CLOUD COMPUTING

SUBJECT CODE : 4BIT6C2

HANDLED BY

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Syllabus

CLOUD COMPUTING

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Unit II

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Unit-1

What is cloud computing?

❶Cloud computing refers to manipulating configuring accessing both hardware and software resources from a remote location.

❷It offers online data storage infrastructure and application.

❸Cloud computing facilitates platform independent.
❹We need not download any additional software to run the application on your browser.

Explain about needs of cloud computing?

❶The cloud computing revaluation is hiding full gear. It is feared by CIO's small to medium size companies. Cloud strategies are being implemented at unbelievable rates.

❷Cost saving is not only the reason businesses or emphasizing the cloud.

Data and application resources can be profession in real time.

Availability:-

Ensure that your resource remind continuously available and secure.

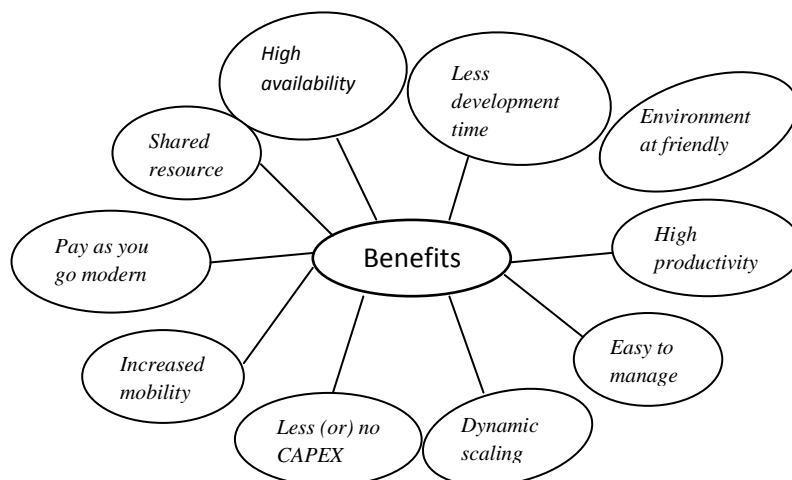Less maintenance:-

Hardware applications and VAN with all manage by these provide.

Expert service:-

Service are continuously monitor and maintain by these provide.
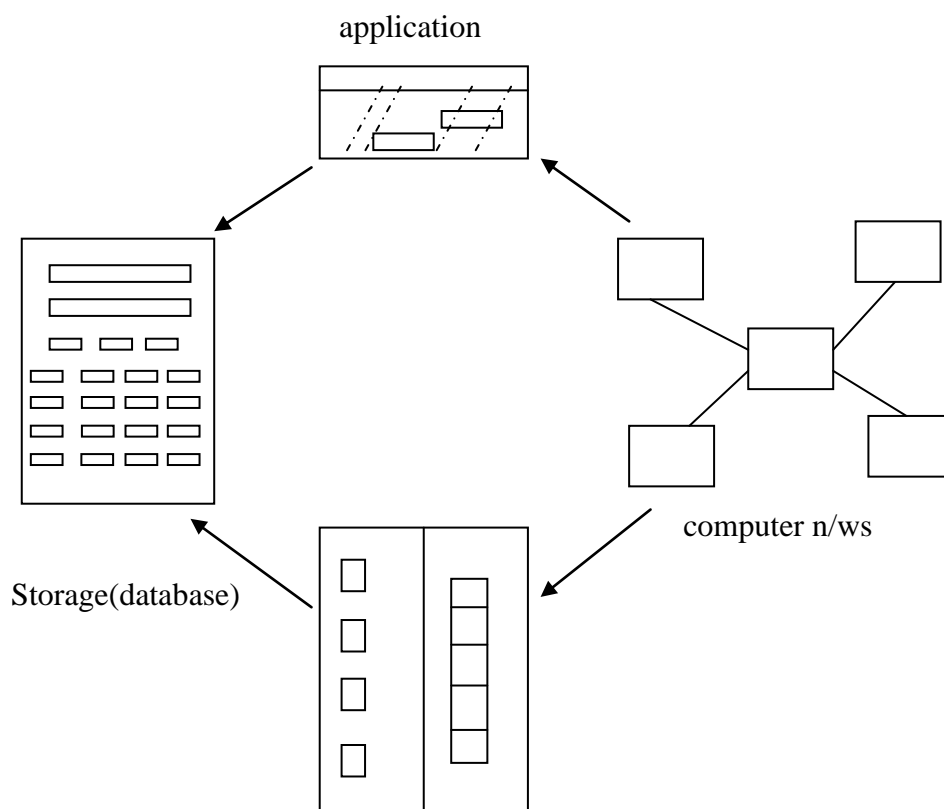
BENEFITS OF CLOUD COMPUTING

Evaluation and history of cloud computing?

- ❖ Cloud computing has as its antecedes both client and server computing, peer to peer, distributed computing.
- ❖ It's all a matter of how centralized storage facilities. Collaboration and how multiple computers work together to increase computing power.

Client/ server computing:-In the earlier days of computing that is from 1980 are so everything operated on the client/server model. All the software applications, all the data and all the control resided on huge mainframe computers are otherwise known as servers.

- ✓ If a user wanted to access specific data are run a program. They had to connect to the mainframe which gained appropriate access and they do their business while essentially renting the program are data from the server.
- ✓ Users connected to the server via a computer terminal some time called a workstation or client. This computer was sometimes called as a dump terminal because it did not have a lot of memory storage space or processing power.
- ✓ The factors when multiple people are sharing a simple computer event if the computer is a huge mainframe they have to wait for their term.
- ✓ So the client/server model while providing similar centralized storage differ from cloud computing in that it did not have a user centric focus with client/server computing all the control rested with the mainframe and with the guardians of the single computer. It was not a enabling environment.

application

Storage(database)

computer n/ws

Grid computing	Utility computing
- Solving large problems with parallel computing - Made mainstream by globes alliance	- Offering computing resources as a metered service - Introduction in late 1990s

Software as a service	Cloud computing
- Network-based subscriptions to applications - Gained momentous in 2001	- Next generation-internet computing - Next generation data centers

Peer to peer computing (sharing resources):-

- ➢ The server part is the system also created a huge bottle like. All communication between computers had to go through the server first. However, in efficient that might be.
- ➢ The obvious need to connect one computer to another without first hiding the server let to the development of peer to peer.
- ➢ Peer to peer computing defines the network architecture. In which each computer has equivalent capabilities and responsibilities.
- ➢ Peer to peer was an equalizing concept in the peer to peer environment every computer is a client and server. There are no masters and sleeves.
- ➢ Peer to peer was also a decentralizing concept. In which control is decentralizing with all computers functioning as equals. Content is also dispose among the various peer computers.
- ➢ Perhaps the most notable implementation of peer to peer computing is the internet. The various ARPA net sides and there were not many of them where connected together not as clients and servers but as sequence.

Distributed computing (providing more computer power:-

- ▪ One of the important subs tics of the peer to peer model is that of distributed computing. Where ideal PC's are across the network or across the internet were taped to provide computing for large processor intensive projects. It is a simple concept is about cycle sharing between multiple computers.
- ▪ When a computer is enlisted for distributed computing project software is installed a machine to run various processing during dose period when the PC's typically.

- Distributer computing dates back to 1970s. When multiple computers when network together.
- A more practical application is distributed computing operated in 1988. When researches at the DEC (digital equipment corporation)system research centre development software that distributed the work to factor large number of on workstation with in their laboratory.
- By 1990 a group of about 100 users utilizing the software had faceted a 100 digit number.
- By 1995 this same effect had been expanded to the web to factor a 130 digit number.
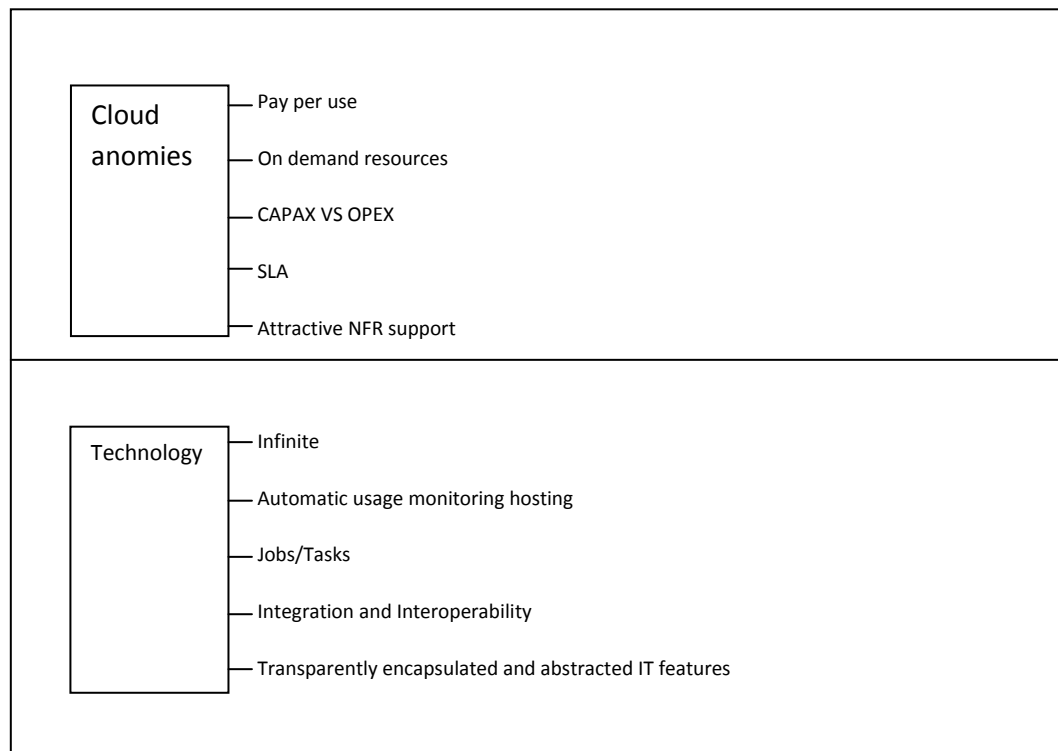
Collaborating computing (working as a group):-

- The collaborating on any project users must be able to top one another. In today's environment is means instant messaging for text based communication with optional audio, telephoning, and video capabilities for voice and picture communication.
- Most collaboration systems offer the complete range of audio video options for full featured multiple user video conferencing.

Cloud computing (the next step in collaboration):-

- ✓ The concept of cloud based document and services took wing with the development of large server forms such as dose run by Google and other search companies. Google already had a collection of servers that it used to power its massive search engine.
- ✓ On the infrastructure side IBM, sun system and other big iron provides are offering hardware necessary to built cloud networks.
- ✓ On the software side dozens of companies are developing cloud based applications and storage services.
- ✓ Today people are using cloud services and storage to create share fine and organized information, of all different types.
- ✓ Tomorrow this functionality will be available not only to computer users but to users are any device to that connect to the internet, mobile phones, portable music player, even auto mobile, and home television sets.

Migrating in to the cloud:

Cloud anomies	— Pay per use
	— On demand resources
	— CAPAX VS OPEX
	— SLA
	— Attractive NFR support
Technology	— Infinite
	— Automatic usage monitoring hosting
	— Jobs/Tasks
	— Integration and Interoperability
	— Transparently encapsulated and abstracted IT features

Migrating is an application to the cloud computing it is not an easy task. It is important strictly adhere to the 7 step model to ensure that the process is robust and error free.

Technology of as the flowing:-

1. **Infinites:-**

    It denotes computer, storage, and bandwidth.

2. **Automatic usage:-**

    Which monitors the usage and read direct them.

3. **Job tasks:-**

    Virtualized and transparently movable.

4. **Integration and interoperability:-**
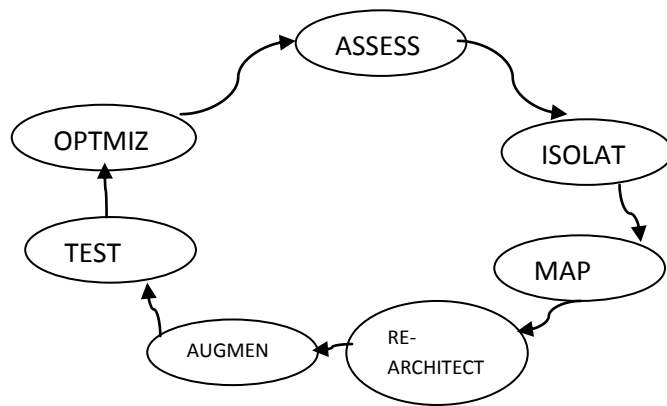
    It supports for hybrid operations.

5. **Transparency:-**

    It denotes are IT features.

7 steps model of migration in to the cloud and the Infosys research:-

By the diagram we denote the process as follows:-

- Conduct cloud migration assessment.
- Isolates the dependencies.

- Map the messaging and the environment.
- Re-architect and implement the lost functionality.
- Leverage cloud functionalities and features.
- Test the migration.
- Iterate and optimize.

Assess:-

1. Migration starts with an assessment of the issues relating to migration at the application, code, design and architecture levels.
2. More over assessments are also required for tools being used functionality, test cases, and configuration of the application.
3. The proof of concepts for migration and the corresponding prizing details will help to assess these issues properly.

Isolate:-

1. The second step is the isolation of all the environmental and systematic dependencies of the enterprise application within the captive data centre.
2. These include library, application, and architectural dependencies.
3. This step results in a better understanding if the complexity of the migration.

Map:-

A mapping construct is generated to separate the components that should reside in the captive data centre from the ones that will go into the cloud.

Re-architect:-

1. It is 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.

2. It is possible to approximate lost functionality using cloud run time support API.

The features of cloud computing service are used to augment the application.

