Data Placement Strategy in Hierarchical Symmetrical Multiprocessor Systems

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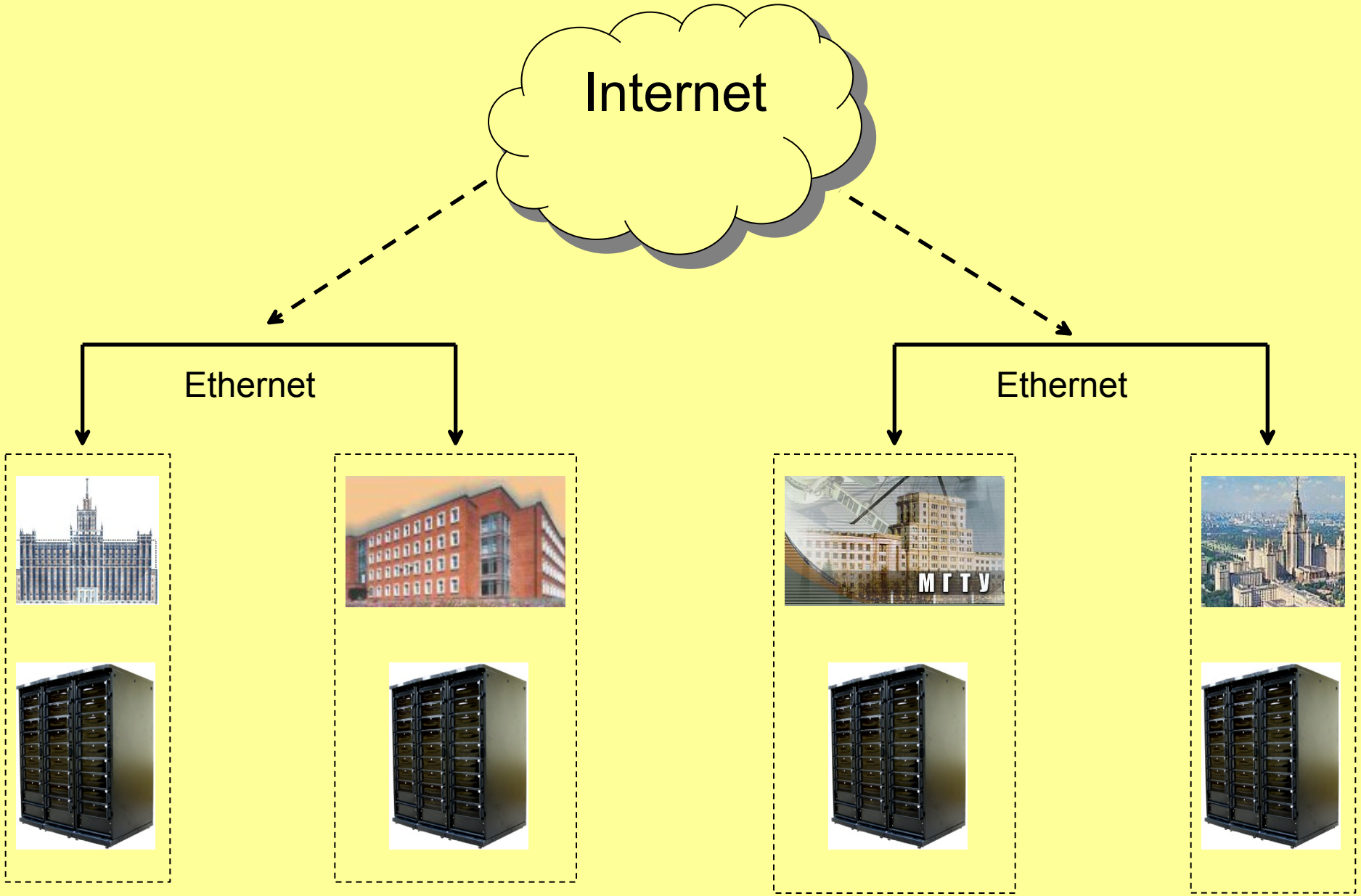
This work was supported by the Russian foundation for basic research (project 06-07-89148)


