15-441 Project3 Write-up

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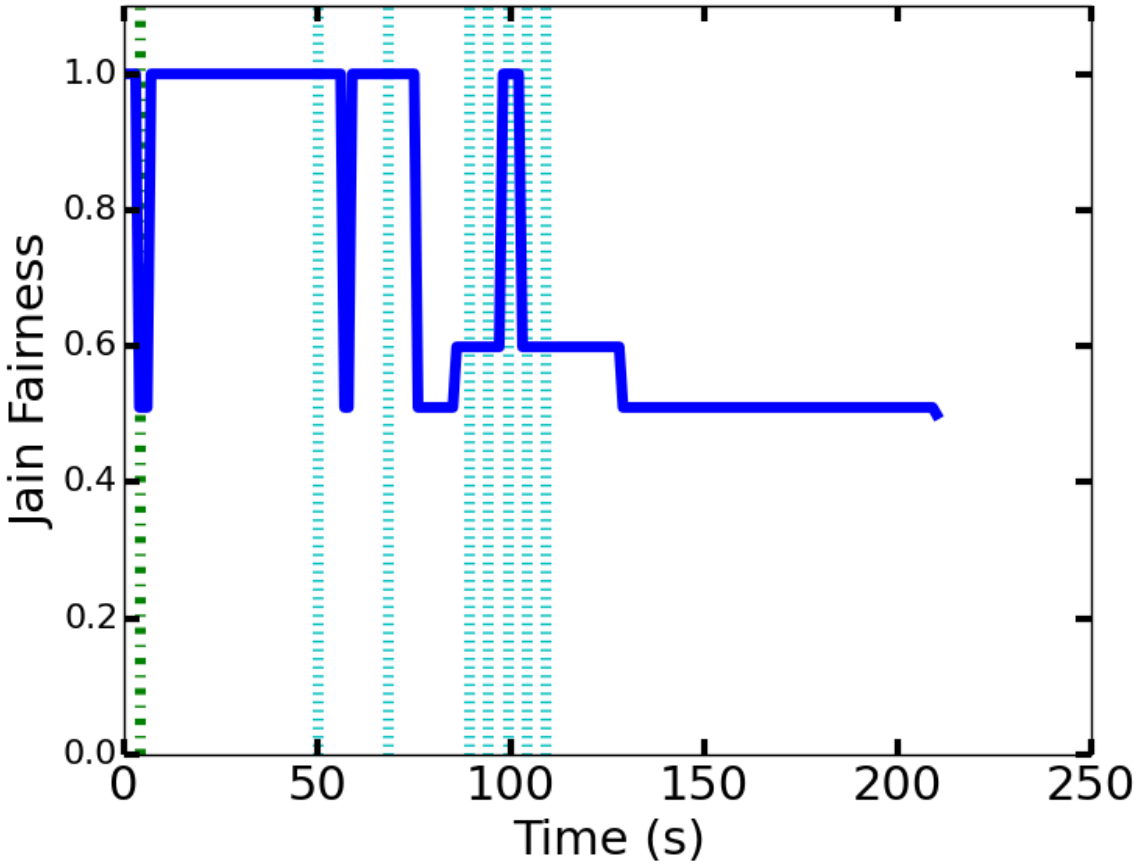
Analysis:

