Network Support for Multiparty Multimedia Applications

Design of Scheme 2

A Multicast Realtime Protocol Scheme

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Outline

Background and motivation

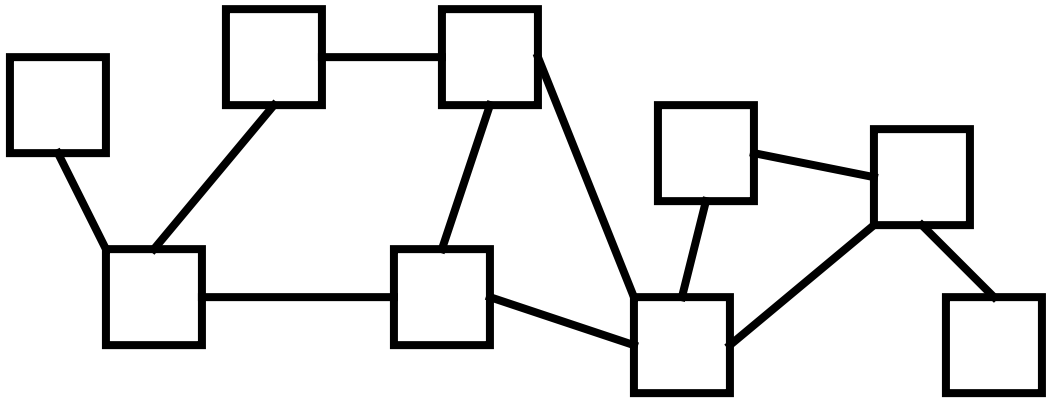
Extensions to previous Tenet scheme

Modifications for multiparty applications

Design considerations

Summary

Framework



Large, heterogeneous internetwork with arbitrary topology

Store-and-forward nodes

Links with boundable delay

Tenet Approach

Traffic specification

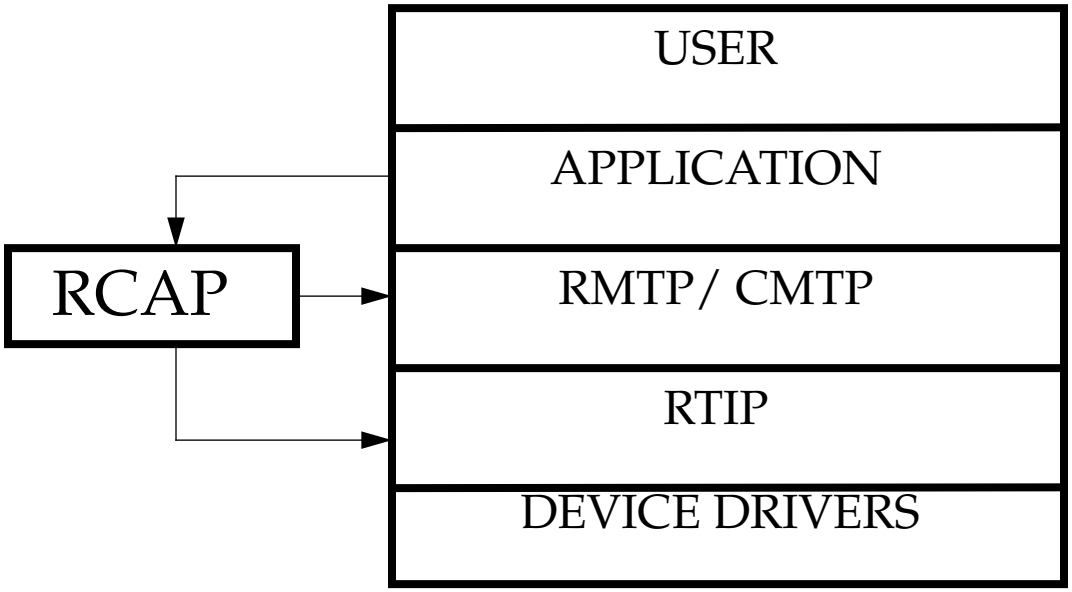
Performance guarantees

- Deterministic and statistical
- QoS parameters: delay, jitter etc.

