Lecture 11

Network Computing I

Networks, Cluster

Ceng505 *Parallel Computing* at December 20, 2010

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Contents

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- Physical layers introduce delays and may be errors, which must be corrected by retransmission and dynamic reconfiguration of the Internet's links.

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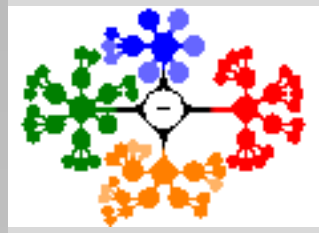

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4. **System or storage area network (SAN)**; a SAN connects computers or storage devices to make a single system.

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  - Using a serial number, the message can be reassembled in the correct order at the destination as packets may arrive in a different order.

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Table: Data Rate, Switching Method, and Routing Scheme for Interconnection Networks.

Interconnection	Switching	Routing
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- Table 1 shows the relative performance and other features of different high-speed networks.

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- For example, over about 15 years, LAN technology has increased in speed from 10 Megabits per second (10 Mbps) to 10 Giga-bits per second (10 Gbps), which is a factor of 1000 increase.
- Over a similar time period, advances in silicon technology, driven by Moore's Law, have allowed the CPU clock frequency in an average PC to increase from roughly 25 MHz to 2.5 GHz (a factor of about 100 increase in processing power).

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- With the projections of Gilder and Metcalfe, the number of users is expected to grow even more.

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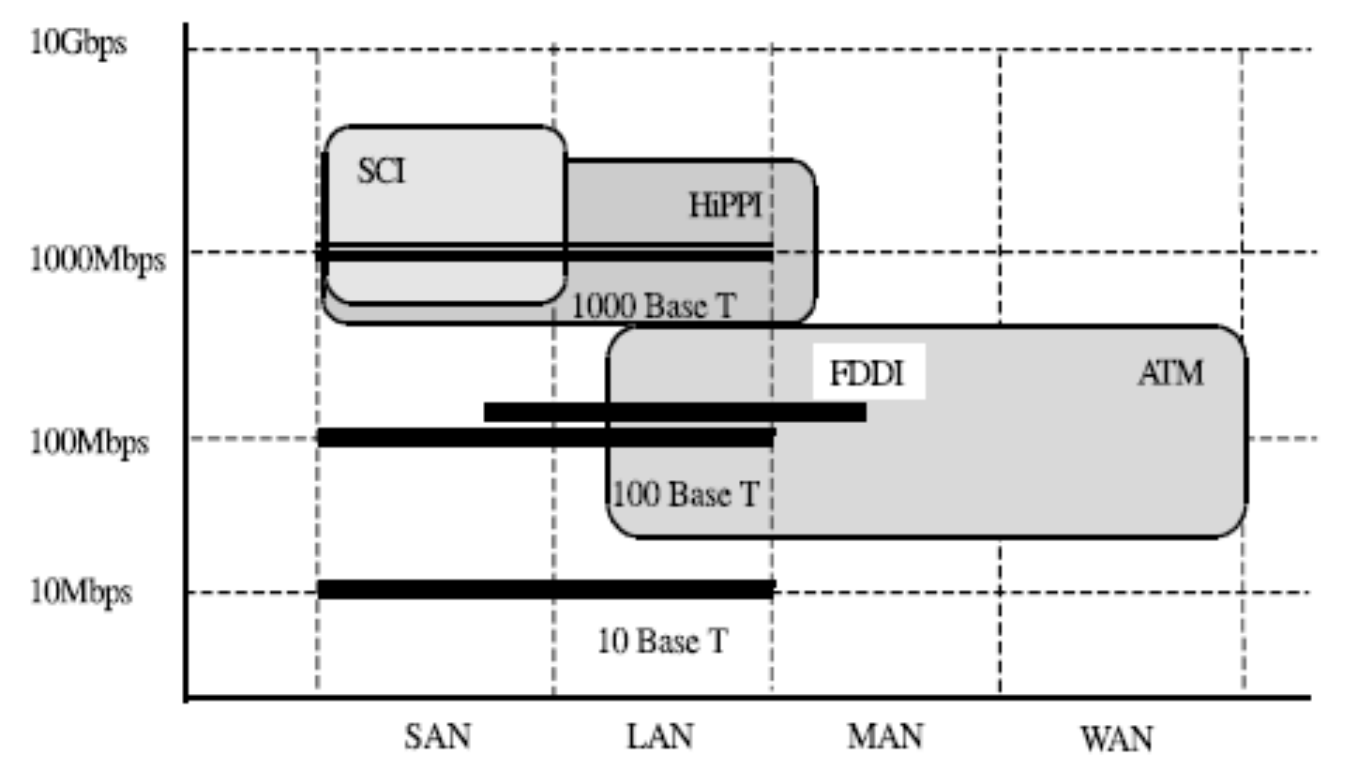

