Parallel Computing: Homework I (Version 2)

This will be your first homework in the exercise parallel computing. Send your solution to Matthias.huy@daimonas.de until May 7th 12.00am. Prepare a pdf file for your written text and attach the source code of your program to the mail.

This homework has been modified to give everyone the chance to get some experiences with unix. You need to be familiar with at least ssh, a text editor, the file system and a shell.

Task I (4 points)

Think about four factors influencing the run time of a program. Rate their influence (e.g. high, normal, low) and reason your decision.

Task II (6 points)

Download the c-program *task2.c* and open it with a text editor. Try to understand the function of the program. You can compile the program with a c-compiler, for example gcc.

You can use the jobfile *jobtask2.pbs* to submit the compiled code to the cluster.

- In this task you are going to extend the code and measure the time needed for calculation the sum for different sizes *n* and *s*.
    - Initialize the array *x* with random numbers.
    - Modify the code so it automatically varies *n* (e.g. 1000, 10.000... 10.000.000) and *s* (1, 2, 4... 10)
    - Plot the results in a graph and describe them

Task III (10 points)

Download the c-program *task3.c* and open it with a text editor. The program sends a message from one process to another and back. The time needed is called round-trip latency.

- In this task you are going to measure the time needed for messages of different size *size*. Vary the *size* of the message and plot the time needed for transferring a message from one process to another.
    - To submit the code to the cluster you can use the jobfile *jobtask3.pbs*
- Currently we are requesting one node and two processors per node. Change the jobfile in order to request two nodes and one processor per node. Now repeat your measurements. Evaluate the result.