Multicast Support in ATM

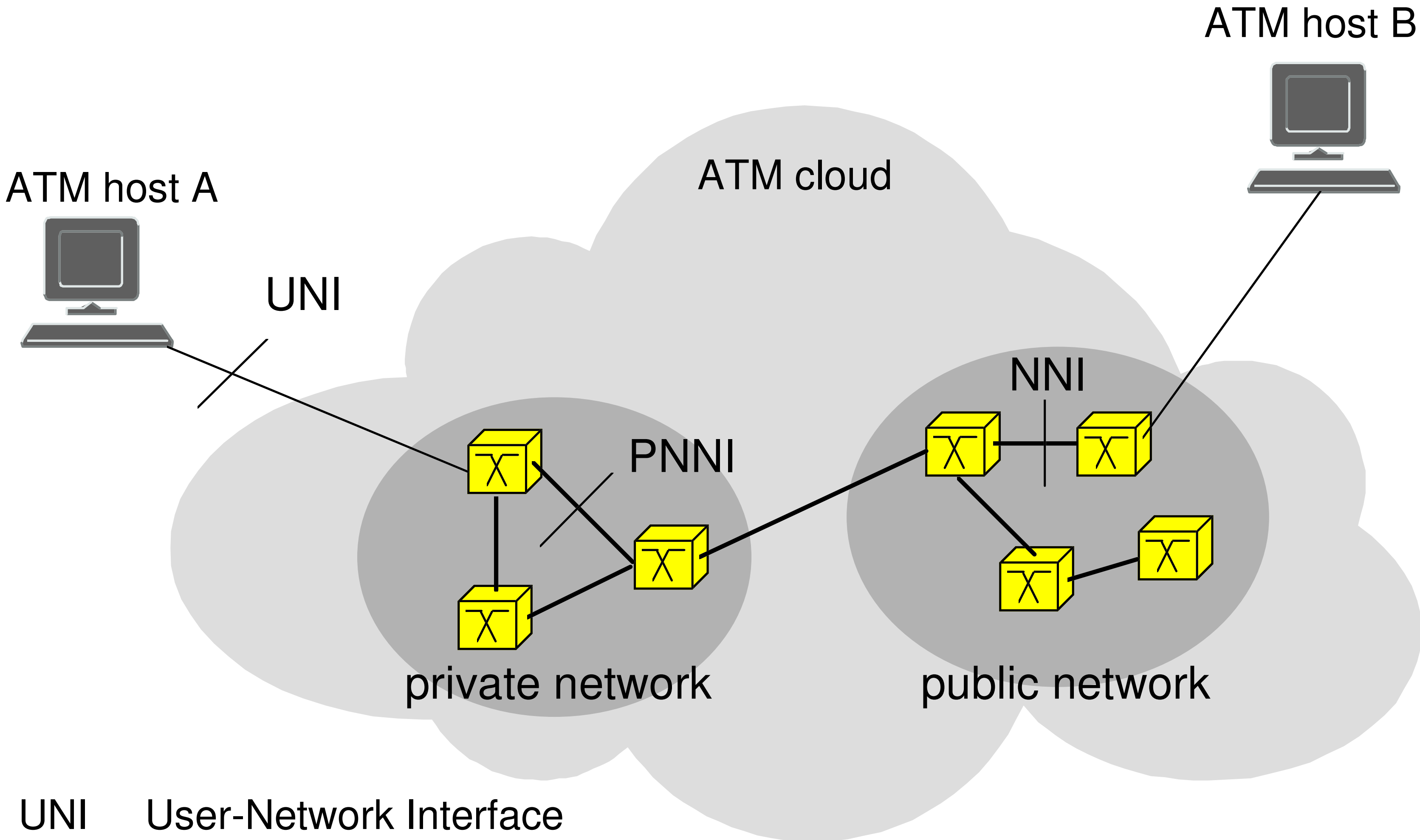
Roya Ulrich Paul J. Kühn

{roya, kuehn}@ind.uni-stuttgart.de

University of Stuttgart

Institute for Communication Networks and
Computer Engineering (IND)

ATM Interfaces



UNI User-Network Interface
PNNI Private-Network-Network Interface
NNI Network-Network Interface

Outline

- ATM Group Multicast Capability
  - UNI 4.0 Specification
  - Multicasting over ATM Adaptation Layer 5
  - Open Issues
- Research Work on ATM Group Multicasting at IND

