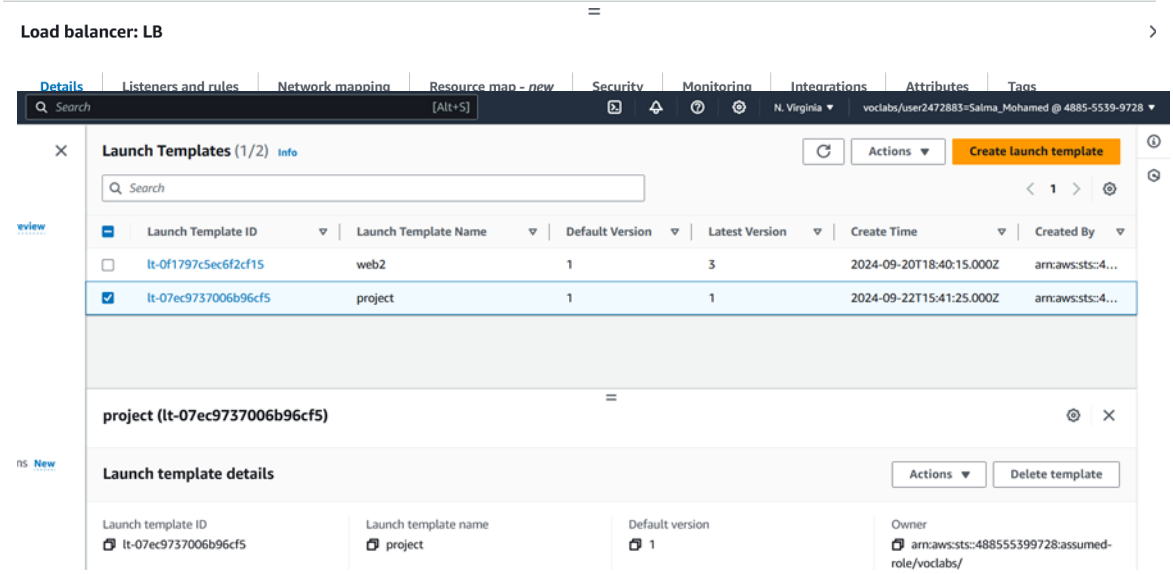


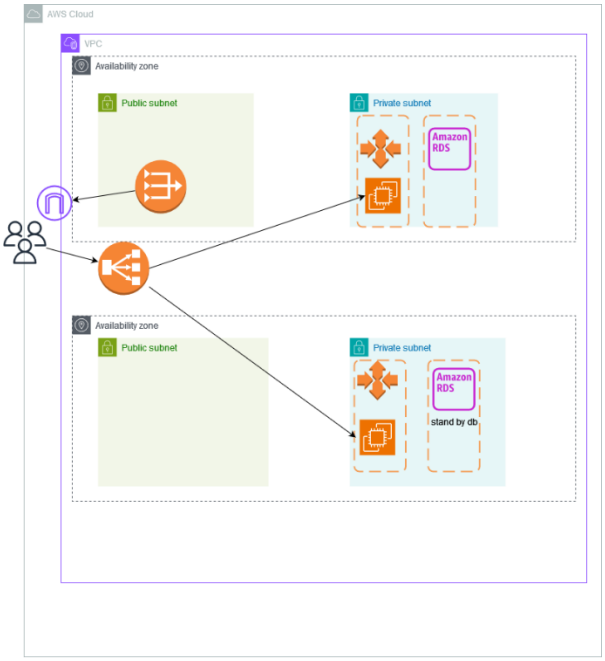
- Define Security Groups and Network ACLs for network traffic control.
  - ✓ I add in the security group 2 rules one for allowing ssh port 22 and one for http port 80
- Install and configure Amazon EC2 instances in public and private subnets.
  - ✓ First I created the Wb instance
  - ✓ And I put the ip on the browser and checked if the site work



- Set up Elastic Load Balancing (ELB) and Auto Scaling groups.
  - ✓ First, I launched an AMI template
  - ✓ Second, Using the Template I created an Auto Scaling Group
  - ✓ Choosed a target tracking policy
  - ✓ Then, I created a load balancer





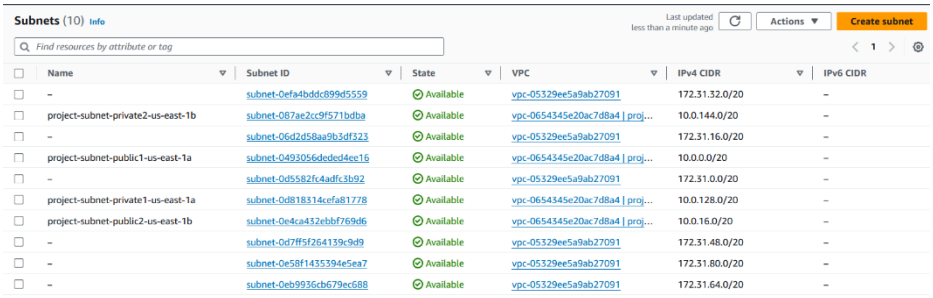


Week 2: Deploying the Application and Database

Task: Deploy a sample web application and set up a database.

