

Distributed & Collaborative Monitoring in SDN

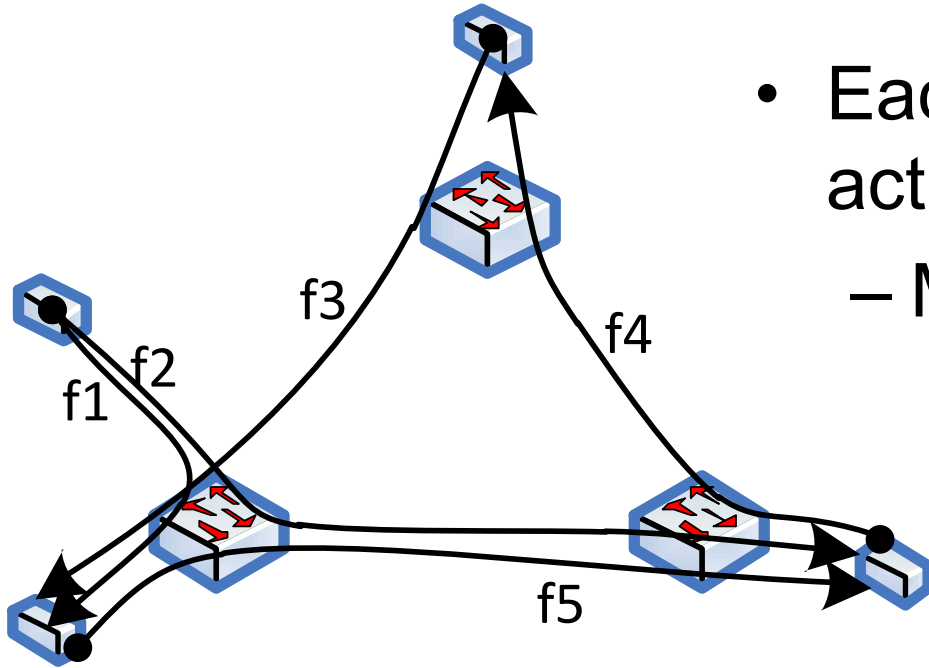
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Motivation

- Per-flow monitoring: different actions for different flows.
 - monitoring rules
- Challenge: Rule storage consumes non-trivial memory space.

Distributed & Collaborative Monitoring

Task: Distribute Monitoring Actions

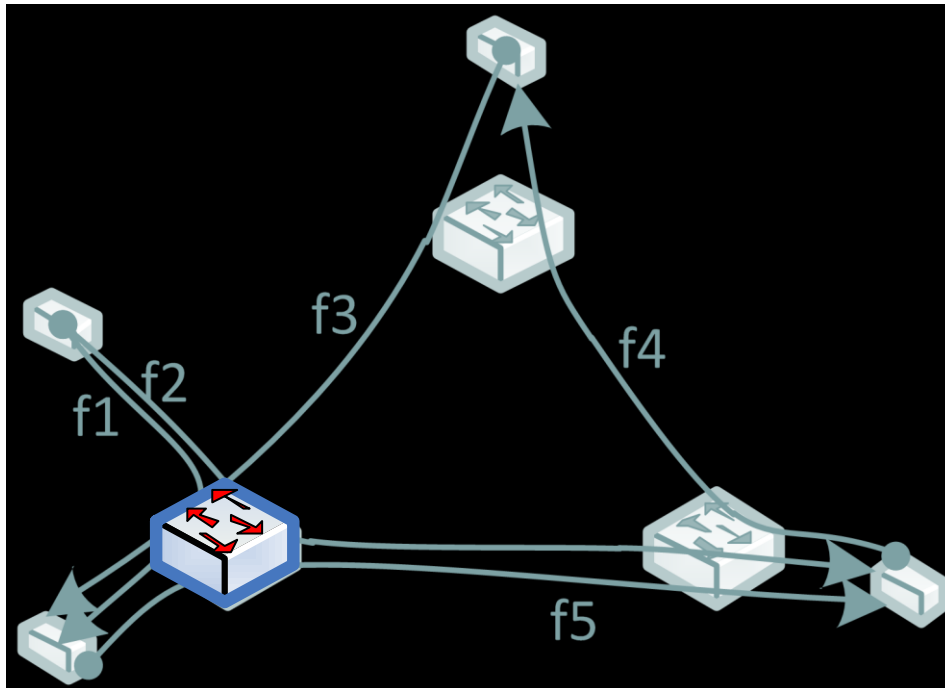


- Each flow may have its own action requirements.
 - Millions of flows

Task:

