CS550 – Advanced Operating System

Programming Assignment 1

Implementation Details:

The program contains two files index.cpp and peer.cpp.

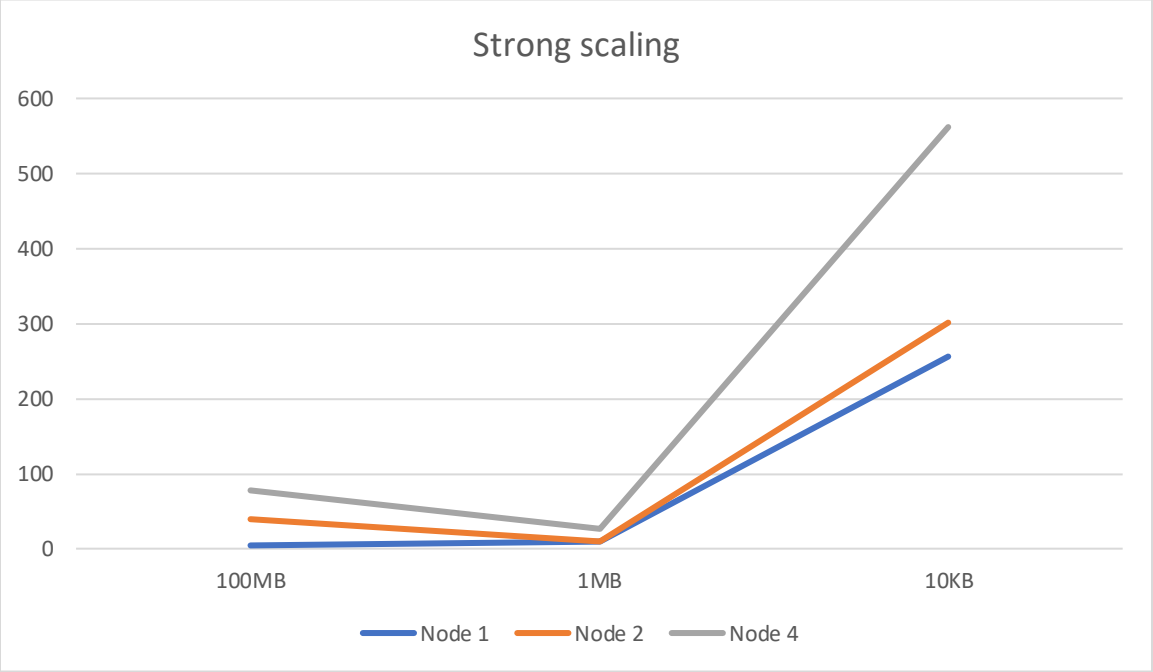
1. Index.cpp : This is the program for the central indexing server. It incorporates two basic features.
   a. It accepts registration from all peers and maintains in a HashMap.
   b. It accepts file requests from all peers and redirects them to the appropriate peer for download.
2. Peer.cpp : This program contains the program for the Peer. It operates on two modes.
   a. Registration Mode: In registration mode it registers all its files with the central indexing server and exits.
   b. Peer Mode: In Peer Mode it acts like a server and a client. As a client it downloads files from other peers. As server it listens to other peers and provides them the file needed.

Test Environment:

Chameleon Cloud: We used 5 M2 instances. One as server and 4 peers.

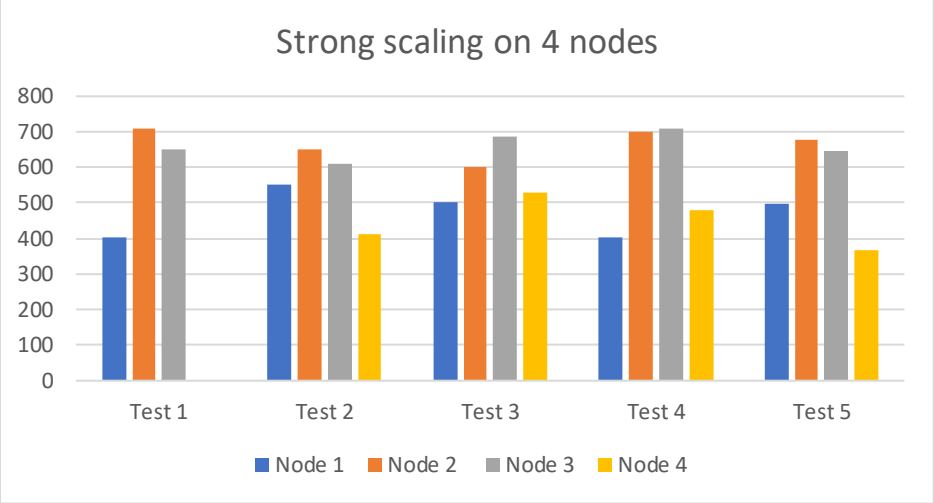
Data: 100K : 10KB text Files, 1K : 1MB text file, 10: 100MB binary file

