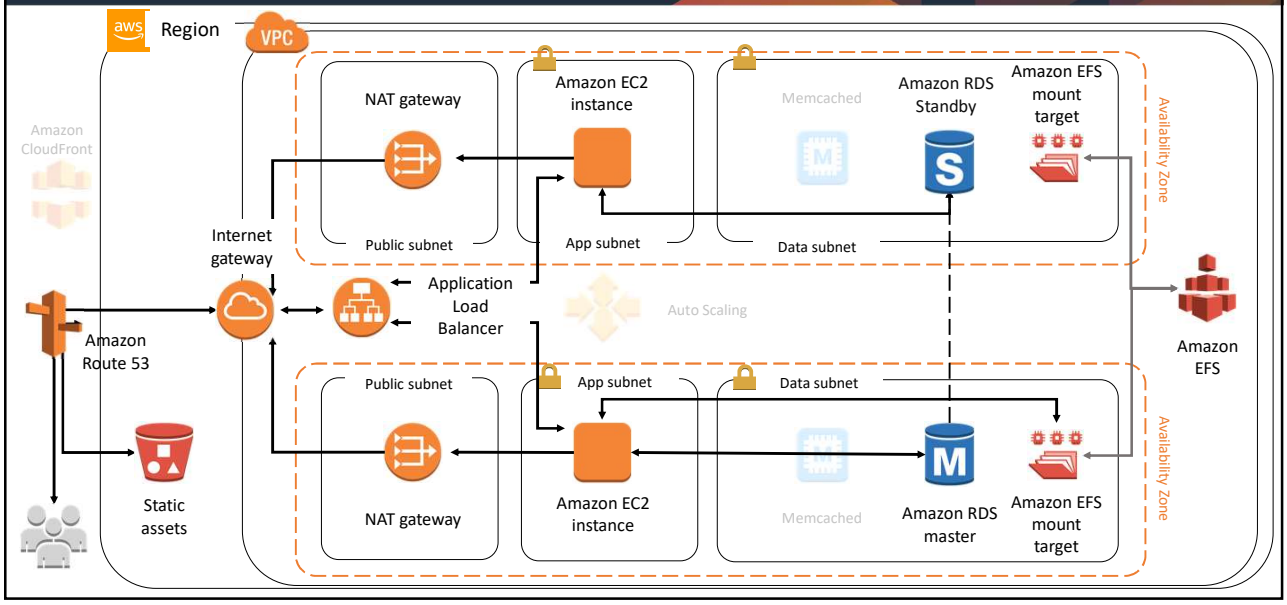
aws training and certification

# Networking In AWS Part 2

**Module 7**

0

## High Availability




1

# Module 7

aws training and certification

## The architectural need

Your application needs to support a much larger user base and variable load, and it needs to handle Availability Zone-level failures.

**Module Overview**

- Connecting Networks
- VPC Endpoints
- Load Balancing
- High Availability

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

2

aws training and certification

# Connecting Networks

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

3

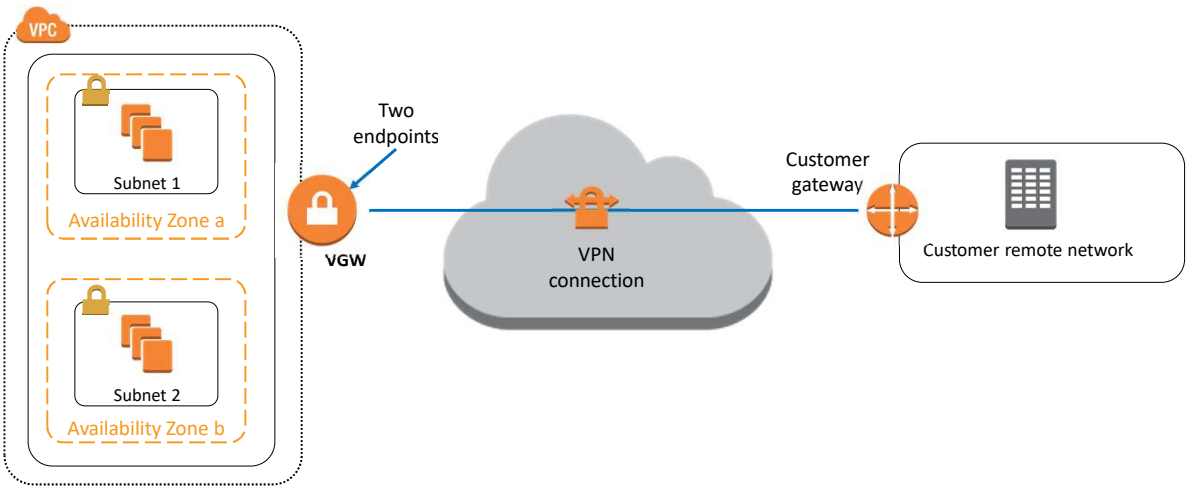
# Virtual Private Gateway (VGW)

