- # Load sharing approach

Load sharing basically denotes the process of forwarding a router to share the forwarding of traffic, in case of multiple paths if available in the routing table.

In case there are equal paths then the forwarding process will follow the load-sharing algorithm.

In load sharing systems, all nodes share the overall workload, and the failure of some nodes increases the pressure of the rest of the nodes.

The load sharing approach ensures that no node is kept idle so that each node can share the load.

For example, suppose there are two connections of servers of different bandwidths of 500Mbps and another 250Mbps.

Let, there are 2 packets. Instead of sending the 2 packets to the same connection i.e. 500Mbps, 1 packet will be forwarded to the 500Mbps and another to the 250Mbps connection.

Here the goal is not to use the same amount of bandwidth in two connections but to share the load so that each connection can sensibly deal with it without any traffic.

Load Sharing algorithm policies

1. Load assessment: It decides how to evaluate the workload of a node in a distributed framework.
2. Process transfer: It concludes whether the process can be executed locally or from a distance.
3. State information exchange: It decides how the framework loads information that can be exchanged among the nodes.
4. Location policy: It decides the determination of an objective hub during process migration.
5. Priority assignment: It decides the priority of execution of a bunch of nearby and remote processes on a specific node.

6. Migration restricting policy: It decides the absolute number of times a process can move starting with one hub then onto the next.

1.Load estimation policies for Load-sharing algorithms

- Load-sharing algorithms attempt to avoid nodes from being idle but it is sufficient to know whether a node is busy or idle.Thus these algorithms normally employ the simplest load estimation policy of counting the total number of processes on a node.
- In modern systems counting the total number of processes on a node is not suitable.Therefore measuring CPU utilization should be used to estimate the load of a node in these systems.

2.Process transfer policies for Load-sharing algorithms

- Load sharing algorithms normally use all-or-nothing strategy.This strategy uses the threshold value of all the nodes fixed at one.A Node becomes a receiver node when it has no process,& becomes a sender node when it has more than one process.
- To avoid processing power on nodes having zero process load-sharing algorithms,a threshold value of two is used instead of one.
- When CPU utilization is used as the load estimation policy,the double-threshold policy should be used as the process transfer policy.

3.Location policies for Load-sharing algorithms

Location policy decides whether the sender node or the receiver node of the process takes the initiative to search for suitable node in the system.The location policy can be the following:

- Sender-initiated location policy
    - In this policy heavily loaded nodes search for lightly loaded nodes.
    - When the node becomes overloaded,it either broadcasts or randomly probes the other nodes one by one to find a node that is able to receive remote processes.

- A node is viable to receive a process only if the transfer of the process to the receiver's node will not increase the receiver node's load above its threshold value.
- When broadcasting,a suitable node is known to be present as soon as reply arrives at the sender node.

- Receiver-initiated location policy
  - In this policy lightly loaded nodes search for heavily loaded nodes
  - When the node becomes under-loaded,it either broadcasts or randomly probes the other nodes one by one to indicate its willingness to receive remote processes.
  - A node is viable to receive a process only if the transfer of the process to the receivers will not increase the receiver node's load above its threshold value.
  - When broadcasting,a suitable node is known to be present as soon as reply arrives at the receiving node.

4.State information exchange policies for Load-sharing algorithms:

In load-sharing algorithms it is not necessary for the nodes to periodically exchange state information,but needs to know the state of other nodes when it is either under loaded or overloaded.A node shares state information with other nodes only when its state changes.Commonly used policies are:

i.Broadcast when state changes

- In sender-initiated/receiver-initiated location policy a node broadcasts State Information Request when it becomes overloaded/under-loaded.
- It is called broadcast-when-idle policy when a receiver-initiated policy is used with a fixed threshold value of one.

ii.Poll when state changes

- In large networks polling mechanism is used
- Polling mechanism randomly asks different nodes for state information until an appropriate one or probe limit is reached.
- It is called poll-when-idle policy when a receiver-initiated policy is used with a fixed threshold value of one.

5.Priority assignment policy for Load-balancing algorithms

In a distributed operating system that supports process migration,a priority assignment rule for scheduling the local & remote process of a node should be planned.