HPC cluster computers

The term **cluster computing** is used to denote nothing but two or more computers that are networked together to provide solutions as required. However, this idea should **not be confused** with a more general **client-server** model of computing as the idea behind clusters is quite unique.

A cluster of computers **joins** computational powers of the **compute nodes** to provide a more **combined computational power**. Therefore, as in the client-server model, rather than a simple client making requests of one or more servers, cluster computing utilize multiple machines to provide a more powerful computing environment perhaps through a **single operating system**.

In its simplest structure, HPC clusters are intended to utilize **parallel computing** to apply more processor force for the arrangement (solution) of a problem. HPC clusters typically have a large number of computers (often called **'nodes'**) and, in general, most of these nodes would be configured **identically**. Though from the out side the cluster may **look like a single system**, the internal workings to make this happen can be quite complex.

Computer clusters emerged as a result of convergence of a number of computing trends including the availability of low-cost microprocessors, high speed networks, and software for **high-performance distributed computing**. They have a wide range of applicability and deployment, ranging from small business clusters with a handful of nodes to some of the fastest supercomputers in the world!

Supercomputers vs. HPC clusters

According to Jan Christian Meyer's Quora response: "**Supercomputer** isn't a name for one particular type of computer, it's a term that refers to computers used to solve problems which require processing capabilities nearly as big as

anyone can build at a given time. The types of systems that people call

supercomputers change over time, supercomputers of yesteryear aren't that super any more.

Cluster computers are loosely coupled parallel computers where the computing nodes have individual memory and instances of the operating system, but typically share a file system, and use an explicitly programmed high-speed network for communication. The term loosely refers to the technicalities of how such machines are constructed."

> "clusters" and "high-performance computing" are synonymous.

All the ideas that went into the design of supercomputers are now part of your everyday personal computer. So there is no real distinction anymore between personal computers and super computers: a supercomputer is just a cluster with a large number of ordinary processors. So the super prefix comes from the days when high performance computing was only done on very special machines called supercomputers. Those days are largely gone. Only NEC still makes processors that are descendants of the old supers, but even they put them in a cluster. Now-a-days, every "super" computer these days is a cluster.