

# CLOUD COMPUTING

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# What is Cloud?

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The term **Cloud** refers to a **Network** or **Internet**. In other words, we can say that Cloud is something, which is present at remote location. Cloud can provide services over public and private networks, i.e., WAN, LAN or VPN.

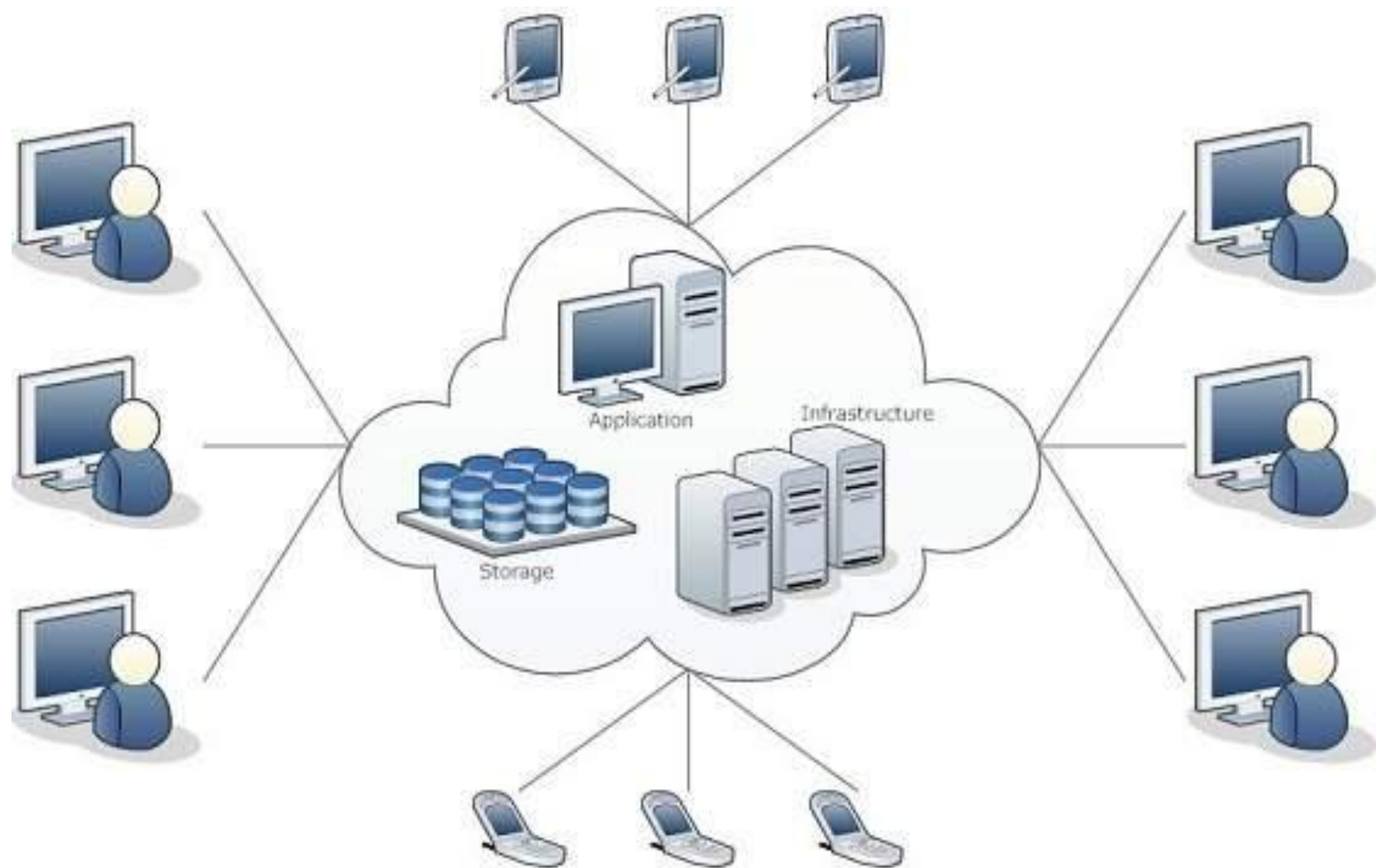
Applications such as e-mail, web conferencing, customer relationship management (CRM) execute on cloud.

# What is cloud Computing??

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The practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer .

Cloud Computing refers to **manipulating, configuring, and accessing** the hardware and software resources remotely. It offers online data storage, infrastructure, and application.