Connection-oriented approach

- Resource reservation based
- Worst-case analysis
- Deterministic and statistical guarantees

Tenet Protocol Suite



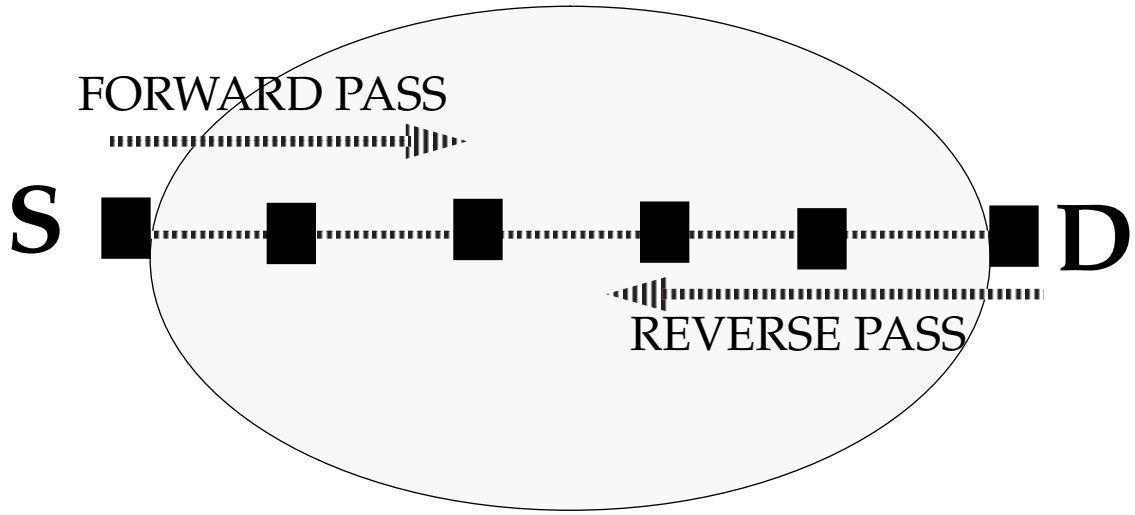
RCAP: Realtime Channel Administration Protocol

RMTP: Realtime Message Transport Protocol

CMTP Continuous Media Transport Protocol

RTIP: Realtime Internet Protocol

Channel Establishment



Forward Pass

Resource reservation and admission control

Reverse Pass

Relaxation of resources reserved

Motivation

Unicast realtime communication

- Scheme 1

Additional support for

- Flexible protocol scheme
- Multi-party communication

Flexibility

Client-service interface

- QoS ranges

Multiple scheduling disciplines

Multiple traffic specification models

Dynamic traffic management (DTM)

