

IndyAWS: Compute

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About Me

AWS Certified Solutions Architect - Associate

- Working with AWS platform for 9+ years

Lead Application Developer with Soliant Consulting

- Nationwide Consulting Company
- FileMaker, Salesforce and Web Development practices
- Architected Soliant.cloud (Soliant dot cloud) AWS hosting
- Building AWS practice

Why AWS Compute

Global Infrastructure

- Amazon networking
- Growing all the time

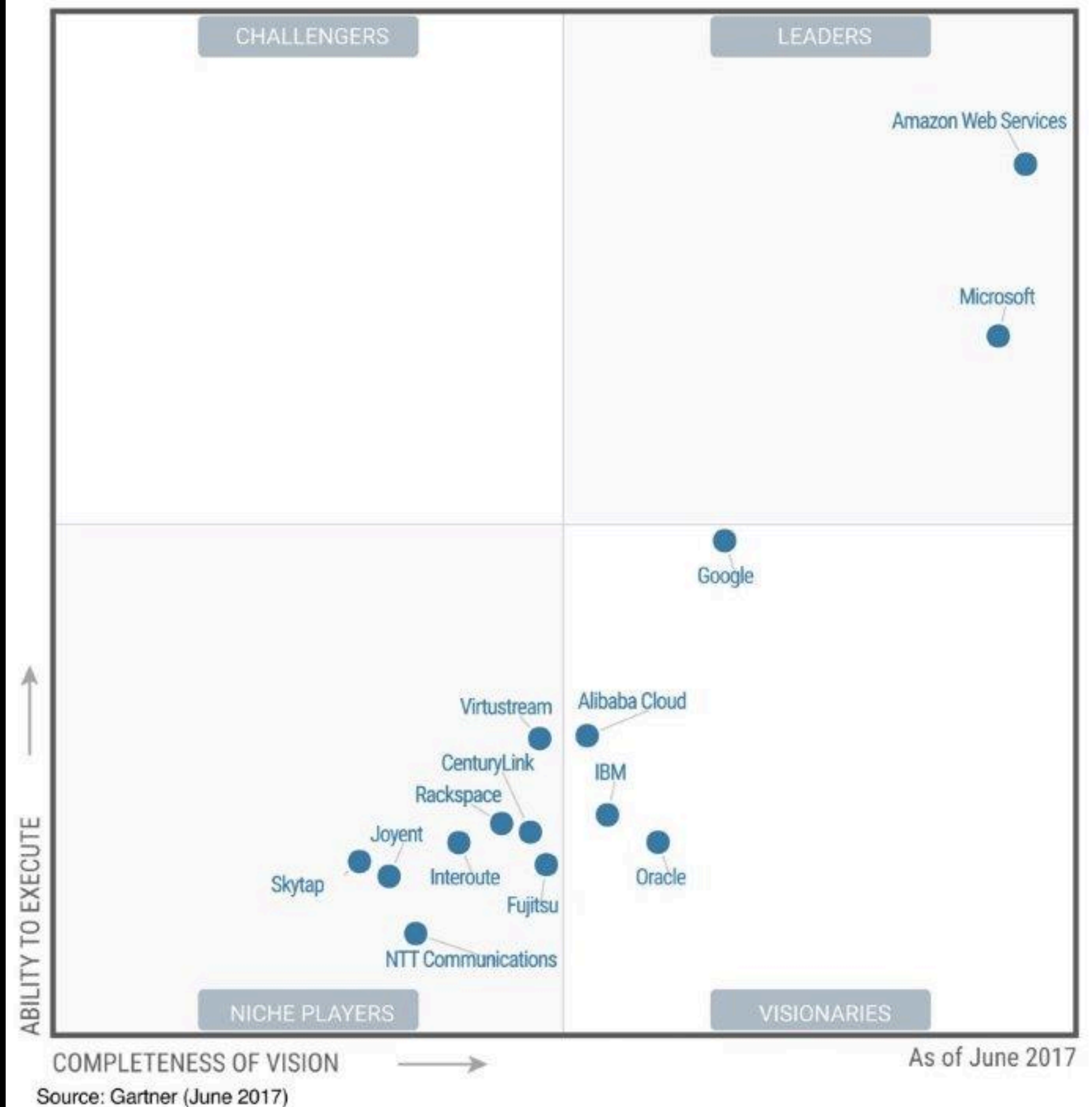
Market Leader

- Gartner IAAS Report
- 10 times capacity of the next 14 rivals

Low Up Front Costs

