T.120

Multipoint Data Conferencing

Reading

- IMTC's overview of the T.120 standards:
  http://www.imtc.org/t120.htm
- T.120 Primer, by DataBeam Corporation
  - DataBeam is no longer supporting T.120 ...
- T.120 Standard, approved July/1996
  - This contains an overview of the T.12x series of standards.
  - Read sections 1 through 9.

What is Data Conferencing?

Data conferencing is a virtual connection between two or more computers where:

- All computers in the conference display a common graphical image of text, graphics or a combination of both.
- Each computer in the conference displays any changes to the common image in near real time.
- Participants have ability to interact with the displayed document.

Types of Data Conferencing

- Presentation
  - broadcast event where a single presenter a single electronic presentation distributed to multiple remote computers.
- Collaboration
  - opposite end of spectrum to presentation
  - usually involves a small conference of 3-10 participants
  - Two types of Collaboration
    - Whiteboarding
    - Application Sharing

T.120 Multipoint Data Conferencing

- Consists of a set of protocols
- Defines multipoint data communications standards in a multimedia conferencing environment
- It is independent of the underlying network
- Places no constraints on the rate or volume of data

T.120 Multipoint Data Conferencing

- Provides mechanism to identify the participating nodes and exchange information
- Enables multiple simultaneous conference handling and participation
- The convener of a conference may control the participation in that conference and may delegate this authority.

T.120 Protocol Suite

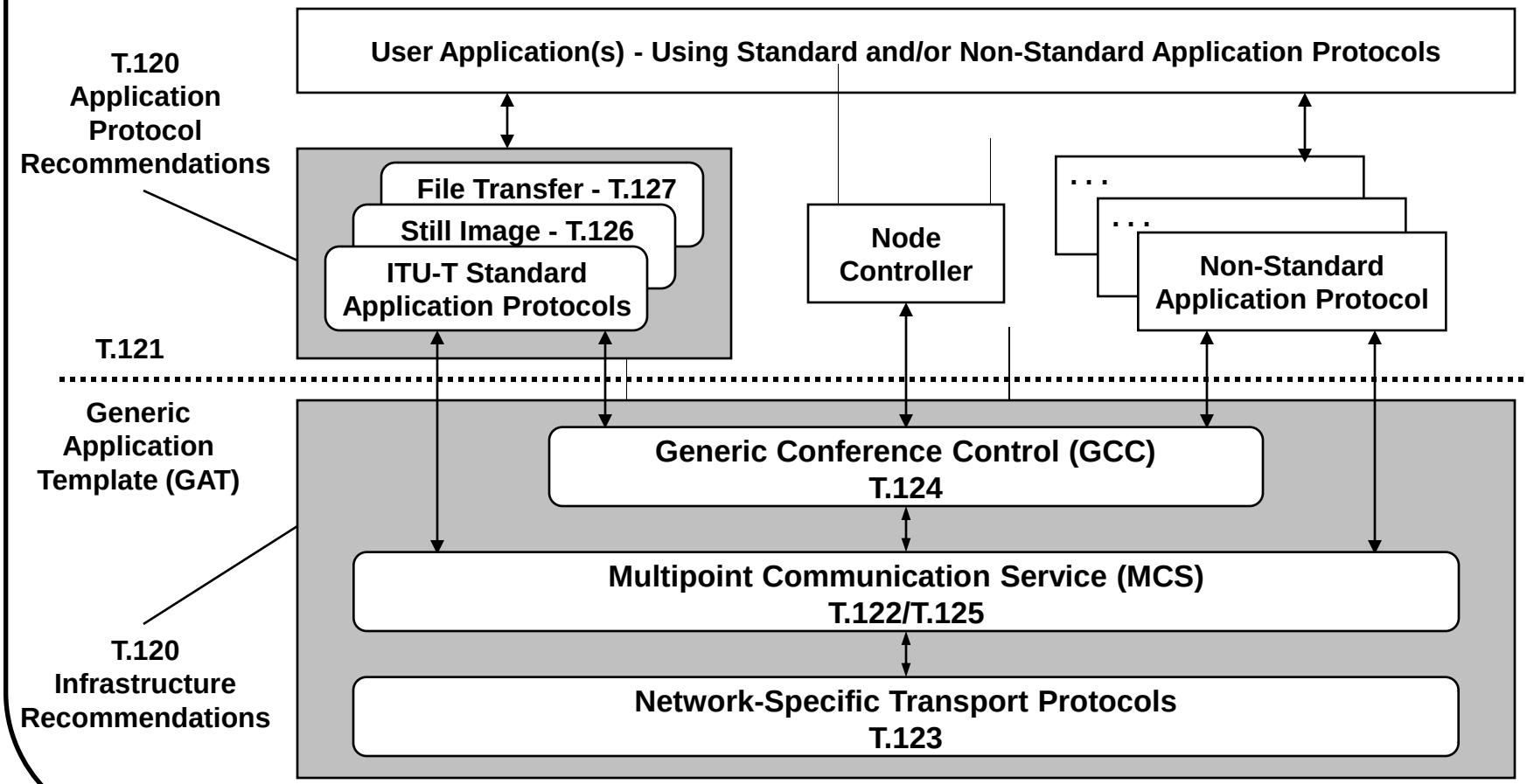
Optional Protocols (must be used if this functionality is provided):

