Report
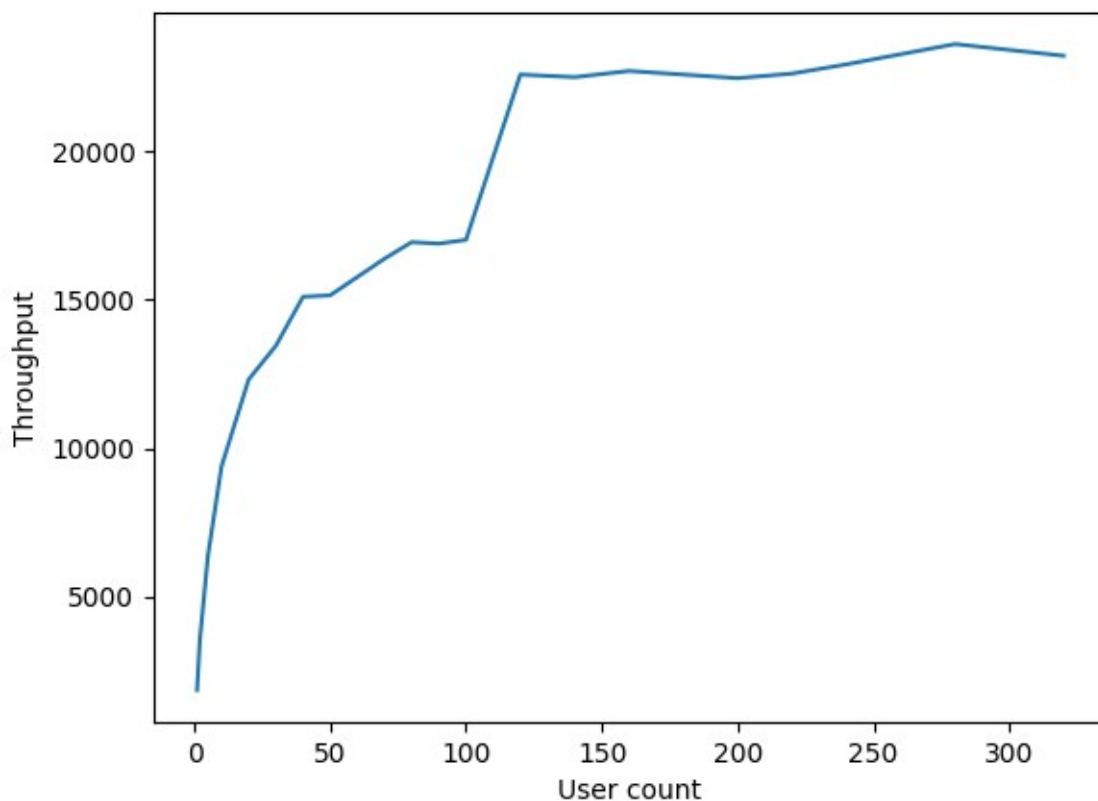
In this Model we are using 1 core given to server to reply and other 3 cores are given to client to send request.As my computer have 4 cores so we can see that All 4 cores are working an almost full capacity se we can not further increase the capacity of machine making it the bottleneck for the model of this server -client program. I am using taskset command to divide cores for server and clients.
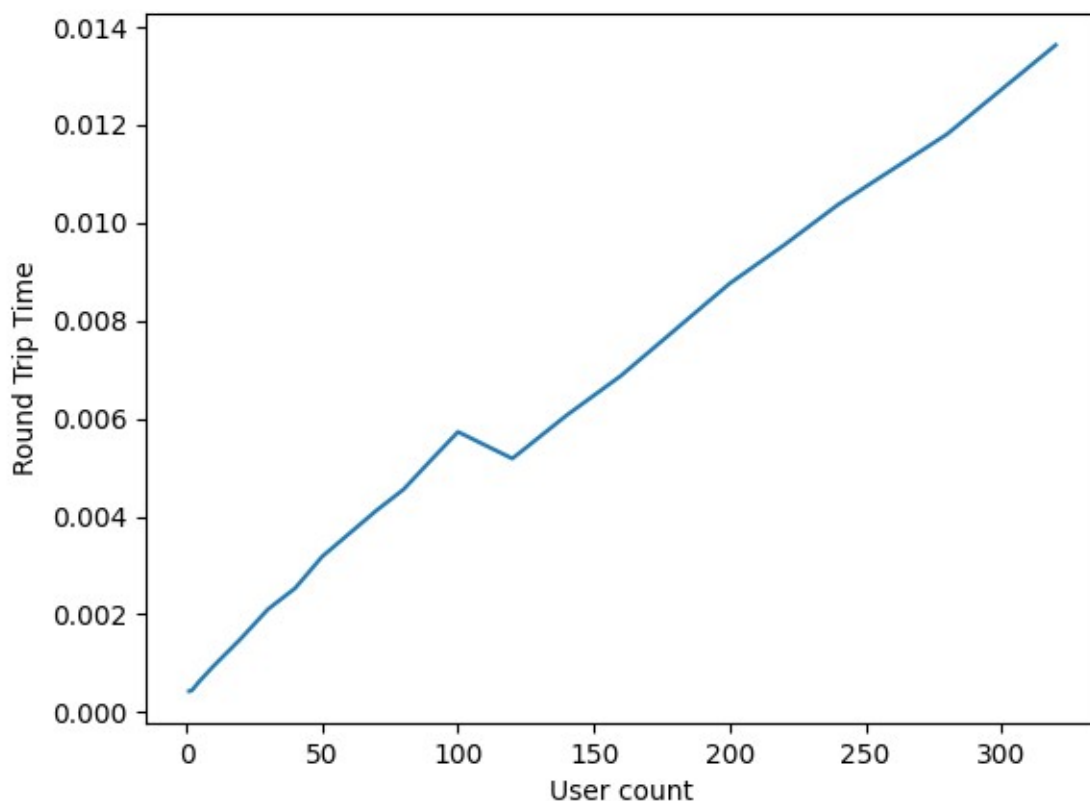
Server:- taskset -c 0 ./server 9800

