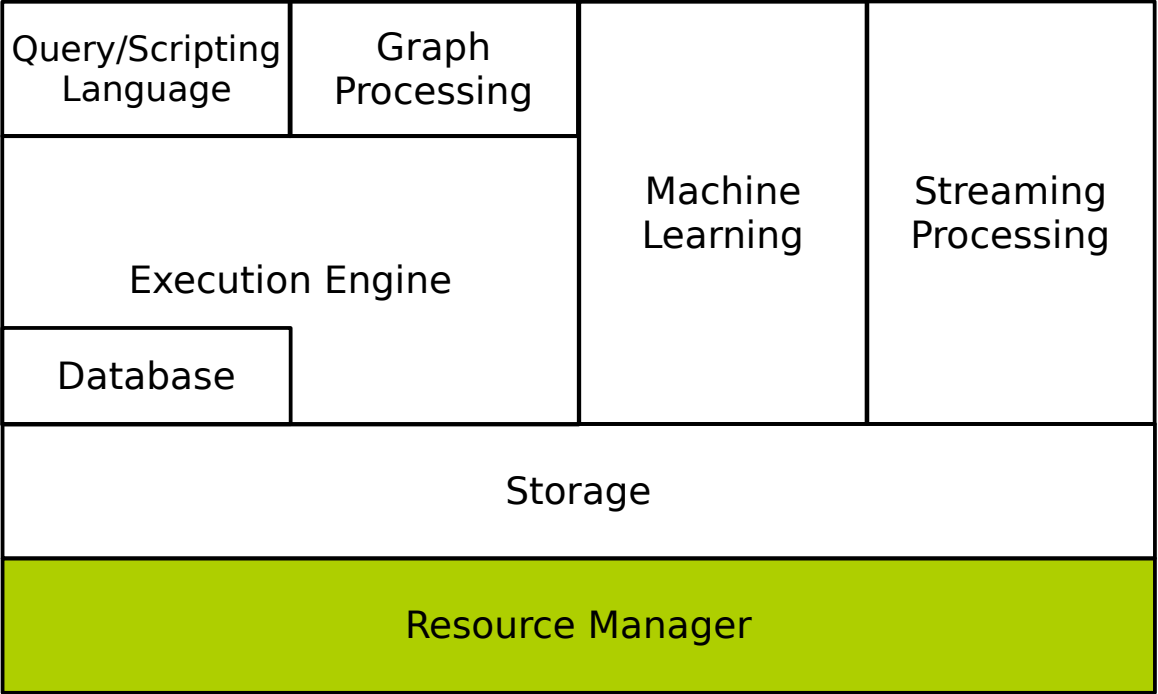
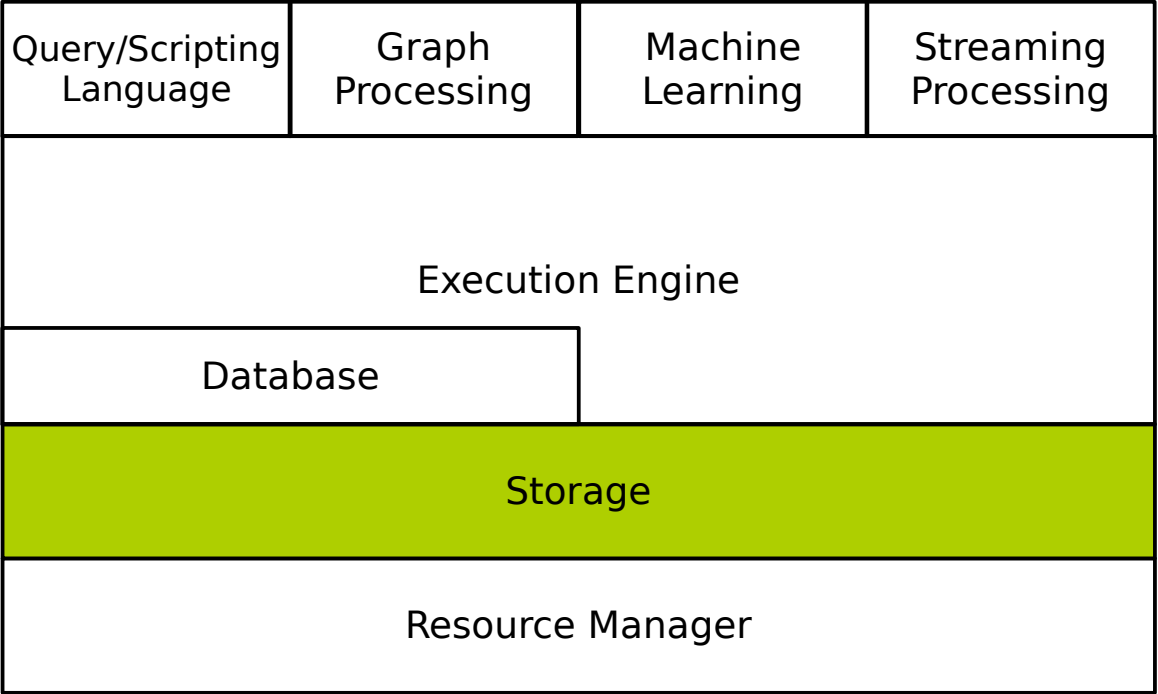
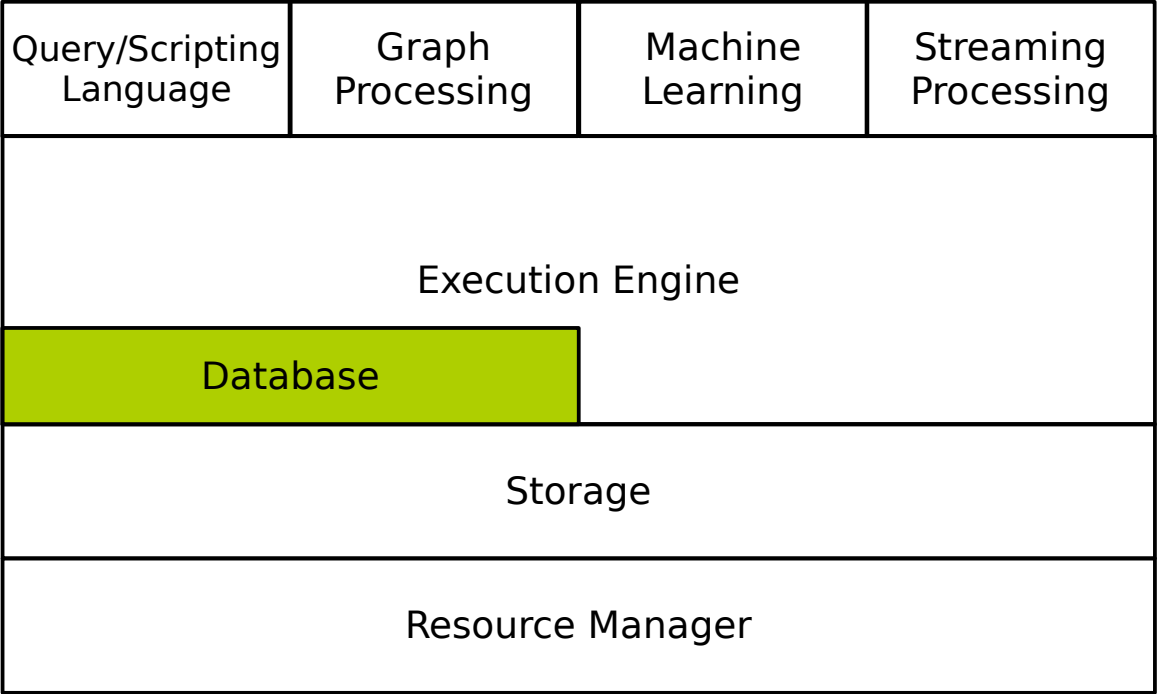
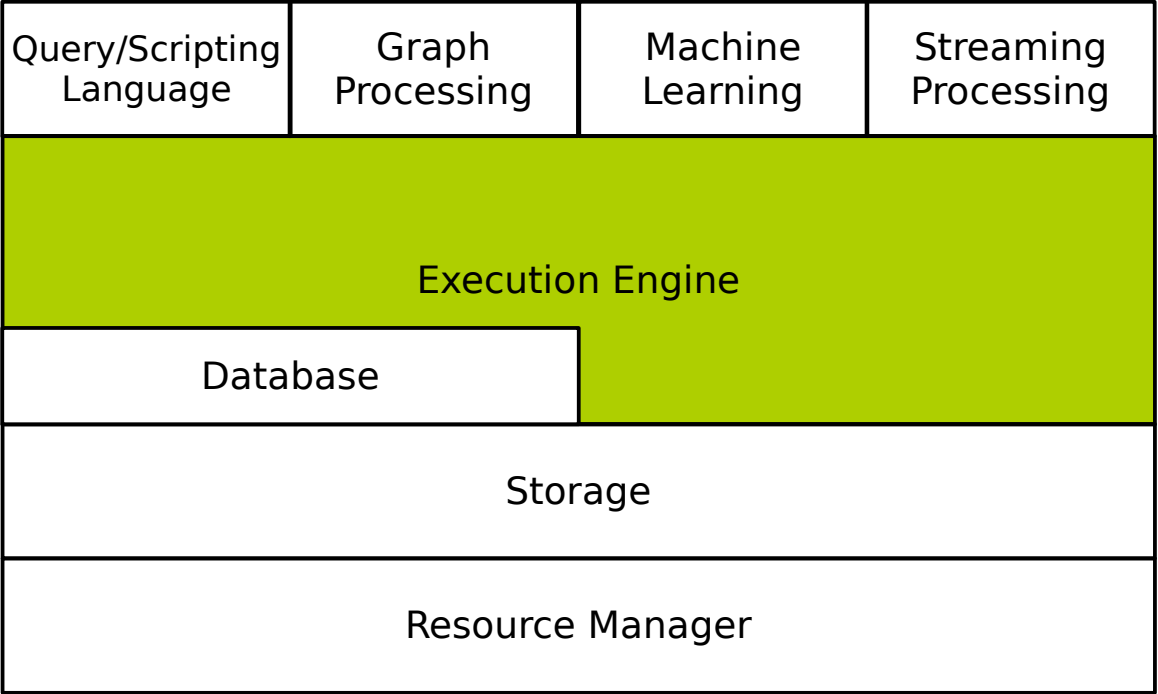


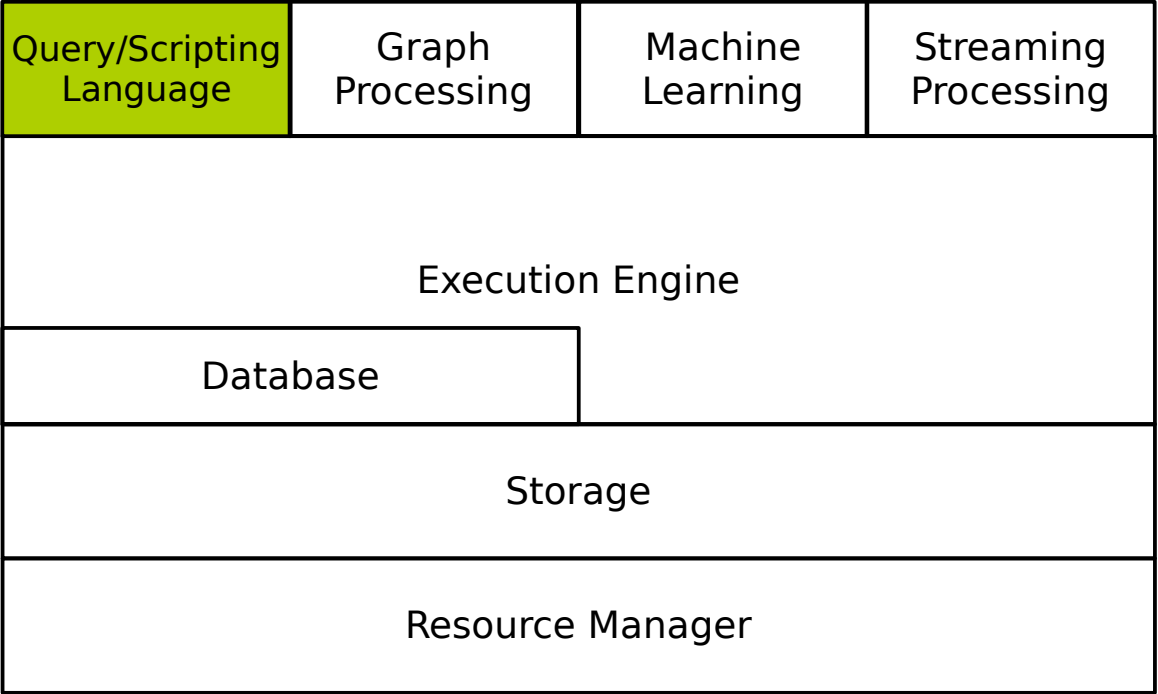
Shark	GraphX/Bagel	MLBase	D-Stream
Spark			
HDFS			
Mesos			



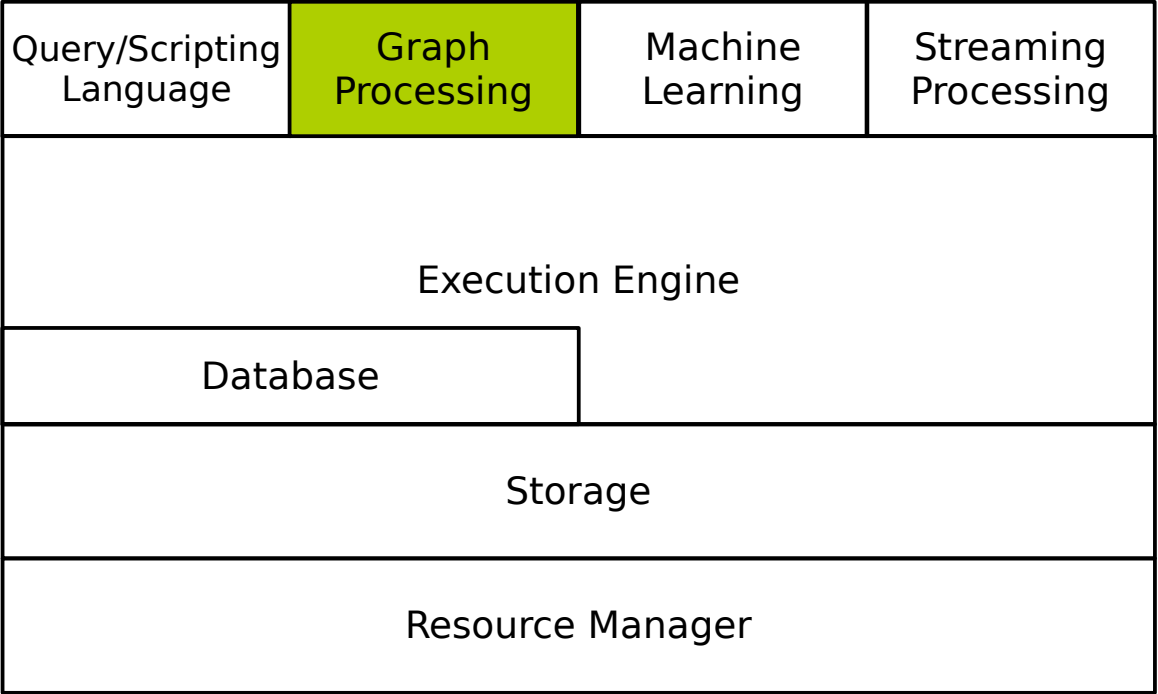




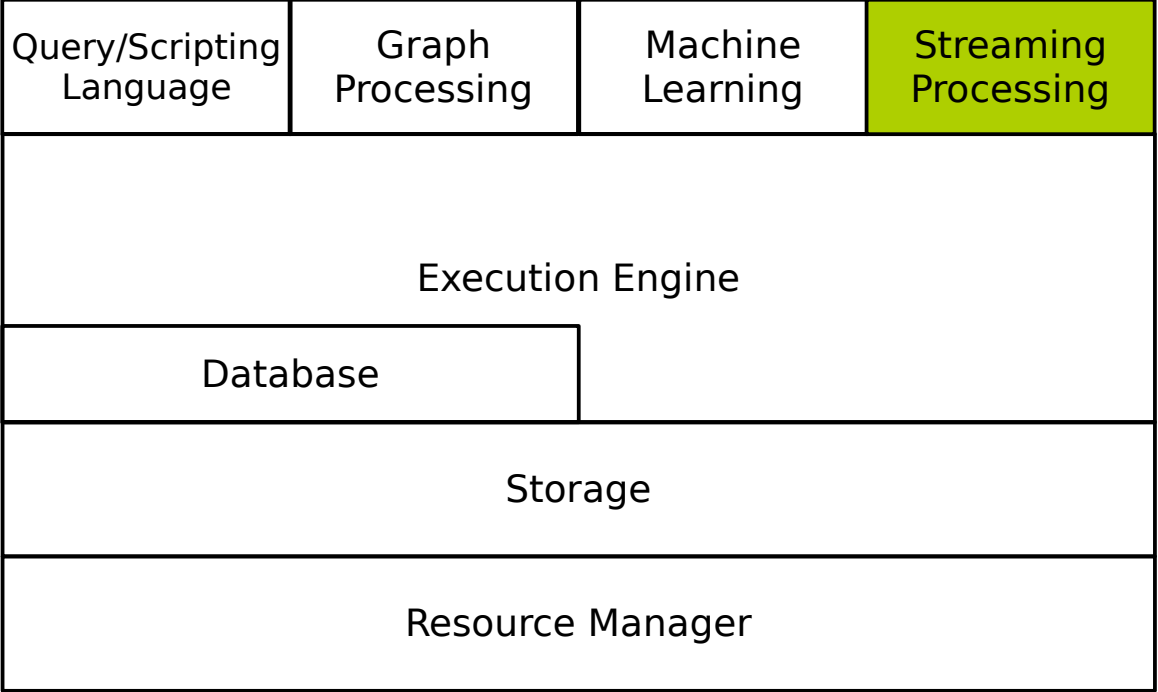


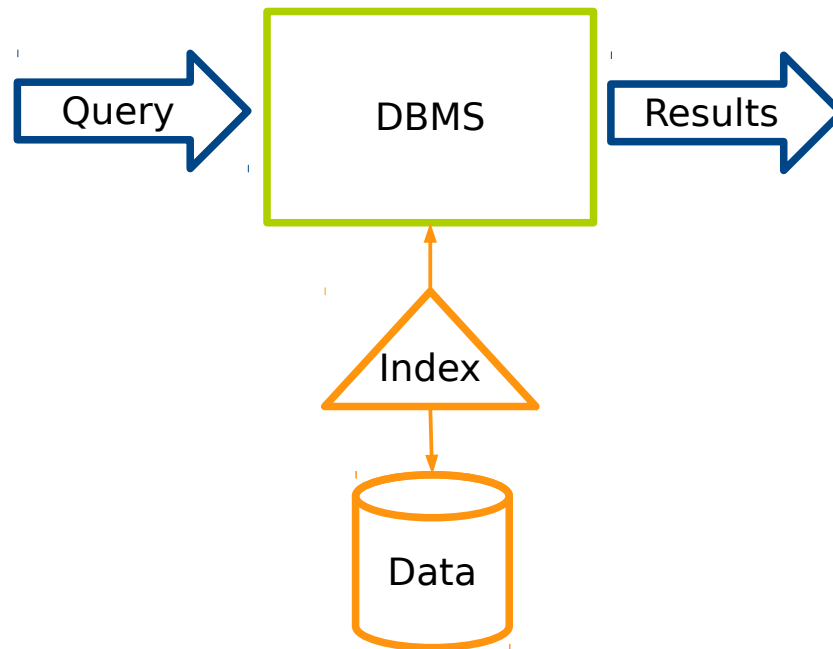


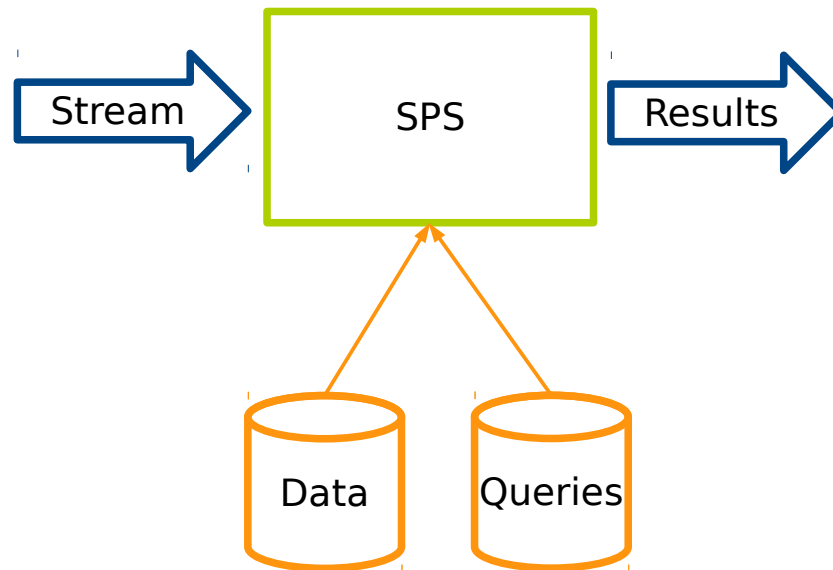




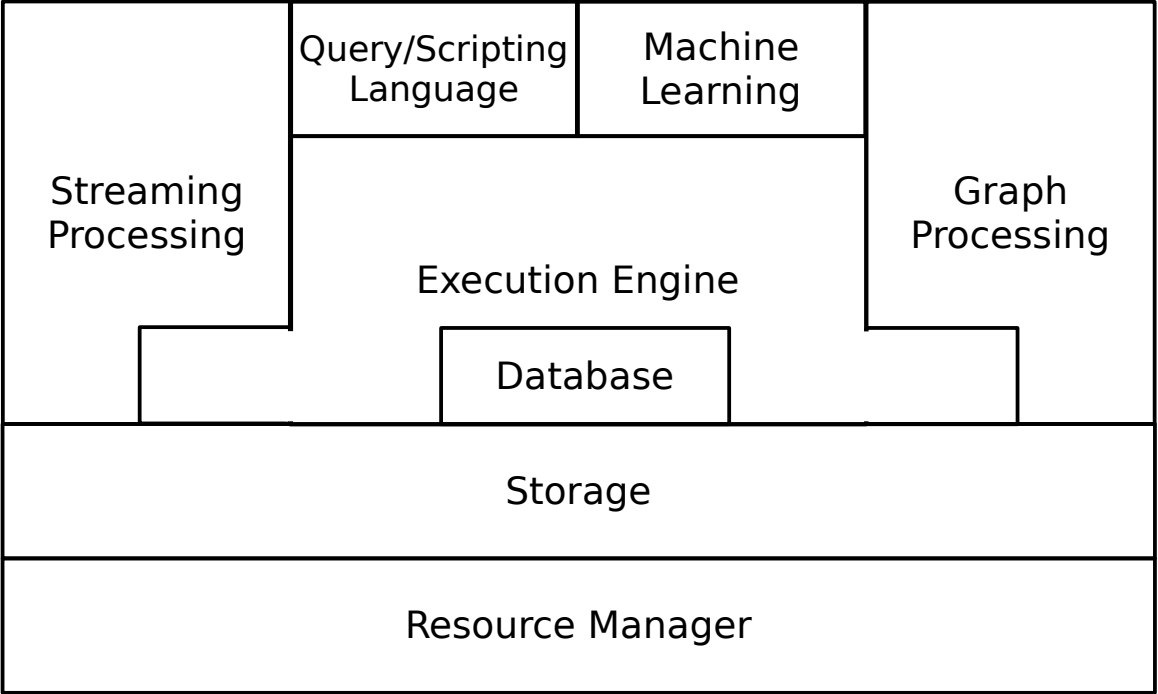
Query/Scripting Language	Graph Processing	Machine Learning	Streaming Processing
Execution Engine			
Database			
Storage			
Resource Manager			