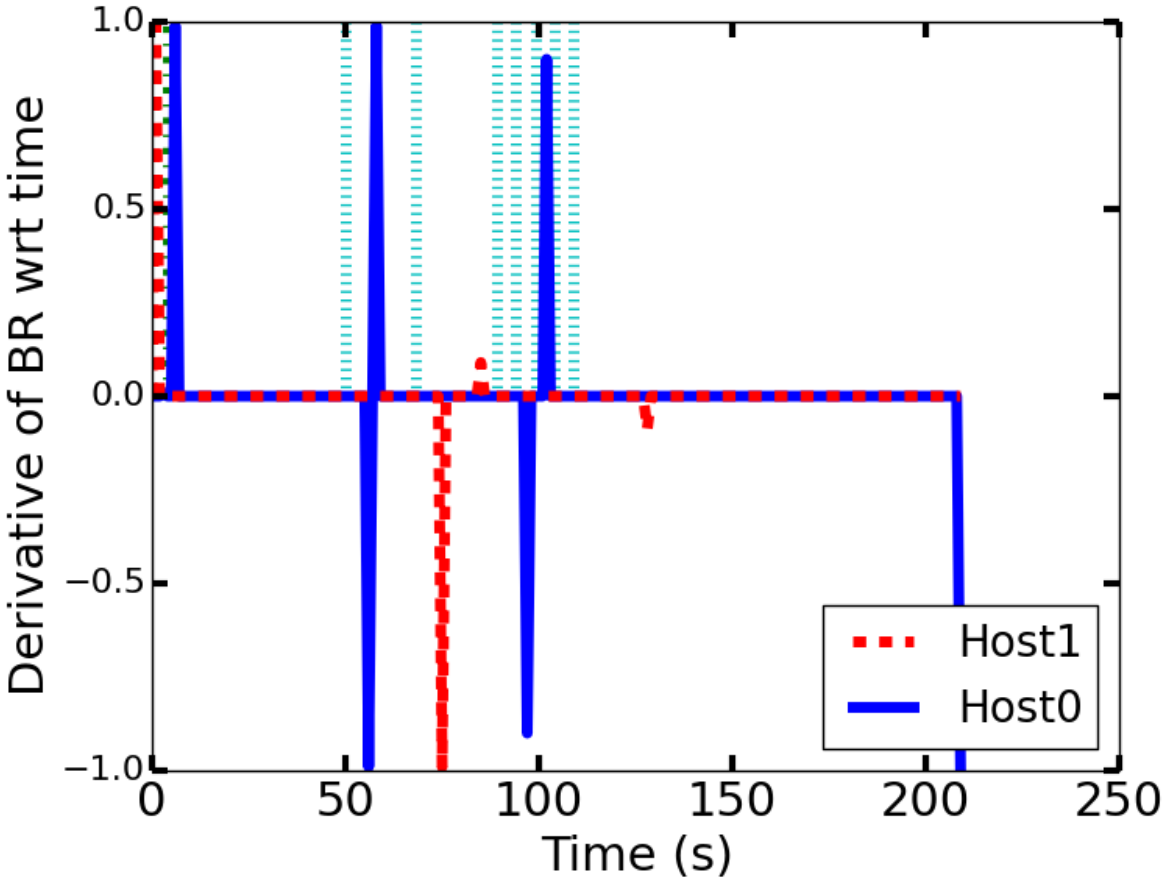
For fairness, when alpha is closer to 0.5, the fairness will be more stable. When alpha is closer to 0, it would be less fair because each client will keep its former pace. In another word prioly faster one will keep being fast while prioly slower one will keep being slow. When alpha is closer to 1, fairness would be floating since each clients change a lot. When alpha is closer to 0.5, they will have space to make adjustment to the change in network and also will not change dramatically. Therefore, fairness will be more stable in this case.