Multi-Party Communication

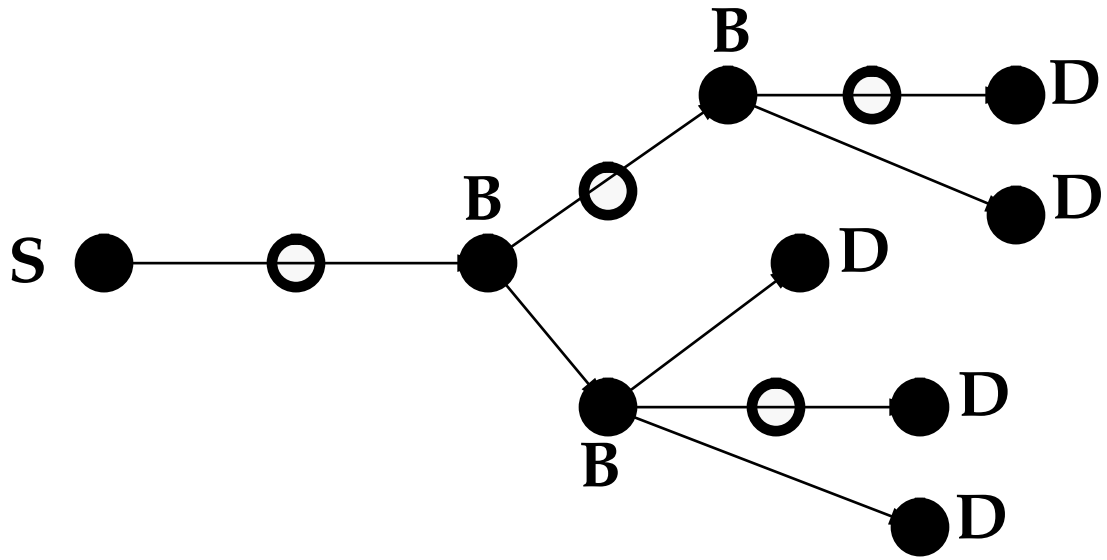
Capture the conference scenario

- Roles and participants
- Organizers and managers

Extend Scheme 1

- Multiple senders and receivers
- Dynamic membership

Multicast Channel Establishment



Branch points

- Coordinate the reverse pass of establishment
- Replicate packets on outgoing links

Basic abstraction

Multicast channel

Simplex, realtime, multicast channels

Single sender multiple destinations

Channel (Source-Id, Traffic Spec, Target-Id)

Target Sets

Abstraction for scalable conferences

Real-time equivalent of IP HostGroup

Decouples senders from receivers

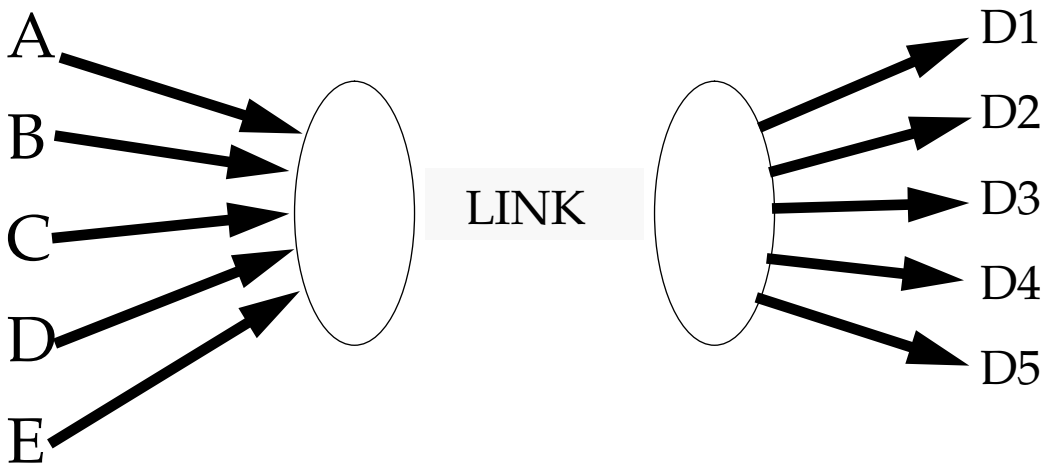
New sender

- Establish (Channel-Id)

New receiver

- Join (Target-Id, Dest-Id, QoS)