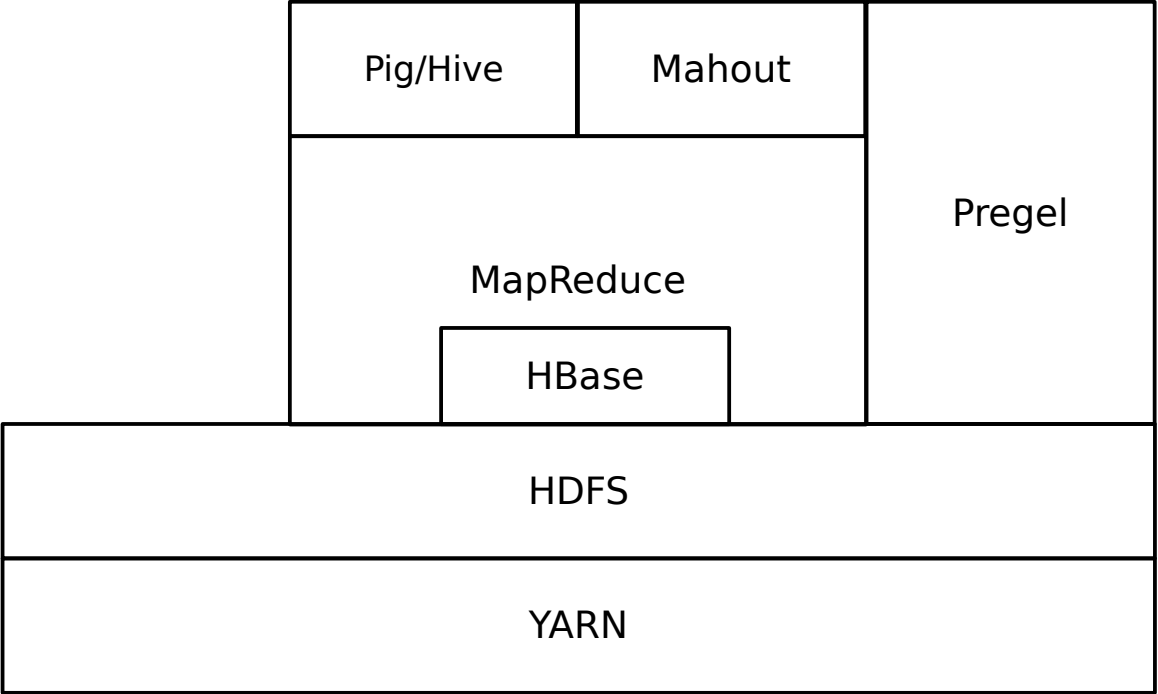




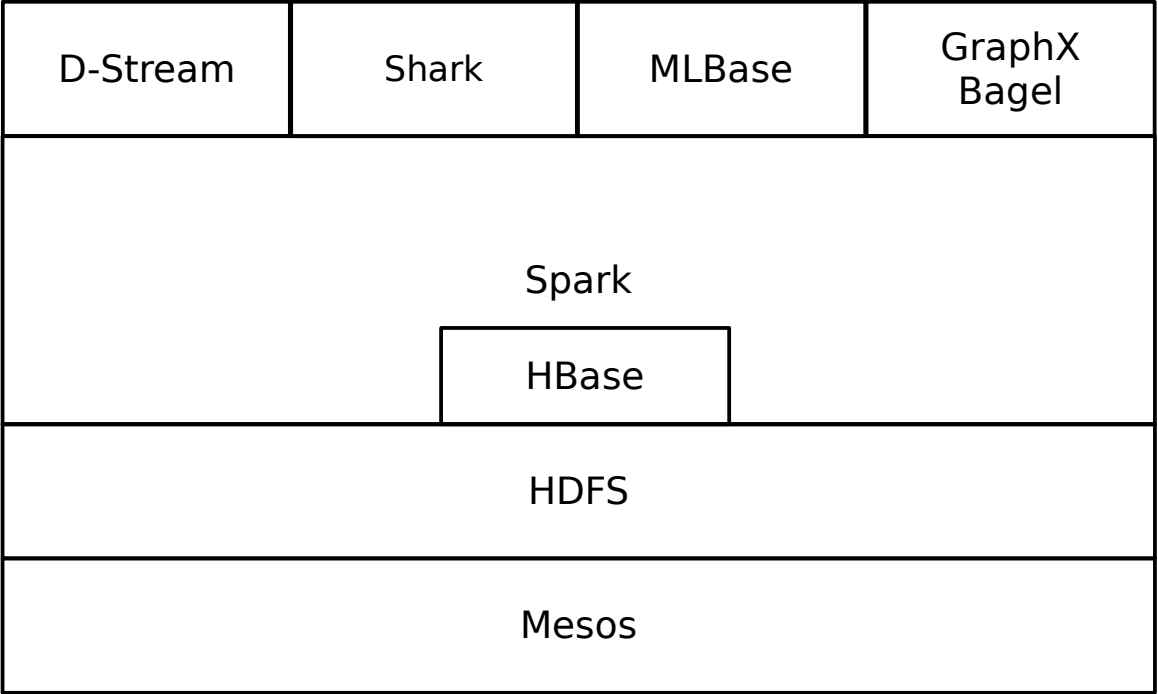


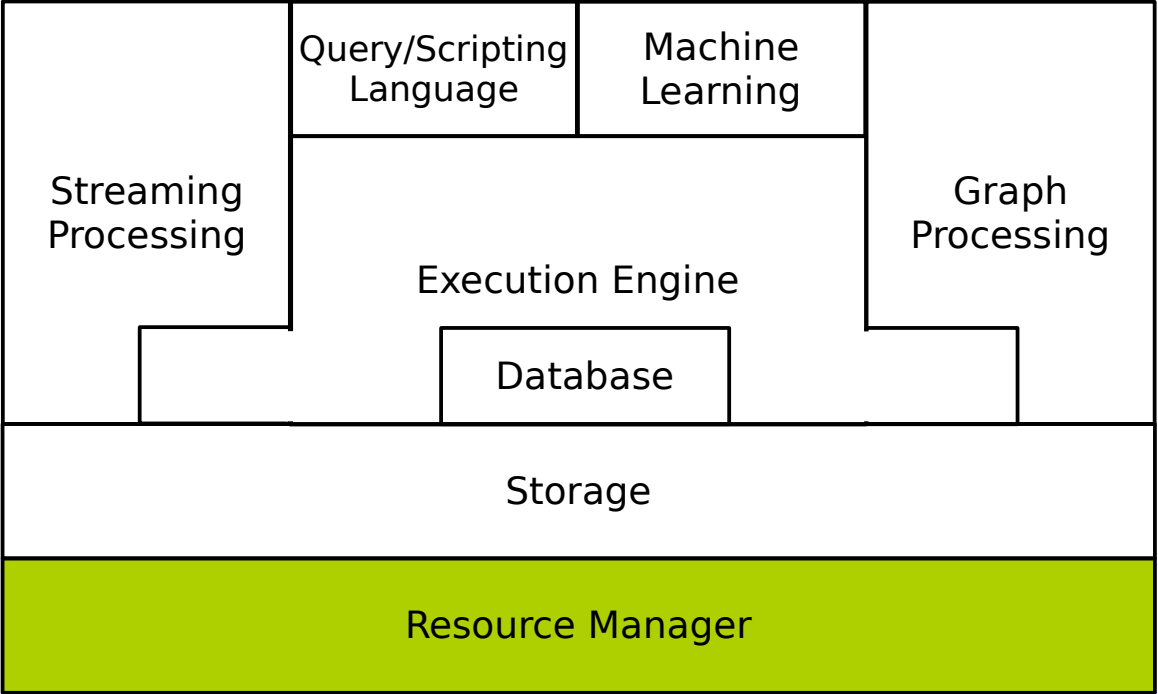
Pig, Hive, Shark FlumeJava, SCOPE DryadLINQ, PACT	Pregel, GraphLab Bagel, Giraph	Mahout, MLBase SystemML, Presto	Sorme, S4, SEEP Dstream, Naiad
MapReduce, Dryad, Spark, Nephele, Hayracks			
BigTable, Hbase, Dynamo, Cassandra MongoDB, Voldemort			
HDFS, S3			
YARN, Mesos			

