

High Availability-Open Source Cluster Application Resources

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www.csm.ornl.gov/Internships/rams_05/websites_05.html/l_shumpert/index.html



Abstract

High Performance Computing (HPC) clusters built with commodity computers and interconnects offer a relatively economical package of computing capability. The cost effective nature of this type of cluster has attracted a wide variety of applications in the scientific, commercial, and educational communities that do not have the opportunity or funding for supercomputer time. Open Source Cluster Application Resources (OSCAR) is a fully integrated bundle of software designed for the building, maintaining, and using a Beowulf style Linux cluster for HPC. New variants of OSCAR have evolved to address alternative clustering needs since OSCAR was first introduced. Examples of this include High Availability, Scalable Systems Software, Single System Image, and Diskless clusters. Each of these projects is a separate working groups under the Open Cluster Group (OCG) organization. This organization has an agenda of furthering open source cluster computing. The task undertaken this summer was to install HA-OSCAR and validate its documentation. First OSCAR was installed on a test cluster and then HA-OSCAR was overlaid to provide the High-Availability component. A duplicate headnode is required to build a HA-OSCAR cluster system and thus eliminating the headnode as a single point of failure. The intent is that if the first headnode fails, the duplicate headnode will take up the system load in a seamless manner. Additional component redundancy is provided by setting the configuration for redundant switching and compute nodes. This work focused on the ability of HA-OSCAR to provide headnode failover.

OSCAR

Building an OSCAR cluster:

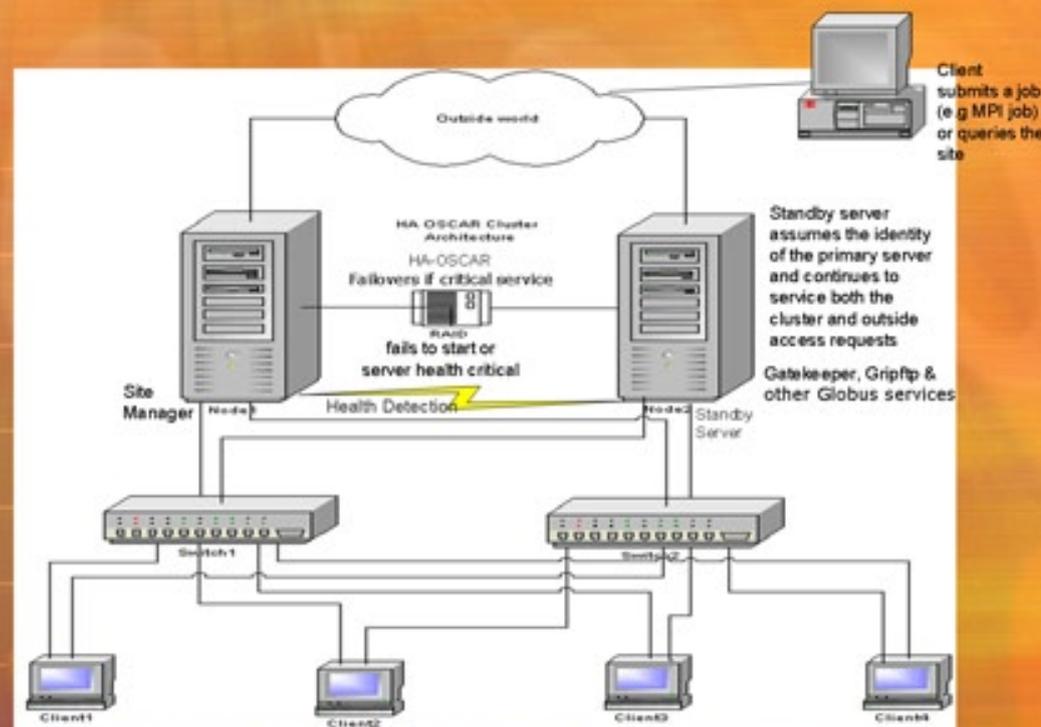
- Install Linux on head node
- Download OSCAR
- Unpack and start OSCAR GUI-based installation

process – then follow steps...

1. Download optional packages
2. Select packages for installation
3. Configure packages
4. Install server packages
5. Build client image
6. Define clients
7. Setup networking
8. Install self-runs post setup procedures
9. Test cluster installation/configuration

For more information regarding OSCAR see:

oscar.openclustergroup.org



HA-OSCAR

HA-OSCAR enhances an OSCAR cluster by providing:

- Availability – Scalability – Security
- HA-OSCAR major system components:

- Primary and Standby Server
- Compute Nodes
- Redundant network infrastructure (LAN)

Each head node has two NICs:

- Eth0 Public / Eth1 Private Interface

Building an HA-OSCAR Cluster:

1. HA-OSCAR Package Installation
2. Build Images for Standby Server
3. Configuration of Standby Server
4. Network Setup & Boot Server
5. Complete Installation/Delete Standby Server

For more information regarding HA-OSCAR see:

xcr.cenit.latech.edu/ha-oscar

Results

The HA-OSCAR initiative was established to build a highly available version of OSCAR that is not restricted to only HPC applications. This research focused on the High-Availability installation process. It was expected that HA OSCAR would be able to leverage the existing OSCAR technology while providing high-availability and scalability capabilities in OSCAR-built clusters. Research experience included learning basics of clusters, software performance and availability in HA OSCAR.