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JANUARY • MONDAY

02

(002-363) WK 02

Cloud Computing

Peer-to-Peer

Client-server

Basic Concepts

1) Deployment Model

{ 2) Service Model

→ (i) Public Cloud: Easily accessible to general public. less secure.

3) E.g.: emails.

4 (ii) Private Cloud: Accessible to within an organisation. More secure.

5 (iii) Community cloud: few services given to specific NGOs etc.

(iv) Hybrid cloud: Combination of any 2 of above clouds.

Service Models -

- (i) IaaS (Infrastructure as a Service)
- (ii) SaaS (Software as a Service)
- (iii) PaaS (Platform as a Service)

Amazon → EC2 → computing

→ S3 → storage

IaaS providers → AWS, Microsoft

Azure, Google Cloud

hardware, system, application
provided with OS.

→ Application

PaaS → OS of your choice

SaaS

→ Software managing
(end user) implementation done by it.

It provides UI to access
their services uploaded
on cloud.

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- IaaS → cloud practitioners, production team or deployment team.
- is done by devops.

Openstack → cloud computing OS.
it works only on IaaS.

→ Deployment Model

- (i) Open on premises distribution.
- (ii) openstack based public cloud.
- (iii) Hosted open stack private cloud

- (iv) Open stack as service.
- (v) Appliance based openstack.

THURSDAY • JANUARY

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Types of cloud

- (i) Public Cloud: It refers to internet based computing for public use. It provides less security resulting in more privacy risks. It is very cost effective and provides free access to users.
- Eg - Gmail
- (ii) Private cloud: It refers to internet based computing for particular organisation. It provides access to users with nominal fee.
- It is customized according to the demand of the users.
 - It provides more security risks resulting in less privacy risks.
 - For eg Microsoft Azure, Oracle
- AC :

- AC :
- (iii) Hybrid cloud: It is heterogeneous mixture of both public & private cloud providing users the benefits of both types. It is cost effective and security effective. It is customised according to the needs of organisation. It is used for critical activities.
- which needs good efficiency but without making it public.
- Eg - Google drive
- (iv) Community cloud: It is internet based computing which is used by a business community or industry sector. It is also customised according to the requirement of business organisation. Its infra - structure is shared by an organisation that has shared common task.
- Cloud may be managed by third party or an organisation.

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SATURDAY • JANUARY

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(009-358) WK 03

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09

(V) Broad networks access: Means no geographical boundaries are there.

(VI) Cost effective: Pay as per your use.

(VII) Security: Provides additional security features such as user authentication.

(VIII) Automation: Enables IT teams

and developers to create, modify and maintain cloud resources

without involvement of any human.

(IX) Measured services: Cloud services used by providers are monitored by providers as well as analyst.

08 SUNDAY

(IV) Resource pooling: Cloud service provider can share resources among clients providing each

Limitations of Cloud

→ Internet connectivity

(i) Internet connectivity

(ii) Data leakage

(iii) Limited control

• Org. compute cloud, cluster

• Grid computing.

- Cluster → in which group of computers are linked together so that they can act as a single entity.
- Grid → It is a collection of computer resources from multiple locations to reach a common goal.

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Accessing the role of open standard

- ⁹ Open standard is a standard that is freely available for adoption.
- ¹⁰ is freely available for adoption.
- ¹¹ implementation & updates. Eg -
- ¹² XML, SQL, HTML.
- ¹³ Open standard establishes protocols and building blocks that can help make applications more functional and inter-operable.
- ¹⁴ Cloud computing technology is the result of convergence of many different standards.
- ¹⁵ The standards help to enable different business models can support such as SaaS, Web 2.0 applications and utility computing.

These businesses require open standards so that data is both portable and universally accessible.

Virtualisation -

- Discuss various virtualisation types.
- Load balancing in virtualisation
- New virtualisations in relation to cloud computing.
- Virtualisation refers to creation of virtual copies (not actual).
- ⁵ multiple copies of something such as server, desktop device etc.
- ⁶ The standards help to enable different business models can support such as SaaS, Web 2.0 applications and utility computing.

