



Enhancing Application Level Multicast for P2P Conferencing

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IP Telephony

Contact Centers

Mobility

Services

P2P Conferencing

GOAL: Scalable P2P conferencing

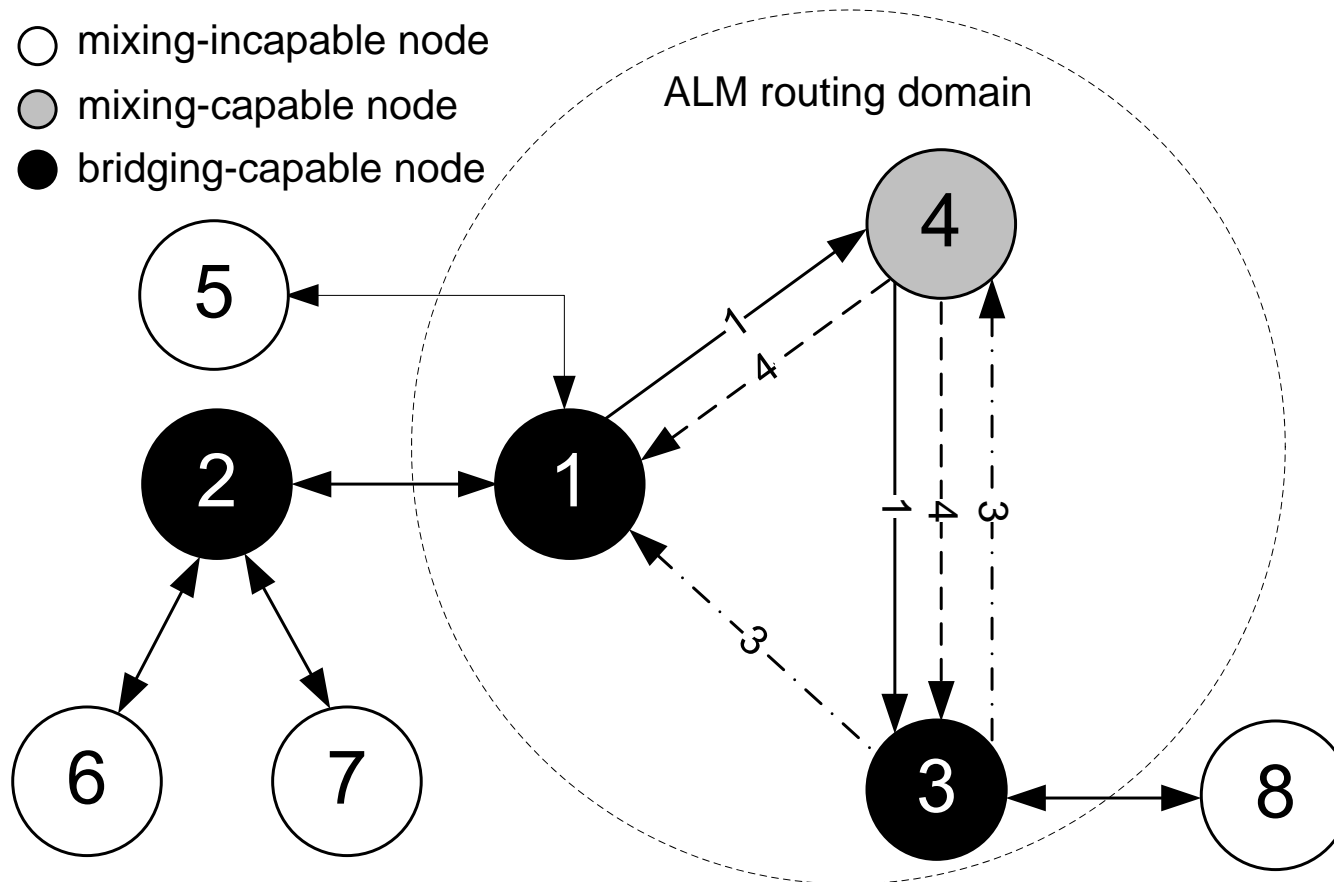
Existing Approaches -- all participants should mix

- IP Multicast
 - deployment
- Full Mesh
 - bandwidth intensive, not scalable
- ALM
 - only considers bandwidth and transmission latency, did not consider mixing capability

Our Solution – Hybrid ALM P2P Conferencing

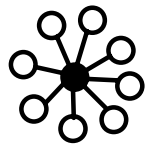
- Enhance ALM to leverage conference specific behavior – mixing capability
- Three step bottom up algorithm to construct ALM tree
- Performance testing that shows the scalability improvements

Hybrid ALM Solution for P2P Conferencing

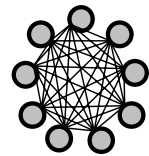


Built a prototype to study various P2P conference architectures on Avaya 4620SW IP Phones acting as various nodes in a conference