Test:-

1. Once the augmentation is done, the application needs to be validated and tested. This is to be done using a test suit for the applications on the cloud.
2. New test cases due to augmentation and proof of concepts are also tested at this stage.

Optimize:-

1. The test results from the last step can be mixed and so require iteration and optimization. It may take several optimizing iterations for the migration to be successful.
2. It is best to iterate through this seven step model as this will ensure the migration to be robust and comprehensive.

Virtualization:-
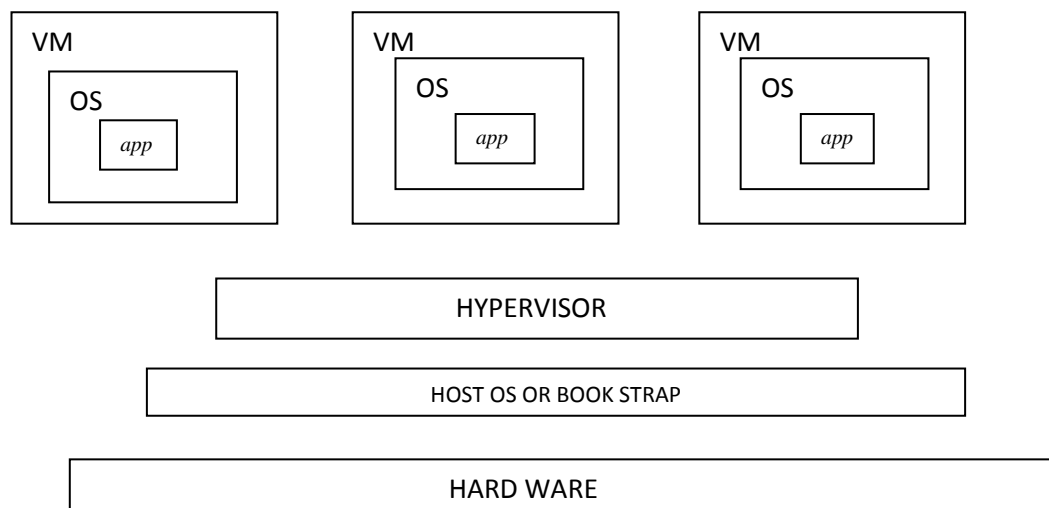
1. Virtualization can be applied very broadly to just about everything you can imagine including memory networks, storage, hardware, operating system, and applications.
2. Virtualization has 3 characteristics that make it ideal for cloud computing.

I. Partitioning:-

In virtualization we can use partitioning to support many applications and operating systems in physical systems.

II. Isolation:-

- Because each virtual machine is isolation each machine is protected from crashes and viruses in the other machines.
- What makes virtualization so important for the cloud is that it decoupled the software from the hardware.

III. Encapsulation:-

It can protect each application so that it does not interfere with other applications. Using encapsulation a virtual machine can be represented and even stored as a single file making it easy to identify and present to other applications.

Some examples:-

- Virtual memory:-

Disks have a lot more space VAN memory. PICs can use virtual memory to barrow extra memory from the hard disk. Although, virtual disks are slower than real memory. It managed drive the substation surprisingly well.
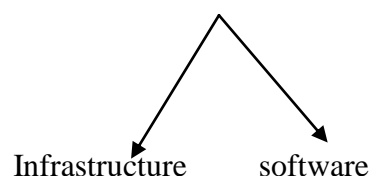
- Software:-

  - There is virtualization software available that can emulate an entire computer. Which means one computer can perform as though it were actually 20 computers.
  - Using this kind of software you might be able to moves from a data's centre with 1000 of servers to one that support as few as the couple of 100.
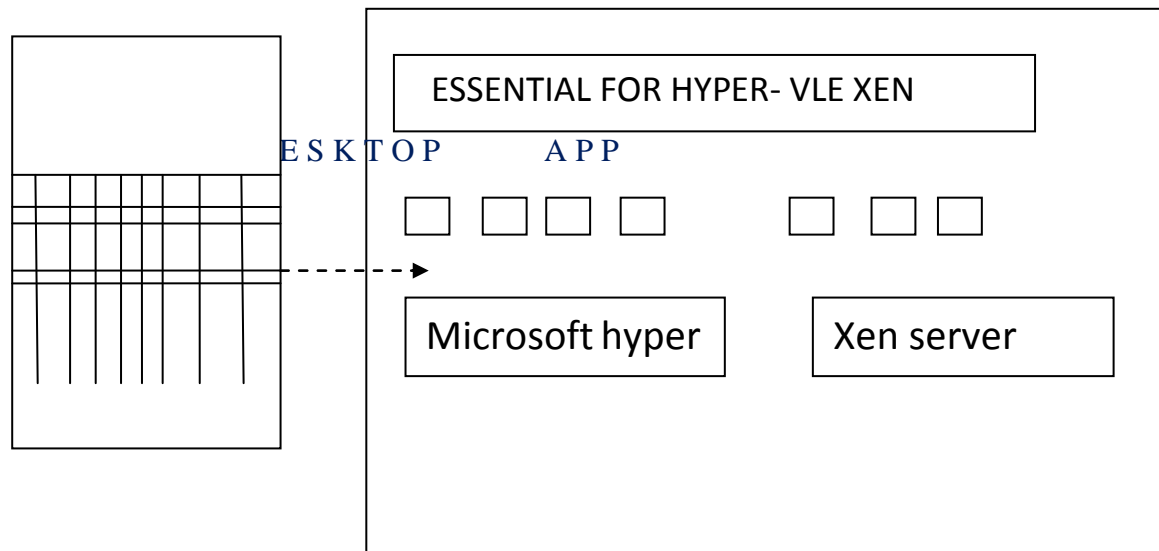
Types of virtualization:-

There are 2 types of virtualization available.
1. Desktop virtualization
2. Server virtualization

Infrastructure   software

Desktop virtualization:-

ESSENTIAL FOR HYPER- VLE XEN

E S K T O P   A P P

Microsoft hyper   Xen server

- The coupling virtualization between PC environment including application and files etc and physical machine.
- Virtualized desktop environment it stored on a remote server and when user has compactable device with sufficient display ability.

  Example:-PC, smart phone.

  - All the programs and data will eventually store in a remote server.

Software virtualization:-

It has 2 categories

- ❖ High level language virtualization
- ❖ Application virtualization

➢ High level language virtualization:-

It is used solve the migration problem of executable programs between different architectures, programs. Which are written in high level language will be compiled in to standard intermediate and these instructions will be executed during interpretation or compile environment such as JVM.

➢ Application virtualization:-

- Decouple applications from OS and provide a virtual running environment for applications including applications executable files and required run time environment.

- Application virtualization server can push user required program components to the client virtual running environment. Such as VMware and thin application.

Infrastructure virtualization:-

It has 2 categories

1. Network virtualization
2. Storage virtualization

1. Network virtualization:-

Integrate network hardware resources with software resources to provide users with virtualization technology of virtual network connection. It can be dividing in to V-LAN and VPN.

2. Storage virtualization:-

It can provide an abstract logical view of physical storage device. So the user can access the integrated storage resources through UNI file Logical interface of disk view.

It can be divided in to storage device base storage virtualization.

Example:-RAID and network based storage virtualization.

Example:-NAS and SAN.

Server virtualization:-

VIRTUAL host   VIRTUAL
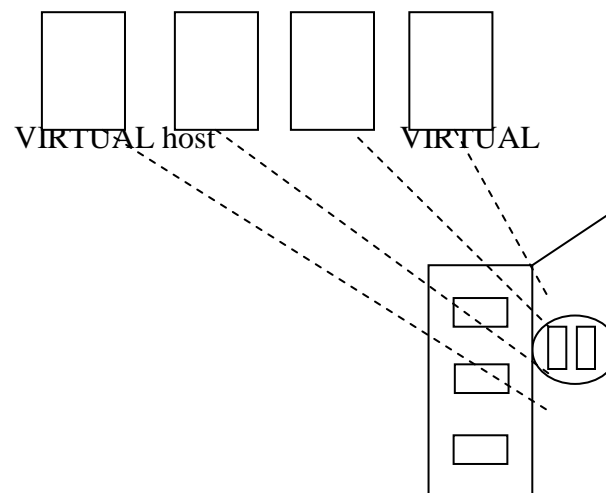
- It is used for convenient to manage.
- To improve the utilization rate.

- To reduce cost.
- To focus on skills.
- To concentrate on whole skill.
- To improve the response speed of business change
- To simplify the environment.
- For higher qualities of service.

VM:-

A Complete Computer System with full functions of hardware system through software simulation and runs in an absolutely isolated environment.

VM-WARE:-

- It offers VM-ware server a free entry level hosted virtualization product for Linux and windows servers.
- Virtualization and VM-ware has become main stream in the post year and many customers have display thousands of VM-ware server environments across their enterprise.
- VM-ware server makes it easy and compiling for companies new to virtualization to take the first step to word enterprise wide virtual infrastructure.

Features of VM-ware:-

VM-ware support the successor to VM-ware GSX server enable users to quickly profession new server capacity by partitioning a physical server in to multiple virtual machines bringing the powerful benefits of virtualization to every server.

Infrastructure:-

- VM-ware is the biggest name in virtual machine and virtualization. They offer VM-ware infrastructure which includes the latest versions of VM-ware.ESX 3.5 server which includes the latest versions of virtual server is 2.5.
- It allows VM-ware customer to stream line the management if IT environment through greater level of automation increase level overall available and boost performance of missile critical workloads. The above figure shows each virtualized server perceives the system resources and unique to them and not share with others.
- VM-ware infrastructure is VM-ware's third generation production- ready virtualization suit.

- The new features in VM-ware infrastructure are targeted at a broad range of customers and IT environments.
- The VM-ware update manager addresses a process each virtual infrastructure administrator dreads facing tracking path levels and applying current security patches and work patches their environment.
- It allows for this through and automated update and remediation process with in the entire infrastructure environment.

Availability and resilience:-

1. VM-ware storage demotion:-

*VM-ware storage demotion enables live migration of virtual machine. Disk from one data storage system to another with no disruption or downtime.

* Storage demotion expense demotion to storage resources of virtual machine namely virtual disks.

2. VM-ware update manager:-

*It automates of patch and update management for VM-ware ESX server host and virtual machines.

*It addresses one of the most significant paint for every IT department integration.

*VM-ware DRS enables 0's downtime. VM-ware ESX server host patching capabilities.

VM-ware distributed power management:-

*It is an experimental feature that reduces power consumption in the data centre through intelligent workgroup balancing.

VM-ware guided consolidation:-

*It is the feature of VM-ware virtual centre enables companies to get started with server consolidation in a step by step tutorial fashion.

Product:-

There are several editions:-

1. VM-ware ESX3I:-

*It is provide single server partitioning is deliver embedded as VM-ware is system or as the standalone purchase for hard drive insulation.

2. VM-ware infrastructure 3 foundation:-

   i.   With includes VM-ware ESX server 3I, VM-ware consolidate backup and the new VM-ware update manager.
   ii. It has no restrictions on shared storage connectivity memory utilization or number of CPU's of the physical server.

3. VM-ware infrastructure 3 standard:-

   * It is design to bring higher levels of resiliency to IT environments at greater value. It includes VM-ware HA which provides automated restart of virtual machines affected by hardware.

4. VM-ware infrastructure 3 enterprise:-

   *It contains the entire array of virtual infrastructure capabilities for resources management workload mobility and high availability.

5. VM-ware v-motion storage v-motion:-

   *It includes VM-ware DRS with DPM. Which are available for standalone purchase with VM-ware infrastructure 3 foundations and standard?

LIMITATIONS:-

For web hosting cloud computing is to that they is a term come across to many benefits of cloud computing. There are some limitations and weakness of cloud computing. They are:-

(i)   Cascading effect:-If there is a problem in data centre all virtual machine are affected. There might or might not be a backup of the data in and an enterprise relies on the cloud for its data management needs.

(ii) Network connections: -1. The concept assumes that the client has reliable network connections. There are problem are network connectivity accessing the cloud also becomes a problem.

2. Performance of the cloud applications also depend. On the performance of network a client side.

(iii) Control of data security:-1.In a public cloud the client does not have the control over security of their own data.

2. The client's data can be susceptivle to hacking or phishing at haps.

IV) Additional cost:-

1. Cloud computing offers cost benefits. It has some hidden or additional cost as well.
2. Client or charge extractor data transfer for other services.

v) Peripherals:-Peripherals device like printer or scanner may not work with cloud many of them requires software to be install locally.

vi)Integration:-Integrating internal applications with those on cloud can be complex and it some cases not biable.

vii) Generic:-Public cloud offers in are very generic on offer multitenency service which all organization not be comfortable with implementing in cloud is more complex to implement and are bride. Some on the internal resources if the organization is not large enough.

