

5/8/04

CLOUD COMPUTING

- Overview of Cloud Computing - Unit I
- Cloud computing Architecture (IaaS, PaaS, SaaS) - Unit II
- Base creation of Cloud Computing - Unit III
- Virtualization - Cloud Computing - Unit IV

Client Infrastructure

Network

→ Data Centers

[Server End] (Load Balancing depends on it)

- # How to show Cloud Computing in our Resume?
- AWS Certificate [Amazon Web Service]
- Study AWS and deploy the webpage (static/dynamic)

6/8/04

- # Evolution / history of Cloud Computing :-
- * John MacLainth in 1961 gave speech in MIT where he pointed out computing resources can be used as basic resources where we pay as per use.
- * In 1991, Salesforce.com (Cloud Service Provider) through internet provided websites as pay per go.
- * In 2002, AWS came, Microsoft in 2008.

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Basic Definition of Cloud Computing:-

- * In cloud computing user don't care.
 - where its server are
 - who manages them
 - where its document are stored.
 - where the applications are hosted.
- * The user just wants the availability, the access to the documents or application with the device he / she is using with the help of Internet and user is willing to pay as long as he / she need it.

NOTE :- Virtualization provides environment where it gives more storage, RAM etc. if needed.

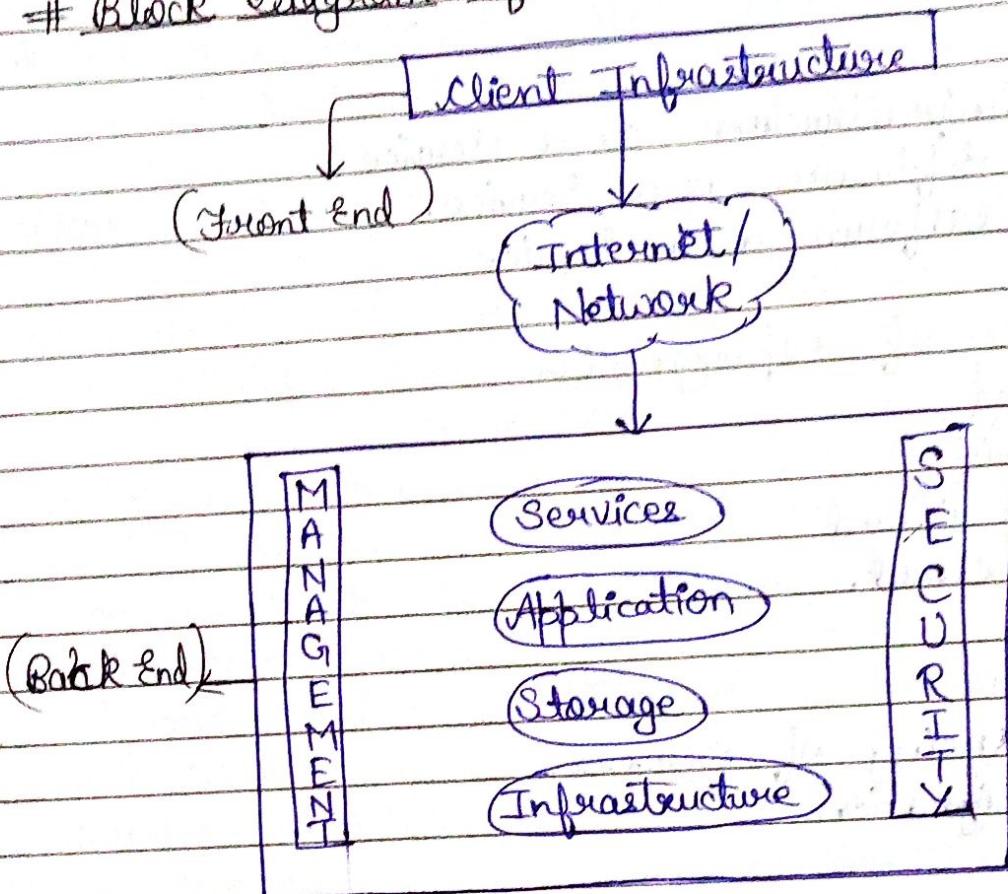
It is a challenge

- 1) Cloud Migration → Switching from one cloud service to another.
- 2) Load Balancing in Cloud Computing → has algorithm (Map Reduce, Round Robin)

7/8/24

CC

Block Diagram of Cloud Computing Architecture



* In Client Infrastructure :-

→ Front end will be mobile device, Smart Watches, GUI(Graphic User Interface), all computer devices etc, using to connect to cloud computing remotely.

* Network without good Internet connection we can't imagine good cloud computing system.

→ In Back end there are data centers.

These Data centers provide us various feature or services that we can avail according to our requirements.

- Various type of Services provided to us by cloud service provider.

SERVICES :-

- 1) IaaS = Infrastructure as a Service.
- 2) SaaS = Software as a Service.
- 3) PaaS = Platform as a Service.

On the base of Deployment:-

- a) Private Cloud
- b) Public Cloud.
- c) Community Cloud
- d) Hybrid cloud.

* Management:-

- a) Load Balancing of Servers.
- b) Cloud Migration.

* Security:-

- a) Authentication & Authorization.
- b) Physical Security of data center devices.

Virtualization :-

- ⇒ It is the process of accessing various services like storage, infrastructure, application that are situated or located in some remote servers.
- ⇒ We create a virtual environment in our client infrastructure and from that virtual Environment we are availing these services.

Hypervisor :-

→ It is a software that help us to create a virtual environment in our client Infrastructure.

Cloud

Definition of Cloud computing According to NIST = National Institute of Standards and Technology.

→ Cloud Computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (eg. network, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

- on-demand
- pay-per-use

Q- Why this subject is named cloud computing?
(Metaphorical term)

Q- What is the major revolution introduced in web 2.0?

→ Cloud Computing.

Q- Definition of Cloud Computing.

Q- Architecture of Cloud Computing.

Q- Diff. challenges we face in CC.

Q- Characteristics, Benefits of CC.

Q- Advantages & Disadvantages of CC.

