VPC

VPC provides several benefits:

- **Isolation**: It allows you to create a logically isolated section of the cloud where you can launch resources such as virtual machines, databases, and storage. This isolation provides enhanced security and privacy for your applications and data.

- **Control**: You have full control over the network configuration within the VPC, including defining IP address ranges, subnets, routing tables, and network gateways. This allows you to customize the network setup to suit your specific requirements.

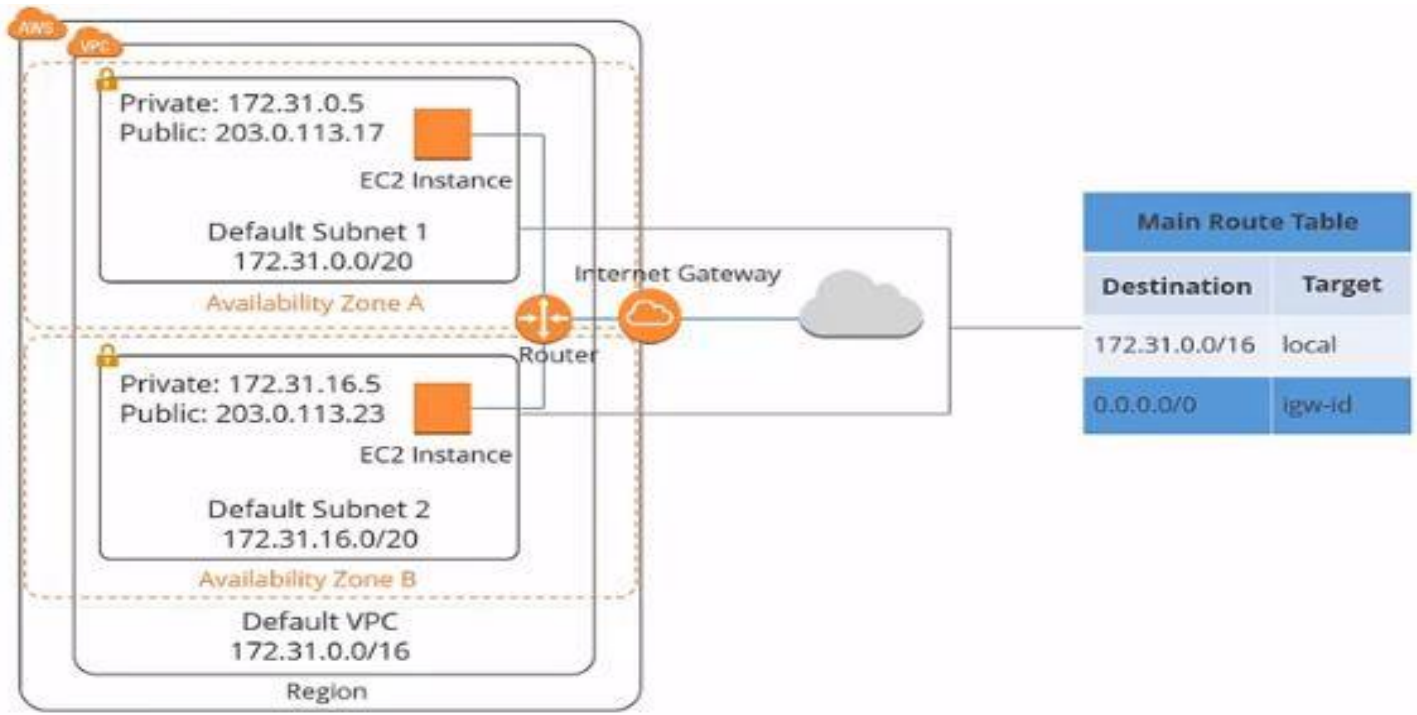
- **Connectivity**: VPCs can be connected to your on-premises infrastructure using secure VPN (Virtual Private Network) connections or dedicated network connections, such as AWS Direct Connect. This enables you to establish hybrid cloud environments and securely access resources in the VPC from your local network.

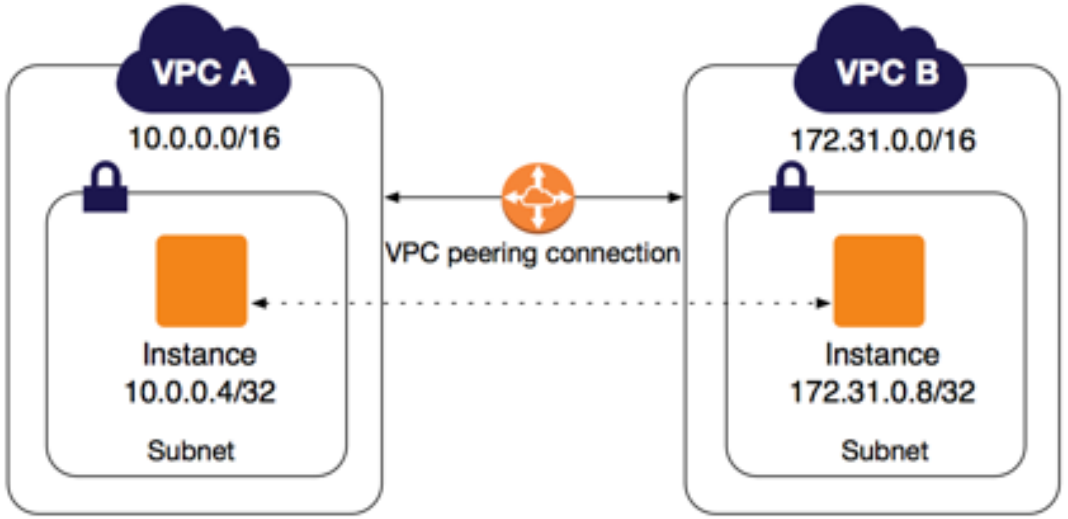
- **Security**: VPCs include features for network security, such as network access control lists (ACLs) and security groups. These allow you to define inbound and outbound traffic rules, restricting access to your resources based on specific protocols, ports, and IP addresses.
- **Scalability**: VPCs can scale to accommodate large-scale deployments. You can create multiple subnets within a VPC and distribute your resources across them. This allows you to scale your applications horizontally by adding more instances, while ensuring they can communicate securely within the VPC.