- Reduced IT support costs

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide



AWS Global Network

21 Regions

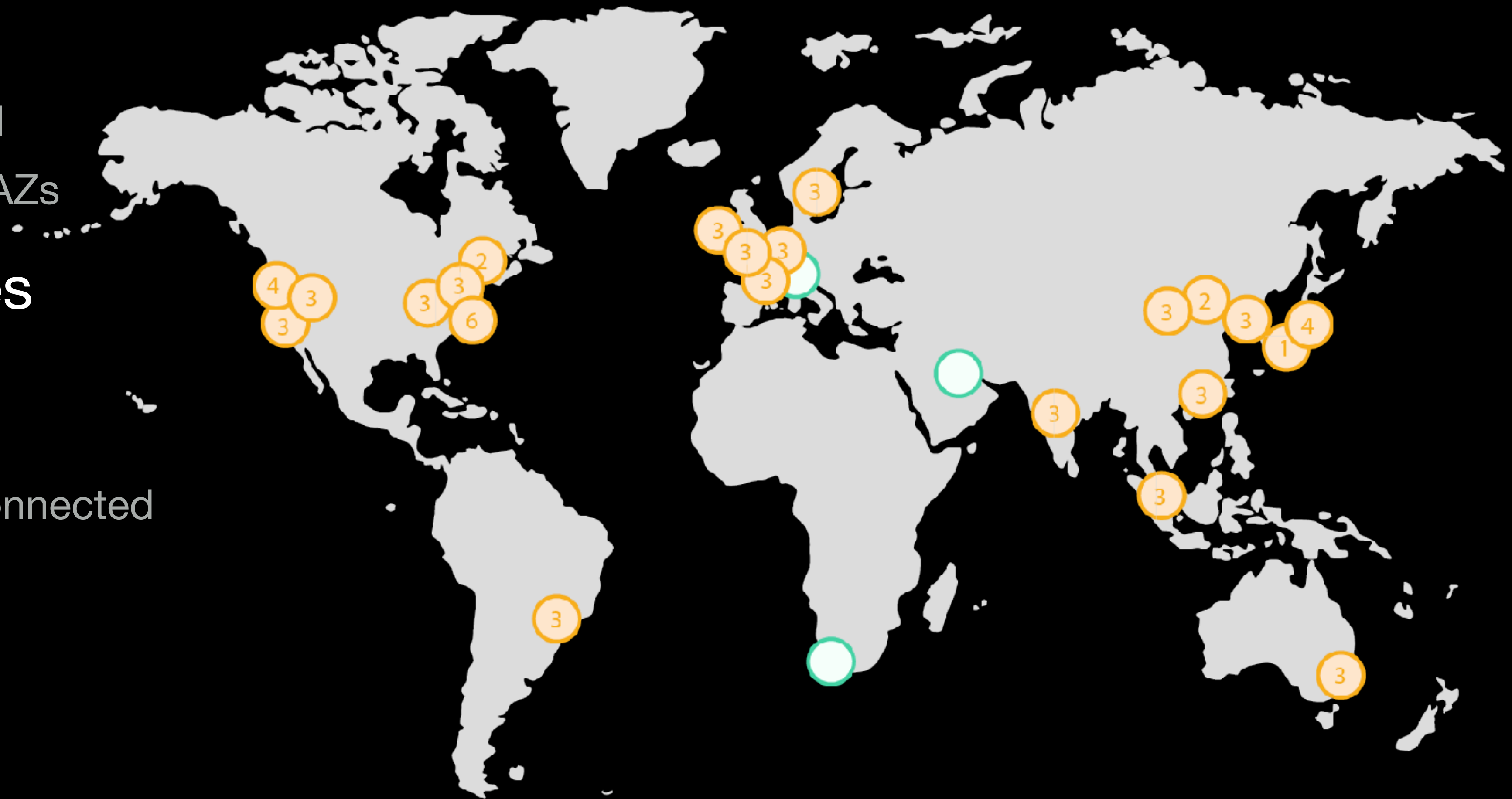
- Globally interconnected
- Comprised of multiple AZs

66 Availability Zones

- 1+ Data Centers
- Secure
- Redundant Power & Connected

Edge Locations

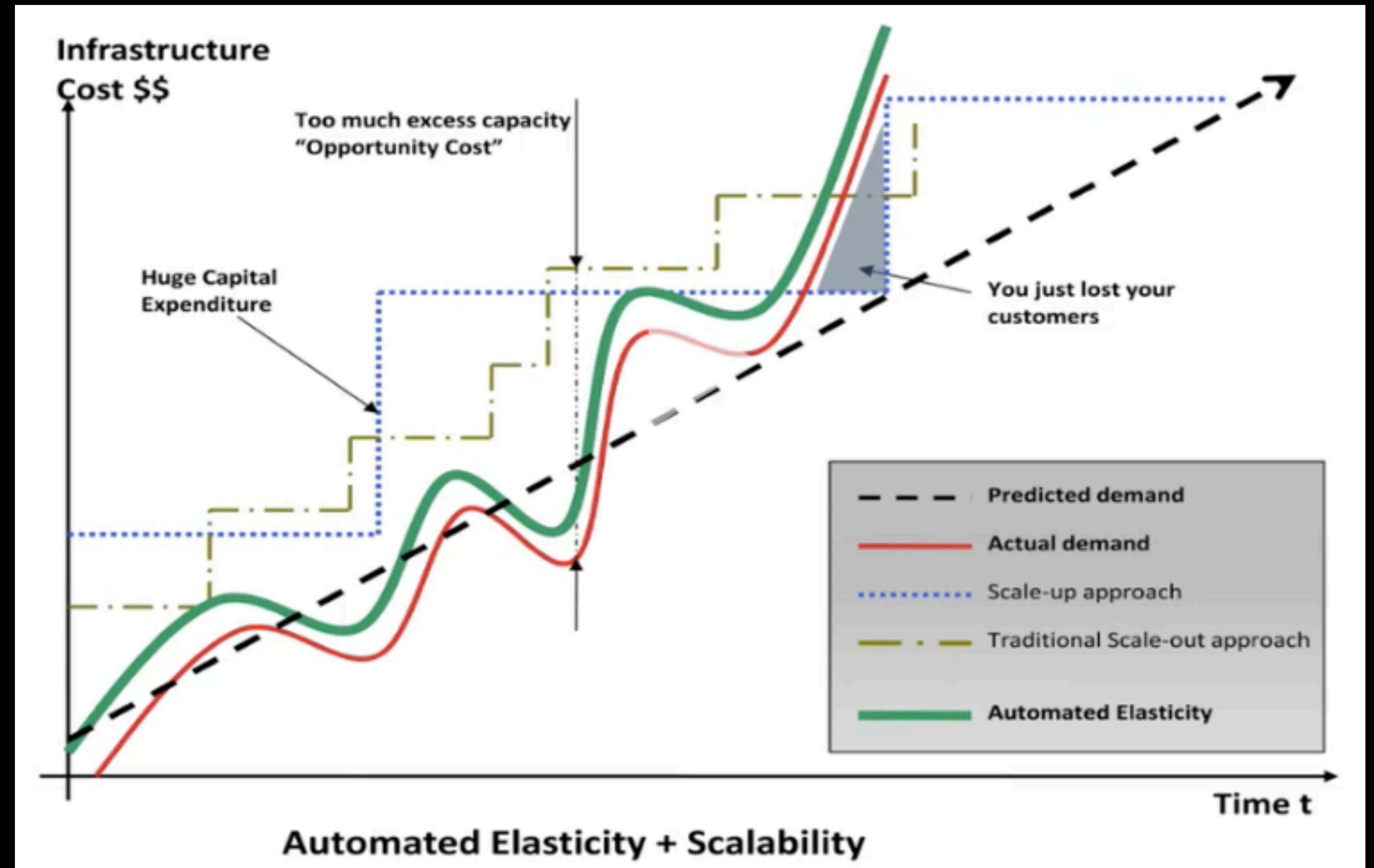
- Regional caches



Why IaaS

Compute Scalability

- Meet demand
- Manage costs
- Scale up and down



EC2 - Elastic Cloud Compute

The Backbone of AWS

- Windows and Linux Virtual Machines
- Available in different sizes and types
- Shared responsibility model

