Cloud Computing

Assignment - 1

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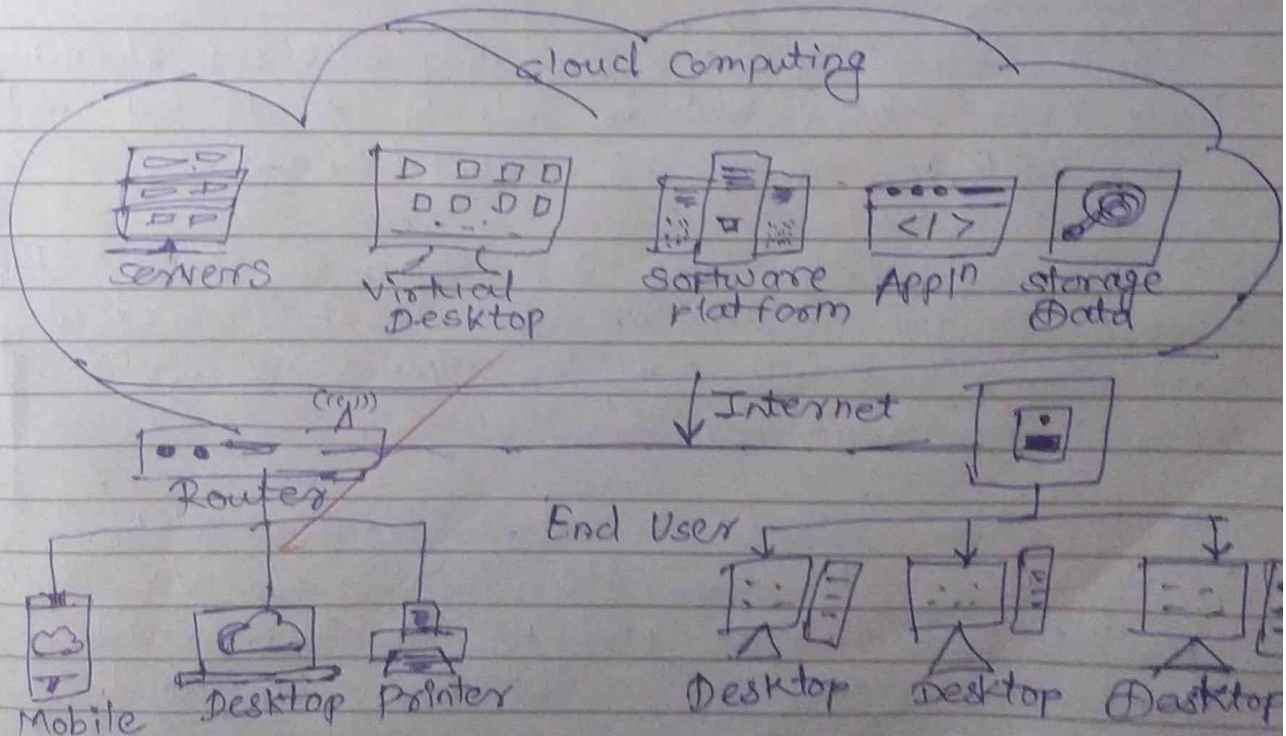
Sub : Cloud Computing.

Q.1 What is cloud computing? What are characteristics of cloud computing?

Ans:⇒ Cloud computing in which Datacenters hardware & system software's provides the application service over the internet.

Cloud computing provides the on demand services to the organizations that include software, platform and infrastructure as a service to its users.

* Cloud Computing Architecture :



* Advantages of ~~Cryptography~~ cloud computing.
  i) Cost proficient
  ii) More secure
  iii) More flexible
  iv) Infinite storage
  v) Backup & recovery.
  vi) Location independent.

* Characteristics of Cloud computing:
  There are basically 5 essential characteristics:

① On-demand self-services:
  The cloud computing services does not require any human administrators, user themselves are able to provision, monitor & manage computing resources as needed.

② Broad network access: The computing services are generally provided over standard networks and heterogeneous devices.

③ Rapid elasticity: The computing services should have IT resources that are able to scale out and in quickly and on as needed basis.

④ Resource pooling: The IT resource (eg. networks, servers, storage, applications, and services) present are shared across multiple applications and occupant in an uncommited manner.

⑤ Measured Service: The resource utilization is tracked for each application and occupant, it will provide both the user and the resource provider with an account of what has been used.

