

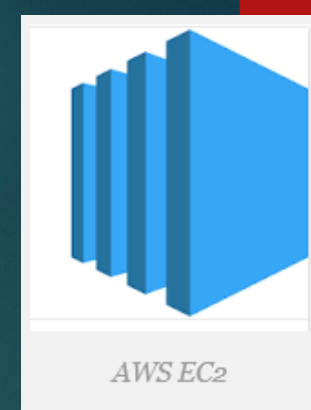


AWS Cloud



Agenda

- ▶ EC2
- ▶ VPC
- ▶ Storage
- ▶ S3
- ▶ IAM



What is Amazon EC2?

- ▶ Amazon EC2 or *Amazon Elastic Compute Cloud*.
- ▶ **Amazon Elastic Compute Cloud (EC2)** is a part of [Amazon.com](https://aws.amazon.com)'s [cloud-computing](#) platform, [Amazon Web Services](#) (AWS), that allows users to rent [virtual computers](#) on which to run their own computer applications. EC2 encourages scalable deployment of applications by providing a [web service](#) through which a user can boot an [Amazon Machine Image](#) (AMI) to configure a [virtual machine](#), which Amazon calls an "instance", containing any software desired. A user can create, launch, and terminate [server](#)-instances as needed, paying by the second for active servers – hence the term "elastic". EC2 provides users with control over the geographical location of instances that allows for [latency](#) optimization and high levels of [redundancy](#). In November 2010, Amazon switched its own retail website platform to EC2 and AWS.



Features

- Storage volumes for temporary information are deleted once you stop or terminate your instance; this is known as instance store volumes.
- Virtual computing environments, which is also known as instances
- It provides pre-configured templates for your instances, which is known as Amazon Machine Images (AMIs), this feature is required for the server.
- Amazon EBS provides you persistent storage volumes for your data using Elastic Block Store.
- AWS EC2 provides you with multiple storage locations for your resources such as instances and EBS volumes which are called regions and availability zones.
- For creating and assigning the resource's metadata, known as tags are provided.
- The Elastic IP address is provided for dynamic cloud computing which is a static IPv4.
- Various configurations of hardware, memory, storage, and networking capability for your instances called for instance varieties.
- Virtual networks which you occasionally connect to your network are known as Virtual Private Network.
- A static IPv4 is provided for dynamic cloud computing. This is known as Elastic IP address.

Amazon Elastic Compute Cloud (EC2)

