Introduction to Amazon Cloud & EC2 Overview

Mona Mona, Solution Architect

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Agenda

- Introduction to AWS Cloud
- Overview of AWS most used service: Storage and EC2
- EC2 Security Details

https://bit.ly/2Cz0yb6

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What is Amazon Web Services (AWS)?

Everything you'd want to do in a traditional datacenter

Provision network, compute, storage and database services in the cloud with the click of a button

Run applications – **reliably** and **securely**

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What sets AWS apart?

✓	Experience	Building and managing cloud since 2006
✓	Service Breadth & Depth	100+ services to support any cloud workload
✓	Pace of Innovation	History of rapid, customer-driven releases
✓	Global Footprint	19 regions, 55 availability zones, 100+ edge locations
✓	Pricing Philosophy	65 proactive price reductions to date
✓	Ecosystem	Thousands of consulting/system integrator & technology partners

*as of July 31, 2014

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① Introduction to AWS

AWS Global Infrastructure
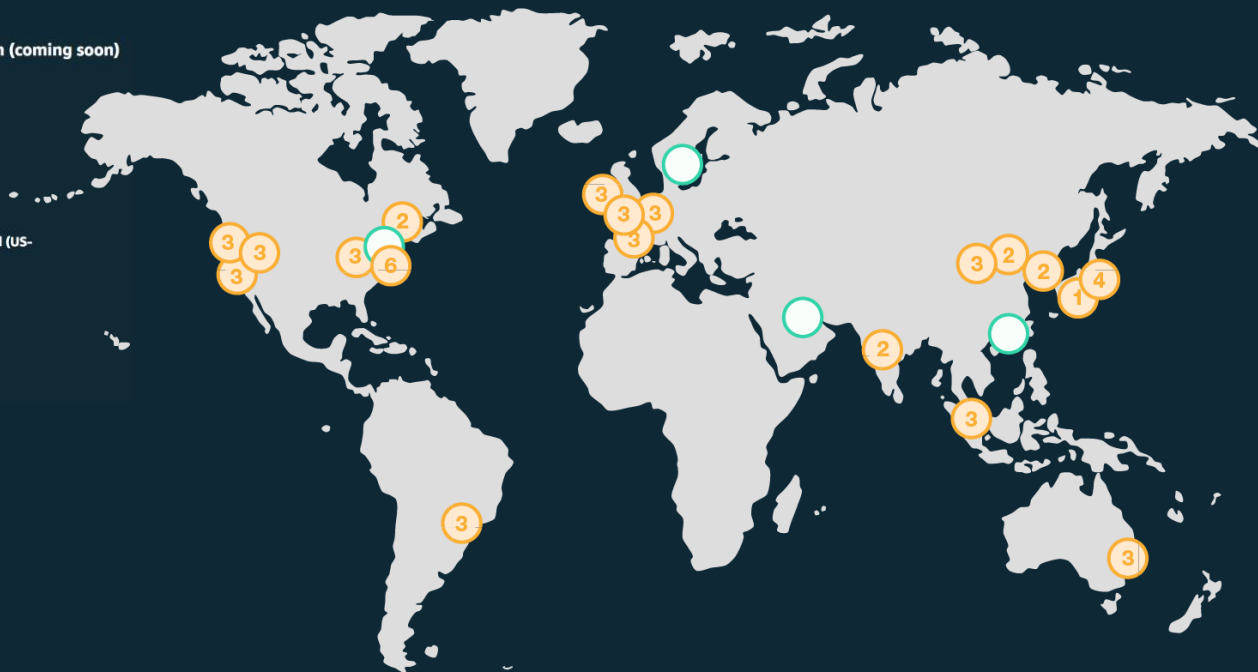
Region & Number of Availability Zones

US East
N. Virginia (6), Ohio (3)

US West
N. California (3), Oregon (3)

Asia Pacific
Mumbai (2), Seoul (2), Singapore (2), Sydney (3), Tokyo (3)

Canada
Central (2)

China
Beijing (2)

Europe
Frankfurt (3), Ireland (3), London (2)

South America
São Paulo (3)
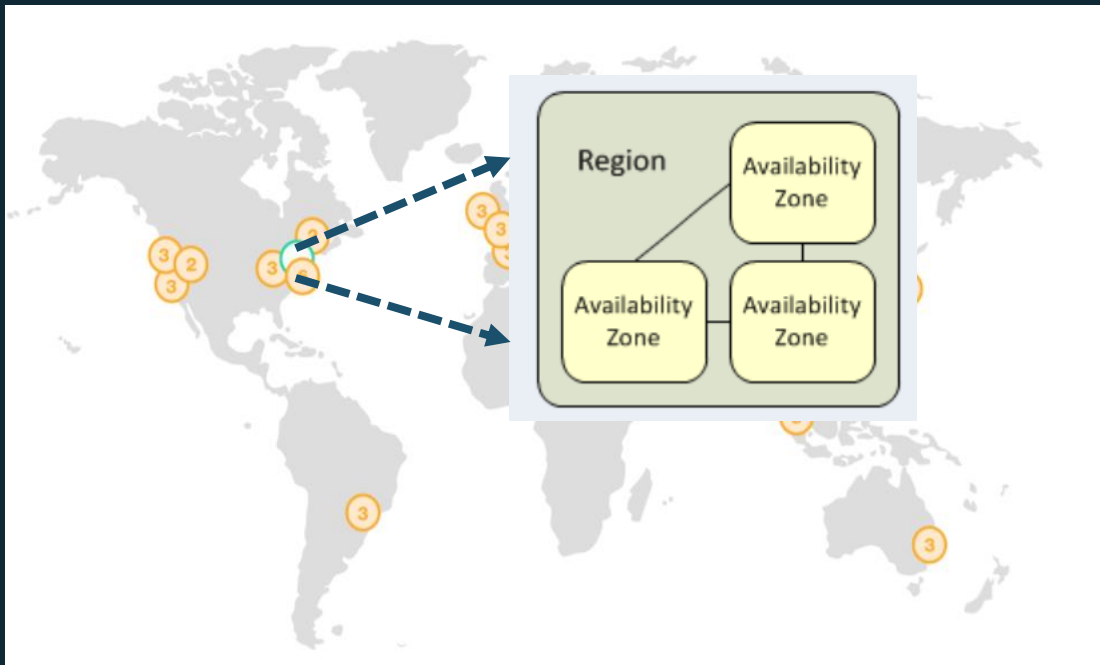
AWS GovCloud (US-West) (2)

New Region (coming soon)

Bahrain

China

France

Hong Kong

Sweden

AWS GovCloud (US-East)

19 Regions
55 Availability Zones
100+ Edge Locations

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AWS Global Infrastructure

18 Regions – **55** Availability Zones – **100+** Edge Locations

Region & Number of Availability Zones

US East
N. Virginia (6),
Ohio (3)

US West
N. California (3),
Oregon (3)

Asia Pacific
Mumbai (2),
Seoul (2),
Singapore (3),
Sydney (3),
Tokyo (4),
Osaka-Local (1)[1]

Canada
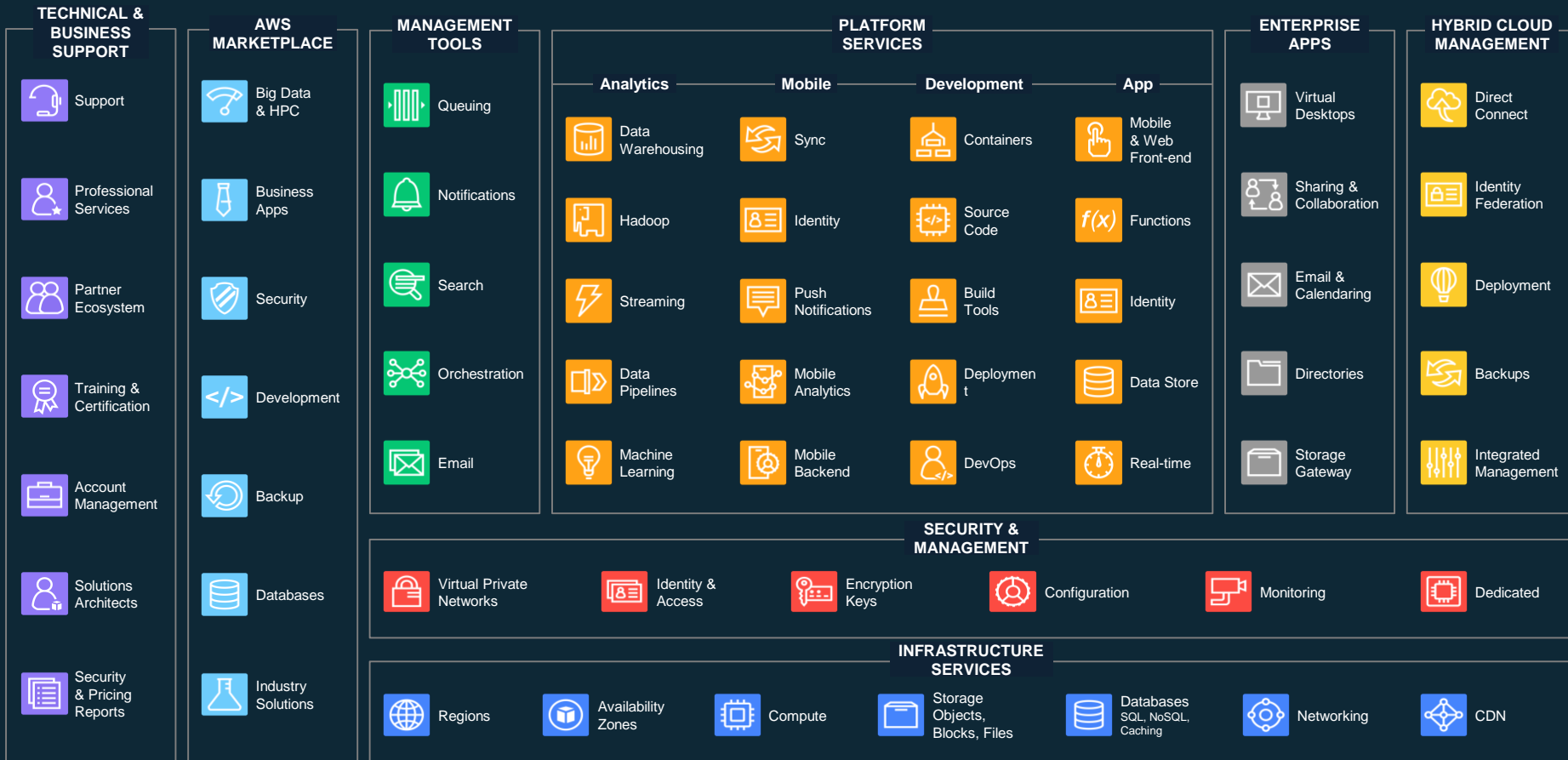Central (2)

