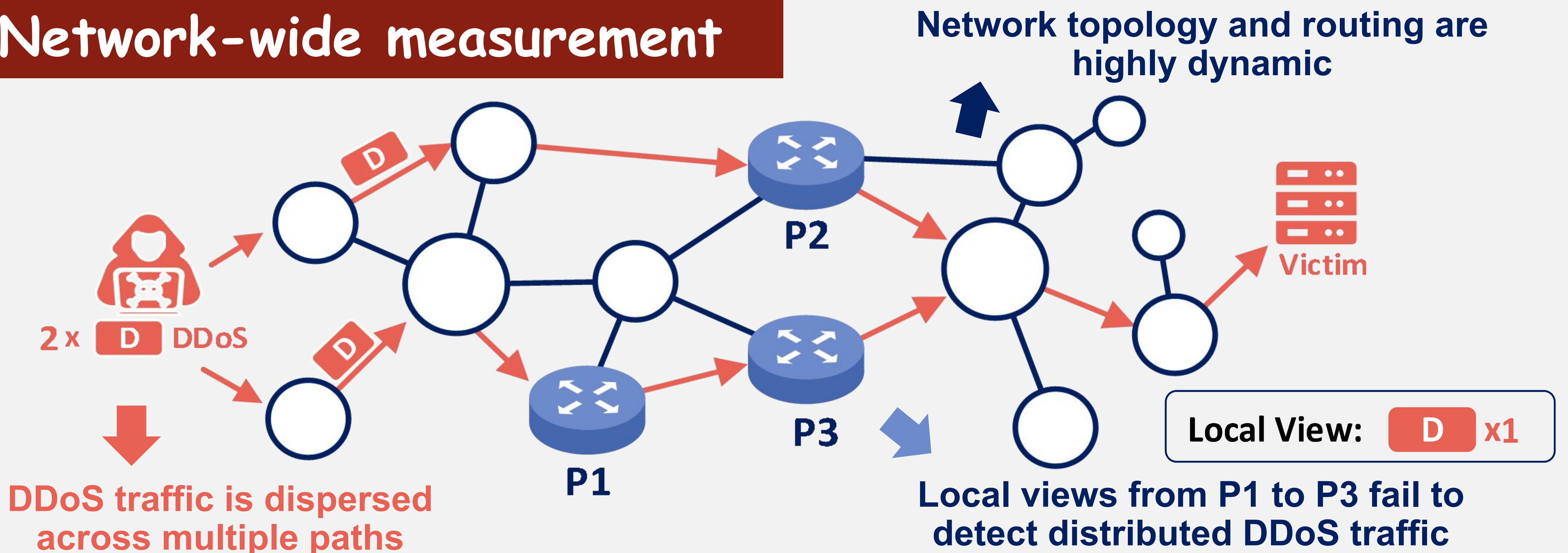
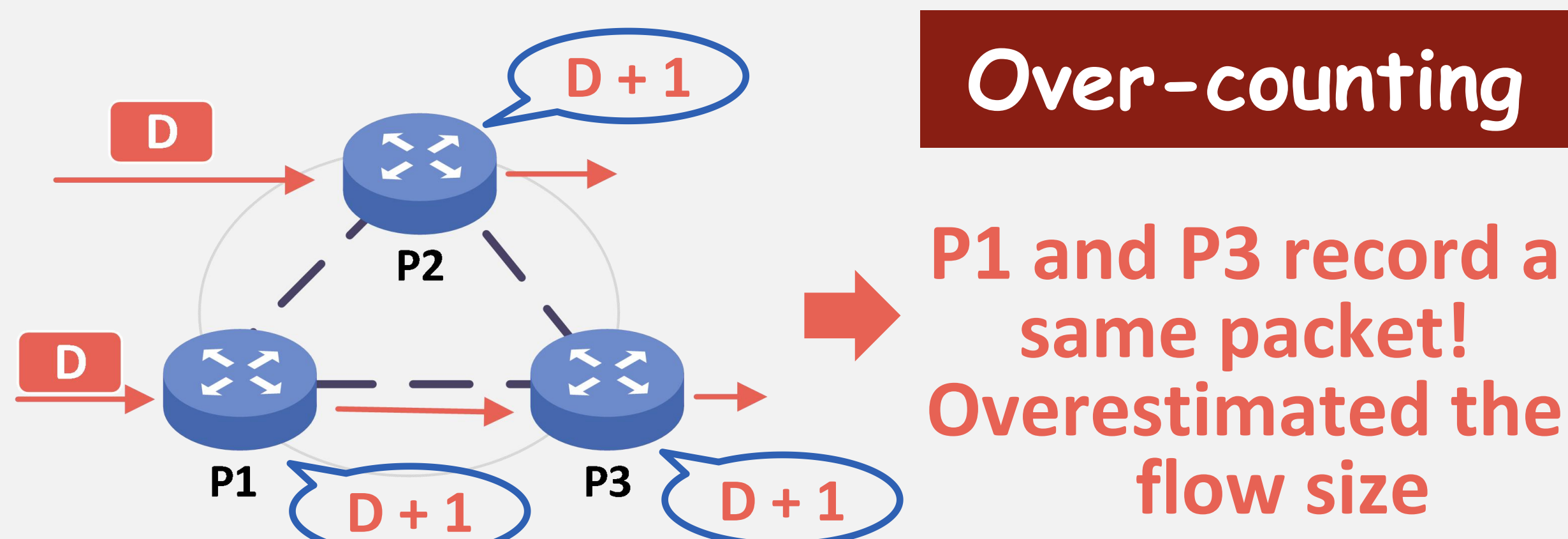


