

# windows cluster server



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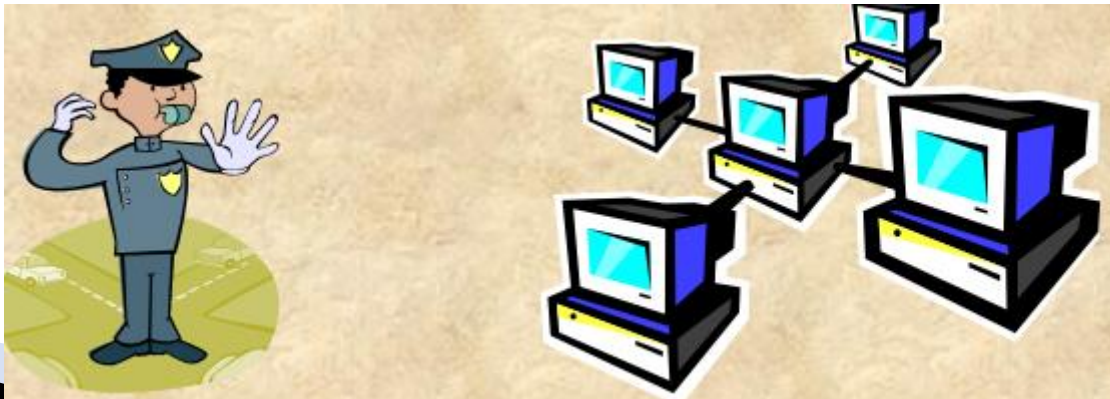
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# introduction

- ▶ A cluster connects two or more servers together so that they appear as a single computer to clients. each computer in a cluster is referred to as a **node** Connecting servers in a cluster allow:-
  - ▶ 1- for workload sharing.
  - ▶ 2- enables a single point of operation/management.
  - ▶ 3- provides a path for scaling to meet increased demand.Thus, clustering gives you the ability to produce high availability applications.



