Amazon EC2

What is EC2?

Amazon EC2 is an IaaS cloud service that provides flexible computing resources. In layman's terms, there are many types of virtual machines available. EC2 is also a core component of AWS, and many services in AWS need to rely on it. In an EC2 environment, a virtual machine is called an instance, and an image of an instance is called an AMI. Any business or individual can choose different types and sizes of instances to create, get up and running in a short amount of time.

Main services provided:

EBS (Elastic Block Storage): Provides permanent storage for EC2 instances
Elastic IP address: A static IP address for dynamic cloud computing, associated with your instance rather than a specific instance
VPC (Virtual Private Cloud): Allows you to pre-configure a private, isolated section in AWS cloud that lets you launch AWS resources in your own defined virtual network. With Amazon VPC, you can define a virtual network topology that is very similar to a traditional network running in your own data center.
ELB (Elastic Load Balancing): You can automatically distribute incoming traffic for your application across multiple Amazon EC2 instances.
Auto Scaling: Automatically scale Amazon EC2 capacity based on criteria you define.

Simple Storage Service (S3)

What is S3?

S3 is the abbreviation of Simple Storage Service, which is a simple storage service. S3 can be seen as cloud storage, in a naive view, big network disk. The concept is similar to a distributed literary system, at the same level of Google's GFS.
In addition to the network disk, S3 stored data can also be directly referenced by other Amazon high-level services. Amazon's large network disk is an integral part of its overall solution.

Fundamental Conceptes:

1. Bucket – a directory that is analogous to the file system
It seems that the directory can not be nested, that is, there can be no subdirectories. The official statement is to play the role of namespace, which is the basic unit of access control. In fact, it is still a directory.
2. Object – an analog file system file
The object has the name of the object, the object attribute, the object itself is up to 5G, and it is actually a file.
At present, the object has the properties of Versioning (that is, the cache concept of different historical versions of the object). This is not available in the file system. In the early S3 data, there is no such concept. It should be the result of evolution. The face should be Users with version control requirements.
3. Keys – analog file name
The style of the key is also the URL, remember that Amazon's services are accessed using Web Service or REST.
For example, http://doc.s3.amazonaws.com/2006-03-01/AmazonS3.wsdl
Where ‘doc’ is the directory name (barrel name) and “2006-03-01/AmazonS3.wsdl” is the file name (object name).
If version is introduced, bucket + key + version uniquely identifies a version of the file.
4. Versioning – an analogy to a version in CVS
5. Regions - the geographical location where the files are stored

This is also not in the file system, is a different geographical area, the user can specify the file to exist in a country's server. I personally think that this is not a good concept. As a cloud provider, these deployment details should be blocked for the application. There is still a gap between engineering and technical ideals. At present, the server locations that can be designated are the United States, Ireland, Singapore and other places.

Interface API

Commonly used APIs are read, write, add, delete, change, check, and so on. Use standard SOAP and REST definitions.

In particular, for the acquisition of objects, in addition to using http to directly obtain the C / S way, Amazon supports the BT protocol, which means providing seeds. From the user's point of view, Amazon will charge less money, but at the same time Amazon itself will also reduce the burden. The speed of bt downloads is less stable, depending on the "quality" of the seed or on the number of people interested in the file. For example, the name "XX Gate" estimates that file downloads can be much faster.

What is the use of data?

After the data is uploaded to the AWS cloud, many services can be used, for example: Amazon ElasticCompute Cloud, Amazon Elastic MapReduce, Amazon Import/Export, etc.

Virtualization

Virtualization is a layer of abstraction of a computer system on actual hardware to run virtual instances. The most common is to run multiple operating systems on a single computer system at the same time.

CPU virtualization technology can simulate multiple CPU parallelism with a single CPU, allowing one platform to run multiple operating systems at the same time, and applications can run in separate spaces without affecting each other, thus significantly improving the efficiency of the computer.

Why use virtualization for computing?

Desktop users, can run applications of multiple operating systems without switching computers or rebooting the system.