- Distribute actions among switches.
- Represent rules efficiently

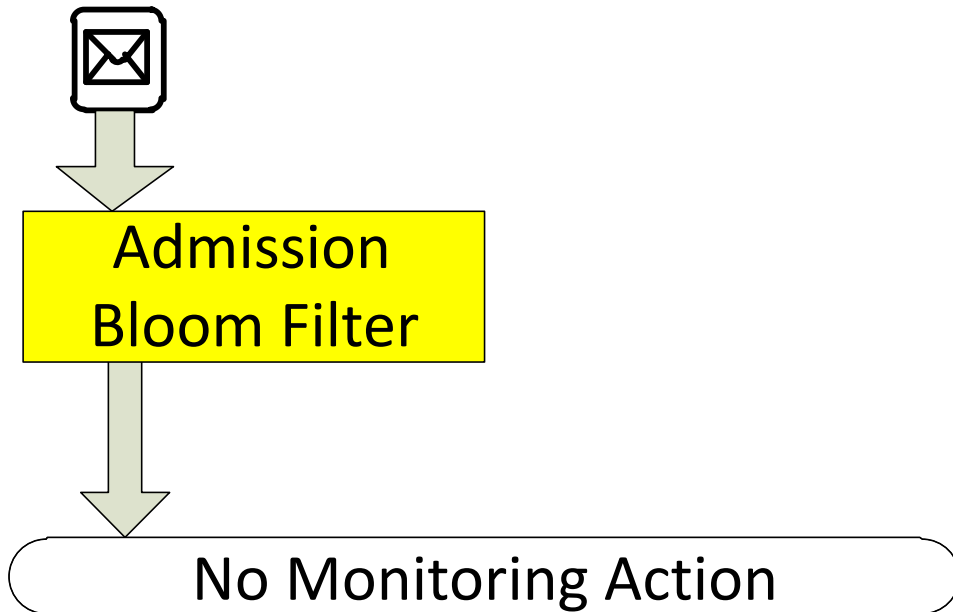
Approach: Bloom Filters



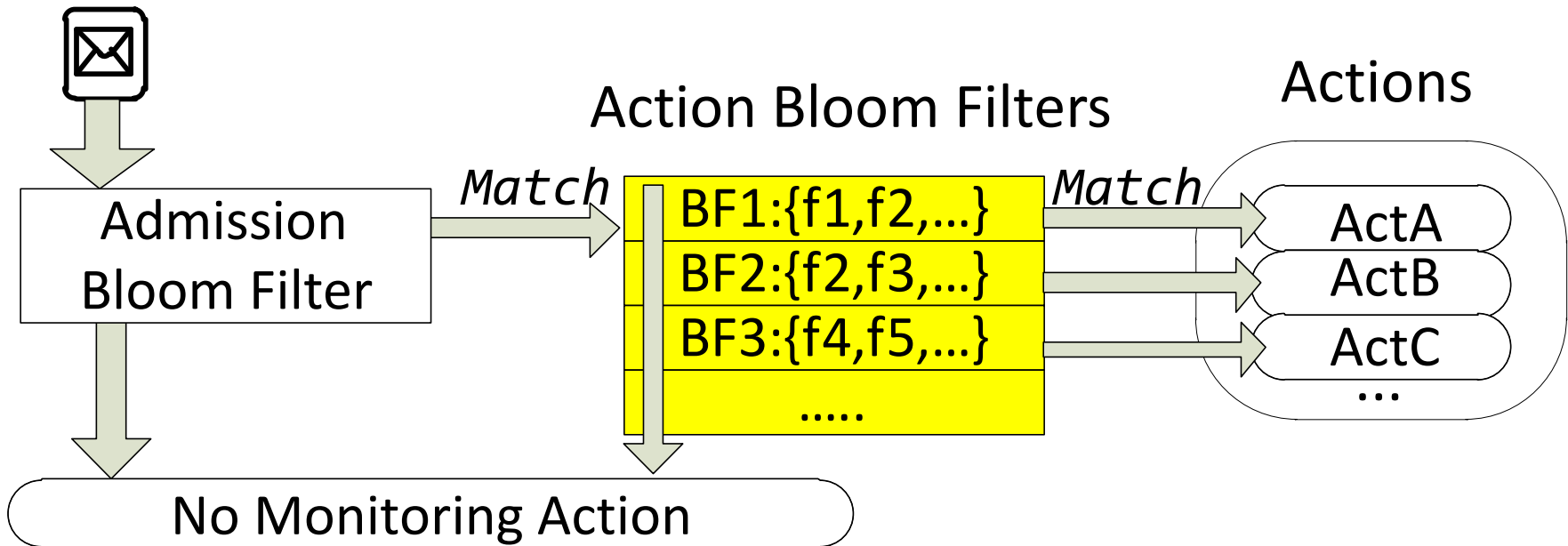
Use Bloom Filters to identify flows that should be monitored.

