

Conception Avancée de Bases de Données



Data Base Partitioning



Traduction en cours

Database Partitioning



- Database partitioning is a technique for distributing a single database across many database instances that work together to form a single large database server.

Objective



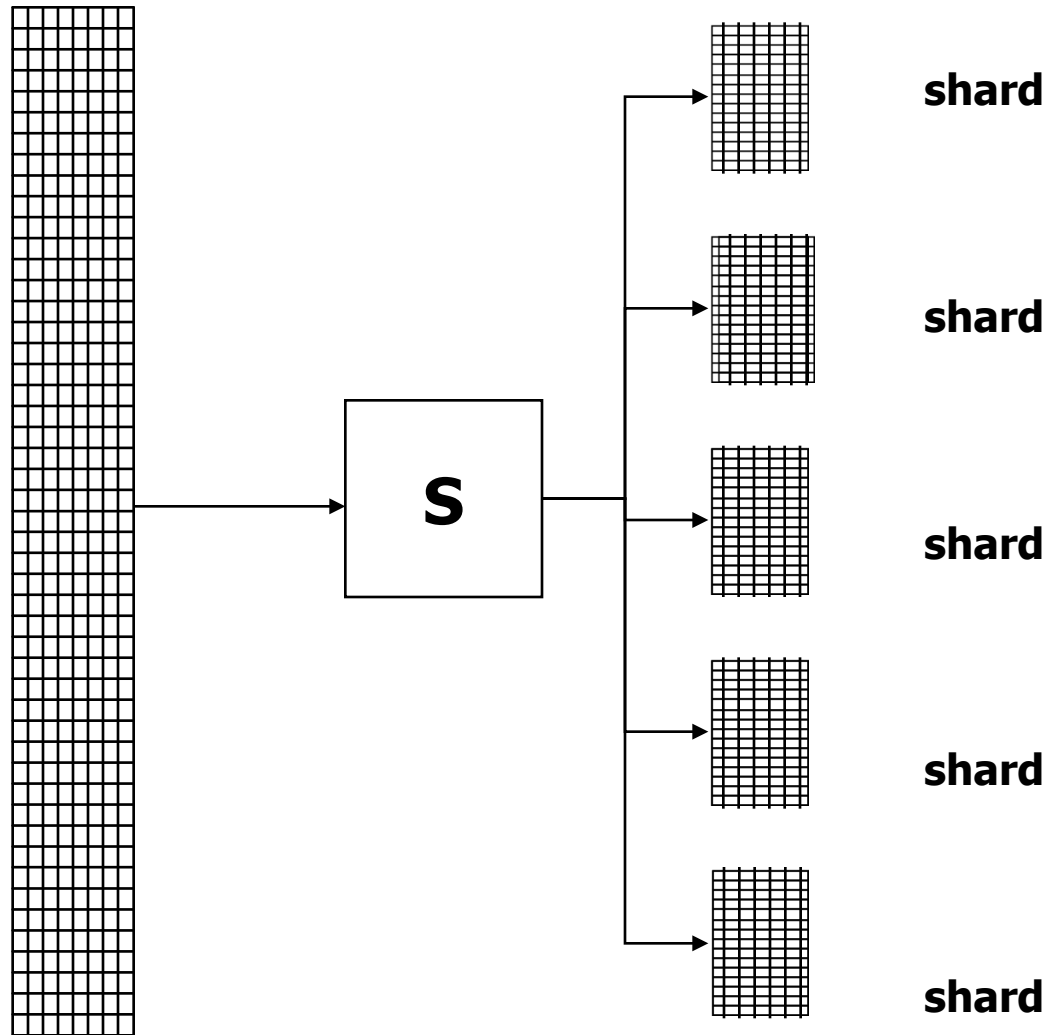
- Reduce IO
 - Block Partitioning
 - Blocks Even distribution
- Parallel processing
 - MPP