# Types of Clouds

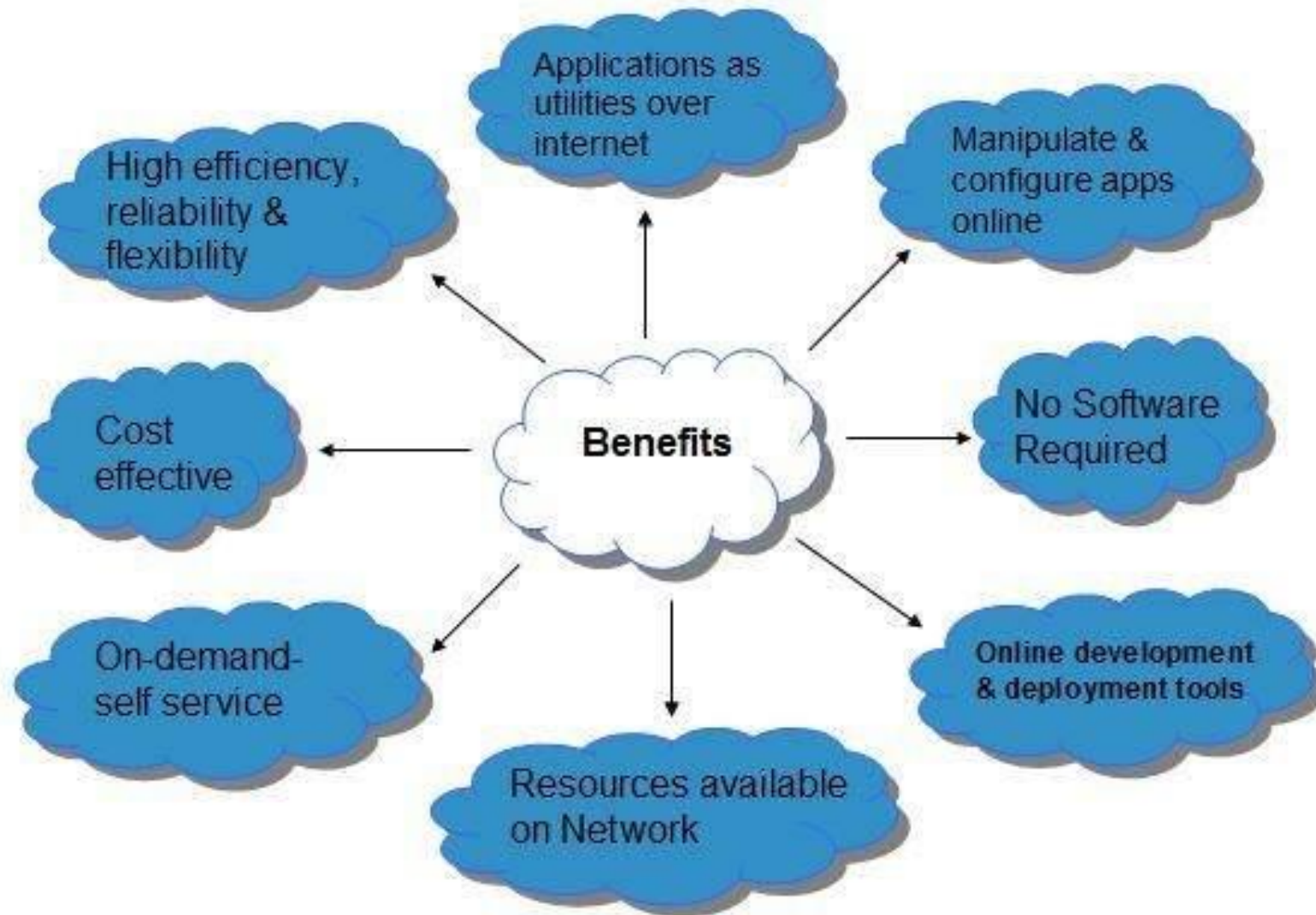
1. Public Cloud
2. Private Cloud
3. Hybrid Cloud
4. Community Cloud

## Advantages

- Reduced hardware cost
- Unlimited storage and reliability
- Reduced cost
- Location independence, availability and compatibility
- Easier group collaboration

## Disadvantages

- Internet Connection
- Data integrity and security
- New technology and incompleteness



## High-Performance Computing

- In high-performance computing systems, a pool of processors (processor machines or central processing units [CPUs]) connected (networked) with other resources like memory, storage, and input and output devices, and the deployed software is enabled to run in the entire system of connected components.
- HPC include a small cluster of desktop computers or personal computers (PCs) to the fastest supercomputers. HPC systems are normally found in those applications where it is required to use or solve scientific problems.