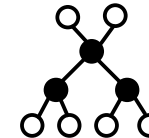
Testing results



Centralized

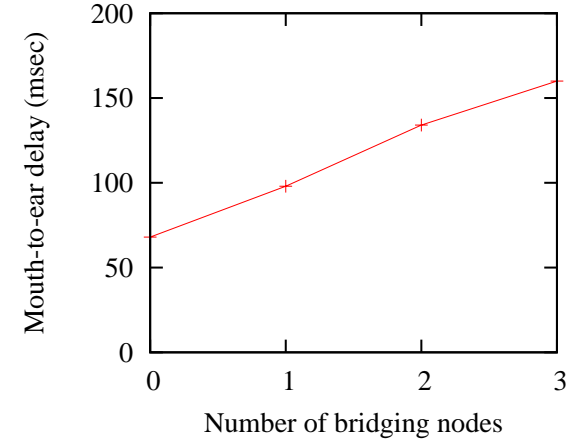
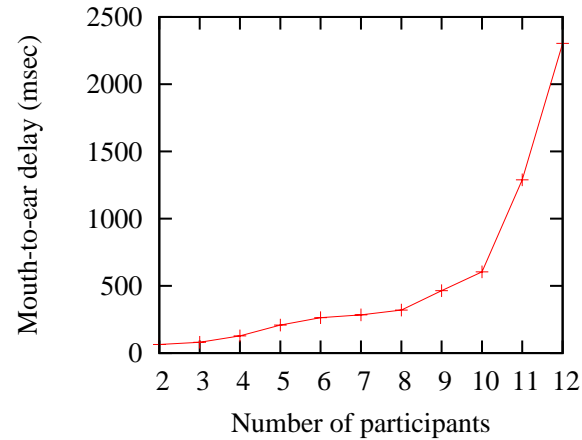
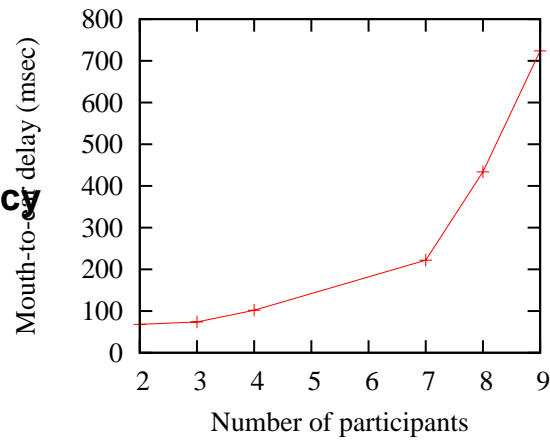


Mesh

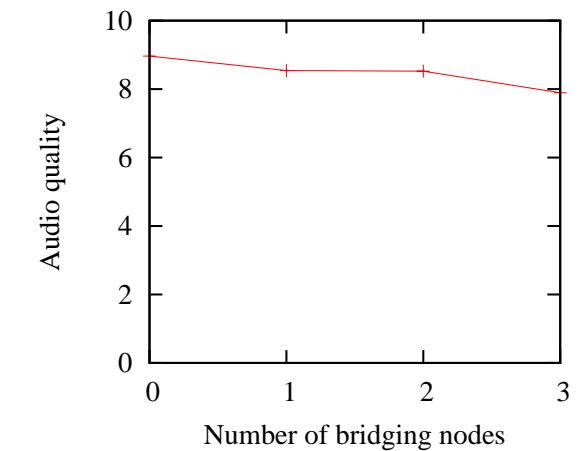
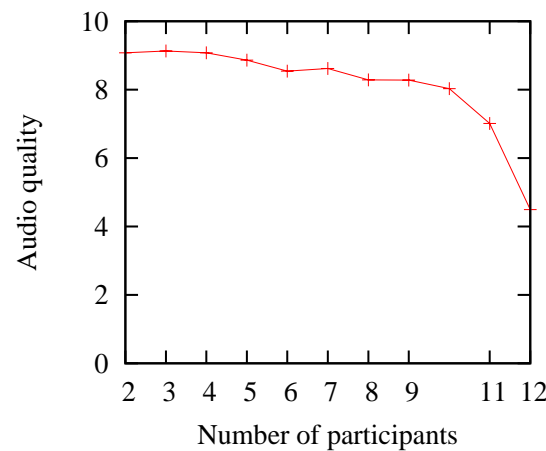
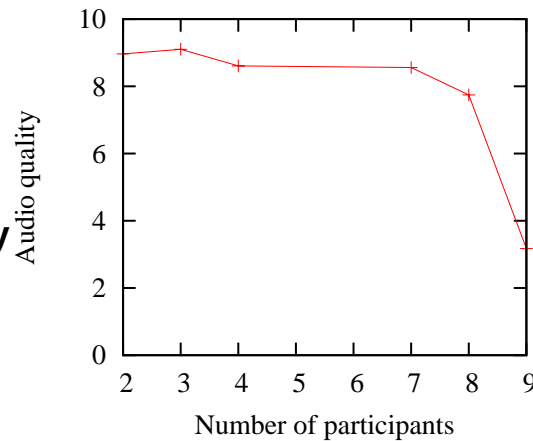


