HDFS Architecture
Part - 3

HDFS

Hadoop Distributed File System

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IMPORTANT

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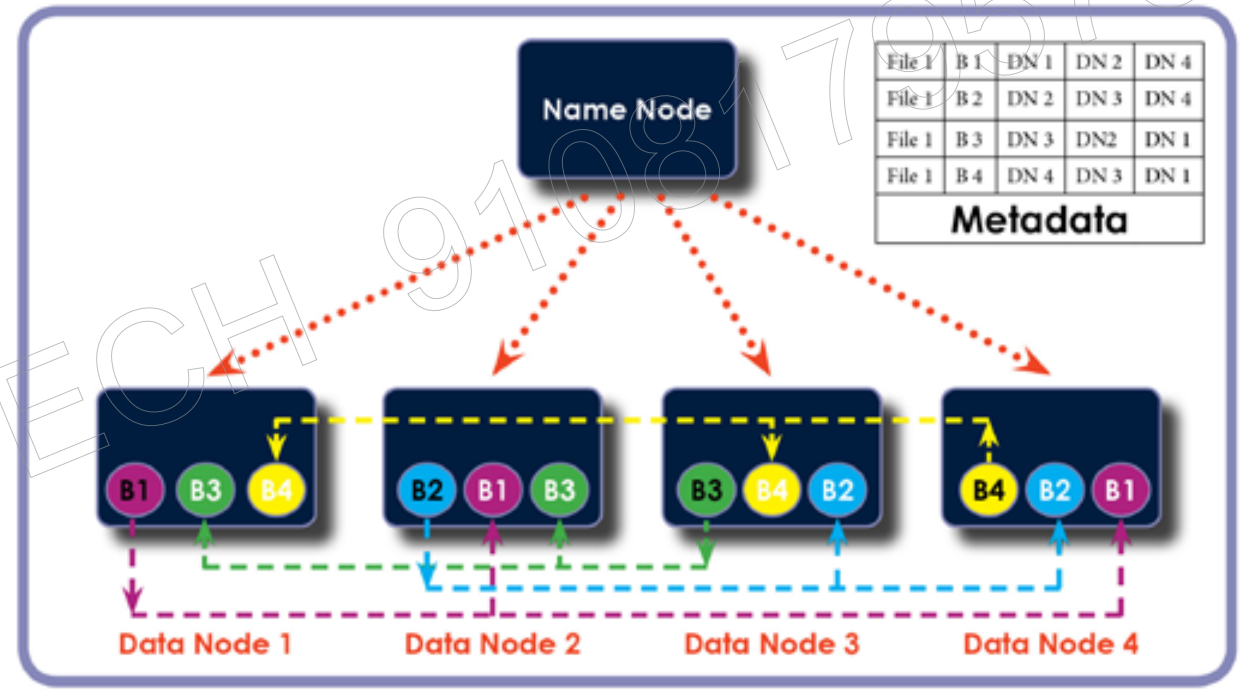
HDFS ARCHITECTURE

