A computer cluster is a group of linked computers, working together closely so that in many respects they form a single computer.

- It is designed with an array of interconnected individual computers and the computer systems operating collectively as a single standalone system.

- It is a group of workstations or computers working together as a single, integrated computing resource connected via high speed interconnects.

- A node – Either a single or a multiprocessor network having memory, input and output functions and an operating system.

- Two or more nodes are connected on a single line or every node might be connected individually through a LAN connection.

Cluster Classification

- High performance clusters (HPC)

    Parallel, tightly coupled applications

- High throughput clusters (HTC)

    Large number of independent tasks

- High availability clusters (HA)

    Mission critical applications

- Load balancing clusters

    Web servers, mail servers, …

- Hybrid clusters

    Example: HPC+HA

1. High performance (HP) clusters :

With a high performance computing cluster, multiple computers, or nodes, are linked together through a local-area network (LAN) to create an

HPC cluster architecture. HP clusters use computer clusters and supercomputers to solve advance computational problems.

They are designed to take benefit of the parallel processing power of several nodes.

2. Load-balancing clusters:

Here workload is equally distributed across multiple installed servers in the cluster network. Incoming requests are distributed for resources

among several nodes running similar programs or having similar content. This type of distribution is generally used in a web-hosting environment.

3. High Availability (HA) Clusters :

A group of clusters which ensure to maintain very high availability. This are very much reliable.

High-availability clusters (also known as Failover Clusters) are implemented for the purpose of improving the availability of services

which the cluster provides. It provide redundancy and eliminate single points of failure.

Single System Image (SSI)

A single system image is the illusion created by software or hardware, that presents a collection of resources as one, (single)more powerful resource.

SSI makes the cluster appear like a single machine to the user, to applications, and to the network.

A cluster without a SSI is not a cluster

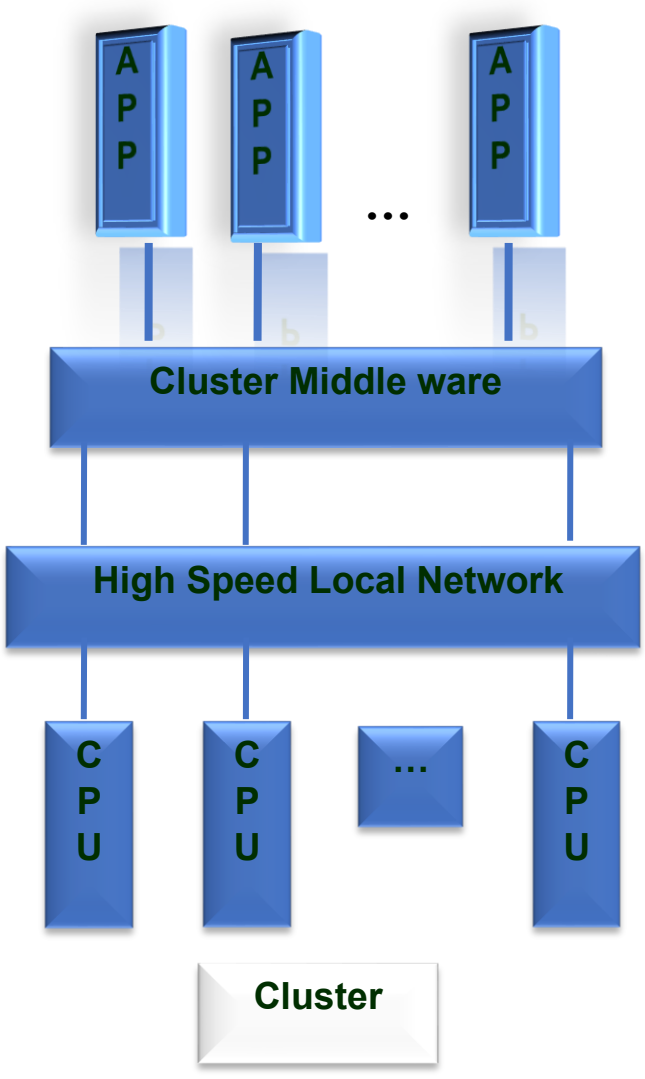
Cluster consists of:

- Nodes

- Network

- OS

- Cluster middleware



Advantages of Cluster Computing :

1. High Performance :
The systems offer better and enhanced performance than that of mainframe computer networks.

2. Easy to manage :
Cluster Computing is manageable and easy to implement.

3. Scalable :
Resources can be added to the clusters accordingly.

4. Expandability :
Computer clusters can be expanded easily by adding additional computers to the network. Cluster computing is capable of combining several additional resources or the networks to the existing computer system.

5. Availability :
The other nodes will be active when one node gets failed and will function as a proxy for the failed node. This makes sure for enhanced availability.

6. Flexibility :
It can be upgraded to the superior specification or additional nodes can be added.

Some of the popular implementations of cluster computing are Google search engine, Earthquake Simulation, Petroleum Reservoir Simulation, and Weather Forecasting system.