## Parallel Computing

Parallel computing is also one of the facets of HPC. Here, a set of processors work cooperatively to solve a computational problem. These processor machines or CPUs are mostly of homogeneous type.

One can distinguish between conventional (also known as serial or sequential or Von Neumann) computers and parallel computers in the way the applications are executed.

In serial or sequential computers, the following apply:

- It runs on a single computer/processor machine having a single CPU.
- A problem is broken down into a discrete series of instructions.
- Instructions are executed one after another.



In parallel computing, since there is simultaneous use of multiple processor machines, the following apply:

- It is run using multiple processors (multiple CPUs).
- A problem is broken down into discrete parts that can be solved concurrently.
- Each part is further broken down into a series of instructions.
- Instructions from each part are executed simultaneously on different processors.
- An overall control/coordination mechanism is employed.

## Distributed Computing Paradigms

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Distributed computing is also a computing system that consists of multiple computers or processor machines connected through a network, which can be homogeneous or heterogeneous, but run as a single system.

P2P Computing

Grid Computing

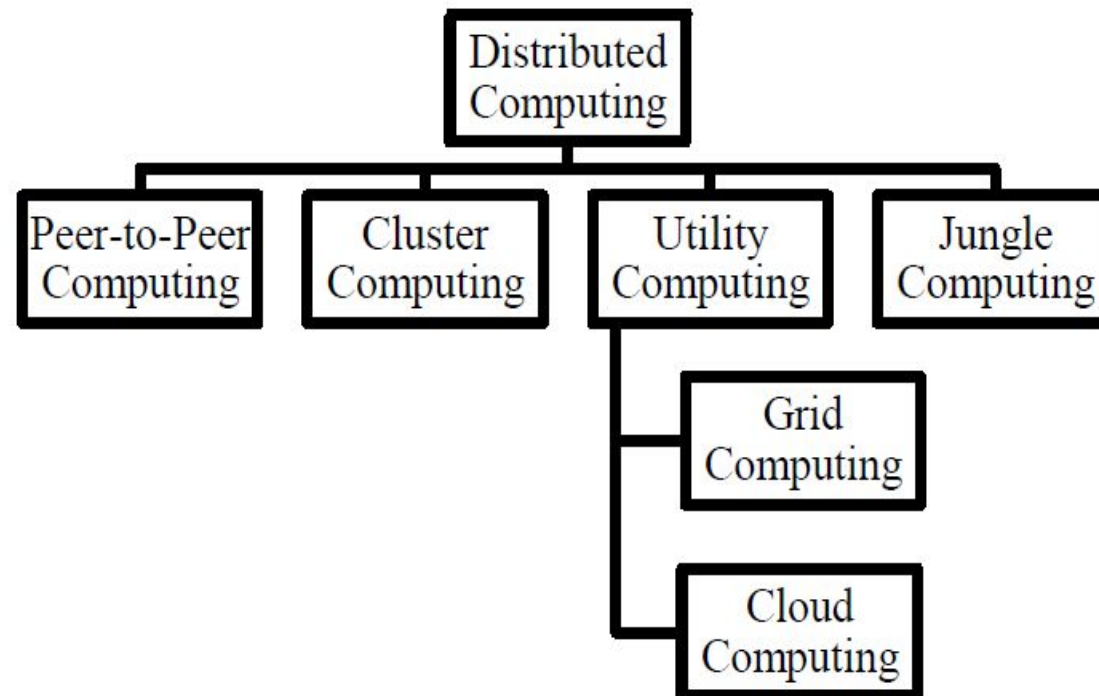
Cluster Computing

Cloud Computing

Jungle Computing

# Classification of Distributed computing

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# Challenges in Distributed computing