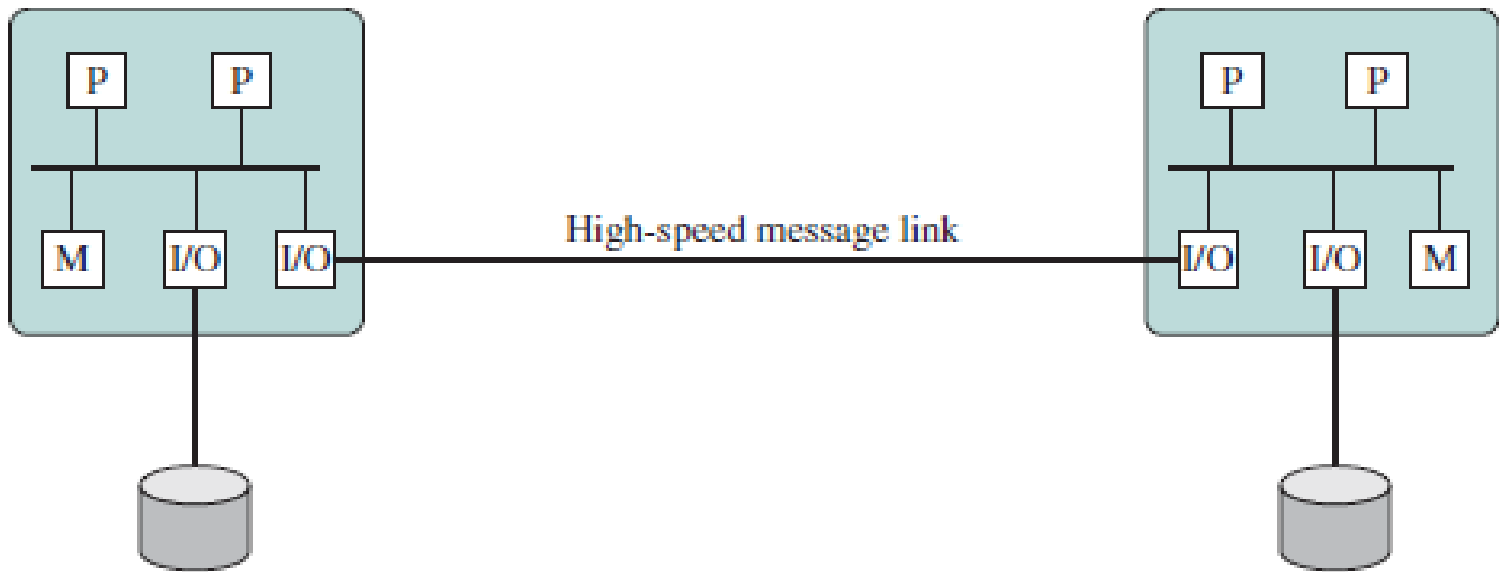
# Classifications of clustering

Three classifications of clustering can be identified:

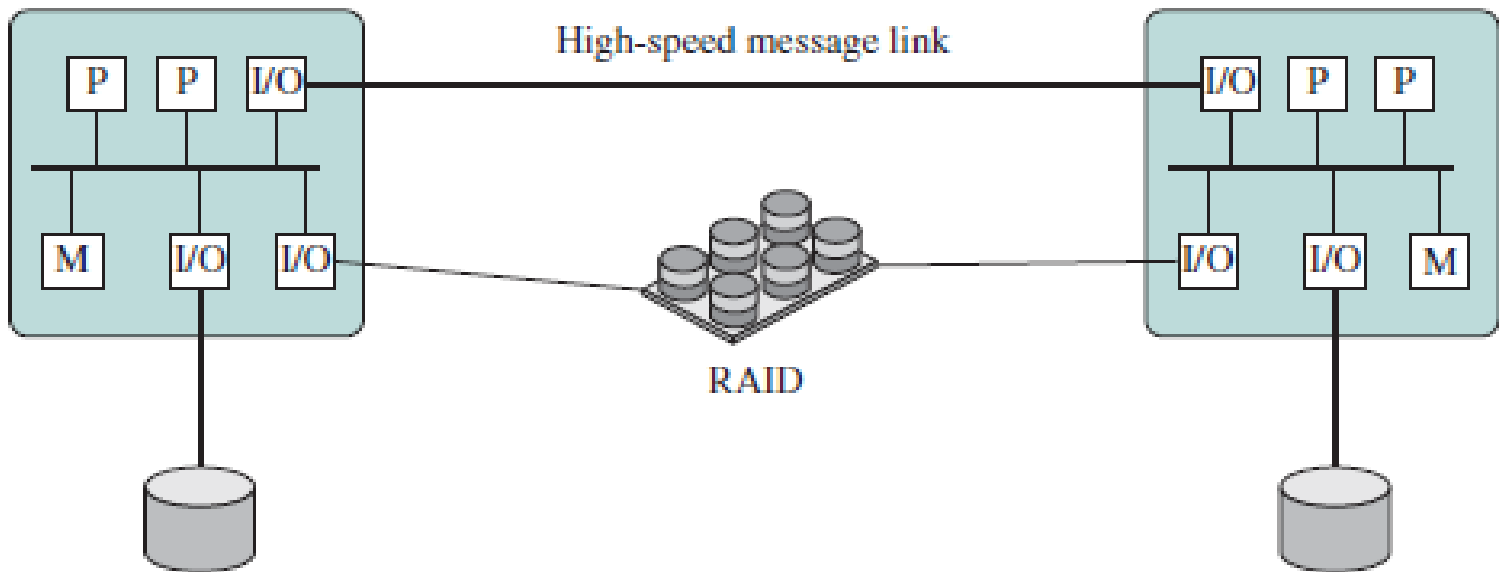
(1): separate servers:– mean each computer with its own disks and there are no disks shared between system.

(2) shared nothing:– mean most clusters now consist of servers connected to common disks the common disks are partitioned into volume each volume is owned by a single computer.

(3) shared memory; computers share the same disks at the same time so that each computer has access to all of the volumes on all of the disks.