Internet
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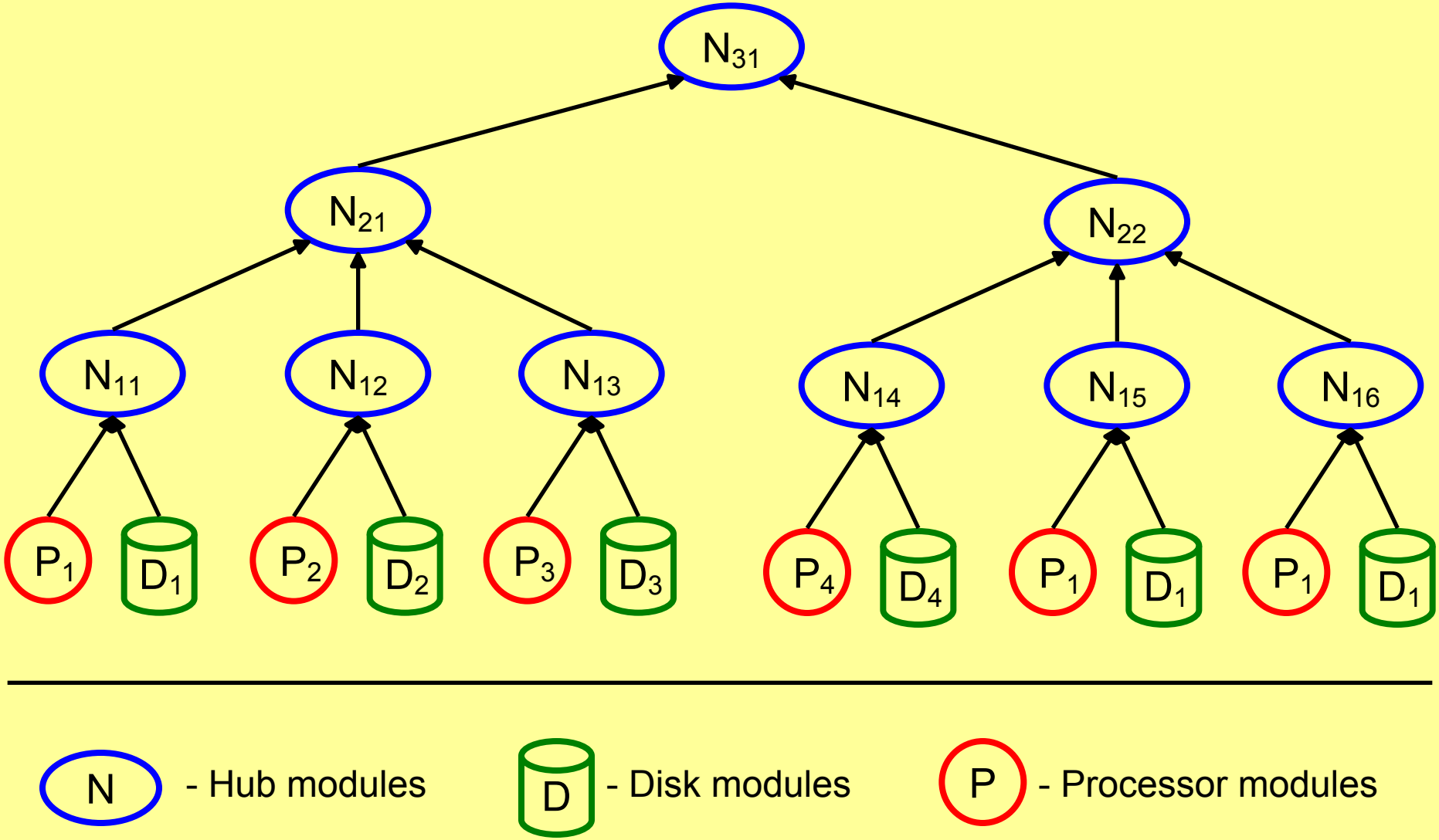
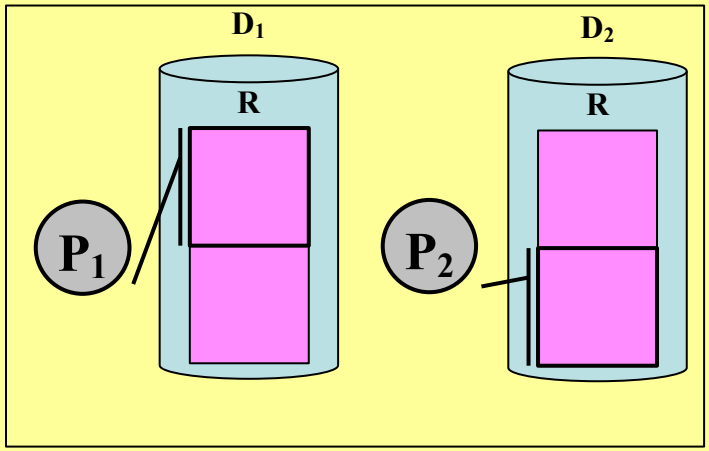
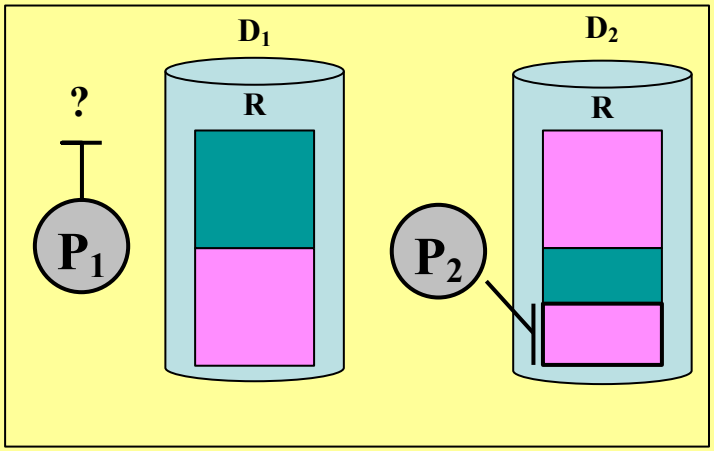
Symmetrical Database Engine Model



