AWS Networking Deep Dive: Elastic Load Balancing (ELB)

INTRODUCTION TO THE ELB DEEP DIVE

AWS Networking Deep Dive

Virtual Private Cloud

Elastic Load Balancing

Route 53 DNS

You Must Know How to Create

VPCs

Subnets

Route tables

Security groups

Prerequisites

Create EC2 Linux instances using a particular AMI

SSH into those instances

Course Scenario

Elastic Load Balancing

Improves fault tolerance and performance of applications running on EC2

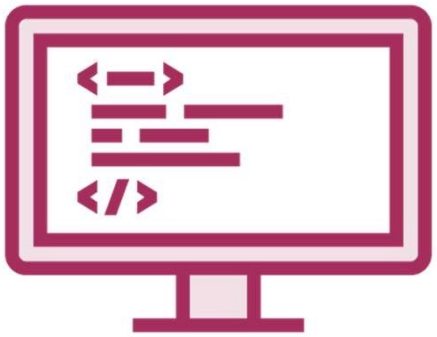
Configuration specifics depend on application architecture

Multi-tier Web Application

Takes user input and stores it in a SQL database

Displays database contents on a webpage

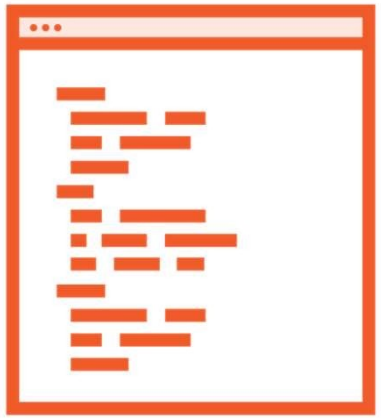
Multi-tier Web Application



Web tier

TCP/80 (HTTP)

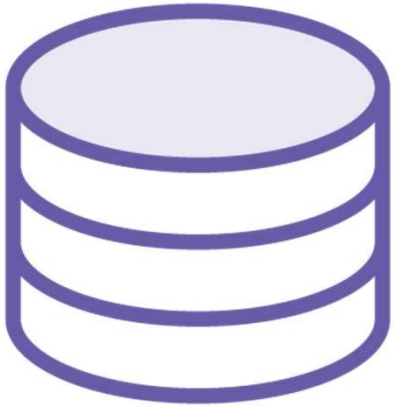
TCP/443 (HTTPS)