Enables you to establish private connections (VPNs) between an Amazon VPC and another network

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

4

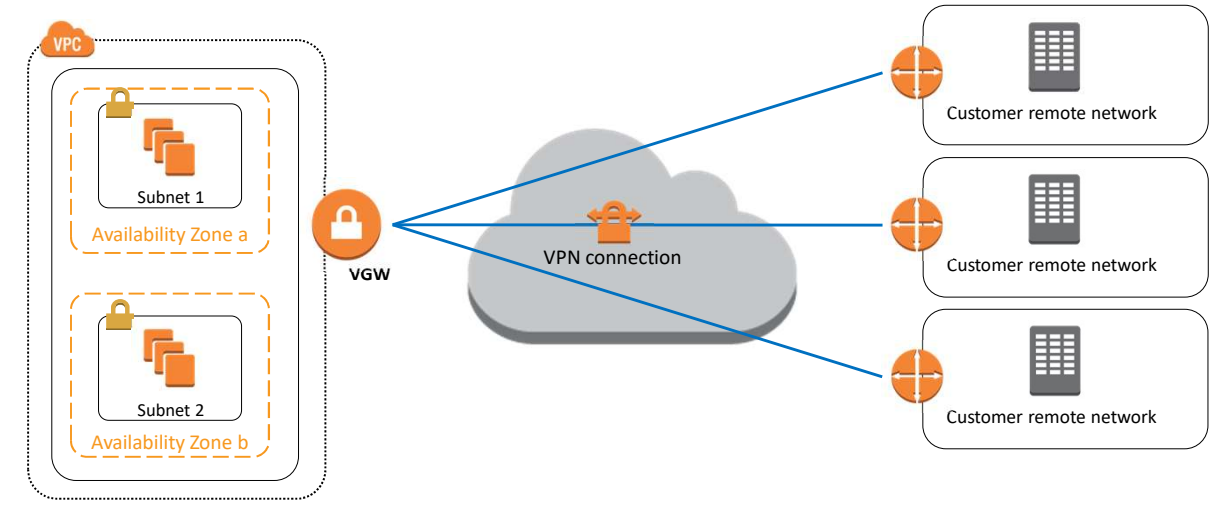
# Extending On-Premises Network to AWS: VPN Connections




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

5

# Extending On-Premises Network to AWS: Multiple VPN




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

6

# AWS Direct Connect (DX)


AWS Direct Connect (DX) provides you with a dedicated, private network connection of either 1 or 10 Gbps

Reduces data transfer costs

Improve application performance with predictable metrics

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

7

# DX Use Cases

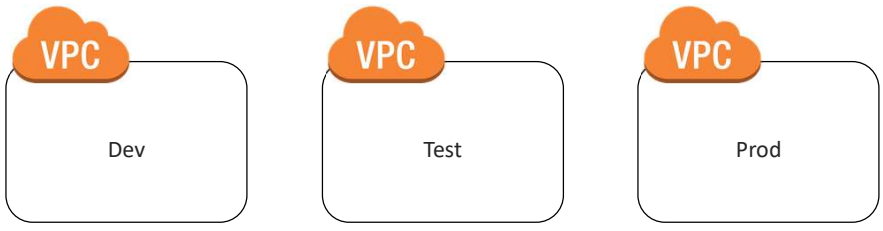

- Hybrid cloud architectures
- Continually transferring large data sets
- Network performance predictability
- Security and compliance

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

8

# Connecting VPCs

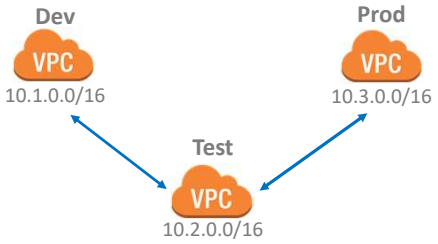
- Isolating some of your workloads is generally a good practice.
- But you may need to transfer data between two or more VPCs.