Elastic = Scalability

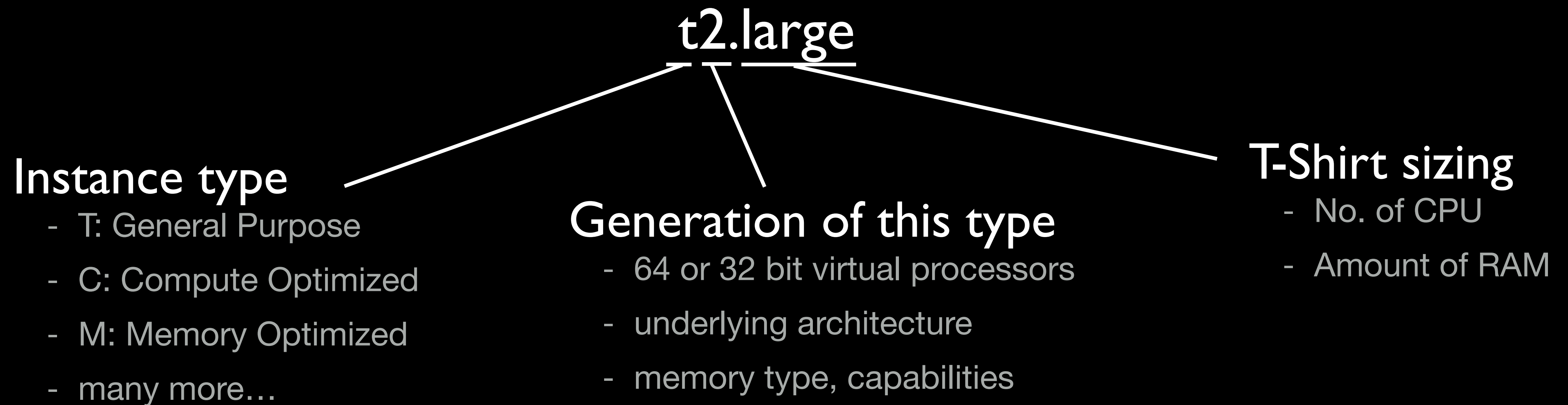
- EC2 instances can be scaled up or down



EC2 Instance

EC2 - Instance Types

Understanding instance types



Pricing is dependent on the type and size of an instance.

EC2 - More Compute

EC2 Auto Scaling & Elastic Load Balancing

- Define rules based on requirements and cost
- Configure with user data to automate
- Auto terminate as demand goes down

EC2 Spot Instance

- Only provision when costs are low
- Auto terminate as costs rise
- Can be managed with AWS Batch

Lightsail



EC2 Instance

VPC and EBS

Virtual Private Cloud

- Complete control over virtual networking
- Internet Gateway for internet access
- Private range of IP Addresses and Subnets
- RFC1918 - /16 range ~ 64K addresses

Elastic Block Storage

- Suitable for OS
- SSD or HDD backed Volumes
- Note: pricing applies to stopped instances



