MODULE 5: Networking and Content Delivery

1. Networking
2. VPC
3. VPC Networking
4. VPC Security
5. Route 53
6. CloudFront

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1. Networking

Number System

- ➔ Decimal
- ➔ Roman
- ➔ Binary
- ➔ Octal
- ➔ Hexadecimal

Protocol

- ➔ TCP/IP by DOD
- ➔ IPX / SPX by Novell
- ➔ APPLETALK by apple
- ➔ NETBIOS by Microsoft
- ➔ OSI by ISO

IP

- ➔ **Class A:** 0 to 127
- ➔ **Class B:** 128 to 191
- ➔ **Class C:** 192 to 223
- ➔ **Class D:** 224 to 239
- ➔ **Class E:** 240 to 255

LAN and WAN: Class A, B, C
Class D is for multicasting
Class E is reserved for R&D
IPv4 address are manually assigned to elastic IP address

Open System Interface Layers

7 = Application
6 = Presentation
5 = Session
4 = Transport
3 = Network
2 = Data Link
1 = Physical

2. VPC

- ➔ It enables you to provision a logically isolated section of the AWS cloud where you can launch AWS resources in the virtual network that you define.
- ➔ It gives you control over your vital networking resources.
- ➔ It enables you to customise the network configuration for your VPC.
- ➔ It enables you to use multiple layers of security.
- ➔ It is logically isolated from other VPC.
- ➔ It is dedicated to your AWS account and belongs to a single AWS region and can span multiple AZs.

Subnets

- ➔ It is the range of IP addresses which divides a VPC.
- ➔ It can belong to a single AZ.
- ➔ Classified as public and private.

IP Addressing

- ➔ When you create a VPC, you assign that vac to an IPv4 CIDR.
- ➔ You cannot change the address range after you create the VPC.
- ➔ The largest IPv4 CIDR block site is /16 and the smaller is /28.
- ➔ IPv6 is also supported.
- ➔ CIDR blocks of a subnet can't overlap.

Elastic Network Interface

- ➔ It is a virtual network interface that can be attached to an instance, that can be detached From the instance and attached to another instance to redirect network traffic.

Route tables

- ➔ Contains a set of rules that you can configure to direct network traffic from your subnets.
- ➔ Each route specifies a destination and a target.
- ➔ Each subnet must be associated with a route table.

3. VPC Networking

Internet gateway: NAT gateway (Network Address Translation)

VPC sharing
VPC peering
Site to site VPN

AWS Direct Connect: Connect virtual gateway to customer gateway via Internet.

AWS Transit Gateway

- ➔ VPC endpoints
    - ➔ Interface endpoint is powered by AWS private Link
    - ➔ Gateway endpoints is powered by S3 and DynamoDB

4. VPC Security

Security groups

- ➔ Security groups act at the instance level.
- ➔ They have rules that control inbound and outbound instance traffic.
- ➔ They are stateful. You can specify allow rules but not deny rules.

Network Access Control List (NACL)

- ➔ Acts at subnet level
- ➔ Has separate inbound and outbound rules and each rules can either allow or deny traffic
- ➔ Stateless
- ➔ You can specify both allow and deny rules

5. Route 53

- ➔ It is a highly available and scalable DNS service.
- ➔ It is used to route end user to internet application by translating names
- ➔ User sends a request to the DNS resolver then DNS resolver checks with route 53 for IP address and route 53 returns IP address to DNS resolver which itself returns it back to the user.

Route 53 supported routing

- ➔ **Simple Routing:** Used in single server environment
- ➔ **Weighted Round Robin Routing:** It assign weight to resources record sets to specify the frequencies
- ➔ **Latency Routing:** Helps improve your global applications
- ➔ **Geolocation Routing:** It routes traffic based on location of your users
- ➔ **Geo Proximity Routing:** It routes traffic based on action of your resources
- ➔ **Failover Routing:** Fail over to a backup site if your primary site becomes unreachable
- ➔ **Multi Value Answer Routing:** It responds to DNs queries with upto 8 healthy records, selected at random.

6. CloudFront

- ➔ Content Delivery Network (CDN).
- ➔ Globally distributed system of caching servers.
- ➔ It accelerated delivery of dynamic content.
- ➔ Global, fast and secure CDN service.
- ➔ It is a self service model.
- ➔ Global network of edge locations and regional edge patches.
- ➔ Pay as you use pricing.

Infrastructures

- ➔ Edge location is a network of data centres that CloudFront uses to serve popular content to customise quickly.
- ➔ Multiples edge locations.

- ➔ **Regional Edges Caches:** CloudFront locations that caches content that is not popular enough to stay at an edge location. It is located between the origin server and the global edge location.

Advantages

- ➔ Fast and global
- ➔ Security at the edge
- ➔ Higher programmable
- ➔ Deeply integrated with AWS
- ➔ Cost Effective

Pricing

- ➔ Data Transfer Out
- ➔ Https Request
- ➔ Invalidation Request
- ➔ Dedicated IP Custom SSL