Q.2 What are three types of service model in cloud and among them which service model is best in cloud computing?

Ans: Below are the three types of service model in cloud.

① Infrastructure as a Service (IaaS) :-

In the Iaas model, the cloud provider supplies the customer with a customized infrastructure on which they can run any os. or applications. It's the most flexible of the three cloud computing service model

→ Iaas is a self-service model for managing remote data center infrastructure. Iaas provides virtualized computing resources over the internet hosted by third party like azure, AWS, g.cloud.

→ Instead of an organization purchasing hardware, Companies purchase Iaas based on consumption model It like buying electricity. You can only pay for what you use.

* Advantages:

① cost-Effective:

② Websitehosting - Running websites using IaaS can be less expensive than traditional web hosting.

③ Security - The IaaS cloud provider may provide better security than your existing software.

④ Maintenance.

2] Software as a service (SaaS):

SaaS replaces the traditional on-device software with software that is licensed on a subscription basis. It

→ It centrally hosted in the cloud.

→ A good ex: is salesforce.com.

→ Most SaaS applications can be accessed directly from a web browser without any downloads or installations required. However, some SaaS appl'n's required plugins.

Advt.: ① cost-effective:- Pay only for what you use.
2) Reduce time - no need to download & install any s/w.
3) Accessibility - We can access app data from anywhere.
4) Auto. updates -
Ex — Salesforce, MS office 365, dropbox, cloudtron.

3] Platform as a Service (PaaS)

PaaS provides a platform and environment to allow developers to build applications and services over the internet.

→ Allows org'n to build, run and manage appl'n without the IT infrastructure. This makes it easier and faster to develop, test & deploy applications.

→ Developers can focus on writing code and create applications without worrying about time-consuming IT infrastructure activities such provisioning servers, storage & backup.

Advt — Ex- salesforce, windows azure, google appengine, cloud bees

① simple & convenient for user - It provides much of the infrastructure & other IT services, which users can access anywhere via a web browser.
2) Cost-effective.
3) Efficiently managing the lifecycle - It is designed to support the complete web appl'n lifecycle: building, testing, deploying, managing & updating.

All services are good, but my point of view,

Among the above three cloud services (Iaas) & Infrastructure as a Service being the most flexible of cloud models gives the best option when it comes to IT hardware

IaaS is right option if you need control over the hardware infrastructure such as managing and customizing according to your requirements.

Whether you are running a startup or a large enterprise, IaaS gives access to computing resources without the need to invest in them seperately.

Q.3] Before going for cloud computing platform what are the essential things to be taken in Concern by users?

following are the essential things that must be followed before going for the cloud computing platform.

① A cloud service platform will take care of Regularly Compilance:

Means your business processes running on cloud-based system are compliant with the standards which your customers require. If your cloud service platform is taking care of the regulatory requirements of many of your existing businesses, then you better need not worry about staying up-to-date with brand-new rules & regulations constantly affecting your bus^{n} dat

2) A cloud Platform is Adaptable with your Infrastructure Requirements:

Infrastructure requirements can be defined as your list of various data types or

business hardware & S/W to enable cc benefits in real-time.

3) A cloud platform will favor SLAs.
SLA ie. service-level-Agreements of cc sincerely a relationship b/w a user (which is you) & a cloud service provider.

4) A cloud service provider should offer Diff^n types of cloud services.
There are three types of cloud services are ① Iaas 2) Paas 3) Saas.
You need to analyze to well your business requirements and then, consult a cloud-service provider to receive soln related to deploy.

5) A cloud service platform must provide recommended security measures.
Recommended security measures let you handle all your concerns of business data and networking principles establishing shareable & resourceful connections among different users.

6) A cloud service platform won't Refuse to Customer Support.
Support will help you get what your business demands simply and quickly.
Typically, the support will ensure that the quality of service, as well as the remedies doing wonders at time of performance failures.

7) A CSP is Presentable with Flexibility in the Pricing plans.
Pricing structure for cloud computing services varies greatly. Here, you should understand that any of the pricing plan you are choosing is matching with your business model, networks, HW requirements.

Q.4] What are advantages of cloud-based storage.

① Cost Proficient - purchasing physical storage can be expensive. without the need for hardware cloud storage is exceptionally cheaper per GB than using external drives.

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

3) Recovery - In the event of a hard drive failure or other hardware malfunction, you can access your files on the cloud.
- It act as backup.

