

# Audio-Video Control

## An Overview

**Presented**

**by**

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**AVC Overview - Trevor Peers**

**23/09/96**

**BT Labs**

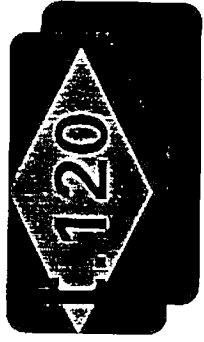
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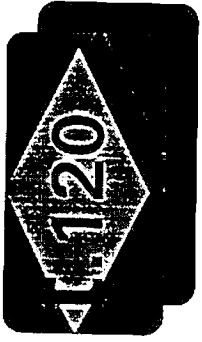
# Introduction

- ♦ Why AVC?
- ♦ AVC Goals
- ♦ Relationship with H.Series
- ♦ AVC Concepts
- ♦ AVC Architecture
- ♦ AVC Recommendations
- ♦ Timescales



# Why AVC?

- ♦ T.120 provides rich network independent multipoint data protocol
  - Wish to extend to embrace control of audio & video
- ♦ Same flexible concepts:
  - Providing user with common way of doing things
  - Independent of network & platform
  - Enabling communication across network boundaries
- ♦ Building on what already exists
  - T.120 & H. Series
- ♦ Exploit the full power of multimedia conferencing



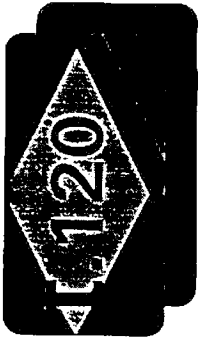
# AVC Goals

- Single A/V control protocol for all multimedia terminals
- Control of media streams crossing network boundaries
- Flexible conference services
  - ◆ Video switching
  - ◆ Audio mixing
  - ◆ Continuous presence
  - ◆ User controlled source selection
  - ◆ Speaker identification
- Remote Device Control
- Minimal complexity, particularly in terminals
- ‘QoS’



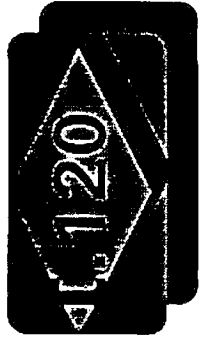
# Relationship with H.Series

- Tight coupling with H.series work
- Underlying protocols leveraged where appropriate
  - Capability exchange
  - Link configuration
  - Terminal operating mode selection
- ♦ T.13x supplements H.245 functionality
- ♦ Supersedes optional parts of H.243
- Additional functionality provided as required
  - ♦ Emphasis on multipoint services
- T.13x co-ordinates the operation of underlying protocol engines to deliver end-to-end audio-video communications



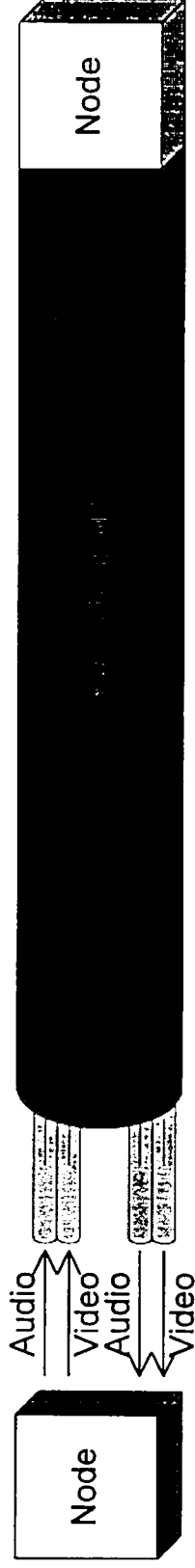
# AVC Concepts

- ♦ Audio-Video Infrastructure comprises
  - Nodes which are classified as
    - ♦ Terminals which *use* AVC Services
    - ♦ Network Elements which *provide* AVC Services
      - e.g. MCUs, MCs
    - ♦ Nodes may have codecs, transcoders, mixers, switches
  - Real Time Links



# Real Time Link

- ◆ Logical connection between adjacent nodes
- ◆ Bi-directional
- ◆ Conveys real time information in one or more logical channels
- ◆ Each logical channel carries a single media stream

