.Net Cloud Platform & development environment

Jing.Li

**Abstract :**

Microsoft Azure is the most popular .NET cloud service platform, which is being used by more and more companies at the computer-centered world today. Over the recently years, Microsoft Azure have been growing to be a ecosystem to handle any kinds of computer problems in society. I want to find out the growing reason and compare the other cloud service platforms. This report gives descriptive information about the basic work principle of Microsoft Azure and the main services provided by Microsoft Azure that are provided in the market at the moment. It also contains a description of the comparison of cloud service platforms available on the consumer market.

Keywords: .NET ,cloud services platform, ecosystem,pay-for-use, Virtualization, hypervisor, Fabric Controller,Windows-base

**Introduction :**

With the ascending business and emerging data, the companies are sharply moving to clouds services. There are also a number of cloud service providers (CSPs) available in the market, such as: Microsoft, Amazon, Google, Oracle, etc. who provide cloud service platform. Many of them are famous names in IT industry.

Organizations are opting for pay-for –use models because they would like to emphasis on their own product rather than wasting time , energy and money on internet services and infrastructure for managing their huge data via the internet . Broadly speaking, a cloud service platform can be viewed as providing services accessible to developers to create applications or store data.

This report will introduce the most popular .NET cloud platform Microsoft Azure by comparing the other mainstream market CSP. (Purohit, n.d.)As Microsoft Azure is reliable, it becomes a popular choice for the enterprises and organizations. Providing developers with a platform and environment so they can develop and build services over the Internet and these applications .In other words,  The Microsoft Azure platform has a set of cloud technologies, each offering a specific set of services for application developers.

**Content:**

What does Azure can do?

Basically speaking ,  it is a way to rent computing power and storage from Microsoft's data centers. Microsoft Azure provides services to developers and IT administrators to build, deploy , and management applications  over the Internet using the pay-as-you-go pricing model.

It also allows users to freely build, manage and deploy applications on a vast global network using their favorite tools and frameworks.

IT engineers can develop in Visual Studio, commit thier codes to GitHub, build with Azure DevOps, and then deploy to Azure. Or they could use a different integrated development environment (IDE) like Eclipse or IntelliJ IDEA, develop on Linux, and deploy directly from their development machine to the cloud.

Using Azure means developer can use their favorite IDE, you choose from a large range of development languages, from C# to Java to Node.js, and you choose your development operating system. Microsoft provides and supports a wide range of development tools for Windows, Linux, and macOS.

Azure is quickly forming an extremely consunmate cloud ecosystem from IaaS (Network ,VM) to PaaS (storage, SQL, media) to SaaS (Office 365, VS Online, AAD VS Online, AAD ,Machine Learning) at nowadays. The business products which are mentioned originally had a large user base, and now easy to be migrated to Azure by their users, which is the reason that Azure has grown rapidly in recent years.(Ramakrishnan et al., 2017)

IaaS: Infrastructure as a Service permits the client to use the hardware and resources over the internet. Microsoft Azure and AWS (Amazon Web Services) have many infrastructure around the world so that they provides hosts hardware, storage, servers and other infrastructure components on behalf of its customers.(Dewangan, Deshmukh, & Mishra, 2018)

PaaS: Platform as a Service provides IT engineers with a platform and environment so they can develop or build services through the Internet, and when these applications are hosted in the cloud, customers can access them through a web browser.

SaaS: Software as a Service provides a software application that can be accessed by a user through an Internet web browser. Take VS Online and AAD as examples.

Visual Studio Code is also an environment that is a popular choice for developing applications for Azure. It's lightweight, taking up only megabytes of storage space, and works on Windows, Linux, and macOS.

AAD is Microsoft’s cloud-based identity and access management service. Azure Active Directory  helps company employees log in and access resources .

Organizations or businesses don't need to own or build their own infrastructure to handle all internal applications or services, instead they can buy them from Microsoft Azure as IaaS, PaaS or SaaS..(Purohit, n.d.)

Overview understanding Microsoft Azure is only an important first step. We should also require a deeper understanding of work principle.

So how does Azure work in the technology?

A technology known as virtualization is used by Azure. Virtualization uses an abstraction layer called a hypervisor to separate the correct coupling between a computer's CPU and its operating system. The hypervisor simulates all the roles of a real computer and its CPU in a virtual machine. Multiple virtual machines can be run by hypervisor simultaneously, and every virtual machine can run any compatible operating system such as Linux or Windows.

Azure applies this virtualization technology and is used on a large scale in Microsoft data centers all over the world. Every data center has a number of racks filled with servers. Each server contains a hypervisor for running multiple virtual machines. The network switch provides connectivity to all servers. One server in each rack runs a special piece of software called a Fabric Controller.

Another unique piece of software known as the orchestrator is connected to each fabric controller. The orchestrator is liable for managing everything that happens in Azure including responding to user requests. The user makes a request using the orchestrator’s web API.

The web API could be rang by a number of tools , including Azure portal user interface. When users make request to create a virtual machine, the orchestrator package everything which are needed , pick the best server rack, then send the package and request to the Fabric Controller.

For simplicity, Azure is a large collection of server and network hardware, as well as a complex set of distributed applications for coordinating configuration, virtualization hardware and the functionality of these server software.

Why should we transfer to the cloud platform?

It is this orchestration that makes Azure so efficient: users do not spend time and money now on maintaining and updating hardware , because Azure handles all of this in the background. Azure's expanding cloud services help businesses meet business challenges.