China
Beijing (2),
Ningxia (3)

Europe
Frankfurt (3),
Ireland (3),
London (3),
Paris (3)

South America
São Paulo (3)

AWS GovCloud (US-West) (3)

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Service Breadth & Depth

TECHNICAL & BUSINESS SUPPORT
- Support
- Professional Services
- Partner Ecosystem
- Training & Certification
- Account Management
- Solutions Architects
- Security & Pricing Reports

AWS MARKETPLACE
- Big Data & HPC
- Business Apps
- Security
- Development
- Backup
- Databases
- Industry Solutions

MANAGEMENT TOOLS
- Queuing
- Notifications
- Search
- Orchestration
- Email

PLATFORM SERVICES

Analytics
- Data Warehousing
- Hadoop
- Streaming
- Data Pipelines
- Machine Learning

Mobile
- Sync
- Identity
- Push Notifications
- Mobile Analytics
- Mobile Backend

Development
- Containers
- Source Code
- Build Tools
- Deployment
- DevOps

App
- Mobile & Web Front-end
- Functions
- Identity
- Data Store
- Real-time

ENTERPRISE APPS
- Virtual Desktops
- Sharing & Collaboration
- Email & Calendaring
- Directories
- Storage Gateway

HYBRID CLOUD MANAGEMENT
- Direct Connect
- Identity Federation
- Deployment
- Backups
- Integrated Management

SECURITY & MANAGEMENT
- Virtual Private Networks
- Identity & Access
- Encryption Keys
- Configuration
- Monitoring
- Dedicated

INFRASTRUCTURE SERVICES
- Regions
- Availability Zones
- Compute
- Storage Objects, Blocks, Files
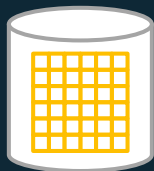- Databases SQL, NoSQL, Caching
- Networking
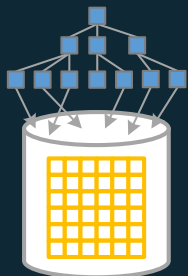- CDN

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Any Questions?

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Storage Primer
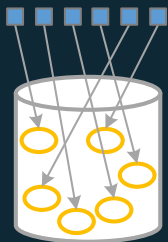
Block vs File vs Object

Block Storage
Raw Storage
Data organized as an array of unrelated blocks
Host File System places data on disk
e.g.: Microsoft NTFS, Unix ZFS

File Storage
Unrelated data blocks managed by a file (serving) system
Native file system places data on disk

Object Storage
Stores Virtual containers that encapsulate the data, data attributes, metadata and Object IDs
API Access to data
Metadata Driven, Policy-based, etc

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AWS has a variety of storage options

Amazon EBS (Elastic Block Storage)

Amazon Elastic File System (EFS)

Amazon EC2 Instance Store (Ephemeral Volumes)

Amazon S3 (Simple Storage Service)

Amazon Glacier

AWS Storage Gateway: File Gateway

Amazon Snowball & Snowball Edge

AWS Snowmobile

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Any Questions?

