Getting Inside the Virtual Machine with EC2 and VPC

Ryan Lewis
CLOUD ENGINEER
@ryanmurakami ryanlewis.dev

Services That Utilize EC2

Relational Database Service

ElastiCache

Elastic Beanstalk

Redshift

Elastic MapReduce

Elastic Block Storage

Elastic Cloud Compute

Virtual machine service that runs software of your choice

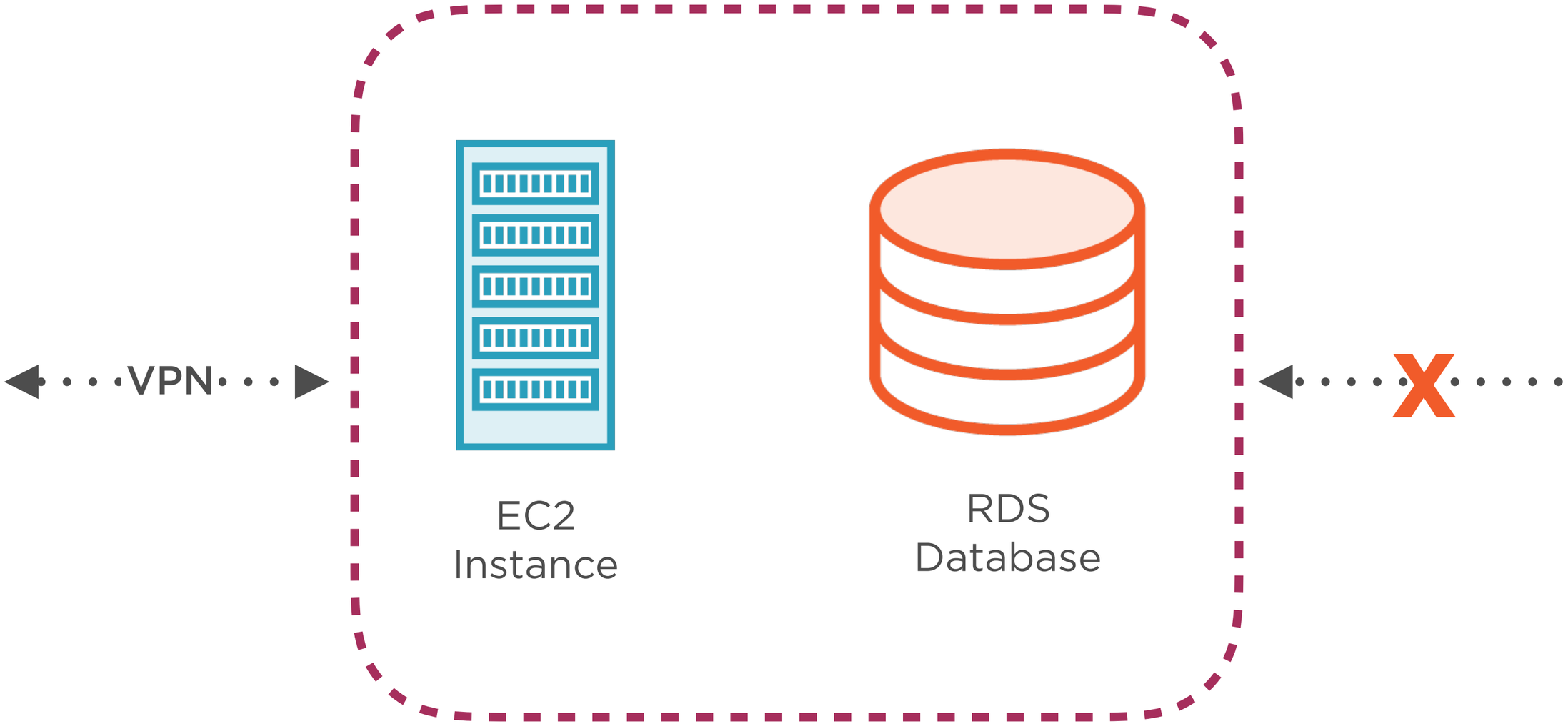
EC2 Additional Features

Elastic IP

Load Balancers

Auto-Scaling Groups

Virtual Private Cloud



Overview

VPC security blanket

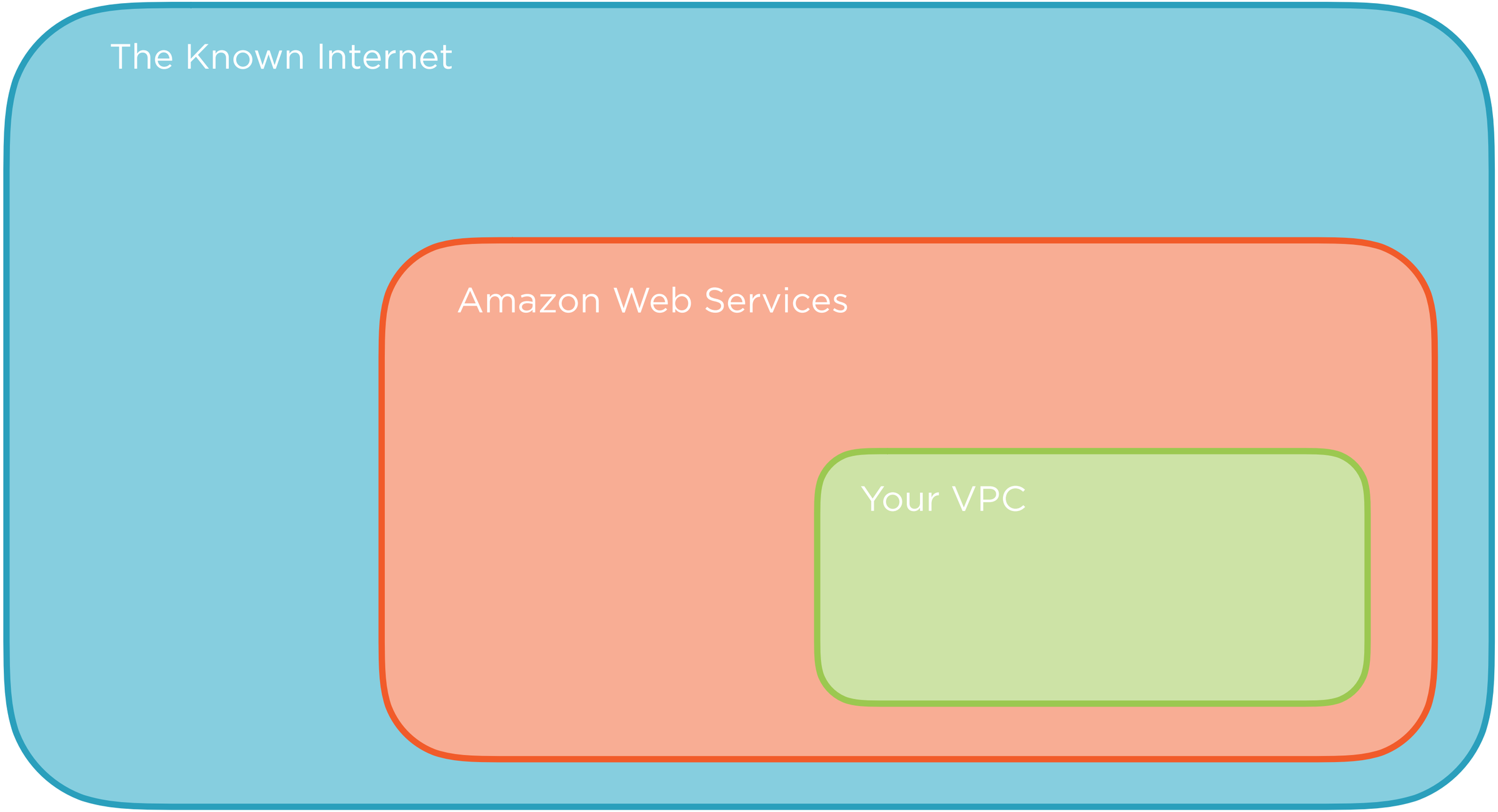
Everyone gets a subnet!

