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Internal Assessment Test 3 – Aug 2023

Sub:	Internet of Things					Sub Code:	22BETCK25	Branch :	ECE, CSE, ISE, AIML & AIDS	
Date:	06/09/2023	Duration:	90 min's	Max Marks:	50	Sem/Sec:	Physics Cycle		OBE	
Answer any FIVE FULL Questions								MARKS	CO	RBT
1	Explain With the help of neat diagrams describe the difference between Network computing and Cloud computing.							10	CO3	L3
2	Explain the importance and metrics of Service-Level Agreement (SLA) in Cloud Computing.							10	CO3	L3
3	Summarize the case study related to Smart irrigation management system. With the help of neat diagrams explain the of cloud models.							10	CO3	L3
4	Explain the features of CloudSim. Write note on advantages and risk of healthcare IoT.							10	CO4	L3
5	Explain hardware components and front end design features of AmbuSens system.							10	CO4	L3
6	Explain fog framework for intelligent public safety in vehicular environments (fog-FISVER) with a block diagram.							10	CO4	L3

Faculty Signature CCI Signature HOD Signature

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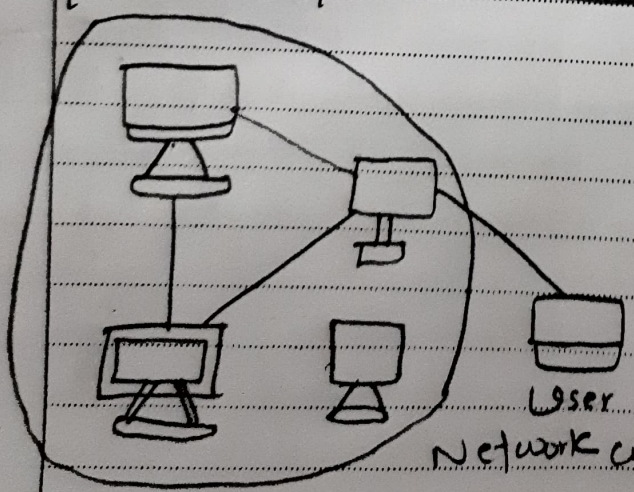
IAT-3 Question paper

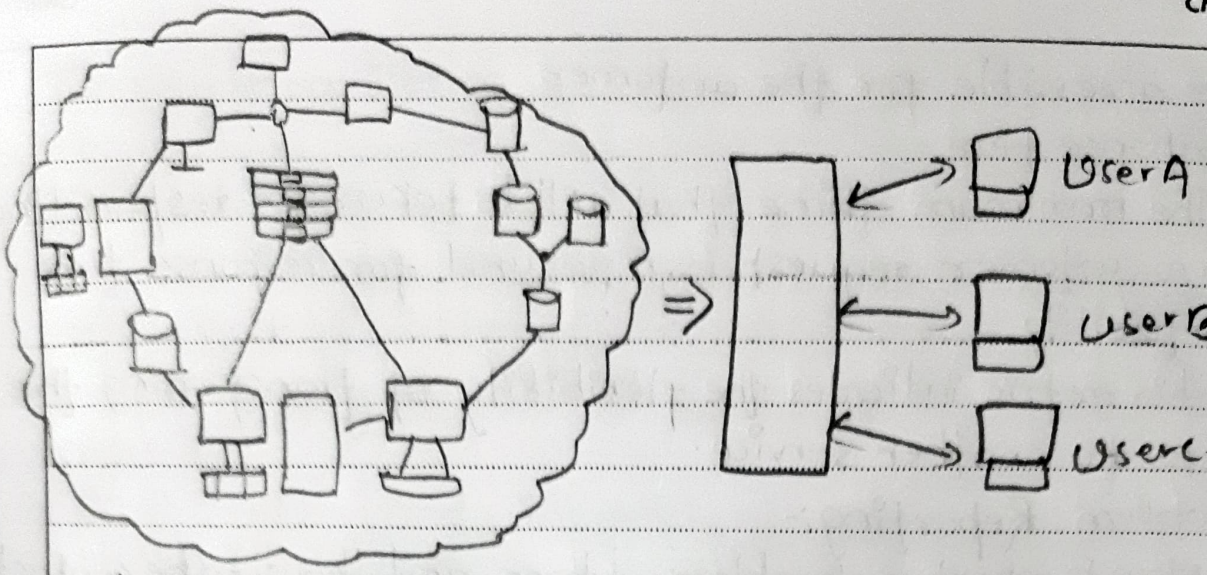
Q.1. Explain with the help of neat diagrams describe the difference between Network computing and cloud networking.