(a) Standby server with no shared disk

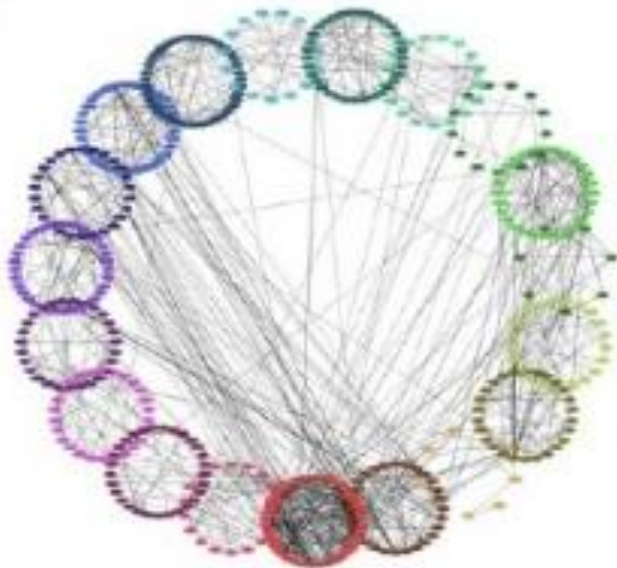


(b) Shared disk



# Cluster Catagorization

- High-availability (HA)
- Load-balancing
- High-Performance



# Windows cluster server

Windows Failover Clustering is a shared-nothing cluster, in which each disk volume and other resources are owned by a single system at a time.

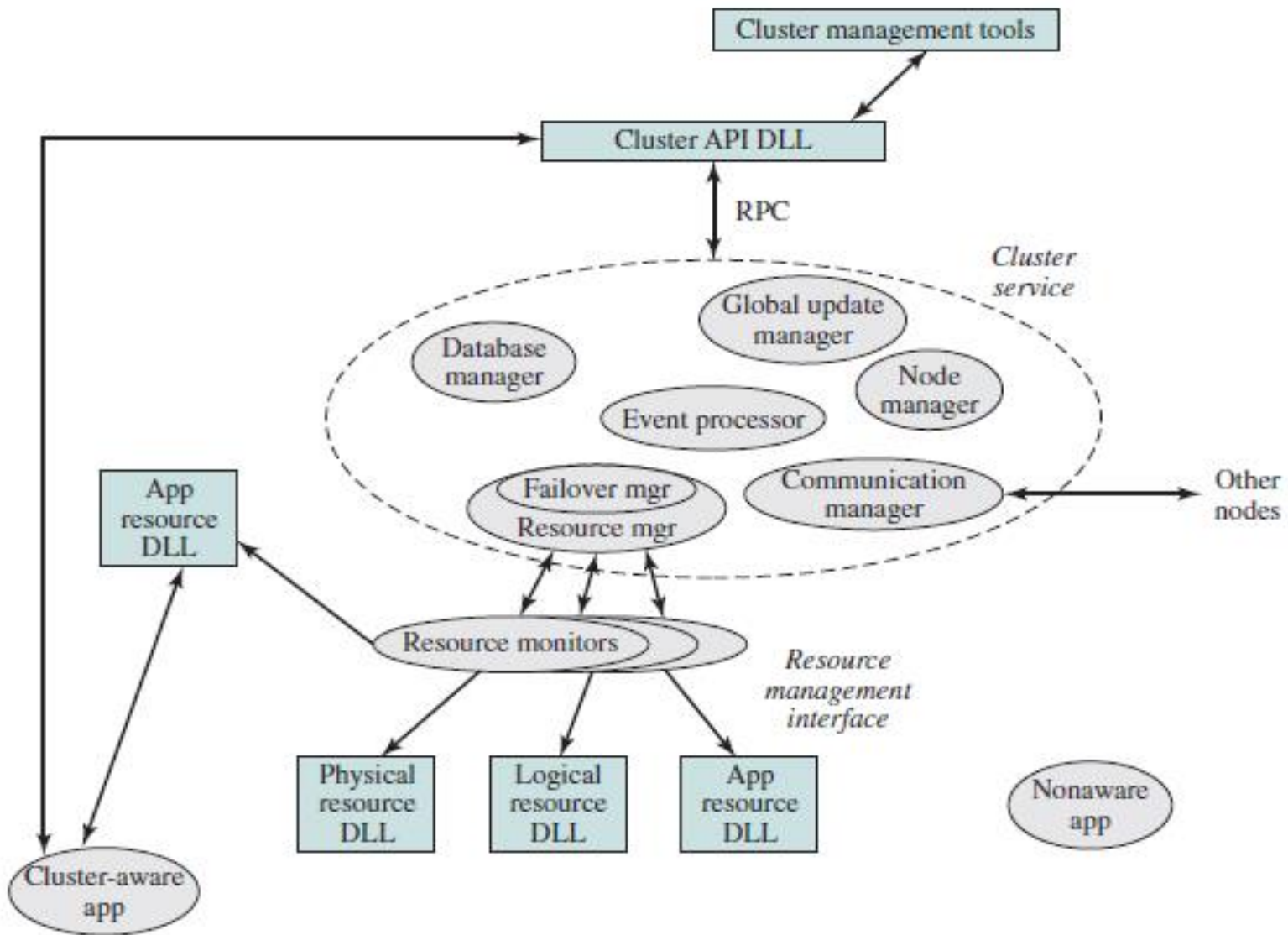
The Windows cluster design makes use of the following concepts:

- Cluster Service: The collection of software on each node that manages all cluster-specific activity.
- Resource: An item managed by the cluster service. All resources are objects representing actual resources in the system, including hardware devices such as disk drives and network cards and logical items such as logical disk volumes .

- **Online:** A resource is said to be online at a node when it is providing service on that specific node.

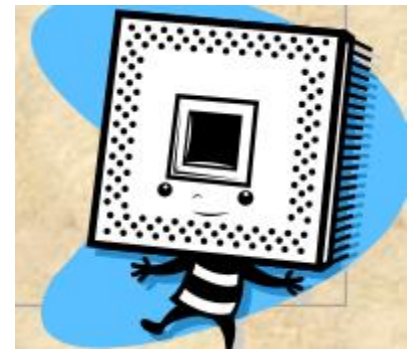
- **Group:** A collection of resources managed as a single unit.





The **node manager** is responsible for maintaining this node's membership in the cluster. Periodically, it sends heartbeat messages to the node managers on other nodes in the cluster.

The **configuration database manager** maintains the **cluster configuration** database. The database contains information about resources, groups and node ownership of groups.



**resource manager/failover manager makes all decisions regarding resource groups and initiates appropriate actions such as startup, reset, and failover.**

**event processor connects all of the components of the cluster service, handles common operations, and controls cluster service initialization.**



# Windows Clustering technologies

(1) Network Load Balancing Provider allows developers to create remote administration and configuration tools as well as customized user interfaces for Network Load Balancing clusters.

