

Fairness of RRTCC

Preliminary results in NS-2

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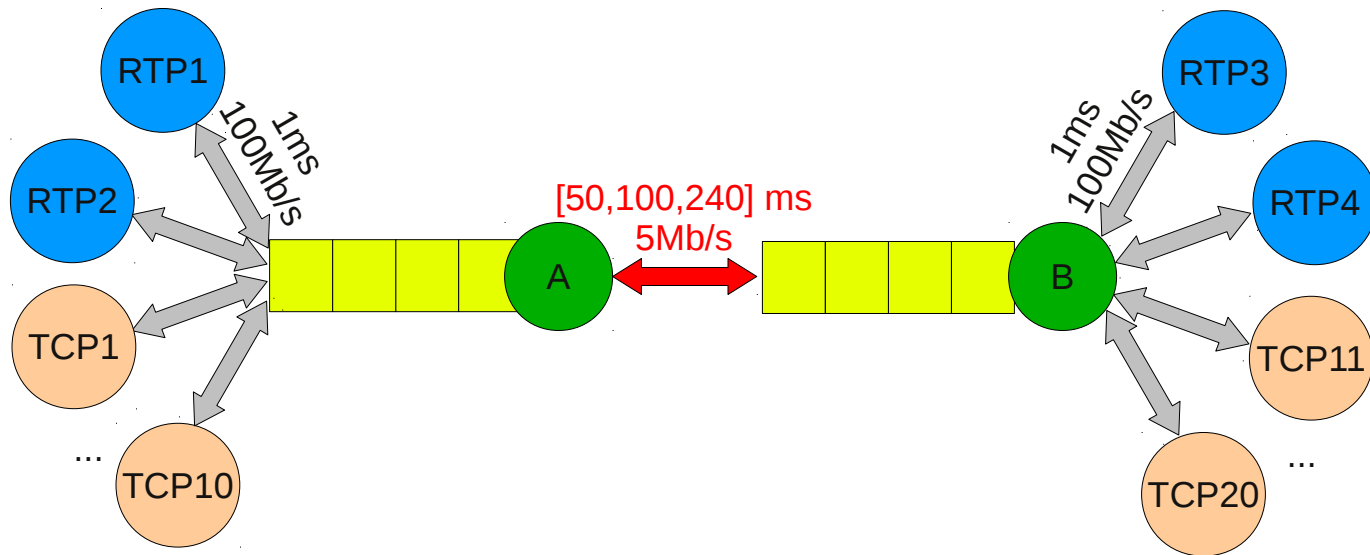
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RRTCC and short TCP flows

- RRTCC and TCP flows share a 5Mbps bottleneck link with 50 or 100ms link delay.
- Each TCP flow is modeled as a sequence of webpage downloads interleaved with idle periods
 - The sizes of the webpages are obtained from a uniform distribution between 100KB and 1.5MB
 - Lengths of the idle periods are drawn from an exponential distribution with the mean value of 10
- Each simulation is run 30 times

