GHULAM ISHAQ KHAN INSTITUTE OF
ENGINEERING SCIENCES AND TECHNOLOGY

Infrastructure As code using Terraform

CS423 (CS) DevOps - Assignment 4

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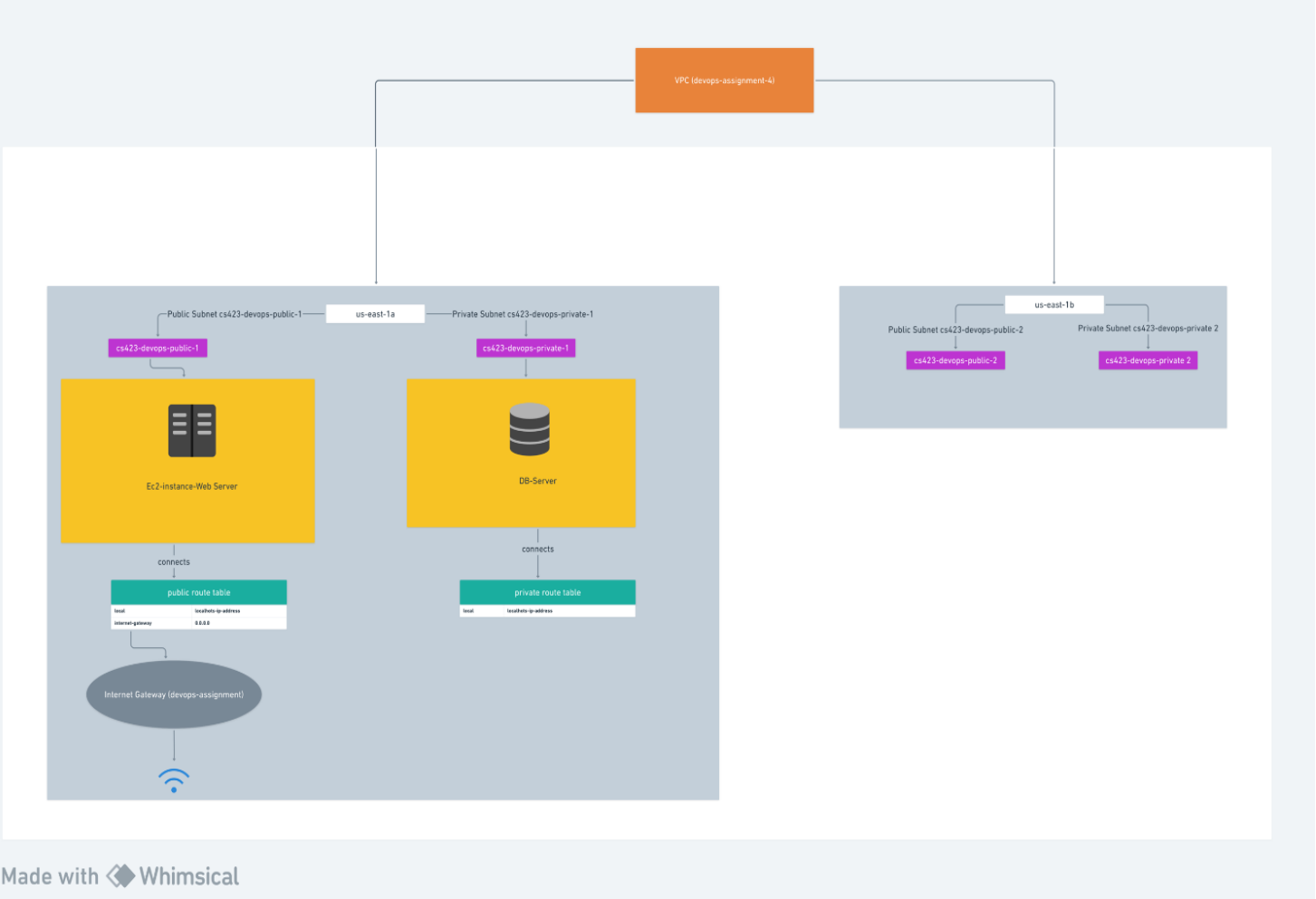
I. Introduction

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.