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*Transparency*

*Flexibility*

*Reliability*

*Performance*

*Scalability*

## Peer-to-Peer Computing

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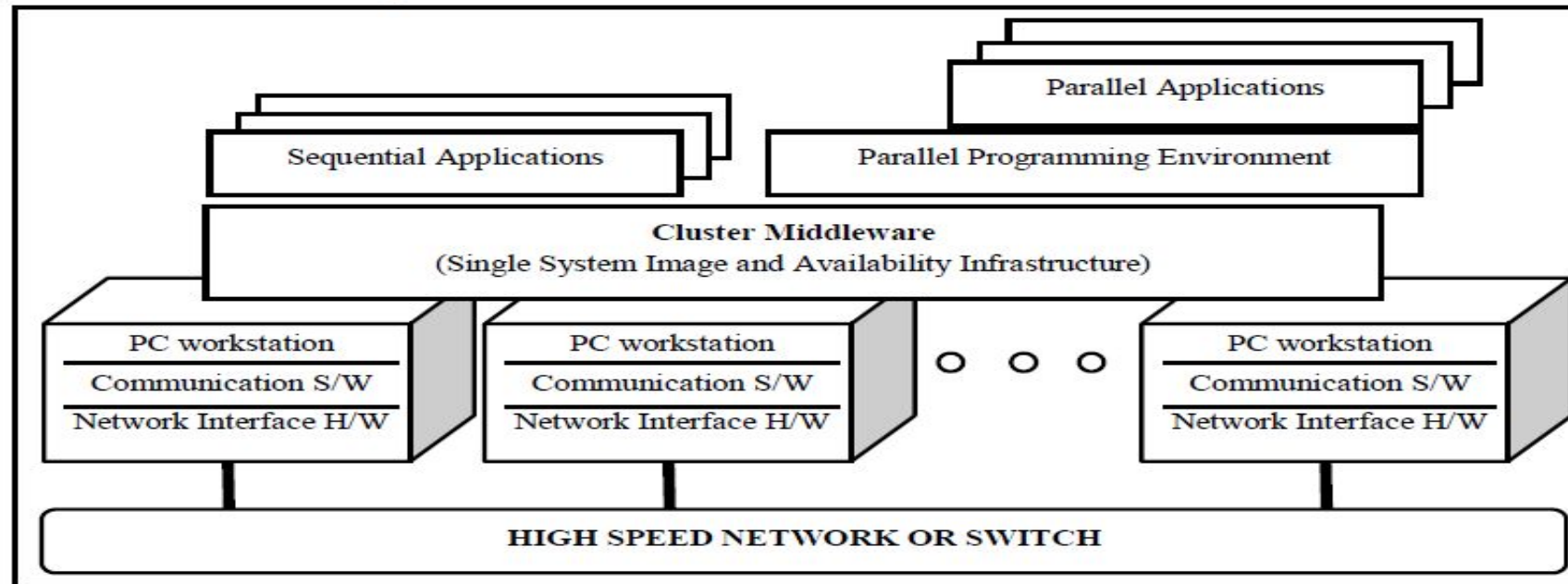
It has been working primarily on the scalability issues inherent in distributing resources over a large number of networked processes.

The system is self-organizing with distributed control.

