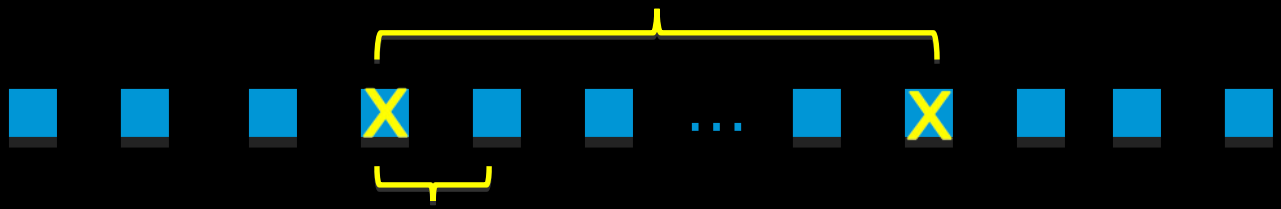
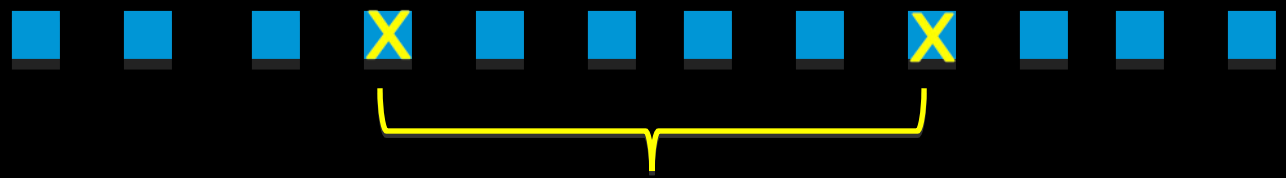
Packet interval and drop interval



