Condor and GridSHED at NERESC

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Introduction

GridSHED in an e-Science project taking place at NERESC (North East Regional e-Science Centre), investigating the dynamic provisioning of computational resources within a Virtual Data Centre. The GridSHED model consists of M computational resources or servers and N conceptual server pools which together process jobs for N different job types supported by the system. Servers may be reallocated between pools, where decision to reallocate is based on arrival rates for each job type, queue size, the cost (or time taken) to reallocate a server and the service time of jobs completed in the past. This is depicted in the diagram below.

Condor is currently used to manage each conceptual server pool, although an initial requirement was that different resource management systems may be used to manage pools, and servers could switch between them.

Use of Condor

Condor is used programmatically in GridSHED by a java interface and is used by the pool manager component which submits jobs, probes the queue and job states, and reallocates servers between pools. The component which manages all of the conceptual pools (called a cluster manager) is the coordinator of a server reallocation which involves the vacation of jobs, the manipulation of the condor_config file on the server being switched, and reconfig and reshced commands being sent to both central managers of the source and destination pools.

Although a polling system was initially developed to probe Condor queues at each pool manager, an event-driven approach is currently being implemented in GridSHED. Condor notifications which would be destined for a user via an email upon job completion are sent instead to the cluster manager via another interceptor program. The system has been used with up to 20 Linux servers.

Condor performs well in the situation described, although interfacing with condor programmatically through the command line is not ideal. Hopefully the Condor Web service interface in development will help.