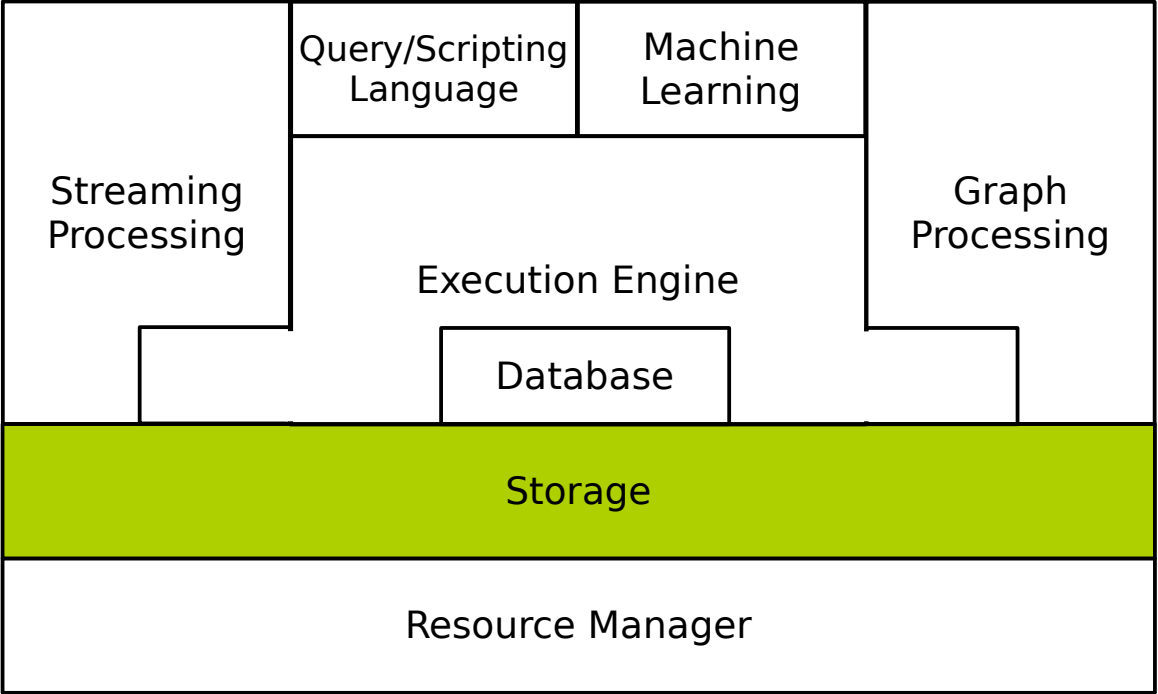


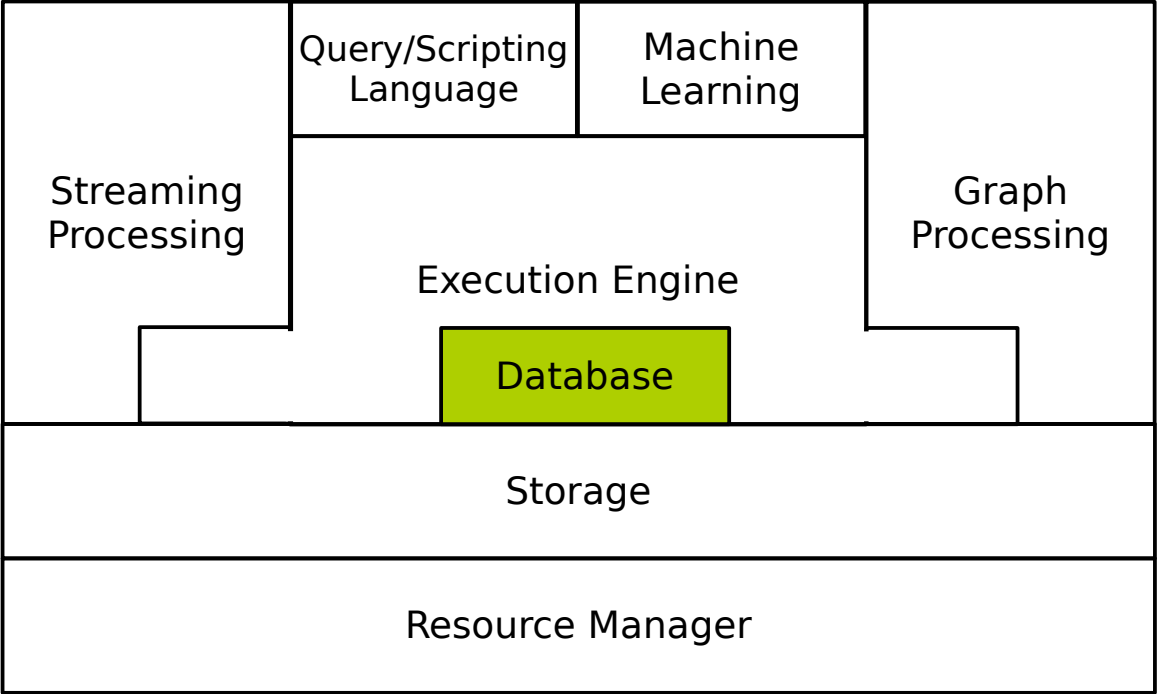


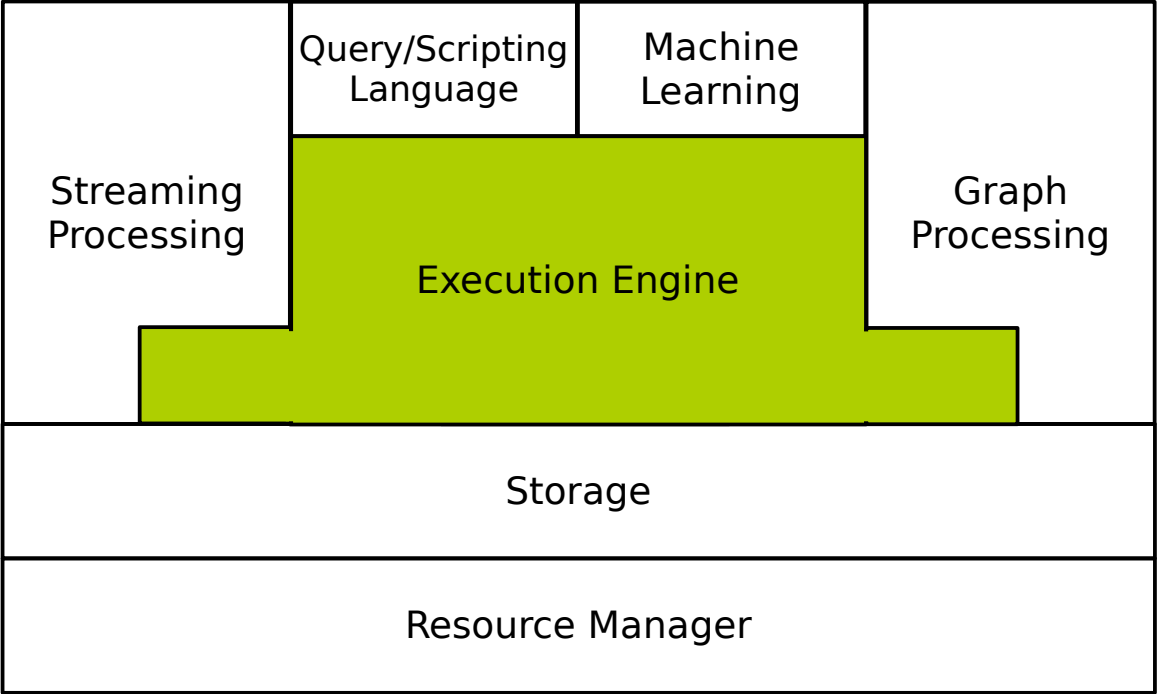


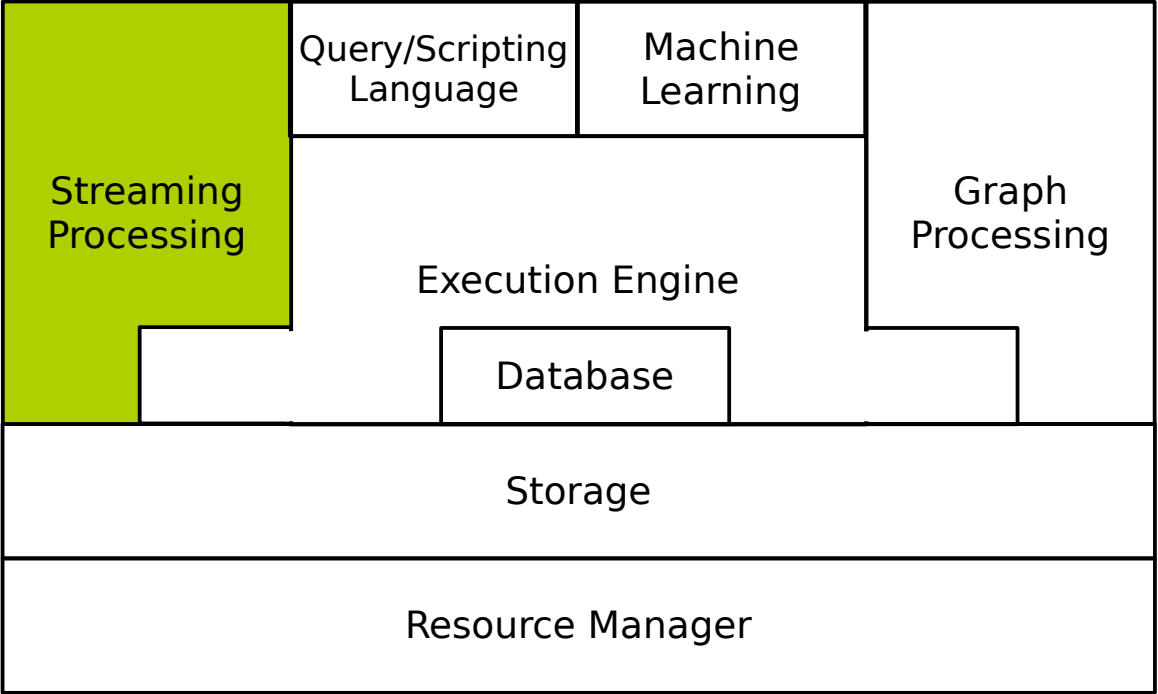


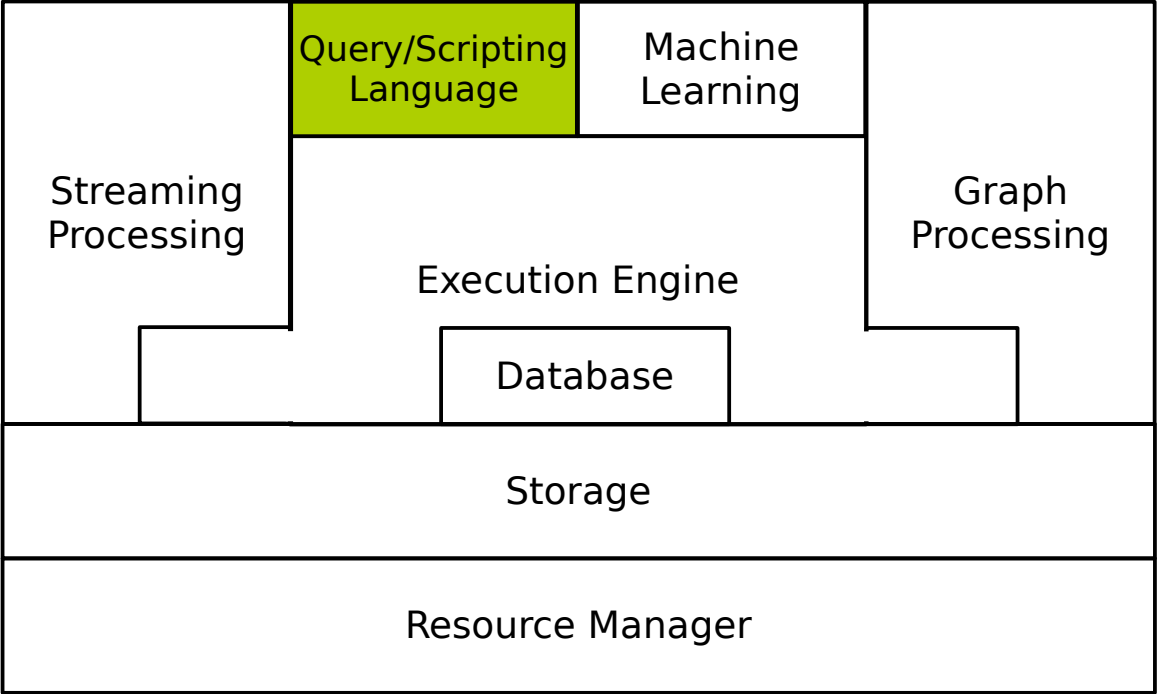


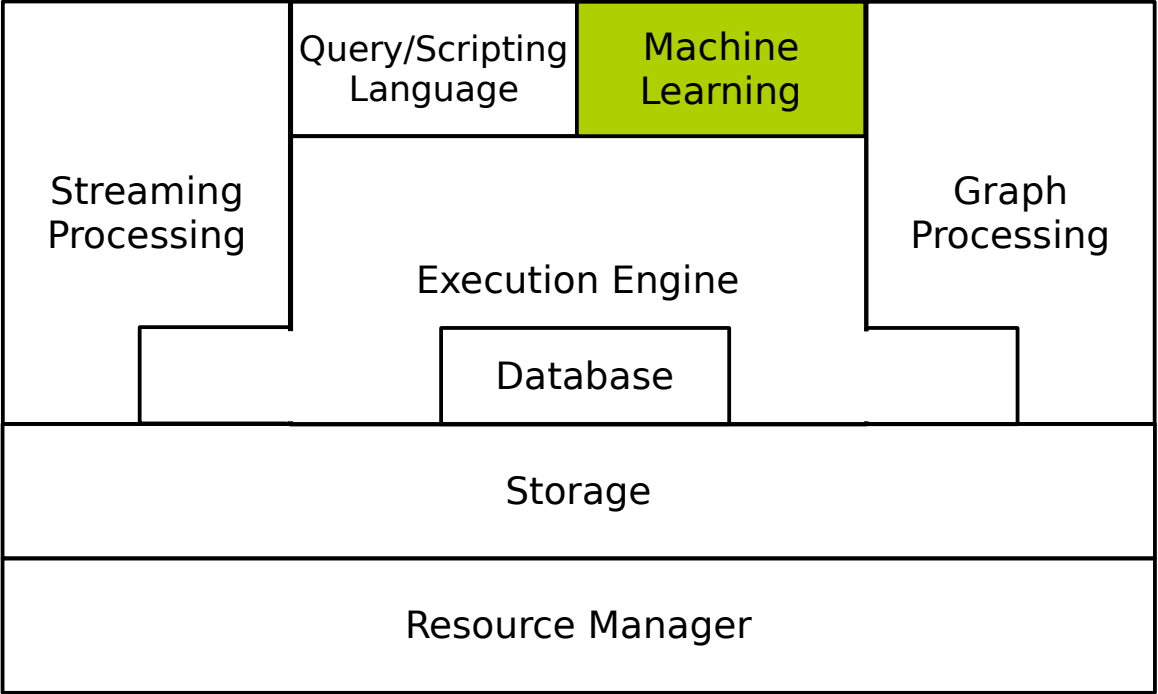




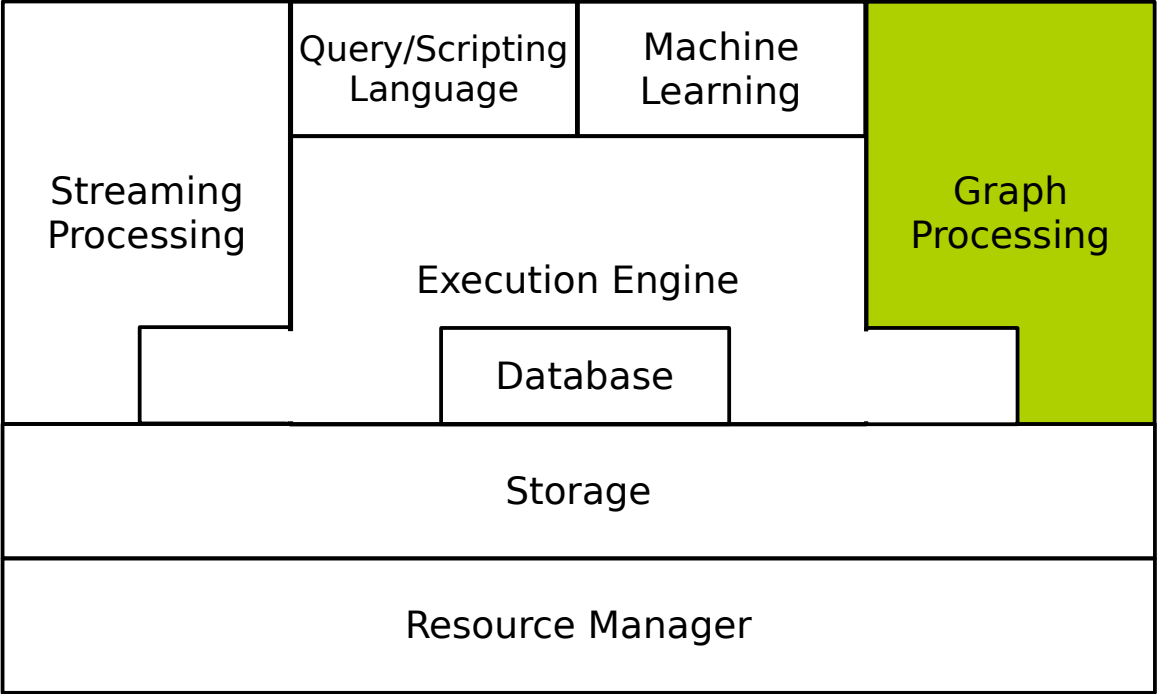


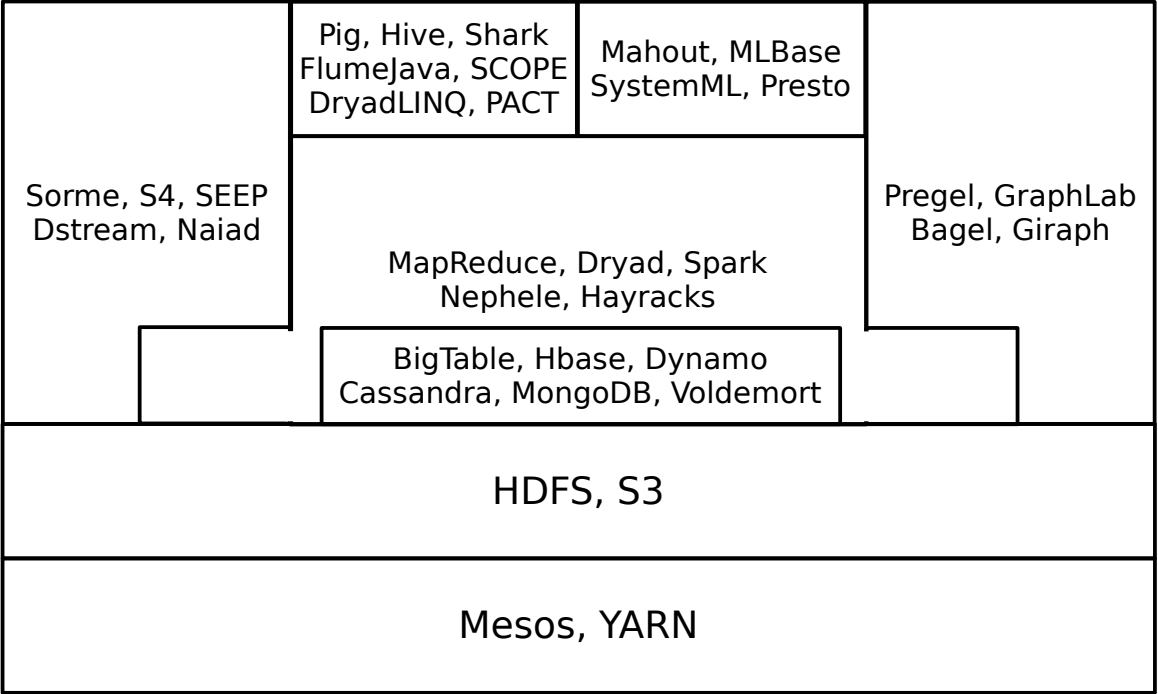




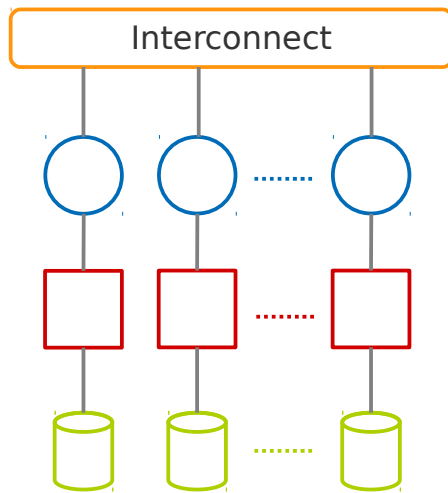




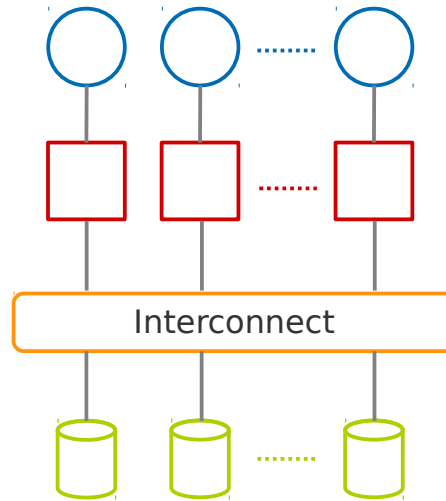




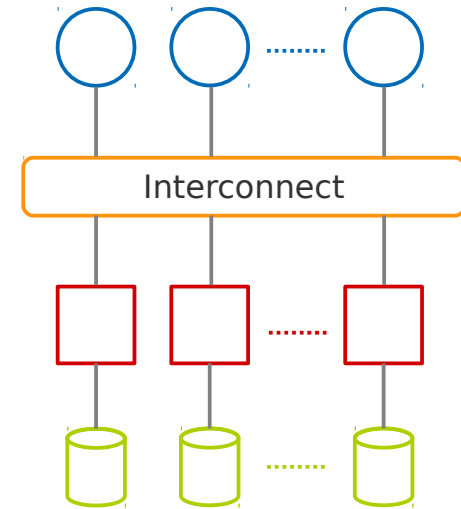
Shared nothing

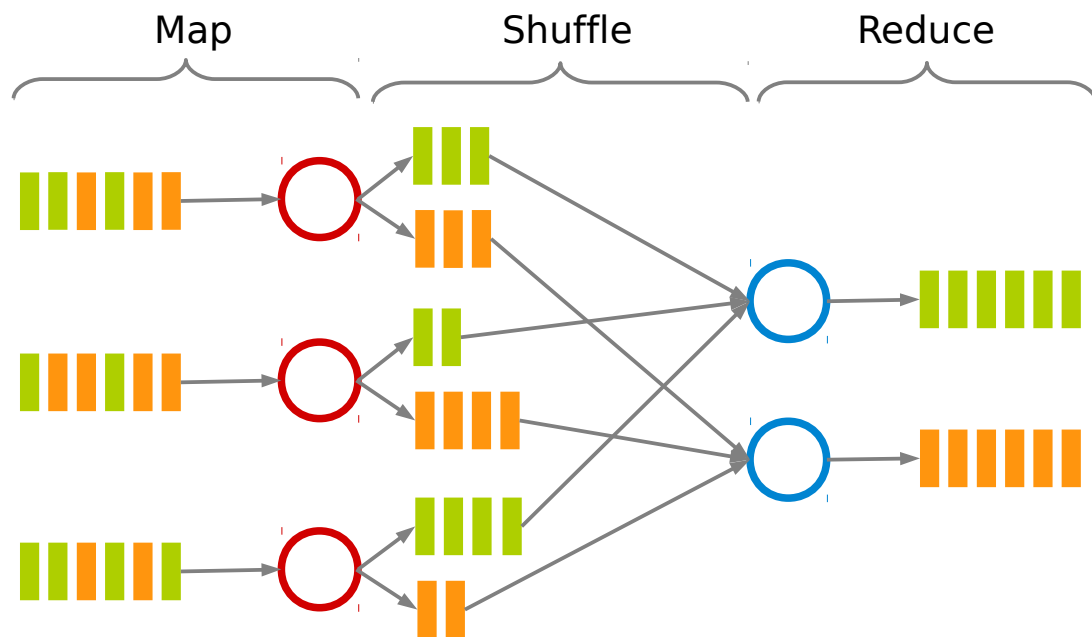


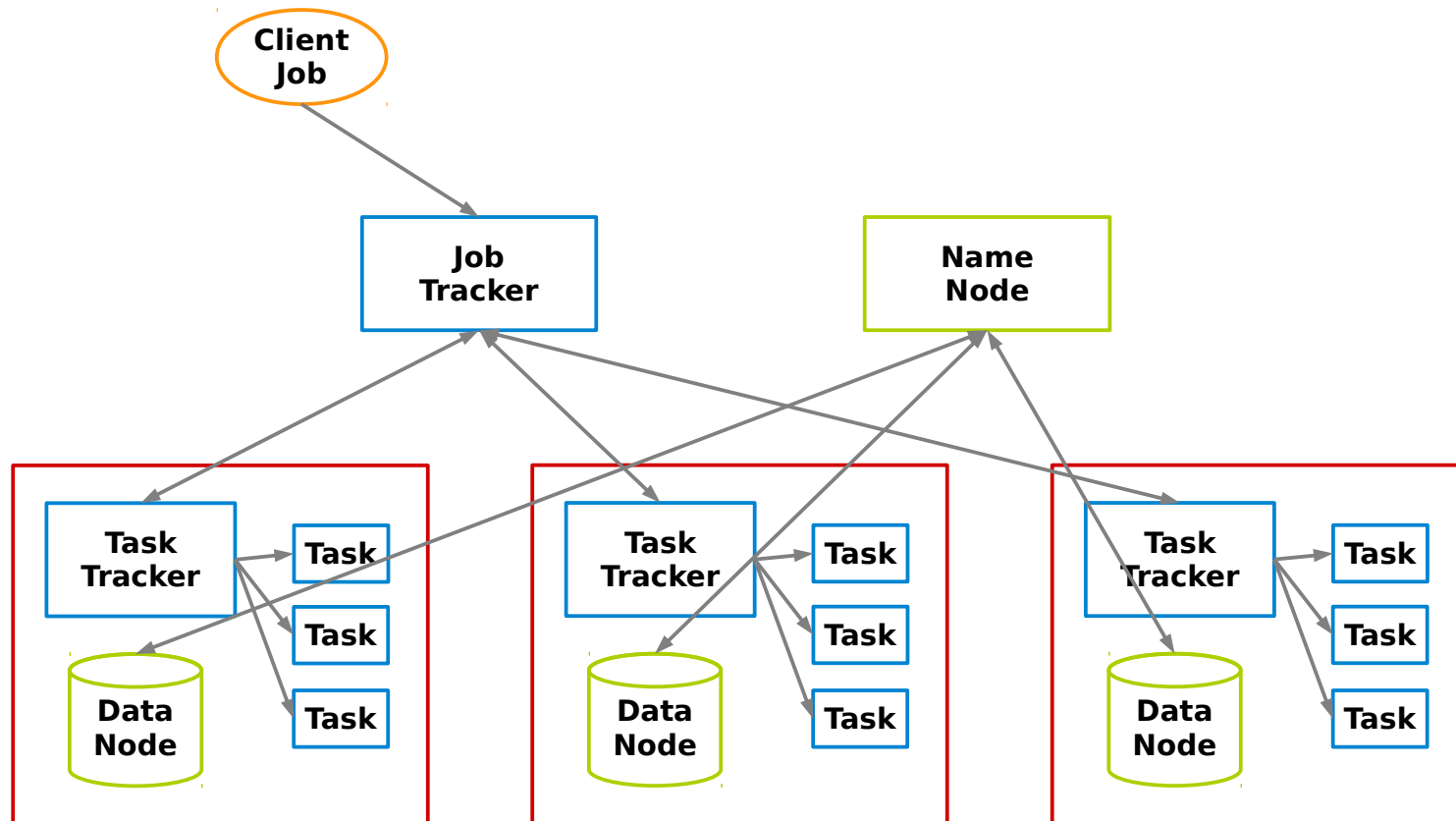
Shared disk

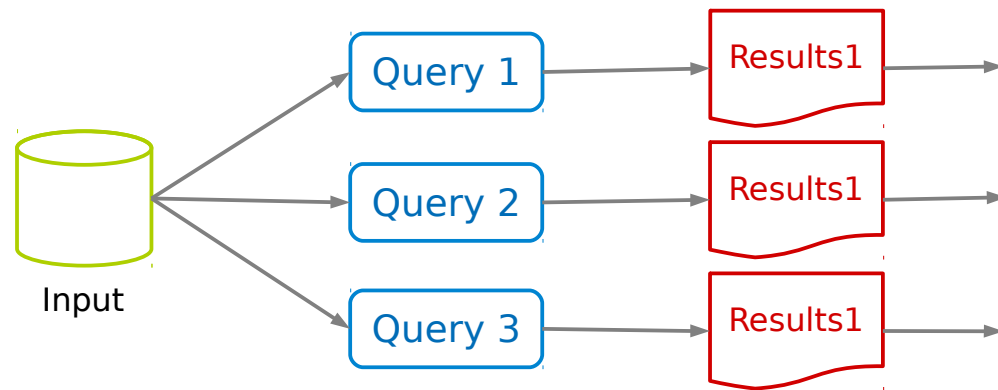
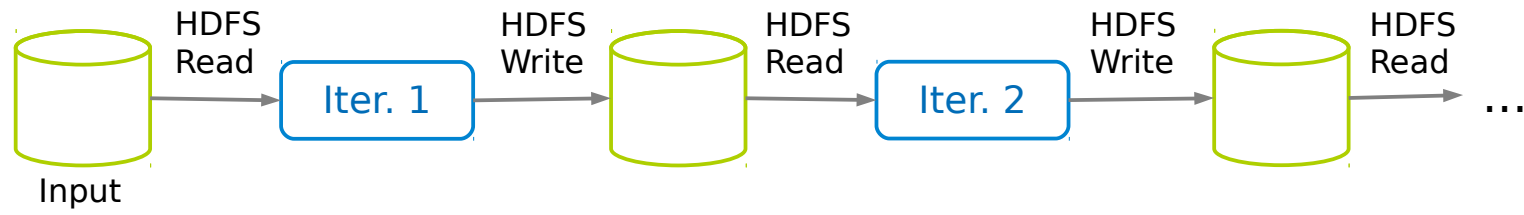


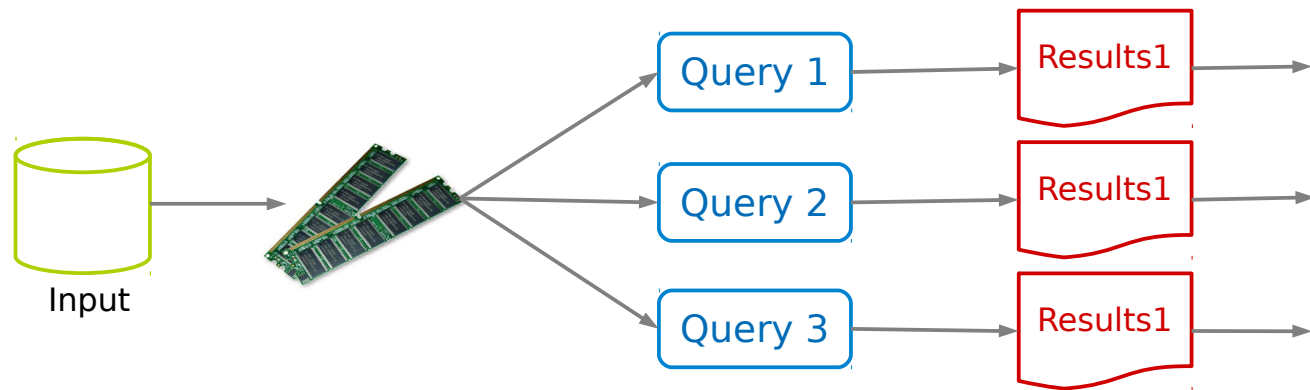
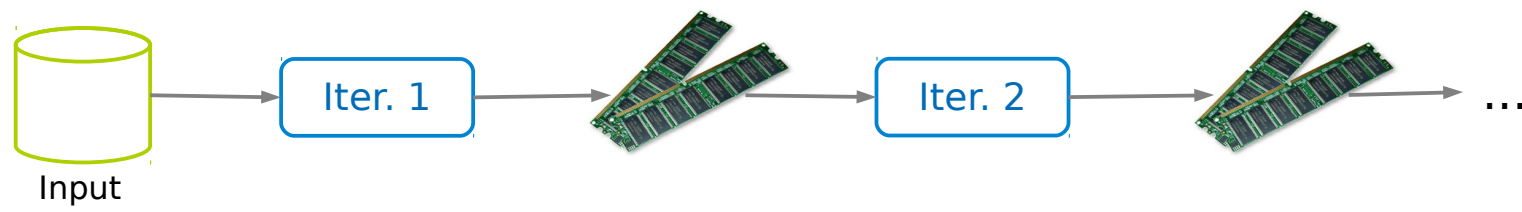
Shared memory

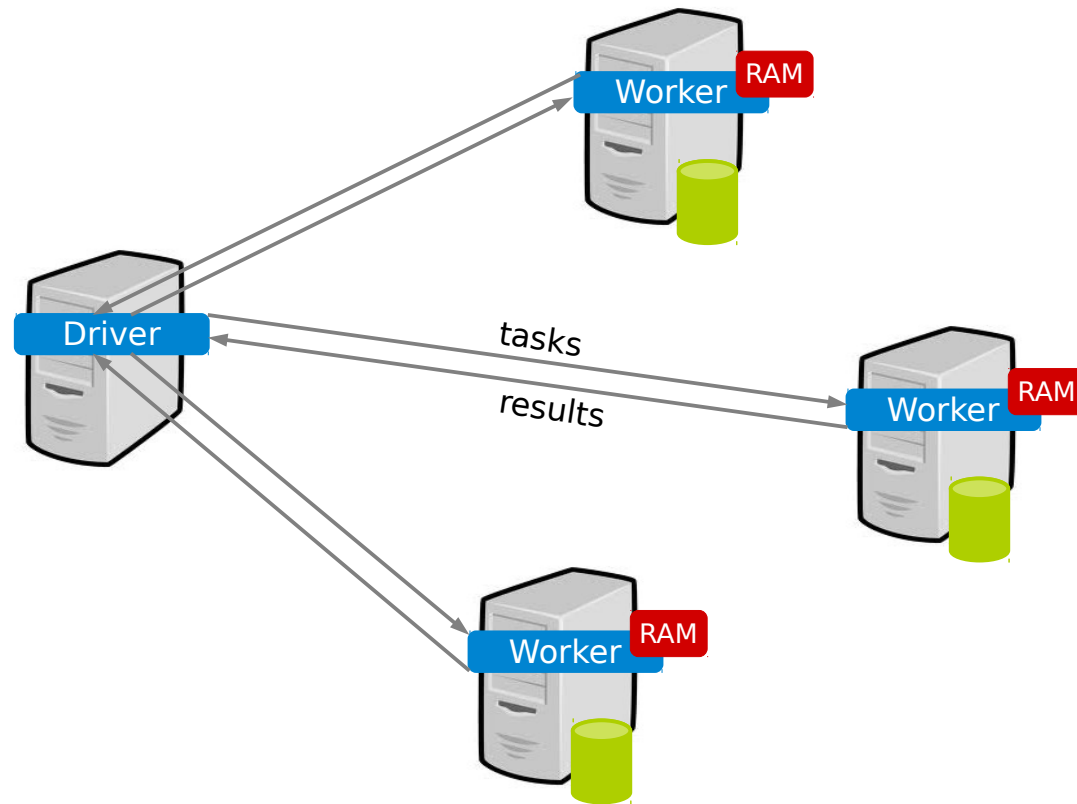




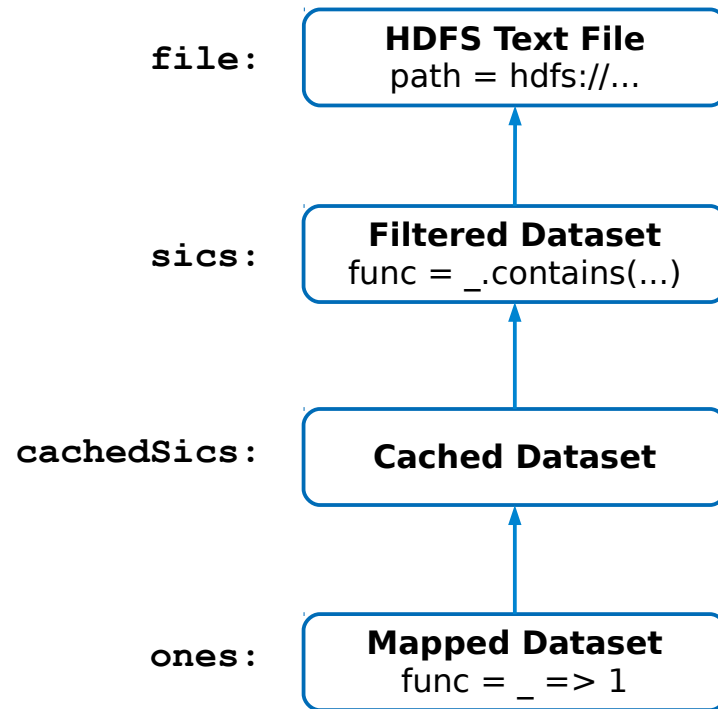


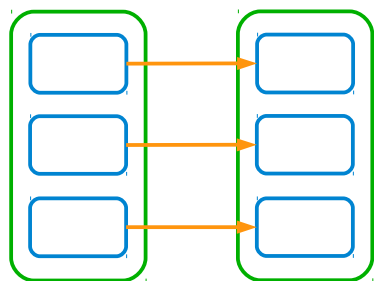




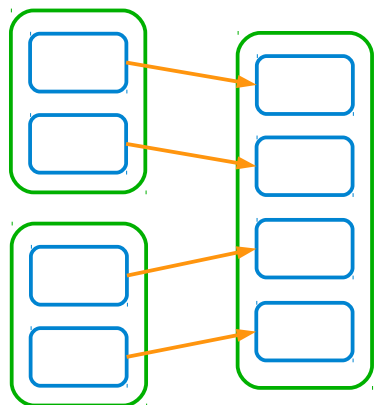




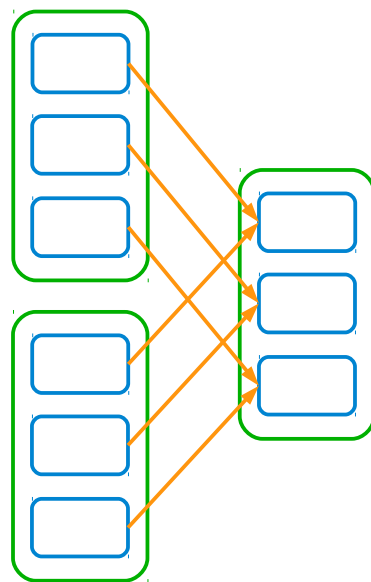




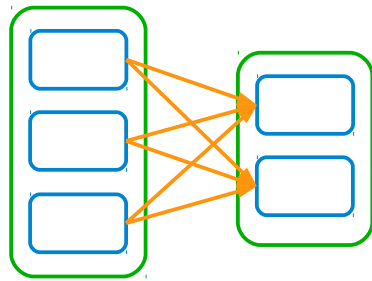
map, filter



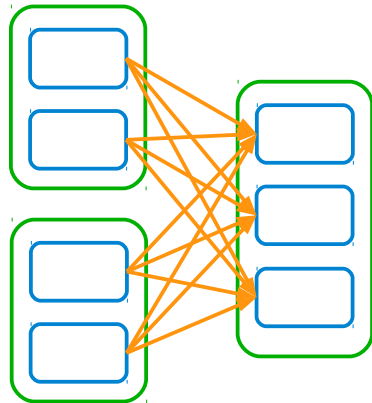
union



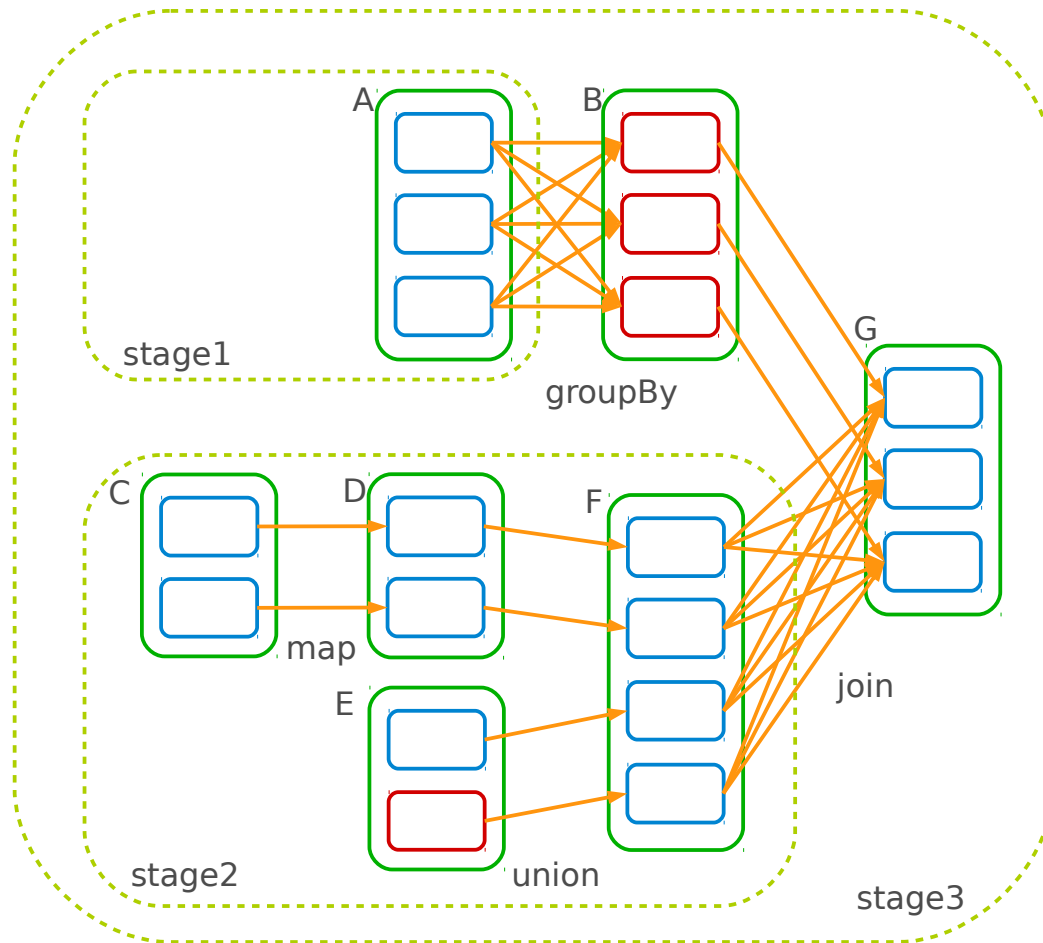
join with inputs  
co-partitioned

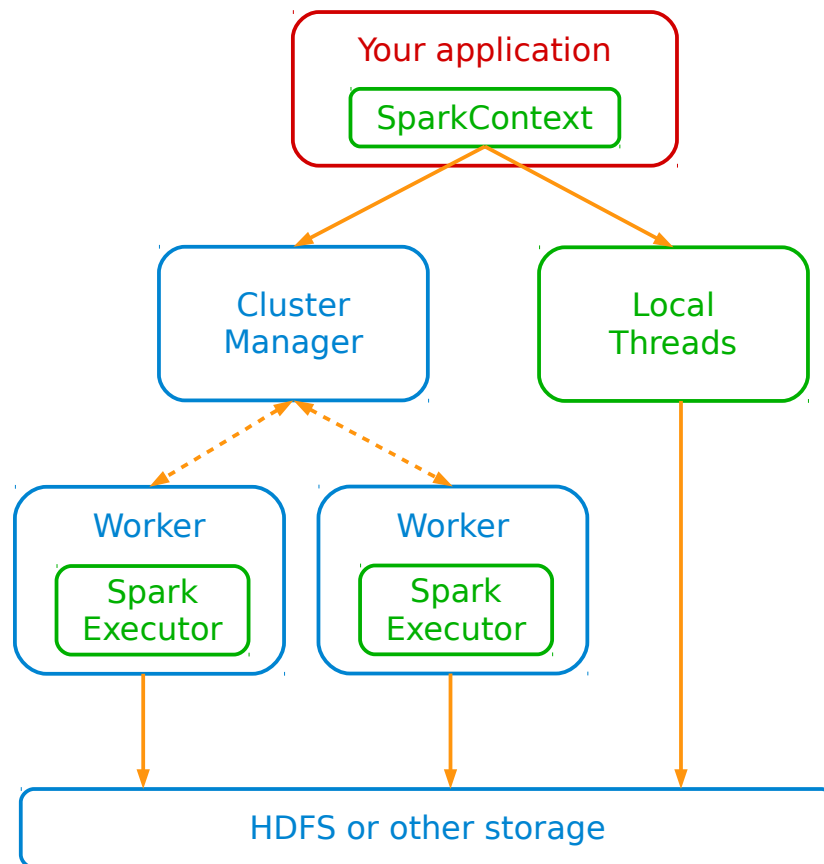


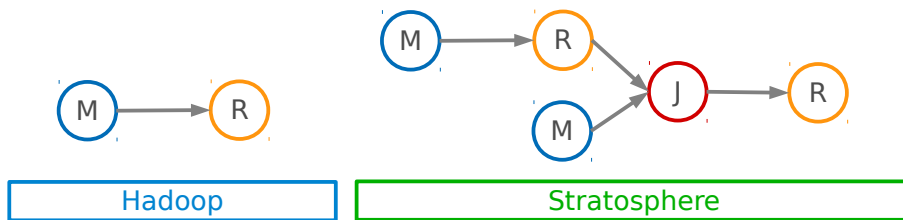
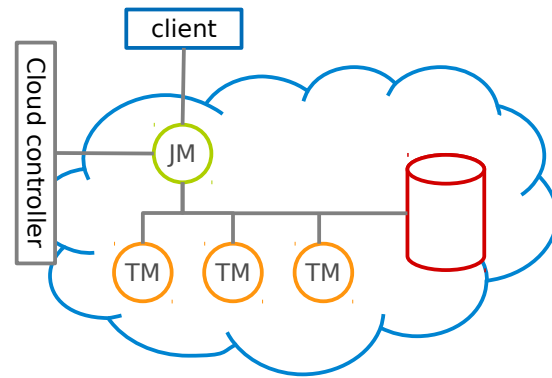
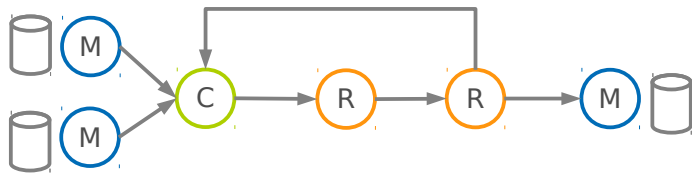
groupByKey

