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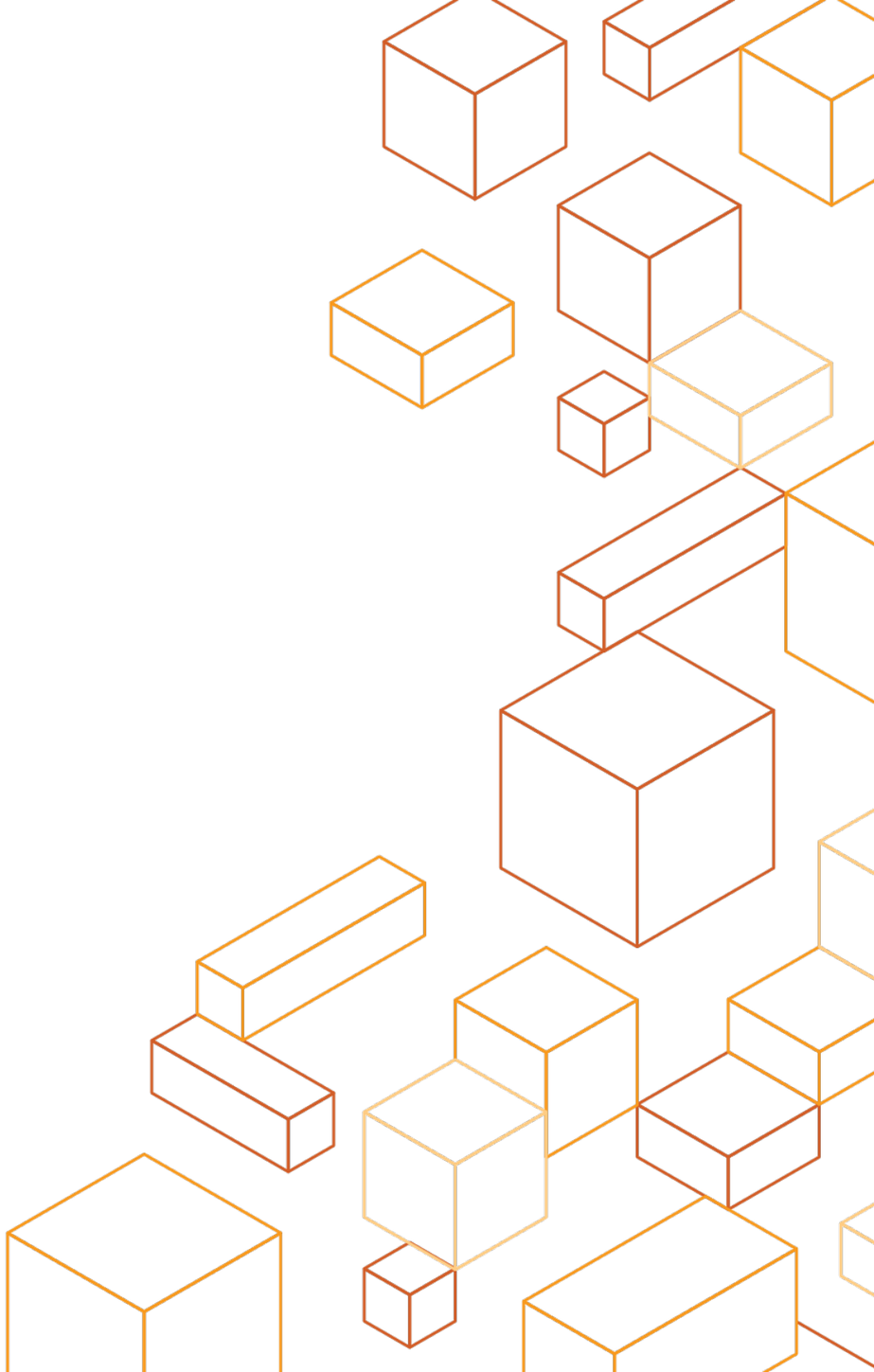
AWS VPC Overview



Agenda

- AWS Virtual Private Cloud
- Networking Concepts in AWS
- DNS
- Connectivity Features

Goals

- Understand how networking is implemented in AWS
- Discover features and functionality of VPC
- Learn how to connect other networks

Outcomes

- Decision on the number of VPC’s and the relation between AWS Accounts and VPC’s
- Decision on IP CIDR ranges
- Decision on DNS (Amazon DNS vs Self-managed AD)
- Decision on connectivity (Internet Gateway/Direct Connect/VPN)

Virtual Private Cloud (VPC)

VPC Overview

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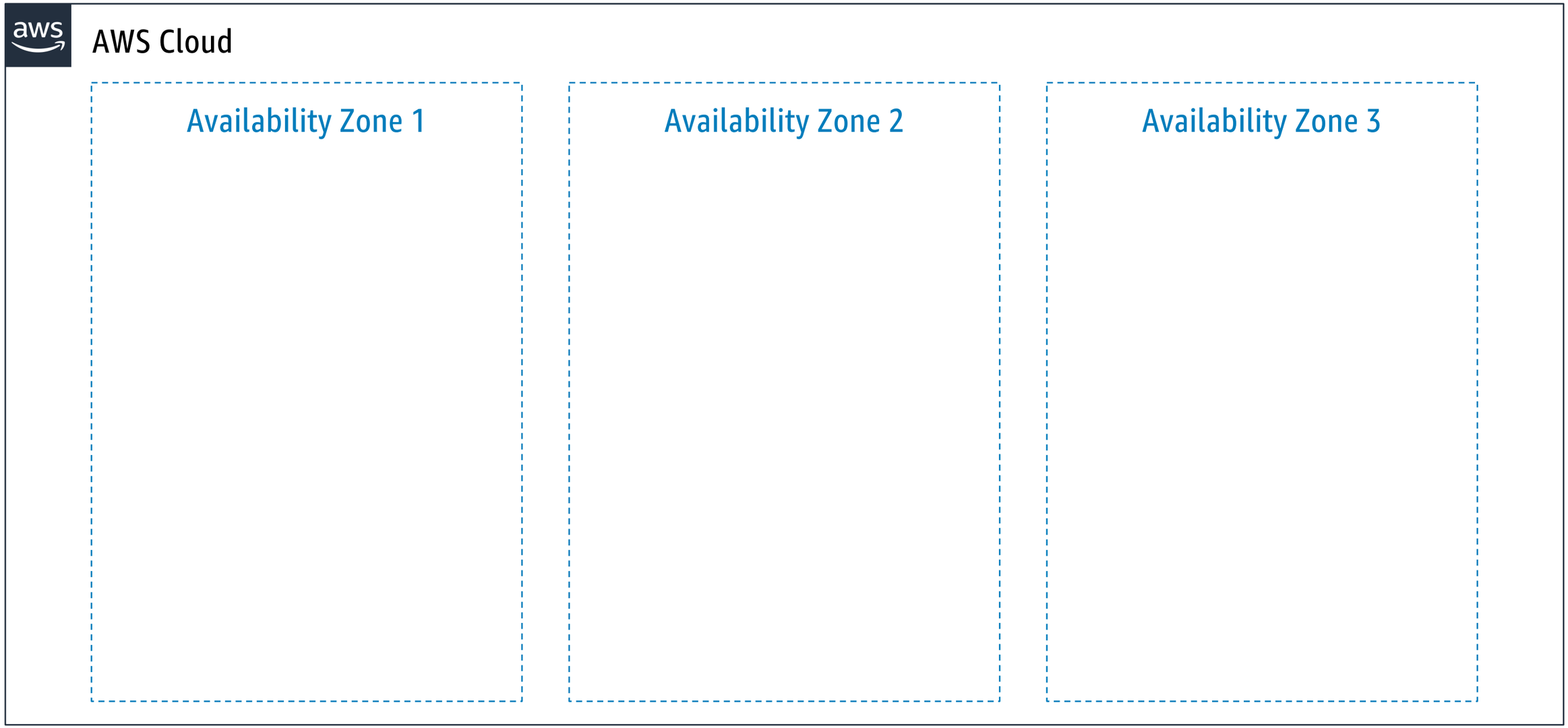
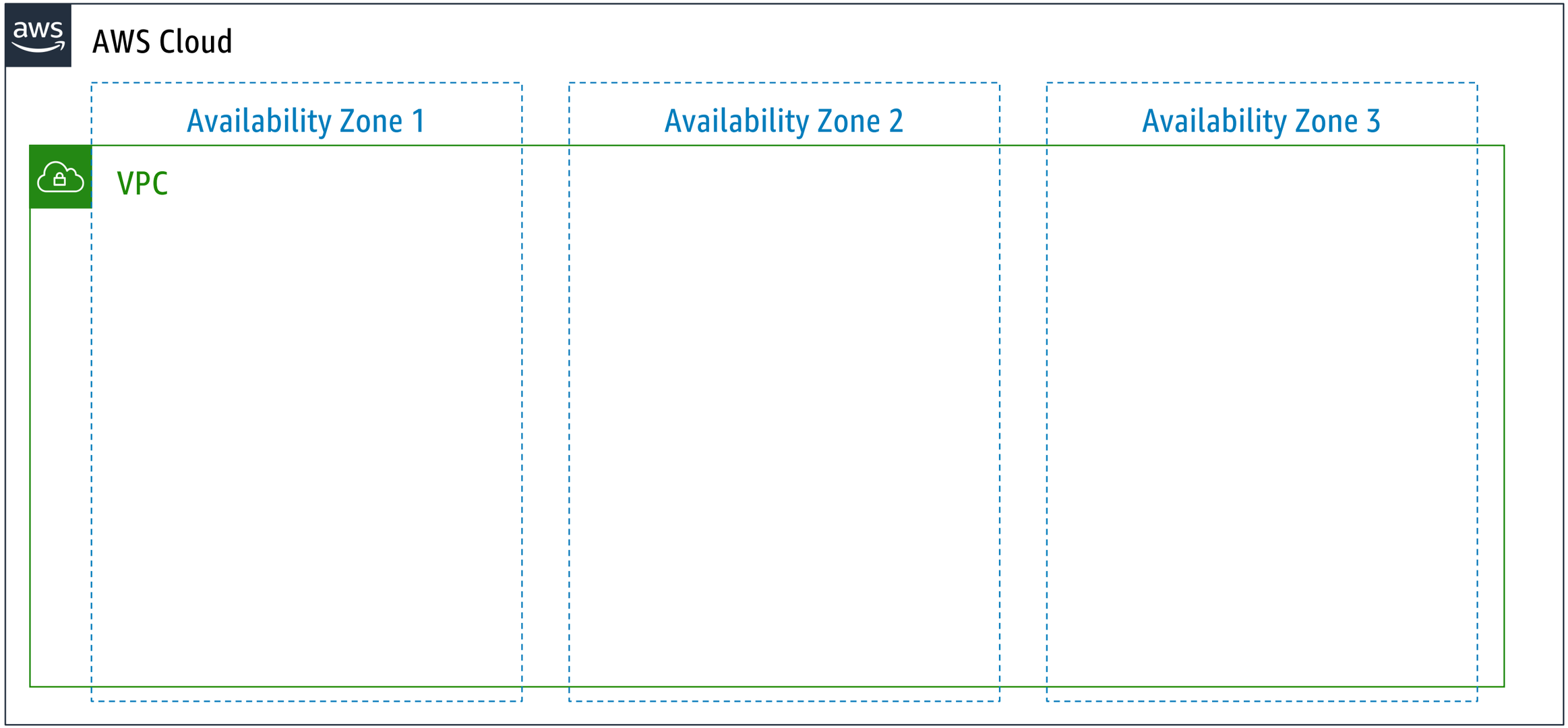
What is a Virtual Private Cloud?

- Software-defined network
- Logically isolated
- Complete control
- Secure
- VPN & Internet connectivity
- Connect your on-premises IT environment

Each AWS Region has multiple Availability Zones



A VPC spans every Availability Zone in a Region



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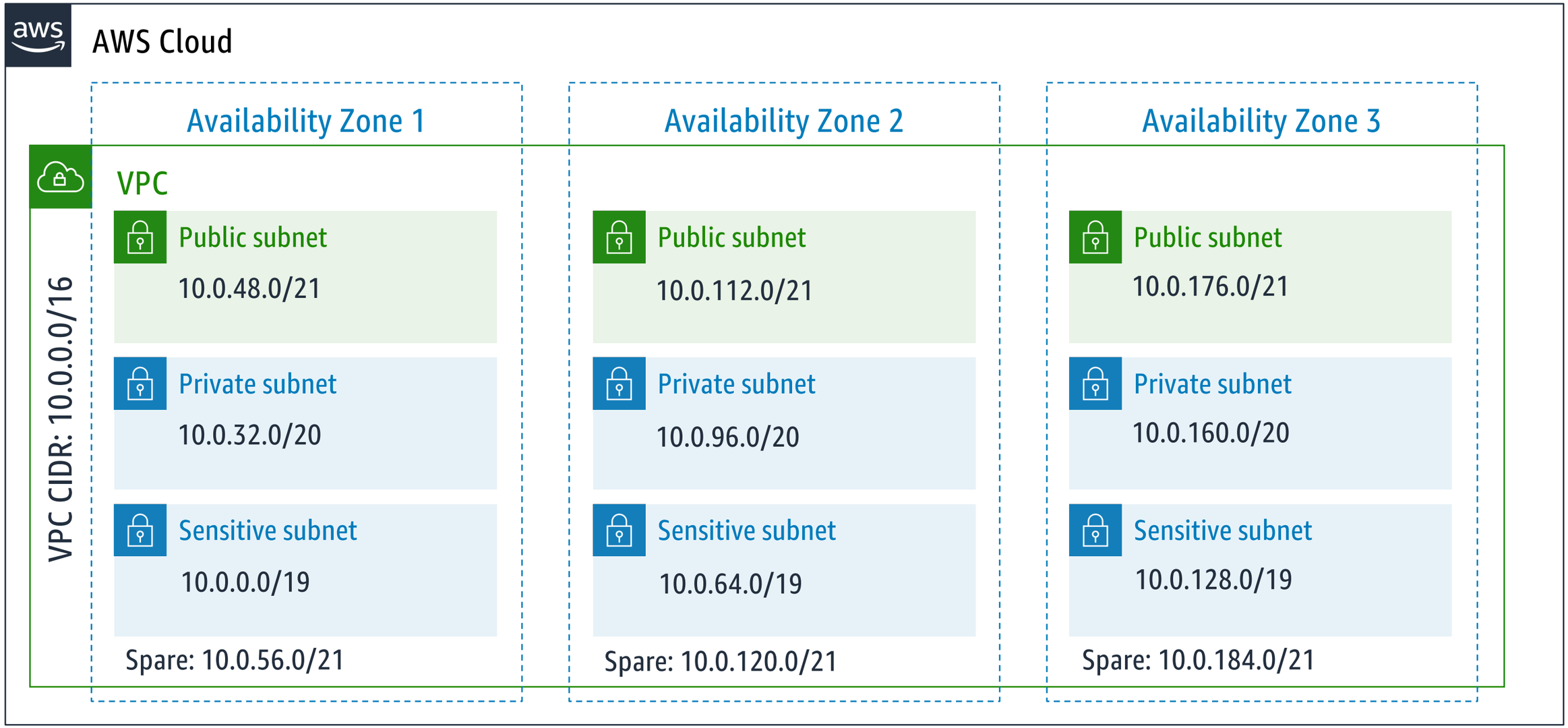
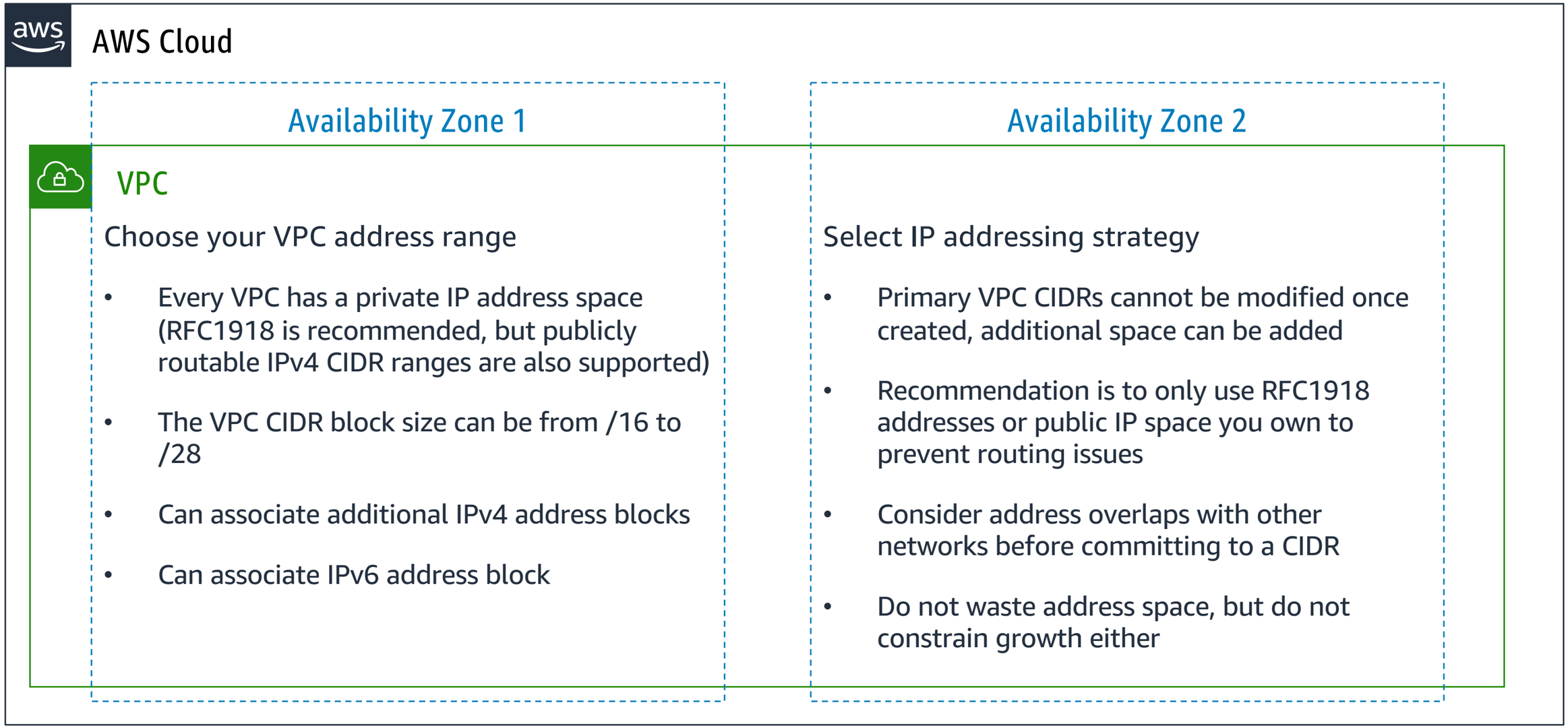
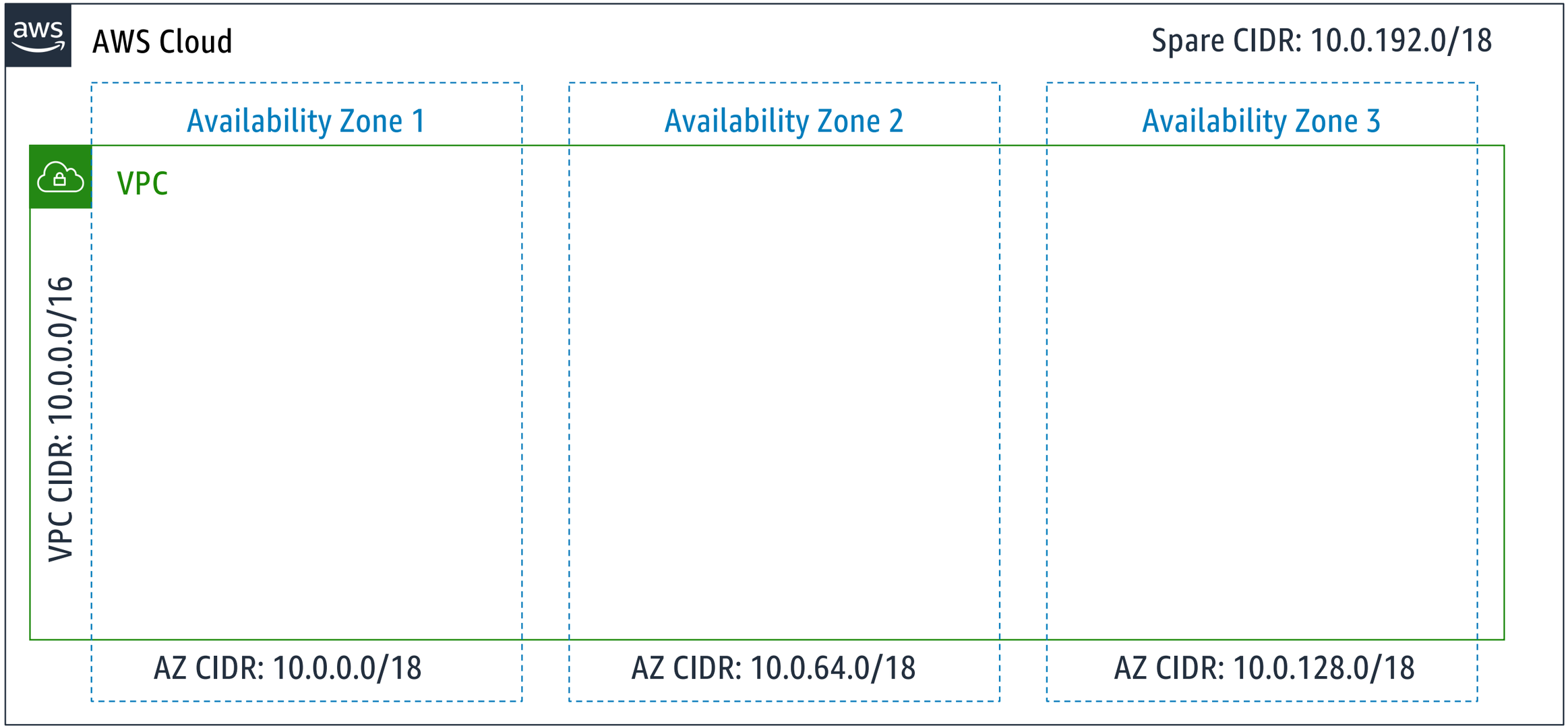
Subnets



