

Q1) List the partition techniques.

There are 3 Techniques

- ① Round - Robin
- ② Hash partitioning
- ③ Range Partitioning.

① Round - Robin -

In Round Robin data partitioning the records of the main table will be allowed to all the tables in clockwise manner. that is if the database table is partitioned into three tables then the first record of the table to be partitioned will be allocated to the first table and the second record will be allocated to the first table in clockwise manner.

② Hash partitioning the partition is done based on single attribute. if the partition is performed based on say designation then particular table and other employee of particular designation will be stored in other partition.

③ Range partitioning -

This partitions the table based on some range values that is employee of certain age say 31 to 40 will be in one partition and employee of age between 41 to 50 will be in one partition. In random unequal partitioning contains randomly unequal number of records.

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Q2 Differentiate between Inter and Intra Query parallelism

Inter Query parallelism

① It is a form of parallelism where many different queries or transactions are executed in parallel with one another on many processors

② Advantages : 1] it includes transaction throughput that is number of transaction executed in a given time can be increased.

- it scales up the transaction processing system

Hence best suited for on-line transaction processing (OLTP) systems.

3] Inter operation parallelism - the process of spreading up query

Intra Query parallelism

① It is form parallelism where single query is executed in parallel on many processors

2] Advantages :

- To speed up a single complex long running queries.

- Best suited for complex scientific calculation (queries) supported parallel database architecture.

- Shared & memory shared disk and shared nothing parallel architecture are supported. we need not about locking and logging as because it involves parallelizing single query.

3] Types : Intra - operation parallelism - the process of spreading up a query.

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through parallelizing various operations which are part of the query.

Through parallelizing the execution of

4] Example
 database system
 which supports
 inter-query
 parallelism:
 greenplum and oracle
 Rdb

4] Example -
 database system which
 support intra-query
 parallelism.
 Informix, Teradata.

Q3 Illustrate parallel database architecture with proper diagram.

parallel Database architecture

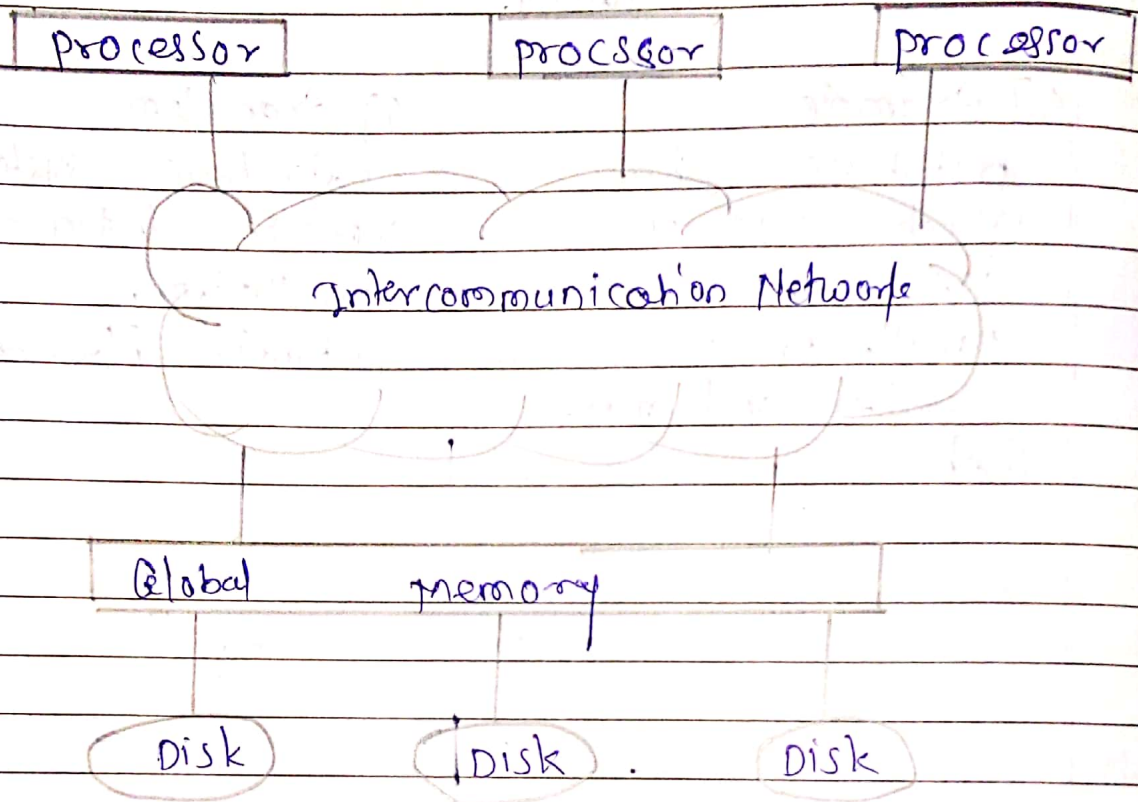
1. Shared memory system.