- T.121: Generic Application Template (GAT)
- T.126: MultiPoint Still Image and Annotation Protocol (NSIA)
- T.127: Multipoint Binary File Transfer Protocol (MBFT)
- T.128: Application Sharing (AS)

Core Protocols:

- T.123: Transport Protocol
- T.124: Generic Conference Control (GCC)
- T.125/T.122 Multipoint Communication Service (MCS)

T.120 System Model



T.120 Model (cont.)

- **Applications:**
  - Not standardized by T.120; the Generic Application Template (GAT - Recommendation T.121) provides guidance to user application developers on how to utilize the T.120 infrastructure in a coherent and consistent way.
  - Can use a combination of standard and non-standard protocols
  - Multiple applications can run concurrently; T.120 provides resource management
- **Application Protocols:**
  - Set of PDUs (packets) and associated actions for peer-to-peer communication.
  - Standard Protocols: Multipoint Binary File Transfer (T.127) and Still Image, Annotation, Whiteboard and Facsimile (T.126).
  - Proprietary protocols also allowed.

T.120 Model (cont.)

- **Node Controller:**
  - Manages the T.120 communication at a terminal or MCU.
  - Not standardized; only the interfaces are defined.
- **Communications Infrastructure:**
  - Provides multipoint connectivity with reliable data delivery.
  - Accommodates multiple independent and concurrent applications.
  - Comprises the following:
    - T.124 Generic Conference Control (GCC), which provides services for setting up and managing the multipoint conference.
    - T.122/125 Multipoint Communication Service (MCS), which provides a general purpose multipoint connection-oriented data service using point-to-point connections.
    - T.123 Network Specific Protocols to support different networks.

Key Benefits of T.120

- Multipoint Data Delivery
- Interoperability
- Reliable Data Delivery
- Network Transparency
- Network Independence
- Platform Independence