Bloom Filter {f1,f3,f5} → Heavy Hitter
Bloom Filter {f1} → Sampling

DCM Data Plane: Two-stage Bloom Filters



DCM Data Plane: Two-stage Bloom Filters

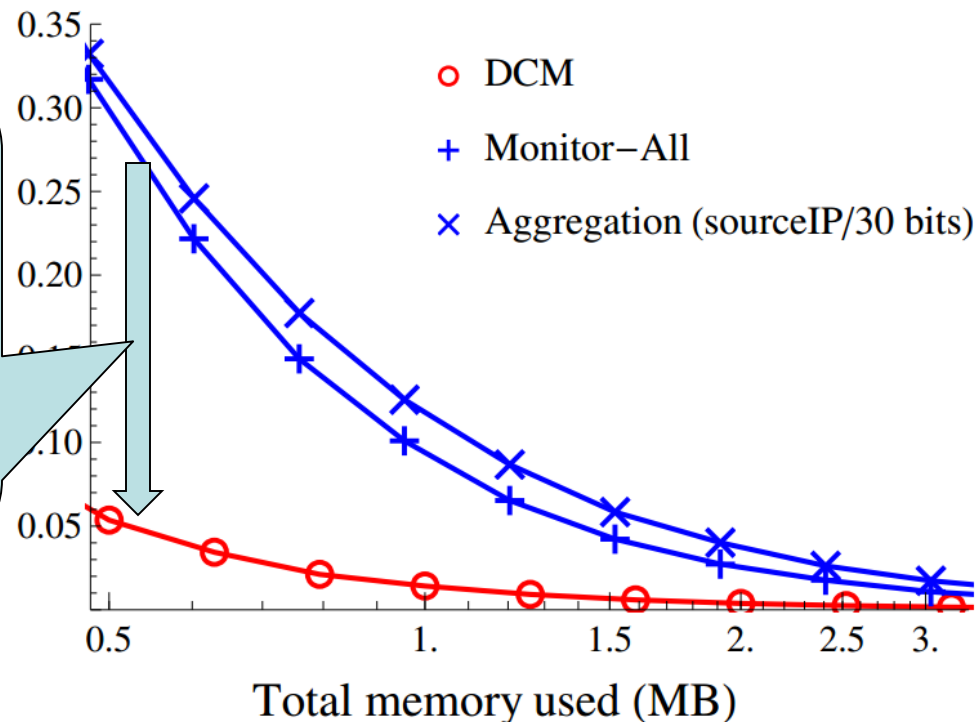


DCM Controller Operations

- Monitoring load distribution
 - Less # of switches involved for a single action
 - No overloaded switches
- Bloom filter construction and updates
 - Real-time addition
 - Periodical re-construction
- False positive detection
 - SDN allows detecting & eliminating false positives

Case Study: Flow Size Counting with Count-Min Sketch

The overestimate ratio reduces significantly.



Thank you!

HotSDN 2014

Distributed and Collaborative Traffic Monitoring in Software Defined Networks