

PROMISE:  
Peer-to-Peer Media Streaming  
Using CollectCast

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Shou-Fon Wu

# Outline

- Introduction
- Overview for PROMISE
  - CollectCast
- Selecting best peers
  - 3 methods
- Simulation
- Conclusion

# Introduction

- PROMISE is a p2p media streaming system based on CollectCast.
- CollectCast: one receiver collects data from multiple senders.
- The main problem is how to select, monitor, and switch sending peers for each p2p streaming session.

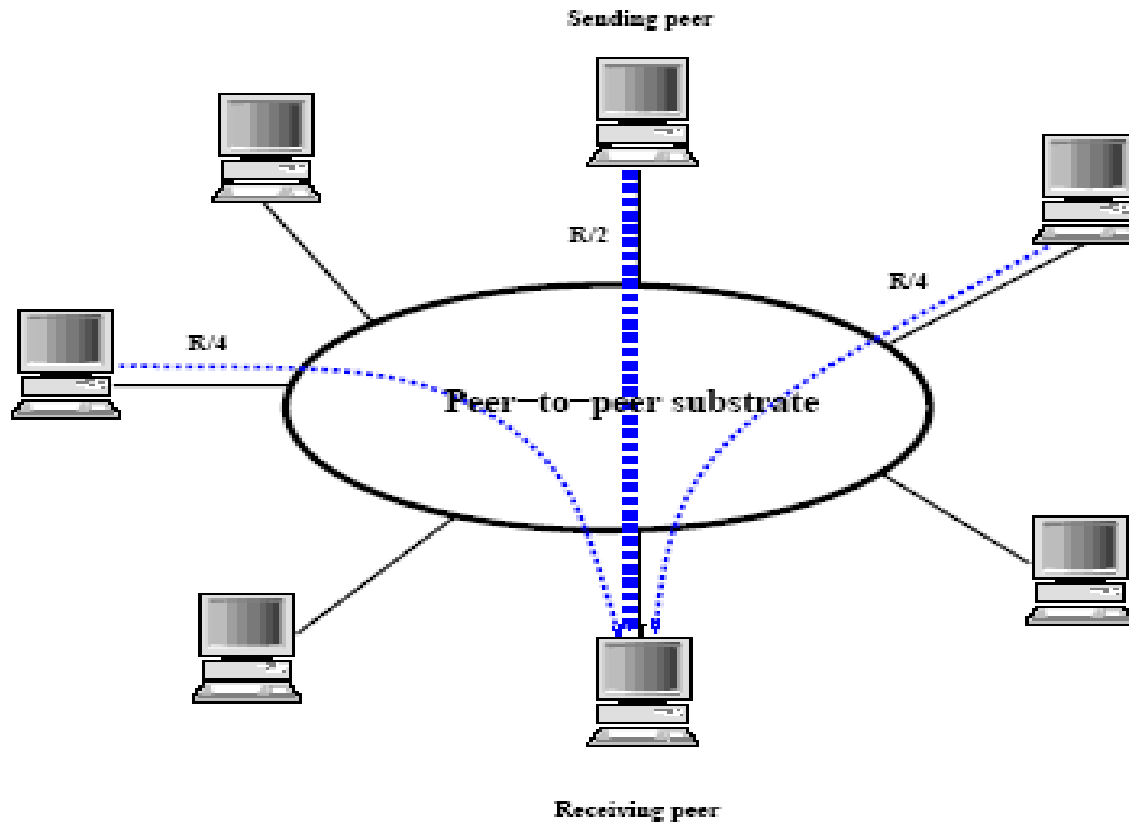
# Introduction

- CollectCast performs 3 main functions:
  1. Inferring the information for the selection of the senders.
  2. Monitor the status of peers.
  3. Dynamically switching active senders and standby senders.

