Virtual Private Cloud

CHAPTER 3

Virtual Private Cloud (VPC) Overview

EPISODE 3.01

Virtual Private Cloud (VPC)

AWS Foundation Services

Compute

Storage

Database

Networking

zon

VPC

- Not yo mamma’s Microsoft VPC
- “Virtually” private
- Personal data center in the cloud
- VPN connections can be made to the VPC

VPC Provisions

- Applications run in the VPC or on-premises
- Subnets can be created in the VPC
    - Public subnets
    - Private subnets

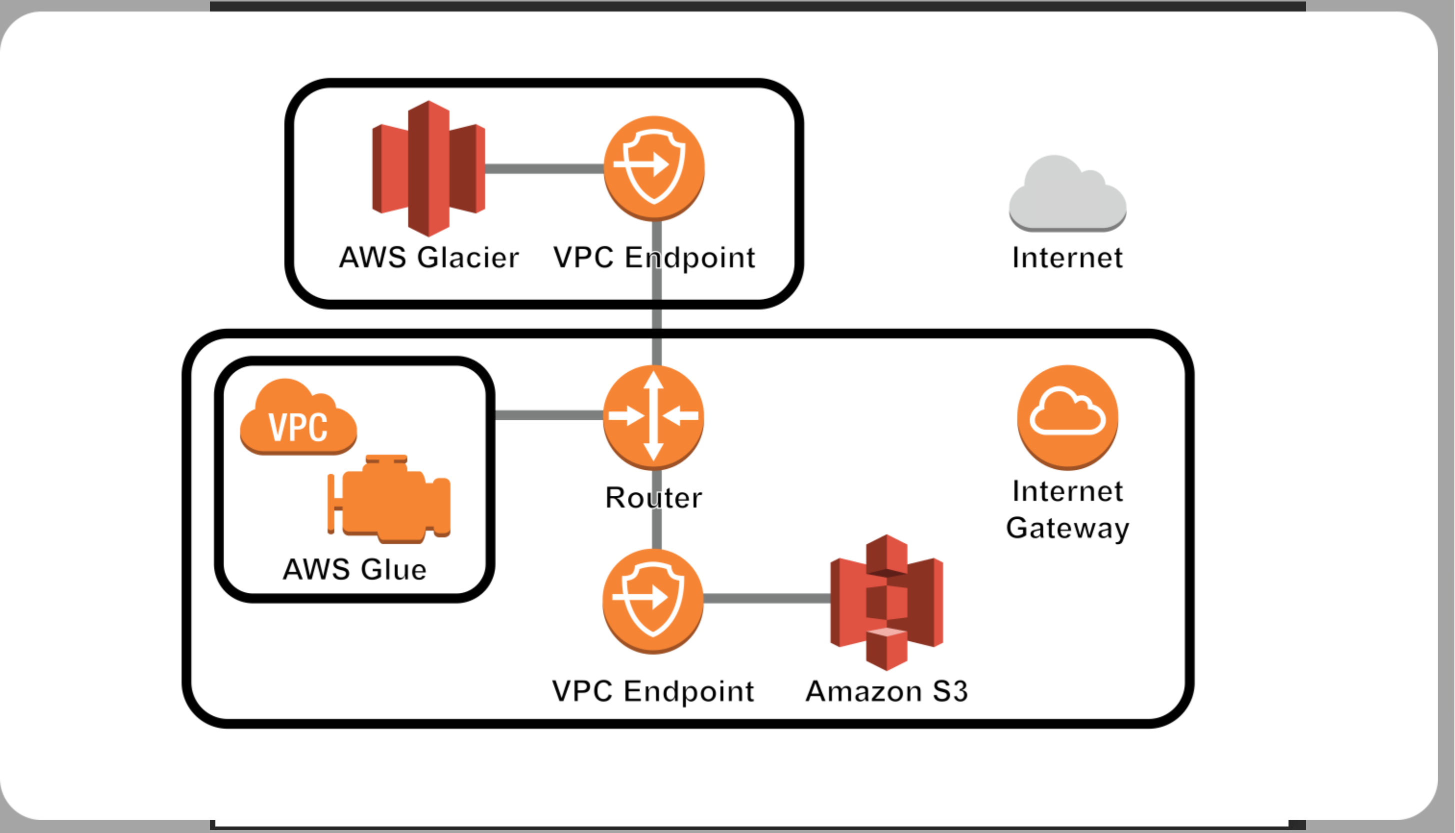
VPC Provisions

- Direct Connect can provide VPN connections
- Multiple VPCs can be interconnected

VPC Provisions

- VPC endpoints connect to resources

VPC endpoint



The Default VPC

- One in each Region