Horizontal and Vertical partitioning

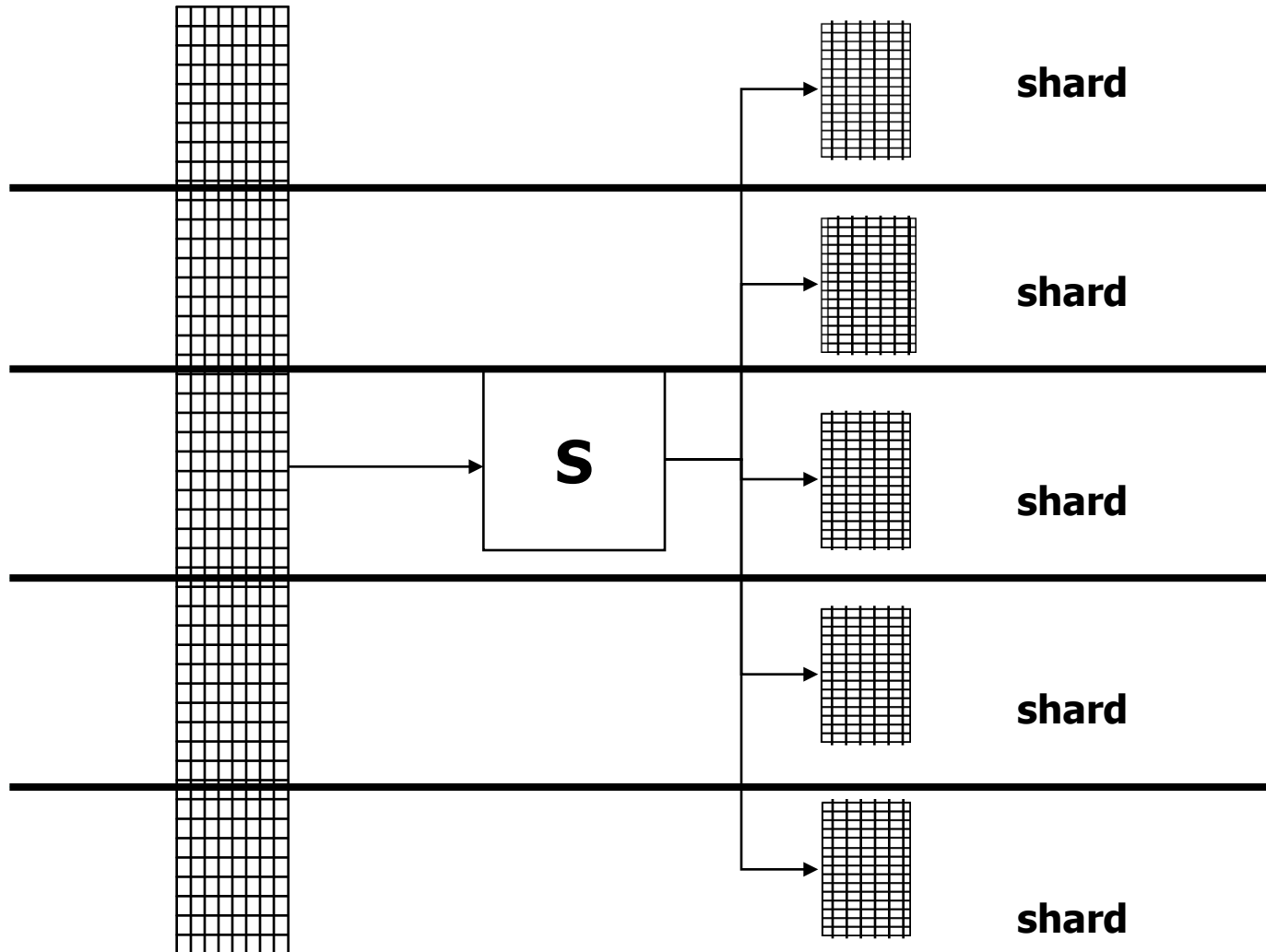


- Horizontal partitioning divides a table into multiple tables.
 - Sharding
- Vertical partitioning divides a table into multiple tables that contain fewer columns.

