.Net Cloud Platform & development environment

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**OpEx:**

**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. 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,

**Introduction :**

With the ascending business and emerging data, the companies are sharply moving to clouds services. There are also many 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 over 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.

Azure is quickly forming an extremely complete 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 over 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 :Azure Active Directory is Microsoft’s cloud-based identity and access management service, that 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.)

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.

Having a whole understanding of Microsoft Azure is just an important first step. We should also require a deeper understanding of work principle.

How does Azure work?

A technology known as virtualization is used by Azure. Virtualization separates the right coupling between a computer’s CPU and its operating system using an abstraction layer called a hypervisor. The hypervisor emulates all the functions of a real computer and its CPU in a virtual machine. It can run multiple virtual machines at the same time, and each virtual machine can run any compatible operating system such as Windows or Linux.

Azure applys this virtualization technology and repeats it on a massive scale in Microsoft data centers throughout the world. Each data center has many racks filled with servers. Each server includes a hypervisor, to run multiple virtual machines. A network switch offers connectivity to all the servers .One server in each rack runs a special piece of software called a Fabric Controller.

Each fabric controller is connected to another special piece of software known as the orchestrator. The orchestrator is responsible for managing everything that happens in Azure including responding to user requests. Users make requests using the orchestrator’s web API.

The web API can be rang by many tools , including the user interface of Azure portal. When a user makes a request to create a virtual machine, the orchestrator packages everything that’s needed , picks the best server rack, then sends the package and request to the Fabric Controller.

Once the fabric controller has created the virtual machine, the user can connect to it. Azure makes it easy for developers and IT professionals to be agile when they build, deploy, and manage their applications and services.

In fact, building a Virtalization is just the beginning , with Azure’s ever expanding set of cloud services to help the companies meet their business challenges .It gives users the freedom to build ,management , and deploy applications on a massive global network , using their favourite tools and frameworks.

Why should we transfer to the cloud platform?

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 selecting 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 Azure I should understand the content of Azure, I search different journals and Microsoft web to understand it. Then I specify research questions as mentioned in the content section, and moving towards previous researches comparing three cloud service platform , including: AWS,Azure,Google which have been summarized in tables for easy comparison. At last I end with discussion results on the opportunity of future use between AWA and Azure. I choose Zotero tool to accomplish APA references.

**Literature review**

There are a lot of cloud service providers for providing cloud services. Various clouds have their own features, storage capacities, methods and billing systems.

Comparison of cloud service platforms:

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| Cloud  Service Providers | Appropriate to be used for | Not approprivate to be used for | Example customers |
| Amazon  Web  Services | * Cost-effective cloud tools for business operations, high scalablity and availability * Computing capacity is five times more than other cloud sevice providers. * Regions is around the world for the various data centers. | * Users seeking open-source, operating 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 require hardware changes to process. It is also suitable for those organizations, that wants to provide their services in different regions. |
| Microsoft  Azure | * Company clients are familiar with Microsoft products, robust development and deployment. * The speed of Microsoft Azure is fast in the key areas therefore giving an edge in the 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 provides only the applications that are based upon windows for technical assistance. | Microsoft,Candanda  Mazda,  Xerox,  FreshDirect ,  NBC Sports,3M  All these APP which are based on windows operating system can use Microsoft Azure assist processing speed is very high and Microsoft Azure is special to windows-based application, which makes it more convenient. |
| Google  Cloud  platform | * A streamlined cloud ecosystem seeked by developers for development and deployment. * Google cloud platform applys full access of information from anywhere via web-based applications which are powered by Google cloud. * Based on excellent security system that has been built over 15 years ,and secures services like Gmail, Google Search,etc | * It is a cloud platform, simple cloud-based tasks. * Google Cloud Platform lacks behind AWS on the basis of features provided. Every year a new feature is added to AWS which is then followed by Google cloud. * It is far behind AWS and Azure in terms of product range. Google is moving in a fast pace but there is a long way to go. | Snapchat, Workiva, Rovio, Motorola, Philips, HTC, AirBus  The price of Google Cloud platform is cheap when compared to other clouds because it only charge for computing process based on 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 .Different levels of abstraction are provided in different layers of the platform when the service is being provided.

No less than one platform should be chosen by the users 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, it has an advantage of the customer base and prices . Amazon started out as an Internet enterprise, so it runs through the genes and styles of the Internet from the inside out. These reflect his listening and understanding of user needs, rapid iteration of product features, and a variety of promotional activities that are very grounded.

But Microsoft Azure is growing to be a ecosystem involved almost everything. Because Microsoft Azure is built over Windows server, it is easy to migrate virtual machines to public cloud as 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. The price advantage of large manufacturers will become more and more obvious. The users just need to choose either monthly or annually pay to get access to the services which will be handed over by Microsoft Azure.

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