2.1.3 Types of Computing (Distributed, Parallel, Grid)

Parallel computing

In parallel computing multiple processors perform multiple tasks assigned to them simultaneously. Memory in parallel systems may be shared or distributed.

Distributed computing

It consists of multiple autonomous computers which appear like a single system. So there is no shared memory and computes communicate (message passing) with each other using network.

Grid computing

The computation is divided into multiple tasks and each task is processed on different machine in parallel. Each machine may be able to handle only the fraction of the work and potentially handle only one job at a time therefore grid computing is suitable for large number of small to medium size tasks.

A grid configuration can help in optimizing both cost and performance. Computation relies on several low cost machines instead of single high-end server. The environment can be scaled relatively cheaply and quickly.

Differences between Parallel Computing and Distributed Computing

1. In parallel computing many operations are performed simultaneously. In distributed computing system components are located at different locations.

2. In parallel computing single computer is used while distributed computing uses multiple computers.

3. In parallel computing multiple processors perform multiple operations and in distributed computing multiple computers perform multiple operations.

4. Parallel computing may use shared or distributed memory but distributed computing has to use only distributed memory.

5. Processors communicate with each other through bus in parallel computing. Computers communicate with each other through message passing in distributed computing.

6. Parallel computing improves the system performance but distributed computing improves system scalability, fault tolerance and resource sharing capabilities.