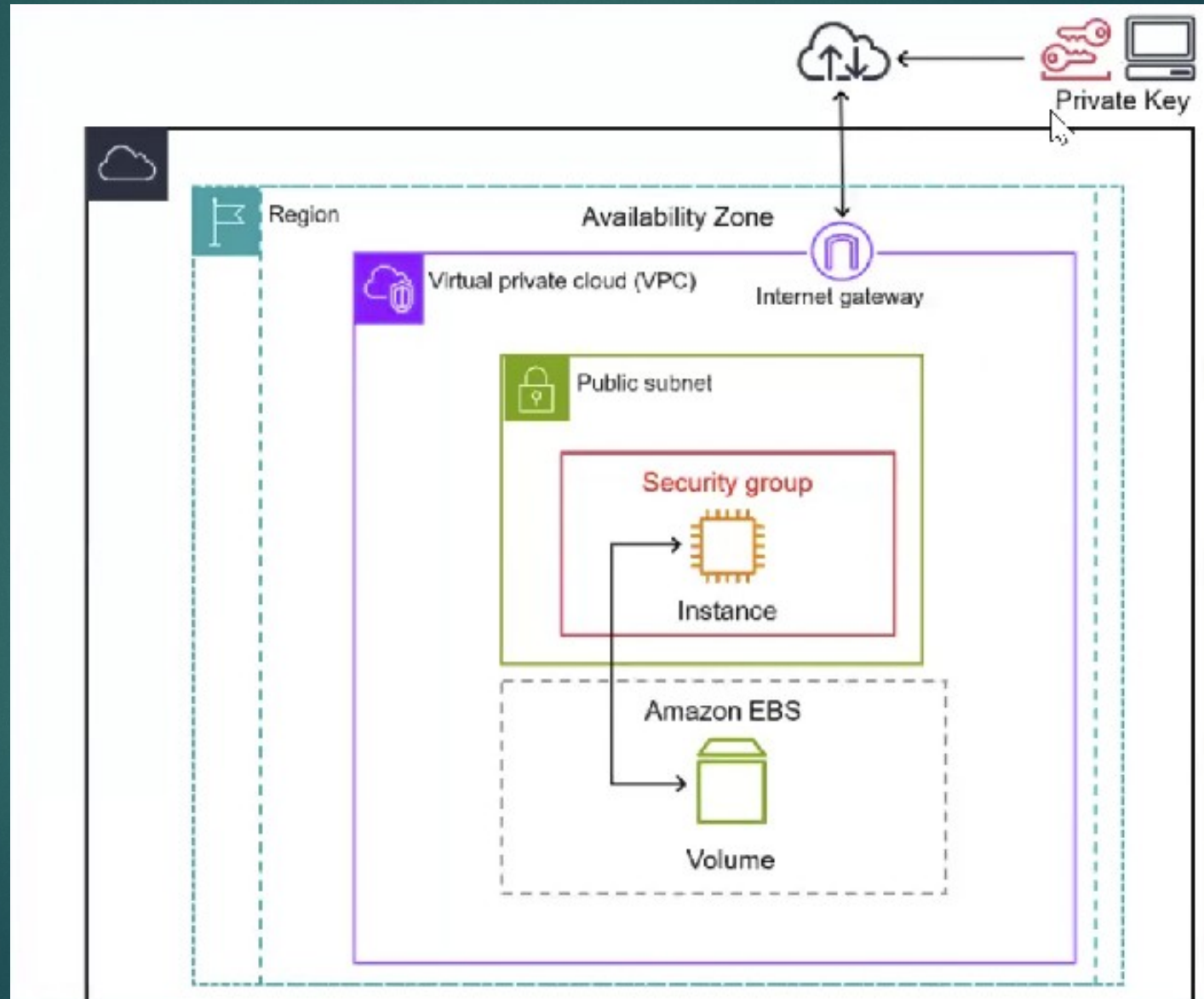


Amazon Elastic Compute Cloud (EC2)

Original author(s)	Amazon.com, Inc.
Developer(s)	Amazon.com, Inc.
Initial release	August 25, 2006; 15 years ago (public beta)
Operating system	Linux Microsoft Windows FreeBSD macOS ^[1]
Available in	English
Type	Virtual private server
License	Proprietary software
Website	aws.amazon.com/ec2/