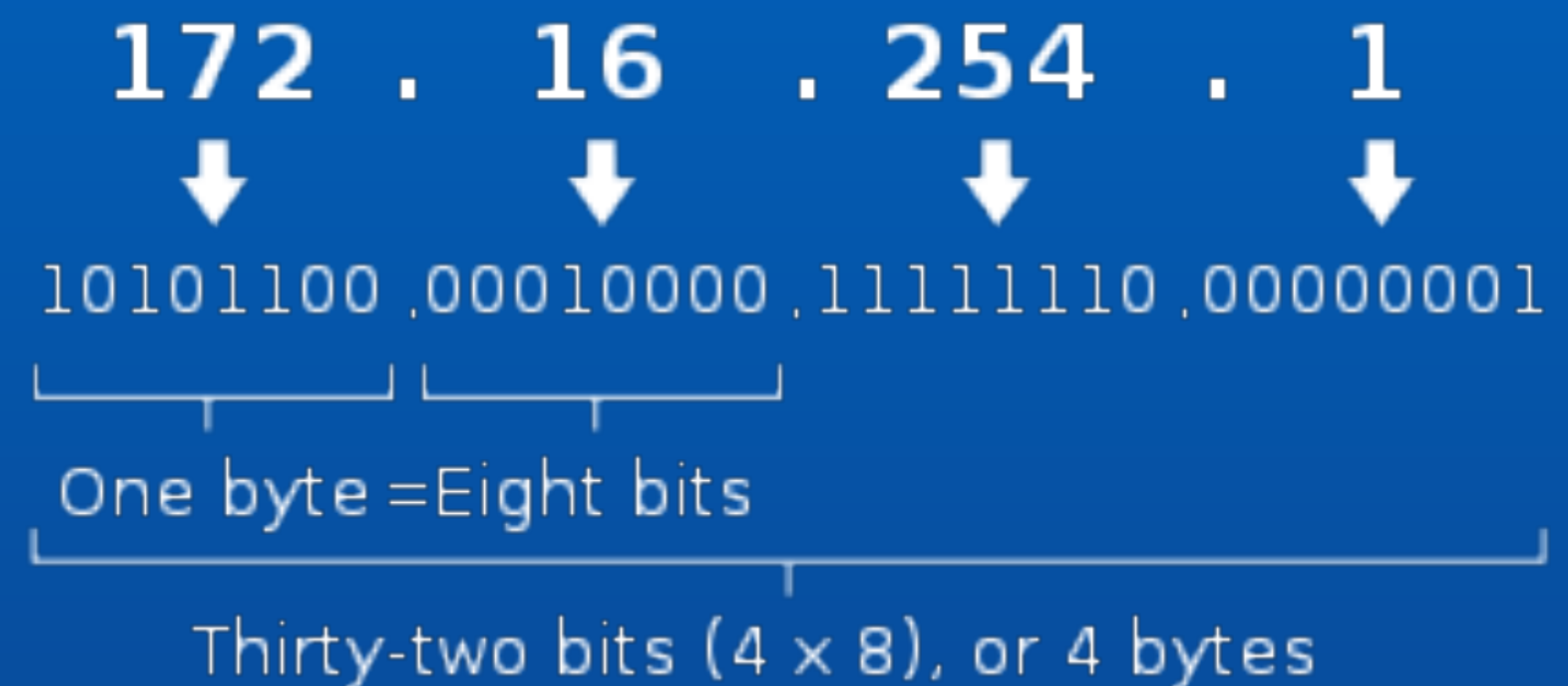
SDN - Software Defined Networking

VPC: your virtual data center

- Required for client requested VPN
- Easy to use and administer networking rules
- Changes apply immediately
- Applicable per VPC in each Region
- Manage Ports and Protocols
- IPv4 CIDR Notation

CIDR Notation Explained

An IPv4 address (dotted-decimal notation)