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VPC (Virtual Private Cloud)

- 9 Private cloud computing env.
- 10 contained within public cloud.
- 11 It is a multi-tenant model that provides an isolated env. within public cloud.
- 12 Virtualisation is of 4 types -
- 13 (i) Hardware
- 14 (ii) Operating systems (for load balancing).
- 15 (iii) Server virtualisation
- 16 (iv) Storage virtualisation
- 17 # Virtualisation in Cloud Computing -
- 18 It plays very important role in
- 19 cloud computing technology. In
- 20 this users can share the data present in cloud like

applications etc. but actually shares infrastructure with the help of it. The main use of virtualisation technology is to provide application with standard versions of cloud users.

Suppose if next revision of that application is released than the latest version to their cloud cloud provider has provide users and practicability it may impossible because it's expensive. To overcome this problem, Virtualisation is used.

While using virtualisation all

Answers and software applications

which are required by cloud

providers are maintained by

the 3rd party people and

cloud providers has to pay

'money' on annual or monthly

basis.

Load balancing & Virtualisation-

Cloud load balancing is defined

as the method of splitting

work load and computing

properties in cloud computing.

It enables enterprise to manage work load demands on application

demands by distributing resources among numerous computers.

Networks are servers. As traffic

on internet is growing rapidly which is about 100% of annually

off traffic hence, the workload

on servers growing so fast

which leads to overloading

of servers mainly for popular

web servers. These are a

solutions to overcome problem

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of overloading

(i) single server solution

(ii) multiple server solution

When multiple servers are allotted with the help of load

balancer to divide working

capacity of cloud storage. which

gets allocated to guest VMware

by this division, workflow

continues in smooth manner.

posses good features like

multiple server, workload

multiple VMs, memory, storage

multiple CPU, network, disk

multiple IP address etc.

allows multiple guest OS to

run simultaneously.

disadvantages of this

method are as follows

1. cost of hardware is high

2. maintenance cost is high

3. power consumption is high

4. cooling system required

5. space required is high

6. management overhead is high

7. security issues

8. compatibility issues

9. scalability issues

10. downtime issues

11. performance issues

12. reliability issues

13. compatibility issues

14. management overhead is high

15. power consumption is high

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run on single host OS in at same time.Utility Computing : It is a service* * * wall - businessprovisioning model, that offers computingresources such as hardware,software, storage, etc. to theclients as and when they requirethem on demand basis. It is alsorequired as pay-per-use model asit provides the client the facilityto use as per demand & pay accordingly.Similarly, utility computing works onsame concept which is pay per use model.Pay-per-use model - It is a subsetof cloud computing allowing user to scale up and down according to needs.Clients, users or business organizationsuse amenities such as storage, spacehardware, software, network bandwidthThis mode is based on its resources tomake easily available the resourcesin technology. Eg - electricity billa consumer pays his electricity billsper no. of units consumed by us.Similarly, utility computing works onsame concept which is pay per use model.

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Steps involved in pay per use -

The processes in transformational
various steps involved are -

- (i) Determining the need.
- (ii) Evaluating service providing claims.
- (iii) Accessing health of computer resources.
- (iv) Identifying resource provisioning environment.
- (v) Map out a time frame

Example - Travel reservation services
online retailers (amazon, flipkart)
startup and small businesses.

- Machine Image : It stores meta data, permissions and data from multiple disk of VM disk.
- Machine image can be used in system failure / maintenance.
- (i) easy access to IT resources.
 - (ii) save time & resources.

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JANUARY • THURSDAY

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(iii) Maximise saving

(iv) shorter time to market

→ Best practices

- (i) choose a suitable service provider.
- (ii) upload transparency about shared responsibilities.
- (iii) choose a suitable service provider.
- (iv) choose a suitable service provider.
- (v) choose a suitable service provider.