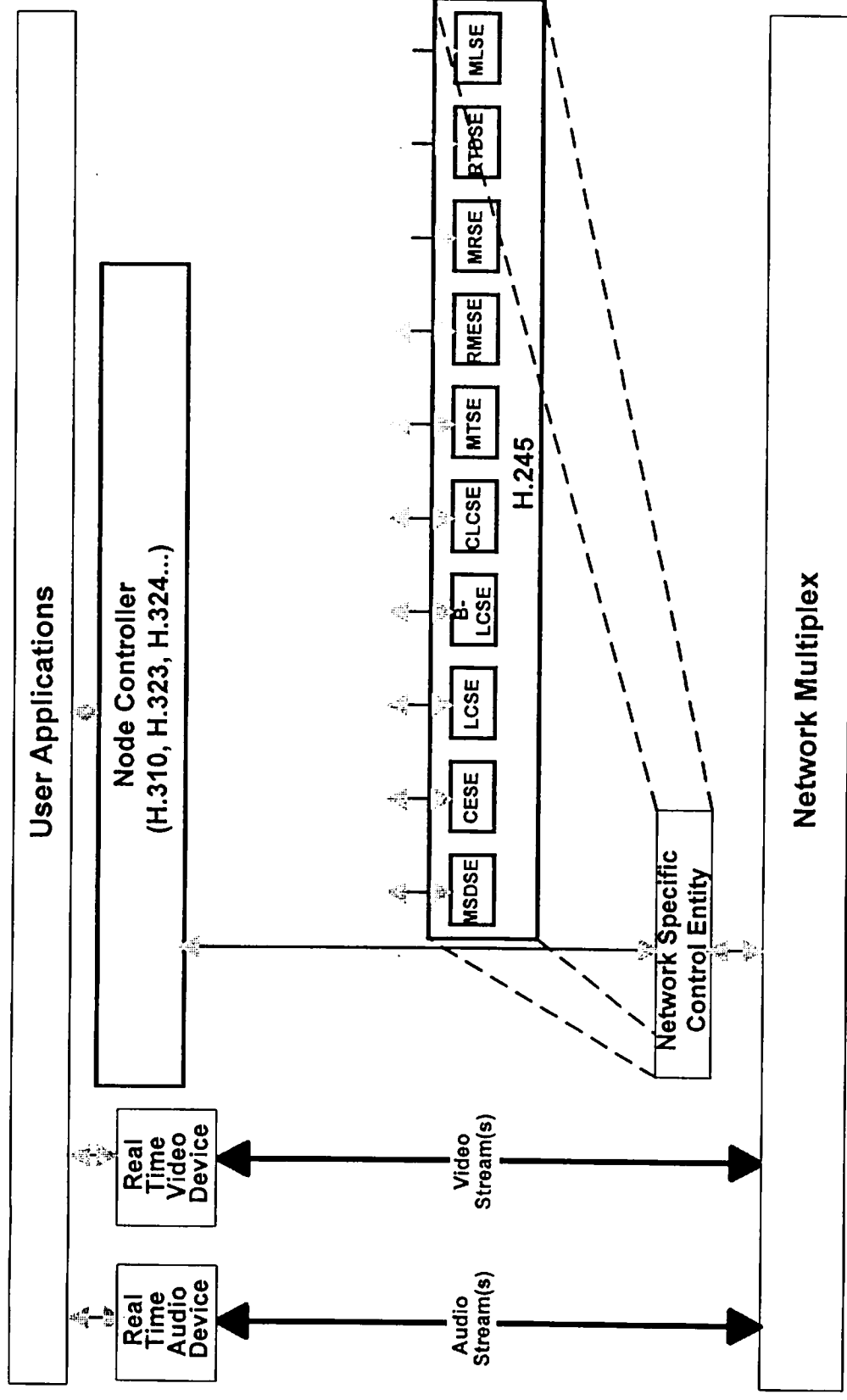


## Switched Network



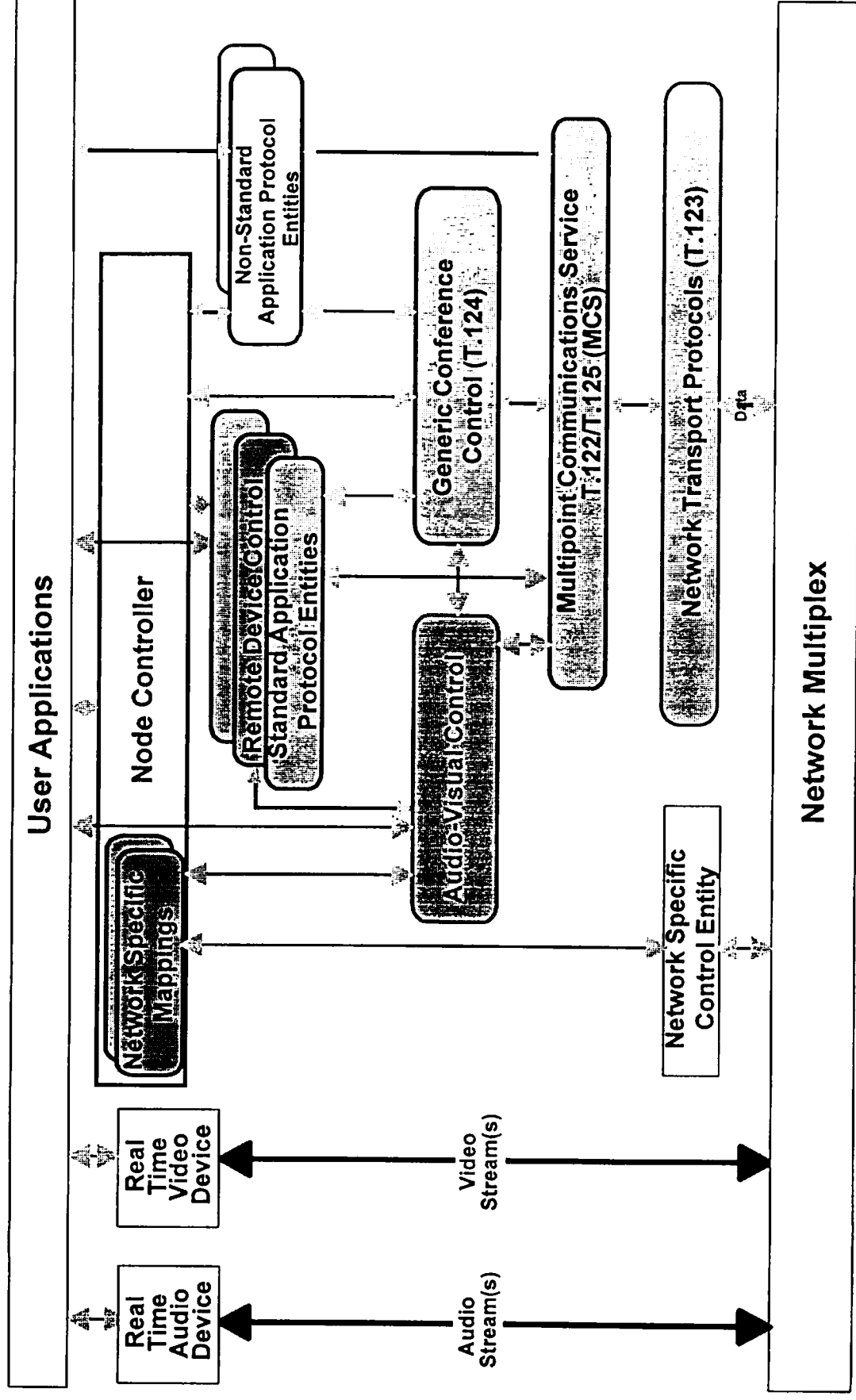


# Pre. T.13x Architecture





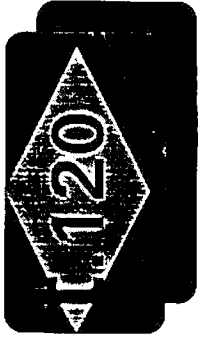
# T.13x Architecture





# T.13x Recommendations

- ◆ T.130 Overview Document
- ◆ T.132 & T.133: 2 documents, 1 protocol
  - ◆ T.132 Audio-Visual Control: Infrastructure Management
  - ◆ T.133 Audio-Visual Control: Service Management
- ◆ T.131 Network Specific Mappings
  - No draft available
- ◆ T.RDC Remote Device Control