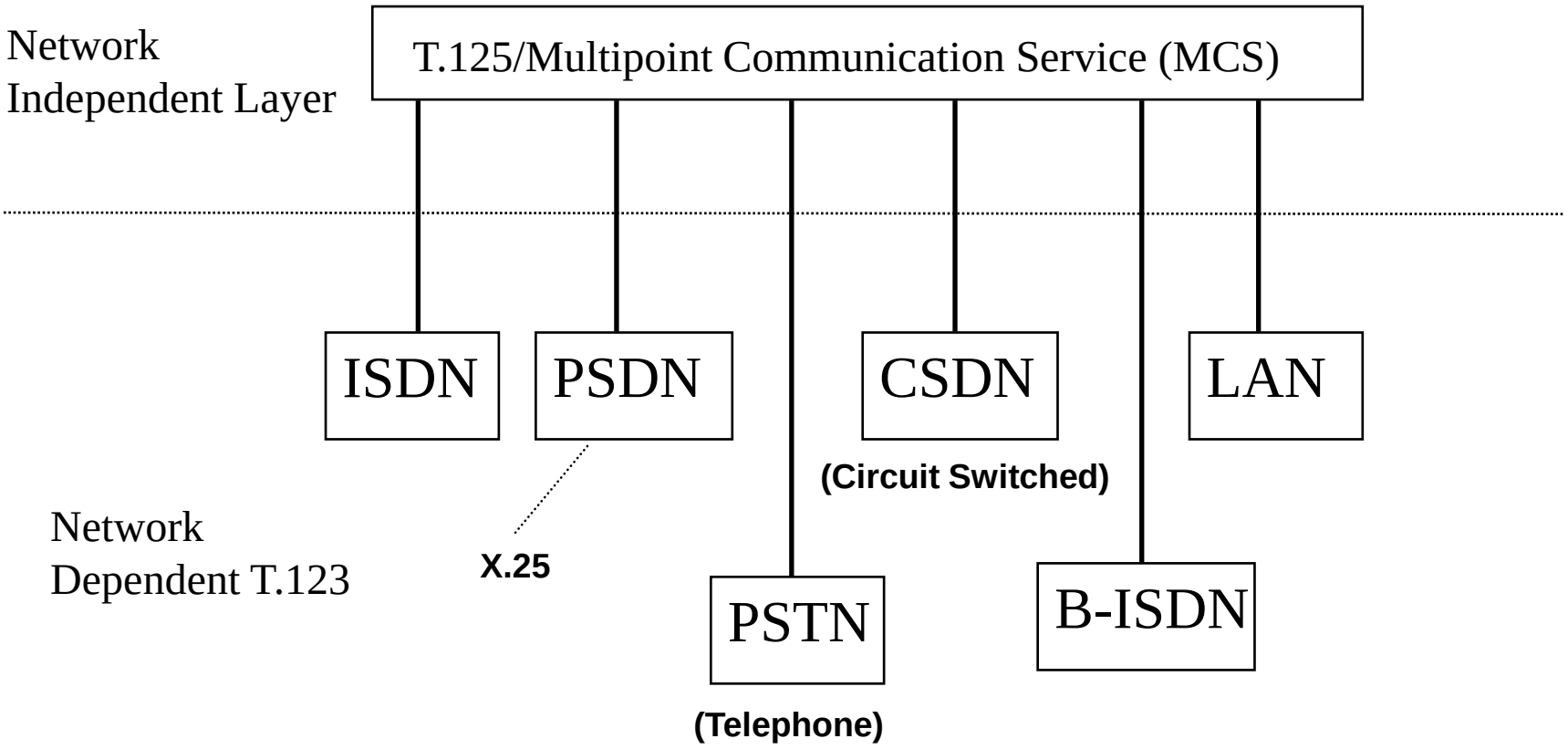
Key Benefits of T.120 (cont.)

- Support for Varied Topologies
- Application Independence
- Scalability
- Co-existence with Other Standards
- Extensibility

T.123: Transport Protocol

- The lowest level of T.120 Protocol Stack
- Provides the standard interface to the higher layers, conforming to the ITU X.214/X.224 specification (OSI)
- Specifies the protocol stack (mappings) for each particular network supported
- At the transport level the conference is seen as a group of point-to-point connected pairs
- Provides reliable, point-to-point sequenced data delivery of MCS PDUs and segmentation of that data if necessary.

T.123: Transport Protocol



Multipoint Communication Services (MCS) T.122 and T.125

- T.122 defines the multipoint services
- T.125 defines the data transmission protocol

MCS provides the following features:

- Flexible modes of data transfer
- Multipoint addressing
- Multipoint routing of data
- Tokens are provided for resource contention resolution
- Network independence

T.122/T.125 (MCS)

- The middle layer of T.120 core portion
- The layer consists of a data transmission protocol
- Provides a framework for multiple point connection oriented data services.
- Is independent of the underlying network through the use of the T.123 transport services
- Acts a resource provider to the layers above