- Amazon recommends not deleting
- Features:
  - Dynamic private IP
  - Dynamic public IP
  - AWS-provisioned DNS names
  - Private DNS names
  - Public DNS names

Creating a VPC Lab

EPISODE 3.02

Configuring DHCP Options Lab

EPISODE 3.03

Elastic IP Addresses (EIPs)

EPISODE 3.04

EIPs

- Public IP addresses from the VPC Region
- Permanently allocated to your account until released
- Account is charged until release

EIPs

- Network interfaces consume EIPs
- EIPs can be moved between instances in the same Region

Elastic Network Interfaces (ENIs)

EPISODE 3.05

ENIs

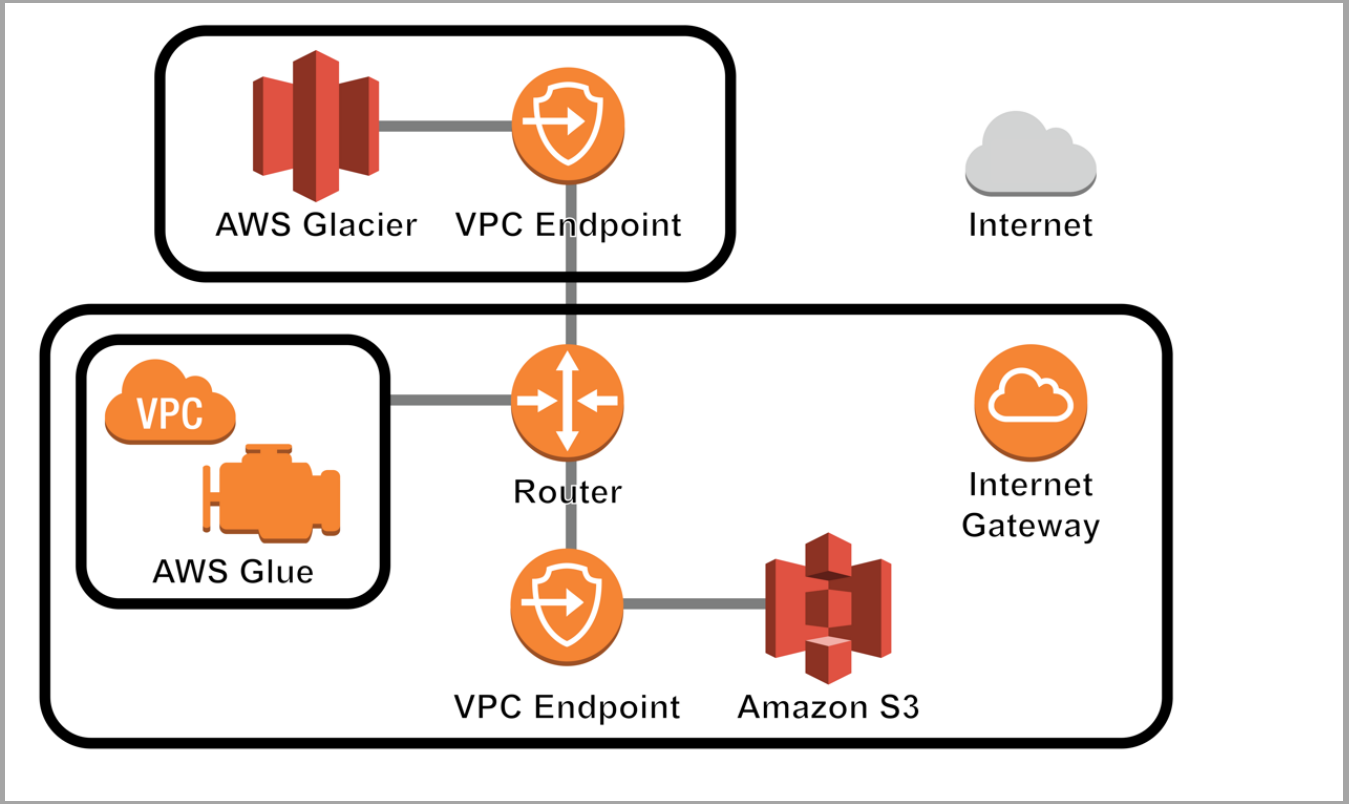
- Virtual network interface attached to an instance
- Only available within a VPC
- Associated with a subnet