Resource Sharing



Well-behaved panel discussion

Channel A: 1 video+1audio; same for Channel B,C,D &E

Channels combined: Require 1 video + 2 audio

Resource partitioning

Multiple virtual subnetworks

Partition based decision making

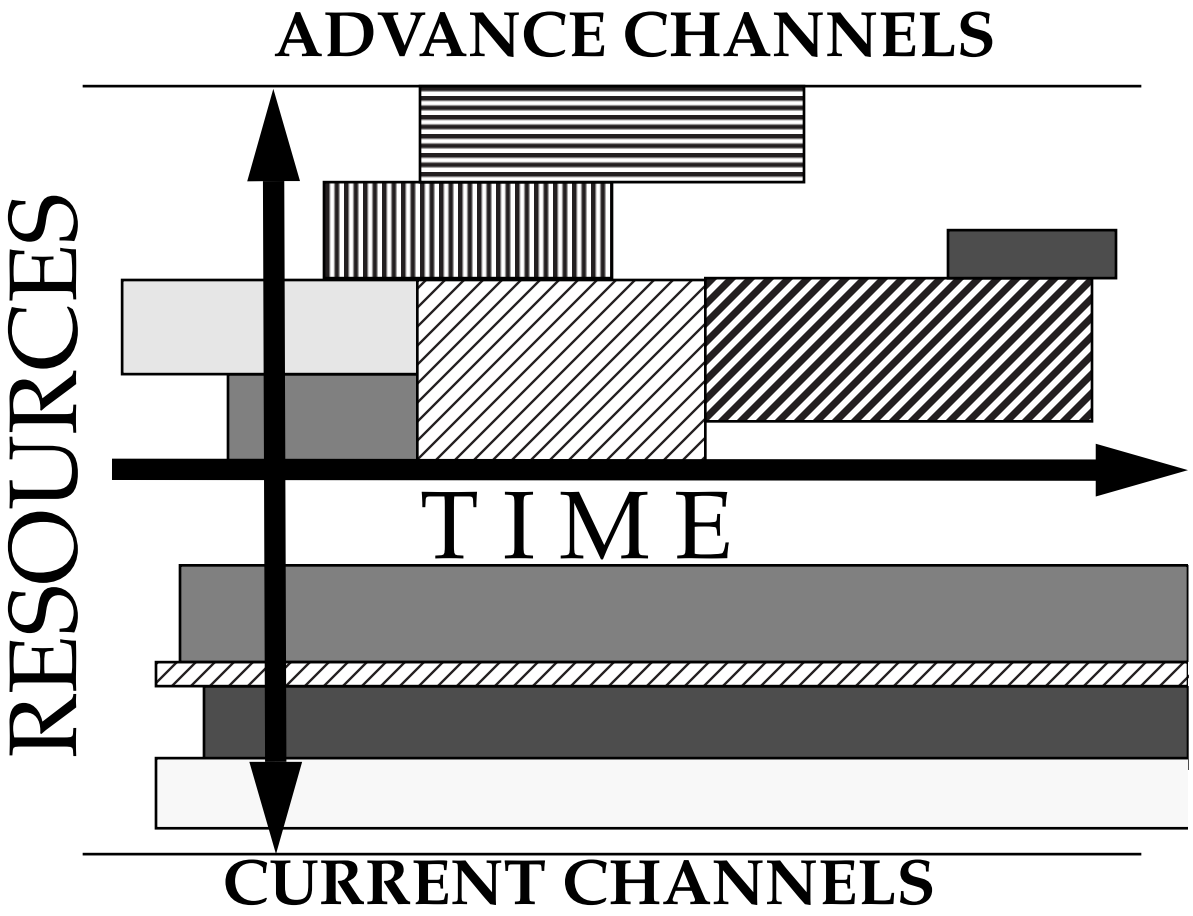
Resources

- Buffers
- Server capacity

Modify admission control tests

Packet scheduler not affected

Advance Reservations



Design considerations

Efficient

Scalable

Robust

Flexible and modifiable

Implementable and usable

Simple

Partial failure semantics

What if the network can only provide resources for a subset of destinations?

Alternatives

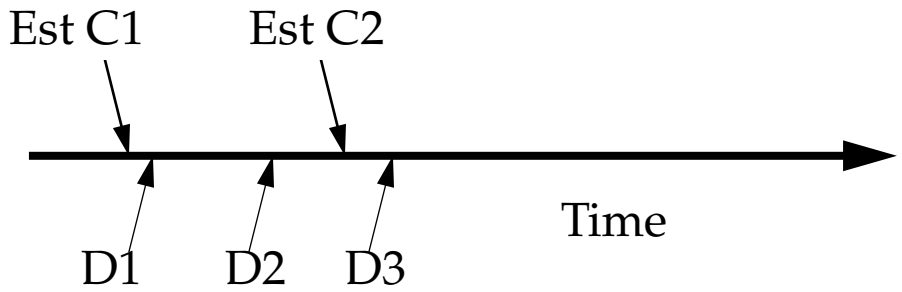
- All-or-nothing
- At-least-n destinations
- **At-least-zero**

Concurrency semantics

Many senders and receivers join a Target Set concurrently

Scalability, efficiency, usability

Network will connect all senders to all destinations



Important design decisions

Route computation before channel establishment (at internetwork level)

Third-party operations

- Channel establishment, teardown, dynamic join and leave
- Security issues

Where is information stored?

Scalability, efficiency and robustness

Target Sets

- All data for a single Target Set is maintained at the same place
- Not the same as maintaining a single centralized information base

What did we leave out?