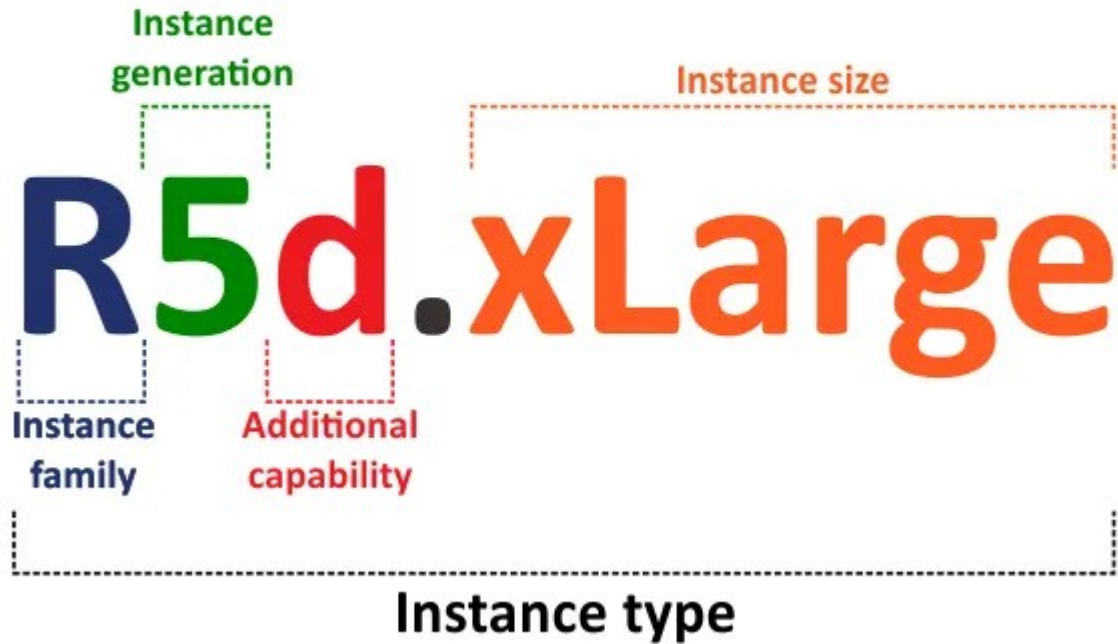


Elastic Compute Cloud





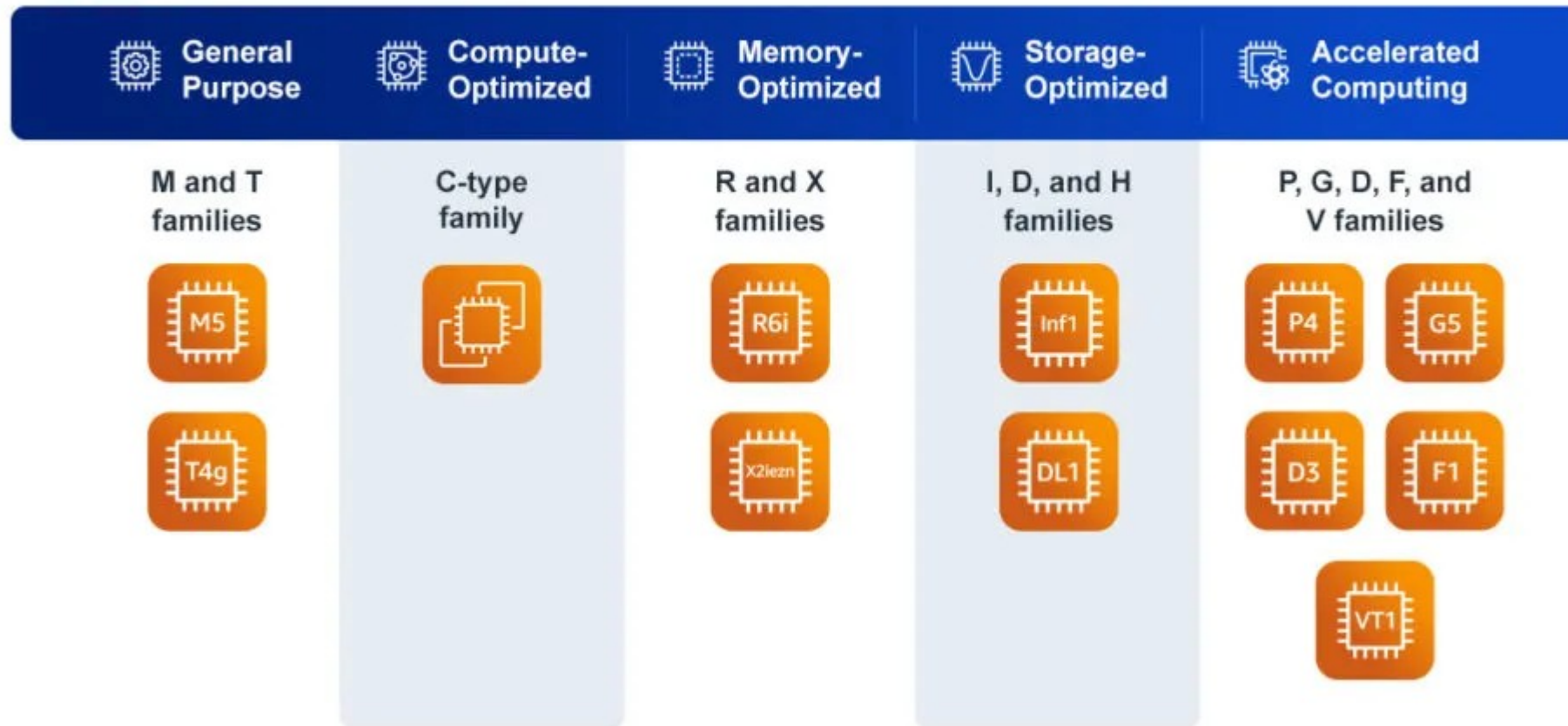
Instance Naming





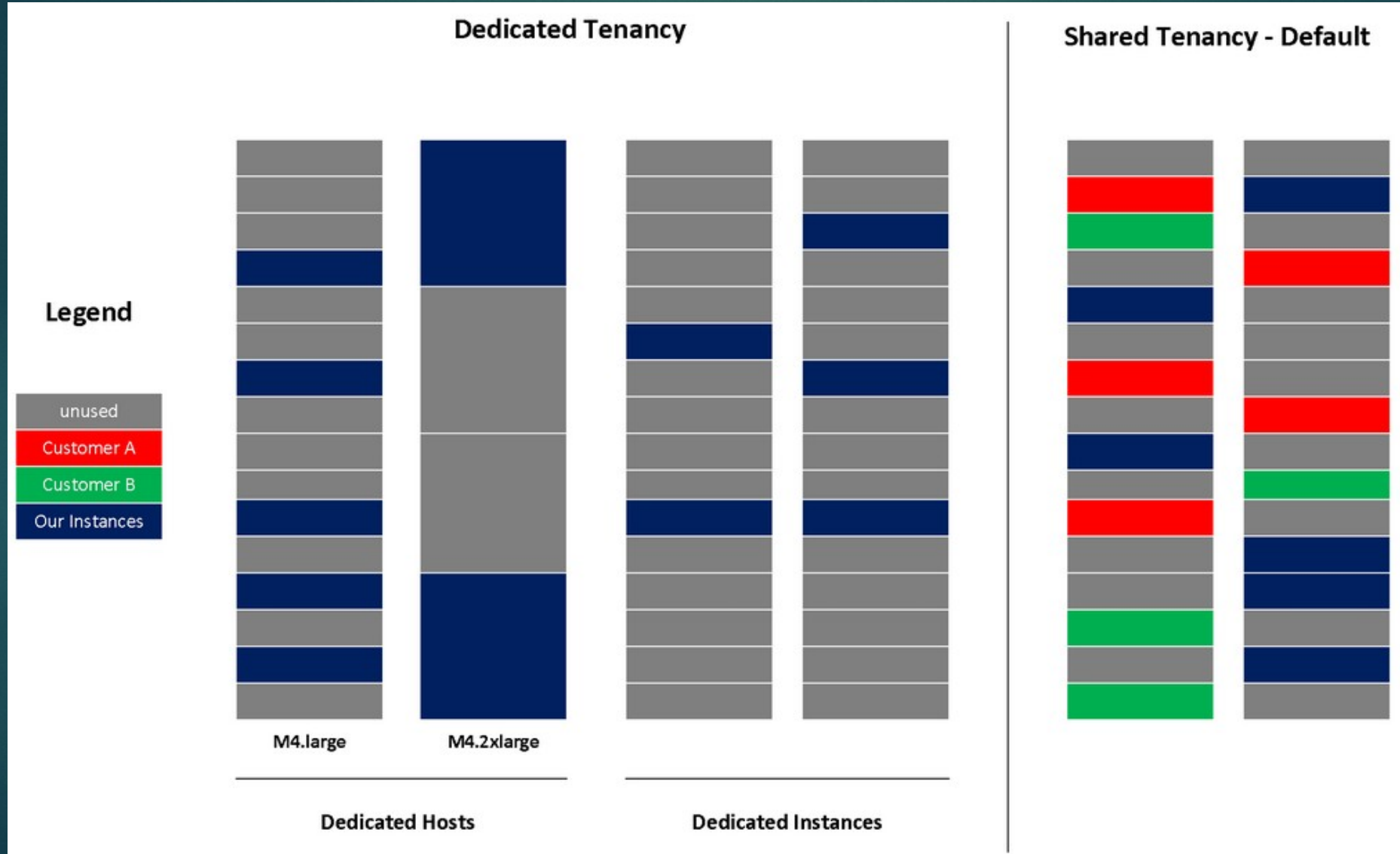
Instance Types

Different AWS EC2 Instance Types





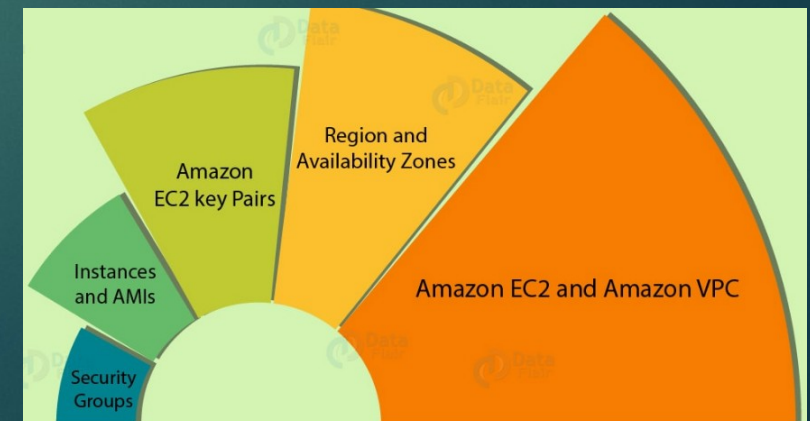
