COMP 6461 – PROGRAMMING ASSIGNMENT 3

Name: Chenglong Zhang

Liu Sun

* Depend on drop rate

For the different drop rate, the ratio of the minimum number of packets required to send the file to the number of packets actually sent for each window size shows as below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **drop** | **1** | **3** | **5** | **7** | **9** | **11** | **13** | **15** | **17** | **19** |
| 5% | 0.940 | 0.927 | 0.464 | 0.900 | 0.122 | 1.000 | 0.351 | 0.971 | 0.734 | 0.092 |
| 10% | 0.890 | 0.699 | 0.188 | 1.000 | 0.338 | 0.367 | 0.135 | 0.155 | 0.073 | 0.080 |
| 15% | 0.837 | 0.927 | 0.175 | 0.346 | 0.112 | 0.100 | 0.302 | 0.140 | 0.067 | 0.060 |
| 20% | 0.847 | 0.342 | 0.171 | 0.250 | 0.204 | 0.104 | 0.102 | 0.106 | 0.172 | 0.065 |
| 25% | 0.732 | 0.342 | 0.243 | 0.111 | 0.130 | 0.144 | 0.082 | 0.100 | 0.059 | 0.079 |
| 30% | 0.682 | 0.342 | 0.158 | 0.186 | 0.117 | 0.096 | 0.099 | 0.094 | 0.067 | 0.094 |
| 35% | 0.632 | 0.342 | 0.143 | 0.168 | 0.107 | 0.100 | 0.092 | 0.111 | 0.064 | 0.069 |
| 40% | 0.614 | 0.342 | 0.132 | 0.136 | 0.117 | 0.195 | 0.066 | 0.084 | 0.089 | 0.044 |
| 45% | 0.545 | 0.342 | 0.277 | 0.186 | 0.107 | 0.120 | 0.079 | 0.074 | 0.073 | 0.070 |
| 50% | 0.473 | 0.342 | 0.205 | 0.110 | 0.080 | 0.086 | 0.085 | 0.075 | 0.052 | 0.039 |

* Depend on delay rate

For the different delay rate, the ratio of the minimum number of packets required to send the file to the number of packets actually sent for each window size shows as below :

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **delay** | **3** | **5** | **7** | **9** | **11** | **13** | **15** | **17** | **19** |
| 5% | 0.258 | 0.243 | 0.857 | 0.222 | 1.000 | 0.791 | 0.139 | 0.810 | 0.245 |
| 10% | 0.127 | 0.214 | 1.000 | 0.193 | 0.579 | 0.557 | 0.149 | 0.198 | 0.069 |
| 15% | 0.177 | 0.122 | 0.170 | 0.143 | 0.105 | 0.132 | 0.270 | 0.160 | 0.106 |
| 20% | 0.213 | 0.142 | 0.106 | 0.324 | 0.094 | 0.101 | 0.098 | 0.090 | 0.064 |
| 25% | 0.132 | 0.150 | 0.165 | 0.136 | 0.091 | 0.099 | 0.103 | 0.103 | 0.065 |
| 30% | 0.137 | 0.247 | 0.240 | 0.082 | 0.088 | 0.089 | 0.089 | 0.076 | 0.070 |
| 35% | 0.120 | 0.146 | 0.171 | 0.106 | 0.194 | 0.098 | 0.101 | 0.089 | 0.060 |
| 40% | 0.141 | 0.132 | 0.101 | 0.124 | 0.091 | 0.121 | 0.077 | 0.070 | 0.055 |
| 45% | 0.132 | 0.112 | 0.122 | 0.113 | 0.089 | 0.083 | 0.079 | 0.061 | 0.058 |
| 50% | 0.129 | 0.116 | 0.102 | 0.096 | 0.088 | 0.085 | 0.097 | 0.070 | 0.061 |

From the graphs, which are more straightforward, we can see that with higher drop (delay) rate, the ratio become lower. Since it means the sender need to send more packets due to router drop (delay) some packets. This situation become worse when the window size is large. Since with a larger window size, the sender need to resent more packets.

It is obvious that in the drop rate case, with the window size is 1, the situation is much better, because if the router drop a packet, the sender only need to resent one packet. But for window size which is bigger than 1, the sender may resent packets as many as the number of window size once it timeout or receive a NCK.