Customers have full control over their VPC's

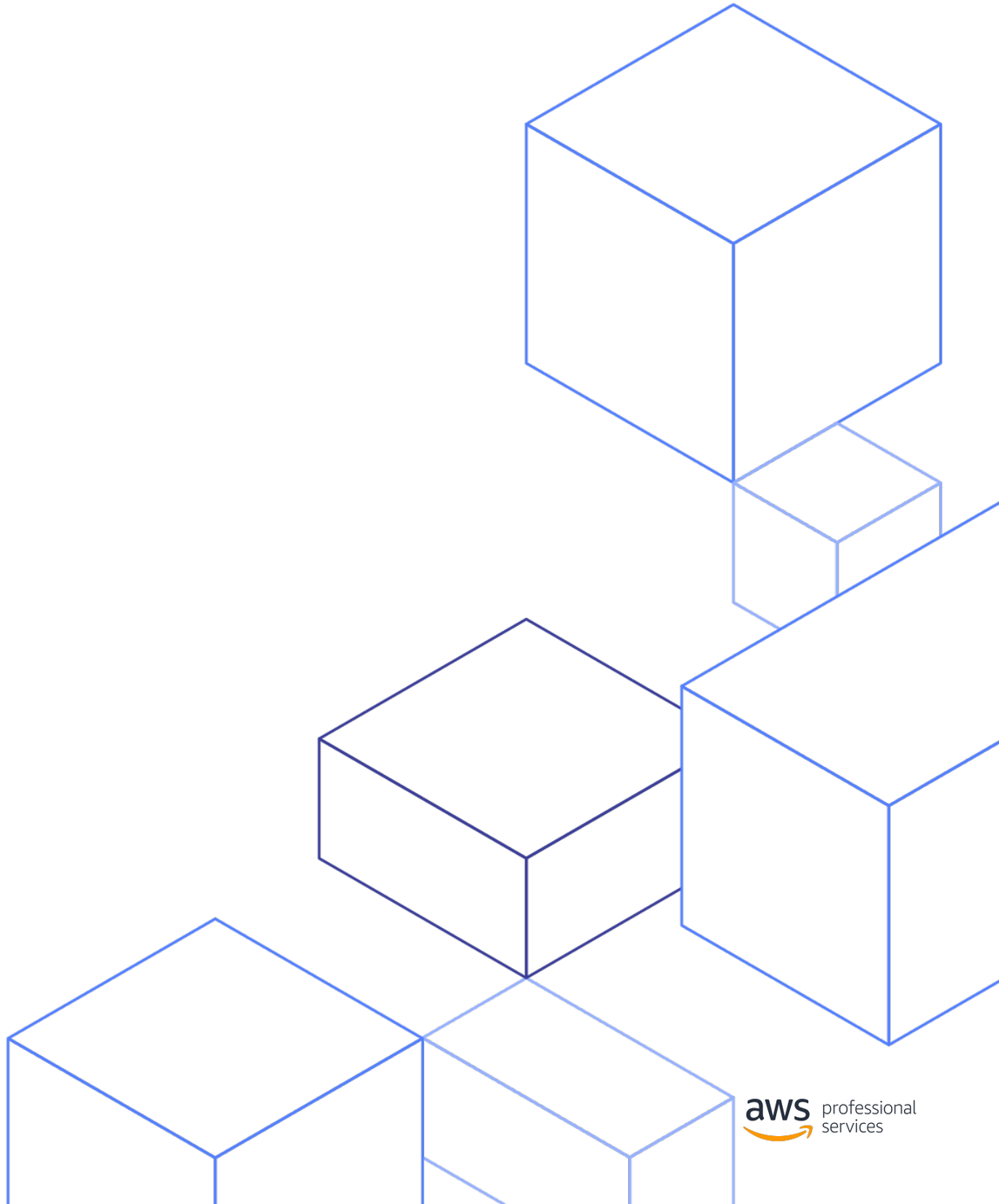


Logically allocate CIDR space for each AZ



Security Groups

VPC Overview



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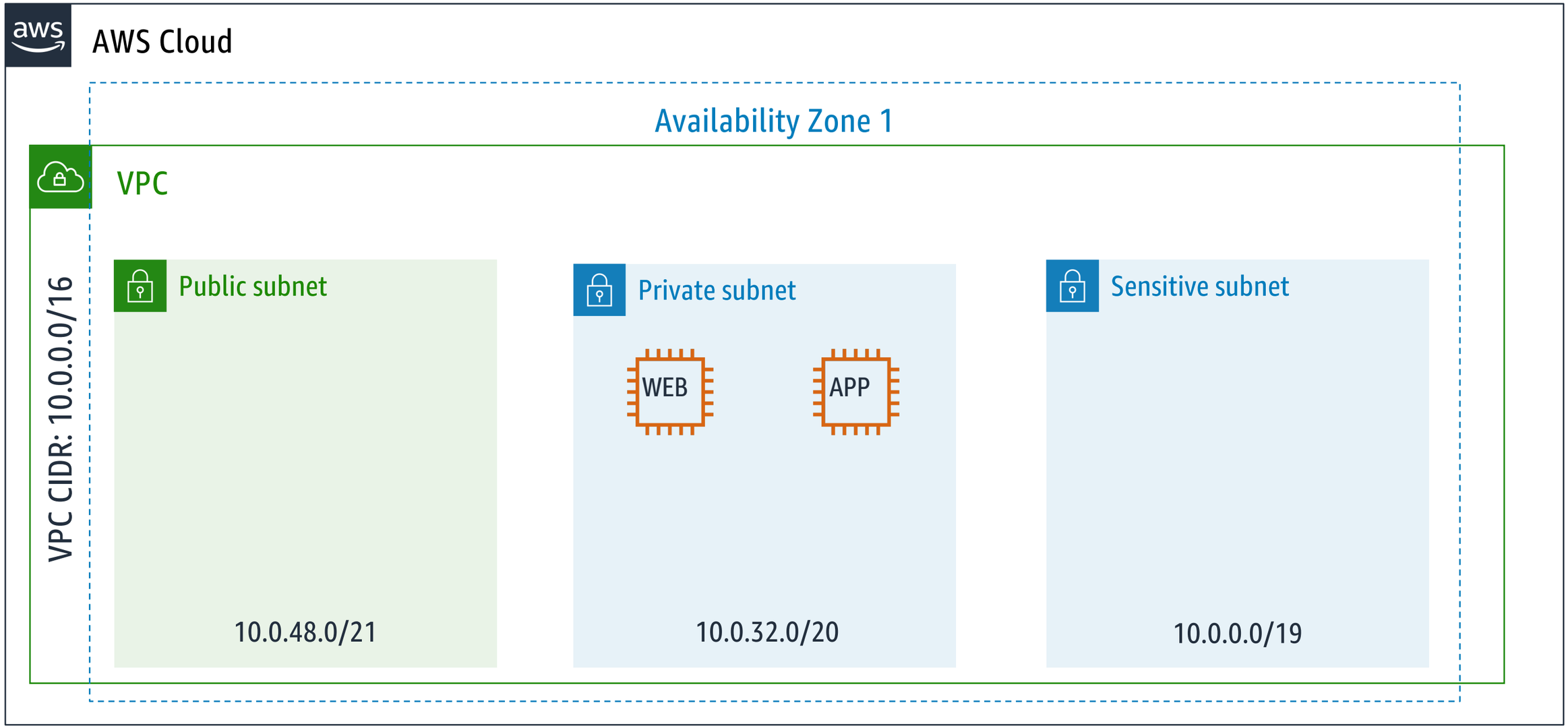
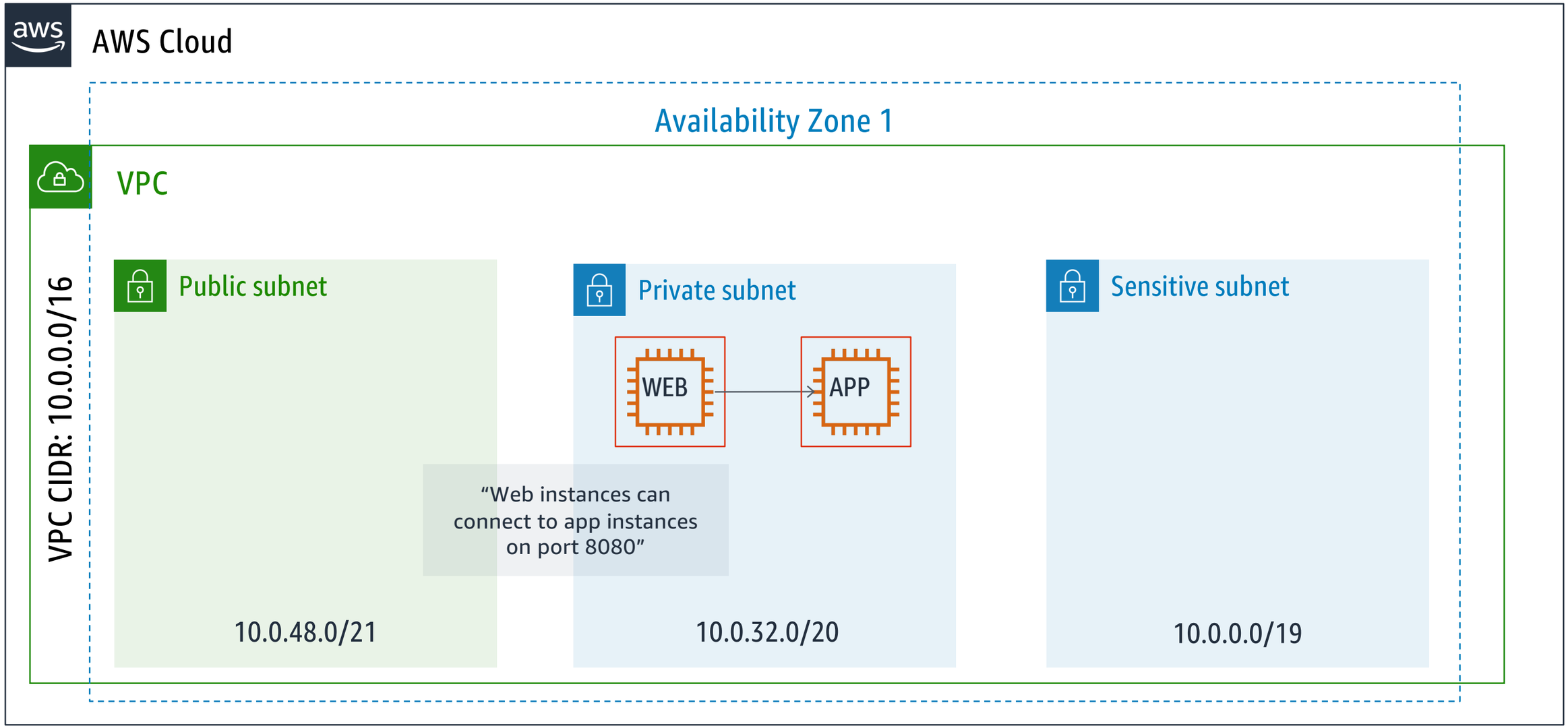
Security Groups – Stateful Firewall