EC2 virtual empire

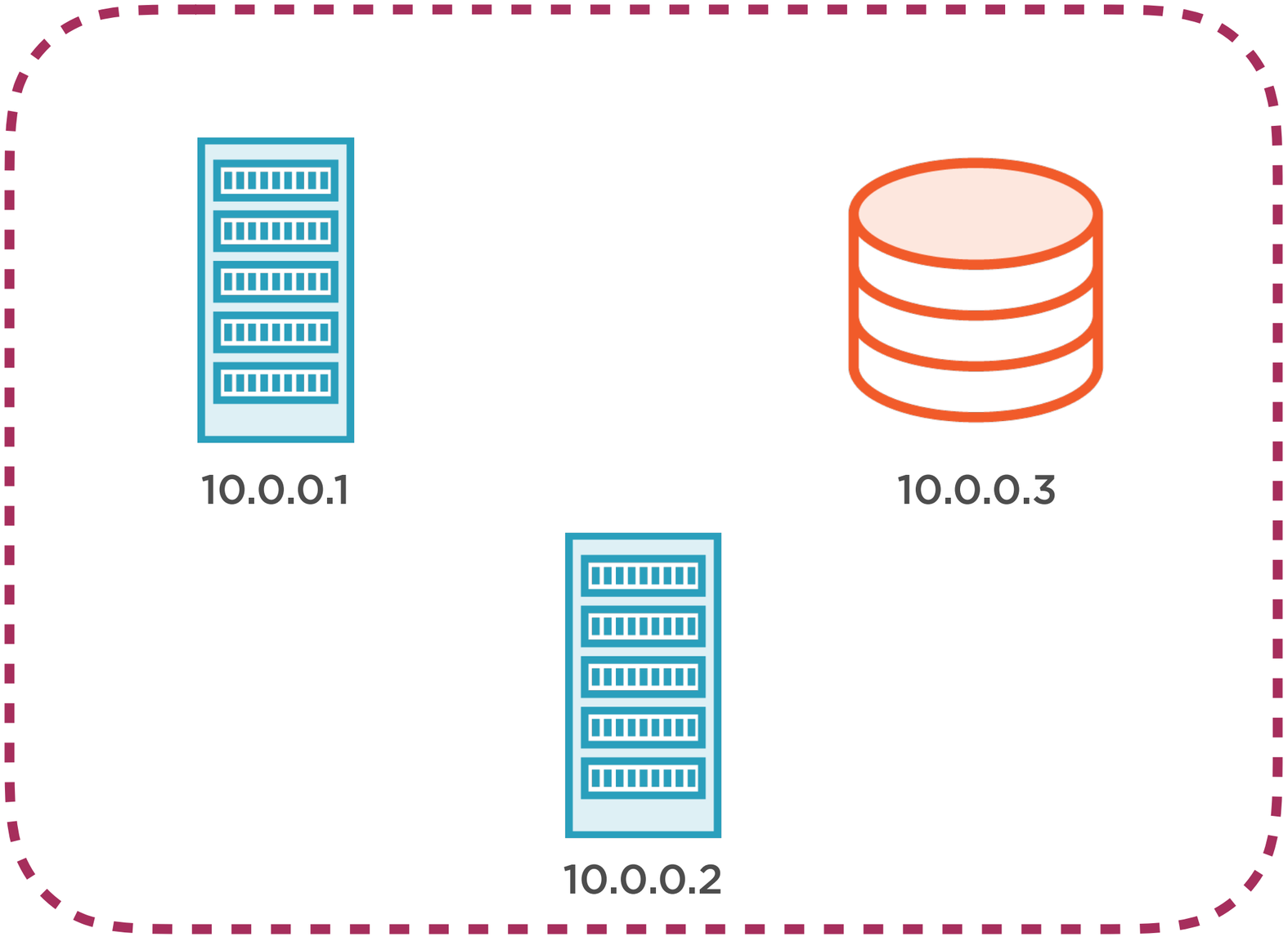
Pizza luvrs goes live

Production-ready pizza

Virtual Private Cloud Overview


The Known Internet