$$pkt\_int = \frac{avg\_pkt\_size}{arrival\ rate}$$

$$drop\_int = \frac{avg\_pkt\_size}{arrival\ rate * drop\_perc}$$

CoDel: control the drop interval



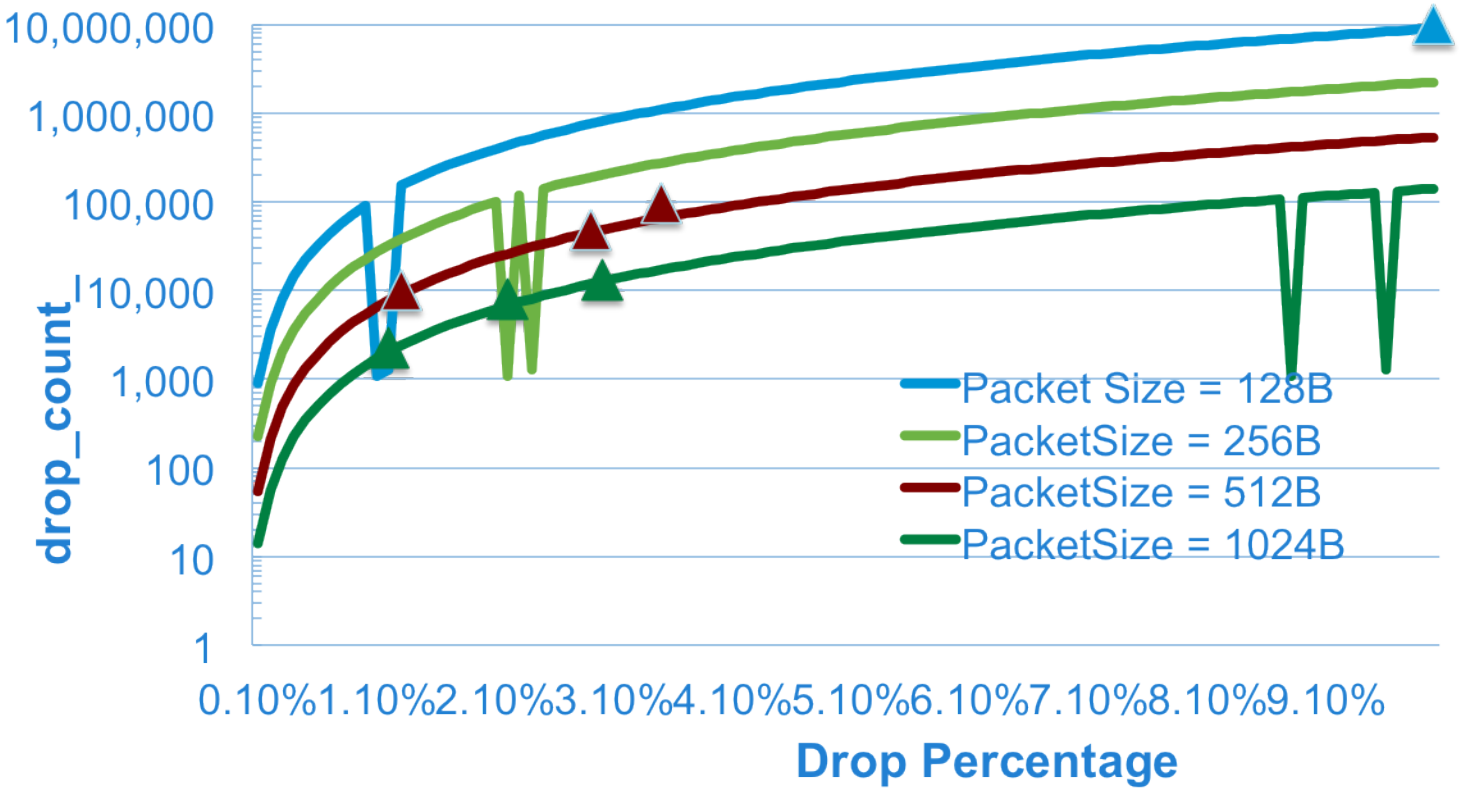
150ms, 150ms/sqrt(2), 150ms/sqrt(3)…