Client :- taskset -c 1,2,3 ./load_1 localhost 9800 100 0.5 100

This is average throughput vs User count Graph We can see that this graph reach at peak at almost 150 users and then it starts getting flattend.

Avg RTT to user Count Graph.In this graph Average Round Trip Time increase continuesly as we increase user load on server.

My valgrind report is like:

==20927== Memcheck, a memory error detector
==20927== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==20927== Using Valgrind-3.15.0-608cb11914-20190413 and LibVEX; rerun with -h for copyright info
==20927== Command: ./server 8080
==20927== Parent PID: 18162
==20927==
--20927--
--20927-- Valgrind options:
--20927--   --leak-check=full
--20927--   --show-leak-kinds=all
--20927--   --track-origins=yes
--20927--   --verbose

--20927--   --log-file=valgrind-out.txt
--20927-- Contents of /proc/version:
--20927--   Linux version 5.15.0-52-generic (buildd@lcy02-amd64-045) (gcc (Ubuntu 9.4.0-1ubuntu1~20.04.1) 9.4.0, GNU ld (GNU Binutils for Ubuntu) 2.34) #58~20.04.1-Ubuntu SMP Thu Oct 13 13:09:46 UTC 2022
--20927--
--20927-- Arch and hwcaps: AMD64, LittleEndian, amd64-cx16-lzcnt-rdtscp-sse3-ssse3-avx-avx2-bmi-f16c-rdrand
--20927-- Page sizes: currently 4096, max supported 4096
--20927-- Valgrind library directory: /usr/lib/x86_64-linux-gnu/valgrind
--20927-- Reading syms from /home/akshit/Documents/DECS/lab4/server
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/ld-2.31.so
--20927--   Considering /usr/lib/debug/.build-id/45/87364908de169dec62ffa538170118c1c3a078.debug ..
--20927--   .. build-id is valid
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/valgrind/memcheck-amd64-linux
--20927--   object doesn't have a symbol table
--20927--   object doesn't have a dynamic symbol table
--20927-- Scheduler: using generic scheduler lock implementation.
--20927-- Reading suppressions file: /usr/lib/x86_64-linux-gnu/valgrind/default.supp
==20927== embedded gdbserver: reading from /tmp/vgdb-pipe-from-vgdb-to-20927-by-akshit-on-???
==20927== embedded gdbserver: writing to   /tmp/vgdb-pipe-to-vgdb-from-20927-by-akshit-on-???
==20927== embedded gdbserver: shared mem   /tmp/vgdb-pipe-shared-mem-vgdb-20927-by-akshit-on-???
==20927==
==20927== TO CONTROL THIS PROCESS USING vgdb (which you probably
==20927== don't want to do, unless you know exactly what you're doing,
==20927== or are doing some strange experiment):
==20927==   /usr/lib/x86_64-linux-gnu/valgrind/../../bin/vgdb --pid=20927 ...command...
==20927==
==20927== TO DEBUG THIS PROCESS USING GDB: start GDB like this
==20927==   /path/to/gdb ./server
==20927== and then give GDB the following command
==20927==   target remote | /usr/lib/x86_64-linux-gnu/valgrind/../../bin/vgdb --pid=20927
==20927== --pid is optional if only one valgrind process is running
==20927==
--20927-- REDIR: 0x4022e20 (ld-linux-x86-64.so.2:strlen) redirected to 0x580c9ce2 (???)
--20927-- REDIR: 0x4022bf0 (ld-linux-x86-64.so.2:index) redirected to 0x580c9cfc (???)
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/valgrind/vgpreload_core-amd64-linux.so
--20927--   object doesn't have a symbol table
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/valgrind/vgpreload_memcheck-amd64-linux.so
--20927--   object doesn't have a symbol table
==20927== WARNING: new redirection conflicts with existing -- ignoring it
