Test and Analysis

(I used 50k bytes file to do the final test and import filecmp to compare input file and output file bit by bit. According to the test result below, the program works well.)

1. Output and result under fixed Average Delay = 100 msec

1) Loss rate = 0%

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 11.274 secs
nput and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 10.676 secs
nput and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 10.676 secs
nput and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 10.127 secs
nput and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 9.705 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 10.684 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 10.684 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
ploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
iFTP: file sent successfully to 127.0.0.1 in 10.684 secs
Input and output file are same? True

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2) Loss rate = 5%

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 15.882 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1
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Uploading the file inputfile.txt by using sFTP to the target server 127.0.0

3) Loss rate = 10%

D:\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 15.135 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 15.135 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 16.870 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 19.212 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 16.870 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 15.15 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 16.870 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication networkopy SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 16.870
secs
Input and output file

4) Loss rate = 15%

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1

Dioading the file inputfile.txt by using sFIP to the target server 127.0.0.1, 9993

SFIP: file sent successfully to 127.0.0.1 in 17.038 secs
Input and output file are same? True

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Statistics and Graph

Fixed average delay	to 100m	ns										
Loss Rate		File transfer time (sec)										AverageFile transfer time (sec)
	0%	11.274	10.676	10.127	9.577	10.409	9.982	9.705	9.919	10.684	10.702	10.3055
	5%	15.882	15.965	13.733	16.792	21.338	17.837	17.82	13.636	17.497	14.958	16.5458
	10%	15.135	16.87	19.212	25.483	23.483	14.972	18.676	16.11	23.242	21.272	19.4455
	15%	17.038	26.7	30.882	25.889	40.184	35.922	28.145	29.201	17.23	29.377	28.0568



When the average delay is fixed, the higher loss rate it has, the longer file transfer time it takes. The file transfer time is almost proportional to the loss rate.

2. Output and result under fixed Loss Rate = 10%

1) Average Delay = 50 msec

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 13.841 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 14.817 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 10.194 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 10.194 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 19.101 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 16.938 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully to 127.0.0.1 in 16.938 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9993
sFTP: file sent successfully

2) Average Delay = 100 msec

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1

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Jploading the file inputfile.txt by using sFTP to the target server 127.0.0.1

Jploading the file inputfile.txt by using sFTP to the target server 127.0.0.1

Jploading the file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1

Jploading the file inputfile.txt by us

3) Average Delay = 200 msec

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 39.160 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 29.902 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 29.902 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 35.723 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 35.723 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 29.477 secs
Input and output file are same? True

D:\Dropbox\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, sFTP: file sent successfully to 127.0.0.1 in 35.065 secs
Input and output file are same? True

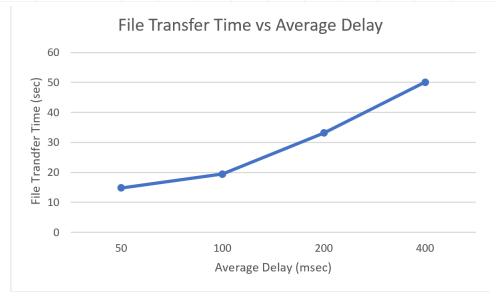
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4) Average Delay = 400 msec

D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1 Uploading the file inputfile.txt by using sFIP to the target server 127.0.0.1, 9 sFIP: file sent successfully to 127.0.0.1 in 42.150 secs Input and output file are same? True	<pre>D:\Dropbox\Dropbox\Computer communication network>py 5ftpClient.py 127.0.0.1 093 Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093 sFTP: file sent successfully to 127.0.0.1 in 52.191 secs Input and output file are same? True</pre>
D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1 Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9 sFTP: file sent successfully to 127.0.0.1 in 48.823 secs Input and output file are same? True	D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1 093 Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093 sFTP: file sent successfully to 127.0.0.1 in 50.539 secs Input and output file are same? True
D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1	D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9	093 Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 49.663 secs	sFTP: file sent successfully to 127.0.0.1 in 50.877 secs
Input and output file are same? True	Input and output file are same? True
D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1	D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9	093 Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
sFTP: file sent successfully to 127.0.0.1 in 46.070 secs	sFTP: file sent successfully to 127.0.0.1 in 52.787 secs
Input and output file are same? True	Input and output file are same? True
D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1	D:\Dropbox\Dropbox\Computer communication network>py SftpClient.py 127.0.0.1
Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9	093 Uploading the file inputfile.txt by using sFTP to the target server 127.0.0.1, 9093
SFTP: file sent successfully to 127.0.0.1 in 54.515 secs	sFTP: file sent successfully to 127.0.0.1 in 52.974 secs
Input and output file are same? True	Input and output file are same? True

Statistics and Graph

Fixed loss rate to 10%											
Average delay	File transfer ti Chart Title										
50	13.841	14.817	11.141	14.091	13.991	9.805	10.194	19.101	16.938	24.048	14.7967
100	15.135	16.87	19.212	25.483	23.483	14.972	18.676	16.11	23.242	21.272	19.4455
200	39.16	29.902	35.723	26.594	36.578	33.717	36.637	29.477	35.065	28.522	33.1375
400	42.15	48.823	49.663	46.07	54.515	52.191	50.539	50.877	52.787	52.974	50.0589



From the graph above, we can conclude that average delay also affects the file transfer time. The file transfer time will increase dramatically if the transfer system has a higher delay.