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backup and recovery, instance cloning scenarios. It is raw copy of operating system and core**cloning Scenarios.** It is raw copy of operating system and core**software for a particular env.** on a specific platform. Ease of portability.**Machine imaging** is the process used to provide system portability and provision and deploy system through capturing state of system using system image.**Eg - AMI (Amazon machine image)**
It is system image used.**In cloud computing.****Ans uses AMI to store copies of virtual machine.****An AMI is a file system image that contains an OS all device drivers****any application and static information not working machines should have.****⇒ Putting application -****Application portability in cloud****computing provides flexibility to move to different platforms on different cloud service vendors****but technology and providers**

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APR

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MAY

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JANUARY MONDAY

restrictions persist.

Portable applications are beneficial

in migration of infrastructure,

platforms and services from one

cloud service provider to another.

Hurdles

(i) Security

(ii) compatibility

(iii) Many have different positions

• They focus on technology without

Lack of standard cloud APIs

which can be utilised by cloud

providers or vendors in mind

developing their technology while

developing their technology while

• handle code, database schema and

product.

• uncertainty about rights of users

to get access and manage data stored

in the cloud.

• Data access problems are another

aspect of service selected data

management cycle.

Capacity Planning

It determine whether systems

are working properly used to

measure their performance

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- determine usage of patterns and predict future demands of cloud capacity. The goal of capacity planning is to maintain workload without improving efficiency.
- 1 Defining baseline & metrics -
 - 2 In business current system
 - 3 capacity on workloads should be determined as measurable quantity over time. Many developers create cloud based application and website based on lamp solution stand.
 - 4
 - 5
 - 6
 - 7

01

WEDNESDAY • FEBRUARY

LAMP → PHP (scripting language)



10 LOS

11

System Metrics -

1 Determining what each system

2 is capable of and how

3 resources of a system affect

4 system level performance.

Network capacity -

5 It is maximum amount of data

6 that can be reliably transferred

7 b/w different locations over a

8 network.

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FEBRUARY • THURSDAY

02

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Scalability & Elasticity in Cloud Computing -

Cloud elasticity: Ability of cloud to automatically expand or compress

The infrastructural resources on

a sudden up & down in requirement so that workload

can be managed efficiently.
Eg - consider online shopping site

increases transaction workload

increases during festive season's for this particular period of time

users need a spike up. In order

to handle these situations we

can go for cloud elasticity

services rather than cloud

Scalability - As soon as , then

resources can be asked for

Withdrawing

C: E is short. term & C is long

for long term.

Cloud Scalability : It is used to

handle growing workload where

good performance is also needed to

work efficiently with software

you are owner of a company whose

database size was small. In earlier

days but as time passed your

business grow and size of database

also increased . So , in this case ,

you just need to request your

cloud service vendor to scaleup

your database capacity to handle

heavy workload .

⇒ Characteristics of Scalability -

1) It is used to buffer static needs

while elasticity is used to

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MONDAY • FEBRUARY

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FEBRUARY • TUESDAY

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fulfil dynamic needs of business

organisation

scalability is pay-per-use

- 1) Scalability is useful where workload remains high and increases statistically.

scalability is a long term

planning whereas elasticity is a

short term planning

- explain architecture of openstack

- 1) its various types of services and

workflow of services

identity and image services. More than a dozen projects can also be

managed public and private clouds.

3 components

1) IaaS SaaS PaaS

2) The tools that comprise openstack

platform called projects handle

the core cloud computing services

to compute networking, storage

identity and image services. More

than a dozen projects can also be

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WEDNESDAY • FEBRUARY

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handled together to create unique deployable cloud.

openstack and virtualisation

management platforms make it easier to manipulate features and

functions of virtual resources.

openstack actually uses virtual

resources to run a combination of

user tools.

workflow : It is a series of

commands known as scripts . These

scripts are bundled into packages

called projects that relate tasks

09

FEBRUARY • THURSDAY

In order to create environment, that create cloud environment.

openstack relies on 2 types of softwares -

(i) Virtualisation → that creates a

layer of virtual resources abstracted from hardware.