→ The difference between network computing and cloud computing are as given below:-

Network computing		cloud computing.
Network computing refers to the interconnection of devices for communication.	(i)	Cloud computing refers to the delivery of computing services over the internet.
It focus on connecting devices & facilitating communication between them.	(ii)	It focus on providing scalable undemand computing resources to user.
Networking includes router, server, switches.	(iii)	Cloud includes, virtual machine storage and databases.
It involve managing devices and their configuration.	(iv)	It involve managing services and their configuration.
Networking is limited to local or wide area network.	(v)	Cloud computing can be used anywhere using the internet
Networking support collaborative work among systems and devices.	(vi)	Cloud computing enables collaborative work on data and resources.



Network computing



(b) cloud computing

Q.2. Explain the importance and metrics of Service-Level agreement (SLA) in cloud computing.

→ The importance of service-level agreement are as given below:-

- Customer point of view:-

Each CSP has its SLA, which contains a detailed description of the services. If a customer wants to use a cloud service, he/she can compare the SLAs of different organizations. Therefore, a customer can choose a preferred CSP based on the SLAs.

- CSP point of view:-

In many cases, certain performance issues may occur for a particular service, because of which a CSP may not be able to provide the service efficiently. Thus, in such a situation, a CSP can explicity mention in the SLA that they are not responsible for inefficient service.

Metrics of Service-Level Agreement are as follows:-

- Availability:-

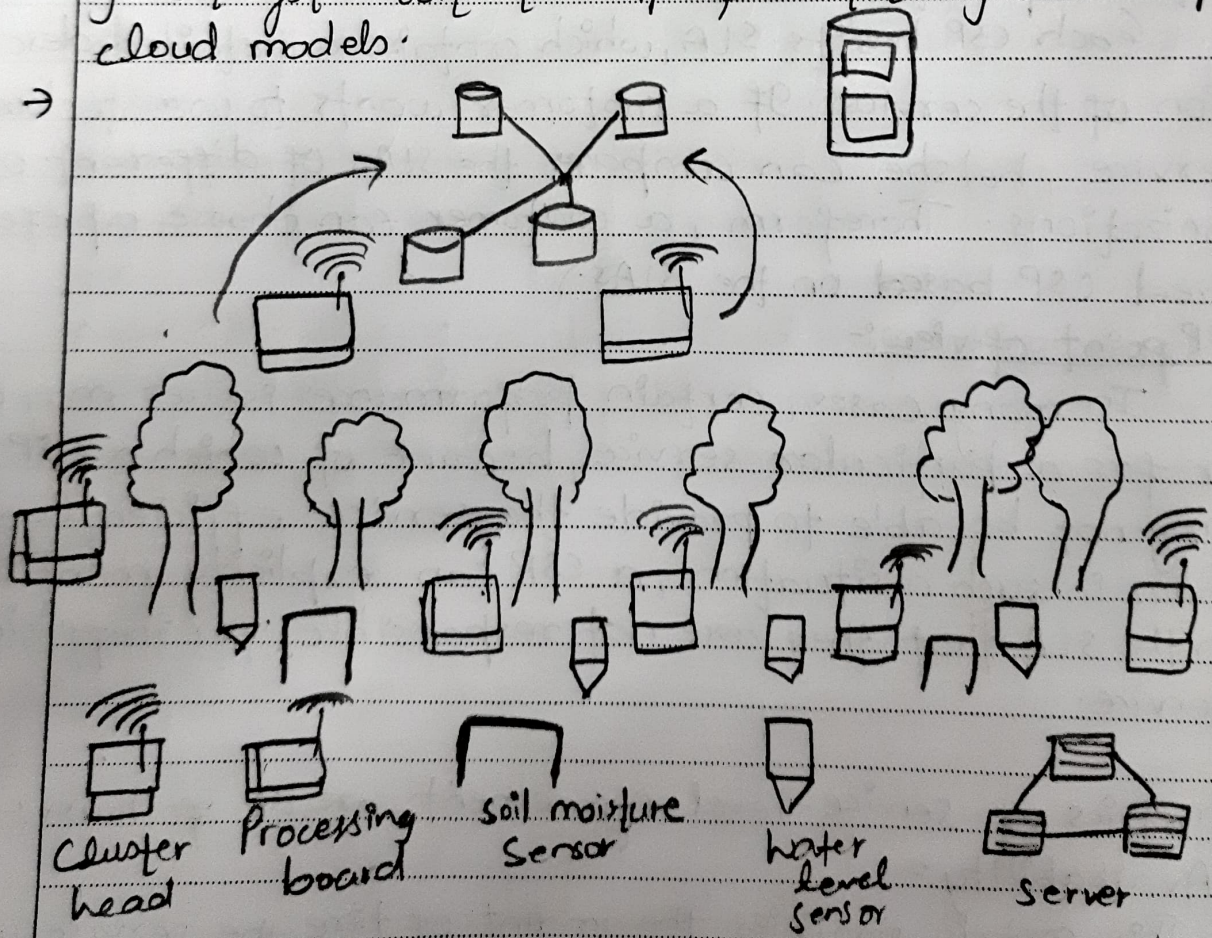
This metric signifies the amount of time the service will