UNIT-II
CLOUD ARCHITECTURE

Categories of Cloud Computing:
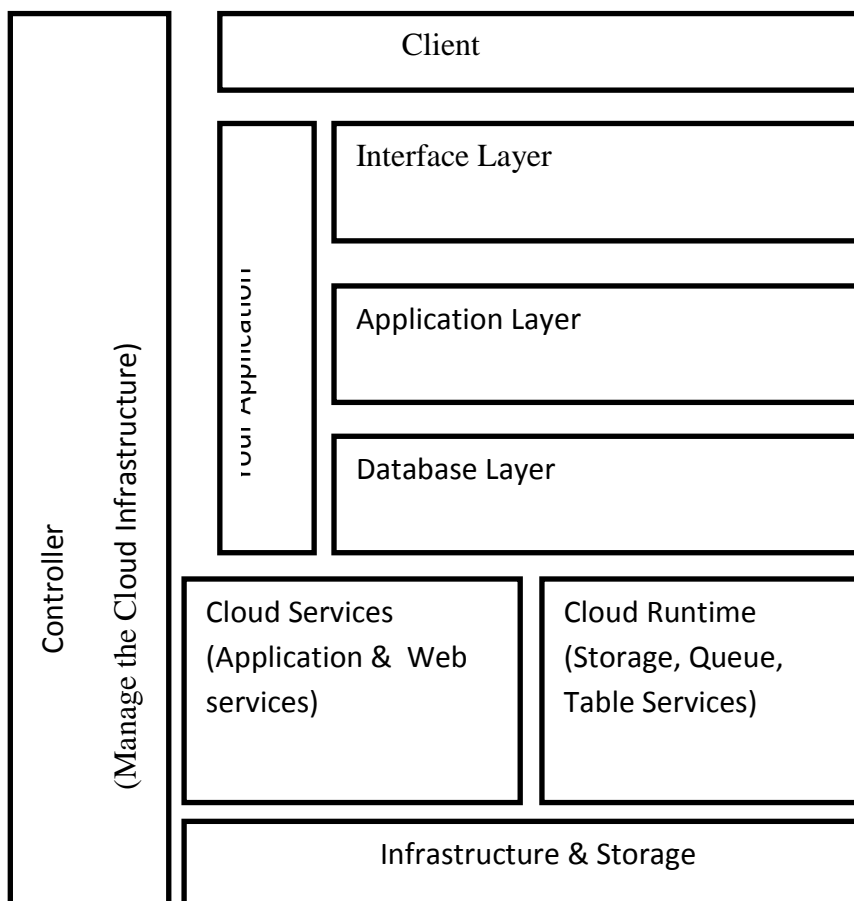
Cloud computing architecture refers to the various components and sub components of cloud that build the structured of the system. Broadly this architecture it can be classified into the frontend and the backend. The frontend and backend is connected to each other we are virtual network or the internet besides there are other components like middle ware cloud resources etc.

Frontend:

It is the side that is visible for the client customer or the user.

It includes the client computer the system or network that is used for accessing the cloud system.

Different cloud computing system has different user interfacing for email programs that support is driven from web browser like firebox, chrome, internet explorer etc.

And the other hand for other system there are unique application shared between the client and the services prorided.

Backend:

It is the side used by the services provided computers data storage system and virtual machines etc it bills together the cloud of computing services.

This system can include different type of computer program each application in this management by its own dedicated server.

Protocols:

One central server is used to manage the entire PC system this server is responsible for monitoring the traffic and making each and reek smoothly without any distribution this process in followed with the fixed set of rules called protocol.

Cloud Characteristics:

On Demand Computing:

The services of the cloud are provided to the cloud users can demand dynamically there by faciliting a demand computing.

Ubiquitous Access:

Provides the ability of the cloud services to be utilized by the cloud user worldwide from any place and time.

Multidenancy:

The single instance of the hardware or software he served to multiple clouds uses at a same time but each user all iosolated in them their performance there by facilitating multidenancy.

Rapid Elasticity:

The cloud platform can add or remove the resources at a any time with flexible elasticity.

Mastered Services:

The cloud platform keeps track of all the users and its resources usage cloud charges the customer for only it Utilized resources provide metered services.

Resilience:

It provides alternate resources and services to the customer when the resources is to be frame there by increment the availabilities and reliability and for tolerant of the system.

**Categories of cloud computing:**

The cloud computing is categories based on the services offered to the uses as help as cloud delivery modal in categories of cloud computing.

The cloud services are provided to the customer in user friendly with pay as you uses modal and the categories of cloud computing are ,

1. IAAS-Infrastructure As A Service

2. PAAS-Platform As A Service
3. SAAS – Software As A Service
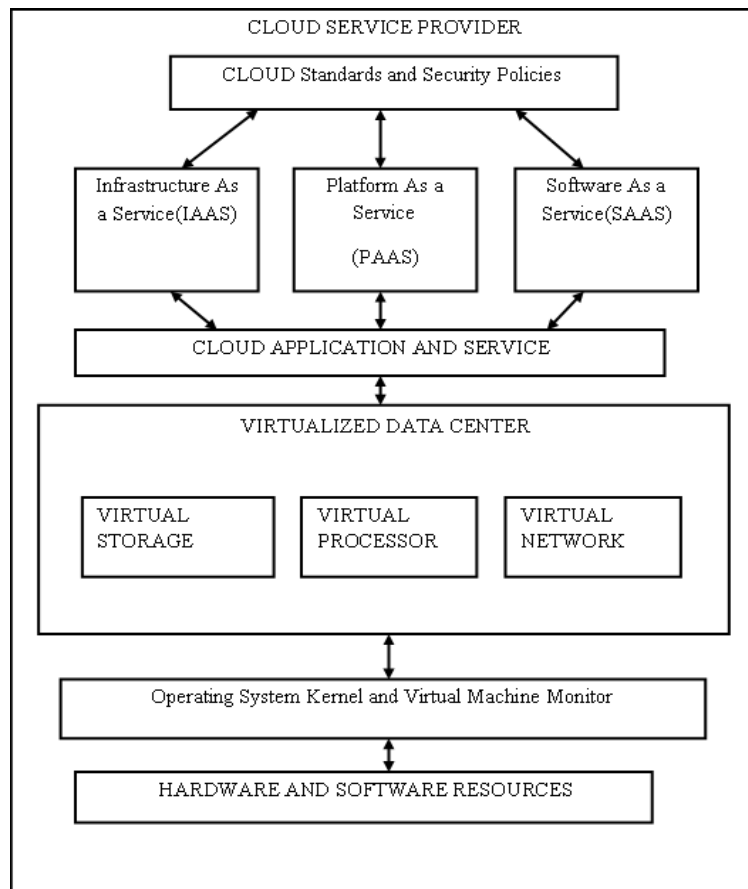
Infrastructure As A Service:

      The IAAS is delivery modal that provided infrastructure centric resources like storage servers, networks and desktop, to be accessed by the cloud customer through services base interface with internet measured cost for the utilize resources.

      The virtualized resources of the IAAS is not free configured on the cloud customer can get they are resource on demand which is dynamically provision with the shad cool of configured virtual infrastructure resources as shown in the figure.

The cloud user can rest for the require infrastructure resources and can deploy and run its own application on the receive virtual computing resource from the cloud providing IAAS it consist of following service.

SAAS-Storage As A Service

CAAS-Compute As A Service

NAAS-Network As A Service

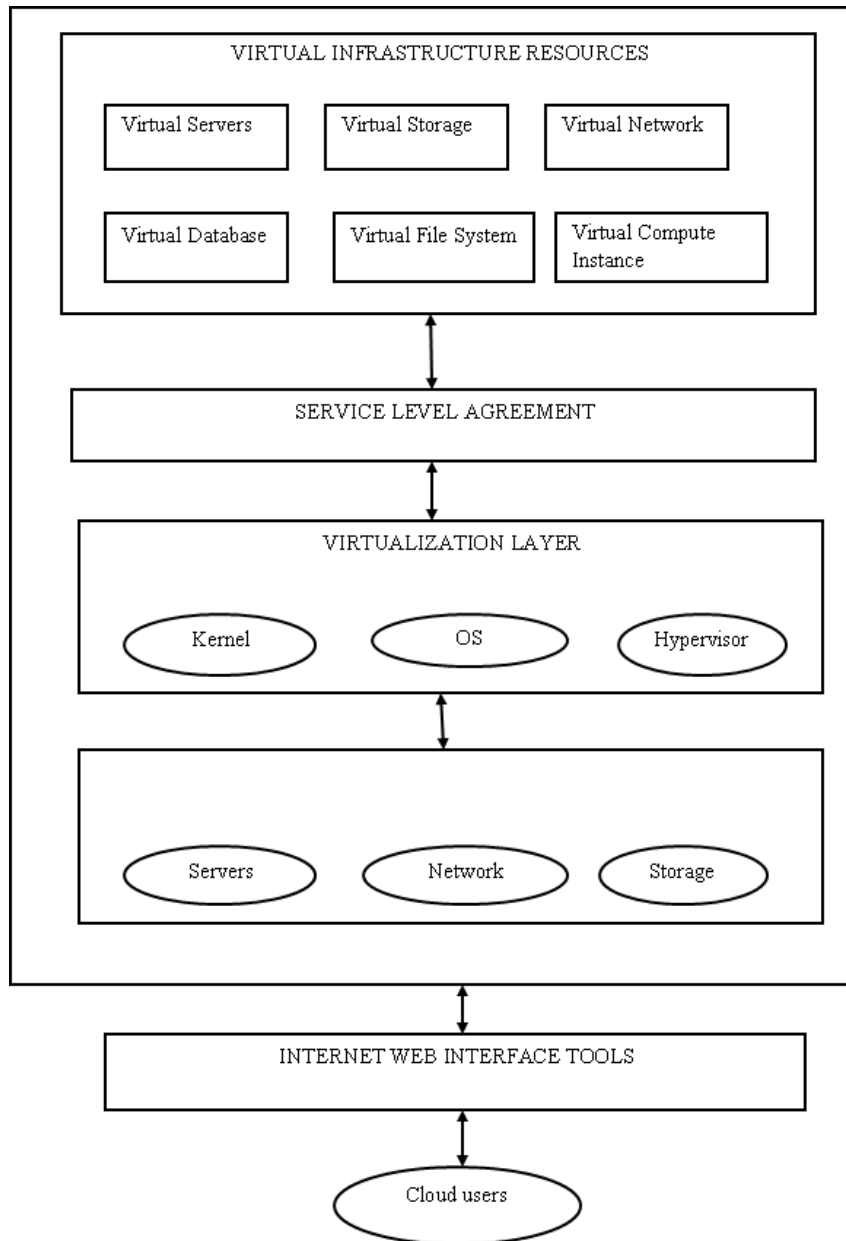DAAS-Desktop As A Service

COAAS-Communication As A Service

There are various company providing IAAS

*Amazon Ec2 for computing

*Amazon S3 for storage

*Go-Grid

*Flexi scale
*Aneka
*Rack space
*Joint cloud
*IBM Blue for computing
*Nirvanix for cloud storage
*Mosso for Network

Platform As A Service:

When the cloud users need to develop their own application and their want to execute that application in the third party cloud service provide platform then they can go for using PAAS.

When the cloud customers are not able to by the original license software package platform along with their complier they are use pass and they can rent an application platform.

The PAAS has they are operating system and application library packages and users need only to deployed and run their application without involving in the management control.

The third party cloud provides will take care of the application packages software along hardware and software resources.

The cloud customer will develop application on the virtualized cloud platform with required platform programming software package supported by the cloud provide and they deploy and run the application on the third cloud platform and the user don't need to manage the application and it software package and the application testing will also be carried out but the cloud platform.

The PAAS provide service oriented architecture to the cloud users and improve the application productivity the cloud users need not maintain the space application, development and testing environment platform.

The PAAS reduces, the cost of initial software licensing, package their by reducing the operation cost of the reducing the operation cost of the cloud customer.
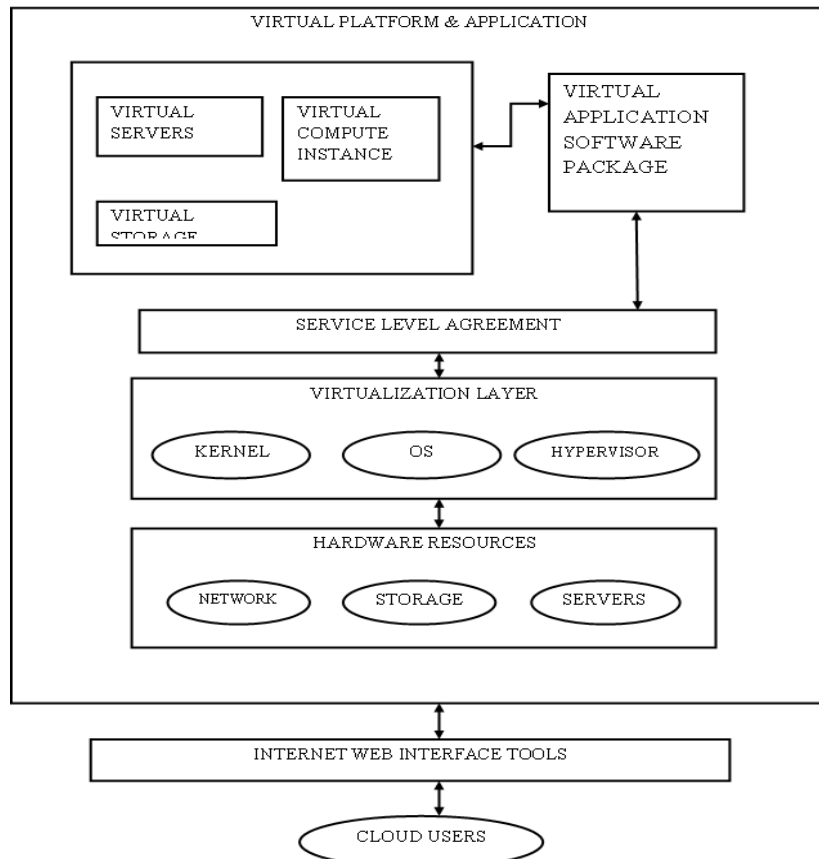
Companies Providing PAAS:

Google App Engine for python Java and chips Id

Sales force engine for APPEX, chips IDC and web based wizard Microsoft Assure for .net assure tools and visual studio package.

Force for IDE and Webpage wizard Amazon elastic map reduce for Java, per python, ruby PHP, c++ and Aneka for .Net and STK application.

PAAS is also termed as "ready to use"

Software As A Service:

When the cloud user are not able to by the software they can go for using SAAS cloud provider and they can rent the software for the required period .

The single virtual software application package is serviced to multiple customers and application management is control by the cloud provided.

The cloud users need not want to install any packages or servers for using the software provided by the cloud service provider and the users are only charged for the time they have used by the application based on the service level agreement.

Companies Providing SAAS:

Google docs for Microsoft word document.

Microsoft share point for PowerPoint design software application.

