



Aalto University
School of Science
and Technology

Deadline-based Resource Management for Information- Centric Networks

Somaya Arianfar, Pasi Sarolahti, Jörg Ott
Aalto University

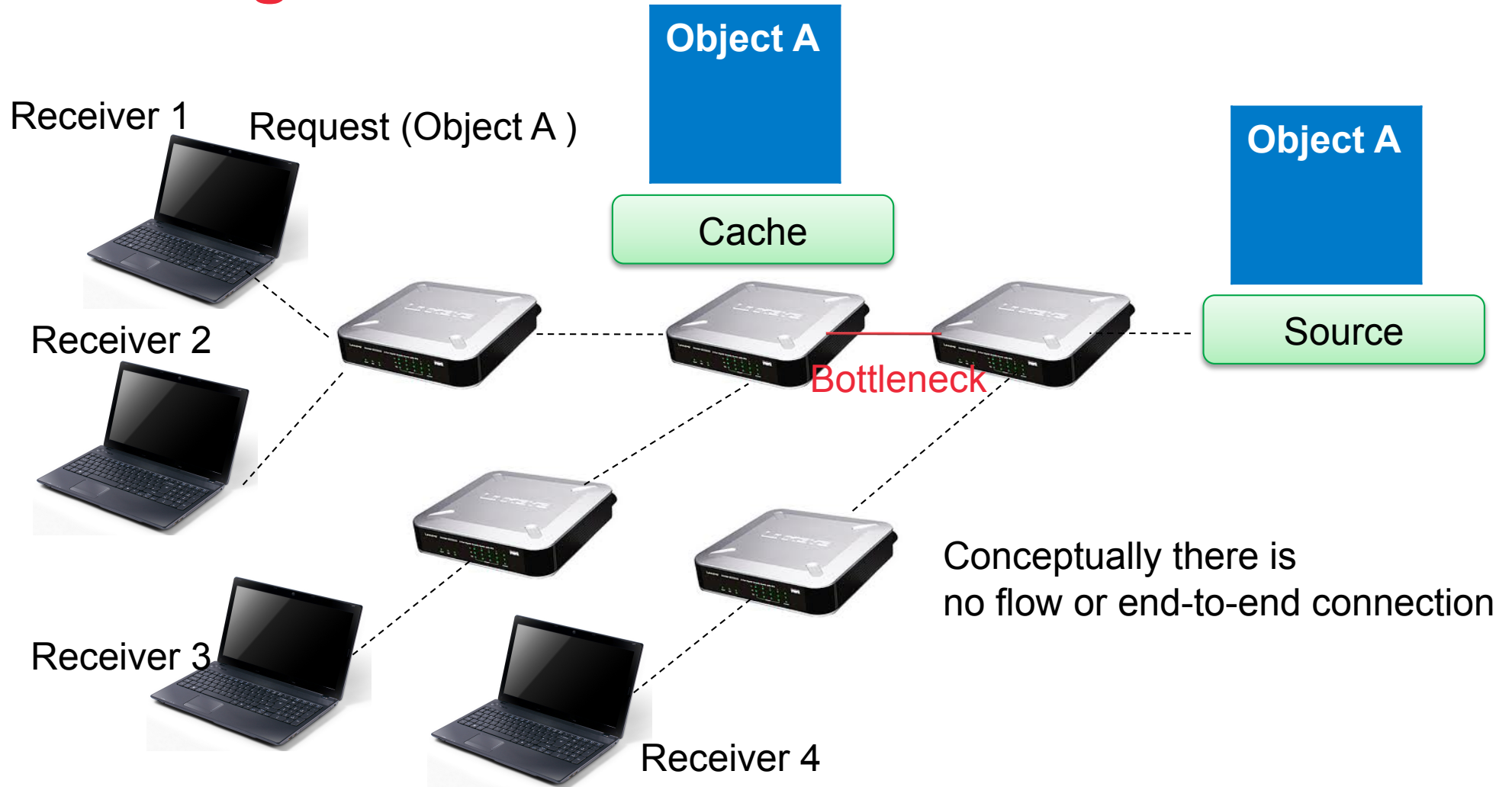
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ICN'13, Hong Kong