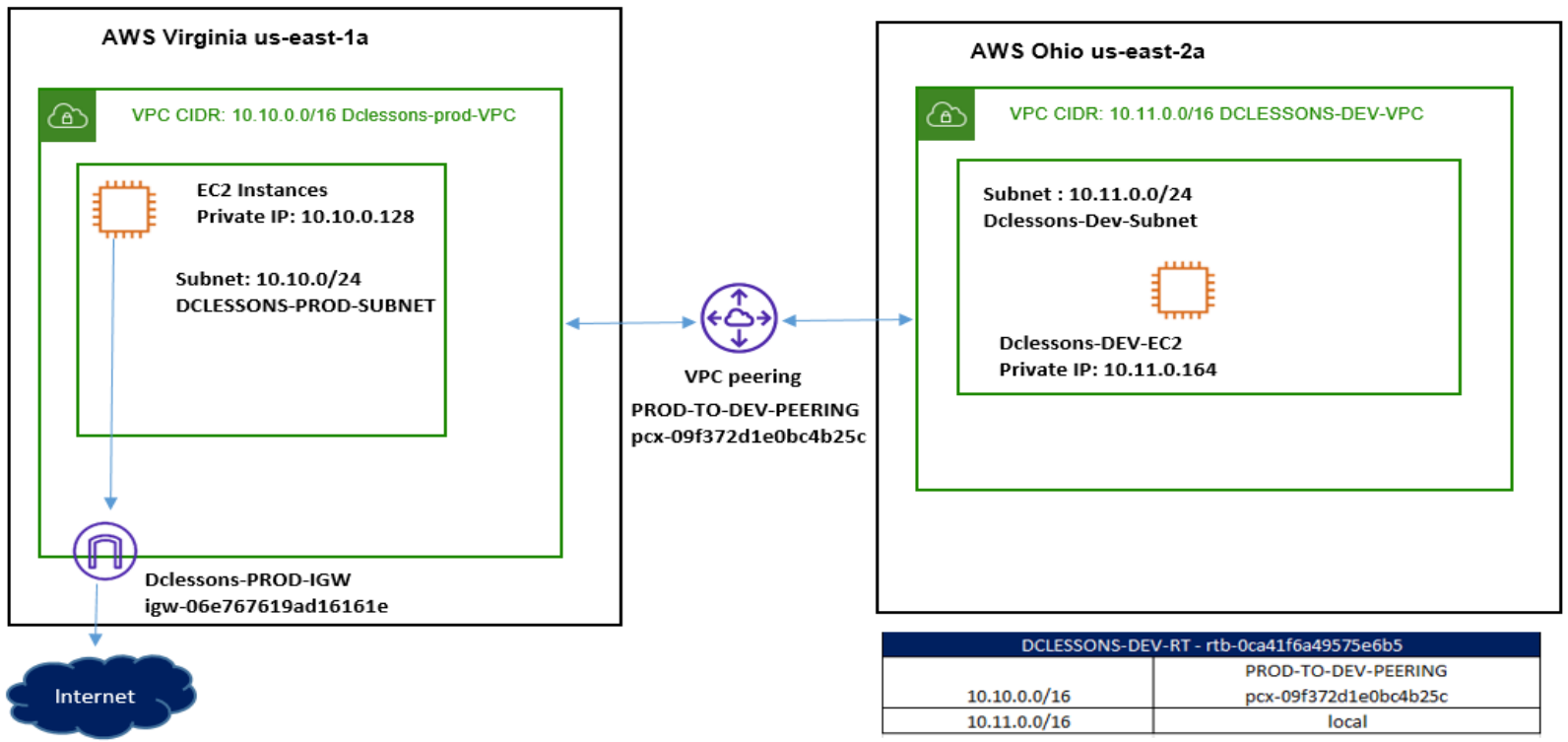
- **IP Address Ranges**: When you create a VPC, you specify an IP address range for the VPC. This range is defined using CIDR (Classless Inter-Domain Routing) notation, such as 10.0.0.0/16. The CIDR block determines the total number of available IP addresses that can be used within the VPC.
- **Subnets** are logical divisions of an IP address range within a network, including a Virtual Private Cloud (VPC) in cloud computing. They enable you to segment and organize your network into smaller, more manageable networks. Each subnet has its unique CIDR (Classless Inter-Domain Routing) block, which defines the range of IP addresses assigned to resources within that subnet.
- A **routing table** is a key component of networking that is used to determine the path of network traffic between different networks or subnets. It is a data structure or a configuration file that resides on a router or a network device and contains a set of rules, called routes.
- **Internet Connectivity**: An Internet Gateway acts as a bridge between your VPC and the public internet. It provides a target for internet-bound traffic from resources within the VPC and allows them to access the internet or be accessed by internet users.

- **Elastic IP addresses** (EIPs) are static, public IPv4 addresses provided by cloud service providers, such as Amazon Web Services (AWS), for use in their cloud environments. EIPs offer a way to associate a persistent public IP address with your cloud resources, allowing them to maintain a stable public presence even if they are stopped and restarted.

- **NAT** (Network Address Translation) Gateways are a managed network service provided by cloud service providers to enable outbound internet connectivity for private subnets within a Virtual Private Cloud (VPC) environment. NAT gateways allow resources in private subnets to communicate with the internet while hiding their private IP addresses.
- **Peering connections** enable resources in different VPCs to communicate with each other as if they were on the same network.


AWS
VPC
Private: 172.31.0.5
Public: 203.0.113.17
EC2 Instance
Default Subnet 1
172.31.0.0/20
Availability Zone A
Internet Gateway
Router
Private: 172.31.16.5
Public: 203.0.113.23
EC2 Instance
Default Subnet 2
172.31.16.0/20
Availability Zone B
Default VPC
172.31.0.0/16
Region
Main Route Table
Destination
Target
172.31.0.0/16
local
0.0.0.0/0
igw-id


VPC A
10.0.0.0/16
Instance
10.0.0.4/32
Subnet
VPC peering connection
VPC B
172.31.0.0/16
Instance
172.31.0.8/32
Subnet



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10.11.0.0/16	pcx-09f372d1e0bc4b25c

DCLESSONS-DEV-RT - rtb-0ca41f6a49575e6b5	
10.10.0.0/16	PROD-TO-DEV-PEERING pcx-09f372d1e0bc4b25c
10.11.0.0/16	local