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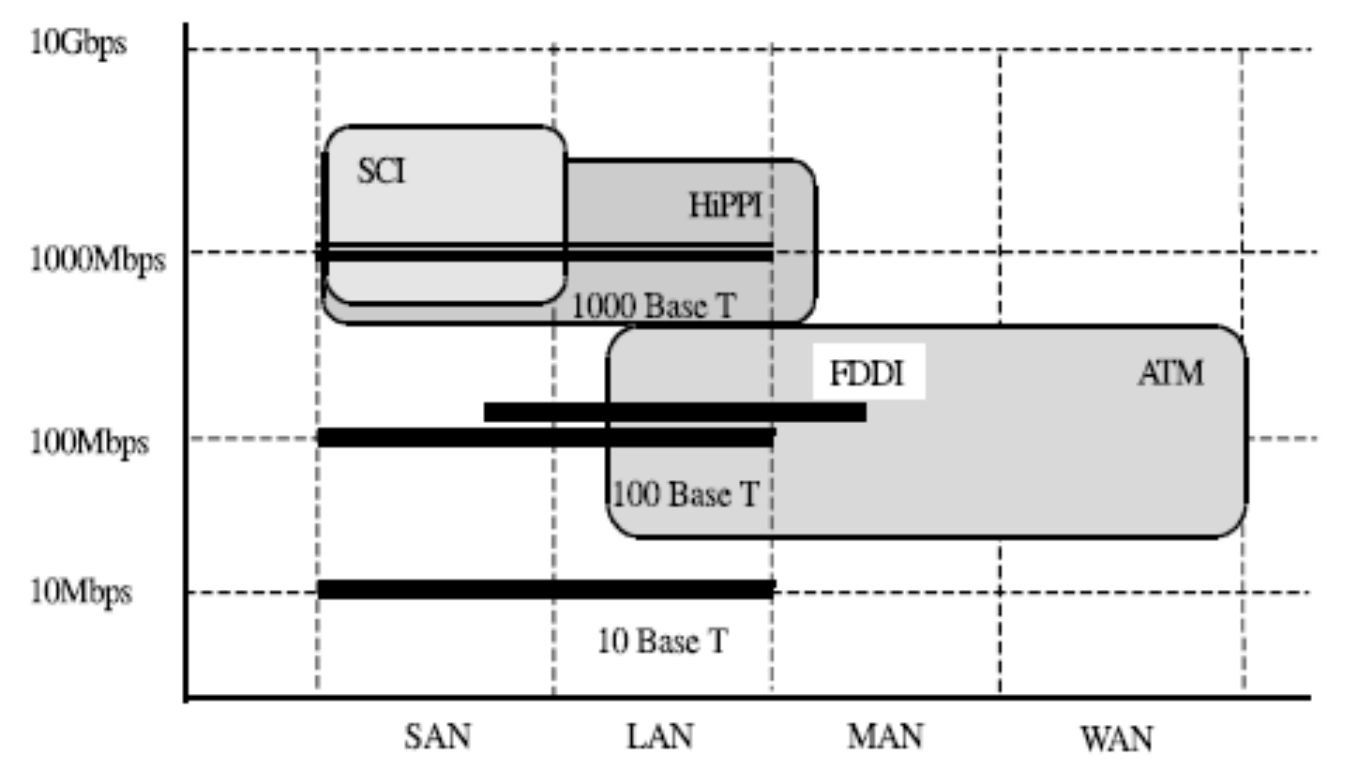

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  - HiPPI is capable of transferring data at 800 Mbps using 32 parallel line or 1.6 Gbps over 64 parallel lines.