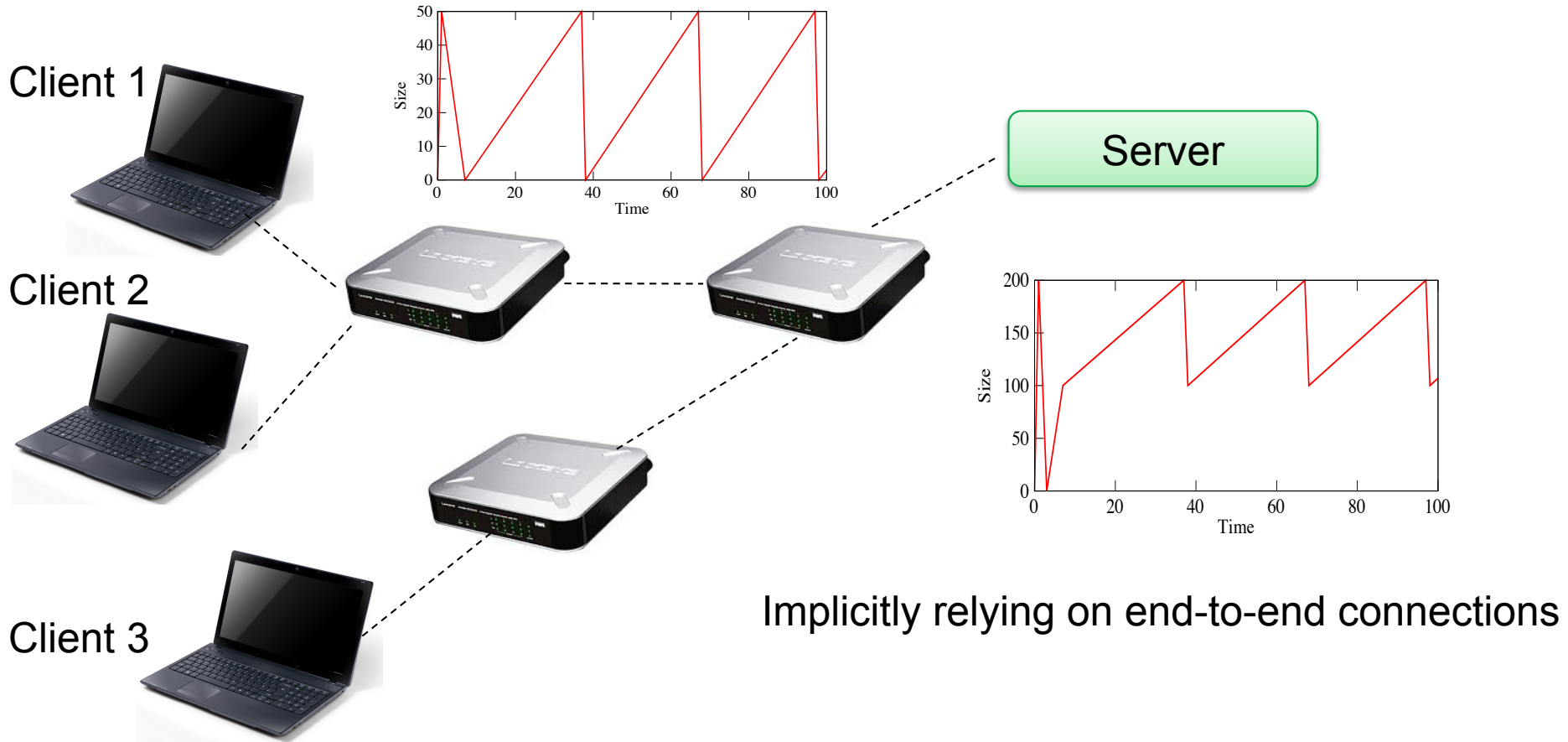
Outline

- Background and problem statement
 - ICN and RTT measurement
- Solution
 - Packet Lifetime
 - Predictive resource scheduling
- Evaluation
- Summary

