Introduction to parallel processing

Home assignment 4 – MATLAB computation using Condor

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Introduction:

This report presents the implementation and evaluation of a parallel computing method using HTCondor to perform HTC (High-Throughput Computing) tasks. The goal of the assignment was to execute 10 MATLAB computations.

Methodology:

To accomplish the task, we developed a short MATLAB program that accepts an argument corresponding to the Condor variable "Process". This variable is translated into a number ranging from 100 to 1000 in steps of 100. This number represents the dimension of a randomly generated matrix, N.

The program generates random matrices of dimensions $M \times M$ when M is represented by N by the following formula: $M = N * 100 + 100$ and $N \in [0,9]$ with a uniform distribution. It then calculates and saves the eigenvalue distribution plots of the generated matrices as PDF files. The plots illustrate the imaginary part of the eigenvalue distribution as a function of the real part.

Results:

The program successfully executed the MATLAB computations using HTCondor. The resulting eigenvalue distribution plots were saved as PDF files for each matrix dimension. The plots describe the real and imaginary parts of the eigenvalues. All files are attached to the submission.

Conclusions:

In this assignment, we utilized HTCondor and MATLAB to perform 10 computations. The program successfully generated and analyzed random matrices of varying dimensions. By implementing the HTC approach, we were able to distribute the computations efficiently, leveraging the power of parallel computing. This approach improves the overall performance and reduces the execution time compared to running the computations sequentially. In conclusion, this assignment demonstrates the effective utilization of HTCondor for parallel computing.

American Questions:

1. What is the purpose of using HTCondor in parallel computing?

   a) To simulate the process of salt grains falling into a hole

   b) To inspect big birds in America 😉.

   c) To distribute computational workload across multiple processors

   d) To generate and analyze random matrices with varying dimensions

2. How does the number of processors affect the execution time in the HTCondor-based parallel computing assignment?

   a) The execution time increases proportionally with the number of processors.

   b) The execution time decreases proportionally with the number of processors.

   c) The execution time remains constant regardless of the number of processors.

   d) The execution time is not affected by the number of processors.