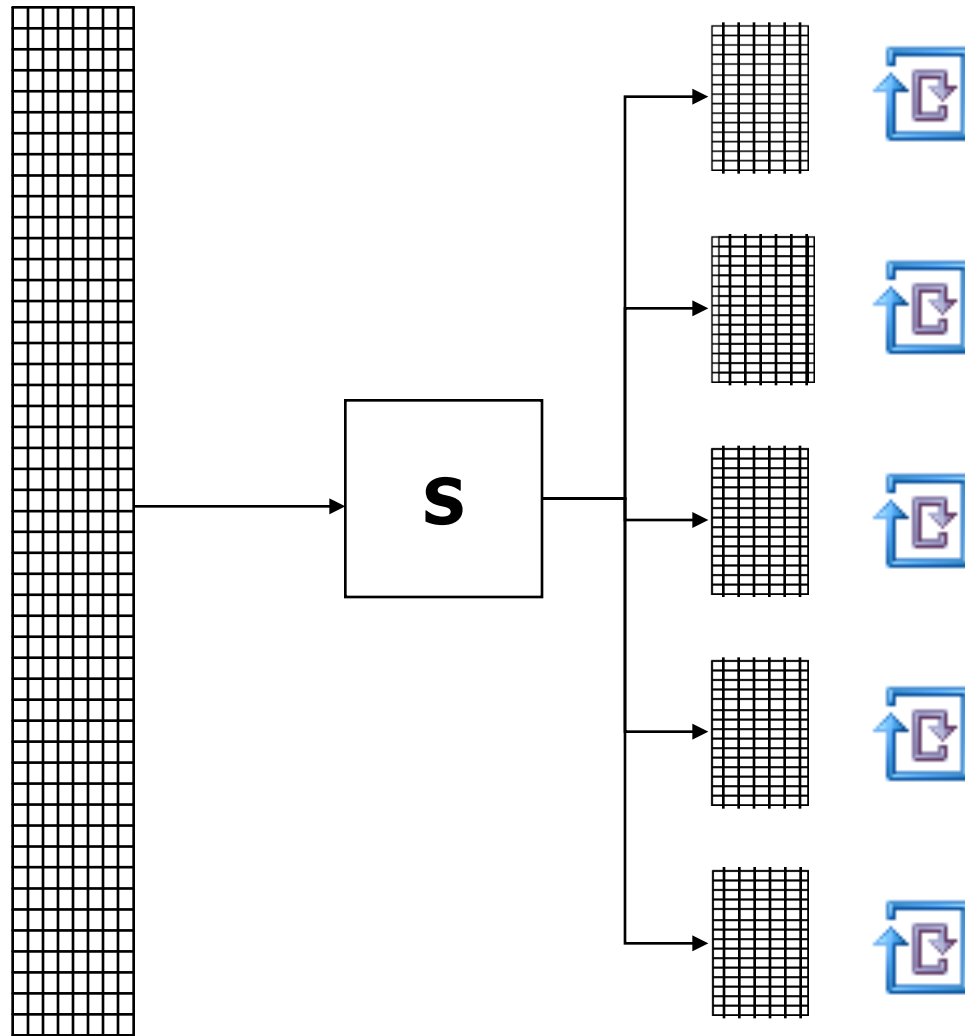
Horizontal Partitioning : sharding



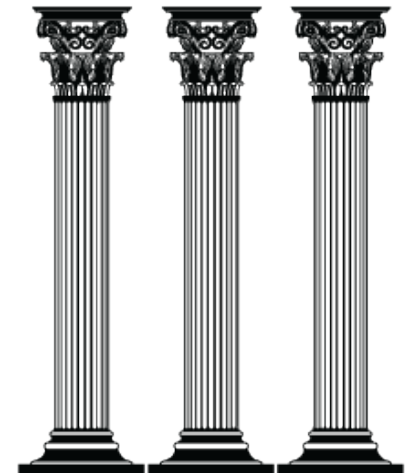
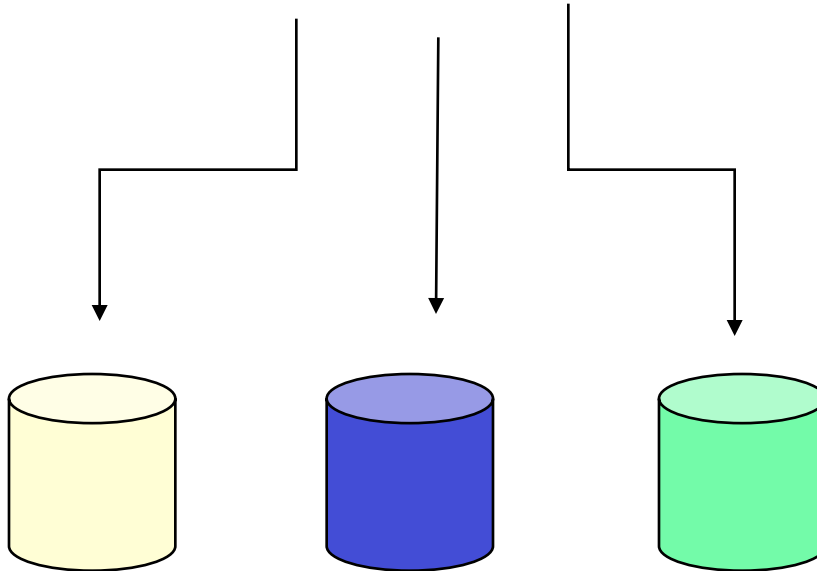
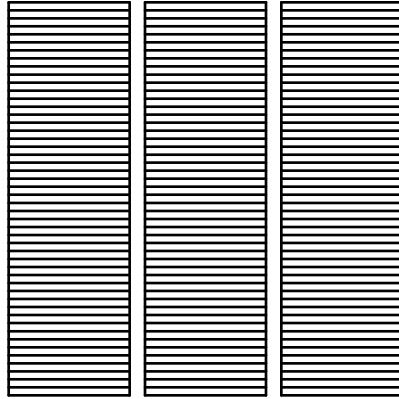
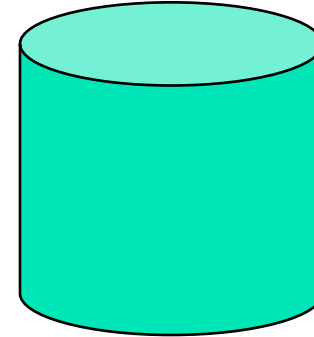
Horizontal Partitioning : sharding