Sales force for CRM software application.

Google calendar for calendar application zoho planner for creating do list application.

Google spreadsheet's for web based Excel sheet workbook application.

Remember the milk for spreadsheet application.

TATA list for Excel application.

My events for managing holiday card for list application.

High raised for managing the holiday card for list applications.

Base camp for project management applications.

The SAAS make the cloud customers to save then amount spending buying cost development and maintenance of the software along with license and infrastructure cost.
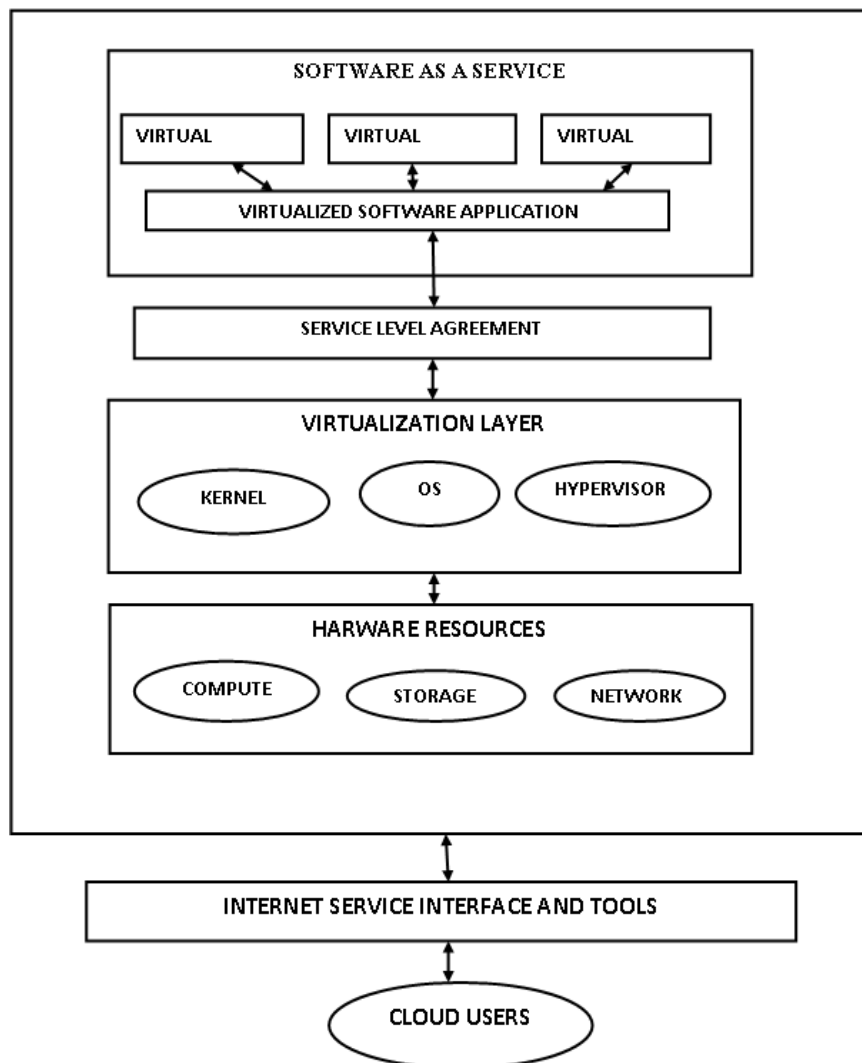

Cloud Deployment Model:

Virtualized cloud platform are on their top of distributed data center.

Cloud managers' large number of virtualized resources and its rapidly professional by contifigurable fool of resources which are dynamically provided to cloud customer.

Cloud computing deliver large number of services to cloud users threw dynamic resources professioning.

It also provides high threw put computing where the virtualized data center the cloud provide cloud service to the cloud users at any time threw internet and avoids high data transfer there by providing affective resource utilization flexibility, scalability and availability.
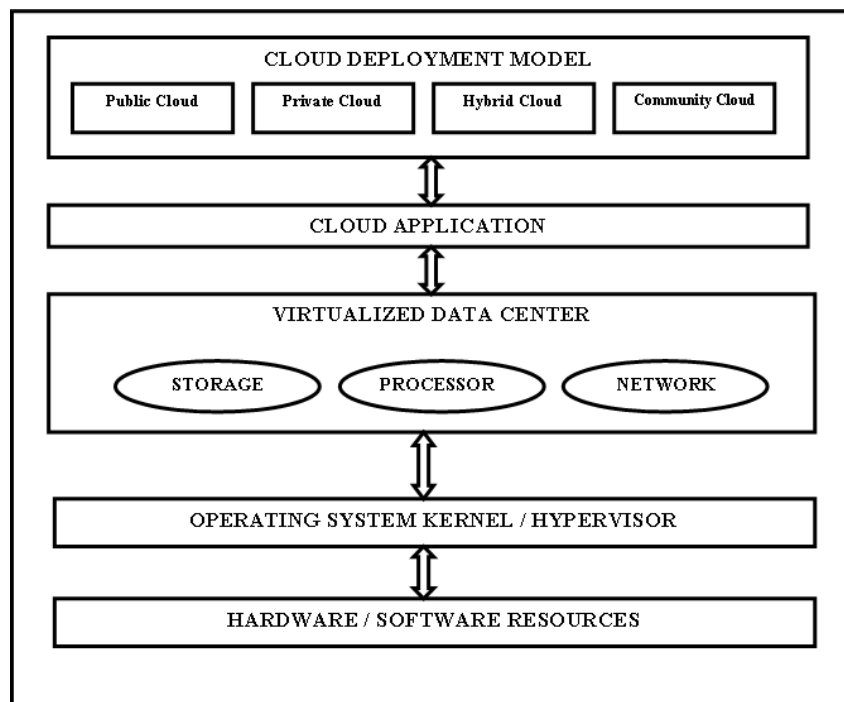
On demand professioning of hardware and software done threw virtualized data center platform cloud computing is the emerging technology. That provide application hardware and software database and other resources are provide as a service to cloud users over the internet.

Cloud consist of a virtualization, virtualized hardware, software, network, service, storage and other resources are compine to a form a virtualized data center and deliver that computing as a service demand over the internet.

The Various Cloud Deployment Modal:

1. Public Cloud
2. Private Cloud
3. Hybrid Cloud
4. Community Cloud

Public Cloud:

Public cloud is the provision of dynamically scalable Virtual resources over the internet.

Public cloud is accessible threw internet by any time has paid for the receiving service.

Public cloud is build in owned by third party service provides. On the services are provided to the customer in worldwide

Some services of public cloud are providing a free service for free of cost to the customer.

All the service management activities like managing Security Deployment, Packup, Reliabilability, Reallocation, Abstract, and Durability. and Isolation are taken care by the third party service provides of public cloud.

The public cloud provide all the services like Intrastructure,Software and Application as service to the customer and the companies providing public cloud service are,

*Google
* Amazon
*Rock Space
*Go Grid
*Microsoft and VMware

Advantage of public cloud:

The public cloud reduces initial investment cost the application service work load provided by public cloud is public access social webpage, public websites and blocks.

The public cloud will perform batch processing job with high security and data privacy The data intensive application are services effectively by public cloud with effective access and service discovery.

The usage of public cloud is low cost and the location of services is managed by public cloud with high speed and responded the availability of public cloud online storage is more reliable.

Disadvantage of Public Cloud:

Organization dealing with the sensitive data like financial information banking credit cards details real time research project are not advised to use public cloud.

Some companies will not outsource the personal employee details to the public cloud storage.
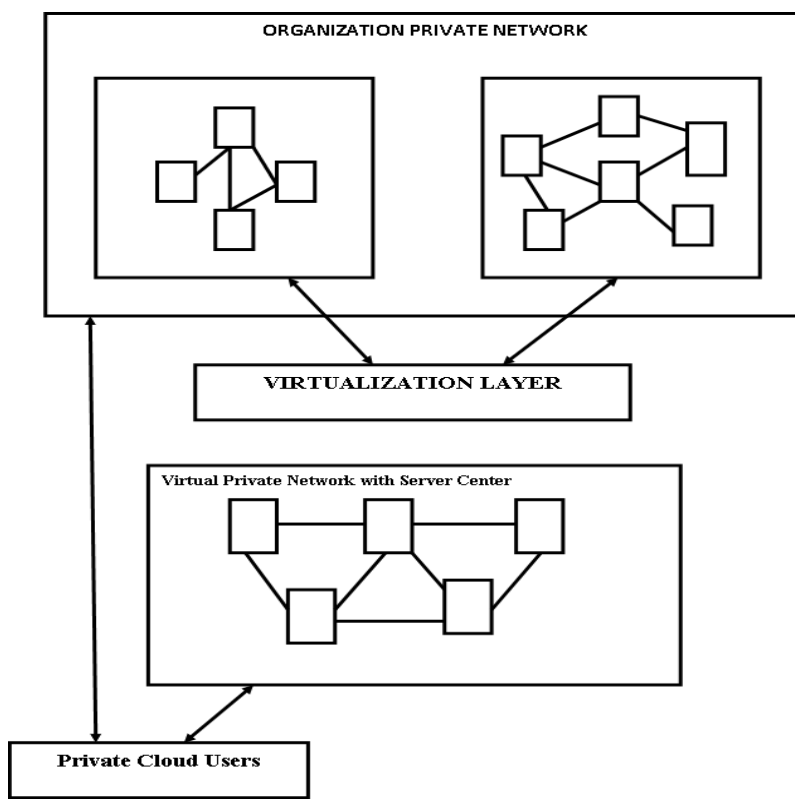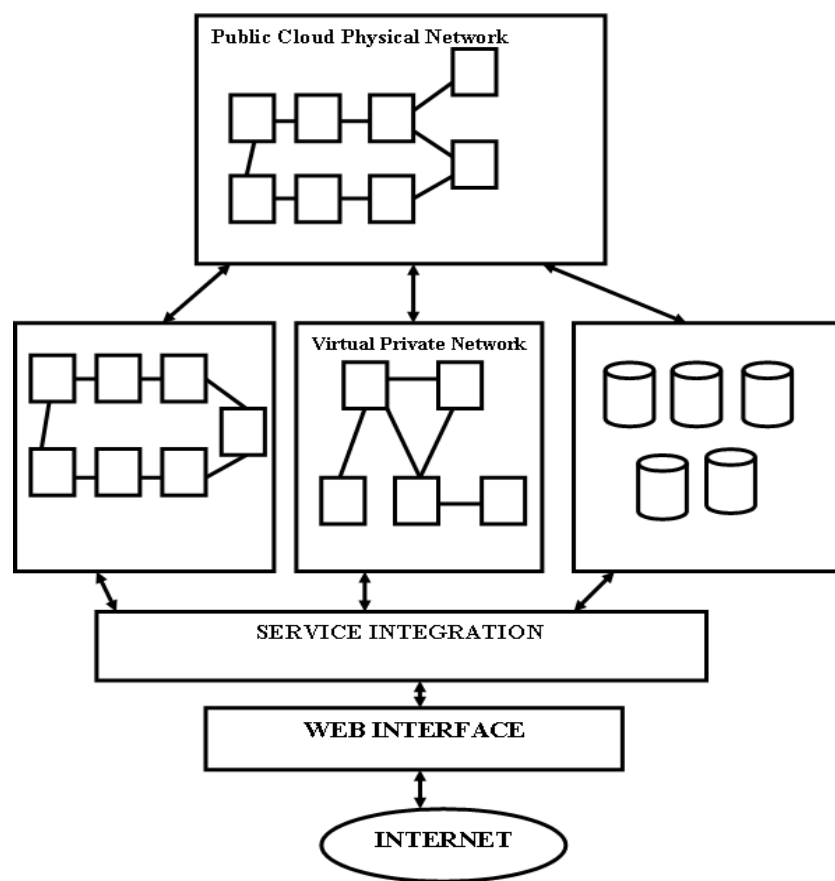
The business with application that needs more flexibility and autoligting will not prepare to use public cloud.

Auditing customize application with high accountability services required by the companies will not use public cloud for the out sourcing.

Private Cloud:

It is developed by the organization for their personal use and is not access by the public customer.

It can be deploy by the administrator of the organization by their unused resource of the network. The access of the private cloud is restricted for their client and employee and its overview.

The private cloud is process on side servers and it also supports on demand access provisioning and dynamic resource provisioning.

The Security of the private cloud is more effective with high availability the usage of private cloud is having high privacy and it s own by the organization and the private cloud is accessed by authorized user with their internet facility.

Advantage of Private Cloud:

The Private Cloud need to have more investment if we build the private cloud with our own unused resources of the network. Management and control of the private cloud is than by the organization itself so high security is possible.Multitanancy is also achieved by the private cloud by making one Resource instants to be access by multiple users. More security and control is possible in private cloud since Location of this virtualized resources is well known to the Organization. The complete implementation control of the private cloud is Taken care by the organization itself.

Disadvantage of private cloud:

Some resources researches point out the private cloud dose not
Realize the key benefits of cloud technology like less operating
Cost and maintenance.

Though the usage of resources by the private cloud is not changed for the customers they have speed money for upfront purches for the build in the private cloud.

If the private cloud is build for predefine work chant then if may be in efficient to server exits capacity workload application.

The service oriented access and dynamic resources provide control has to be fully taken use by the organization which a complex and tedious process.

Hybrid Cloud:

The Hybrid cloud is combination of public and private cloud. In general business organization resides the business real time critical services and information under their private cloud control and non critical business application are outsource to the public cloud which makes hybrid cloud intracture as shown in the figure

The organization which deals with both sensitive and non sensitive data can go for build in hybrid cloud platform infrastructure.

The sensitive information of the organization can be kept inside the private cloud infrastructure.

The non sensitive information of the organization can be outsourcing to the public cloud infrastructure.

The hybrid cloud uses both public and private cloud contain use assay by servicing both critical and non by critical business services in parallel.
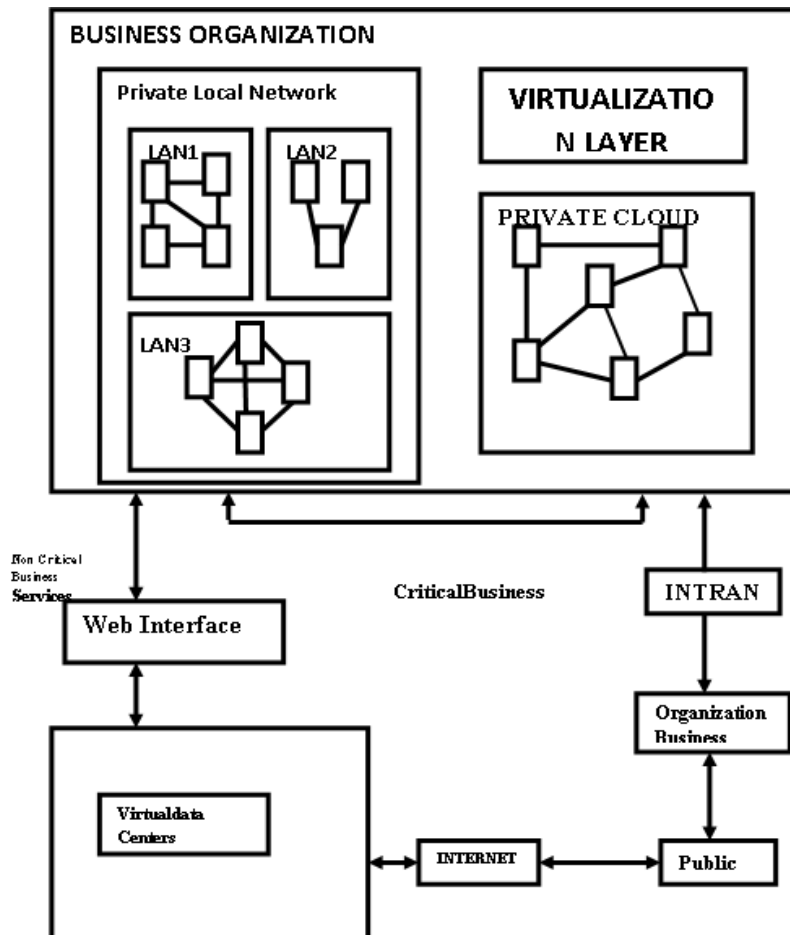
The security maintenance and control of the private cloud is taken care by the organization and the outsource business service are taken care and controlled by the taken care and controlled by the third party service provides.

Advantage of Hybrid cloud:

The hybrid cloud provides accessts both public users and private client and partners.

Since hybrid cloud provides both public and private cloud standardization low capital cloud and high security is achieved by its private cloud.

It provides efficiency customization; Availability, Reliability, Security and privacy threw the on premise infrastructure platform.

The responsibilities of the hybrid cloud are easily repeated as on –premise application an out sourcing application.

Building the hybrid cloud and its deployment is highly complex and it is the challenging task.

The security and maintenance of the hybrid cloud for and on-premise network separate control management.

The security for the non critical business is less when it is out sourced to third party cloud provides.

Community Cloud:

It is created and controlled by the group of organization who have shared same internet and they are all having same security policies.

The users of the community can access the network and share their resources outline threw interest access the community cloud is same as that of public cloud but the access to the community cloud is restrict the only belonging to the community.

The community cloud cannot be access by the unauthorized user who has not registered to the community group of organization.

The community cloud is jointly owned and administrator by the community group is by third party cloud service provider with restricted access only by the registered community.

Advantage of Cloud Computing:
1. Less expensive system for user
2. Number software instating
3. Low infrastructure cost
4. Low software cost
5. High performance
6. Less maintenance cost
7. Readymade software updates
8. High computing power
9. Unlimited storage
10. High data safety
11. High compatibility between operating system
12. Compatitaility document for word
13. Universal access to files
14. Group collaboration
15. Latest version application
16. User centric
17. High intelligent

Disadvantage of Cloud Computing:
1. Need Constant internet connection
2. Doesnot work with low internet connection
3. Slow processing
4. Limited Feature
5. Less data security
6. Less data customization

UNIT-3

FEDERATION IN CLOUD:

FEDERATION:

The combination of disparate things.so that they can act as one.As in federate states data or identy managment and making sure and all the right rools applied.

CLOUD FEDERATION:

1)   Cloud federation refers to the unionization of software infrastructure and platform services from desparate networks that can be accessed by a client we are the internet.

2)   The federation of cloud resources is facilliated through network gate ways that connect public or externel clouds like private or internel clouds owned by a single entity and/or community clouds owned by several co-oberating entities.

3)   Creating a hybrid cloud computing environment.It is important to note that federated

cloud cloud computing services still relay on they existing of physical data centers.

CLOUD FEDERATION BENEFITS:

1)   The federation of cloud resources allows client to optimize enterprise IT service delivery.

2)   The federation of cloud resources allows a client to choose.The best cloud service providers in terms of flexibility cost and availability of services to neat a particular business or technological need within their organization.

3)   Federation across different cloud resources pools allows applications to run in the most appropriate infrastructure environments.

4)   The federation of cloud resources allows an enterprise to distribute workload around the globe and move data between desparate networks and implement inuvative security models for user acess to cloud resources.

CLOUD FEDERATION AND IMPLEMENTATION:

1)   One weekness that exist in the federation of cloud resources is the difficulty in progarring connectivity between a client and a given externel cloud provider as they each possess their own unique network adressing scheme.

2)   To resolve this issue cloud providers must grant clients the permission to specify an adressing scheme for each server the cloud provider has external to the internet.

3)   This provides customers to with the ability to the access cloud services without the need for reconfiguration when using resources from different service providers.

4)   Cloud federation can also be implemented behind a firewall which providing clients with the menu of cloud services provided by one or more trusted entities.
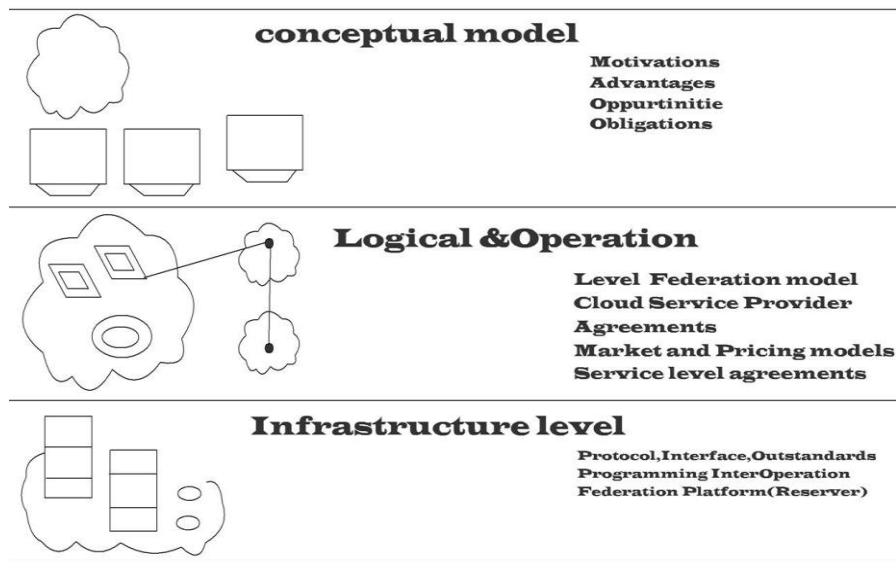
Four levels of federation:

 Technically Speaking federation is the

ability for to xmpp servers in different domains to excahange xml stanzas.According to the XEP-0238 xmpp protocol flows for inter domain federation.There are four basic types of federation:

1)Permissive

2)Verified

3)Encrpted

4)Trusted

Permissive Federation:

1) It occurs when the server accepts a connection from a peer network servers without verifying its identy using DNS look as are certificate checking.

2) The lack of verification are authentication may let to domain schooling that is the unauthorized use of third party domain name in an e-mail messaage in order to pertent to be someone else.

3) Which opens the door to white spread spram and other

with the relafese of the jaberd 1.2 servers which included support for the server dialware protocol premissive federation mirt is device on the xmpp network.

Verified Federation:

1) This type of federation occurs from a peer has been verified it users information obtain we are DNS and by means of domain specificas exchange before hand.

2) The connection is not encrypted and the use of identity verification effectively prevence domains pooling make this works.

3) Fedreation requires proper DNS setup and that is still subjective DNS voisoning attacks.

4) Verified federation has been the default service policy on the open XMPP since the release of the open source jaberd 1.2 server.

Encrypted Federation:

1) In this mode a server accepts a connection from a peer if an only if the peer supports TLS(Transport Layer Security)as define for XMPP in RFS(Request For Comments)3920.

2) The peer must prevent a digital certificate the certificate may be selfsine but this prevence using mutal authendication.If this is the case both parties procede to weekely verify identity using server dial pair.

3) XEP0220 define the server dialup protocol which is used between XMPP servers to provide identity verification servers dial pair uses the DNS of the basis for verifying identity the

basic approaach is that when a receiving server receives a server to server connection request from an orginatting server although server dialpair does not provide strong authentication are trusted federation and although it is subjective DNS voisoning attacks this results in an encrypted connection with we identity verification.

Trusted Federation:

1)   Hear a server accepts a connection from a peer under only the stipulation that the peer supports TLS and the peer can present a digital certificate issued by a root certification authority(CA) that is trusted by the authendicating server.

2)   The list of trusted root CAAS may be detemine by one or more factors such as the os,xmpp server or local service policy.

3)   In trusted federation use of digital certificates results not only in channel encryption but also in strong authendication.

4)   The use of trusted domain certificate prevense DNS voisoning effectively attacks but makes federation more difficult since such certificates have treditionally not being easy to uptain.

Privacy in cloud:

1)   Infotmation privacy or data privacy if the relationship between collection and dissemination of data technology the public expectations of privacy and then legal issues surrounding then.

2)   The challenge in data privacy is to share data while protecting persinally Identifiaaple Information(PII).The fields of data security and information security design and utilize software,hardware and human resources to adress this issue.

3)   PII as used in information security refers to information that can be used to uniqly identifying single individual.

4)   Privacy is used to business issue focussed an ensuring that personal data is protected from unauthorized and inappropriate collection use and discloser ultimatting preventing the trust lost of customer trust.

        And Inaapropriate fraudcilent activity such as identify theft e-mail spaming and phishning many countries have enappted loss to product individuals right to have their privacy respected such as (PIPEDA)Personals Information Protection and Electronic Documents Act.Which is result of the Poniment the Nimon,Insultute,Trustees of 2008.Which is now changed as ziber world.

        The Europpean commision directive on data privacy.

        The Swis Federal Data Protect Act(SFDPA)Which was developed by swis federal data protectional audience.

        In United States individual right to privacy is also protected in business sector regularly

requirements such as HIPPA(Health Insurance Portability and accountability Act)

GLA(Grammelur Link)biley act and the FCC sit CPNI(Customer Property Network Information) rools.

It includes following information:

1)   Any data that is collected directly from a customer.

2) Any data about a customer that is gathered indirectly.

3)   Any data about a customers usage behavior.

4)   Any data relative a customers system.

5)   Contact Information.

6)   Forms of Identification.

7)   Demographic Information.

8)   It occupational Information.

9)   Healthcare Information and online activity.

Privacy Risks and the cloud:

  Cloudcomputing has significant implementation for the privacy of personal information as well as for the confidentality of business of governmented information.

   Any information store locally on a computer can be store in a cloud including e-mail word processing documents,spreadsheets,videos,health records,tax or other financial information business plans,power point presentation,accounting,information advertising compigns sales,numbers,appoinment calenders address,books and mode.The location of information in the cloud may have significant effects on the privacy and confidality prottection to information and on the privacy obligations of those who process or store the information legal uncertanisites make a difficult to assess the states of information in the cloud as well as the privacy and confidentality prottections available to the users.

Protecting Privacy Information:

  The Federal Trade Commision(FTC) is educatting consumers and businesses about the importance of personal information privacy include the security of personal information under the FTC act the commission guards against and unfarmous and deseption by enforcing companies about how they collect use and secure consumers personal information.

They are ask follows:

1) Collection

2)Notice

3)Choice and cinsent

4)Use

5)Security

6)Access

7)Retention

8)Dispose

9)In future of privacy in the cloud

There has been a good deal of public discussion of the technical architecture of cloudcomputing and the business models that good support it.That is

1)   Responses to the privacy and confidently risks of cloud computing include better policy and practices.

2)   The cloud computing industry established cloud standards that would health users to analyze the difference between cloud providers and practises to assets the risks that user face.

3)   Users should pay more attention to the consequences of using a cloud provider and espesially to the providers terms are services for those risks not addressable soling through policies and practises changes in laws may be needed.

Security in the cloud:

1)   Clouds service providers are leveraging virtualization technologies combined with self service capabilities for computing resources we are internet.In this service provider environments virtual machines from multiple organizations have to be co-locatted on the same physical server in order to maximize the efficiencies of virtualization.

2)   Cloud service providers must learn from MSP(Managed Service Provider)model and ensure that the customers applications and data are secure.If they hope you return their customer base and competitiveness.More important this discussions focussed on why and how these resources should be protected in SAAS,PAAS,IAAS

3)   SAAS is model of software deployment in which an application is licensed for use as the service provider to customers on demand.

4)   PAAS is an outgrowth of the SAAS application delivery model with the PAAS model all of the facility required to support the complete life cycle of building and delivering web applications and services are available to developers.IT managers and endusers entirely from the internet without software doenloads are initializtion.