# CollectCast

- Candidate senders:  
All the senders that we may choose.
- Active senders:  
The senders we really choose.
- Standby senders:  
The reminder senders.
- Example:  
Candidate senders {P1,P2,P3,P4,P5,P6,P7}  
Active senders {P1,P3,P4}  
Standby senders {P2,P5,P6,P7}

# PROMISE architecture



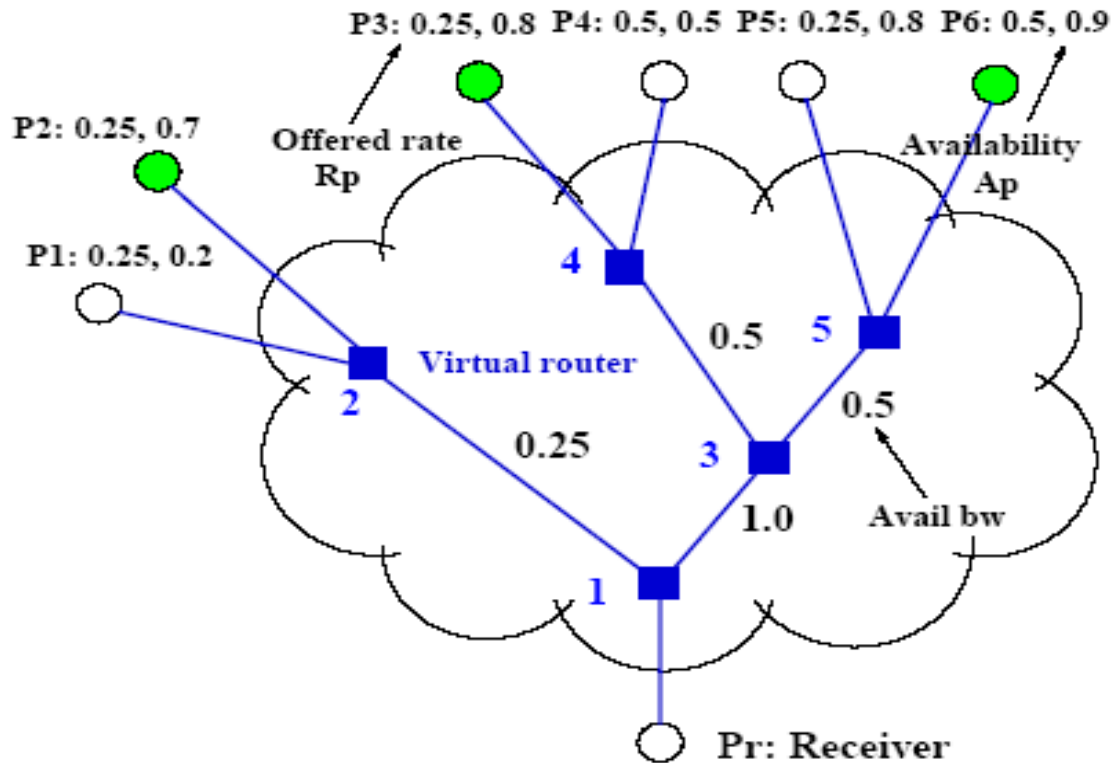
Senders are chosen based on the current network condition and the reliability of peers to render the best quality

# Selecting the Best Peers

(1) Random selection:

- Randomly chooses a number of senders
- Just to fulfill the aggregate rate requirement.

