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https://github.com/abhirimal/be-software-notes

Chapter = 9 (1 or 2 Q)

Multimedia Communication System (MCS)

1) What is Multimedia Communication System.

Ans: Multimedia Communication system refers to the exchange of different media over networks via email, video conferencing, etc between users.

→ From the communication perspective, we divide the higher layers of the Multimedia communication System (MCS) into two architectural subsystems.

1) An application Subsystem
   i) Collaborative computing
   ii) Group communication Architecture
   iii) Session Management

2) Transport Subsystem
   i) Transport layer
      a) TCP
      b) UDP
      c) RTP
      d) XTP
   ii) Network Layer
      a) IP

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Application Subsystem → it provides services for group cooperation & provides session management.

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12) What are the architectural subsystem of Multimedia Communication System?

Ans: From the communication perspective, we can divide higher layers of the Multimedia Communication system (MCS) into two architectural subsystems

1) An Application subsystem (Explain Q.4)
2) Transport subsystem (Explain Q.5)

13) Explain the application subsystem of multimedia communication system.

Ans: The application subsystem includes the software and tools with which the end user directly interacts with one another.
Eg: Email, Video Conferencing s/w, social media, ~~sch~~ screen sharing tools, etc.

→ The application subsystem includes
i) Collaborative Computing
ii) Collaborative Dimension
iii) Group Communication Architecture
iv) Session Management

i) Collaborative computing
→ Collaborative computing includes enterprise collaboration software and social media tools that enables group discussion or collaboration.

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→ It enables company to increase efficiency and improve productivity & encourage innovation.

→ Eg of collaborative tools
- Electronic Mail, Voice Chat, Text Chat, Video Conferencing, Social Media etc.

ii) Collaborative Dimension

→ Electronic collaboration can be categorized according to three main parameters:
i) Time ii) User Scale iii) Control

→ It can be represented in 3-dimensional space

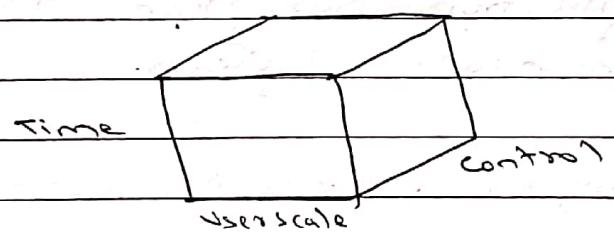

Fig: Dimension of collaborative computing

1) Time

→ According to time there can be two types of collaborative work.
a) Asynchronous → cooperative works do not happen at same time
b) Synchronous → cooperative works happen at same time

2) User Scale

→ The user scale parameter specifies whether
- a single user collaborates with another user
- or group of more than two users collaborate together.

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3) Control

→ Control during the collaboration can be centralized or distributed.

- Centralized → reports to one head/admin
- Distributed → every group member has equal control.

iii) Group Communication Architecture

→ Group Communication involves the communication ~~of multiple~~ or collaboration of multiple users in a synchronous or an asynchronous mode with centralized or distributed control.

→ Group communication agents may use the following for their collaboration.

1) Group Rendezvous
2) Shared Applications
3) Conferencing

iv) Session Management

→ A session is a total logged in time of a user in a particular application.

→ The management of session is a very important task and it should consider several issues like allowing users to join and leave the conferencing.

→ It also allows distributing information between users.

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11 4) Explain the Group Communication Architecture

or,

Discuss the communication support model for group communication architecture.

Ans: Group communication involves the communication or collaboration of multiple users in a synchronous or an asynchronous mode with centralized or distributed control.

→ The Group Communication ~~support~~ architecture consists of a support model, system model and interface model.

→ The Group Communication support model includes group communication agents that communicate via a multi-port multicast communication network.

→ Group communication agents may use the following for their collaboration:

i) Group Rendezvous

→ It denotes a method which allows one to organize meetings, and to get information about the group, ongoing meetings and other static and dynamic information.

ii) Shared Applications

→ It denotes technique which allows one to replicate information to multiple users simultaneously.

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→ The remote users may modify the information such that all users can immediately see the updated information.

→ Eg: Multiple users working on same google spreadsheet document.

iii) Conferencing

→ Conferencing is a simple form of collaborative computing.

→ It represents the service which manages the multiple users to communicate and interact with each other by the use of multimedia data.

→ Thus, conferencing is basically a management service that controls the communication among multiple users via multiple media, such as video and audio, to achieve simultaneous face-to-face communication

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→ The group communication architecture consists of:

1) Support model → contains group communication agents
   i) Group Rendezvous
   ii) Shared Application
   iii) Conferencing
2) System Model → client/server model
3) Interface Model → exchanging information within the support model
   → includes user presentation & group management protocol.