Horizontal Partitioning



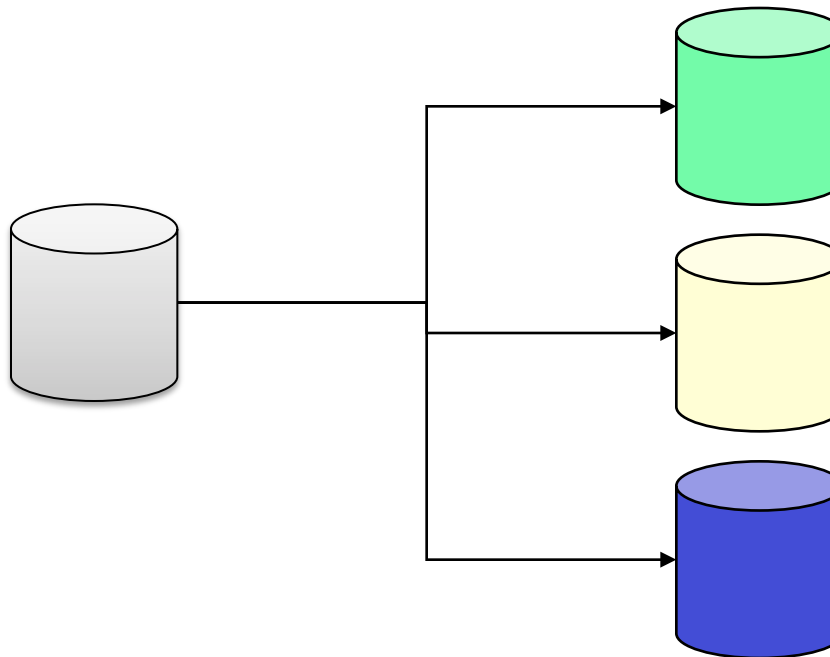
Vertical Partitioning : Column



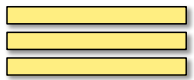
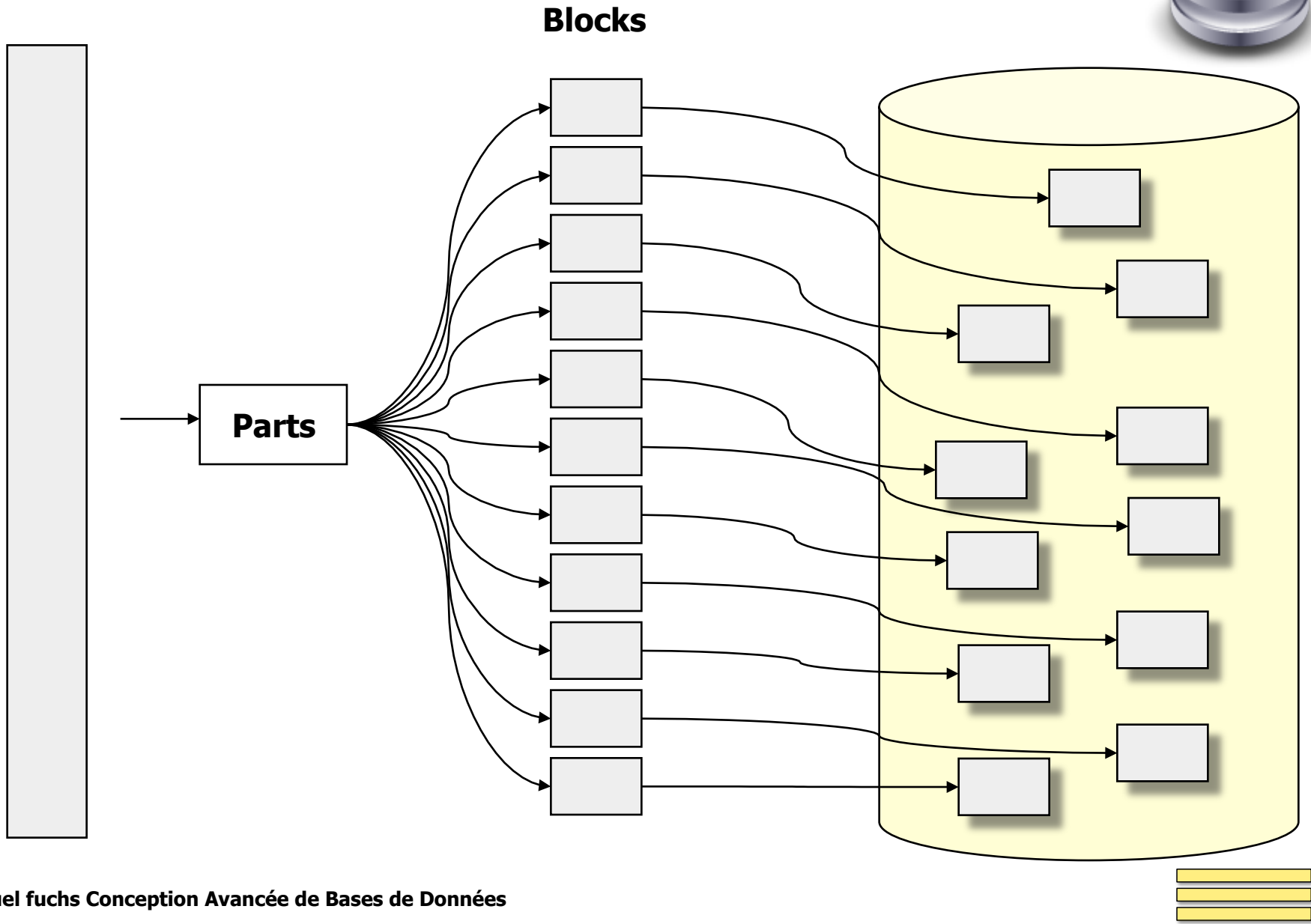
Devices Partitioning



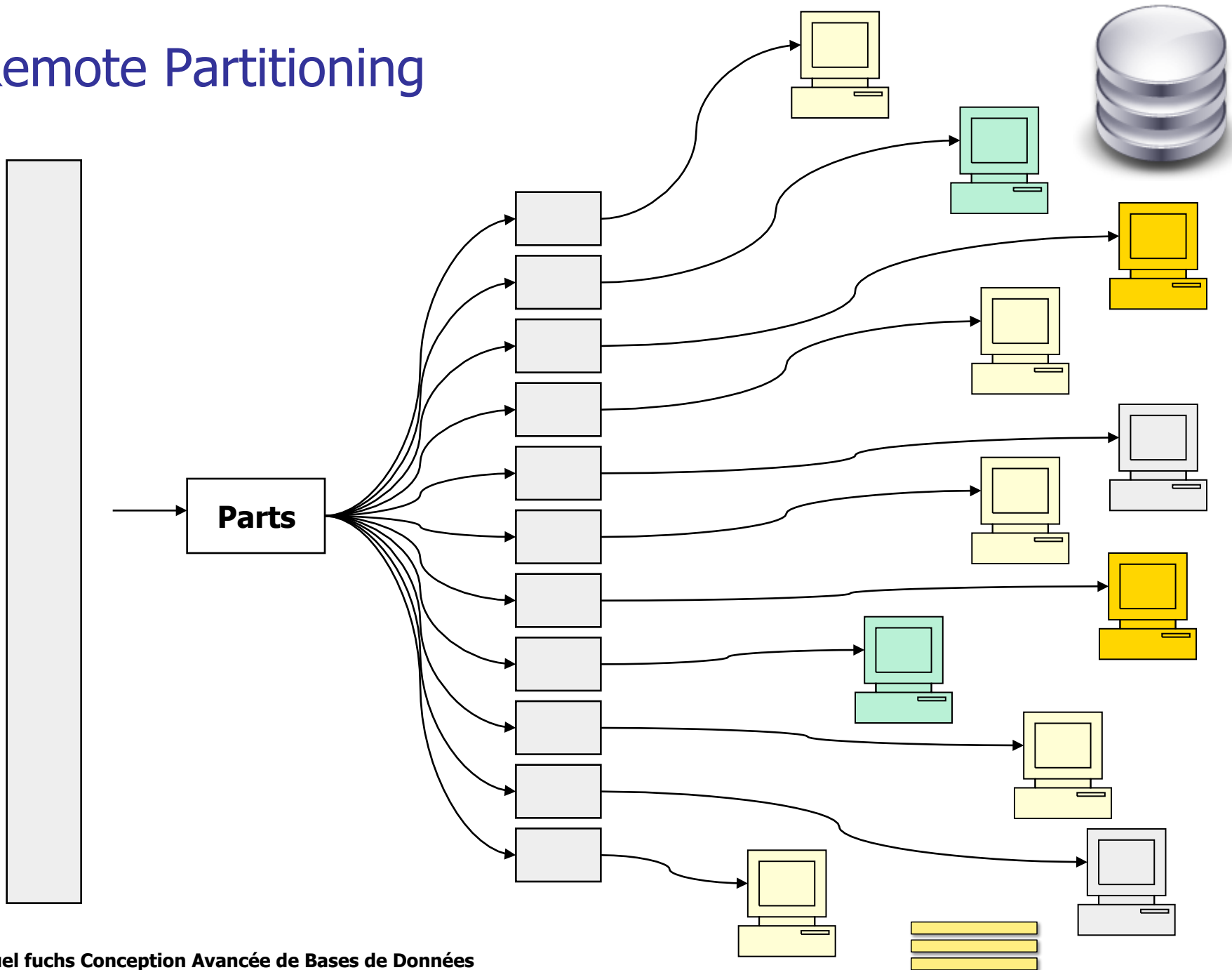
- Devices Partitioning is a method for distributing data evenly across devices.