# Selecting the Best Peers



In random selection, we may choose P1,P3,P4 as active senders

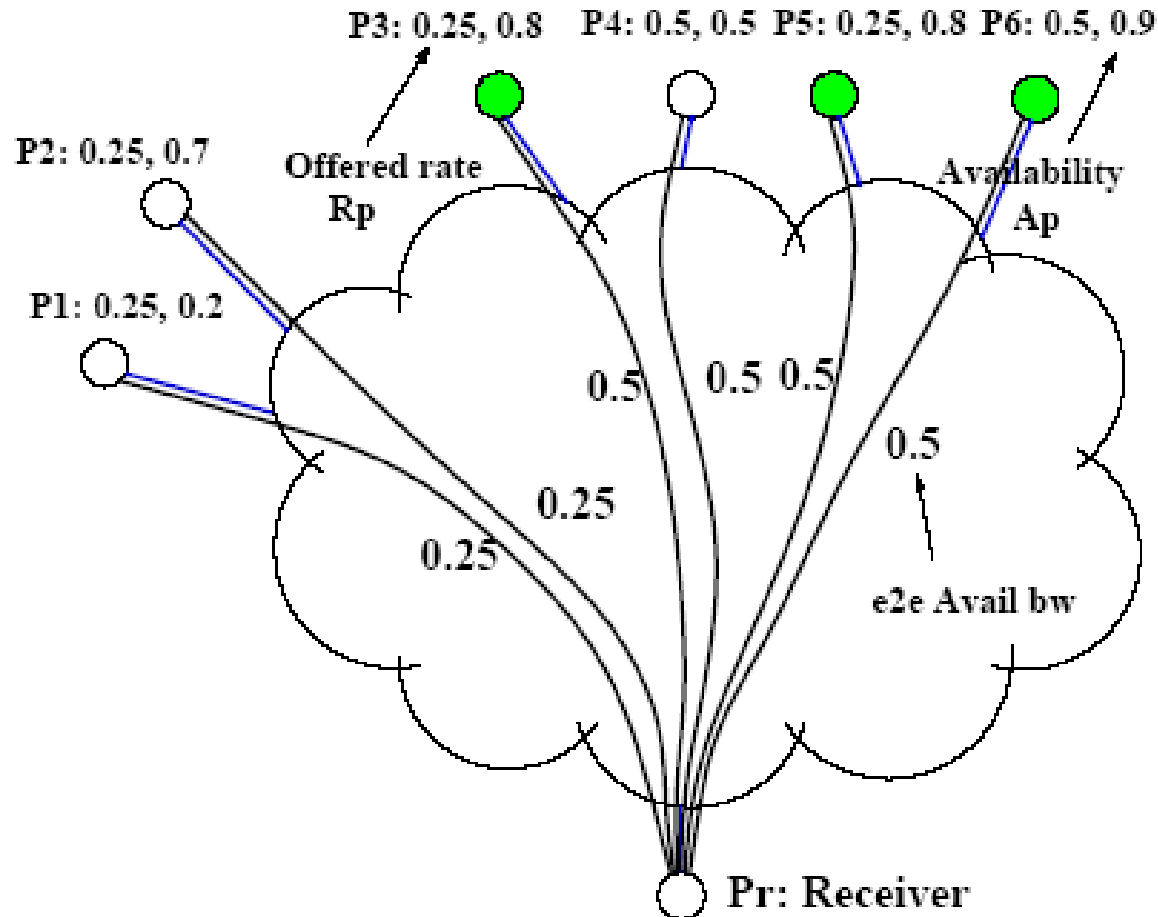


# Selecting the Best Peers

## (2) End-to-end selection:

- Estimates the “goodness” of path from each candidate sender to the receiver.
- Based on the quality of the individual paths.
- Based on the availability of each peer.