$$drop\_int = \frac{150ms}{sqrt(drop\_count)} = \frac{avg\_pkt\_size}{arrival\ rate * drop\_perc}$$

At Equilibrium

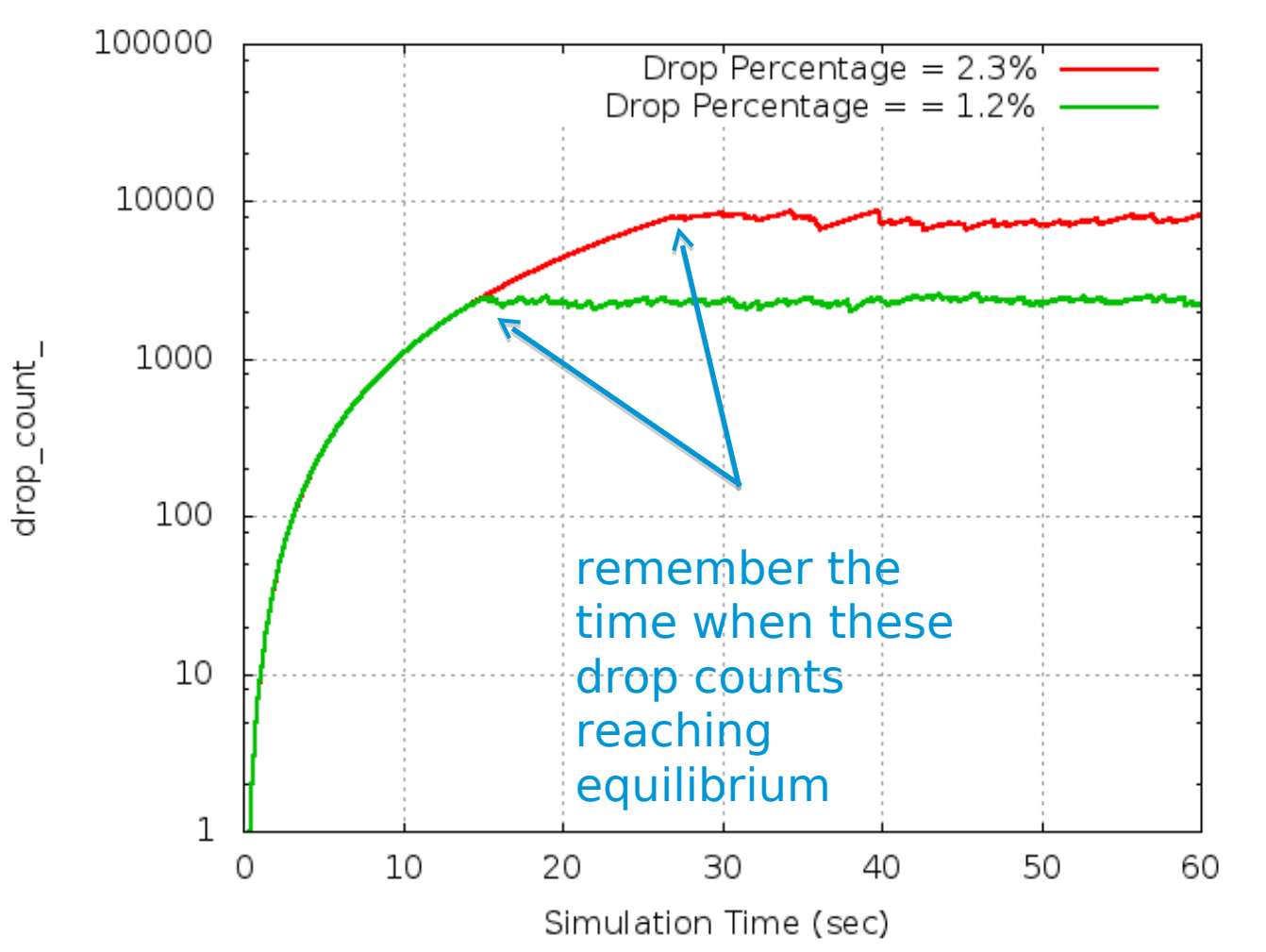
$$\text{drop\_count} = \left(\frac{150\text{ms} * \text{arrival rate} * \text{drop\_perc}}{\text{avg\_pkt\_size}} \right)^2$$