Understanding Replication Factor

Each data block in Hadoop has **3** replicas

Replicas are stored in different locations

The replica locations are also updated in Metadata stored in the Name Node

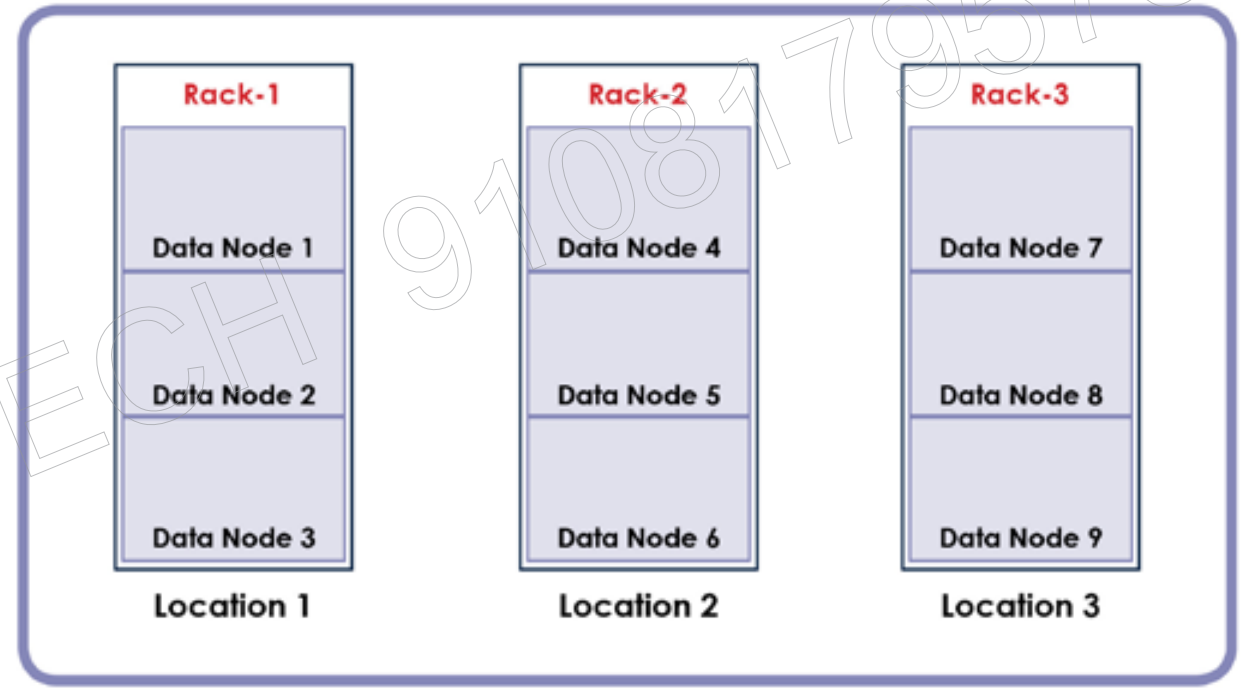


4 node Cluster

HDFS ARCHITECTURE

How Replicas are placed

