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Subject :- Advanced Database Concept

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Theory Assignment 4
Chap 7. Parallel Database

I   Define scale up, speed up in parallel databases

→   Scale up :-

Scale-up is the ability to keep performance constant, when number of process and resources increases proportionally.

Formula-

Let Q be the Task and QN the task where N is greater than Q

TS = Execution time of task Q on smaller machine MS

TL = Execution time of task Q on smaller machine ML

Scale up = TS/TL

Speed up :-

Speed-up is the process of increasing degree of resources to complete a running task in less time. The time required for running task is inversely proportional to number of resources.

Formula-

Speed up = TS/TL

Where,

     TS = Time required to execute task of size Q

     TL = Time required to execute tasks of size $N*Q$

II. Goals of parallel database.

→ The concept of parallel database was built with a goal to

① Improve performance :

The performance of the system can be improved by connecting multiple CPU and disks in parallel. Many small processors can also be connected in parallel.

② Improve availability of data :

Data can be copied to multiple locations to improve the availability of data.

③ Improve reliability :

Reliability of system is improved with completeness, accuracy and availability of data.

④ Provide distributed access of data :

Companies having many branches in multiple cities can access data with the help of parallel database system.
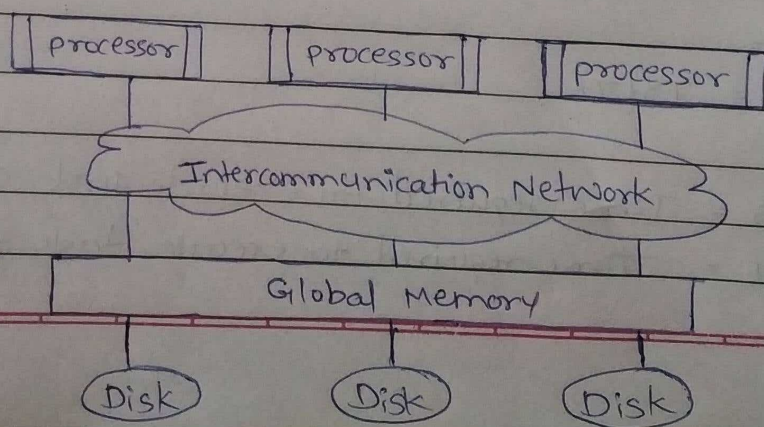
III. Explain architectures of parallel DB.

→ Types of Parallel Database Architecture :-

① Shared Memory system -

It uses multiple processors which is attached to a global shared memory via intercommunication channel or communication bus.
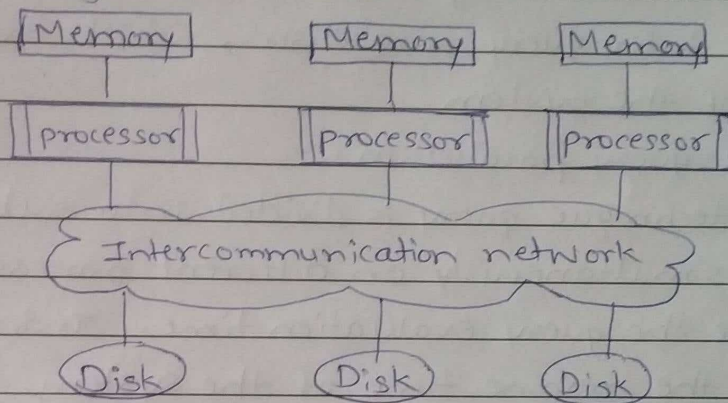
Shared memory system have large amount of cache memory at each processors, so referencing of the shared memory is avoided.
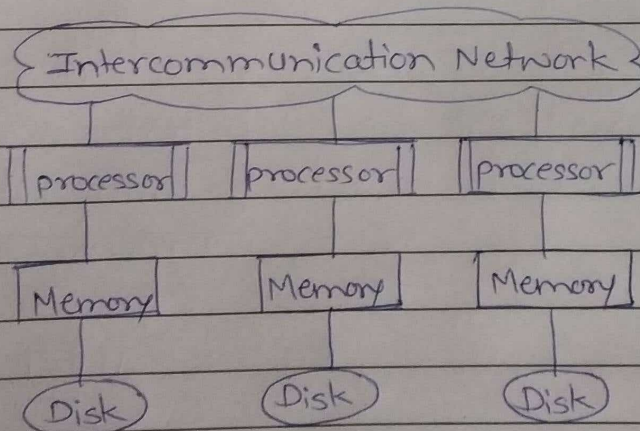
(II) Shared disk system -

It uses multiple processors which are accessible to multiple disks via intercommunication channel and every processor has local memory.

Each processor has its own memory so the data sharing is efficient.

(III) Shared Nothing 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 serve the data which is stored on local disk.

IV. Explain various methods of achieving parallelism in Queries.

→ The two techniques used in query evaluation are as follows:

1. Inter query parallelism -

This technique allows to run multiple queries on different processors simultaneously. Pipelined parallelism is achieved by using inter query parallelism, which improves the output of the system.

2. Intra query parallelism -

In this technique query is divided into sub queries which can run simultaneously on different processors, this will minimize the query evaluation time. Intra query parallelism improves the respone time of the system.