3/8/24

Cloud Computing

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Benefits of Cloud computing:-

- 1.) Backup and Restore Data
- 2.) Data Loss & Prevention
- 3.) Ease of Excellent Accessibility
- 4.) Low Maintenance Cost

- * In cloud computing, the space or the memory have firewall which is programmed to only consider few types of file which is considered to be good & acceptable.
- 5.) Data Security.
- 6.) Large Storage Capacity.

Characteristics of Cloud computing:-

- 1.) On-demand self service
- 2.) Broad Network Access
 - ⇒ Cloud computing resources can be accessed over the network using standard access mechanism with platform independency (Operating system should be independent).
- 3.) Resource Pooling
 - ⇒ It provides computing resources pooled together to serve multiple consumers using a multi-tenant model. (Each time few multiple users to share the same resource by multiple clients at the same time)
- 4.) Rapid Elasticity (Scaling up, Scaling down).
 - [Increasing or decreasing cloud computing resources]

5.) Measured Services

- Cloud Computing is based on pay-per-use model.
The uses of the cloud resources is measured and user is charged based on some specific metrics (storage unit we are using, power using).

14/8/04

6.) Security

- Cloud Computing system, platform should not be internally / externally by intruders. ~~compromised~~
~~(compromised)~~

7.) Availability

- Cloud Computing system should be available for 24x7.

8.) Cost

- Deployment Cost in CC is always high.
• As an user maintenance cost is low. Eg:- Gmail,
Facebook etc.
• But If some organisation is deploying its local server/^{to} to the cloud server. At that point the deployment cost is always high.

- But In future, that initial Investment cost will generate a revenue for that organisation.

9.) Device Specific

- It should not be device specific. In any platform CC will execute.

10.) It is Platform Independent.

* Services of Internet:-

→ Service availed from Internet (Health, Social Networking Sit, Entertainment, Education etc.)

* Disadvantages

- 1) Deployment Cost
- 2) Environment
- 3) Certain level skillset are required for managing the cloud computing services system.

Ques 04

Vision of Cloud Computing:-

- 1) In CC vision cloud computing provide us the facility of virtual hardware, runtime environment and various services based on pay-per-use model.
- 2) All these things can be used as long as user needs them.
- 3) Long term vision of CC is that IT services are traded as basic utilities in an open market without technological and legal barriers.

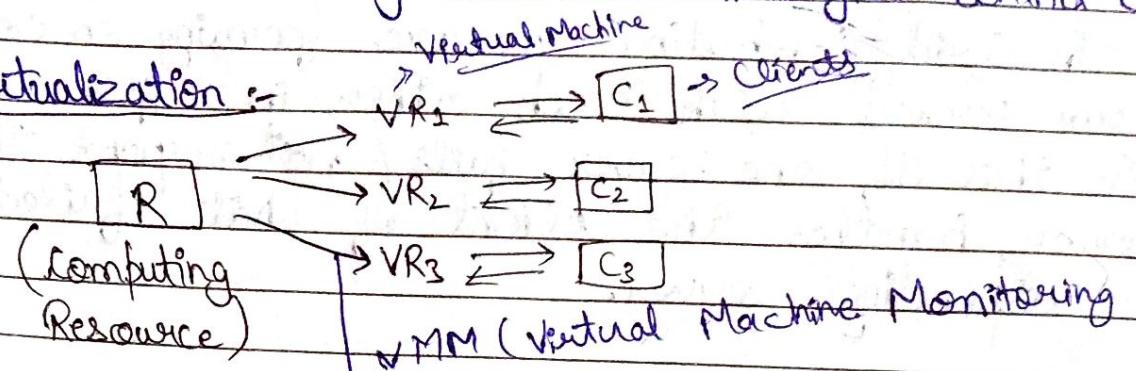
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Enabling Technologies in Cloud Computing :-

Whenever we talking about technologies behind C.C.

1) Virtualization :-



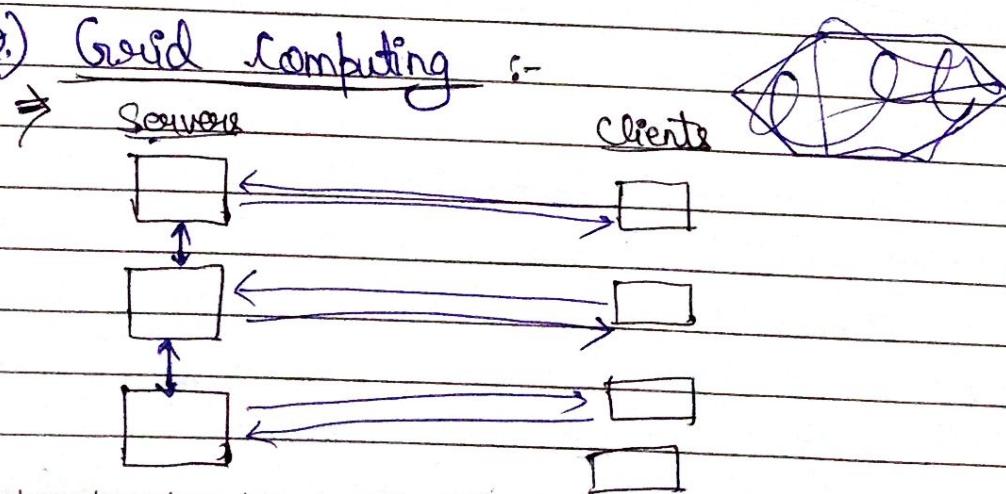
There are a software which is Hypervisor for this help virtualization occurs.

⇒ Virtualization refers to the partitioning of physical computing resource such as computing, storage, networks/ processing, powers into a multiple virtual machines / virtual resource.

⇒ It is a key enabling technology in C.C which allows us to achieve "Resource Pooling".

* Hypervisor is a software that is deployed between Resource (R) and Virtual Machine (VR₁, VR₂, VR₃).

2) Grid Computing :-



- Grid Computing is most important technology behind any cloud computing services.
- In Grid Computing we are focussing on connecting our servers with each other in a form of grid. So, that If one server fails / not respond then other server handles the client of that failed / not responding server.