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  - A remote communication in SCI takes place as just part of a simple load or store process in a processor.

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- The server executes the queries on behalf of the clients and sends each client its respective result.

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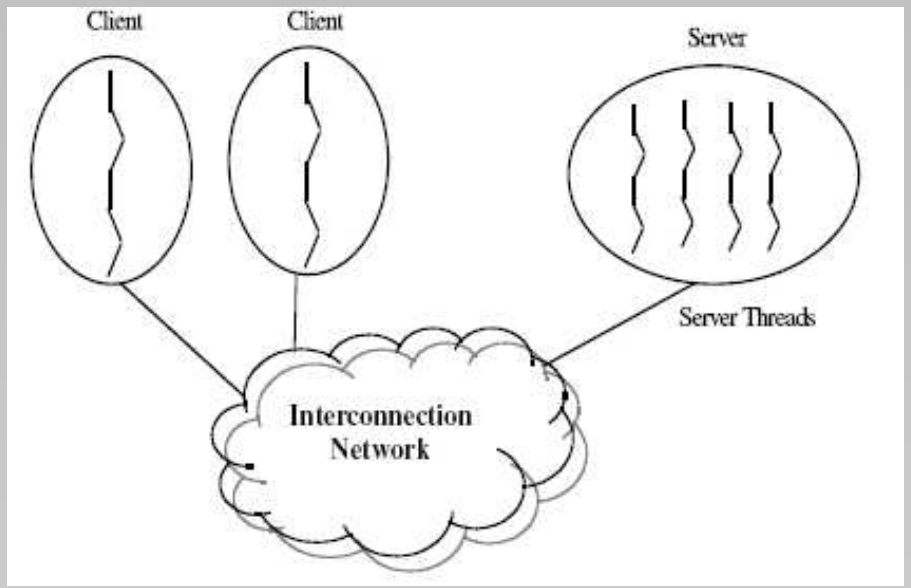

Figure: A multithreaded server in a client server system.

