

Result Analysis Document

Eshwar Reddy Pasula (830531654), Gayatri Pendharkar (830670002)

The results have been calculated for two different scales of network 20 and 80 nodes. For following different combinations:

# of Nodes in the Network	# of Entries (each node)	# of entries each node can cache
20	8	2
80	2	1,2,4

Each network has been simulated for a value of $s = 0.2, 0.6, 0.8$ which will determine the stepping for the zipf distribution. The zipf distribution will determine the popularity of the queries in the network. As caching has been implemented for this lab, we will compare the results from the previous lab (without caching).

RESULTS FOR 20 Node Network and CACHING WITH CACHE SIZE $N_c = 2$:

	LAB3 (no caching)	LAB4 (caching)		
	$S=0.8$	$S=0.2$	$S=0.6$	$S=0.8$
Min Latency	7.19E-5	6.77E-6	1.07E-5	8.97E-6
Max Latency	4.2148	4.197859	1.811	3.7798
Std Deviation	0.28411	0.5764308	0.1311	0.3129
Mean Latency	0.0343	0.18592863	0.0247	0.04733
Min Hops	1	1	1	1
Max Hops	3.73684	2.8	3.55	4.1
Std Deviation of Hops	0.736	0.28966648	0.448183	0.459216
Mean of Hops	2.0435	1.084419	1.194	1.1582
Number of messages processed	756	293.15	338.25	320.45
Routing table size	5.368	5.4	5.4	5.4

RESULTS FOR 80 Node Network and CACHING WITH CACHE SIZE $N_c = 2$:

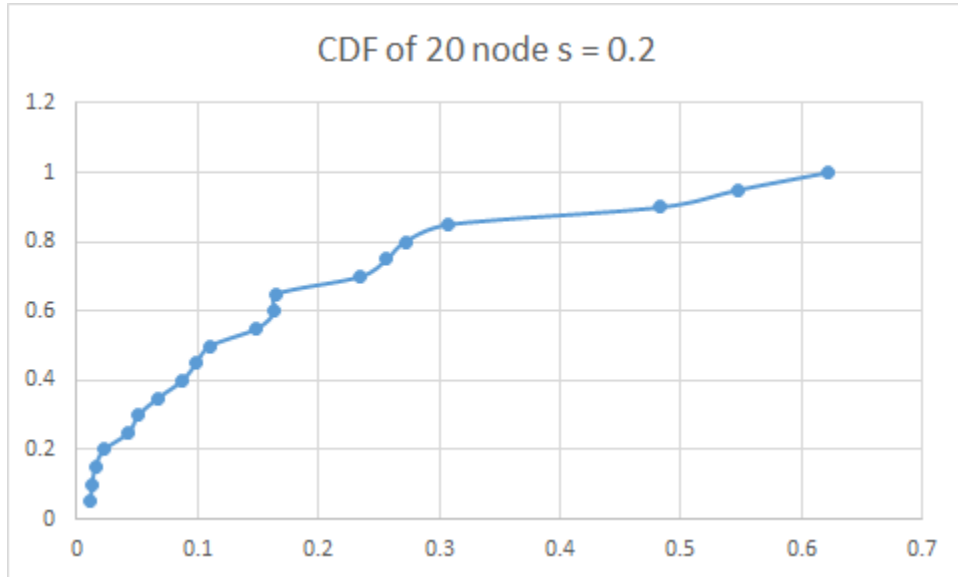
	LAB3 (no caching)	LAB4 (caching)		
	S=0.8	S=0.2	S=0.6	S=0.8
Min Latency	0.000126	1.22E-4	8.37E-5	1.29E-4
Max Latency	2.698585	2.277	1.543	1.6506
Std Deviation	0.1575	0.2188	0.158	0.124766
Mean Latency	0.02170	0.0474	0.0325	0.019262
Min Hops	1.1375	1	1	1
Max Hops	4.4875	7.75	7.9125	7.3
Std Deviation of Hops	0.8375	1.465	1.611	1.4045
Mean of Hops	2.80224	3.1823	3.254	3.0081
Number of messages processed	799.8375	489.2625	463.55	464.1125
Routing table size	5.85	5.85	5.85	5.85

- As seen from the above table, the mean number of hops after performing the caching (Lab4) have been reduced as each node will cache popular query popular. In case of 80 nodes, resources could be found at multiple nodes which result in slight increase in mean hop count.
- Also, with different value of s , the mean latency in the network decreases due to caching.