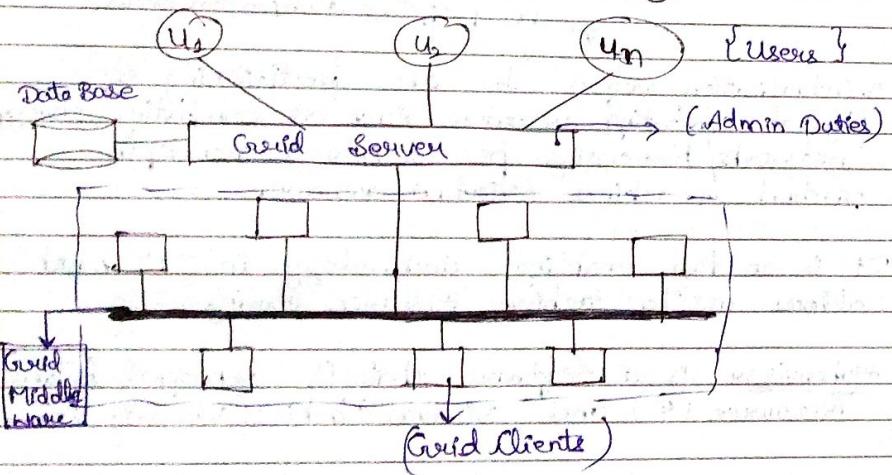
3) Service-Oriented Architecture :-

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Computing is most important technology behind any cloud computing services.

→ In Grid Computing we are focusing on connecting our servers with each other in a form of grid. So, that if one server fails / not respond then other servers handle the client of that failed / not responding server.

3) Service-Oriented Architecture



Grid Computing

* Grid Middleware : It is a special grid network which is responsible for interconnection between different grid clients.

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3) Service Oriented Architecture (SOA)
→ Request-Response Model.

→ In CC, the measurement of service that we are using from any CC service provider is based on Service-oriented architecture of CC.

→ 3 Types :-

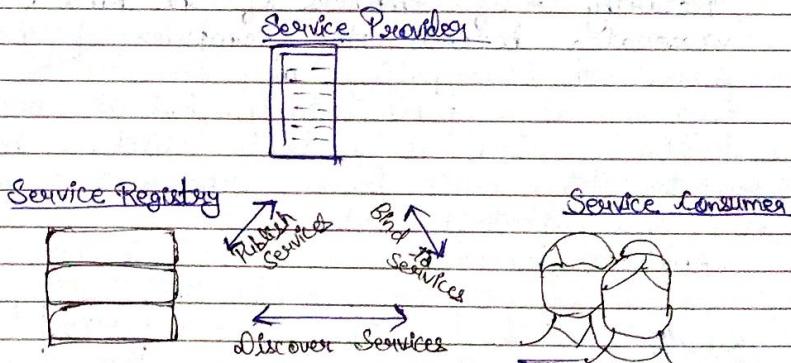
i) Time Based Pricing :-

ii) Per Unit Pricing / Model

iii) Subscription based

SOA

The Service Oriented Architecture Triangle



→ SOA is a software architecture style that supports and distributes application components that incorporate data discovery, data security, data mapping and many more.

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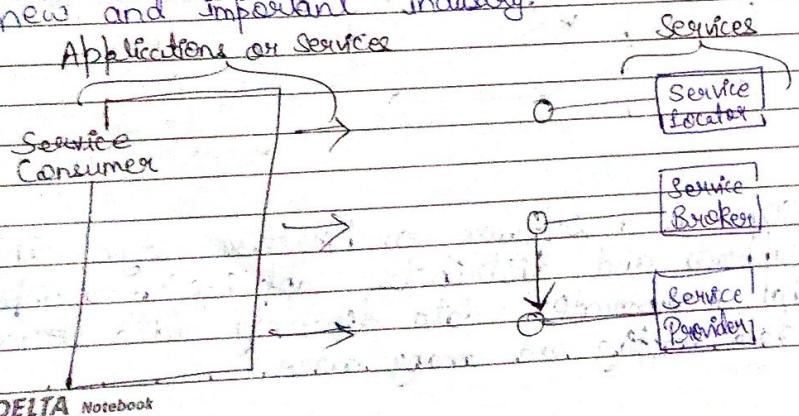
→ SOA as always depends on following principles:-

- 1) Standardized Services
- 2) Loose Coupling. [Dependency b/w services]
- 3) Service Reusability.
- 4) Service Discoverability
- 5) Service Interoperability (should be compatible)

4) Utility Computing :-

→ It is the computing vision in which we are utilising computing resources (storage, service, Application host, Networking etc.) as basic commodity.

→ In 1961 at MIT american scientist "John McCarthy" = "If computers of the kind I have advocated become the computers of the future, then computing may someday be organized as a public utility, just as the telephone system is a public utility... The computer utility could become the basis of a new and important industry."



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Cloud Infrastructure :-

↓
Using Physical Components & hardware

→ Cloud Infrastructure refers to hardware and software components such as server, storage, network, Broad network access, virtualization software (Hypervisor), services & management tools that support computing requirements of any cloud computing models.

* Note :-

In cloud Architecture we are talking about the blueprint of cloud computing model.

Q- What is the role of cloud Infrastructure in CC?

Q- What is the role of cloud Architecture in CC?

Different Components of cloud Infrastructure

- 1) Servers
- 2) Storage - HDD (Hard disk Drive)
- 3) - DFS (Distributed file System)
- 4) Broad Network Access
↳ We are talking about networking technologies we are using eg - wifi, to
- 5) Software - Hypervisor (Virtualization).

Cloud Architecture
↳ Talking about blueprints Frontend.

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Q1. What are the requirements for building a cloud infrastructure?

- ⇒ 1) Standardised Architecture
- 2) On-premises hardware & software from which resources are abstract.
- 3) Additional Management Function such as Integration system, security system, hosting system, management system.

Advantages of Using (Building own cloud infrastructure):-

- 1) Flexibility
- 2) Reliability
- 3) Security
- 4) Maintenance

Disadvantages

- 1) Expensive | High Deployment Cost.
- 2) Complex Design.
- 3) Experts | Skilled persons are required.

Cloud Computing on the basis of Deployment model :-

- ⇒ Private, Public, Community, Hybrid.