ENIs

- Allows dual-homing
- One public address and multiple private addresses

Endpoints

EPISODE 3.06



Endpoints

- AWS endpoints connect VPCs to AWS services
- Can enforce policies on different endpoints

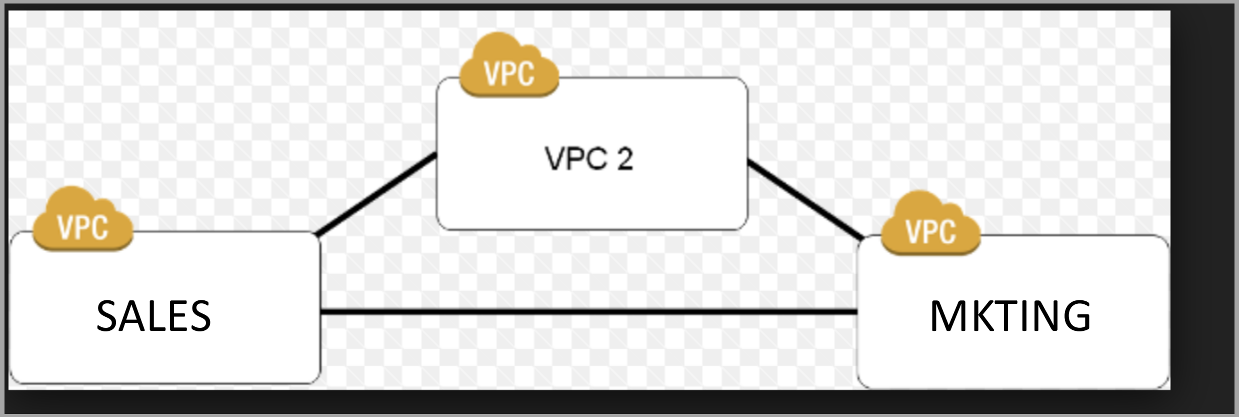
Creating an Endpoint

- Specify the Amazon VPC
- Specify the service
  - com.amazonaws.<region>.<service>
- Specify the policy
- Specify route tables

