

**FACULTY OF INFORMATION TECHNOLOGY****CLOUD COMPUTING 600****1st SEMESTER ASSIGNMENT****Name & Surname:** Tawana Kombora**ICAS/ITS No:** 402202621**Qualification:** BSc I.T**Semester:** 1st**Module Name:** Cloud Computing 600**Submission Date:** 31st May 2023

ASSESSMENT CRITERIA	MARK ALLOCATION	EXAMINER MARKS	MODERATOR MARKS
MARKS FOR CONTENT			
QUESTION ONE	60		
QUESTION TWO	30		
TOTAL MARKS	90		
MARKS FOR TECHNICAL ASPECTS			
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LAYOUT AND SPELLING	3		
REFERENCE	5		
TOTAL MARKS	10		
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QUESTION ONE

Question 1.1

- *Cost-Savings:* Saving money is one of the biggest advantages of using cloud computing services. Businesses can avoid the high upfront costs of purchasing + maintaining gear + software by utilizing cloud-based services.
A business that employs a customer relationship management (CRM) system would be an example of cost reduction. Using a cloud-based CRM system they only pay for the resources used as opposed to purchasing + maintaining their own servers.
- *Collaboration:* Cloud computing services can encourage better communication among employees. Employees can access the same files and documents using cloud-based services, making it easier for the teams to collaborate on projects from any location. They might collaborate on code and track changes using a cloud based version control system rather than exchanging files over email.
- *Scalability* is another advantage of cloud computing. Cloud-based services give companies the flexibility to scale up or down in response to variations in demand. A retail company that suddenly finds a spike in online sales over the holiday season would be a use case for scalability. The company might use a cloud-based service to swiftly scale out its infrastructure to match the increased demand rather than investing in more gear and software.
- *Enhanced agility:* Firms can benefit from heightened agility thanks to cloud computing services. Businesses can adopt new technologies and services by utilizing cloud-based services,. An example of improved agility in action would be a startup that needs to create and market a new product quickly. Without the need for costly hardware and software, they could easily design and test their product utilizing cloud-based services.
- *Disaster recovery:* Cloud computing services can give firms better options for disaster recovery. Businesses may easily retrieve their data in the case of a calamity, such as a natural disaster or cyberattack, by storing data on the cloud. A healthcare provider that saves patient records in the cloud would be an example of a use case for disaster recovery. They could easily recover the data in the event of a calamity and go on caring for the patients.

Question 1.2

1. *Data ownership and control:* Problems with data ownership and control show up with cloud computing. Companies must make sure they have complete control over their data and understand how it is being used. A company that employs a cloud-based CRM system would be an example of a use case for data ownership and control. They would have to make sure that the provider is not exploiting the data for their own reasons and that they continue to hold the consumer data. The debate over Facebook's usage of user data for targeted advertising serves as a practical illustration of this.
2. *Issues with availability and performance:* Downtime or poor performance can affect business operations when using cloud computing services. For such occurrences, businesses need to have backup plans in place. An example of a use case for availability and performance problems is an e-commerce company that encounters downtime during busy shopping seasons like Black Friday. To lessen the impact on operations and revenue, the company would need to establish a backup plan.
The AWS outage in 2017—which affected numerous companies, including well-known websites like Netflix and Spotify—is a practical illustration of this.
3. *Issues with compliance and regulation:* Cloud computing can cause problems with compliance and regulation, especially for companies that manage sensitive data. Businesses must make sure that they adhere to all applicable laws and requirements. A healthcare provider that maintains patient data in the cloud would be an example of a use case for compliance and regulatory difficulties. To guarantee the security and privacy of patient data, they would have to adhere to laws like HIPAA.
4. *Security concerns:* One of the biggest problems with cloud computing is the security concerns with keeping data in the cloud. Businesses must be aware of the possibility of data breaches and take the necessary precautions to safeguard their data. An example of a use case for security issues is a financial organization that uses the cloud to store customer data. To safeguard the private financial data, they would need to put in place strong security procedures.
5. *Vendor lock-in:* The potential for vendor lock-in is another issue with cloud computing. Businesses that depend significantly on one cloud provider might find it problematic to transfer to different provider later on. A company that employs a cloud-based platform for all of its apps and data storage would be an example of vendor lock-in.

Question 1.3

In order to help enterprises make sure that their systems can handle rising workloads and demands, capacity planning and scalability are essential ideas in cloud computing.

Estimating the resources needed to support a specific workload is referred to as capacity planning. In the context of cloud computing, it entails evaluating present and upcoming workloads to gain an understanding of the necessary number of computer resources.

The ability of a system to accommodate an increase in workload and demands is referred to as scalability, on the other hand. Scalability in cloud computing is accomplished by dynamically adding or deleting computing resources according to the workload.

This can be carried out automatically with the use of cloud management tools or manually by cloud engineers.

Scalability and capacity planning are principles that assist enterprises in making the best use of cloud computing resources.

Organizations can assure that their systems always perform at peak levels and satisfy the demands of the current world by precisely anticipating capacity needs and having the flexibility to scale up or down as necessary.