On the basis of Service model:-

- ⇒ IaaS, PaaS, SaaS.
(Infrastructure), (Platform), (Software)

On-Premises	IaaS	PaaS / SaaS
Applications	Applications	Applications
Data	Data	Data
Runtime	Runtime	Runtime
Middleware	Middleware	Middleware
OS	OS	OS
Virtualization	Virtualization	Virtualization
Services	Services	Services
Storage	Storage	Storage
Networking	Networking	Networking

- Blue - This will be done by user.
- Orange - This will be done by cloud computing.

Q1. What do you mean by cloud based service model?

→ In cloud based service model there are 3 types of services:-

→ IaaS = Infrastructure as a Service.

→ PaaS = Platform as a Service.

→ SaaS = Software as a Service.

These cases :-

• SaaS

⇒ It is a way of delivering services & applications over the Internet / Cloud / Web. But instead of installing and maintaining software we simply access it by

the internet and avoiding deployment and storage related issue.

Advantages:-

- 1) Time Saving
- 2) Cost Reducing
- 3) Maintenance
- 4) Storage

Disadvantages:-

- 1) Security.

• PaaS (Platform as a Service)

→ In this the application & software that we are deploying is controlled by user from third party or we can say cloud computing service provider, we are only

→ Consumer does not manage or control cloud infrastructure like OS, Network, storage.

But consumer has control over the deployed application and possibly configuration settings of application.

⇒ In this an user have access to application & data.

Advantages

- 1) Cost Effective
- 2) Scalability
- 3) More secure than SaaS
- 4) Having access for researchers.

Disadvantages

- 1) Limited Control over Infrastructure.
- 2) Dependency on cloud provider.
- 3) Not more flexible.

⇒ Eg:- Google App Engine.

* IaaS (Infrastructure as a Service).

⇒ It is a service model that delivers computer Infrastructure on ~~out source~~ basis to support various operations. Typically Infrastructure as a service is a service where virtual Infrastructure is provided - Virtualization, servers, storage & Networking.

Eg- Various AWS Services are like EC2
E2C = (Elastic Compute Cloud).

* Advantages:-

- 1) More secure.
- 2) IaaS provide better security than PaaS & SaaS.

3) Runtime Web Hosting on the choice of our platform is possible only in IaaS.

* Disadvantages:-

- 1) On the basis of deployment cost IaaS is cost effective but if we compare it with PaaS & SaaS then it's little bit expensive than both of them.

Scenario:- Improving website Performance

→ outline the key point or script to use

Taking Initiative to fix a website

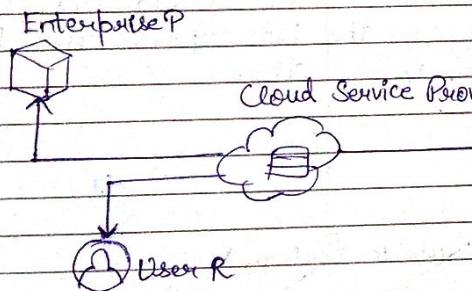
I was working on a client

g/gay

Cloud Computing Deployment Models :-

- 1) Private Cloud
- 2) Public Cloud
- 3) Hybrid
- 4) Community

4) Public Cloud :-



- ⇒ Public Cloud makes it possible for anyone to access computing services.
- ⇒ The Public cloud is one in which cloud infrastructure services are provided over the Internet to the general public.

* Advantages :-

- 1) Cost Effective.
- 2) Easy to access.

3) No maintenance issues (Users & Enterprises are not concerned about services. Provides 24x7 time accessibility).

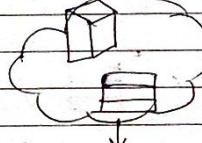
* Disadvantages :-

- 1) Less secure = Because the computing resources that are used in Public cloud are open to all users.
- 2) Less control & Customizable = We cannot customize according to our need.

2) Private Cloud :-

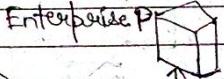
On Premise Private Cloud

Enterprise P



Cloud Service Provider

Externally hosted Private cloud



Cloud Service Provider
Dedicated for
Enterprise P

- ⇒ This model is exact opposite to public model in terms of the computing resources dedicated to / used by particular Enterprise so, in private cloud the user have full control over computing resources.

*** Advantages:-**

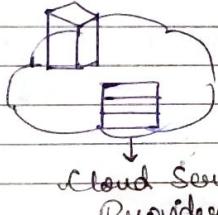
- 1) Better Control :- The owner have full command over computing resources.
- 2) Security :- More secure than public cloud.
- 3) It's easily customizable according to our need.

*** Disadvantages:-**

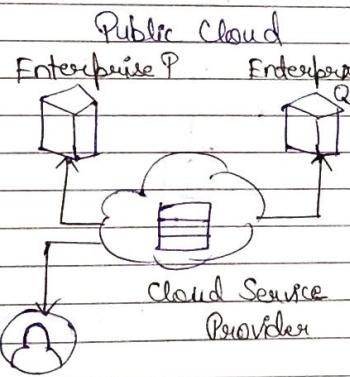
- 1) More costly than Public Cloud.
- 2) Not easy to scale "Scalability".

3) Hybrid Cloud**Private Cloud**

Enterprise P



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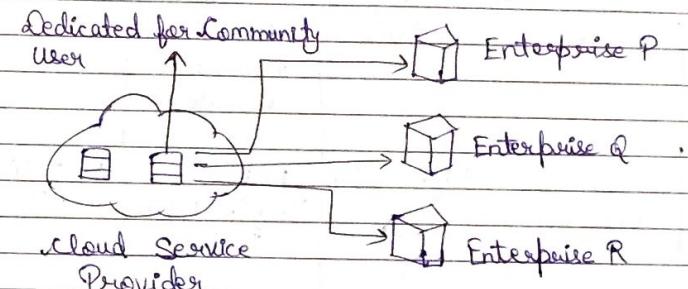
- In Hybrid Cloud we are using the features of both the private & public cloud.
- In hybrid cloud organization can move their data b/w different clouds according to their requirement.
For Eg:- Netflix & any streaming platform.

*** Advantages:-**

- 1) Flexibility.

*** Disadvantages:-**

- 1) Difficult to manage.
- 2) Data transmission is very high.

Topology**4.) Community Cloud**

⇒ In this model system and services are accessible to a community group of enterprises belonging to same organization.

⇒ It is a distributed computing system that integrates different services and fulfill the needs of all enterprises that belong to same organization.

