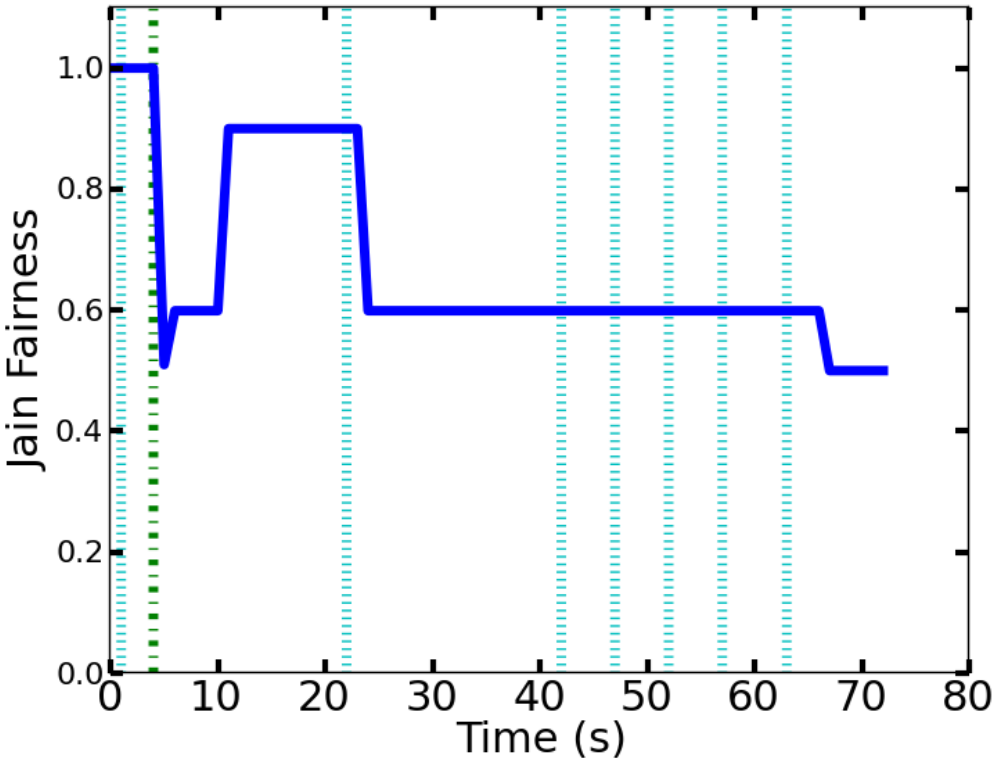
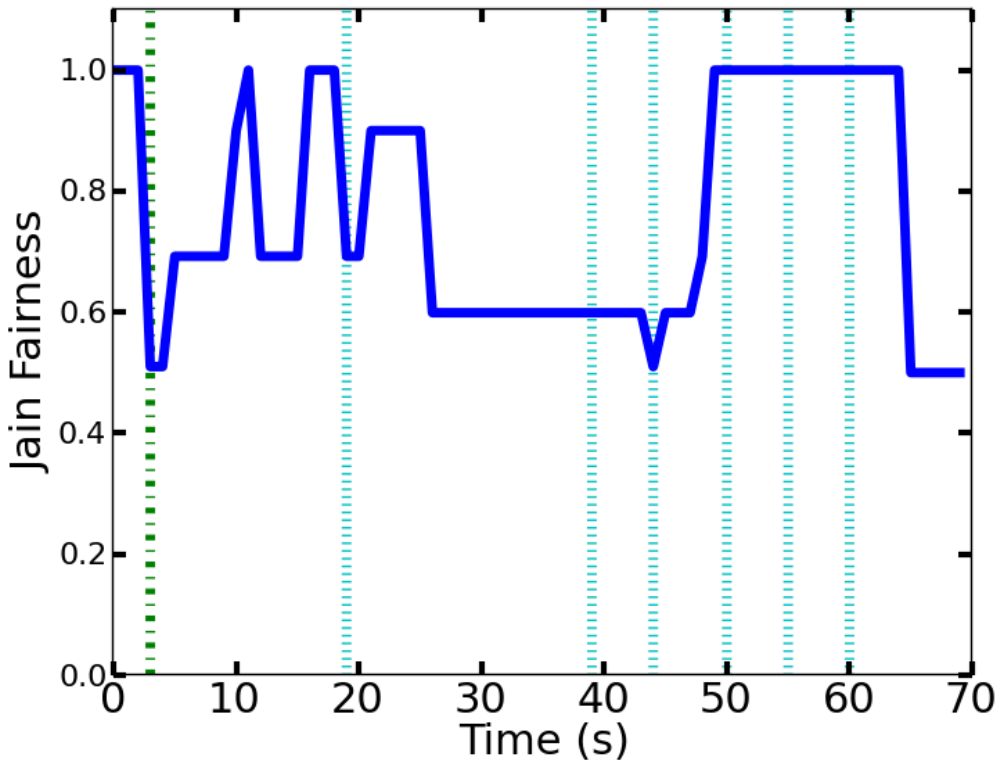
Discussion