Relationship between drop_count and drop percentage (independent of tcp or udp)



Assuming 200Mbps uplink speed

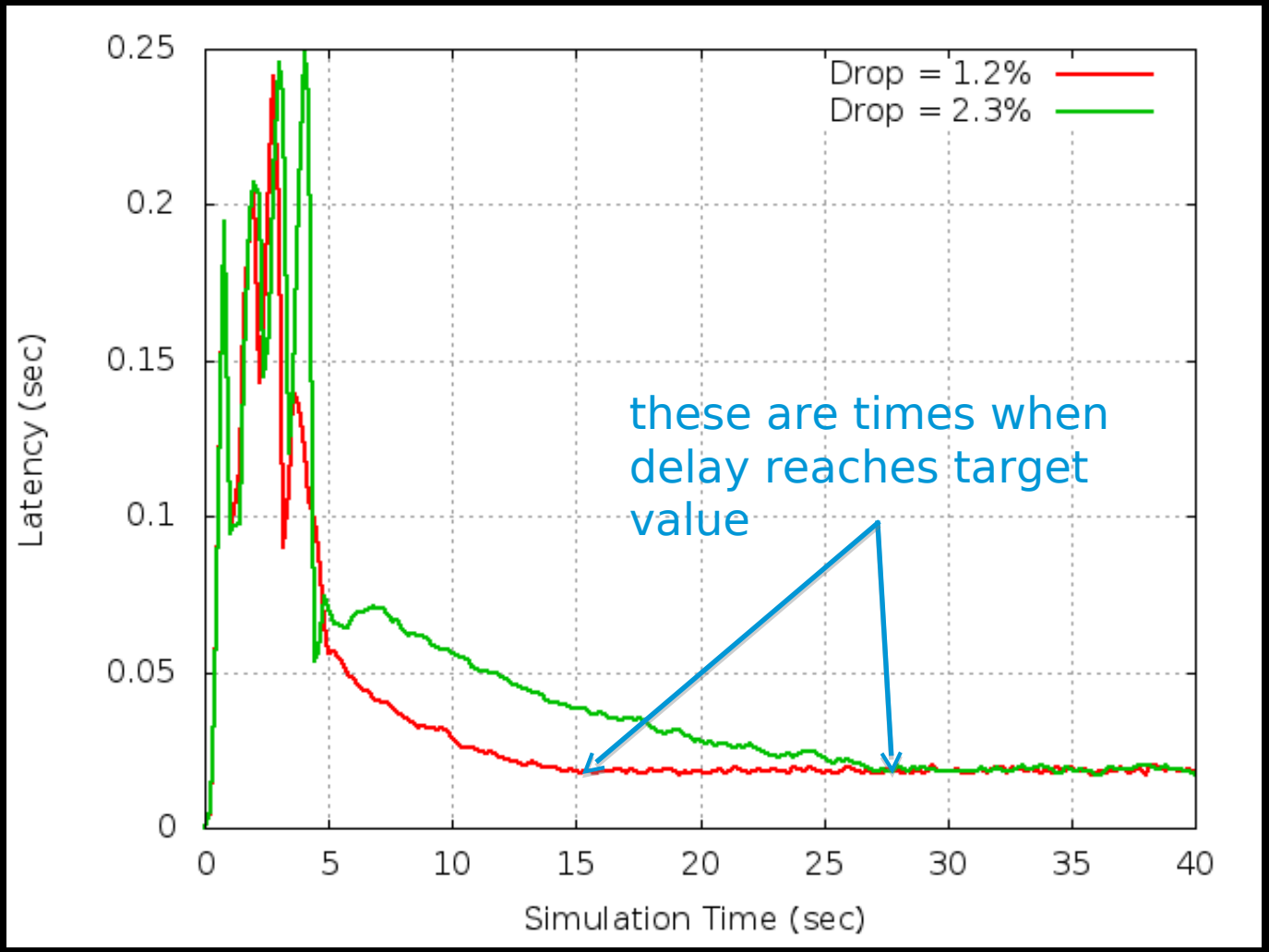
Simulation Results: drop_count



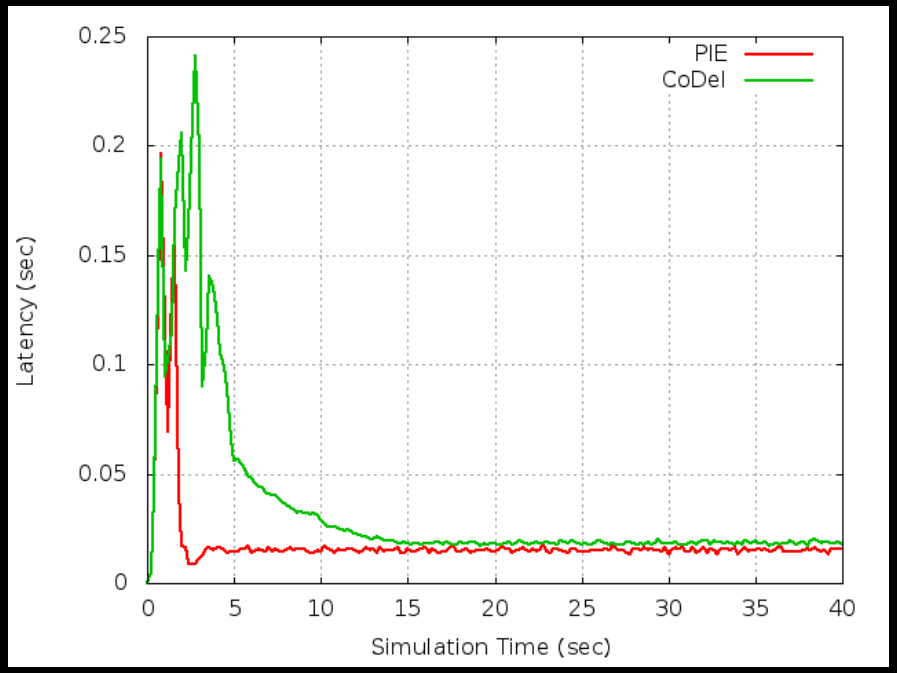
need to wait
# of drops
to get to a high value in order to reach equilibrium

100(1.2% drop) vs. 150(2.3% drop) TCP flows, drop percentage is the final equilibrium value