Application tier

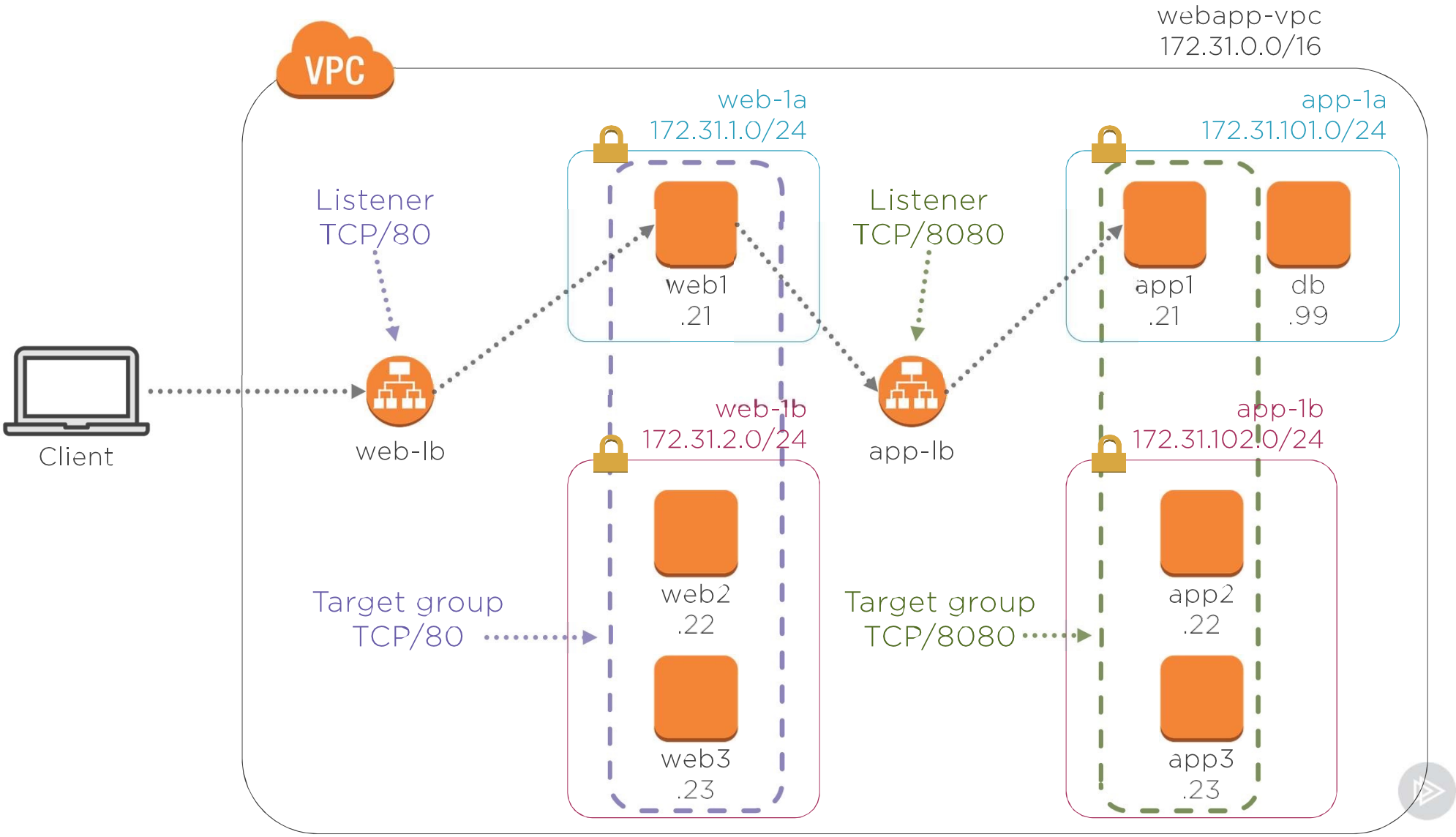
TCP/8080 (HTTP)

TCP/8443 (HTTPS)



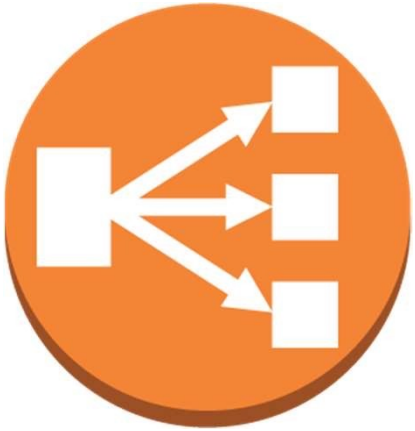
Database tier

TCP/3306

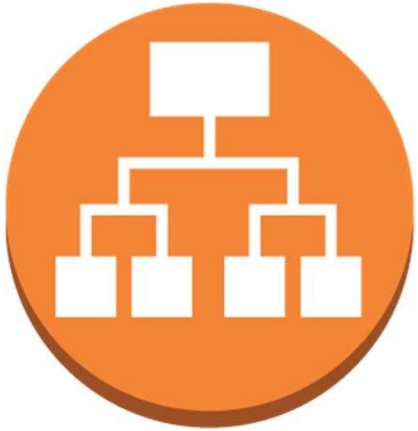

webapp-vpc
172.31.0.0/16
VPC
web-1a
172.31.1.0/24
app-1a
172.31.101.0/24
Listener
TCP/80
Listener
TCP/8080
web1
.21
app1
.21
db
.99
Client
web-lb
app-lb
web-1b
172.31.2.0/24
app-1b
172.31.102.0/24
Target group
TCP/80
Target group
TCP/8080
web2
.22
web3
.23
app2
.22
app3
.23