Blocks Partitioning



Remote Partitioning



Horizontal Partitioning methods



- List Partitioning
- Range Partitioning
- Hash Partitioning
- Composite Partitioning

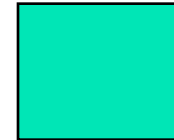
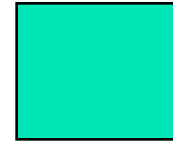
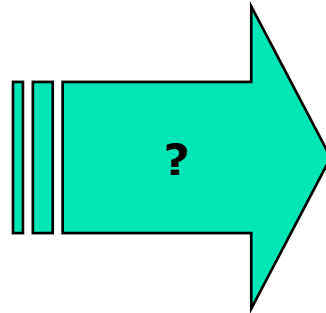


Partitioning: Turn Over By City



City List

Amien
Bordeaux
Brest
Dunkerque
Lille
Metz
Montpellier
Nancy
Narbone
Rennes
Strasbourg
Toulouse
Toulouse



List partitioning



- Segmentation of data based on a pre-defined list of values.



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Strasbourg
Toulouse
Toulouse

North Area
Lille
Dunkerque
Amien

West Area
Rennes
Brest
Bordeaux

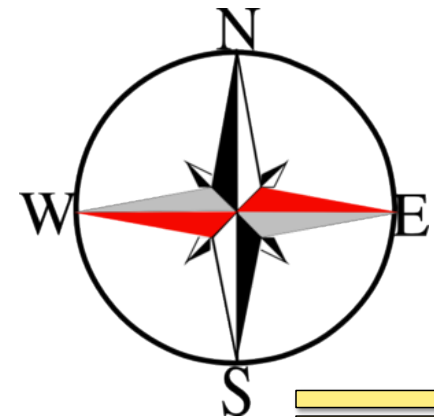
South Area
Toulouse
Montpellier
Narbone

East Area
Strasbourg
Toulouse
Metz
Nancy

list



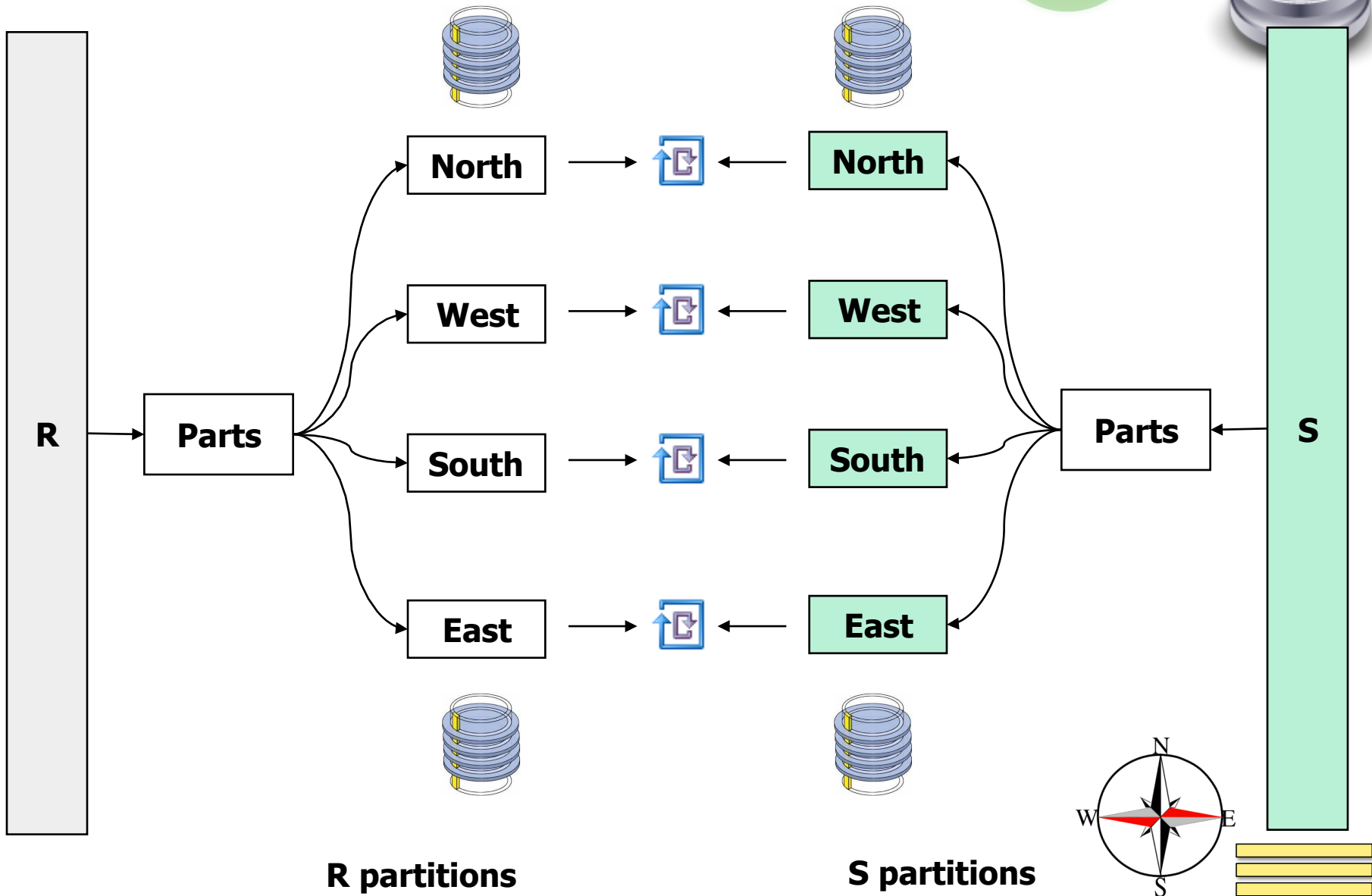
By region



Join Partitioning

What we want

Yes



Range Partitioning



- Range partitioning maps data to partitions based on ranges of partition key values.
- Exemple :
 - Dates partitioning.
 - Partition data into monthly partitions.
- Range partitioning maps rows to partitions based on ranges of column values.



