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PART - A

1. Cloud computing :

In cloud computing, the client does not have to buy the resources and manage them. Instead, the provider provides the resources as a Service which is much cheaper.

Essential characteristics :

- * On demand self services
- * Resource pooling
- * Measured service

2. Infrastructure as a Service (IaaS): resources

- * Virtual machines
- * In memory (RAM) storage
- * Disk storage
- * Network devices

3. Resource consolidation and Virtualization :

- * It reduces network traffic.
- * It allocates resources more efficiently
- * Reduces maintenance costs
- * Scaling of applications is easier

4. Hypervisor :

It is a virtualization software used to divide and allocate the resources on various pieces of hardware.

- * It separates the host hardware from the guest user
- * Resources are divided efficiently.
- * Allows for multiple guest OSes

5. Core components of cloud computing:

- * Cloud Infrastructure
- * Storage
- * Security
- * Management
- * Internet
- * Application
- * Client Infrastructure

6. Public cloud challenges:

- * Controlling Costs
- * Data privacy and security
- * Resource protection
- * Compliance

7. Private cloud challenges

- * Huge investment
- * IT reluctance

7. Microsoft Azure Security services

- * Azure Active Directory
- * Azure Key vault vault
- * Azure Security center

8. Solution for data security:

- * Adequate use of encryption
- * Attribute - Based encryption
- * Anonymization of data

9. Cloud Migration Factors :

- * Business goals
- * Security
- * Compliance
- * Cost and ROI
- * Disaster Recovery

10. Workload Migration can be time consuming:

Executing a cloud strategy can be time consuming. And ~~more~~ many applications have to be modernized to get them migrated which again consumes time and money.

PART-B

11. a) i) Cloud computing deployment model:

1. Public cloud:

The public cloud makes it possible for anybody to access systems and services. The public cloud may be less secure as it is open for everyone.

But it is cheap and efficient.

- * The infrastructure is provided over the internet.

- * It is not owned by the client but by the provider

- * Easy access to systems and services

- * Minimal investment, No setup cost, No maintenance.

2. Private cloud:

The private cloud deployment is the opposite of public cloud deployment model. It is a one-on-one environment for a single user (customer).

There is no need to share hardware with anyone else.

- * Better control over resources
- * Data Security and Privacy
- * Sugg Supports Legacy System
- * Customization

3. Hybrid cloud:

By using both public and private cloud with a layer of proprietary software, hybrid clouds is created. Secure components can be hosted on Private cloud.

- * Flexibility and control
- * Cost is low
- * Security is high

11. a) ii) Web conferencing services :

As this is a service provided by another provider, it comes under public cloud software as a service (SaaS)

SaaS is a cloud computing offering that provides users ~~do not~~ with access to a vendor's

cloud-based software. Users install application on their local devices. Instead, the application reside on a remote cloud network accessed through the web ~~or API~~ or API.

- * Software is maintained by the vendor.

- * Infrastructure is set up by the vendor

- * Software access through client-side application

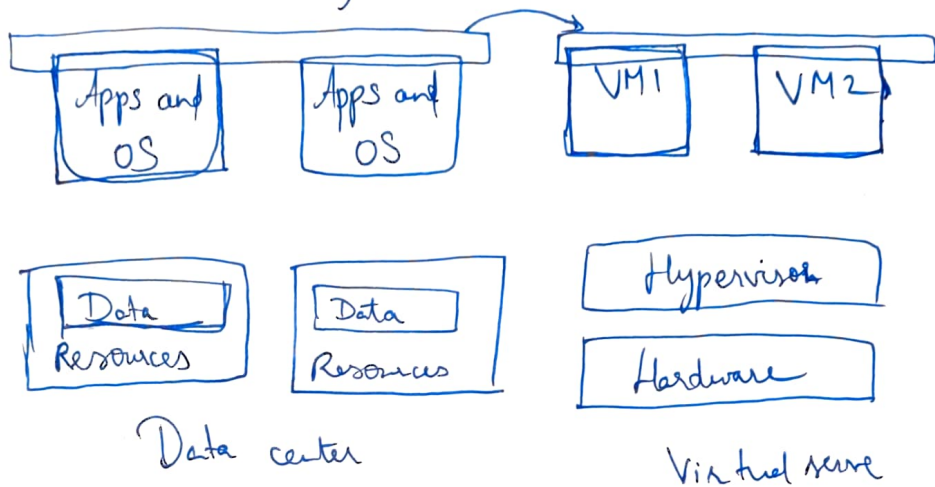
- * Problems are managed by the vendor.