        The PAAS is also known as cloud where because it offers including work flow facilities so are application,design,application development the string,deployment and hosting as well as applications,   services   such   as   team   collabration   web   service

integration,security,scalability,storage persistence state managment application versioning,application instrumentation and developer community facilitiation.

PAAS:

It is delivery of computer infrastructure as a service.

It is an evaluation of web hosting and virtual private server offerings.

ITAAS:

(Information Technology AS A Service)

It is being proposed to take to bring the service model right to your IT infrastructure.Many organizations are in the process of transforming their IT departments in to self sastaining cost center operations.The transformation can take several years to be completed.Many large IT organizaions have adapted the ITIL(Information Technology Infrastructure Library)

XAAS:

(Anything As A Service)

1) Which is also subset of cloud computing. which is broadly encompasses a process of activatting reusable software components over the network.

2) All as a service offerings share a number of common attributes including littla exponditure since the required infrastructure is owned by the service provider,massive,Scalability,multitanancy

device and location independance allowing to the customers.

SAAS:

Cloud computing models of the futures will likely combined the use of SAAS utility computing and web2.0 collabration technologies to leverage the internet to satisfies the customers needs.

The technology analyst and consentic form list 7 security issues one should discuss with the cloud computing vendor.

1)Privilaged User Access:

Inquare about who has specialized access to data and about the hiering and management of such administrators.

2)Regulartry Compilence:

Make sure that the vendor is willing to under go external audits and or securrity certifications.

3)Data Location:

Does the provider allow for any control over the location of data.

4)Data Segregation:

Make sure that the encryption is available at all stages and that is encryption schemes where design and tested by experinced professional.

5)Recovery:

Find out what will happen to data in the case of a disaster do they of a complete restoration.

 If so how long would that take.

6)Investigate Support:

Does the vendor have the ability to investigate any in appropriate are illegal activity.

7)Long term viability:

What will happen to data if the companies goes out of business how will data be return and it what format.

 The base line security practises for the SAAS environment as currently formulatted as following.

 It is called SEDLC(Secure Software Development LifeCycle)involves identifying specific threads and the list they represent followed by design and implementation of specific controls to counter which must provider consistancy repeatability and conformence.

It has six phases:

phase 1:-Investigation

 Define Project Process and goals document then in the program security policy.

Phase 2:-Analysis:

 Analysis existing security policies and programs analyse current threads and controls examine legal issues and perform risk analyses.

Phase 3:-Logical Design:

 Develop the security blue print plant insident responds to disaster and determine the feasibility of continuing and are outsourcing the project.

Phase 4:-Physical Design

 Select technologies to support the security blueprint develop a destination of a successful solution design physical security meases to support technological solution and preview and approve plants.

Phase 5:-Implementation

 By are develope security solution and the end of these phase present a tested package to

managment for approval.

Phase 6:-Maintenance

Constantly monitor , test , modify , update and repair to respond changing threads

In the secure software DLC application coders return in a consistence manner that can easily audited and enhanced.

Core application services are provided in a common structured and repeatable manner and frame work models are throughly tested for security issues before implementation and continuosly retested for conformance through the software regrettion test cycle.

XMPP:

Xtensionable Messaging and presents Protocol. It is an XML based protocol used for real Xtensionable instant messaging and presents information.

The technology is also enables collabration across many different presents.System such as Ms office , communicatin server IBM AOL-AIM ,

Goole and yahoo.These are has through to support features voice-over-Ip and file transfer signalling.

XMPP based serever and software is deployed on goole server across the internet.

The XMPP specification have been published as RFC 3920 and RFC 3921.Because a client users http(Hyper textTransfer protocol). Most firewalls allows users to fetch and host messages without network.

Anega:

1)www.manjarasoft.com it is a cloud application platform developed by manjarasoft based in melbone Australia.

2)It is designed to support rapid development and deployment of parallel and distributted application or private or public clouds.

3)It can be deploy on a public cloud such as AMAZON EC2 accessable the internet to the subscriber or a private cloud constitued by a set of notes with restricted assets.

4)Anega altness a work load distribution for accelariting application in both linux and microsoft.net frame works.

Advantages:

1)Support multiple programming and application environment.

2)Simultaneous support of multiple run time environments.

3)Rabid deployment tools and frame works.

4)Ability to hardness multiple virtual and or physical machines for asirlatting application provisioning based on users QOS(Quality Of Service)SLA(Service Level Agreement)requirements.

5)Built top of the microsoft .net frame work with support for linux environments through mono.

Anega offerings:

1) It offers three types of capabilities which are essential for building assaratting and managing the clouds and their buildings applications.They are anega includes a which compains API and tools to enable users to rapidly develop applications.

2)Anega also allows uses to built different run time environments such as enterprise or private cloud by harnessing compute resources in network are enterprise data centers Amazon Ec2 and hybrid clouds by company enterprise private cloud managed by anega from other enetrprise cloud Amazon Ec2 built and manage using XEN server.

Accelaration:

Anega supports rapid development and deployment of applications in multiple runtime environments renning different os such as windows , linux , unix anega users physical machines as method possible to achieve maximum utilization in local environment.

Managing:

Management tools and capabilities supported by anega which include a GUI and API to setup monitor , manage and maintain remove from global anega compute clouds.

Anega also has and accounts mechanism and managers priorities and scalability based on SLA/QOS which enables dynamic professioning anega architecture.

ANEKA ARCHITECTURE:

Aneka is a cloud application platform features a homogeneous attributed run time environment for applications.

i)This environment is built by aggregating together physical and virtual nodes host the aneka containers.

ii)The interaction with hosting platform is mediated through the PQL(Platform Abstraction Layer) Which hides in miss implementation all the heterogeneity of the different os.

iii) The available services can be agreegated in to agree major categories.

SERVICE LEVEL AGREEMENTS:

i) Fabric Service

ii) Foundation service

iii)   Application service

Fabric service:

It implemented the operation of the infrastructure of the cloud.These services include HIA and fail over for involved readability node membership and directory resource professing performance monitoring and hardware professing.
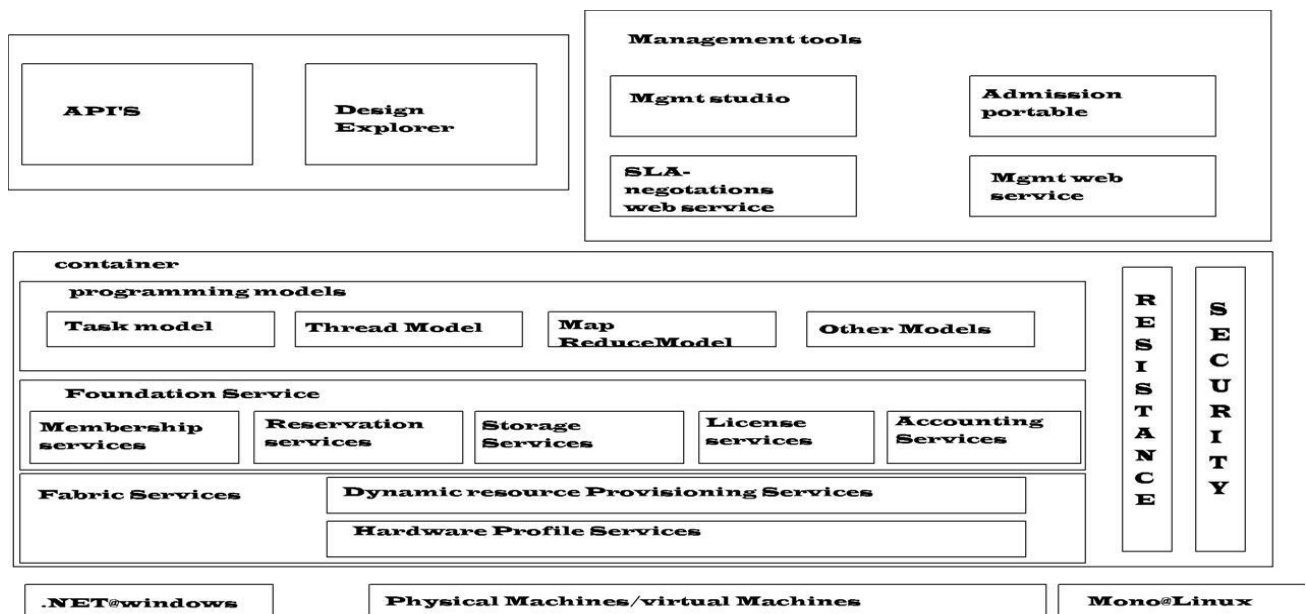
FOUNDATION SERVICE:

Foundation services constitude the core functionality of the aneka middle ware may provide a basic set of capabilities that enhance application execution in the cloud.These services provide added value to the infrastructure and/or of use to system administrators and developers within this categories. we can list storage management resource reservation , reporting, accounting building, services monitoring and licency.

APPLICATION SERVICES:

Application services deal directly with the execution of applications and/or in charge of providing the appropriate run time environment for each application model.

The leverage foundation an fabric services for several tasks of application execution such as elastic scalability data transfer and performance monitoring ,accounting and building at this level aneka expresses its true potential in supporting different application models and

Management tools			
API'S	**Design Explorer**	**Mgmt studio**	**Admission portable**
		SLA-negotations web service	**Mgmt web service**

container
 programming models

Task model	Thread Model	Map ReduceModel	Other Models	R E S I S T A N C E	S E C U R I T Y

Foundation Service

Membership services	Reservation services	Storage Services	License services	Accounting Services

Fabric Services   Dynamic resource Provisioning Services
Hardware Profile Services

| .NET@windows	Physical Machines/virtual Machines	Mono@Linux

distributed programming patterns.

1.Define cloud storage?

Cloud storage means the storage of data online in the cloud. Where in a combines data is stored in and accessible from multiple distributed and connected resources that comprise a cloud.

Cloud storage can provide the benefits of greater accessibility and reliability rapid deployment strong production data backup archival and disaster recovery purposes and lower overall storage cost as the result of not having to purchase, manage and maintain expensive hardware.

2. Explain about types of cloud storage?
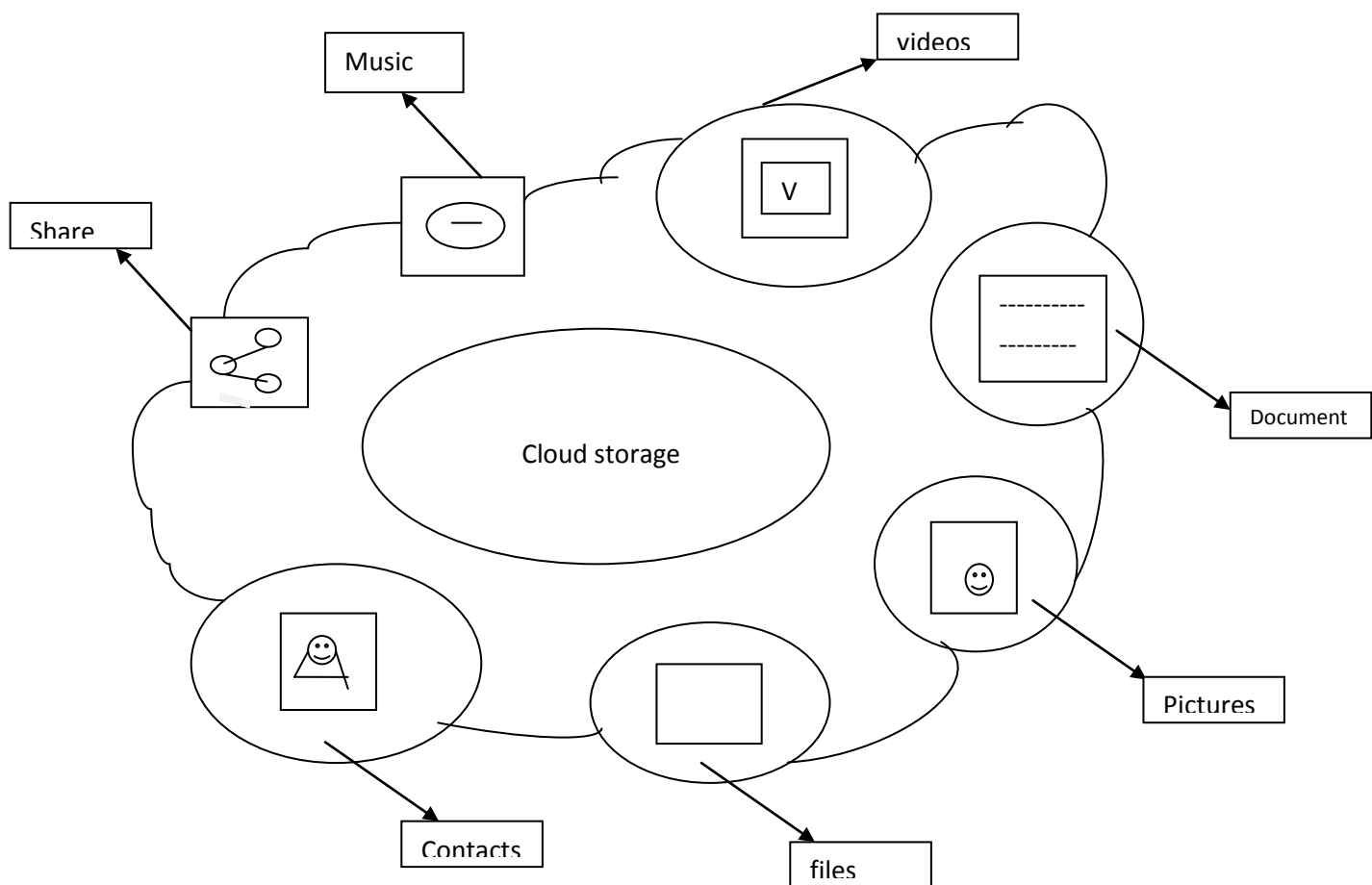
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recovery purposes and lower overall storage cost as the result of not having to purchase, manage and maintain expensive hardware.