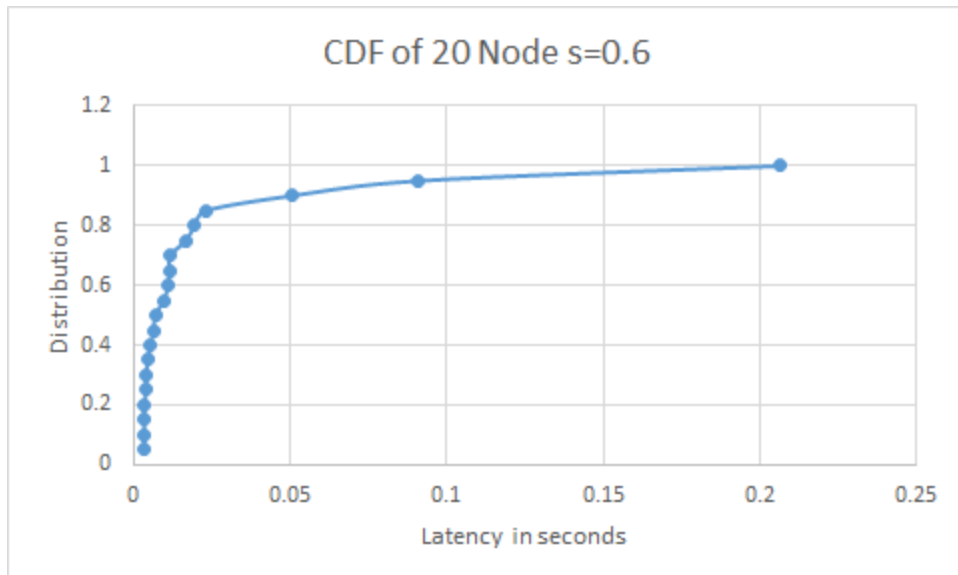
CDF OF LATENCY FOR LAB4 RESULTS:

CDF of LATENCY FOR A 20 NODE NETWORK SCALE (CACHE SIZE = 2):

