Introduction to Amazon Cloud & EC2 Overview

Yasser Quraishi, AWS Solutions Architect – yquraish@amazon.com

Jeff Hosley, AWS Account Manager – jhosley@amazon.com

Agenda

- Introduction to AWS Cloud
- Global Reach
- EC2 Overview
- EC2 Details
- Pop quiz
- Hands-on Lab

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What is AWS?

AWS provides a highly reliable, scalable, low-cost infrastructure platform in the cloud that powers millions of businesses in 190 countries around the world.

Benefits

- Low Cost
- Elasticity & Agility
- Open & Flexible
- Secure
- Global Reach

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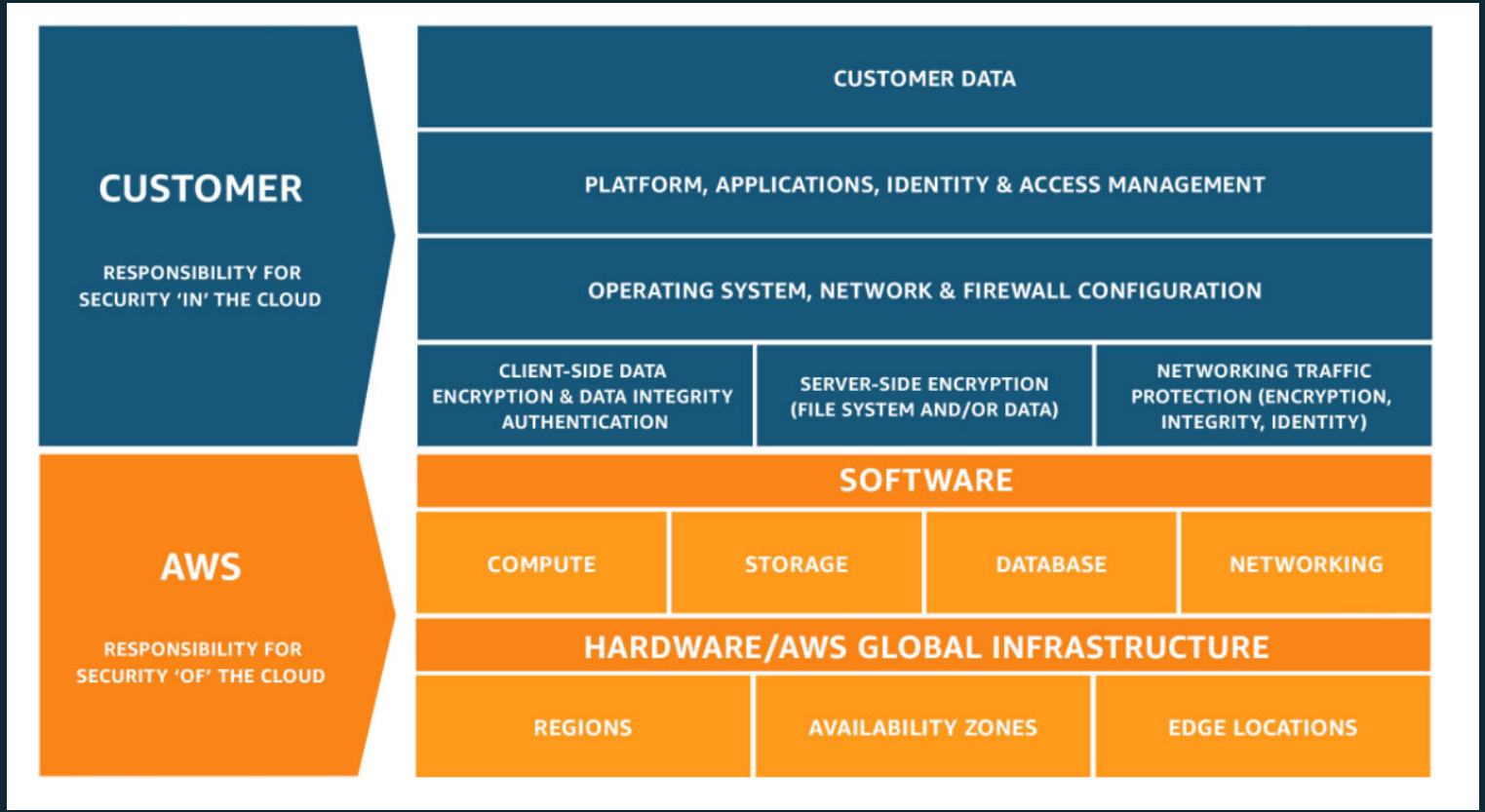
Shared Responsibility Model



