

Compute Services



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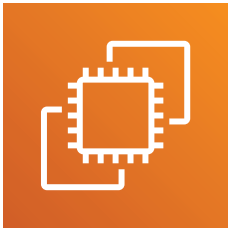
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Compute Services

A service that enables you to leverage cloud-based virtual machines for workloads. This could be serving web content to visitors, running a database, or calculating statistics from a data set.

Compute Services on AWS



Amazon EC2

**Provides secure and
resizable virtual
servers on AWS**



AWS Elastic Beanstalk

**Platform for scaling
and deploying web
apps and services**



AWS Lambda

**Enables compute
without managing
servers**

Overview

Introducing Amazon EC2 capabilities

Exploring pricing approaches for EC2 instances

Introducing the capabilities of AWS Elastic Beanstalk

Reviewing use cases for Elastic Beanstalk

Introducing AWS Lambda

Amazon EC2 Overview

“Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers.”

Amazon Web Services

Amazon EC2 Use Cases

Web application hosting

Batch processing

Web services endpoint

Desktop in the cloud

Amazon EC2 Concepts

Instance Types

Root Device Type

Amazon Machine Image (AMI)

Purchase Options

Amazon EC2 Instance Types

Defines the processor, memory, and storage type

Cannot be changed without downtime

Provided in the following categories

- General purpose
- Compute, memory, and storage optimized
- Accelerated computing

Pricing is based on instance type

Some instance types have unique capabilities

Example EC2 Instance Type Pricing

	vCPU	Memory	Linux Pricing
t3.medium	2	4 GiB	\$0.0416 per Hour
m5.large	4	16 GiB	\$0.096 per Hour
c5d.24xlarge	96	375 GiB	\$4.608 per Hour
p3.16xlarge	64	488 GiB	\$24.48 per Hour
i3.16xlarge	64	488 GiB	\$4.992 per Hour

Root Device Type

Instance Store

Ephemeral storage that is physically attached to the host the virtual server is running on

Elastic Block Store (EBS)

Persistent storage that exists separately from the host the virtual server is running on

Amazon Machine Image (AMI)

Template for an EC2 instance including configuration, operating system, and data

AWS provides many AMI's that can be leveraged

AMI's can be shared across AWS accounts

Custom AMI's can be created based on your configuration

Commercial AMI's are available in the AWS Marketplace

Amazon EC2 Purchase Types

Amazon EC2 Purchase Options

On-Demand

You pay by the second for the instances that are launched

Reserved

You purchase at a discount instances in advance for 1-3 years

Spot

You can leverage unused EC2 capacity in a region for a large discount

Reserved Instance Cost Models

All Upfront

Entire cost for the 1 or 3 year period is paid upfront

Partial Upfront

Part of 1 or 3 year cost is paid upfront along with a reduced monthly cost

No Upfront

No upfront payment is made, but there will be a reduced monthly cost

Maximum
Savings

Minimum
Upfront Cost

Spot Instances

Can provide up to 90% discount over on-demand pricing

There is a market price for instance types per availability zone called the Spot price

When you request instances, if your bid is higher than Spot price they will launch

If the Spot price grows to exceed your bid, the instances will be terminated

Spot instances can be notified 2 minutes prior to termination

Amazon EC2 Purchase Options



If you have an instance that is consistent and always needed, you should purchase a Reserved Instance.



If you have batch processing where the process can start and stop without affecting the job, you should leverage Spot Instances.



If you have an inconsistent need for instances that cannot be stopped without affecting the job, leverage On-Demand Instances.

Reserved Instance EC2 Pricing Example

	On-Demand	All Upfront	Effective Hourly	Savings
t3.medium	\$0.0416 per Hour	\$213.00 (1 Year) \$412.00 (3 Years)	\$0.024 (1 Year) \$0.015 (3 Years)	\$151.42 (1 Year) \$681.25 (3 Years)
	On-Demand	Partial Upfront (1 Yr)	Effective Hourly	Savings
c5d.24xlarge	\$4.608 per Hour	\$12,124 (Upfront) \$1,010.32 (Monthly)	\$2.768	\$16118.40 (40%)
	On-Demand	No Upfront (3 Yr)	Effective Hourly	Savings
i3.16xlarge	\$4.992 per Hour	\$1,765.87 (Monthly)	\$2.419	\$22539.48 (52%)

Spot Instance EC2 Pricing Example

	On-Demand	Spot Pricing	Percentage Savings
t3.medium	\$0.0416 per Hour	\$0.0125 per Hour	70%
c5d.24xlarge	\$4.608 per Hour	\$0.9122 per Hour	80%
i3.16xlarge	\$4.992 per Hour	\$1.4976 per Hour	70%

Launching EC2 Instances

Demo

Launching a new EC2 instance based on an AWS AMI

Exploring the EC2 launch wizard in the AWS Console

Configuring EC2 instance to be used as a web server

Terminating an EC2 instance

AWS Elastic Beanstalk Overview

AWS Elastic Beanstalk



Automates the process of deploying and scaling workloads on EC2 (PaaS)

Supports a specific set of technologies

Leverages existing AWS services

Only pay for the other services you leverage

Handles provisioning, load balancing, scaling, and monitoring

Java
.NET
PHP
Node.js
Python
Ruby
Go
Docker

Supported Application Platforms

Elastic Beanstalk Features

Monitoring

Deployment

Scaling

EC2 Customization

Use Cases

Deploy an application with minimal knowledge of other services

Reduce the overall maintenance needed for the application

Few customizations are required

Launching an App on Elastic Beanstalk

Demo

Accessing the sample Elastic Beanstalk applications

Launching a sample application on Elastic Beanstalk

Deleting a deployed Elastic Beanstalk application

AWS Lambda Overview

“**AWS Lambda** lets you run code without provisioning or managing servers. You pay only for the compute time you consume. You can run code for virtually any type of application or backend service - all with zero administration.”

Amazon Web Services

AWS Lambda



Enables the running of code without provisioning infrastructure

Only charged for usage based on execution time

Can configure available memory from 128 MB to 3008 MB

Integrates with many AWS services

Enables event-driven workflows

Primary service for serverless architecture

**Reduced maintenance
requirements**

**Enables fault tolerance
without additional work**

Scales based on demand

Pricing is based on usage

AWS Lambda Advantages

Scenario Review

Scenario 1



Sylvia's company is in the process of moving multiple workloads into AWS

One workload is an application that will be leveraged for at least 5 more years

The organization is looking to be as cost efficient as possible for its EC2 usage

What EC2 purchase option should be chosen for this application?

Scenario 2



Edward is looking to deploy his PHP web application to a virtual server

He doesn't have experience managing EC2 instances on AWS

He needs the ability to scale this application to meet user demand

What is the best compute option for Edward based on this criteria?

Scenario 3



Cindy's company is transitioning to the cloud for its data processing workloads

These workloads happen daily and can start or stop without a problem

This workload will be leveraged for at least one year

What EC2 purchase option would be the most cost efficient choice?

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Solution: All Upfront Reserved - 3 Years

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Solution: AWS Elastic Beanstalk

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Solution: Spot Instances