Security Groups – Stateful Firewall



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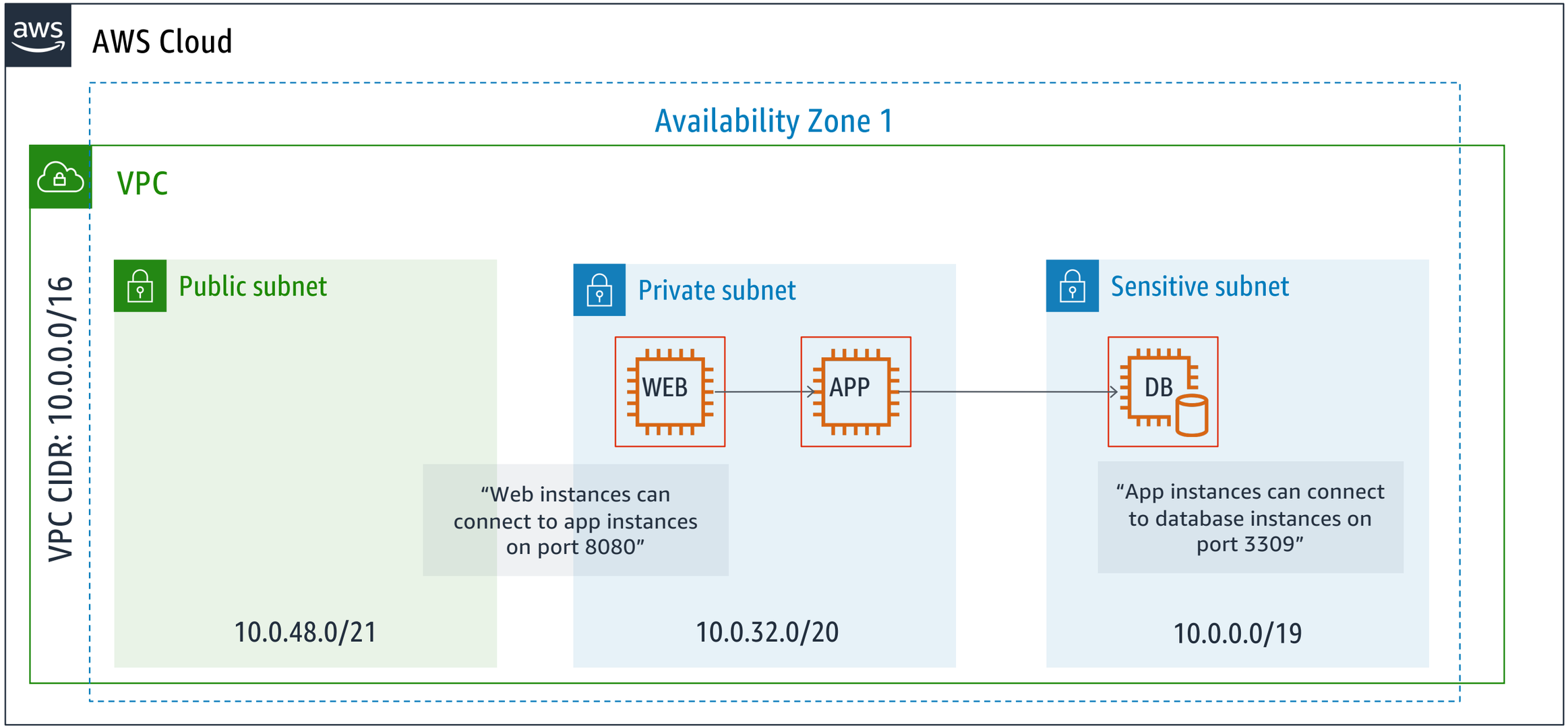
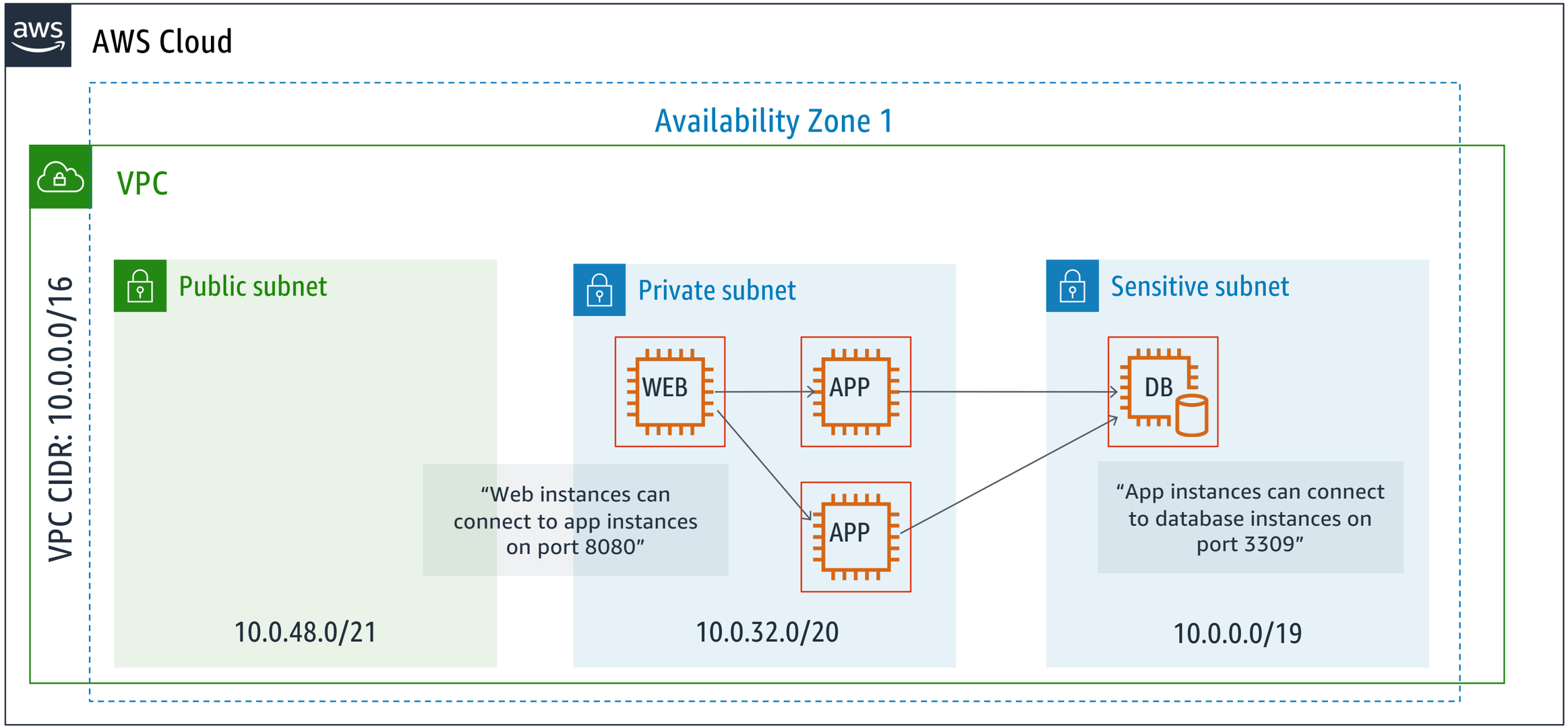
Security Groups – Stateful Firewall



Security Groups – Stateful Firewall



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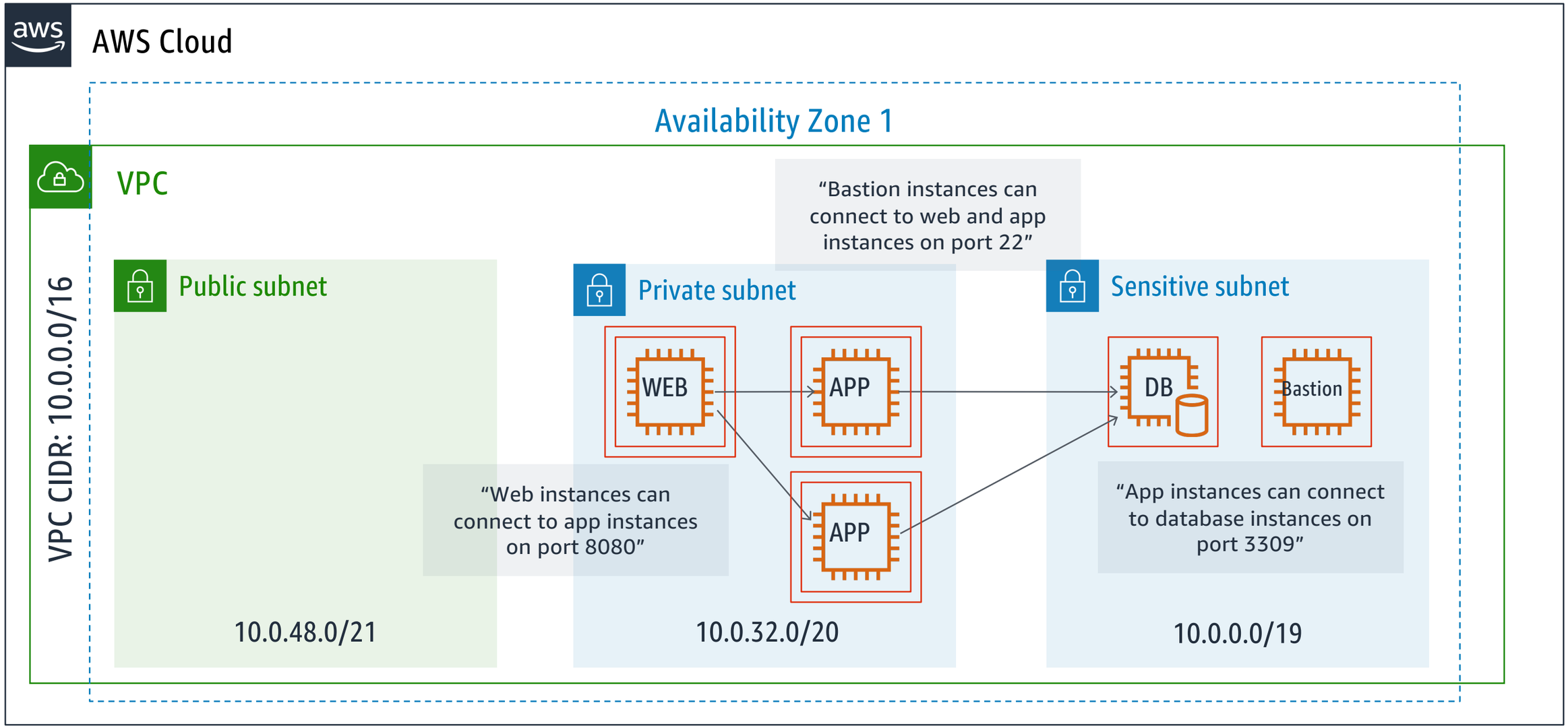
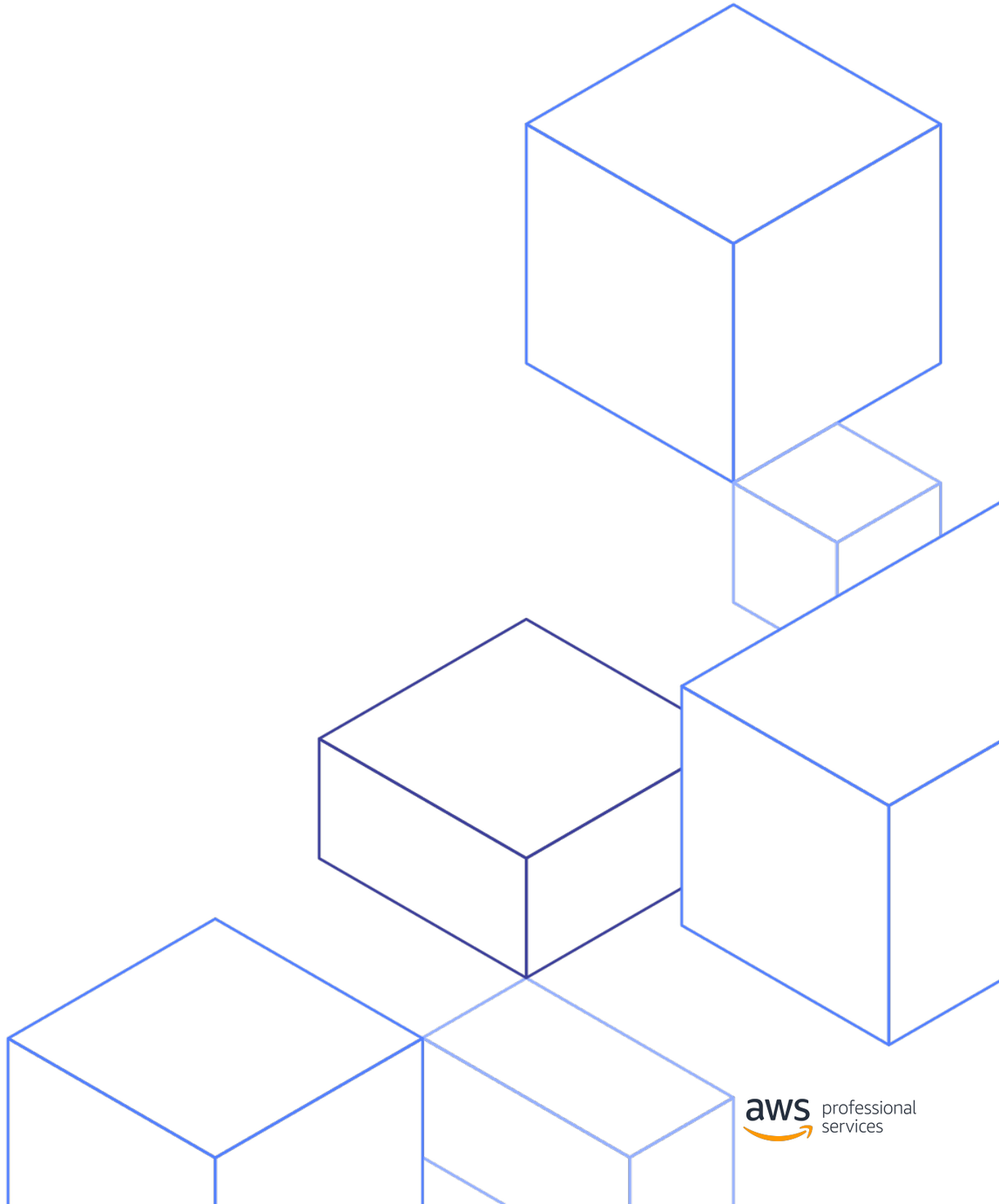
Security Groups – Stateful Firewall