Rack means group of systems placed in different geographical locations



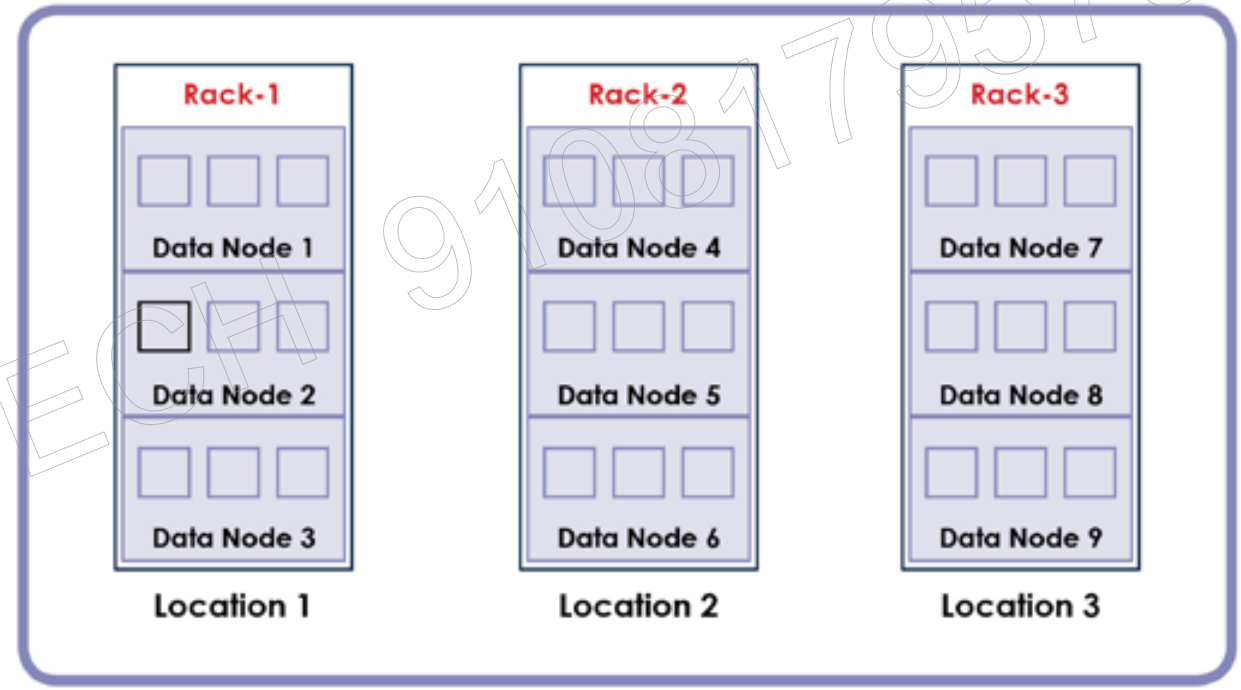
HDFS ARCHITECTURE

Replica Pipeline

Replicas of data block are forwarded to new locations

Forwarding data blocks requires large amount of network bandwidth

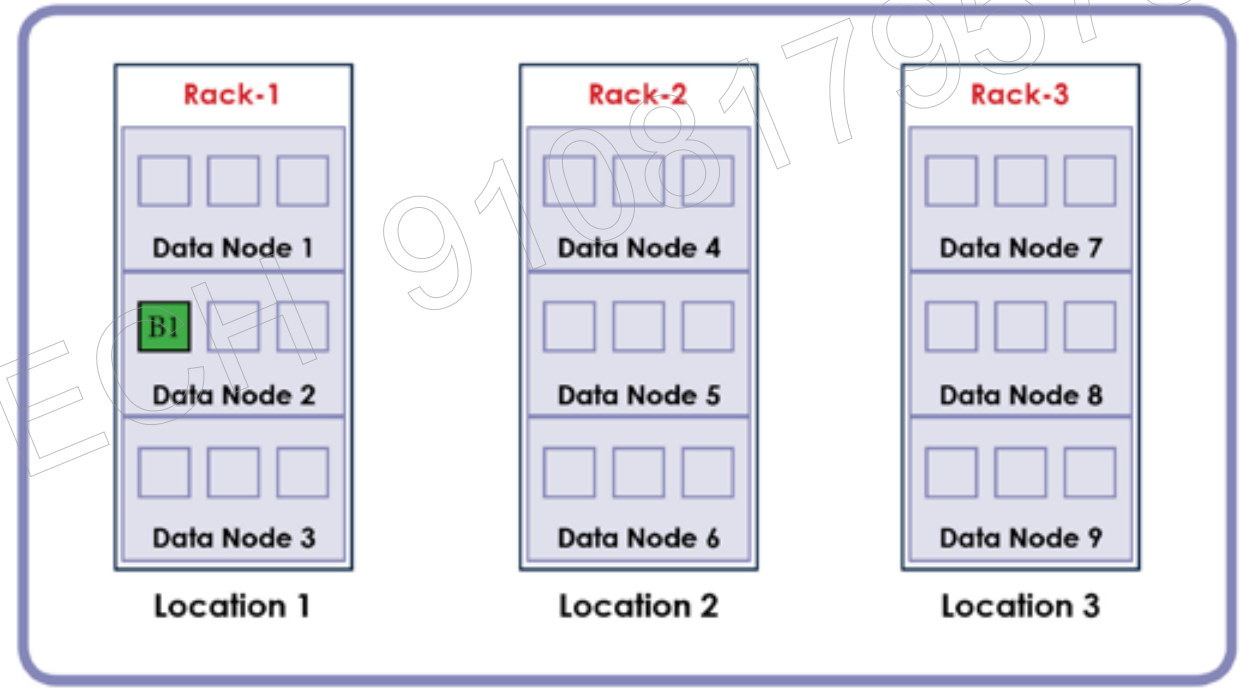
Involves more input-output operations