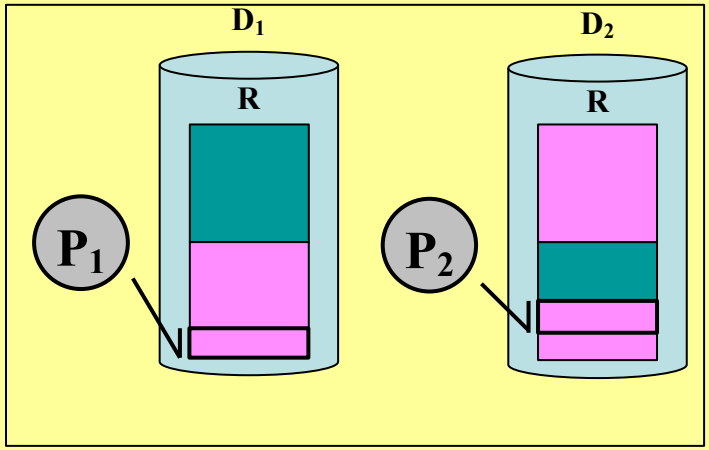
Load Balancing Problem



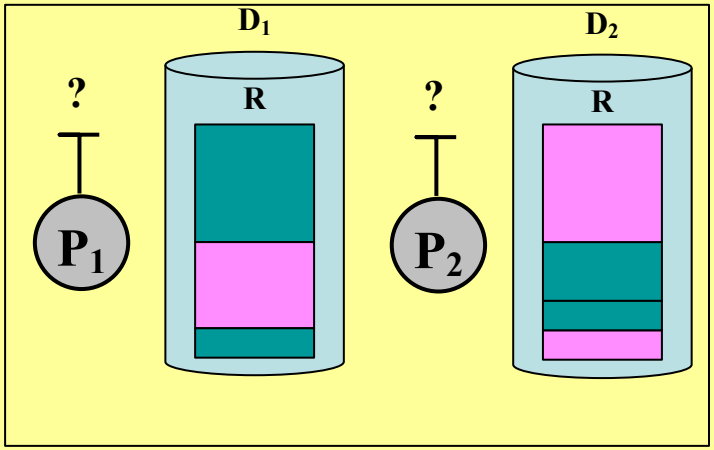
t_0



t_1



t_2



t_3

- Assigned to processing

- processed

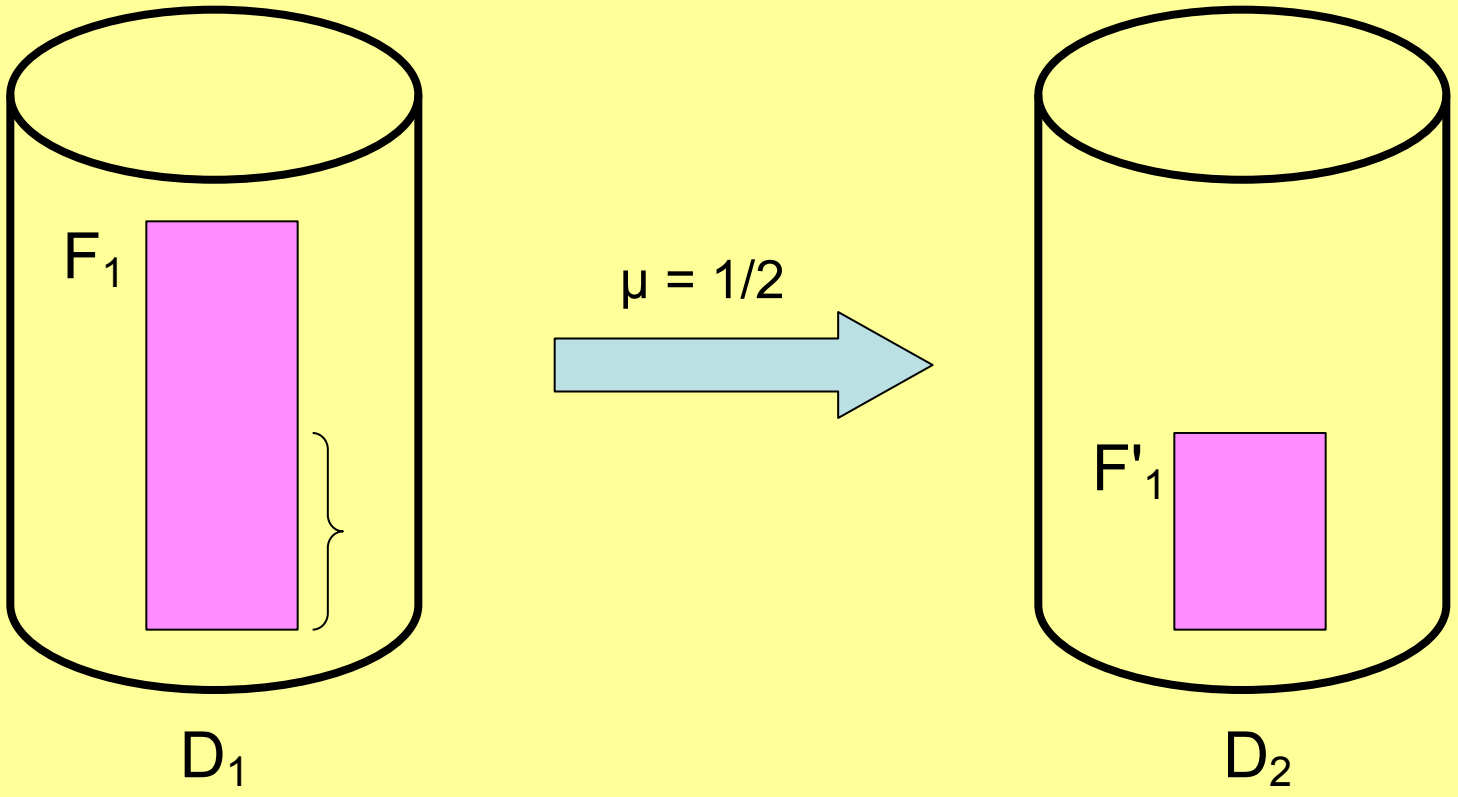
Data Partitioning

Each relation is divided into disjoint horizontal fragments, which are partitioned into different disk units.
The order of tuples in fragment is fixed for each query. It defines a SCAN operation order. We will call this order as *natural order*.
At the logical level each fragment is divided into a sequence of fixed-length segments.
All segments of a fragment has a length *C* except for last segment.
Last segment has a length ≤ C.
Partitioning of segments is performed according to natural order.
Segment is smallest measurement unit of replication.

