DAY 1 (Duration: 8 Hours) [Level 2]

Category 2 - Networking and Security in Cloud

Total Marks - 150 Marks

1 PROJECT

1.1 CONTENTS

This Project proposal consists of the following document/file:

1.2 INTRODUCTION

The competition has a fixed start and finish time. You must decide how to best divide your time.

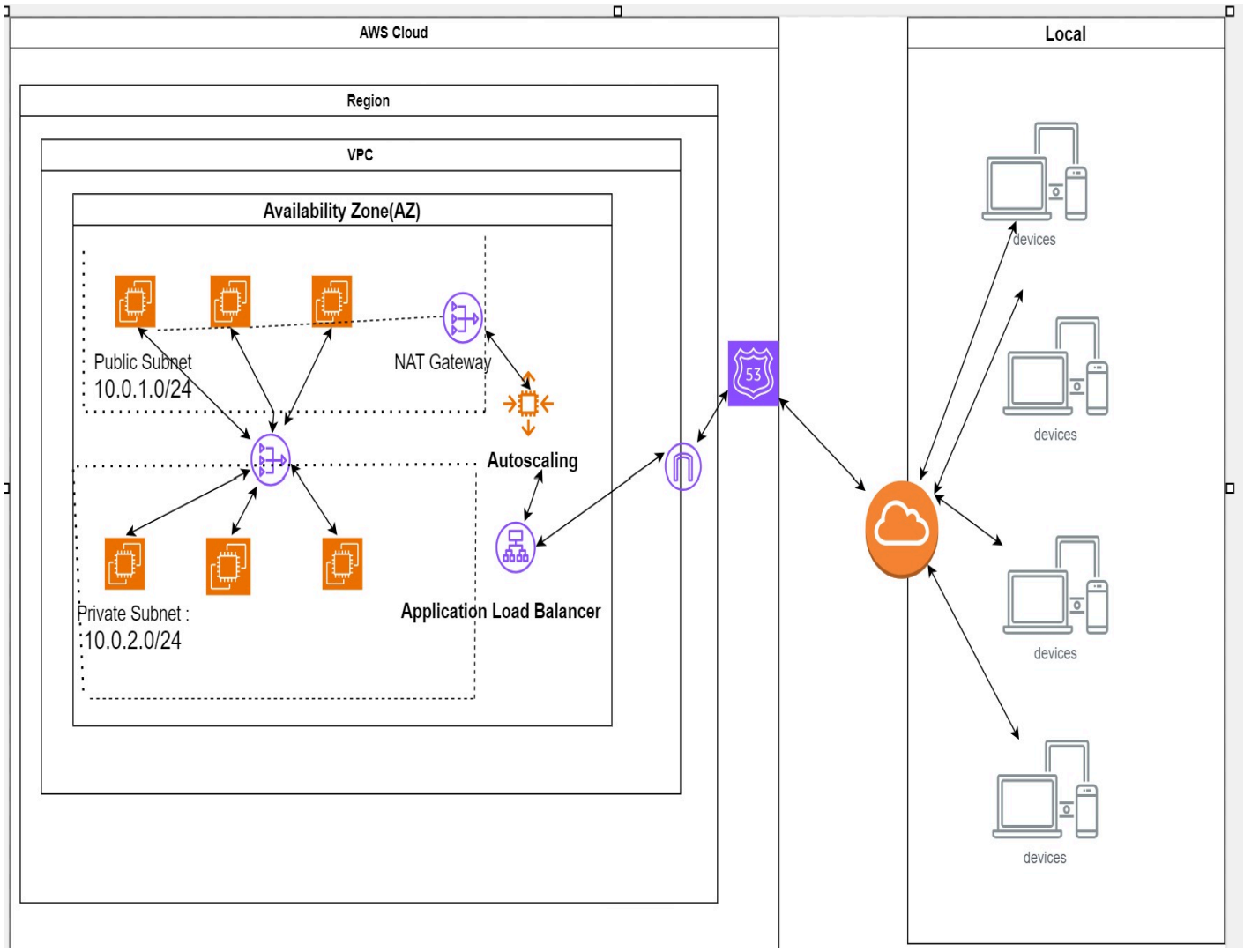
1.3 Description Project and Tasks

The Virtual Private Cloud (VPC) implementation project aims to design and configure a secure and scalable networking infrastructure within the AWS cloud environment. The project will focus on creating a VPC with multiple subnets, implementing network access controls, and ensuring connectivity to the internet and other resources.

2. Objectives

- Design a VPC architecture that meets the requirements of the organization's applications and services.
- Configure subnets within the VPC to logically isolate different components and control traffic flow.
- Implement security measures such as security groups and network ACLs to control inbound and outbound traffic.
- Establish connectivity to the internet gateway and enable secure communication with external resources.
- Ensure high availability and fault tolerance by distributing resources across multiple availability zones.