# End-to-End Selection

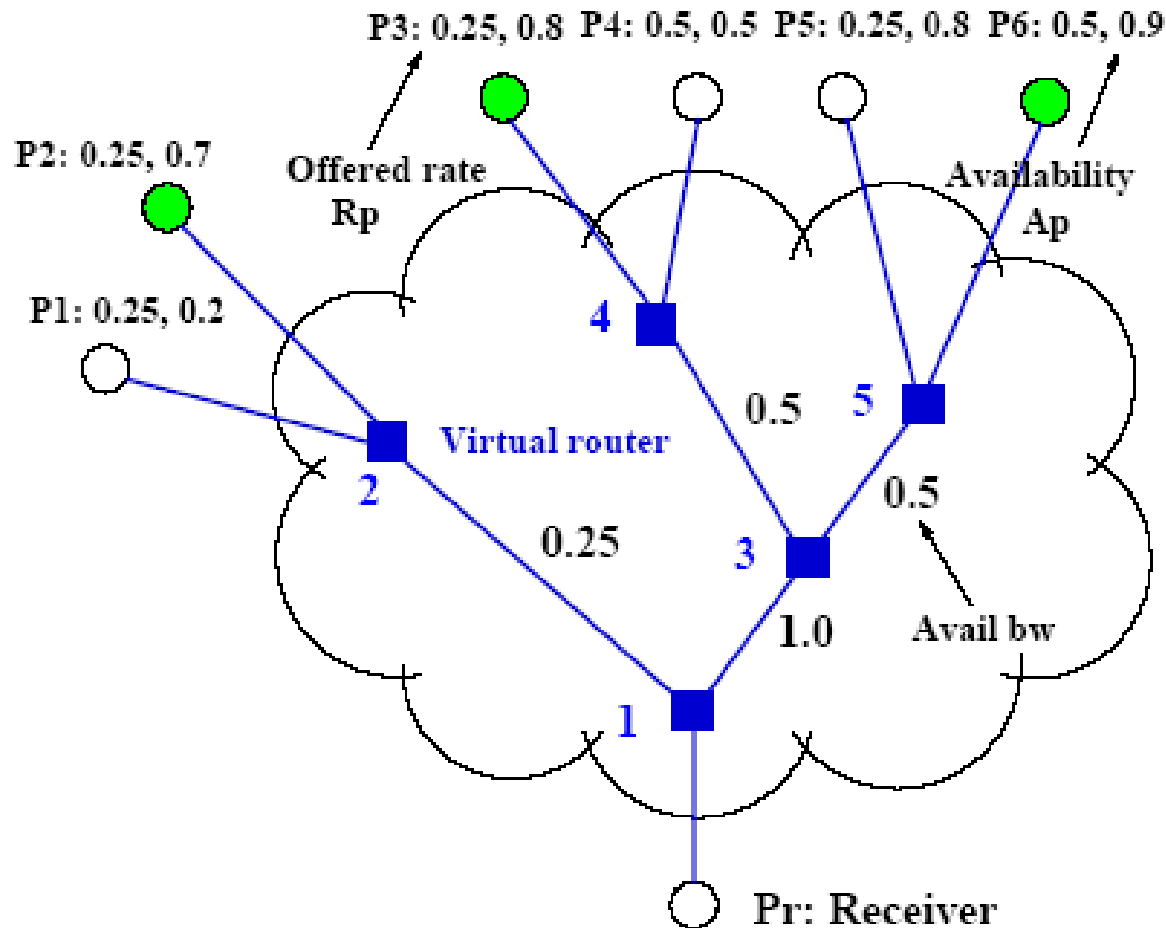


# Selecting the Best Peers

## (3) Topology-aware selection

- Infers the underlying topology and its characteristic.
- Considers the goodness of each segment of path.
- Avoid the shared segment.

# Topology-Aware Selection



# Example for Topology-Aware Selection

- Definition: 
$$G_p = A_p \prod_{i \rightarrow j \in p \rightarrow r} w_{i \rightarrow j}^{(p)} x_{i \rightarrow j}$$