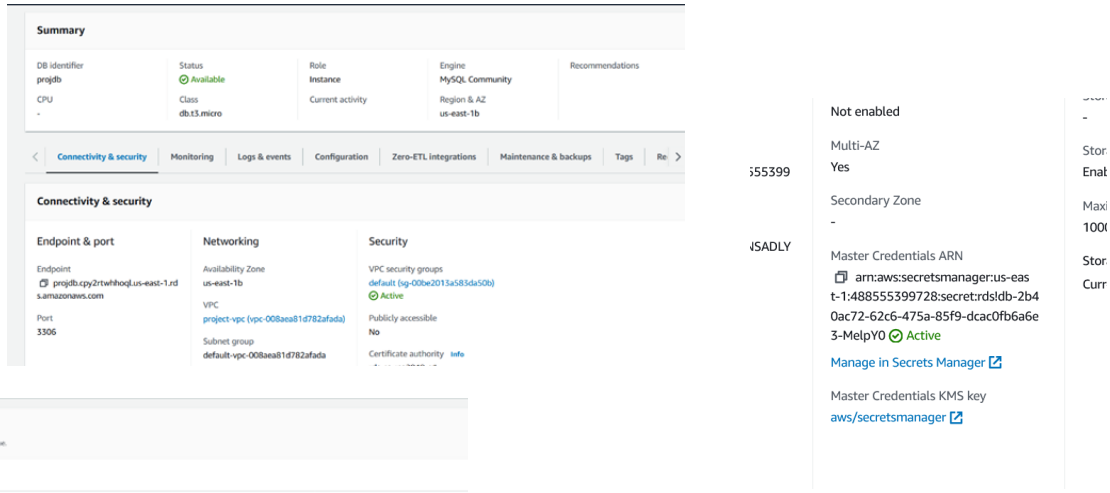
Deliverables:

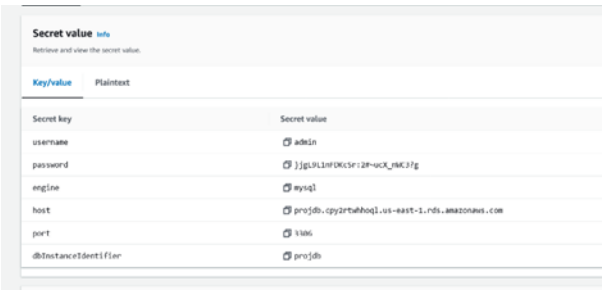
- Launch a multi-tier application with web servers and application servers.
- Use Amazon RDS for setting up a relational database (e.g., MySQL or
- PostgreSQL).
- ~~Integrate Amazon S3 for storing static content.~~
- ~~Implement IAM roles and policies for secure access management.~~