Load Balancer Types

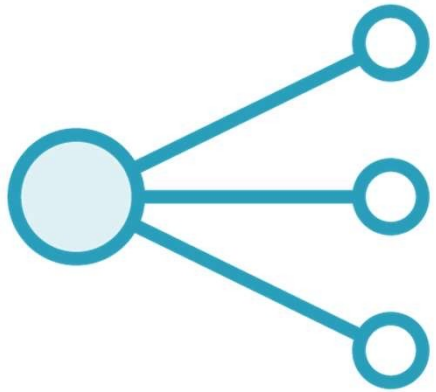
Load Balancer Types



Classic
(version 1)

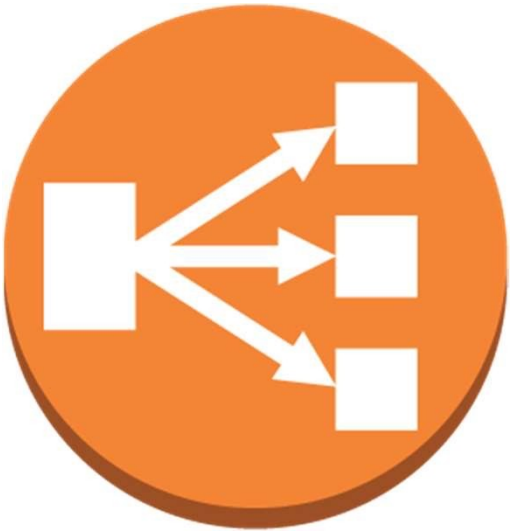


Application
(version 2)



Network
(version 2)