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Instances and Amazon Machine Image(AMI)
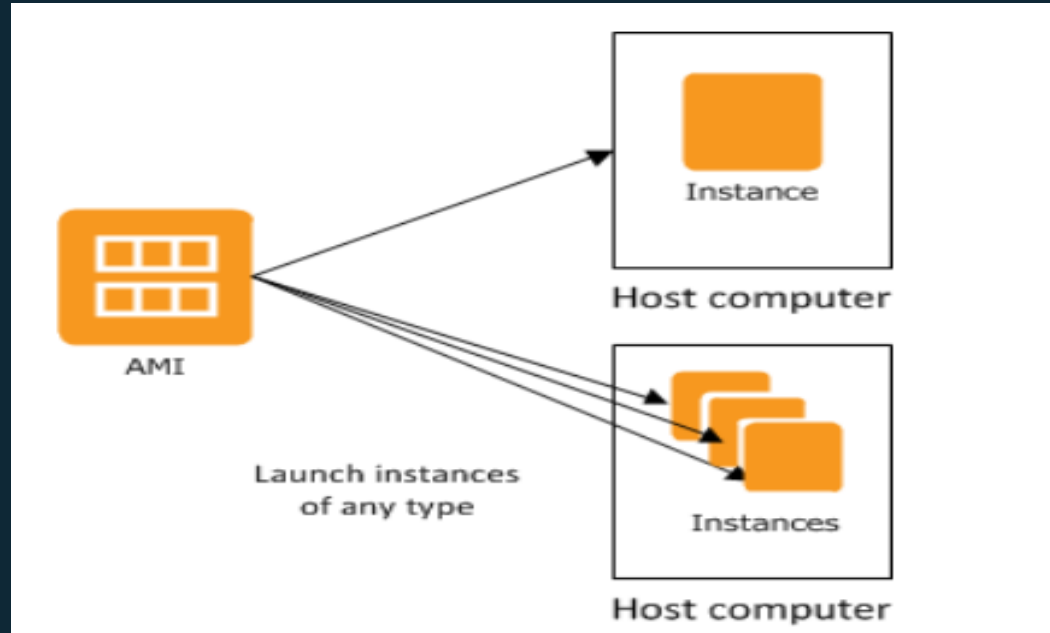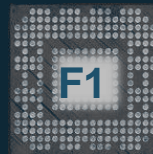
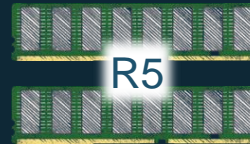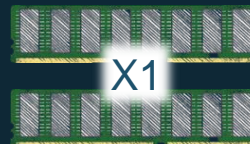# Broad Set of Compute Instance Types

General purpose	Compute optimized	Storage and IO optimized	GPU & FPGA enabled	Memory optimized
T2	C5	I3 D2	F1	X1
M5	Z1		P3	R5
Bare Metal			G2	

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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

AWS Marketplace

Community AMIs

Purchasing Options

On demand	Reserved	Spot	Dedicated Instances	Dedicated Host
• **Pay as you go** • **Flat hourly rate** • **No commitment**	• **Pay a low upfront price** • **Reserve an instance slot** • **Secure a low hourly rate** • **Sell & modify reservations** if your needs change	• **Bid what you like**—your Spot instances run while your bid > the Spot price • **Save up to 90% off of On-Demand** • **Run 1,000s of instances**	• Dedicated Instances are Amazon EC2 instances that run in a VPC on hardware that's dedicated to a single customer. AWS accounts.	• Dedicated Hosts give you additional visibility and control over how instances are placed on a physical erver, and you can reliably use the same physical server over time.