Background- ICN



Background- RTT dependencies in IP



Problem Statement

- Challenged RTT measurement
 - Dynamic routes and sources
 - From where the next item will come?
 - Optimized retransmission timeout
 - Optimized congestion control
 - Buffer sizing
 - Bufferbloat
 - High variations in packet delays

ICN solutions

- Redefine the RTT-dependent functionality
 - Hop-by-hop congestion control
 - Implicit association of chunk to source
 - Maximum RTT
- Re-introduce the old concepts
 - Flow identification with content name (?!)
- Other new ideas??

Lifetime

- A higher bound on service time
 - In IP and PIT: order of seconds
 - Here: order of milliseconds to a few seconds at maximum

 - In IP and PIT: pure validity duration
 - Here: the means for resource management

 - Goals
 - Setting the retransmission timeout

 - Queue management policy
 - Intelligent processing order

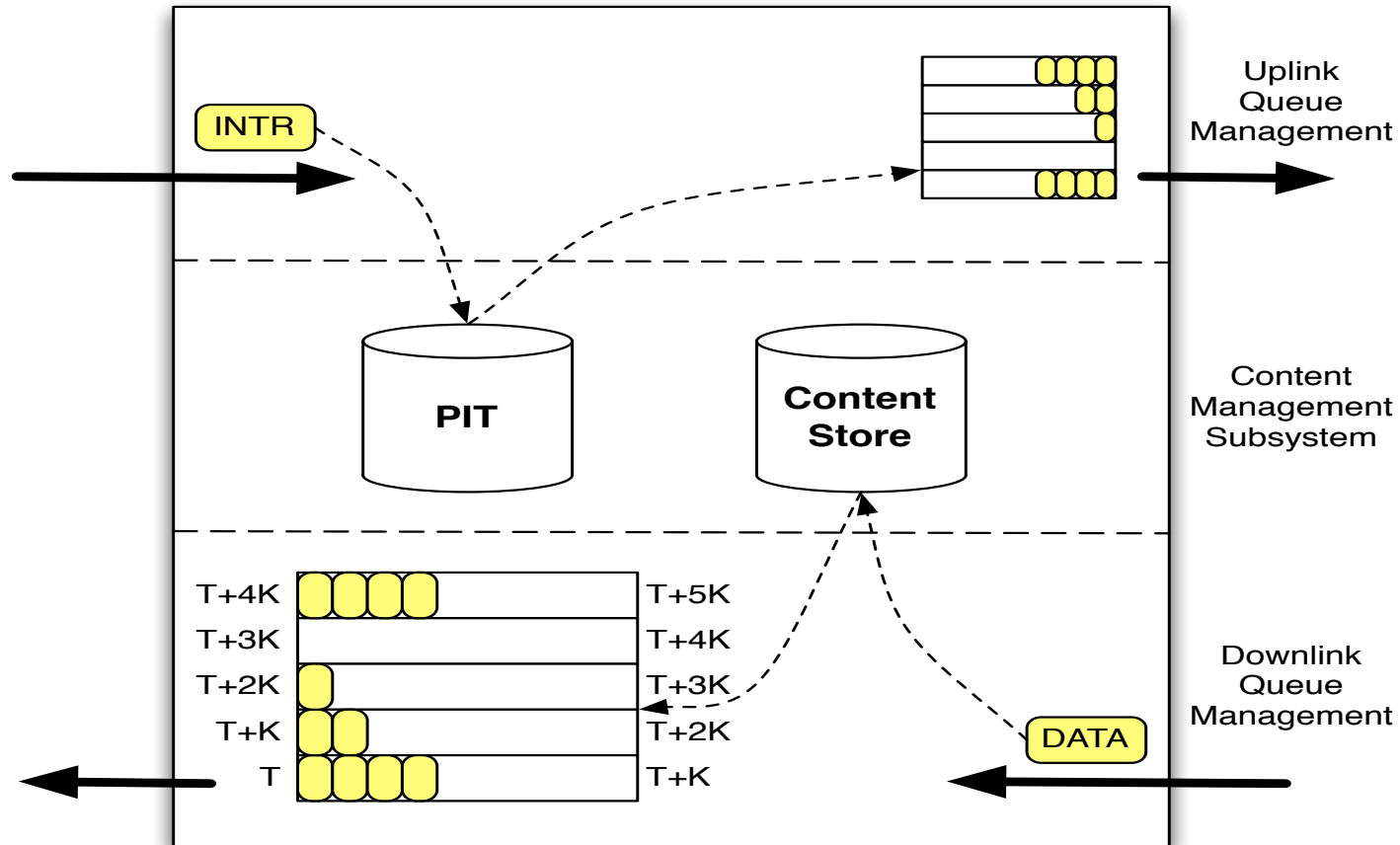
 - Predictive discard
 - Early resource release
-