HDFS ARCHITECTURE

Replica Pipeline

Name Node stores data block in a data node of a rack



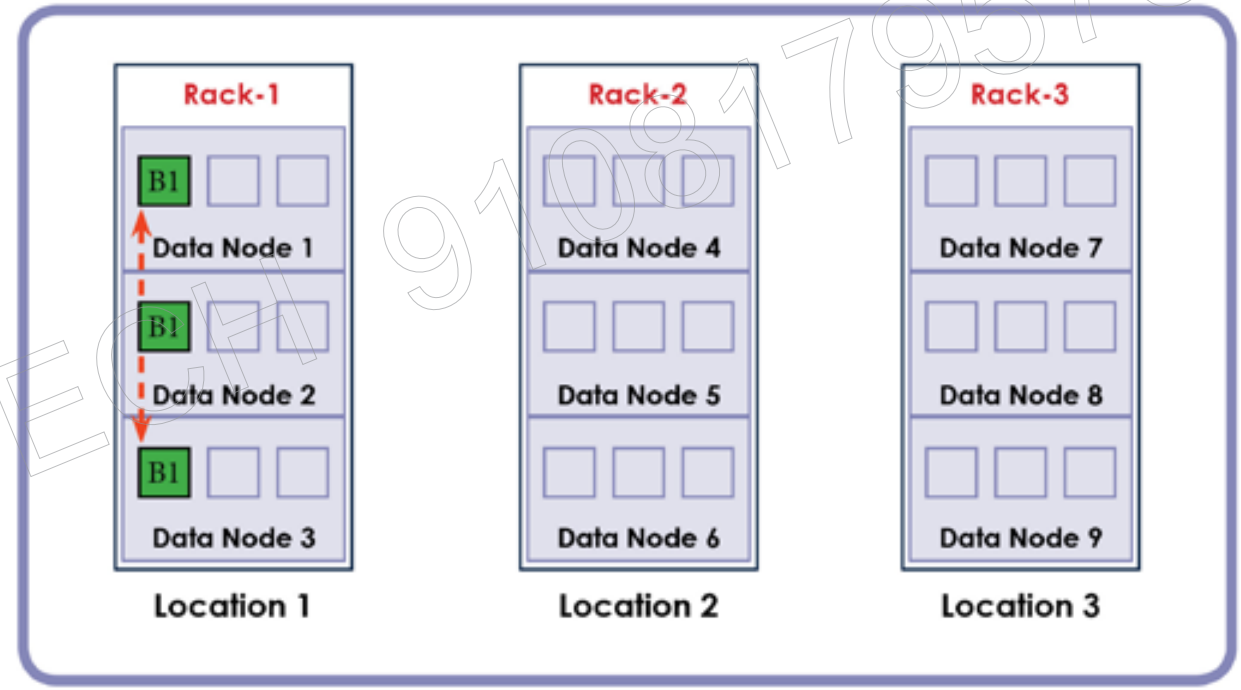
HDFS ARCHITECTURE

Replica Pipeline

Replicas of data block are forwarded to new locations

Forwarding data blocks within the same rack requires small amount of network bandwidth

