TEST REPORT

The test was performed on the platform described below:

OS Ubuntu 18.04.5 LTS
Memory 23.3 GiB
Processor AMD Ryzen73800X8-core processor×8
Graphics SVGA3D;build:RELEASE;LLVM;
GNOME 3.28.2
OS type 64-bit
Virtualization Oracle
Disk 42.0 GB

To minimize the disk IO bottleneck, we created a file system in memory to hold the input and output files:

mkdir /mnt/tmp
mount -t tmpfs -o size=20g tmpfs /mnt/tmp

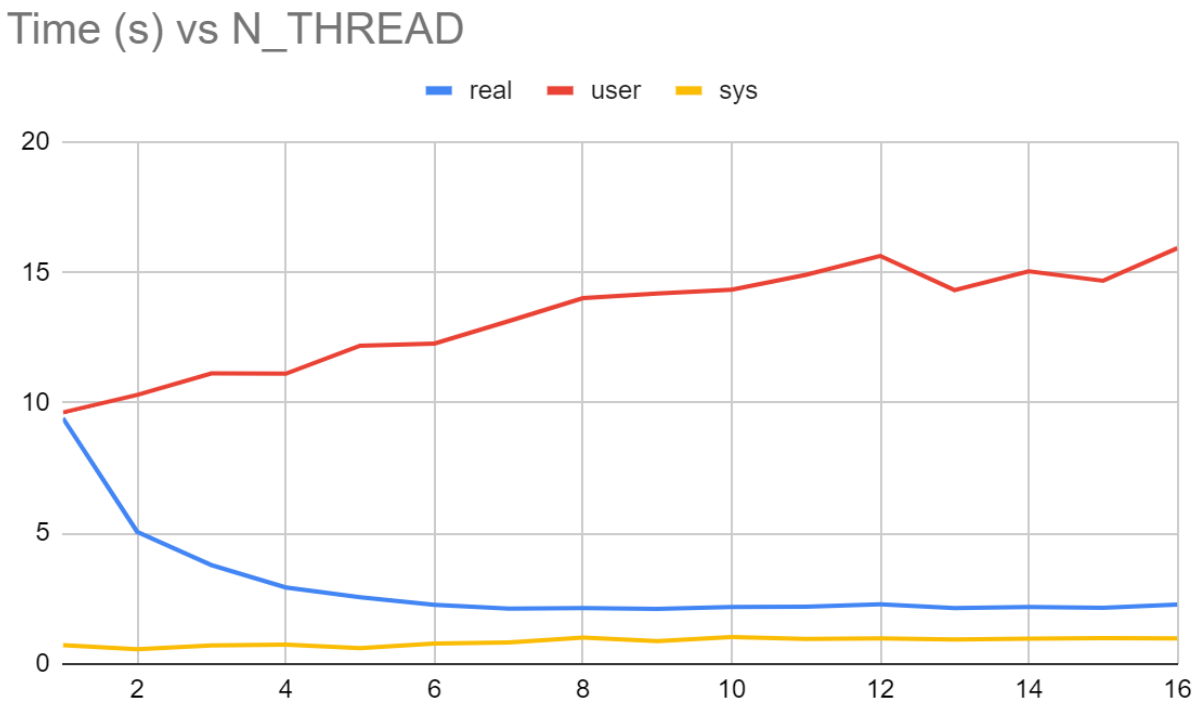
The test file used was ubuntu-18.04.5-desktop-amd64.iso (renamed to test.iso). We timed the execution with the command:

time build/a.out N_THREAD 6 test.iso

where N_THREAD is the number of threads ranging from 1 to 16. Results are recorded in a table and then plotted.

N_THREAD	real	user	sys
1	9.411	9.63	0.699
2	5.051	10.306	0.546
3	3.769	11.13	0.693
4	2.917	11.119	0.719
5	2.544	12.193	0.584
6	2.253	12.279	0.764
7	2.106	13.138	0.809

8	2.124	14.019	0.993
9	2.097	14.195	0.857
10	2.168	14.346	1.01
11	2.175	14.91	0.94
12	2.269	15.64	0.962
13	2.128	14.326	0.922
14	2.172	15.048	0.947
15	2.139	14.689	0.973
16	2.263	15.933	0.964



The real value decreases from thread number 1-8. No significant improvement over eight threads, as the CPU has eight cores. Interestingly, we see the user value grows over time. This is because the value sums up all user space CPU time from all threads. Sys value remains unaffected because IO load is equal for all the tasks.

Therefore we can conclude that the number of threads is optimal when it equals the number of cores on a home-grade CPU.