Introduction to Amazon Cloud & EC2 Overview

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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
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*
Introduction to AWS
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)
- **China**
  - Beijing (2),
  - Ningxia (3)
- **Europe**
  - Frankfurt (3),
  - Ireland (3),
  - London (3),
  - Paris (3)
- **South America**
  - São Paulo (3)
- **AWS GovCloud (US-West)** (3)
- **Canada**
  - Central (2)

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Any Questions?
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
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
Any Questions?
EC2 Overview
Instances and Amazon Machine Image (AMI)
Broad Set of Compute Instance Types

General purpose
- T2
- M5
- Bare Metal

Compute optimized
- C5
- Z1

Storage and IO optimized
- I3
- D2

GPU & FPGA enabled
- F1
- P3
- G2

Memory optimized
- X1
- R5
EC2 Operating Systems Supported

Amazon Linux
Debian
Suse
CentOS
Red Hat Enterprise Linux
Ubuntu
AWS Marketplace
Community AMIs
## Purchasing Options

<table>
<thead>
<tr>
<th>On demand</th>
<th>Reserved</th>
<th>Spot</th>
<th>Dedicated Instances</th>
<th>Dedicated Host</th>
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</thead>
<tbody>
<tr>
<td>• Pay as you go</td>
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<tr>
<td>• Flat hourly rate</td>
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<td>• No commitment</td>
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<td>• Pay a low upfront price</td>
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<td>• Reserve an instance slot</td>
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<td>• Secure a low hourly rate</td>
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<td>• Sell &amp; modify reservations if your needs change</td>
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<td>• Bid what you like—your Spot instances run while your bid &gt; the Spot price</td>
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<td>• Save up to 90% off of On-Demand</td>
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<td>• Run 1,000s of instances</td>
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<td>• Dedicated Instances are Amazon EC2 instances that run in a VPC on hardware that's dedicated to a single customer. AWS accounts.</td>
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<td>• Dedicated Hosts give you additional visibility and control over how instances are placed on a physical server, and you can reliably use the same physical server over time.</td>
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Layer your options
Any Questions?
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
Networking Building Blocks
Amazon Virtual Private Cloud (VPC)

• Bring your own network
Amazon Virtual Private Cloud (VPC)

- Bring your own network
Networking Building Blocks

Amazon Virtual Private Cloud (VPC)

- Bring your own network
- Create your own subnets
Network Building Blocks

Network Control

- Security Groups
  - Per instance
  - Stateful
Scale your instances using Auto Scaling

- Minimum size
- Desired capacity
- Scale out as needed
- Maximum size
Running EC2 instances in VPC

AMI

Virtual Machine Configuration

Running or Stopped VM

Instance

Elastic Load Balancer

Auto scaling group

Security Group

Availability zone 1

EBS

EBS

EBS

Availability Zone 2

EBS

EBS

EBS

EBS Snapshots

Amazon S3

S3 Buckets

Region

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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)
EC2 DEMO
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
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.
Thank you!

chirhart@amazon.com

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Any Questions?