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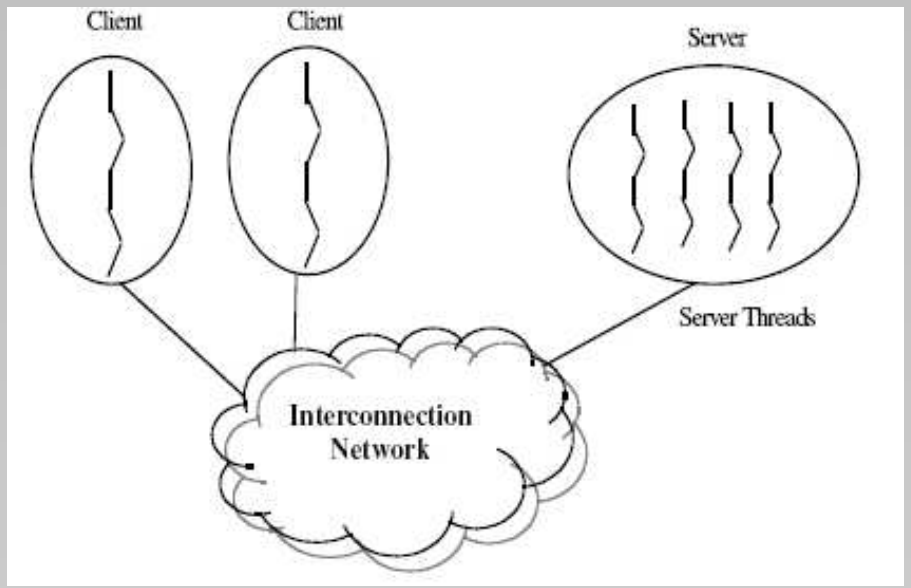
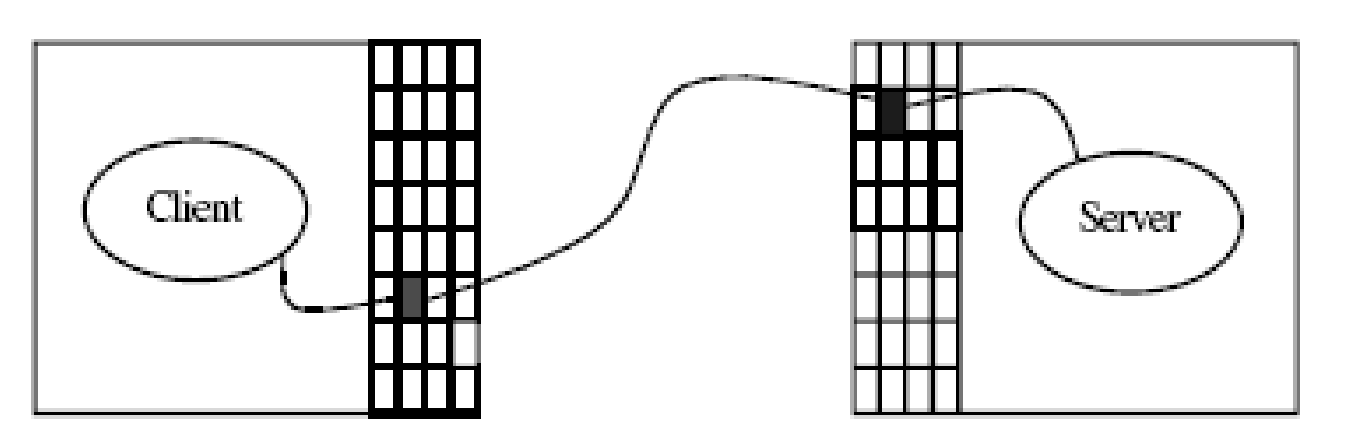


Figure: A multithreaded server in a client server system.

- Each client request triggers the creation of a new thread in the server.

Sockets I



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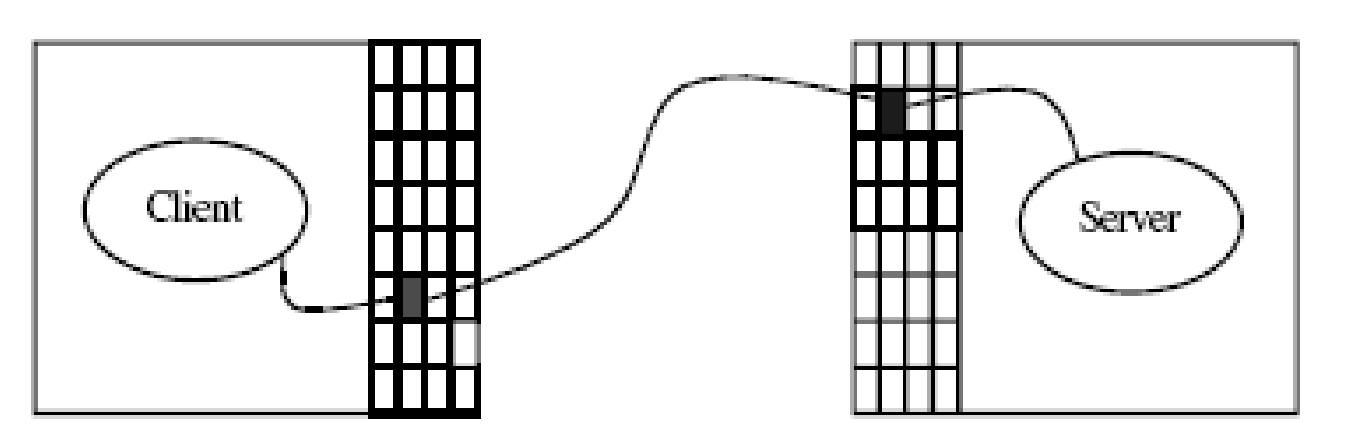