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Layer your options
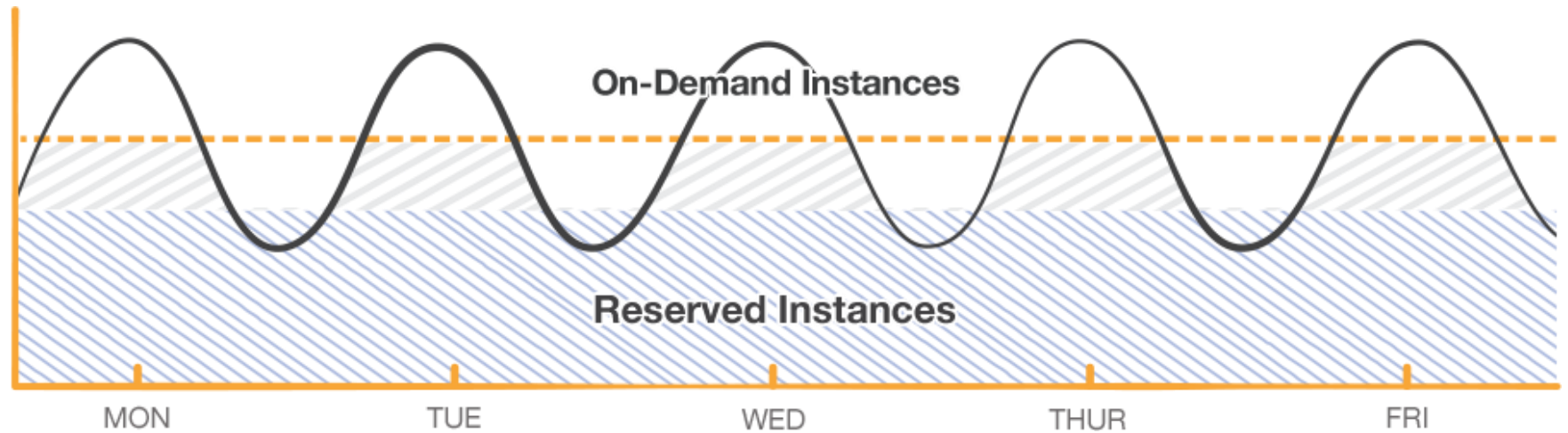
Any Questions?

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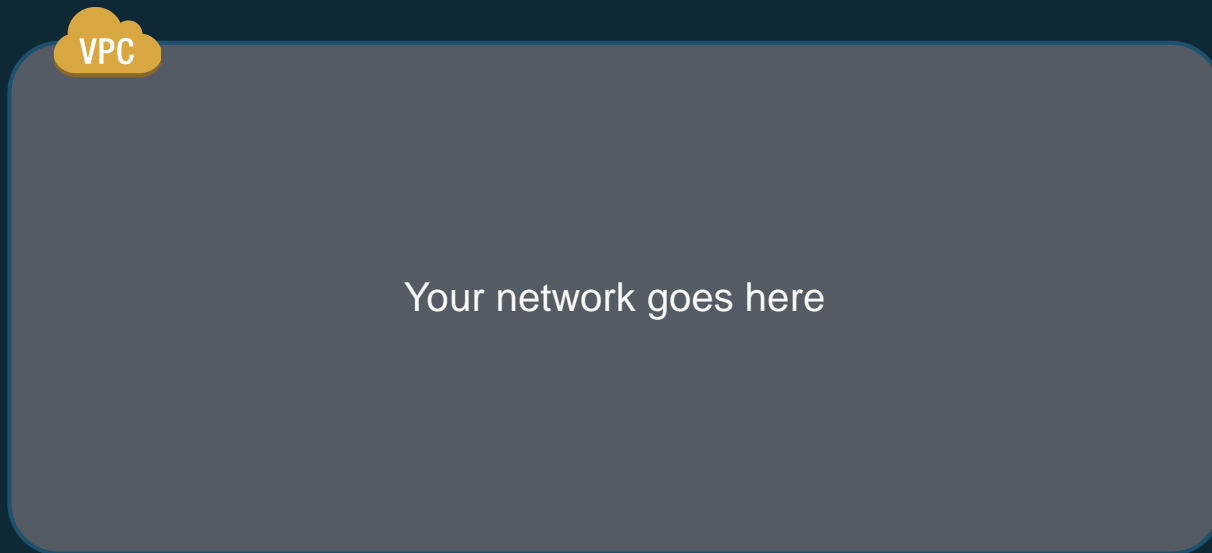# ② EC2 Security and Design