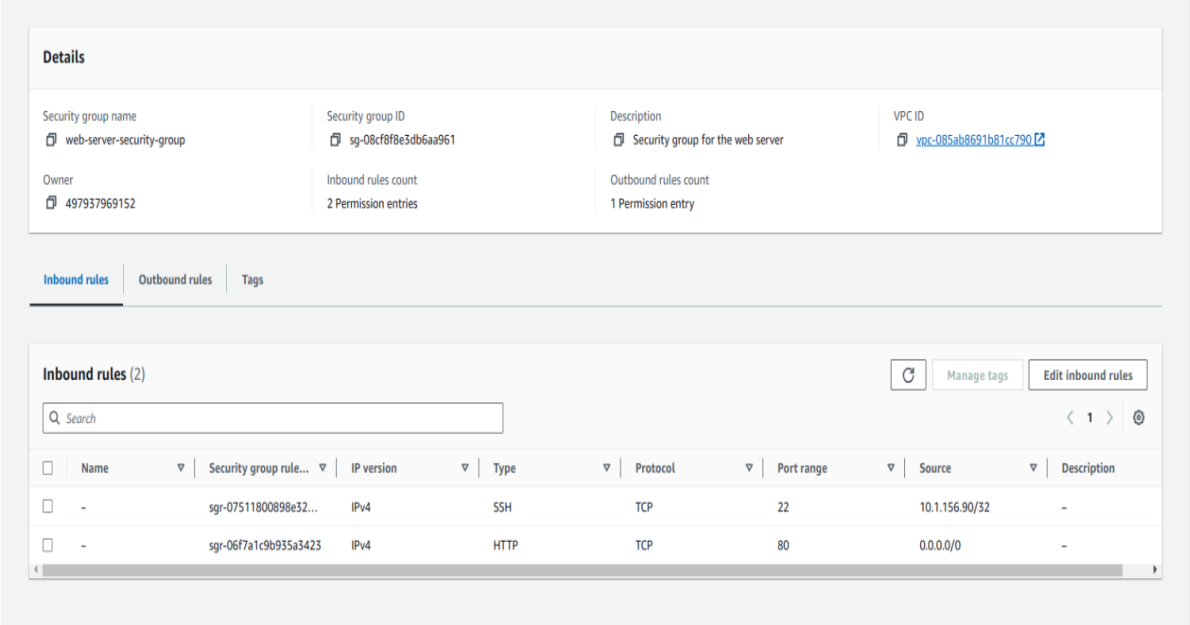
Subnets: Established two pairs of public and private subnets across two Availability Zones.

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

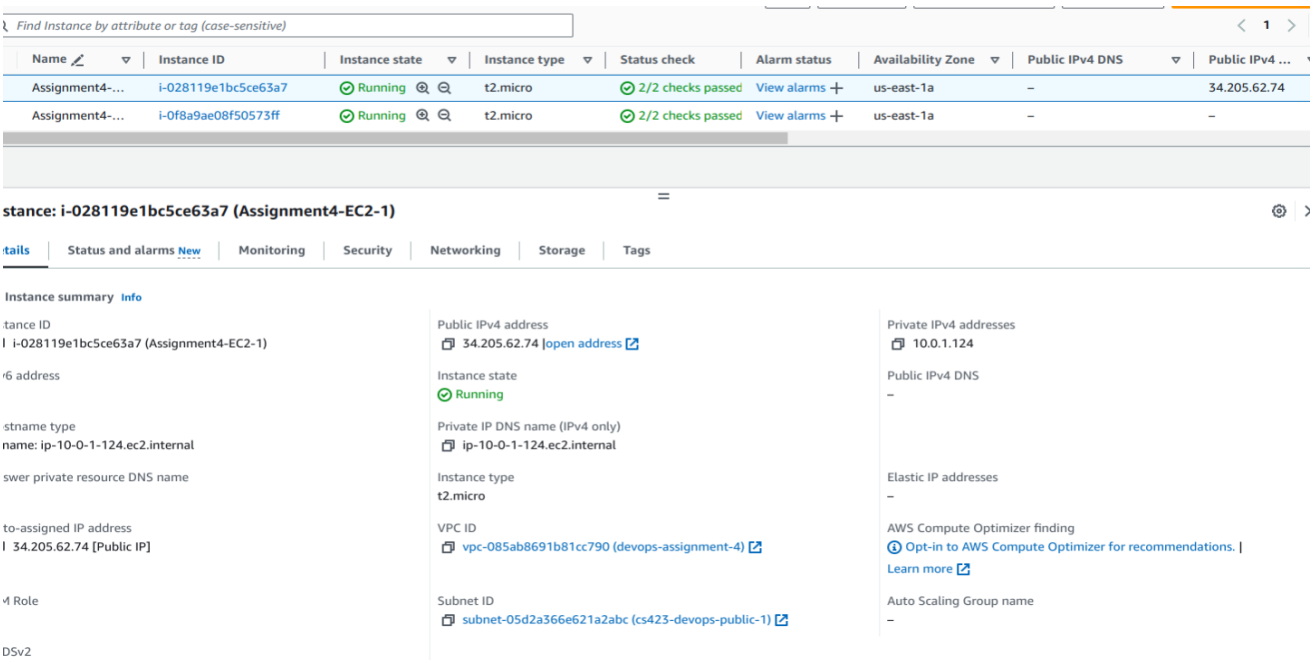
A security group 'web-server-security-group' is created to control inbound/outbound traffic for EC2 instances. Opened ports 22 (SSH) and 80 (HTTP) following the principle of least privilege.



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.



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.