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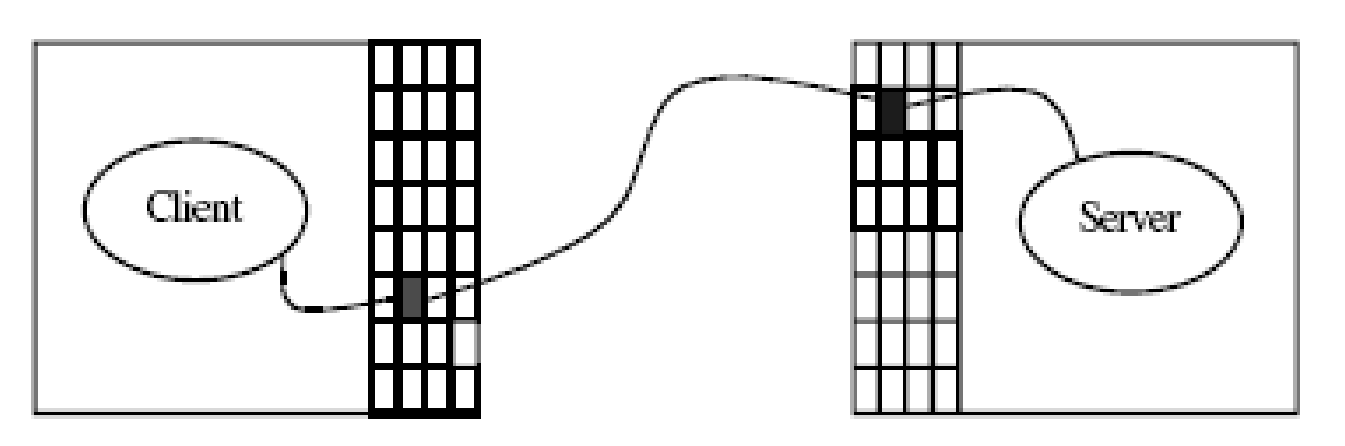

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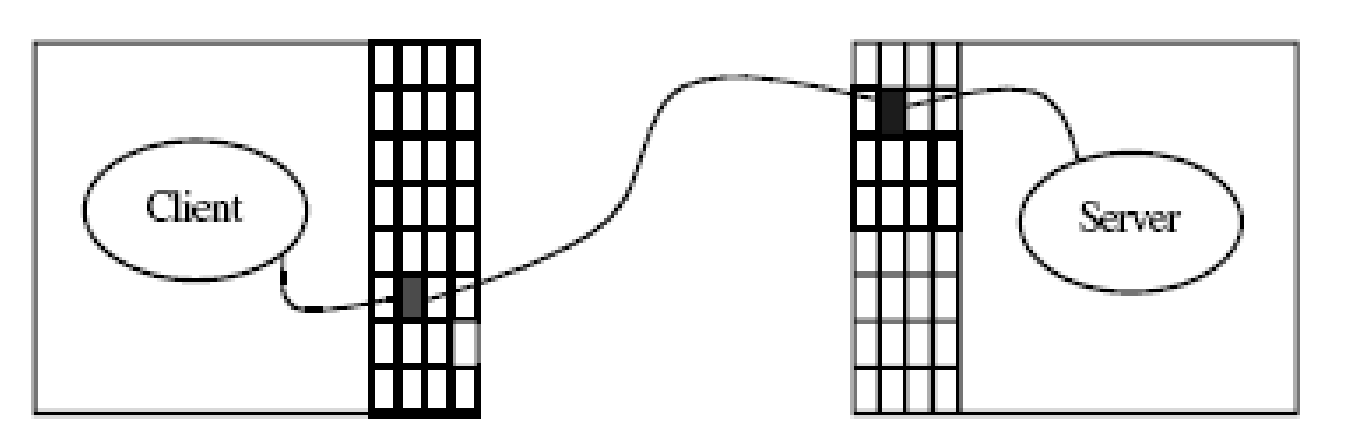