4) Syncing & updating: when you working with cloud storage, every time you make changes to a file it will be synced & updated across all of your devices that you access the cloud from.

5) Security:
cloud storage providers add additional laye of security to their services.

* Disadvantages -
1) Internet Connection
2) Hard drives required sometimes
3) Support - isn't best, especially if you're using free version of a cloud provider.
4) Privacy.

Q.5] What are seven steps involved in cloud migration.

① Conduct cloud Migration Assessments.
Migration starts with an assessment of the issues relating to migration, at the application, code, design and architecture levels.

2) Isolates the dependencies.
These include library, appl^n, and architectural dependencies. This step results in a better understanding of the complexity of the migration.

3) Map the messaging & Environment -
A mapping construct is generated to segregate the components that should reside in the Captive data center from the ones that will go into the cloud.

4) Re-architect & Impl^m the lost functionality:
It is a likely that a substantial part of the application has to be re-architected and implemented in the cloud. This can affect the functionalities of the application and some of these might be lost.

5] Leverage cloud functionalities & features or agument:
The features of cloud computing service are used to aygment the application.

6] Test the migration: Once the agumentation is done the application needs to be validated and tested. This is to be done using a test suite for the application on the cloud.

7] Iterate & optimize: The test results from the last step can be mixed and so require Iteration & optimization. It make take several optimizing Iterations for the migration to be successful.

Q.5] What is cloud computing & it's advantages and disadvantages.

Cloud computing is a term reffered to storing and accessing data over the internet. It does not store data on the hard disk of your personal computer. In CC you can access data from a remote server.

* Advantages:

1) cost efficiency
2) High speed.
3) Excellent accessibility
4) Back-up and restore data.
5) Manageability
6) Easy implementation
7) No hardware required.
8) Mobility (remote server).

* Disadvantages:

1) Vulnerability to attack:
2) Network connectivity dependency.
3) Downtime
4) Vendor loc-in ⇒ when in need to migrate from one cloud platform to another, a company might face some serious challenges bc of the diff^{n} b/w vendor platforms.
5) Limited control -
6) May not get all the features.
7) Lacks support.
8) Technical issues.

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Assignment - 2.

Q.1) What are different deployment models in cloud computing explain with example ?

Ans: The cloud deployment model identifies the specific type of cloud environment based on ownership, scale, and access, as well as the cloud's nature & purpose.

→ The location of the servers you're utilizing and who controls them are defined by a cloud deployement model.

* diff. types.

1) Public cloud:
2) private cloud
3) Hybrid cloud
4) Community cloud
5) Multi-cloud.

1) Public cloud :- It makes it possible for anybod to access systems and services.
→ Less secure, as it is open for everyone.
→ It is a type of cloud hosting that allows customers and users to easily access systems and services.
→ Ex- Google App Engine etc.

* Adv.
1) Minimal Investment — Bz it pay-per-use-service
2) No setup cost — no need to set up any hardware.
3) Infrastructure Mgmt is not required.
4) No maintenance
5) Dynamic scalability:

2) Private cloud:
→ It exact opposite to the public cloud deployment.
→ Gives the greater flexibility of control over cloud resources.
→ There is no need to share your hardware with anyone else.
Adv:
① Better Control – you are sole owner of the property.
2) Data security & Privacy
3) Support legacy systems – unable to access the public cloud.
4) Customization.

3] Hybrid cloud:
→ By bridging the public & private worlds with a layer of proprietary s/w, hybrid cloud computing gives the best of both worlds.
→ Here, you may host the app in a safe env. while taking advantage of the public cloud's cost savings.
Adv.
1) flexibility & control ② cost ③ security

4] Community cloud:
→ It allows system & services to be accessible by a group of org^n.
→ It is distributed system
→ It is generally managed by a third party or by the combination of one or more org^n in the Community.
Adv: 1) Cost effective 2) security 3) shared resources 4) collaboration & data sharing.

5] Multi-cloud: It similar to Hybrid cloud, instead of merging private & public cloud, it uses many public clouds.
→ It improves the high availability of your services even more.
Adv. – 1) Reduce latency 2) High availability of service 3)

Q.3] What is Direct Attached Storage (DAS)? Draw its diagram & state benefits of DAS.

Ans. — DAS is a storage that is connected directly to a computer such as PC or server & without going through a network.

or As opposite to storage that is associated to computer over a network.

— The imp feature of all DAS is that it is measured by a single computer to which is attached.

* Diagram.