Amazon Web Services
Your VPC

Example VPC IP Range - 10.0.0.0 - 10.0.255.255

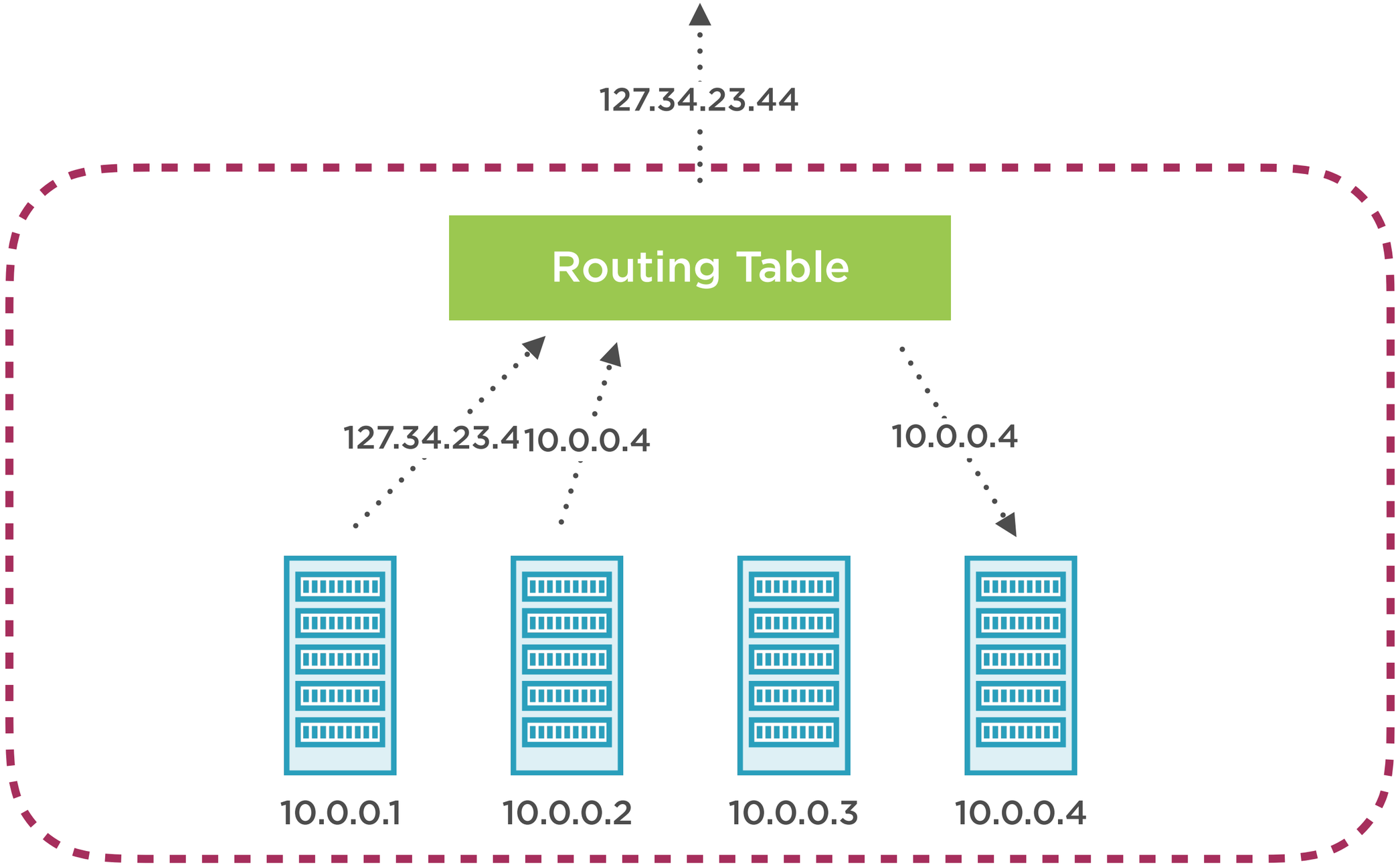


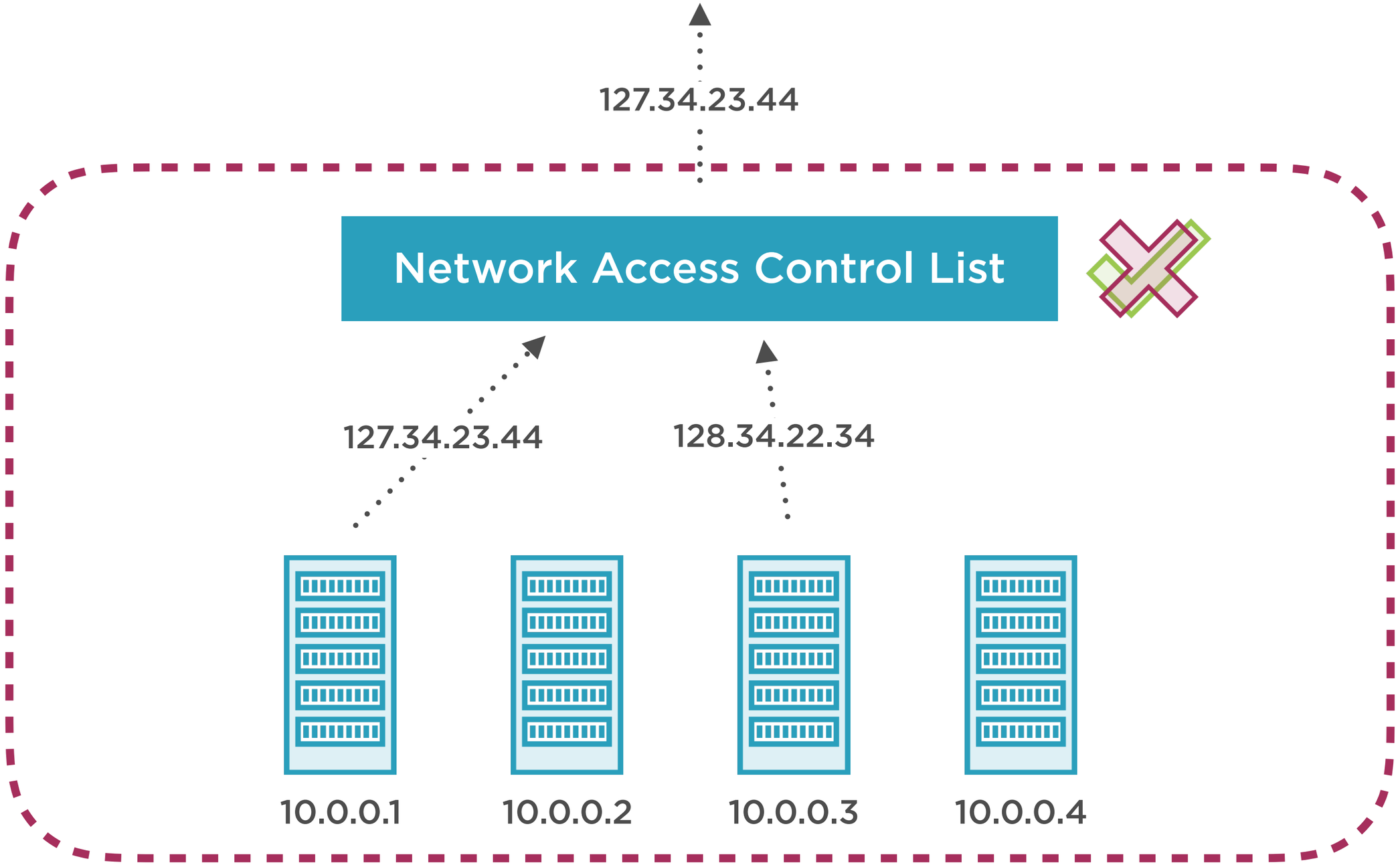
VPC is free!