Amazon VPC

- Virtual network topology that you define
- Your own logically isolated section of AWS
- Complete control of your networking environment
  - ➢ IP ranges
  - ➢ Subnets
  - ➢ Routing tables
  - ➢ Gateways
- Multiple Connectivity Options
- Advanced Security Features
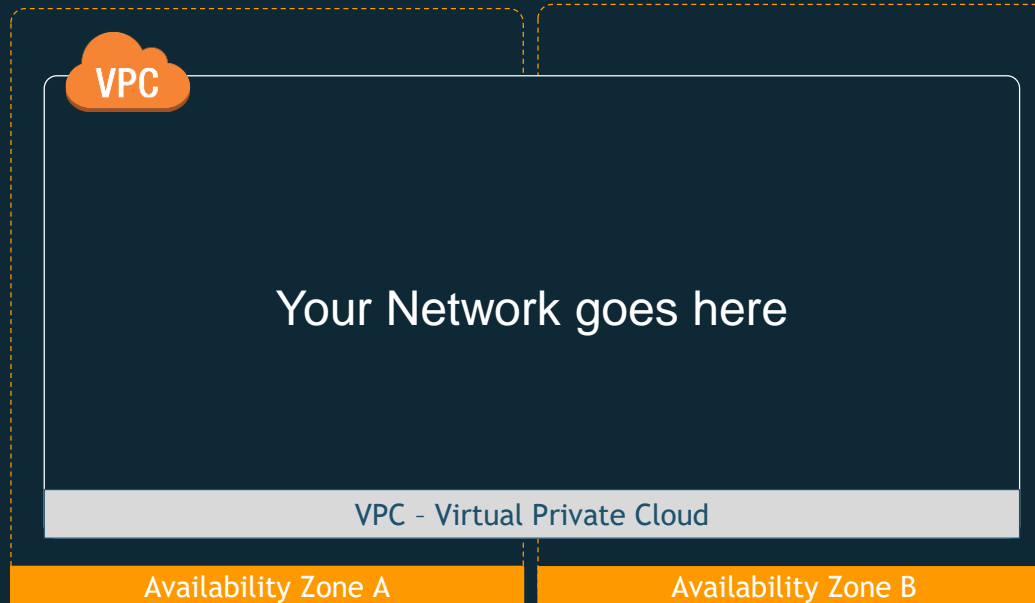
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Networking Building Blocks
Amazon Virtual Private Cloud (VPC)

- Bring your own network

VPC

Your network goes here

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Amazon Virtual Private Cloud (VPC)

- Bring your own network

Your Network goes here

VPC – Virtual Private Cloud
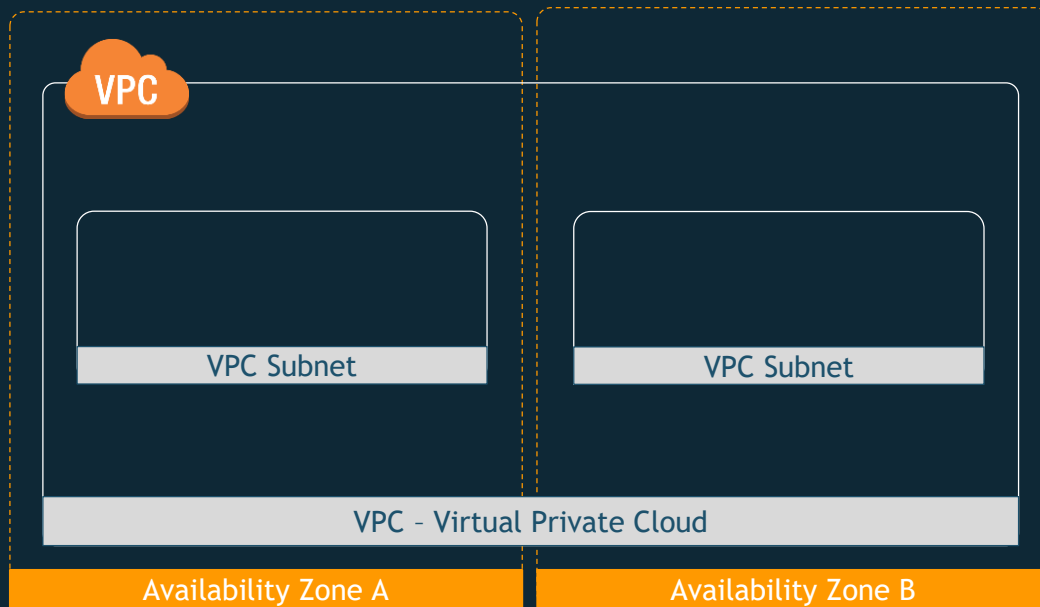
Availability Zone A

Availability Zone B

Networking Building Blocks
Amazon Virtual Private Cloud (VPC)