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

9

# Connecting VPCs – VPC Peering




Instances can communicate across a peering connection as if they were in the same network.

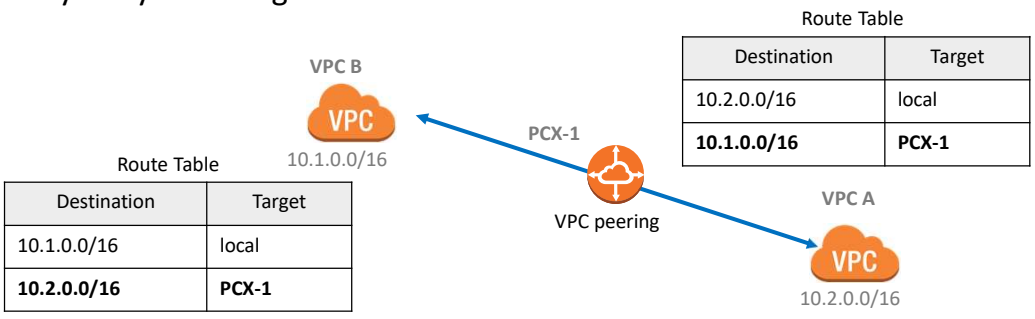
- Use private IP addresses
- Intra and inter-region support
- IP spaces cannot overlap
- Only one peering resource between any two VPCs
- Transitive peering relationships are not supported
- Can be established between different AWS accounts

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

10

# VPC Peering

- No internet gateway or virtual gateway required
- Highly available connections; not a single point of failure
- No bandwidth bottlenecks
- Traffic always stays on the global AWS backbone




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

11

# VPC Endpoints

Privately connect your EC2 instances to services outside your VPC without leaving AWS.

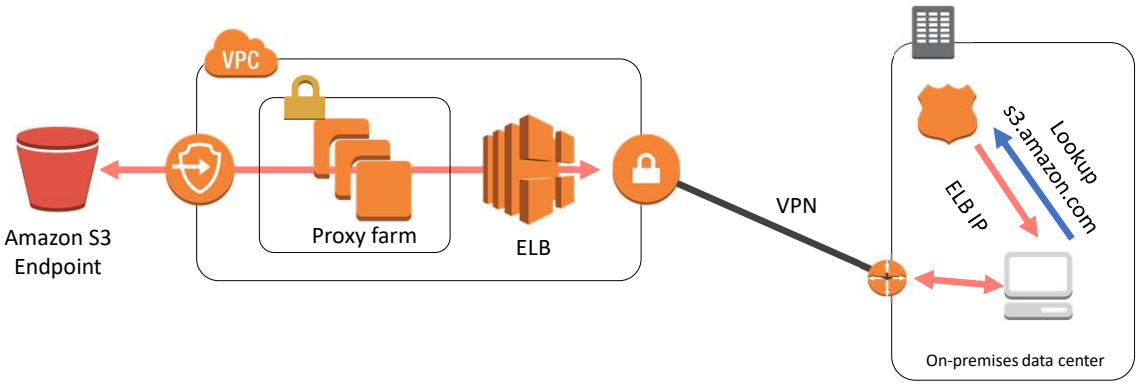
Don't need to use an internet gateway, VPN, network address translation (NAT) devices, or firewall proxies.

- Does not require traversal over the internet
- Must be in the same region
- They are horizontally scaled, redundant, and highly available

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

12

# Accessing VPC Endpoints from Outside the VPC




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

13

aws training and certification

# Load Balancing on AWS

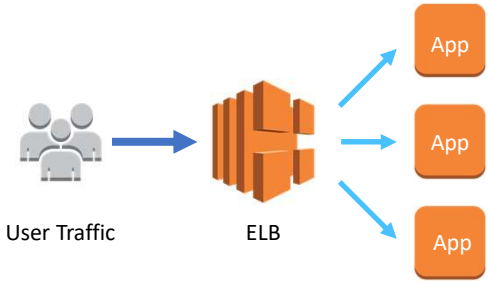
© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

14

## Elastic Load Balancing (ELB)

aws training and certification


A managed load balancing service that distributes incoming application traffic across multiple Amazon EC2 instances, containers, and IP addresses.