T.122/T.125 (MCS)

- Takes point to point transport connections and combines them to form a multipoint domain
- Provides channels and token resources on demand to applications for use in co-ordination and synchronization of events and processes.
- Data delivery normally follows the shortest path
- A mechanism is provided to guarantee that data originating from different nodes is received in the same sequence at all nodes

MCS: Definitions

- **MCS Domain**: It is a tree of MCS connections among MCS providers.
- **MCS Channels**: A channel is a domain wide address. A channel can be thought of as a distribution list. All members who are users of the same channel will receive data sent to that channel
- **Top MCS provider**: In every domain a single MCS provider will become the Top MCS provider and will be the exclusive manager of all the domain channels, user IDs and token resources

T.124 Generic Conference Control

- This is a “session management” function of T.120
- Provides a set of services for setting up and managing a multipoint conference
- Provides application registration and application directory services to nodes that wish to join a conference or create one
- Provides conference security procedures in the from of the ability to incorporate a password which joining users must know

T.124 (GCC)

- Provides access central and arbitration of capabilities
- Is used by application to coordinate the use of MCS channels and tokens
- Is used to query an MCU or multipoint terminal node to find a desired conference
- Knows the logical structure of a conference - the nodes and application - but does not know the structure of the network that supports it.

T.124 (GCC) Services

- Conference establishment and termination
- Conference Roster
- Application Roster
- Application Registry
- Conference Conductorship
- Misc. Functions

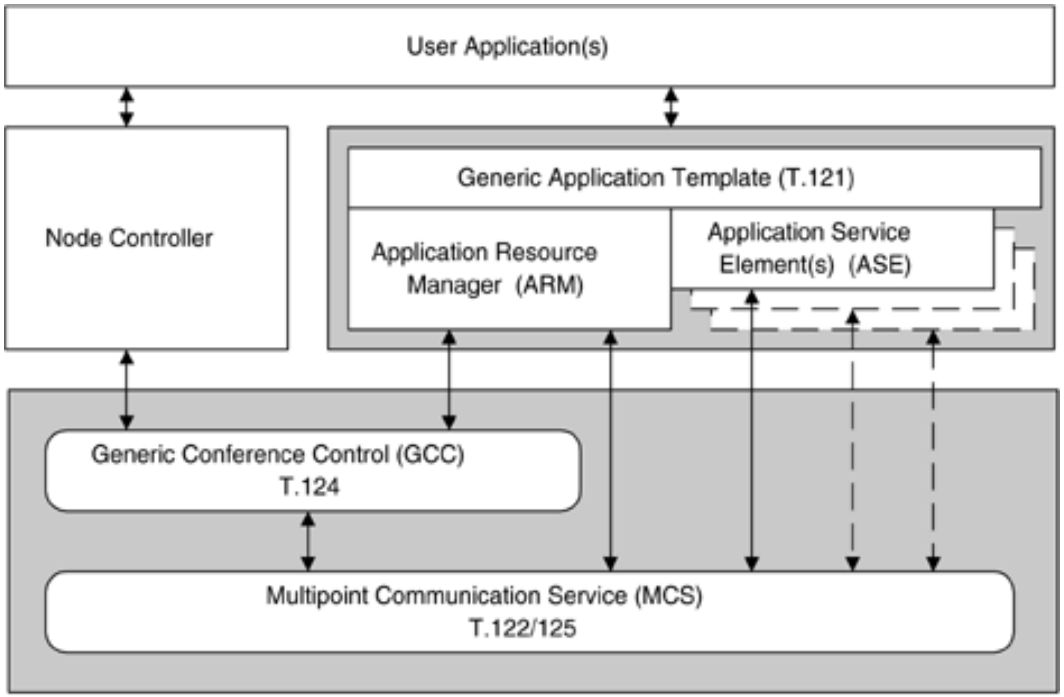
Conference Profile

The following characteristics are defined when the conference is created and communicated to each node as it enters the conference

- Conference Name
- Conference Description
- Listed Vs. Unlisted
- Termination Method
- Password Protected or Not Password Protected
- Conductible Vs. Non-conductible
- Privilege Lists