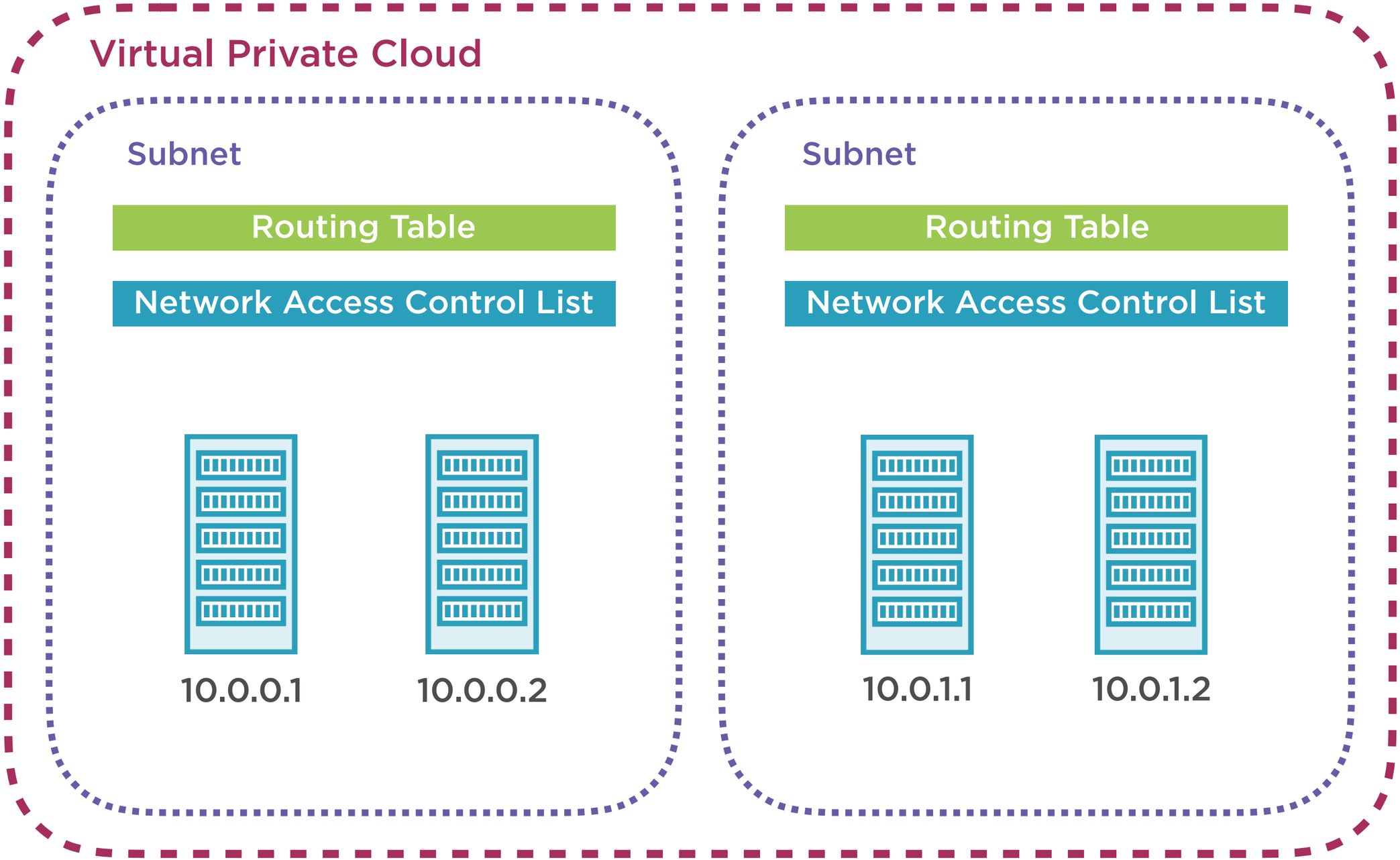
Security Group

Defines allowed incoming/outgoing IP addresses and ports. Kind of like a mini-firewall.