NS-2 Setup



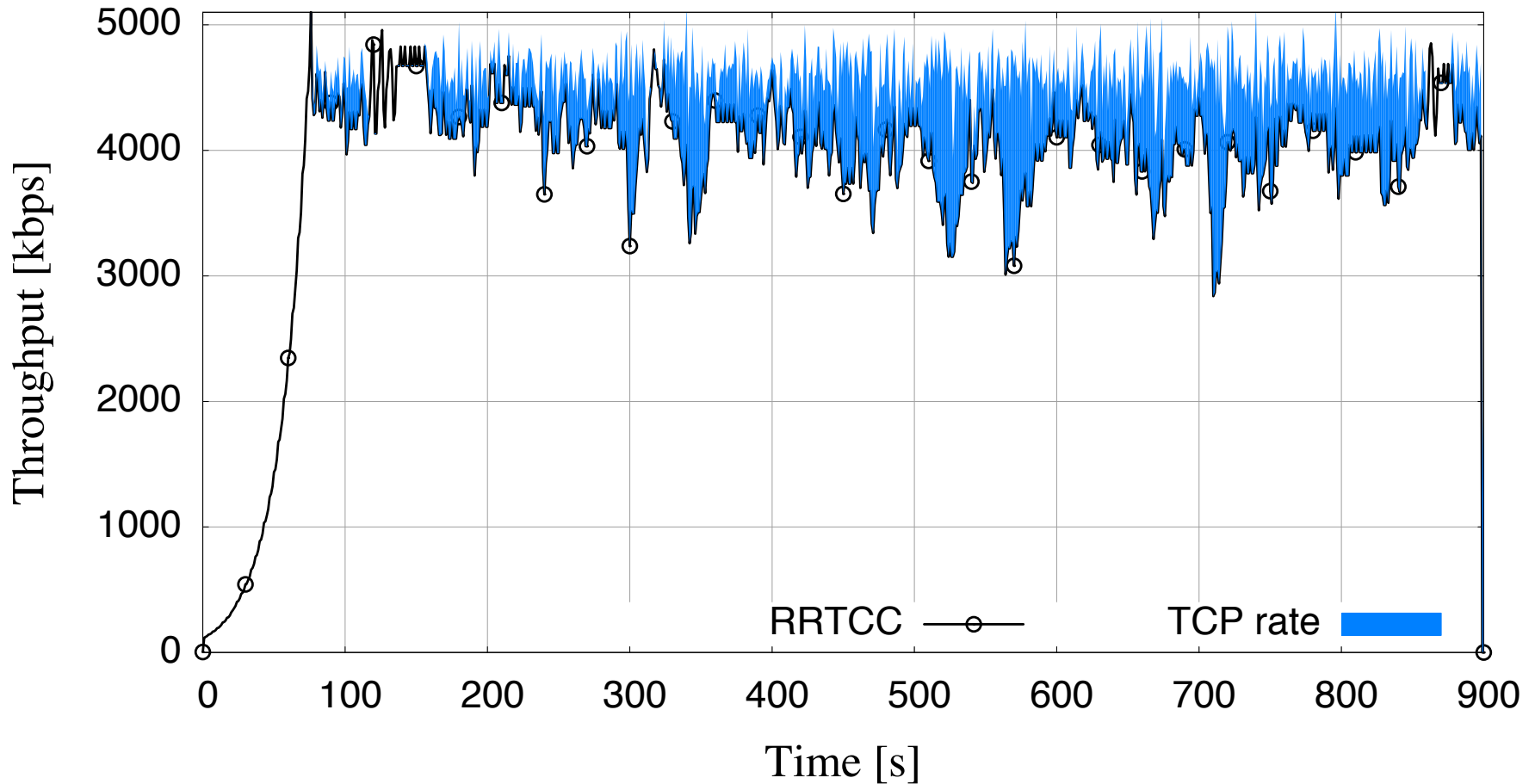
- Drop tail routers
- Default queue size: 50
- Codec start rate= 128kbps
- Max. end-to-end delay = 400ms
- RTCP Interval = 1 sec

1 RRTCC and 5 TCP flows

	50ms	100ms
Goodput	3593 kbps ($\sigma = 279$)	3700 kbps ($\sigma = 420$)
Packet Loss Rate	3.68% ($\sigma = 0.26$)	4% ($\sigma = 0.19$)
Average TCP Throughput (during ON time)	688.5 kbps ($\sigma = 53$)	323 kbps ($\sigma = 111$)
Average TFS	151% ($\sigma = 8$)	72% ($\sigma = 0.21$)

$$TFS = \frac{TCP\ Throughput}{\left(\frac{Total\ Throughput}{no.\ of\ flows}\right)}$$

