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Performance Evaluation of PCN-Based Admission Control

http://www3.informatik.uni-wuerzburg.de/staff/menth/Publications/Menth08-PCN-AC.pdf
http://www.ietf.org/internet-drafts/draft-menth-pcn-performance-02.txt

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Overview

- Edge behaviors for admission control
  - Congestion level estimate based AC (CLEBAC)
  - Observation-based AC (OBAC)
- Metering and marking in the core
  - Excess marking
  - Threshold marking
- Performance results
- Summary

CLEBAC and OBAC

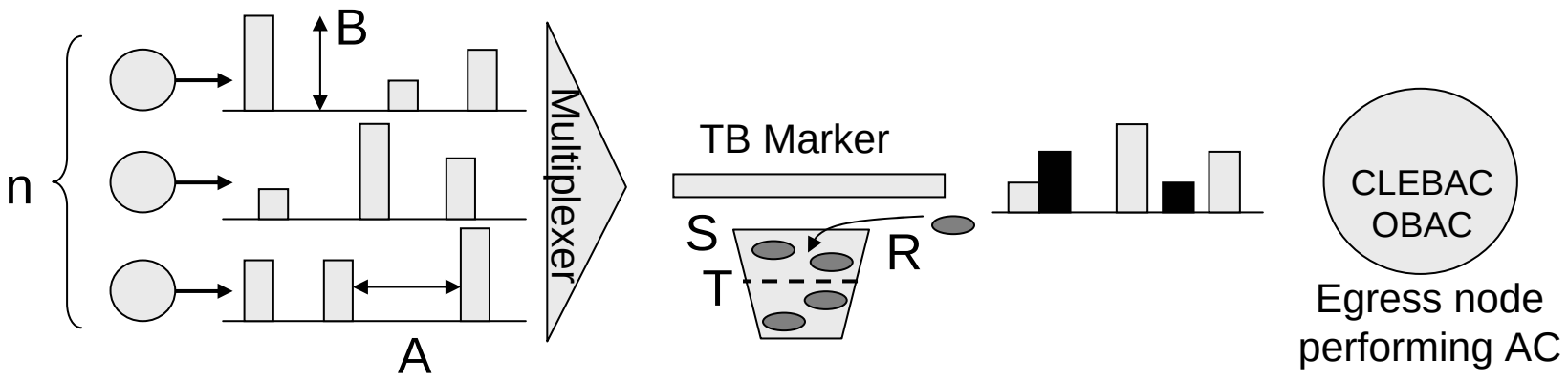
- Ingress-egress aggregates (IEAs)
  - State K (block, admit)

- CLE-based admission control (CLEBAC)
  - Measurement intervals D_{MI}
  - CLE = “marked bytes” / “all bytes” per IEA
  - After D_{MI}, state K switched to
    - *block* when CLE exceeds T^{AStop}
    - *admit* when CLE falls below T^{ACont}

- Observation-based admission control (OBAC)
  - State K is switched to
    - *block* when a marked packet is observed
    - *admit* when no marked packet has been observed for time D_{block}