*** Advantage:-**

- 1) Cost-effective.
- 2) Easy to manage.
- 3) Shared Resources available.
- 4) Collaboration & Data sharing.

*** Disadvantage:-**

- 1) Rigid in customization - As data & resource are shared among diff. organizations acc. to their mutual interest. If Enterprise P wants to change some administrative settings or updating a system.
- 2) Less Scalable.

* Difference b/w :-

Parameters	Public	Private	Hybrid	Community
1) Define.				
2) Initial Set up	Easy to set up.	Complex to set up.	Complex	Complex
3) Flexibility & Scalability	Highly Scalable	Highly Scalable	Less Scalable but not more than Public & Private	Fixed / Rigid
4) Cost	Less cost. less	High cost.	In b/w Public & Private.	Distributed cost.
5) Data Security	Least Secure	High	High	High
6) Data Privacy	Provide least data privacy.	High	High	In b/w. Public & Private.

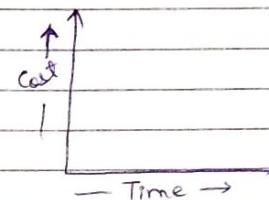
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Capex

E In Capital Expenditure of CC it has fixed cost. cost.

Opex

Operating expenditure



Q:- Diff. b/w Total cost of Exp. & Capex.

Key Points

1) Cloud Economics is the study of cost resource usage, Business Impact on cloud IT platform of an organization.

2) A sound business case for clouds includes element such as a upfront cost (Capex) effective governance of security and economic benefits of improved processes.

Factors that affect cloud Economics !-

1) Which cloud deployment model we are choosing from for our business will directly impact on our cloud economics.

Ex:- If someone is choosing private deployment model is expensive.

2.) Return on Investment

(Cloud Economics)

- Q:- What is the role of TCO in CE?
→ TCO = Total Cost of Ownership.

* In Private Cloud deployment model TCO will be high.

- Q:- In which cloud deployment model the TCO will be high.
→ Private Cloud.

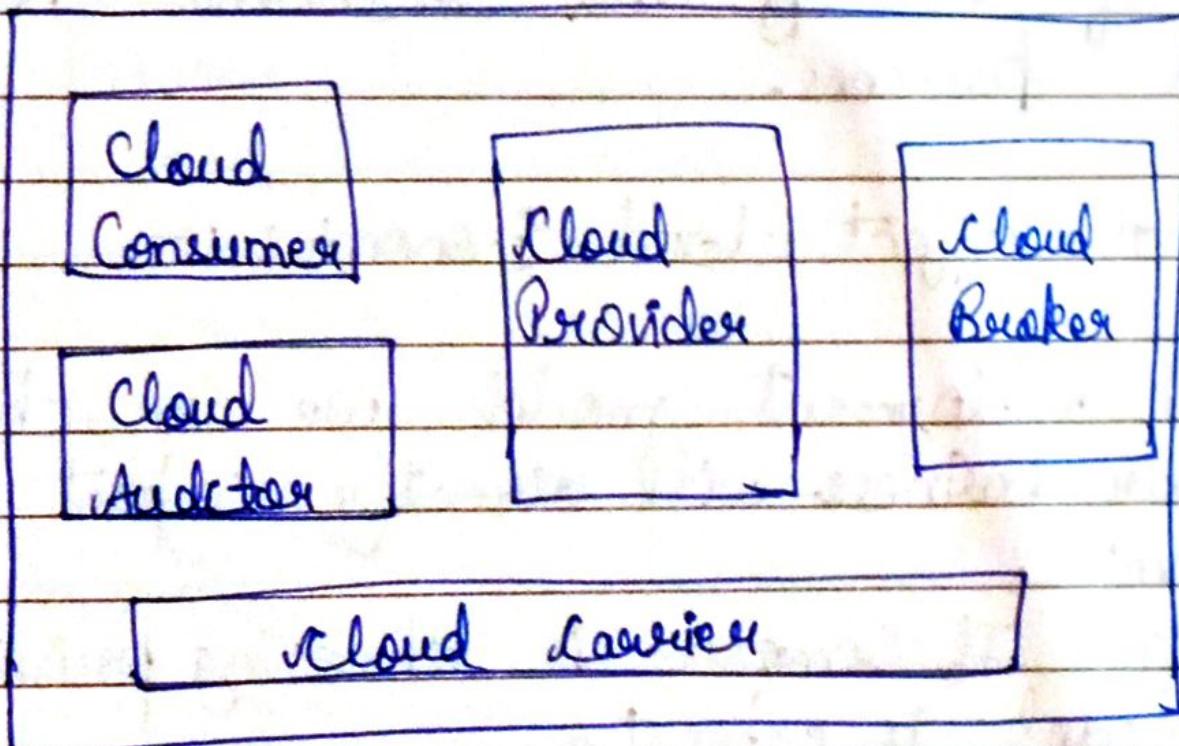
- Q:- Diff. b/w Capital Expenditure and Operational Expenditure.

- Q:- Cloud Reference Model.

↳ Combination of all both model service, model, deployment model and cloud architecture.