Strong scaling experiment:

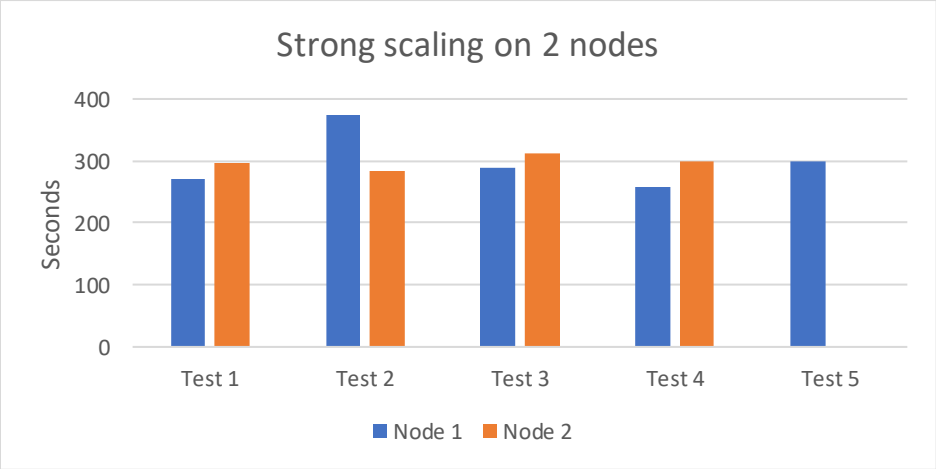


100K small files (10KB)

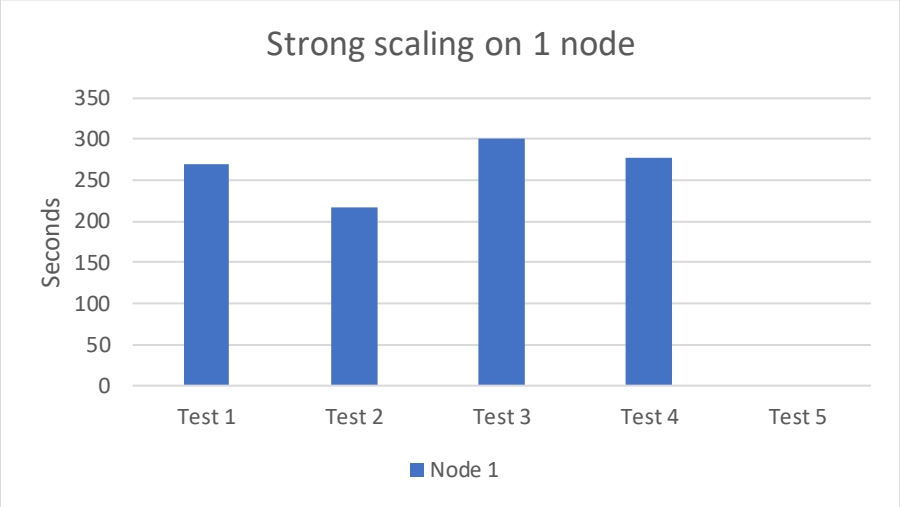
Node 1	Node 2	Node 3	Node 4
404 sec	711 sec	650 sec	411 sec
550 sec	651 sec	608 sec	528 sec
502 sec	602 sec	686 sec	478 sec
402 sec	698 sec	711 sec	369 sec
498 sec	678 sec	644 sec	455 sec
Average=471.2	Average=668	Average=659.8	Average=448.2
SD=58.61	SD=49.42	SD=35.6	SD=54.69



Node 1	Node 2
270 sec	297 sec
374 sec	285 sec
290 sec	311 sec
258 sec	299 sec
300 sec	328 sec
Average=298.4	Average=304
SD=40.56	SD=14.56