be accessible for the customer.

- Response time:-
  The maximum time that will be taken for responding to a customer request is measured for response time.
- Portability:-
  This metric indicates the flexibility of transferring the data to another service.
- Problem Reporting:-
  How to report a problem, whom and how to be contacted is explained in this metric.
- Penalty:- The penalty for not meeting the promises mentioned in the SLA.

Q.3. Summarize the case study related to smart irrigation management system. With the help of neat diagrams explain cloud models.

→



- The regular monitoring of different agriculture parameters, such as water level, soil moisture, fertilizers, and soil temperature are essential.
- For monitoring these agriculture parameters, a farmer needs to go to his/her field and collect the data. Excess water supply in the agricultural field can damage the crops.
- On the other hand, insufficient water supply in the agricultural field also affects the healthy growth of crops. Thus, efficient and optimized water supply in the agricultural field is essential.
- The architecture of this system consist of three layers, sensing & actuating layer, remote processing and service layer, and application layer. These layers perform dedicated tasks, depending on the requirements of the system.

Cloud models

As per the national institute of standards and technology (NIST) and cloud computing standard Roadmap working group, the cloud model can be divided into two parts

(i) Service model and
(ii) Deployment model

Further the service model is categorized as:

- Software-as-a-serivice (Saas),
- Platform-as-a-service (Paas), and
- Infrastructure-as-a-service (Iaas)