1. Fairness

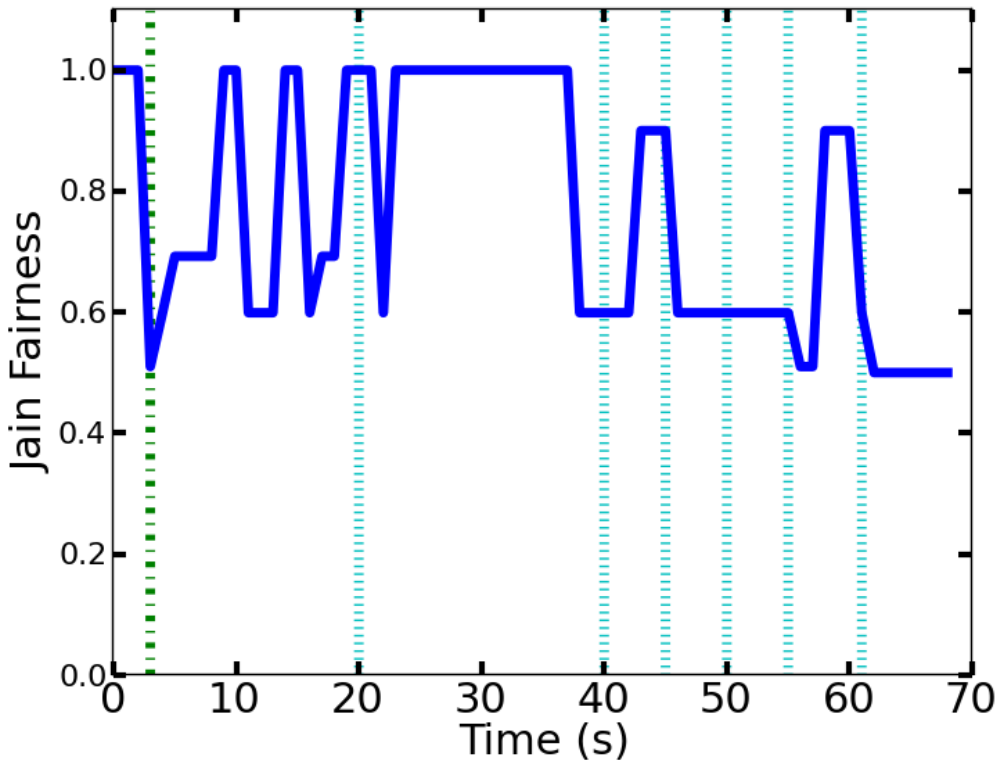
1. alpha = 0.1



2. alpha = 0.5

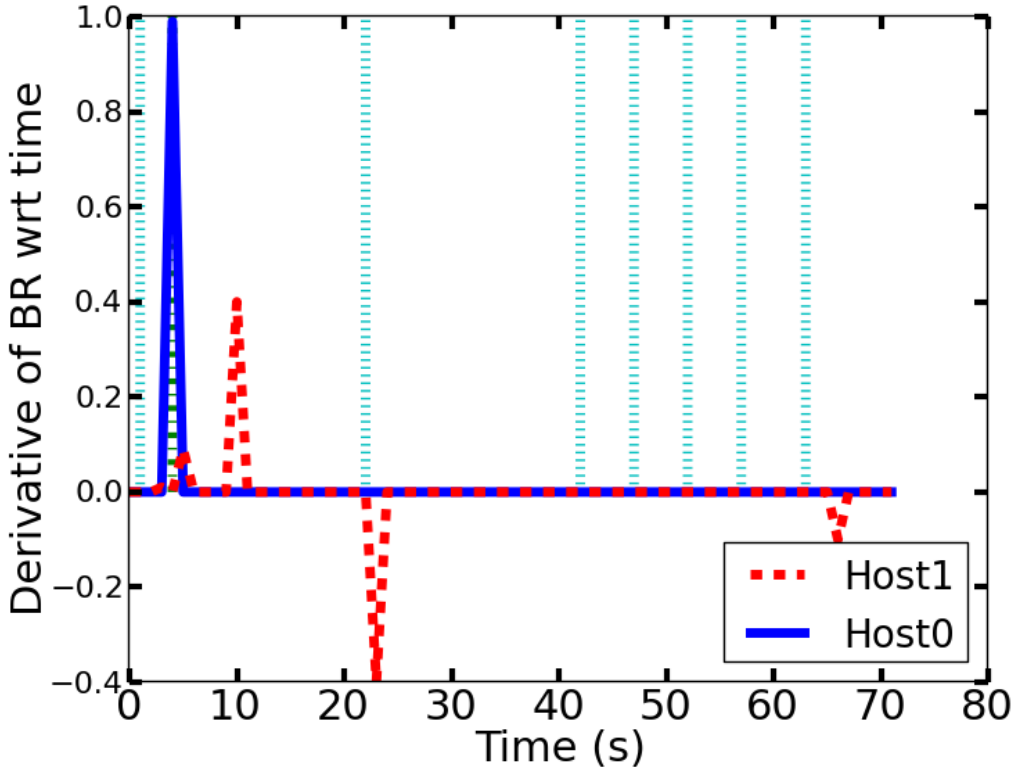


3. alpha = 0.9

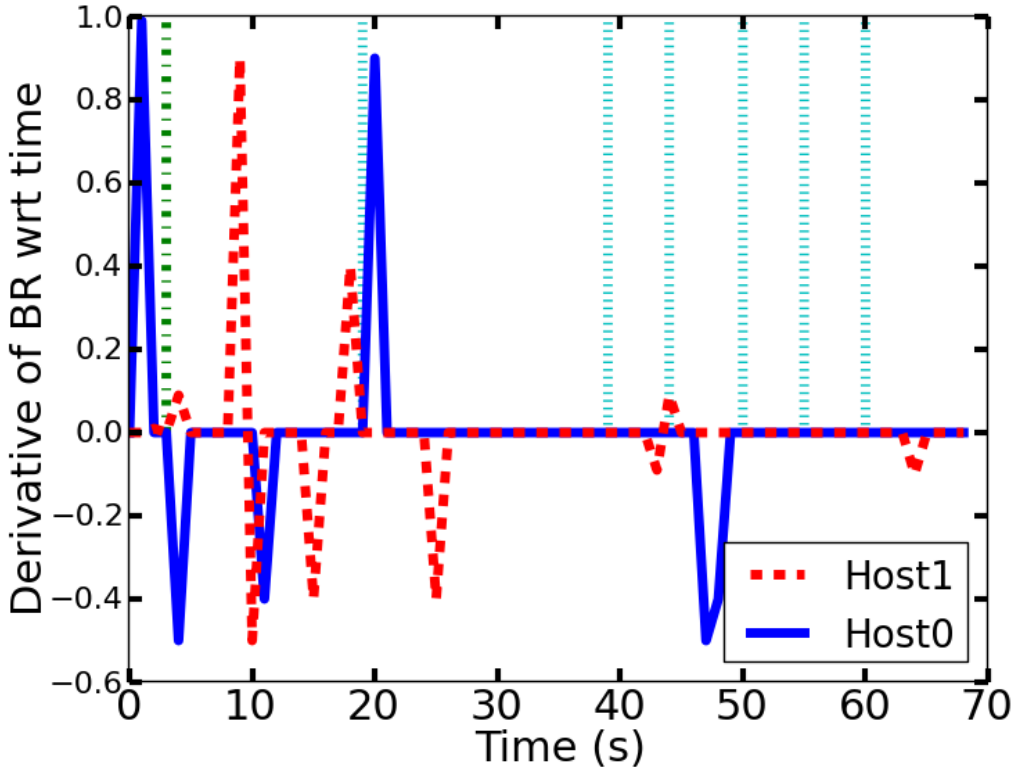


2. smoothness

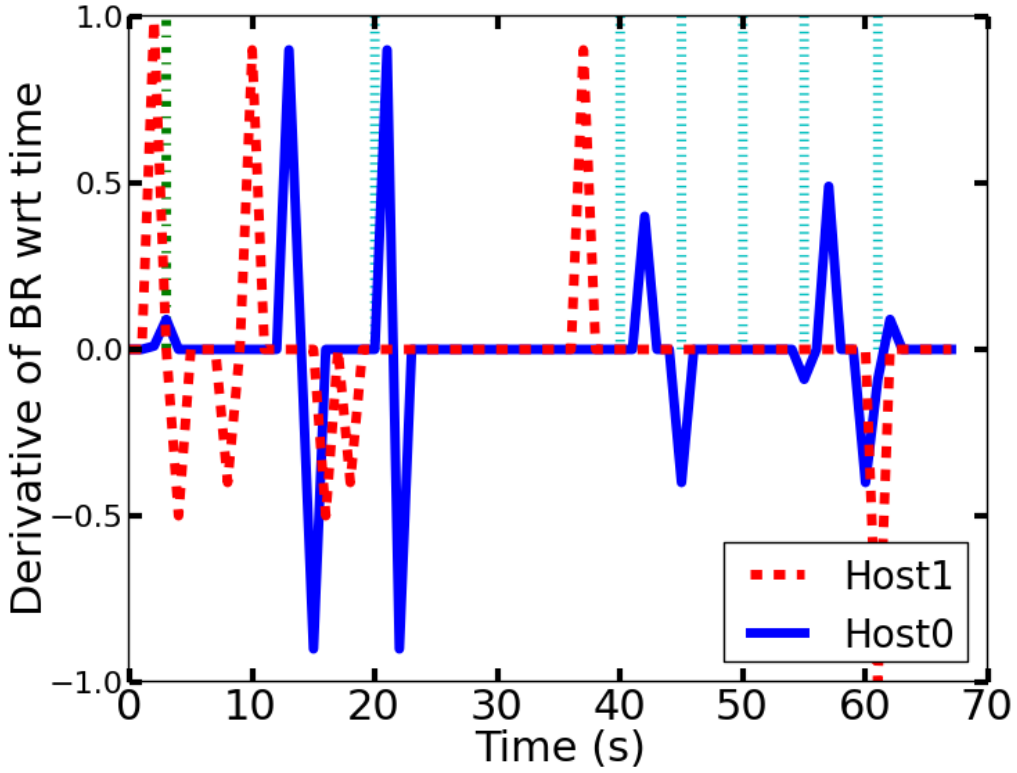
1. alpha = 0.1



2.alpha = 0.5