# T.132 Infrastructure Management

- Management of AVC infrastructure
- Co-ordination of Network Specific Control Entities
- Audio-Video Capability Distribution
  - ♦ Leveraging underlying protocols (H.245, H.242)
  - ♦ Link & Node Rosters
- Inheritance of existing audio & video connections
- Resource management
  - ♦ Resource Ownership - Zones
  - ♦ Resource Configuration
  - ♦ Resource Arbitration



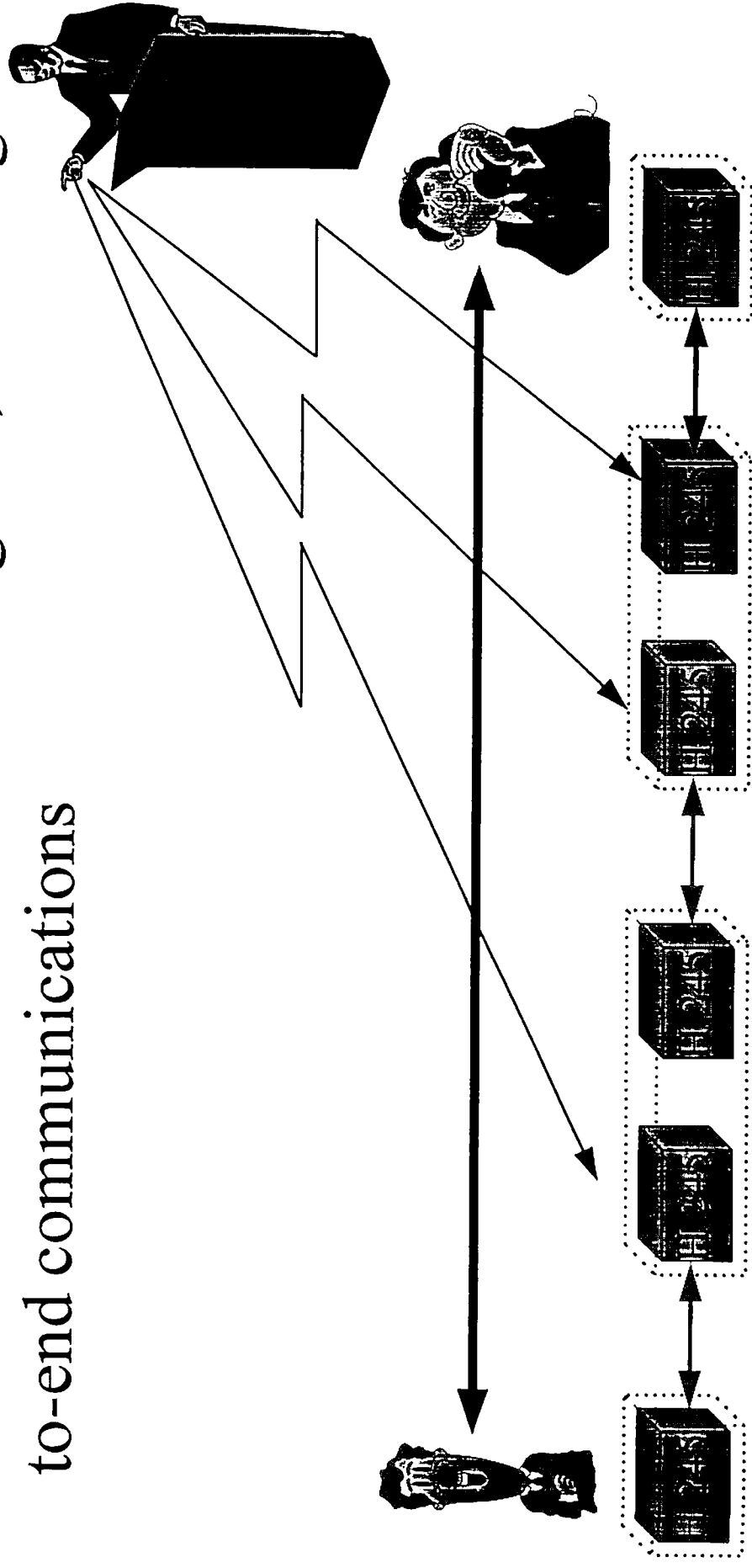
# Capability Exchange

- Underlying protocols (H.245, H.242) perform point-to-point capability exchange
- T.132 distributes capabilities between Network Elements
  - ♦ Terminals don't receive the information
- Capabilities partitioned into 2 types:
  - ♦ Link Roster: link transmission characteristics
    - e.g. bandwidth
  - ♦ Node Roster: node media processing capabilities
    - e.g. codecs
- ♦ Format inherited from H.245