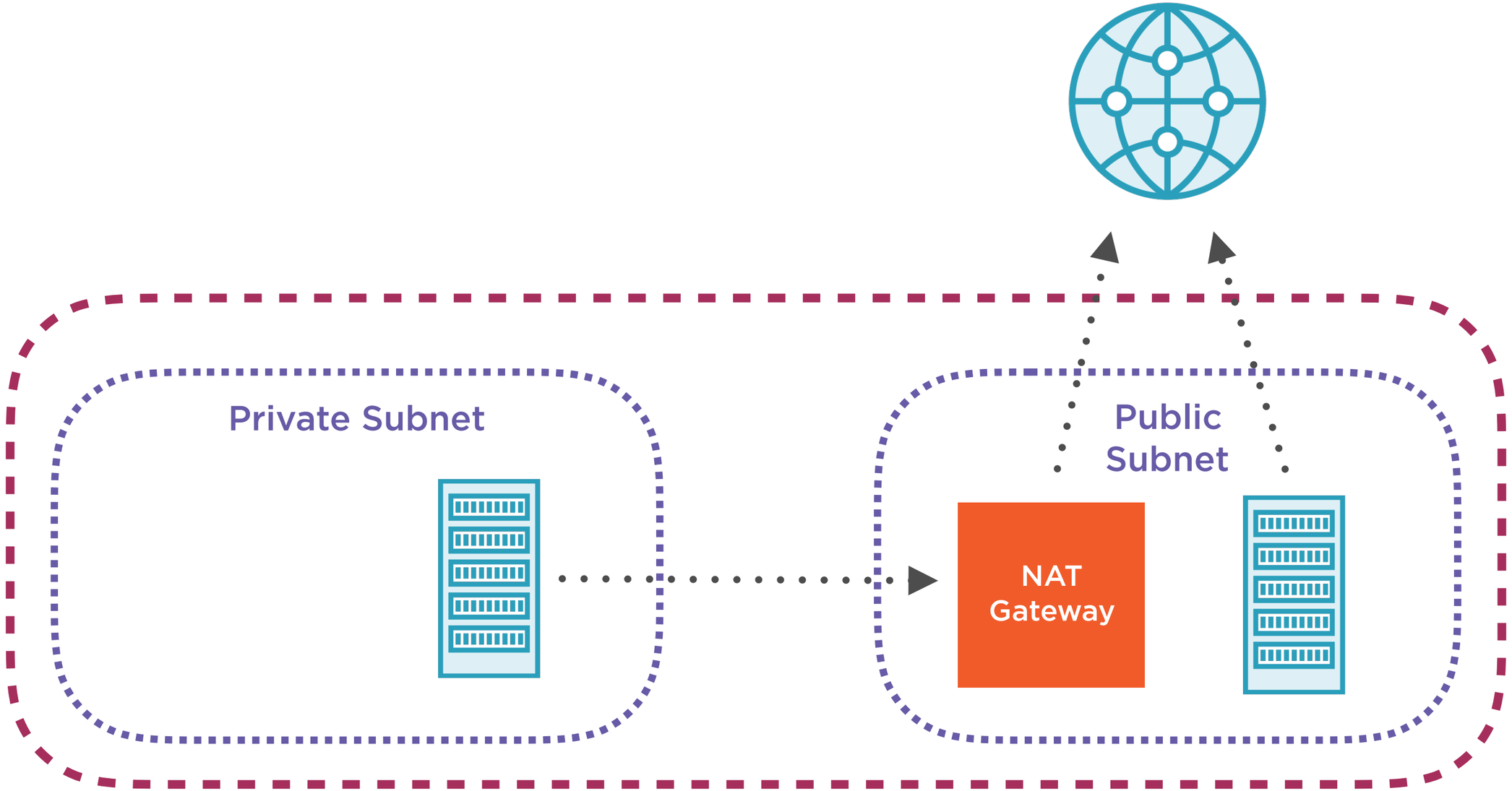
Security Groups


127.34.23.44
Routing Table
127.34.23.4
10.0.0.4
10.0.0.4
10.0.0.1
10.0.0.2
10.0.0.3
10.0.0.4


127.34.23.44
Network Access Control List
127.34.23.44
128.34.22.34
10.0.0.1
10.0.0.2
10.0.0.3
10.0.0.4


Virtual Private Cloud
Subnet
Routing Table
Network Access Control List
10.0.0.1
10.0.0.2
Subnet
Routing Table
Network Access Control List
10.0.1.1
10.0.1.2