Naming and location service

Fault-handling and management

Concurrent establishment of multiple channels

Authentication and authorization

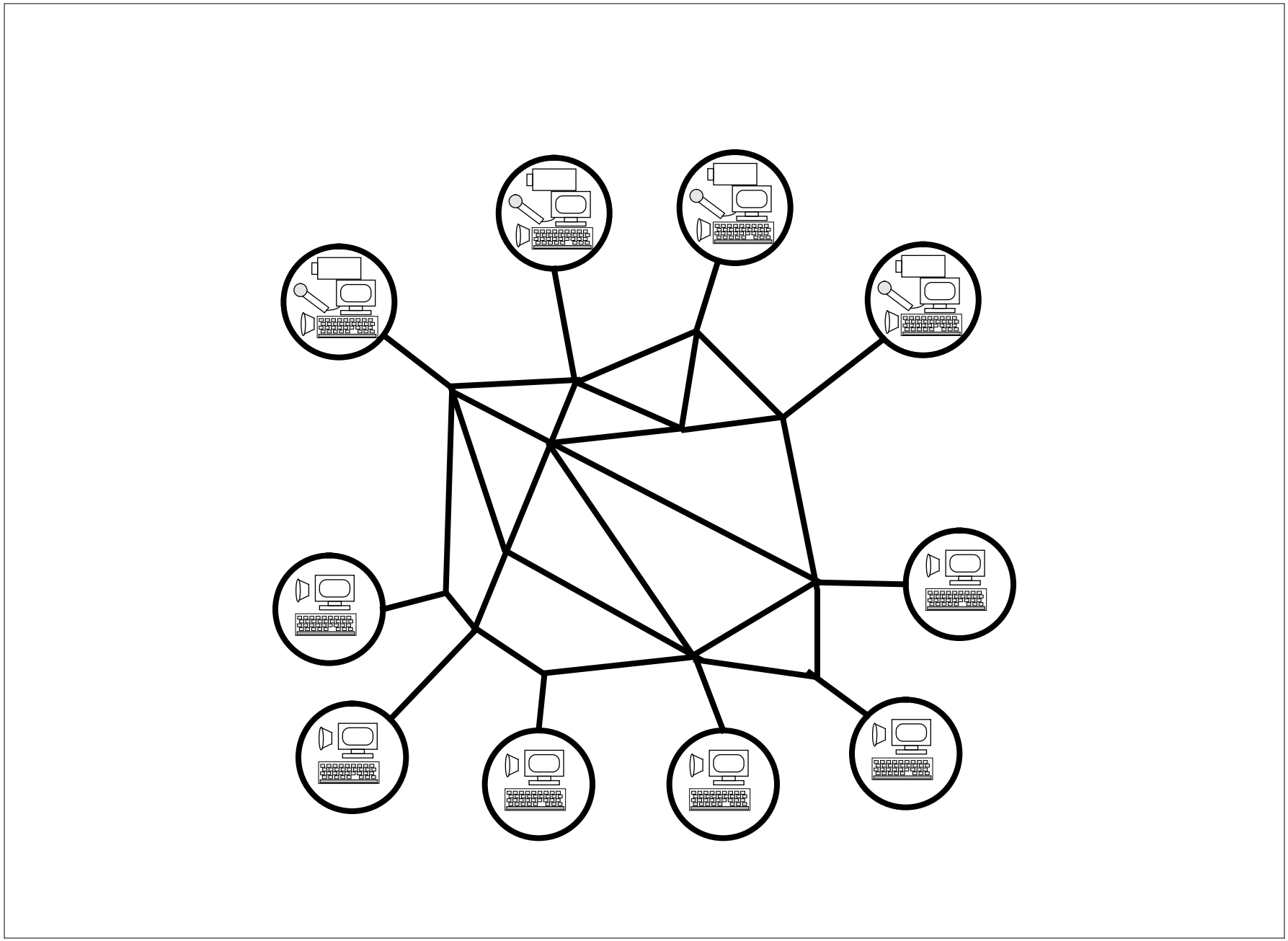
Summary

Scheme 2 builds up on Scheme 1

Adds flexibility and support for multiparty applications

Resource sharing, advance reservations and resource partitioning

Design: Simple, scalable implementation



Xunet student meeting: Design of Scheme 2

THANK YOU!!