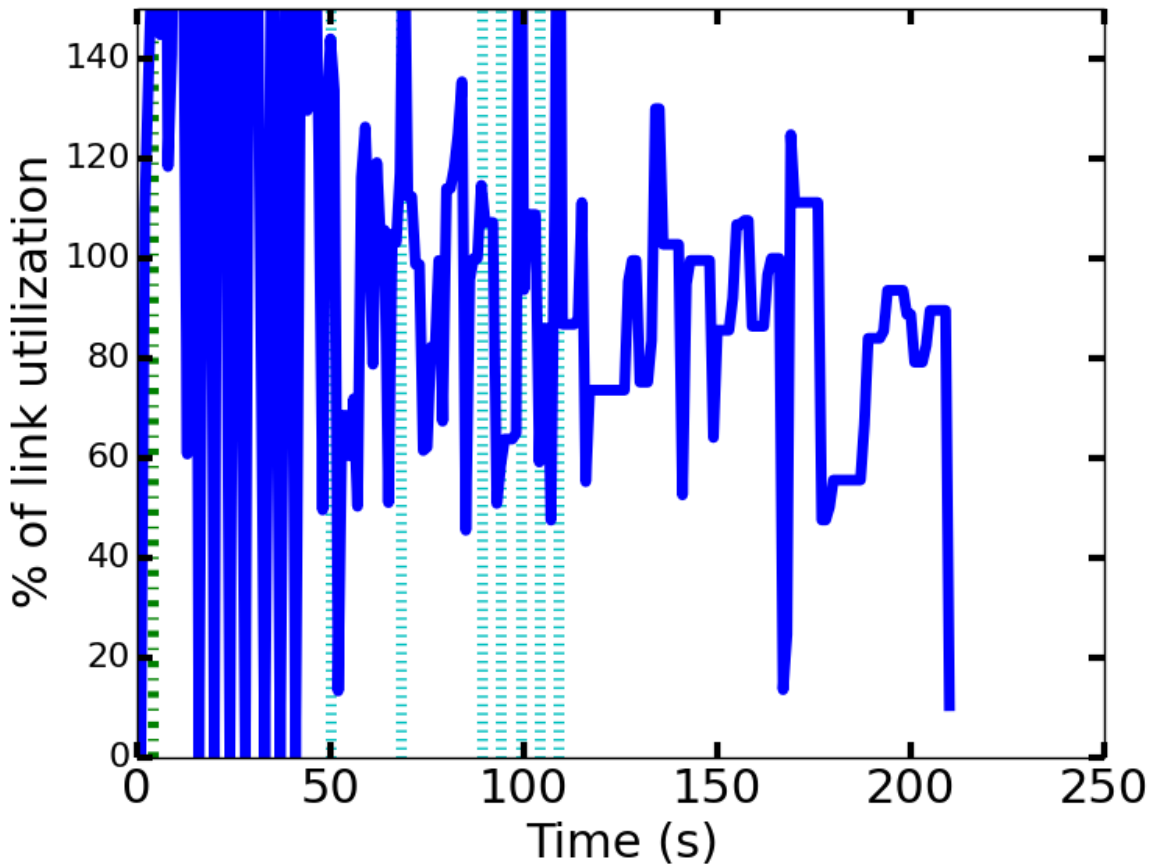
For smoothness, larger alpha would most likely mean less smoothness. Since new average throughput is largely based on new measured throughput, it will reflect changes in the network quickly. As can be seen from the graphs below, there are many spikes in the fairness graphs when alpha is close to 1. That is consistent to prior analysis. On contrary, smoothness will be higher if alpha is close to 0, because the average throughput is largely based on previous number and subsequently will not change significantly if network environment changes.

For utilization, larger alpha would most likely mean higher utilization since clients could adjust its bitrate better, as new average throughput will largely depend on new measured throughput. In another word, clients could adapt network change better when alpha is closer to 1