X is a binary variable

W is weight

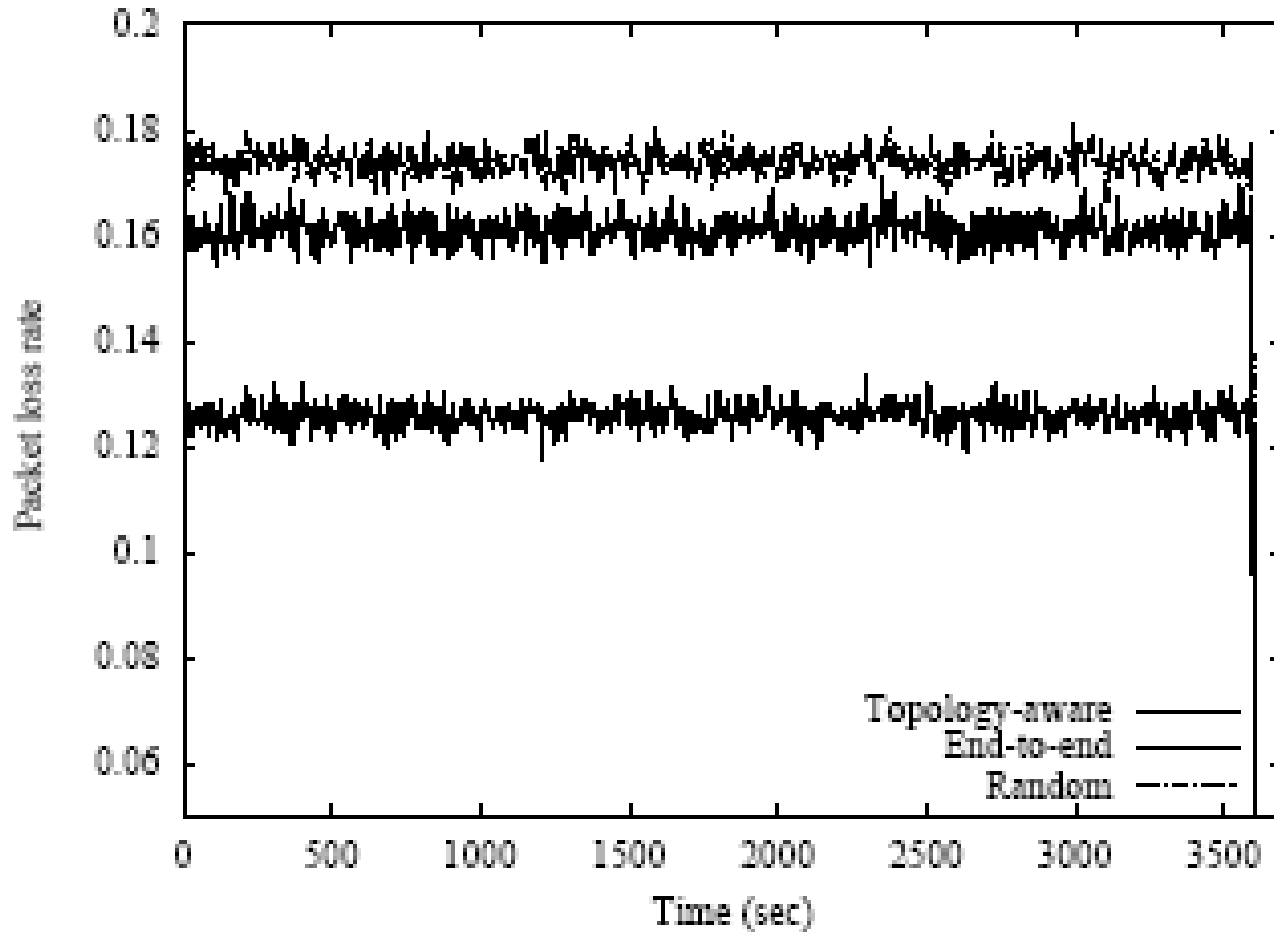
A is availability