Routing, NACL's, and Load Balancing

VPC Overview



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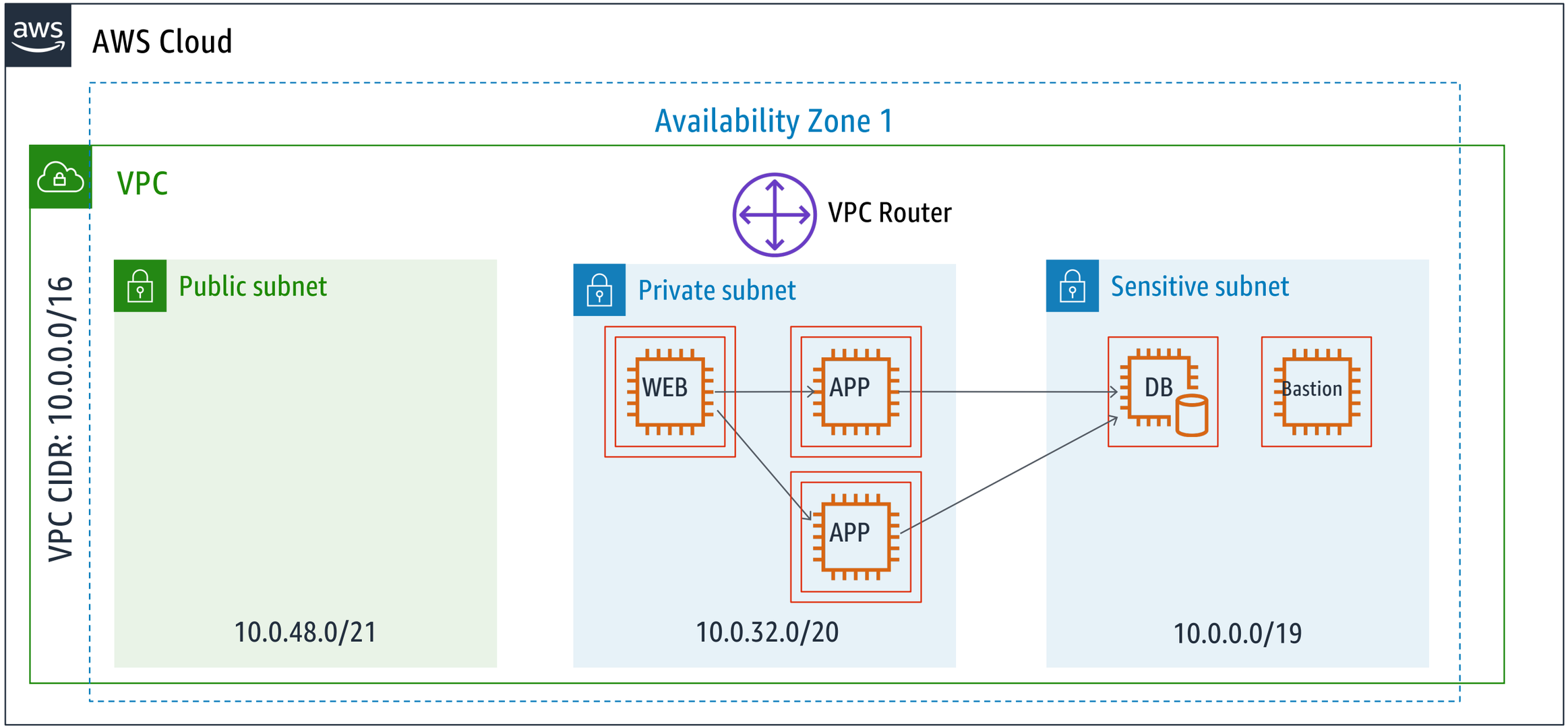
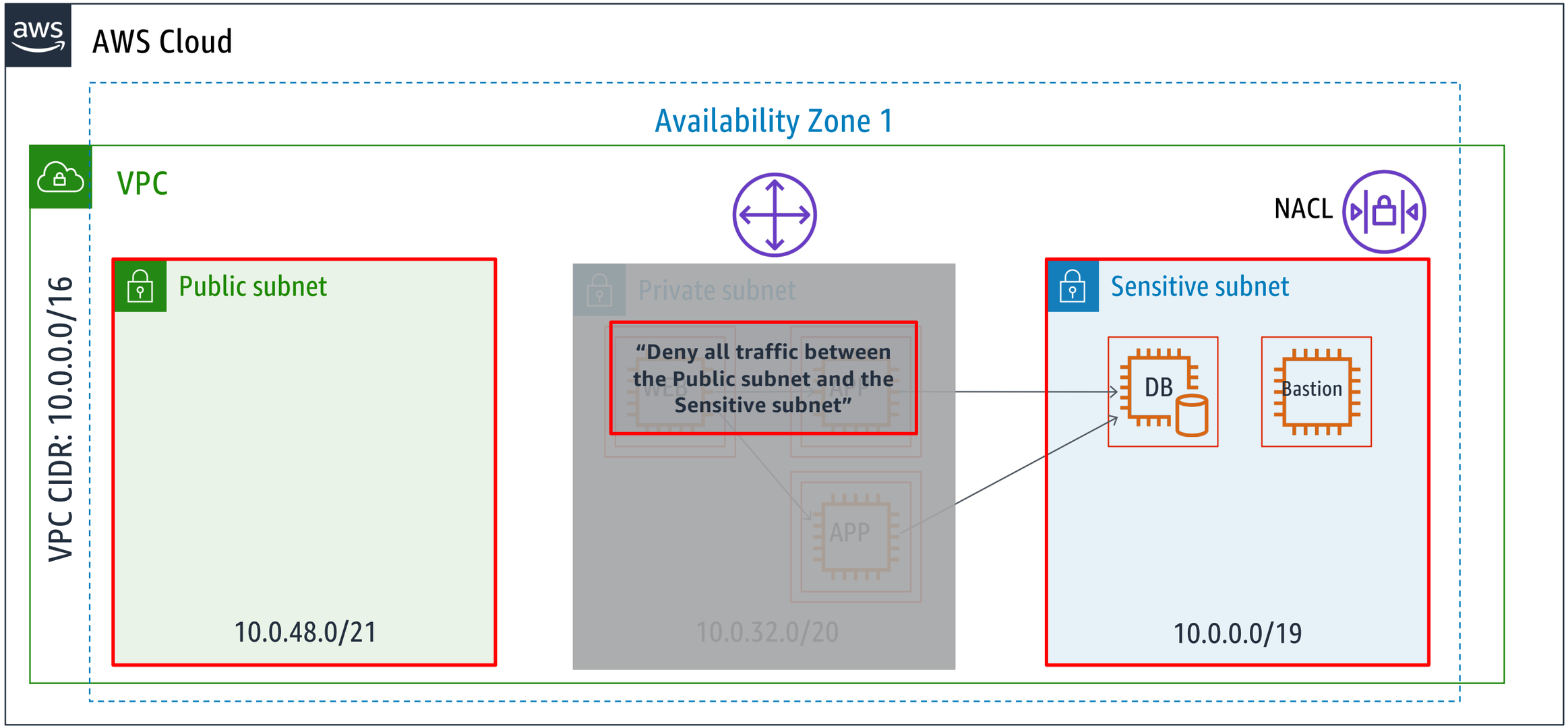
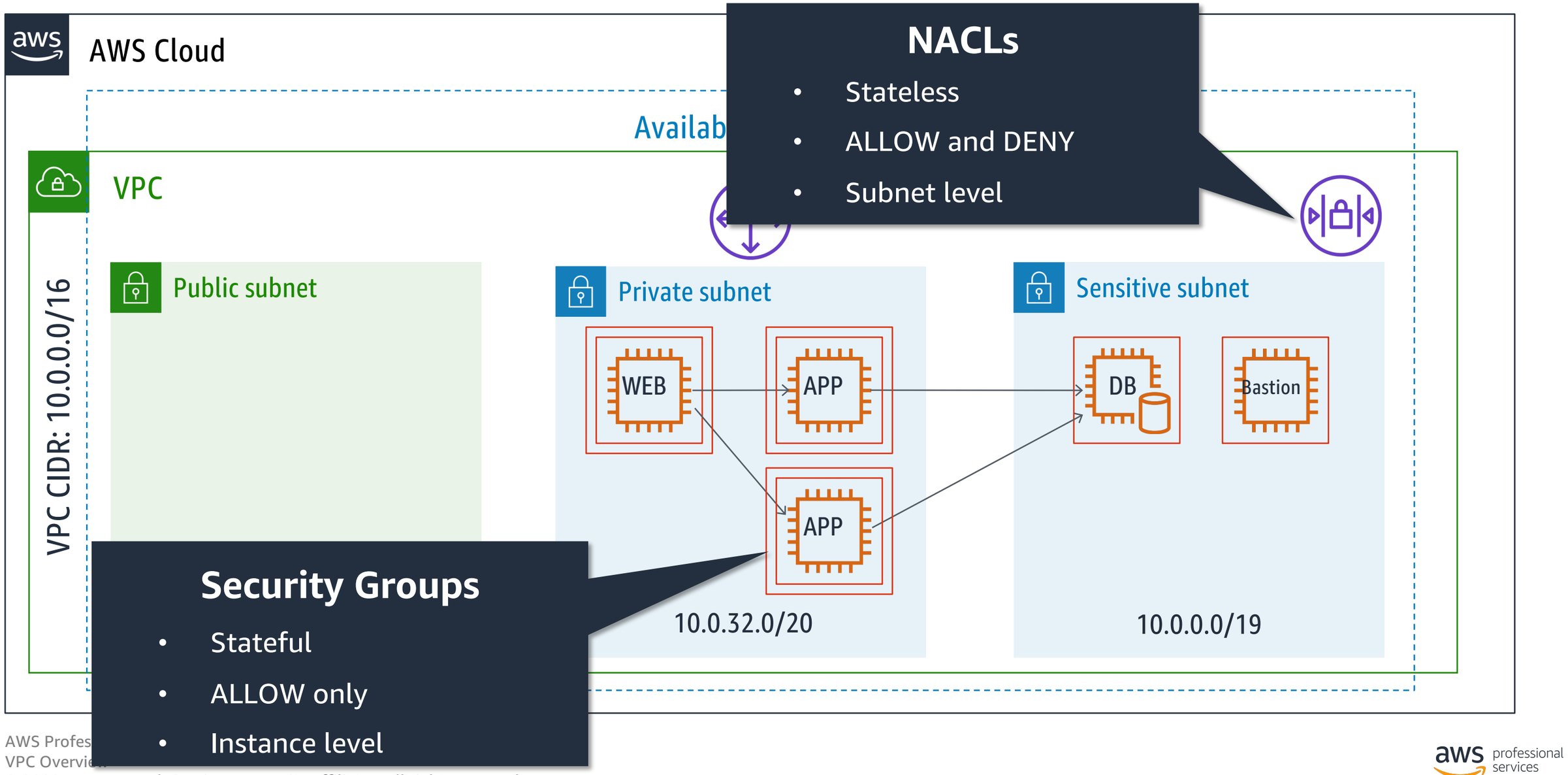
Routing



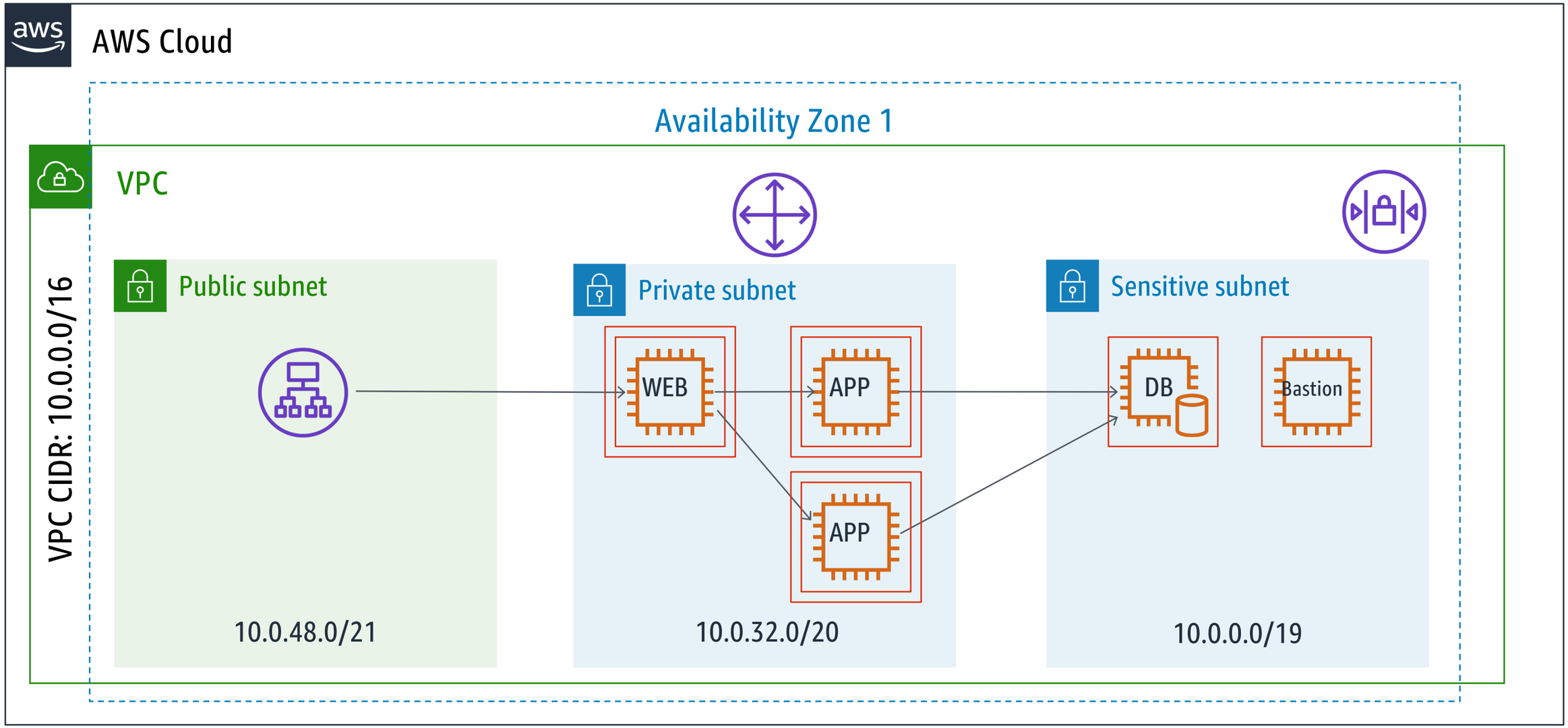
Network Access Control List (NACL)



NACLs and Security Groups



Load Balancing



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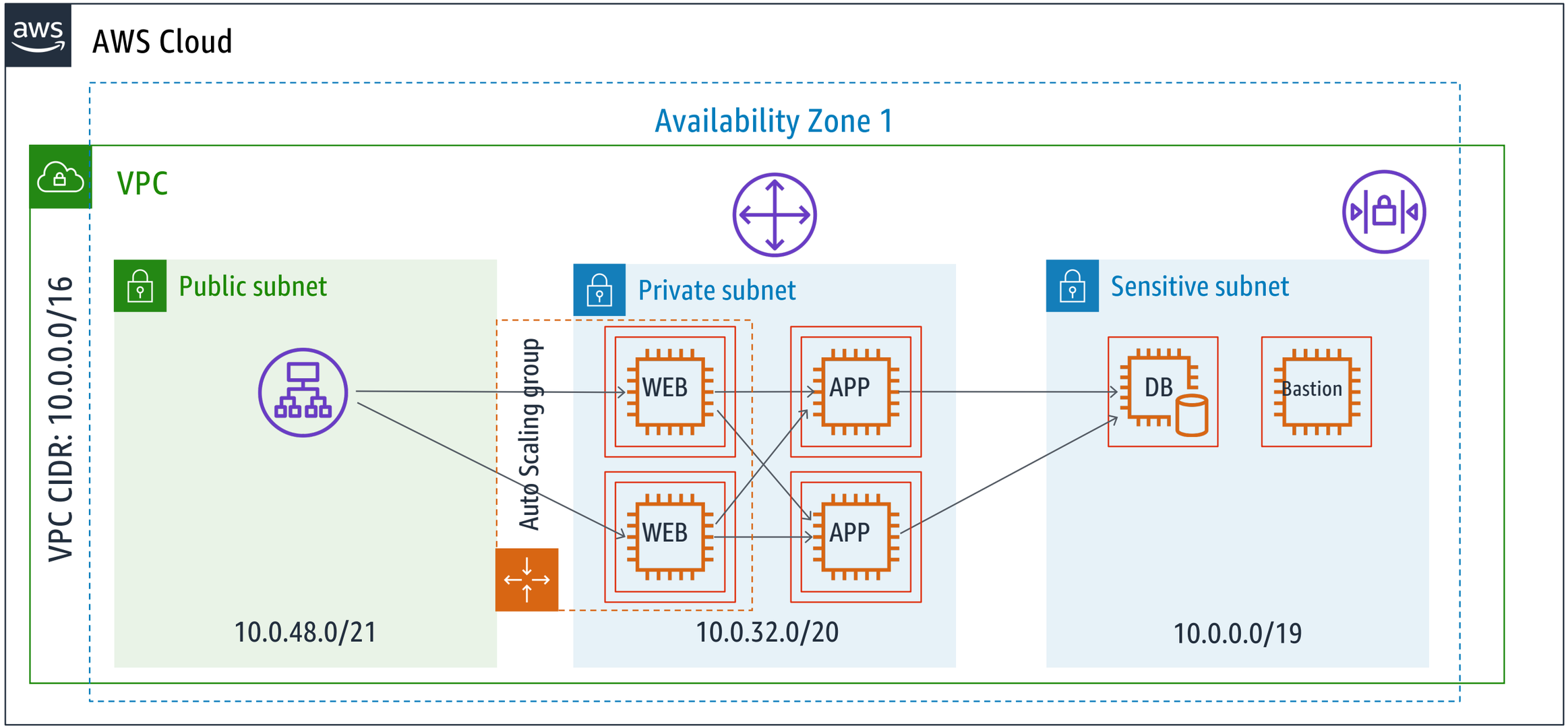
Load Balancing



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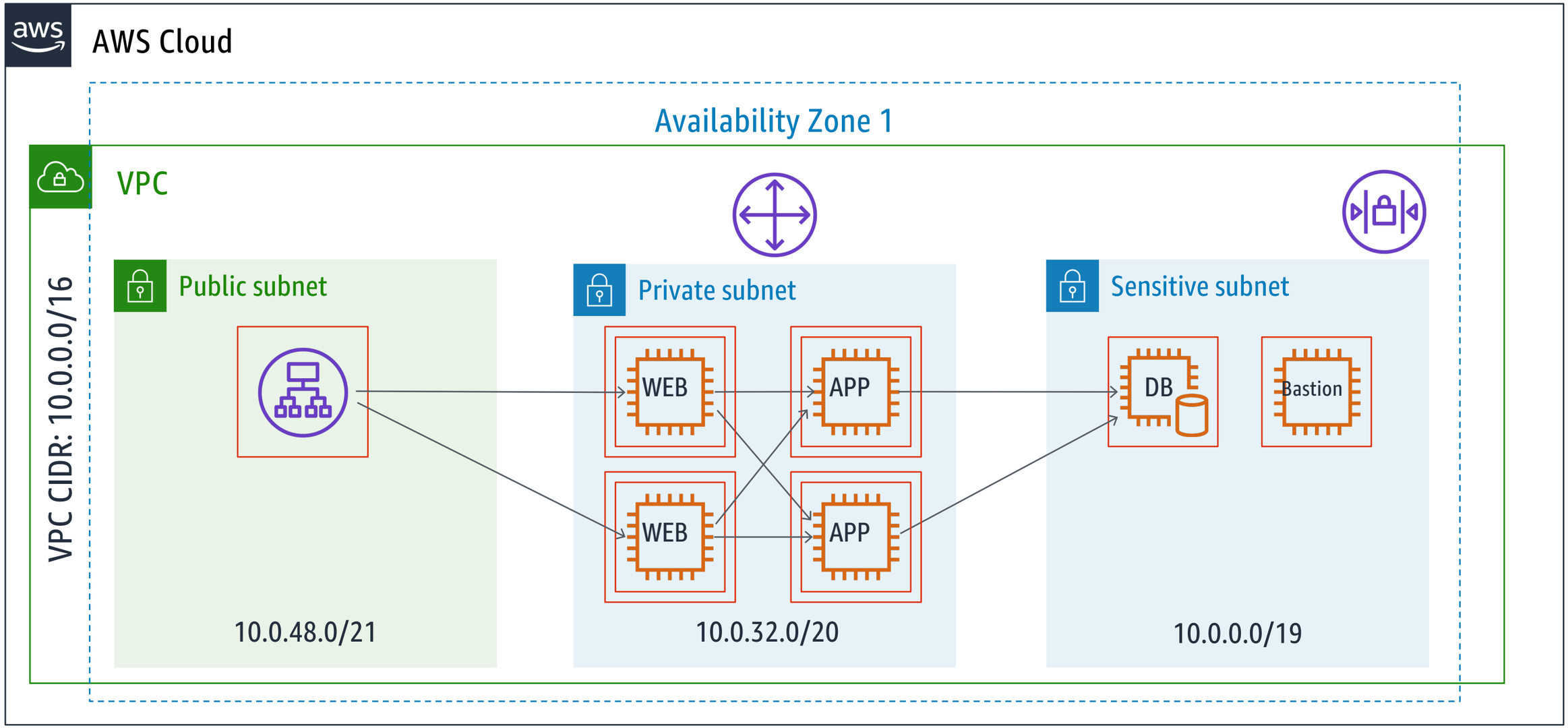
Load Balancing



