CS 765 Assignment 3

Building a layer 2 Dapp on top of Blockchain

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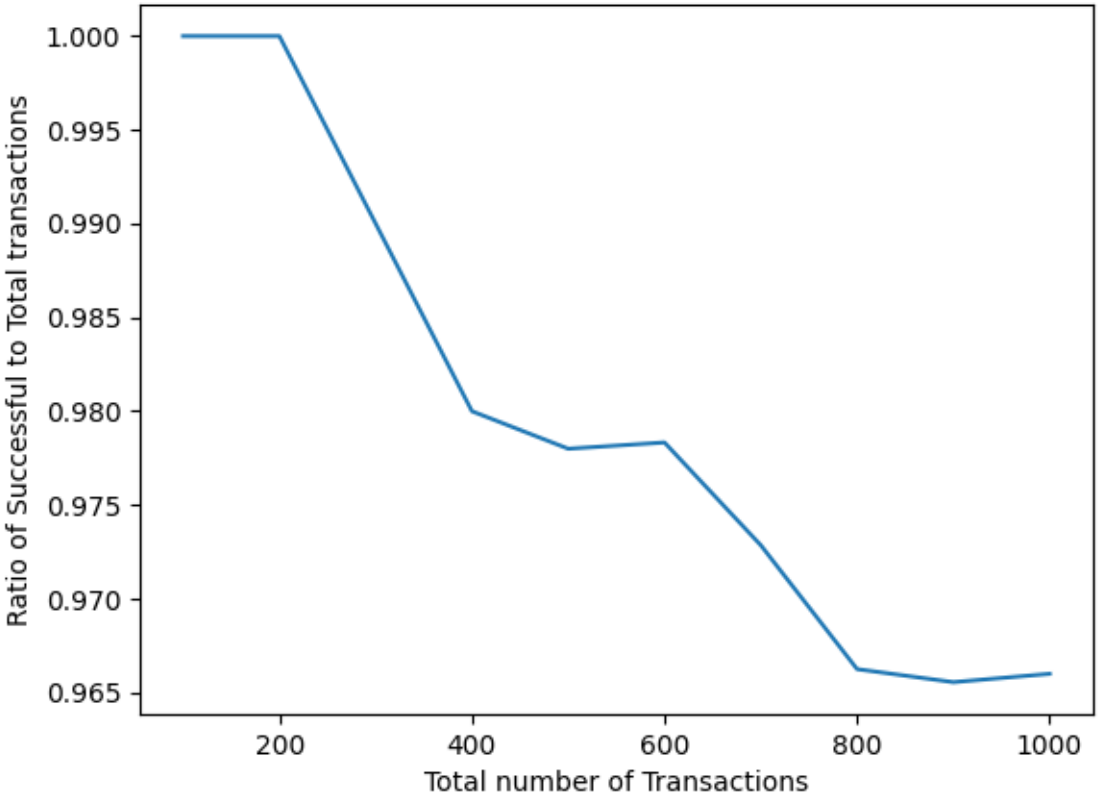
Data

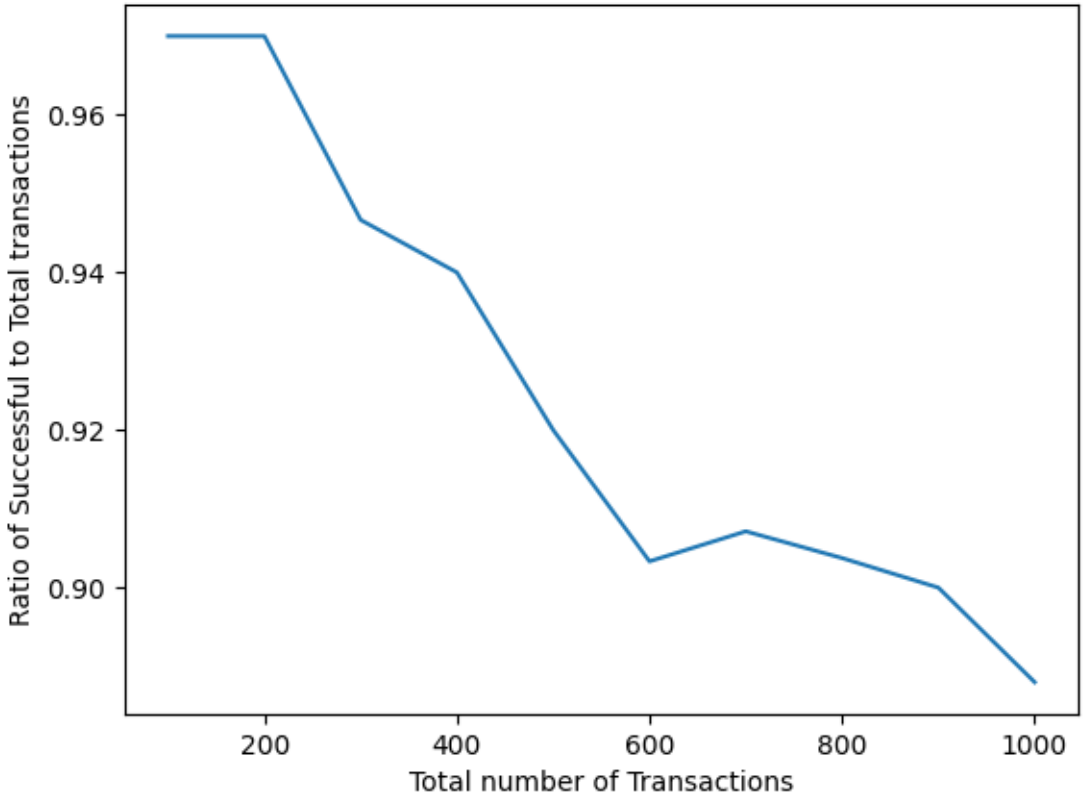
Running the simulation for mean of exponential distribution = 10