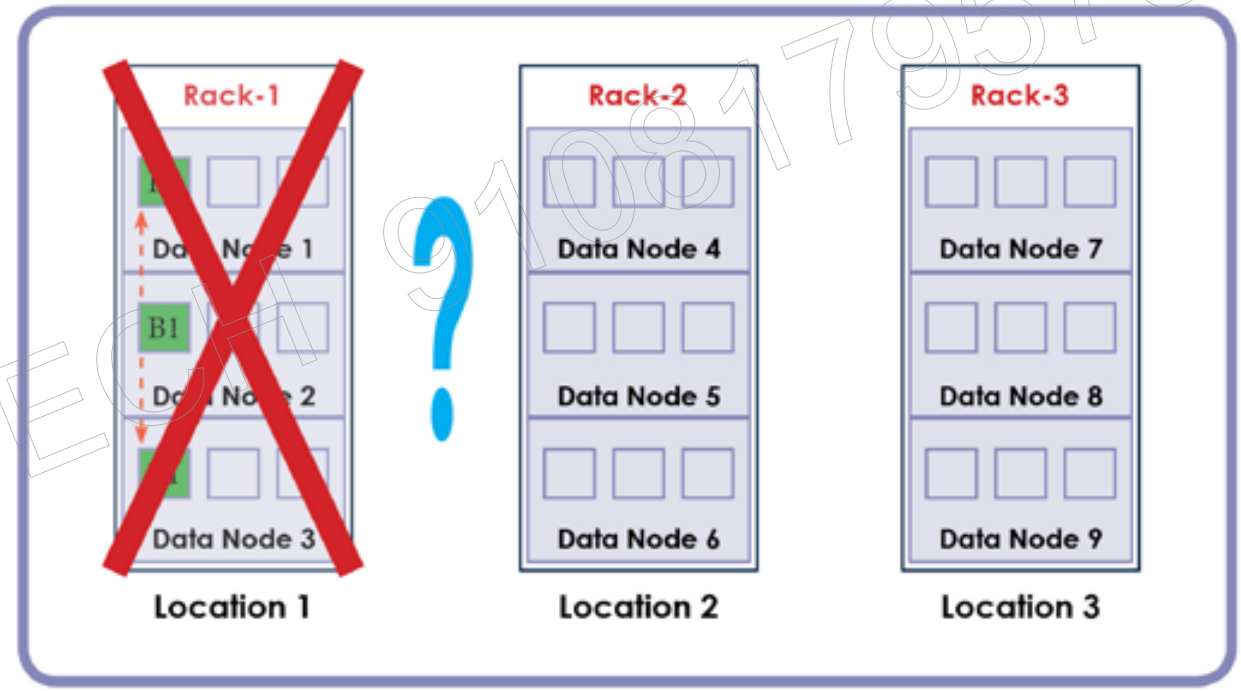
Involves less input-output operations



HDFS ARCHITECTURE

Rack Failure

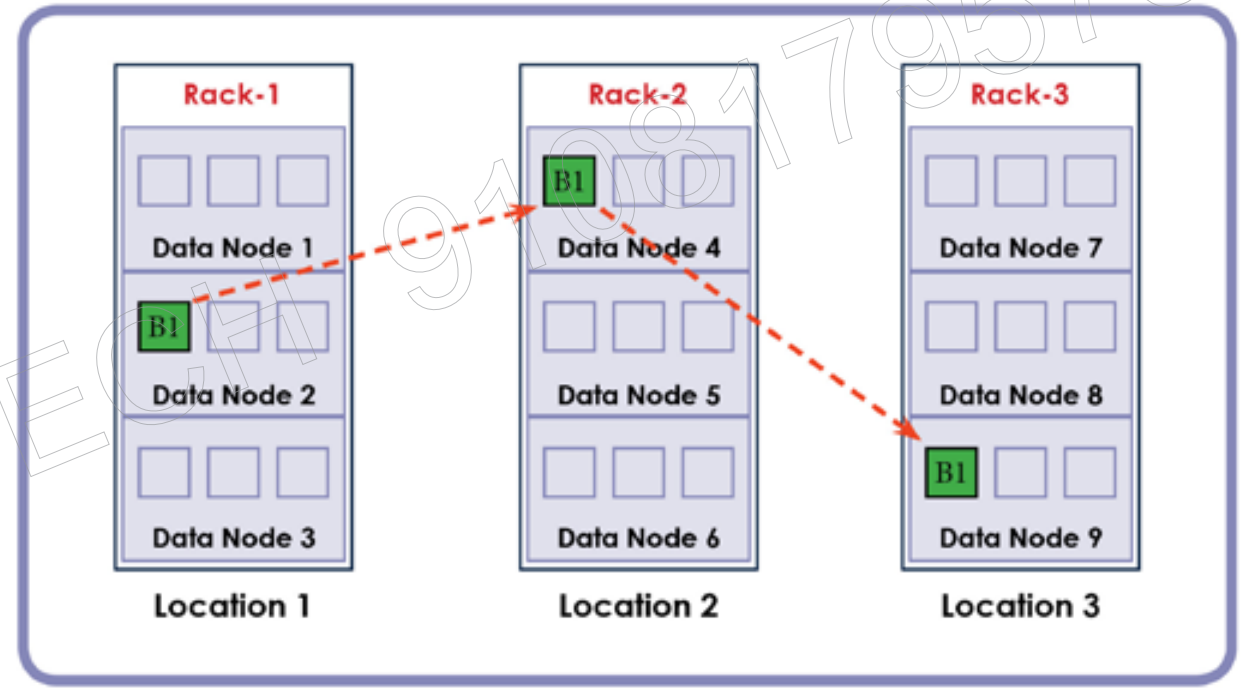
If we place all replicas in a single rack, there are high chances of **data loss** if the rack goes down