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

15

# ELB: Features


- Uses HTTP, HTTPS, TCP and SSL (secure TCP) protocols.
- Can be external or internal facing
- Each load balancer is given a DNS name
- Recognizes and responds to unhealthy instances

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

16

# ELB: Options

Application Load Balancer


- Flexible application management
- Advanced load balancing of HTTP and HTTPS traffic
- Operates at the request level

(Layer 7)

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

17

# ELB: Options

aws training and certification

## Application Load Balancer


- Flexible application management
- Advanced load balancing of HTTP and HTTPS traffic
- Operates at the request level

(Layer 7)

## Network Load Balancer


- Extreme performance and static IP for your application
- Load balancing of TCP traffic
- Operates at the connection level (Layer 4)

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

18

# ELB: Options

aws training and certification

## Application Load Balancer


- Flexible application management
- Advanced load balancing of HTTP and HTTPS traffic
- Operates at the request level

(Layer 7)

## Network Load Balancer


- Extreme performance and static IP for your application
- Load balancing of TCP traffic
- Operates at the connection level (Layer 4)

## Classic Load Balancer

PREVIOUS GENERATION
for HTTP, HTTPS, and TCP

- Existing application that was built within the EC2 Classic network
- Operates at both the request level and connection level

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

19

# Why You Should Use ELB

High availability

Health checks

Security features

TLS termination

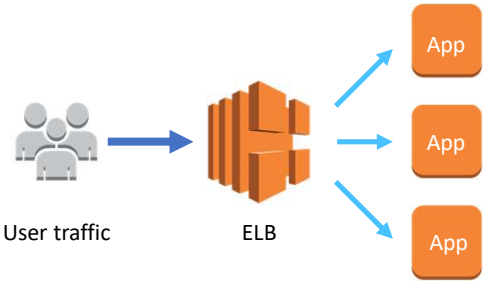
© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

20

# Connection Draining

If you need to remove an instance from your production fleet, but don't want to affect your users:

Affected backend instances will complete requests in progress before deregistration

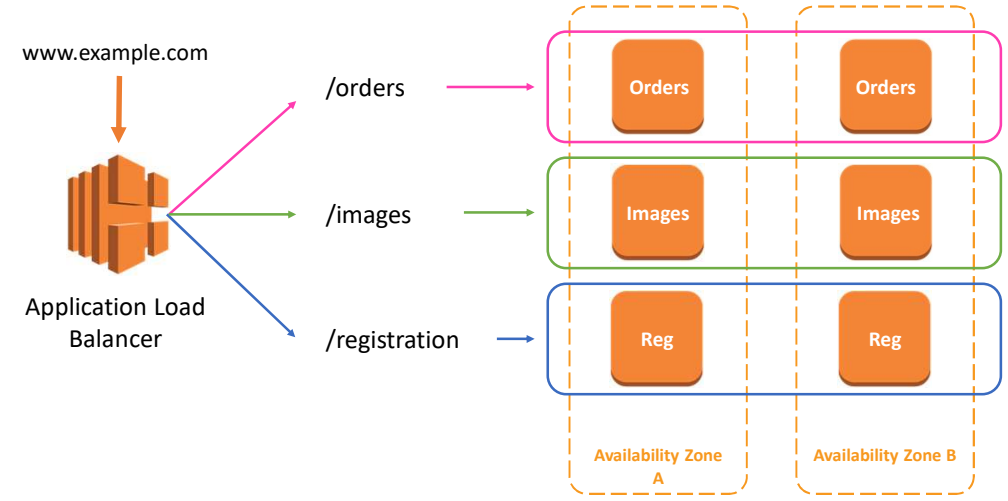



**Enable connection draining**

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

21

# Cloud Design Pattern: Application Load Balancer




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

22

# High Availability

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

23

# What is High Availability?

aws training and certification

Your application can recover from a failure or roll over to a secondary source within an acceptable amount of degraded performance time.