Network-Wide DDoS Detection with Routing-Oblivious Per-Flow Measurement

Network-wide measurement



- Packets traversing multiple measurement points are **recorded multiple times**
- Current sketches **save space via multi-stage processing**, assigning flows by size.

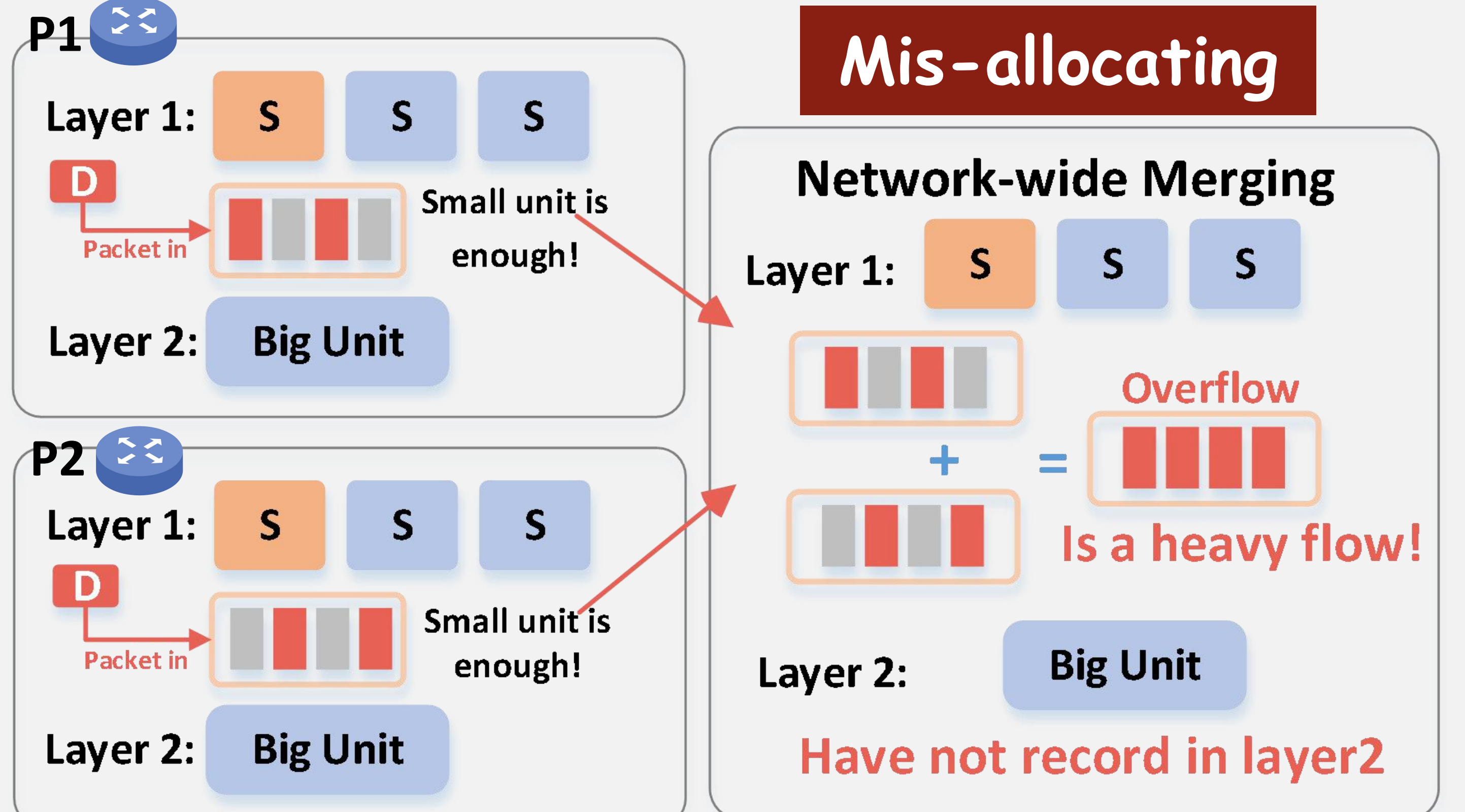


Results Collecting