- for some active set {P3,P5,P6}

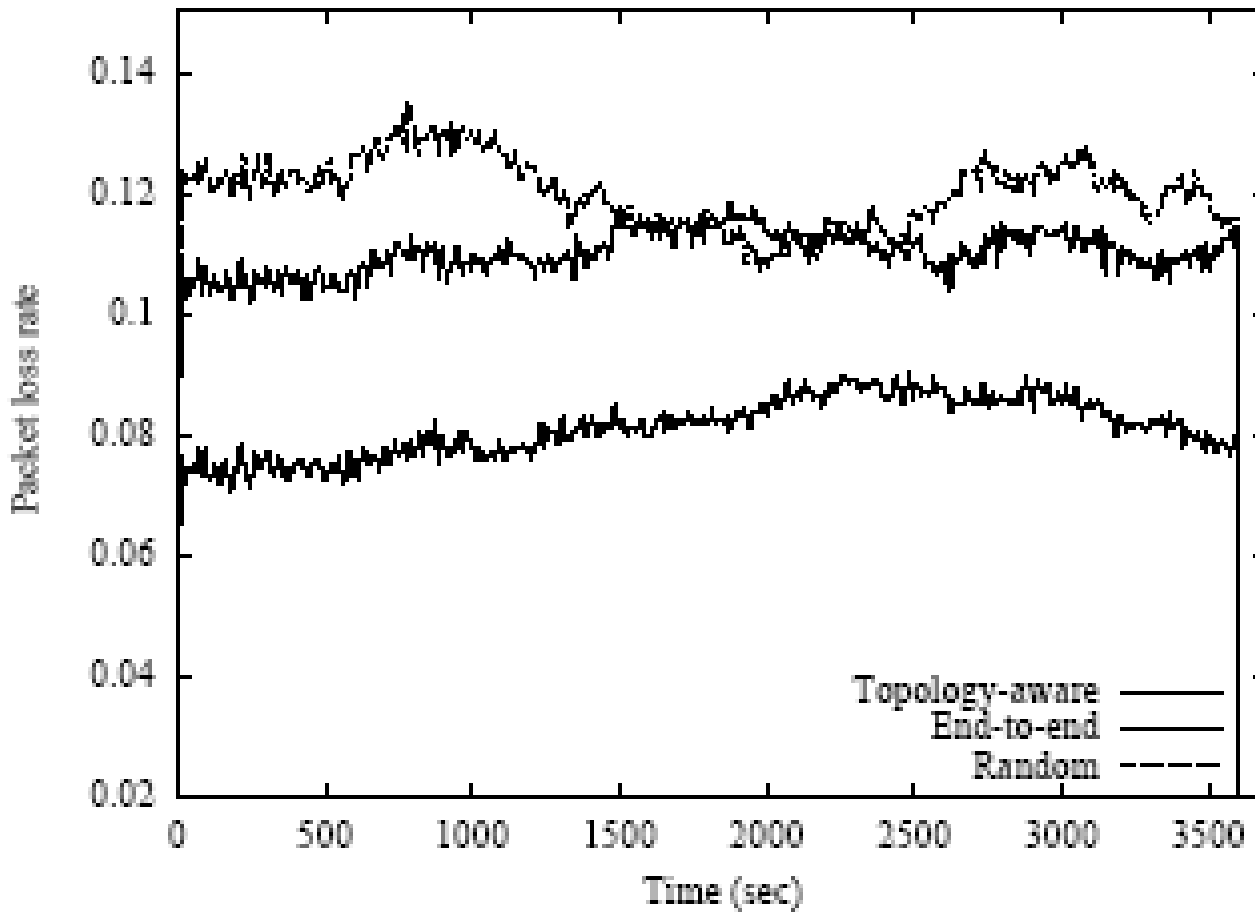
$$G = 1 * 0.8 + 1 * 0.8 + 0.25 / 0.50 * 0.9 = 2.09$$

