CePOINT Networks

Cepoint Cluster Server

CEP™ Cluster Server …turnkey system.

ENTERPRISE HIGH AVAILABILITY, High performance and very reliable Super Computing Solution for heterogeneous applications environment.

This document briefly gives an overview application solution, features and benefits of CEP Cluster system for High Availability applications. A lot of times people get confused about "fault-tolerant" clustering and "Shared Storage" or "non-stop" server cluster.

The purpose of CEP Cluster Server is to provide high availability and fail resilient, blazing performance, super computing resources equal to a super computer performance level, but at far less cost and a higher ease of manageability, flexibility and scalability. Thus CEP Cluster as a whole acts as a single high performance, highly available Virtual Server or Super Computer, ensuring that in the event of a failure or disaster, clients and end users are transparently moved to a surviving cluster node without disruption.

OVERVIEW

CEP Cluster Server™ is a highly integrated super computing solution adopting selected third party software vendors for highly scalable, high availability and very reliable Enterprise application solutions. CEP Cluster architecture is an open, non- proprietary cluster system that is ideal for eliminating planned and unplanned downtime, and consolidate server management across the enterprise or campus.

CEP Cluster is an affordable, easy-to-use server clustering solution for campus level clustering, small businesses, branch offices or

High level Enterprise users who want to make applications highly available. CEP Cluster Server can support from two-server cluster configurations, scalable up to 32 server nodes , easily integrated with other Cepoint solutions and many other industry standard computing resources available with minimal training. CEP Cluster Server supports heterogeneous computing environment such as Windows, Linux, HP/UX, Solaris, Unix and IBM AIX, and a host of different Networks, Switches, SAN and NAS so resources and applications can be managed transparently across the enterprise. And automated action is taken to avoid failures or recover failed services quickly.

CEP Cluster Server is Ideal For:

• First-time users who want to make applications highly available

• Organizations managing availability of applications at campus settings and remote sites

• Application Service Providers (ASPs) and similar organizations that must quickly and easily provide customers with the extra security of highly available applications

• Customers who want to reduce training and support costs by standardizing availability solutions across platforms
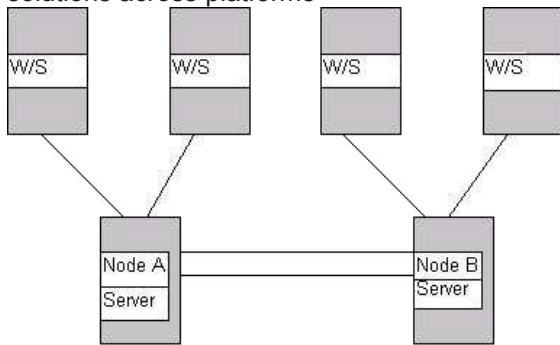
In a CEP Cluster Server, two or more servers (or nodes) are connected through a shared storage device — either directly attached or via a storage area network (SAN). If an unexpected outage occurs on one of the nodes in the cluster, CEP Cluster Server will shut down the application or service running on the failed node and restart it on one of the healthy server node.