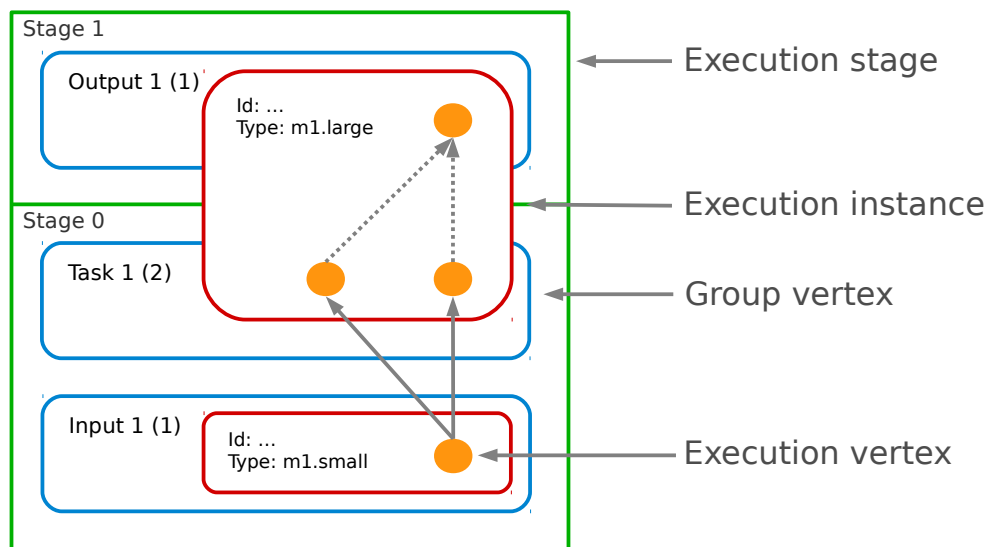
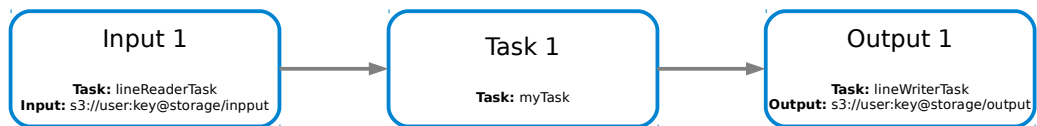


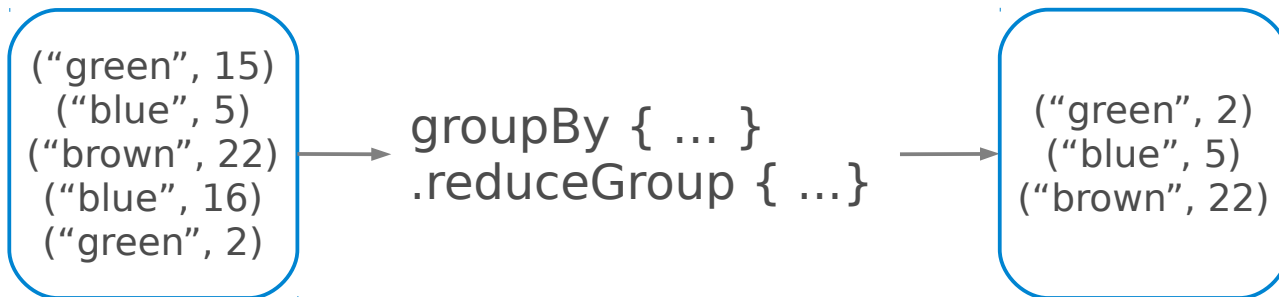
Join with inputs not  
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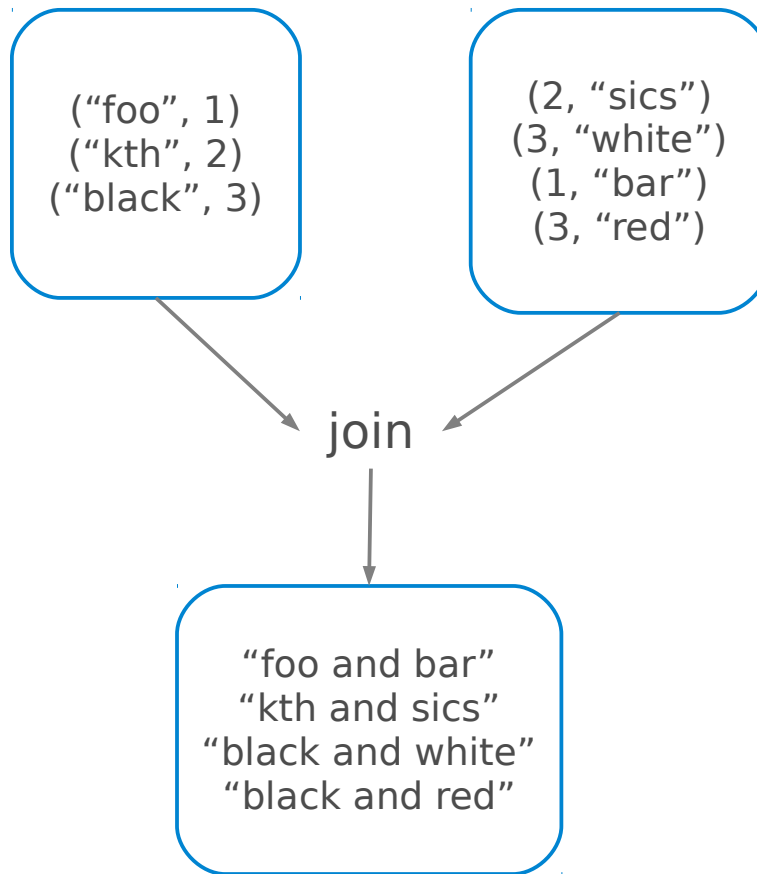