Packets with lifetimes

- Based on application requirements
 - Too long vs. too short
- Optimized retransmission timeouts

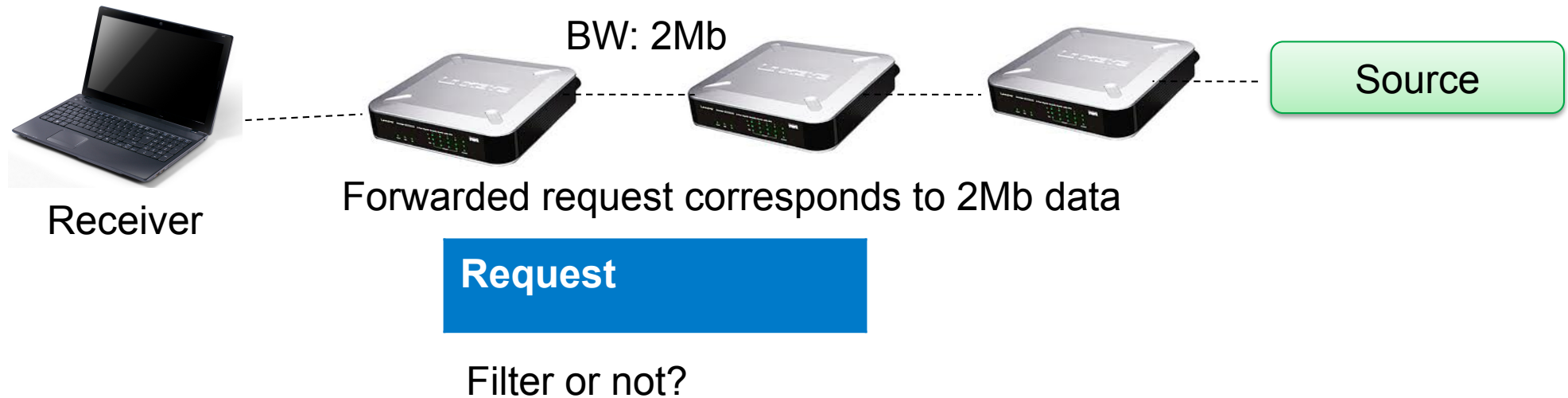


Lifetime-based moving queues



Network resource management

- Interest filtering



Predictive Interest Filtering



