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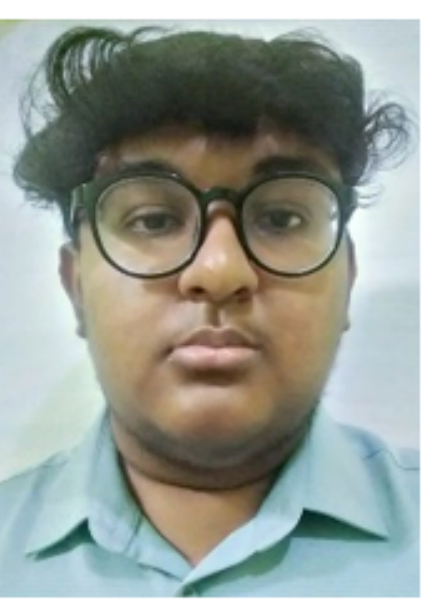
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TECHNOLOGY & INFORMATION SYSTEM

**ASSIGNMENT 2 : Cloud Computing Service Provider,
Industry Talk 3 & 4 Newsletters**

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CLOUD COMPUTING SERVICE PROVIDER

5 EXAMPLES

CLOUD COMPUTING SERVICE PROVIDER

Microsoft Azure

Microsoft Azure was launched later into the years compared to AWS and Google Cloud. Despite the severe disadvantage when it comes to popularity, Microsoft Azure managed to get their name to the top by recently winning a \$10 billion US government contract. As one of the traits that is required to be at the top, Azure offers a myriad of services such as AI+ Machine Learning, Internet of Things, Security and many more in order to attract customers toward their product. When it comes to availability, Azure is available in 140 countries and 54 regions worldwide. Microsoft Azure revenue is predicted to be around \$33 billion to 35\$ billion making it one of the most fruitful cloud services in the world.

IBM Cloud

IBM Cloud were founded by information technology company IBM in 2007. IBM Cloud were mainly focused on businesses. IBM Cloud also offers similar services as other cloud service providers like IaaS, SaaS and PaaS via public private, and hybrid cloud models. IBM Cloud currently has 18 availability zones in 6 regions around the globe. The annual revenue of this cloud services is \$19.16 billion.

Google Cloud

In April 2008, Google announced a platform for building web application using Google's data centers called App Engine which will then became the first cloud computing service from the company. Throughout the existence of App Engine, Google had added multiple cloud services in various categories for example AI and machine learning, DevOps and also security. Google Cloud uses the same infrastructure that Google uses for its revolutionary product such as Google Search, Gmail and YouTube. Till this day, Google Cloud Services are available in 20 regions, 61 zones and over 200 countries. In the year 2020, Google Cloud had generated \$13 billion in terms of revenue.

Alibaba Cloud

Alibaba Cloud was founded in 2009. It is registered and headquartered in Singapore. The initial plan of this cloud services is to serve Alibaba's e-commerce ecosystem that includes data mining, data processing and also data customization but then was offered to the public in the current day and became the largest cloud service provider in China. Some of the services and products provided are Elastic Computing, Apsara Stack and Media Services. Alibaba Cloud is accessible in 19 regions and 56 availability zone around the world. Annually, Alibaba Cloud can generate \$4.5 million in revenue.

Oracle

Oracle Cloud were launched in October 2016 by Oracle Corporation. Oracle Cloud provides Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Data as a Service (DaaS). Oracle permit its cloud services to be "provisioned" which mean it is preparing and equipping a network to allow it to provide new services to its users. In October 2016, Oracle Cloud was only available in a single region but since then had grew to 29 region with more than 70 services. Oracle aims to reach 38 total region by the end of 2021. Oracle Cloud had not exposed its revenue and operating income. (Mahesh Chand, 2021)



Microsoft Azure



Google Cloud



IBM Cloud

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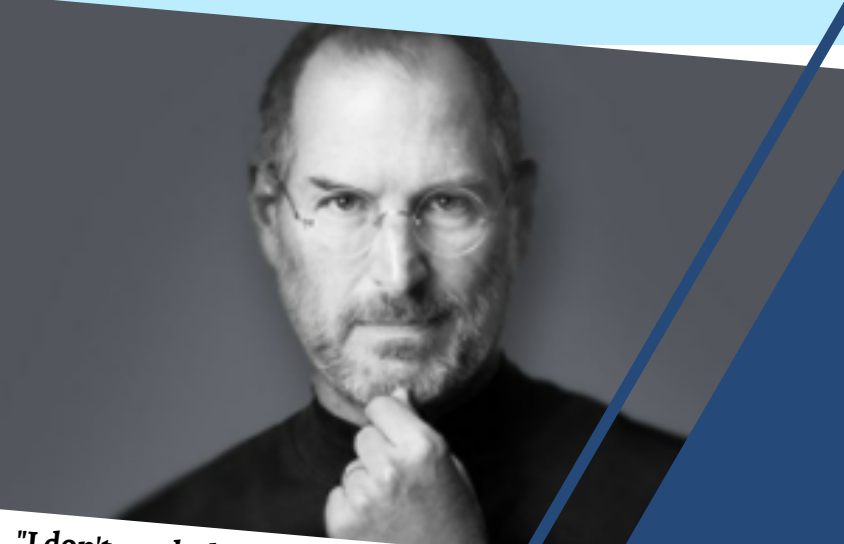
Alibaba Cloud