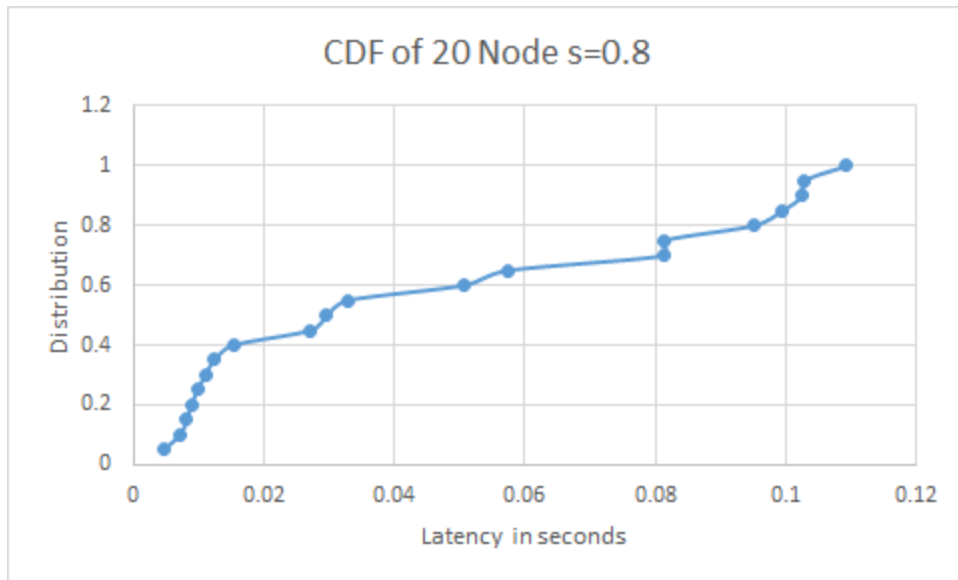
1. $S = 0.2$



2. $S = 0.6$

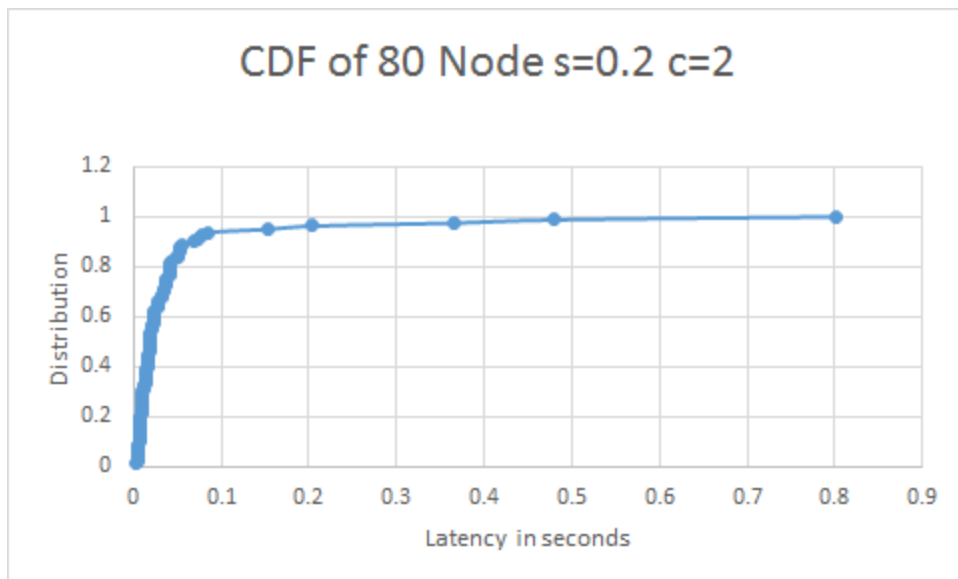


3. $s=0.8$

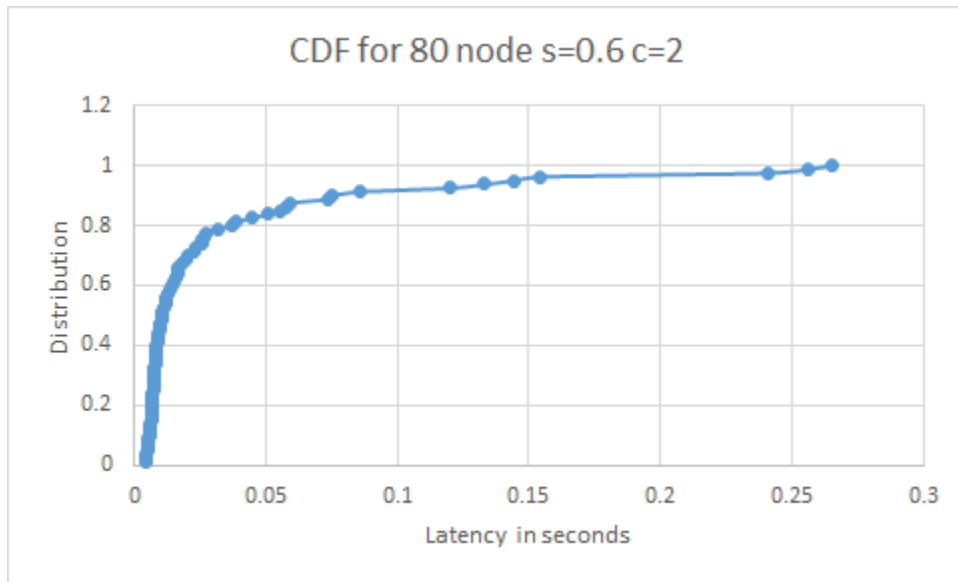


CDF of LATENCY FOR A 80 NODE NETWORK SCALE (CACHE SIZE = 2):