$$\text{for } w_{5 \rightarrow 3}^{(P_5)} = 1$$

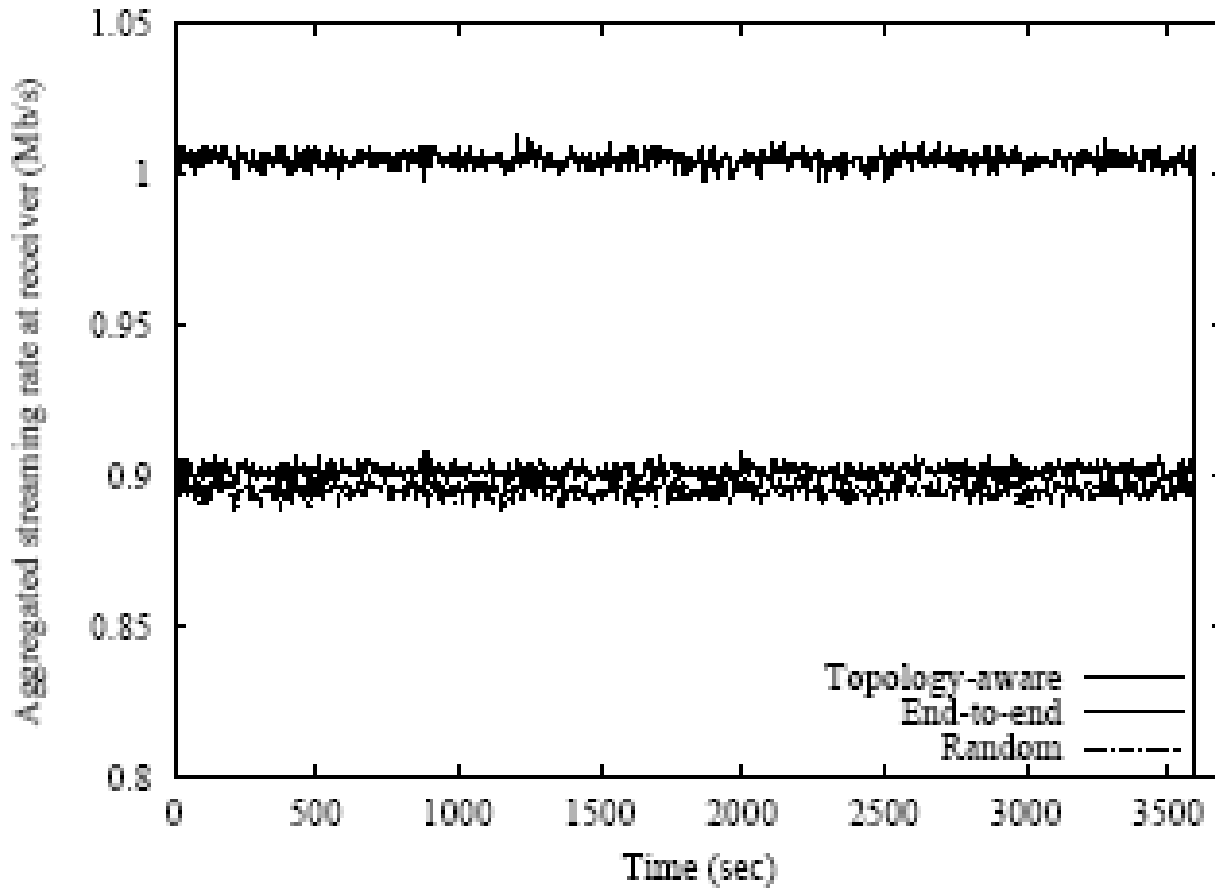
# Simulation



# Simulation

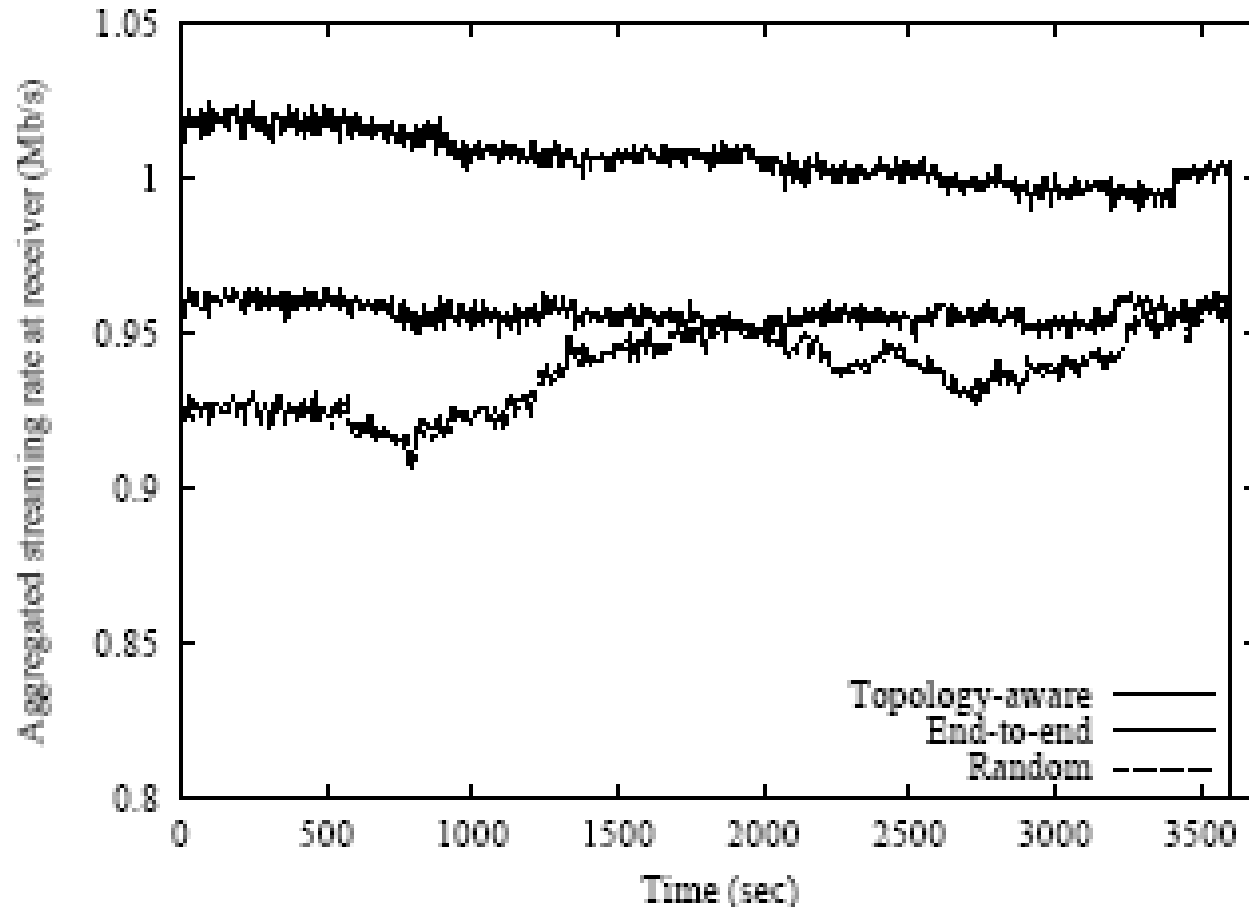


# Simulation





# Simulation



# Conclusion

- PROMISE matches a requesting peer with a set of supplying peers.
- To achieve the best streaming quality.

# Other issues

- Compared to reputation system on p2p network.
- They both provide solution to media streaming in p2p network.
- Their algorithms are different but solve the same problem.

# Other issues

- The difference between PROMISE system and reputation system:
  - PROMISE computes the goodness of each set
  - Reputation system computes the reputation score of each peer