- Bring your own network
- Create your own subnets

VPC

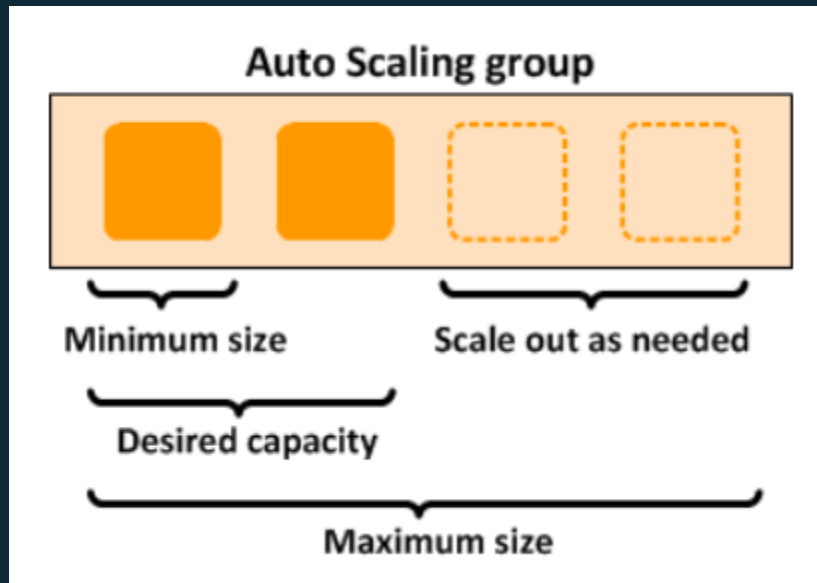| VPC Subnet | VPC Subnet |

VPC – Virtual Private Cloud

Availability Zone A | Availability Zone B

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Network Building Blocks
Network Control

- Security Groups
  - Per instance
  - Stateful

Web (HTTP)

Security Group Firewall

Load Balancer

Security Group Firewall

8080

Web Server

Web Server

Security Group Firewall

DB Server

VPC

Availability Zone 'A'

Availability Zone 'B'

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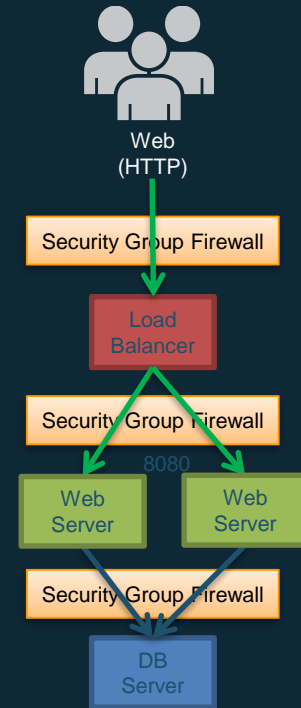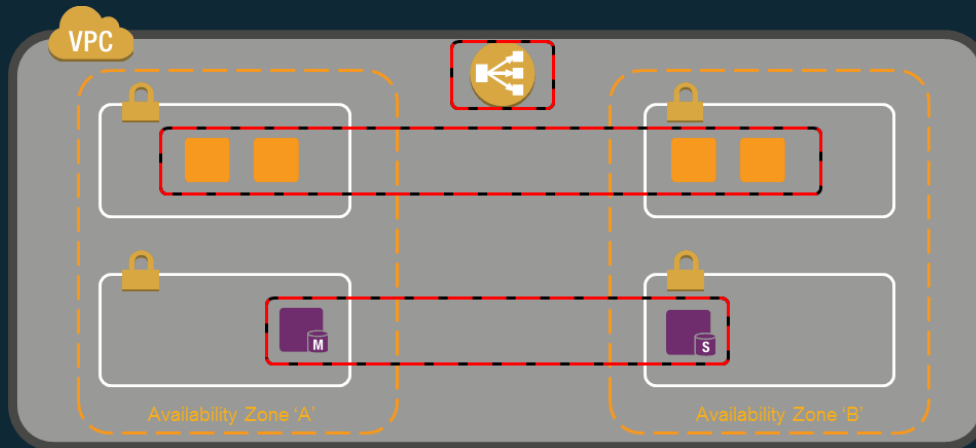
Scale your instances using Auto Scaling