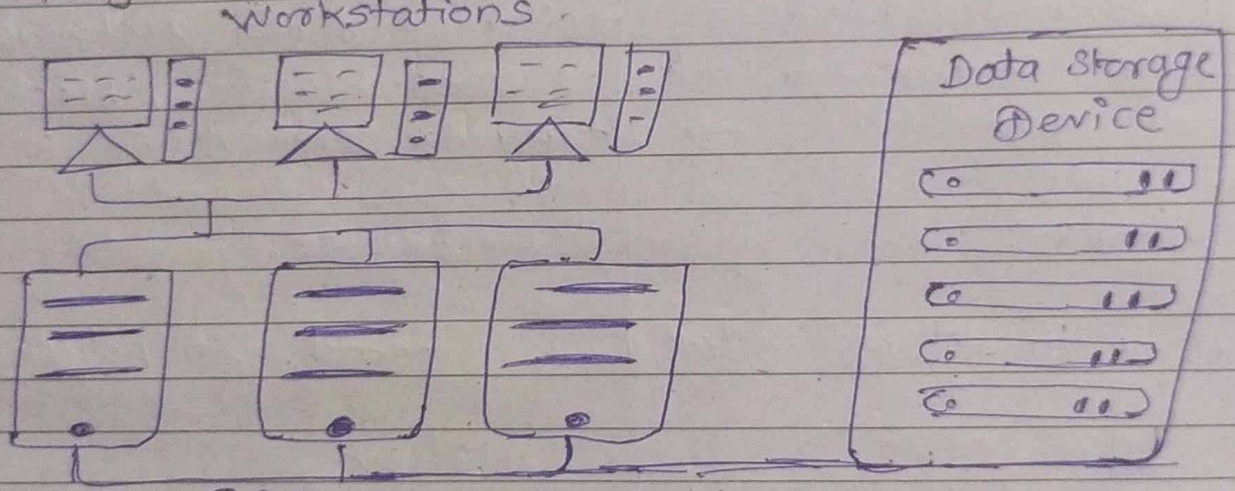


fig: ~~Dist~~ Direct-Attached Storage (DAS)

→ DAS is closely associated to the computing devices it servers, rather than use the more indirect new conn?

* Benefits:

① High Performance: DAS proposals fast access to data bz it is attached to the comp that usually needs it.

2) Easy to setup & configure: Computer systems are freqeuntly supplied with internal DAS which is already to use instantly.

3) Low cost - DAS contain only of the storage device itself, plus any drive inclusion.

4) Data storage capacity expansion.

5) Greater data security

* Disadvantages of DAS. (Drawbacks).

1) limited scalability

2) poor performance possible when data needs to be shared.

Diff^n. b/w DAS & SAN.

Sr.	DAS	SAN
1)	Direct attached storage	Storage Area Network.
2	Uses sector for backup & recovery	→ uses block by block copying technique.
3	Simple	Complex.
4	easy to setup & install	~~hard~~ slightly difficult
5	Low cost.	higher
6)	Capacity only 109 bytes	1012 bytes.

Q.9] How does Google file system (GFS) differ from Hadoop Distributed file system (HDFS)?

Properties	GFS	HDFS
Design goals	① The main goal of GFS is support large files	—
Processes (Nodes)	② Master & chunk server	Name node & Data node
File mgmt	③ is exclusively for google only	support third party file syst such as Amazon, cloudstore.
	④ Developed in C, C++ environment	in Java env
	⑤ Network stack issue occured	No.
	⑥ → work on linux.	work on cross-platform
	⑦ random file write possible	only append is possible.
Implemented by	→ google	→ Yahoo, fb, IBM.

Q.10] Explain briefly the security concern of cloud computing?

① Data loss - It is also known as data leakage. In cc, data loss occurs when ens sensitive data is somebody else's hands, one or more data elem can not be utilized by data owner, hard disk is not working properly, & s/w is not updated.

② Hacked Interfaces & Insecure APIs - cc is completely depends on Internet, so if is ... to protect interfaced & APIs

that are used by external users.

3) Data Breach — Is the process in which the confidential data is viewed, accessed or stolen by the third party without any authorization.
→ org^n's data is hacked by hackers.

4) Vendor lock-in ⇒ org^n may face problems when transfering their services from one vendor to another.

5) Denial of Service (DoS) attacks: It occurs when system receives too much traffic to buffer the server.

