**Worksheet 13 - TCP Fairness**

Let’s say there are 2 TCP flows across a bottleneck router whose capacity is maximized when 25 segments are sent across in a RTT.

Note: Assume cwnd is cut to half every time a loss occurs.

1. If one flow is sending 20 segments/RTT and the other is sending 10 segments/RTT, Show how they reach fair bandwidth distribution between the two flows. How many RTTs does it take before fairness is achieved?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Flow 1 | Flow 2 | Total | Flow 1 | Flow 2 | Total |
| 20 | 10 | 30>25 |  |  |  |
| 10 | 5 | 15<25 |  |  |  |
| 11 | 6 | 17<25 |  |  |  |
| 12 | 7 | 19<25 |  |  |  |
| 13 | 8 | 21<25 |  |  |  |
| 14 | 9 | 23<25 |  |  |  |
| 15 | 10 | 25=25 |  |  |  |
| 16 | 11 | 27>25 |  |  |  |
| 8 | 5 | 13<25 |  |  |  |
| 9 | 6 | 15<25 |  |  |  |
| 10 | 7 | 17<25 |  |  |  |
| 11 | 8 | 19<25 |  |  |  |
| 12 | 9 | 21<25 |  |  |  |
| 13 | 10 | 23<25 |  |  |  |
| 14 | 11 | 25=25 |  |  |  |
| 15 | 12 | 27>25 |  |  |  |
| 7 | 6 |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

1. If one flow is sending 8 segments/RTT and the other is sending 15 segments/RTT, Show how they reach fair bandwidth distribution between the two flows. How many RTTs does it take before fairness is achieved? Assume bottleneck router’s capacity =15

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Flow 1 | Flow 2 | Total | Flow 1 | Flow 2 | Total |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |