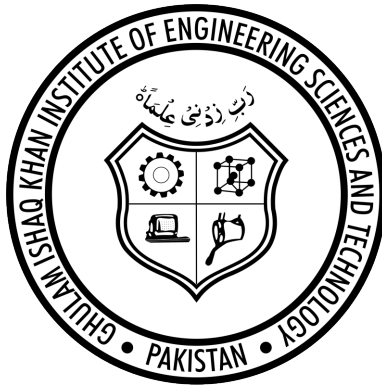


GHULAM ISHAQ KHAN INSTITUTE OF ENGINEERING SCIENCES AND TECHNOLOGY



Infrastructure As code using Terraform

CS423 (CS) DevOps - Assignment 4

Submitted By:

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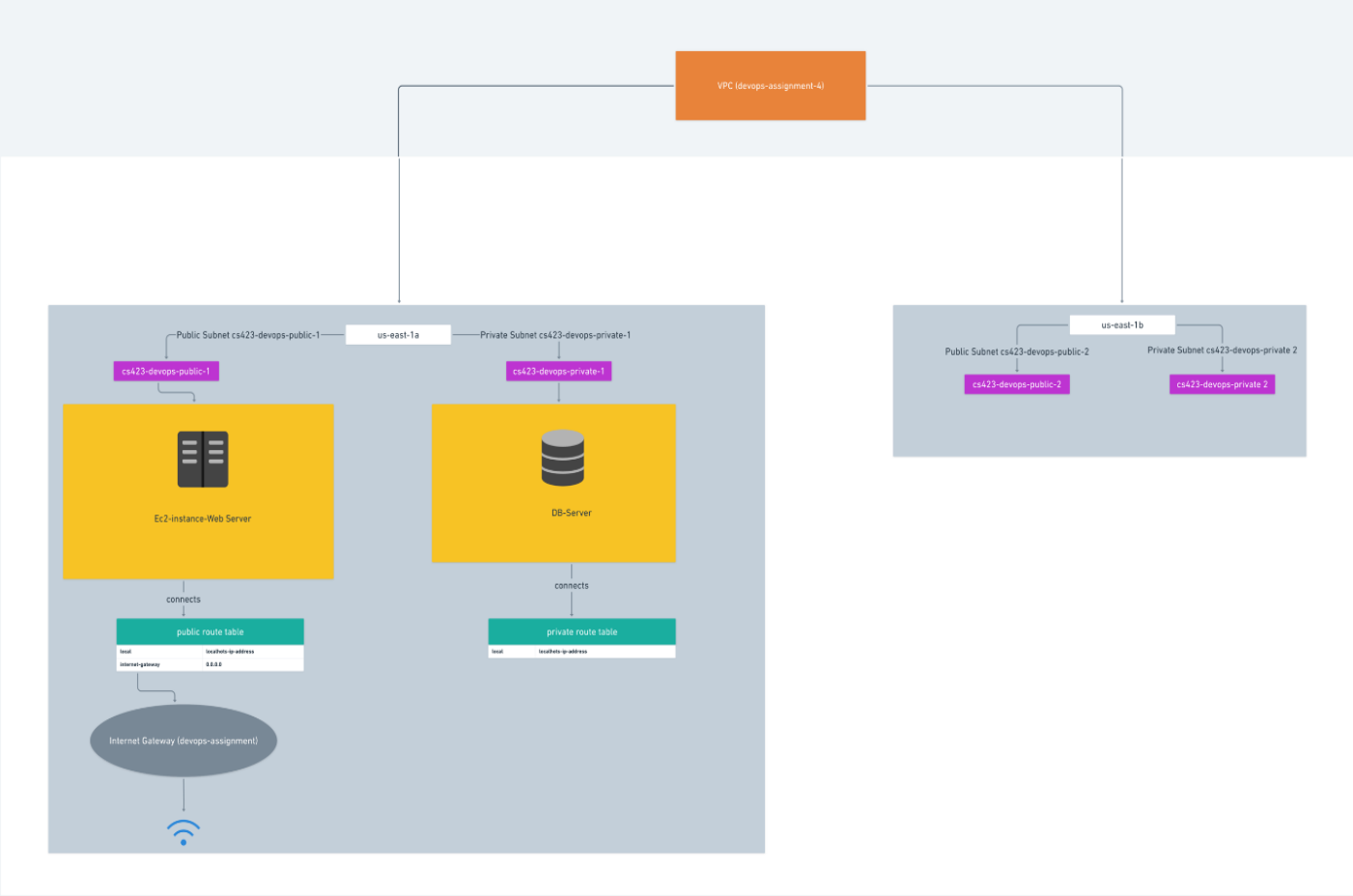
Submitted to:

Sir Sajid Ali

I. Introduction

This report presents the implementation of a web application infrastructure on AWS using Terraform. The infrastructure includes a Virtual Private Cloud (VPC), subnets across two Availability Zones, and EC2 instances for web server hosting. The purpose is to develop Terraform skills and demonstrate efficient infrastructure management through code.