Running EC2 instances in VPC
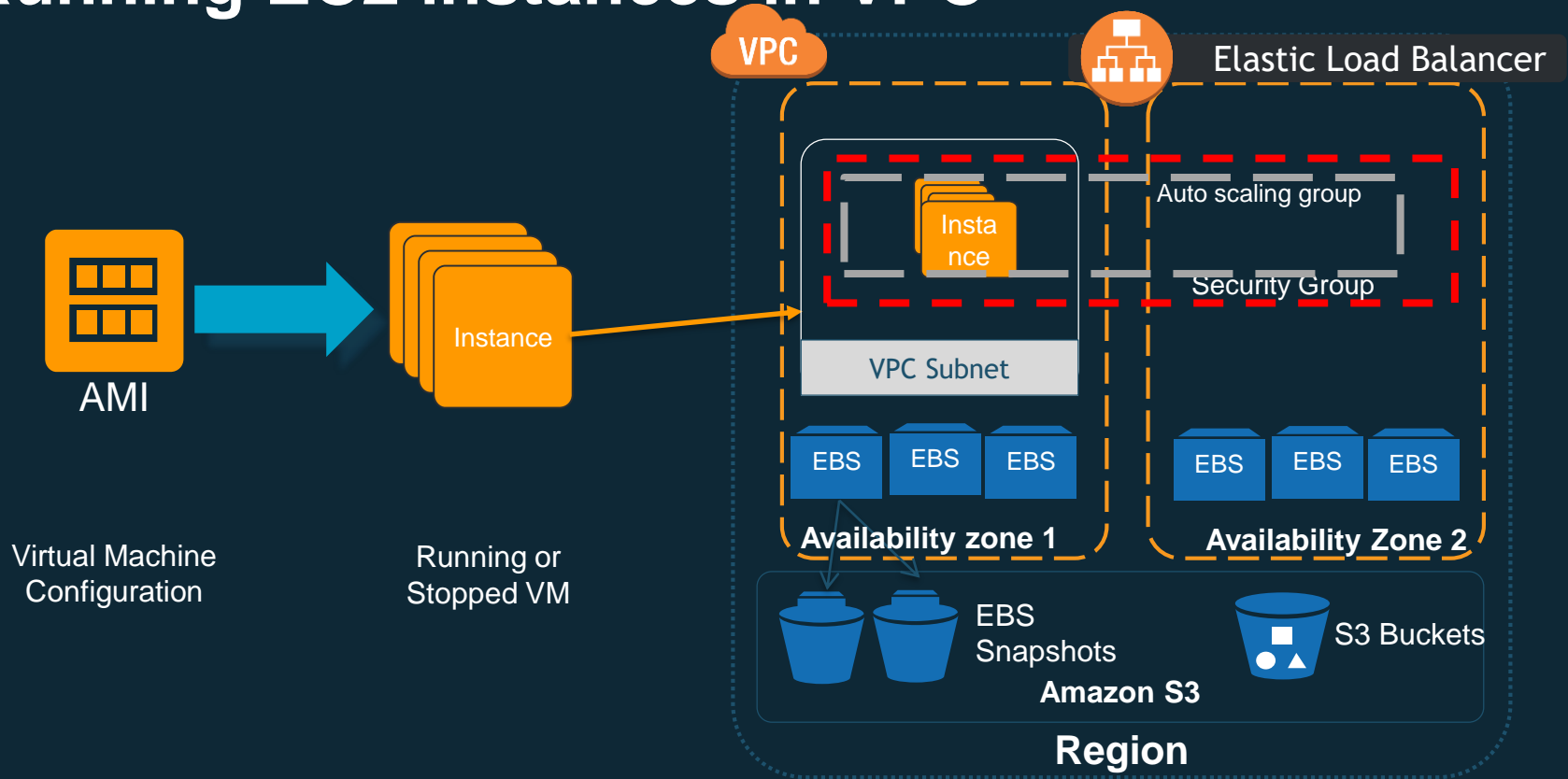
EC2-Specific Credentials

EC2 key pairs
- Linux – SSH key pair for first-time host login
- Windows – Retrieve Administrator password

Standard SSH RSA key pair
- Public/Private Keys
- Private keys are not stored by AWS

AWS approach for providing **initial** access to a generic OS
- Secure
- Personalized
- Non-generic (NIST, PCI DSS)

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

"Private Half" downloaded to your desktop

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EC2 DEMO

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AWS & UC System Enterprise Agreement
(UCSB prefers that you place your account under the EA)

- Includes better terms and conditions from a legal perspective
- The EA also includes a data egress waiver
- You can attach a Purchase Order to your account instead of using a credit card.

    Directions for how to do this can be found on the UCSB Software Central site here:
    http://www.software.ucsb.edu/info/aws

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AWS Credits for experimentation - $150

1. Create an account: http://www.software.ucsb.edu/info/aws

2. Send your AWS account number to chirhart@amazon.com and request your $150 in AWS credits

3. I'll reply with your Credit Code along with simple instructions for adding credits to your account.

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Thank you!

Luke Chirhart, HigherEd Account Consultant.
chirhart@amazon.com

Mona Mona, Solutions Architect
monamo@amazon.com

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Any Questions?