

Impact of SDN induced routing changes on TCP BBR

Author: Alexandru-Mihai Șologon
Email: a.m.sologon@student.tudelft.nl

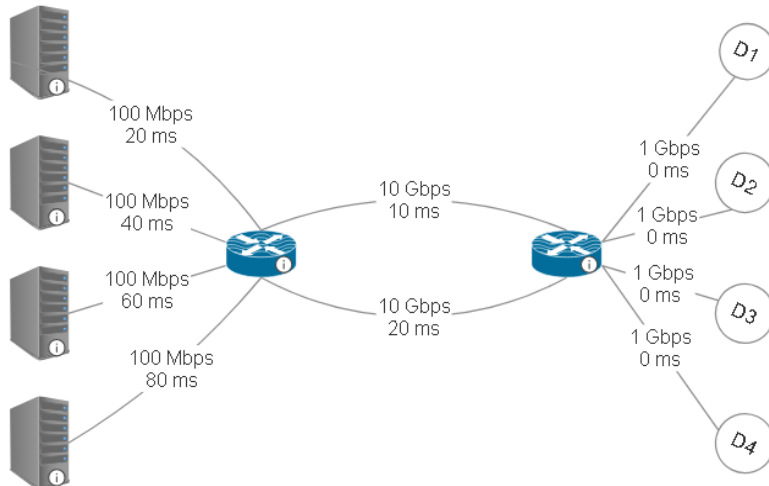
Supervisors: Adrian Zapletal, Fernando Kuipers

Introduction

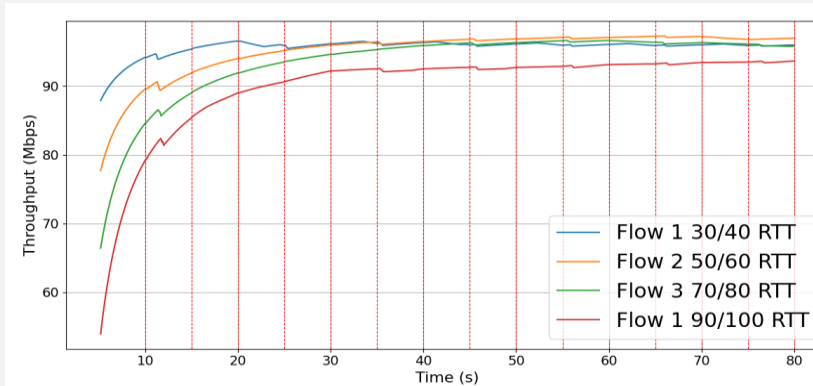
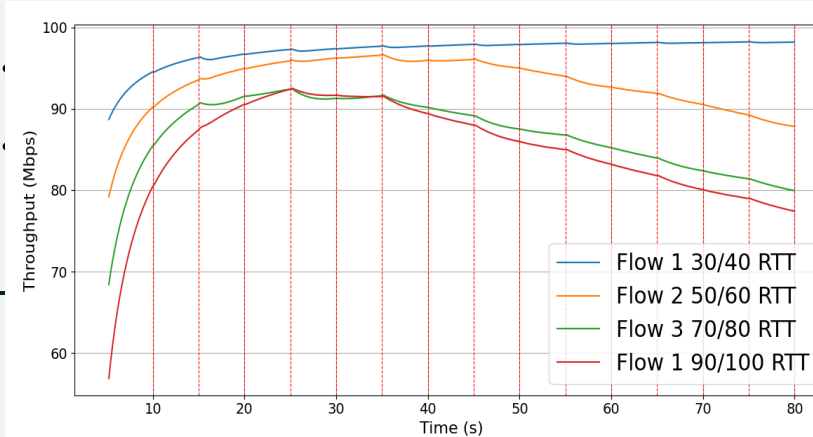
- In networks that use SDN changes in routing can occur as often as every 10 seconds or even less.
- The biggest cloud providers have moved to the usage of SDN in their networks.
- It was showed that TCP Cubic performance can suffer greatly from frequent routing changes, throughput can reach as low as 35%.
- Google is already using BBR for most of their networks.

Research Question

How are TCP flows affected by frequent routing changes when using BBR congestion control?

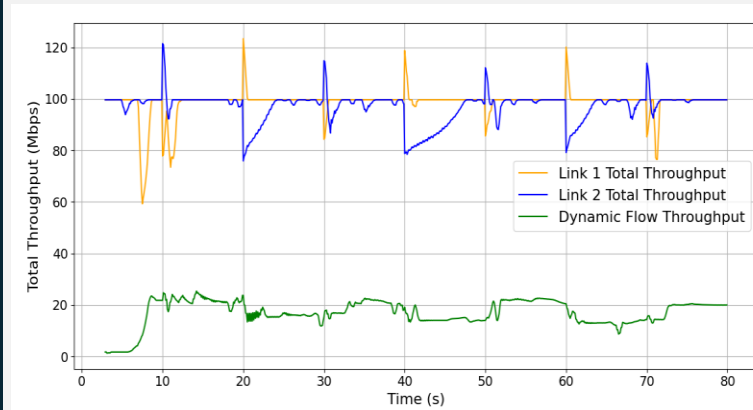


Results



- TCP Cubic performance is greatly affected at higher RTTs

- TCP BBR maintains within 8% of the maximum throughput on all RTTs.
- This difference comes from the way the CCAs interpret pack reordering



Cubic takes up to 8 seconds to fill new available bandwidth
BBR almost instantaneously fills the link and maintains high link usage

Conclusion

In conclusion BBR is much better suited for dynamic network environments where rerouting occurs frequently. Its capable of reacting faster and fully utilizing the available resources