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AWS Global Reach

22 Regions

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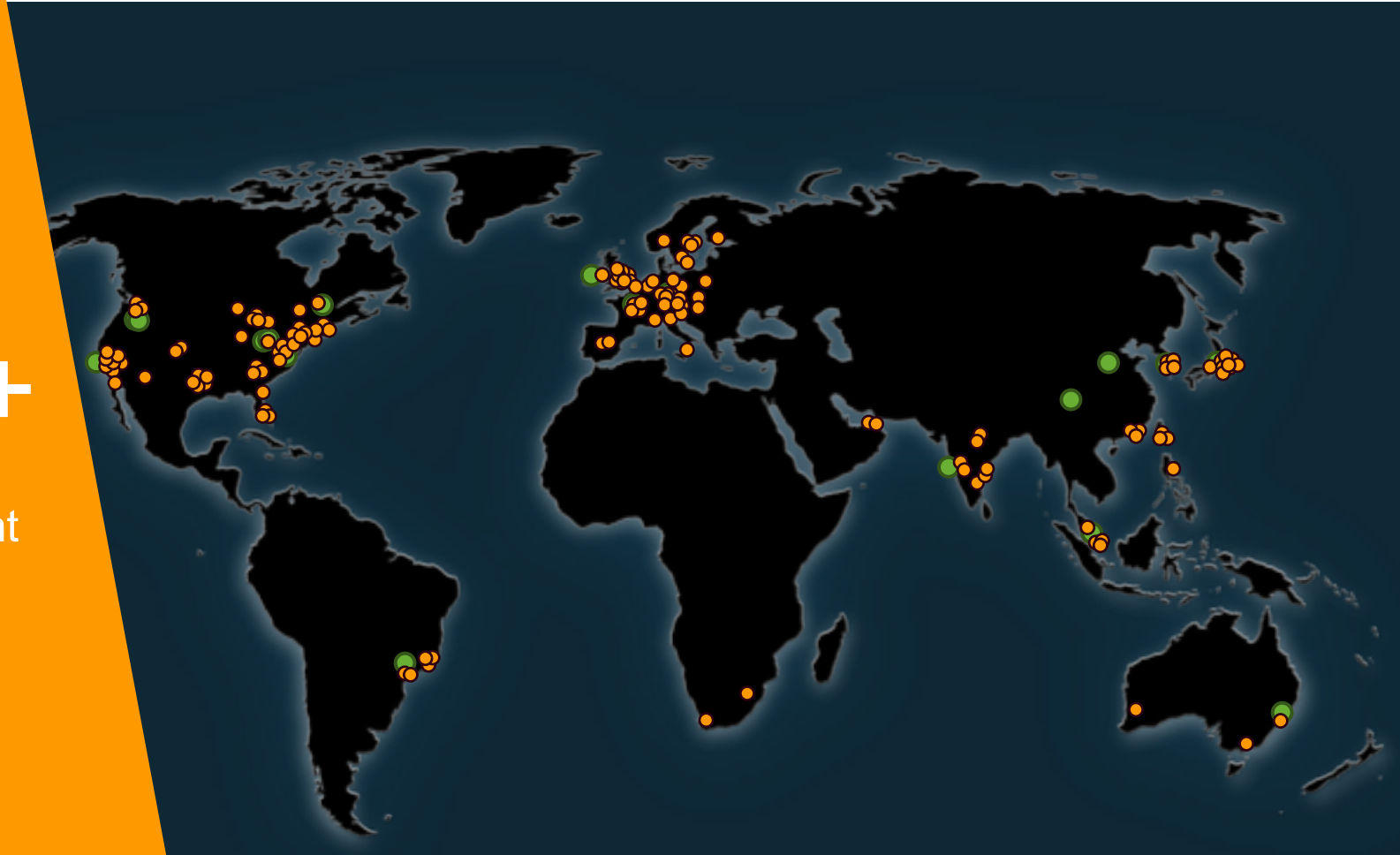
180+

Amazon CloudFront Points of Presence



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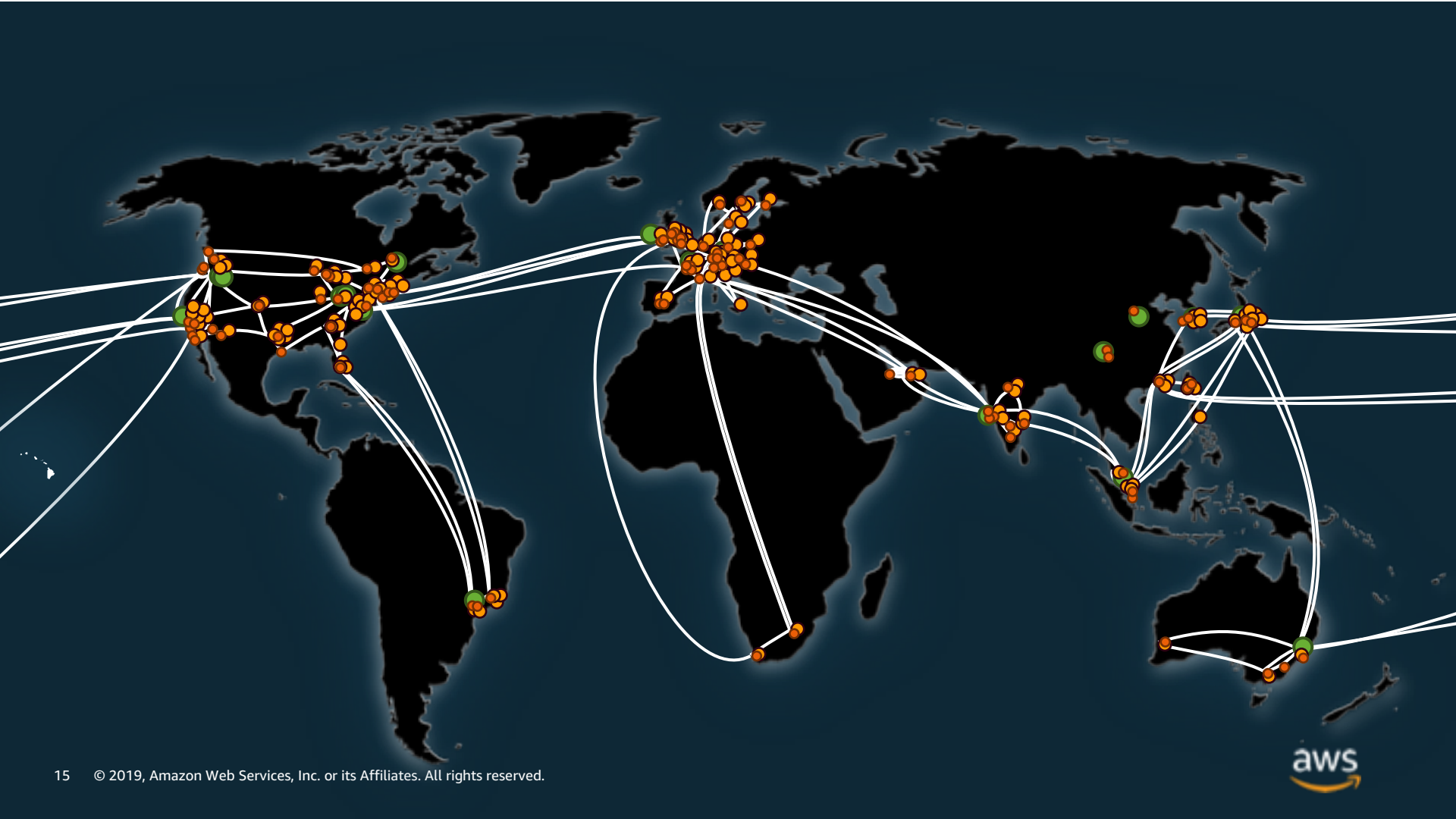