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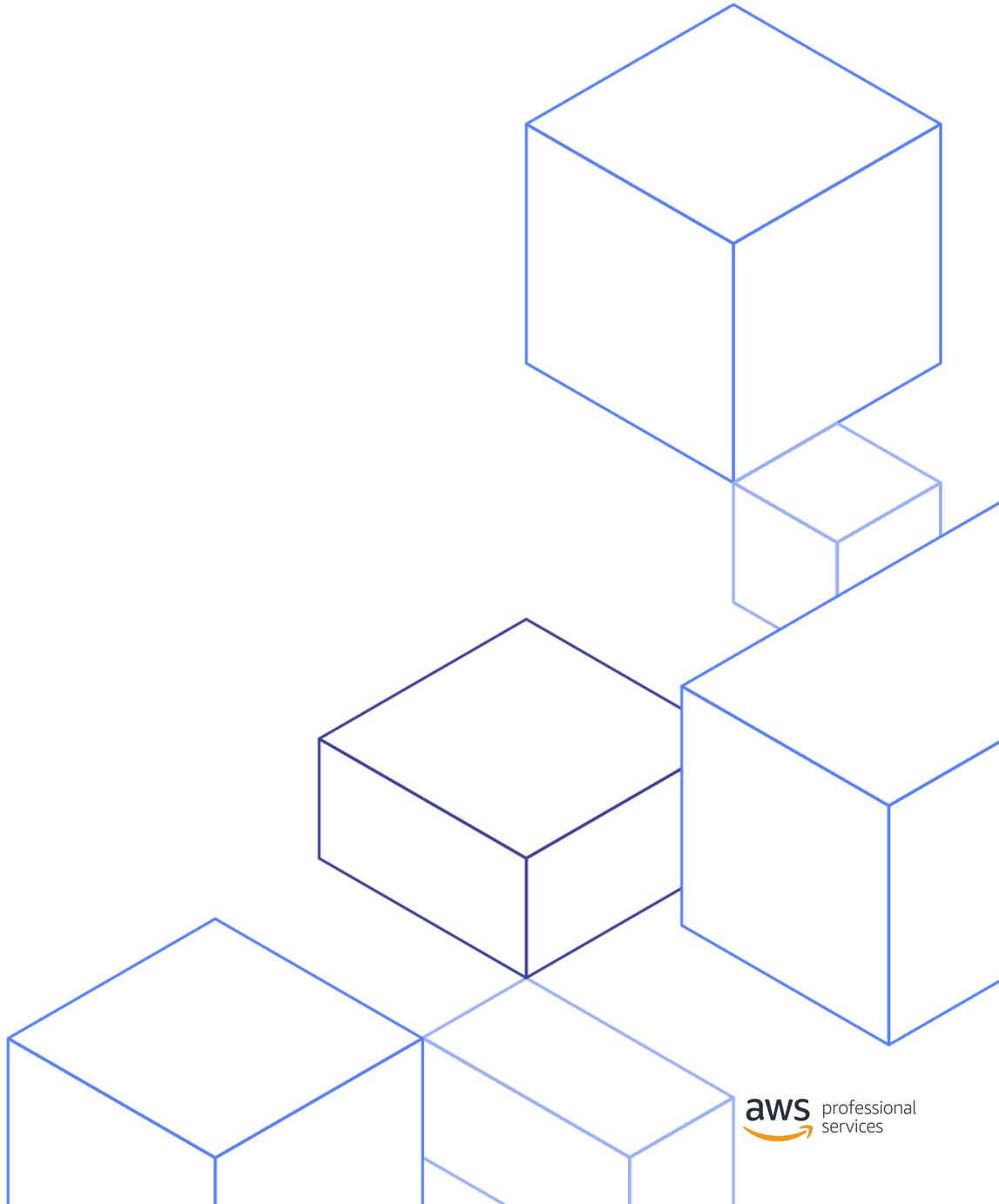
Load Balancing – ELB Types

	Classic Load Balancer	Application Load Balancer	Network Load Balancer	Gateway Load Balancer
Protocols	TCP, SSL/TLS, HTTP, HTTPS	HTTP, HTTPS	TCP, TLS	GENEVE
Network Layer	L4 – L7	L7	L4	L3 – L4
IP address as a target	✗	✓	✓	✓
Lambda function as a target	✗	✓	✗	✗
Server Name Indication (SNI)	✗	✓	✗	✗
Preserve Source IP address	✗	✓	✓	✓
Static IP	✗	✗	✓	✗(only available as VPC service endpoint)
User authentication	✗	✓	✗	✗
Back-end TLS authentication based on public-key	✓	✗	✗	✗

https://aws.amazon.com/elasticloadbalancing/features/

DNS

VPC Overview



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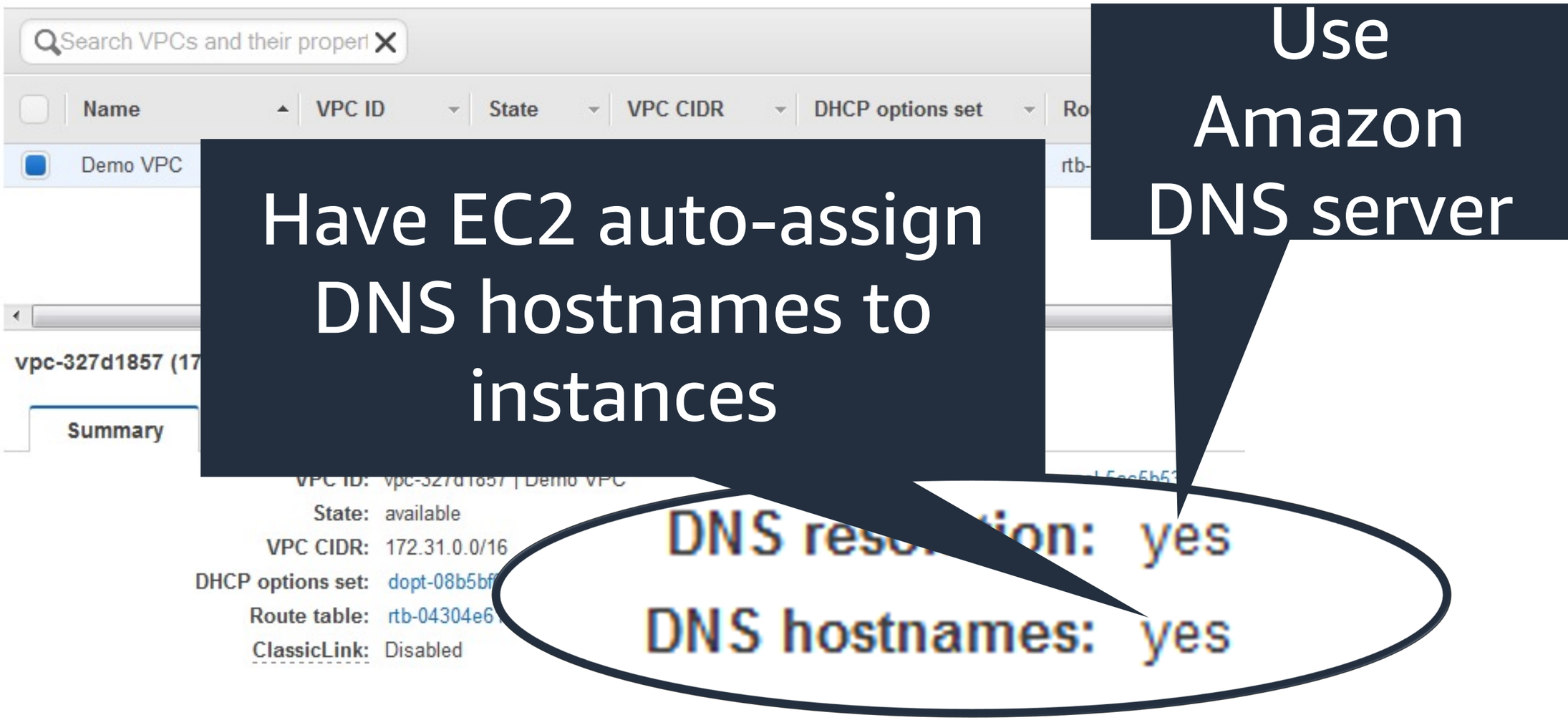
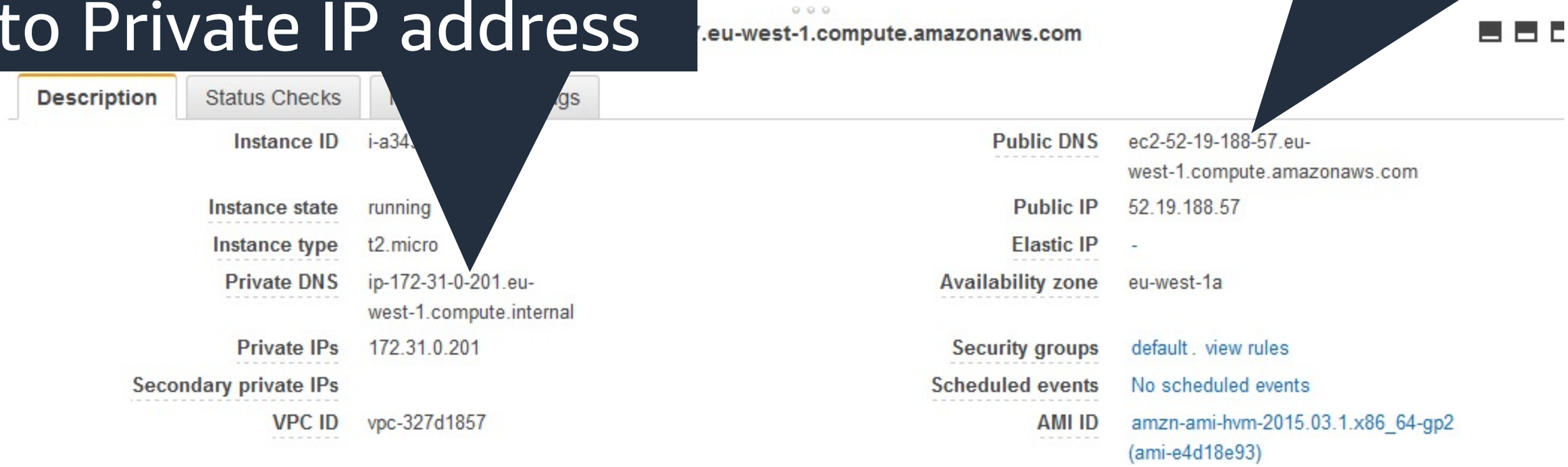
VPC DNS Options



EC2 DNS Hostnames

Internal DNS hostname: Resolves to Private IP address

External DNS name: Resolves to…



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EC2 DNS Hostnames from outside the VPC

```
C:\>nslookup ec2-52-18-10-57.eu-west-1.compute.amazonaws.com

Non-authoritative answer:
Name:    ec2-52-18-10-57.eu-west-1.compute.amazonaws.com
Address:  52.18.10.57
```

Outside your VPC:
Public IP address

EC2 DNS Hostnames from inside the VPC

```
[ec2-user@ip-172-31-0-201 ~]$ dig ec2-52-18-10-57.eu-west-1.compute.amazonaws.com

; <<>> DiG 9.8.2rc1-RedHat-9.8.2-0.30.rc1.38.amzn1 <<>> ec2-52-18-10-
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 36622
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;ec2-52-18-10-57.eu-west-1.compute.amazonaws.com. IN A

;; ANSWER SECTION:
ec2-52-18-10-57.eu-west-1.compute.amazonaws.com. 60 IN A 172.31.0.137

;; Query time: 2 msec
;; SERVER: 172.31.0.2#53(172.31.0.2)
;; WHEN: Wed Sep  9 22:32:56 2015
;; MSG SIZE  rcvd: 81
```

Inside your VPC:
Private IP address

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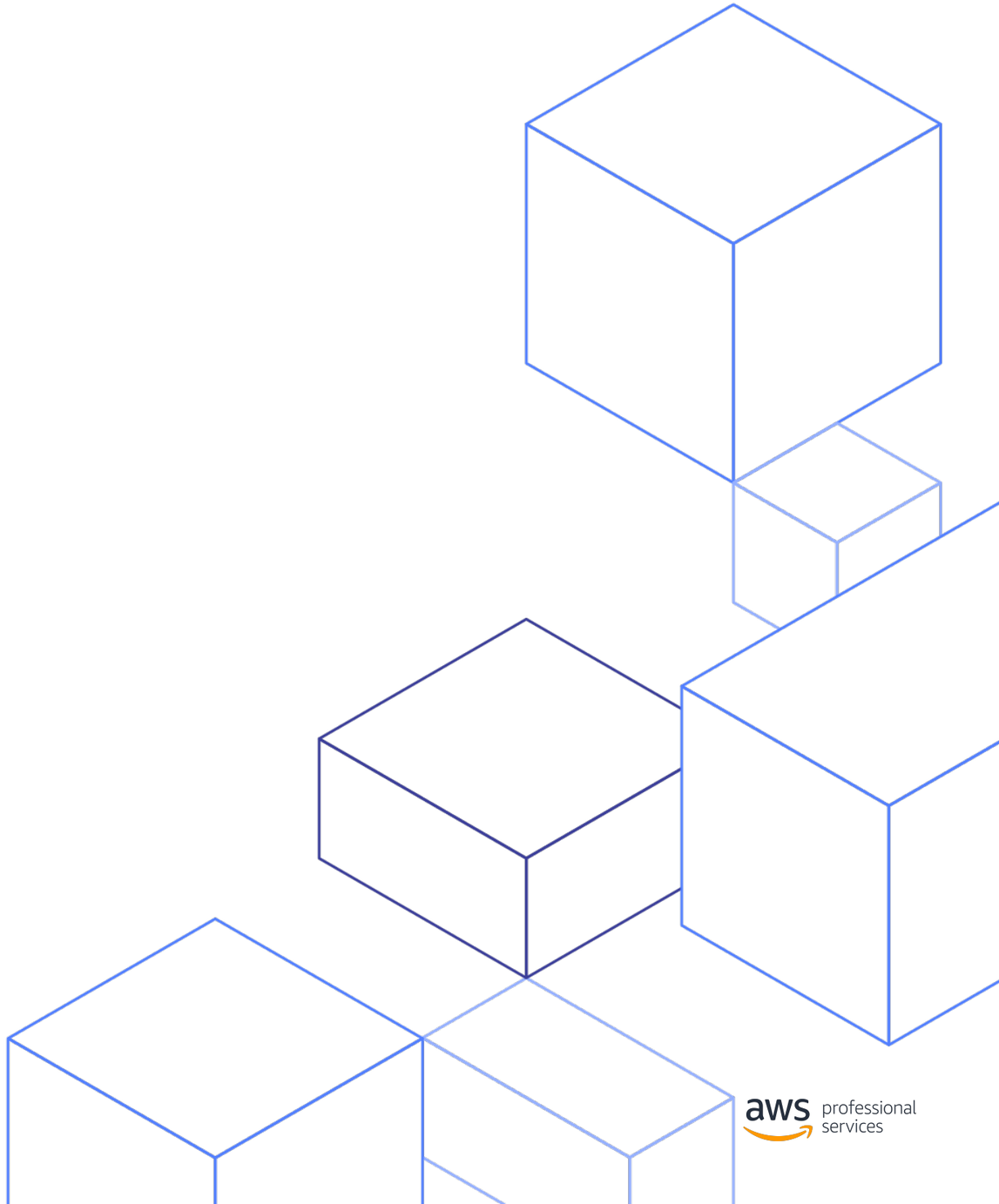
Connectivity