Fig 1a: 2-Node Cluster with "Heartbeat" monitoring
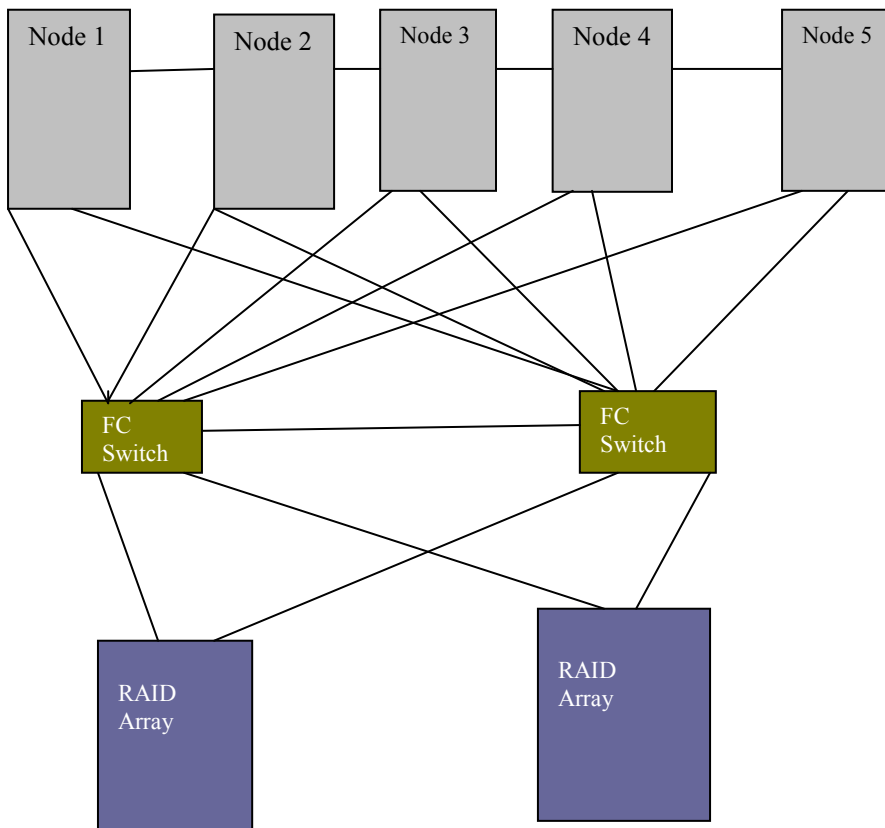
Figure 2. Example of a 5-Node CEP Cluster with shared storage arrays.

CEP Cluster Server features configuration wizards to make installation easy, while a clear, intuitive, Web-based graphical user interface (GUI) allows information technology (IT) personnel to manage application availability from virtually anywhere.
CEP Cluster Server provides support for standard file systems such as Oracle and Network File System (NFS), and supports virtually any Oracle compatible application software by third party software vendors.

CEP Cluster Server is Highly Scalable

CEP Cluster Server is scalable up to 32 nodes. And unlike some other vendor's clusters that's is had to manage, CEP Clusters' Java GUI (Graphical User Interface) simplifies management and administration of the clusters servers by even untrained IT staff not experienced in high availability computing platform. Thus increasing application uptime, utilizing minimal support and training and allowing IT staff to easily make broader range of applications highly available.

Customizable agent templates are available to support virtually any application. Allowing IT staff to monitor and administer application availability from anywhere across the enterprise or campus.

Server Consolidation and Intelligent workload management

CEP Cluster Server supports centralized management and intelligent monitoring of system resources, capacity, resource availability, automated migration of application services and optimum load distribution among the nodes.

Third party vendor software's can easily Integrate with CEP Cluster Manager to allow a unified management of all local CEP Cluster Server and other remote CEP Cluster Servers worldwide.

This flexible features plus CEP Cluster Server support for Windows platforms, Linux, HP/UX, Solaris, Unix and IBM AIX, and support for a host of different Networks, Switches, SAN and NAS makes CEP Cluster Server the most flexible choice for High Availability, High performance and High reliability super computing solution your IT staff will be pleased with.

Besides the huge savings in your TOC (Total Cost of Ownership) and ROI (Return on Investments) out weighs any other thing.

How does a clustering solution like CEP differ from a "fault-tolerant" or "nonstop" server?

The answers to this varies, depending on system configurations, applications requirements and configurations and host of other requirements associated with the entire enterprise demands.

