LONDON
METROPOLITAN
UNIVERSITY

islington college
(इस्लिङ्टन कलेज)

Module Code & Module Title

CC5068NI– Cloud Computing & IoT

Assessment Type

Weekly Assignment

Semester

2021 Spring/Autumn

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Assignment Due Date: 3rd April 2022

Assignment Submission Date: 3rd April 2022

Submitted To: Sugat Man Shakya

Word Count (Where Required):

Week 5

Tutorial

Answer the following questions.

1. What is high availability concept?

   Answer: High availability (HA) is the ability of a system to operate continuously without failing for a designated period. HA works to ensure a system meets an agreed-upon operational performance level. In information technology (IT), a widely held but difficult-to-achieve standard of availability is known as five-nines availability, which means the system or product is available 99.999% of the time.

2. Define Load Balancing & Failover.

   Answer:

   Load balancing is a core networking solution used to distribute traffic across multiple servers in a server farm. Load balancers improve application availability and responsiveness and prevent server overload.

   Failover is a backup operational mode that automatically switches to a standby database, server, or network if the primary system fails, or is shut down for servicing. Failover is an extremely important function for critical systems that require always-on accessibility.

3. What could be the difference between storage and database?

   Answer:

   Storage is a semi organized, generally un-indexed disk location where entire files of data can be saved and stored as one large object. Storage has rough search capabilities but generally is not intended to support detailed queries or data retrieval. Examples: S3 buckets in AWS, shared drives on servers, perhaps to a certain extent file management platforms like SharePoint, etc.

   Databases are structured systems designed to hold individual data elements in referentially sound structures that maintain data integrity, data lineage and support

detailed and aggregated reporting. Files can be stored within databases, but are difficult to then search upon or query upon; instead, the individual key data elements of a file are designed to be extracted and stored separately. Examples are the litany of commercial and Open-source database platforms available today. Oracle, MS Sql Server, DB2, Mysql, Postgres, etc etc.

4. What is scaling? Describe vertical scaling and horizontal scaling?

   Answer:

   In cloud computing, scaling is the process of adding or removing compute, storage, and network services to meet the demands a workload makes for resources to maintain availability and performance as utilization increases.

   While horizontal scaling refers to adding additional nodes, vertical scaling describes adding more power to your current machines. For instance, if your server requires more processing power, vertical scaling will mean upgrading the CPUs. You can also vertically scale the memory, storage, or network speed.

5. What could be the difference between AI and Machine Learning?

   Answer:

   Artificial intelligence is the capability of a computer system to mimic human cognitive functions such as learning and problem-solving. Through AI, a computer system uses math and logic to simulate the reasoning that people use to learn from new information and make decisions.

   Machine learning is an application of AI. It's the process of using mathematical models of data to help a computer learn without direct instruction. This enables a computer system to continue learning and improving on its own, based on experience.

Week 5

Workshop

Answer the following questions:

1. What is Amazon VPC?

Answer:

Amazon Virtual Private Cloud (Amazon VPC) enables you to launch AWS resources into a virtual network that you've defined. This virtual network closely resembles a traditional network that you'd operate in your own data center, with the benefits of using the scalable infrastructure of AWS.

2. Study about Amazon's Route 53.

Answer:

Amazon Route 53 is a highly available and scalable cloud Domain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like www.example.com into the numeric IP addresses like 192.0.2.1 that computers use to connect to each other. Amazon Route 53 is fully compliant with IPv6 as well.

3. Study and write any three-database service of Amazon.
   Answer:
   Amazon Aurora
   Amazon Aurora is a fully managed relational database engine designed specifically for AWS. It is MySQL and PostgreSQL compatible with minor changes to your source database. Aurora includes features for self-healing, fault tolerance, point-in-time recovery, and continuous backup.

Amazon DynamoDB

Amazon DynamoDB is a fully managed, document and key-value database. It includes features for multi-master, multi-region used along with built-in security, automated backup and restoration, and in-memory caching. DynamoDB can provide support for serverless web apps, microservices, and mobile backends.

Amazon DocumentDB

Amazon DocumentDB is a fully managed document database service. It is scalable, highly-available, and compatible with MongoDB. With it, you can store, index, and query JSON files. With DocumentDB, you can scale your compute and storage resources separately for maximum flexibility.

4. What is Cloud Service-Networking & Content Delivery in Amazon?
   Answer:
   AWS networking services allow customers to separate their cloud infrastructure, scale-up workload request and even connect the physical network to personal private virtual networks.
   Amazon CloudFront is a fast content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to customers globally with low latency, high transfer speeds, all within a developer-friendly environment.

5. What are the benefits of Cloud Platform in IoT? Explain any 4.
   Answer:
   - Scalability
     One of the greatest advantages of placing your IoT system in a cloud is that it is very easily scalable. In case of complex on-premise network infrastructures, scaling up requires purchasing more hardware, investing more time and undertaking increased configuration efforts to make it run properly. In a cloud-based Internet of Things system, on the other hand, adding new resources usually boils down to leasing another virtual server or more cloud space which both usually have the extra advantage of being

quickly implemented. Moreover, IoT cloud platform services offer more flexibility in case you want to limit your storage requirements or scale down the number of IoT-enabled devices.

- Data Mobility

  With your data stored and processed in a cloud server, it can be accessed from almost anywhere in the world, which also means that it won't be bound by any infrastructural or networking constraints. Mobility is especially important when it comes to IoT projects involving real-time monitoring and management of connected devices. While data stored in on-site servers can be only acted upon within the company's premises, an advanced Internet of Things cloud platform will give you the tools to provision, manage, and update your devices and sensors and process the acquired data remotely and in real-time.

- Time to market

  With IoT cloud solutions, it usually takes less time and effort to implement them and significantly lowers the overall cost, but this is achieved at the expense of platform customization. While it is true that Internet of Things systems installed on premises can be more easily fitted for the project's purpose, they also involve time-consuming deployment of data management and analysis capabilities and upgrades to the company's existing network structure due to increased data traffic. All in all, cloud based IoT infrastructure turns out to be more profitable when time to market is a crucial business factor.

- Security

  Security issues, which have been a major concern for the IoT world ever since its inception, can be a tough one here. In the cloud platform vs. on-premises IoT infrastructure clash, it's all about responsibility. In case of on-site servers, it lies in the hands of the company, and it only depends on the

security practices within the organisation if the data is kept safe. Therefore, it is quite understandable that some organisations may feel uncomfortable about giving up control over their sensitive data and passing it to an external party.