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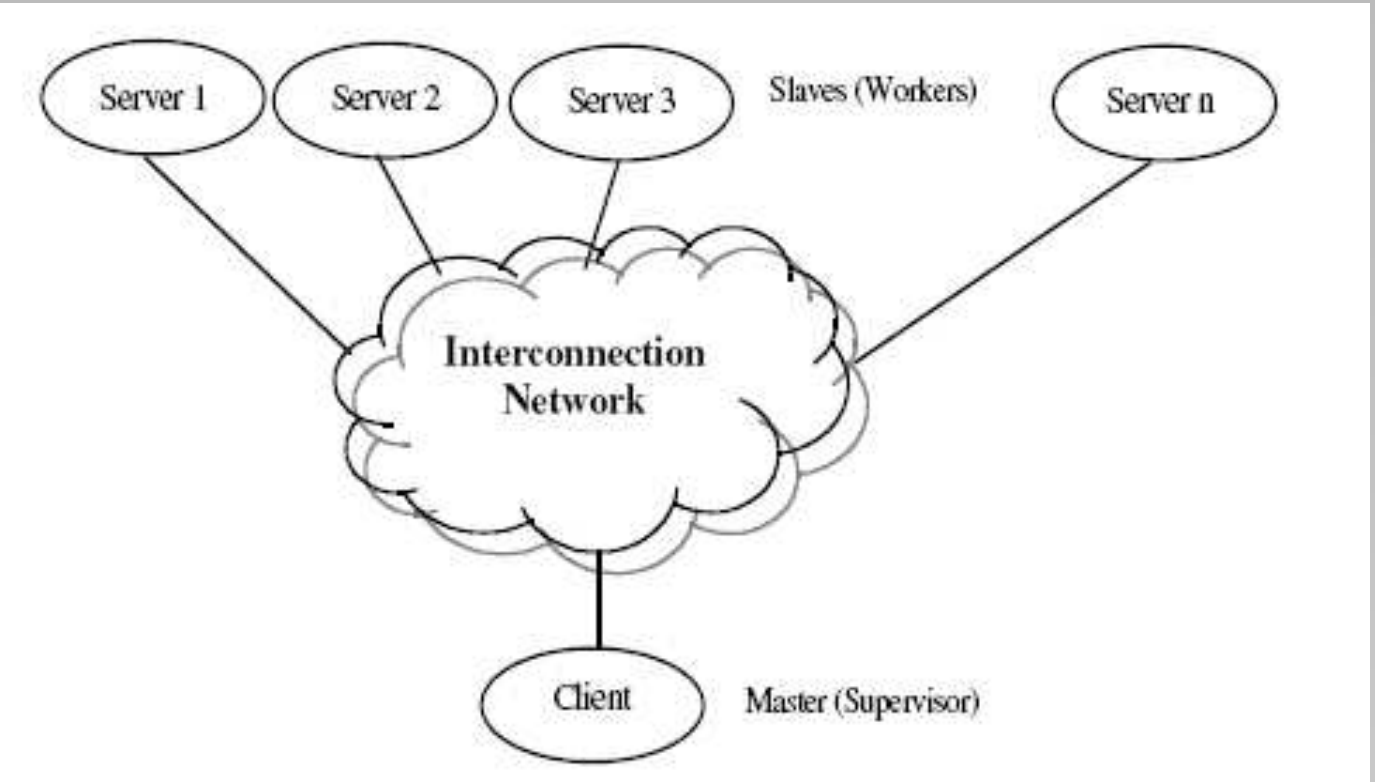
A Client Server Framework for Parallel Applications I