| Percent of Uptime | Max Downtime per Year | Equivalent Downtime per Day |
|---|---|---|
| 90% | 36.5 days | 2.4 hrs |
| 99% | 3.65 days | 14 min |
| 99.9% | 8.76 hrs | 86 sec |
| 99.99% | 52.6 min | 8.6 sec |
| 99.999% | 5.25 min | .86 sec |

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

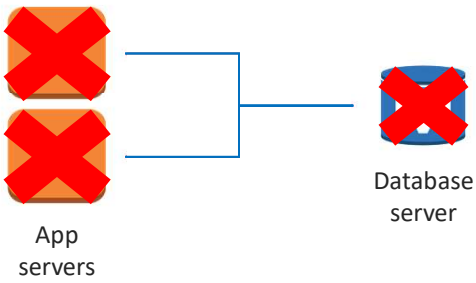
24

# High Availability Example

aws training and certification

*Assume everything fails, and design backward*

Implement redundancy where possible in order to prevent single failures from bringing down an entire system.

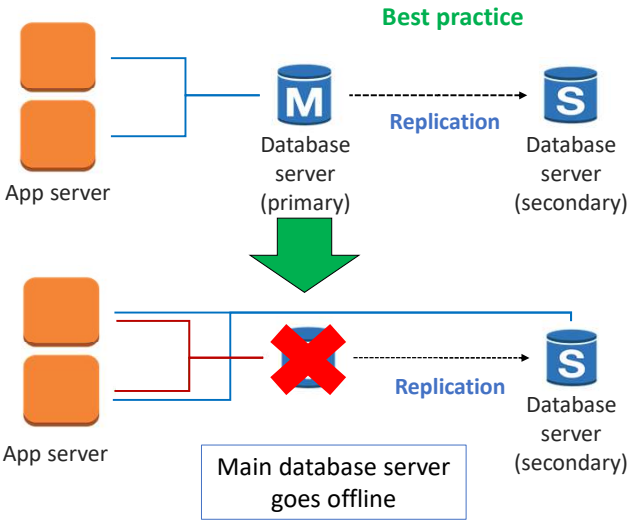



**Anti-pattern**

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

25

# High Availability Example



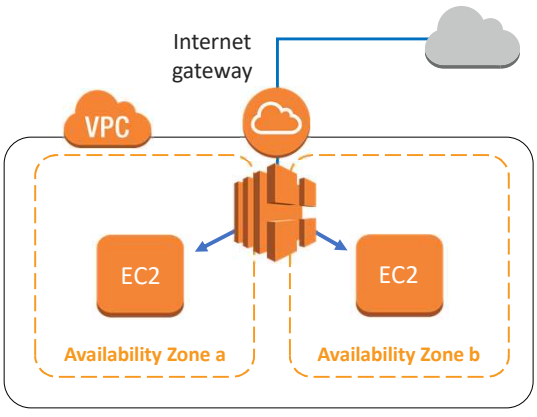

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

26

# How Many Availability Zones Should I Use?

Start with two Availability Zones per AWS Region.

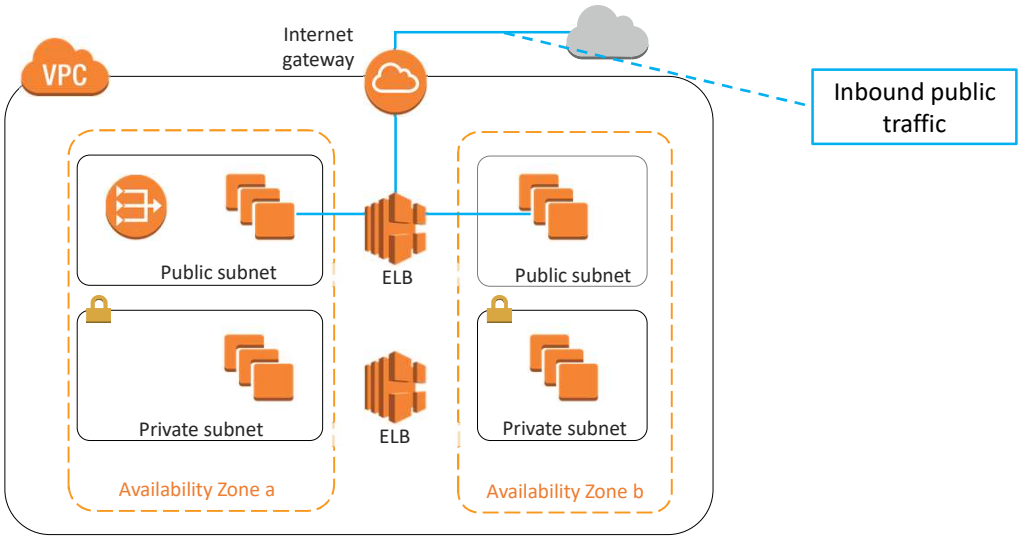
If resources in one Availability Zone are unreachable, your application shouldn't fail.