# T.132: The H.245 Co-ordinator

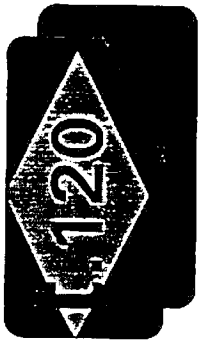
- ♦ T.132 is used to co-ordinate the operation of autonomous H.245 Protocol Engines, allowing end-to-end communications



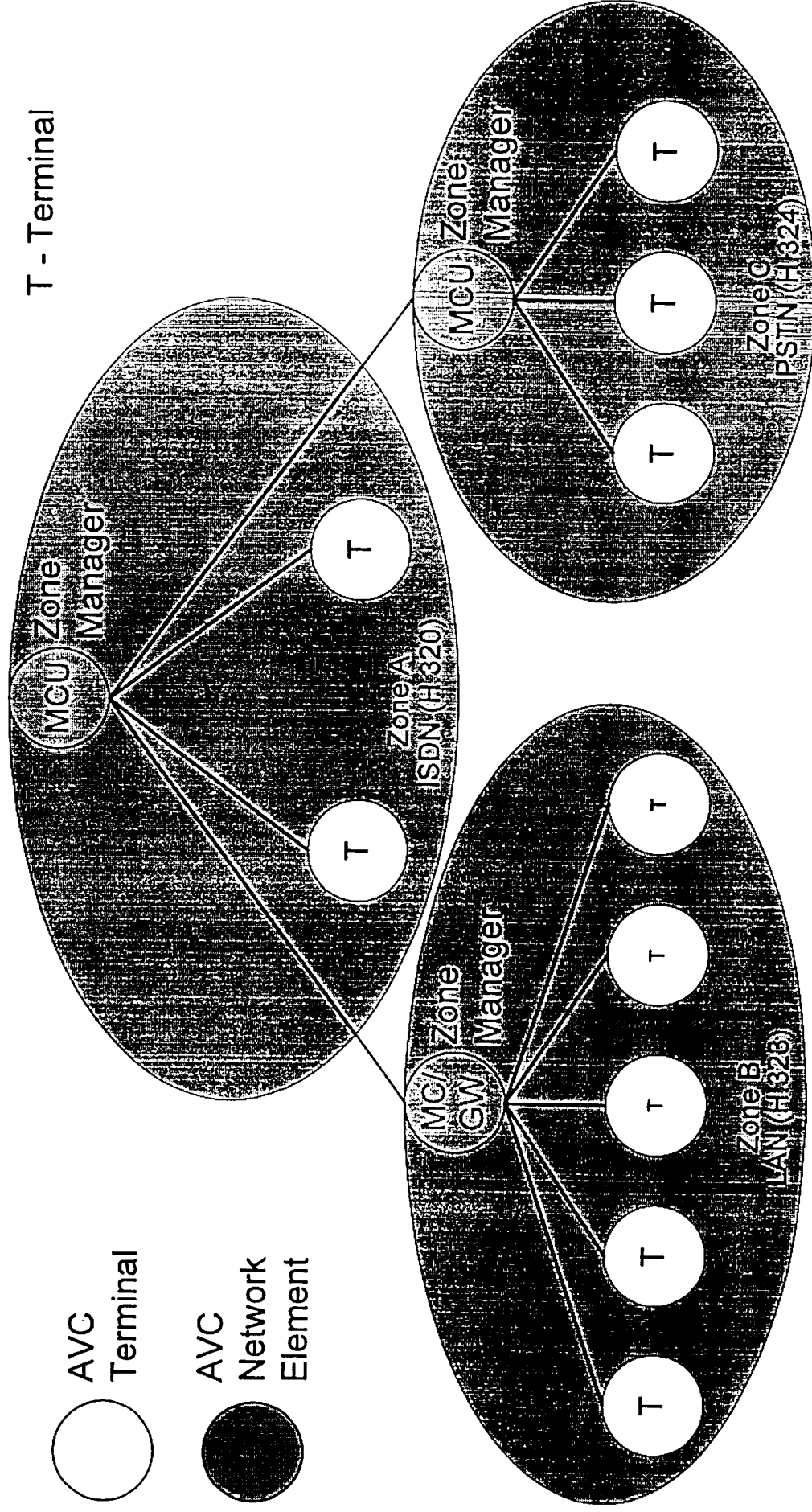


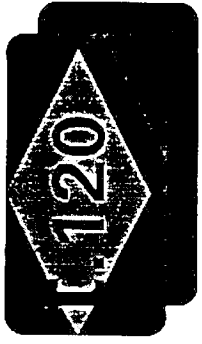
# Resource Management

- Intelligence in Network Element Node Controllers
  - ♦ Minimises AVC protocol complexity
  - ♦ Greater flexibility
    - Service providers determine their own resource management strategies
  - ♦ Resource Managers can evolve without requiring protocol changes
- Distributed resource management
  - ♦ AVC infrastructure can be divided into zones
  - ♦ Each zone has a node designated as Zone Manager which
    - Fields service requests from terminals
    - Co-ordinates with the other Zone Managers to fulfill those requests
  - ♦ Network specific knowledge can be used



# AVC Zones





# Audio-Video Control (T.133)

- Provides enhanced support for multimedia conferencing with a suite of dedicated services
  - ◆ Stream Routing Service
    - Manages establishment of end-to-end communication paths
  - ◆ Stream Identification
  - ◆ Source Selection
  - ◆ Audio Mixing
  - ◆ Video switching
  - ◆ Continuous Presence
  - ◆ VoD Streams
  - ◆ On Air Indication



# T.133 Service Management

- AVC Service Arbitration
  - ◆ Capability exchange for new AVC features
  - ◆ Determines common operating mode
  - ◆ Services advertised to terminals
- AVC Service Management Issues
  - ◆ Sharing AV resources between services
  - ◆ Service dependencies
  - ◆ Prioritising services
  - ◆ Suspending services
- Utilises T.132 to configure AVC infrastructure



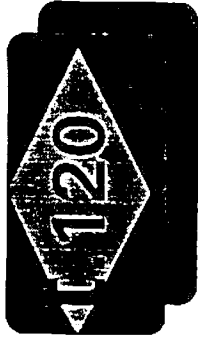
# T.131 Network Specific Mappings

- Maps AVC functionality to specific environments (e.g. H.320, H.323)
- Allows co-ordinated control of Network Specific Control Entities
- Specifies interaction between AVC and Network Specific Control Entity for
  - Capability exchange
  - Creation and management of logical channels
  - Selection of node operating modes
- Mapping performed within Node Controller
  - ♦ Allowing seamless transfer of control of existing a/v streams