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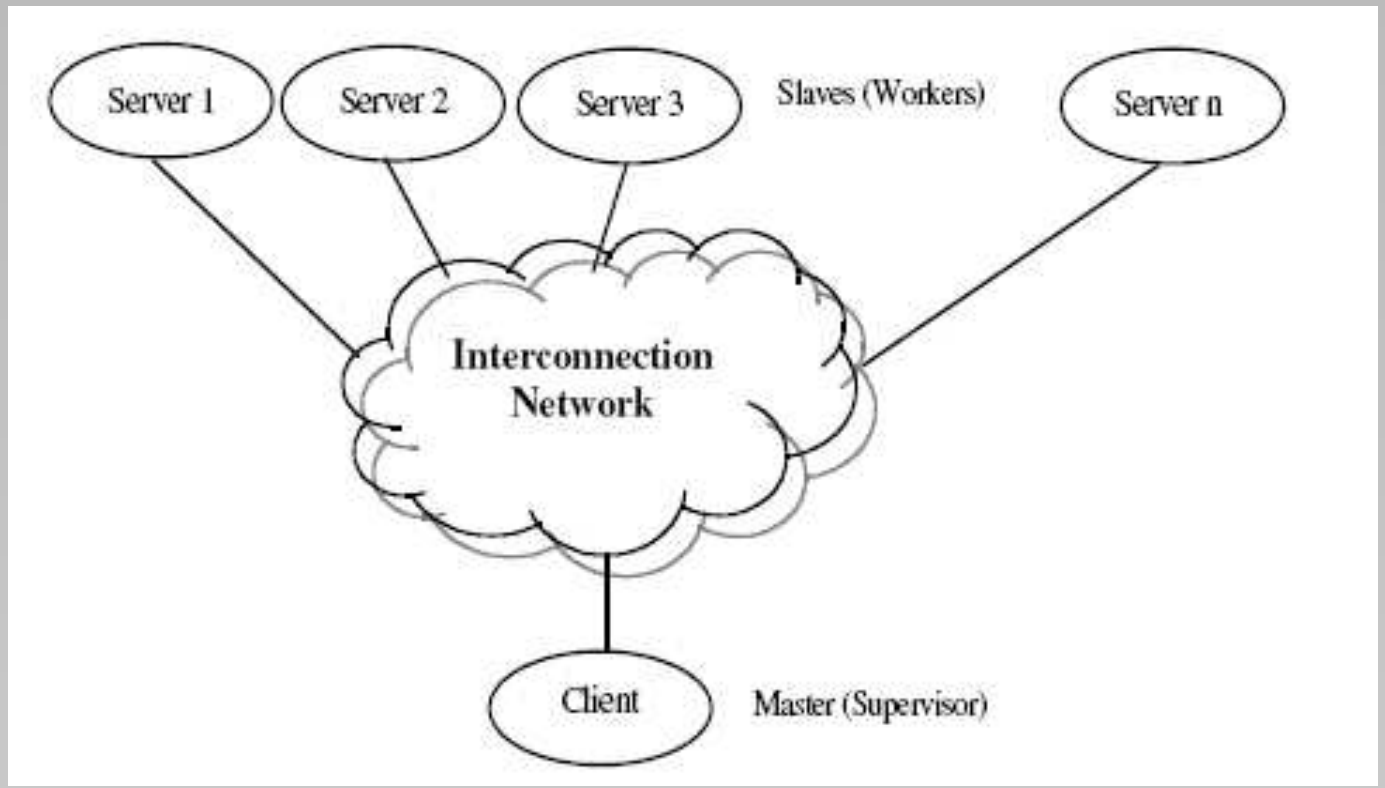

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- Parallel applications can be designed using the client/server model.
- A client may divide a big application into several smaller problems that can be processed by multiple servers simultaneously.

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- The client assembles the results from each server and outputs the final result to the user.
- The client acts as the master (supervisor) while the servers act as the slaves (workers) in the master-slave (supervisor-workers) model as shown in Fig. 4.

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- the cluster is called **homogeneous**, otherwise, it is **heterogeneous**.