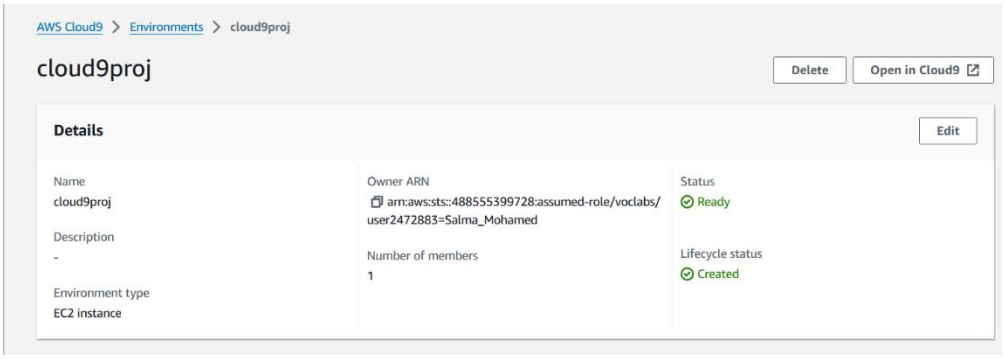


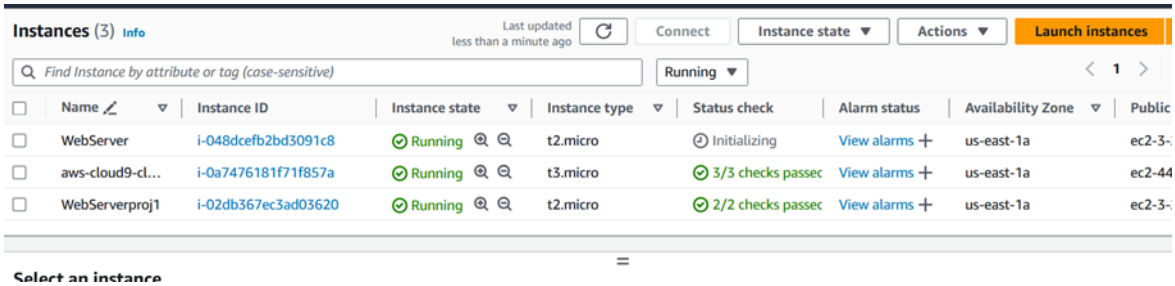
✓ Create RDS choosing mysql as engine and choosing RDS to be Multi-AZ Deployment to be highly available

- ✓ RDS credentials I choose to put them in Secrets Manager
- ✓ I created an cloud9 environment for interacting with EC2
- ✓ I created new instance
- ✓ Then data migration phase [Commands were runned in cloud9]
  - **Export the Data from EC2 Instance→** mysqldump -h <EC2instancePrivateip> -u nodeapp -p --databases STUDENTS > data.sql
  - **Import the Data into the RDS Database →** mysql -h <RDSEndpoint> -u nodeapp -p STUDENTS < data.sql
  - **Verify Data Import into RDS →** mysql -h <RDSEndpoint> -u nodeapp -p STUDENTS
  - **SHOW TABLES;SELECT * FROM <tablename>;**










```
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 855
Server version: 8.0.35 Source distribution

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| STUDENTS           |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.00 sec)

mysql> exit;
Bye
```

~~Week 3: Enhancing Security and Compliance~~ (I didn't use them~~)~~

~~Task: Implement security and monitoring tools~~

~~Deliverables:~~

- ~~Configure AWS Identity and Access Management (IAM) for fine-~~
- ~~grained access control.~~
- ~~Implement AWS WAF, AWS Shield, and AWS Certificate Manager~~
- ~~(ACM) for enhanced security.~~
- ~~Set up Amazon CloudWatch, AWS CloudTrail, and AWS Config for~~
- ~~monitoring and logging.~~
- ~~Use AWS Trusted Advisor for security and compliance checks.~~
- ~~Presentation: Security strategies and compliance measures implemented.~~

Week 4: Optimizing Performance and Cost

Task: Optimize the application for performance and cost.

Deliverables:

- ~~Implement Amazon CloudFront for content delivery and caching~~.
- Use AWS Cost Explorer and AWS Budgets for cost management.
- Configure AWS Auto Scaling for dynamic scaling based on demand.(created in previous step)
- Perform a Well-Architected Review to identify areas for optimization.

Estimate summary

Upfront cost	Monthly cost	Total 12 months cost
0.00 USD	254.62 USD	3,055.44 USD Includes upfront cost

Detailed Estimate

Name	Group	Region	Upfront cost	Monthly cost
Elastic Load Balancing	No group applied	US East (N. Virginia)	0.00 USD	57.39 USD
Status: - **Description**: **Config summary**: Number of Application Load Balancers (1)				
Amazon EC2	No group applied	US East (N. Virginia)	0.00 USD	20.29 USD
Status: - **Description**: **Config summary**: Tenancy (Shared Instances), Operating system (Ubuntu Pro), Workload (Consistent, Number of instances: 2), Advance EC2 instance (t3.micro), Pricing strategy (On-Demand Utilization: 100 %Utilized/Month), Enable monitoring (disabled), DT Inbound: Not selected (0 TB per month), DT Outbound: Not selected (0 TB per month), DT Intra-Region: (0 TB per month)				
Amazon Virtual Private Cloud (VPC)	No group applied	US East (N. Virginia)	0.00 USD	38.75 USD
Status: - **Description**: **Config summary**: Working days per month (22) Number of NAT Gateways (1) Number of In-use public IPv4 addresses (1)				
Amazon Elastic Block Store (EBS)	No group applied	US East (N. Virginia)	0.00 USD	8.99 USD
Status: - **Description**: **Config summary**: Number of volumes (1), Average duration each instance runs (730 hours per month), Storage amount per volume (30 GB), Snapshot Frequency (2x Daily), Amount changed per snapshot (3 GB)				
AWS Data Transfer	No group applied	US East (N. Virginia)	0.00 USD	4.00 USD
Status: - **Description**: **Config summary**: DT Inbound: All other regions (20 TB per month), DT Outbound: US East (Ohio) (200 GB per month), DT Intra-Region: (100 GB per month), Data transfer cost (4)				
Amazon RDS for MySQL	No group applied	US East (N. Virginia)	0.00 USD	125.20 USD