

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

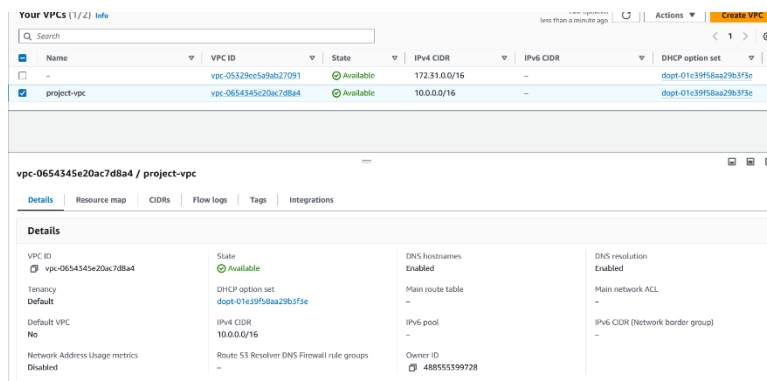


## Week 1: Setting Up the Foundation

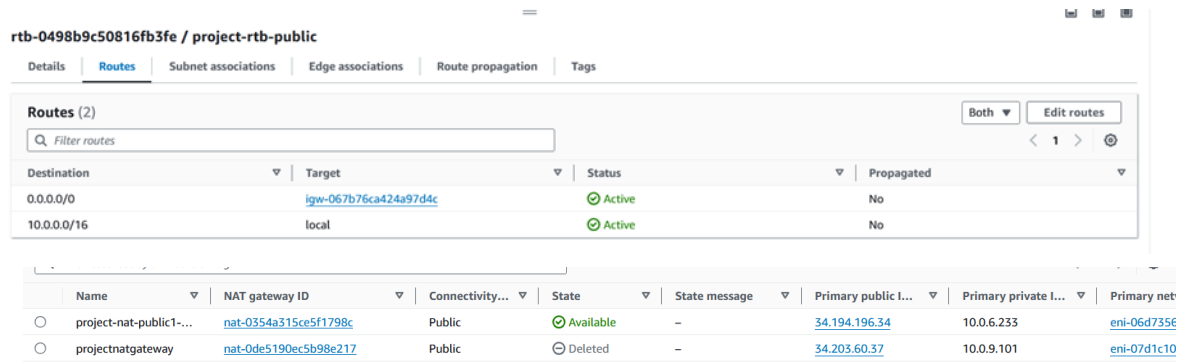
- Task: Set up the AWS environment and resources

Deliverables:

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

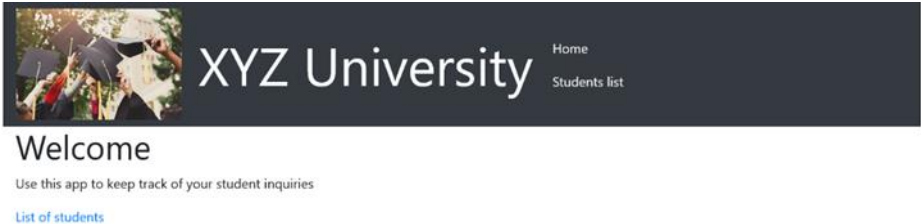


- Configure Internet Gateway and NAT Gateway for secure access.



- 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

Instances (3) Info								
Find Instance by attribute or tag (case-sensitive)				All states				
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
<input type="checkbox"/>	aws-cloud9-cl...	i-0a7476181f71f857a	Running	t3.micro	Initializing	View alarms +	us-east-1a	ec2-35-1
<input type="checkbox"/>	WebServerproj1	i-02db367ec3ad03620	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1a	ec2-98-8
<input type="checkbox"/>	Wb	i-0c2062deb31f51751	Running	t2.micro	Initializing	View alarms +	us-east-1a	ec2-98-8