1.4 Diagram


AWS Cloud
Region
VPC
Availability Zone(AZ)
Public Subnet
10.0.1.0/24
NAT Gateway
Autoscaling
Private Subnet :
10.0.2.0/24
Application Load Balancer
53
Local
devices
devices
devices
devices

Project:Secure Multi-Tier Web Application Deployment on AWS (Level 2)

1. Project Overview

- **Duration**: 8 Hours
- **Total Marks**: 150 Marks

2. Introduction

In this project, we aim to deploy a secure multi-tier web application architecture on AWS, ensuring scalability, security, and high availability.

3. Scenario

An e-commerce company "TechCo" wants to migrate its existing web application to AWS for better scalability and security. The application consists of a front-end web server and a backend database server. They require a robust architecture that can handle varying levels of customer traffic securely.

4. Project Description and Tasks

Task 1: VPC and Subnet Setup (40 Marks)

- **Objective**: Design and implement a Virtual Private Cloud (VPC) with appropriate subnets.
    - **Steps**:
        - Create a VPC named "TechCoVPC" with CIDR block 10.0.0.0/16. **(10 Marks)**
        - Create two subnets: **(15 Marks)**
            - Public Subnet: 10.0.1.0/24 (for web servers)
            - Private Subnet: 10.0.2.0/24 (for database servers)
        - Ensure subnets are distributed across different Availability Zones (AZs) for high availability. **(15 Marks)**

Task 2: Security Configuration (35 Marks)

- **Objective**: Implement basic security measures to protect resources.
    - **Steps**:
        - Configure Security Groups: **(15 Marks)**
            - **WebServerSG**: Allow inbound HTTP (port 80) and SSH (port 22) traffic from the internet to instances in the public subnet(10.0.1.0/24)
            - **DatabaseSG**: Allow inbound MySQL (port 3306) traffic only from instances in the private subnet(10.0.2.0/24)
        - Configure Network ACLs: **(20 Marks)**
            - Set up network ACLs to restrict traffic between the subnets according to specified policies:
            - For Public Subnet
            - Inbound: Allow HTTP (80) and SSH (22).
            - Outbound: Allow all
            - NACL Range : Open from 1024-65535

            Private Subnet:

            - Inbound: Allow MySQL (3306) from public subnet.
            - Outbound: Allow all.
            - NACL Range : Open from 1024-65535

Task 3: Internet Connectivity (25 Marks)

- **Objective**: Enable outbound internet access and manage traffic flow.
    - **Steps**:
        - Attach an Internet Gateway to the VPC "TechCoVPC".**(10 Marks)**
        - Update route tables: **(15 Marks)**
            - Direct public subnet traffic to the Internet Gateway.
            - Keep private subnet routes internal or through a NAT Gateway for outbound access.

Task 4: Application Deployment (50 Marks)

- **Objective**: Deploy and configure web and database servers in a scalable and fault-tolerant manner.
    - **Steps**:
        - Launch EC2 instances: **(10 Marks)**
            - Deploy web server instances (e.g., Amazon Linux) in the public subnet.
            - Deploy database server instances (e.g., Amazon RDS MySQL) in the private subnet.
        - Set up Application Load Balancer (ALB): **(25 Marks)**
            - Configure ALB to distribute incoming HTTP traffic across web server instances in multiple AZs.
        - Implement Auto Scaling: **(15 Marks)**
            - Set up Auto Scaling groups for web server instances to adjust capacity based on traffic patterns.
            - Configure health checks and scaling policies.

Conclusion :

The successful implementation of the VPC project will provide the organization with a secure, scalable, and highly available networking infrastructure in the AWS cloud environment. By adhering to best practices and leveraging AWS services, the project aims to meet the organization's requirements for performance, security, and reliability in the cloud.

2.1 INSTRUCTIONS TO PARTICIPANTS

- Do not bring any materials with you to the competition.
- Mobile phones are not to be used.
- Do not disclose any competition material / information to any participants during competition.
- Read the whole competition script prior to you starting work.
- Be aware different tasks attract a percentage of the overall mark.
- Plan your time carefully.
- Centers are requested to please check whether AWS Free Tier Accounts are created.
- Delete the AWS Resources after the Competition is over.

- This Task will incur Cost, so Participants are requested to please keep a check on the Cost while performing this Task.
- Centers are requested to please keep a check on the cost while performing a Task
- Centers are requested to please check ,After the Task is Completed , Resources used in the Task are deleted/Stopped.
- Create documentation for the tasks performed in the project along with the screenshot of AWS ID (unique group).
- Please follow the Project Guidelines/Ground Rules.
- Please save the document in below format :

  Centername_Category no_Groupname_Projectname.docx

- Indore_Category2_TechTitans_projectname.docx
- Share the documentation in word/pdf/docx format and send to **ops.exe@jetking.com**