Turn Over By City



Range Partition

Janvier/Fév

Mars/Avril

Mai/Juin

Juillet/Août

Sept/Oct

Nov/Déc

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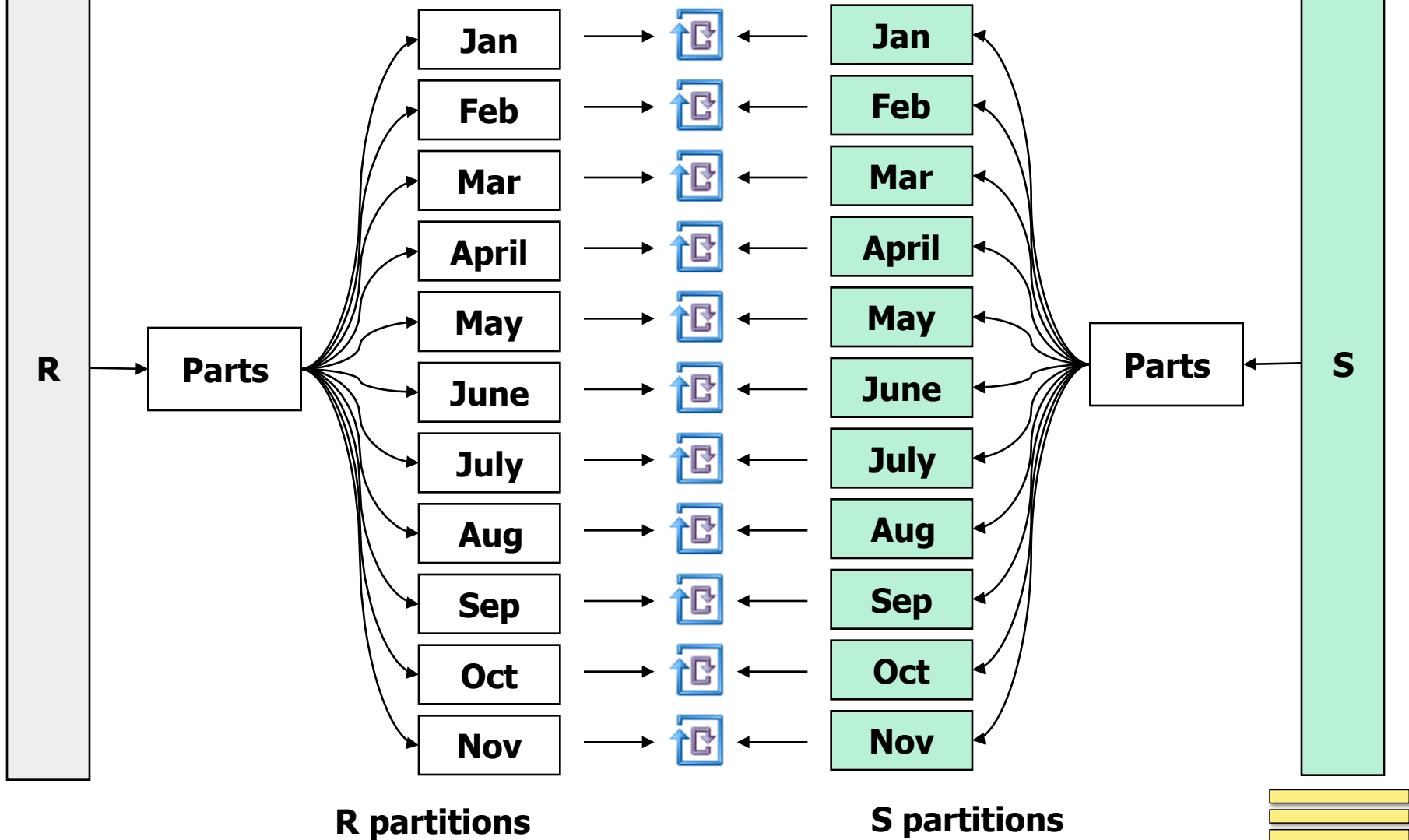
Time Partition