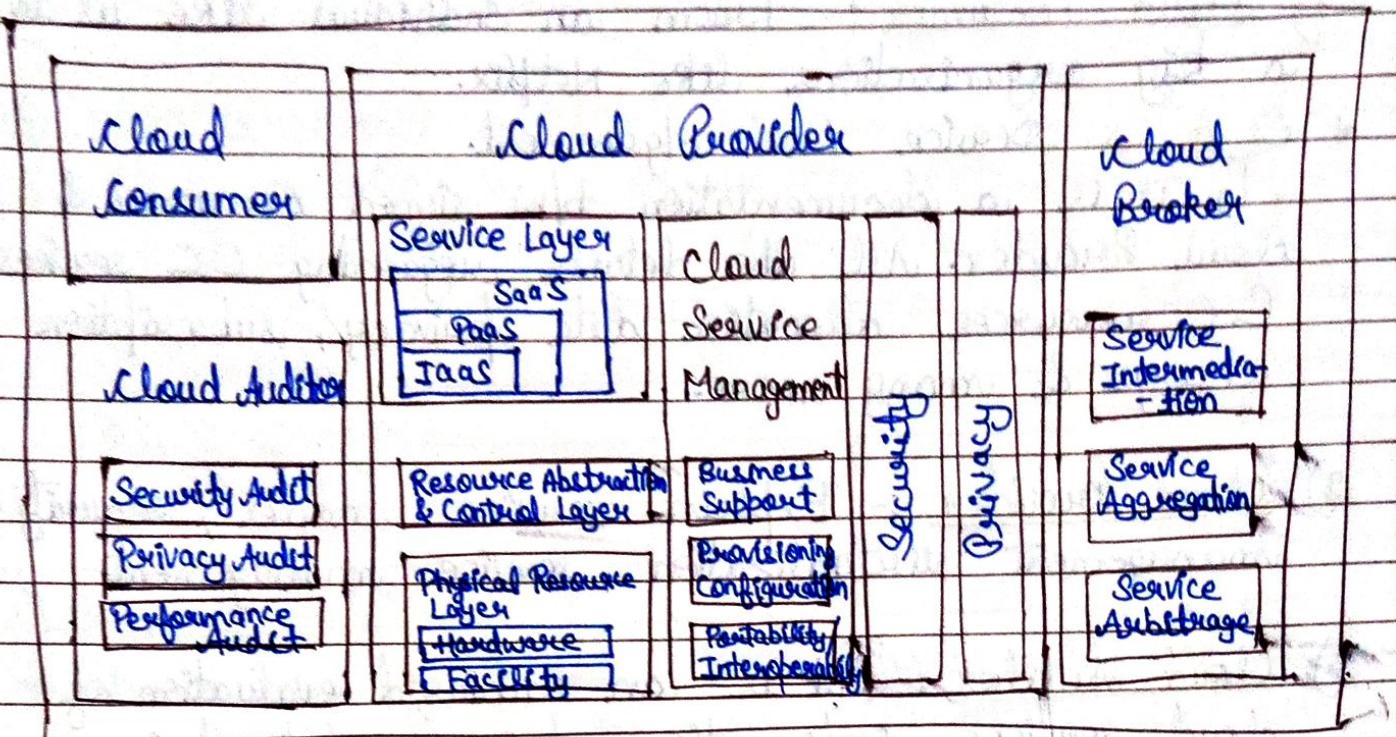
Cloud

Basic Block Diagram of cloud reference model:-



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Detailed Diagram of Cloud Reference Model :-



⇒ Cloud Reference Model is the abstract model that divides cloud computing environment into different layers.

⇒ These 5 blocks are standard reference set by NIST [National Institute of Standard Technology].

* Need of Standard Cloud Reference Model :-

- 1.) To create vendor neutral architecture that follows NIST standard.
- 2.) The NIST cloud reference model provides characteristics like elasticity, self service and resource collaboration.
- 3.) In CC reference model we have 5 main actors (cloud consumer, cloud Provider, cloud Broker , cloud Auditor).

* In newspaper → CAG → Auditing Authority of India.

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In diagram:-

1) Cloud Consumer :- From an individual like us to a big organisations like Netflix.

* SLA → Service Level Agreement.

↳ It is a documentation b/w signed consumer & cloud Provider. All the details regarding C.C. services, C.C. resources allocation, data privacy, subscription charges & many more.

2) Cloud Provider :- Explain service model, security & management, virtualization, service management.

3) Cloud Auditor :- It is an unbiased evaluation of cloud services, information, privacy, data privacy system & the security of cloud computing implementation.

Q1. What is CC reference model (NIST)?

Q2. What is cloud auditor?

→ Cloud auditor is an organization which performs unbiased audit of an organization and in cloud the three main operations are performed by CA.

- 1.) Security
- 2.) Performance
- 3.) Privacy

1) Security Audit:-

→ In Security Audit the Auditing team will analyze the authorization and authentication policies.
→ The data which is stored in server will not be prone to any type cyber attack.

2) Privacy Audit:-

→ They will check the data which is stored in the server should not be shared with some third party (govt., private company) without prior informing the customer.

3) Performance Audit:-

→ In this the audit organization will be look after the business model, balance sheet, customer feedback

Cloud Broker :-

- ⇒ It is an organization that control how cloud services will be accessed and delivered to the cloud consumer.
 - ⇒ This will act as an Intermediate b/w cloud consumer and cloud provider.
 - * A cloud broker provide single point of access for controlling numerous cloud services provided by cloud provider.
 - ⇒ Cloud Broker will perform 3 main functions
- 1) Service Intermediation
 - 2) Service Aggregation
 - 3) Service Arbitrage

1) Service Intermediation:-

- ⇒ The Cloud Broker will act as an Intermediate b/w cloud consumer and cloud provider.

2) Service Aggregation:-

- ⇒ In this, the cloud broker will combine different cloud computing services in single access point.

3) Service Arbitrage:-

- ⇒ Like service aggregation service arbitrage differs in that the services being integrated and aggregated aggregated are not enough for cloud consumer. Then service arbitrage will provide us access to the new market from where we can fulfill the needs of computing resources of cloud consumer.

Cloud Carrier

→ It acts as an intermediate b/w diff. cloud reference blocks. So, In this the personal computers, networks, phones, technologies etc.

25/9/24

Q1- Cloud Computing Model

→ Reference Model

→ Service Model

→ Deployment Model.

Q2- Diff. b/w cloud Infrastructure & cloud architecture

Cloud Architecture

→ It is a blueprint of our cloud computing.

Cloud Infrastructure

→ It includes servers, storage networks, virtualization.

Q3- Enabling Technologies in C.C. or Tech. Behind C.C.

Q4- What do you mean by Internet as a platform?

Q5- C.C. Economics.

↳ Needs

↳ Factors affect in C.C. Cloud Economics

1) ROI (Return On Investment)

2) TCO (Total Cost of Ownership)

3) Capex (Capital Expenditure)

4) Opex (Operational Expenditure)

* CapEx

→ Fixed upfront cost in order to create long term benefits.

OpEx

→ It is expenses to run day to day business in order to generate profit.

Q1- How Private Cloud & Public Cloud are differ from each other in terms of economics.

Ans:

Private Cloud

→ In terms of CapEx private cloud requires more investment.

Public Cloud

→ Public cloud can be managed at ~~minimum~~ base minimum cost.