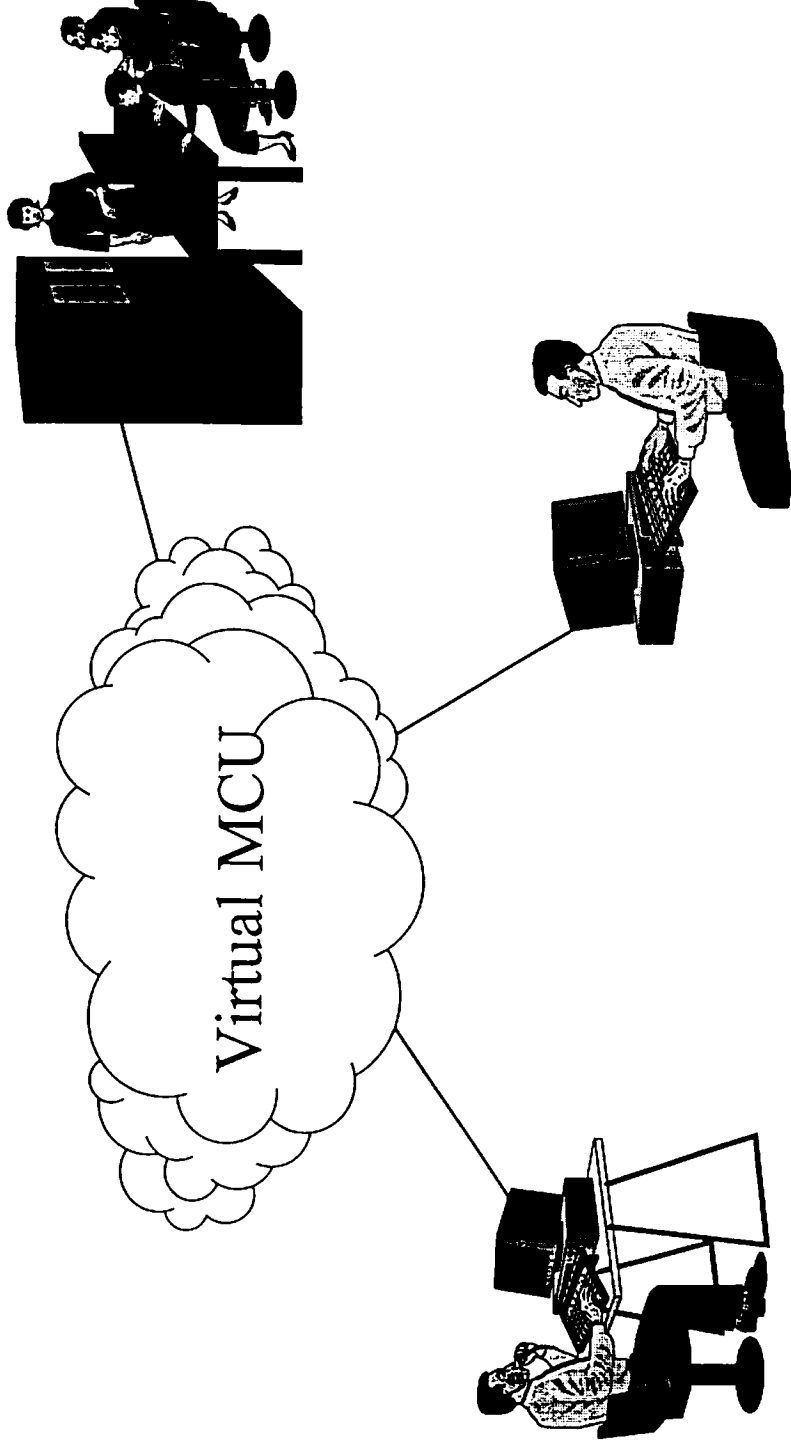
# Remote Device Control

- Allows users to configure and control devices at other sites:
  - ♦ Cameras
  - ♦ VCRs
  - ♦ Slide projectors, .....
- Supports a variety of camera control paradigms
- Supports simultaneous control of multiple devices
- Device owner arbitrates access
