PThreads Comparison

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I used three types of thread synchronizations to show how fast each type of comparison is. For each type of thread synchronization, I compared the result of the program, as well as the time taken for the program to run, using the default amount of threads (4), 8 threads, and 16 threads. For each amount of threads, I used different increment amounts per thread, using the default amount (10,000), one million (1,000,000) increments, and one billion (1,000,000,000).

1   No Synchronization

The first type of synchronization type used in this experiment is actually no synchronization between each thread.

1.1   4 threads

The first test using no synchronization has 4 threads.

- For the default increments per thread, it takes 6 milliseconds to produce a result of 40,000.

- For one million increments per thread, it takes 15 milliseconds to produce a result of 4,000,000.

- For one billion increments per thread, it takes 7.9 seconds to produce a result of -294,967,296.

1.2   8 Threads

The second test using no synchronization uses 8 threads.

- For the default increments per thread, it takes 7 milliseconds to produce a result of 80,000.

- For one million increments per thread, it takes 24 milliseconds to produce a result of 8,000,000.

- For one billion increments per thread, it takes 15.7 seconds to produce a result of -589,934,592.

1.3   16 Threads

The third test using no synchronization uses 16 threads.

- For the default increments per thread, it takes 7 milliseconds to produce a result of 160,000.

- For one million increments per thread, it takes 46 milliseconds to produce a result of 16,000,000.

- For one billion increments per thread, it takes 31.5 seconds to produce a result of -1,179,869,184

2   PThread Locks

The second synchronization type used in this experiment is PThread locks, (or mutex locks because ti.

2.1   4 Threads

The first test using PThread locks uses 4 threads.

- For the default increments per thread, it takes 6 milliseconds to produce a result of 40,000.

- For one million increments per thread, it takes 13 milliseconds to produce a result of 4,000,000.

- For one billion increments per thread, it takes 7.8 seconds to produce a result of -294967296.

2.2   8 Threads

The second test using PThread locks uses 8 threads.

- For the default increments per thread, it takes 5 milliseconds to produce a result of 80,000.

- For one million increments per thread, it takes 23 milliseconds to produce a result of 8,000,000.

- For one billion increments per thread, it takes 15.8 seconds to produce a result of -589,934,592.

2.3 16 Threads

The third test using PThread locks uses 16 threads.

- For the default increments per thread, it takes 8 milliseconds to produce a result of 160,000.

- For one million increments per thread, it takes 41 milliseconds to produce a result of 16,000,000.

- For one billion increments per thread, it takes 31.7 seconds to produce a result of -1,179,869,184.