Amazon Web Services

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Building a website used to take a lot of effort and time. One needed to buy his own server or rent a virtual hosting. Maintaining the machines or scaling up for larger web traffic was even more troublesome and more trivial, and sometimes costly. But now with Amazon Web Services, abbreviated as AWS, it gets simpler and cheaper. With the slogan "Pay only for what you use," AWS charges users based on their usage – use more pay more. Therefore, one does not need to worry about maintaining a server or how or when to scale up, but rather, he can focus on building and managing the site.

History

Amazon, founded by Jeff Bezos in 1995, was a web store selling books in the beginning. With Bezos' great management, Amazon survived the dot-com bubble in 2000, and became one of the largest online retailers in the world. In 2004, an engineer presented an idea of making a profit on the infrastructure required to run the Amazon.com store [1]. This is the start of AWS, making Amazon transform from an infrastructure user into a server provider. Elastic Compute Cloud (EC2) was built first in South Africa, and AWS was officially launched in the summer of 2006 [2].

From virtual computers (Amazon EC2), data storage (Amazon S3, Simple Storage Service) to Content delivery network (Amazon CloudFront), Amazon now runs more than 20 types of services, all easy to use, scalable and flexible. Developers can deploy their application, pay by usage time, and don't need to wait for hardware anymore [3].

Architecture

Products of AWS can be roughly categorized into 3 types: Computing (EC2), Storage (S3) and Supports. For computing, different from traditional virtual hosting, users can dynamically change the amount of EC2. For example, a startup company may start with only one, and scale up to 2 or more when in need. Amazon even provides auto-scaling function,

which automatically change the number of EC2 according to conditions users set up. For example, one can set up a condition such that when CPU usage is more than 70%, automatically add another EC2, or when usage is too low, reduce one EC2 to reduce cost [4].

As for storage, S3 provides online data storage service for documents of all sizes. For average users, it is convenient cloud storage. One feature is time-limited sharing. For example, one can create a link that is only viable for 5 minutes, so after it expires, no one can download it anymore. For developers, traditional problems such as scaling, space wasting, data structure and security [5].

AWS supports many different programming languages, including JAVA, Ruby, Python, PHP, .NET, and so on [6]. SDK of different languages and deployment and management tools are also provided. Developers can easily deploy their code to server without modification.

Application

One classic example is New York Times. One day they have to convert 11 million scanned articles from tiff pictures to pdf documents. The engineers in NYT decided to upload all images to S3 and initiate 100 EC2s to process this task. It finally took them only 24 hours to process and cost only 3000 dollars. This example completely shows the efficiency and flexibility of AWS [7].

Another example is 99designs.com. This is a website where companies in need of designs can post a competition, and designers can upload works for it. Obviously it needs a lot of space for the images uploaded, and since it was a newly started company, it grew very fast. As the founder recall, “The initial cost of launching our business on AWS was reduced by a factor of 5 when compared to conventional hosting.” [8]

Competitors

After AWS achieved a great success in the market, other web companies started to notice the potential of cloud computing. Google launched Google App Engine in 2008, and

Microsoft launched Azure in 2010. There are some differences among these products, but the basic ideas are the same: providing an environment easy to deploy web services.

Google App Engine, GAE, is also a popular service. However, compared to AWS, it has much more limits. GAE supports only JAVA, Python and Go (and some other JVM languages like JRuby), while AWS supports almost every popular web languages. GAE provides APIs for developers to easily write scalable applications, and removes many of the system administration and development challenges. These features make it more convenient for developers to develop and deploy agilely, but this also means that developers don't have the same freedom for customize their server environment as in AWS [9]. To sum up, GAE adds up some limitations but reduces the troubles for maintaining the server.

As for Azure, it is harder to compare this with AWS. Both have similar counterparts in functionalities. However, since AWS was the first in the market, there is no reason for old developers to transfer to Azure (made by Microsoft, which does not gain good reputation in development). But it is interesting to note that, AWS recently supports Ruby but not yet Node.js, while Azure, on the contrary, supports Node.js and not Ruby. These two are probably the most popular technologies currently, so developers might just take what they want [6].

Conclusion

AWS accelerated the development of the web services, and changed the economics of the software world. Startups can now cheaply and agilely launch their products, without worries of scaling and maintenance. It also led the current of cloud computing (although in Taiwan most just misunderstand the true meaning of it). Amazon Web Services is no doubt the most important pivot of recent history of web development.

Reference

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