• Shared memory system uses multiple processors which is attached to a global shared memory via intercommunication channel or communication bus

• shared memory system have large amount of cache memory at each processor, so referencing of the shared memory is avoided.

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- if processor performs a write operation to memory location the data should be updated or removed from that location.



Shared memory system in parallel Database.

Advantages of shared memory system.

- Data is easily accessible to any processor
- one processor can send message to other efficiently.

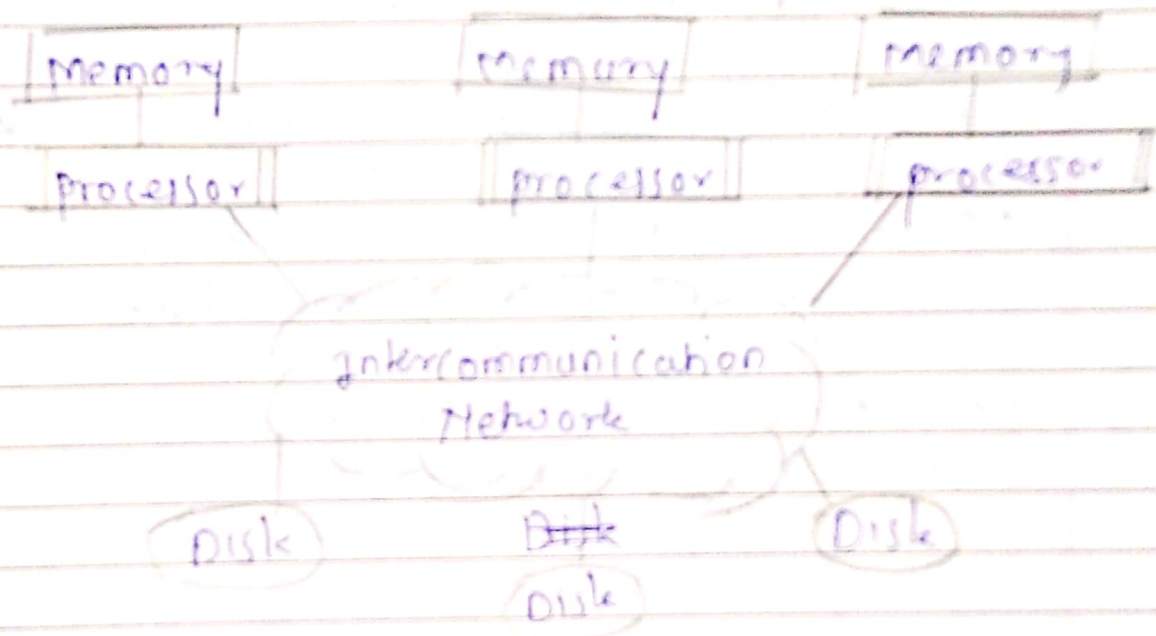
Disadvantage : of Shared memory system

- waiting time of processors is increased due to more number of processors
- Bandwidth problem.

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2. Shared Disk System.

- Shared disk system uses multiple process which are accessible to multiple disks via intercommunication channel and every processor has local memory.
- Each processor has its own memory so that data sharing is efficient.
- The system built around this system are called as cluster.



Shared disk system in parallel database.