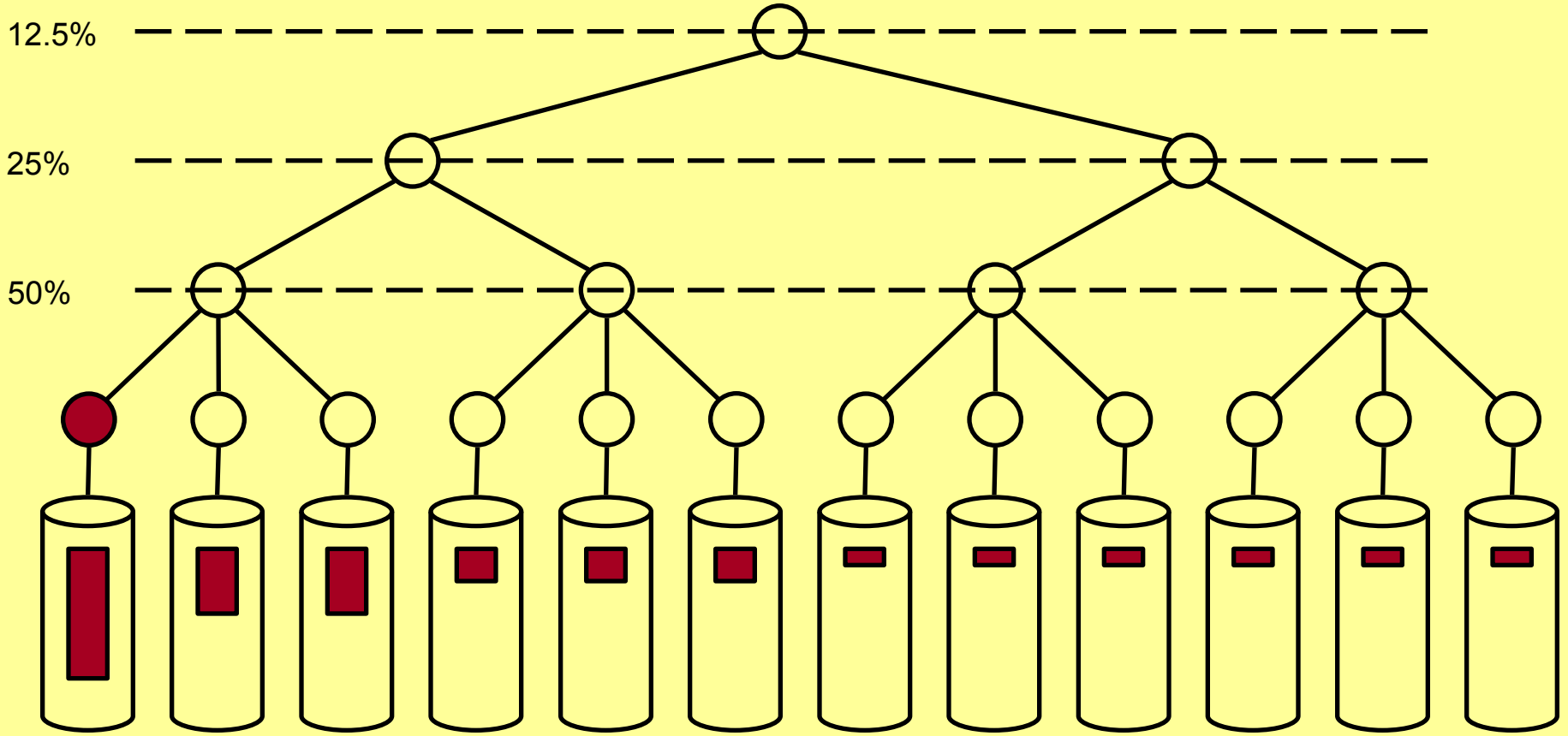
Mirroring

Fragment into a disk may have some partial copies called *replicas*, which located into another disks.
The only one replica of a given fragment may be located into a disk.