T.121 - Generic Application Template (GAT)

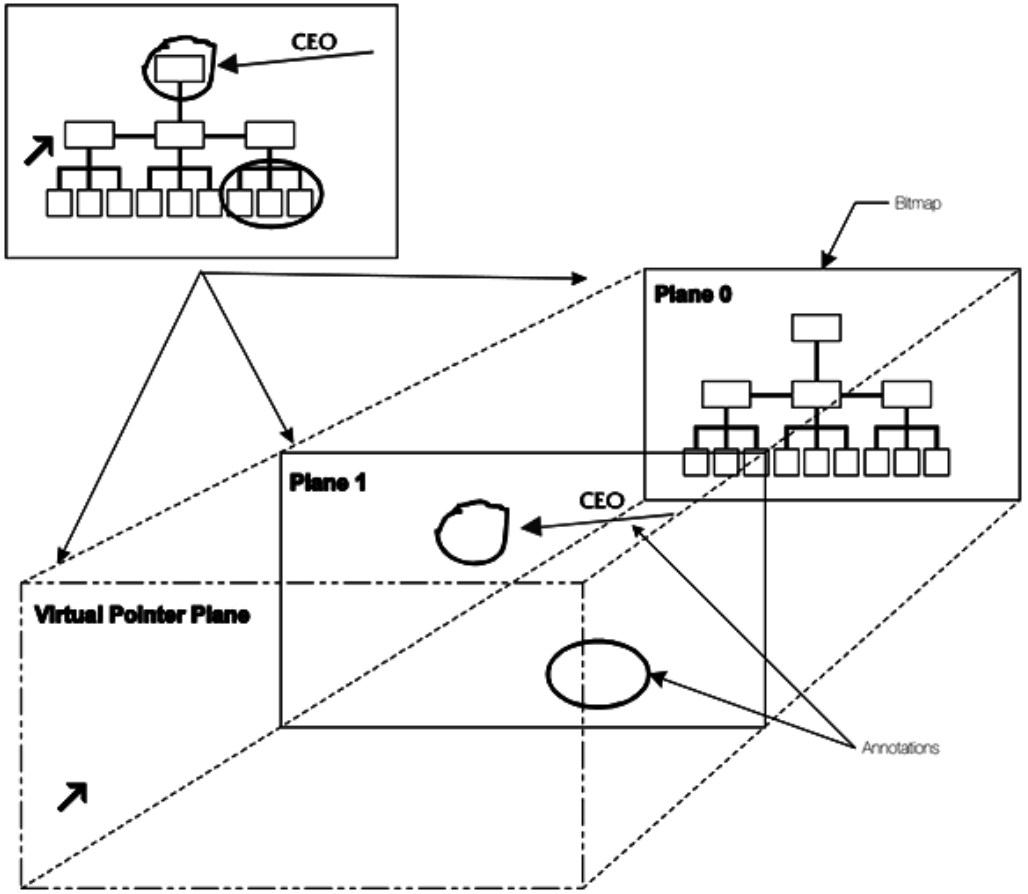
- Provides a consistent model for T.120 resource management
- Manages GCC and MCS resources



T.121 GAT (cont.)

- The model contains two parts:
  - The **Application Resource Manager (ARM)** provides the generic functionality relevant to all protocols and manages the GCC and MCS.
  - The **Application Service Element (ASE)** provides the application specific functionality independent of the type of channel and token resources provided to it by the ARM.
- The functionality provided by the template is required by all application protocols; both standard and non-standard.
- Compliance to the template is mandatory for standardized application protocols and highly recommended for proprietary protocols.

T.126: Still Image Exchange and Annotation



- Protocol for viewing and annotating still images transmitted between two or more applications (shared whiteboarding)
- Shared virtual workspaces

T.127: Multipoint Binary File Transfer

- Provides means to transfer a file between multiple endpoints in a conference
- Files can be sent to all participants, or just to a subset
- Multiple file transfers at different priorities can happen simultaneously
- Files can be optionally compressed prior to transmission

T.127 Example