

CHAPTER – 5

Multimedia Communication System:

- It includes the application subsystems, management and service issues for group collaboration and session are presented.
- Group collaboration and session management provide support for a large group of multimedia applications, such as Tele-collaboration.
- Similarly it includes transport subsystem which presents transport and network layer protocols that are user for the standardized support of networked multimedia application.

Application Subsystem:

Collaborative computing:

- The current infrastructure of network workstations and PCs, and the availability of audio and video at these points, makes it easier for people to cooperate and bridge space and time. In this way, network connectivity and end-point integration of multimedia provides the users with a collaboration computing environment.
- Collaboration computing is generally known as computer supported cooperative work (CSCW).
- There are many tools for collaboration computing, such as electronic mail, bulletin boards, screen sharing tools, text-based conferencing systems (Example, Internet Relay chat), telephone conference system, conference rooms and video conference system.

Session Management:

- Session management is an important part of multimedia communication architecture. It is the core part which separates the control, needed during the transport from the actual transport.

Architecture:

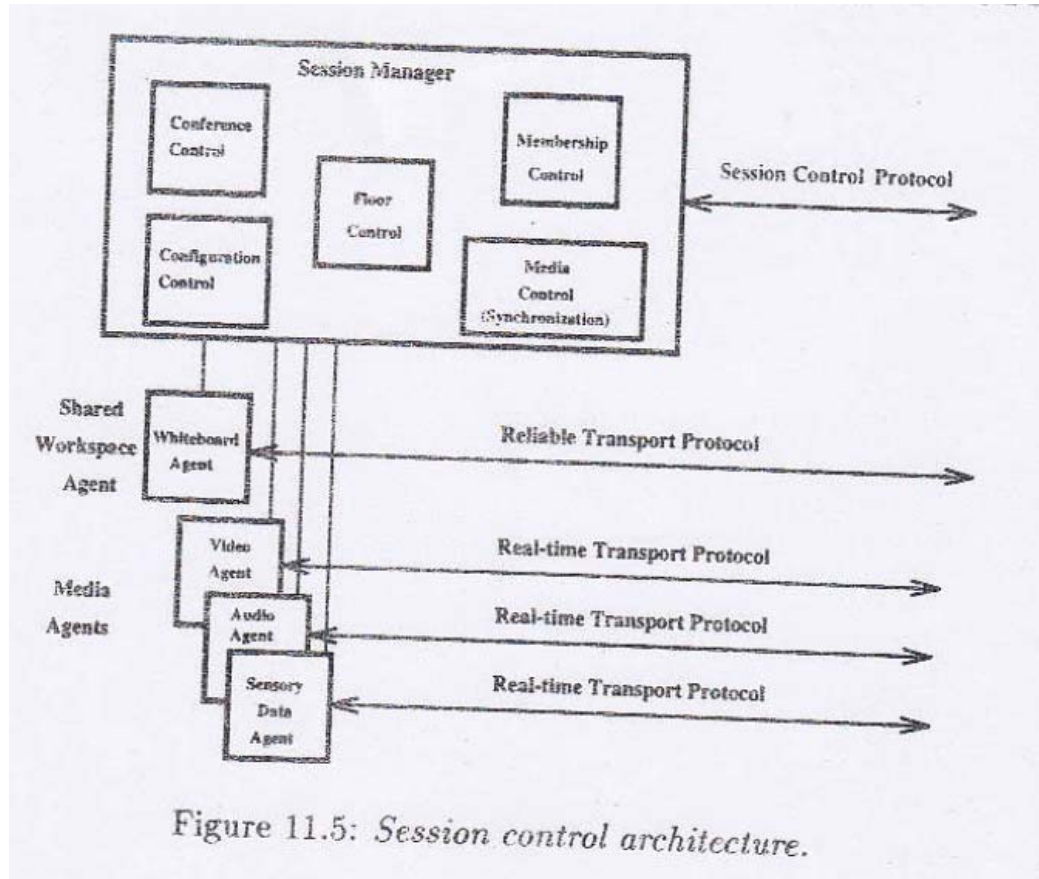


Figure 11.5: Session control architecture.

Figure: - Session Control architecture

- Session Management architecture is built around an entity. Session Manager which separates the control from the transport.
- The session control architecture consists of the following components:

Session Manager: It includes local and remote functionalities.

Local functionalities may include:

- (a) Membership Control Management
- (b) Control Management for Shared workspace (floor control)
- (c) Media Control Management
- (d) Configuration Control Management
- (e) Conference Control Management

→ Remotely the session manager communicates with other session managers to exchange session state information which may include the floor information, configuration information etc.

