

# Experiment Report of Assignment 2 (CS656)

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## Data and plots

The experiments are performed on the cs ubuntu server 002, 004, and 008.

Transmission time of file "small.txt".

Case	Maximum Delay (ms)	Packet Discard Probability	Transmission time 1 (s)	Transmission time 2 (s)	Transmission time 3 (s)	avg time (s)
Baseline	0	0	0.1062	0.1386	0.1241	0.12296667
No Delay 1	0	0.1	1.4573	1.4599	1.4633	1.46016667
No Delay 2	0	0.2	2.1633	2.1289	2.1752	2.1558
No Delay 3	0	0.3	3.8468	3.8944	3.8862	3.8758
No Delay 4	0	0.4	5.6647	5.6548	5.6768	5.66543333
No Delay 5	0	0.5	7.1695	7.18	7.1972	7.18223333
No Discard 1	10	0	0.2521	0.2523	0.247	0.25046667
No Discard 2	20	0	0.3997	0.3997	0.3996	0.39966667
No Discard 3	30	0	0.5613	0.5607	0.5601	0.5607
No Discard 4	40	0	0.7208	0.7207	0.721	0.72083333
No Discard 5	50	0	0.9671	0.9779	1.0046	0.9832
Delay and Discard 1	20	0.1	2.190608756	2.205172827	2.195787548	2.19718971
Delay and Discard 2	20	0.2	3.242681589	3.231491699	3.233260115	3.23581113
Delay and Discard 3	20	0.3	5.540601407	5.538599033	5.526286442	5.53516229
Delay and Discard 4	40	0.1	3.071301856	3.072128988	3.337556239	3.16032903
Delay and Discard 5	40	0.2	4.548419854	4.549772267	4.475922243	4.52470479
Delay and Discard 6	40	0.3	7.383497346	7.234449477	7.382451801	7.33346621

Transmission time of file "medium.txt".

Case	Maximum Delay (ms)	Packet Discard Probability	Transmission time 1 (s)	Transmission time 2 (s)	Transmission time 3 (s)	avg time (s)
Baseline	0	0	0.430760653	0.471591407	0.504591168	0.46898108
No Delay 1	0	0.1	7.195570335	7.221720216	7.314707186	7.24399925
No Delay 2	0	0.2	13.04827685	13.17074783	13.57422741	13.2644174
No Delay 3	0	0.3	26.19173279	26.1838537	26.12795673	26.1678477
No Delay 4	0	0.4	31.65447893	32.16436263	29.99053826	31.2697933
No Delay 5	0	0.5	47.13358569	47.31911231	47.11308027	47.1885928
No Discard 1	10	0	1.162319537	1.156501118	1.139724115	1.15284826
No Discard 2	20	0	2.031924636	2.024768379	2.023314797	2.02666927
No Discard 3	30	0	2.902857526	2.896125725	2.92643572	2.90847299
No Discard 4	40	0	3.782580483	3.782395514	3.782834588	3.78260353
No Discard 5	50	0	5.017146684	5.459023958	5.412426885	5.29619918
Delay and Discard 1	20	0.1	11.07389778	11.07316111	11.108629	11.0852293
Delay and Discard 2	20	0.2	19.41418609	19.4441773	19.42661066	19.4283247
Delay and Discard 3	20	0.3	37.25055063	37.26398726	37.32162363	37.2787205
Delay and Discard 4	40	0.1	15.56086821	15.72375106	15.70718564	15.663935
Delay and Discard 5	40	0.2	26.04684381	25.55920632	26.06626394	25.8907714
Delay and Discard 6	40	0.3	49.89332795	49.95869973	49.85281108	49.9016129