Storage devices:-

There are 2 types of storage devices.

They are:-

        *Black Storage Devices

         *File Storage Devices

Black Storage Devices:-

Black Storage Devices offers raw storage to the clients. This raw storage is partition to create volumes.

File Storage Devices:-

        File Storage Devices offers storage to clients in the form of the files maintaining its own file system. This storage is in the form of NAS (Network Attacked Storage).

Cloud Storage Classes:-

        There are 2 types of cloud storage classes available:-

      *Unmanaged cloud storage

       *Managed cloud storage

Unmanaged cloud storage:-

        Unmanaged cloud storage means the storage is pre configured from the customer. The customer can neither format nor install its own fill system are change drive properties.

Managed cloud storage:-

        Managed cloud storage offers online storage space on demand. This system appears to the user to be a raw disk that the user can partition and format.

3. What are the Advantages and Disadvantages of Cloud storage?

        Advantages:-

1. There are many benefits to using cloud storage most notable is file accessibility file storage in the cloud can be access at any time from any place so long as you have internet access.
2. Another benefit is that cloud storage provides organization with off-side i.e.) remote backups of data. Which reduces is cost associated with disaster recovery.

Disadvantages:-

1. Unfortunately the biggest disadvantage to cloud storage is that users are limited by bandwidth
2. It your internet connection is slow or unstable.

You might have problems accessing or sharing your files.

4. Explain about Amazon S3?

 *Amazon simple storage service if provide the simple web services. Interface that can be used stored and retrieve any amount of data at any time from any ware on the web.

*S3 provides the object oriented storage service for user. User can access their object through soap (simple object access protocol).

*The fundamental operation of S3 is called object each object is stored in a packet are retrieve in a unique developed assign key.

*Through the key value programming inter face user can write, read and delete object containing from 1, 2, 5 of data.

*There are 2 types of web services interface for the user to access the data stored in Amazon cloud.

- Rest Interface
- Soap Interface

Key feature of S3:-

*Retied through geographic discussion design to provide 99.99999999 person durability and 99.999 person availability of object over a given year with chipper RRS returns retained storage.

*per object URL's and ACL's access control list default download protocol of HTTP a bit protocol interface is provides to lower cost of high scale distribution.

*First 1GB per month input or output in free and then dollar of $0.8 to dollar of $0.15 per GB for transfers outside and S3 regent.

5. Explain about map reduce technique?

Map reduces:-
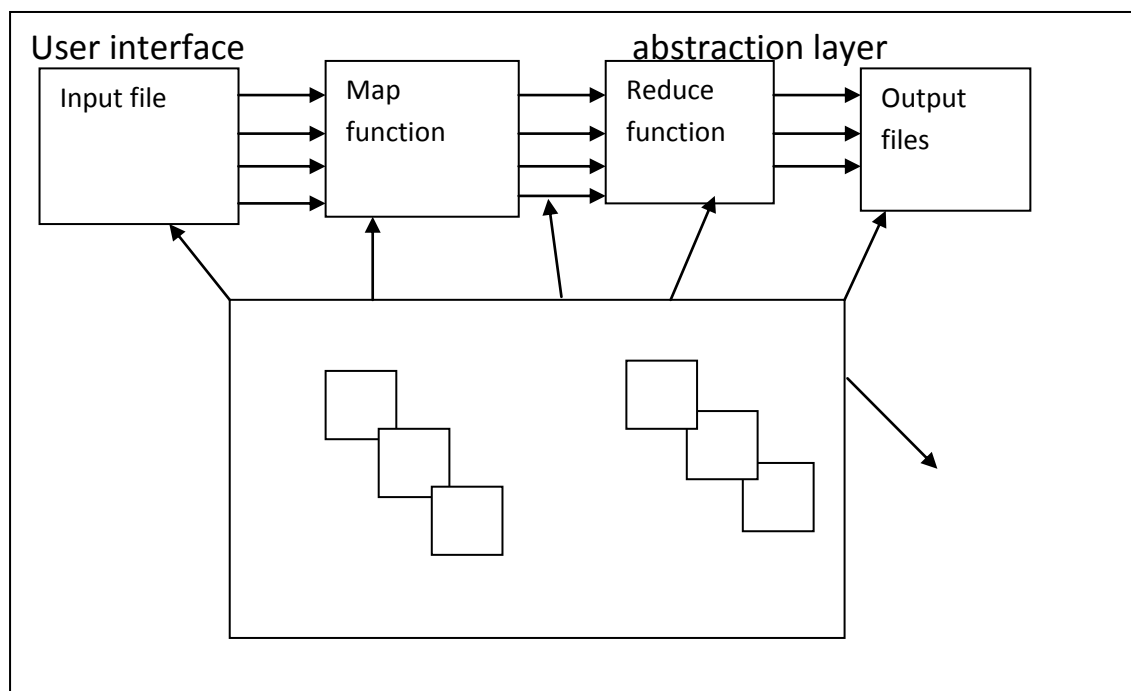
It is a software framework which supports parallel and distributed computing on large data sets. This software framework abstracts the dataflow of running a parallel program on a distributed computing system by providing users with two interfaces in the form of 2 functions.

- Map and
- Reduce

In this framework the "value" part of the data" key, value" is the actual data and the "key" part is only used by the map reduce to controller to control the data flow.

Formal Definition:-

The map reduce software framework provides and abstraction layer with the data flow and flow f control to users and hides the implementation of all data flow stapes such as data partitioning, mapping, synchronization, communication and scheduling. Therefore, the user over rides the map and reduce functions first and then invokes the provided map reduce function from the library to start the flow of data.

Map reduces logical data flow:-

- The input data both the map and the reduce function has the particular structure.
- The input data to the map function is in the form of a (key, value) pair). The reduce functions receives the intermediate (key, value) pair) in the form of the group of intermediate values associated with one intermediate key (key, set of values).

Formal Notation of map reduces data flow:-

- The map function is applied in parallel to every input (key, value) pairs) and produces new set of intermediate (key, value) pairs).
- Then the map reduce library collects all the produce intermediate (key, value) pair) from all input (key, value) pair) and sorts them based on the "key" part.
- Finally "key" part the reduce function is apply in parallel to each group produce in the collection of "values" as output.

Map reduces actual data and control flow:-

The main responsibility of the map reduce frame work is efficiently run the user program on a distributed computing system. In summarized, this is the following steps:-

1. Data partitioning

2. Computation partitioning
3. Determine the master and workers
4. Reading the input data / data distribution
5. Map function.
6. Compiler function.
7. Partitioning function.
8. Synchronization.
9. Communication.
10. Sorting and grouping.
11. Reduce function.

Explain Hadoop?

Hadoop is an open source implementation of map reduce coded and release in java rather than C by Apache.

The Hadoop implementation of map reduce uses the Hadoop distribute file system (HDFS).

As its underlying layer rather than GFS.

The Hadoop code is divided in to 2 fundamental layers:-

- Map reduce engine and
- HDFS.

Map reduce engine:-

Map reduce engine is the computation running on top of HDFS as its data storage manager.

HDFS:-

It is the distributed file system inspirit by GFS that organizes files and stores the data on a distributed computing system.

HDFS Architecture:-

HDFS Architecture has a master slave architecture containing single name nodes as the master and a number of data nodes as workers. To store file in this architecture HDFS split the file in to fixed size blocks and stores them on workers.

The mapping of block to data nodes is determined by name node.

The name node also managers the file system metadata and namespace.

HDFS Features:-

Distributed file system have special requirements such as performance scalability, concurrency control, fall tolerance and security requirements to operate efficiently.

HDFS Fall tolerance:-

One of the main aspects of is its fall tolerance characteristics.

Since, Hadoop is design to deployed and low cost ordered by default in the hardware failure in this system common rather than an exception.

Block replication:-

To reliably store data in HDFS file blocks are replicated in this system.

In other words HDFS stores a data file as a set of and each block is replicated and distributed across the whole cluster.

Replica placement:-

Because is another factor to fulfil the desired fall tolerance in HDFS.Although storing replaces on different nodes located in different racks. Across the roll cluster provides more reliability. It is sometimes ignore as the cost of communication between two nodes in different rack is reliability high in comparison with of different nodes located in the same rack.

HDFS Operation:-

The control flow of HDFS operation such as write and read can properly highlight roles of the name node and data nodes. In the managing operations in this section the control flow of the main operations of HDFS on files in further describe to main interaction between the user name node and data node.

Reading a file:-

To read a file in HDFS users sends an "open" request to the name node to get the location of file block.

For each file block the name node returns the address of a set of data values containing replica information for the requested file. Up reserving such information the user calls read function to connect to the closes data node containing the first block of the file.

After the file block is streamed from the respective data node to the user the establish connection is terminated and the same process is repeated for all blocks of the requested file until the hole file is streamed to the user.

Writing to the file:-

Writing to the file in HDFS a user sends a "create" request to the name node. To create a new file in the file system namespace.

If the file does not exist. The name node notices the user and allows starting writing data to the files by calling the writing function.

Cloud computing providers:-

Various cloud computing platforms are available today. They are Sales force. Com. This is the force. Com development platform this provides a simple user interface and lets users log in built an app and push it in the cloud.

1. Appistry:-

The Appistriescloud queue platform is efficient in delivering a runtime application .

2. Platform:-

This platform is very useful to create scalable and service oriented application.

3. App scale:-

The App scale is open source platform for Google app engines app.

4. ATNT:-

ATNT allows access to virtual servers and managers the virtualization infrastructure it includes network server and storage.

5. Engine yard:-

The Engine yard is the application cloud computing platform.

6. Anomaly:-

The Anomaly provides service is the IAAS platform.

7. Flexi scale:-

The Flexi scale offers a cloud computing platform that allows flexible, scalable and automated cloud infrastructure.

8. G Cloud 3:-

It offers private cloud solution in its G platform.

9. GIZMOX:-

The GIZMOX visual web GUI platform is best suited for developing new web applications and modernized the legacy of wave on Asp.net, d html etc.,

10. Go Grid:-

The Go Grid platform allows the users to deployed web and data base cloud services.

11. Google:-

The Google's app engine lets the users built, run and maintain. There applications on Google's infrastructure.

12. Long Jump:-

The long jump offers a business application platform and PAAS.

13. Microsoft:-

The Microsoft's windows azure is a cloud computing is platform offering an environment to create cloud applications and services.

14. Orange scale:-

It offers a PAAS for non programs built in an application is as easy as spread sheet.

15. Rack space:-

It provides servers on demand we are a cloud platform of virtualized servers.

16. Amazon EC2:-

The Amazon EC2 lets the users configure and control computing resources while running them on Amazon's environment.

Unit- 5

Explain some open source cloud platform?

Data centre or virtual to form virtual data centre as cloud provider to the user of web their as follows:-

*Eucalyptus

*Open nebula

*Nimbus

*V-Sphere

With above mention first three are free open source software which as virtualized data centre owning large number of services.

Eucalyptus:-

Open source software that provides IAAS cloud. The main feature of software is supporting virtual network and its management does not support virtual storage.

The OS of Eucalyptus is Linux with VST platform licenses. The input and output data structure is operator on the WSDL document with WS security features and resources manager use when this Eucalyptus are as follows:-

- Instant manager
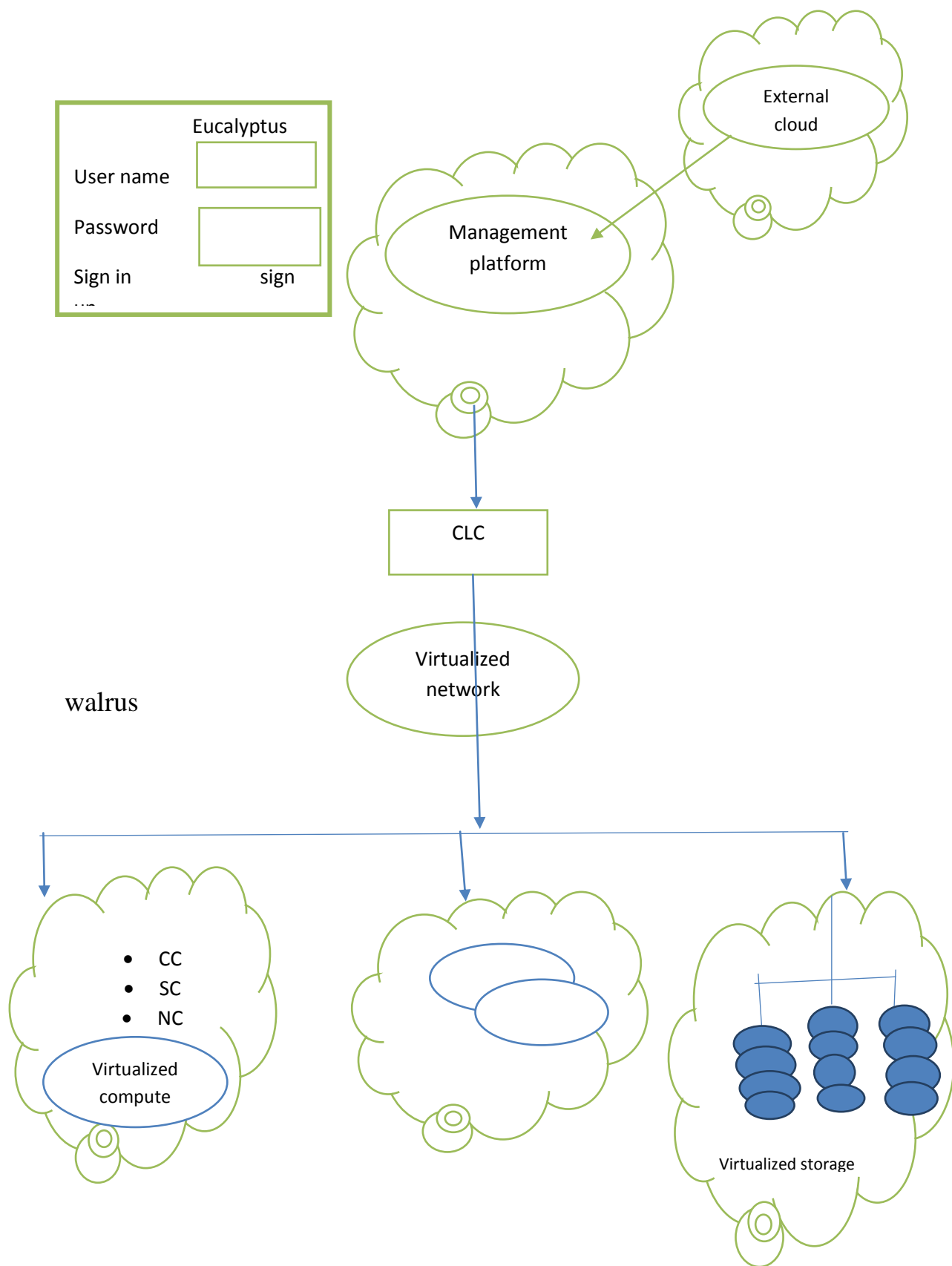- Group manager
- Cloud manager