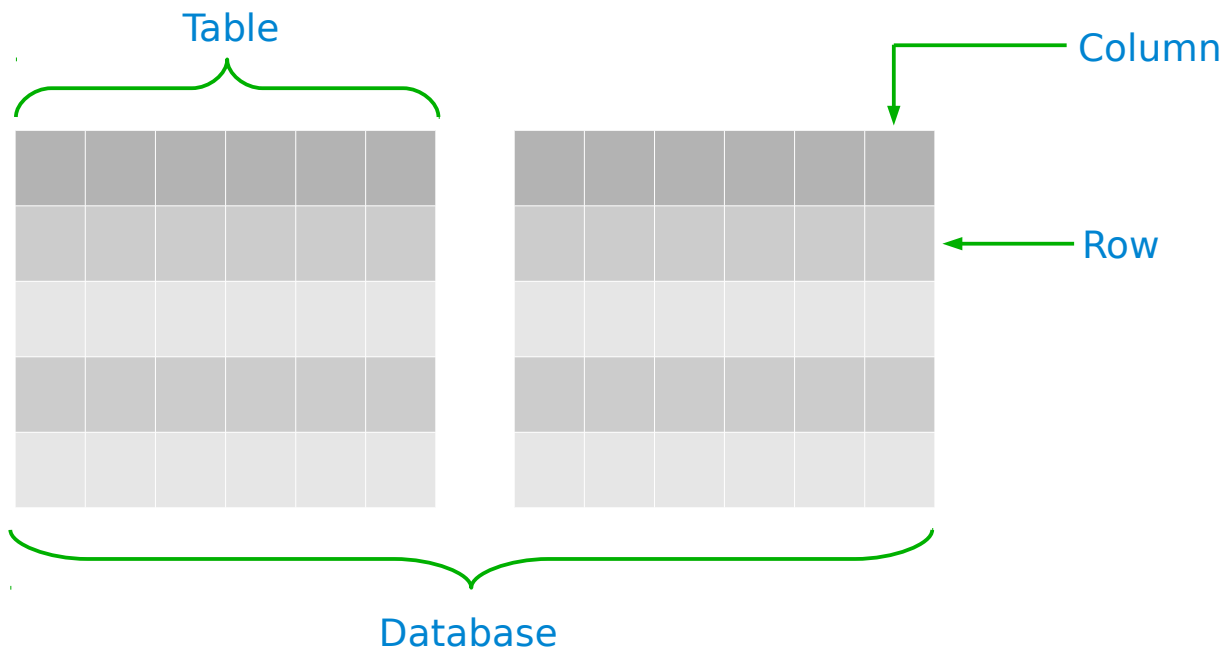


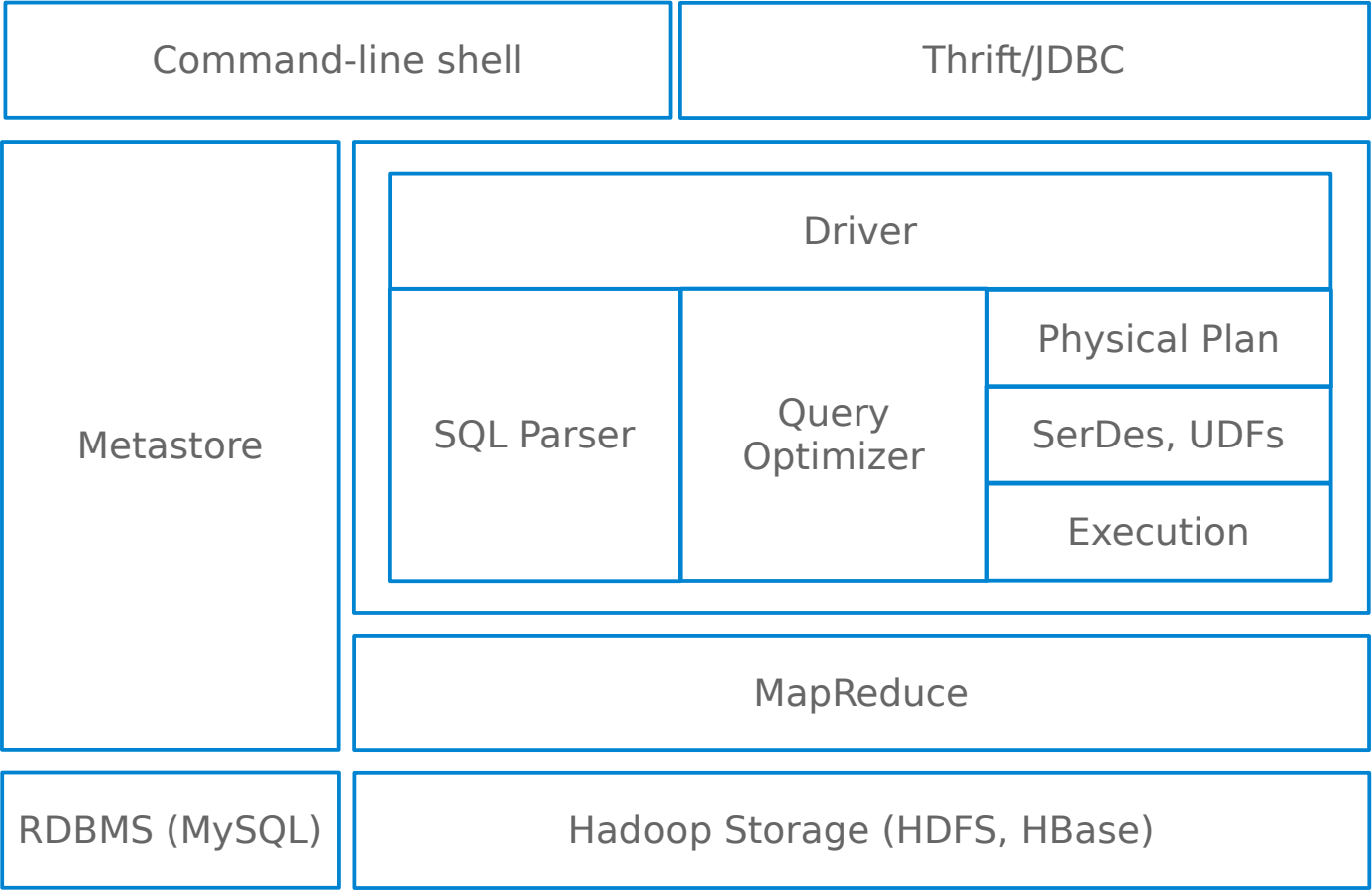


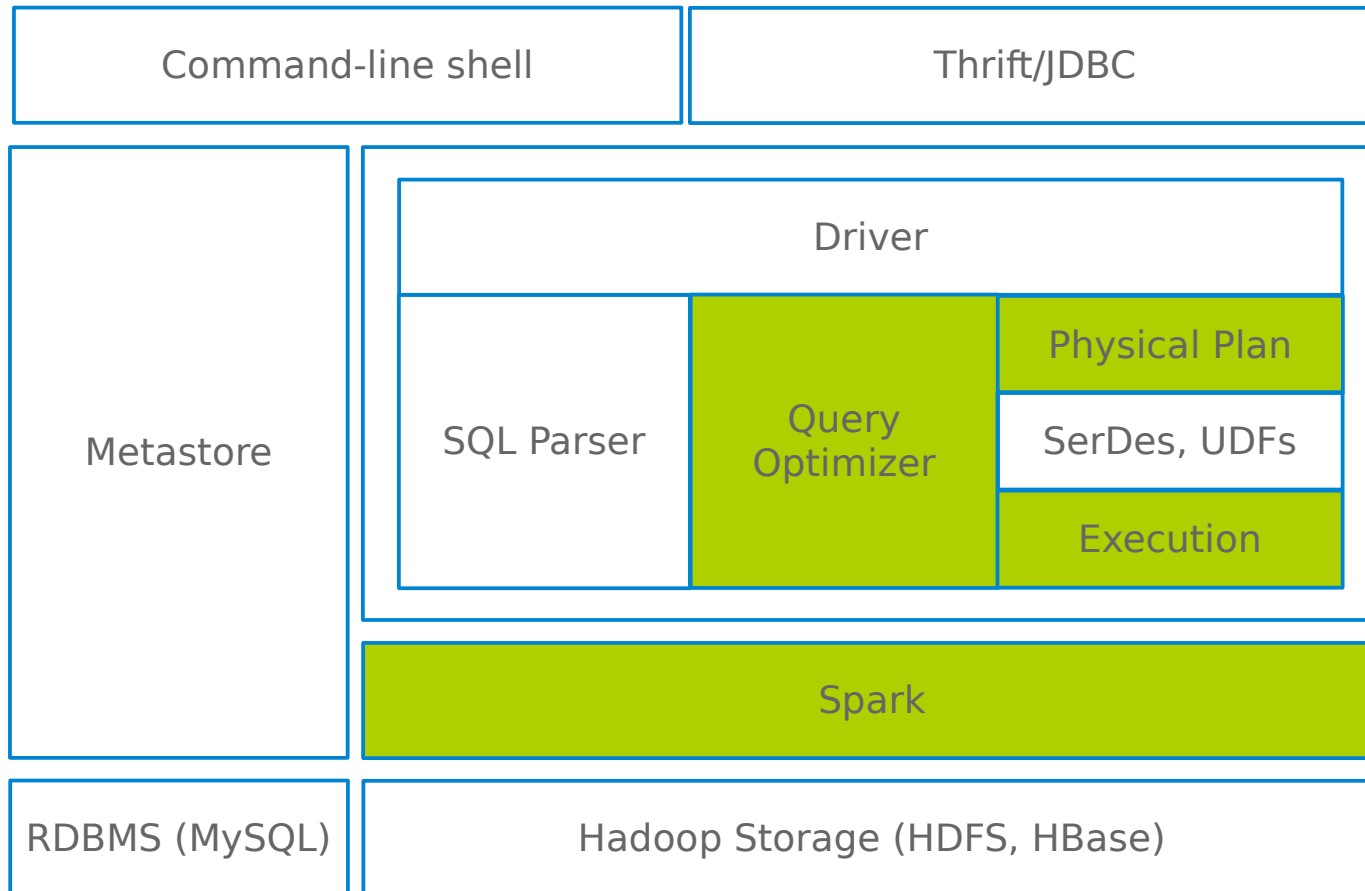










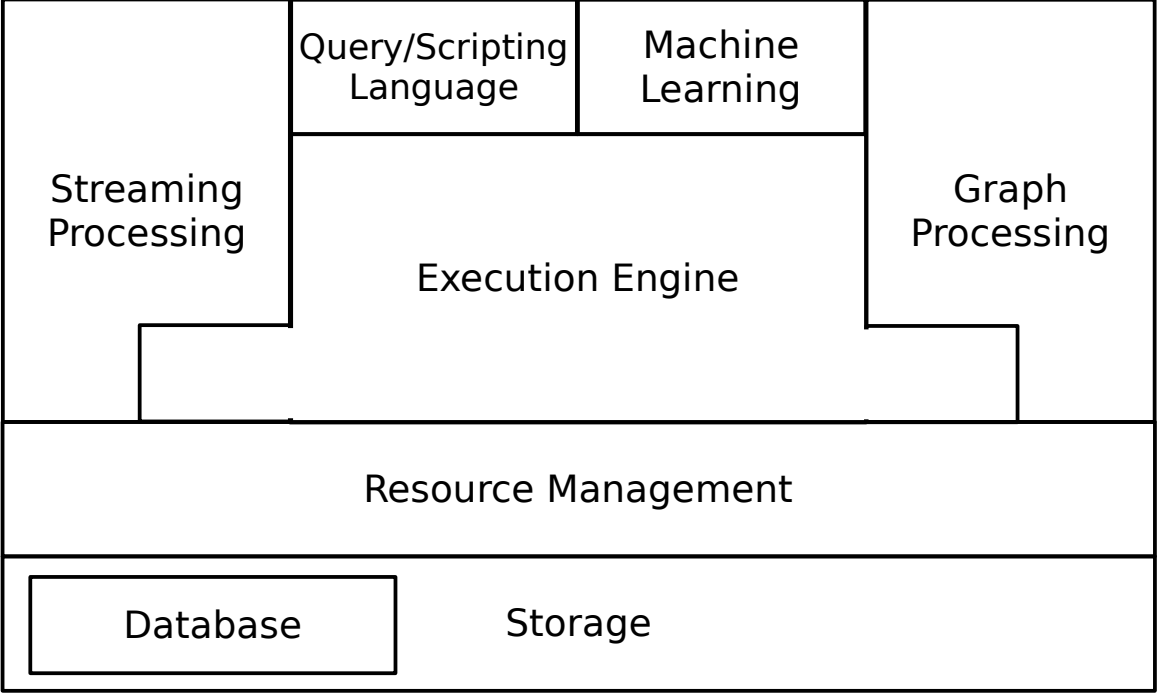


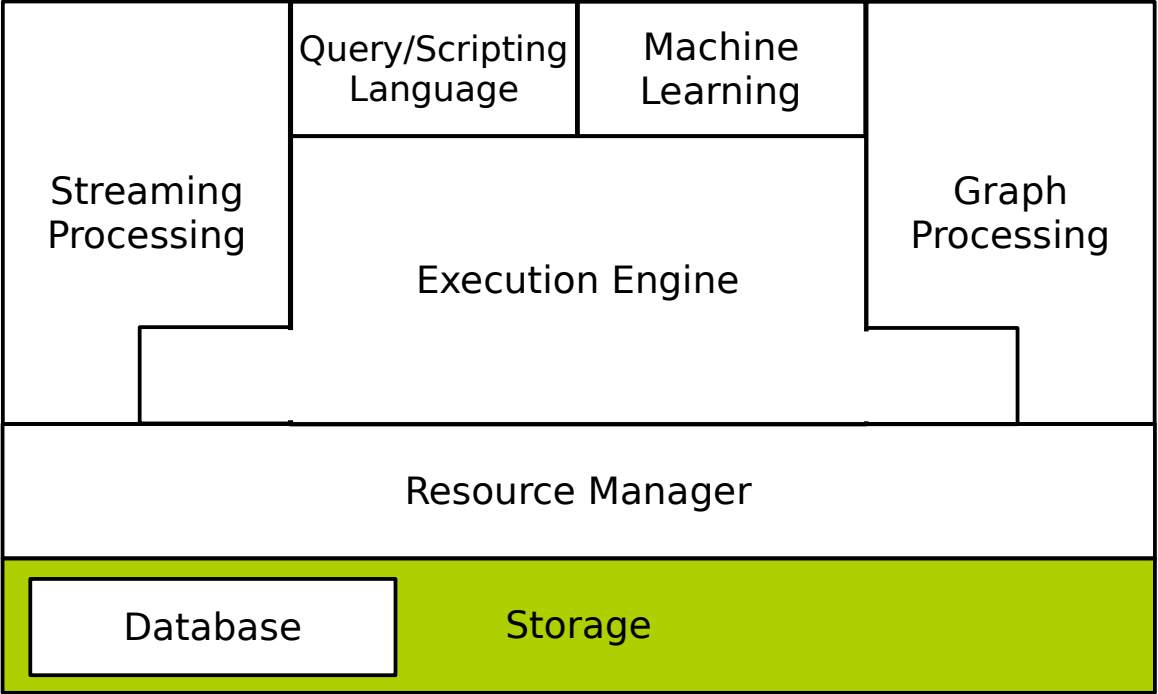
1	John	4.1
2	mike	3.5
3	sally	6.4

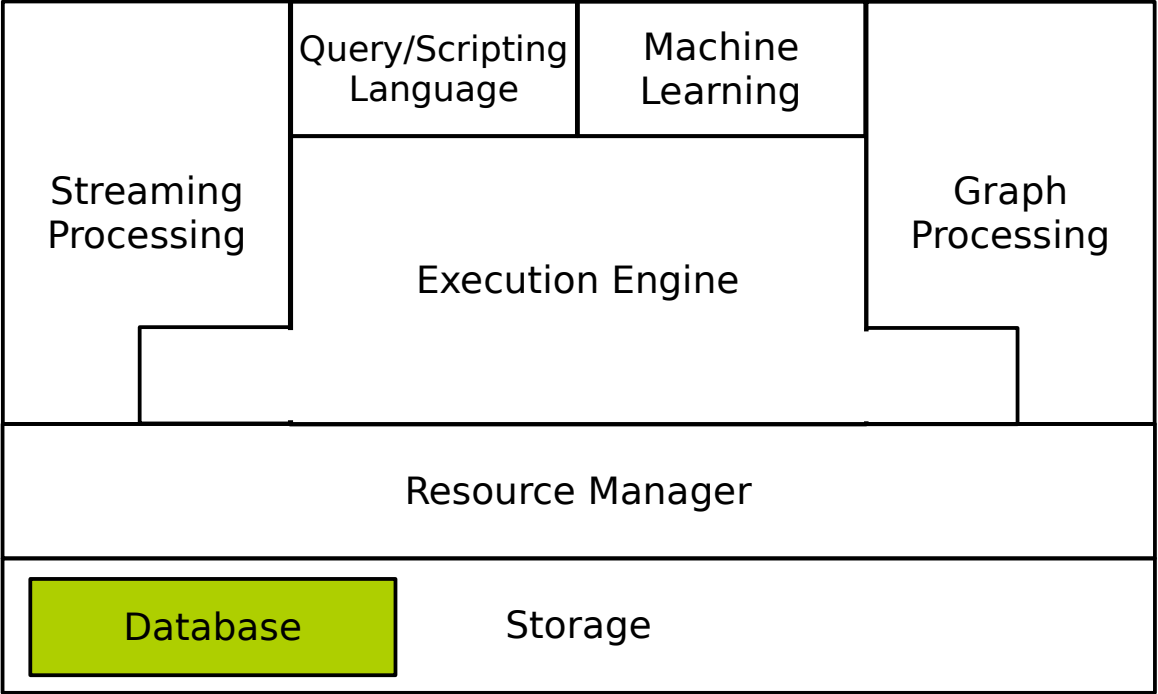
Row Storage

1	2	3
John	mike	sally
4.1	3.5	6.4

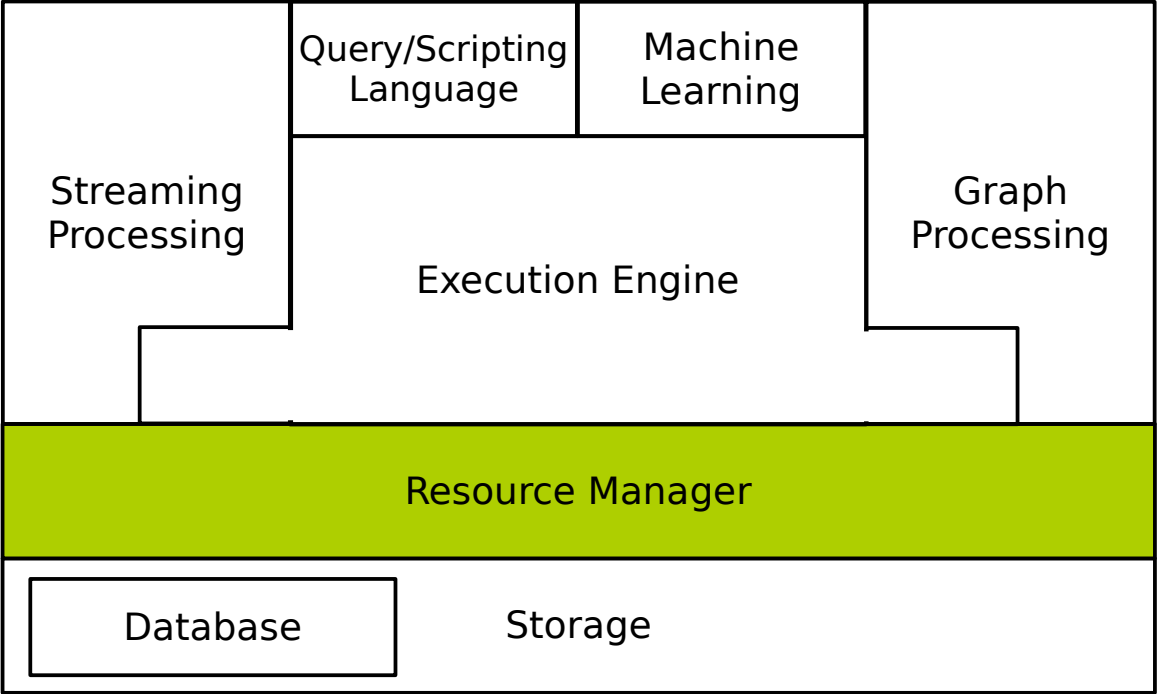
Column Storage

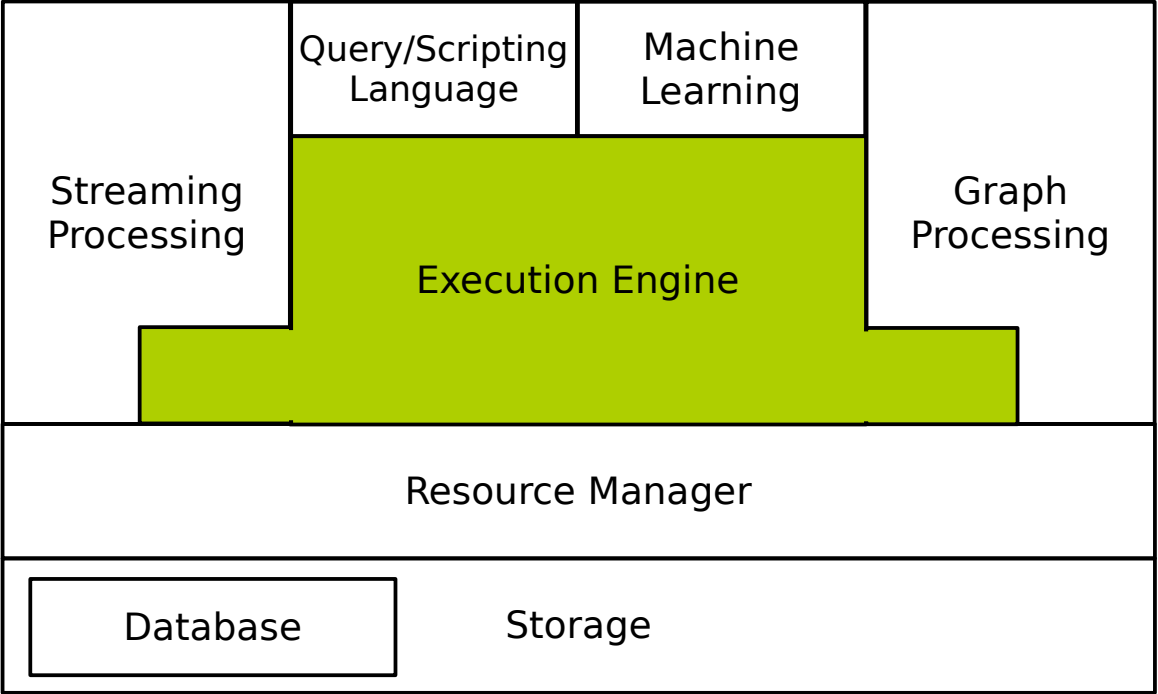


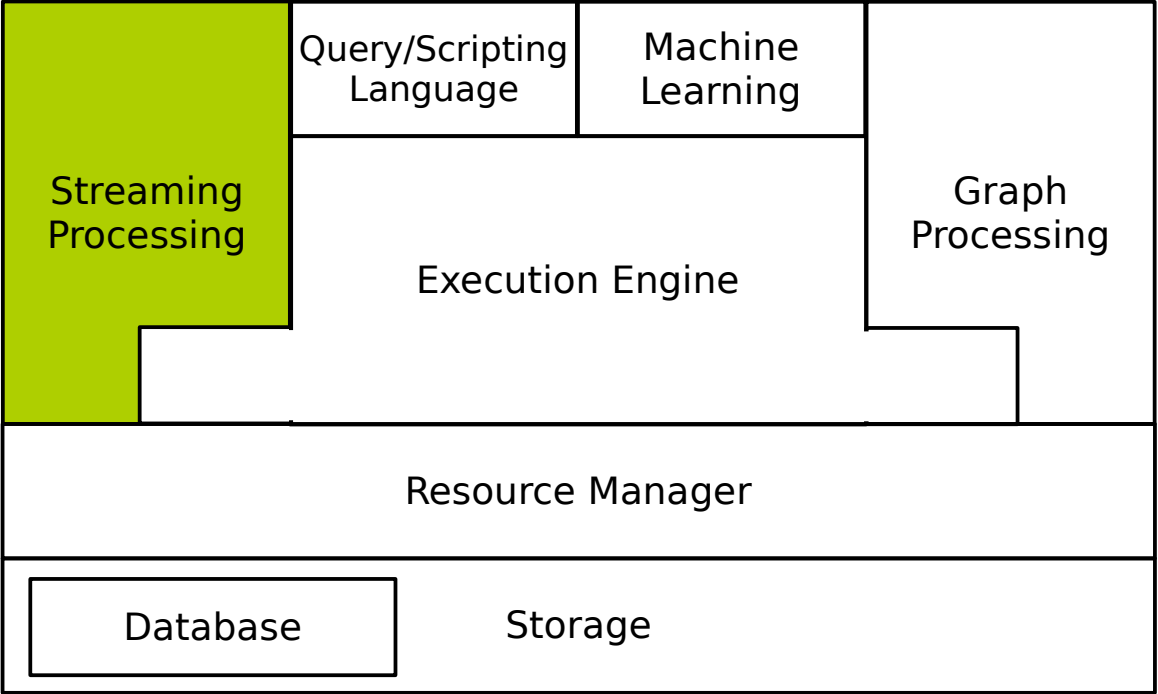


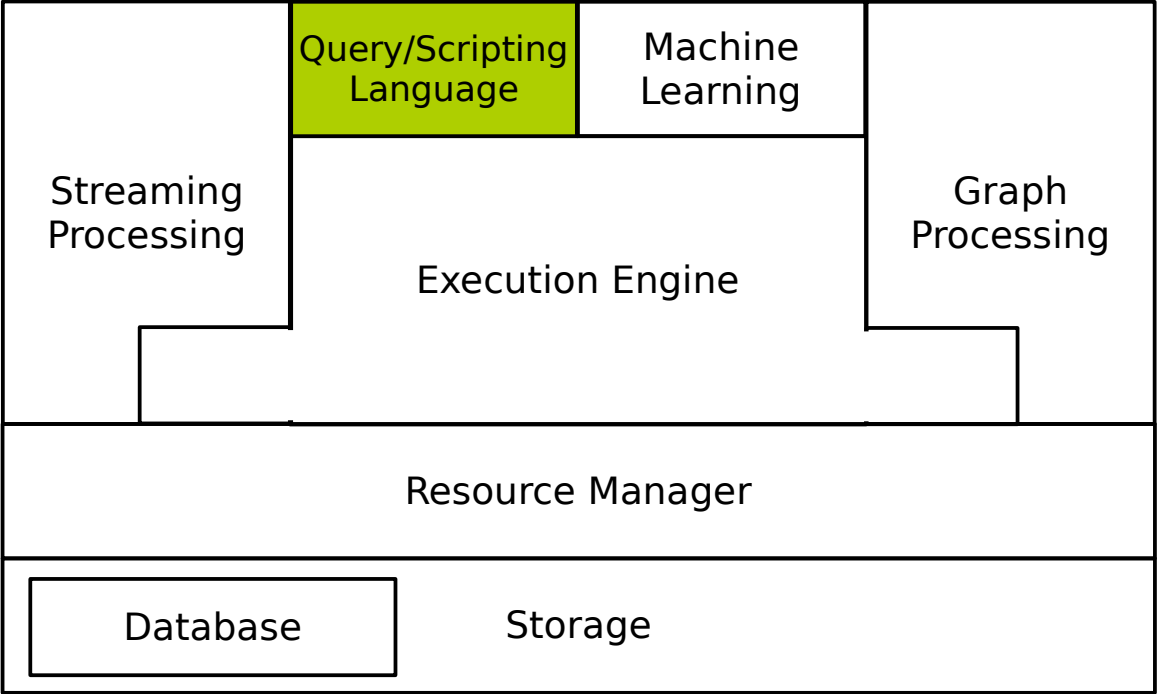


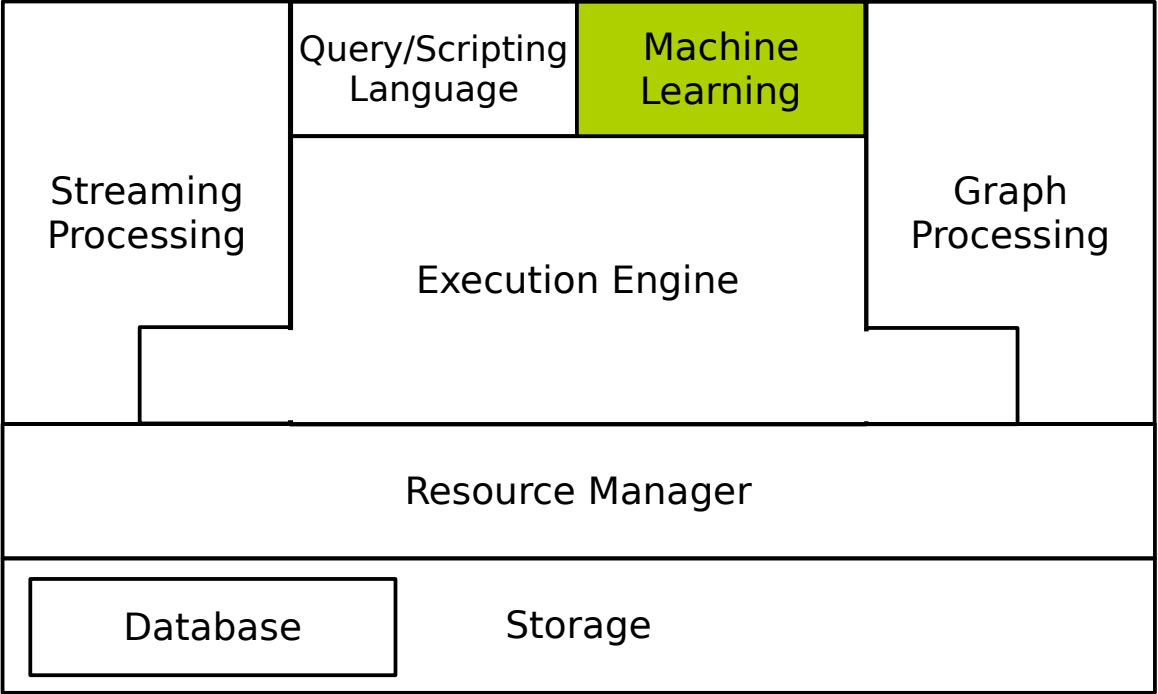


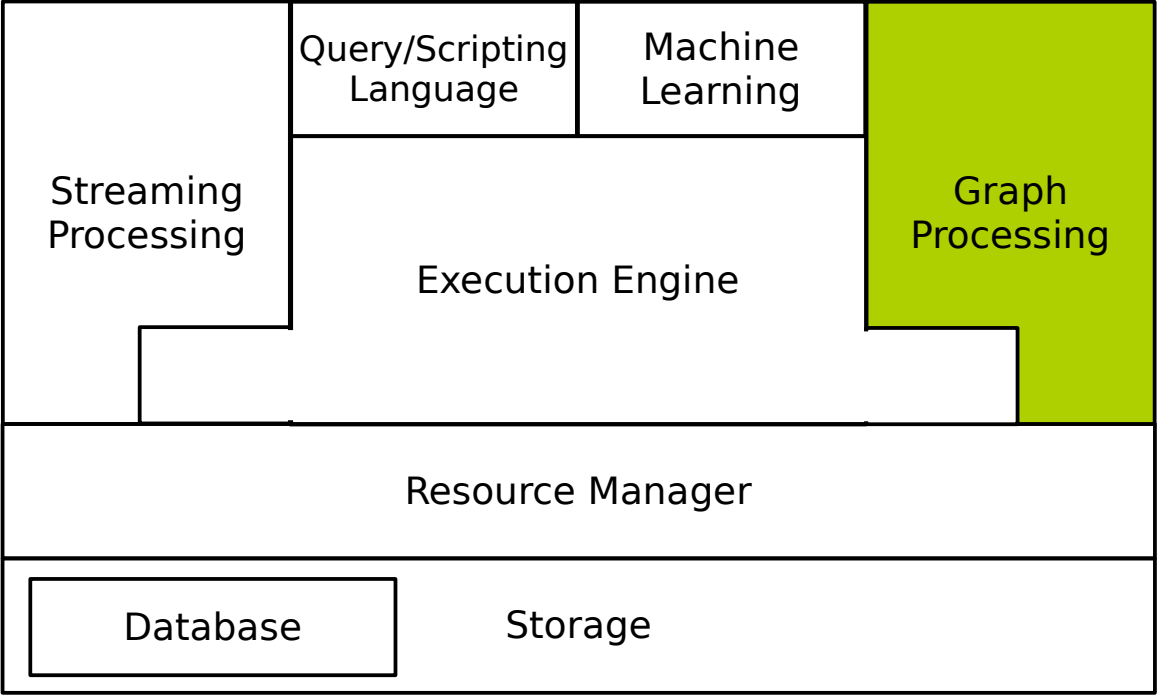


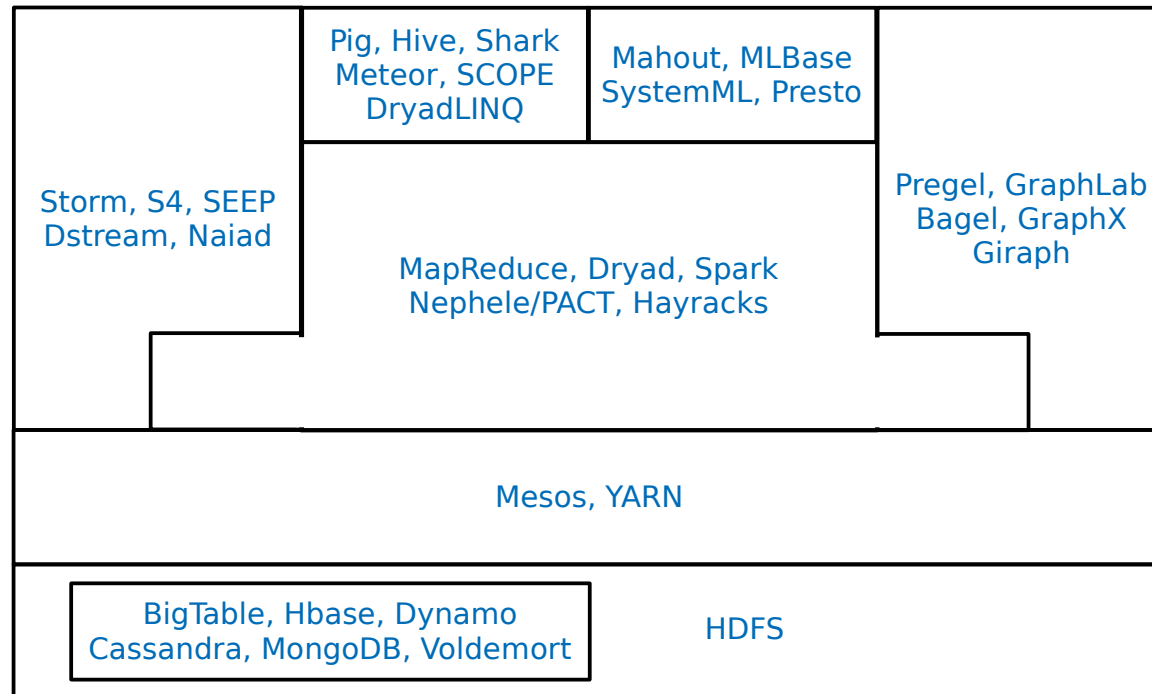


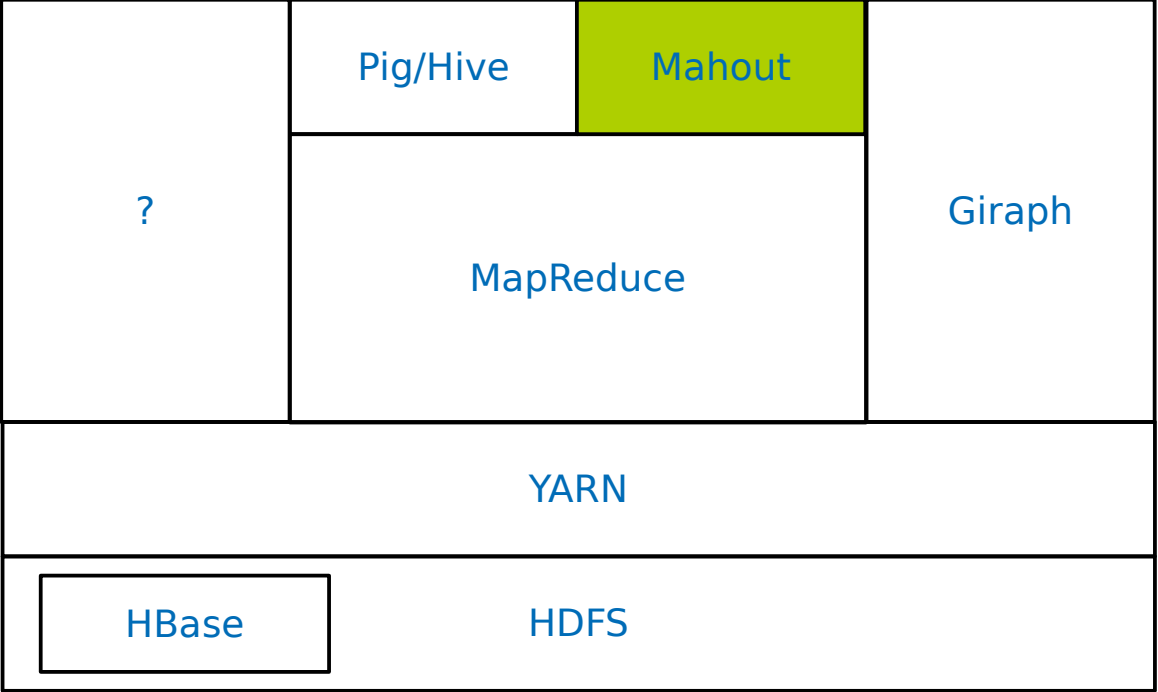






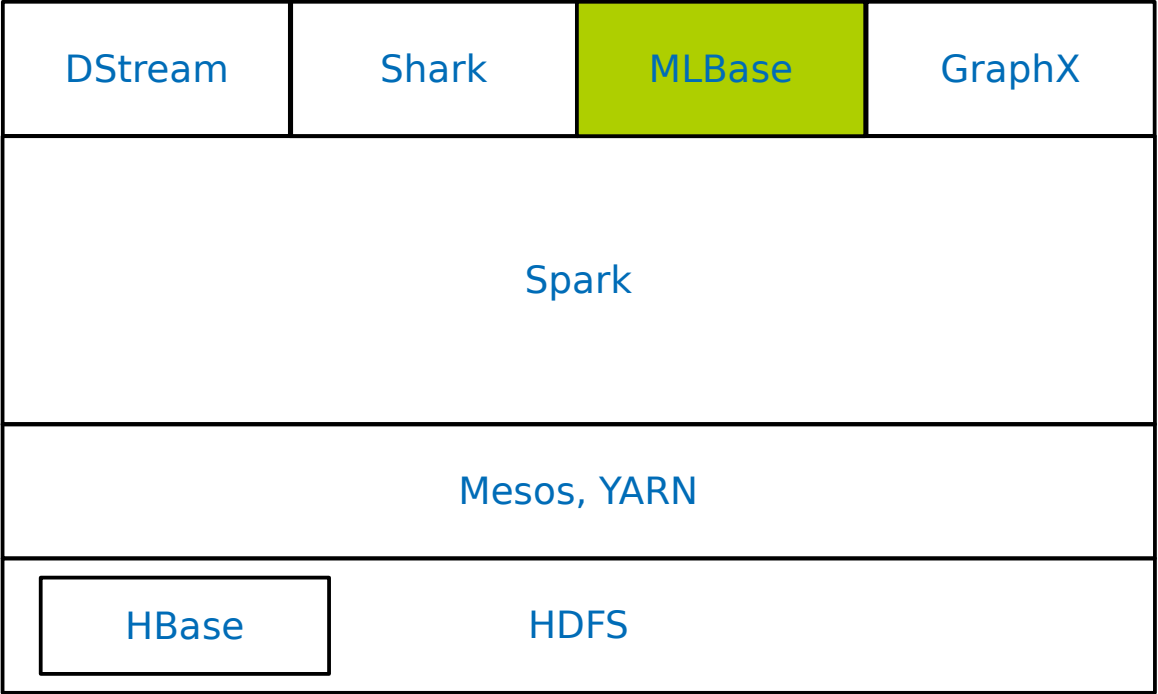




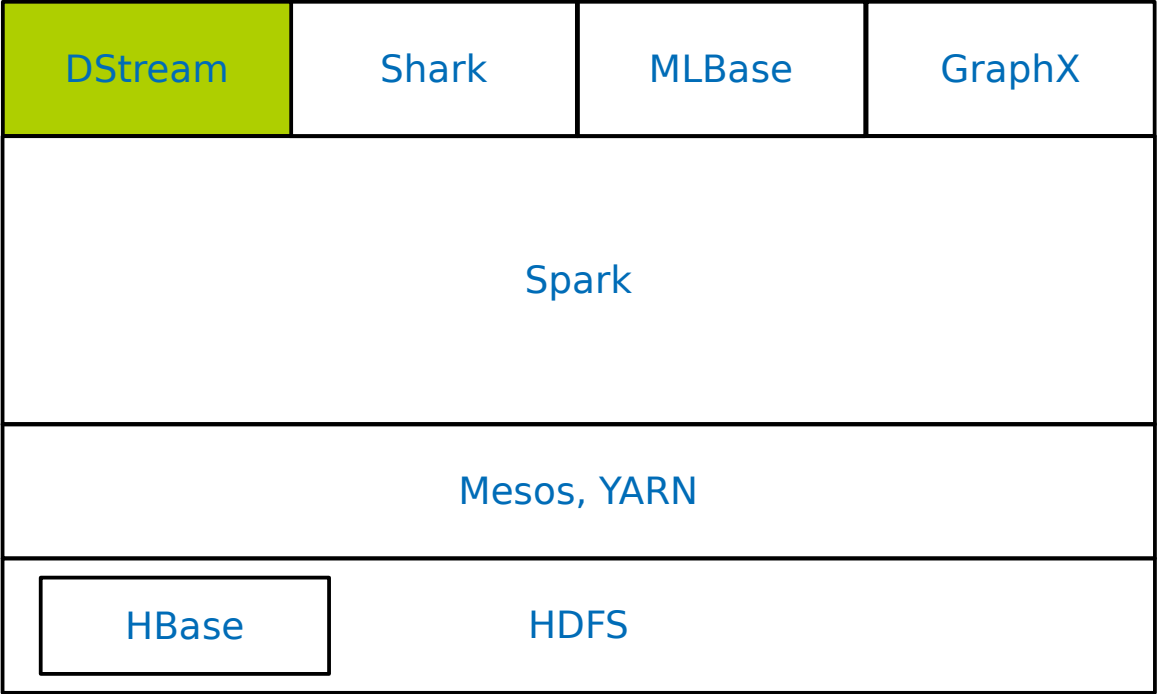


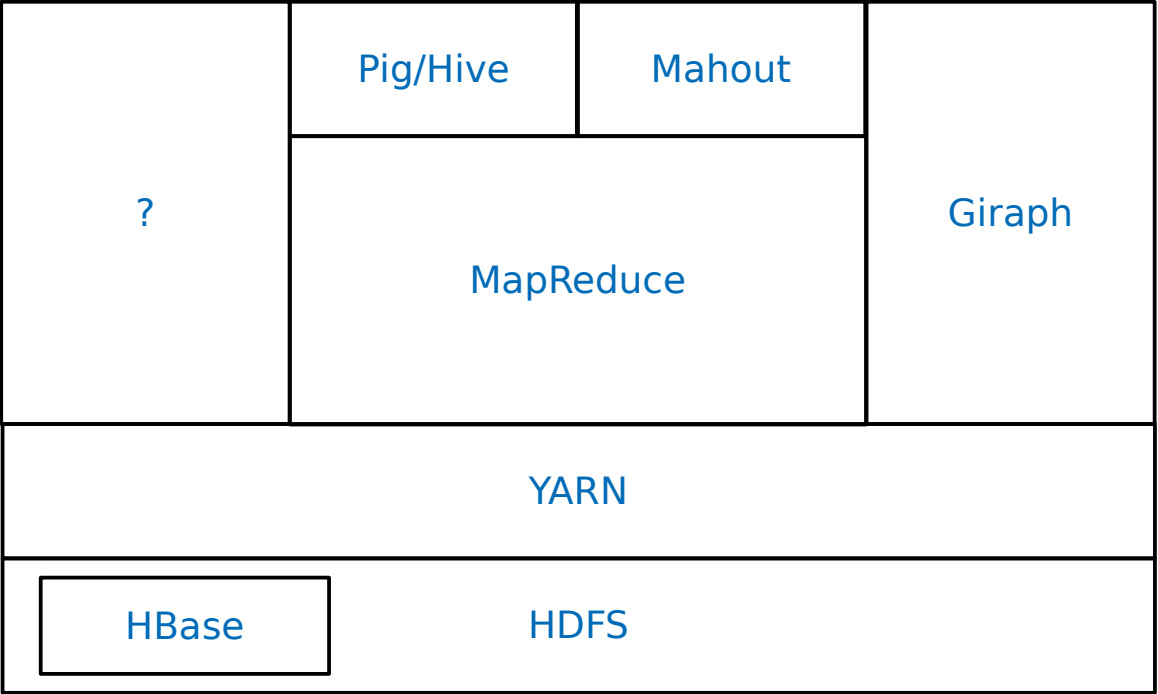


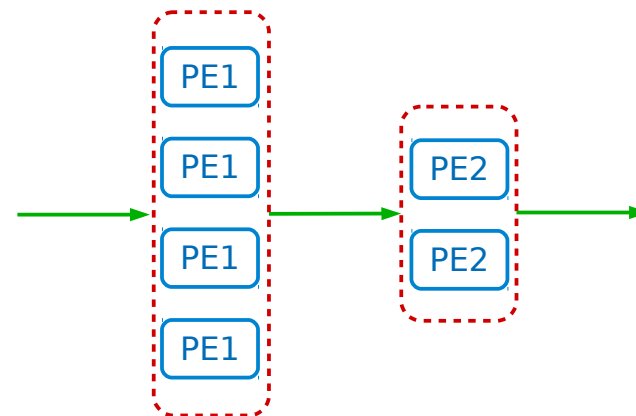
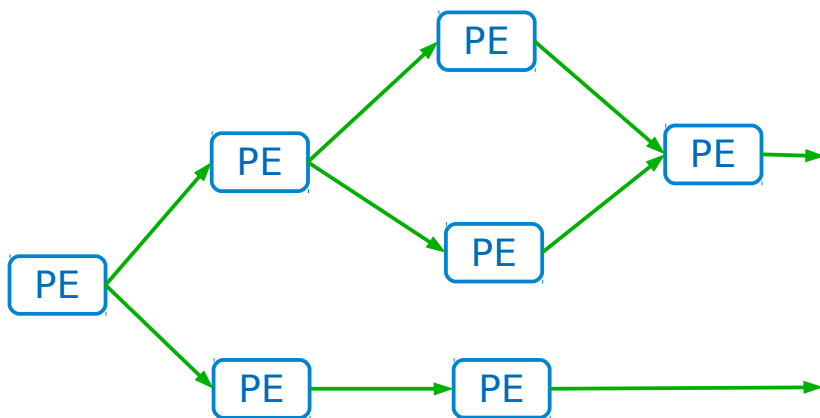
Nephele Streaming	Meteor	?	Spargel
Nephele/PACT			
YARN			
<div>HBase</div> HDFS			