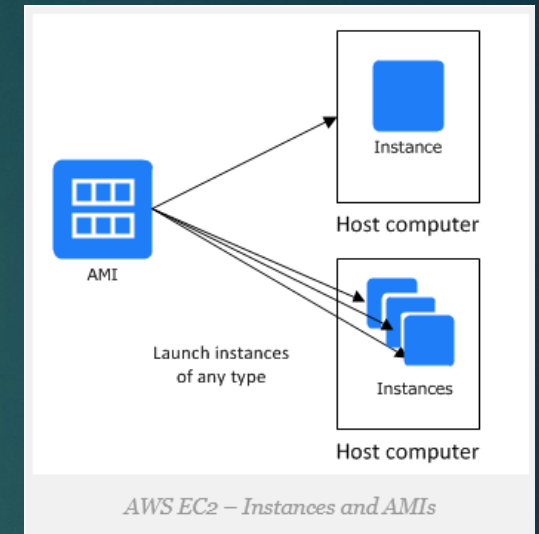
Instance Tenancy





Getting started

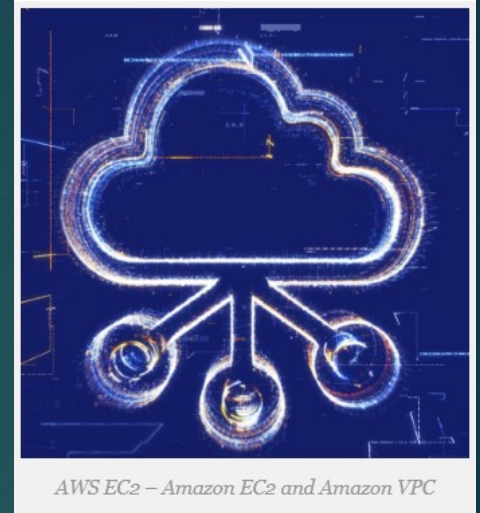
- Amazon Machine Image (AMI) is a template that contains a software configuration such as an operating system, servers, and applications.
- AWS EC2 host in multiple locations worldwide. These locations are composed of different regions and availability zones.
- Amazon EC2 uses public-key to encrypt and decrypt login information.
- AWS security groups associate with EC2 instances and provide security at the protocol and port access level.