ATM Group Multicasting

ATM Forum

User
Network
Interface

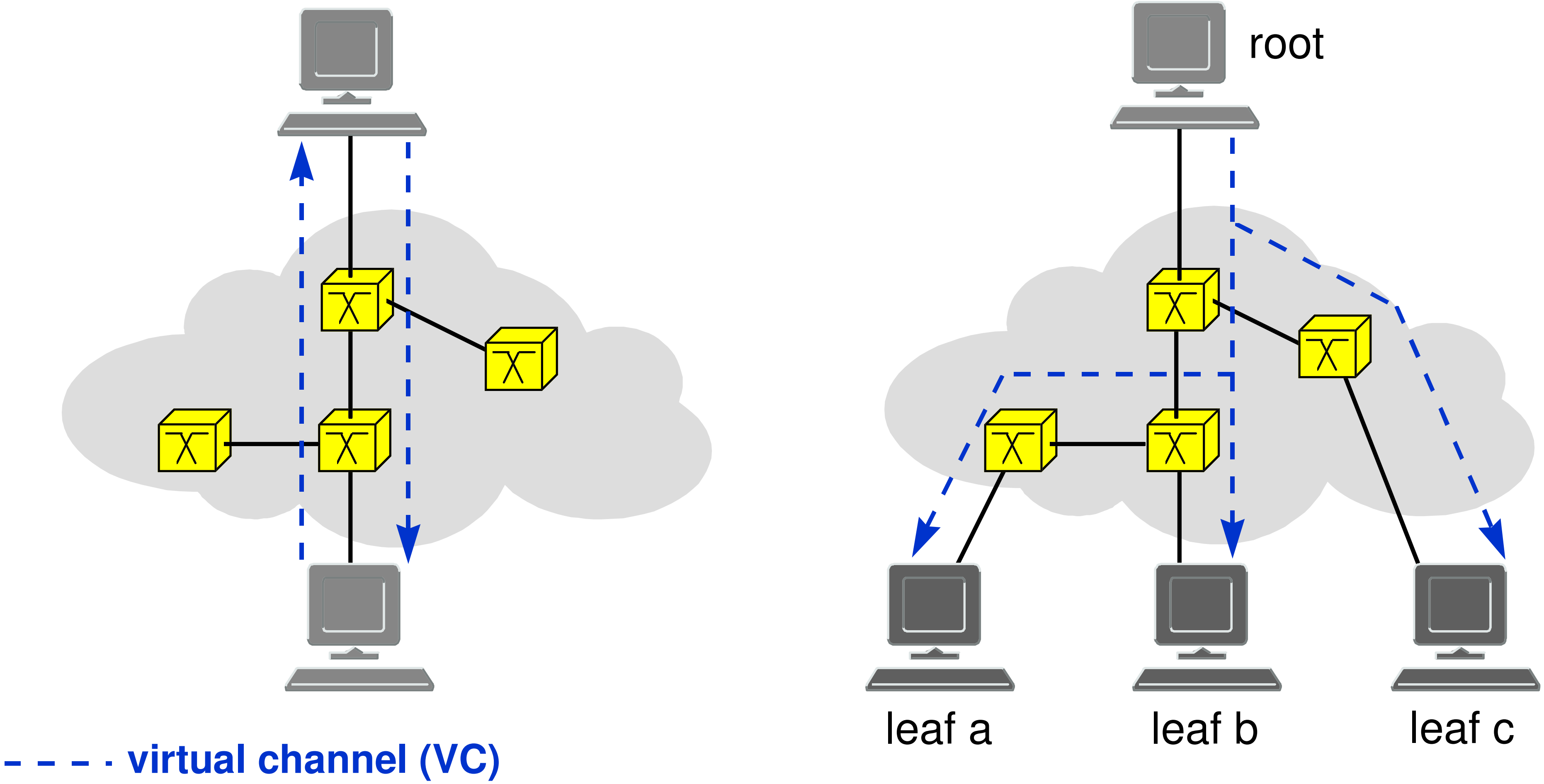
4.0

- ATM Group Address
- Membership in Multiple Groups
- Dynamic Group Membership
- Open Groups
- Closed Groups
  - Membership Scope Control
  - Connection Scope Control
- Leaf Initiated Join
- Connection-oriented