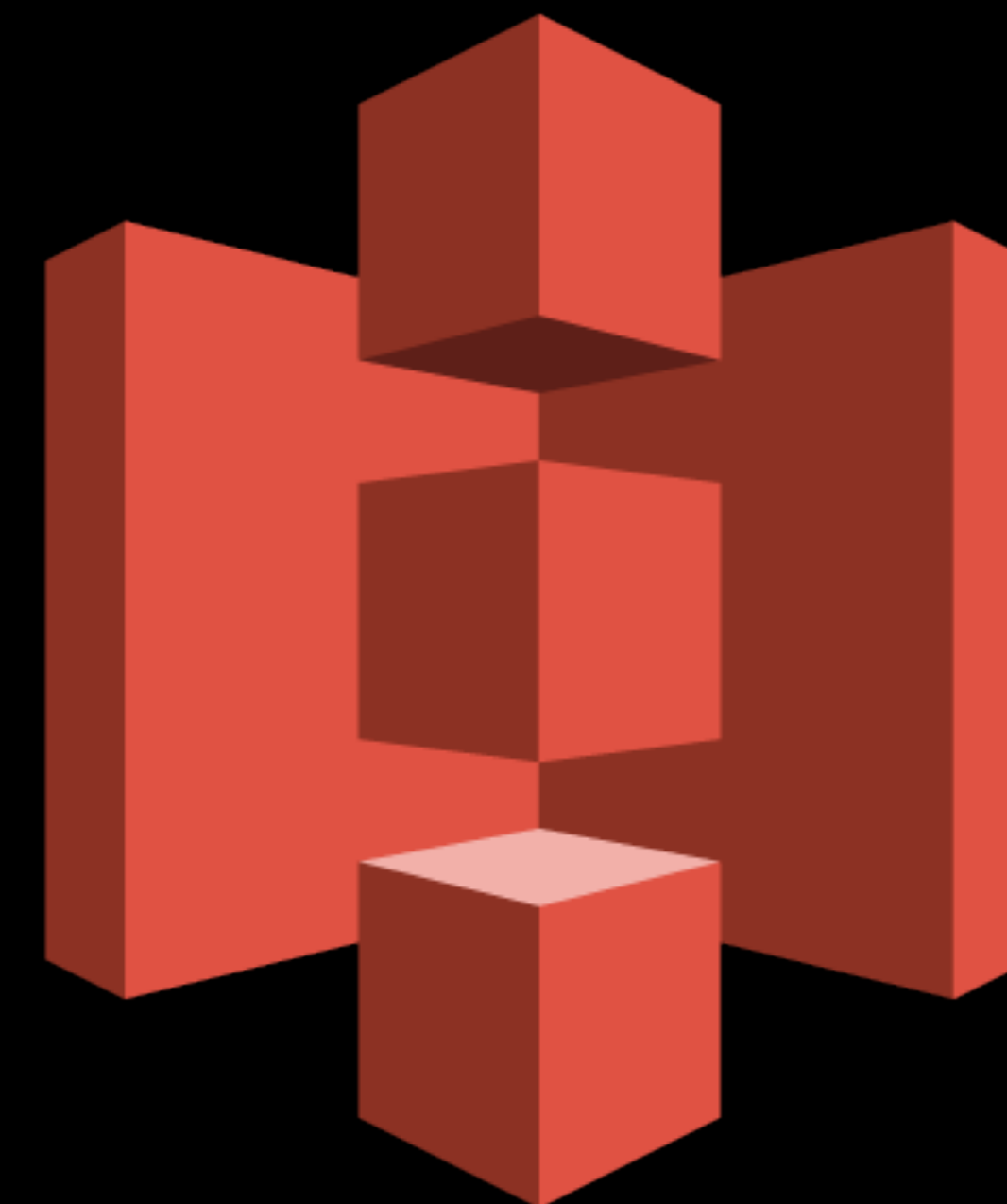


eg: 172.16.0.0/16

S3 - Simple Storage Service

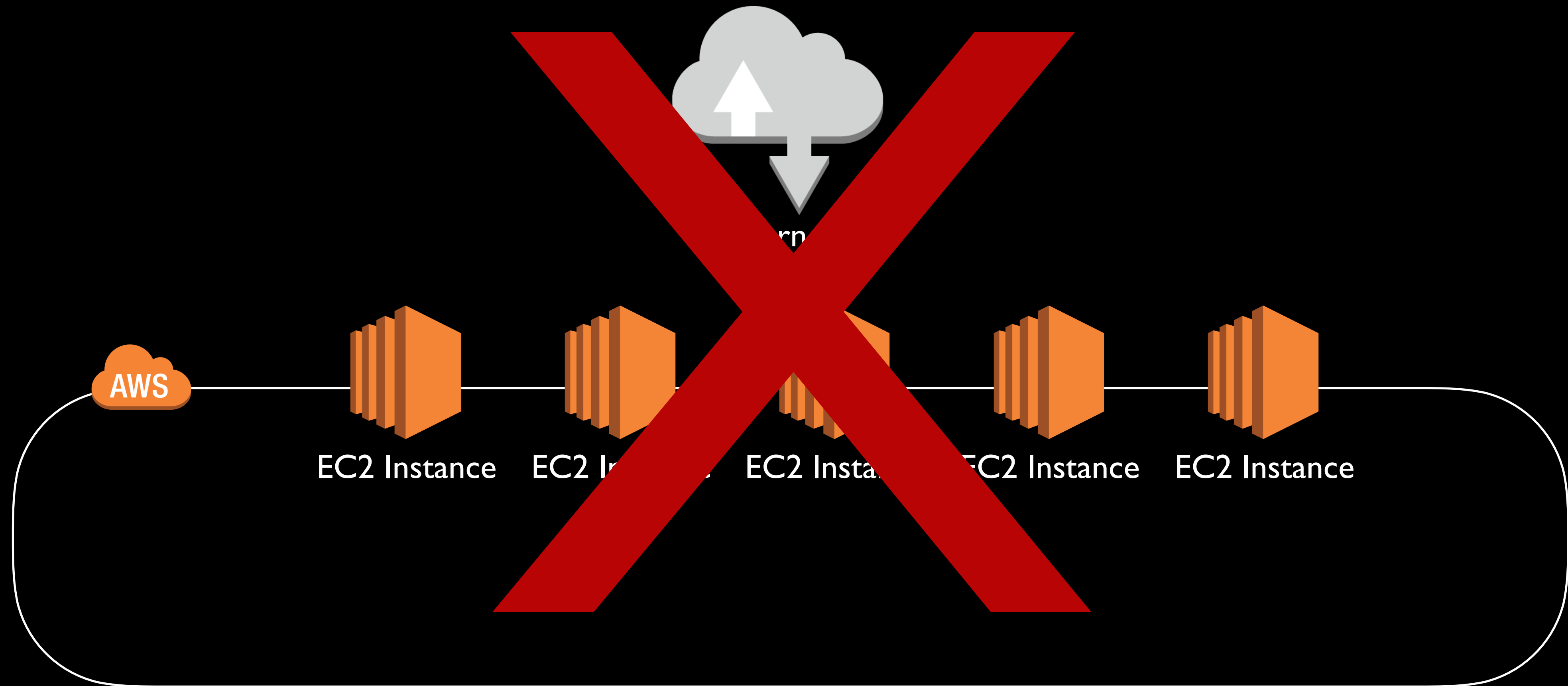
Object Storage (vs. Block Storage)

- 99.999999999% Durable
- Secure
- Different Tiers available
- Optional Versioning and Lifecycles
- Suitable for Backups and Disaster Recovery Strategies
- EBS Snapshots stored in S3