6) Account hijacking ⇒ It is the process in which individual user's or org^n cloud account (bank account, email, social media A/c) is stolen by hackers.

Unit-3.

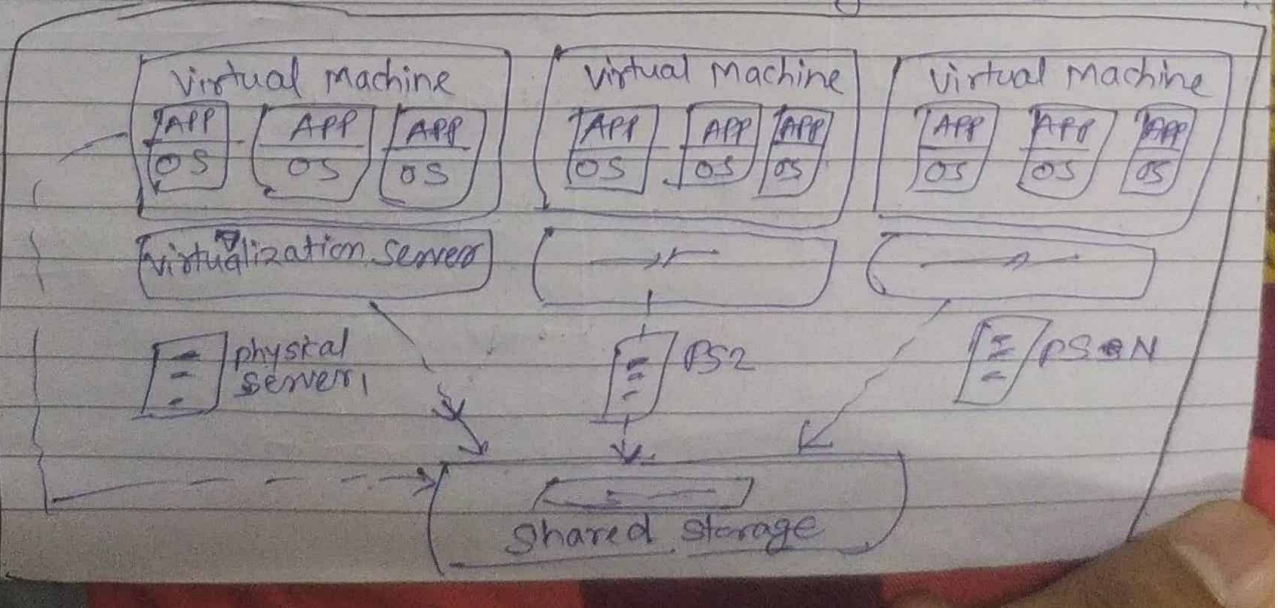
Q.13) What is virtualization & what are its benefits?

Defⁿ — create a software-based or virtual representation of applications, servers, storage and network to reduce IT expenses while boosting efficiency and ~~ability~~ agility.

→ ~~Creation~~ Virtualization is a technique, which allows to share a single physical instance of a resource or an application among multiple customers and organizations.

* There are below types.

1) Hardware virtualization – When the virtual machine sfw or virtual machine manager (VMM) is directly installed on the hardware system is known as hardware virtualization.
2) Operating System Virtualization – VMM is installed on the Host operating system instead of hardware
3) Server Virtualization – VMM is directly installed on the server system.
4) Storage → It is a process of grouping the physical storage from multiple storage devices so that it looks like a single storage device.



* Benefits of virtualization.