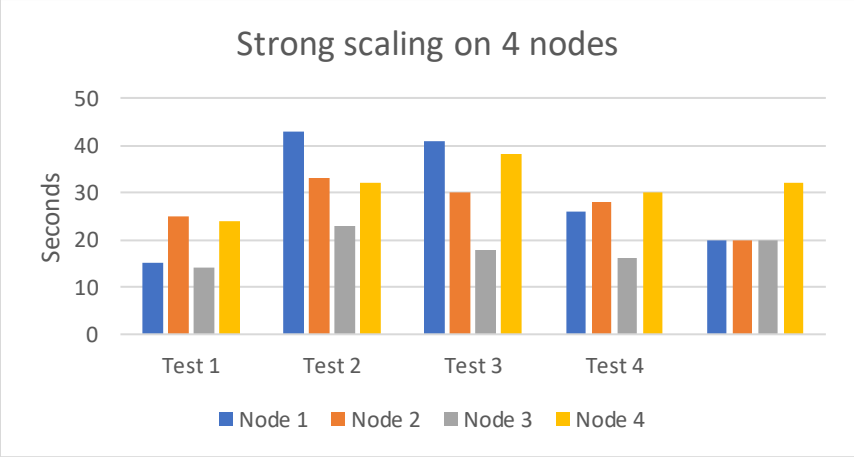


Node 1
269 sec
218 sec
300 sec
278 sec
215 sec
Average=256
SD=33.8

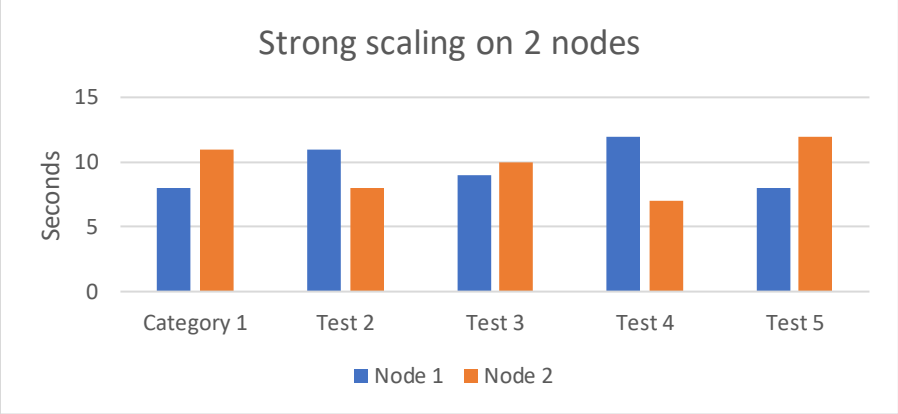


1K Medium files(1MB)

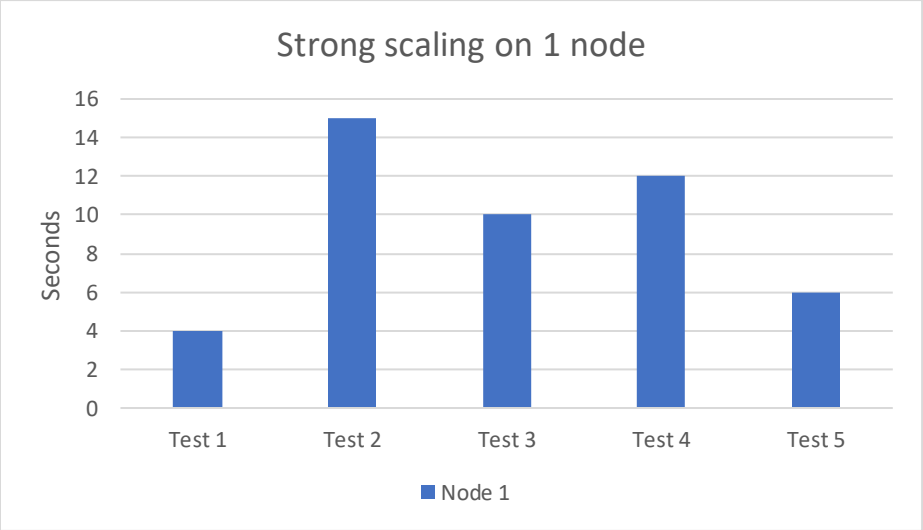
Node 1	Node 2	Node 3	Node 4
15 sec	25 sec	14 sec	24 sec
43 sec	33 sec	23 sec	32 sec
41 sec	30 sec	18 sec	38 sec
26 sec	28 sec	16 sec	30 sec
20 sec	20 sec	20 sec	32 sec
Average=29	Average=27.2 sec	Average=18.2	Average=31.2
SD=11.18	SD=4.44	SD=3.12	SD=4.48



