The test was run on two CIMS computers, one as server, another one as client. Both machines are 4 cores, running Red Hat Linux. The tests were done on combinations of three types of conditions: number of thread (1 and 4), type of distribution (Zipfian and uniform), and in-memory cache (cache size 64 and 0). Each combination of conditions are given 4 different workloads. The original data is in appendix.

Some discussion about the test result:

First of all, I noticed that the median didn't change much among all tests, much less than the average. The medians are also significantly smaller than the averages. I think this is due to the fact that in all tests, there are fair amount of disk I/O, which is much slower than memory accessing, and contributes a lot to the average value.

The influence by type of distribution and cache is strongly coupled. For a server with cache, Zipfian distribution input runs noticeably faster than a uniformly distributed input; while for a server without cache, there is no noticeable difference between Zipfian distribution and uniform distribution. For a Zipfian distribution input, a server with cache runs much faster than a server without cache; while for uniform distribution, there is not much difference. This result falls in line with expectation, since a LRU cache would expedite operations on frequently visited data pieces, while for a uniform distribution, the cache is seldom useful.

The tests also showed an improvement on running time from 1 thread to 4 threads.

Appendix:

Test Data:
1 thread, zipfian, with cache
Request time (ms): min = 0.087240, avg = 0.554242, max = 209.973221, median = 0.150586
Request time (ms): min = 0.094484, avg = 0.489354, max = 208.278580, median = 0.153537
Request time (ms): min = 0.124933, avg = 0.485647, max = 208.588974, median = 0.151794
Request time (ms): min = 0.124030, avg = 0.533474, max = 204.954575, median = 0.151932
1 thread, zipfian, without cache
Request time (ms): min = 0.098673, avg = 0.958011, max = 763.765198, median = 0.150799
Request time (ms): min = 0.090559, avg = 0.696194, max = 212.334381, median = 0.153199
Request time (ms): min = 0.103455, avg = 0.668232, max = 181.183029, median = 0.155737
Request time (ms): min = 0.084037, avg = 1.213905, max = 215.158722, median = 0.155502

1 thread, uniform, with cache
Request time (ms): min = 0.092763, avg = 1.520004, max = 1963.305542, median = 0.152498
Request time (ms): min = 0.105308, avg = 0.879825, max = 212.762146, median = 0.150383
Request time (ms): min = 0.101303, avg = 0.843378, max = 250.282104, median = 0.149215
Request time (ms): min = 0.123592, avg = 0.639589, max = 209.276642, median = 0.149398
1 thread, univorm, without cache
Request time (ms): min = 0.123868, avg = 1.198961, max = 223.243973, median = 0.150312
Request time (ms): min = 0.127917, avg = 0.538719, max = 57.111103, median = 0.150289
Request time (ms): min = 0.125362, avg = 0.646673, max = 210.008316, median = 0.150348
Request time (ms): min = 0.112190, avg = 1.312818, max = 222.787445, median = 0.150344

4 threads, zipfian, with cache
Request time (ms): min = 0.094734, avg = 0.464291, max = 205.434494, median = 0.155321
Request time (ms): min = 0.128561, avg = 0.464148, max = 208.330338, median = 0.154051
Request time (ms): min = 0.125883, avg = 0.433946, max = 54.713455, median = 0.151683
Request time (ms): min = 0.090147, avg = 0.487677, max = 210.222031, median = 0.153565
4 threads, zipfian, without cache
Request time (ms): min = 0.127813, avg = 0.608164, max = 16.619158, median = 0.153507
Request time (ms): min = 0.125309, avg = 0.582811, max = 208.080170, median = 0.153613
Request time (ms): min = 0.124594, avg = 0.872355, max = 223.126587, median = 0.157048
Request time (ms): min = 0.086501, avg = 0.883427, max = 209.091141, median = 0.153351
4 threads, uniform, with cache
Request time (ms): min = 0.099685, avg = 0.658543, max = 208.130417, median = 0.152470
Request time (ms): min = 0.085635, avg = 0.833399, max = 213.388260, median = 0.149933
Request time (ms): min = 0.108242, avg = 0.655364, max = 665.994812, median = 0.150208
Request time (ms): min = 0.123898, avg = 0.584984, max = 208.427948, median = 0.150140
4 threads, univorm, without cache
Request time (ms): min = 0.125908, avg = 0.614683, max = 209.048691, median = 0.151836

Request time (ms): min = 0.123628, avg = 0.569595, max = 207.858383, median = 0.149582
Request time (ms): min = 0.124961, avg = 0.633041, max = 208.214294, median = 0.149772
Request time (ms): min = 0.125718, avg = 0.531721, max = 230.043552, median = 0.150694