Join Partitionning

What we want

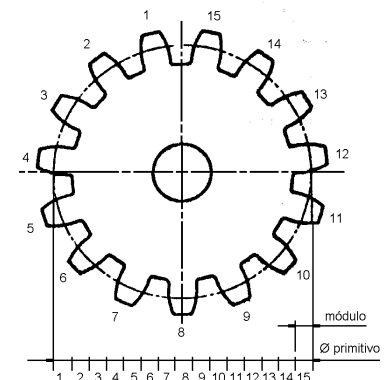
Yes



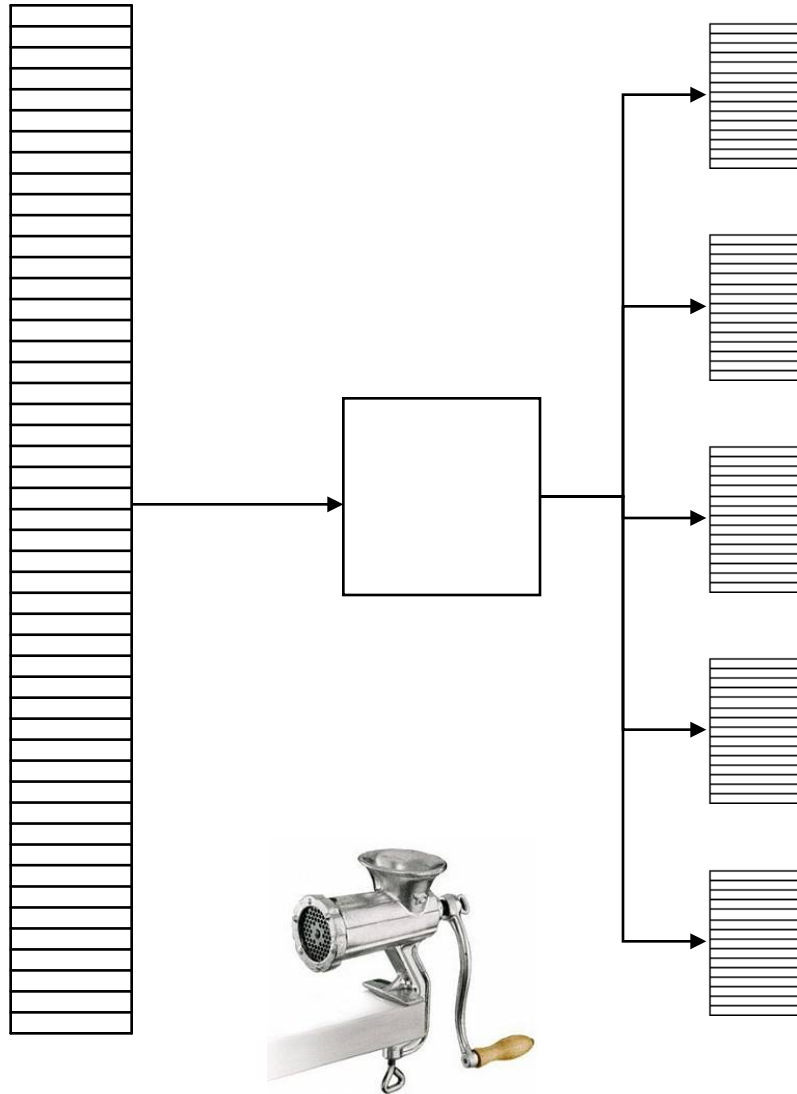
Hash partitioning



- Hash partitioning maps data to partitions based on hash value.
- Each partition being associated either with one join attribute value or a range or set of such values.
- Hashing distributes rows among partitions,
 - Giving partitions the same size
- Uses linear hashing algorithm to prevent data from clustering within specific partitions,
- Number of partitions by a power of two
 - 2, 4, 8, 16, 32.



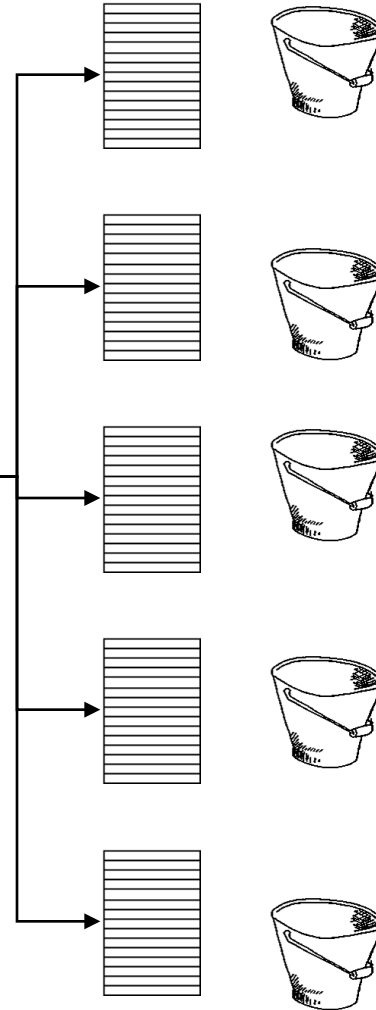
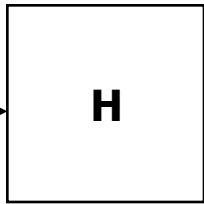
Hash Partitioning