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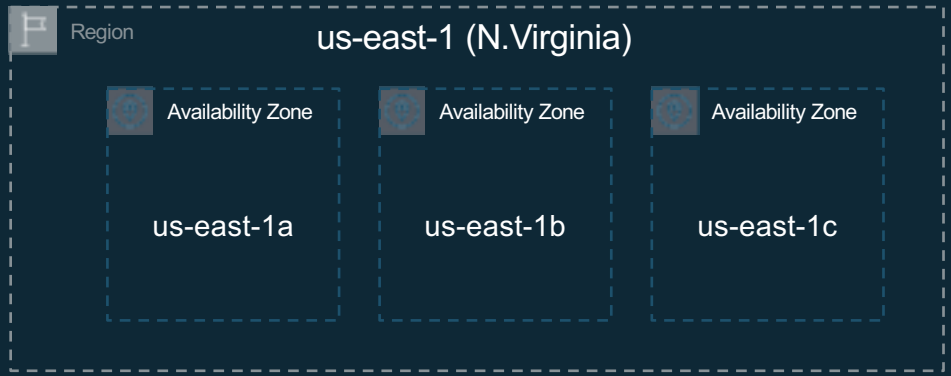
Availability Zones

- A Region is comprised of multiple Availability Zones
- Isolation from other Availability Zones (power, network, flood plains)
- Low latency (<10mS) direct connect between Availability Zones
- 1AZ can include multiple data centers
- Physical Separation < 100km



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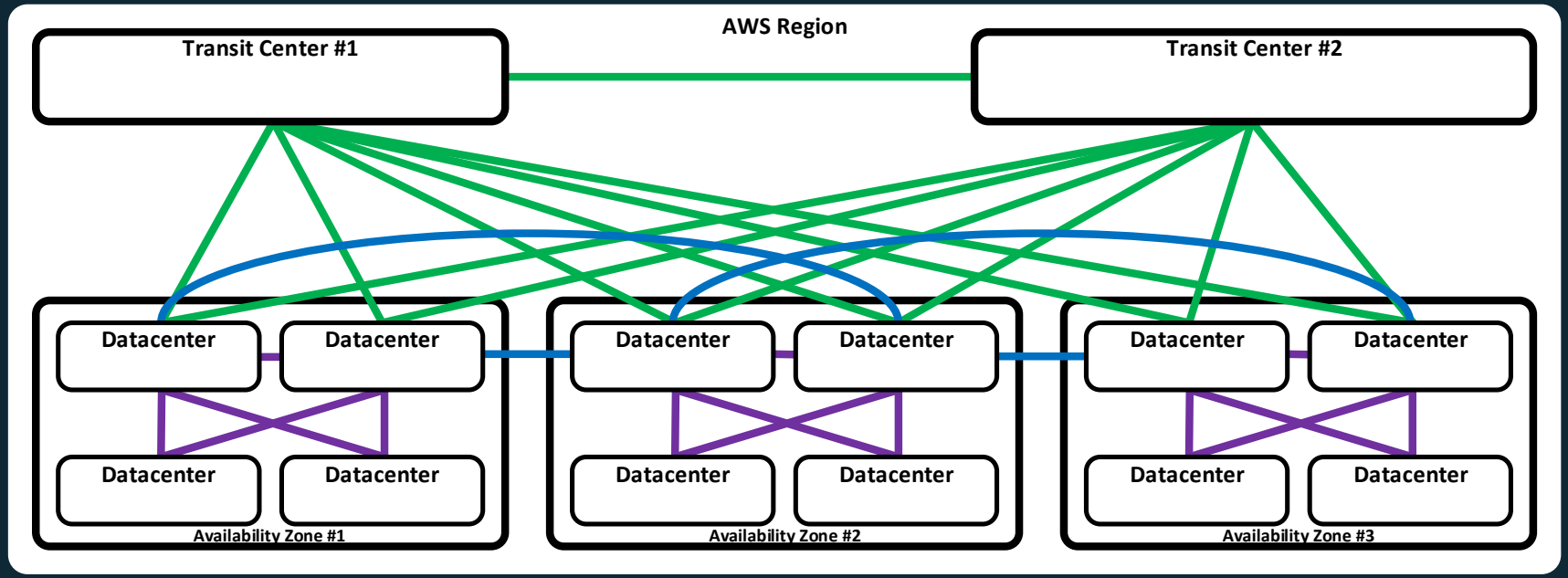
Availability Zones