→ Scalability :- More Scalable.
If we want to scale up our cloud computing resources than private cloud is costly.

→ Less Scalable
Public cloud is cheap.

→ 1

UNIT = 3

- * Parallel computing
- * Distributed computing
- * Sequential Computing

Hardware# Flying Flynn's classification :-

- SISD (Single Instruction Single Data)
- SIMD (Single Instruction Multiple Data)
- MISD (Multiple Instruction Single Data)
- MIMD (Multiple Instruction Multiple Data).

Parallel computing

⇒ It is a conceptual framework.

Distributed computing

⇒ It is also a conceptual framework

⇒ That serves as foundation of modern day cloud computing

- Four key Elements that are considered for high processing power are:-

- 1) Architecture
- 2) Application

- 3) Compiler
- 4) Problem Solving

Parallel Processing :- It is the conceptual framework in which same task is divided into sub-task (divide & conquer technique) and with the help of shared memory location it is distributed into different processor to deliver us the result in limited time duration.

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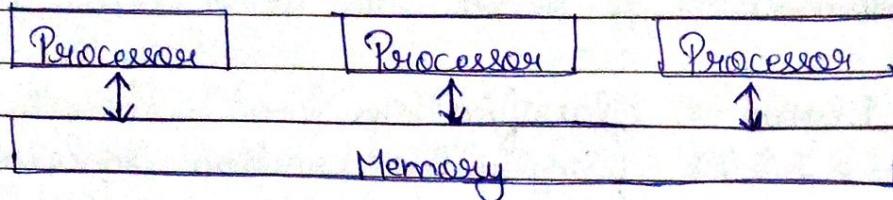
Q: Why is the parallel computing model is introduced?

- Basic of CC
- What is CC architecture, challenges, benefits
- Services
- Various types of pricing model in CC.
 - Fixed Pricing
 - Elastic
- eg: Subscription → There are two types
 - Spot - based on the market value of resource. If the market value of resources increases then the pricing of CC services also increases and vice-versa.
- From CC model & C.C services
- Case Study questions

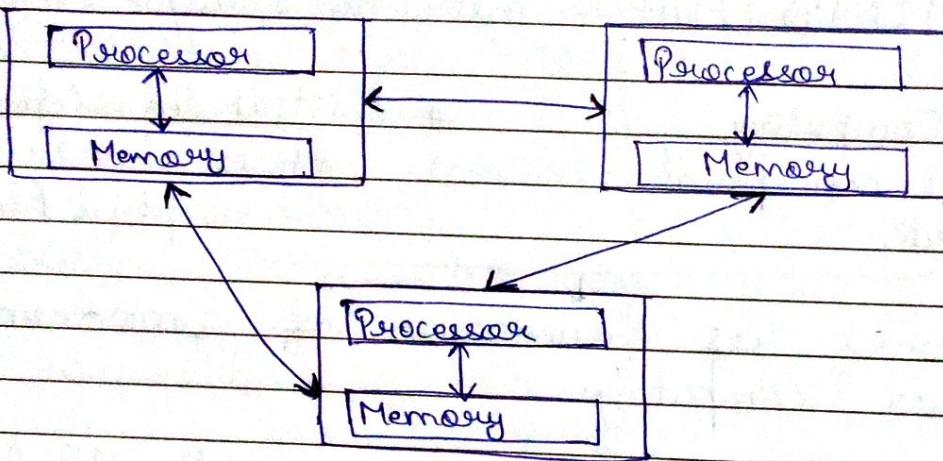
Q: Why is the parallel computing model is introduced?

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Parallel Computing



Distributed Computing



→ In Parallel Computing multiple processors performing same task simultaneously and these processors are located at same ~~position~~ location.

→ In Distributed Computing multiple processors performing same task at simultaneously and these processors are located at remote location.

In Parallel Computing

→ Single machine used.

→ All processes are shared memory allocation.

→ Latency should be low.
(Delay in network communication.)

→ Fault Tolerance is worst.

→ Cost is low.

Distributed Computing

→ Multiple machines are operating simultaneously.

→ There is no possibility of shared memory location.

→ Latency should be high.

→ Fault Tolerance is better.
Because it has multiple servers. In any case even if any server will be stopped, other servers may work consistently.

→ Cost is high.

Q1- What do you mean by Distributed Computing and Parallel Computing with its advantages and disadvantages?

* Advantages

- When Parallel Computing model is proposed
- a) Speed is Increased.
- b) Efficient Use of Resources.

* Disadvantages of Parallel Computing :-

- Complexity In Programming.
- Hardware Cost should be Increased.

* Advantages of Distributed Computing :-

- Fault Tolerance is better.
- Scalability is better.

* Disadvantages

- Cost is high.
- Latency is high.

glossary

Par

Hardware Architecture of Parallel Processing :-

[or]

Flynn's Classification

- SISD
- SIMD
- MISD
- MIMD

Instruction Streams

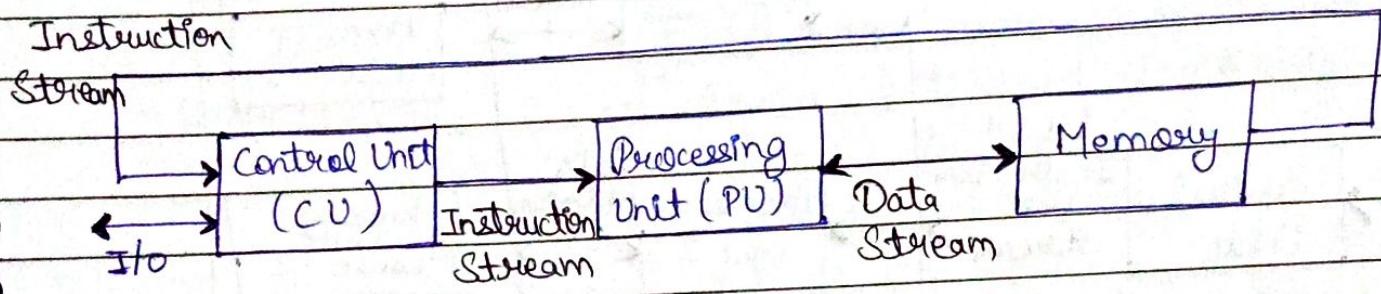
One many

Streams one	SISD Traditional von Neumann single CPU Computer	MISD May be pipelined Computers
Streams many	SIMD Vector processor fine grained data Parallel Computers	MIMD Multi computers Multiprocessors

* Features :-

- Data Stream
- Instruction Stream
- Control Unit
- Processing Unit
- Shared Memory | Memory Modules

1.) SISD [Single Instruction Single Data] :-



⇒ The Core Element of parallel processing are CPUs (Processors).