VPC Peering

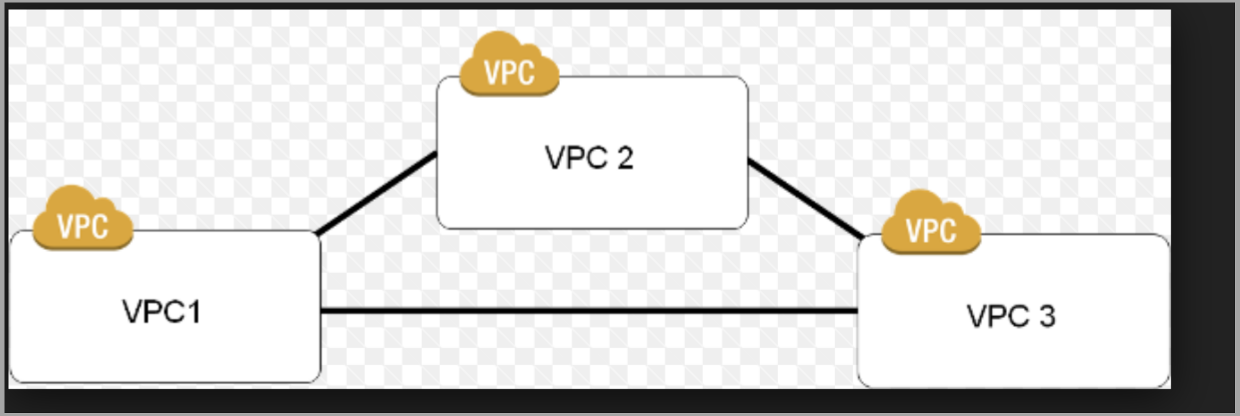
EPISODE 3.07

VPC Peering



- Connects one VPC to another
- Many possible scenarios
  - Management VPC > Production VPC
  - Development VPC > Production VPC
  - Corporate VPC > Partner VPC

VPC Peering



- VPC peering is not transitive
  - VPC A peered with VPC B
  - VPC B peered with VPC C
  - VPC A is not able to pass through VPC B to VPC C

Creating VPC Peers

- Initiating VPC sends a request to the receiving VPC
    - Owner role required
    - IP CIDR blocks in each VPC must not overlap
- Receiving VPC accepts the request
    - Owner role required

Creating VPC Peers

- Each VPC needs a defined route to the other VPC
  - May require routing table modifications
- Security group rules
  - May require modification for the VPC peers

Creating a VPC Peering Connection Lab

EPISODE 3.08

DEMO

- Creating a VPC peer

Security Groups Overview

EPISODE 3.09

Security Group Overview

- Acts like a firewall
  - Assigned to an instance in a VPC
  - Applied to instances not to subnets
- Defines allowed traffic flows
  - Ingress (entrance)
  - Egress (exit)

Security Group Overview

- Supports only allow rules – deny is implicit
- Stateful processing is used

Network Access Control Lists (NACLs)

- Applied on subnets
- Stateless processing
- Supports both allow and deny rules

Network Access Control Lists (NACLs)

- Rule number defines precedence
  - Lowest numbered rules first
  - First match applies

Network Address Translation (NAT)

EPISODE 3.10

NAT Concepts

- NAT translates between:
  - Private IP addresses
  - Public IP addresses

NAT Instances

1. NAT implemented on a private and public subnet
   - EIP associated with NAT instance
2. Instances in the private subnet connect through the NAT instance

NAT Gateways

- Work more like traditional NAT servers/appliances

DEMO

- Creating a NAT instance
- Creating a NAT gateway

Gateways (VPGs and CGWs)

EPISODE 3.11

Virtual Private Gateway (VPG)

- Connects local networks to the VPC
- VPG is the VPN concentrator

Customer Gateway (CGW)

- Physical device or software application
- Anchor on the customer side
  - Connects to the VPG

Alternative Connections

- AWS hardware VPN
- AWS Direct Connect
- VPN CloudHub
- Software VPN

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- Creating a VPC with VPN access