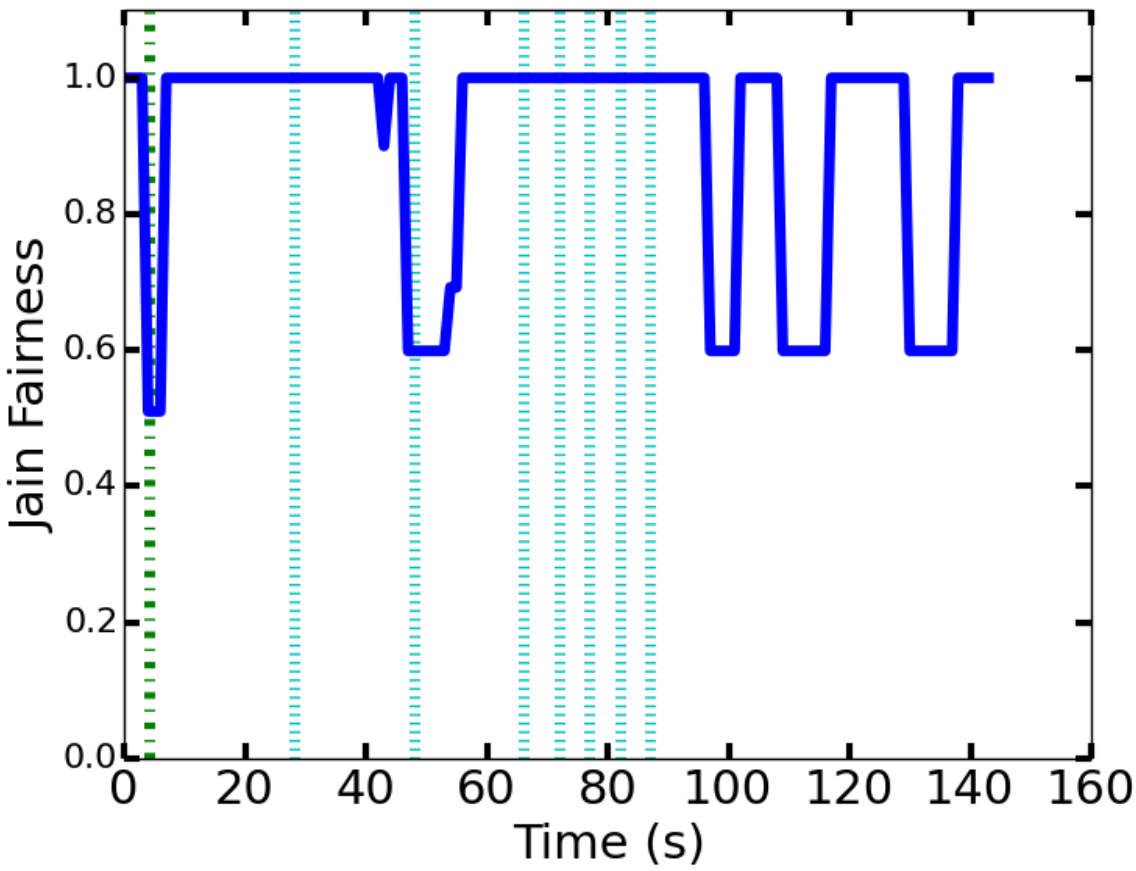
################################ Alpha = 0.1
################################