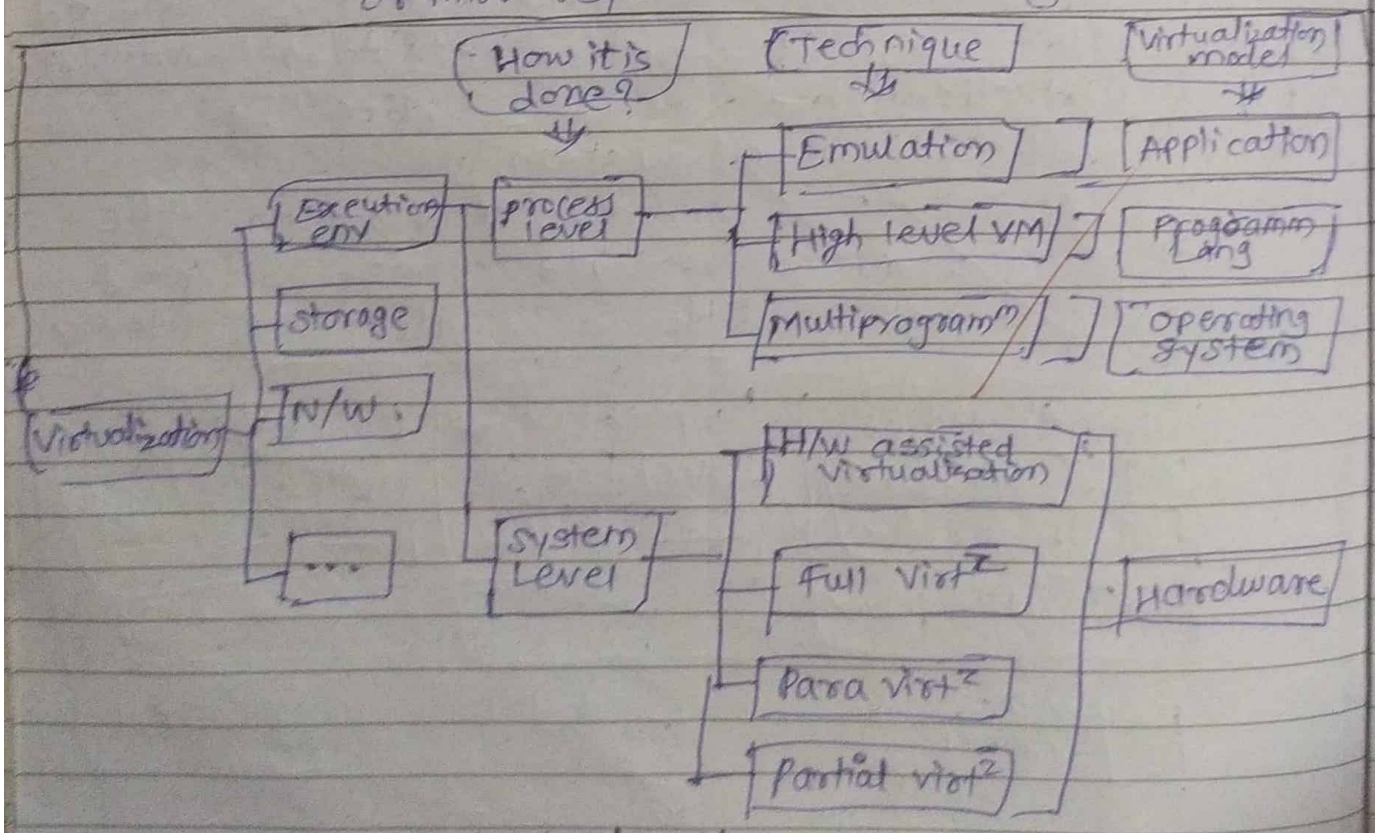
1) More flexible & efficient allocation of resources
2) Enhance development productivity
3) It lowers the cost of IT infrastructure.
4) Remote access & rapid scalability.
5) High availability & disaster recovery.
6) Pay peruse of the IT infrastructure on demand.
7) Enables running multiple operating systems.

Q.14) Explain classification or taxonomy of Virtualization at different levels.

Virtualization is mainly used to emulate the execution environment, storage, & networks.

→ The execution env. classified into two types.

1) Process level — Implemented on top of an existing OS.
2) System level — directly on hardware & doesn't require any min requirements of existing OS.



Virtualization.

* process virtual Machine ⇒ also known as Appl^n.VM
→ operates as a regular program within a host OS and supports a single process.

* System virtual Machine ⇒ such as virtual Box, offers a full system platform that allows the operation of a whole operating system.

* virtual Machine - are used to distribute & designate suitable system resources to S/W (which might be several OS or an appl^n) and the software is restricted to the resource provided by the VM.

ex. (1) Java VM & common Language Runtime are two popular examples of process VMs that are used to virtualize the Java programm. lang & the .NET framework program. env, respectively.

(Q.15) Types of virtualization.

(1) Application virt. :- helps a user to have remote access of an appl^n from a server.
→ server stores all personal info and other char. of the appl^n but can still run on a local workstation through the Internet.
→ ex. a user who needs to run two diff versions of the same software.

(2) Network virt^z : The ability to run multiple virtual n/w with each has a seperate control data plan.

3) Desktop virt^z ⇒ allows user's OS to be remotely used stored on a server in the data centre.