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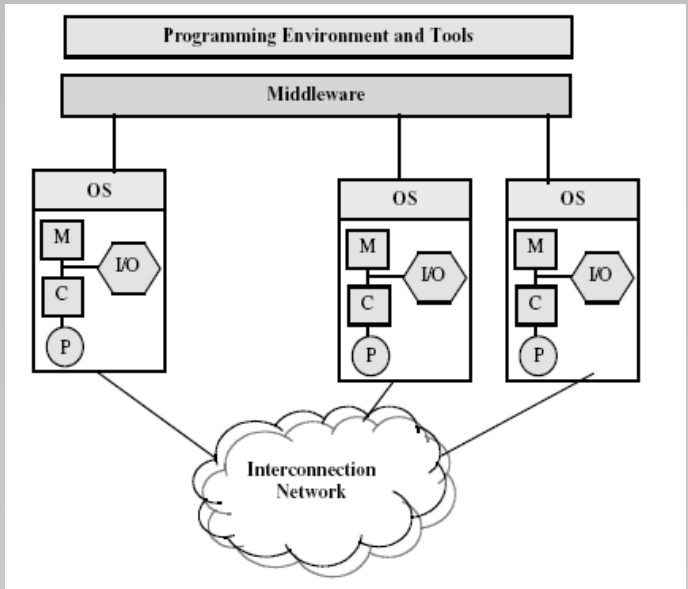

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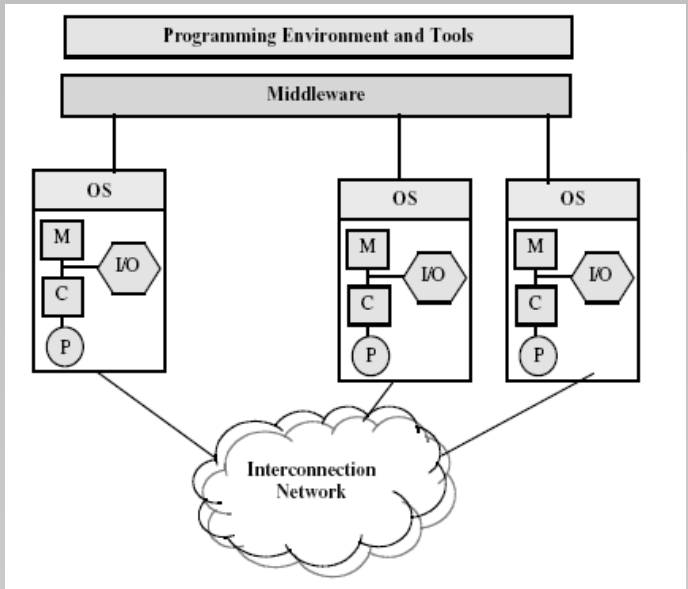

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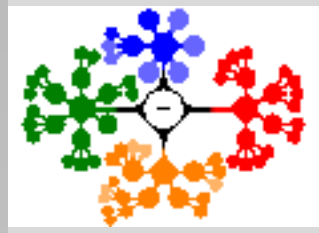

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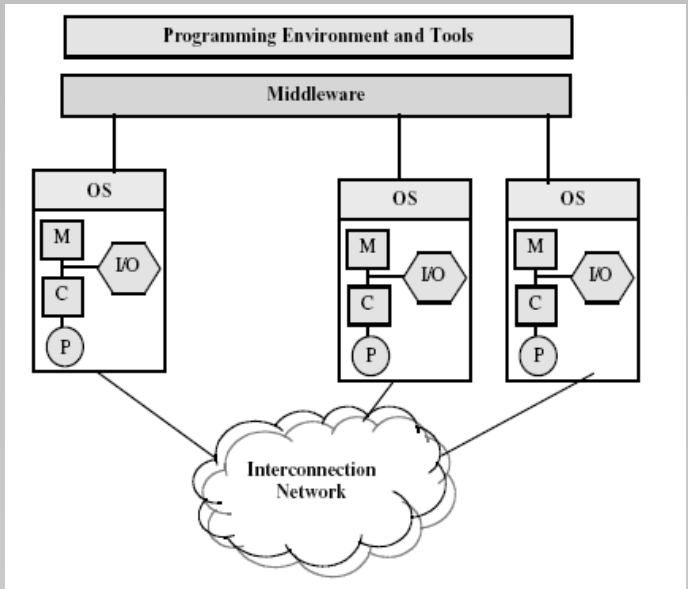

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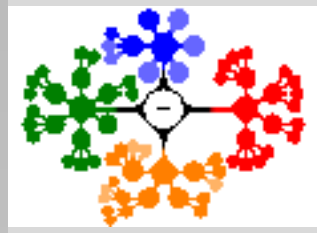

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