Receiver

Source

Data

LT:240ms

Data

LT:340ms

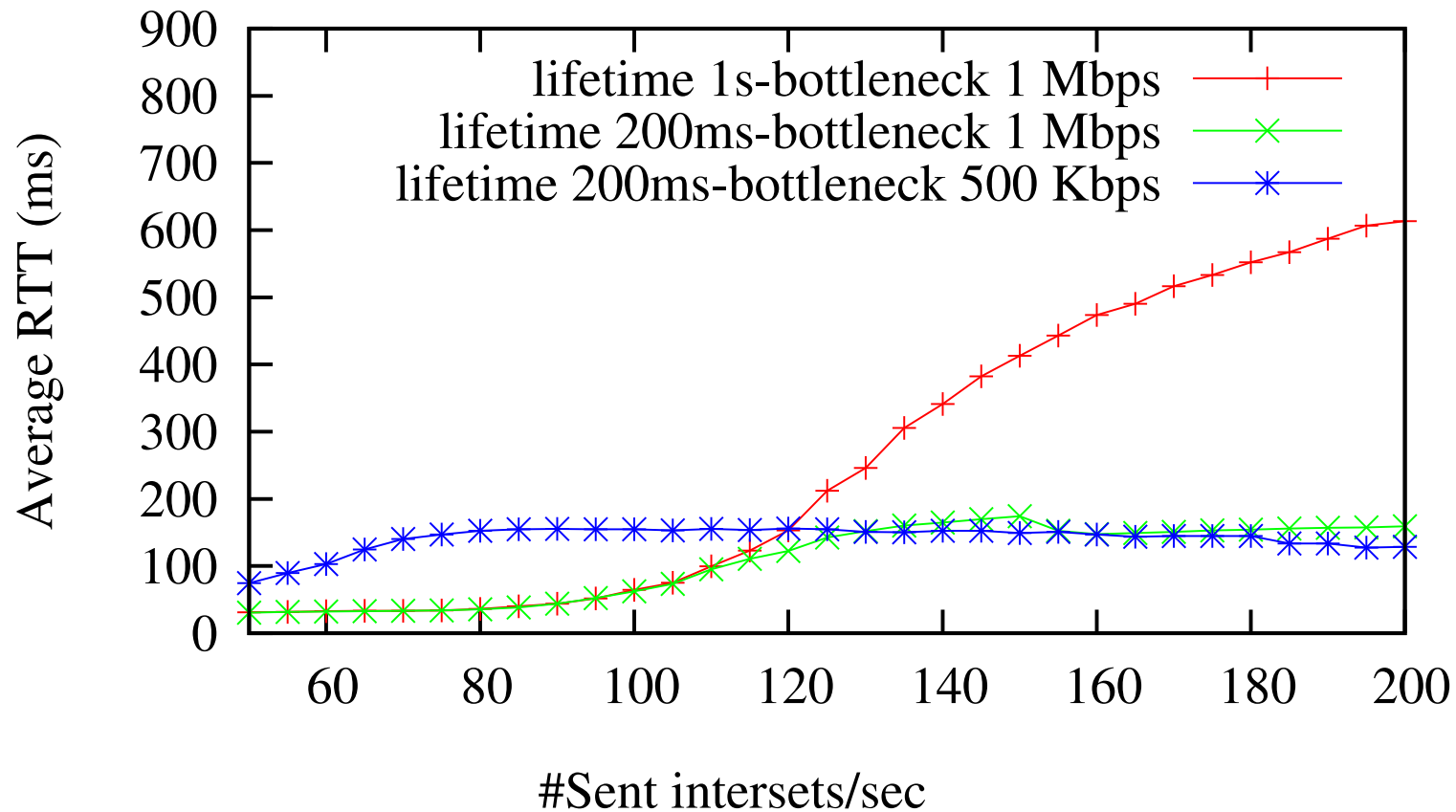
Request arrival time: 2000ms

Service time: 2450ms

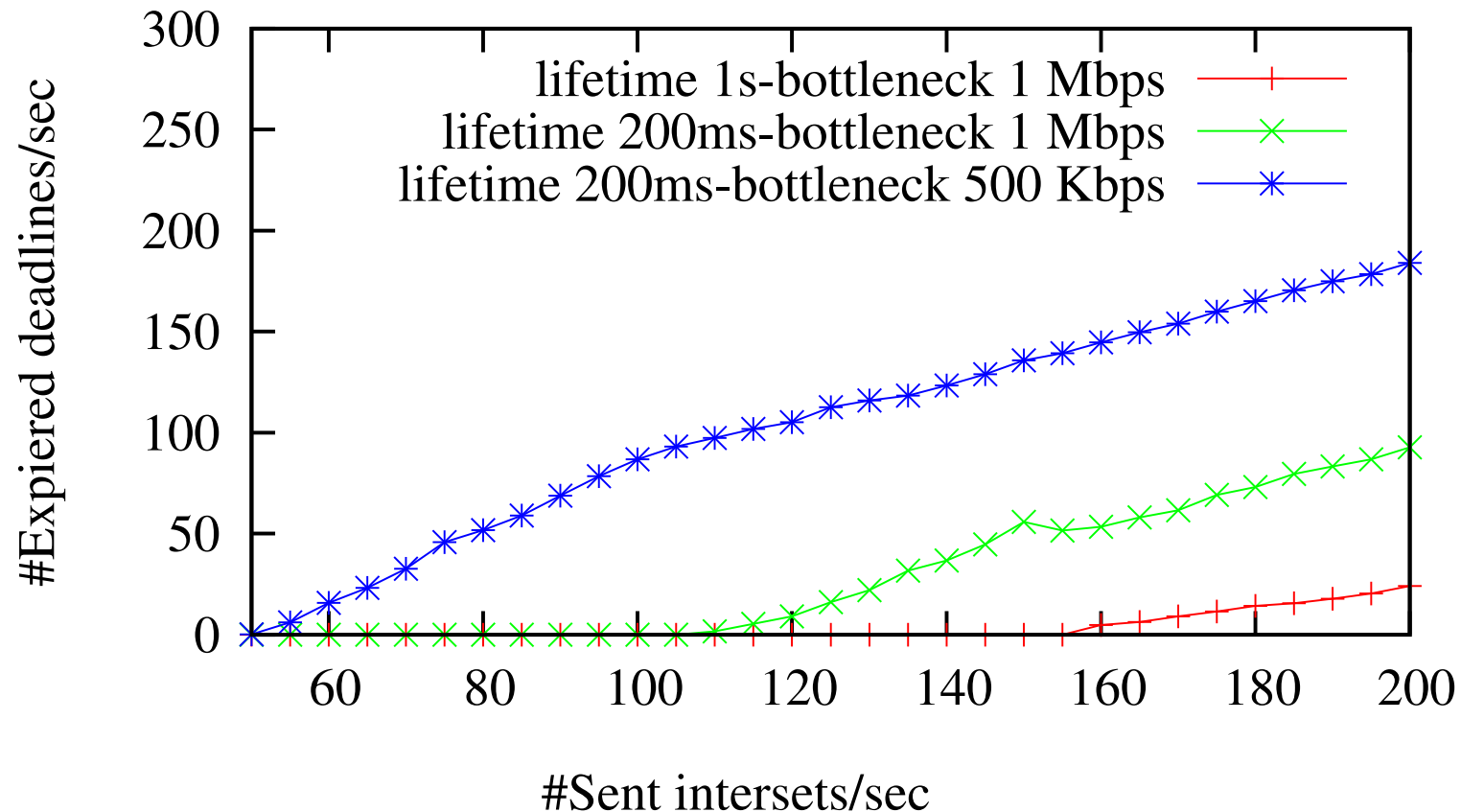
Data arrival time: 2210ms

Service time: 2450ms

Initial Evaluations- RTT variation



Initial Evaluations- drop rate



Summary

- Lifetime-based resource management
 - Optimized retransmission timeout
 - Queue management policies
 - Interest filtering
 - Useful for different environments



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Questions?

Thanks!