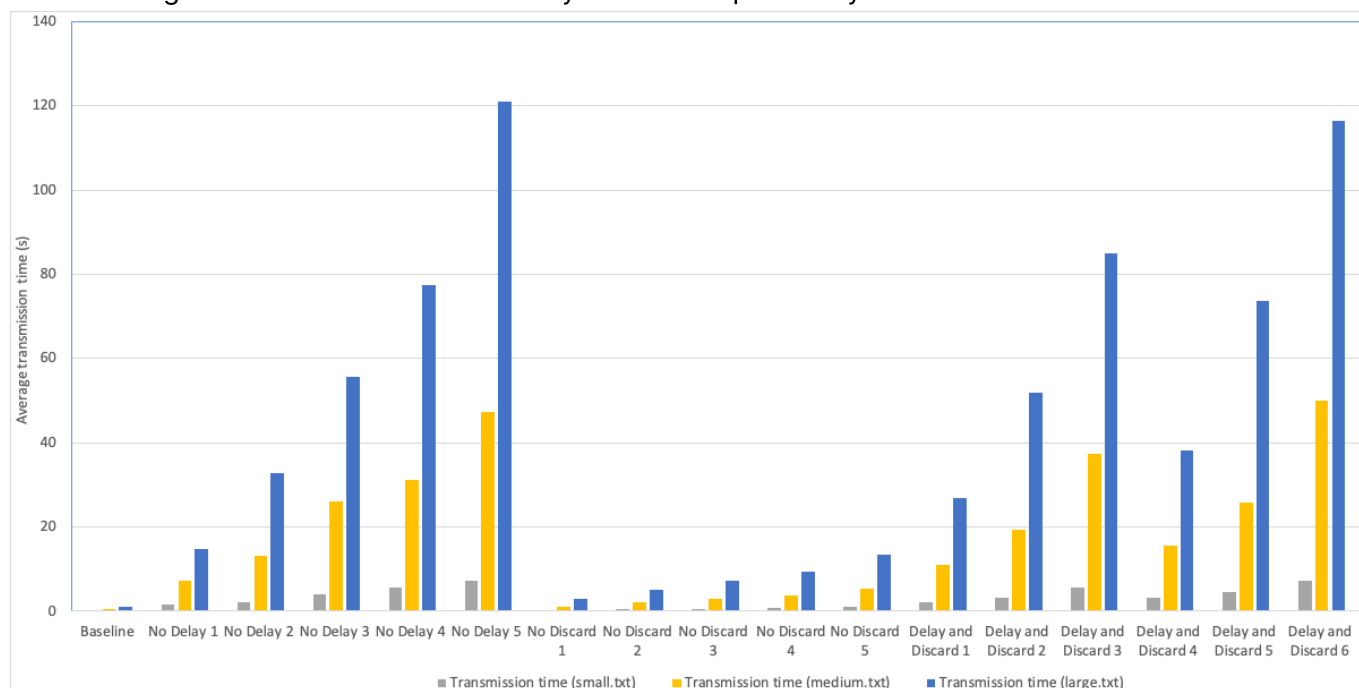
Transmission time of file "large.txt".

Case	Maximum Delay (ms)	Packet Discard Probability	Transmission time 1 (s)	Transmission time 2 (s)	Transmission time 3 (s)	avg time (s)
Baseline	0	0	1.040163033	1.18695398	1.02769619	1.08493773
No Delay 1	0	0.1	14.7115328	14.49247779	15.17769897	14.7939032
No Delay 2	0	0.2	31.86403312	33.06120576	33.54358245	32.8229404
No Delay 3	0	0.3	56.02853274	55.20687461	55.81055633	55.6819879
No Delay 4	0	0.4	76.54311627	77.94765805	77.51151147	77.3340953
No Delay 5	0	0.5	120.7720695	120.7994712	121.2004747	120.924005
No Discard 1	10	0	2.942545109	2.885851673	2.86446266	2.89761981
No Discard 2	20	0	5.050148368	5.085442775	5.046547829	5.06071299
No Discard 3	30	0	7.219393244	7.216961256	7.222205788	7.2195201
No Discard 4	40	0	9.409149756	9.401015546	9.406812653	9.40565932
No Discard 5	50	0	13.42939093	13.31236425	13.63530546	13.4590202
Delay and Discard 1	20	0.1	26.7685724	26.81210067	26.82788684	26.8028533
Delay and Discard 2	20	0.2	51.97891399	52.03985752	51.98866871	52.0024801
Delay and Discard 3	20	0.3	85.08227785	84.98553301	84.79967819	84.9558297
Delay and Discard 4	40	0.1	37.89045712	38.11096088	38.11762481	38.0396809
Delay and Discard 5	40	0.2	71.3398939	71.09532519	78.50347372	73.6462309
Delay and Discard 6	40	0.3	114.0499814	113.8466216	121.1808725	116.359159