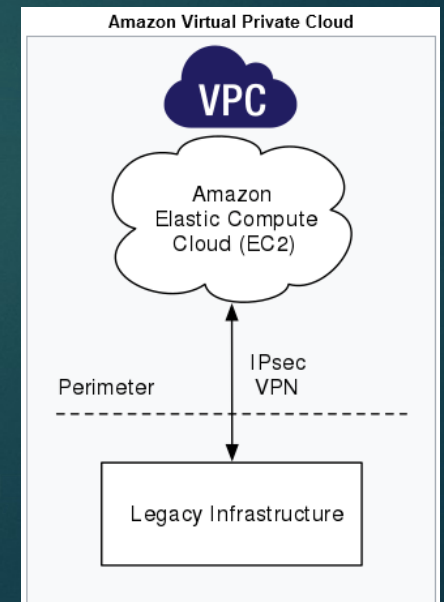


VPC

- *Amazon Virtual Private Cloud* allows you to provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that is defined by you.
- **Amazon Virtual Private Cloud (VPC)** is a commercial [cloud computing](#) service that provides users a [virtual private cloud](#), by "provisioning a logically isolated section of [Amazon Web Services](#) (AWS) Cloud". [Enterprise](#) customers are able to access the [Amazon Elastic Compute Cloud](#) (EC2) over an [IPsec](#) based [virtual private network](#). Unlike traditional EC2 instances which are allocated internal and external IP numbers by Amazon, the customer can assign IP numbers of their choosing from one or more subnets.
- **Elastic IP addresses**
- Amazon's elastic IP address feature is similar to static IP address in traditional data centers, with one key difference. A user can programmatically map an elastic IP address to any virtual machine instance without a network administrator's help and without having to wait for DNS to propagate the binding. In this sense an Elastic IP Address belongs to the account and not to a virtual machine instance. It exists until it is explicitly removed, and remains associated with the account even while it is associated with no instance.