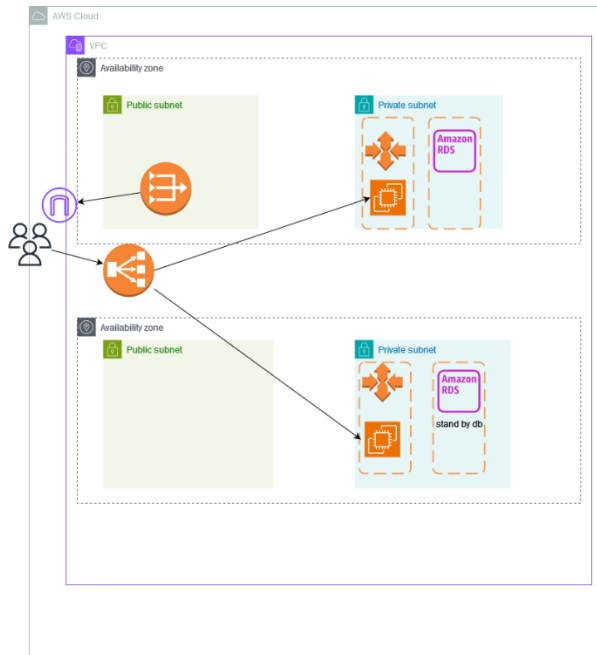


- Set up Elastic Load Balancing (ELB) and Auto Scaling groups.
  - ✓ First, I launched an AMI template
  - ✓ Second, Using the Template I created an Auto Scaling Group
  - ✓ Chooosed a target tracking policy
  - ✓ Then, I created a load balancer

EC2 > Load balancers							
Load balancers (1/1)							
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.							
Filter load balancers							
<input checked="" type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	
<input checked="" type="checkbox"/>	LB	LB-1707074292.us-east-1....	Active	vpc-008aea81d782afada	2 Availability Zones	application	

Load balancer: LB

Launch Templates (1/2) Info							
Search							
<input type="checkbox"/>	Launch Template ID	Launch Template Name	Default Version	Latest Version	Create Time	Created By	
<input type="checkbox"/>	lt-0f1797c5ec6f2cf15	web2	1	3	2024-09-20T18:40:15.000Z	arn:aws:sts:4...	
<input checked="" type="checkbox"/>	lt-07ec9737006b96cf5	project	1	1	2024-09-22T15:41:25.000Z	arn:aws:sts:4...	
project (lt-07ec9737006b96cf5)							
Launch template details							
Launch template ID		Launch template name		Default version		Owner	
lt-07ec9737006b96cf5		project		1		arn:aws:sts:488555399728:assumed-role/voclabs/	



## 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.~~

Subnets (10) Info							Last updated less than a minute ago	Actions	Create subnet
Find resources by attribute or tag							< 1 > @		
<input type="checkbox"/>	Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR			
<input type="checkbox"/>	-	subnet-0ef4bdc899d5559	Available	vpc-05329ee5a9ab27091	172.31.32.0/20	-			
<input type="checkbox"/>	project-subnet-private2-us-east-1b	subnet-087ae2cc9f571bd8a	Available	vpc-0654345e20ac7d8a4   proj...	10.0.144.0/20	-			
<input type="checkbox"/>	-	subnet-06d2d58aa9b3df323	Available	vpc-05329ee5a9ab27091	172.31.16.0/20	-			
<input type="checkbox"/>	project-subnet-public1-us-east-1a	subnet-0493056deded4ec16	Available	vpc-0654345e20ac7d8a4   proj...	10.0.0.0/20	-			
<input type="checkbox"/>	-	subnet-0d5582f64adfc3b92	Available	vpc-05329ee5a9ab27091	172.31.0.0/20	-			
<input type="checkbox"/>	project-subnet-private1-us-east-1a	subnet-0d818314cef81778	Available	vpc-0654345e20ac7d8a4   proj...	10.0.128.0/20	-			
<input type="checkbox"/>	project-subnet-public2-us-east-1b	subnet-0edca432ebbf769d6	Available	vpc-0654345e20ac7d8a4   proj...	10.0.16.0/20	-			
<input type="checkbox"/>	-	subnet-0d77ff5f264139c9d9	Available	vpc-05329ee5a9ab27091	172.31.48.0/20	-			
<input type="checkbox"/>	-	subnet-0e58f1435394e5ea7	Available	vpc-05329ee5a9ab27091	172.31.80.0/20	-			
<input type="checkbox"/>	-	subnet-0eb9936cb679ec688	Available	vpc-05329ee5a9ab27091	172.31.64.0/20	-			