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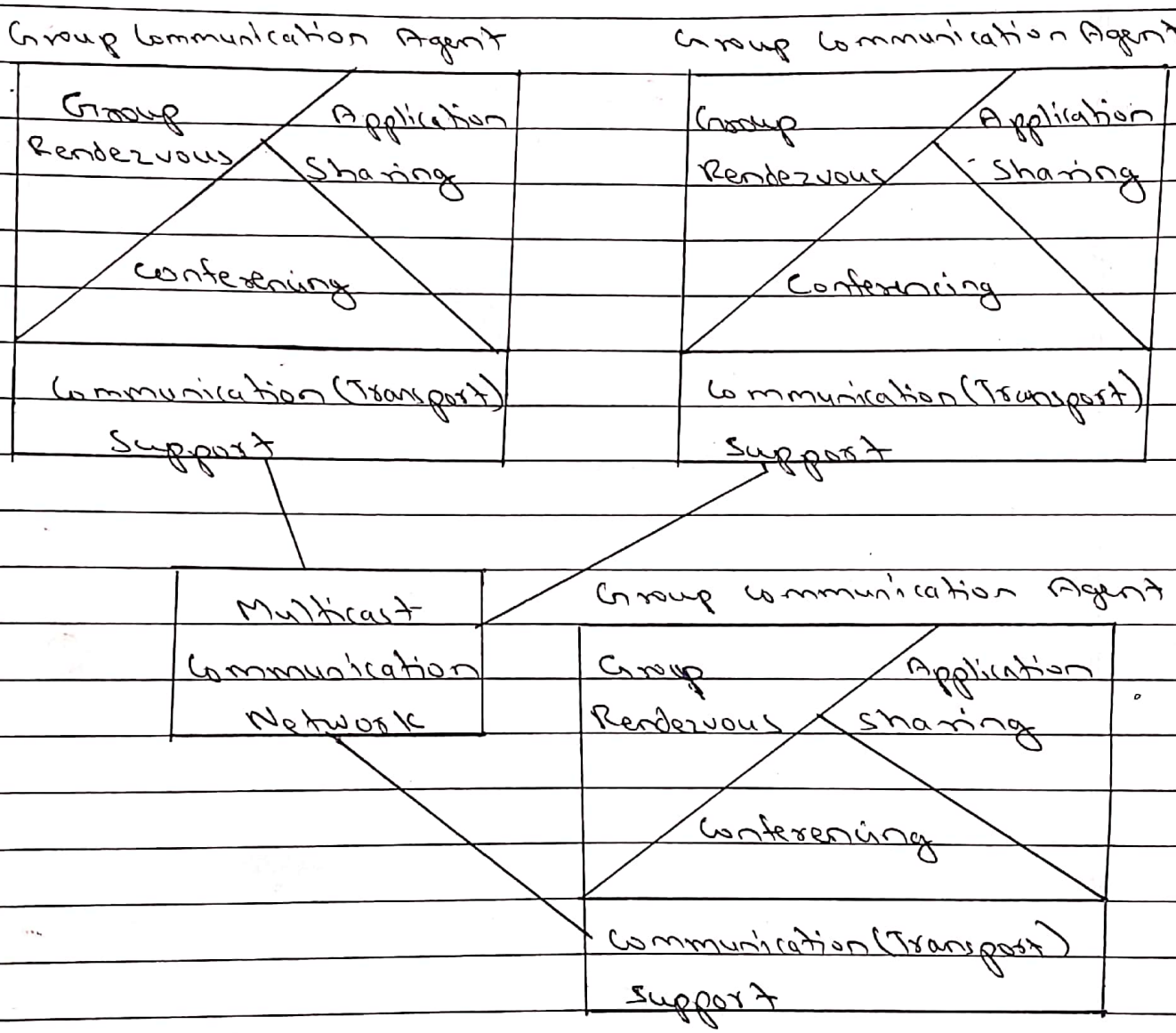

Fig: Group Communication Support Model

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5) Transport Sub System

→ This subsystem includes the brief overview of transport and network layer of OSI reference model. It ~~includes~~ explains their functionalities.

→ It includes

1) Transport layer
   - i) TCP
   - ii) UDP
   - iii) RTP
   - iv) XTP

2) Network layer
   - i) IP

1) Transport Layer

→ It provides the communication services directly to the application processes running on different hosts.

→ It includes:

i) TCP (Transmission Control Protocol) (not asked)

→ It is connection oriented.

→ Reliable, retransmission of lost packet, sequence of message order.

ii) UDP (User Datagram Protocol) (not asked)

→ connectionless protocol

→ not reliable, retransmission is not possible

→ message does not reach destination in sequence.

→ lightweight & fast.

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(iii) RTP (Real-time Transport Protocol)

-> It is a UDP protocol.
-> It is suitable for transmitting real-time data such as audio, video etc.
-> It is primarily designed for conferencing.
-> It doesnot guarantee delivery of packets.
-> It is not reliable, packets are sent out of order.
-> It is fast. Ensures fast delivery of packet.
-> Used in video calling, Video streaming, Conferencing etc.