On the other hand, the deployment model is further classified as:-

- Private cloud
- Community cloud
- Public cloud and

- Hybrid cloud

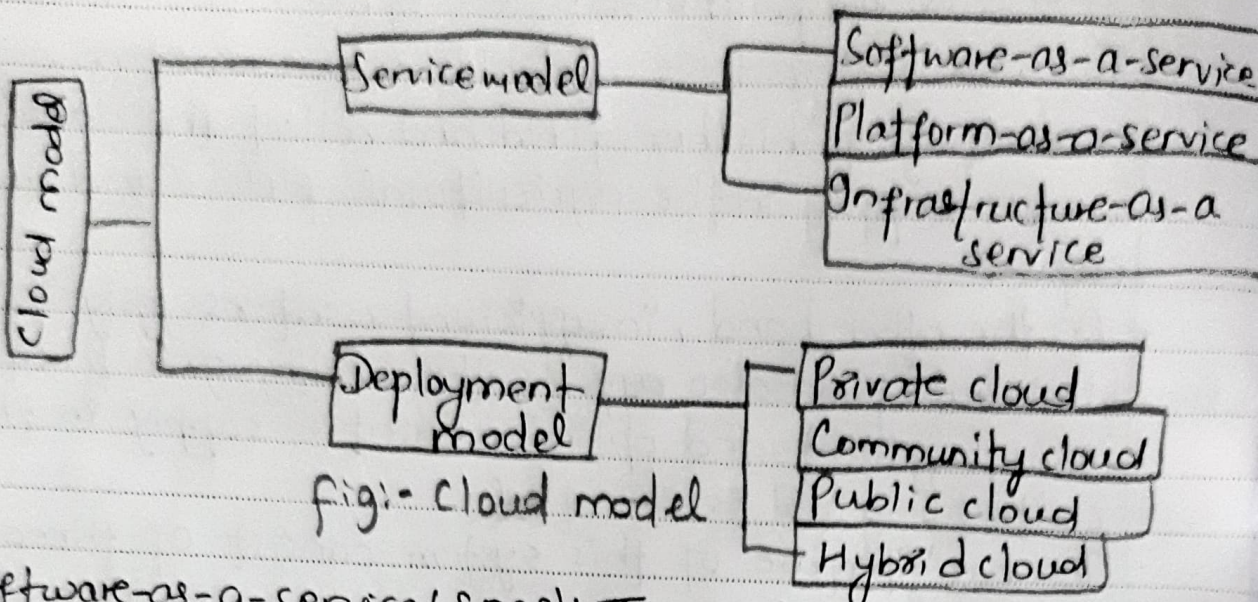


fig:- Cloud model

- Software-as-a-service (SaaS): This service provides access to different software applications to an end user through internet connectivity. Ex:- Google workspace, Dropbox
- Platform-as-aservice (Paas): Paas provides a computing platform, by using a user can develop and run different application. Ex:- Google App Engine
- Infrastructure-as-a-software (Iaas):- Iaas provides infrastructure such as storage, networks, and computing resources. A user use the infrastructure without purchasing the software and other network components.

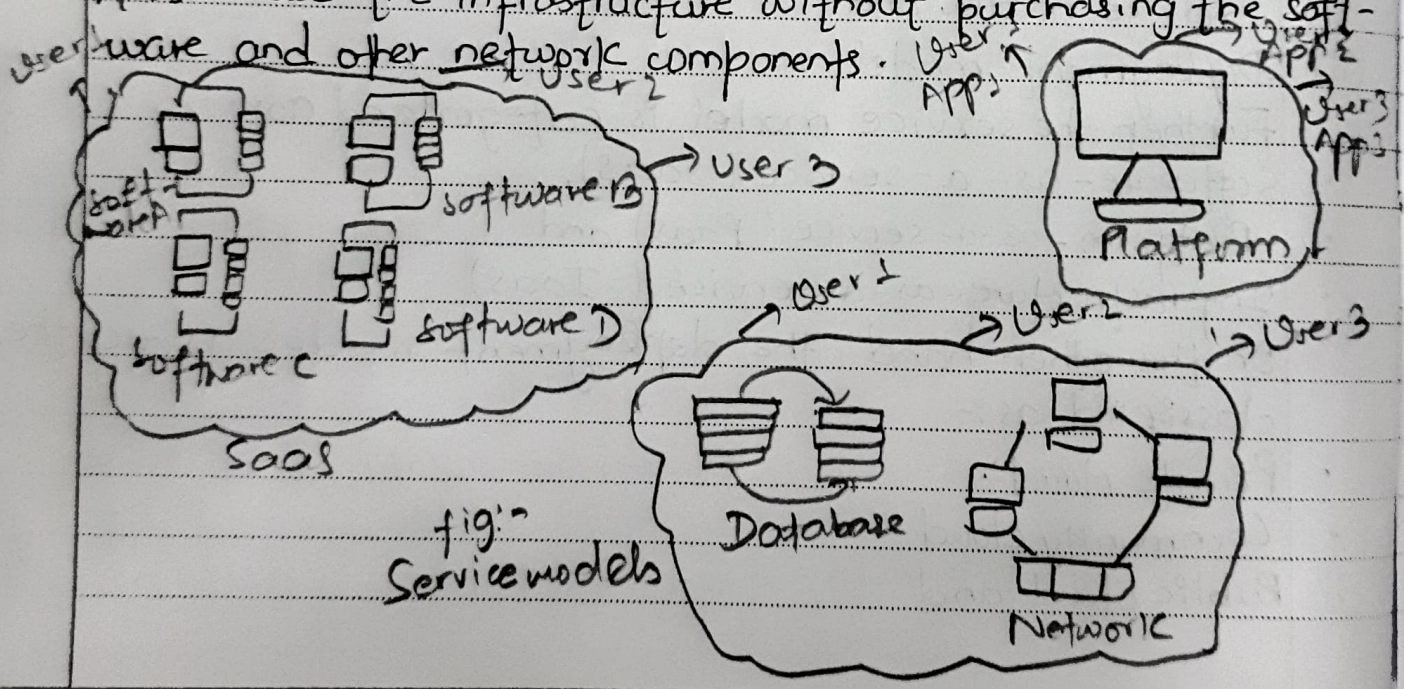


fig:- Service models

CMR

Deployment model

- Private cloud:- This type of cloud is owned explicity by an end organization.
- Community cloud:- This cloud forms with the collaboration of a set of organizations for a specific community.
- Public cloud:- The public cloud is owned by a third party organization, which provides services to the common public.
- Hybrid cloud:- This type of cloud comprises two or more clouds (private, public or community)

4. Explain the features of cloudsim. Write note on advantages and risk of healthcare IOT.

→ Cloudsim is a popular cloud simulator that was developed at the university of melbourne. This simulator is written in a java-based environment. In cloudsim, a user is allowed to add or remove resources dynamically during the simulation and evaluate the performance of the scenario.