It allows user to access their desktop virtually, from any location by a diff. machine

4) Storage virt^z ⇒ is an array of servers that are managed by virtual storage system. It

5) server virt^I ⇒ This a kind of virt^z in which masking of server resources take place. Here physical servers divided into multiple diff virtual servers by changing the identity no., processors. So each one can operates its own OS.

6) Data virt^z ⇒ In which data is collected from various sources and managed that at a single place without knowing more about the technical information like how data is collected, stored & etc.

Q.18) Difference btw Para & full virt^z,

Full Virtualization	Para. virt^z.
1) virtualization is less secure	→ more secure than full.
2) uses binary translation & a direct approach as a technique for operations	→ uses hypercalls at Compile time for operations.
3) is slow than para in operation.	is faster.
4) are more portable & Compatible	Less portable & compatible
5) Ex. Microsoft & Parallels systems	ex. Microsoft Hyper-V, Citrix Xen, etc.
6) less streamlined compared to para	more streamlined.
7) provide the best isolation	→ possible. less isolation

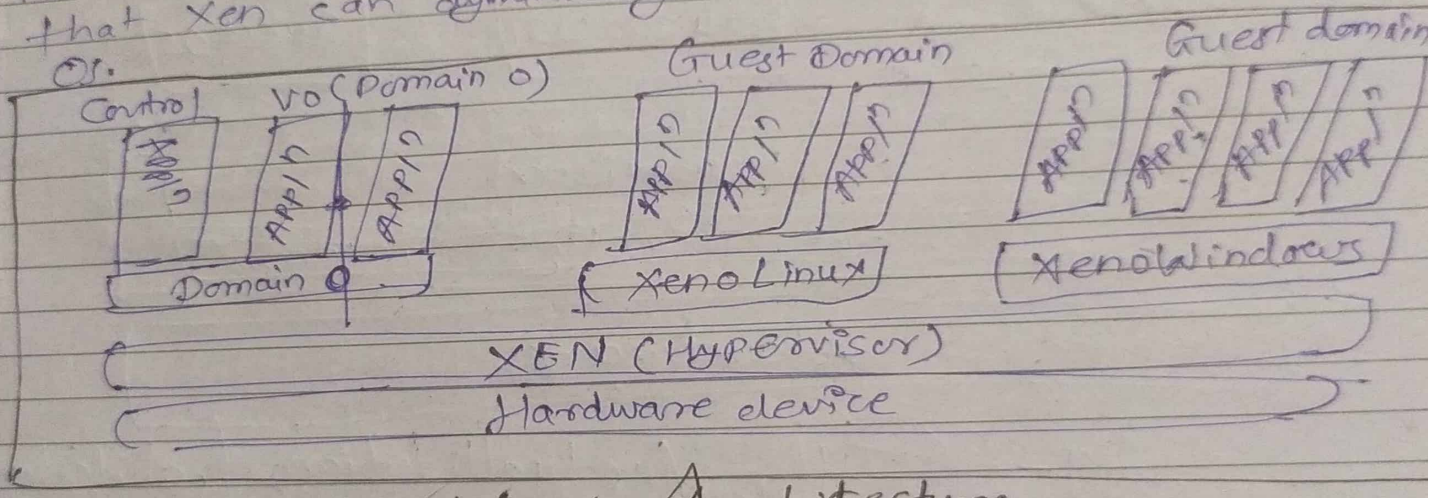
Q.17) What is Xen? Explain the elements of virtualization.

→ Xen is an open source hypervisor based on paravirtualization.

→ Most popular appln of para virtz.

→ It runs directly on the syst hardware.

→ Xen insert a virtualization layer b/w the syst hardware & the virtual machine, turning the syst hardware into a pool of logical computing resource that Xen can dynamically allocate to any guest OS.



