Final Term Paper (Spring - 2020)

Cloud Computing

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Note: Attempt all Questions. Answers should be in your own words. Plagiarism will not be tolerated, if detected, it will lead to failure.

Question No. 1: (20)

Explain in detail network and cloud-based storage.

Answer:

Cloud based-storage is a model of computer data storage in which the digital data is stored in logical pools. The physical storage spans multiple servers (sometimes in multiple locations), and the physical environment is typically owned and managed by a hosting company

How Does Cloud Storage Work?

Cloud storage involves at least one data server that a user connects to via the internet. The user sends files manually or in an automated fashion over the Internet to the data server which forwards the information to multiple servers. The stored data is then accessible through a web-based interface.

Cloud storage systems involve vast numbers of data servers to ensure their availability. That way, if one server requires maintenance or fails, the user can rest assured that the data has been replicated elsewhere to ensure availability. For example, the Amazon AWS Cloud spans 55 availability zones in 18 geographic regions at the present time.

While the data in a public cloud is replicated in different physical locations for fault tolerance and disaster recovery purposes, the primary or local location tends to be nearer physically to the company's facility using it so the data can be processed faster and at lower costs then, say choosing a primary location halfway around the globe.

Cloud storage management trends continue to unfold with more companies extending out to the cloud. Public clouds are managed by public cloud service providers. Their infrastructure and services include:

- Servers

- Storage

- Networking

- Data center operations

Cloud data storage resources can be provisioned in the following ways:

By end users using a web interface that are paying for capacity on a per-transaction basis

By users who specify pre-determined capacity which is prepared in advance of the service. The customer then pays for the service monthly or pays a flat fee.

By the service provider which allocates resources dynamically as needed. Payment is on a pay-per-use basis.

As noted above, pricing can vary, and it can depend on a number of factors including the service provider, capacity required, length of time required, etc.

Types of cloud storage

1. Personal Cloud Storage: Also known as mobile cloud storage, personal cloud storage is a subset of public cloud storage that applies to storing an individual's data in the cloud and providing the individual with access to the data from anywhere. It also provides data syncing and sharing capabilities across multiple devices. Apple's iCloud is an example of personal cloud storage.

2. Public Cloud Storage: Public cloud storage is where the enterprise and storage service provider are separate and there aren't any cloud resources stored in the enterprise's data center. The cloud storage provider fully manages the enterprise's public cloud storage.

3. Private Cloud Storage: A form of cloud storage where the enterprise and cloud storage provider are integrated in the enterprise's data center. In private cloud storage, the storage provider has infrastructure in the enterprise's data center that is typically managed by the storage provider. Private cloud storage helps resolve the potential for security and performance concerns while still offering the advantages of cloud storage.

4. Hybrid Cloud Storage: Hybrid cloud storage is a combination of public and private cloud storage where some critical data resides in the enterprise's private cloud while other data is stored and accessible from a public cloud storage provid

Advantages of Cloud Storage

Cost Purchasing physical storage can be expensive. Without the need for hardware cloud storage is exceptionally cheaper per GB than using external drives.

Accessibility
Using the cloud for storage gives you access to your files from anywhere that has an internet connection.

Recovery
In the event of a hard drive failure or other hardware malfunction, you can access your files on the cloud. It acts as a backup solution for your local storage on physical drives.

Syncing and Updating
When you are working with cloud storage, every time you make changes to a file it will be synced and updated across all of your devices that you access the cloud from.

Security
Cloud storage providers add additional layers of security to their services. Since there are many people with files stored on the cloud, these providers go to added lengths to make sure your files don't get accessed by someone who shouldn't

Disadvantages of Cloud Storage

Internet Connection
Cloud based storage is dependent on having an internet connection. If you are on a slow network you may have issues accessing your storage. In the event you find yourself somewhere without internet, you won't be able to access your files.

Costs
There are additional costs for uploading and downloading files from the cloud. These can quickly add up if you are trying to access lots of files often.

Hard Drives

Cloud storage is supposed to eliminate our dependency on hard drives right? Well some business cloud storage providers require physical hard drives as well.

Support

Support for cloud storage isn't the best, especially if you are using a free version of a cloud provider. Many providers refer you to a knowledge base or FAQs.

Privacy

When you use a cloud provider, your data is no longer on your physical storage. So who is responsible for making sure that data is secure? That's a gray area that is still being figured out.

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Question No. 2: (20)

a) Explain in detail web application and multitenant technology.

Answer:

Web Application:

A web application is computer program that utilizes web browser and web technologyto perform tasks over internet.

How web application works:

Web applications are usually coded in browser-supported language such as JavaScript and HTML as these languages rely on the browser to render the program executable. Some of the applications are dynamic, requiring server-side processing. Others are completely static with no processing required at the server.

The web application requires a web server to manage requests from the client, an application server to perform the tasks requested, and, sometimes, a database to store the information. Application server technology ranges from ASP.NET, ASP and ColdFusion, to PHP and JSP.