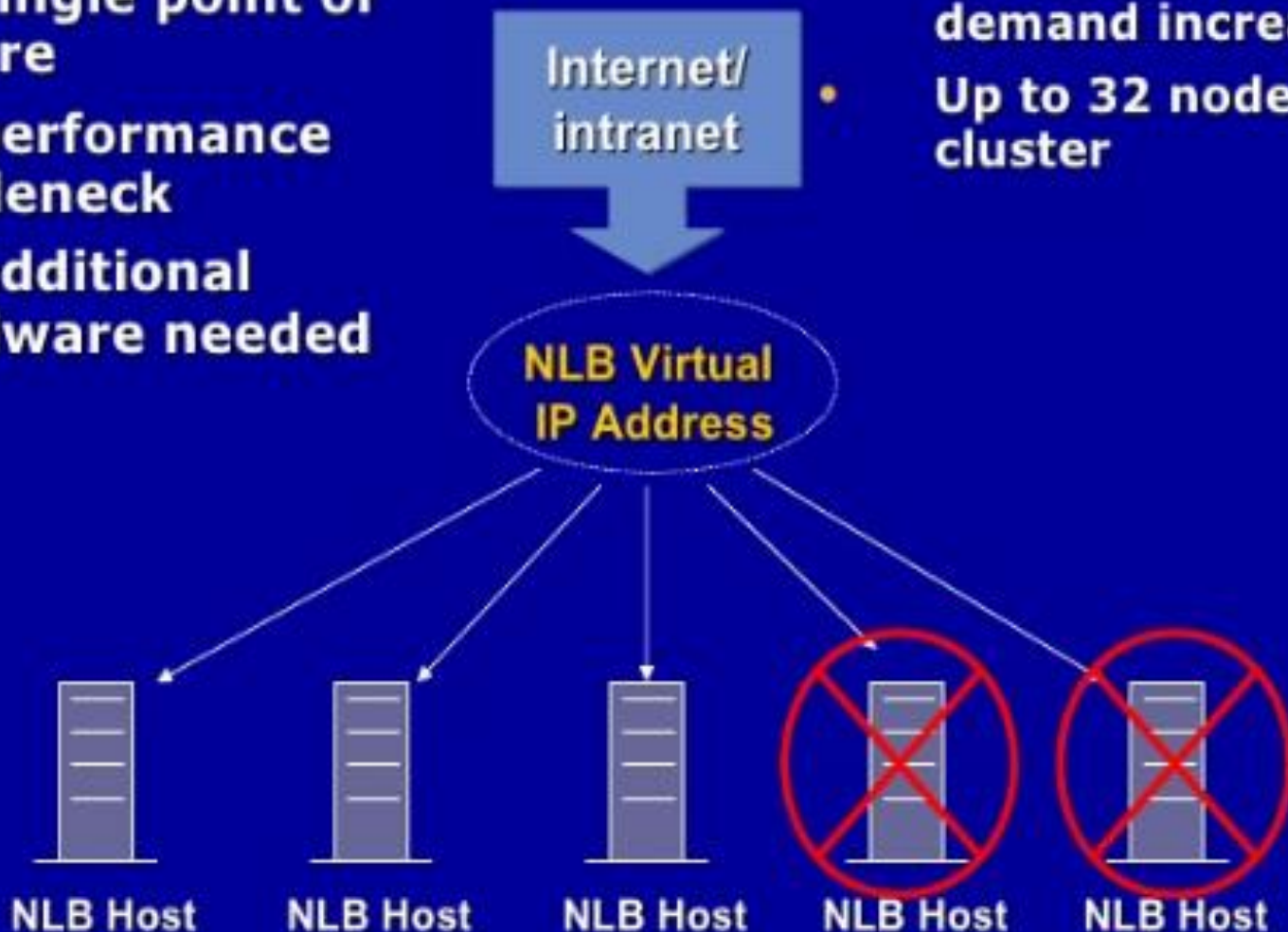
(2) Failover Cluster APIs allow developers to create cluster-aware applications, implement high availability for new types of resources, and create remote administration and configuration tools