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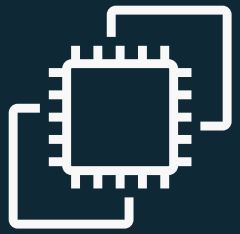
EC2 Overview

Choices for Compute



Amazon EC2

Virtual server instances
in the cloud

Amazon ECS, EKS, and Fargate

Container management
service for running
Docker on a managed
cluster of EC2

AWS Lambda

Serverless compute
for stateless code execution
in response to triggers

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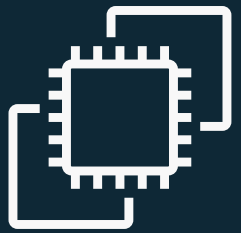
Amazon EC2



Amazon EC2

Linux | Windows

Arm and x86 architectures

General purpose and workload optimized

Bare metal, disk, networking capabilities

Packaged | Custom | Community AMIs

Multiple purchase options: On-demand, RI, Spot

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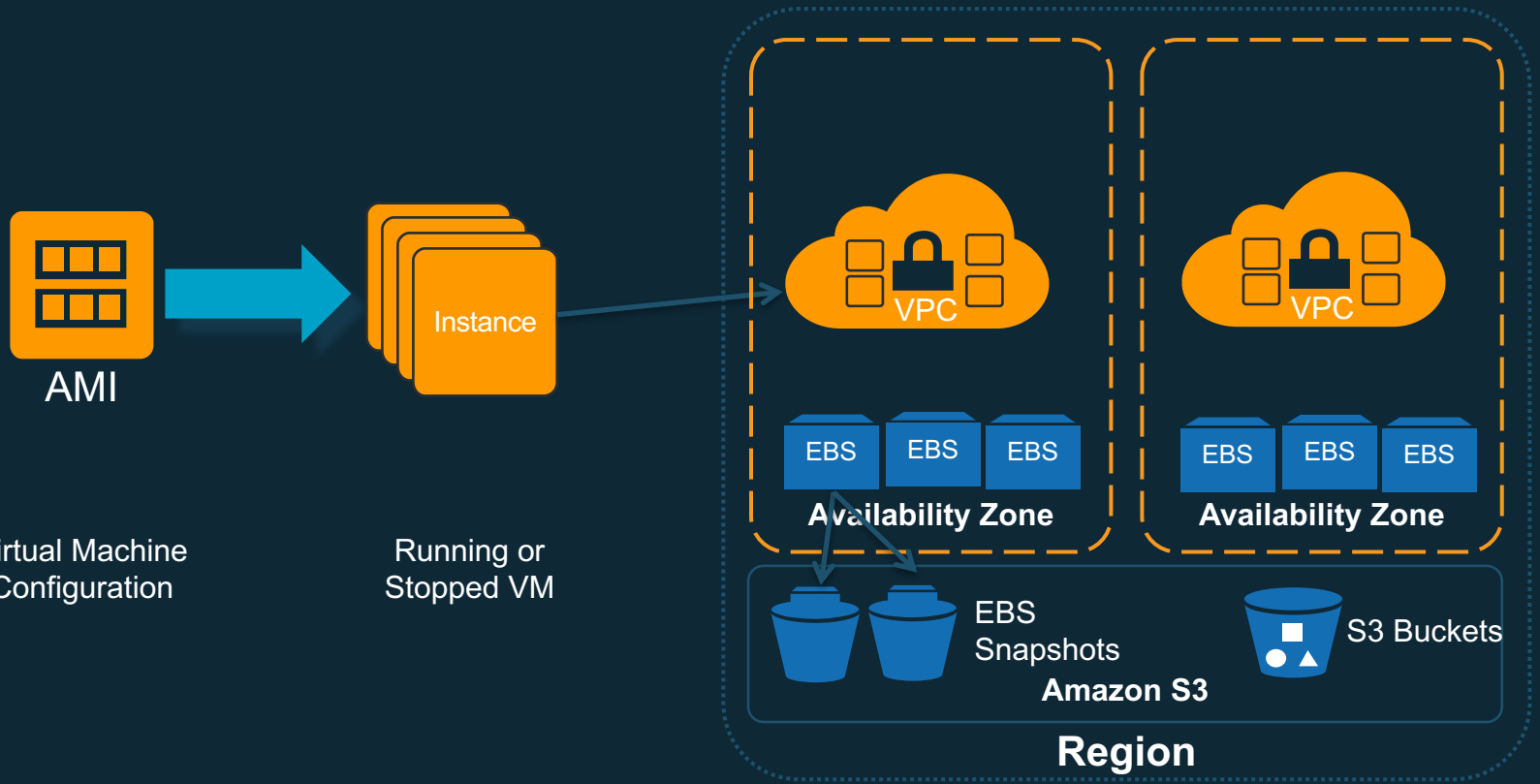
EC2 Terminology