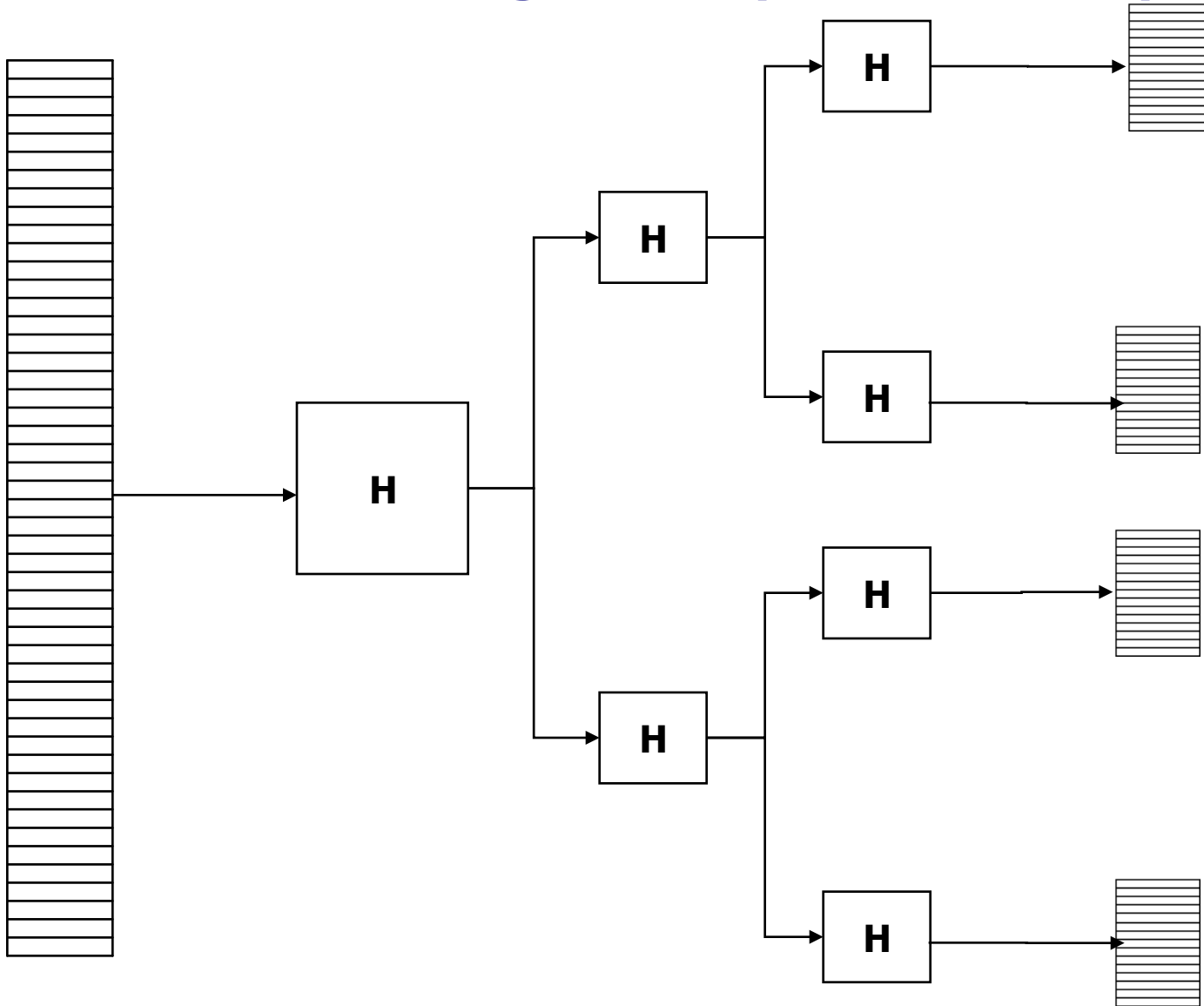
Hash Partitioning

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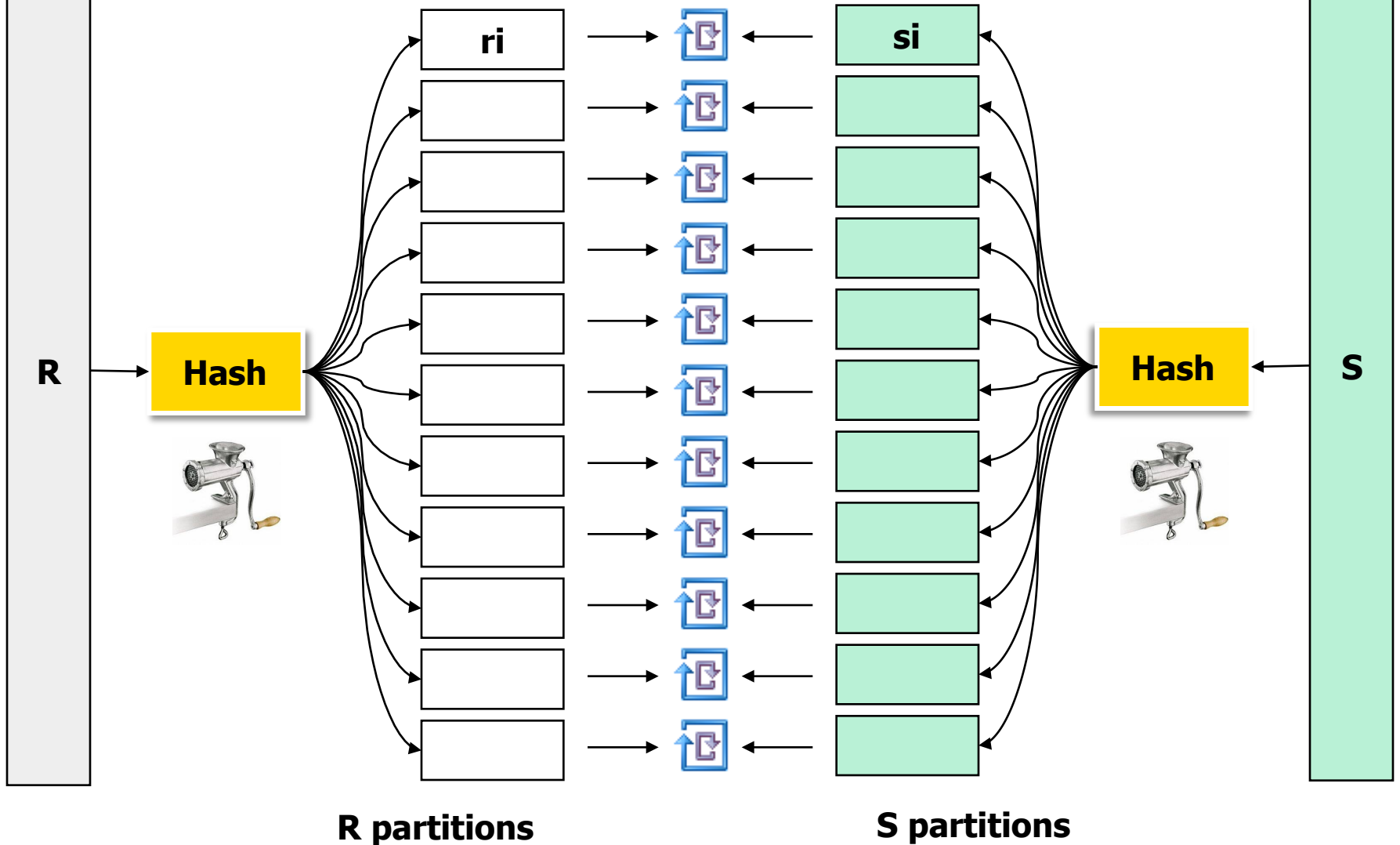
Hash Partitioning Tree (Merkle tree)



Join Partitionning

What we want

Yes



Composite partitioning



- Composite partitioning is a combination of the basic data distribution methods;
- A table is partitioned by one data distribution method and then each partition is further subdivided into subpartitions using a second data distribution method.
- All subpartitions for a given partition together represent a logical subset of the data.



Turn Over By City



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Dunkerque
Amien

[illegible]

West Area
Rennes
Brest
Bordeaux

[illegible]

South Area
Toulouse
Montpellier
Narbonne

[illegible]

East Area
Strasbourg
Toulouse
Metz
Nancy

[illegible]

Ranges

Janvier/Fév

[illegible]Mars/Avril[illegible]

Mai/Juin	
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[illegible]Juille/Aout[illegible]Sept/OctNov/Dec[illegible]

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Remote Partitioning

