

Project Report

1 October 2006

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Resources Reviewed

The following are the resources that have been reviewed during the past period. It should be noted that quite a few of the articles are purely educational (describing what a certain piece of technology does) and/or academic (the theory behind the technology). Real practical information is still hard to come by, even with the reduced scope of the project. Also note that the subject areas are quite foreign to the student, so some learning is required.

Redundancy with Standards in Industrial Ethernet LANs

<http://www.garrettcom.com/techsupport/papers/redundancy.pdf>

This paper suggests that we use ring topology with IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for redundancy and fast recovery. The older version of the protocol (Spanning Tree Protocol, STP, 802.1d) is available more widely in commercial equipments; its convergence time is 30 to 50 seconds. RSTP is designed to be faster and compatible with STP, and some vendor might offer their own proprietary version of it. The papers suggests the use of ring topology because using "daisy-chain" or sequential point-to-point topology is optimal for minimizing cabling, and routing the end of the cable back to the router/switch is fairly easy. This provides a ring network with redundancy.

Network Topology

http://en.wikipedia.org/wiki/Network_topology

<http://www.delmar.edu/Courses/ITNW2313/network.htm>

<http://www.networkdictionary.com/networking/mesh.php>

Many resources has suggested that mesh topology provides the best redundancy, but it is also the most expensive to install. In a fully connected mesh network, one node is connected to every other node; the number of connections can be reduced to form a partial mesh, which is less expensive to implement. Of course it would be impossible to build the mesh network by using individual computers as nodes, but it can be a good idea to use routers/switches as nodes. Another topology is the ring topology, it is easier to install and still provides redundancy, as mentioned above.

High-availability cluster

http://en.wikipedia.org/wiki/High-availability_cluster

HA clusters are computer clusters that are implemented primarily for the purpose of improving the availability of services they provide. It uses redundant computers (or "nodes") to provide service in case part of the system fails. This is often used for key databases, file sharing, business applications, and customer services. Products found extensively in commercial or research/academic use:

[HA-OSCAR](#) - High Availability Open Source Cluster Application Resources

[Veritas Cluster Server](#) - multi-platform

[Sun Cluster](#) - Solaris only

[OpenVMS](#) - The original clustering OS
[HP ServiceGuard](#) for HP-UX and Linux
[Linux-HA](#) — a commonly used free software HA package for the Linux OS.
[High Availability Cluster Multiprocessing](#) aka IBM HACMP for AIX
[Microsoft Cluster Server](#) (MSCS) - Windows only

IEEE Task Force on Cluster Computing: High Availability

<http://www.ieeetfcc.org/high-availability.html>

Provides some links to common commercial HA products

Network attached storage

http://en.wikipedia.org/wiki/Network-attached_storage

This article is mostly educational but has noted a few free NAS software which can be used to build custom NAS servers: [FreeNas](#), [NASLite](#) and [Openfiler](#)

Andrew File System (AFS)

http://en.wikipedia.org/wiki/Andrew_file_system

This is a distributed networked file system developed by Carnegie Mellon University, and is the file system used in the University of Auckland. The benefits include good security and scalability over traditional networked storage solutions. Free implementations include [OpenAFS](#) and [Arla](#).

Reliability, Availability and Optimization

<http://www.weibull.com/systemrelwebcontents.htm>

Too theoretical

Reliability and Availability

http://www.eventhelix.com/RealtimeMantra/FaultHandling/reliability_availability_basics.htm

Too theoretical

Hardware Fault Tolerance

<http://www.eventhelix.com/RealtimeMantra/HardwareFaultTolerance.htm>

Too theoretical

Storage area network

http://en.wikipedia.org/wiki/Storage_area_network

Purely educational

Disaster recovery

http://en.wikipedia.org/wiki/Disaster_recovery

Purely educational

Remote backup

http://en.wikipedia.org/wiki/Remote_backup

Purely educational