

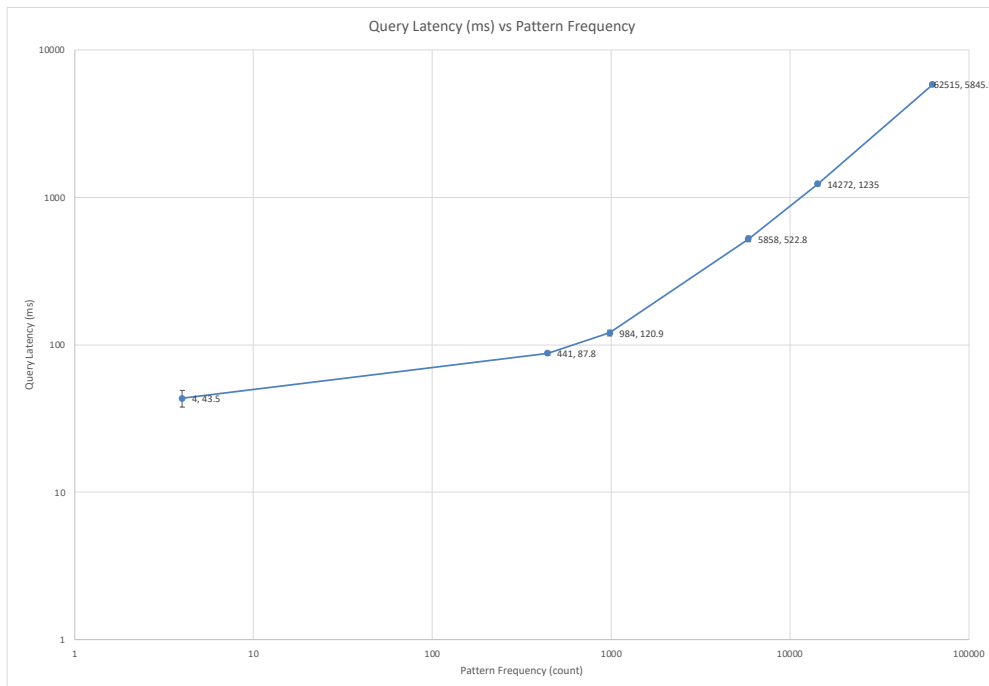
Js66, hj33

Each VM that acts as a server starts up a TCP server that accepts clients on detached background threads. Each background thread receives the query pattern from the client and runs the grep system call using the popen(3) call, whose output we save in a buffer and send back to the client.

The client consists of a central controller that handles the spawning of background threads using the std::thread API, one for each VM. Each thread sends the pattern to the target server and reads back the grep output. Each thread then places this grep output into a unique .temp file for reading by the main thread. To handle waiting for thread completion, we use std::forward to wait for results from the background threads. The controller iterates through these futures and prints grep output from the corresponding .temp file.

We test by first generating log files. These log files include patterns that only exist on one VM, half the VMs and all the VMs. Interspersed between these lines are lines that occur with three degrees of varying frequency, from rare to highly frequent. To test, we assert that we receive the correct number of lines in each case befitting a pattern that arrives from a certain number of servers or a pattern of a certain frequency. We test this by redirecting stdout to a file.

We implement .sh files to let us do work on other servers without having to ssh into them manually. This includes starting and pkillng servers as well as generating logs and cleaning. Furthermore, we make the program as scaleable and multithreaded as possible by doing the bulk of the work on background threads. And letting the whole system be managed from one VM.



pattern	total lines	average	stdev	total latency(ms)									
brooks-mar	4	43.5	5.622376	59	41	45	42	40	41	42	43	41	41
cn	441	87.8	2.820559	89	88	86	85	86	85	92	86	93	88
barber	984	120.9	5.445691	120	115	114	131	126	122	126	116	119	120
sanchez	5858	522.8	23.65399	555	506	530	517	561	486	505	540	519	509
davis	14272	1235	35.63394	1269	1181	1195	1219	1226	1241	1222	1252	1305	1240
homepage	62515	5845.5	161.7709	5727	5830	5782	6155	5645	6089	5769	5853	5724	5881