Administrators of servers, virtualized to run different operating systems, and more importantly, provide a way to segment large operating systems into smaller parts, allowing servers to be used more efficiently (different users or different Languages needs).

Also supports isolation, ensuring that processes running inside a virtual machine are safe and not disturbed by another virtual machine process on the same host.

What is a hypervisor?

The hypervisor is a program to create and run virtual machines. Traditionally, it is divided into two categories.

Type one, or "bare metal" hypervisors, which are run by the system hardware to run the guest virtual machine, basically operating system behavior.

Type two, or "hosted" hypervisors are more like traditional applications, like a program can be started and stopped. In modern systems, this classification lacks universal prevalent, especially like the KVM system. KVM, kernel-based virtual machine, is a part of the Linux kernel that can run virtual machines directly, although you can still use a system to run KVM virtual machines.

What is virtual machine?

It is a simulation of a computer system that runs on top of another system. Virtual machines can obtain any number of resources, computing power, through hardware-assisted.

The difference between a container and a virtual machine?

Linux containers, which are similar in concept to virtual machines, have different functions. Both allow applications to run in isolated environments, allowing multiple stacks on the same machine as if they were separate machines.

LAMP

LAMP (Linux-Apache-MySQL-PHP) website architecture is currently the international popular web framework, including: Linux operating system, Apache web server, MySQL database, Perl, PHP or Python programming language, all components are open source software. It is an internationally mature architecture framework. Many popular commercial applications adopt this architecture. Compared with the Java/J2EE architecture, LAMP has the characteristics of rich, lightweight and rapid development of Web resources. Compared with Microsoft's .NET architecture, LAMP has the advantages of universal, cross-platform, high performance and low price. Therefore, LAMP is the platform of choice for enterprises to build websites regardless of performance, quality or price.

DynamoDB

DynamoDB is a highly available key-value storage system from Amazon. Used to provide an "always on" available storage. To achieve this level of availability, DynamoDB will sacrifice consistency in certain failure scenarios. It makes extensive use of object versions and application-assisted conflict coordination to provide a novel interface that developers can use.
The following are technical overviews and benefits used by DynamoDB:

Problem	Technology	Advantage
partitioning	consistency hash	incremental scalability
Write high availability	vector clock and reconciliation during reading	process version size and update operation rate decoupling
Temporary failure handling	Sloppy Quorum and hinted handed handoff	high availability and durability, even when some copies are not available
Permanent failure recovery	anti-entropy using the Merkle tree	Synchronize different copies in the background
Membership and fault detection	Gossip members and fault detection protocols	maintain symmetry

AWS Lamda

What is AWS Lambda?

According to Jeff Barr's blog post, Lambda is a "computing platform that can easily create Lambda functions without management." But we can also understand this: Lambda is an IFTTT script creator and manager for AWS computing resources.
For example: You have a photo app. After the photo is uploaded to S3, the metadata of the new photo needs to be recorded on DynamoDB. The role of Lambda is to have a place to put a trigger script to perform this task, regardless of what machine or virtual machine the script is running on.
Lambda can also be understood as a service that abstracts functions from the computing resource layer.

Lambda's design philosophy

What are the fundamentals of cloud computing?
Answer: Cloud computing is an execution environment.
What is the root of the application?

Answer: functions (the carrier of business logic) + data (related input and output), and the interaction between the two - events (common events such as additions, changes, Delete, etc.).
In other words, for an application, in addition to the three things things, data, events is fundamental, no matter what code and framework, nothing is more than glue or UI.
In this case, the ideal situation is to write the glue with the least amount of time and put more time into the core of the application.
The most common glue code is a trigger: when an event occurs, a function is executed and new data is output. Vogels uses the Excel form as an example: in a form, a change in a cell value triggers a change in the cell value corresponding to the sum column, which is the process by which an event trigger function incorporates a new variable into a new value. This process is automatic, and can also be concurrent, that is, one change triggers multiple functions at the same time.
Based on this idea, AWS made Lambda services.