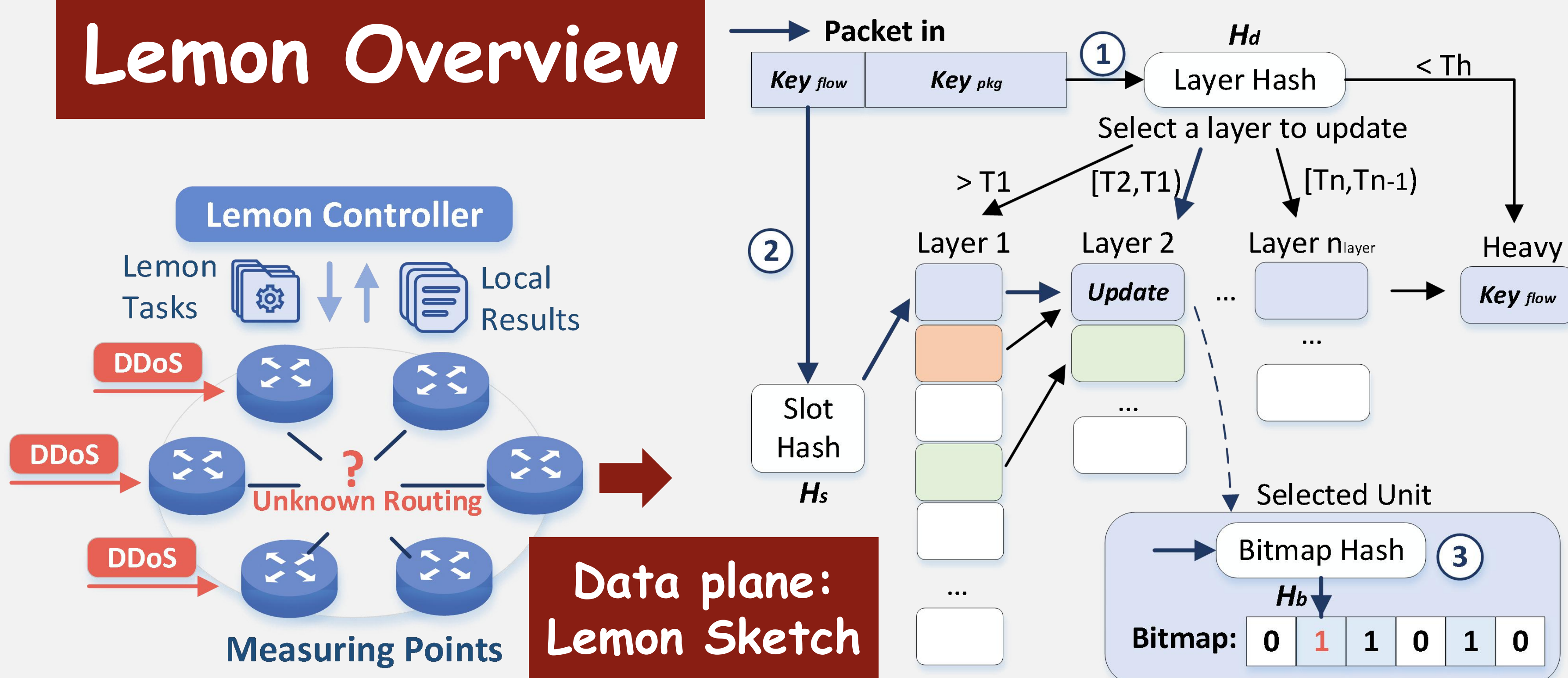
P1: D
P2: D
P3: D

Merging all results

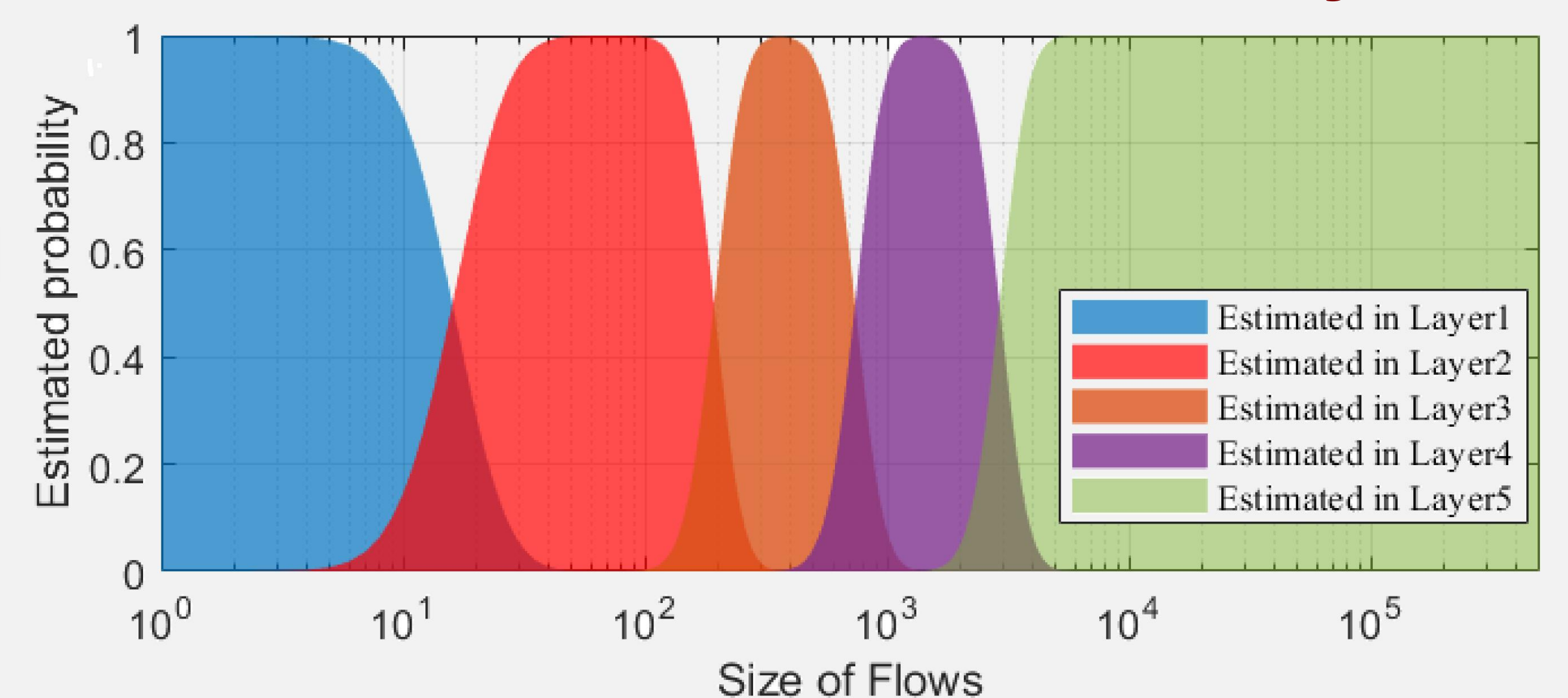
Per-flow: $D \times 3$
Ground Truth: $D \times 2$