- RDC is separate application protocol
  - ♦ Peer-to-peer communications unlike rest of AVC
  - ♦ Utilises AVC Services (Stream Routing, Source Selection)



# Virtual MCU

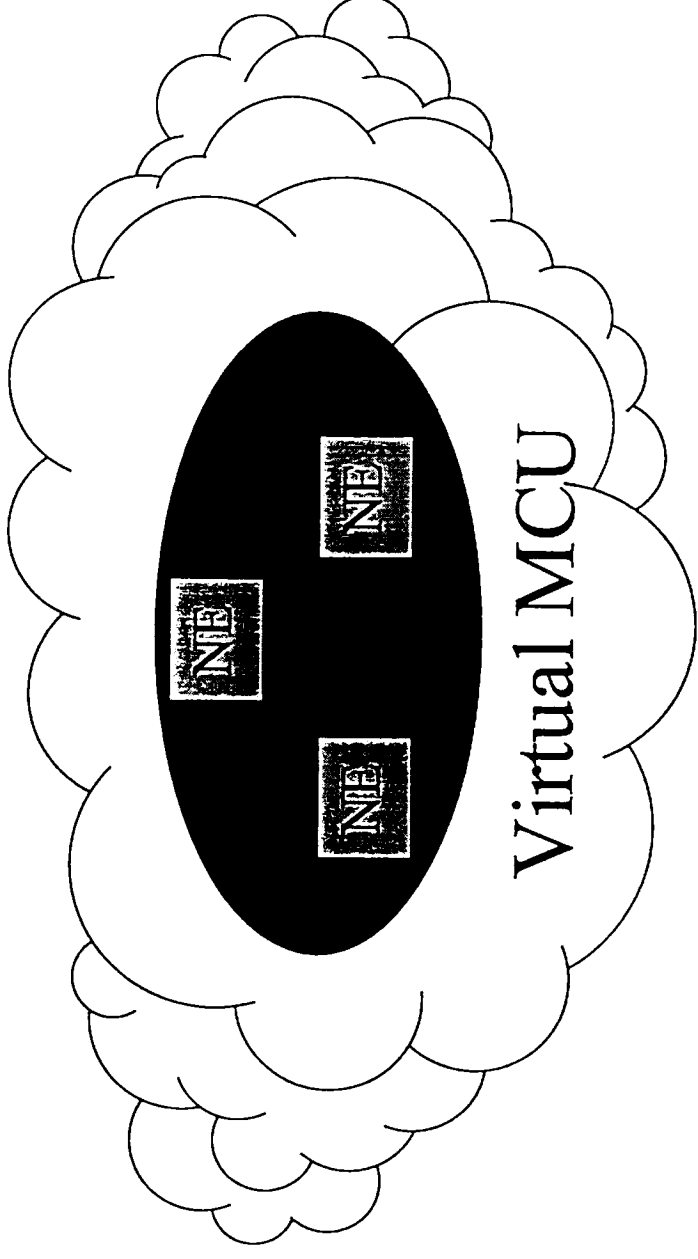
- ‘Client-Server like’ relationship between Terminals & Network Elements
- Terminals view network as single ‘Virtual’ MCU