Contents of a replica is defined by mirroring factor μ, assigned to the disk, which contains this replica.

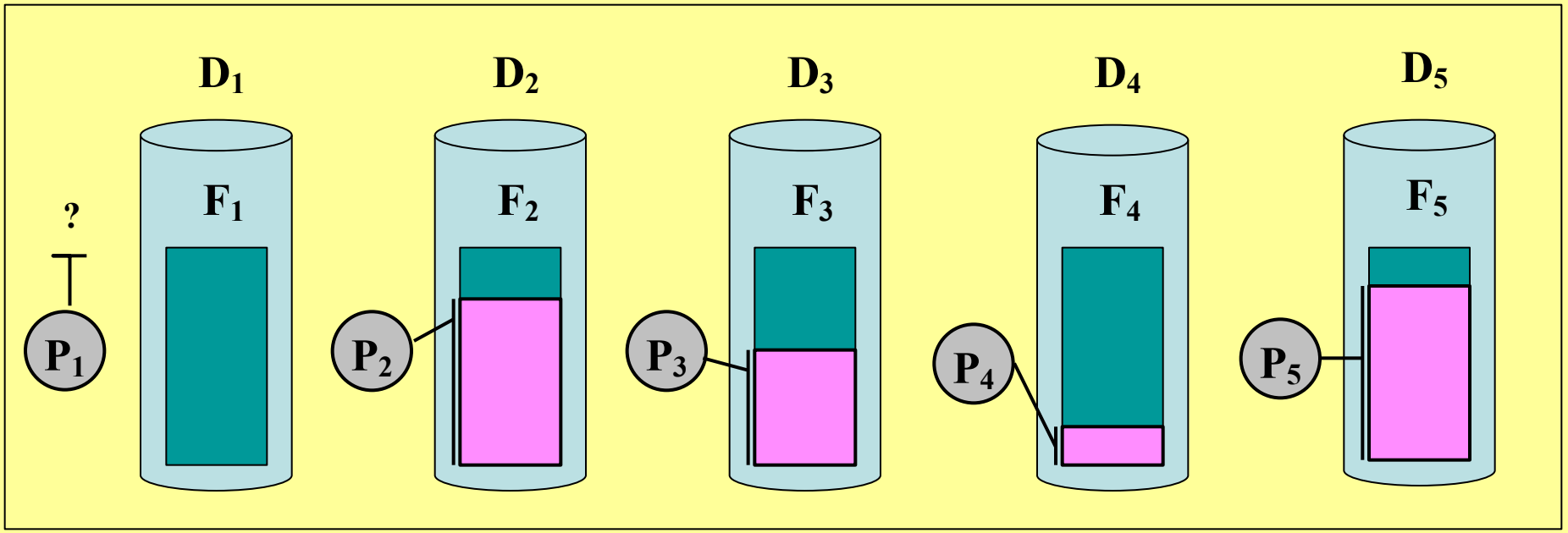
Replica Building



Mirroring factor



Load Balancing Algorithm



Thank You for your attention