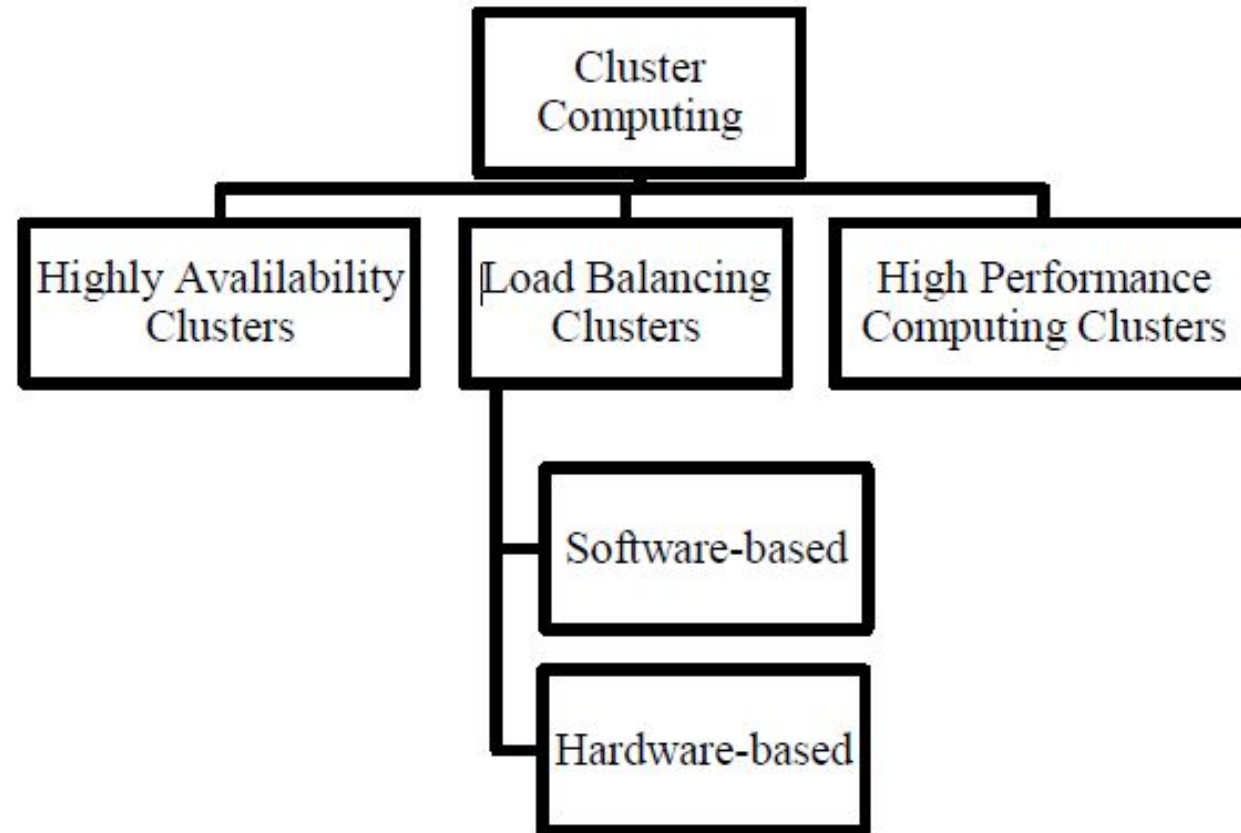


# Cluster Computing

A cluster computing comprises a set of independent or stand-alone computers and a network interconnecting them.



## Cluster Computing Classification



## Utility Computing

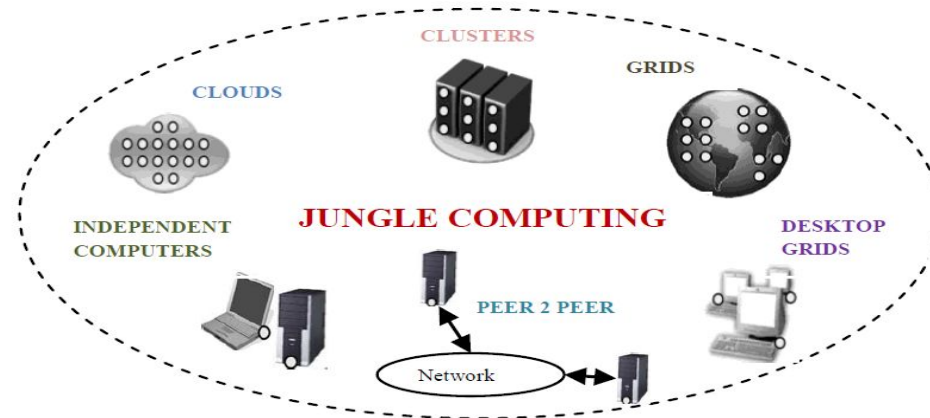
It is envisioned to be the next generation of Information Technology evolution that depicts how computing needs of users can be fulfilled in the future IT industry.

## Grid Computing

The aim of Grid computing is to enable coordinated resource sharing and problem solving in dynamic, multi-institutional virtual organizations.

## Jungle Computing

It is a simultaneous combination of heterogeneous, hierarchical, and distributed computing resources. Jungle computing refers to the use of diverse, distributed and highly non-uniform high performance computer systems to achieve peak performance





## Biocomputing

- Biocomputing systems use the concepts of biologically derived or simulated molecules (or models) that perform computational processes in order to solve a problem.
- Biocomputing provides the theoretical background and practical tools for scientists to explore proteins and DNA.
- Biocomputing lead to a better understanding of life and the molecular causes of certain diseases.

## Mobile Computing

- In mobile computing, the processing (or computing) elements are small (i.e., handheld devices) and the communication between various resources is taking place using wireless media.
- Mobile computing–based applications are becoming very important and rapidly evolving with various technological advancements as it allows users to transmit data from remote locations to other remote or fixed locations.

## Quantum Computing

- Quantum computers are millions of times faster than even our most powerful supercomputers today.
- Quantum computing works differently on the most fundamental level than the current technology, and although there are working prototypes, these systems have not so far proved to be alternatives to today's silicon-based machines.

## Optical Computing

- Optical computing system uses the photons in visible light or infrared beams, rather than electric current, to perform digital computations.
- An electric current flows at only about 10% of the speed of light. This limits the rate at which data can be exchanged over long distances and is one of the factors that led to the evolution of optical fiber.

## Nanocomputing

- Nanocomputing refers to computing systems that are constructed from nanoscale components.
- The silicon transistors in traditional computers may be replaced by transistors based on carbon nanotubes.
- The successful realization of nanocomputers relates to the scale and integration of these nanotubes or components.