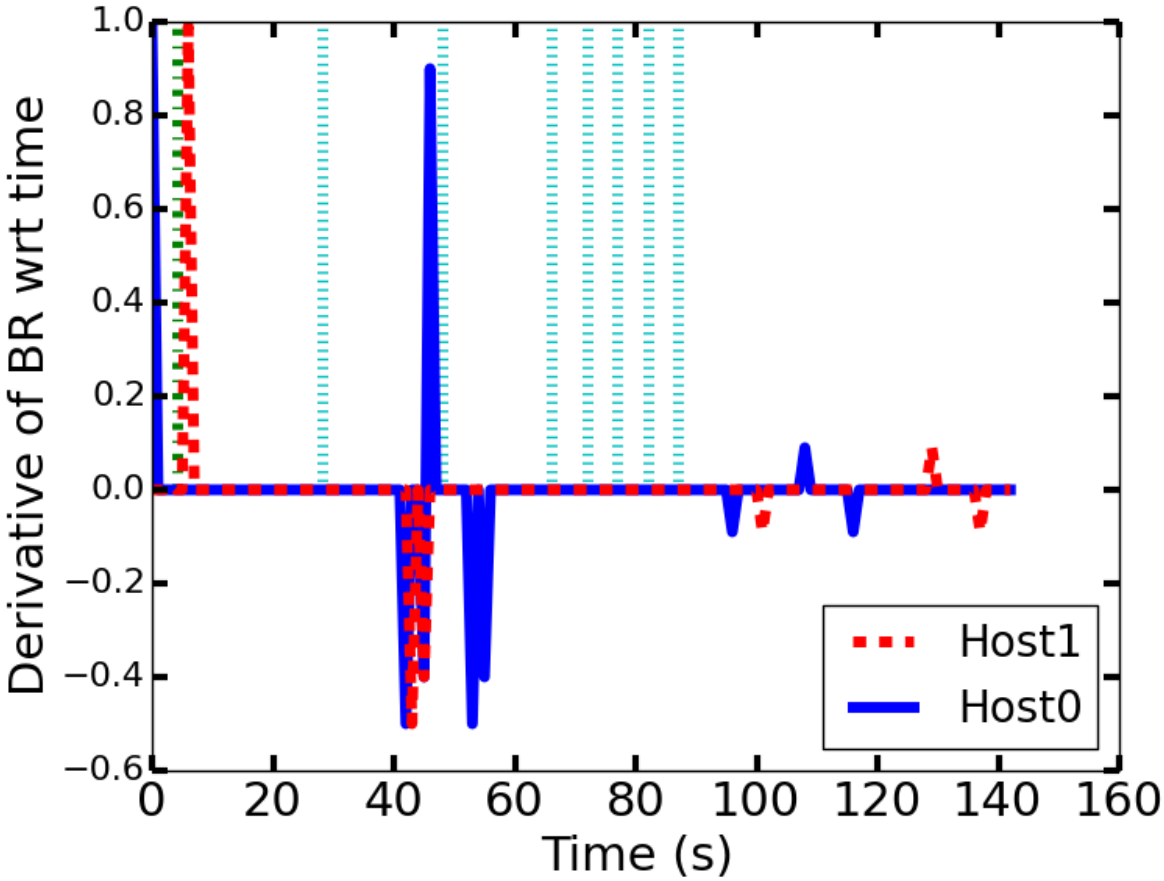


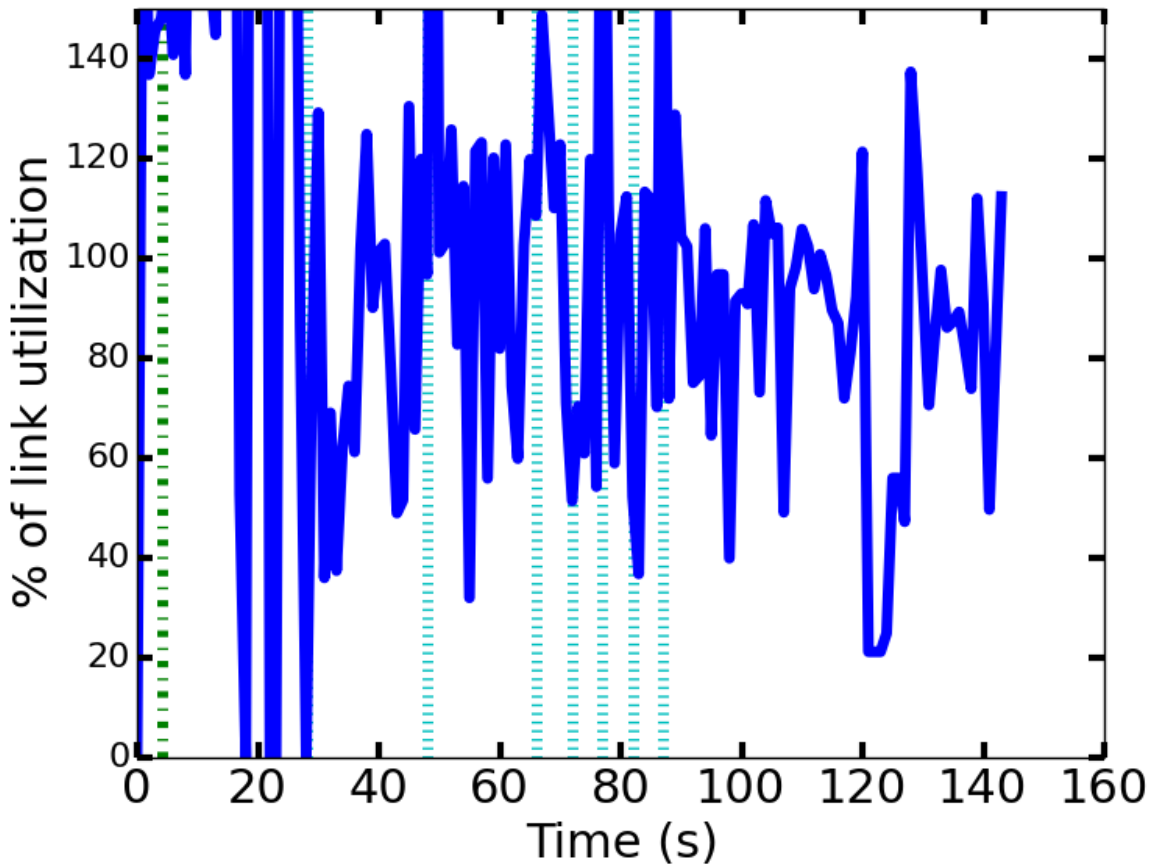

Derivative of BR wrt time
Time (s)
Host1
Host0
1.0
0.5
0.0
−0.5
−1.0
0
50
100
150
200
250