Media Agents: Media agents are separate from session manager and they are responsible for decision specific to each type of media. This modularity allows a replacement of agents. Each agent performs its own control mechanism over the particular medium, such as mute, un-mute, change video quality, start sending, stop sending etc.

Shared Workspace Agent: The shared workspace agent transmits shared objects. (Example, Tele-pointer coordinate, graphical or textual object) among the shared applications.

Transport Layer:

Transport protocols, to support multimedia transmission need to have features and provide the following functions.

- timing function: timing information, semi-reliability, multicasting
- NAK (Non-Acknowledgment) – based error recovery mechanism and
- rate control

Transport Protocols: TCP and UDP, which are used in the Internet Protocol stack for multimedia transmission.

New emerging protocols: RTP (Real-time Transport Protocol) and XTP (Xpress Transport Protocol), which are suitable for multimedia.

Other Protocols:

- Telnet Transport Protocol
- Real-time Channel Administration Protocol (RCAP)
- Real-time Message Transport Protocol (RMTP)
- Continuous Media Transport Protocol (CMTP)

Network Layer:

The requirements on the network layer for multimedia transmission are provision of high bandwidth, multicasting, resource management and QOS guarantees, new routing protocols with support for streaming capabilities and new-higher capacity routs with support of integrated services.

Some protocols used in internet services

- (1) IP (Internet Protocol)
- (2) IGMP (Internet Group Management Protocol)
- (3) RSVP (Resource Reservation Protocol)

Quality of service and resource Management:

The user (application requirements on the multimedia communication system (MCS) are mapped into communication services which make the effort to satisfy the requirements. Because of the heterogeneity of the requirements, coming from different distributed multimedia applications, the services in the multimedia systems need to be parameterized.

Basic Concepts:

Parameterization of the services is defined in ISO standards through the notion of Quality of service (QOS). The ISO standard defines QOS as a concept for specifying how “good” the offered networking services. QOS can be characterized by a number of specific parameters.

QoS layering:

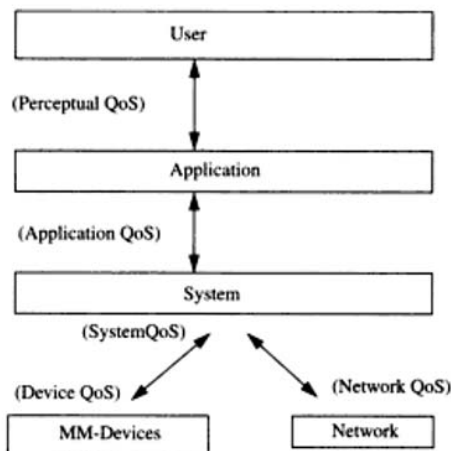


Figure 2-1 Example of a QoS layered model for networked multimedia systems.

The MCS consists of three layers:

- Application system (including communication services and operating system services).
- And Devices (Network and Multimedia (MM) devices).
- Above application may or may not reside a human user.

Trends in collaborative Computing:

- New application disciplines place new demands on the collaboration infrastructure and tele-services are emerging. Only conferencing and application sharing is not enough.
- Multimedia networked applications, such as tele-medicine, tele-working, virtual collaborative space, distributed simulation and tele-action, require sophisticated handling at the level of an application subsystem.
- Further collaborative computing will incorporate a (possibly unknown) number of people at geographically distributed sites, using a variety of applications from different application domains. With the heterogeneity of collaborative multimedia application, interoperability issues need to be satisfied.

Trends in Transport System:

The trend in transport systems goes in two directions:

- (1) One is special purpose protocol approach and
- (2) Other is the general purpose

(1) One is special purpose protocol approach:

- The special purpose protocol approach, also known as the Internet Paradigm, is to design various special-purpose protocols on top of IP for different classes of applications. Example,

TCP (for reliable communication)

UDP (for Unreliable Communication)

RTP (for Audio and Video Transport)

(2) Other is the general purpose protocol approach:

The general purpose protocol application is to provide a general set of services that the user can pick and use. Example, XTP: - where the user can select one-way, two-way or three-way hand shaking for connection setup and release etc.

Multimedia Database System:

- Multimedia Database Systems are database systems where, besides text and other discrete data, audio and video information will also be stored, manipulated and retrieved.
- To provide this functionality, multimedia systems require a proper storage technology and file system.