AWS EC2 – Amazon EC2 and Amazon VPC





VPC



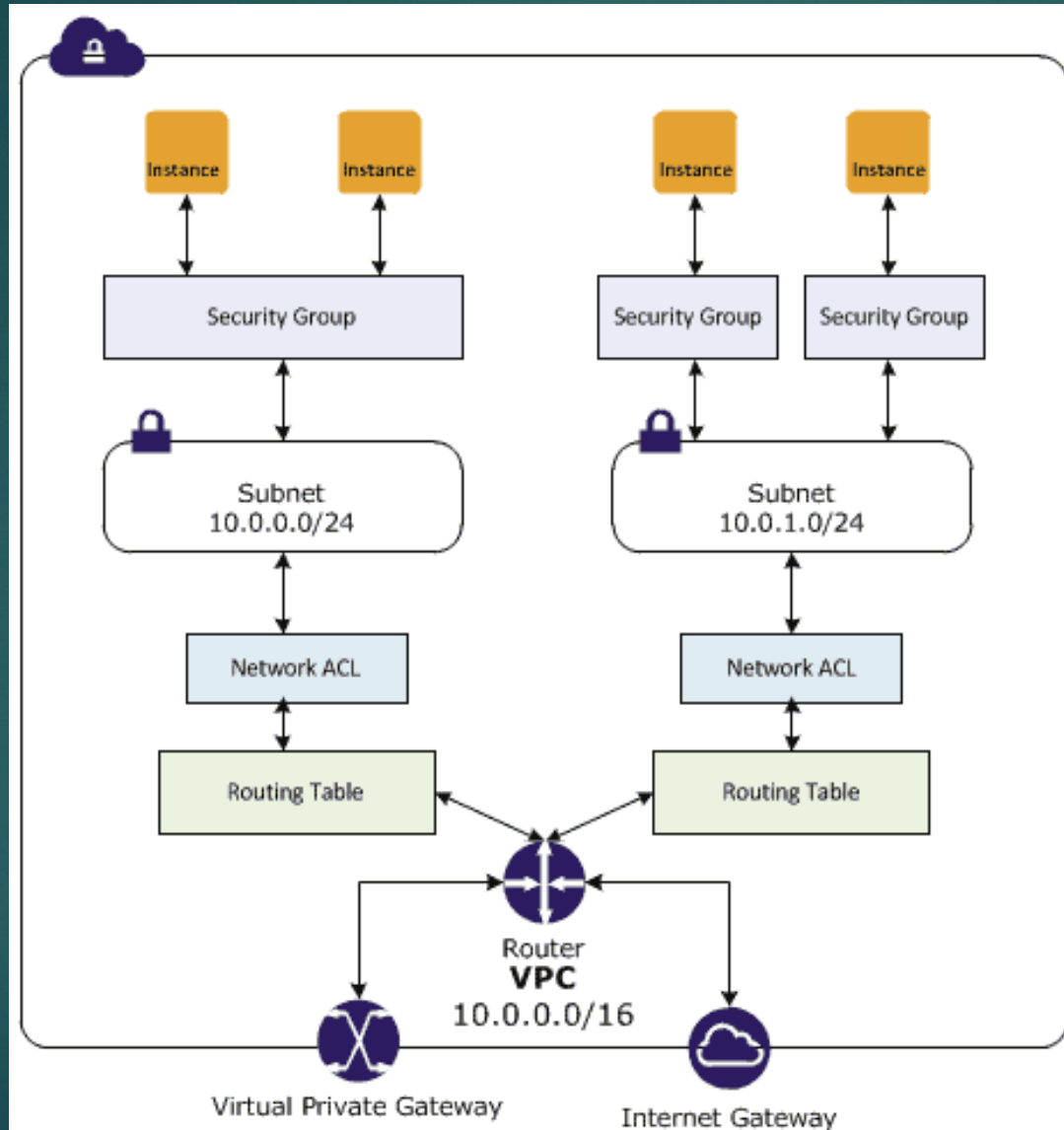
Comparison of Security Groups and Network ACLs

The following table summarizes the basic differences between security groups and network ACLs.

Security Group	Network ACL
Operates at the instance level	Operates at the subnet level
Supports allow rules only	Supports allow rules and deny rules
Is stateful: Return traffic is automatically allowed, regardless of any rules	Is stateless: Return traffic must be explicitly allowed by rules
We evaluate all rules before deciding whether to allow traffic	We process rules in number order when deciding whether to allow traffic
Applies to an instance only if someone specifies the security group when launching the instance, or associates the security group with the instance later on	Automatically applies to all instances in the subnets it's associated with (therefore, you don't have to rely on users to specify the security group)



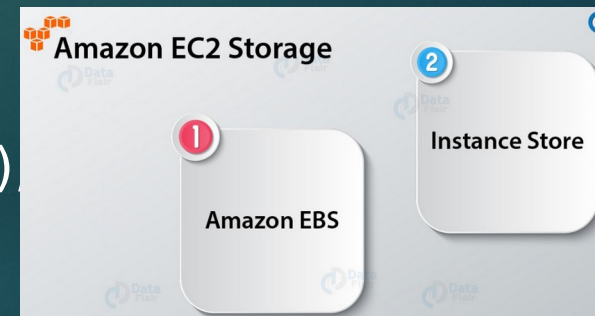
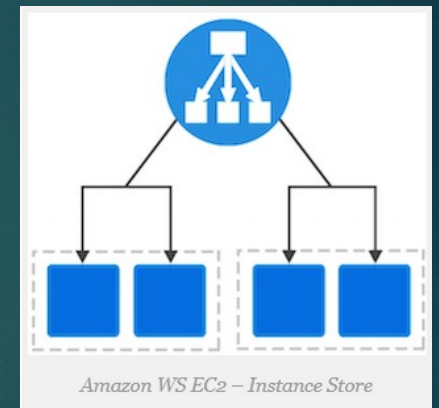
VPC