VPC Overview



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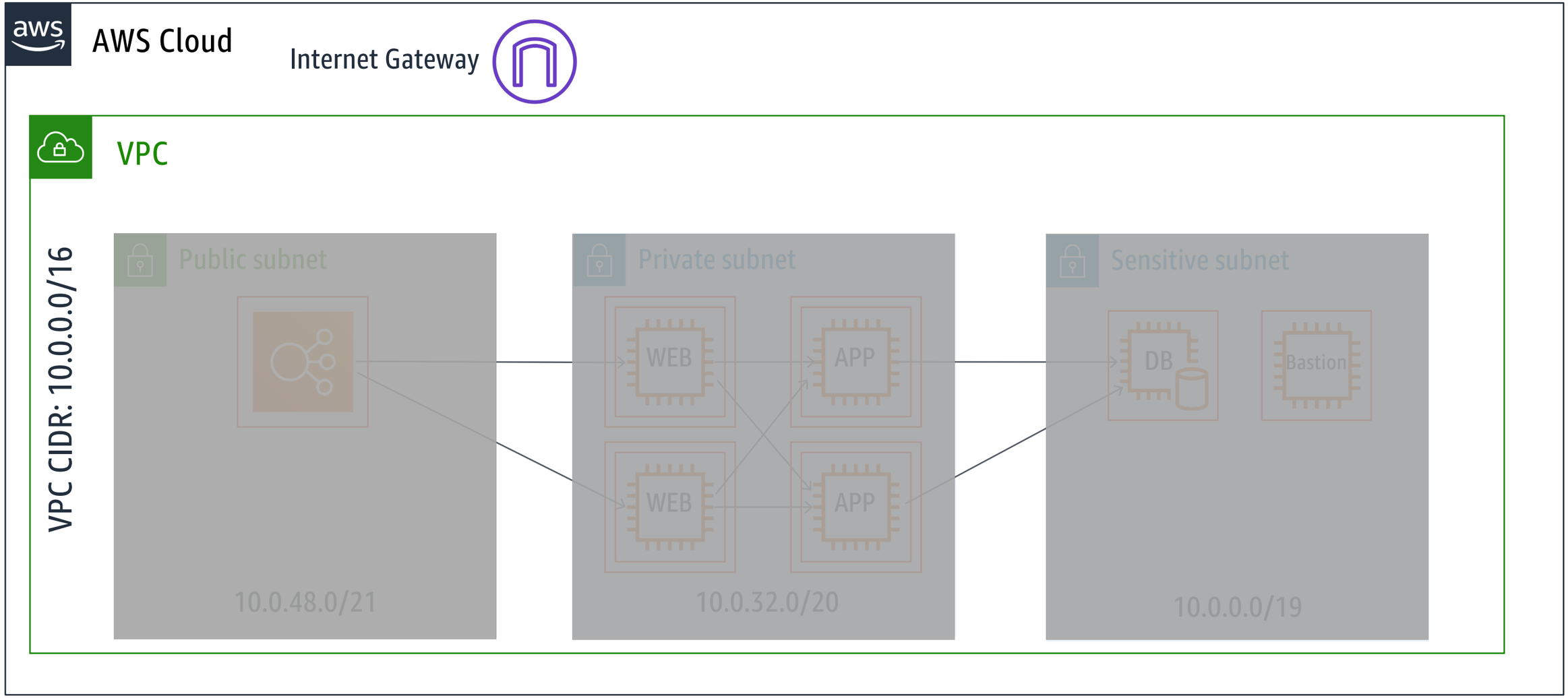
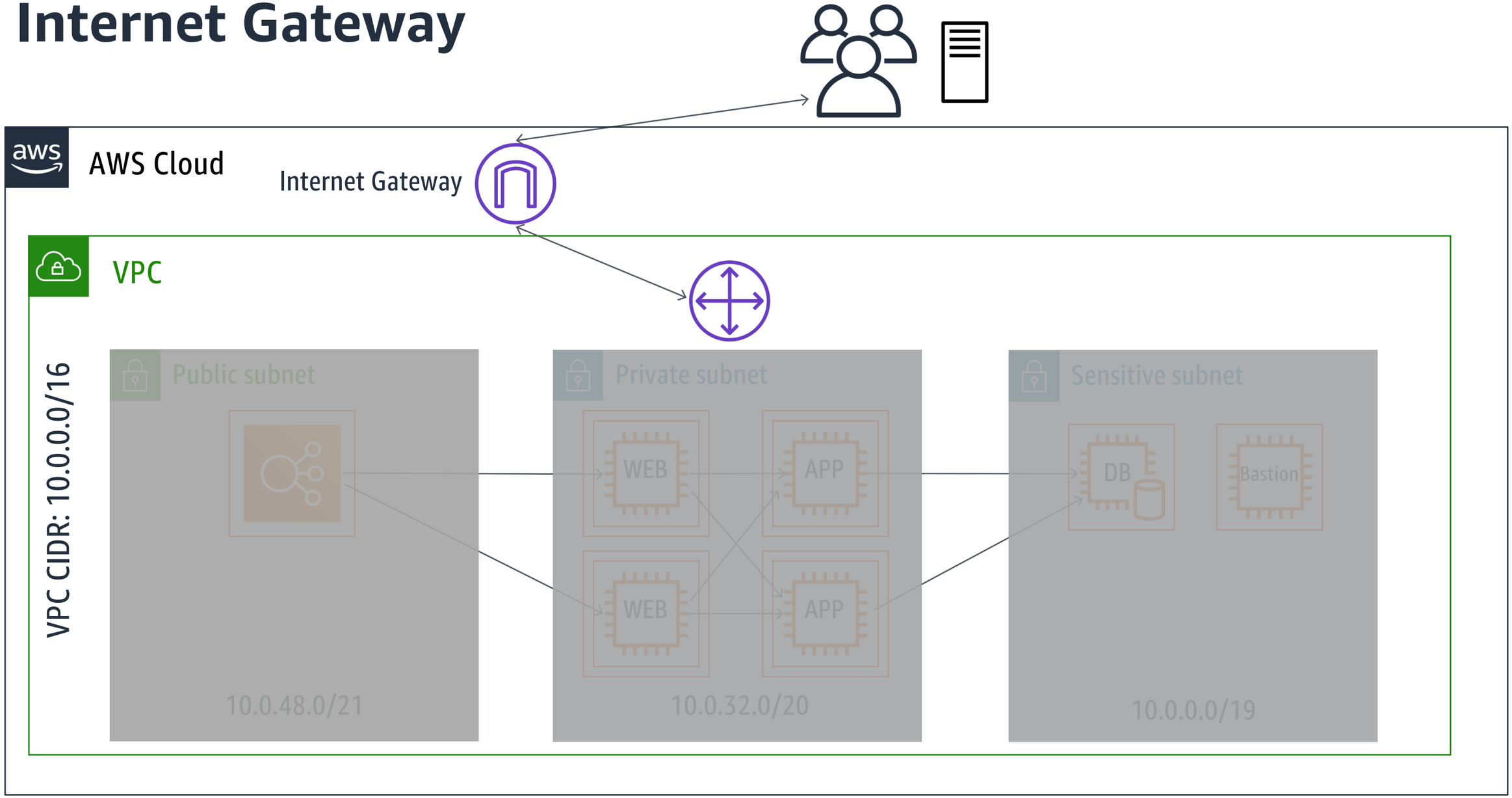
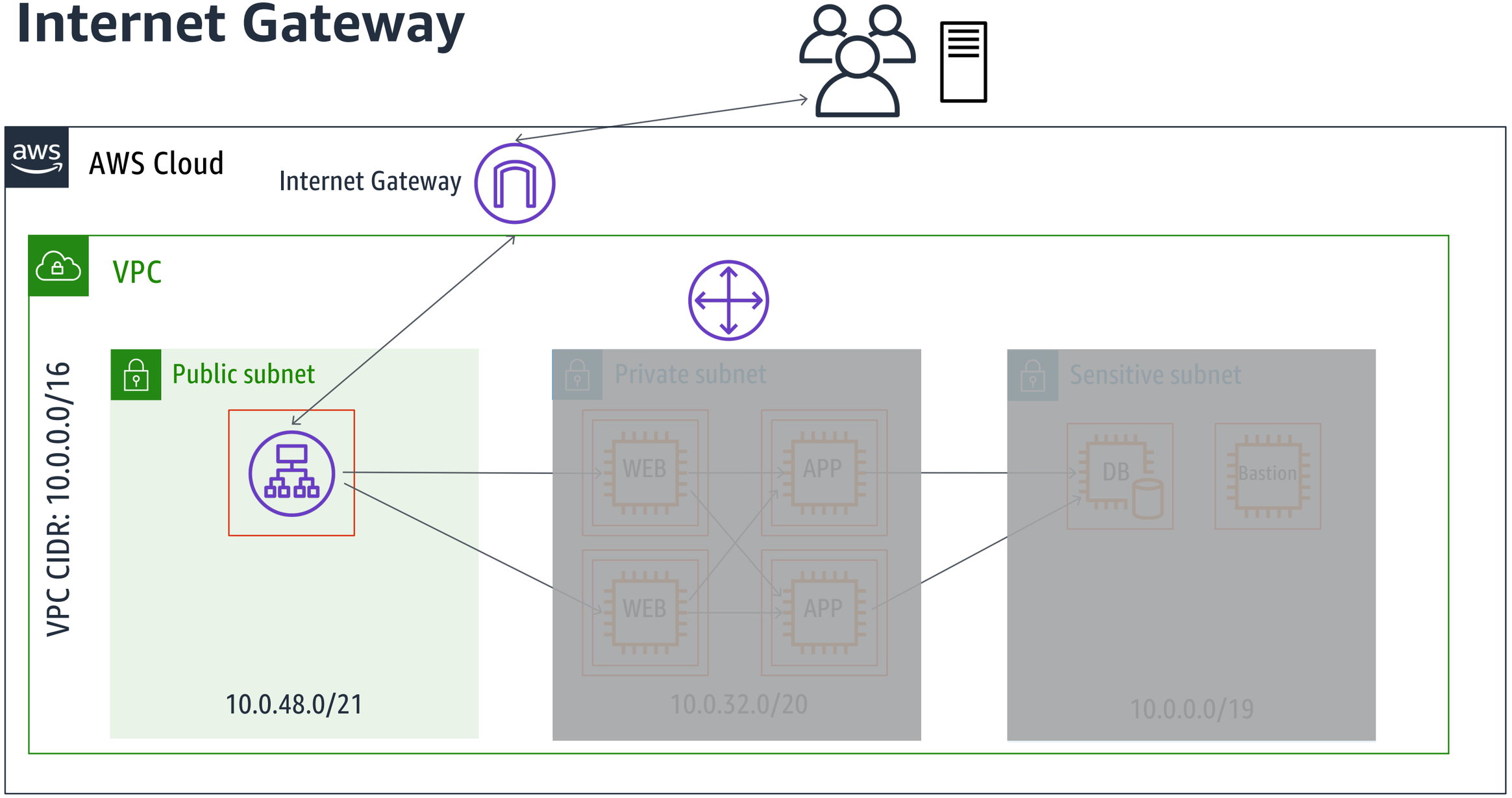
Internet Gateway