CEP clusters with Redundant RAID systems support can take advantage of both "fail-tolerant" and "non-stop" server cluster. CEP clusters offer high availability. The term "fault-tolerant" is generally used to describe technology that offers a higher level of resilience and recovery. "Fault-tolerant" servers typically use a high degree of hardware redundancy plus specialized software to provide near-instantaneous recovery from any single hardware or software fault. Examples of fault tolerant servers include Cepoint's CEP Non-Stop Cluster Servers which are based on Windows NT Server or Linux). These solutions cost significantly more than a simple, two node local clustering solution, because you must pay for redundant hardware that waits idly for a fault from which to recover. Fault-tolerant servers are used for applications that support very high value, high rate transactions such as check clearinghouses, Automated Teller Machines (ATMs), or stock exchanges.

CEP Cluster Server and Windows NT Load Balancing Service

How does CEP Cluster Server work with Windows NT or Linux Load Balancing Service?

Windows NT or Linux load balancing service is fully complementary to CEP Cluster Server. CEP Clustering Service provides a non-stop reliable platform for data base, messaging and related application services through fail-over clustering for two nodes. CEP Load Balancing Service balances and distributes client connections (TCP/IP connections) over multiple servers. In a three tier model, CEP handles the application layer and the data layer, while the Load Balancing Service is focused on handling the front end connections. When used together, CEP Cluster Server and Windows NT or Linux Load Balancing Service provides customers with a highly scalable, reliable and available system. This is an industry leading way to combine transactional systems with a web-based front end,

and to deliver the scale, availability and robustness demanded by enterprise class customers

Some other vendors offer high-availability solutions that use mirrored disks rather than shared storage. What are the criteria customers should use when comparing mirrored-disk solutions to CEP Cluster solution?

Many of the simpler failover products currently available for Windows NT or Linux Server can only recognize and recover from complete server failures. CEP cluster Server system, on the other hand, is a true clustering solution that can also monitor individual applications and resources. CEP Cluster Server system automatically recognizes and recovers from more failure conditions, and provides administrators with greater flexibility in managing the workload within a cluster.

Simple failover products monitors only single "heartbeat" per server. CEP Cluster server system can monitor multiple server heartbeats PLUS up to two different types of heartbeat for each application and resource: a quick "looks alive" heartbeat, plus an optional "is alive" heartbeat that can perform a more extensive check to detect subtle failure conditions. These heartbeats are very efficient and typically have no appreciable impact on cluster performance. However, the person administering a cluster can easily change the polling rate for any of these heartbeats at any time using the CEP graphical administrator's console.

With the increasing performance of standard server hardware, many customers today are running mixed workloads, rather than having dedicated single-purpose servers. Unlike simple failover products that can only manage entire physical servers, CEP simplifies the management of mixed workloads

with its concept of "cluster groups": a collection of applications and resources that, together, constitute a single business process, or a "virtual server." CEP lets administrators establish different failover policies and priorities for each cluster group so that mixed workloads are recovered correctly in the event of an application or server failure. CEP also lets administrators easily adjust server workload within a cluster by moving individual business processes (for example, cluster groups) between servers with a simple point-and-click action from the graphical CEP administrator's console.

CEP Cluster system provides failover for individual applications and for whole servers. Other high availability solutions only provide failover for servers. What are the implications of this difference?

Many of the simpler failover products currently available for Windows NT or Linux environment can only recognize and recover from complete server failures. CEP Cluster Server, on the other hand, is a true clustering solution that can also monitor individual applications and resources on different nodes. This allows CEP Cluster Server to automatically recognize and recover from more failure conditions, and provides administrators with greater flexibility in managing the workload within the cluster or computing environment.

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HOW ARE MY SYSTEMS CONNECTED OR INTER-CONNECTED?

Cepoint's CEP Cluster communicates via interconnect cards (the mode of communications and connections depends on your applications and configuration requirement. But primarily the two common modes are:

　　1) SCSI to SCSI and 2) TCP/IP protocol

Giga-FAST Interconnect Cards in a CEP Cluster Configuration

Super Fast Interconnect cards are what CEP Clusters uses to communicate between each nodes of the cluster. This network needs to be high-speed and highly reliable. The heartbeat of a cluster is constantly sent back and forth across this network to keep track of which nodes are up in the cluster. The cluster database records and checkpoint

information are sent across this network as well. The most important aspects of this are the speed at which packets can be sent over the network, the number of dropped packets, and the reliability.