XEN Architecture

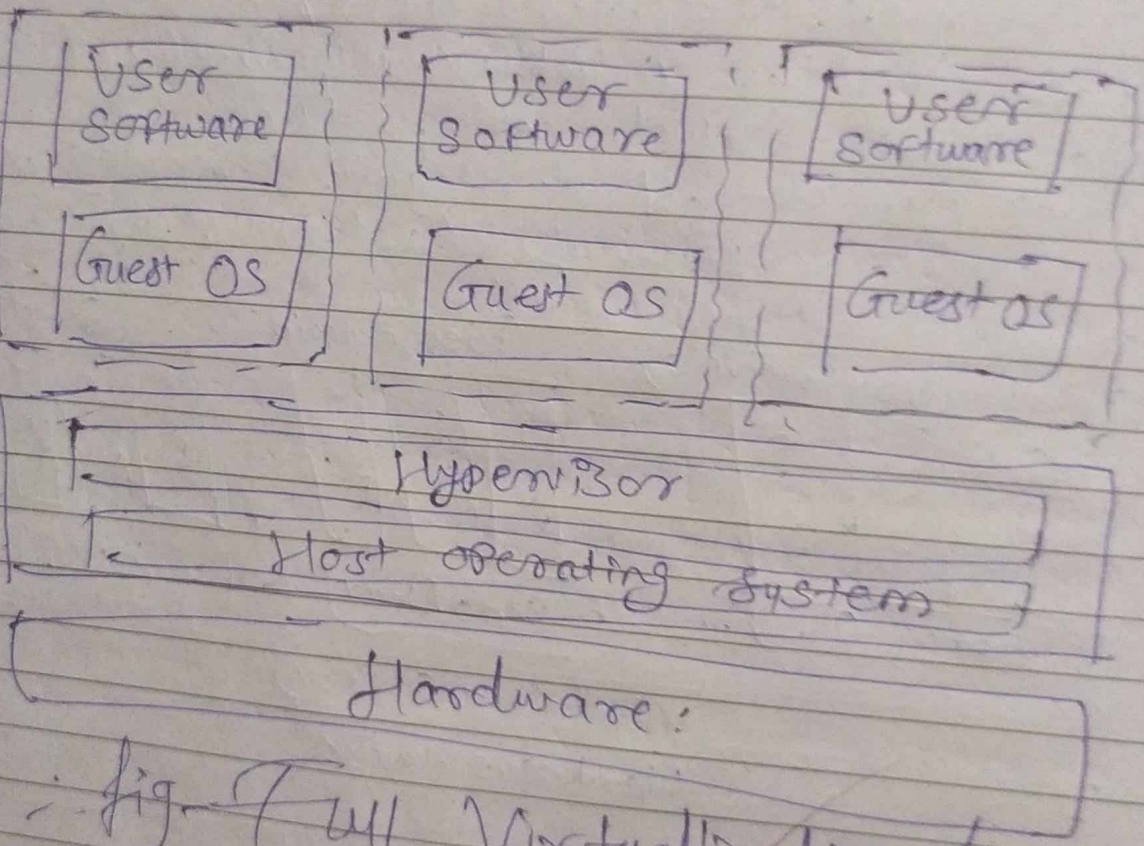
→ Xen can run multiple guest OS each in its own VM.

→ Xen is more reliable over linux rather than windows.

* elements of virtualization.

Q.(8) Explain the reference model of full Virtualization.

Is a common & cost-effective type of virtualization which is basically a method by which computer service requests are seperated from the physical h/w that facilitates them.



: fig- Full Virtualization Architecture

Q.19) Explain in detail various aspects of the need of virtualization in cloud computing.

Ans. ① cost ⇒ With virtualization, administration becomes a lot easier, faster and cost effective. Virtualization lowers the execution cost.

2) Administration – Administrating virtᴸ has to be done in efficient manner since all the resources are centralized security issues has to be categorized more sensitively.

→ It is done through virtual server administration website.

3) Fast deployment – ~~Previous~~ virtualization provides much faster & efficient way of deployment of services by some third party software like VMware, oracle, etc. Thus it provide fastest service to the users.

4) Reducing Infrastructure cost –
virtᴸ essentially allows one Computer to do the job of the multiple computers by means sharing the resources of a single computer across multiple environment.

Virtual servers & virtual desktops allow hosting multiple OS & multiple applⁿ locally & in remote locations. It lowers the expense by efficient by altering the physical resource by virtual sharing.

5) Protect from system failures.
6) provides security to data.

(VSM)

Q.20) Explain Virtualization Security Management?

Virtualization Security management is the collective measures, prodedures and processes that ensure the protection of a virtualization infrastructure/environment.

Typically ~~virtu~~ (VSM) may include processes such as:

1) Implementation of security controls & procedures routinely at each virtual machine.

2) Securing VM, V network and other V applience with attacks and vulnerabilities surfaced from the underlying physical device.

3) Ensuring control & authority over each virtual machine.

4) Creation and implementation of security policy across the infrastructure/environment.

Sur
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