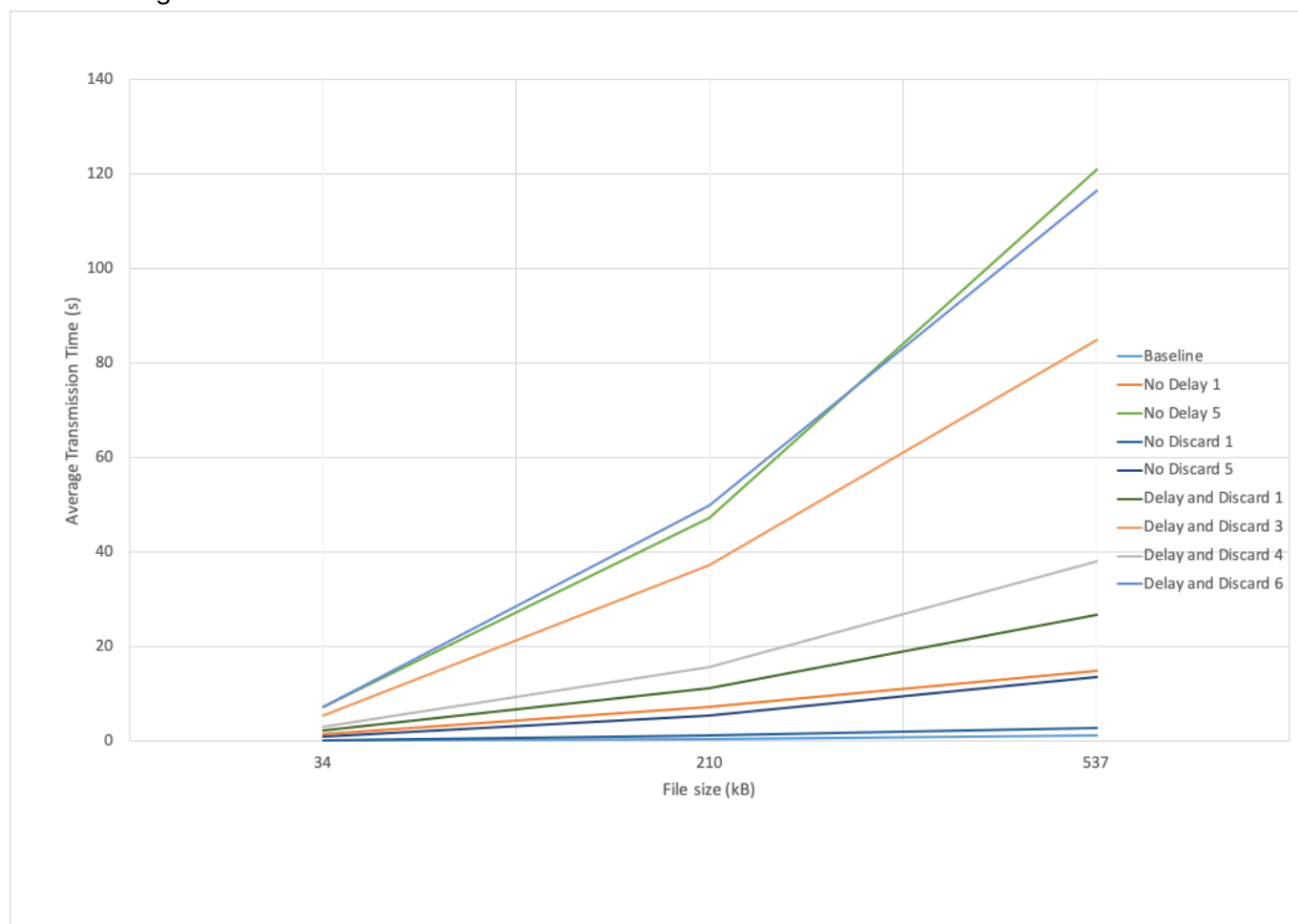
## Average transmission time of three files.

Case	Maximum Delay (ms)	Packet Discard Probability	Transmission time (small.txt)	Transmission time (medium.txt)	Transmission time (large.txt)
Baseline	0	0	0.122966667	0.468981076	1.084937734
No Delay 1	0	0.1	1.460166667	7.243999246	14.79390319
No Delay 2	0	0.2	2.1558	13.26441736	32.82294045
No Delay 3	0	0.3	3.8758	26.16784774	55.68198789
No Delay 4	0	0.4	5.665433333	31.26979327	77.33409527
No Delay 5	0	0.5	7.182233333	47.18859276	120.9240051
No Discard 1	10	0	0.250466667	1.152848257	2.897619814
No Discard 2	20	0	0.399666667	2.026669271	5.060712991
No Discard 3	30	0	0.5607	2.90847299	7.219520096
No Discard 4	40	0	0.720833333	3.782603529	9.405659318
No Discard 5	50	0	0.9832	5.296199176	13.45902021
Delay and Discard 1	20	0.1	2.19718971	11.0852293	26.8028533
Delay and Discard 2	20	0.2	3.235811134	19.42832468	52.00248007
Delay and Discard 3	20	0.3	5.535162294	37.27872051	84.95582969
Delay and Discard 4	40	0.1	3.160329028	15.66393497	38.03968094
Delay and Discard 5	40	0.2	4.524704788	25.89077136	73.64623094
Delay and Discard 6	40	0.3	7.333466208	49.90161292	116.3591585

## Plot of average transmission time versus delay and discard probability.



Plot of average transmission time versus file size.



## Discussions

- The transmission time linearly increases with delay.
- The transmission time exponentially increases with packet discard probability. With the same delay and file size, the transmission time almost doubled when increasing the discard probability by 0.1.
- The transmission time increases with the file size. The increase is almost linear, but a conclusion cannot be made due to lack of enough data points.