COMPARISON BETWEEN CLOUD COMPUTING SERVICE PROVIDERS

With the existence of various cloud computing service providers, it is certain that there will be differences between all of those service providers. Every service providers will definitely have their fair share of strengths, weaknesses and locations/availability. To start off with the comparison, strength will first be brought into the current topic. Let's start off with Microsoft Azure. In terms of strength, partnership with Oracle, VMWare and SAP had helped them cement themselves as the leading PaaS segment of cloud service by extending its capabilities. Next, Google Cloud is very outstanding in big data, machine learning and data science capabilities with its products like TensorFlow, ML Kit and Google Datasets. Google Cloud also enables AI platform created on the finest technologies. On the other hand, Oracle Cloud strength comes from its partnership with Microsoft Azure. The interoperability enables customers to access their workload across both platform and permits customer to migrate their existing workloads that includes Oracle Cloud and Microsoft Azure. In addition to that, IBM Cloud is a solid option for outdated application especially for the ones that are very memory-intensive. Lastly, Alibaba Cloud strength comes from its broad set of Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Alibaba's offering are comparable in terms of availability, performance and security with other mainstream cloud providers. (Andriy Stashko, 2021)

Secondly, it is undeniable that every cloud service providers have its own weak points. For Microsoft Azure, lesser amount of availability zone compared to its rival company made them lose a portion of their customers in niche location. Azure also does not offer any form of assurance when it comes to cloud capacity. For example, during the Covid-19 pandemic, a handful amount of customers were not able to provision the cloud capacity that they paid for. Hence, this cause distrust of customers toward the product. Furthermore, Google Cloud faced hardship when it comes to placing themselves as an enterprise-class Infrastructure as a Service (IaaS) solution. Google Cloud also found itself lacking when it comes to amount of well-versed managed service providers compared to its rival. Moreover, inability to come up with a data warehousing solution even though working with the founders of Snowflake (data warehousing solution) for over a decade had made its customers, especially the one that uses both Microsoft Azure and Oracle Cloud realized how incompetent Oracle Cloud is. Besides that, IBM Cloud revenue growth of 22% makes it incomparable to the growth rate of Amazon Web Service (AWS) and Microsoft Azure which recorded 45-50% growth rate. As the product of legacy offerings, IBM Cloud is a complex platform making it hard to use. Finally, finite adoption in other parts of the world besides South Asia must be one of Alibaba's Cloud point of improvement. Alibaba's cloud has the most potential in cloud servicing but it must be willing to branch out and enable more offering for Alibaba's international from Alibaba China's.

Lastly, location plays an important role that could determine the success rate of a service provider. The reason is because more area covered around the globe is equivalent to more customer from many demographic and also more accessibility for customer that loves to travel around the world. For Microsoft Azure, it spans over 54 regions worldwide and every region has at least 3 availability zones. Consumers will be able to run 2 copies of their applications. Next, Google Cloud is accessible in 200 countries and 25 region worldwide. Google Cloud also has 76 zones and 144 network edge locations. Other than that, Oracle Cloud is available worldwide in 29 cloud regions. On the other hand, IBM Cloud comprised of 60 data centers and 6 multi-zone regions that are located in busy areas across the continents in this globe. Lastly, Alibaba Cloud spans over 23 regions and has 69 availability zones worldwide.



"I don't need a hard disk in my computer if I can get to the server faster... carrying around these non-connected computers is byzantine by comparison." - Steve Jobs

REFLECTION

As technology continues to develop and expand, cloud computing will slowly take over the whole Internet market. These cloud computing service providers are merely the starting point of the whole industry. As time goes by, many company will come up with a better solution to satisfy its customers need. If the current leading company do not foresee the potential of its future competitors, they will definitely be wiped out from the market. I highly urge every company to not be complacent when it comes to updating and upgrading its product but always remember "customer first".