(ii) Base OS → that writes out

commands given by openstack.

Architecture

9 components :-

(i) Nova (Compute) : It manages

computer resources (deleting, creating & handling the scheduling)

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(ii) Neutron (Networking service): It

is responsible for connecting all networks across openstack. It

manages all networks & IP addresses.

(iii) Swift (Object storage): It is

object storage services with high

fault tolerance capability and it is

used to retrieve unstructured data

objects.

(iv) cinder (Block storage): It is

responsible for providing block

storage that is used to make

accessible using API.

(v) key stone (Identity service): It

is responsible for all type of

authentication & authorisation in

all type of services.

(vi) Glance (Image service provider):

It is responsible for registering, storing

& retrieving virtual disk images from

complete network.

(vii) Horizon (Dashboard): It is

responsible for providing web-based

interface for open-stack services.

It is used to manage, provision

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and monitor cloud resources.

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MST Ques

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(Vii) Cermetem (Telemetry) : It is responsible for metering & billing

of services used.

(ix) Heat (Orchestration): It is Ans - subset of cloud. → def.

Process → all 5 point with description.

Ans - provisioning with auto - scaling of used, for on-demand services

(i) It involves accessing internal needs and combination of services and resources required. They provide valuable integrated fully customised utility computing solutions and resources as per the clients needs.

(ii) Evaluating the service provider claims. It is essential to determine

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whether their services will empower users to be more effective

in accomplishing their goal on time.

Understanding which tasks to be supported and what level of resources

will be provided if essential.

(iii) Access the health of computing

resource: It is typical to deploy

source that looks after the

and dynamic resource monitoring

utility computing resource involves

identifying failure and network

storage & app resources

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(iv) Identifying the source provisioning:

It involves analysing service provider

scalability to customize & configure

without over provisioning or under provisioning resources.

(v) Time span: The final step for

architecturing a utility computing submission involves mapping out the schedule identifying when a specific resource needed and for how much time.

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Best practices

- (i) Assess current workload.
- (ii) Choose a reliable utility service provider.
- (iii) Uphold transparency with service provider.
- (iv) Discuss all security concern with service provider.
- (v)
- (vi) Maintain visibility
- (vii)
- (viii) Setup identity & access management solution.
- (ix) Check & recheck compliance requirement.

(x) Reverse automation .

Q2— Discuss different types of clouds

and diff. type of services in cloud.

Ans— definition → Cloud computing

— 4 types of cloud: public, private,

community, hybrid.

Draw diagram & explain.

— example : iaas, paas, saas

— architecture

— types of services.

LAYERS

(i) [Saas]: Software as a service .

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• It offers on demand pay per

to user .

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- It is platform independent.

• One doesn't need installation of software on PC.

• It transfers single instance of software which makes it available for multiple end users.

• It's quite cheap and its services are managed by vendor.

• This service can be accessed by web browser.

• Eg - google drive.

• It is made up of programming language execution environment, operating

- It provides user & environment system, web browser & database.

• Where they can build, compile & run their program without underlying infrastructure.

• User manage data & application resources. Other resources are managed by vendor.

• Used by developers.

• Eg - amazon web services, spouts.com

• It is Infrastructure as a service.

• This service offers computing infrastructure & architecture.

• It is made up of programming language execution environment, operating

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But in virtual environment formultiple user can access it.venders are responsible for datavenders are responsible for datastorage, virtualisation, servers & ITnetworking, user are responsiblefor handling resources such asapplication, data, runtime andmiddleware.storage is used to store informationin cloud?Ans - Amazon S3, Google Cloud StorageCloud storage provider - IBMCloud storage provider - OracleCloud storage provider - MicrosoftCloud storage provider - AmazonAssignment1) Discuss architecture of openstackand list various components ofopenstack.2) How object storage & blockstorage is used to store informationin cloud?(submit by - Next Friday)23 septAns -Ans -Ans -Ans -Ans -Ans -

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⇒ Accessing the role of open standard -

(i) They provide various benefits to the organisation -

(ii) Increased choices:

It gives customer's freedom to choose products that works.