Virtual Machine Configuration

Running or Stopped VM

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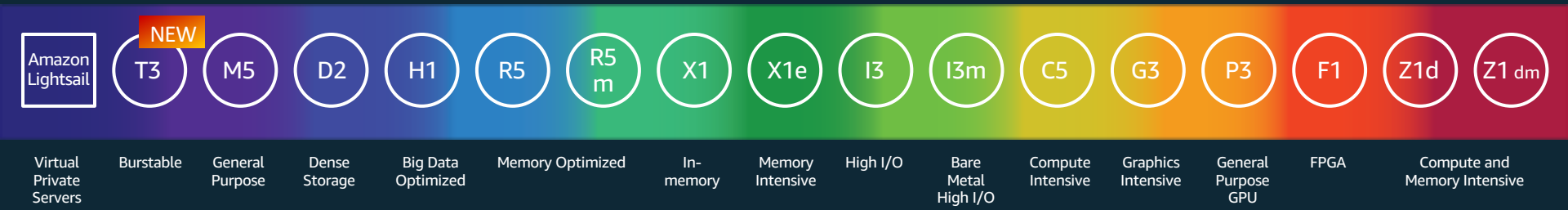
Instance Types



EC2 Elastic GPUs

- Graphics acceleration for EC2 instances

EC2 Fleet

- Simplified provisioning
- Massive scale
- Flexible capacity allocation

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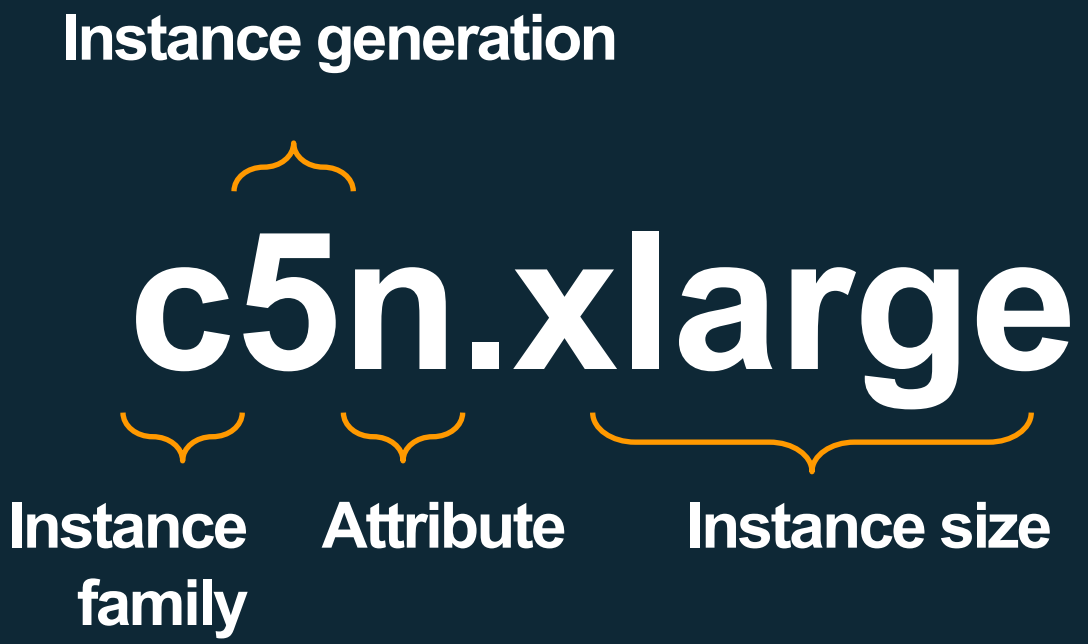
EC2 Naming Explained