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INDUSTRY TALK 3

AMAZON WEB SERVICES & CLOUD COMPUTING

SUMMARY



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Lecturer



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Cloud computing is a concept that has grown popular in recent years. With the exponential increase in data usage that has accompanied society's transition into the digital twenty-first century, companies and institutions find that it is extremely difficult to keep all of their crucial data, programmes and systems that have been running on computer servers. This problem has a solution that has been around almost as long as the internet, but only a few of us know about its existence.

By replacing traditional computer servers with cloud computing server models, it has shown significant impact to the industry and helped start-ups to grow their business. Amazon Web Services (AWS) on the other hand is a secure cloud platform that offers a broad set of global cloud-based products. During the talk, AWS is highlighted as a perfect platform for us to invest in cloud computing as it gives us a better vision about cloud computing.



Cloud Computing

Introduction

The on-demand delivery of compute power, database, storage, application, and other IT resources via the internet with pay as you go pricing. Infrastructure as the software will enable us to stop thinking of our infrastructure as hardware and instead think of it as software. There are two types of computing model which is traditional and cloud. The traditional computing model is infrastructure as hardware. It requires space, staff, physical security, planning and capital expenditure. It also has a long hardware procurement cycle and requires us to provision capacity by guessing theoretical maximum peaks. While cloud computing model is infrastructure as software. It is flexible, can change more quickly, easily and cost-effectively than hardware solutions and eliminate the undifferentiated heavy-lifting tasks. There are 3 types of cloud computing deployment models which are cloud, hybrid and on-premise (private cloud).

Advantages

The first advantage is trade capital expense for variable expense. Data centre investment based on forecast and pay only for the amount you consume. Second is massive economies of scale. This is because due to aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers. Moreover, other advantages is stop guessing capacity. No overestimated or underestimated server capacity because it only depends on the scaling on demand. Increase speed and agility where purchasing request takes weeks between wanting resources and having resources but AWS can prepare in minutes between wanting resources and having resources. Finally, stop spending money on running and maintaining data centres. This is because we don't need to pay salary to staff, utilities, maintenance, landscaping and hardware and only focus on investing to business and customers.

ISSUES AND CONTENTS

Amazon Web Services

What are web services? It is any piece of software that makes itself available over the internet and uses a standardized format for request and the responds of an application programming interface (API) interaction. For example; Extensible Markup Language (XML) or JavaScript Object Notation (JSON). What is AWS? AWS is a secure cloud platform that offers a broad set of global cloud-based products and provides on-demand access to compute, storage, network, database and other IT resources and management tools. It is flexible, you pay only for the individual services you need only as long as you use them and it works together like building blocks.

There are so many categories of AWS services like analytics, cost management, database, blockchain, compute, media services and others. For choosing a service, it depends on your business goals and technology requirements. Example of services provided; compute services like Amazon EC2, AWS Lambda, AWS Elastic Beanstalk, Amazon ECS. Storage services like Amazon S3, Amazon S3 Glacier, Amazon EFS. Database services like Amazon RDS, Amazon DynamoDB and many more other services. There are three ways to interact with AWS. First is AWS Management Console where it is easy to use graphical interface. Second is Command Line Interface (AWS CLI) where we can access to services by discrete commands or scripts. Third is Software Development Kits (SDKs) where access services directly from your code like Java and Python.



AWS Help Center

First is AWS pricing calculator. It is used to estimate monthly costs, identify opportunities to reduce monthly costs, model your solution before building them, explore price points and calculations behind your estimate, find the available instance types and contracts terms that meet your needs and name your estimate and create and name groups of services. There's also AWS support plans, which are Basic Support where Resource Centre access, Service Health Dashboard, product FAQs, discussion forums and support for health checks. It also has Developer Support where Support for early development on AWS. For Business Support, AWS help Customers that run production workloads. Even for Enterprise, they support Customers that run business and mission-critical workloads.

Total cost of ownership (TCO)

TCO is financial estimate to help identify direct and indirect cost of a system. Why do we need to use TCO? It is here because to compare the cost of running an entire infrastructure environment or specific workload on-premises versus on AWS. It is also to budget and build the business case for moving to the cloud. So, what are the TCO considerations? Server costs, storage costs, network costs and IT labor costs. For example, could save up to 96% a year by moving your infrastructure to AWS rather than staying at on-premises.

REFLECTION

The 3rd talk focussed on cloud computing as it's been utilized in modern day business. We must widely implement cloud computing in the industry as it gives positive outputs in the future. In this pandemic we must take all precautions to secure our industry and AWS seems to offer the best solution for the business to stabilize itself as this company offers professional coaching and it is a type of model that scales with the usage "pay-as-you-go" which can avoid unexpected operating expenses. To summarize this talk, we must implement the latest tech in our industry as the technology keeps improving and by adapting to the latest inventions it will give us a better future.