Best with tools & works in environment.

(iii) Improved inter-operability:

It enables business ability and responsiveness.

Discuss consolation b/w load balancing & virtualisation.

Ans - LB is the process of re-distribution of work load in distributed system ensuring no computing machine is overloaded.

Underloaded or ideal. It reduces cost associated with

& no. of tools required to support environment.

support environment.

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document management system
& making availability of resources.

Virtualisation : It is the process
of making virtual hardware /

software, virtual servers, infra-
structure, devices & computing

resources.

Advantages

correlation: when multiple users
are allotted with the help of load balancer to divide working capacity

balance to cloud storage which allot
to guest is VMware and by

Pay - as - you - go.
Measured services.

This division, weekend continue
in smooth manner.

Practices of cloud computing -

Resource pooling

on-demand self-service

easy maintenance

slower network access

Availability

Automatic system

Economical

Security

Measured services.



Record the list of things you might want to do

Q- Who are cloud consumers in cloud ecosystem?

Ans - Cloud consumer is an organisation or human that has a formal contract/agreement with cloud provider to use IT resources made available by cloud provider.

Q- What are serverless components in cloud computing ?

Ans - Serverless components give you ~~way~~ a way to compute

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9 and share parts of cloud application.

10 Example — Ans Lambda, Microsoft

11 Azure functions, Google Cloud Func.

12 Q - What are cloud enabling technologies?

1 Ans - Every technology in which

2 Internet is used is known as

3 Cloud enabling technology.

4 It is the use of computing

5 Resources that are delivered to

6 customers with the help of internet.

Cloud computing technologies are used

across various sectors such as

energy and power, oil & gas,

building and construction, transport,

communication etc.

12 Q - Discuss limitations of cloud

1 Ans - (i) Already done.

2 Ans - (ii) Already done.

3 Q - How does resource replication

4 takes place in cloud computing?

5 Ans - Cloud replicates the data &

6 stores them strategically on multiple

servers located at various geograph-

7 ical locations . Replication

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ensures consistency & improves availability and reliability by

creating multiple copies of same data on different storage devices

at geographical locations.

Q- what is on-demand service?

A- It is a service, where resources are offered instantly as and when needed.

are offered instantly as and when needed. It includes storage space, need. It includes storage space, and networks.

Q- What are the most essential things that must be followed before going for cloud computing platform?

A- Following are the essential things that must be followed -

- (i) Up-time
- (ii) Loss of data
- (iii) Data storage
- (iv) Compliance
- (v) Business continuity
- (vi) Data integrity in cloud computing

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(065-289) WK 11

Q - What are different cloud computing databases?

Ans - (i) AWS

(ii) Oracle database

(iii) Microsoft Azure

(iv) Google cloud platform

(v) IBM DB2.

(vi) MongoDB Atlas

(vii) Openstack

(viii) Define cloud.

Ans - The term cloud refers to

services that are accessed over

Internet and software and

databases that run on these servers.

Q - When you add a software stack,

such as an operating system and

applications to the service, The model

shifts to which mode?

Ans - It is SaaS. This is often

because Microsoft, Window, true

platform is best represented as

presently using SaaS model.

Q - What is the diff. b/w

Cloud & traditional data centers?

How does cloud computing different

from internet?

Traditional Data

Cloud Computing

location on premises
physically available

internal business responsibility

internal business outsourced to new third party provider

house it professional employees of service provider

adminis-
stration

business pays directly business pays per
purchasing for planning people use by source provider
hardware & software.

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(067-298) WK 11

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