Simulation Results: Latency

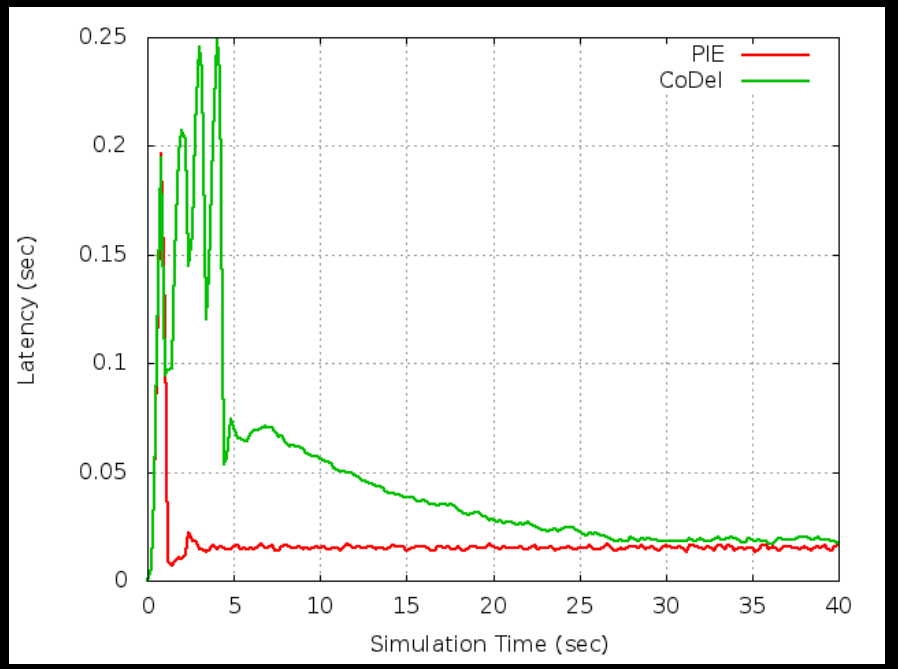


Comparison to PIE



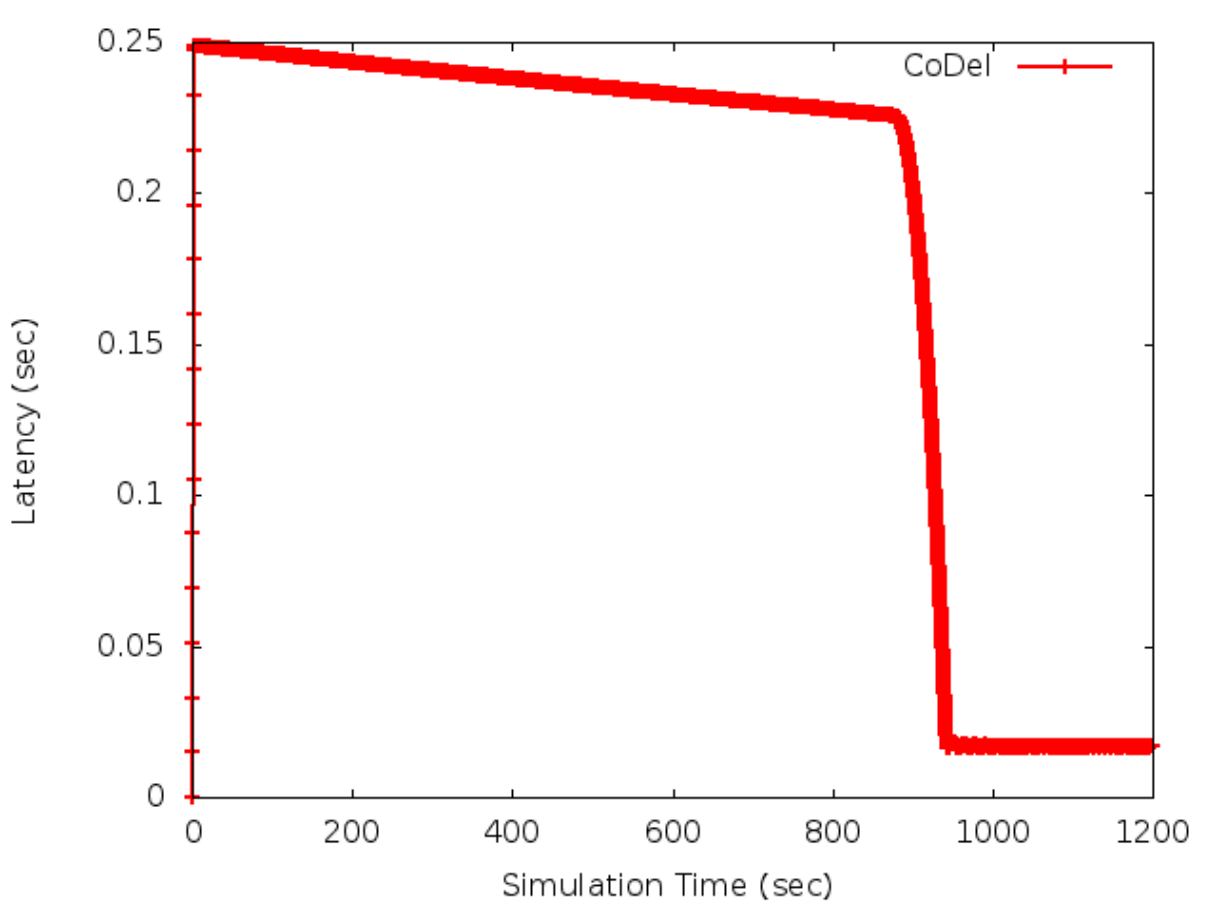
100 Flows

150 Flows



In both cases, PIE reaches equilibrium much faster

UDP sending at 10% over subscription



Thank you.