

SAT4480

Senior Design – Distributed Virtual Computing

Statement of Purpose

Purpose:

The purpose of the Distributed Virtual Computing project is to create and host a private cluster of general purpose computers or servers. These computers or purpose servers will be able to scavenge excess resources as a single monolithic cluster to utilize a large scale general purpose application hosted on a virtual machine(s).

Goals:

Our goals include the following (revisions may occur)

1. Scavenge CPU, Memory, or other system hardware not being used in the cluster to go towards application performance in the cluster
2. Utilize off the shelf general purpose workstations or blade servers to participate in this private cluster
3. Monitor the cluster using SNMP, an application, or some other sort of utility
4. Be able to efficiently add or negate nodes from the cluster with no down time
5. Provide shared storage over high speed links (GigE or Infiniband)
6. Minimize Impact of the local machine's usage while participating in the cluster
7. Leverage the cluster to host more than one virtual machine (if possible)
8. Explore ways to tune the cluster from an administrative standpoint
9. Collect monitoring statistics to graph or benchmark the clusters performance of the application vs that of a traditional host based application servers.
10. Possibly leverage GPU compute power from CAD workstations to provide faster compute power for modeling applications that an industry uses.

Expectations:

Our expectations include meeting the purpose and most of the goals. We expect to have a cluster using some form of open source or commercial virtualization platform that can bind hosts under a controlled hierarchical cluster. This cluster should be able to indiscriminately load balance system resources over a high speed network to allow resource intensive applications to perform better than over a standard nodal architecture.