HDFS ARCHITECTURE

Choosing Multiple Racks

Each Replica placed in different rack is also not a ideal solution

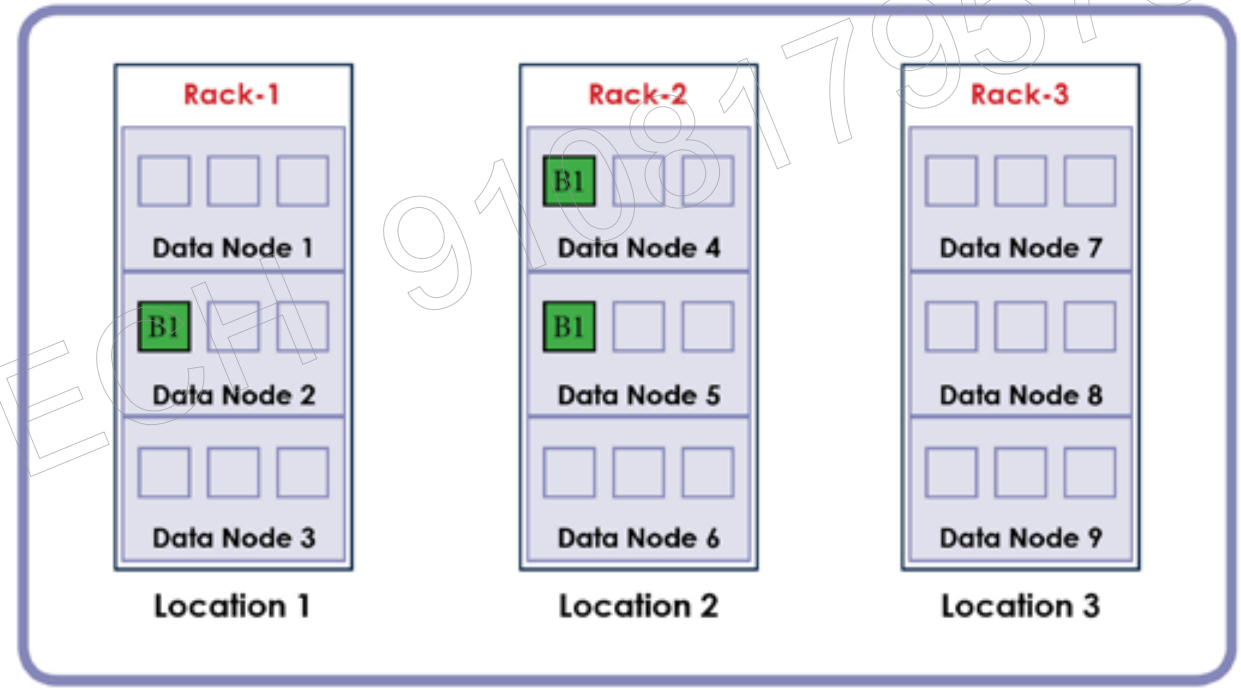


HDFS ARCHITECTURE

Rack Awareness Mechanism

The balanced approch is to place replicas in two different racks

One replica in one rack and other two in a different rack or vice versa



SUMMARY

- Data Nodes
- Name Node
- Fault Tolerance
- Replication Factor
- Checkpointing
- Rack Awareness Mechanism

Thank You !!

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