⇒ Based on the number of Instruction stream and the Data Stream that can be processed simultaneously, the computing system are classified into 4 categories
 Stream = Information that is stored in Memory

Data Stream

Operations performed on the data in Processors.

Instruction Stream

The sequence of Instruction which are read from memory unit.

SISD :- It represents the system of a single computer containing control Unit, Processing Unit & Memory Unit. Instructions executed in this system in sequential order. It has single Instruction Stream and single Data Stream.

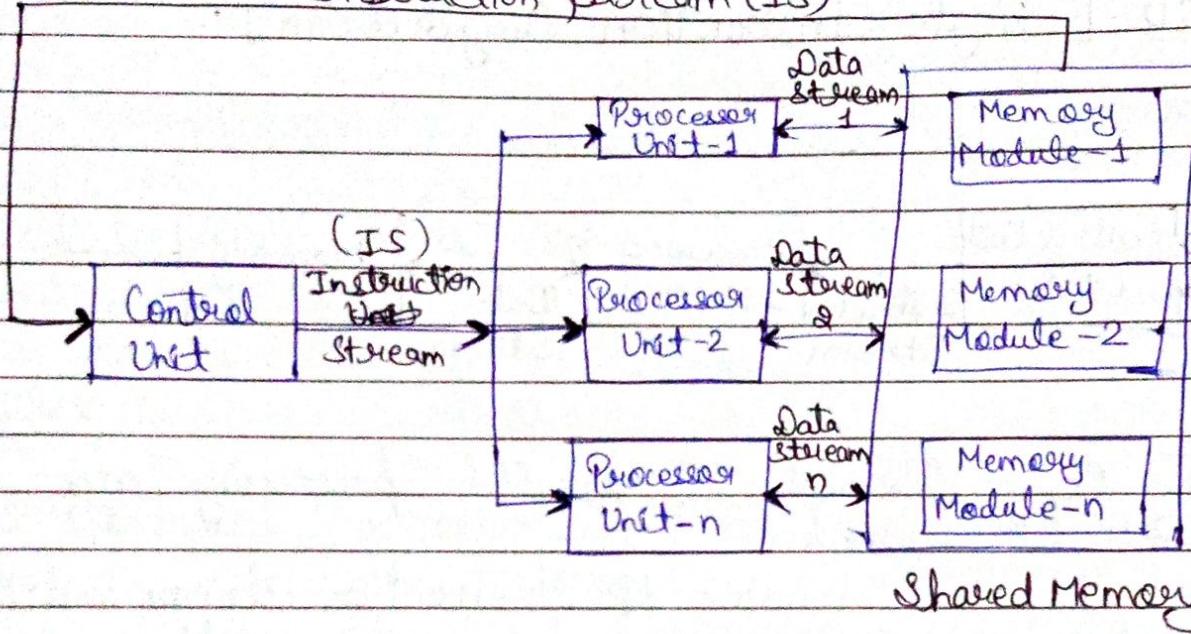
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Delta

* Common Key Point :-

- Instructions are decoded by the Control Unit and then CU transmits these instructions to the Processing Unit for execution.

Q.) SIMD [Single Instruction Multiple Data] :-

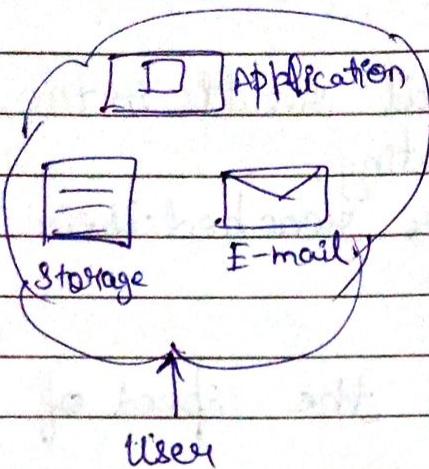
Instruction Stream (IS)



03/10/24

Vendor-LockIN :- :- Where our cloud service consumer is stuck between one server.

AWS



→ Vendor-LockIN is a situation where user / organization / company finds itself locked IN to a certain cloud provider.

→ Vendor Lock IN can become a big situation in CC because it is very difficult when user want to move their database (cloud migration)

→ If vendor suddenly decreases the quality of cloud computing services then a Vendor Lock-IN can become difficult.

Q. How can you avoid the Vendor-LockIN situation?

- 1.) Carefully Evaluate terms and Conditions.
- 2.) Carefully Examining the process of database Migration the user must check that the database migration process must not be that much complicated.
- 3.) Hybrid Cloud Computing model is the most suitable one when we trying to avoid Vendor-Lock IN situation.

Productivity Software-

→ It is that category of software that helps user to produce things like database graphs, presentations, etc.

Advantages

- 1) Time Saving
- 2) Collaboration

* Limitations of Parallel Computing that results in the development of Distributed Computing.

- ⇒ The Silicon chip based processor reached their physical location at that time.
- 2) Processing speed is constraint by the speed of light.
- 3) Density of transistor package in a processor is limited.

* What are the major reasons because we shift P.C architecture to D.C architecture.

~~CC~~

(M)

Role of RPC in CC :-

(M)

↓
Remote Procedure Call

(B)

- Load Balancing
- off loading

⇒ Role of RPC in cloud computing :-

RPC- These are the Inter communication calls handled by operating system of our machine.

→ Some high priority calls have to be entertained by OS as compared to other calls and this management of various calls.

How RPC different from CC:-

→ In CC:-

The concept of load balancing determine how smooth our cloud computing services will take place in server for the smooth conduct of cloud services. the concept of off loading

→ So in this way RPC decides that which cloud computing services will be off loaded and our server will respond in optimal way.

Q: Short note on Economics of Private Cloud.