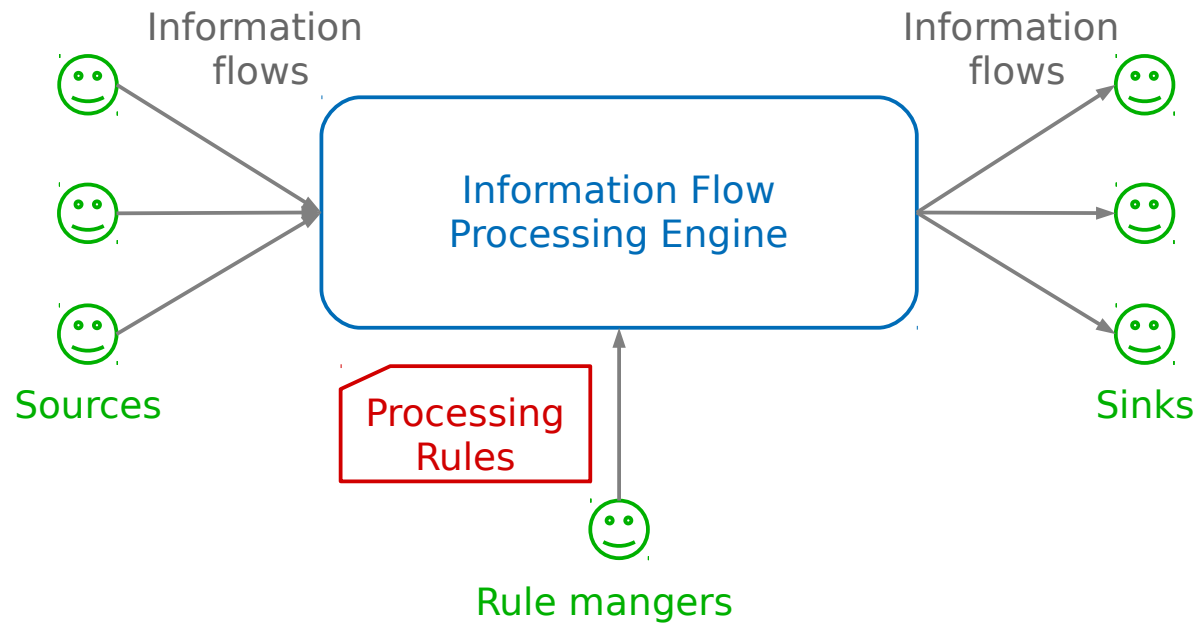


Nephele Streaming	Meteor	?	Spargel
Nephele/PACT			
YARN			
<div>HBase</div> <div>HDFS</div>			

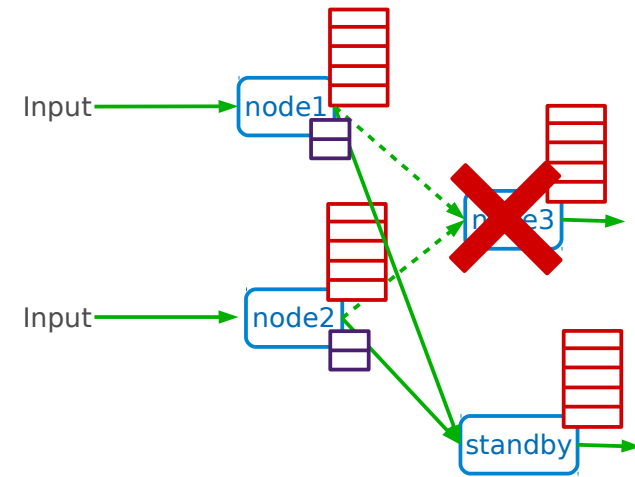
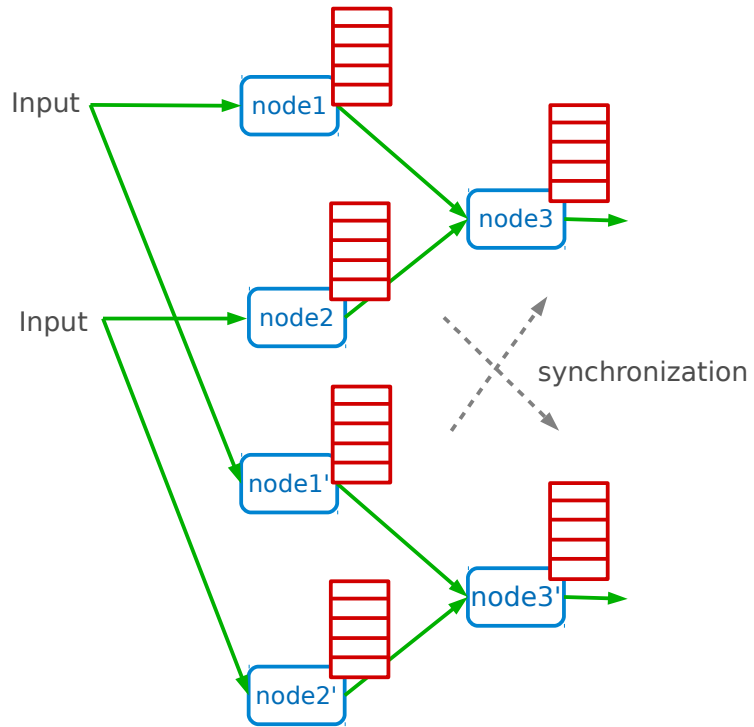
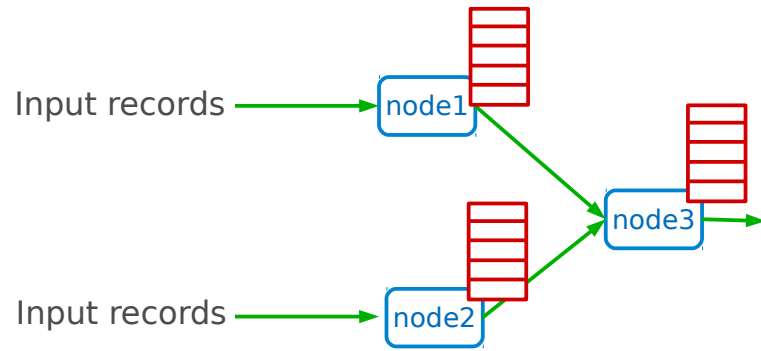




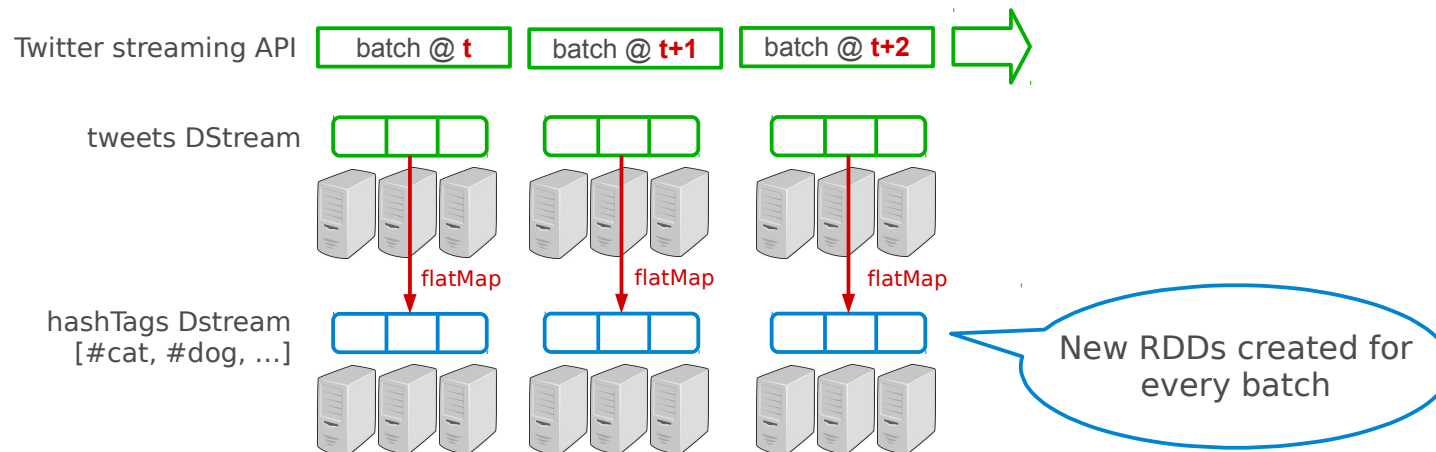
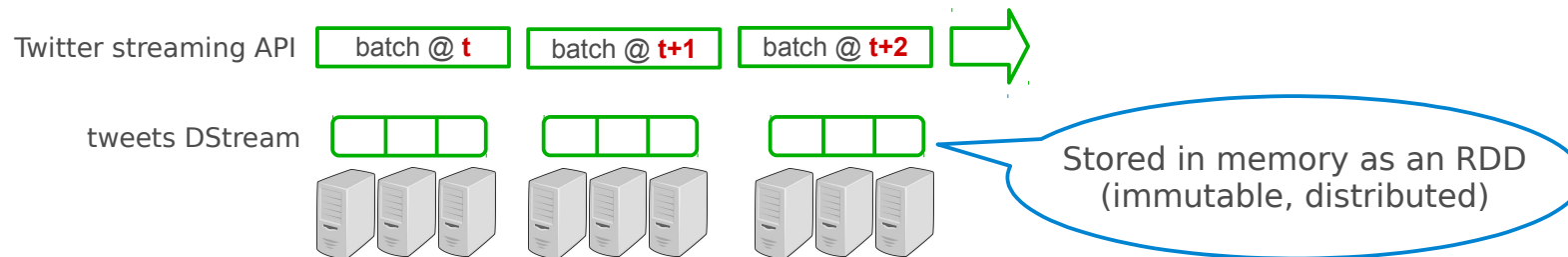


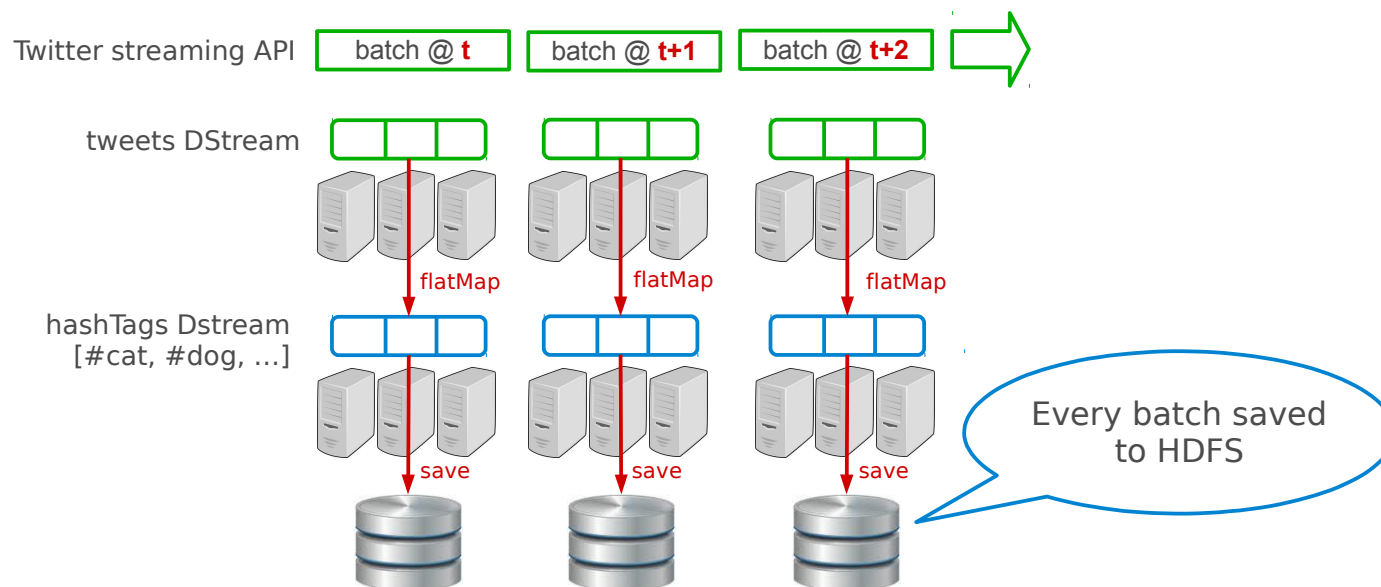


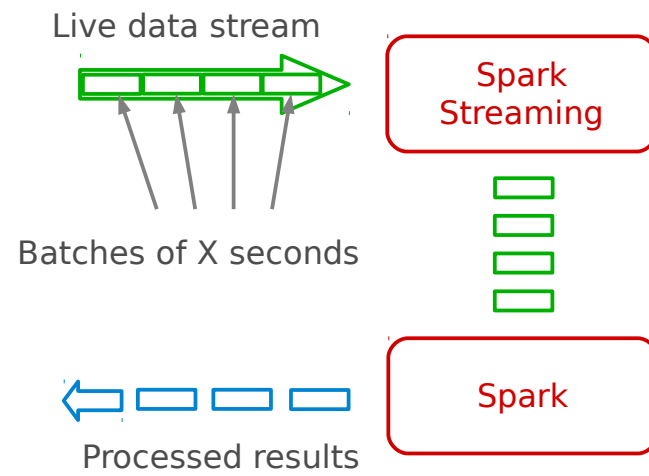
### Mutable state

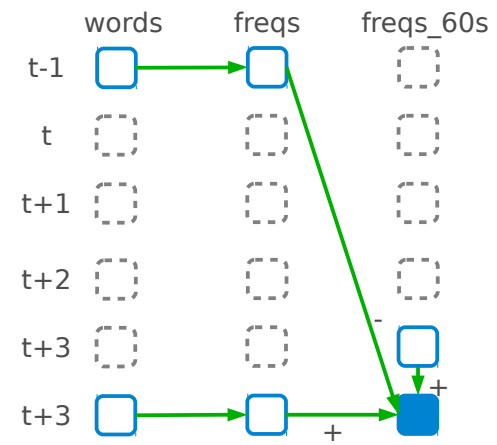
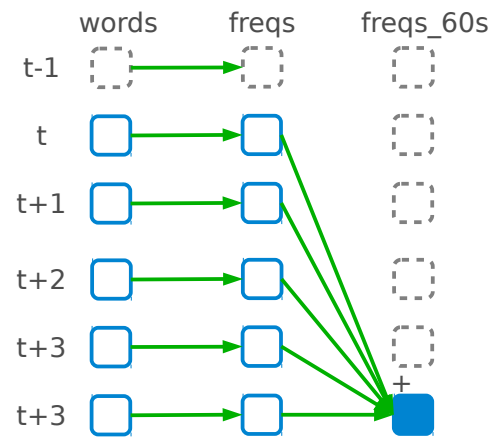


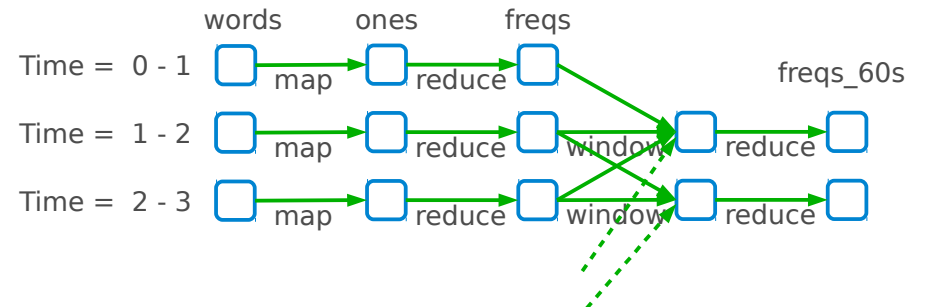
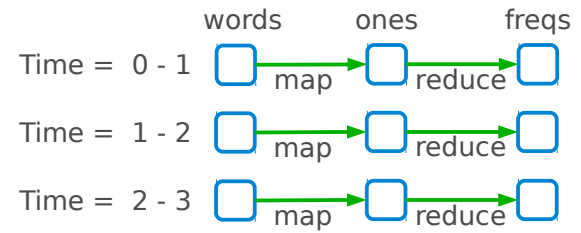
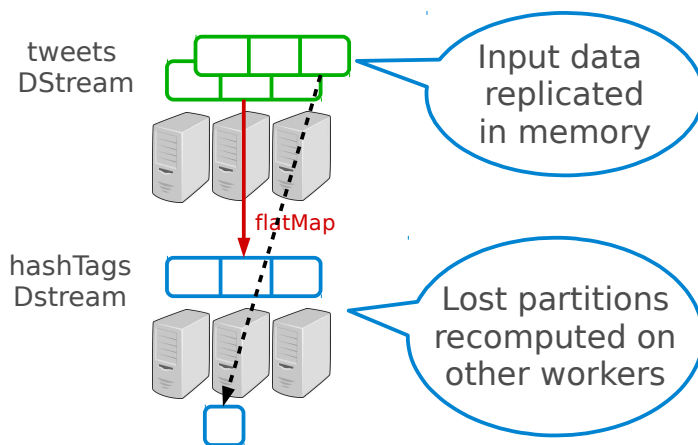