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INDUSTRY TALK 4

CURRENT TRENDS OF AUGMENTED REALITY IN INDUSTRY



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SUMMARY

The talk emphasizes on one of the 9 digital industrial technologies which is the Augmented Reality. The talk shared that augmented reality combines virtual reality to reality with the aid of technologies. A brief explanation of 4th Industrial revolution was shared to enhance the understanding of it. There are many digital industrial technologies and one of the most expected and will be achieving high standards is the augmented reality. There were many predictions being made by expertise has been true and it is said that the augmented reality will be part of the future.

The talk also does share few examples and types of augmented reality to put up a cleared view towards it. Besides, the talk also does share the connections of augmented reality with the future career. Many skills could be practiced from this new 4.0 industrial revolution such as more creativity and negotiation skills. During the talk, keys and tips on choosing the right career path also being shared during the talk for the betterment of new generations.

INDUSTRY 4.0

9 DIGITAL INDUSTRIAL TECHNOLOGIES

- Autonomous Robots
- Big Data and Analytics
- Augmented Reality
- Additive Manufacturing
- Cloud
- Cybersecurity
- Industrial Internet of Things
- System Integration
- Simulation

10 SKILLS FOR FUTURE JOBS - 4TH IR

In the next 5-10 years, when the AR industry already built and the industries surely needs a lot of employees to work for them. There are 10 skills that are needed for the future jobs in 4th IR. The skills are complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgement and decision making, service orientation, negotiation and cognitive flexibility. These are the most important skills that are required for you to get employed in the future jobs of AR industry.

5 THINGS TO CONSIDER WHEN CHOOSING CAREER

In the future when the 4th IR already successfully built in the world, there are 5 things to consider when choosing your career. First, study data science and get a job in data because in the future a lot of data science graduate will have a high demand in jobs. Second, choose a job that the robots still can't do well such as jobs that require creativity, interact with people on a human level and problem solving. Next, be a data savvy where you learn how to work with data and problem solving. Furthermore, keep in touch with the jobs market to see what job has the high demands and its average salary. Lastly, get familiar with artificial intelligence (AI) because you going to have the advantages to work with robots.

FUTURE OF AUGMENTED REALITY

Augmented reality future are expected revenue by industry by 2025. One of the industry of Augmented Reality that are expected to have a better future in 2025 is video games. Nowadays video games are one of the most attractive things in this era where everything done online. As we can see the esports field is slowly become an attraction more than the normal sports. So in 2025, the Augmented Reality industry of video games will have the highest expected future. Other than that, the industry of AR which is education can be seen has the lowest expected future in AR industry which is \$7 million but still high because students are expected to start studying online and study using AR material. Others AR industry such as healthcare, engineering, live events, video entertainment, real estate, retail and military also has the future expected in 2025.

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In the future, robots are going to take over a lot of the work in the industry where lesser human being going to get employed. However, there 3 key areas where humans can beat machines or robots to future job creation. Firstly, creative endeavors where a person is creative and has the ability to create an original ideas such as from the scientific discovery. Secondly, social interaction where people has the ability to have emotional intelligence where robots don't. Lastly, Physical dexterity and mobility where the robots have the disability that limits the physical function such as swimming, mountain climbing where human have the extraordinary ability of agility and physical abilities.

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ISSUES AND CONTENTS

TYPES OF AUGMENTED REALITY

Marker based AR also known as image recognition. This can be seen where smartphones camera can scan and sense a visual marker such as QR code that produces an AR when be scan. As examples, a chocolate factory paste a QR code on their billboard for people to scan and manage to go to their websites and see the list of products

Projection-based AR can be described as a video projection where it can display, extend and reinforced visual data by showing images on the 3D objects and shapes. This projection-based technique advantages is for better customer or audiences experiences in the performance

Superimposition based AR uses object recognition. As example, IKEA has an application where customer can just click a product and point their smartphones to an angle and view either the product is suitable or not to them. Other than that superimposition based AR also been used in medical such as x-ray to superimpose into patients body.



REFLECTIONS

From the talk, many information and knowledges regarding augmented reality and 4th industrial revolution were gained. The new implementation of augmented reality would create a great impact in the future. Many jobs pathway will be created, and a wise choose of the job is a necessary act that should be taken. From the talk, we could also gain that video games and healthcare aspect would be the highest field getting exposed to this augmented reality. We, the upcoming generation should take initiative in finding the right field of career that focuses more of human's effort that uses skills like creative thinking and more. Being an expert in data related area's is essential in the upcoming days to get hired. As a conclusion, we could gain that augmented reality will be a new piece in the technological world which will enhance human's lifestyle in the future.

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