12. b) i) Virtual Machine Migration Techniques :

* Physical system to Virtual Machine

* Copy all data from physical disk to virtual disk

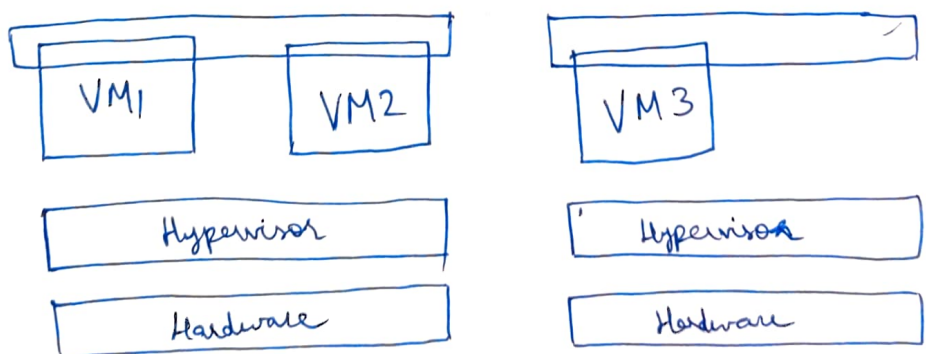
* This is actually conversion.



* Virtual to Virtual

* Migration of all data from one VM to another

* Change of resources



12. b) ii) Bare Metal Hypervisor vs Hosted Hypervisor:

Bare metal Hypervisor is different from hosted hypervisor as it runs directly on the host hardware whereas Hosted hypervisor runs on a Host Operating System.

- * Bare metal hypervisor has direct access to resources.

- * Bare metal hypervisor is more efficient than Hosted.

- * As bare metal allows direct access, there is a chance for security problems.

- * More scalability in Bare metal.

- * Has special software to deploy and manage.

13. b) i)

Public cloud

Private Cloud

- | | |
|----------------------------|---------------------------|
| * Shared resources | * Personal resources |
| * Low security | * High security |
| * No maintenance cost | * High maintenance cost |
| * Low complexity | * High complexity |
| * No need to buy resources | * Have to buy resources |
| * Agile for innovation | * Efficient |
| * Minimal control | * Full control |
| * Easy scaling | * Limiting infrastructure |

13 b) ii) Private cloud deployment steps:

- * Select optimal Hardware setup
- * Install Management Software
- * Install Management Software Controller
- * Create VM Templates
- * Create, License and Test VM

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Private cloud Merits:

- * High customization
- * High security
- * Legacy systems

Private cloud Demerits

- * Infrastructure cost
- * High Maintenance
- * Low scalability.

14. b) i) Security concerns of traditional IT:

A traditional IT framework involves purchasing, installing and maintaining your IT device on-site. For many years, the traditional IT framework has been used by business to ~~collect~~ collect, store and process data for various function.

Furthermore, more security devices have to be allocated to manage network and data.

But traditional culture also allows for more control over resources. But this ~~as~~ also means more maintenance over legacy resources. And ~~so~~ scaling ~~is~~ is also hard as technology keeps increasing and modernization is required.

14. b)ii) Risk evaluation in Cloud computing model.

Risk evaluation in cloud computing can be done on the following conditions :

- * Data Security
- * Damage Recovery
- * ~~As~~ Availability
- * Consistency
- * Integrity

- Data Security is the most important in selection of Public, Private or Hybrid cloud deployment model.
- Maintenance and Damage recovery are very important
- Availability of the Application and server
- Consistency of the user interface and data transfer.
- Integrity of the data.

15. a) Cloud deployment model based on situation:

a) For Startups to grow fast instantly: Public Cloud.

As public Cloud is cheap and easy to use, it is the first choice of startups. And as maintenance is low, the Startup can focus on development and Deployment.

b) For periodic processing at certain periods of time:

~~Private Cloud~~ Public Cloud

As these processes occur at certain periods of time, these processes can use resources only when required. As public cloud is a 'pay as you use' model, the cost will only be the time used, which is cheaper than personal resources.

c) For predefined burst-event which demands high Utilization:

Public Cloud:

You will only be charged for what you use and as it is only burst-event, scalability is most important.

d) Unpredictable utilization by users :

Hybrid Cloud

As the utilization is ~~type~~ unpredictable, the private ~~cloud~~ cloud can be used to store important information like user data, while the scalability part can be taken care by the public cloud.

e) Storing sensitive data :

Private Cloud

Private cloud offers high security, so it is the most suitable for sensitive data.