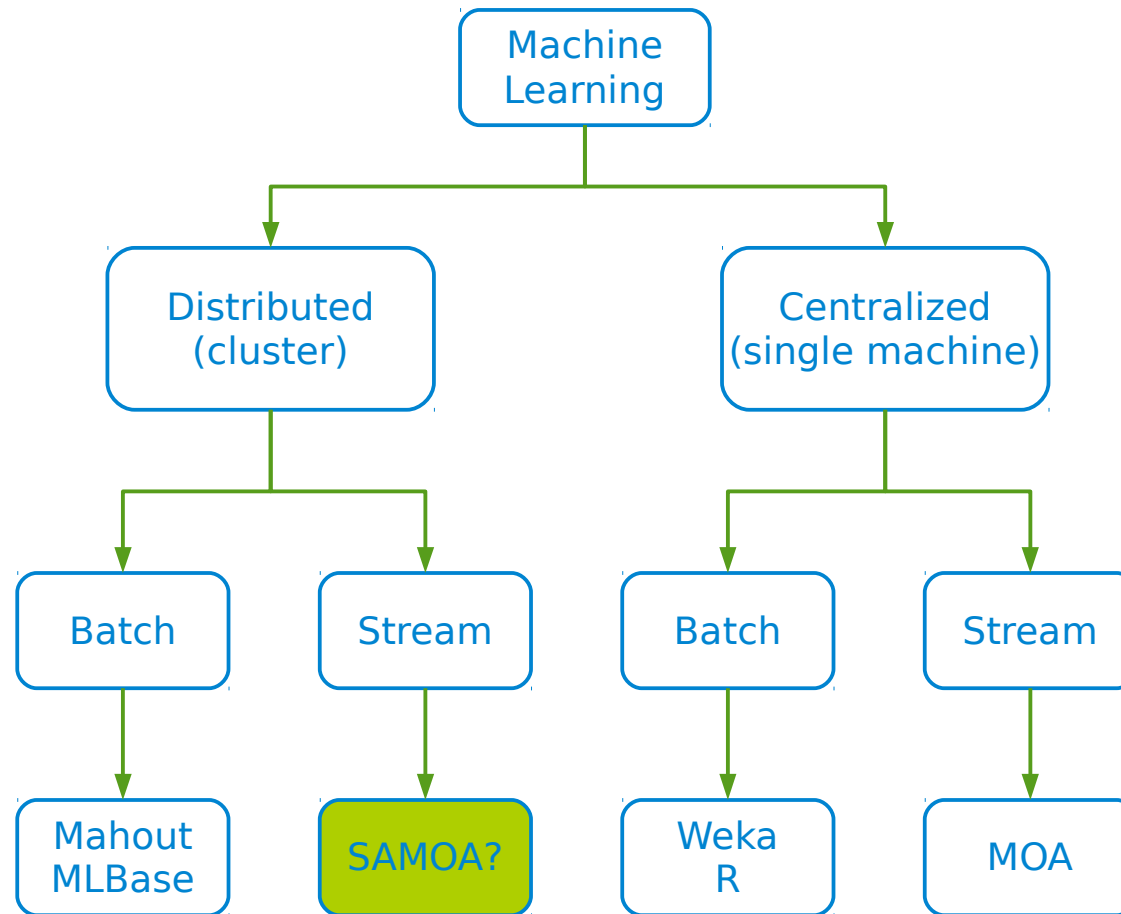


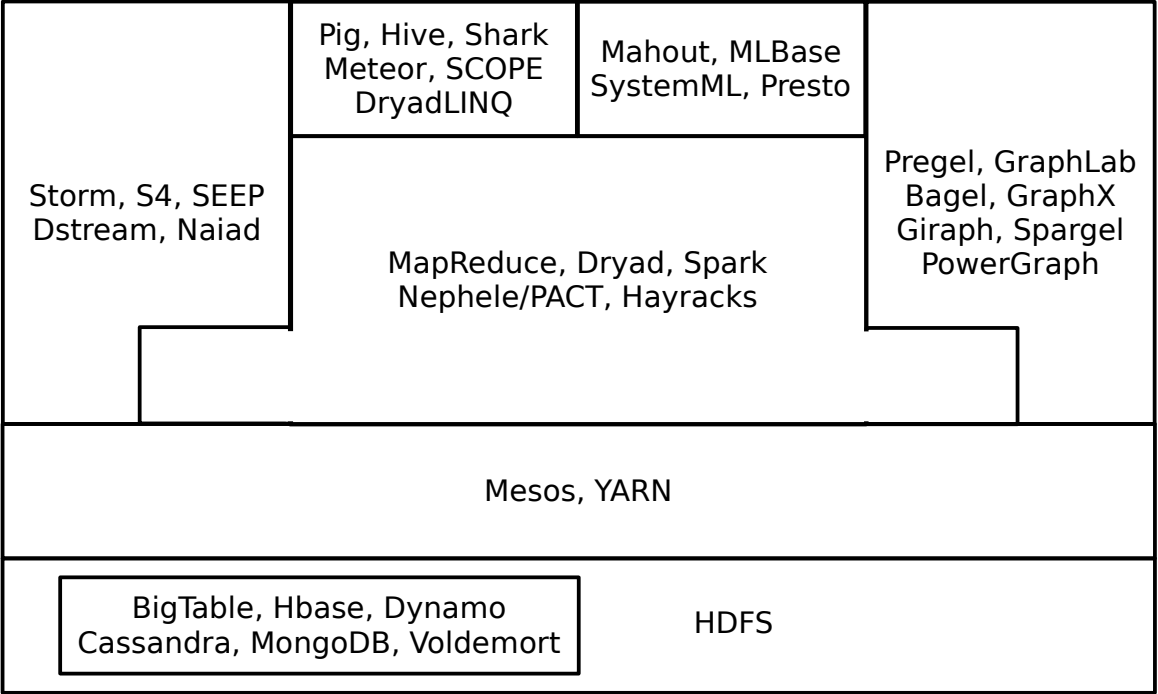


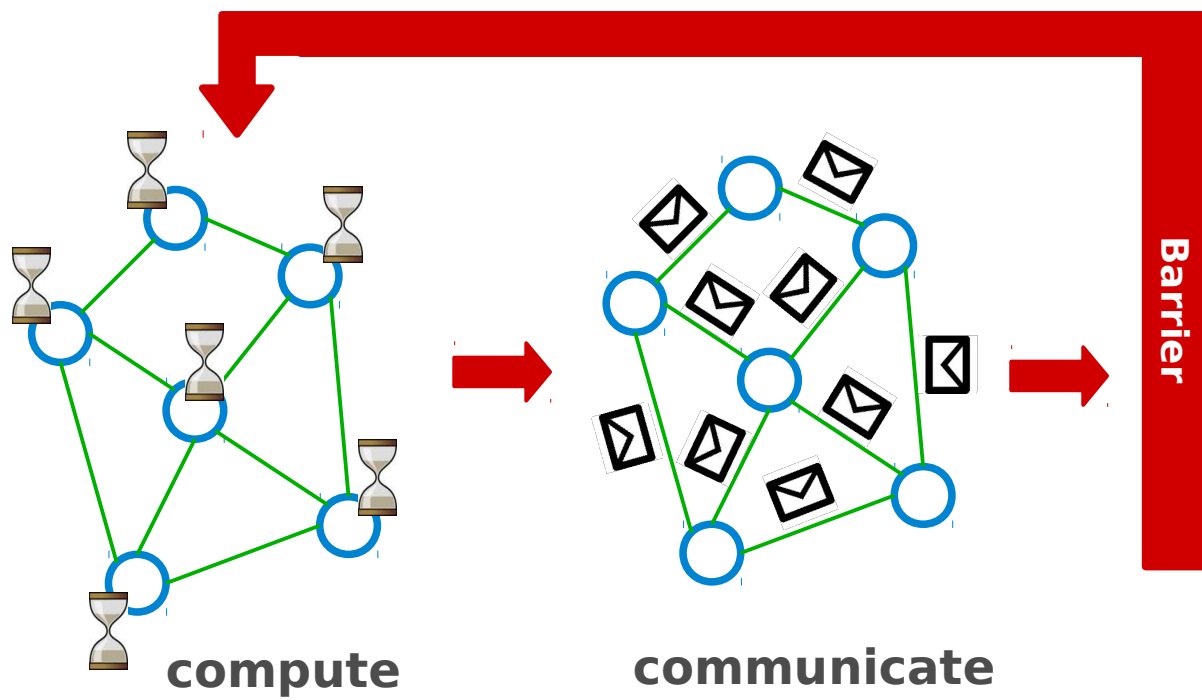




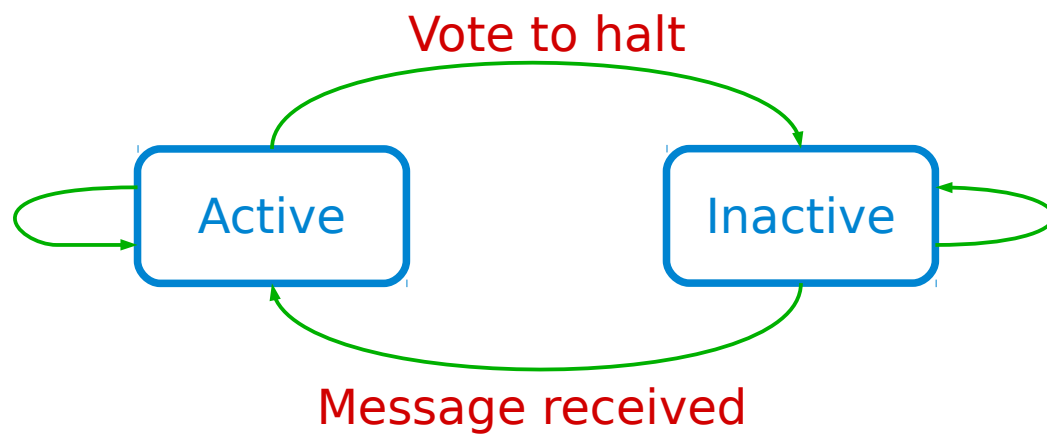


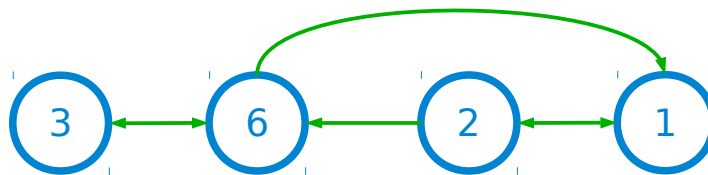




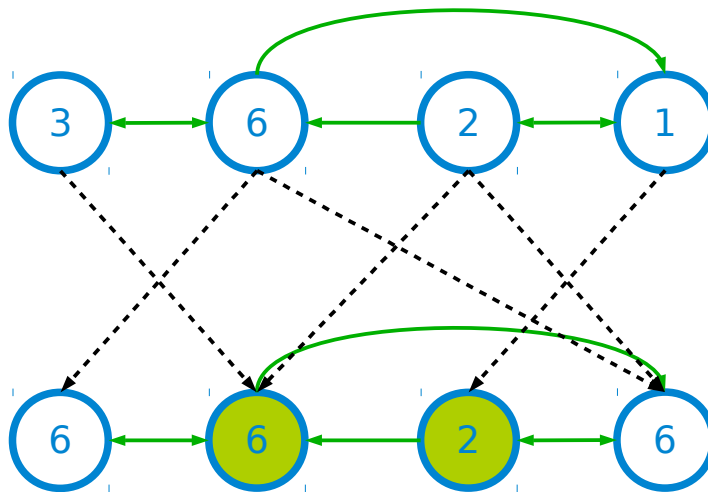






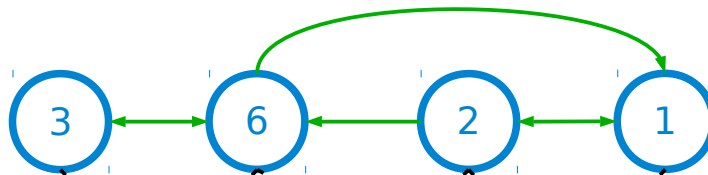


Super step 0

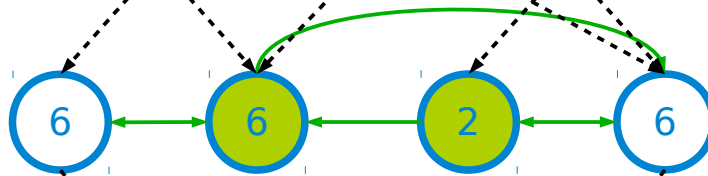


Super step 0

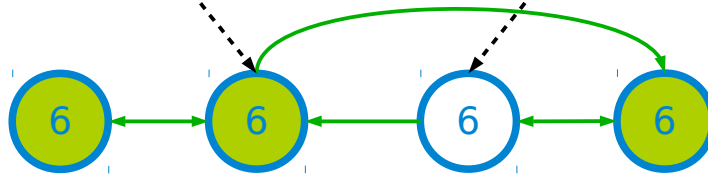
Super step 1



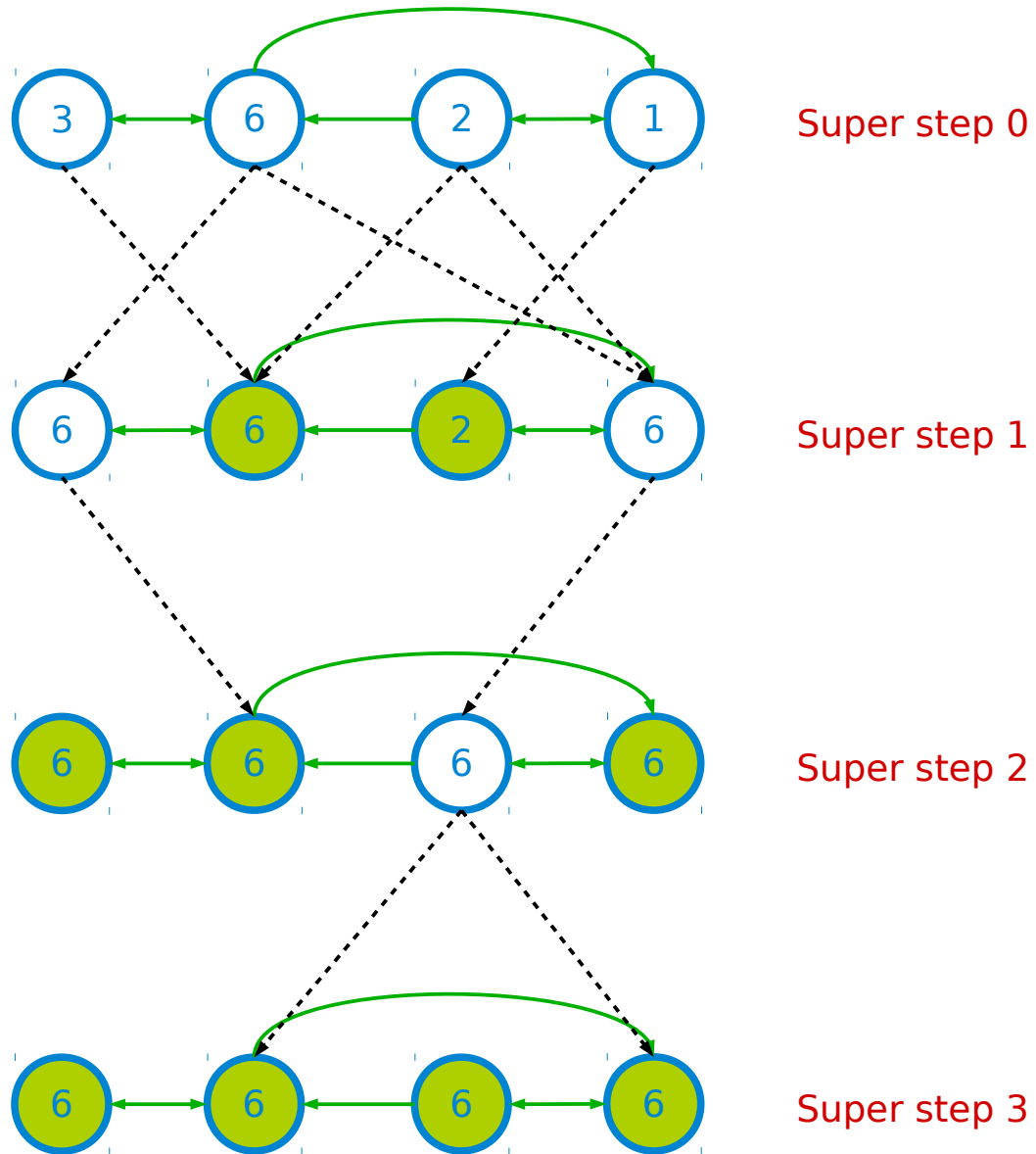
Super step 0

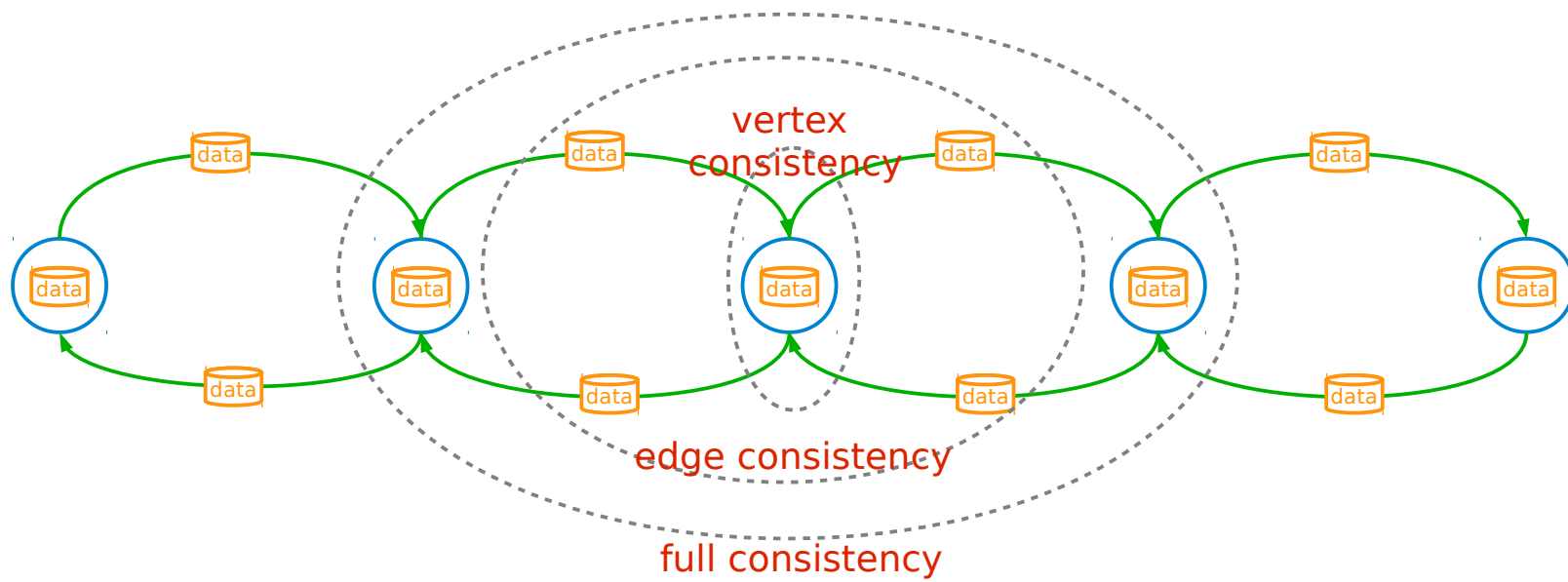


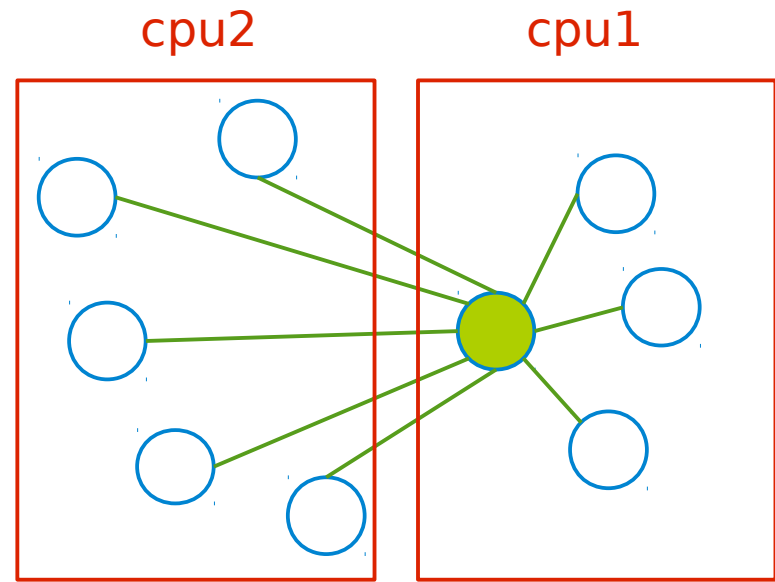
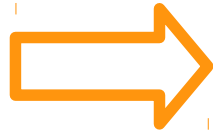
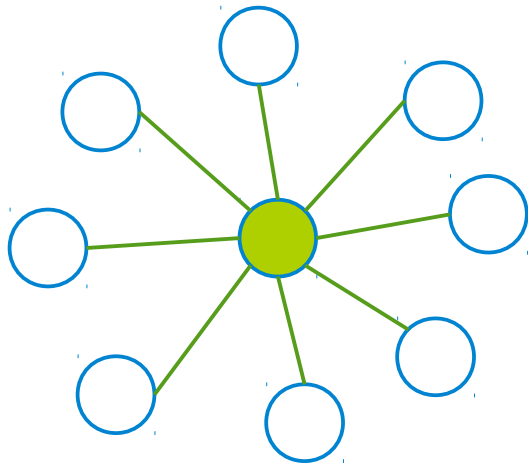
Super step 1

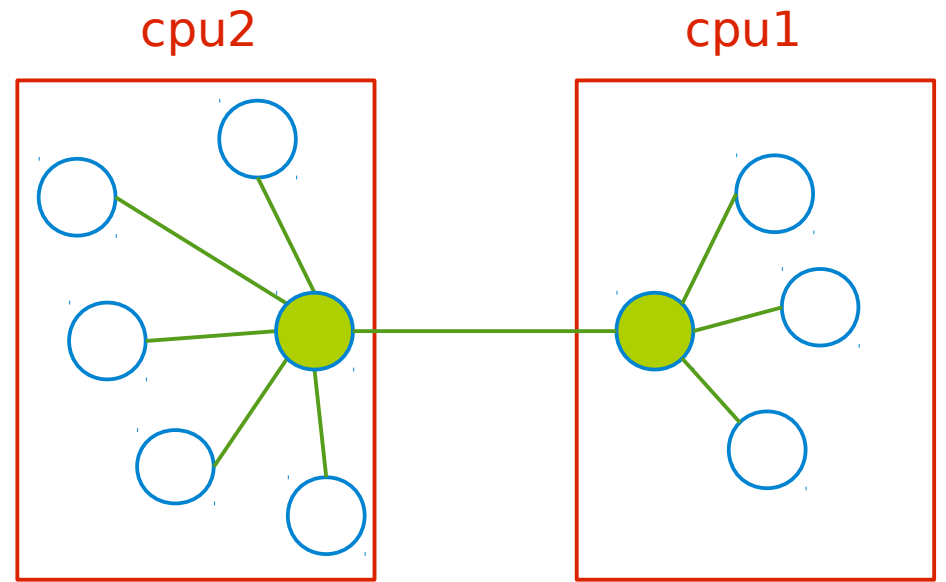
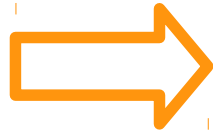
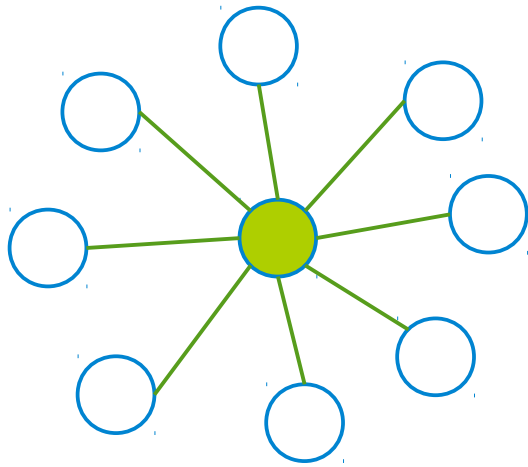