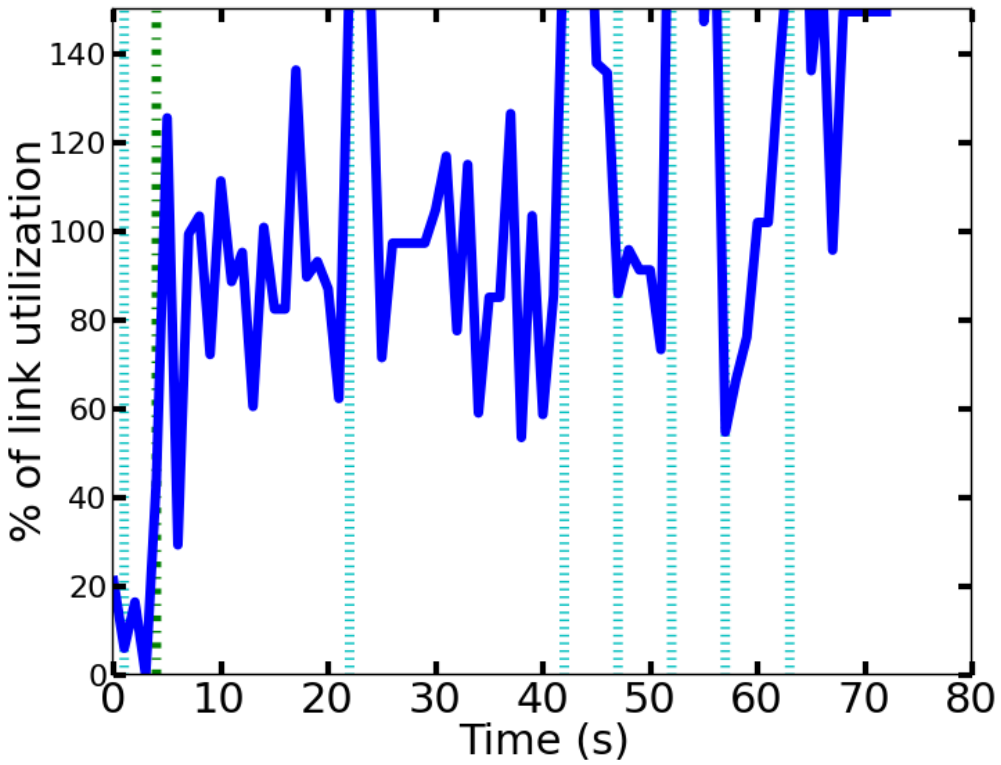


3.alpha = 0.9

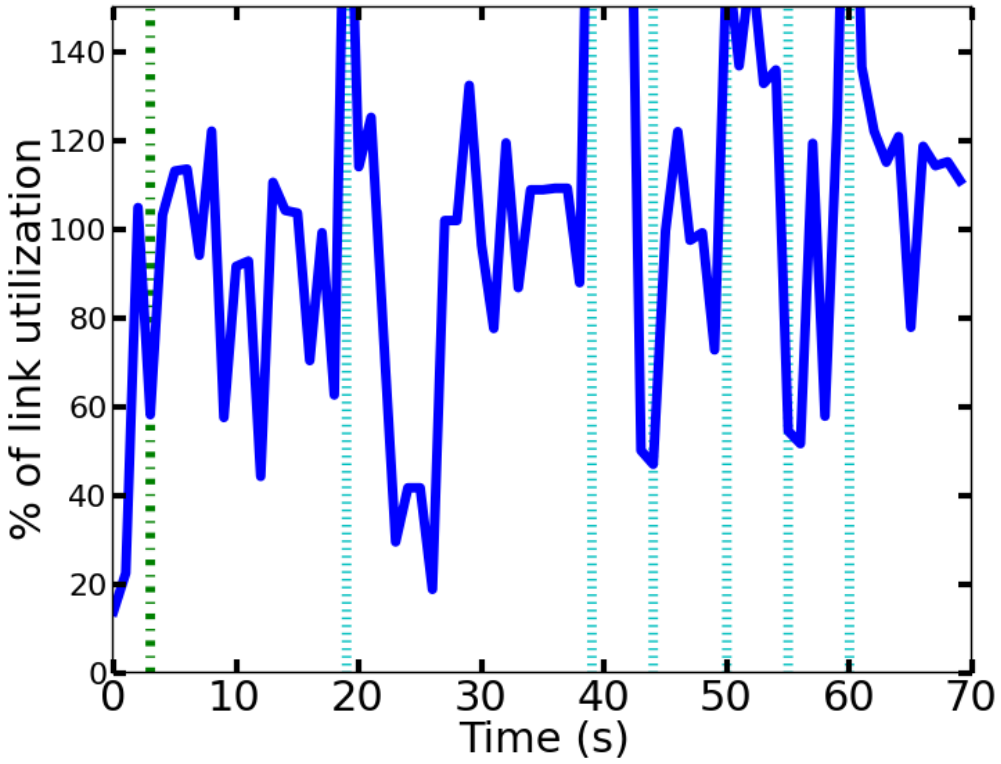


3. utilization

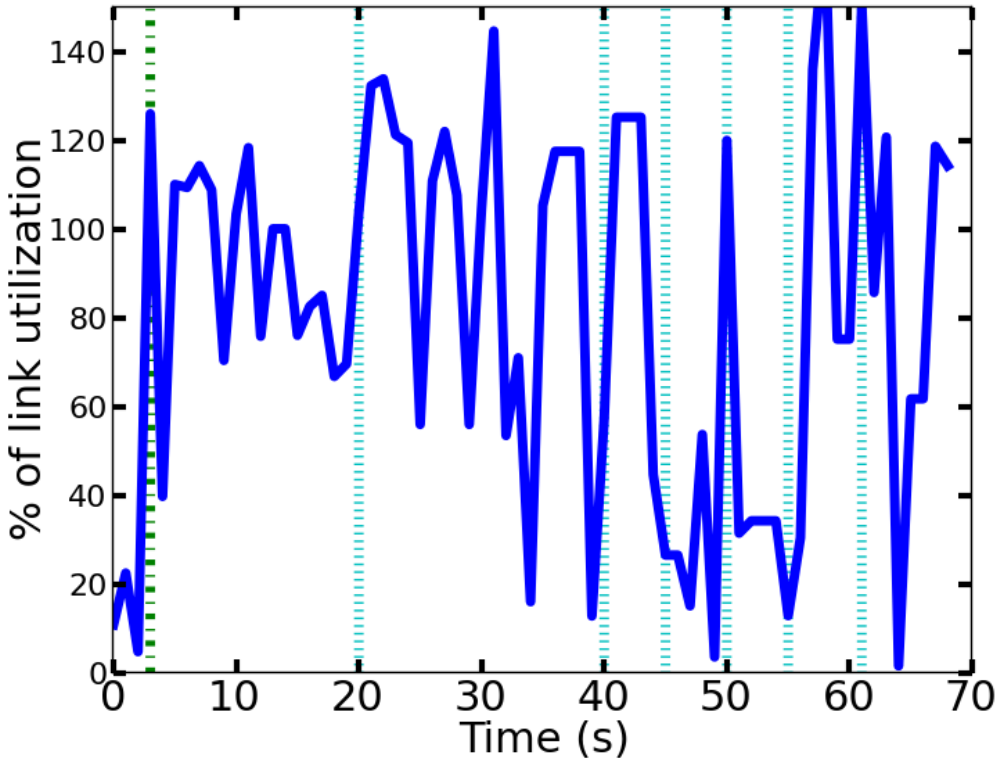
1.alpha = 0.1



2.alpha = 0.5


% of link utilization
Time (s)
0
20
40
60
80
100
120
140
0
10
20
30
40
50
60
70

3. alpha = 0.9


% of link utilization
Time (s)
0
20
40
60
80
100
120
140
0
10
20
30
40
50
60
70

As alpha decreases from 0.9 to 0.1, the changing rate of bit rate is decreasing. So when the bandwidth of network is full, a lower alpha makes bitrate adaption more slowly, in which case, the network will be more congested by data flow. Thus utilization will be lower if congestion cannot be adjusted quickly. For the same reason, since bitrate adaption is slower when alpha is smaller, a client will keep a high bit rate for a long time compared with fast bitrate adaption. It is more unfair for others get connected into the network. On the contrary, if alpha is large, the derivative of bitrate will be greater, because the changing rate of bitrate keeps increasing when alpha increases. Thus:

Utilization is proportional to alpha.
Fairness is proportional to alpha.
Smoothness is inversely proportional to alpha.