% of link utilization
Time (s)
0
20
40
60
80
100
120
140
0
50
100
150
200
250

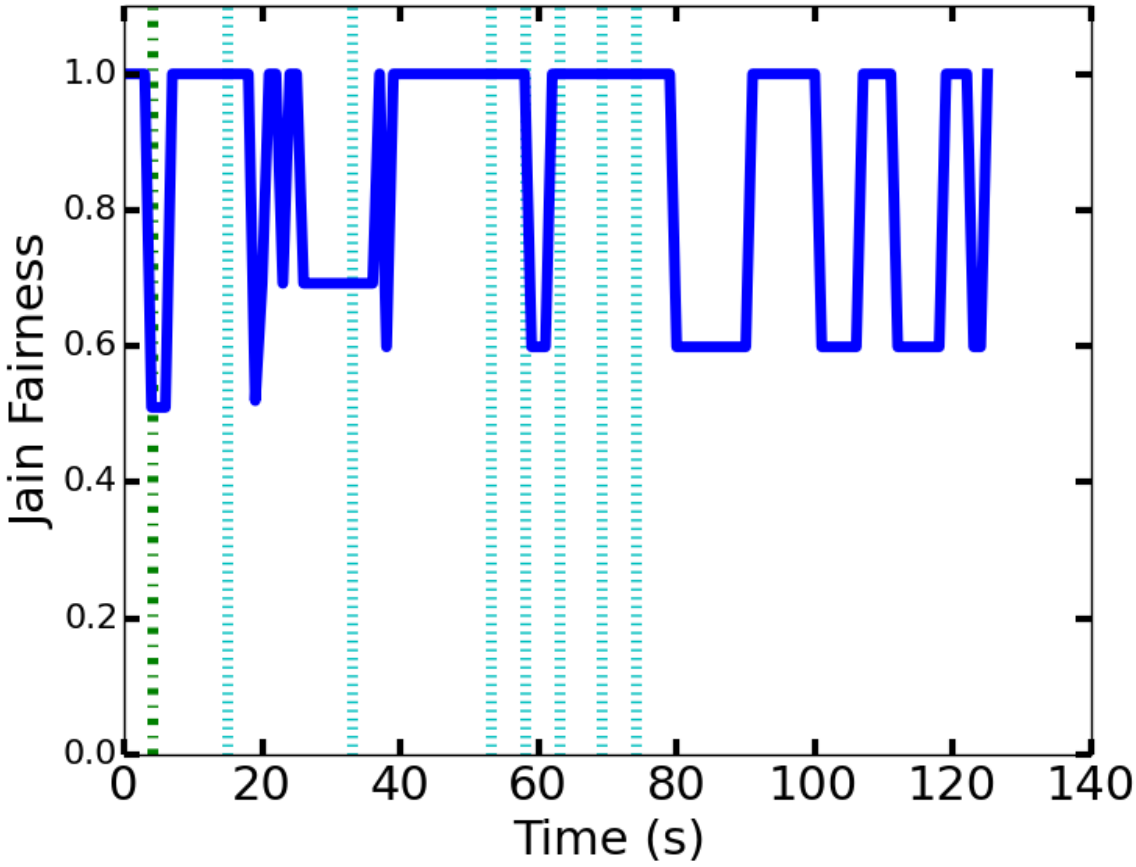
################################ Alpha = 0.5
################################