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

27

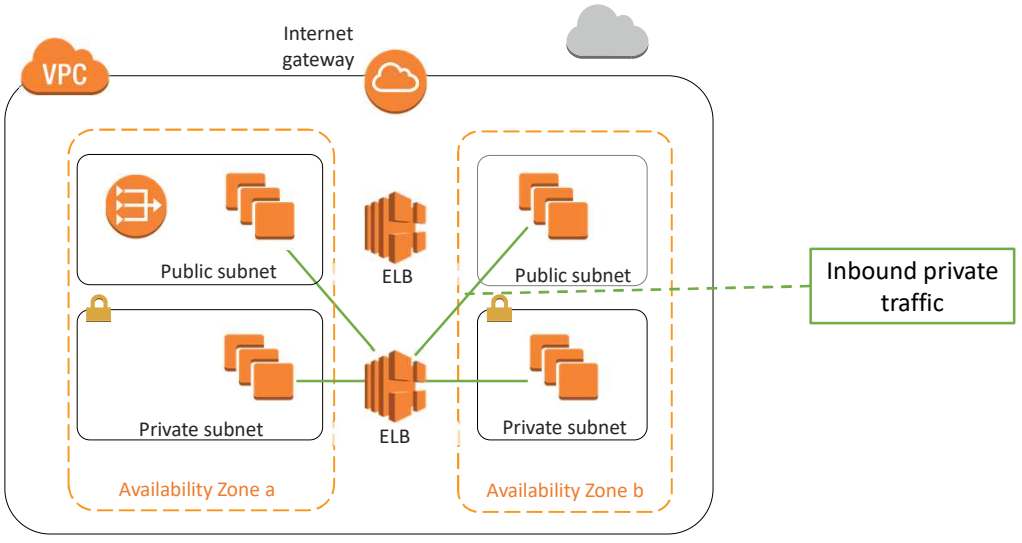
# Example Architecture Diagram




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

28

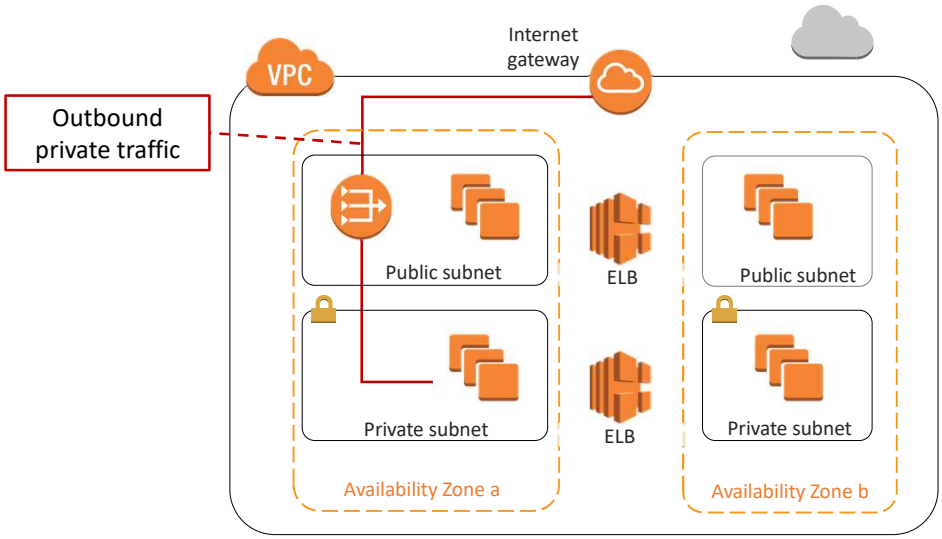
# Example Architecture Diagram




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

29

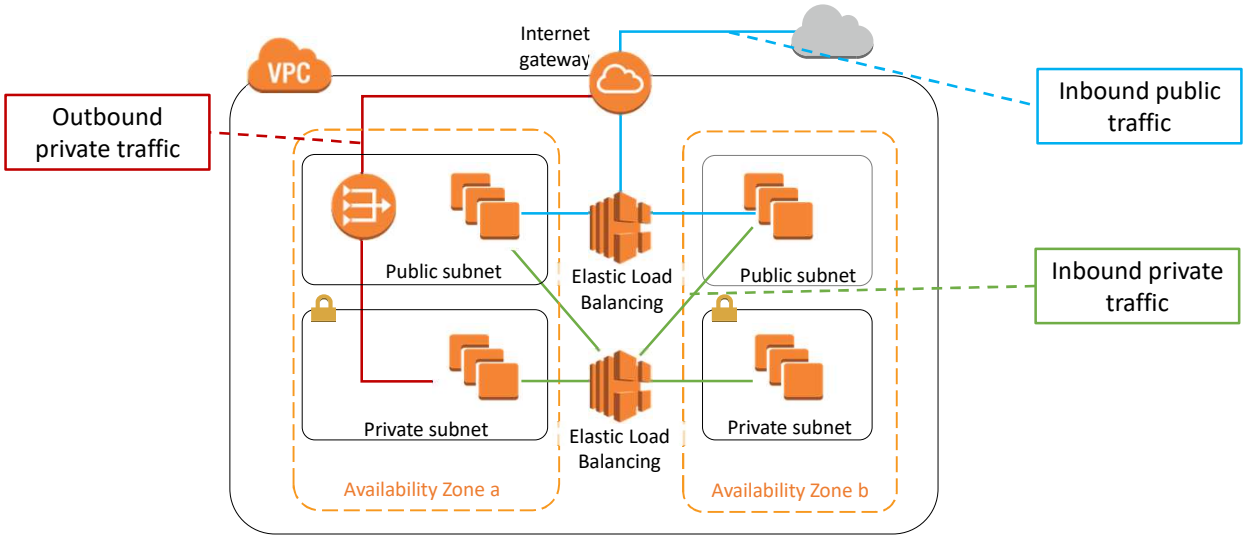
# Example Architecture Diagram




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