Question 1.4

1. **Startups and SMEs:** In cloud computing, they are able to access the technology and resources at a low cost which does not require them to invest in costly hardware or software. They are also given the opportunity to scale up or down as their business grows and evolves through cloud computing.
2. **E-commerce companies:** E-commerce companies can profit from cloud computing because it gives them the adaptability to handle traffic spikes during busy shopping seasons. They can securely manage and store customer data in the cloud thanks to cloud computing.
3. **Healthcare organizations:** By allowing them to safely store and manage patient data in the cloud, cloud computing benefits healthcare organizations. Additionally, cloud computing enables them to access patient data from any location, simplifying collaboration and information sharing between healthcare professionals.
4. **Businesses in the media and entertainment industries** can profit from cloud computing because it enables them to easily store and stream vast amounts of multimedia content. They can efficiently and affordably deliver content to a global audience thanks to cloud computing. AWS is used by media streaming service Netflix to host its content and distribute it to millions of users worldwide.
5. **Financial institutions:** Cloud computing offers financial institutions the ability to securely store and manage huge amounts of sensitive financial data in the cloud, which is a benefit. They can access and analyze financial data in real time thanks to cloud computing, which makes it simpler for them to make defensible decisions.

QUESTION TWO

QUESTION 2.1

Google and Microsoft are two of the world's largest and most powerful technology corporations, each with its own unique business plans and operating systems that have contributed to their expansion and success in their respective sectors.

GOOGLE

Google's business strategy revolves around dominating the online search industry. By providing users with the most relevant and accurate search results, Google attracts more people and increases its advertising revenue. Additionally, Google leverages the vast amount of user data it

has collected to develop new products and services such as Google Maps, Google Drive, and Google Assistant. By expanding its offerings, Google aims to keep users within its ecosystem and maintain its dominance in the search business.

On the other hand, Microsoft's business strategy focuses on providing software and services to both businesses and consumers. They achieve this by offering a wide range of products and services, including operating systems, productivity software, cloud computing services, and gaming. Microsoft's emphasis on research and development enables them to innovate and introduce new products and services to the market. By catering to diverse customers and industries, Microsoft aims to maintain a strong presence in the technology market.

In terms of business models, Google's primary source of revenue comes from advertising.

Users can access their search engine and other products and services for free, while Google monetizes by displaying targeted advertisements based on individual user information. Businesses also pay Google for premium tools and offerings such as Google AdWords and Google Analytics. By leveraging user data, Google can offer highly targeted advertising to companies and generate substantial profits.

MICROSOFT

In contrast, Microsoft's business model relies on software and service sales.

They charge for software products like Microsoft Office and Windows operating systems, which are used by individuals and companies. Additionally, Microsoft provides cloud computing services through Azure, allowing companies to pay for computing resources based on usage. Microsoft's presence in the gaming industry is also significant due to its Xbox game console and associated services. With a wide range of goods and services, Microsoft generates revenue from multiple sources, contributing to a diverse business portfolio.

Several real-world examples highlight the strategies employed by Google and Microsoft. Google's acquisition of YouTube in 2006 enabled the company to expand its product portfolio and enter the video sharing and streaming industry. Today, YouTube is one of the most widely used video platforms worldwide and generates substantial advertising revenue for Google.

Similarly, Microsoft's acquisition of LinkedIn in 2016 allowed the company to diversify its offerings and enter the professional networking sector. Microsoft benefits from a vast user base of professionals and businesses through LinkedIn, which is currently the largest professional networking site globally.

Furthermore, Google's creation of the Android mobile operating system has been instrumental in diversifying its product portfolio. As the most popular mobile operating system in use today, Android generates significant revenue for Google through advertising and app revenues. Similarly, Microsoft's development of the cloud computing platform Azure has enabled the company to expand into the rapidly growing cloud sector. Azure, as one of the largest cloud computing platforms, generates substantial revenue for Microsoft through its usage-based pricing model.

Google and Microsoft have established unique business models and strategies that have allowed them to maintain dominant positions in the technology market. Through continuous innovation and expansion of their product offerings, these companies have remained competitive and adaptable to changing market conditions.

Question 2.2

Security is paramount for businesses utilizing cloud computing services, and there are various security measures that organizations can implement to mitigate cloud security threats. These measures include:

1. **Multi-Factor Authentication (MFA):** MFA requires users to authenticate themselves using multiple methods before accessing cloud services. These methods may include passwords, security tokens, fingerprints, and other forms of verification. MFA adds an extra layer of security and can prevent unauthorized access even if a user's password is compromised. For example, Amazon Web Services (AWS) provides MFA as an additional security measure for accessing its cloud services.
2. **Data encryption:** Data encryption involves encoding data in such a way that it can only be accessed by authorized individuals with a decryption key. This helps protect sensitive data stored in the cloud from unauthorized access. Microsoft Azure, for instance, offers clients the option to encrypt sensitive data at rest and in transit, providing data encryption solutions.
3. **Network segmentation:** Network segmentation involves dividing a network into smaller sub-networks, each with its own set of security controls and regulations. This practice helps mitigate the impact of a security breach and prevents unauthorized access to cloud services. An example of this is the creation of virtual private clouds (VPCs) on the Google Cloud Platform (GCP), which allows users to implement network segmentation features to prevent unauthorized access.
4. **Regular security audits:** Conducting regular security audits helps businesses identify potential vulnerabilities in their cloud applications and infrastructure. This proactive approach aids in preventing security lapses and ensuring compliance with legal requirements. Salesforce, for example, offers regular security assessments to ensure the safety and compliance of client data.

5. Employee education and training: Training employees on cloud security best practices on an ongoing basis helps prevent security breaches resulting from human error. Dropbox, for instance, provides employee education and training programs to prevent security incidents caused by unintentional data leaks or other mistakes.

Organizations can enhance cloud security and safeguard the privacy of their data by implementing security measures such as MFA, data encryption, network segmentation, regular security audits, and employee education and training programs. These measures collectively contribute to reducing cloud security threats and maintaining a secure cloud environment.

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