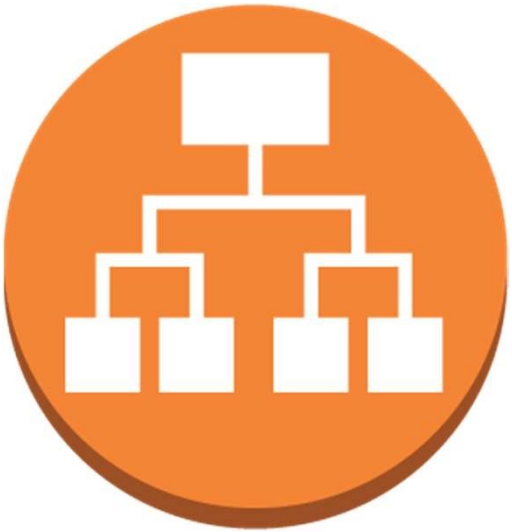
Classic Load Balancer



Designed for EC2-Classic network

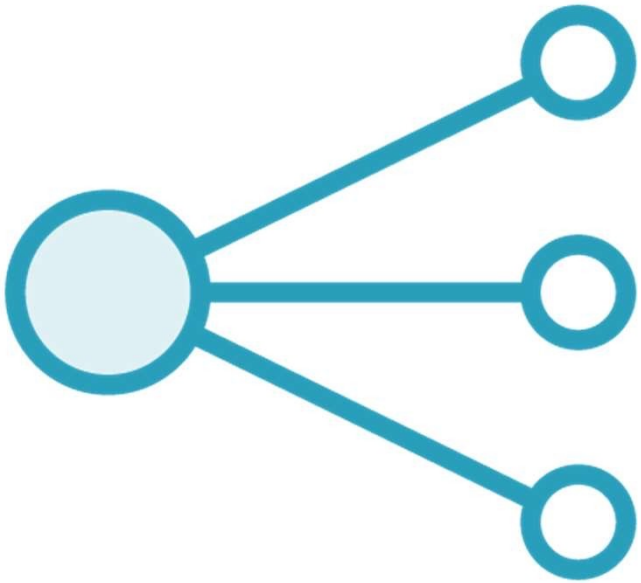
Not recommended for VPC

Application Load Balancer



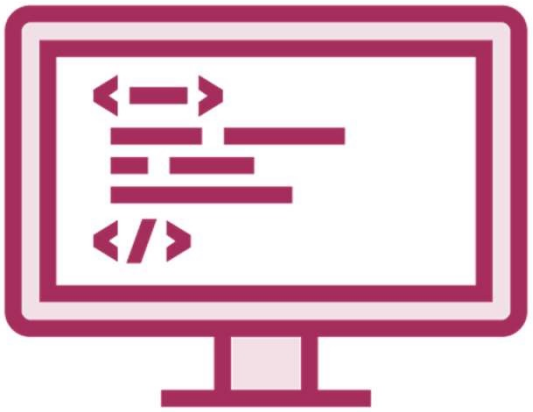
- HTTP and HTTPS traffic
- Terminates the client connection
- TCP ports 1-65535
- Listener supports IPv6
- Path and host-based routing

Network Load Balancer



- Supports any TCP connection
- Layer 4 load balancer
- Handles high traffic at low latency
- Does not terminate HTTP(S) connections

Application or Network Load Balancer?



Web tier

TCP/80 (HTTP)

TCP/443 (HTTPS)

Application tier

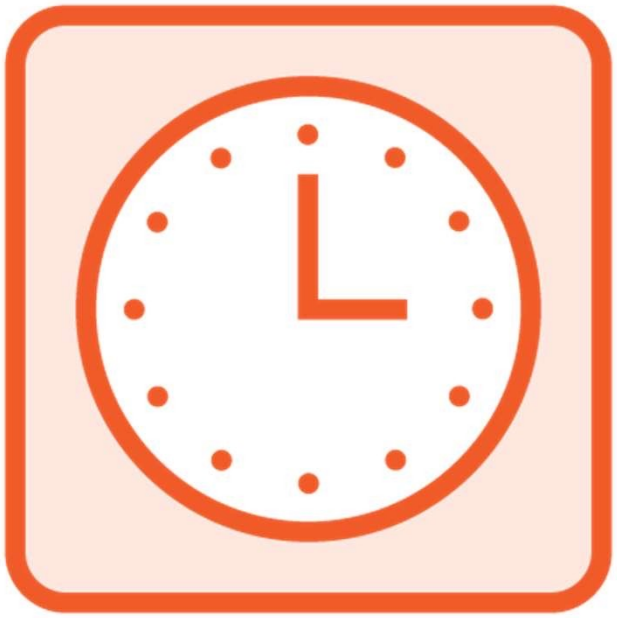
TCP/8080 (HTTP)

TCP/8443 (HTTPS)

Course Overview

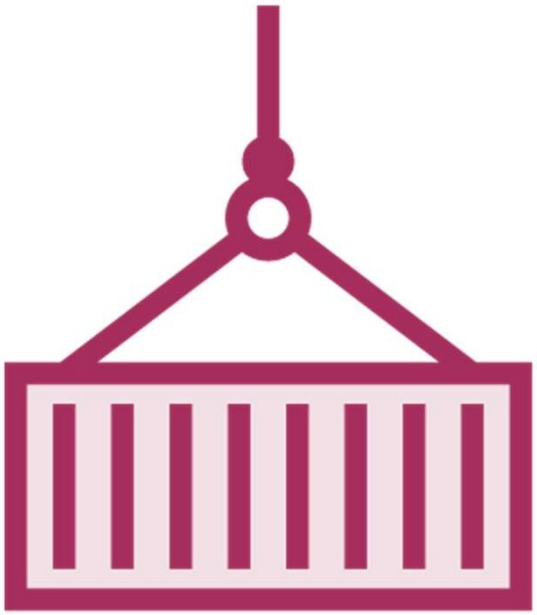
Load Balancing Internet-facing Web Applications