30

# Example Architecture Diagram




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

31

aws training and certification

# Multi-Region High Availability and DNS

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

32

## Amazon Route 53

aws training and certification

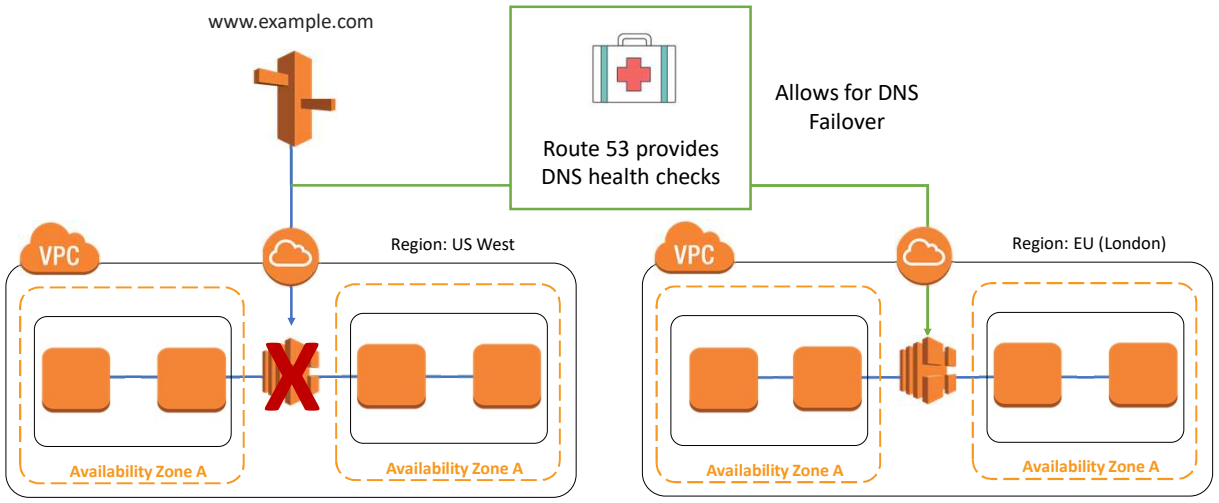

Route 53 is a highly available and scalable cloud Domain Name System (DNS) service.