Layered

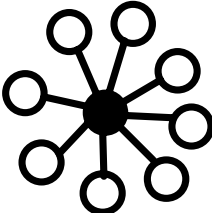
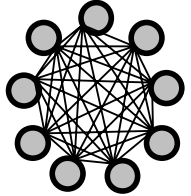
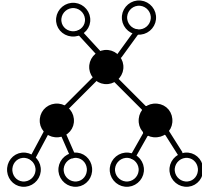
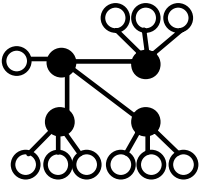
Latency



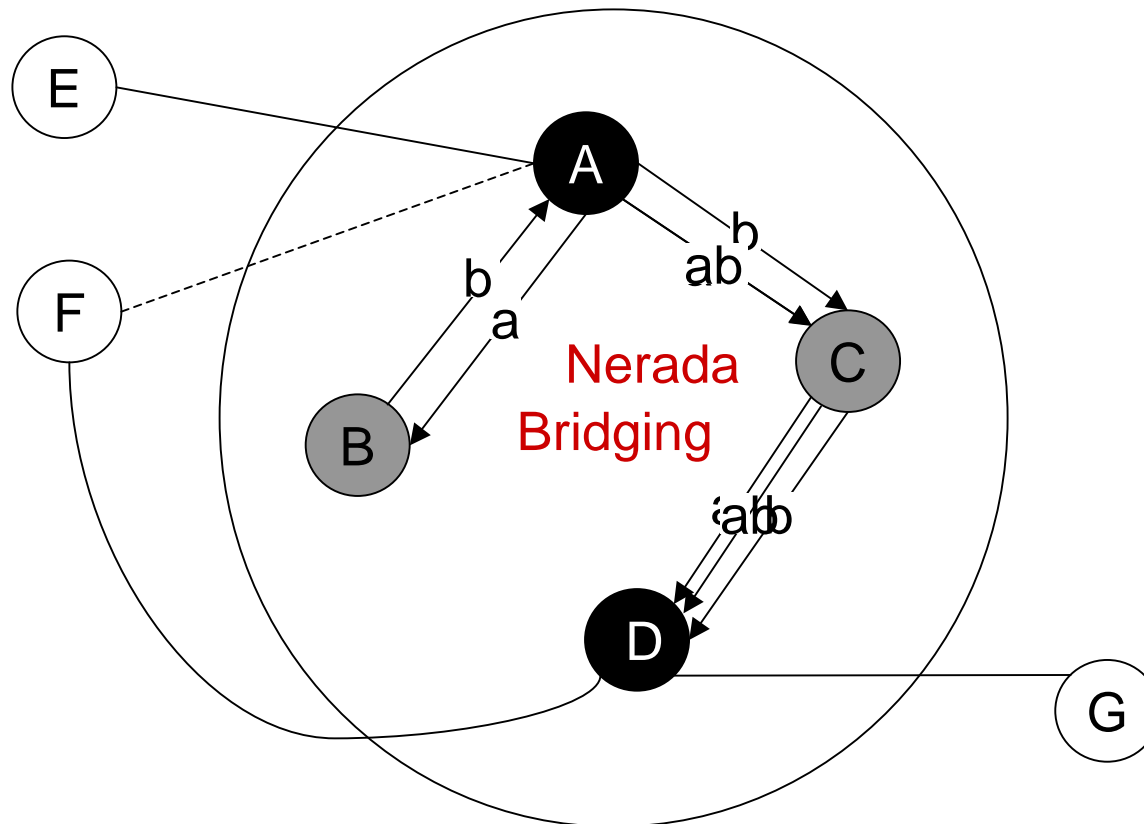
Quality



Testing results

	Participants	Architecture	Latency (ms)	Quality
	9	centralized	740-1930	< 3.17
	9	full-mesh	464	8.278
	9	layered/hybrid	74-218	8.438-8.853
	15	layered/hybrid	102-416	8.37-8.85

Constructing a conference



Require global information

Difficult to control

Needs to know bridging nodes' mixing capability

Redefine the goal (future work)

- Minimizing the number of audio mixing nodes
 - easier for conference control
- Minimizing the number of signaling messages to establish and maintain a conference
- No global information required
- Acceptable latency and quality
 - good but not best