II. Architecture Diagram



III. Task 1 - IAM User

An IAM user named 'terraform-cs423-devops2' is created with console access and assigned the Administrator policy. The user's credentials are securely encrypted using PGP for submission.

IV. Task 2 – Networking

VPC Creation: Created a VPC named 'devops-assignment-4' with a specified CIDR block.

Subnets: Established two pairs of public and private subnets across two Availability Zones.

Private Route Table: A route table for private subnets is configured to restrict internet access.

Internet Gateway: An internet gateway is created to provide internet access to public subnets.

V. Task 3 - Security Groups

A security group 'web-server-security-group' is created to control inbound/outbound traffic for EC2 instances. Opened ports 22 (SSH) and 80 (HTTP) following the principle of least privilege.

Details

Security group name

web-server-security-group

Security group ID

sg-08cf8f8e3db6aa961

Description

Security group for the web server

VPC ID

vpc-085ab8691b81cc790

Owner

497937969152

Inbound rules count

2 Permission entries

Outbound rules count

1 Permission entry

Inbound rules

Outbound rules

Tags

Inbound rules (2)

Manage tags

Edit inbound rules

Q Search

< 1 > ⓘ

<input type="checkbox"/>	Name	Security group rule...	IP version	Type	Protocol	Port range	Source	Description
<input type="checkbox"/>	-	sgr-07511800898e32...	IPv4	SSH	TCP	22	10.1.156.90/32	-
<input type="checkbox"/>	-	sgr-06f7a1c9b935a3423	IPv4	HTTP	TCP	80	0.0.0.0/0	-

VI. Task 4 - Key Pair and EC2 Instances

Key Pair: A secure key pair 'cs423-assignment4-key' is generated for secure SSH access.

EC2 Instances: Launched two t2.micro EC2 instances. One configured for Apache web server, the other for database.

Find Instance by attribute or tag (case-sensitive)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
Assignment4-...	i-028119e1bc5ce63a7	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1a	-	34.205.62.74
Assignment4-...	i-0f8a9ae08f50573ff	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1a	-	-

stance: i-028119e1bc5ce63a7 (Assignment4-EC2-1)

tails

Status and alarms

Monitoring

Security

Networking

Storage

Tags

Instance summary

Instance ID

i-028119e1bc5ce63a7 (Assignment4-EC2-1)

Public IPv4 address

34.205.62.74

open address

Instance state

Running

Private IP DNS name (IPv4 only)

ip-10-0-1-124.ec2.internal

Instance type

t2.micro

VPC ID

vpc-085ab8691b81cc790 (devops-assignment-4)

Subnet ID

subnet-05d2a366e621a2abc (cs423-devops-public-1)

Private IPv4 addresses

10.0.1.124

Public IPv4 DNS

-

Elastic IP addresses

-

AWS Compute Optimizer finding

Opt-in to AWS Compute Optimizer for recommendations.

Learn more

Auto Scaling Group name

-

VII. Task 5 – Outputs

Outputs are defined to display public/private IP addresses of EC2 instances and IAM user details.

```
aws_security_group.web_server_sg: Modifying... [id=sg-08cf8f8e3db6aa961]
aws_security_group.web_server_sg: Modifications complete after 3s [id=sg-08cf8f8e3db6aa961]

Apply complete! Resources: 0 added, 1 changed, 0 destroyed.

Outputs:

credentials = <sensitive>
database_instance_private_ip = "10.0.4.82"
database_instance_public_ip = ""
iam_user_details = {
  "arn" = "arn:aws:iam::497937969152:user/terraform-cs423-devops"
  "force_destroy" = false
  "id" = "terraform-cs423-devops"
  "name" = "terraform-cs423-devops"
  "path" = "/"
  "permissions_boundary" = ""
  "tags" = tomap({})
  "tags_all" = tomap({})
  "unique_id" = "AIDAXH33KOAANCLX75J2B"
}
web_server_instance_private_ip = "10.0.1.124"
web_server_instance_public_ip = "34.205.62.74"
warda@warda-Lenovo-IdeaPad-C340-14IWL:~/Desktop/devops-assignment4-2020517-2020519/terraform$
```

VIII. Conclusion

This Terraform project successfully deploys a web application infrastructure on AWS. Detailed tasks ensure proper networking, security, and resource deployment. Instructions facilitate easy deployment and testing.