These are CEP Cluster components used for interconnect communications. The cards that are used in Cepoint Clusters for both public or private network communications are:

1. NIC with industry standard NDIS drivers.

2. Any card that can pass 100% of Windows NT NDIS tests or compatible with Linux. Point to Point network cards can function as a interconnect card and can be used as emergency replacement in any node that its NIC fails.

3. The nodes uses FC or SCSI RAID HBA (With External Port)

4. The R-STOR Cluster Server Storage-Subsystems uses SCSI or FC HW RAID components

STORAGE connection/Inter-connection:

The cluster configuration with RAID features normally will use shared storage bus.

Shared Storage Bus in CEP Cluster Configuration

The shared SCSI bus is probably the most sensitive part of CEP cluster configuration. There are four components that potentially make up the shared SCSI bus, although not all four are required for any given configuration. The components are:

• Fibre Channel Adapter or SCSI Adapter

• SCSI RAID Protocol (Used in every Node)

• SCSI RAID Subsystem (Cepoint's R-STOR Array Server Storage Sub-System)

RAID: A RAID that is done with no knowledge of the operating system. As far as Windows NT/2K knows, these RAID sets appear to be a normal physical disk and the RAID operations are all done in hardware

- Minimum of 250 MB free hard disk space on system installation drive required.

CEP Cluster in Windows Shared Storage Bus Channel configuration
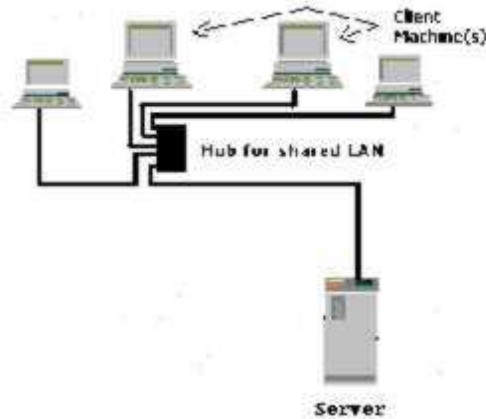
Figure 1. **Sample Connection for Standard Server with no clustering. Server failure brings down the whole network.**
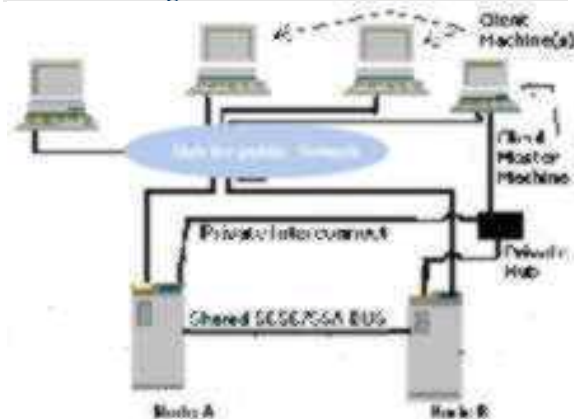
Figure 2. Standard 2-Node CEP Cluster configuration using FC or SCSI host bus. Here

In figure-2 illustration above, each node has its own local disks (mirrored or single). More nodes can be added but that increases the total cost. An R-STOR shared Storage Server sub-system (not shown on the illustration) with Hot-swappable Redundant drives can be added for fault-tolerance. One node automatically handles application transactions until the failed node is restored to health.

CEP Cluster server system is scalable to 32 nodes, with each node configurable with up to two (2) 64-bit processors for a total of 64 CPU's and redundant, fail-resilient storage of 16TB or shared storage array of 48TB.

For pricing information contact sales representative: sales@cepoint.com
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