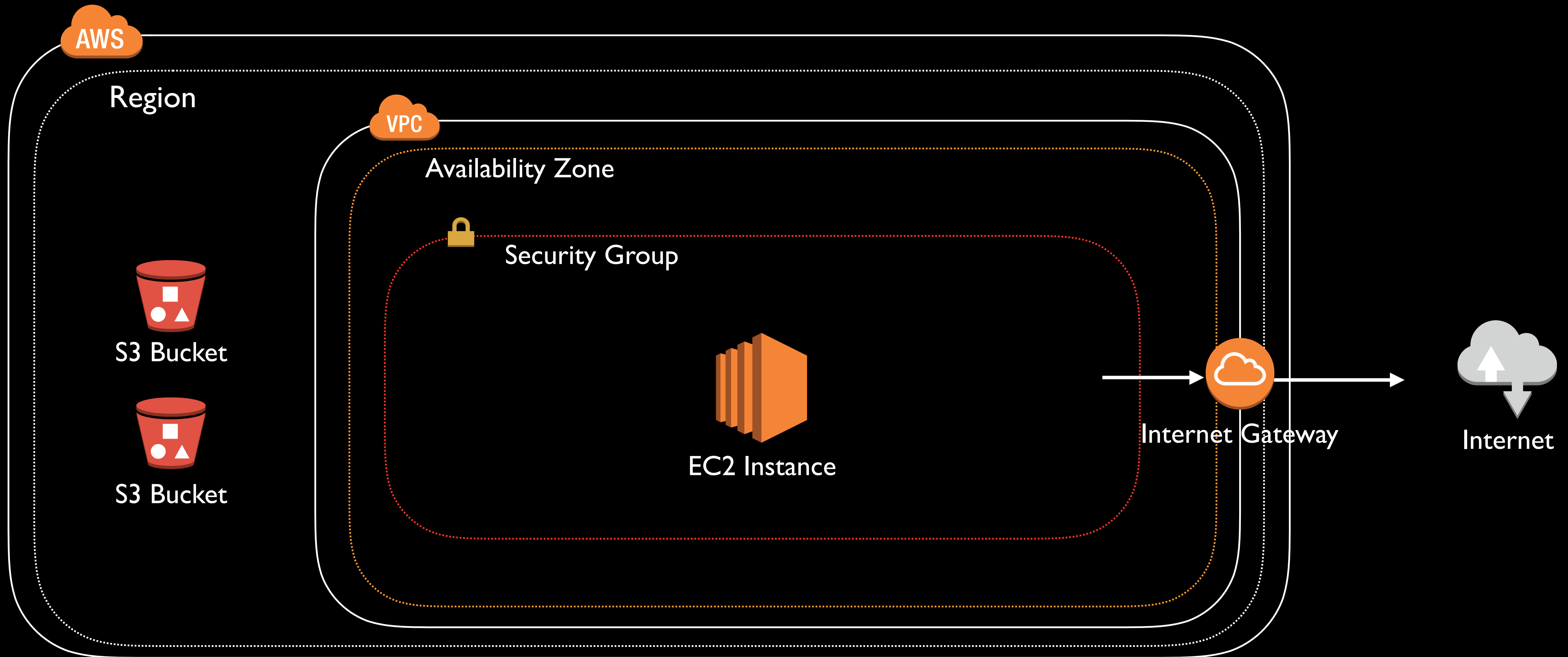


Amazon S3

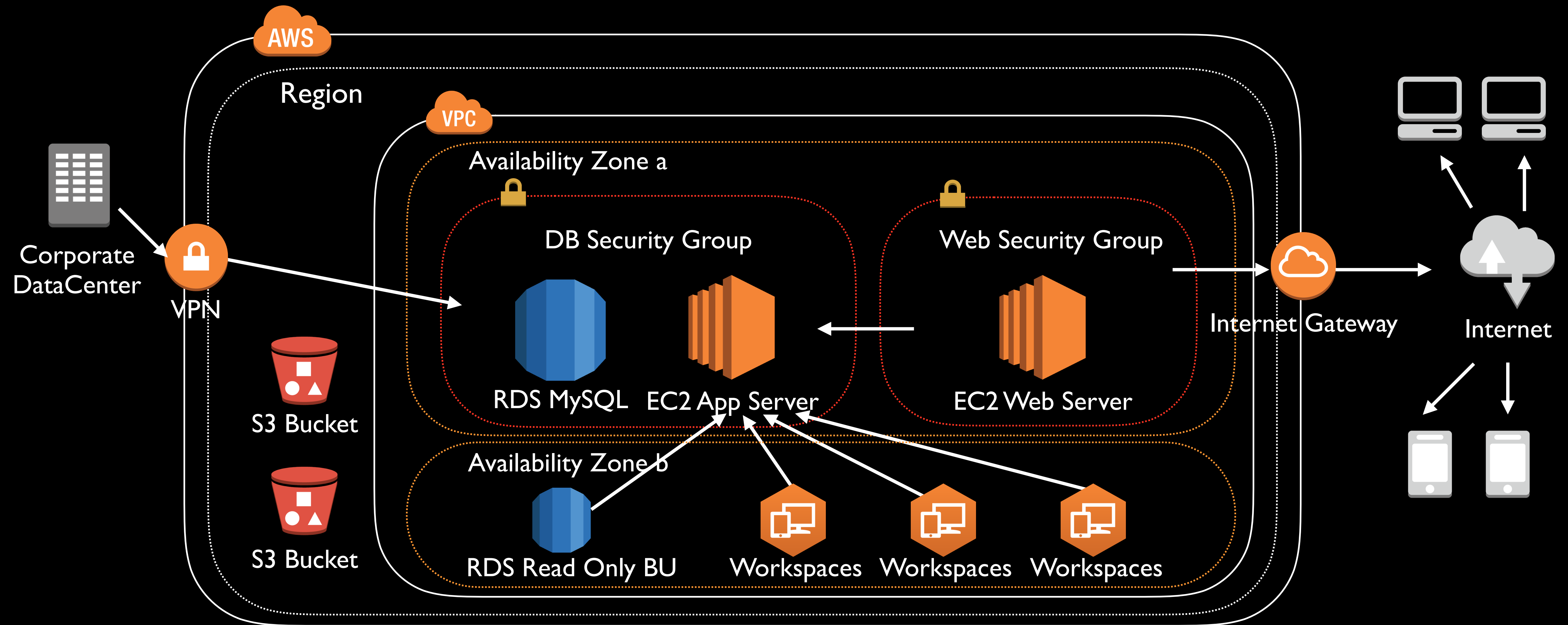
EC2 Classic Sample Scenario



EC2 in a VPC Sample Scenario 1



EC2 in a VPC Sample Scenario 2



Other Concepts

Reserved Instance

- Contracts for usage

Cost Monitoring

- Detailed billing reporting
- Use CloudWatch to create alerts

Tags

- Strategies for resource management
- Cost allocation

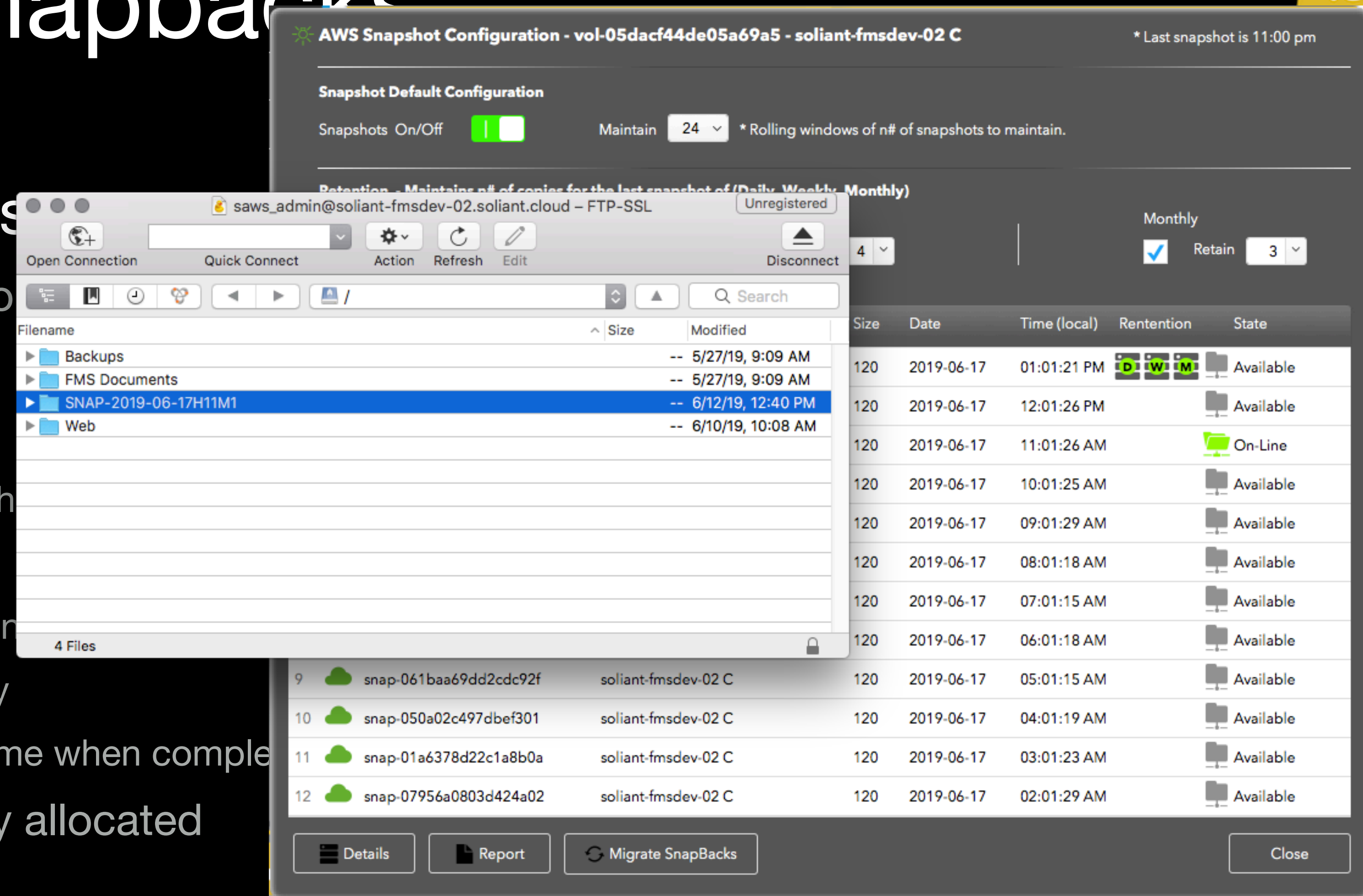
- High Availability
- Automated Monitoring
- Extend functionality of architecture
 - IE; Snapbacks
- Ease of operation for clients
- Cost effective