- DNS translates domain names into IP addresses
- Able to purchase and manage domain names and automatically configure DNS settings
- Provides tools for flexible, high-performance, highly available architectures on AWS
- Multiple routing options

© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

33

# How Does Route 53 Help with High Availability?




© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

* Consider using Global Accelerator for stringent SLAs

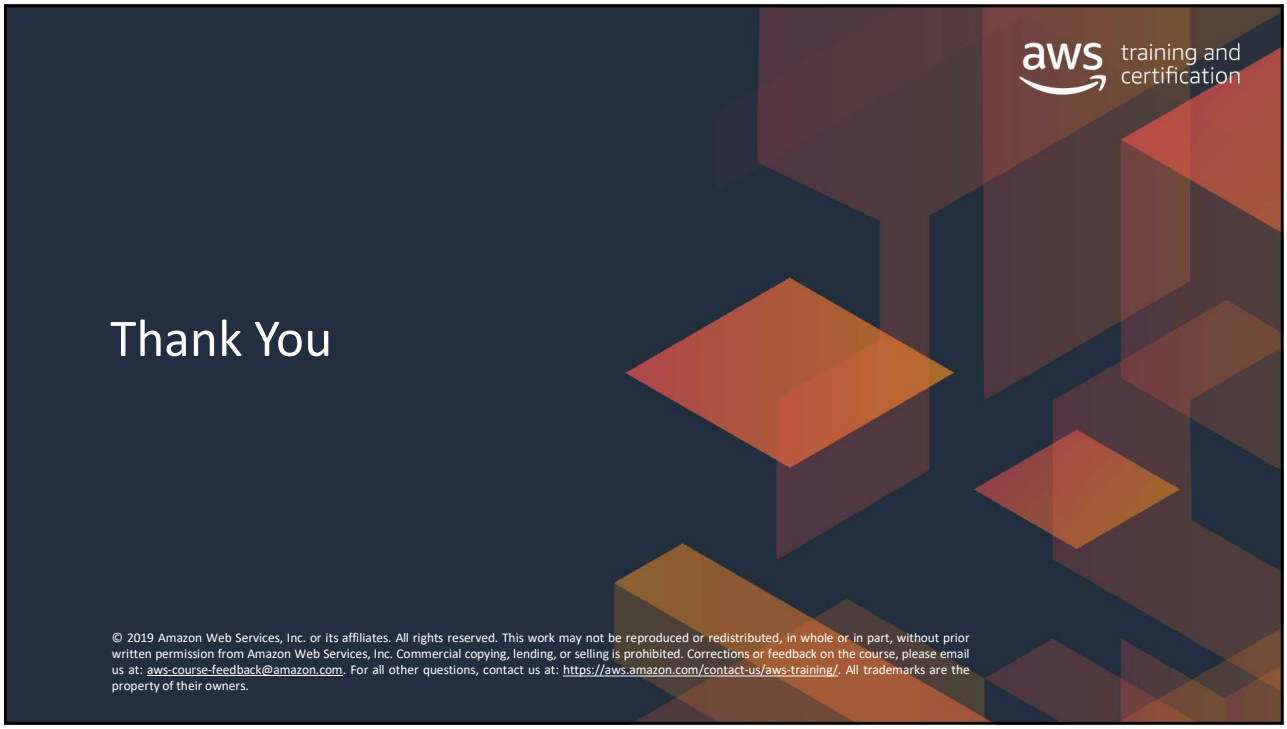
34

# Route 53 Routing Options

- Simple round robin
- Weighted round robin
- Latency-based routing
- Health check and DNS failover
- Geolocation routing
- Geoproximity routing with traffic biasing
- Multi-value answers


© 2019, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

35


aws training and certification
Thank You
© 2019 Amazon Web Services, Inc. or its affiliates. All rights reserved. This work may not be reproduced or redistributed, in whole or in part, without prior written permission from Amazon Web Services, Inc. Commercial copying, lending, or selling is prohibited. Corrections or feedback on the course, please email us at: aws-course-feedback@amazon.com. For all other questions, contact us at: https://aws.amazon.com/contact-us/aws-training/. All trademarks are the property of their owners.

36