Example of a web application

Web applications include online forms, shopping carts, word processors, spreadsheets, video and photo editing, file conversion, file scanning, and email programs such as Gmail, Yahoo and AOL. Popular applications include Google Apps and Microsoft 365.

Multitenant technology:

The term "software multi tenancy" refers to a software architecture in which a single instance of software runs on a server and serves multiple tenants. ... A tenant is a group of users who share a common access with specific privileges to the software instance.

Importance of multitenant

Multi-tenancy has seen a lot of could adoption and is used most with cloud computing. Multi-tenant architectures are found in both public cloud and private cloud environments, allowing each tenant's data to be separated from each other. For example, in a multi-tenant public cloud, the same servers will be used in a hosted environment to host multiple users. Each user is given a separate and ideally secure space within those servers to store data.

Multi-tenancy is also important for the scalability of public and private clouds, and has helped make multi-tenancy a standard. The multi-tenant architecture can also aid in providing a better ROI for organizations, as well as quickening the pace of maintenance and updates for tenants.

Examples

In cloud computing, the meaning of multi-tenant architecture has broadened because of new service models that take advantage of virtualization and remote access. A software-as-a-service (SaaS) provider, for example, can run one instance of its application on one instance of a database and provide web access to multiple customers. In such a scenario, each tenant's data is isolated and remains invisible to other tenants. Multi-tenancy can also be implemented in multi-tier systems such as an SAP system.

b) Explain in detail cloud security threats.

Answer:

 Threats in cloud security:

Database breaches: the risk of data breach is not unique to cloud computing, but it consistently ranks as a top concern for cloud customers**.**

Human error: according to Jay Hisser, research vice president at Gartner, "Through 2020. 95% of cloud security failures will be the customer's fault.

Data loss with no backup: an accident or catastrophe can lead to the permanent loss of customer data unless there are measures in place to backup that data.

DDoS attacks: distributed denial-of-service attacks pose significant risks to cloud customers and provide, including lengthy service outages, reputational damage, and exposure of customer data.

Spectre and meltdown: Attackers can exploit Meltdown to view data on virtual servers hosted on the same hardware, potentially disastrous for cloud computing hosts. Spectre is even worse— harder to exploit, but harder to fix too.

Question No. 3:   (10)

Briefly describe following.

a. Advantages and disadvantages of cloud computing

b. Collaborative meeting in cloud.

Answer:

Advantages of cloud computing:

Backup and restore data: once data is stored in the cloud, it is easier to get back-up and restore that data using the cloud

Improved collaboration: cloud applications improve collaboration by allowing groups of people quickly and easily share information in the whole world, using an internet connection. An internet cloud infrastructure increases organization productivity and efficiency by ensuring that our data is always accessible.

Excellent accessibility: Cloud allows us to quickly and easily access store information anywhere, anytime in the whole world, using an internet

connection. An internet cloud infrastructure increases organization productivity and efficiency by ensuring that our data is always accessible

Low maintenance: Cloud computing reduces both hardware and software maintenance costs for organizations.

Mobility: Cloud computing allows us to easily access all cloud data via mobile.

IServices storage in the pay-per-use model: Cloud computing offers Application Programming Interfaces (APIs) to the users for access services on the cloud and pays the charges as per the usage of service.

Unlimited storage capacity: Cloud offers us a huge amount of storing capacity for storing our important data such as documents, images, audio, video, etc. in one place.

Data security: Data security is one of the biggest advantages of cloud computing. Cloud offers many advanced features related to security and ensures that data is securely stored and handled.

Disadvantages of Cloud Computing

A list of the disadvantage of cloud computing is given below.

1) Internet Connectivity: As you know, in cloud computing, every data (image, audio, video, etc.) is stored on the cloud, and we access these data through the cloud by using the internet connection. If you do not have good internet connectivity, you cannot access these data. However, we have no any other way to access data from the cloud.

2) Vendor lock-in: Vendor lock-in is the biggest disadvantage of cloud computing. Organizations may face problems when transferring their services from one vendor to another. As different vendors provide different platforms, that can cause difficulty moving from one cloud to another.

3) Limited Control: As we know, cloud infrastructure is completely owned, managed, and monitored by the service provider, so the cloud users have less control over the function and execution of services within a cloud infrastructure.

4) Security: Although cloud service providers implement the best security standards to store important information. But, before adopting cloud technology, you should be aware that you will be sending all your organization's sensitive information to a third party, i.e., a cloud computing

service provider. While sending the data on the cloud, there may be a chance that your organization's information is hacked by Hackers.

Collaborative meeting in cloud.

Is a powerful collaboration application with a full of audio, video, and meeting tools in a persisting space

- Includes everything for online meetings

- Messaging

- Integrated file sharing

- White boarding

- Annotation

- Meeting minutes

- Scheduling

    And more….

- Includes the ability to make calls to landlines and mobile phones, which can be bridged to other COLLABORATE space participants.

- Users can create searchable, persistent private and public channels, organized by topic, which can include messages, documents, whiteboards, session recordings, and more.

- Include a simple and friendly interface that's intuitive and simple to use.

- It runs on any device

- Mobile, Desktop and all Clear One COLLABORATE Live room systems.