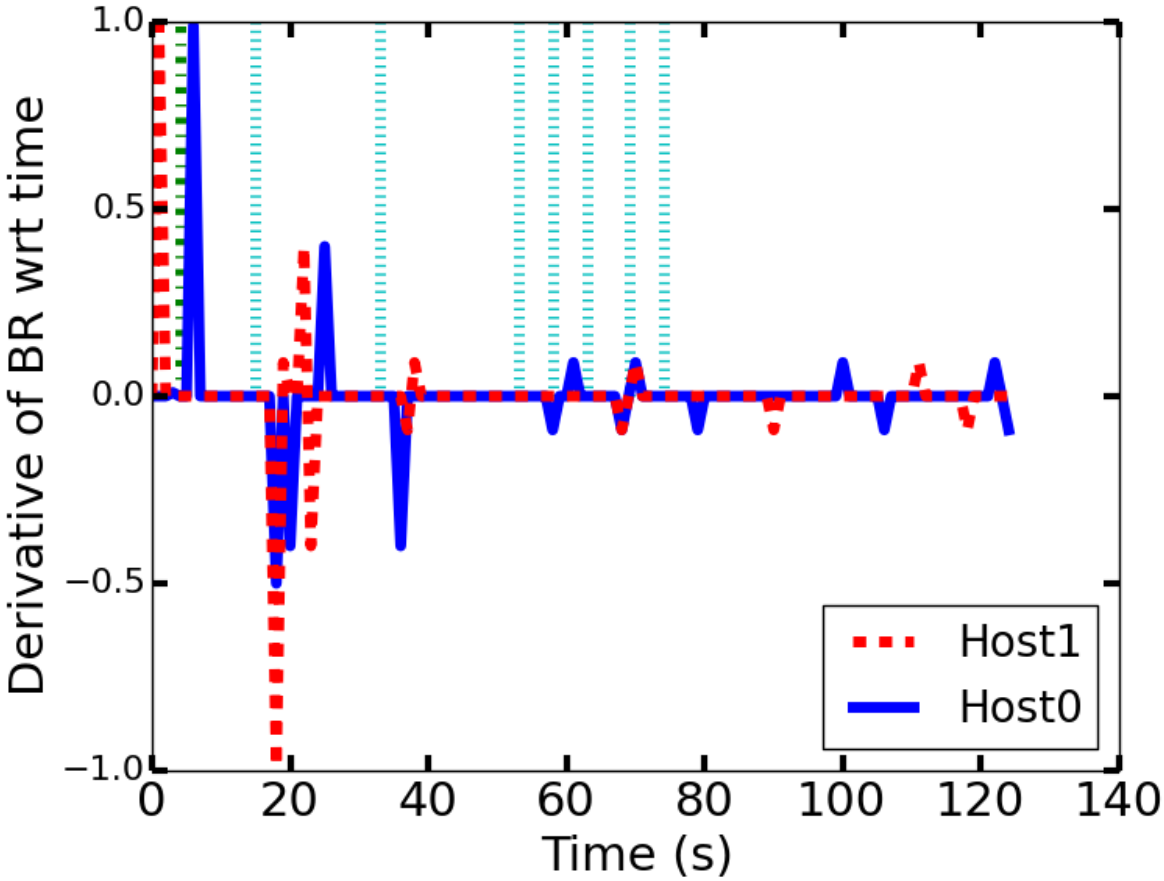

Jain Fairness
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
100
120
140
160
Time (s)