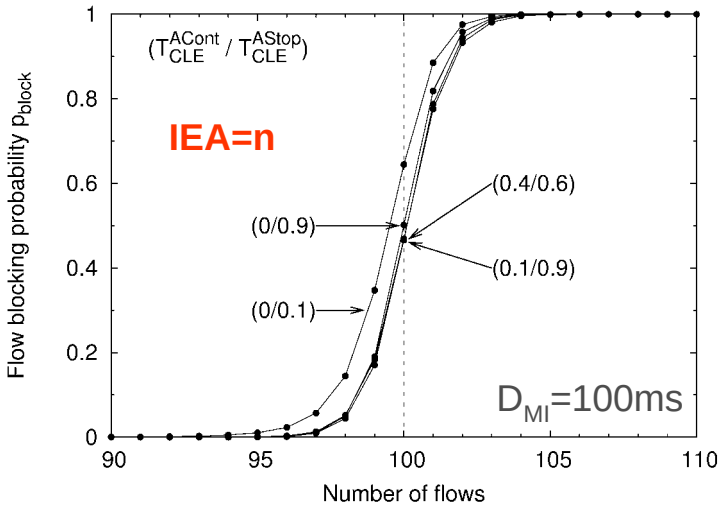
Experiment Setup

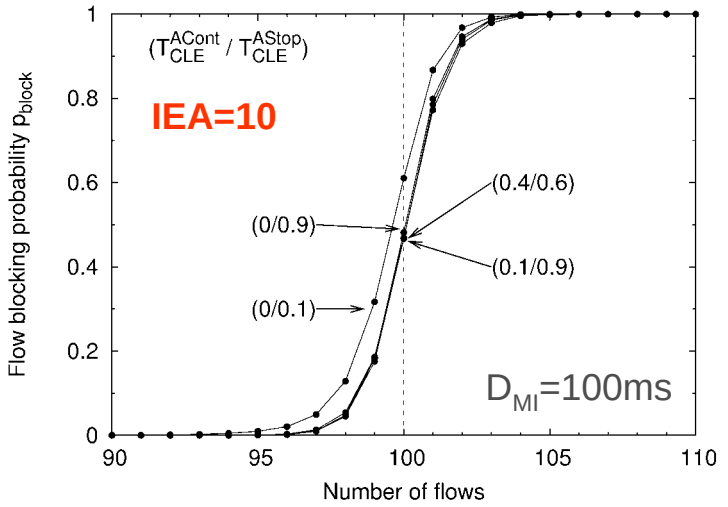
- Bursty traffic
  - Packet size: E[B]=1000 bytes
  - Interarrival times: E[A]=100 ms
- n (~100) independent traffic sources over bottleneck link
- Admissible rate AR = 100 flows
- n and 10 flows in studied IEA



CLEBAC with Threshold Marking

- False AC decisions
  - Few false negatives (n≤100)
  - Few false positives (n>100)
- Little impact of parameters





OBAC with Threshold Marking

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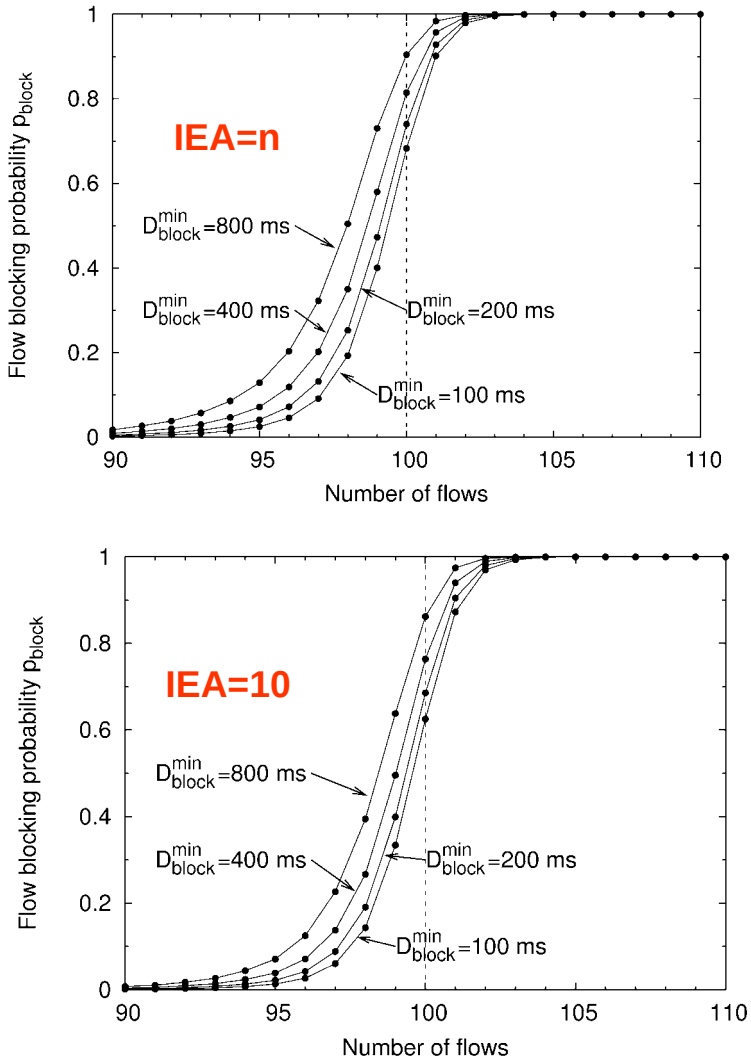