Node 1	Node 2
8	11
11	8
9	10
12	7
8	12
Average=9.6	Average=9.6
SD=1.62	SD=1.85

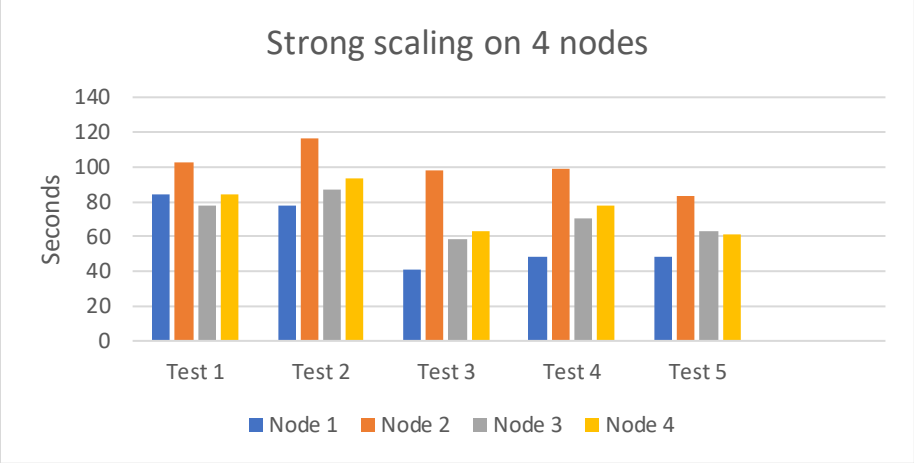


Node 1
4
15
10
12
6
Average=9.4
SD=3.97

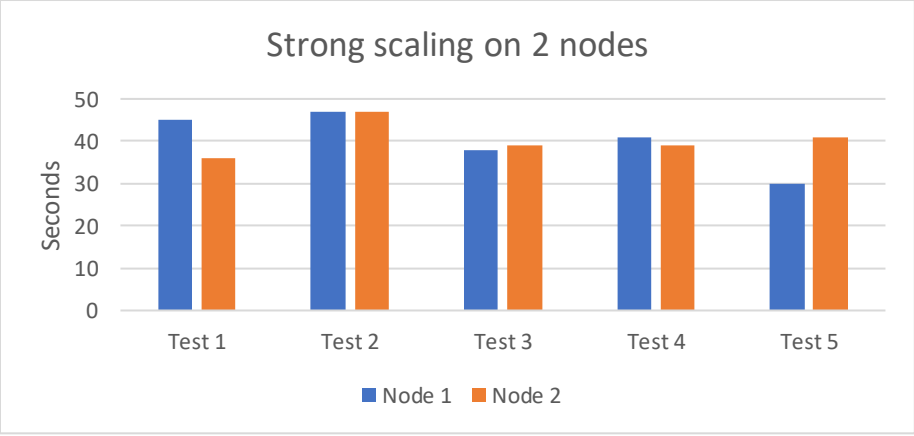


10 Large files(100MB)

Node 1	Node 2	Node 3	Node 4
84 sec	103 sec	78 sec	84 sec
78 sec	116 sec	87 sec	93 sec
41 sec	98 sec	58 sec	63 sec
48 sec	83 sec	63 sec	61 sec
48 sec	99 sec	70 sec	78 sec
Average=59.8	Average=99.8	Average=71.2	Average=75.8
SD=17.6	SD=10.57	SD=10.38	SD=12.25



Node 1	Node 2
45 sec	36 sec
47 sec	47 sec
38 sec	39 sec
41 sec	39 sec
30 sec	41 sec
Average=40.2	Average=40.4
SD=5.97	SD=3.66



Node 1
38 sec
34 sec
31 sec
37 sec
30 sec
Average=34
SD=3.16