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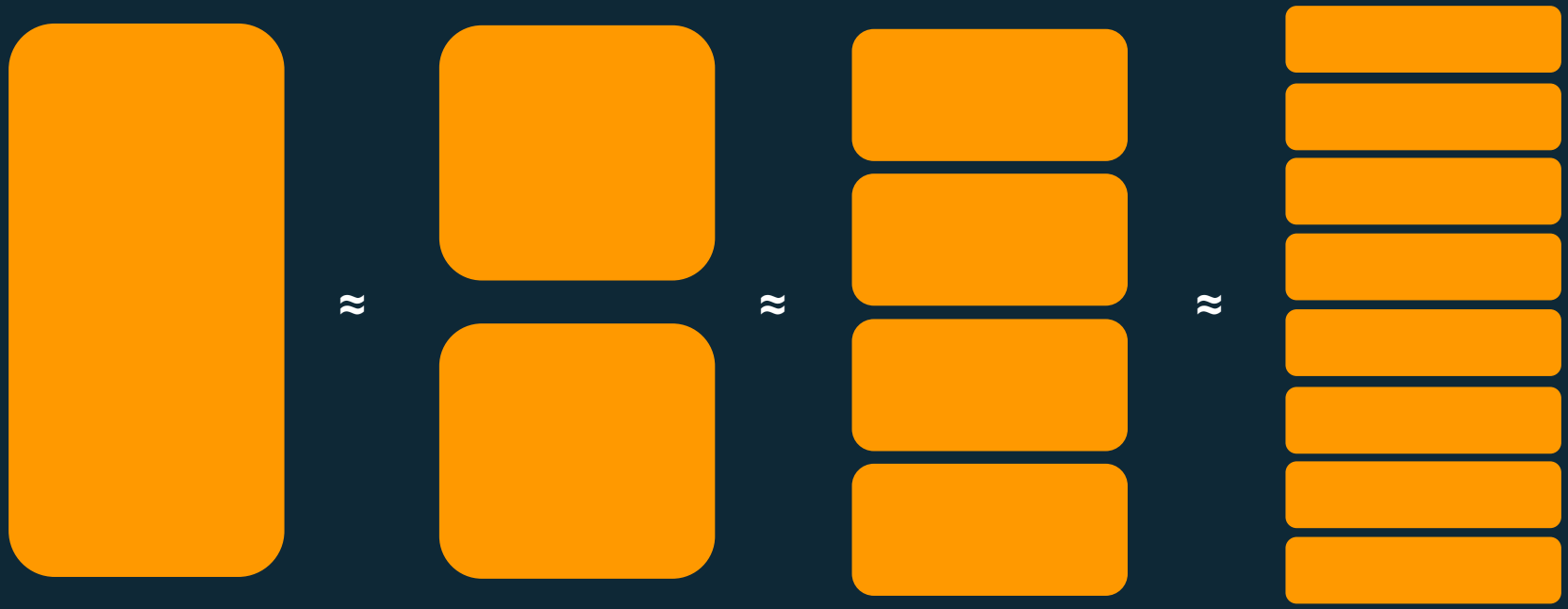
Instance sizing



c4.8xlarge | 2 - c4.4xlarge | 4 - c4.2xlarge | 8 - c4.xlarge

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EC2 Operating Systems Supported

Windows 2003R2/2008/2008R2/2012/2012R2/2016
Amazon Linux
Debian
Suse
CentOS
Red Hat Enterprise Linux
Ubuntu

for more OSes see: https://aws.amazon.com/marketplace/b/2649367011

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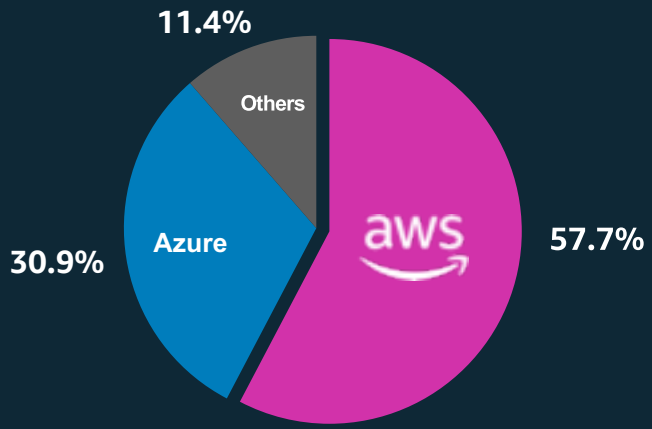
Windows Licenses by Cloud Provider



Note: Includes Windows instances deployed in the public cloud IaaS market during 2017 Source: IDC estimates 2018

IDC, Windows Server Operating Environment Market Update, Doc # US44217118, Aug 2018

https://d1.awsstatic.com/analyst-reports/IDC_Slide_WindowsonAWS_JM181015.pdf

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Choose your processor and architecture

Intel® Xeon® Scalable (Skylake) processor

NVIDIA V100 Tensor Core GPUs

AMD EPYC processor

Amazon ARM based Cloud Processor

Right compute for the right application and workload

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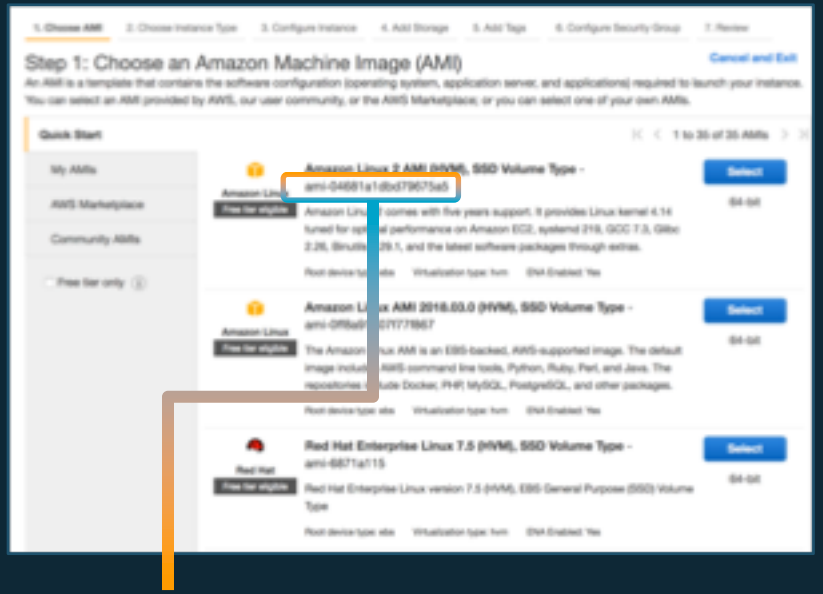
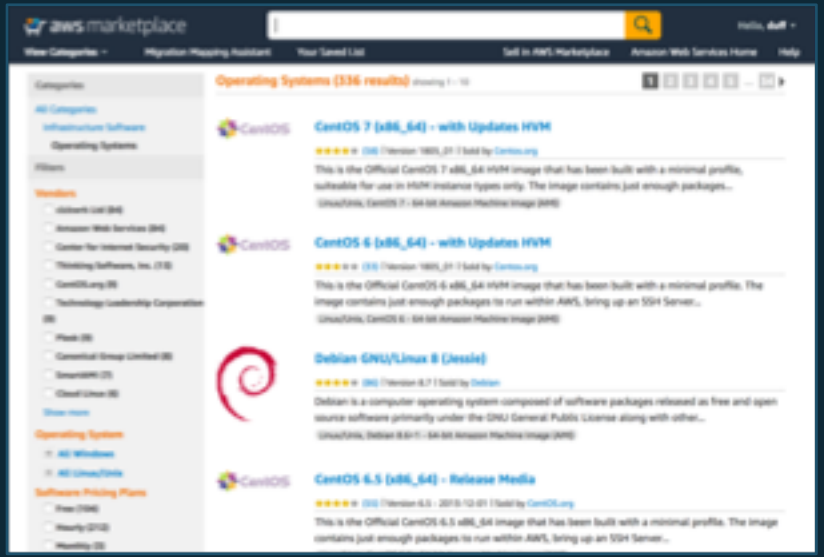
Choosing an AMI