Load Balancing Internal Web Services

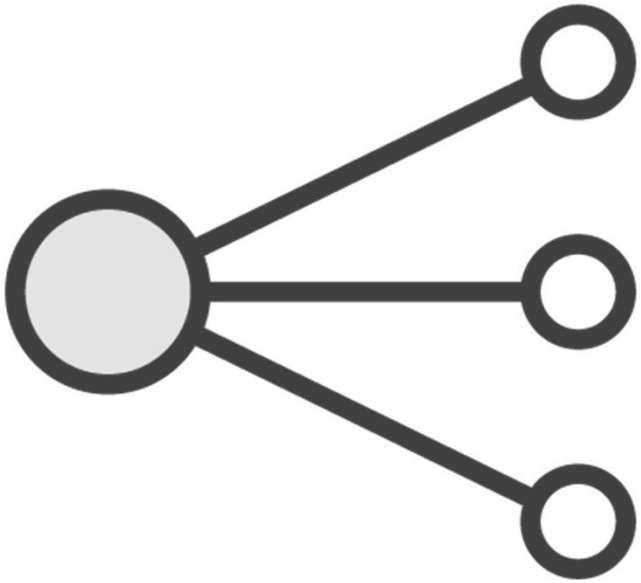


Sticky Sessions and Idle Timeouts

Securing Web Applications with HTTPS



Path-based Routing for Microservices



Configuring the Network Load Balancer

Lab Setup

VPC and Subnets

VPC: webapp-vpc

- CIDR: 172.31.0.0/16
- Enable DNS hostnames
- Internet gateway: webapp-igw

Subnets:

- web-1a: 172.31.1.0/24
- web-1b: 172.31.2.0/24
- app-1a: 172.31.101.0/24
- app-1b: 172.31.102.0/24

Routes

Route table: webapp-rt

- Associate with all subnets

Default routes:

- IPv4: 0.0.0.0/0
- IPv6: ::0/0
- Target: webapp-igw

Security Group: web-sg

Direction	Protocol	Ports	Source
Inbound	TCP	80	Any
Inbound	TCP	443	Any
Inbound	TCP	81	172.31.0.0/16
Inbound	TCP	22	Your IP

Security Group: app-sg

Direction	Protocol	Ports	Source
Inbound	TCP	8080,8443	172.31.1.0/24
Inbound	TCP	8080,8443	172.31.2.0/24
Inbound	TCP	22	Your IP

Security Group: db-sg

Direction	Protocol	Ports	Source
Inbound	TCP	3306	172.31.101.0/24
Inbound	TCP	3306	172.31.102.0/24
Inbound	TCP	22	Your IP

Instance AMI

`aws-elasticbeanstalk-amzn-2017.03.1.x86_64-ecs-hvm-201709251832`

`ami-c710e7bd` **in the N. Virginia (US-East) region**

If you use a different image, make sure Docker is installed

Instances

Name	Subnet	IP address	Security group
web1	web-1a	172.31.1.21	web-sg
web2	web-1b	172.31.2.22	web-sg
web3	web-1b	172.31.2.23	web-sg
app1	app-1a	172.31.101.21	app-sg
app2	app-1b	172.31.102.22	app-sg
app3	app-1b	172.31.102.23	app-sg
db	app-1a	172.31.101.99	db-sg

PowerShell Lab Setup Script

Available in the course exercise files and at

Uses the AWS PowerShell SDK

Works on Windows, Linux, and Mac!

Refer to `elb\lab-setup.md` for setup instructions

Summary

Understand what architecture, protocols, and ports your application uses

Application load balancer supports HTTP and HTTPS

Network load balancer supports any TCP-based connections

Coming Up Next

Load Balancing Internet-facing Web Applications