--20927--   old: 0x04022e20 (strlen   ) R-> (0000.0) 0x580c9ce2 ???
--20927--   new: 0x04022e20 (strlen   ) R-> (2007.0) 0x0483f060 strlen
--20927-- REDIR: 0x401f600 (ld-linux-x86-64.so.2:strcmp) redirected to 0x483ffd0 (strcmp)
--20927-- REDIR: 0x4023380 (ld-linux-x86-64.so.2:mempcpy) redirected to 0x4843a20 (mempcpy)
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/libpthread-2.31.so

--20927--   Considering
/usr/lib/debug/.build-id/7b/4536f41cdaa5888408e82d0836e33dcf436466.debug ..
--20927--   .. build-id is valid
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/libstdc++.so.6.0.28
--20927--   object doesn't have a symbol table
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/libgcc_s.so.1
--20927--   object doesn't have a symbol table
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/libc-2.31.so
--20927--   Considering
/usr/lib/debug/.build-id/18/78e6b475720c7c51969e69ab2d276fae6d1dee.debug ..
--20927--   .. build-id is valid
--20927-- Reading syms from /usr/lib/x86_64-linux-gnu/libm-2.31.so
--20927--   Considering
/usr/lib/debug/.build-id/fe/91b4090ea04c1559ff71dd9290062776618891.debug ..
--20927--   .. build-id is valid
--20927-- REDIR: 0x4b1f480 (libc.so.6:memmove) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e780 (libc.so.6:strncpy) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f7b0 (libc.so.6:strcasecmp) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e0a0 (libc.so.6:strcat) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e7e0 (libc.so.6:rindex) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b20c50 (libc.so.6:rawmemchr) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b3bce0 (libc.so.6:wmemchr) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b3b820 (libc.so.6:wcscmp) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f5e0 (libc.so.6:mempcpy) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f410 (libc.so.6:bcmp) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e710 (libc.so.6:strncmp) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e150 (libc.so.6:strcmp) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f540 (libc.so.6:memset) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b3b7e0 (libc.so.6:wcschr) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e670 (libc.so.6:strnlen) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e230 (libc.so.6:strcspn) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f800 (libc.so.6:strncasecmp) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e1d0 (libc.so.6:strcpy) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f950 (libc.so.6:memcpy@@GLIBC_2.14) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b3cf50 (libc.so.6:wcsnlen) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b3b860 (libc.so.6:wcscpy) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e820 (libc.so.6:strpbrk) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e100 (libc.so.6:index) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1e630 (libc.so.6:strlen) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b27bb0 (libc.so.6:memrchr) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f850 (libc.so.6:strcasecmp_l) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f3d0 (libc.so.6:memchr) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b3b930 (libc.so.6:wcslen) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)