AWS Console



AWS Marketplace



Use the AMI ID to launch through the API or AWS Command Line Interface (AWS CLI)

```
aws ec2 run-instances --image-id ami-04681a1dbd79675a5 --instance-type c4.8xlarge --count 10 --key-name MyKey
```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Purchasing options at a glance

On-Demand Instances

Pay for compute capacity by the hour with no long-term commitments

For Spiky workloads or to define needs

Reserved Instances

Make a low, one-time payment and receive a significant discount on the hourly charge

For committed utilization

Spot Instances

Price fluctuates based on supply and demand

For time-insensitive or transient workloads

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EC2 Options

Categories

General purpose

Burstable

Compute intensive

Memory intensive

Storage (High I/O)

Dense storage

GPU compute

Graphics intensive

Capabilities

NEW! Choice of processor
(AWS, Intel, AMD)

Fast processors
(up to 4.0 GHz)

High memory footprint
(up to 12 TiB)

Instance storage
(HDD and NVMe)

Accelerated computing
(GPUs and FPGA)

NEW! Networking
(up to 100 Gbps)

Bare Metal

Size
(Nano to 32xlarge)

Options

Elastic Block Store

Elastic Graphics

NEW! Elastic Inference

175

instance types

for virtually every workload and business need

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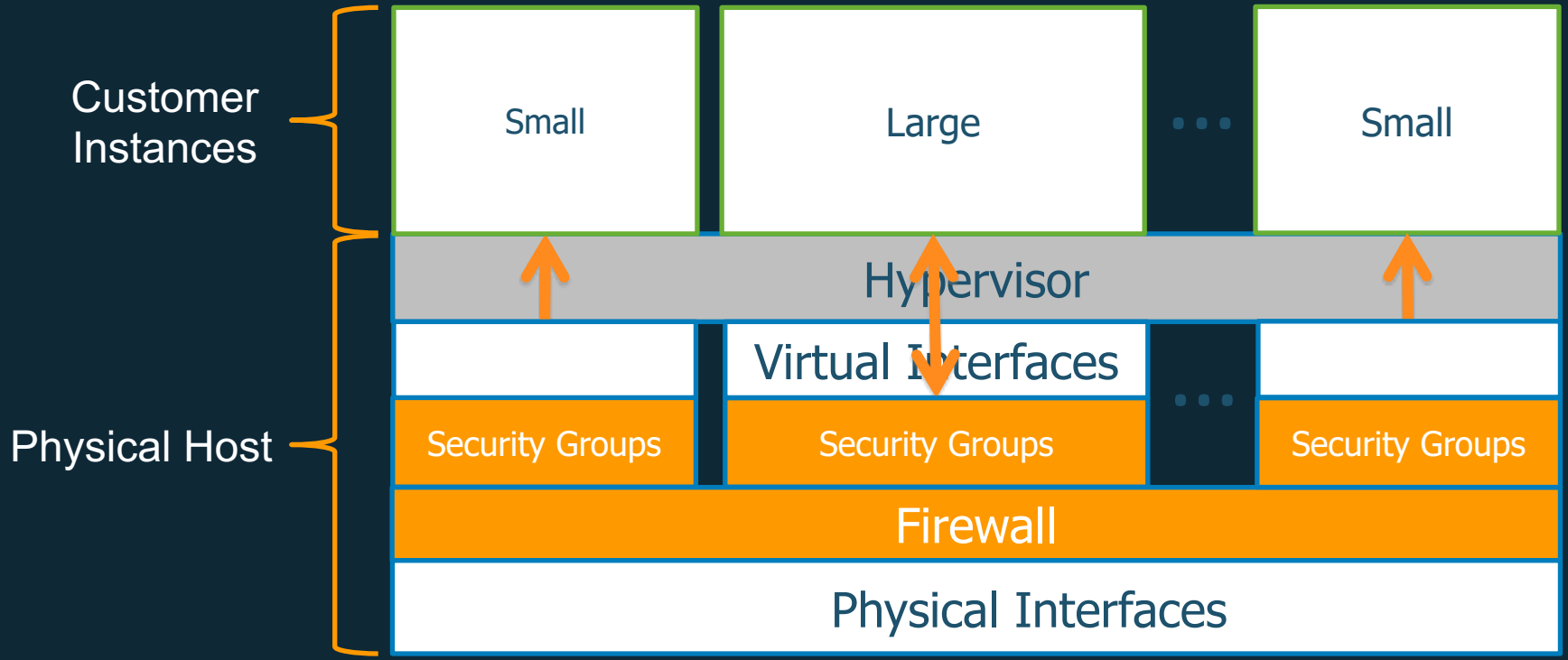
EC2 Design