Features

Cloudsim has different features, which are listed as follows:-

(i) The cloudsim simulator provides various cloud computing data centers along with different data centre network topologies in a simulation environment.

(ii) Using cloudsim, virtualization of server hosts can be done in a simulation.

(iii) A user is able to allocate virtual machines (VMs) dynamically.

(iv) It allows users to define their own policies for the allocation of host resources to VMs.

(v) It provides flexibility to add or remove simulation components dynamically.

Advantages of healthcare IOT are as follows:-

(i) Real time:-

- One of the important characteristics of an IOT-based healthcare system is real-timeliness.
- On the otherhand, users at the patient-end can easily take different decisions, such as where to take a patient during critical situations.

(ii) Low cost:-

An authorized user can easily find the availability of the beds in a hospital with simple internet connectivity and a web-browser-based portal.

(iii) Easy management:-

The management of numerous tangible & intangible entities is a challenging task. However, healthcare IOT facilitates easy and robust management of all the entities.

(iv) Automatic processing:-

Automatic processing features can remove such manual intervention with a finger print sensor/device.

(v) Easy record keeping:-

A healthcare IOT enables the user to keep these records in a safe environment and deliver them to the authorized user as per requirement.

(vi) Easy diagnosis:-

For diagnosing a disease, a huge chunk of prior data is required. The diagnosis of the disease becomes easier with the help of certain learning mechanisms along with the availability of prior datasets.

Risk of healthcare IOT are as follows:-

(i) Loss of connectivity:-

Intermittent connectivity may result in data loss, which may

result in a life-threatening situations for the patient.

(ii) Security:-
The healthcare system must keep the data confidential.

(iii) Error:-
In the healthcare system, errors in data may lead to misinterpretation of symptoms and lead to the wrong diagnosis of the patient.

Q.5. Explain hardware components and front end design features of Ambusens system.

→ In the Ambusens system, a variety of hardware components are used such as sensors, communication units, and other computing devices.

(i) Sensors:- The sensors used in the Ambusens system are non-invasive.
Optical pulse sensing probe:- It senses the photoplethysmogram (PPG) signal and transmits it to a GSR expansion module.
Electrocardiogram (ECG) sensor:- It measures the pathway of electrical impulses through the heart.
Electromyogram (EMG) sensor:- The sensor is used to measure the biomechanics of the human body.
Tempare sensor:- The body temperature of patients changes with the condition of the body.

(ii) Local data processing unit (LDPU):-
In Ambusens, all the sensors attached to the human body sense and transmit the sensed data to a centralized device, which is known as LDPU.

(iii) Communication module:-
Each sensor node consists of a Bluetooth (IEEE 802.15.1) standard module.

The LDPU delivers the data to the cloud with 3G/4G communication.

Front-End features of Ambusens system

(i) In the Ambusens system, three actors - doctor, paramedical nurse, and patient - are able to participate and use the services.

(ii) The web interface is designed as per the requirements of the actors of the system.

(iii) For example, the detailed health data of a patient is accessible only to the assigned doctor.

(iv) In Ambusens, the database is designed in an effective way such that it can deliver the customized data to the respective actor.

(v) In this system, the registration process is also designed in a customized fashion, that is, the details a user to be entered into the registration form is different for different actors.

(vi) For example, a doctor must enter his/her registration number in the registration form.

Q6. Explain fog framework for intelligent public safety in vehicular environment (fog-FISVER) with a block-diagram.

→ This is a case study on smart safety in a vehicular IOT infrastructure. The system have a fog framework for intelligent public safety in vehicular environment.

The primary aim of the system is to provide smart transportation safety (STS) in public bus services.

(Fog-FISVER) - fog framework for intelligent public safety in vehicular environments

↓ Ensures

Smart transportation safety

The vehicle is equipped with a smart surveillance system

Fog computing Architecture works as a mediator

A mobile application is used to report the crime to a nearby police agent.

Architecture

Image processor Tier I

i) Crime definition downloader
ii) Crime definition storage
iii) Algorithm launcher

Event dispatcher

i) Event notification
ii) Data gatherer
iii) Virtual sensor interference

Tier II

Target object training

Notification factory

Tier III

Crime assist unit