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CS 3013 Prof. Willis
Proj4 Report
10.10.2019

The testing was completed on my virtual machine created for project 2, which is an Ubuntu i386 operating system, and ran on the Oracle VM VirtualBox manager.

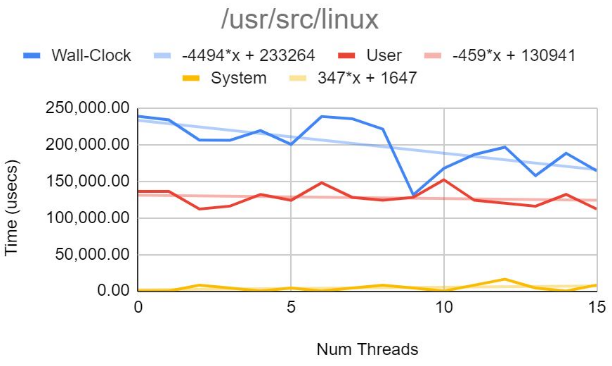
Below are five performance graphs (figures 1-5) each corresponding to one of the five directories tested. The wall-clock execution time, user CPU time, and system CPU time, measured in microseconds, are plotted against the number of threads. Zero threads refers to the serial architecture. The directories were /usr/src/linux, /*, /dev, /etc, and /project4 which was the current directory.

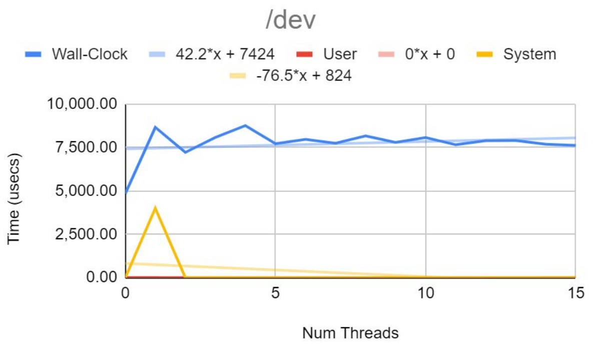
System CPU time is the time spent executing inside the kernel, not including time spent waiting to be scheduled. User CPU time is the time spent outside the kernel, not including wait times. Wall-clock is the total elapsed time, including time waiting to be scheduled. This means the time could jump around even when the number of threads remains constant. Additionally, when there are multiple threads the total CPU time, system and user, could exceed the elapsed wall-clock time. Some caching might have been occurring as well that could have impacted times.

For serial architecture it is expected to take a longer time. This is generally seen for the user time in figures 1, 3, and 5. The values for system time are small and frequently resulted in zero, in figure 3 the serial architecture is on the slower side as expected. There may be some overhead in creating the threads, which would be especially impactful for smaller directories.

The user time is expected to decrease as the number of threads increases. This is apparent in figures 1, 3, and 5 which have linear trendlines with slopes of -459, -424, and -294, respectively. Figures 2 and 4 have slopes of zero because the amount of time was so small.
The system time is also expected to decrease as the number of threads increases. The graph with non-zero values and mostly clearly shows this trend is figure 2 whose trendline has a slope of -959. In figure 1 /usr/src/linux the slope of system time actually increases slightly, due to a small outlier at thread 12 in this case.

Figure 3, the largest directory, resulted in the most reliable times and showed the negative trends of CPU times as the number of threads increases.



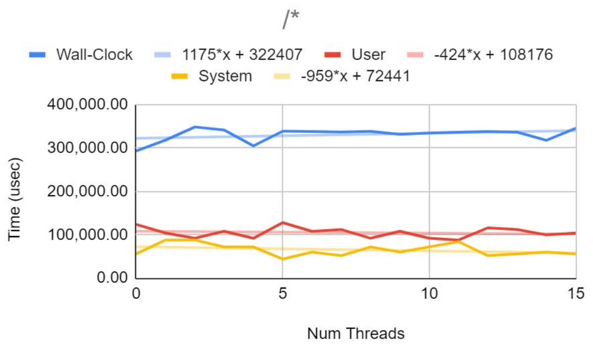


ux (above left)

Fig 2. /dev (above right)

Fig 3. /* (below left)

Fig 4. /project 4 (below right)



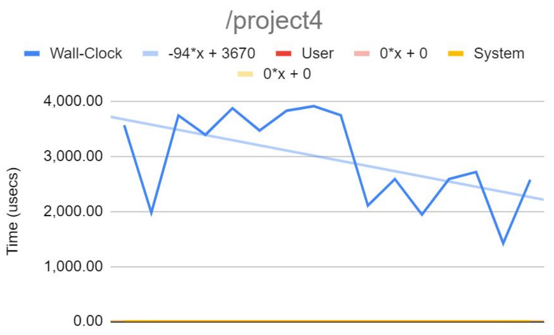
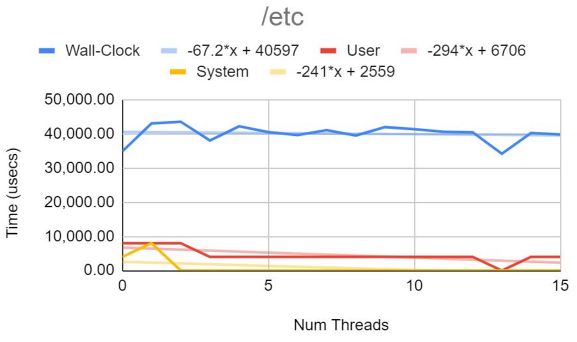


Fig 5. /etc (below)


/etc
Wall-Clock
-67.2*x + 40597
User
-294*x + 6706
System
-241*x + 2559
Time (usecs)
Num Threads