ATM Connections

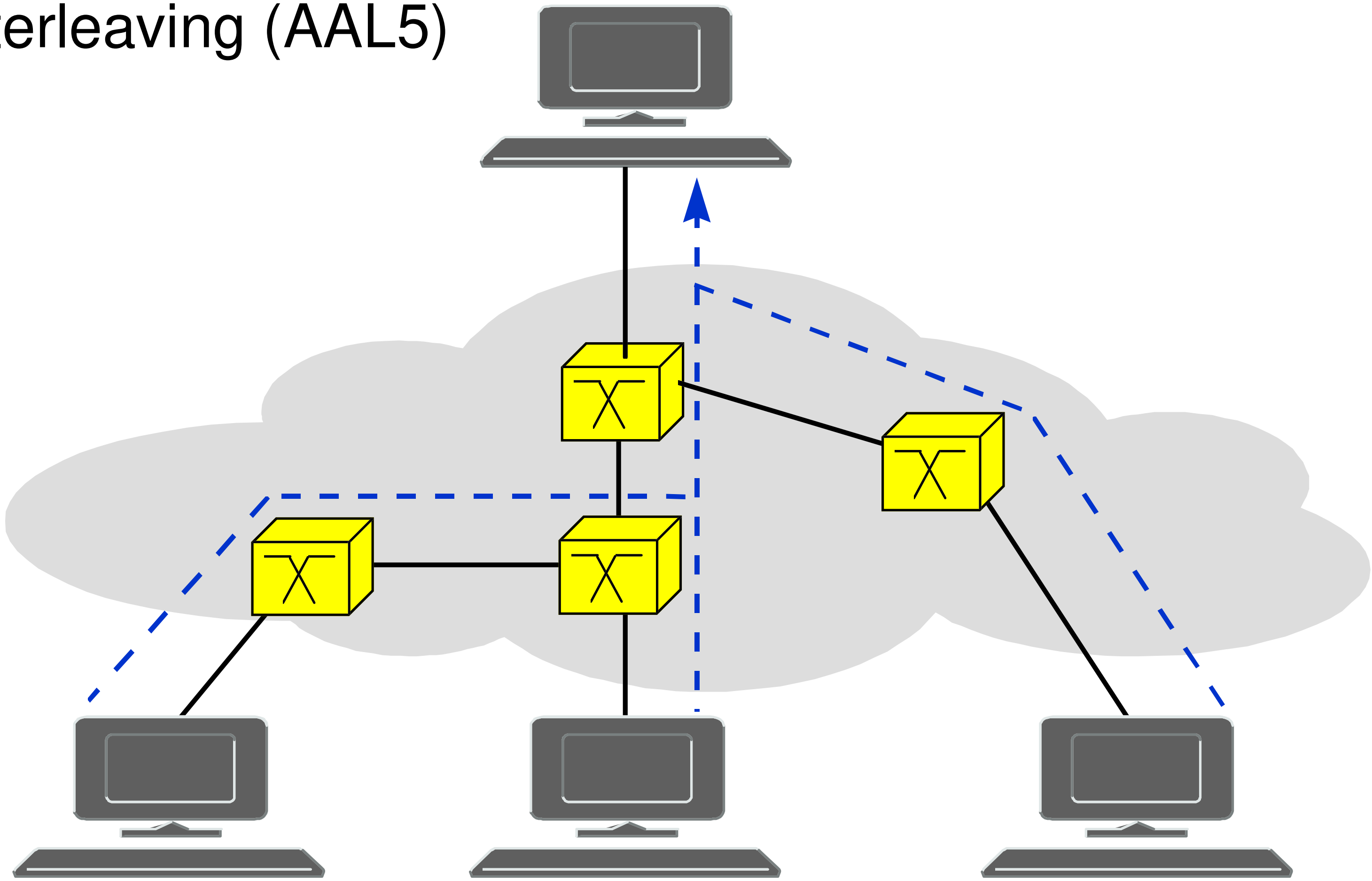
point-to-point
(uni- or bidirectional)

point-to-multipoint
(unidirectional)



Multipoint-to-Multipoint

- VCs Merging in ATM Switches
- Cell Interleaving (AAL5)