[illegible]

Example: Snapbacks

Snapshot + Backups

- Hourly, Daily, Weekly, Monthly
- Customer accessible
 - Request Snapback
 - Create Volume from snapshot
 - Attach Volume to Instance
 - Bring Volume Online, assign
 - Create FTP virtual directory
 - Tear down and delete volume when complete
- All charges automatically allocated



AWS Snapshot Configuration - vol-05dacf44de05a69a5 - soliant-fmsdev-02 C * Last snapshot is 11:00 pm

Snapshot Default Configuration

Snapshots On/Off ☒ Maintain * Rolling windows of n# of snapshots to maintain.

Retention - Maintain n# of copies for the last snapshot of (Daily, Weekly, Monthly)

Monthly ☒ Retain

Size	Date	Time (local)	Retention	State
120	2019-06-17	01:01:21 PM		Available
120	2019-06-17	12:01:26 PM		Available
120	2019-06-17	11:01:26 AM		On-Line
120	2019-06-17	10:01:25 AM		Available
120	2019-06-17	09:01:29 AM		Available
120	2019-06-17	08:01:18 AM		Available
120	2019-06-17	07:01:15 AM		Available
120	2019-06-17	06:01:18 AM		Available
120	2019-06-17	05:01:15 AM		Available
120	2019-06-17	04:01:19 AM		Available
120	2019-06-17	03:01:23 AM		Available
120	2019-06-17	02:01:29 AM		Available

9 snap-061baa69dd2cdc92f soliant-fmsdev-02 C 120 2019-06-17 05:01:15 AM Available

10 snap-050a02c497dbef301 soliant-fmsdev-02 C 120 2019-06-17 04:01:19 AM Available

11 snap-01a6378d22c1a8b0a soliant-fmsdev-02 C 120 2019-06-17 03:01:23 AM Available

12 snap-07956a0803d424a02 soliant-fmsdev-02 C 120 2019-06-17 02:01:29 AM Available

Details Report Migrate SnapBacks Close

File browser interface showing:

- Filename: Backups, FMS Documents, SNAP-2019-06-17H11M1, Web
- Size: --
- Modified: 5/27/19, 9:09 AM, 5/27/19, 9:09 AM, 6/12/19, 12:40 PM, 6/10/19, 10:08 AM



Other AWS Services we use

Route 53 - DNS

RDS - ODBC Database as a Service

SES - Simple Email Service

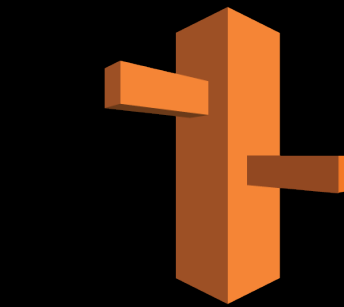
- Low cost email service

WorkSpaces

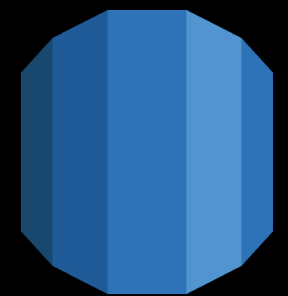
- Secure, multi-platform app for Virtual Desktop Infrastructure (VDI)

AppStream 2.0

- Deliver FileMaker Apps via web browser



Route 53



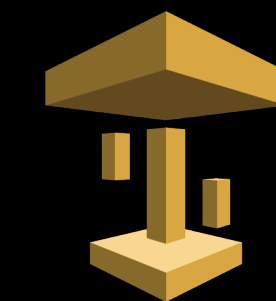
RDS



SES



Workspaces



Appstream 2.0

Organizations



Multiple Accounts

- AWS Organizations
 - Consolidated billing, transparent to clients
 - Economies of scale
 - Structure Organizational Units
 - Allow any and all services
 - Minimize Blast Radius
 - A-B testing across accounts