Successful Transactions	Total Transactions	Ratio
100	100	1.000000
200	200	1.000000
297	300	0.990000
392	400	0.980000
489	500	0.978000
587	600	0.978333
681	700	0.973857
773	800	0.966250
869	900	0.965555
966	1000	0.966000



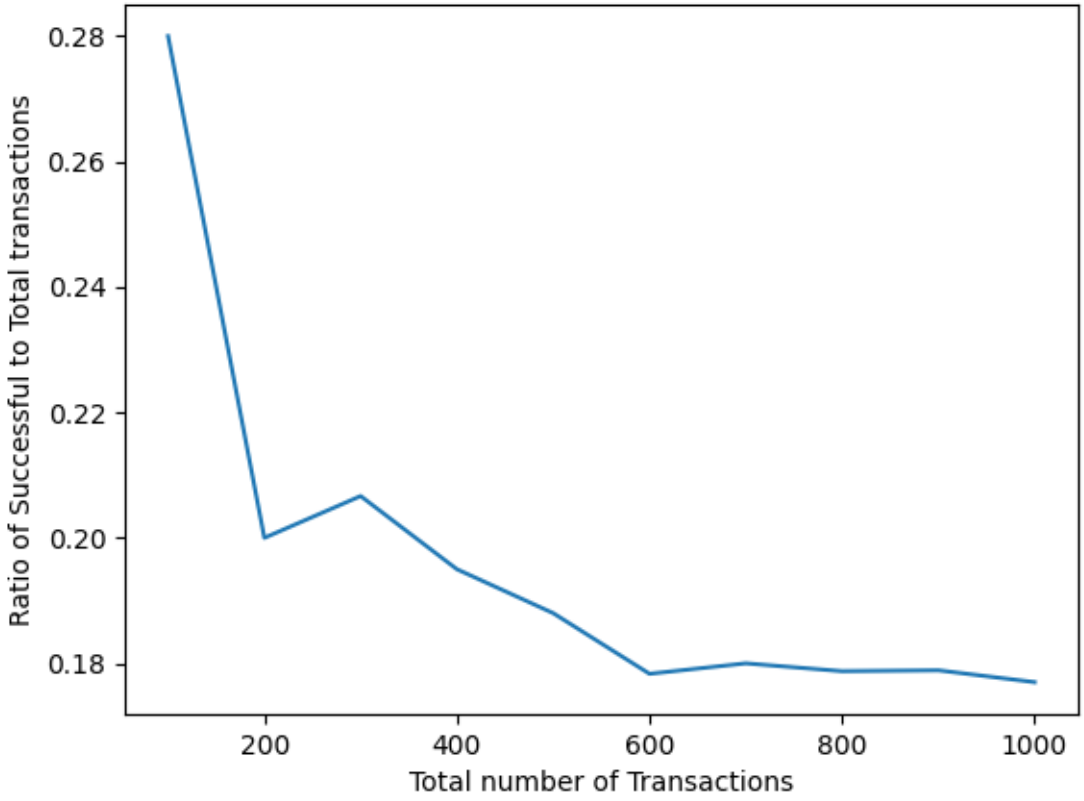
Running the simulation for mean of exponential distribution = 5

Successful Transactions	Total Transactions	Ratio
97	100	0.970000
194	200	0.970000
284	300	0.946666
376	400	0.940000
460	500	0.920000
542	600	0.903333
635	700	0.907143
723	800	0.903750
810	900	0.900000
888	1000	0.888000



Running the simulation for mean of exponential distribution = 1

Successful Transactions	Total Transactions	Ratio
28	100	0.280000
40	200	0.200000
62	300	0.206666
78	400	0.195000
94	500	0.188000
107	600	0.178333
126	700	0.180000
143	800	0.178750
161	900	0.178888
177	1000	0.177000



Observations

We see that for all three experiments the ratio of successful to total transactions decreases as the total number of transactions increases. This is because as time goes on, the possibility that at least one of the nodes involved in a path between any two users has achieved a balance of 0 increases, which is why the overall shape of the graph is similar for all three cases.

The difference in the graphs in the scale of the y axis. As the mean decreases from 10 to 5 to 1, we see that the number of successful transactions also decreases, starting out with a total of 966 successes when the mean is 10, 888 successes when the mean is reduced to 5 and only 177 when the mean is 1, out of a total of 1000 transactions. If the nodes start out with a lower balance, they are likely to achieve a 0 balance more quickly compared to nodes that start out with higher balances, since the transaction amount is fixed at 1 coin.

More results for mean=10 are present in the results.txt file present in the submission.