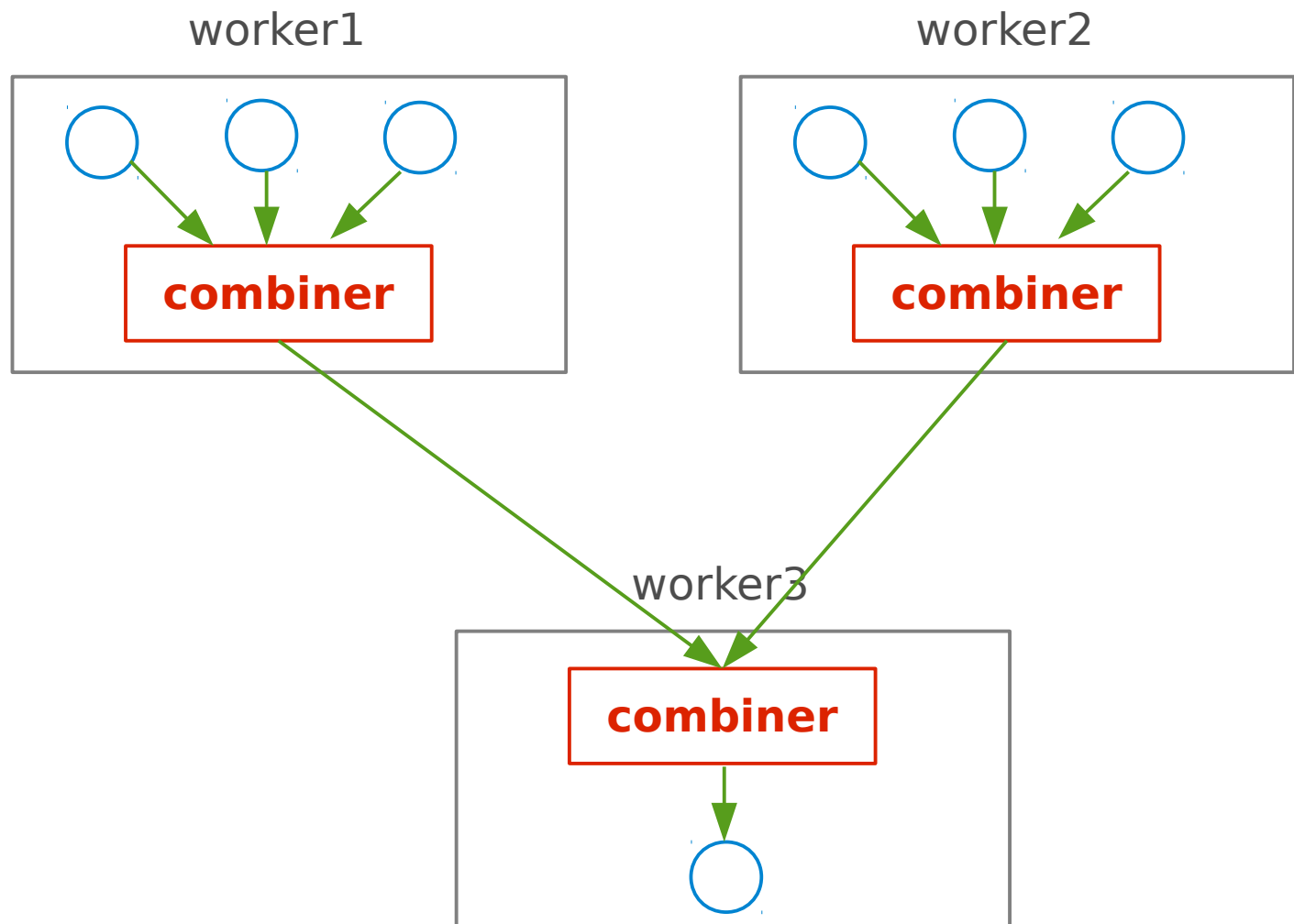
Super step 2



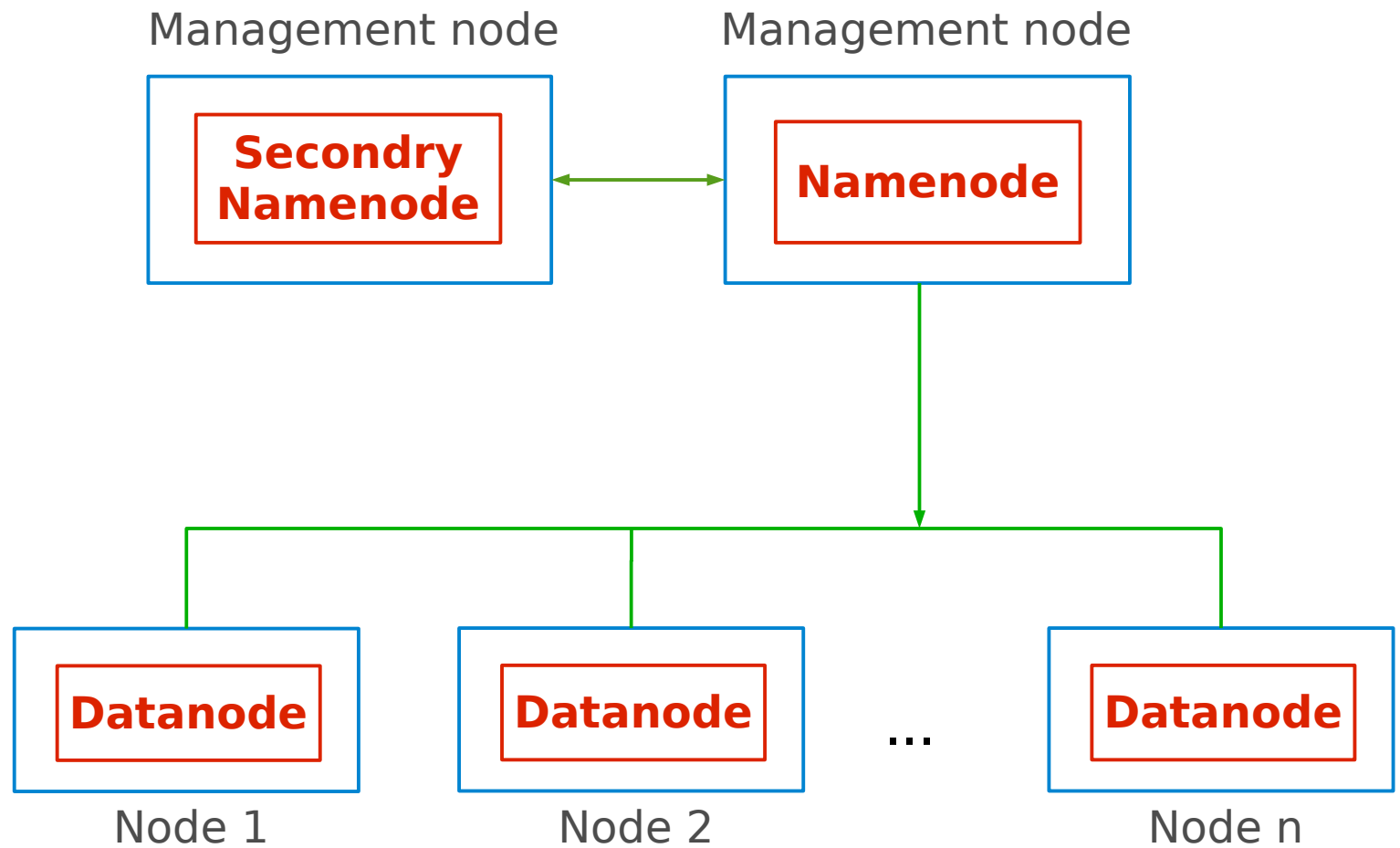


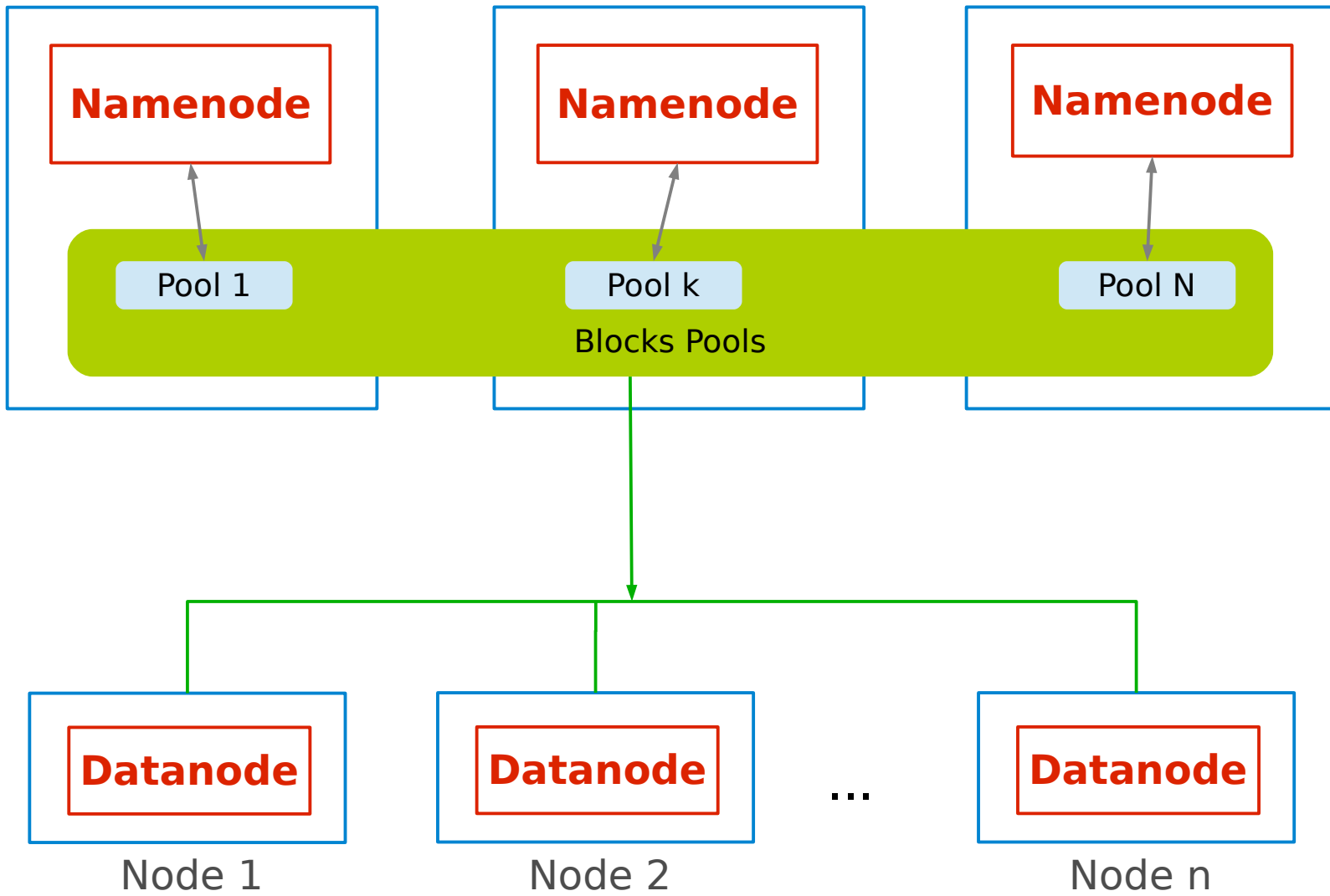


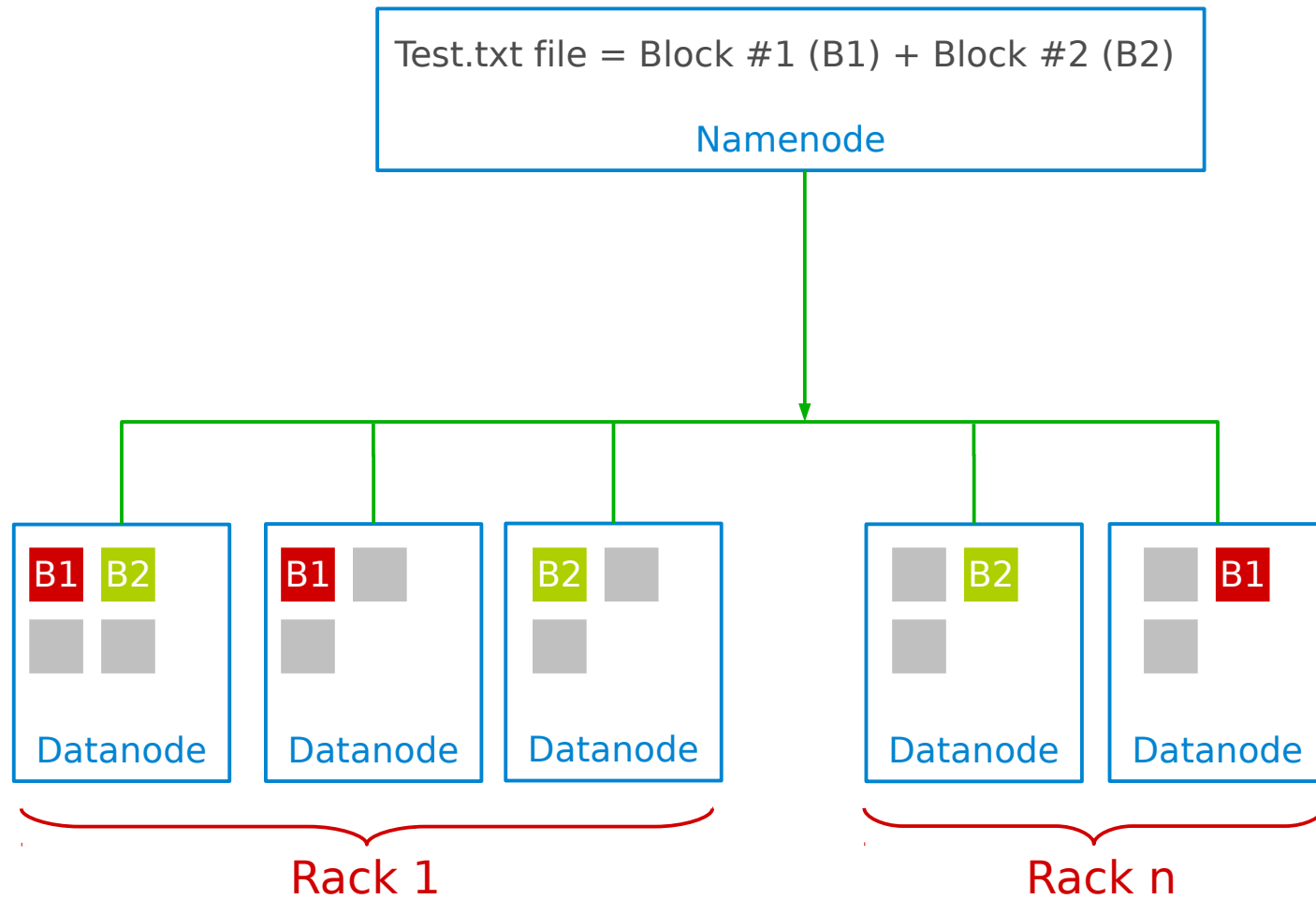


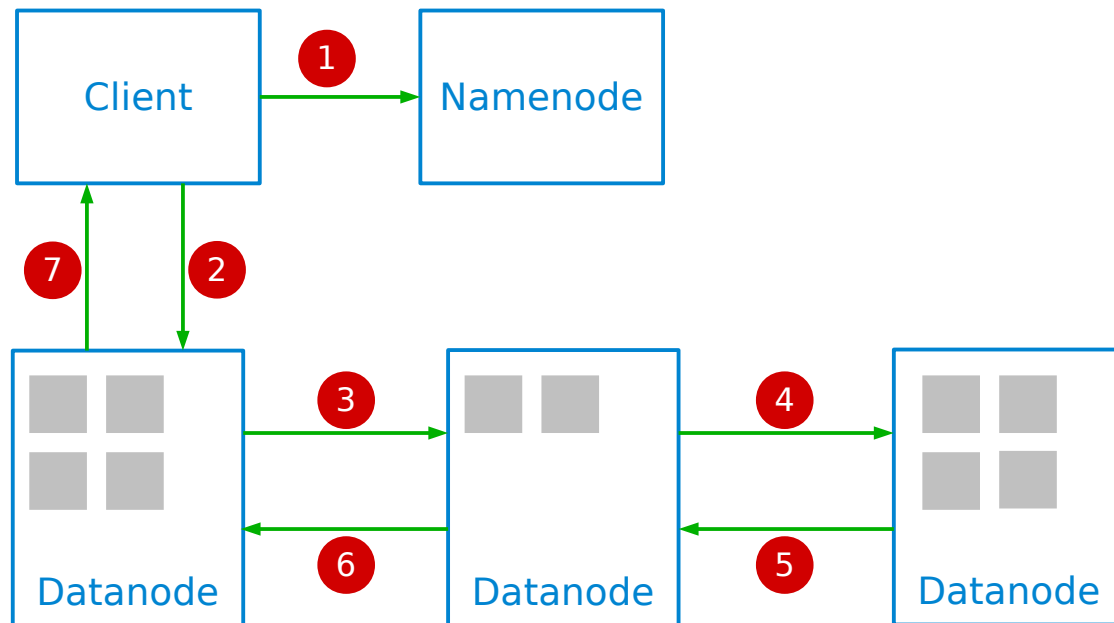


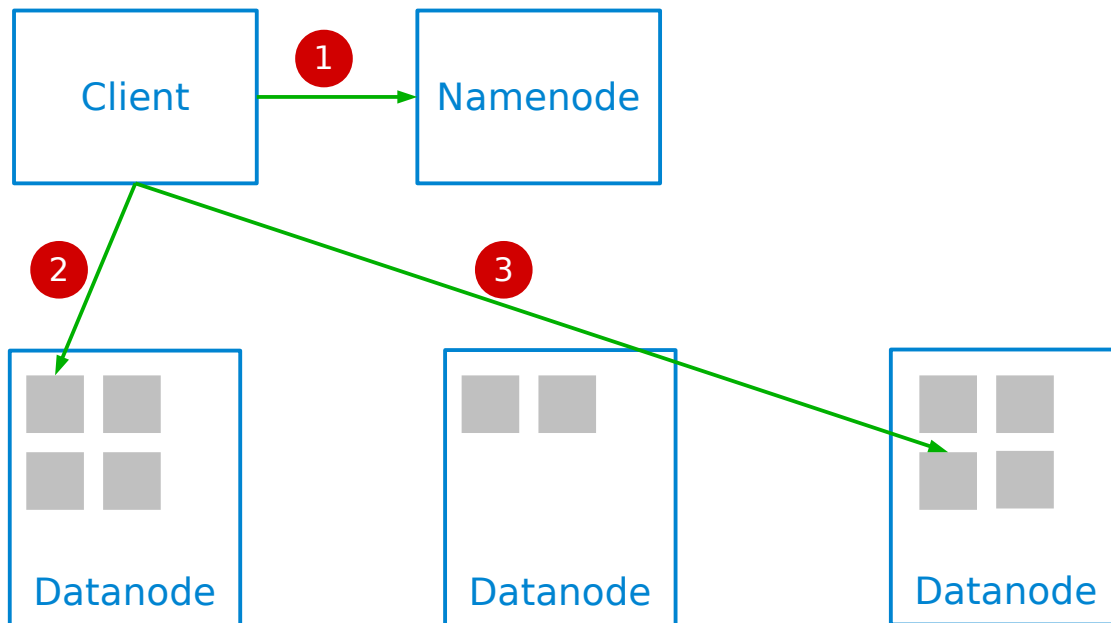


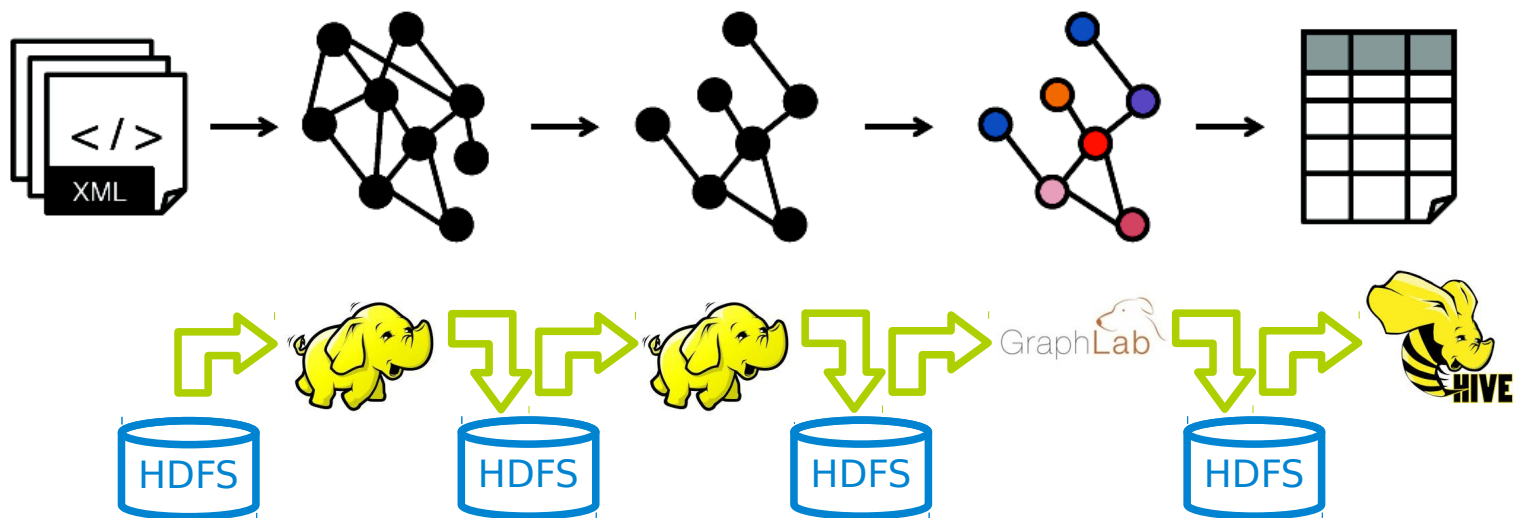


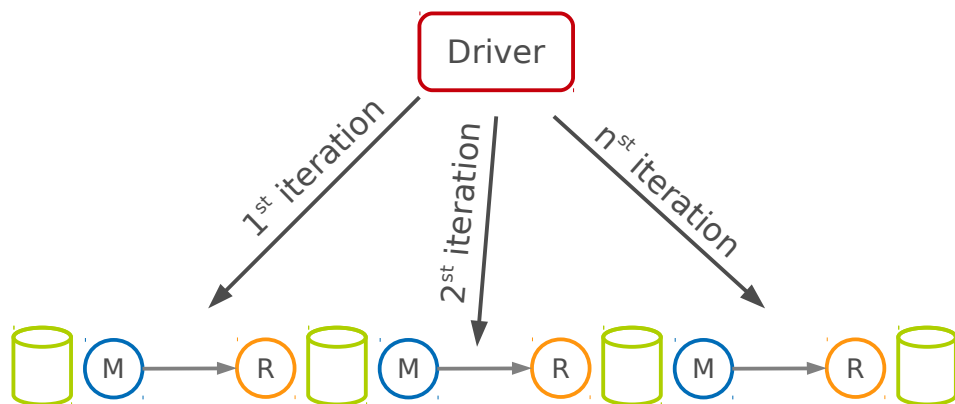
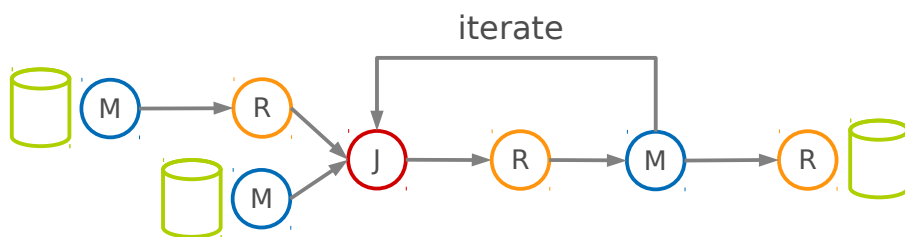


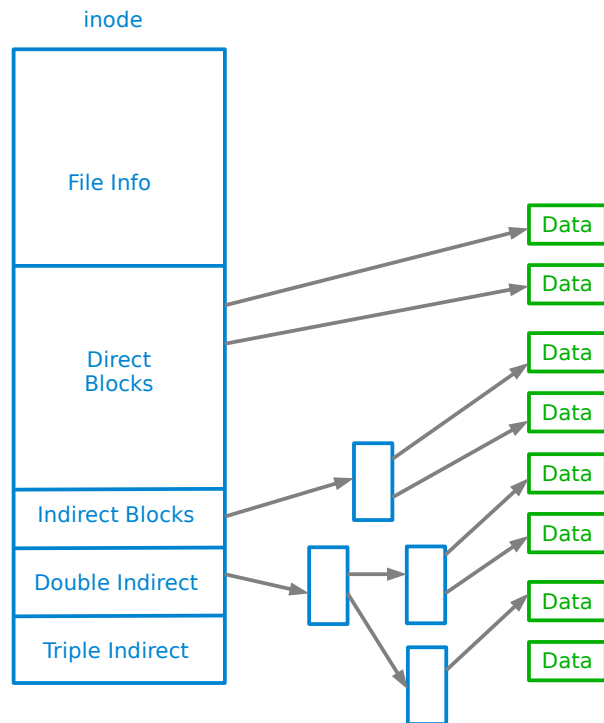




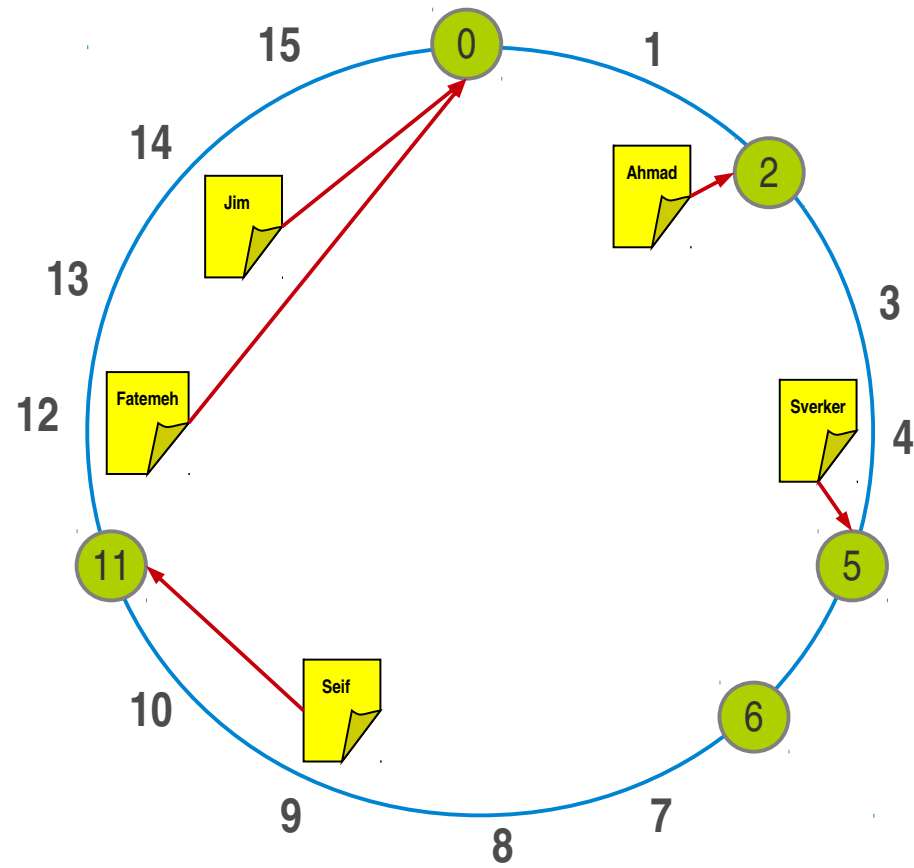


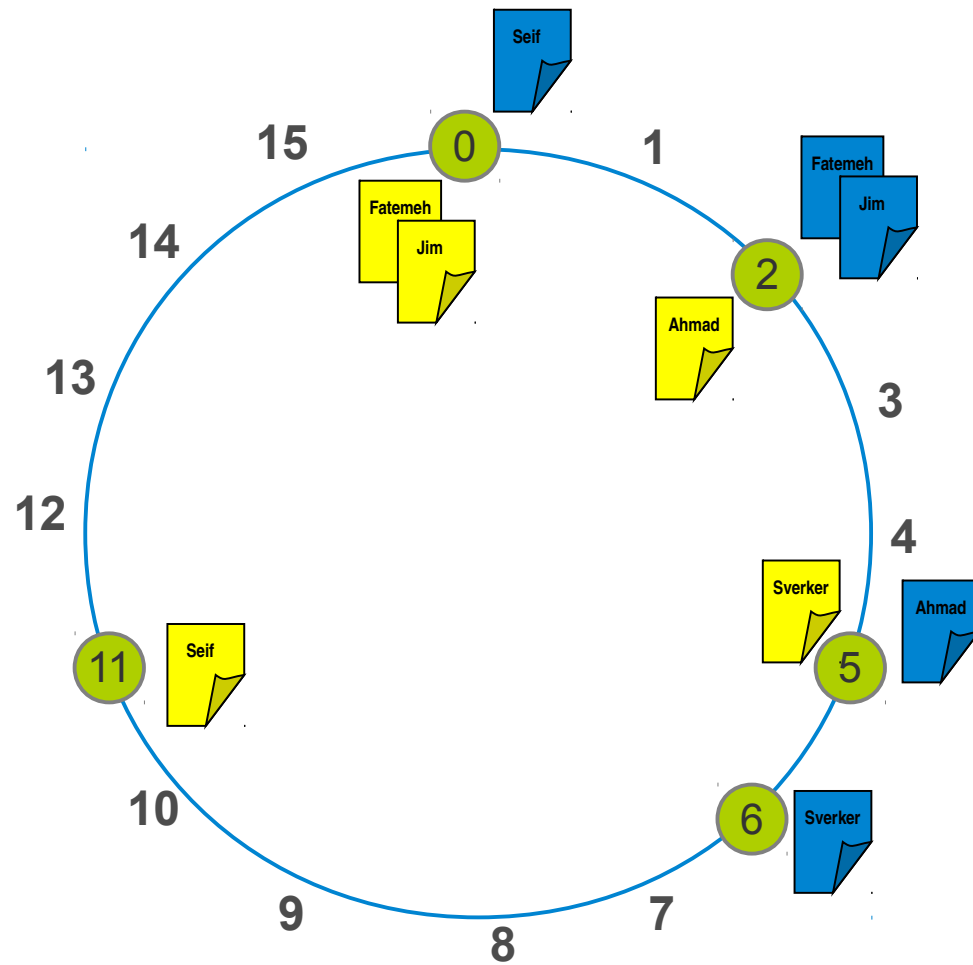


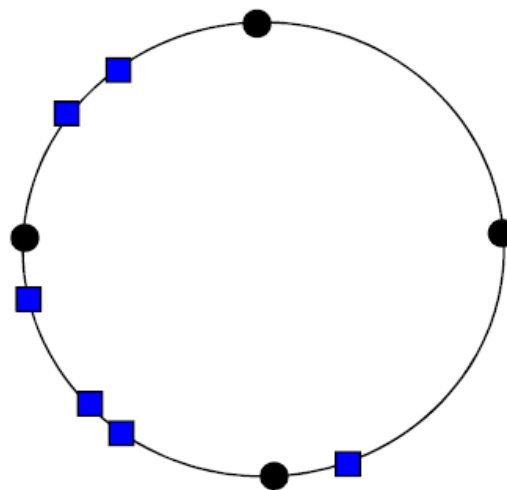
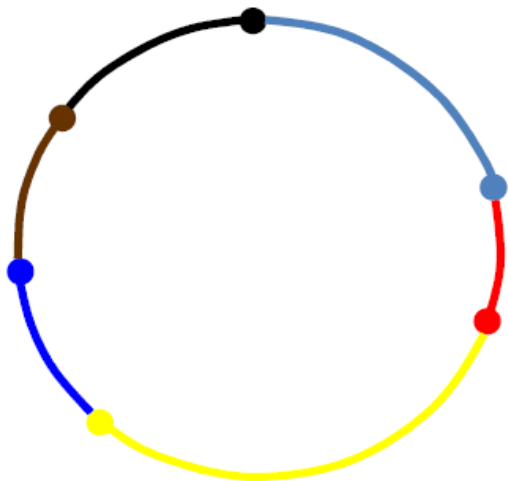




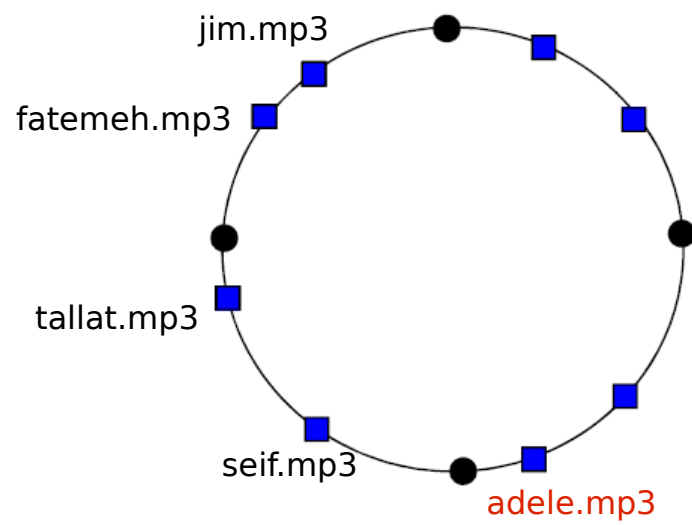




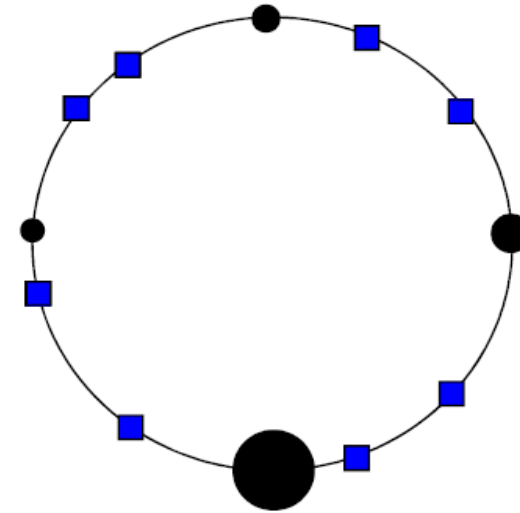




● - node  
■ - data



● - node  
■ - data



● - node  
■ - data

