Practical packet deflection with Canary

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JOHNS HOPKINS
U N I V E R S I T Y
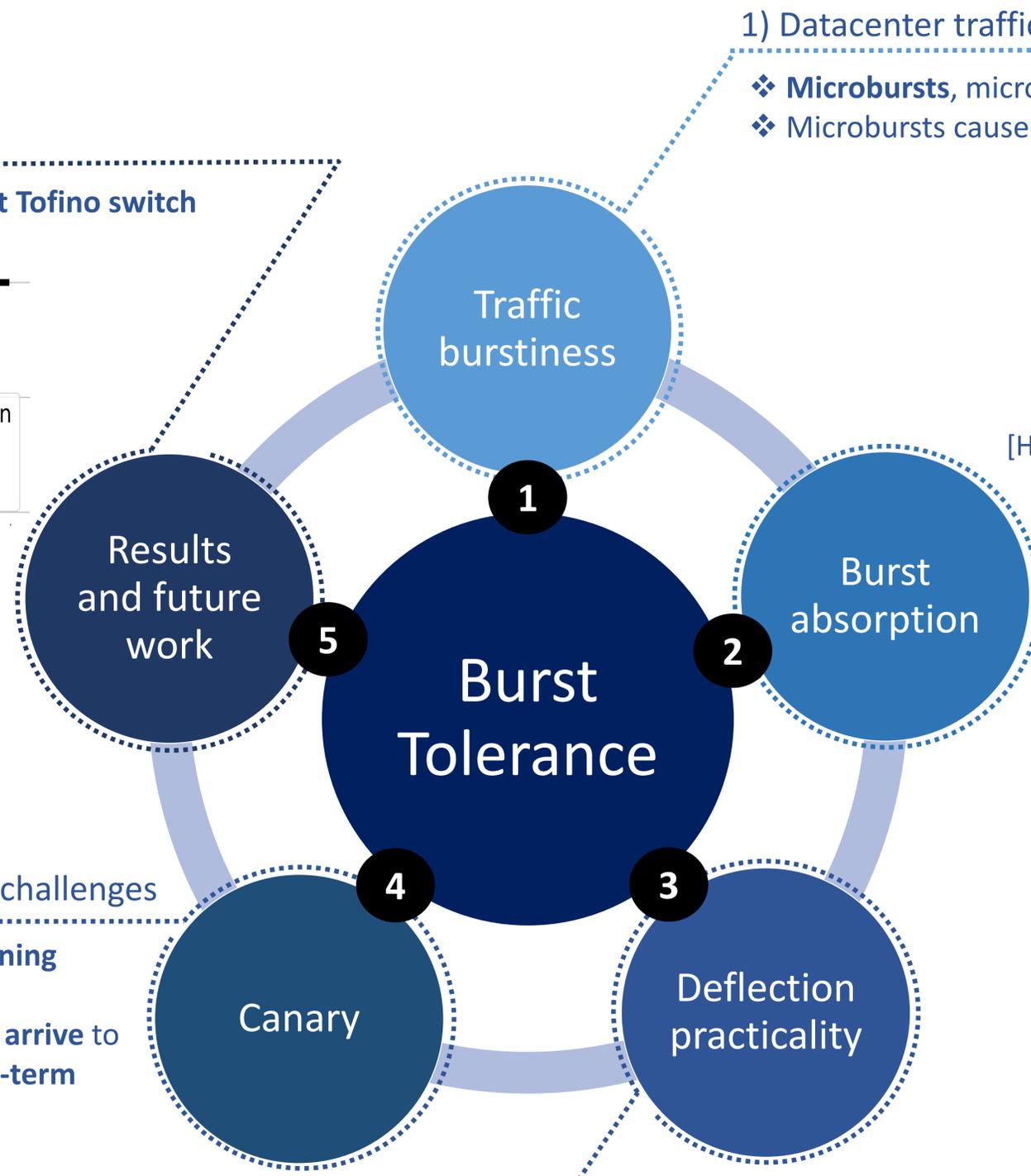
1) Datacenter traffic is **Bursty**