--20927-- REDIR: 0x4b1eae0 (libc.so.6:strspn) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f750 (libc.so.6:stpncpy) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f6f0 (libc.so.6:stpcpy) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b20c90 (libc.so.6:strchrnul) redirected to 0x48311d0 (_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4b1f8a0 (libc.so.6:strncasecmp_l) redirected to 0x48311d0
(_vgnU_ifunc_wrapper)
--20927-- REDIR: 0x4c07500 (libc.so.6:__strrchr_avx2) redirected to 0x483ea10 (rindex)
--20927-- REDIR: 0x4b190e0 (libc.so.6:malloc) redirected to 0x483b780 (malloc)
--20927-- REDIR: 0x4c076d0 (libc.so.6:__strlen_avx2) redirected to 0x483ef40 (strlen)
--20927-- REDIR: 0x4c03cc0 (libc.so.6:__memcmp_avx2_movbe) redirected to 0x48421e0 (bcmp)
--20927-- REDIR: 0x4c02bd0 (libc.so.6:__strcmp_avx2) redirected to 0x483fed0 (strcmp)
--20927-- REDIR: 0x492cb20 (libstdc++.so.6:operator new(unsigned long)) redirected to
0x483bdf0 (operator new(unsigned long))
--20927-- REDIR: 0x4b1ab10 (libc.so.6:calloc) redirected to 0x483dce0 (calloc)
--20927-- REDIR: 0x492ad70 (libstdc++.so.6:operator delete(void*)) redirected to 0x483cf50
(operator delete(void*))
--20927-- REDIR: 0x4b196d0 (libc.so.6:free) redirected to 0x483c9d0 (free)
==20927==
==20927== HEAP SUMMARY:
==20927==   in use at exit: 5,760 bytes in 20 blocks
==20927==   total heap usage: 23 allocs, 3 frees, 79,040 bytes allocated
==20927==
==20927== Searching for pointers to 20 not-freed blocks
==20927== Checked 167,878,872 bytes
==20927==
==20927== 5,760 bytes in 20 blocks are possibly lost in loss record 1 of 1
==20927==   at 0x483DD99: calloc (in /usr/lib/x86_64-linux-gnu/valgrind/vgpreload_memcheck-amd64-linux.so)
==20927==   by 0x40149DA: allocate_dtv (dl-tls.c:286)
==20927==   by 0x40149DA: _dl_allocate_tls (dl-tls.c:532)
==20927==   by 0x4868322: allocate_stack (allocatestack.c:622)
==20927==   by 0x4868322: pthread_create@@GLIBC_2.2.5 (pthread_create.c:660)
==20927==   by 0x10BED7: main (in /home/akshit/Documents/DECS/lab4/server)
==20927==
==20927== LEAK SUMMARY:
==20927==   definitely lost: 0 bytes in 0 blocks
==20927==   indirectly lost: 0 bytes in 0 blocks
==20927==   possibly lost: 5,760 bytes in 20 blocks
==20927==   still reachable: 0 bytes in 0 blocks
==20927==   suppressed: 0 bytes in 0 blocks
==20927==
==20927== ERROR SUMMARY: 1 errors from 1 contexts (suppressed: 0 from 0)