EC2 Host Virtualization



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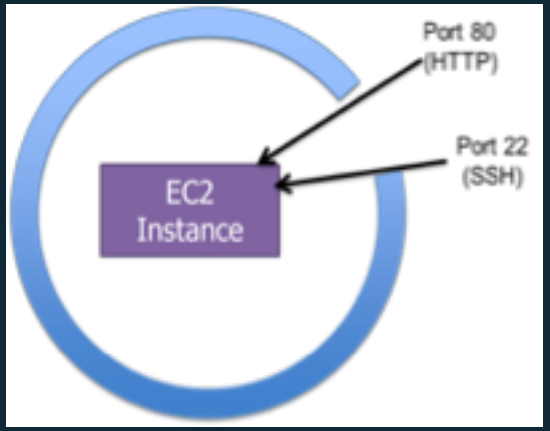
EC2 Security Groups

Security Group Rules

- Name
- Description
- Protocol
- Port range
- IP address, IP range, Security Group name



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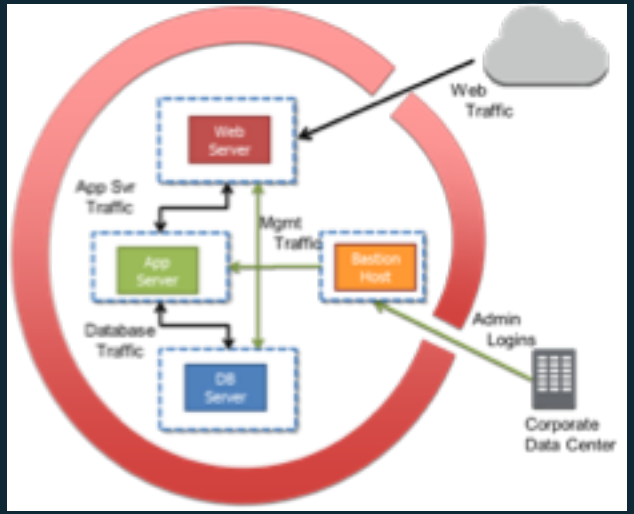
Tiered EC2 Security Groups

Hierarchical Security Group Rules

- Dynamically created rules
- Based on Security Group membership
- Create tiered network architectures

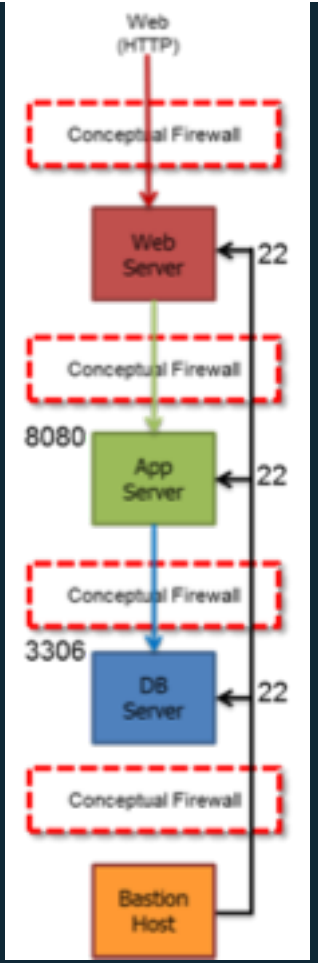


"Web" Security Group:
TCP 80 0.0.0.0/0
TCP 22 "Mgmt"

"App" Security Group:
TCP 8080 "Web"
TCP 22 "Mgmt"

"DB" Security Group:
TCP 3306 "App"
TCP 22 "Mgmt"

"Mgmt" Security Group:
TCP 22 163.128.25.32/32



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EC2-Specific Credentials

EC2 key pairs

- Linux – SSH key pair for first-time host login
- Windows – Retrieve Administrator password

"Public Half" inserted by Amazon into each EC2 instance that you launch

Standard SSH RSA key pair

- Public/Private Keys
- Private keys are not stored by AWS

"Private Half" downloaded to your desktop

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Instance Metadata

http://169.254.169.254/latest/meta-data/ contains a wealth of info

- ami-id
- ami-launch-index
- ami-manifest-path
- block-device-mapping/
- hostname
- instance-action
- ★ **instance-id**
- instance-type
- kernel-id
- local-hostname
- local-ipv4
- mac
- network/
- ★ **placement/availability-zone**
- profile
- public-hostname
- public-ipv4
- public-keys/

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Pop Quiz

1. How many Regions does AWS have?
2. What are Availability Zones?
3. When should you use Reserved instances?
4. What is a Security Group?
5. What is a AMI?
6. What is a key pair?
7. How can an authorized user determine the IP address or hostname of an EC2 instance?

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Any Questions?

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Hands-on Lab #1:
https://bit.ly/2Z13Ccn

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