Bottleneck 5Mbps, 50ms



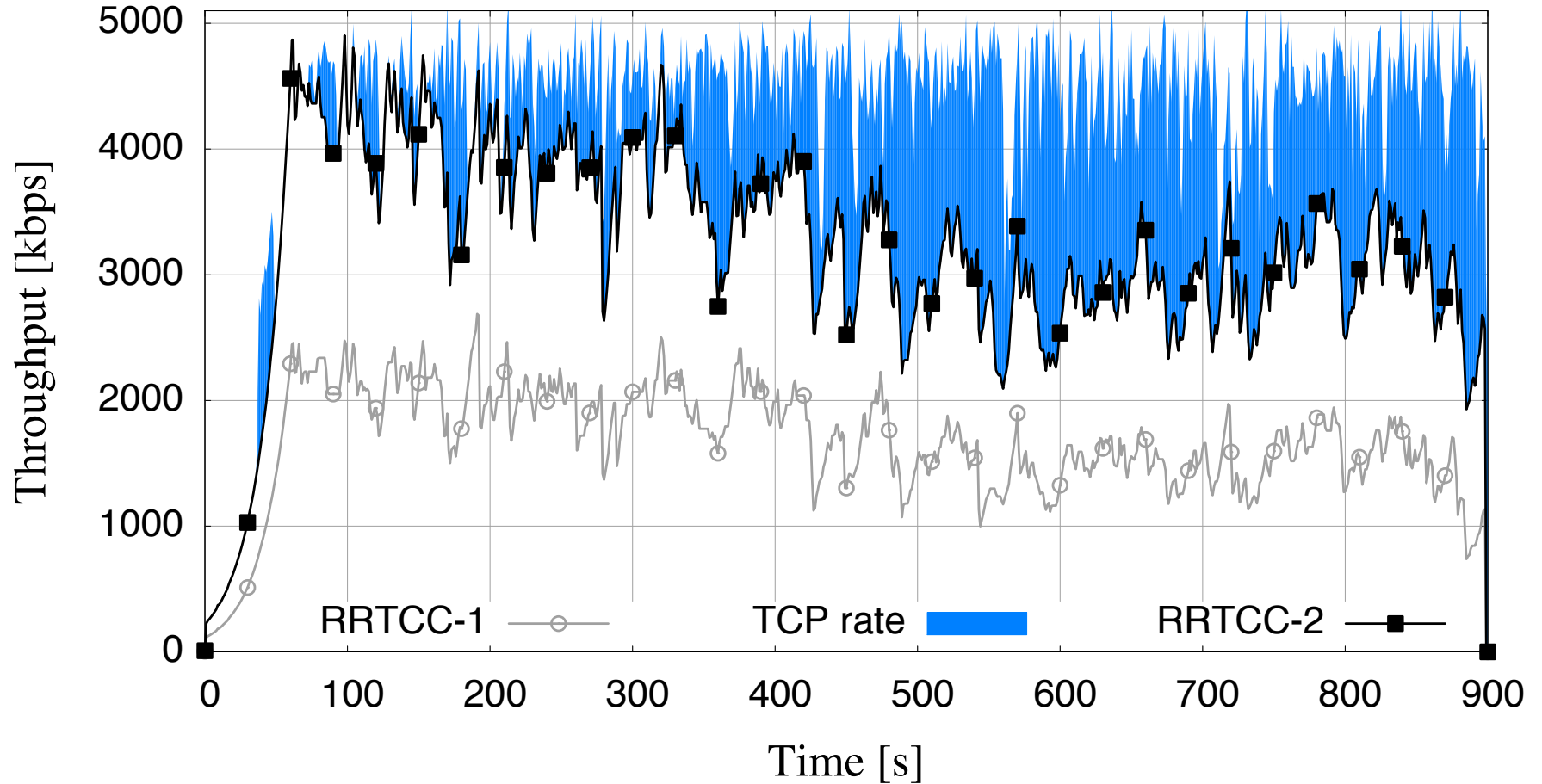
Note: The graphs just showing the RTP in the one direction (from Peer 1 to Peer 2) and TCP data flowing from (Peer 1 to Peer 2) and ACK for data requests (from Peer 1 to Peer 2)

2 RRTCC with 10 TCP flows

50ms	Flow 1	Flow 2
Goodput	1640 kbps ($\sigma = 37.63$)	1750 kbps ($\sigma = 65$)
Packet Loss Rate	5.6 % ($\sigma = 0.09$)	5.5% ($\sigma = 0.3$)
Average TCP Throughput (during ON time)	390 kbps ($\sigma = 36.7$)	
TFS	78% ($\sigma = 7$)	

100ms	Flow 1	Flow 2
Goodput	1782 kbps ($\sigma = 54.5$)	1904 kbps ($\sigma = 46.7$)
Packet Loss Rate	5.4% ($\sigma = 0.33$)	5.3% ($\sigma = 0.17$)
Average TCP Throughput (during ON time)	281.7 kbps ($\sigma = 23.5$)	
TFS	56% ($\sigma = 7$)	

Bottleneck link: 5Mbps, 50ms



Bottleneck link: 5Mbps, 100ms