Multicasting over AAL 5

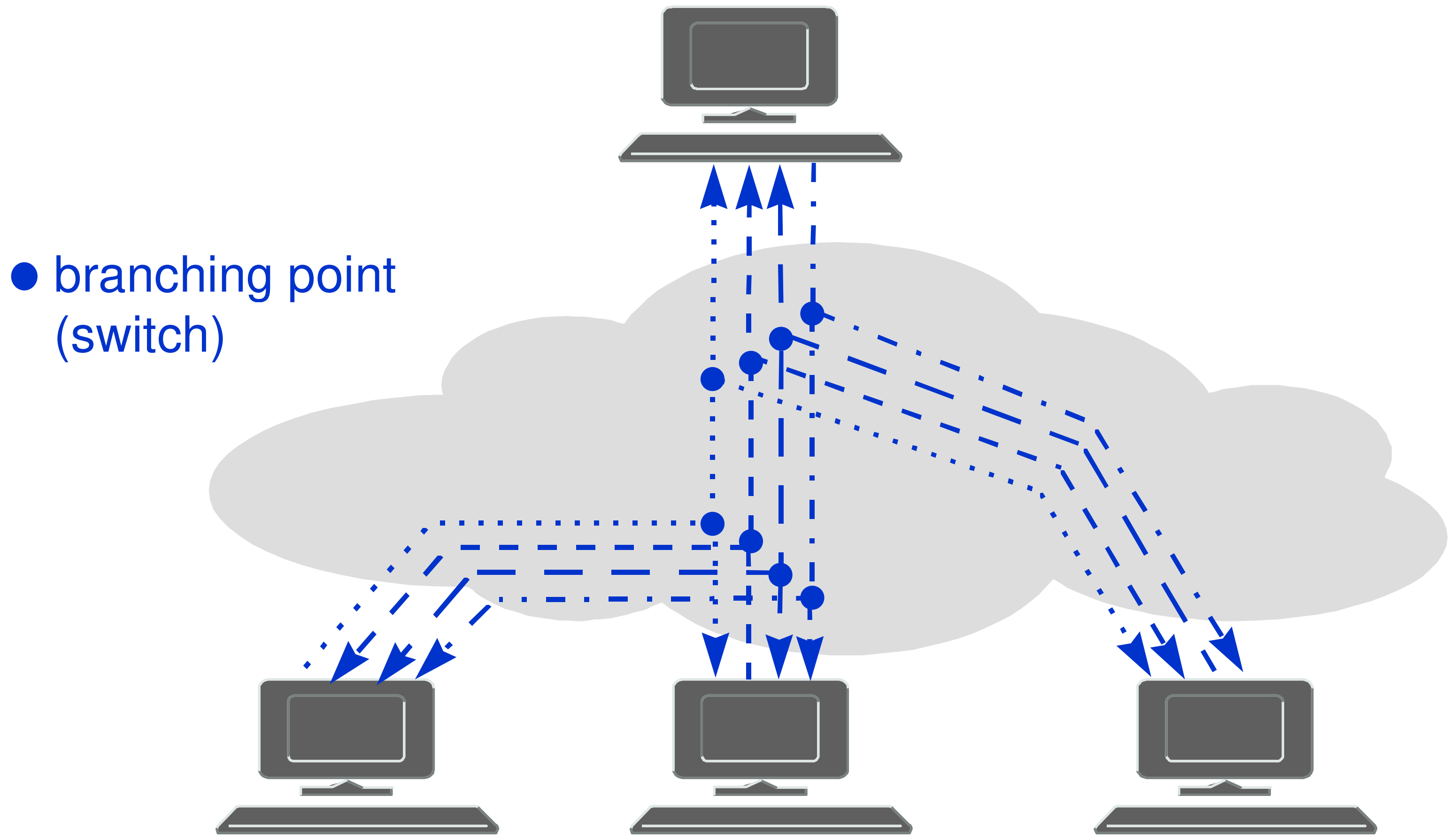
❶ Multipoint-to-Multipoint Virtual Path (VP)

❷ Virtual Channel Mesh

❸ Multicast Server (MCS)