Advantages of shared parallel Database

Fault tolerance is achieved using shared disk system. Fault tolerance: if a processor or its memory fails the other processor can complete that task. This is called as fault tolerance.

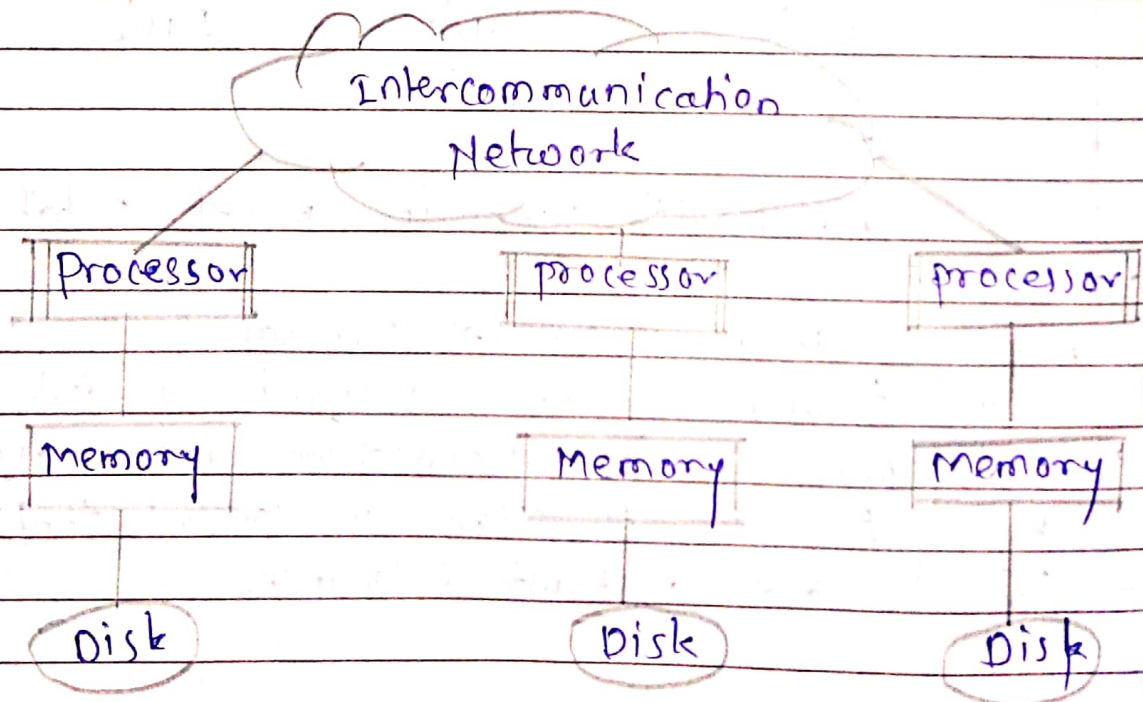
Disadvantages of shared disk system.

- Disk system disk system has limited scalability as large amount of data travels through the interconnection channel.
- If more processor are added the existing processors are slowed down.

Application of shared disk system Digital Equipment Corporation (DEC)

3] Shared nothing disk system.

- Each processor in the shared nothing system has its own local memory and local disk
- Processors can communicate with each other through intercommunication channel
- Any processor can act as a server to server the data which is stored on local disk.



Shared nothing disk system in parallel database.

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Advantage of shared nothing disk system

- Number of processor and disk can be connected as per requirement share nothing disk system
- shared nothing disk system can support for many processor, which make the system more stable.

Disadvantages of shared nothing disk system

- Data partitioning is required in shared nothing disk system
- cost of communication for accessing local disk is much higher application of shared nothing disk system.

4] Hierarchical system or Non-uniform memory architecture

- Hierarchical model system is hybrid of shared memory system shared disk system and shared nothing system
- Hierarchical model also known as Non-uniform memory architecture (NUMA)
- In this system each group of process has a local memory. But processors from other groups can access memory which is associated with the group in coherent.

Advantages

- Improve the scalability of the system
- memory bottleneck problem is minimized in the architecture.

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Disadvantages OF NUMA

The Cost of the architecture is higher compared to other architecture.