Public + Private Subnet Configuration

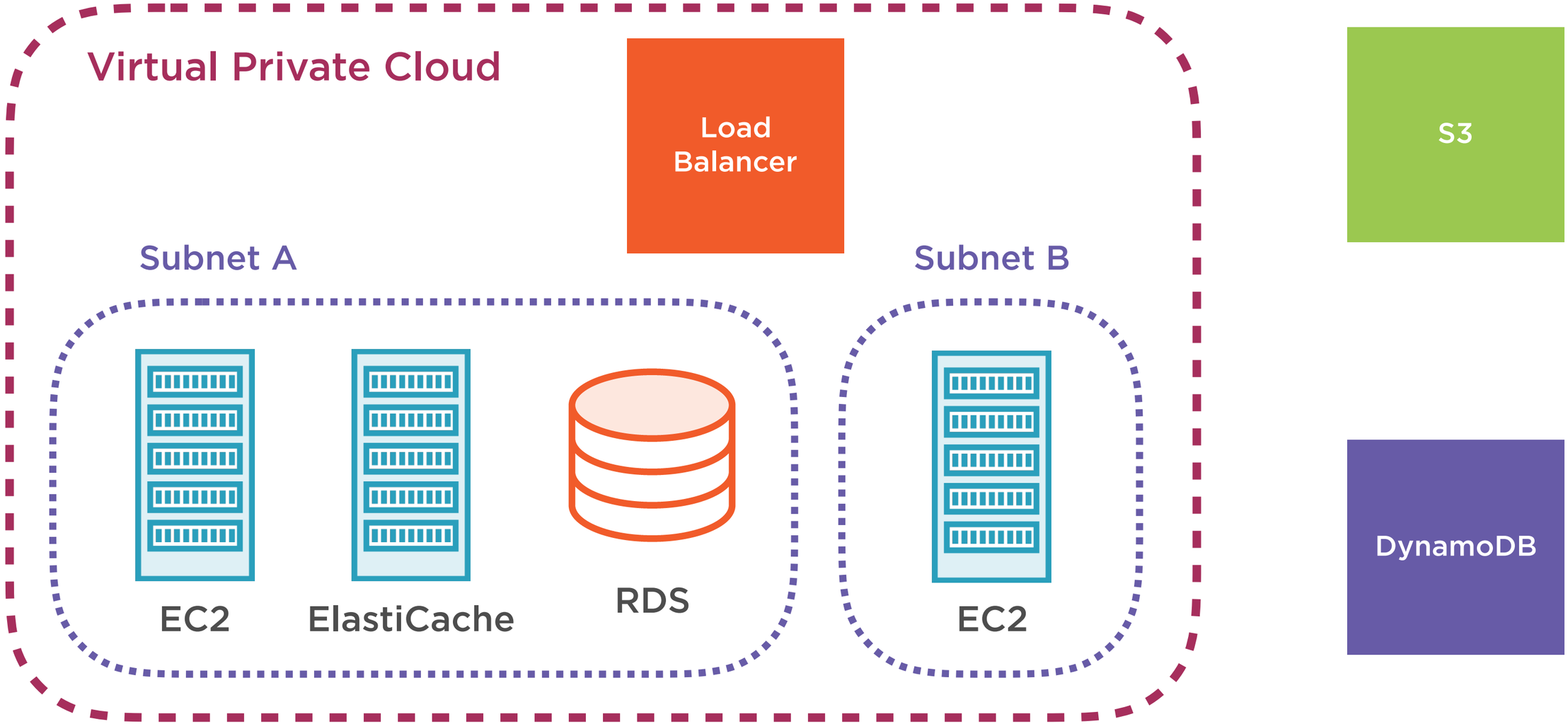


Creating a Virtual Private Cloud

Objective

Create VPC and Subnets

Pizza Luvrs Architecture Diagram



Objective

Create Public Subnet for Scaling

Elastic Cloud Compute Overview

EC2 Instance Parameters

CPU

Memory

Storage

Network

Typical EC2 Operating Systems

Linux
(Amazon, Red Hat, Ubuntu, etc)

Windows

EC2 Instance Types

General Purpose

Compute Optimized

Memory Optimized

Storage Optimized

Instance Type Comparison with Linux

Compute Optimized c4.large

2 CPU

3.75 GB memory

$0.105 per hour

Memory Optimized r3.large

2 CPU

15.25 GB memory

$0.166 per hour

Amazon Machine Image (AMI)