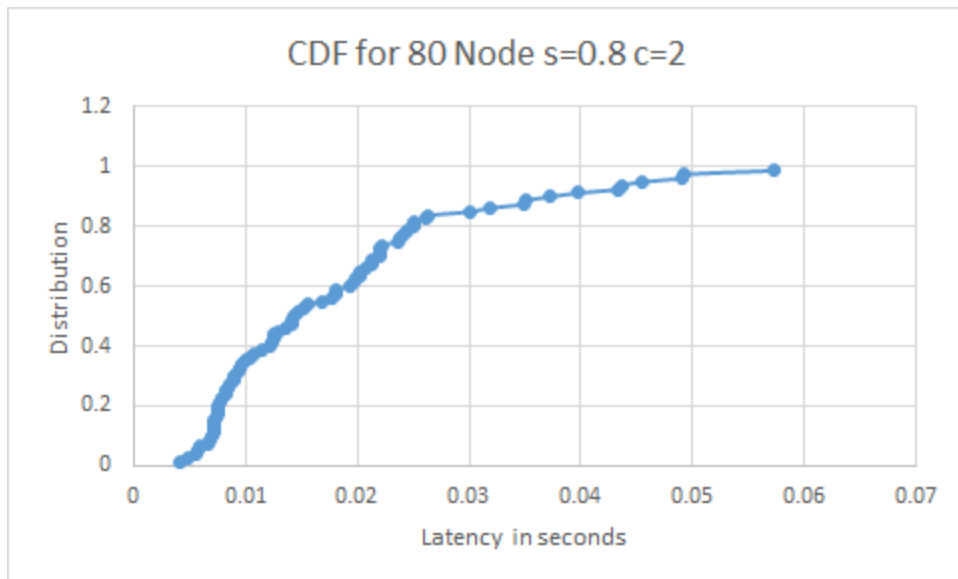
1. $s=0.2$



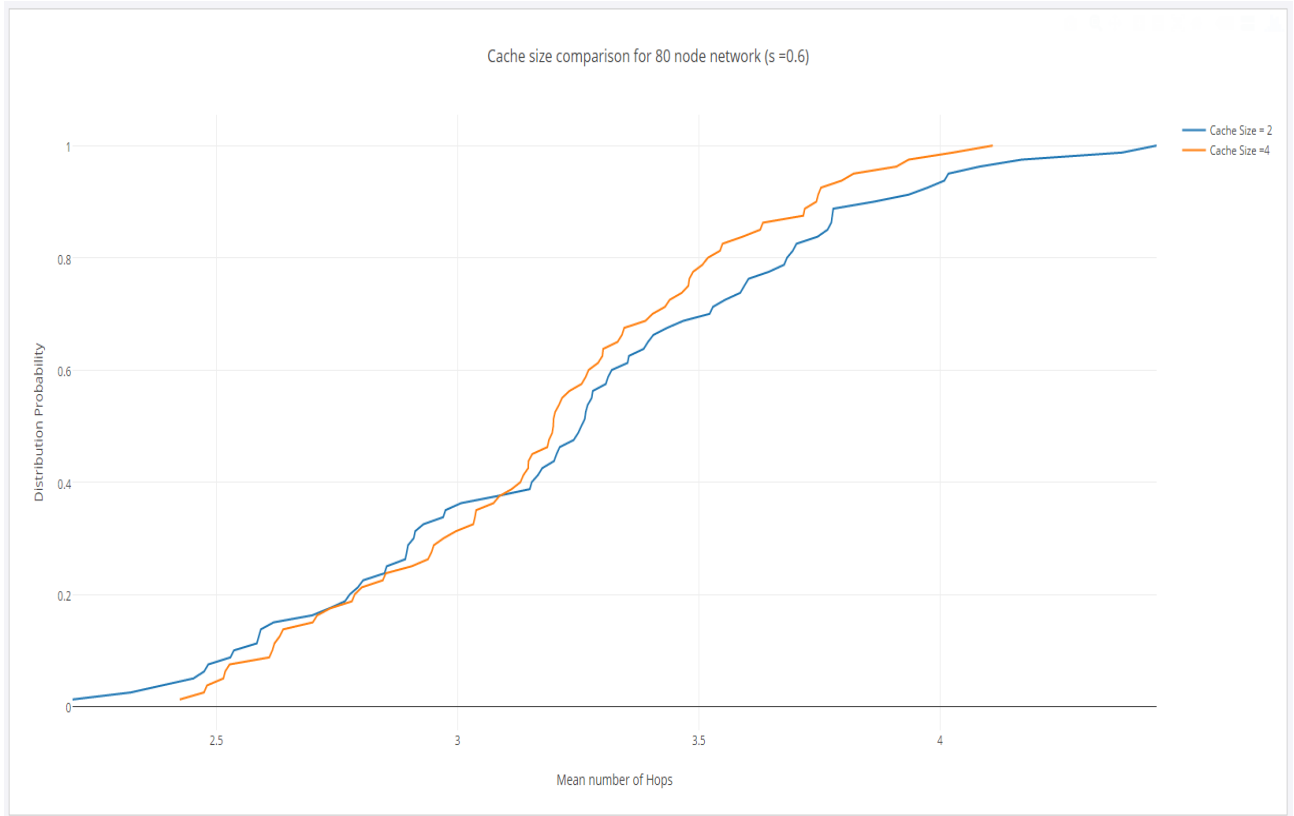
2. $s=0.6$



3. $s=0.8$



CACHE SIZE COMPARISON:



The above graph plots the cache size comparison for 80 node network with cache sizes 2 and 4 for mean number of hops. s is kept constant at 0.6.

As it can be seen, for cache size 4, almost 80 percent of the nodes have a mean hop count less than 3.518

And for cache size 2, almost 20 percent of the nodes have a mean hop count less than 3.6829.

Hence, this graph shows that with increase in cache size, the mean number of hops decreases.