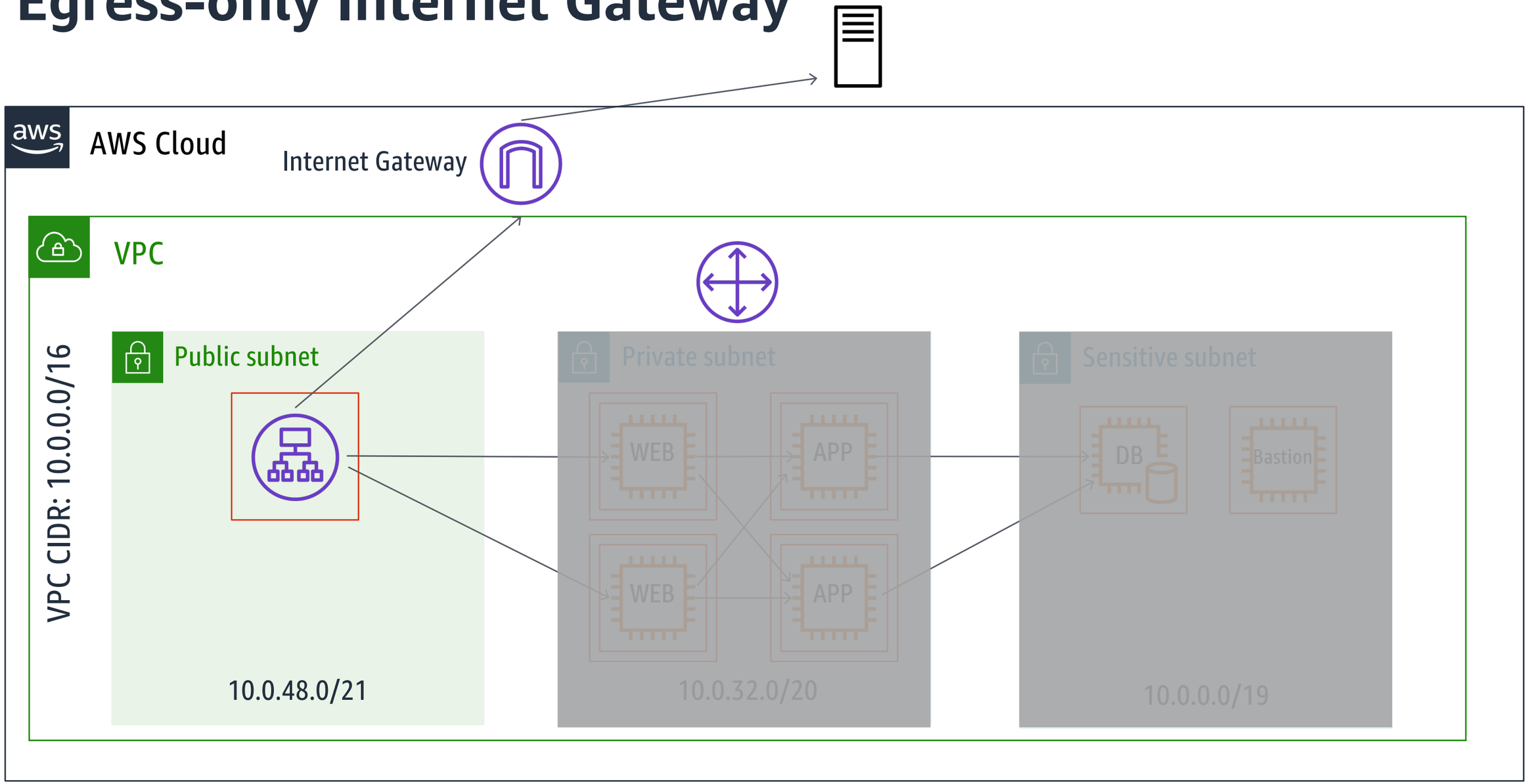
Internet Gateway



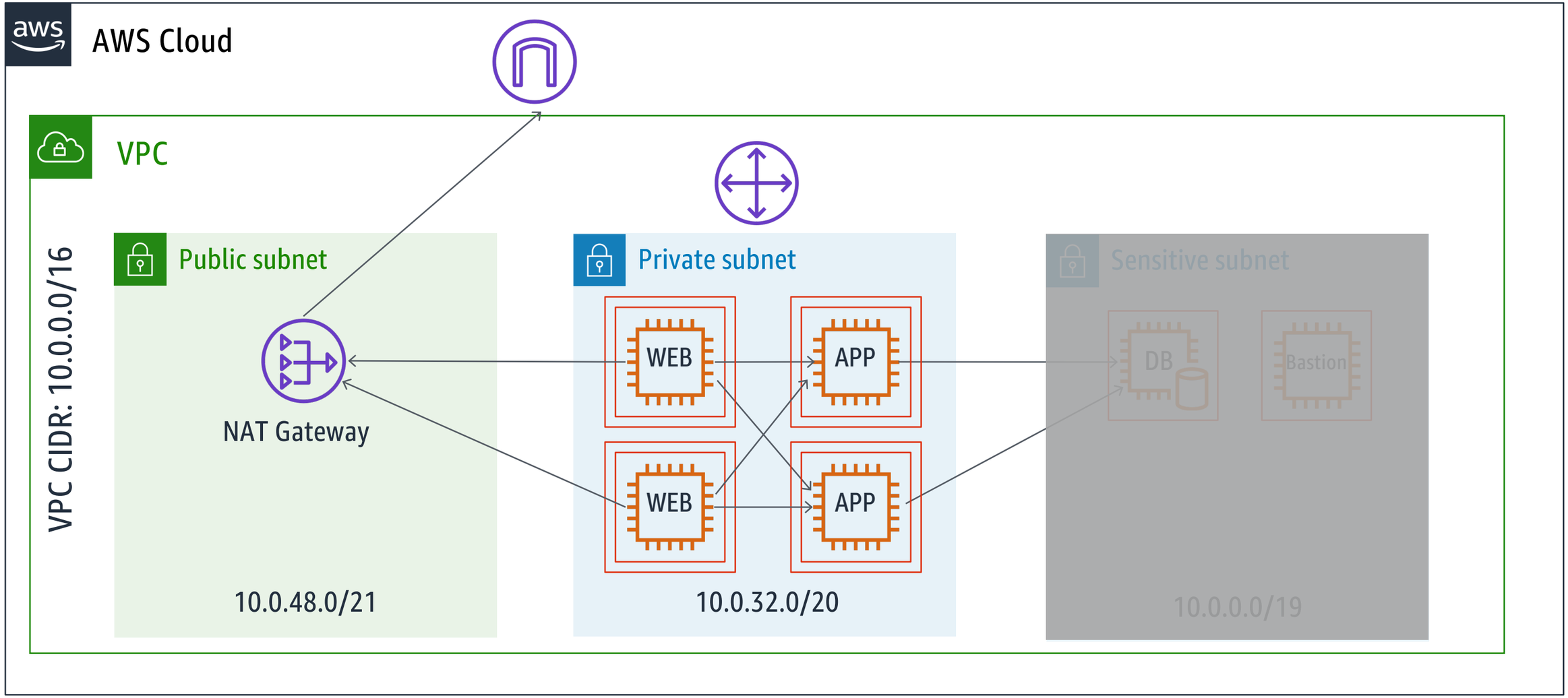
Internet Gateway



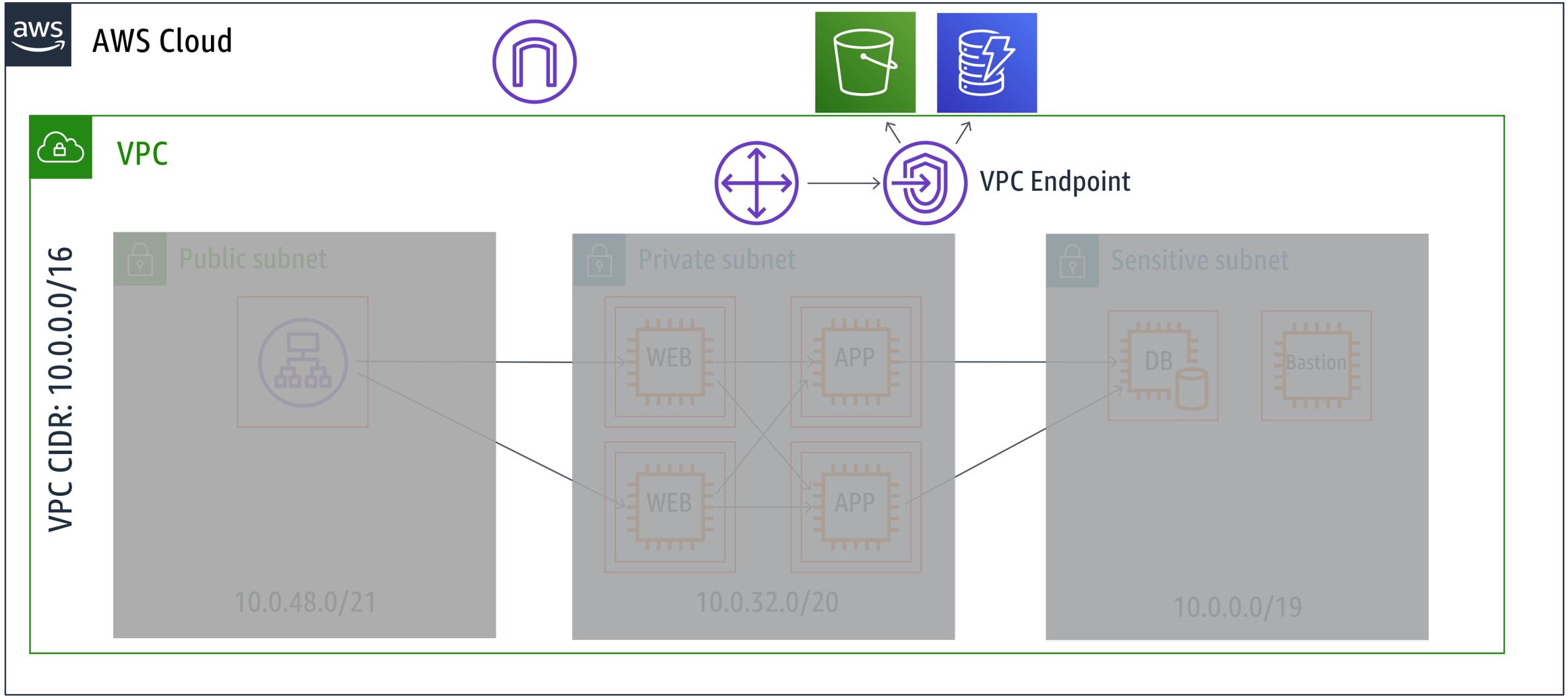
Egress-only Internet Gateway



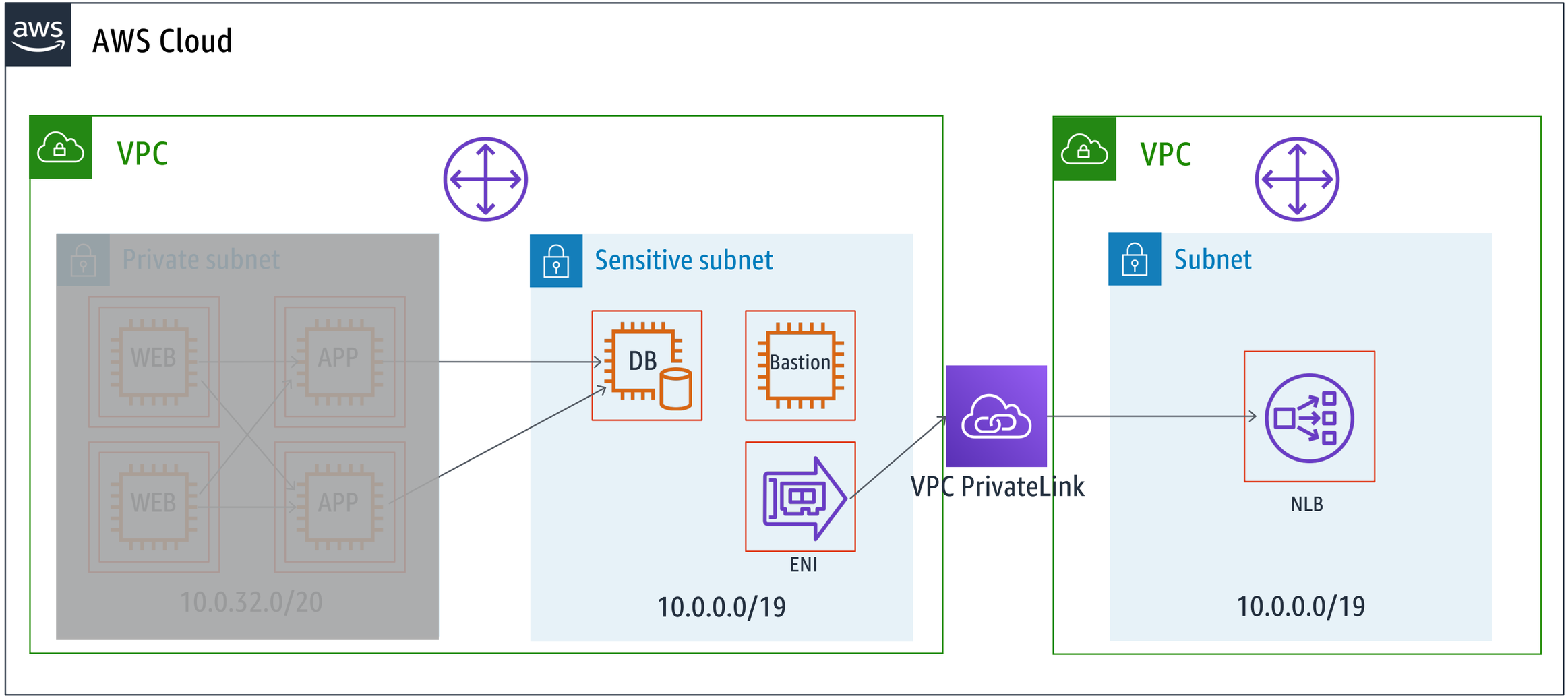
NAT Gateway



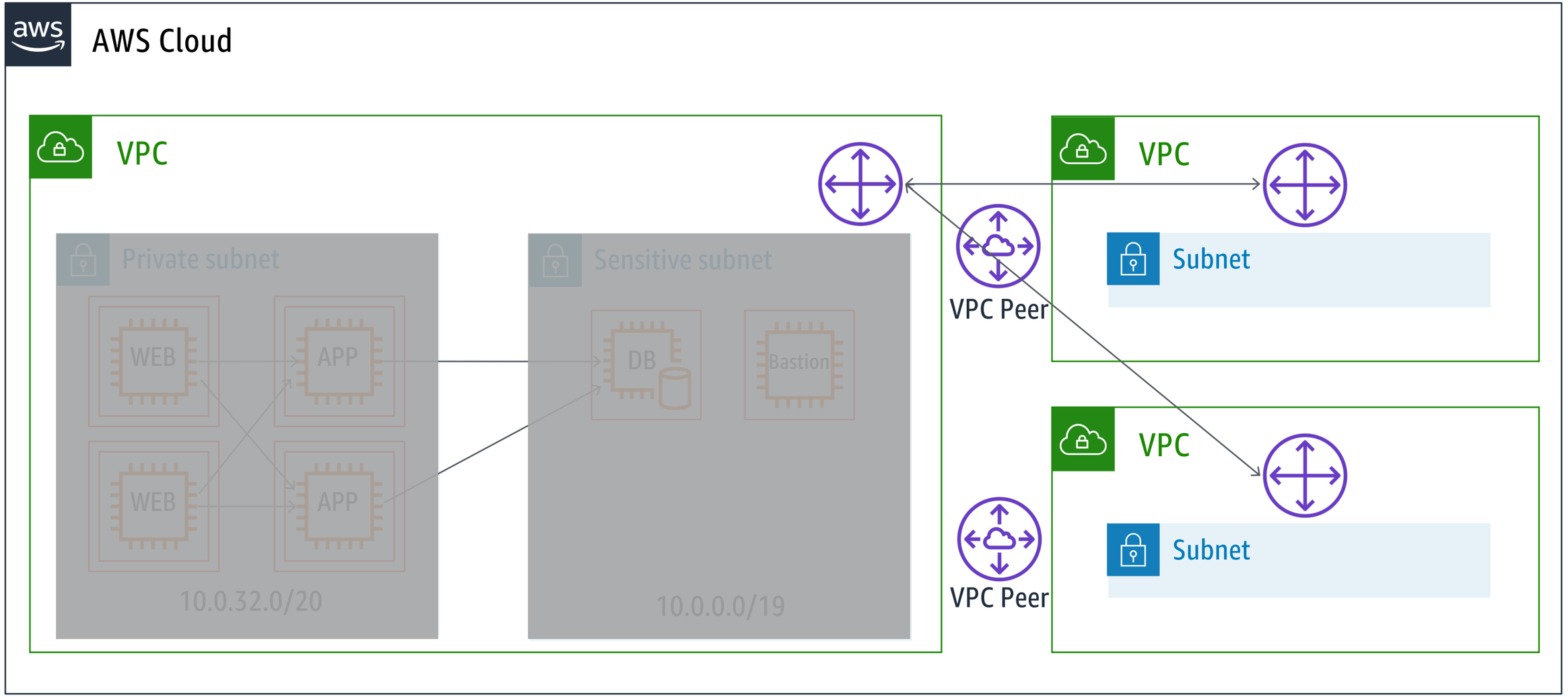
VPC Endpoints



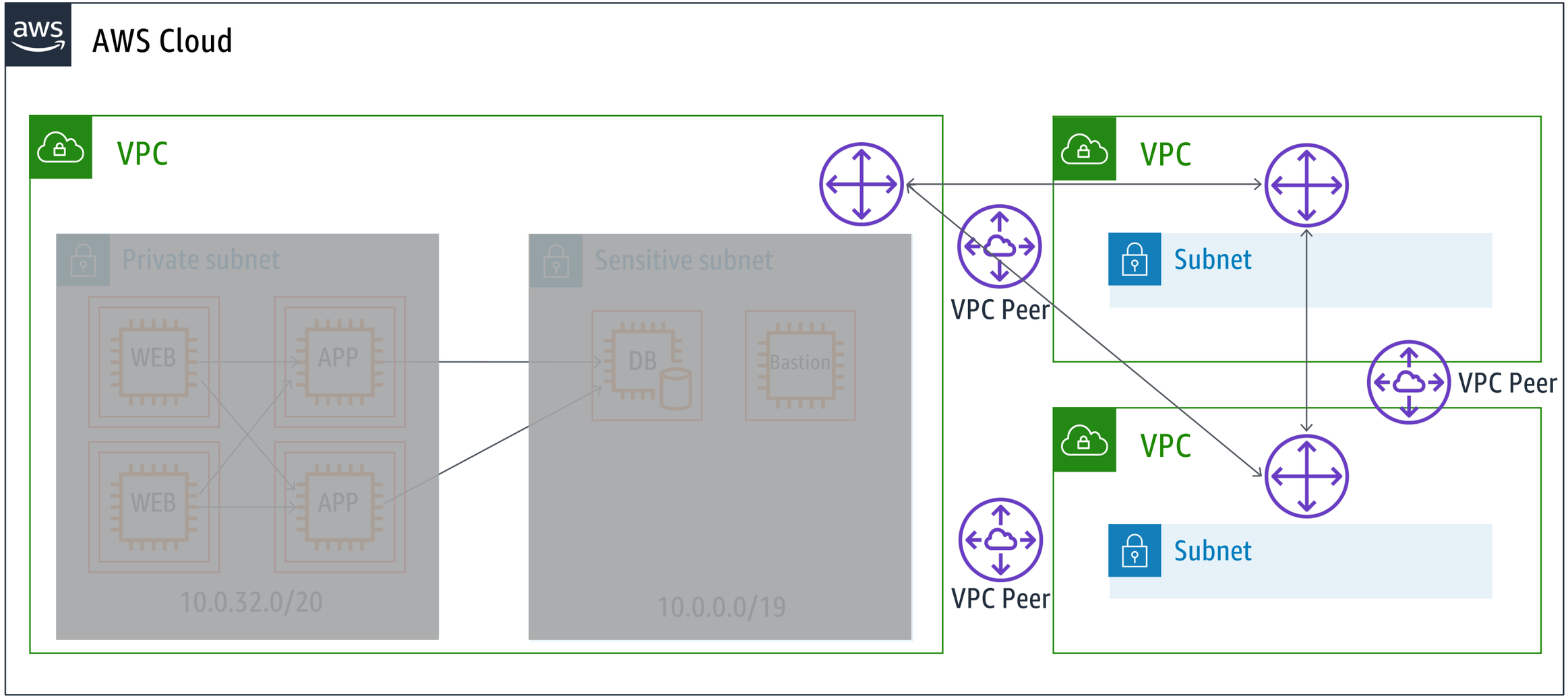
VPC PrivateLink



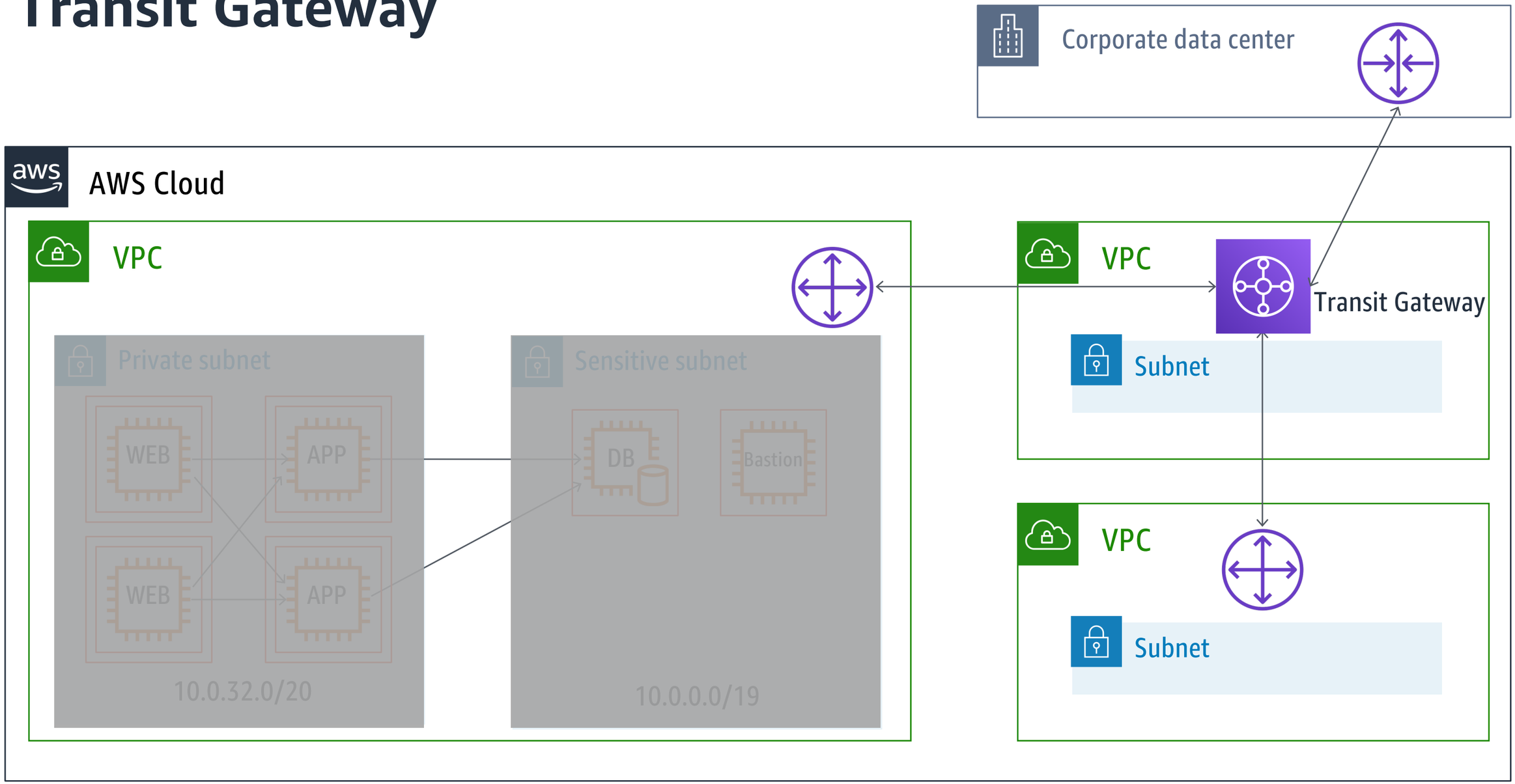