❖ **Microbursts**, microsecond-scale congestion events, are prevalent in **datacenters**
❖ Microbursts cause **packet drops** and **increase latency**
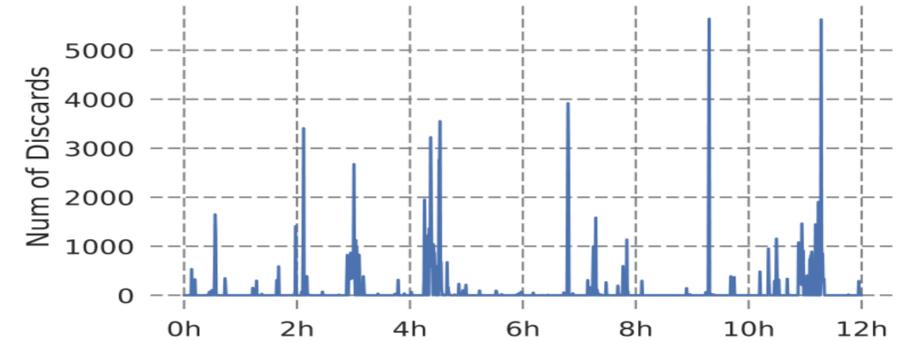
[High-Resolution Measurement of Data Center Microbursts, IMC '17]

5) Canary's is **Practical**

❖ We implemented Canary in **Barefoot Tofino switch**
❖ Canary efficiently **absorbs bursts**

❖ What's next? **Partial deployment** of packet deflection

Burst Tolerance

- 1 Traffic burstiness
- 2 Burst absorption
- 3 Deflection practicality
- 4 Canary
- 5 Results and future work

2) **Deflection** absorbs bursts

❖ **Packet Deflection:** re-routing packets to neighboring switches instead of dropping them

Flow 1
Deflection
Congestion
Flow 2

4) **Canary** addresses the practicality challenges

❖ Prioritize packets based on the **remaining bytes of their corresponding flows**
❖ Deflect packets of large flows **as they arrive** to keep a headroom for absorbing **short-term bursts**
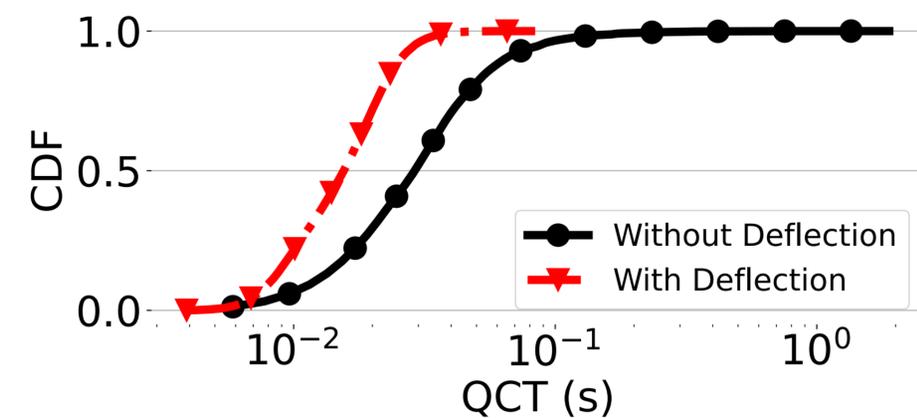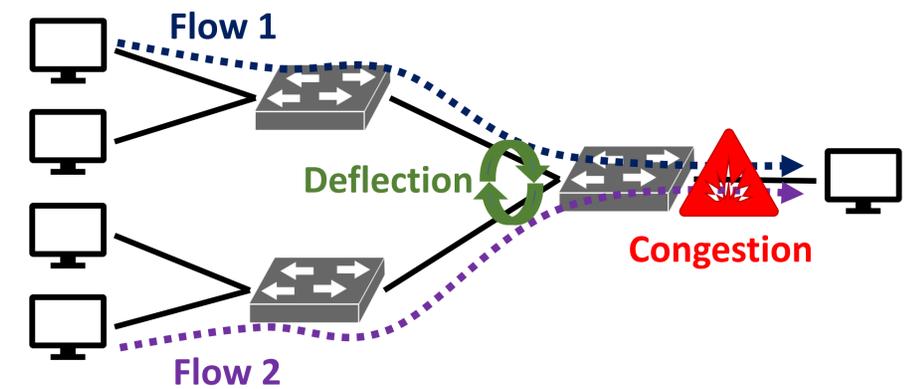
3) Deflection is **not practical**

❖ Critical operations:
  ❖ Packet prioritization
  ❖ Selective deflection
❖ **Not implementable** in commodity switch hardware

$$Percentile(pkt.prio) < \frac{Q-q}{Q}$$

Destination Queue

Packet Priorities
2 5 1