Options Setup Links View Quick Instance Locator...				
Kalisher - kalisher-t2 - US East (N. Virginia) - Mon, Jun 17, 2019 01:24 PM				
Detail View				
Instance Volumes Databases Connections Accounts Communication Log Command Queue Invoicing	Invoice Estimator & Builder		Monthly Costs Estimate	
	Show Year-Month 2019-06			
	Product Name	Usage Type	Quantity	Rate
	1 Amazon Simple Storage Service	Requests-Tier1	109680.000 @ 0.0000 =	\$ 0.548
	2 Amazon Simple Storage Service	Requests-Tier2	74397.000 @ 0.0000 =	\$ 0.030
	3 Amazon DynamoDB	WriteRequestUnits	68212.000 @ 0.0000 =	\$ 0.085
	4 AWS Lambda	Request	34411.100 @ 0.0000 =	\$ 0.000
	5 AWS Lambda	Lambda-GB-Second	25851.000 @ 0.0000 =	\$ 0.006
	6 Amazon DynamoDB	ReadRequestUnits	5321.000 @ 0.0000 =	\$ 0.003
	7 AWS Lambda	EUC1-Lambda-Edge-Request	4955.000 @ 0.0000 =	\$ 0.005
	8 Amazon CloudFront	US-Requests-Tier2-HTTPS	1000.000 @ 0.0000 =	\$ 0.003
	9 AWS Lambda	Lambda-Edge-Request	3340.000 @ 0.0000 =	\$ 0.002
	10 AWS Lambda	USE2-Lambda-Edge-Request	3208.000 @ 0.0000 =	\$ 0.004
	11 Amazon CloudFront	EU-Requests-Tier2-HTTPS	3203.000 @ 0.0000 =	\$ 0.011
	12 Amazon API Gateway	USE1-APIGatewayRequest	1161.000 @ 0.0000 =	\$ 0.000
	13 Amazon Route 53	Intra-AWS-DNS-Queries	928.000 @ 0.0000 =	\$ 0.000
	14 Amazon Route 53	DNS-Queries	762.000 @ 0.0116 =	\$ 8.839
	15 Amazon Elastic Compute Cloud	BoxUsage:t2.micro	762.000 @ 0.0180 =	\$ 13.716
	16 Amazon Relational Database Service	InstanceUsage:db.t2.micro	643.569 @ 0.0001 =	\$ 0.032
	17 AWS Lambda	EUC1-Lambda-Edge-GB-Second	451.000 @ 0.0000 =	\$ 0.001
	18 AWS Secrets Manager	USE1-AWSSecretsManagerAPIRequest	404.438 @ 0.0001 =	\$ 0.020
	19 AWS Lambda	Lambda-Edge-GB-Second	381.000 @ 0.0360 =	\$ 13.716
	20 Amazon Elasticsearch Service	ESInstance:t2.small		
Monthly Total				\$ 42.312

Lambda

Serverless Computing

- No servers to provision
- Auto scale for usage
- Availability and fault tolerant
- Event driven Compute
- More language support being added
- Billed in 100ms increments



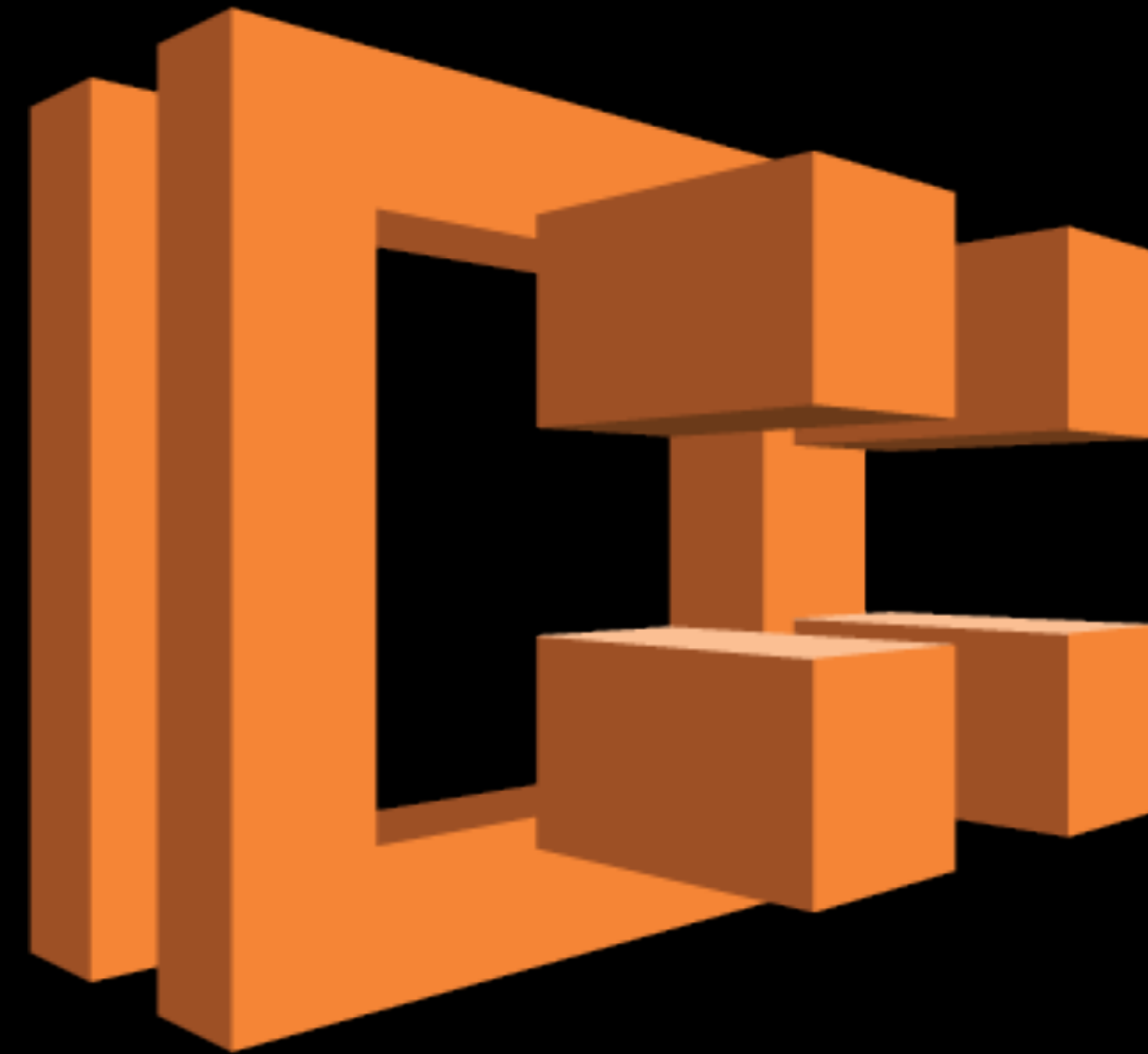
ECS - Containers

Container as an Elastic Service

- Docker
- Kubernetes and EKS

Fargate

- Managed container service



The Well Architected Framework

A set of questions to evaluate if a solution is aligned with established best practices.

Based on five pillars:

- Operational Excellence
- Security
- Reliability
- Performance Efficiency
- Cost Optimization

Questions?