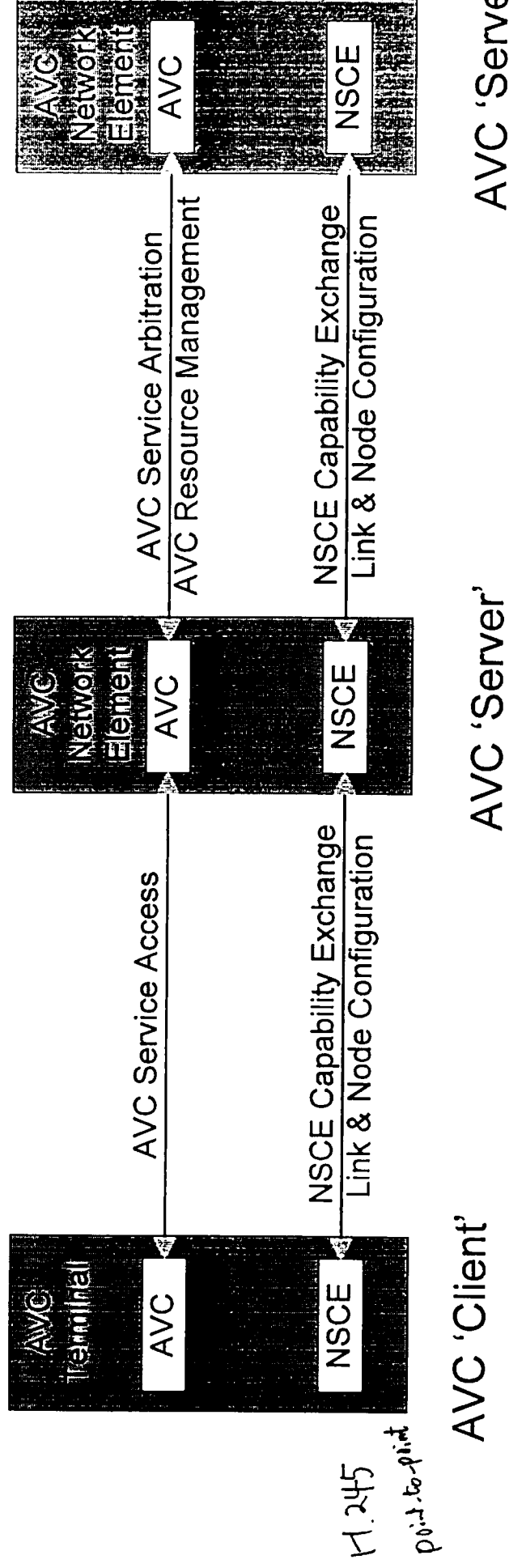
# Inside The Virtual MCU

- A group of communicating Network Elements
- AVC service management transparent to Terminals
- ♦ Minimising terminal complexity





# AVC Communications



## 'Client-Server like' Model



# Timescales

- T.132 Service Definition Sept '96
- T.133 Service Definition Dec '96
- T.132/3 Protocol Definition Q2 '96
- Encourage participation, particularly by Bridge Vendors & Service Providers
- AVC Editing Session Q4 '96