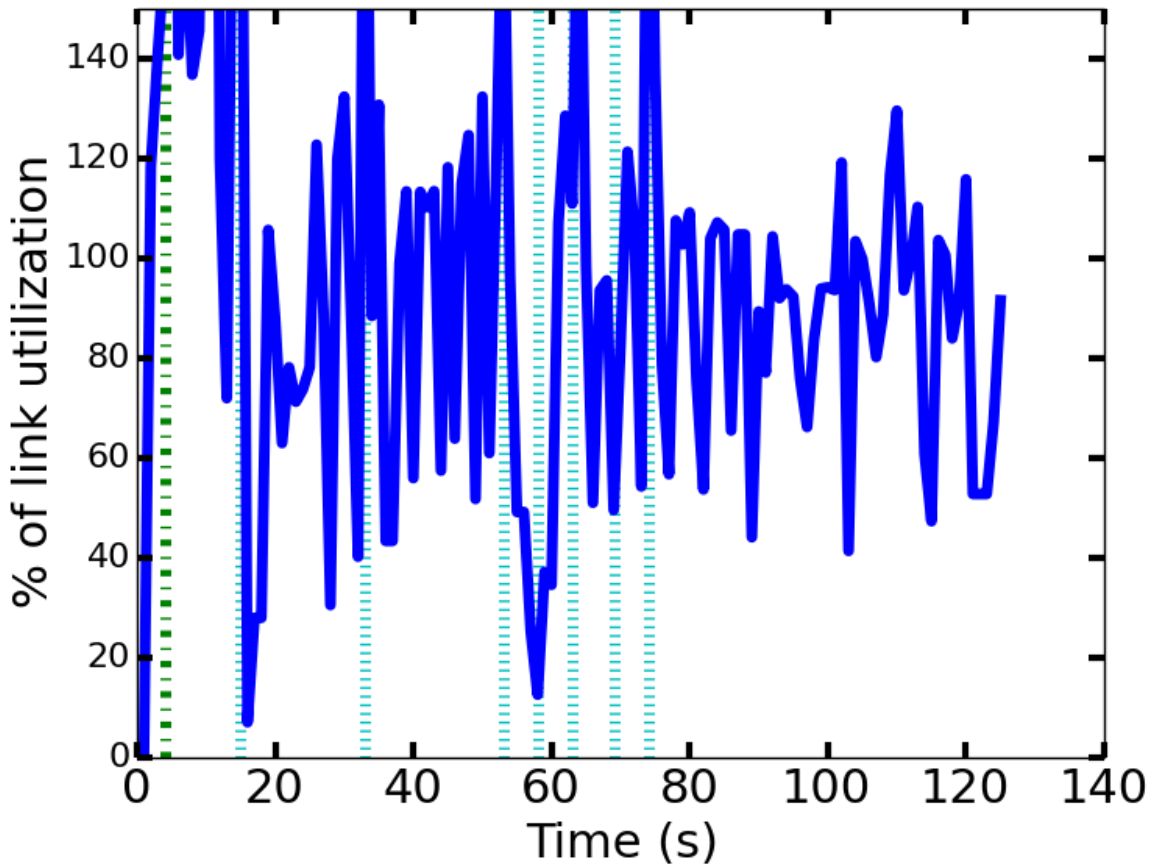

Derivative of BR wrt time
Time (s)
Host1
Host0
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0
20
40
60
80
100
120
140
160


% of link utilization
Time (s)
0
20
40
60
80
100
120
140
160

################################ Alpha = 0.9
################################




Derivative of BR wrt time
Time (s)
Host1
Host0
1.0
0.5
0.0
−0.5
−1.0
0
20
40
60
80
100
120
140


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