VPC Peering



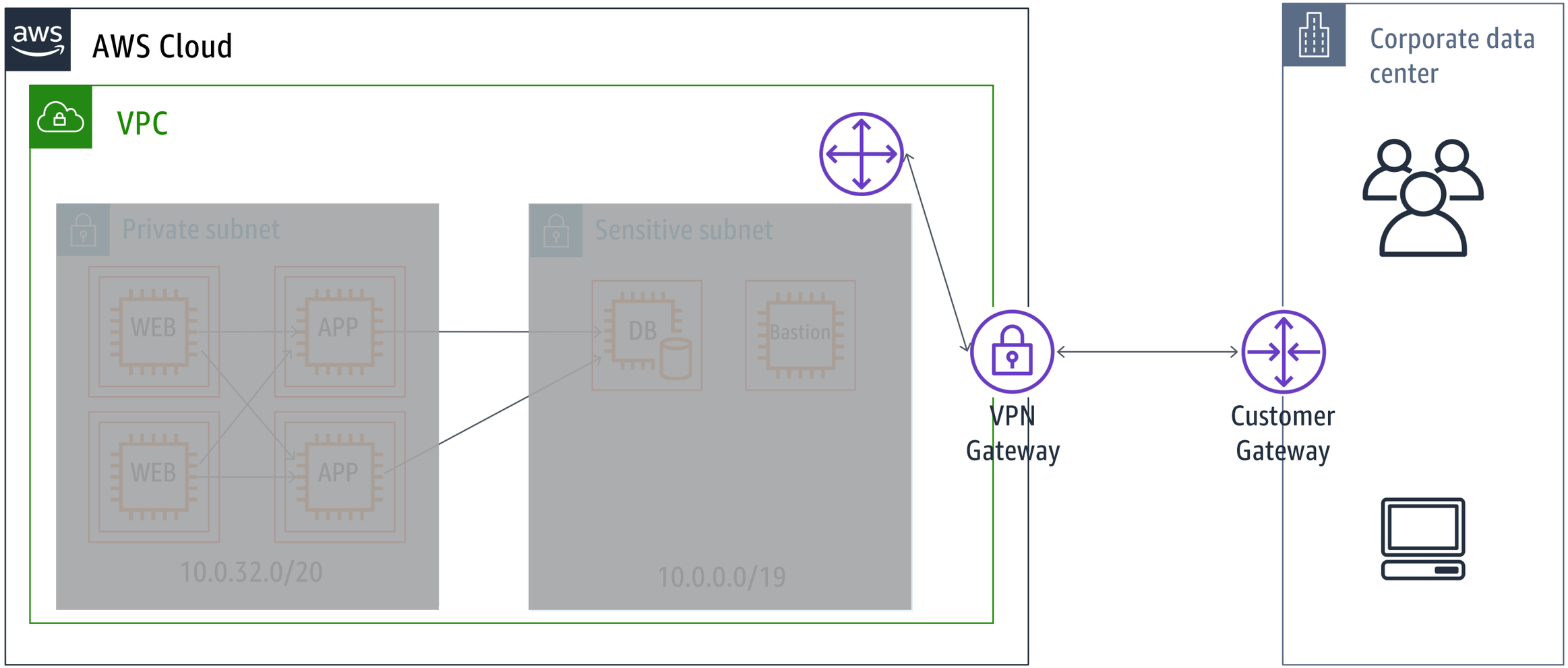
VPC Peering



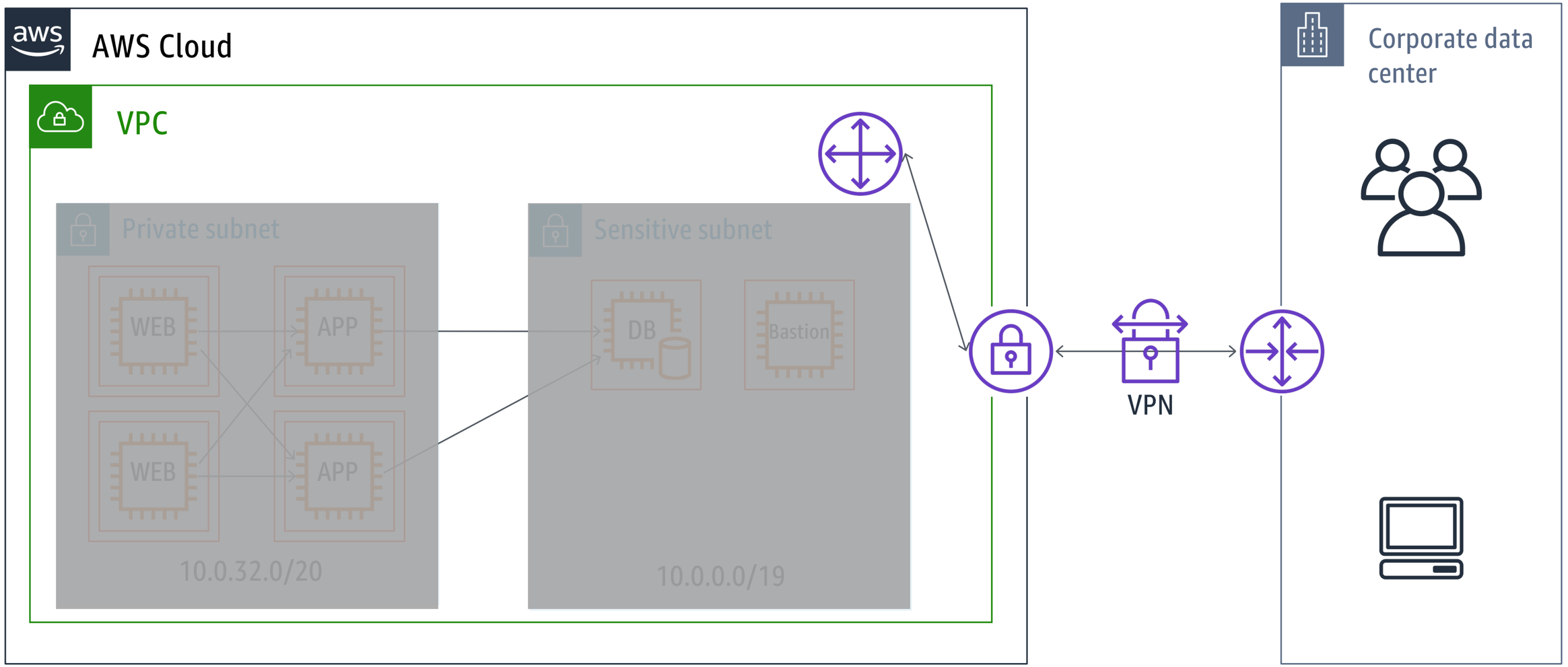
Transit Gateway



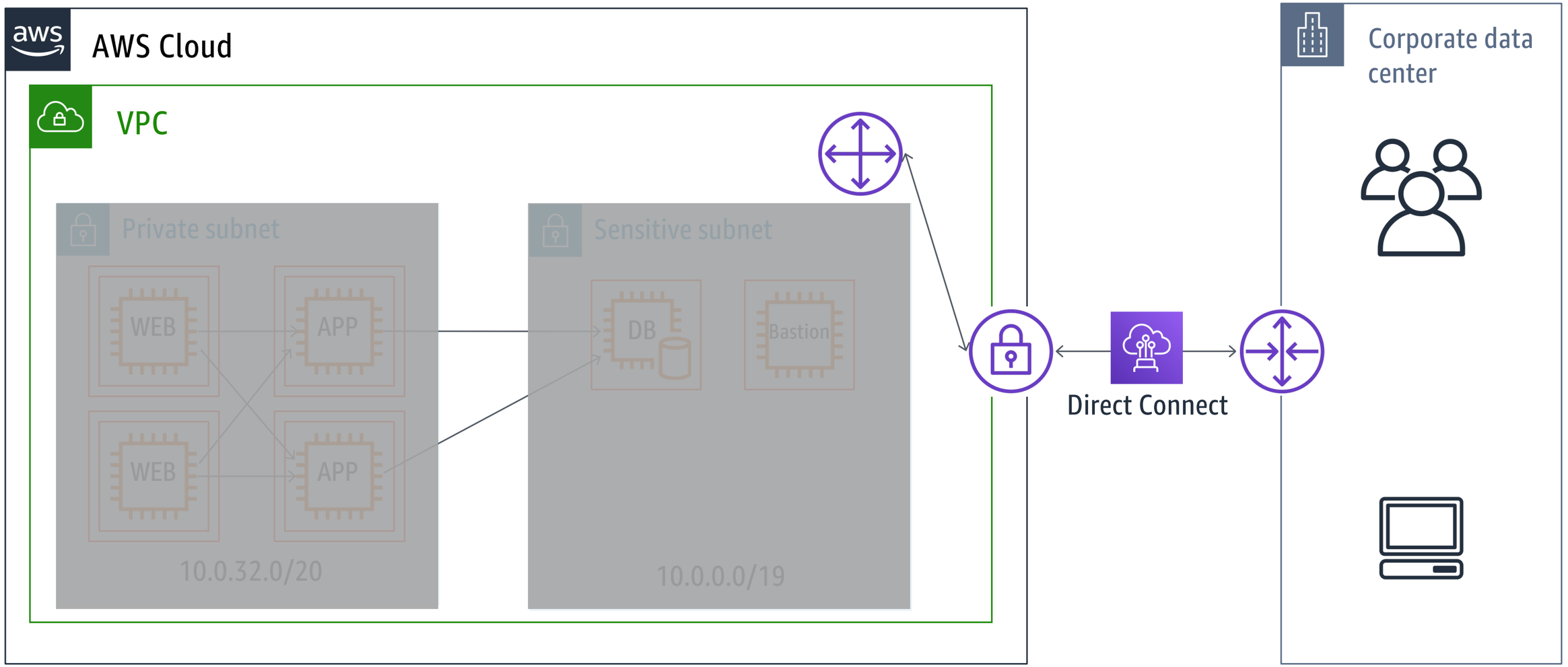
VPN



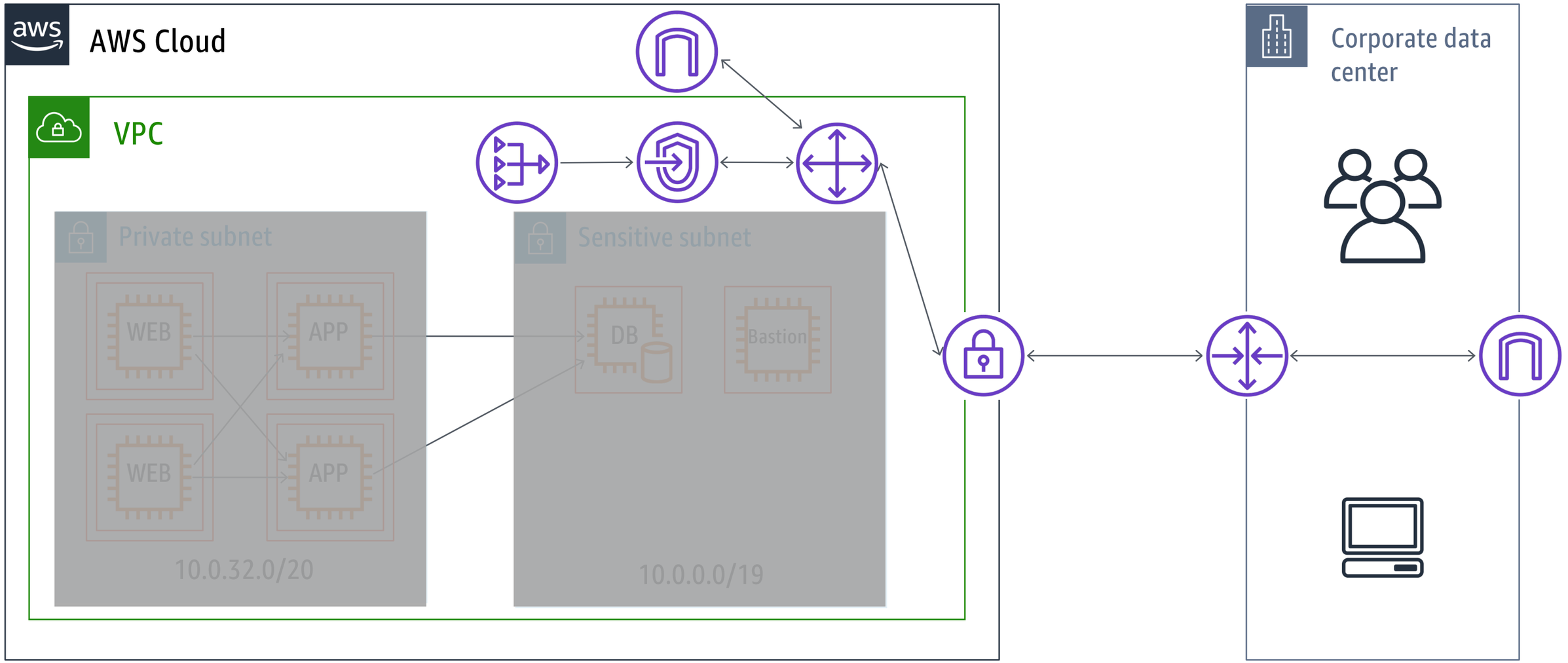
VPN



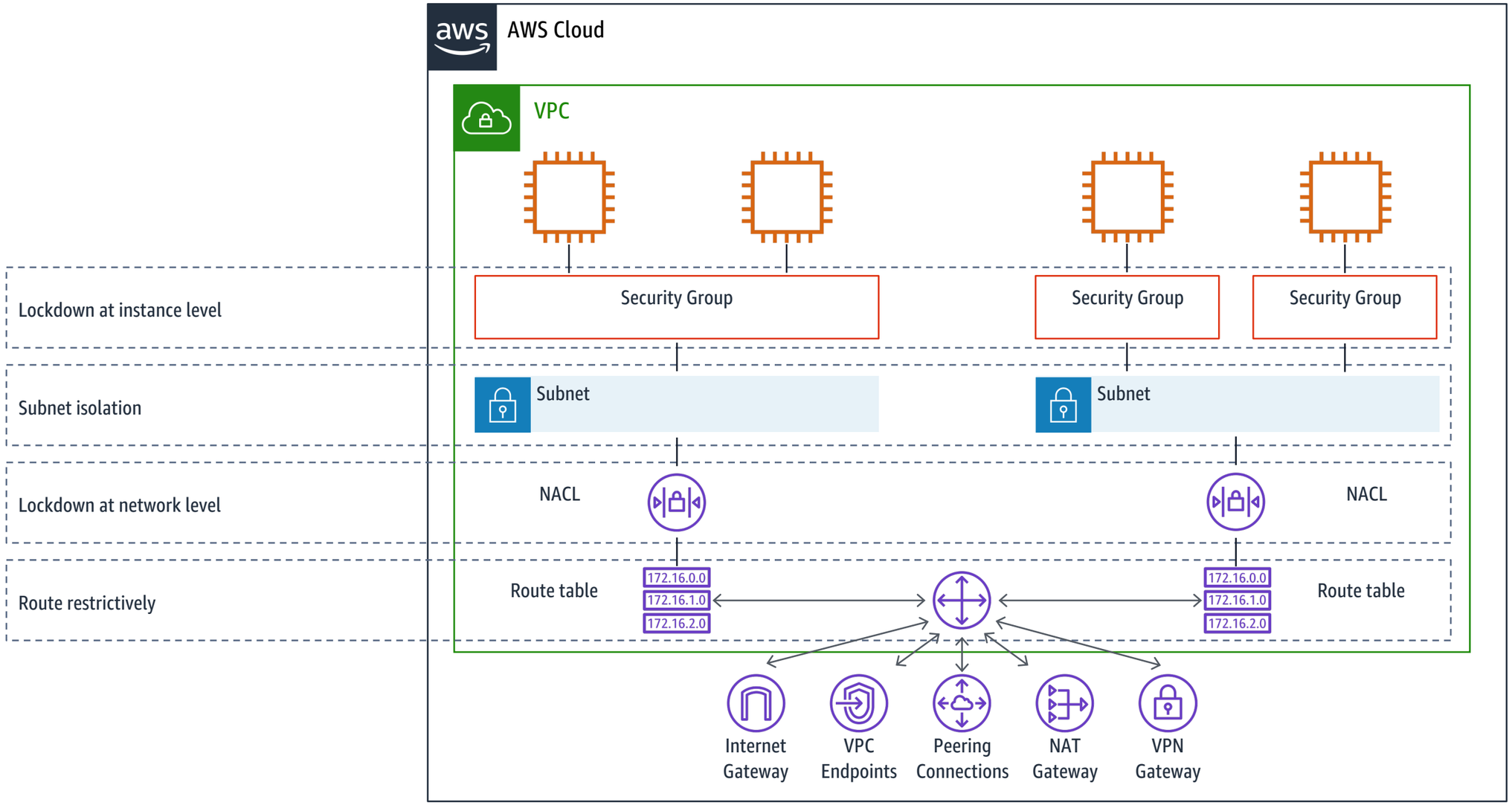
Direct Connect



Multiple Gateways



Network Defense in Depth



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Questions?