# Network Load Balancing Cluster

## Logical View

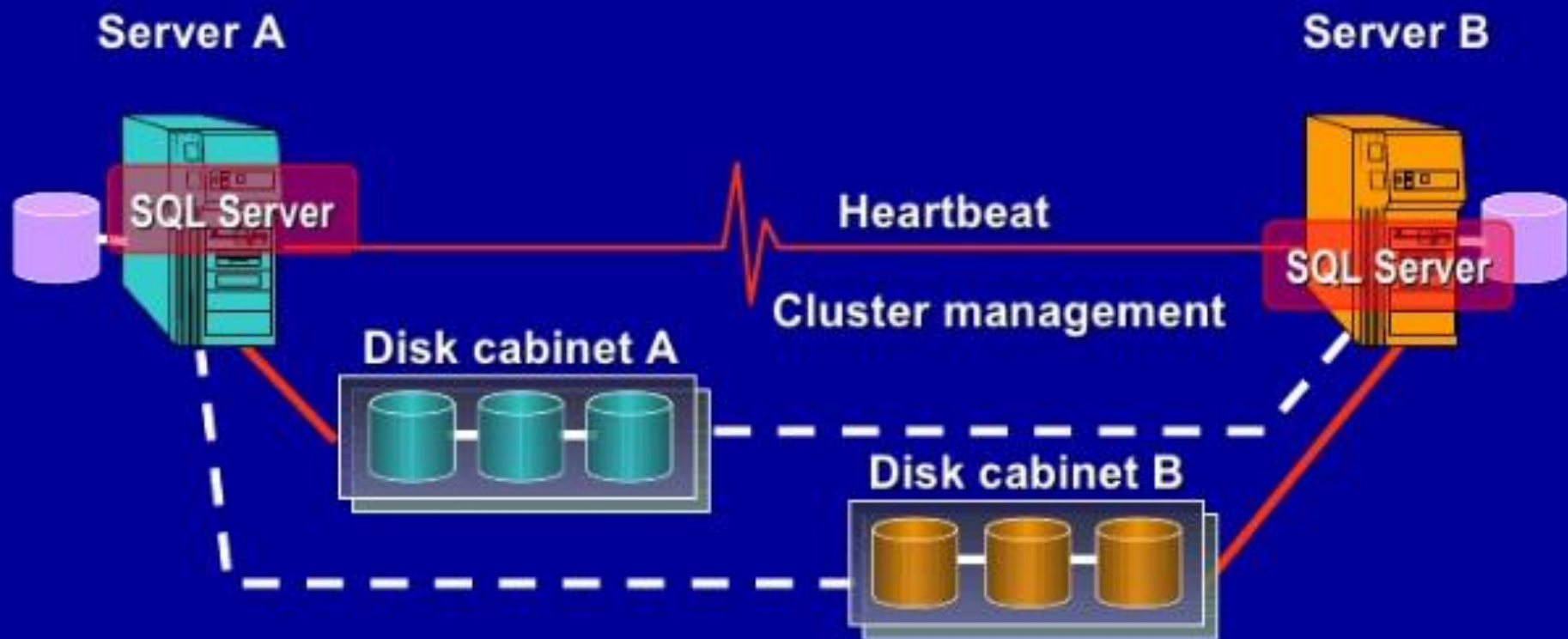
- No single point of failure
- No performance bottleneck
- No additional hardware needed