AWS EC2 Storage

- ▶ **Amazon Elastic Block Store** helps us with block-level storage which is compatible with the EC2 instance. Moreover, they are highly available and reliable and can attach to any working instance available in the same Zone.
- ▶ **Instance Store**
- ▶ It consists of one or more blocks of the same type. The size of this instance and the available number of devices changes by instance type.
- ▶ An EC2 instance may be launched with a choice of two types of storage for its boot disk or "root device." The first option is a local "instance-store" disk as a root device (originally the only choice). The second option is to use an EBS volume as a root device. Instance-store volumes are temporary storage, which survive rebooting an EC2 instance, but when the instance is stopped or terminated (e.g., by an API call, or due to a failure) this store is lost.





AWS S3

- ▶ **Amazon S3** or **Amazon Simple Storage Service** is a service offered by [Amazon Web Services](#) (AWS) that provides object storage through a web service interface. Amazon S3 uses the same scalable storage infrastructure that [Amazon.com](#) uses to run its global e-commerce network. Amazon S3 can be employed to store any type of object, which allows for uses like storage for Internet applications, backup and recovery, disaster recovery, data archives, [data lakes](#) for analytics, and [hybrid cloud storage](#).
- ▶ Although Amazon Web Services (AWS) does not publicly provide the details of S3's technical design, Amazon S3 manages data with an object storage architecture which aims to provide [scalability](#), [high availability](#), and [low latency](#) with 99.999999999% durability and between 99.95% to 99.99% availability (though there is no [service-level agreement](#) for durability).
- ▶ The basic storage units of Amazon S3 are objects which are organized into buckets. Each object is identified by a unique, user-assigned key. Buckets can be managed using either the console provided by Amazon S3, programmatically using the AWS SDK, or with the Amazon S3 [REST](#) application programming interface (API). Objects can be managed using the AWS SDK or with the Amazon S3 REST API and can be up to five [terabytes](#) in size with two [kilobytes](#) of [metadata](#). Additionally, objects can be downloaded using the [HTTP GET](#) interface and the [BitTorrent](#) protocol.
- ▶ Requests are authorized using an access control list associated with each object bucket and support [versioning](#) which is disabled by default.

Amazon S3	
	
Amazon S3 Logo	
Type of site	Cloud storage
Available in	English
Owner	Amazon.com
URL	aws.amazon.com/s3/
IPv6 support	Yes
Commercial	Yes
Registration	Required (included in free tier layer)
Launched	March 14, 2006; 15 years ago
Current status	Active



AWS IAM

- ▶ AWS Identity and Access Management (IAM) is a web service that helps you securely control access to AWS resources. You use IAM to control who is authenticated (signed in) and authorized (has permissions) to use resources.
- ▶ When you first create an AWS account, you begin with a single sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account *root user* and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you do not use the root user for your everyday tasks, even the administrative ones. Instead, adhere to the [best practice of using the root user only to create your first IAM user](#). Then securely lock away the root user credentials and use them to perform only a few account and service management tasks.



urls

- ▶ <https://aws.amazon.com/console/>
- ▶ https://aws.amazon.com/free/?all-free-tier.sort-by=item.additionalFields.SortRank&all-free-tier.sort-order=asc&awsf.Free%20Tier%20Types=*all&awsf.Free%20Tier%20Categories=*all
- ▶ <https://aws.amazon.com/getting-started/>
- ▶ https://en.wikipedia.org/wiki/Plan_9_from_Bell_Labs
- ▶ <https://www.openstack.org/>
- ▶ <https://www.eucalyptus.cloud/>



What next?

TO BE CONTINUED