Operating System + Software installed on EC2 instance

Example Image Types on AWS Marketplace

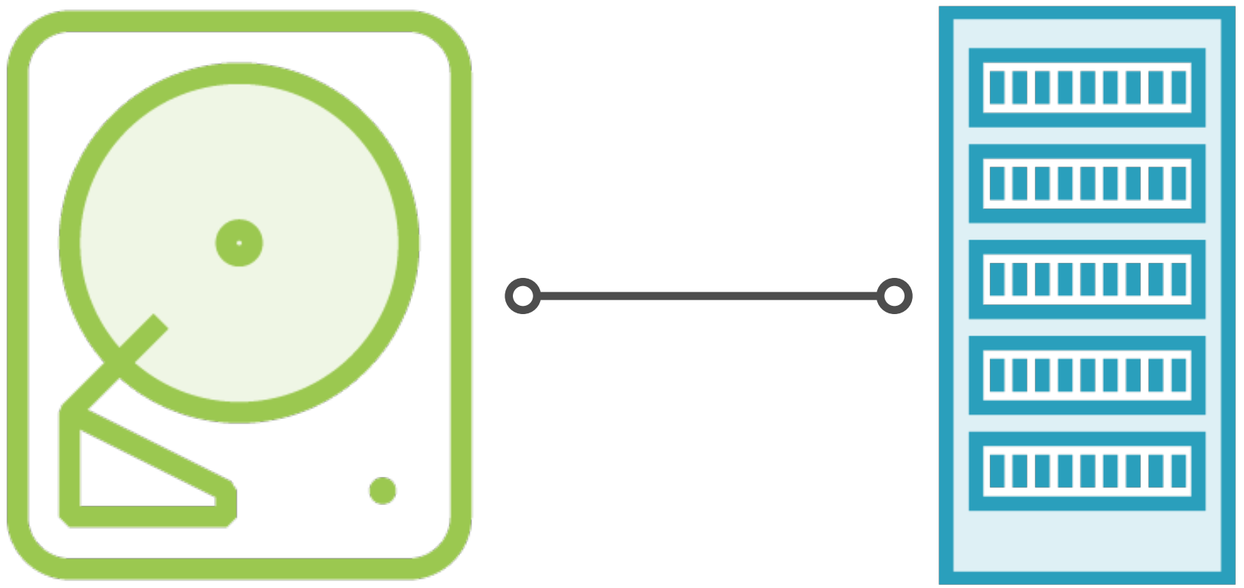
Anti-virus Scanners

Network Firewall

Business Intelligence Software

Elastic Block Store

Independent storage volumes used with EC2 instances



EBS Volume

EC2 Instance

Creating an EC2 Instance

Connecting to an EC2 Instance

Ways to Download the Demo Application

Pluralsight Exercise Files

Github

Demo Application Github Site

https://github.com/ryanmurakami/pizza-luvrs

Objective

Create and Assign a Public IP Address

Elastic IP

Public IP addresses that are created, destroyed, and assigned independently

Objective

Connect to the EC2 Instance via SSH

Updating and Deploying to an EC2 Instance

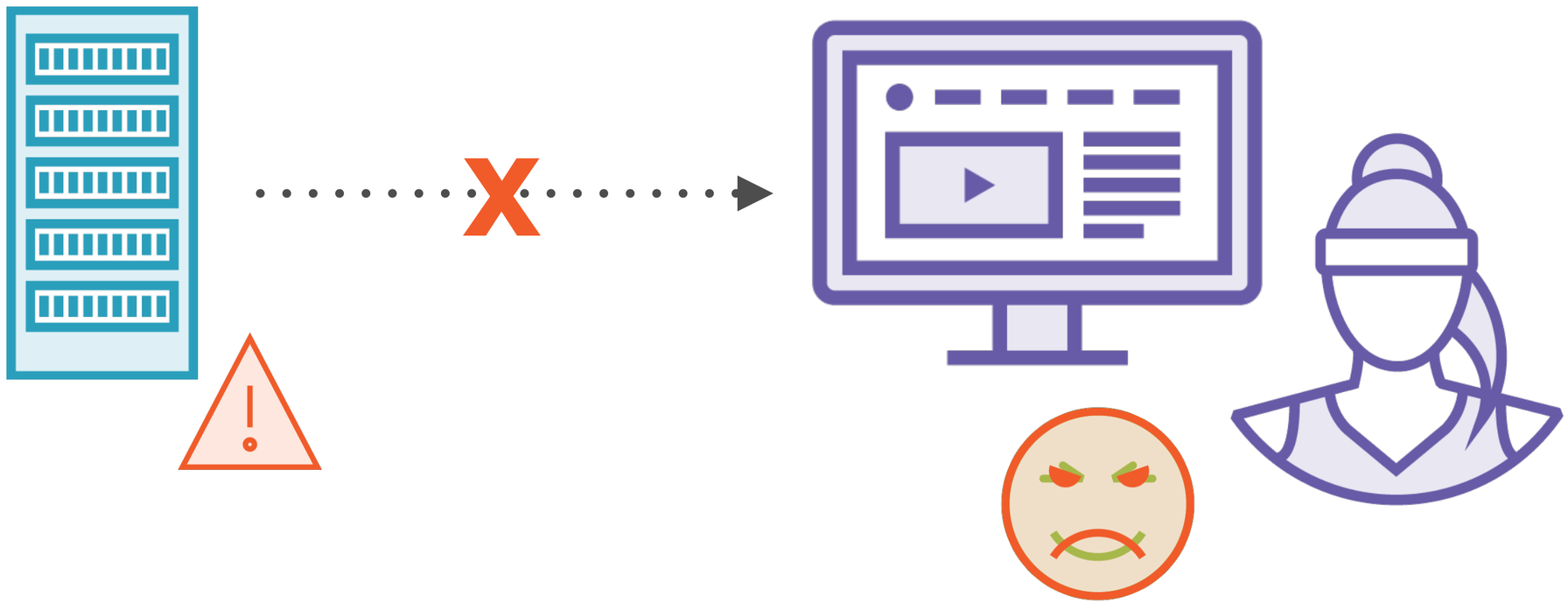
Objective

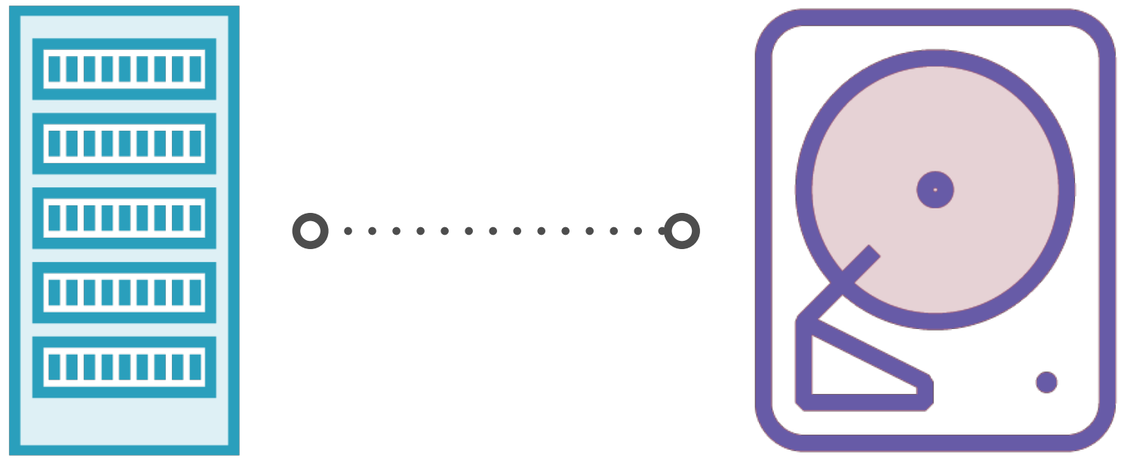
Update OS Software and Install Node.js

Objective

Transfer Demo Application Code to EC2 Instance

Scaling EC2 Instances




EC2
Instance
Amazon
Pizza Luvrs
Linux AMI

With custom AMIs, an EC2 instance can be saved as a snapshot and replicated

Auto Scaling Group

Expands or shrinks a pool of instances based on pre-defined rules

Load Balancer

Routing appliance that maintains a consistent DNS entry and balances requests to multiple instances

Creating an Amazon Machine Image (AMI)

Objective

Create an AMI from the EC2 Instance

Typical Load Balancer Listeners

HTTP
on Port 80

HTTPS
on Port 443

Creating a Load Balancer

Objective

Enable Instance Stickiness on Load Balancer

Creating an Auto Scaling Group

Objective

Create Auto Scaling Group to Use with Load Balancer

Launch Configuration User Data

```
#!/bin/bash
echo "starting pizza-luvrs"
cd /home/ec2-user/pizza-luvrs
npm start
```

Scaling in Action

Available Metrics for EC2 CloudWatch Alarms

CPU Utilization

Disk Reads

Disk Read Operations

Disk Writes

Disk Write Operations

Network In

Network Out

Objective

Generate Requests to the Application

Ways to Generate Requests

Open in Browser without Browser Cache

Use JMeter

Use Apache Benchmark

Conclusion

Summary

Secured by VPC

EC2 + Pizza = Pizza Luvrs

Scaling through time and space

Up Next:

Hosting All the Things with S3