CLEBAC with Excess Marking

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  - Many false positives (n>100)
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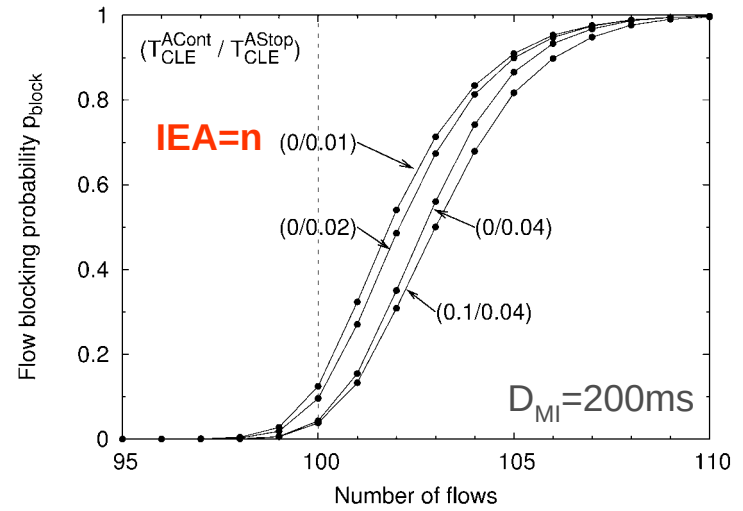
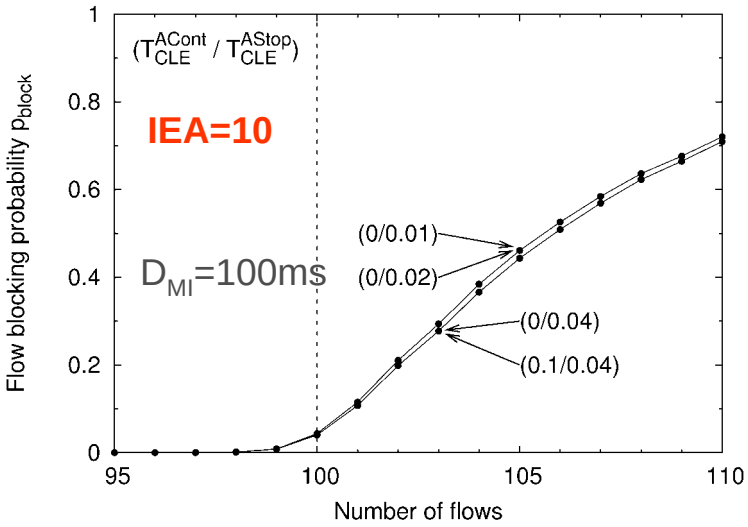
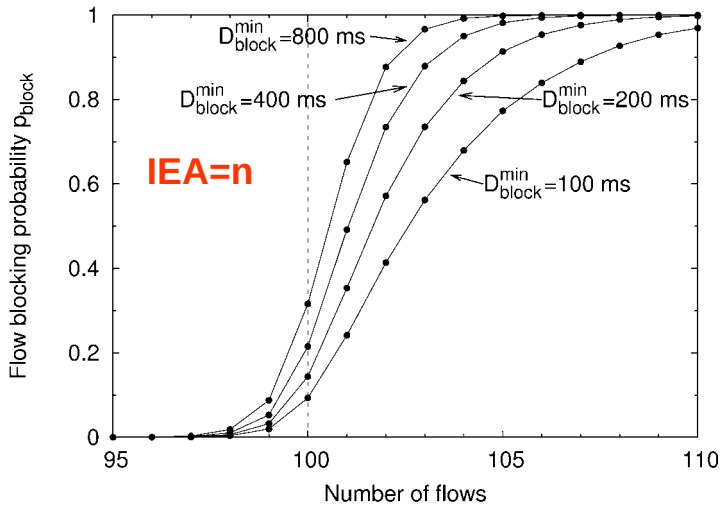
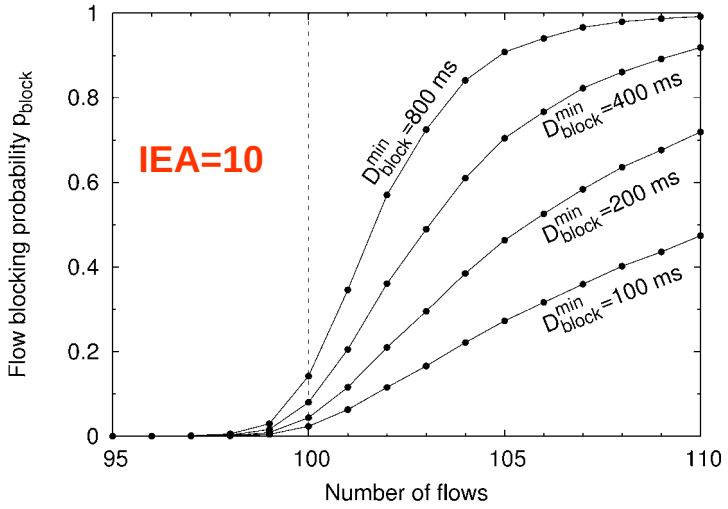




OBAC with Excess Marking

- False AC decisions
  - Few false negatives (n≤100)
  - Many false positives (n>100)
- Significant impact of parameters





Summary

- 4 Combinations
  - 2 edge behaviors: CLEBAC, OBAC
  - 2 marking behaviors: excess rate marking, threshold marking
- Findings
  - Threshold marking
    - Any edge behavior works fine
    - Also for small IEAs (10 flows)
  - Excess marking
    - Many false positives, danger for flash crowds
    - Big problem for small IEAs (10 flows)
    - Usefulness?
    - OBAC not good, but better than CLEBAC
- No figures
  - OBAC blocks faster than CLEBAC
  - Important for flash crowds