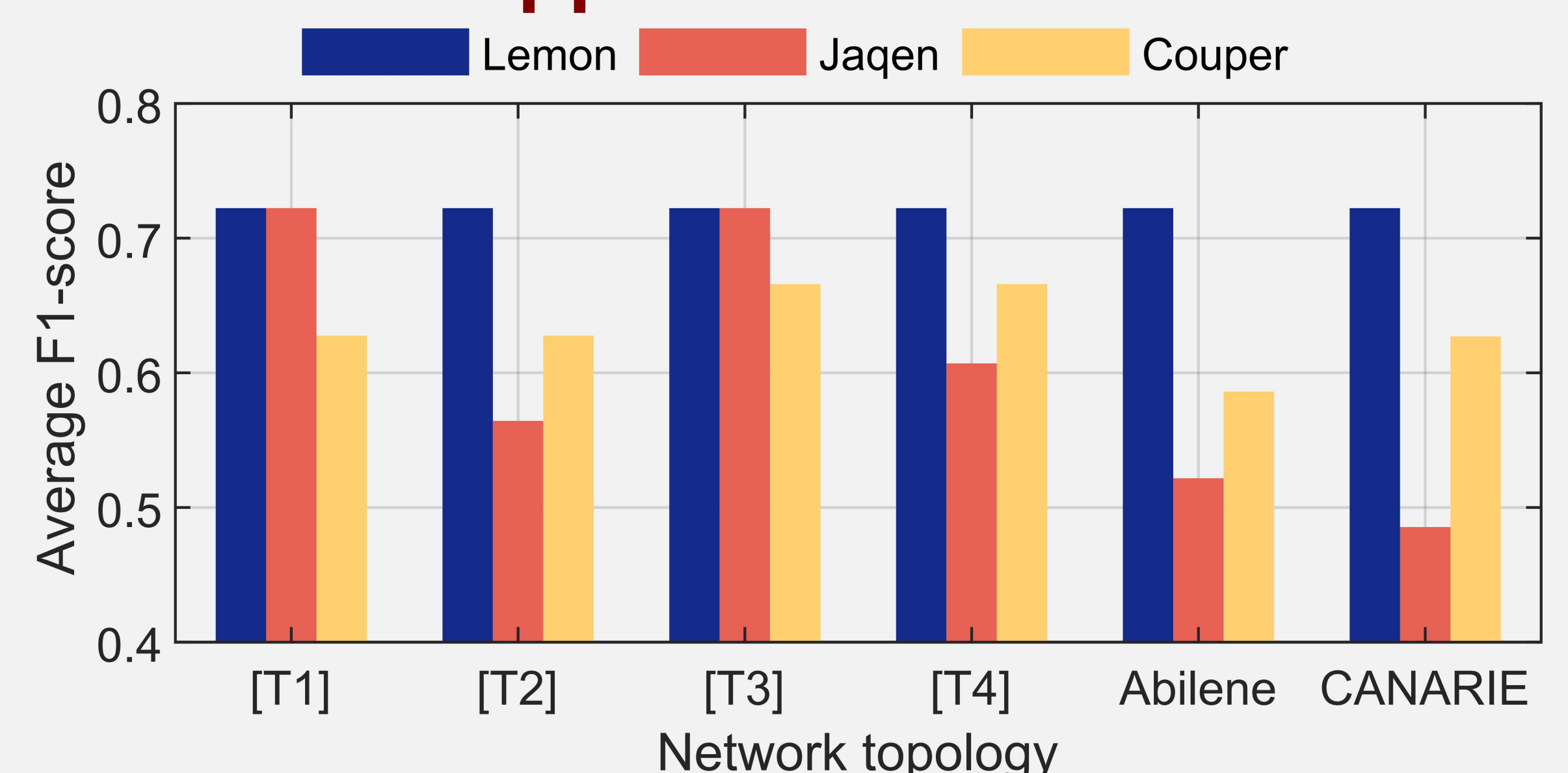
Lemon Overview



- Lemon segregates flows with different sizes into different layers



- Accurate network-wide measurement results support DDoS detection



Over-counting-free

Each packet is uniquely identified by Key_{pkg} , reframing the packet counting as per-flow cardinality estimation

Mis-allocating-free

Assigns flows to units fully depends on the hash results of Key_{pkg} and Key_{flow} , ensures globally consistent updates