ICSI 520 Distributed & Parallel Computing - Fall 2019

Homework 7

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UAlbany Cluster Results:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **n** | **Number of cores (p)** | **Serial execution time (microseconds)** | **Distributed execution time (microseconds)** | **Speedup** |
| 700 | 20 | 22.2 | 1158.8 | 0.01916 |
| 1400 | 20 | 37.8 | 1249.8 | 0.03024 |
| 2500 | 20 | 76.4 | 1270.8 | 0.06012 |
| 5000 | 20 | 141.8 | 1229.2 | 0.11536 |
| 10000 | 20 | 286.2 | 1387.8 | 0.20623 |
| 20000 | 20 | 476.6 | 1450.6 | 0.32855 |
| 30000 | 20 | 854.2 | 1225.2 | 0.69719 |
| 50000 | 20 | 1346.4 | 1525.0 | 0.88289 |
| 60000 | 20 | 1582.8 | 1649.8 | 0.95939 |
| 70000 | 20 | 2072.6 | 1549.4 | 1.33768 |
| 80000 | 20 | 2278.0 | 1603.8 | 1.42038 |
| 90000 | 20 | 2481.2 | 1646.0 | 1.50741 |
| 100000 | 20 | 2670.2 | 1673.8 | 1.59529 |
| 200000 | 20 | 5592.8 | 2093.4 | 2.67163 |
| 500000 | 20 | 12553.4 | 3117.6 | 4.02662 |
| 1000000 | 20 | 23912.4 | 4864.4 | 4.91580 |
| 2500000 | 20 | 57227.6 | 14029.2 | 4.07918 |
| 5000000 | 20 | 112797.0 | 20769.8 | 5.43082 |
| 10000000 | 20 | 229064.4 | 45879.4 | 4.99275 |
| 25000000 | 20 | 555758.4 | 100309.6 | 5.54043 |
| 50000000 | 20 | 1115379.2 | 193854.6 | 5.75369 |
| 100000000 | 20 | 2229397.4 | 392245.8 | 5.68367 |

srun -n1 -c1 Homework7\_Serial.out <n>

salloc -n 20

mpirun Homework7\_Distributed.out <n>

(Averaging 5 runs)

StarCluster Results:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **n** | **Number of cores (p)** | **Serial execution time (microseconds)** | **Distributed execution time (microseconds)** | **Speedup** |
| 700 | 16 | 24.2 | 9707.6 | 0.00249 |
| 1400 | 16 | 44.6 | 9791.8 | 0.00455 |
| 2500 | 16 | 101.8 | 10318.6 | 0.00987 |
| 5000 | 16 | 149.8 | 10717.8 | 0.01398 |
| 10000 | 16 | 289.6 | 9981.8 | 0.02901 |
| 20000 | 16 | 573.8 | 10073.8 | 0.05696 |
| 30000 | 16 | 857.6 | 10183.4 | 0.08422 |
| 50000 | 16 | 1406.0 | 10183.2 | 0.13807 |
| 60000 | 16 | 1712.2 | 10199.8 | 0.16787 |
| 70000 | 16 | 1962.2 | 10447.8 | 0.18781 |
| 80000 | 16 | 2259.4 | 10263.4 | 0.22014 |
| 90000 | 16 | 2538.6 | 9319.0 | 0.27241 |
| 100000 | 16 | 2798.2 | 10124.8 | 0.27637 |
| 200000 | 16 | 5637.0 | 10483.8 | 0.53769 |
| 500000 | 16 | 14029.0 | 11362.8 | 1.23464 |
| 1000000 | 16 | 28063.4 | 11724.2 | 2.39363 |
| 2500000 | 16 | 70078.6 | 17279.4 | 4.05562 |
| 5000000 | 16 | 140236.0 | 22947.8 | 6.11109 |
| 10000000 | 16 | 279574.8 | 31073.0 | 8.99735 |
| 25000000 | 16 | 698927.6 | 56513.0 | 12.36755 |
| 50000000 | 16 | 1403751.4 | 102167.6 | 13.73969 |
| 100000000 | 16 | 2808494.2 | 191614.6 | 14.65699 |

./Homework7\_Serial.out <n>

mpirun ./Homework7\_Distributed.out <n>

(Averaging 5 runs)

(Run on 16 node cluster created using StarCluster)