Virtual Channel Mesh

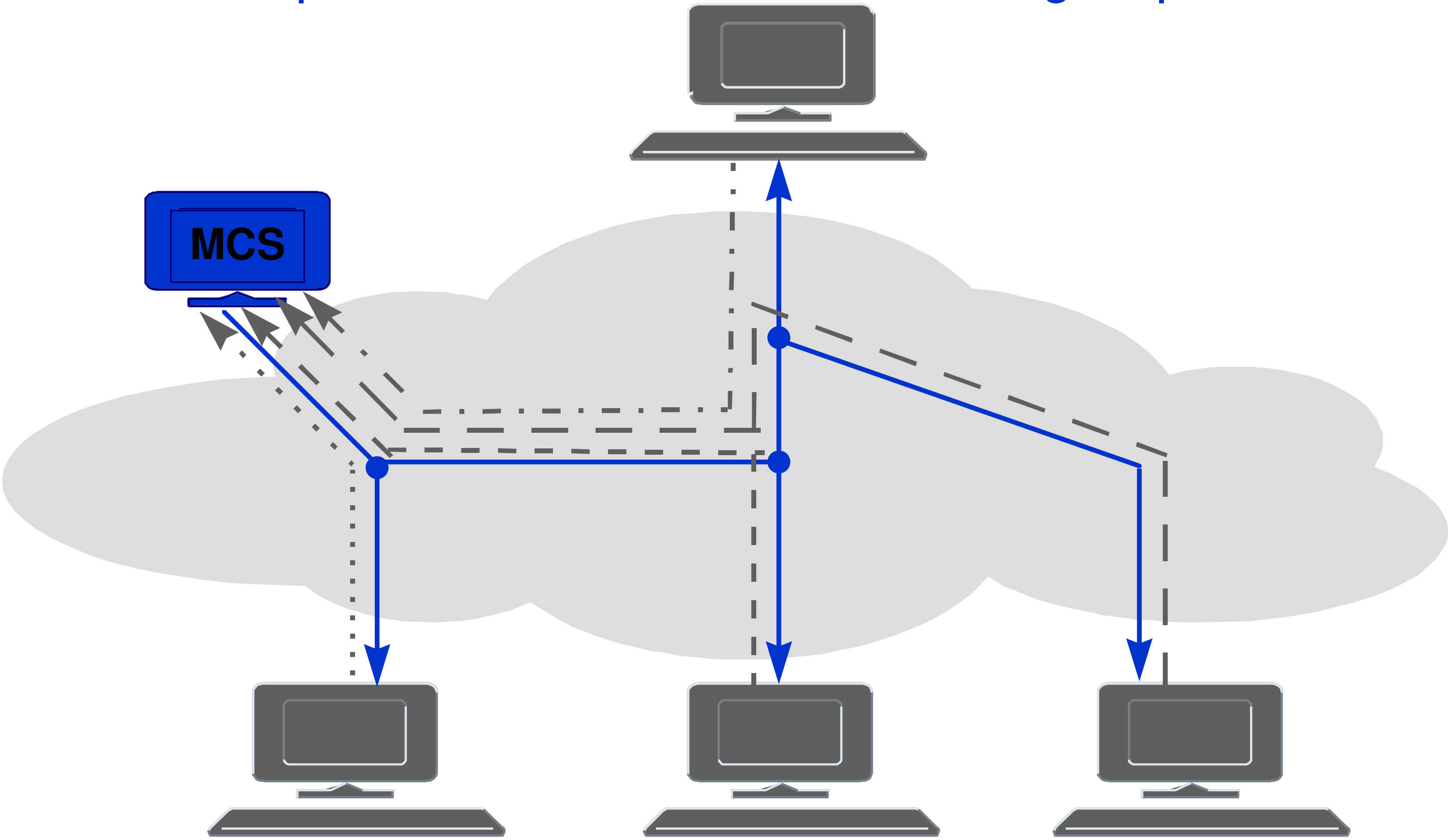
point-to-multipoint virtual channels between group members



Multicast Server (MCS)

point-to-point VC from each group member to a dedicated server

point-to-multipoint VC from server to each group member



ATM Multicasting: Tradeoffs

	VC Mesh	MCS
Cell Interleaving	unique VC	packet serialization in MCS
Fault Tolerance	high ☺	low ☹
Performance	• high resource consumption ☹ • low end-to-end latency ☺ • high throughput ☺	congestion point MCS ☹
Scalability	low ☹	high ☺
Signaling Load	high ☹	low ☺
QoS heterogeneity	uniform for all point-to-multipoint VCs	uniform for all point-to-multipoint VCs

Open Issues

- Standards for ATM Multicast Signaling
- Standards for ATM Multicast Routing

Extension of ATM Forum's unicast PNNI protocols

Research Work at IND

- Multicast Routing

- Multicast Signaling

  - dynamic QoS renegotiation
  - heterogenous QoS in multipoint connections
  - group multicasting with ATM's *available bit rate services*

- Performance Studies