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Implementing a Condor Pool Using a Green-IT Policy

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KeyWord: Condor, HTC, Job Scheduling, Computer Clusters, cycle stealing, Flocking

Abstract

High Throughput Computing (HTC) systems are designed to utilise available resources on a network of idle machines in an institution or organization by cycle stealing. Condor is an excellent HTC tool that excels in cycle stealing job scheduling on idle machines. However only idle and powered machines can be used from the a networked pool. Most organisations deploy power saving mechanisms to try and reduce energy consumption of their systems, and power down idle resources, using rigid and inflexible power management policies. Condor supports some power management, but it is not used widely because it is not easily configurable. An example is from the University of Liverpool where they had calculated that their computer labs were only used 6% of the time [1].

Background

- During the course of a day there are thousands of machines that are idle for long periods of time. These machines are wasting power as well as computing cycles that could be better utilised by researchers simulations/calculations.
- Condor is an excellent HTC tool that excels in cycle stealing job scheduling on idle machines.
- However only idle and powered machines can be used from the a networked pool.
- Most organisations deploy power saving mechanisms to try and reduce energy consumption of their systems, and power down idle resources, using rigid and inflexible power management policies.
- Condor supports some power management, but it is not used widely because it is not easily configurable.
- An example is from the University of Liverpool where they had calculated that their computer labs were only used 6% of the time [1].

Current Configuration of Condor Pool

- The current condor pool has around 500 cores on Lab machines in engineering with the ability to expand to over 2000+ cores
- We plan to implement Linux virtual machines (Pool of Virtual Boxes, POVB) to run on lab machines when the labs are closed.
- Machines power off after 20 minutes from the user logging out.

Connecting to QGG Condor

- Users connect to the Bellatariix submission node using the campus key which authenticates the user using the LDAP
- The Master node is implemented as a virtual machine which aid testing of new versions
- The Submission node is a part of the internal submission node for the QGG. The submission node is separate from the Master node because the scheduler requires a larger amount of processing power than currently available on the virtual machine.

Conclusions

- Condor is an excellent HTC tool that provides extra computing resources for scientific calculations utilising existing idle resources, and providing a relatively inexpensive solution for research computing.
- With new intelligent management system, Condor can become more energy efficient.
- With PoVB it will allow Linux specific programs to run on an already existing Windows computing infrastructure

Further Work

- To deploy Condor across the Queensgate campus computing laboratories and in the library.
- To increase the user base, running a variety of applications from different schools, and to make a more efficient use of the computing infrastructure owned by the University.