(iv) XTP (Xpress Transport Protocol) {Similar to TCP}

-> It integrates transport and network protocol functionalities. To have more control over the environment.
-> It was developed to replace TCP.
-> It has two types of packets.
  - information packet which carry user data.
  - control packets for protocol management.
-> For flow control, XTP uses sliding window.
-> It supports data retransmission of lost packets.
-> It is connection oriented protocol.
-> It has error management functionality.

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6) Explain QOS layered Model for the multimedia Communication System.

or,

QOS (Quality of Service)

or,

Explain various QOS parameters.

Ans: Quality of Service is a concept for specifying how good the offered networking services are.

→ During a multimedia communication, the services in the multimedia systems need to be parameterized.

→ Parameterization of the services is defined in ISO standards through the notion of Quality of Service.

→ Each service can be characterized by a quality of service. As a example some services are reliable i.e they donot loose data while some are unreliable as they may loose data.

→ The parameters can be bandwidth, maximum and minimum end to end delay, jitter, etc.

→ Quality of Service for multimedia Communication System consists of three layers:

i) Application ii) System iii) Devices

↳ Above the application layer, there may or may not reside a human user.

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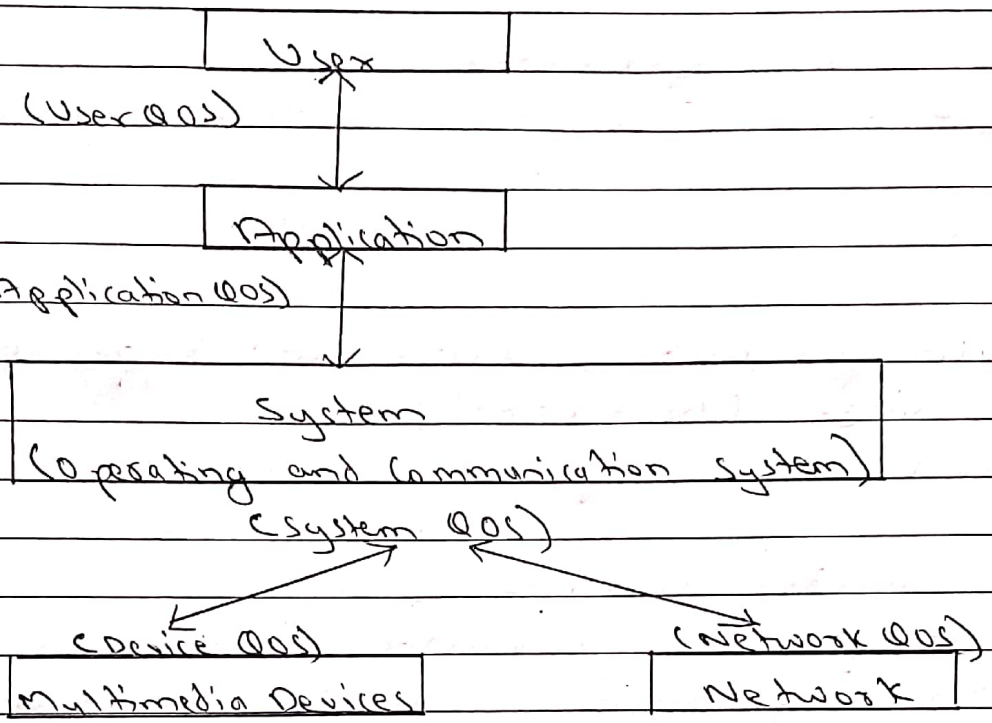

fig:- QOS-layered model for the MCS

The QOS parameters are described below:-

i) Application QOS parameter
→ It may include media quality, transmission delay, jitter, synchronization.

ii) System QOS parameter
→ It describes requirement on the communication service and operating system services

iii) Network QOS parameter
→ It describes requirements of the network services.
→ It may be described on the terms of network load & network performance.

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iv) Device QOS parameter
→ It describes the requirement for device services.

7 QOS parameters values and types of service. (Not asked)
→ There are 3 types of services

i) Guaranteed Services
→ It provides guarantee of the QOS
→ It may ensure the lossless transmission of data i.e reliable transmission.

ii) Predictive Services
→ In this, The QOS parameter are predictable with the help of the past parameter.
i.e based on past network behavior.

iii) Best-effort Services
→ In this, QOS parameter depend on the load of the network.
→ It ensures that the best possible service is provided to the multimedia data.
→ Most of the current network protocols have best effort services.

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Q.N.5 continue....

2) Network layer
-> It is responsible for routing and forwarding the packets from source to destination.
-> Stores the IP address of source & destination.

i) IP (Internet Protocol)
-> It is the IP address of the host.
-> The packets are routed from source to destination based on the hosts IP address
-> IP address allows one computer to locate another computer on a network.
-> It is a unique identifier.

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