- EPISODE 3.01
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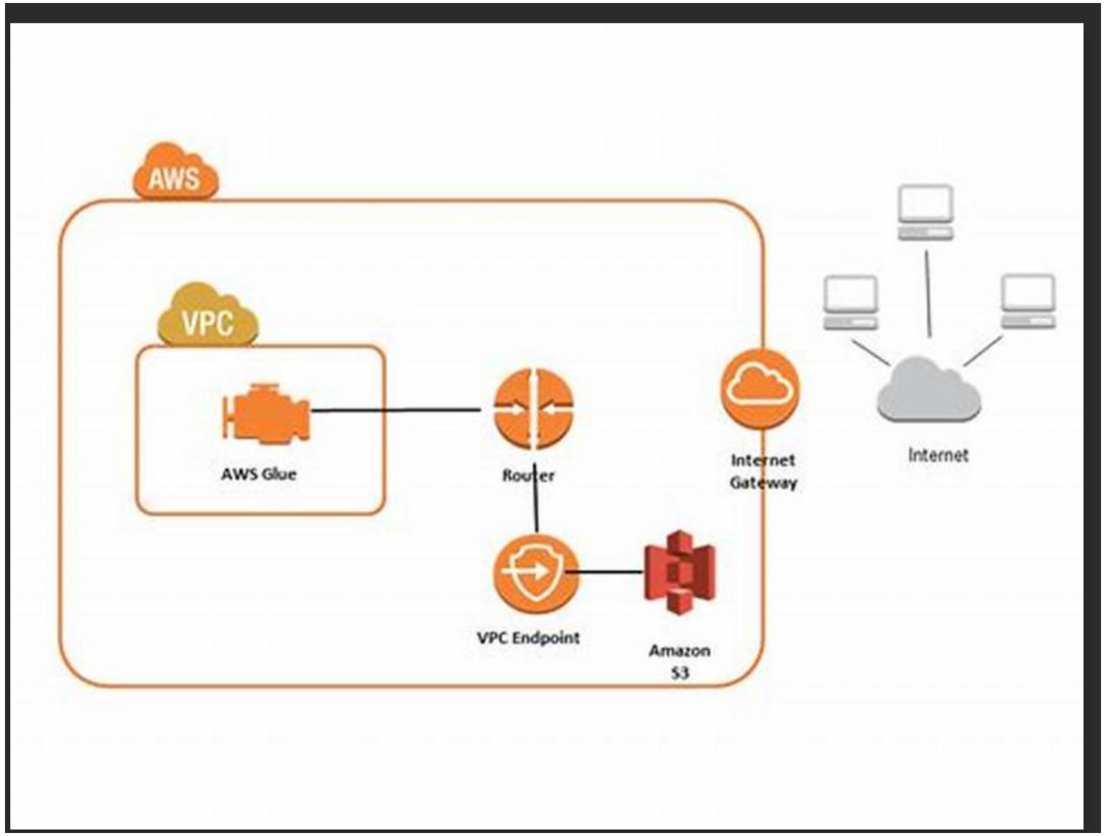

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- EPISODE 3.04
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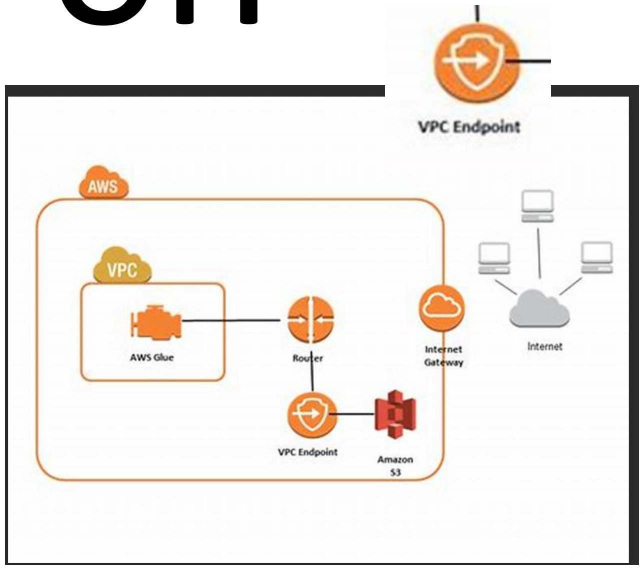

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