- Grow incrementally as demand increases
- Up to 32 nodes in a cluster



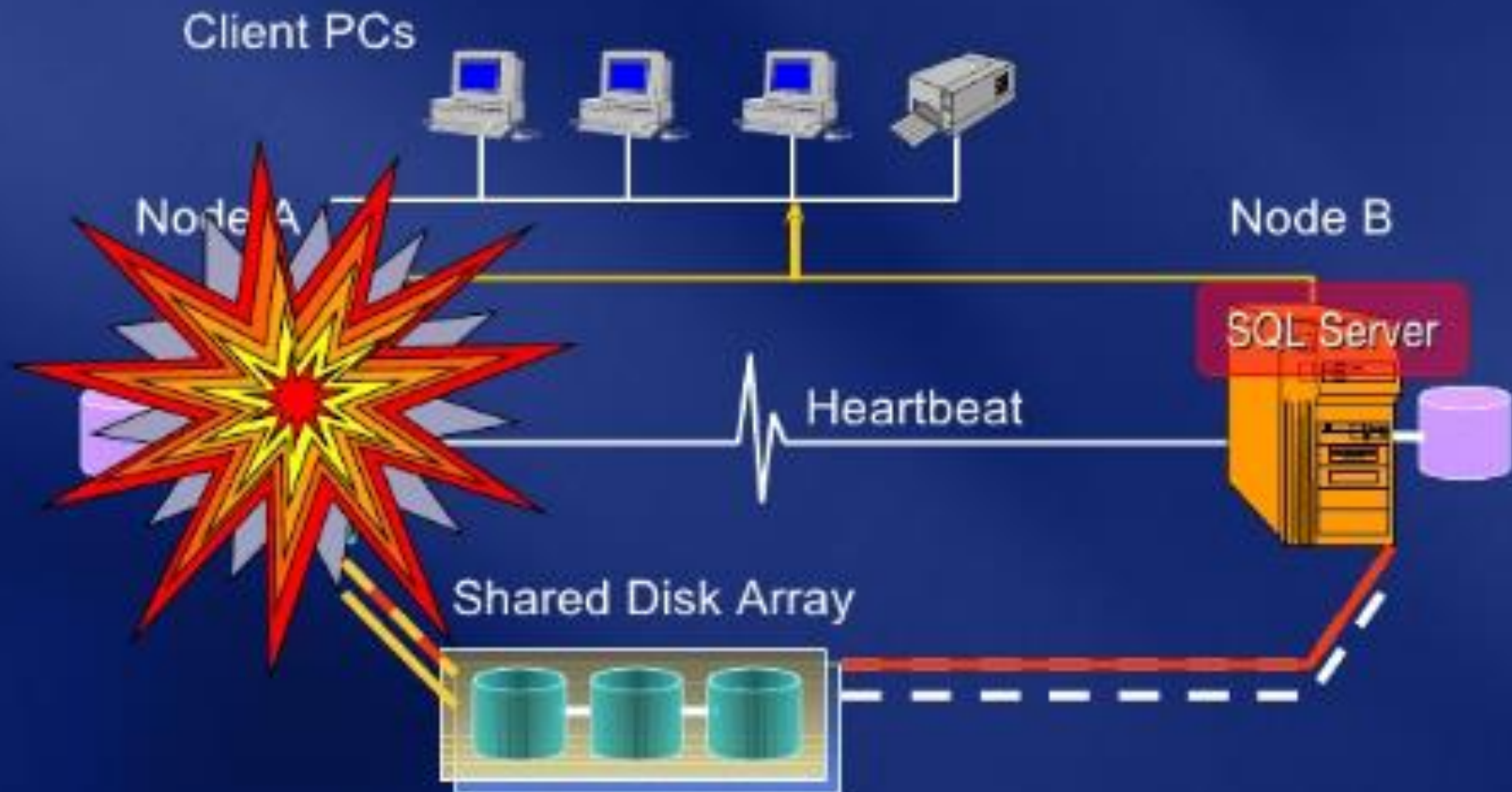


# Failover Cluster in Action





# Illustration Of Failover



- ▶ With Windows Server Failover Clustering, each active server has another server identified as its standby server.
- ▶ In order for a failover cluster to work, each server's hardware specifications must be the same and the servers must share storage.



- ▶ The two servers communicate through a series of "heartbeat" signals over a dedicated network. If the signals are initiated by the active server and sent to the standby signal at specific intervals, they are called *push* heartbeats. If the standby server does not receive a push heartbeat within a certain amount of time, it takes over and becomes the active server. Communication signals can also be sent from the standby server to the active server; these are called *pull* heartbeats. If the active server doesn't respond to a pull heartbeat within a certain amount of time, the standby server determines that the active server has failed and takes over.

# Conclusion:-

- ▶ A windows failover cluster is a group of independent servers and working together to increase the availability of services and applications. When a failure occurs on one computer in a cluster, resources are redirected and the workload is redistributed to another computer in the cluster. You can use failover clusters to ensure that users have nearly constant access to important server-based resources. The clustered servers (called nodes) are connected by physical cables and by software. If one of the nodes fails, another node begins to provide service through a process known as failover.

# References:-

- ▶ [Windows Server Technologies: Failover Clusters](#)
- ▶ [Storage Spaces Direct \(S2D\) Overview](#)
- ▶ [Failover Clusters in Windows Server 2008 R2](#)
- ▶ [View Events and Logs for a Failover Cluster](#)
- ▶ [Get-ClusterLog Failover Cluster Cmdlet](#)