- ✓ 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>;**

**Summary**

DB identifier projdb	Status Available	Role Instance	Engine MySQL Community	Recommendations
CPU -	Class db.t3.micro	Current activity	Region & AZ us-east-1b	

< **Connectivity & security** | Monitoring | Logs & events | Configuration | Zero-ETL integrations | Maintenance & backups | Tags | Re >

**Connectivity & security**

<b>Endpoint &amp; port</b>	<b>Networking</b>	<b>Security</b>
Endpoint projdb.cpy2rtwhqoj.us-east-1.rds.amazonaws.com	Availability Zone us-east-1b	VPC security groups default (sg-00ba2013a581da50b)
Port 3306	VPC project-vpc (vpc-00baea81d782afada)	Active
	Subnet group default-vpc-00baea81d782afada	Publicly accessible No
		Certificate authority info

55399

JSADLY

Not enabled

Multi-AZ

Yes

Secondary Zone

-

Master Credentials ARN

arn:aws:secretsmanager:us-east-1:488555399728:secret:rdsldb-2b40ac72-62c6-475a-85f9-dcac0fb6a6e3-MelpYQ Active

[Manage in Secrets Manager](#)

Master Credentials KMS key

[aws/secretsmanager](#)

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**Secret value** info

Retrieve and view the secret value.

Key/value	Plaintext
Secret key	Secret value
username	admin
password	jjjgUL1nF0Kc5r12P-wcLgMK37g
engine	mysql
host	projdb.cpy2rtwhqoj.us-east-1.rds.amazonaws.com
port	3306
dbInstanceIdentifier	projdb

AWS Cloud9 > Environments > cloud9proj

**cloud9proj** Delete Open in Cloud9

**Details** Edit

Name cloud9proj	Owner ARN arn:aws:sts::488555399728:assumed-role/voclabs/user2472883=Salma_Mohamed	Status Ready
Description -	Number of members 1	Lifecycle status Created
Environment type EC2 instance		

Instances (3) [Info](#)

Last updated  
less than a minute ago

Connect

Instance state ▾

Actions ▾

Launch instances

Find Instance by attribute or tag (case-sensitive)

Running ▾

< 1 >

<input type="checkbox"/>	Name <a href="#">↗</a> ▾	Instance ID	Instance state ▾	Instance type ▾	Status check	Alarm status	Availability Zone ▾	Public
<input type="checkbox"/>	WebServer	i-048dcefb2bd3091c8	<div><div></div>Running <a href="#">🔍</a> <a href="#">📄</a></div>	t2.micro	<div><div></div>Initializing <a href="#">🔍</a></div>	<a href="#">View alarms +</a>	us-east-1a	ec2-3-
<input type="checkbox"/>	aws-cloud9-cl...	i-0a7476181f71f857a	<div><div></div>Running <a href="#">🔍</a> <a href="#">📄</a></div>	t3.micro	<div><div></div>3/3 checks passed <a href="#">🔍</a></div>	<a href="#">View alarms +</a>	us-east-1a	ec2-44
<input type="checkbox"/>	WebServerproj1	i-02db367ec3ad03620	<div><div></div>Running <a href="#">🔍</a> <a href="#">📄</a></div>	t2.micro	<div><div></div>2/2 checks passed <a href="#">🔍</a></div>	<a href="#">View alarms +</a>	us-east-1a	ec2-3-

Select an instance

```

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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affiliates. Other names may be trademarks of their respective
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
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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
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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
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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
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