Eucalyptus

User name

Password

Sign in   sign
up

External
cloud

Management
platform

CLC

Virtualized
network

walrus

- CC
- SC
- NC

Virtualized
compute

Virtualized storage

Instant manager:-Instant manager takes care of execution controlling and termination of the virtual machine.
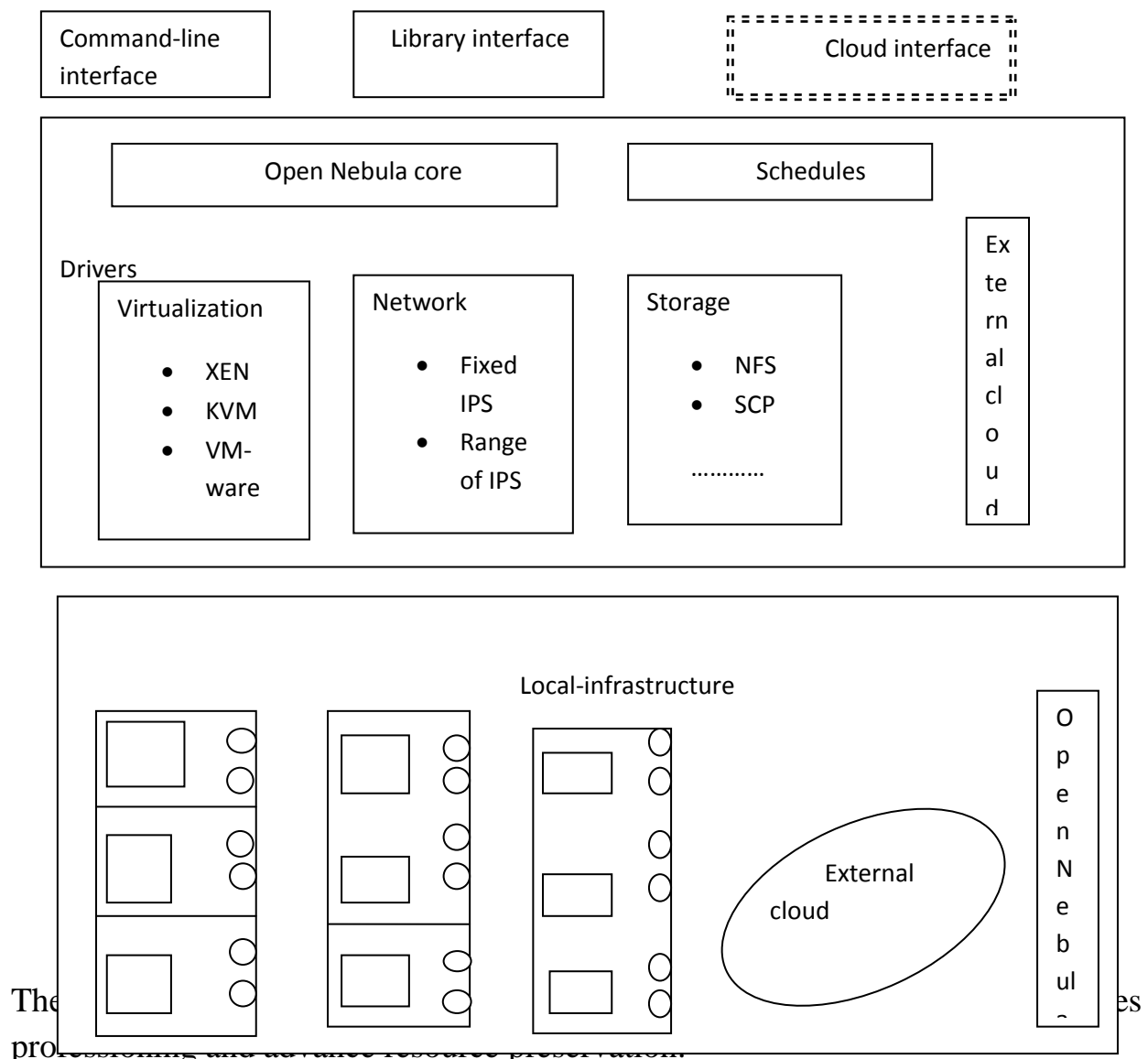
Group manager:-Group manager performing the grouping of virtual information and its scheduling.

Cloud manager:-   Cloud manager is the entire control handler of the cloud which managers the virtual resources and decision making.

Open Nebula:-It is the free open source software of building dynamic professioning of virtual networks and its scheduling.

The application programming interface and language of the Nebula is XMC, RPC, CLI and JAVA.

The hypervisor of the open Nebula is XEN and KVM.

Command-line interface	Library interface	Cloud interface

Open Nebula core   **Schedules**

Drivers

Virtualization
- XEN
- KVM
- VM-ware

Network
- Fixed IPS
- Range of IPS

Storage
- NFS
- SCP
…………

External cloud

Local-infrastructure

External cloud

Open Nebula

The   es professioning and advance resource preservation.

The public cloud interface of open Nebula is Amazon EC2 host machines.

Nimbus:-Nimbus is also an open source pre software package used for providing virtual networks with Amazon EC2 public cloud interface with EC2 window clients.
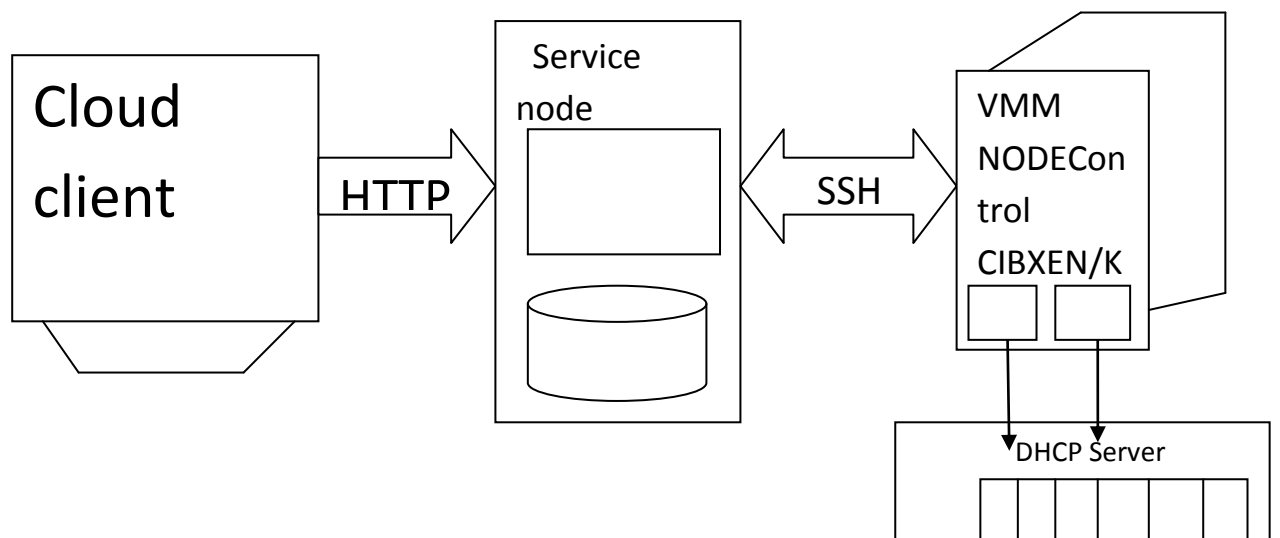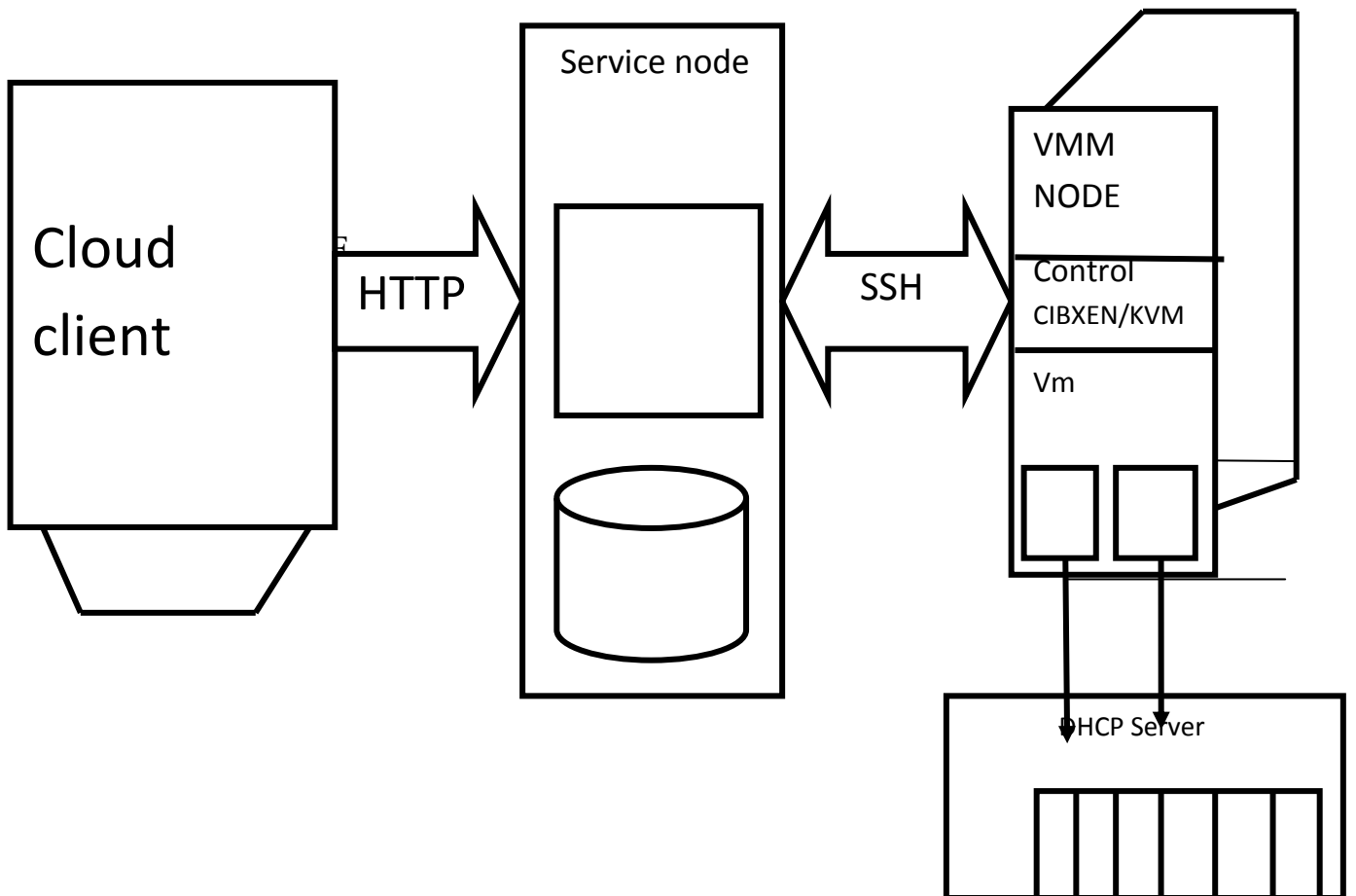
The virtual machine monitor of Nimbus is XEN and KVM the cluster are virtualized with the deployment of virtual machine.

It supports WS security and the resources are maintained by web services resources framework with CCI language.

V-Sphere:-V-Sphere is the preparatory operating system has to be purchase for cost for using virtual cloud and data management.

The OS is virtualized in this V-Sphere data centre with VM-ware as the virtual machine monitor.

The main features of V-Sphere are:-

- Data security
- Virtual storage management and
- Dynamic resource management

It has highly supports available, reliability, security, and scalability and fall tolerance.

It produces 2 services:-

- Application V-Sphere services
- Infrastructure V-Sphere services

❖ Application V-Sphere services:-

The 3 services provided by application service of V-Sphere are

1. Availability
2. Security and
3. Scalability

- The features of availability service are V-motion, storage motion, availability, fall tolerance and data backup recovery.
- The security package software of V-Sphere is V-shield and VM-safe
- The scalability feature of V-Sphere are
  o Dynamic resource scheduling.
  o Resource professioning.
  o Resource management.
  o Resource pooling.
  o Resource backup.

❖ Infrastructure V-Sphere services:-

The 3 component package of infrastructure V-Sphere services are as follows:-

1. V-Compute
2. V-Storage
3. V-Network

- The VM-ware virtualization libraries like EXS, EXSI and DRS support V-Compute.
- The V-Storage is provided by thin professioning libraries of VM-ware.
  - The switching and networking functions are provided by V-Network.