Introduction to Amazon EC2

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AWS global infrastructure

Over 1 million active customers across 190 countries

2,000+ government agencies

5,000+ educational institutions

17,500+ nonprofits

11 regions

30 Availability Zones

53 edge locations
What is Amazon EC2?
Amazon EC2

Virtual machines

Purchase options

Networking

User experience
Amazon Elastic Compute Cloud (EC2) - Elastic virtual servers in the cloud

Physical Servers in AWS Global Regions

EC2 Instances

Guest 1
Guest 2
Guest n

Hypervisor

Host server
A brief look back…

Amazon EC2: Nine years young
Amazon EC2 nine years ago...

- Single instance family and size
  - m1.small (1 vCPU, 1.7 GiB RAM, 160 GB storage)
- Linux only
- On-Demand pricing only
Since then

- More instance choices
  - CPU, GPU, Memory, Storage
- Deployment options
- OS and application support
- Amazon Elastic Block Store
- Elastic IP addresses
- Amazon VPC
- Auto Scaling
- Elastic Load Balancing
- Performance, security, manageability, and scalability improvements
- Amazon ECS, Lambda
- Amazon Machine Learning
- And more
EC2 instances: Families and Generations

- General-purpose: M1, M3, M4, T2
- Compute-optimized: C1, CC2, C3, C4
- Memory-optimized: M2, CR1, R3
- Dense-storage: HS1, D2
- I/O-optimized: HI1, I2
- GPU: CG1, G2
- Micro: T1, T2
EC2 instances: Types and Sizes

Instance generation

`c4.large`

Instance family

Instance size
C4 instances are the latest generation of Compute-optimized instances, featuring the highest performing processors and the lowest price/compute performance in EC2.

**Features:**

- High frequency Intel Xeon E5-2666 v3 (Haswell) processors optimized specifically for EC2
- EBS-optimized by default and at no additional cost
- Ability to control processor C-state and P-state configuration on the c4.8xlarge instance type
- Support for Enhanced Networking and Clustering

<table>
<thead>
<tr>
<th>Model</th>
<th>vCPU</th>
<th>Mem (GiB)</th>
<th>Storage</th>
<th>Dedicated EBS Throughput (Mbps)</th>
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<tr>
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Why do customers use Amazon EC2?
Why Do Customers Use Amazon EC2?

- **Fast Deployments**: Access computing infrastructure in minutes
- **Low Cost**: Pay-as-you-go pricing
- **Elastic**: Easily add or remove capacity
- **Globally Accessible**: Easily support customers around the world
- **Secure**: A collection of tools to protect data and privacy
- **Scalable**: Access to effectively limitless capacity
Elasticity
Server load over the hour of the day

- **Capacity of 1 server**
- **Traditional capacity required**

- **1 server for 8 hours**

- **Hour of day**

Graph showing server load and capacity requirements over the hour of the day.
Server load

1 server for 8 hours

Hour of day

Traditional capacity required

1 server for 8 hours

Capacity of 1 server
Server load

1 server for 8 hours

Capacity of 1 server

Traditional capacity required

Hour of day

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Server load

Capacity of 1 server

1 server for 8 hours

Traditional capacity required

Hour of day

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Server load over the course of a day, with traditional capacity required at the top and capacity of 1 server at the bottom. The graph shows a saving of 1/3rd.
Scaling automatically

Amazon EC2
Elastic virtual servers in the cloud

Auto Scaling
Automated scaling of EC2 capacity

ELB
Dynamic traffic distribution
Completely Controlled
Completely Controlled

• You have control of your instances
• Log on as root (Linux) or Administrator (Windows)
• Install the software you need
• Start, stop, control instances with console or APIs
• Make the configuration changes you like
• Create an AMI (Amazon Machine Image)
• Use automation create and configure entire stacks
Flexibility
Multiple instance types

• Choose the instance type that suits you
• Change the instance type when you want to
• Attach as much or as little storage as you need
• Choose your operating system
• Choose a pre-configured image (AMI)
Build reliable architectures

• Easily build highly available applications
• ELB distributes load
• Auto Scaling helps ensure availability and scale
• Use multiple Availability Zones (AZs)
• Use multiple global Regions
Security
Our Top priority!

- Secured premises
- Secured access
- Built-in firewalls
- Unique users
- Multi-factor authentication
- Private subnets
- Encrypted data storage
- Dedicated connection

A few of our many certifications:
Cost Effectiveness
Purchase options that fit your workloads

**On-Demand**
Pay for compute capacity by the hour with no long-term commitments
For spiky workloads, or to define needs

**Reserved**
Make an Amazon EC2 usage commitment and receive a significant discount
For committed utilization

**Spot**
Bid for unused capacity, charged at a Spot Price which fluctuates based on supply and demand
For time-insensitive or transient workloads
It’s easy to get started!
AWS Console

http://aws.amazon.com/getting-started/
Next Steps

• Sign-up for an AWS account via the UW IT Connect Service Catalog
  – https://www.washington.edu/itconnect/service/amazon-web-services/

• Take advantage of the Free Tier: aws.amazon.com/free

• Learn more: aws.amazon.com/ec2
Thank You!