Azure can help you accelerate development and innovation in ways that were once impossible. Azure provides advanced solutions that help users quickly solve the toughest business challenges. This is great, the real value of Azure is to provide advanced solutions that help users quickly solve the toughest business challenges.I will list some other benefits:

Security：With Azure’s identity management organizations have tight control over who has access to each service and data in it. All kinds of security aspects like success control , malware and thread protection, encryption technologies, rules and regulations etc of government which are considered important reasons for choosing Azure or the other cloud service platforms .(Purohit, n.d.)

Cost : Users can rent CPUs and storage when they need instead of maintaining them in users’ own data center. The cloud provider is responsible for maintaining the underlying infrastructure for you. Shortly it is that the best part is you only pay what you use. Centralized use during peak hours, after use, just return resources . Just pay for the resources you use. It is using the pay-as-you-go pricing model.

**Methodology**

* The methodology in this paper is firstly to be assure the topic I want to research. To learn about .Net cloud platform I should understand the content of Azure, I search different journals and Microsoft web to understand the most popular Azure. Then I specify research questions as mentioned in the content section like what it is and how does it work , and why organizations select it .Then I move towards previous researches comparing three cloud service platform , including: AWS,Azure,Google which have been summarized in tables below for easy comparison. At last I draw a discussion result on the opportunity of future use between AWA and Azure after comparison.

**Literature review**

There are many cloud service providers offering cloud services. Various clouds have their own features, storage capacities, methods and billing systems.

Comparison of cloud service platforms:

|  |  |  |  |
| --- | --- | --- | --- |
| Cloud  Service Providers | Appropriate to be used for | Not approprivate to be used for | Example customers |
| Microsoft  Azure | * Company customers are familiar with Microsoft products, strong development and deployment. * Microsoft Azure is fast in key areas and therefore has an advantage in a highly competitive business * .Azure could work under challenging environment and provides superior disaster recovery system. | * Those companies or individuals are unfamiliar with Microsoft products will find it need time to use. * One of the disanvantages of Azure is that it requires management and maintenance. * • Microsoft only offers Windows-based applications for technical assistance. | Microsoft,Candanda  Mazda,  Xerox,  FreshDirect ,  NBC Sports,3M  All of these Windows-based apps can use Microsoft Azure to handle processing very fast, and Microsoft Azure is especially suitable for Windows-based applications, which makes it even more convenient. |
| Amazon  Web  Services | * Computing capacity is five times that of other cloud service providers. * Regions is around the world for the various data centers. * Cost-efficient cloud tools for business operations, high scalablity and availability | * Seek open source users to operate without internal management. * AWS does not provide hardware level change, by means that if applications need some hardware changes to improve it is not possible by AWS. * It does not provide Multicast Network. | US Navy, Adobe, NetFlix , Airbnb ,Expedia, Kellogs, Siemens etc  In summary，  AWS is suitable for those APP ,that does not only require hardware changes to process, but also is suitable for those companies, that want to provide their services in different regions. |
| Google  Cloud  platform | * • Developers seek to develop and deploy a simplified cloud ecosystem. * The Google Cloud Platform applies full access to information from anywhere through a web-based application powered by Google Cloud. * Based on excellent security systems, has been established for more than 15 years, and protects Gmail, Google search and other services | * It is a cloud platform, simple cloud-based tasks. * Google Cloud Platform lacks AWS based on the features provided. Every year, a new feature is added to AWS, followed by Google Cloud. * • Far behind AWS and Azure in terms of product range. Google is growing fast, but there is still a long way to go. | Snapchat, Workiva, Rovio, Motorola, Philips, HTC, AirBus  Compared to other clouds, the Google Cloud platform is cheaper because it only charges the computing process based on the user's computing time and requirements.  It also provides services and information in various ranges. |

Summary /conclusion

The report gives a brief introduction about Azure ,which is the most popular .NET cloud platform at the moment. Microsoft Azure enables you to quickly and efficiently build, deploy, monitor, and scale cloud hosted solutions. Azure's deployment model is flexible.

The reference lists comparative survey of major cloud service providers.It tells the comparison among three cloud platforms and make a list that various range of services is provided by the existing platforms .Various levels of abstraction are provided in various layers of the platform when the service is being provided.

The users may choose no less than one platform because every requirements which may will satisfy users’ business needs. In fact the choices of the companies is changed by the market policy from the cloud service platforms. Because AWS start to provide services earlier than the other CSP and it has a boig customers base, it has an advantage of price . Amazon started out as an Internet enterprise, so it runs through the genes and styles of the Internet from the inside out. These are reflected by his listening and understanding of user needs, rapid iteration of product features, and a variety of very basic promotions.

But Microsoft Azure is quickly growing to be a ecosystem involved almost everything. Because Microsoft Azure is built on a Windows server, it's easy to migrate virtual machines to a public cloud, just like many similar software and applications which are being used in companies and organizations between local data centers and Microsoft Azure.(Purohit, n.d.)

The cloud service platform is a product with obvious effects of the Matthew effect and the marginal cost reduction effect. So the price advantage of ecosystem from Microsoft Azure will become more and more obvious. Windows-base- software users simply choose to pay monthly or yearly to access services easily that will be handed over by Microsoft Azure.

In my opinion from the paper, Azure is becoming a better and better choice for IT engineers and organizations with Microsoft's open source trend, also because it is a reliable ecosystem.

**References**

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