Review

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- Single point of failure of NameNode

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- Cassandra doesn't have a single point bottleneck like HDFS.
In HDFS, you can add more datanodes, but there still will be a single namenode which can be a bottleneck.

If you wanted to run real-time analytics queries on structured/semi-structured data, which storage would you prefer – HDFS or Cassandra?

If you wanted to run analytics queries on live structured/semi-structured data, which storage would you prefer – HDFS or Cassandra?

- Cassandra is better suited for online operations, that includes analytics on live or hot data. It has lower latency than HDFS

http://www.datastax.com/nosql-databases/nosql-cassandra-and-hadoop

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- HDFS has higher throughput on historical data.

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Availability – Yes, because there is no single point of failure and each node can act as the coordinator for different client requests.

Consistency – Not necessarily. Data has to be shared with each node, which may take place over time. They aim for eventual consistency.

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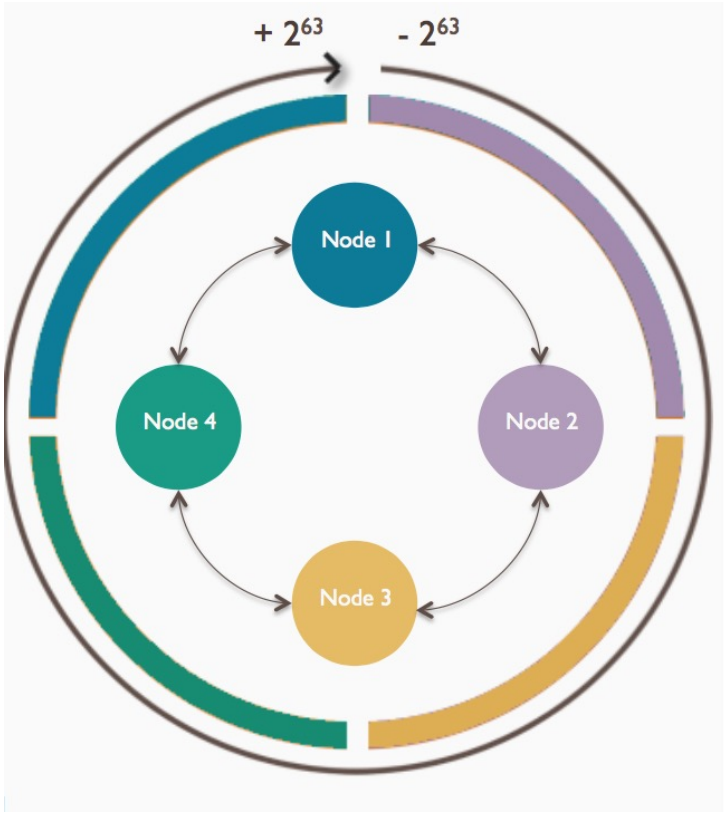
Entire keyspace is represented by the token range, which is distributed in the form of a ring.

Default algorithm: Murmur3Partitioner



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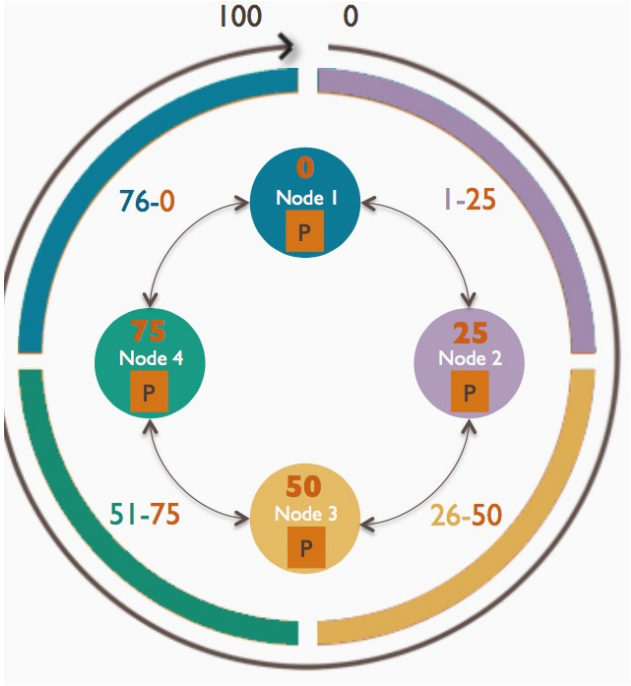
Node tokens represent the highest value in the segment owned by that node.



Where is the first replica of a write request written to in Cassandra?

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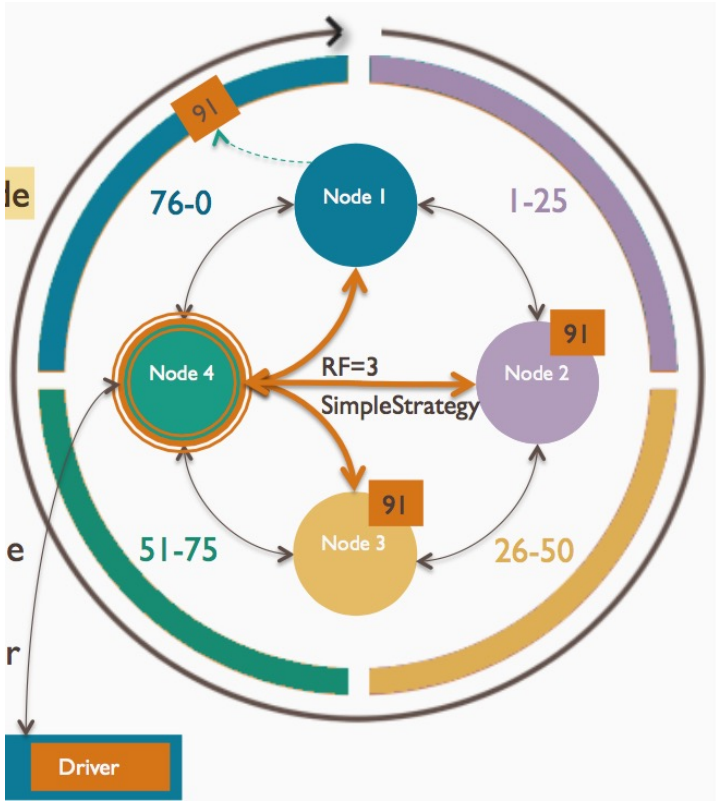
On the node owning the token's primary range



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Consistency level – how many nodes must acknowledge a read/write
CL of ALL provides the highest consistency.
CL of QUORUM provides the best balance.

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What is the stale read problem? When does it occur? Can it occur for a QUORUM CL?

Stale read= when the data returned to the client is not the latest version.

It happens when (read CL + write CL) < RF

It can not happen when CL = QUORUM

Which protocol is used to spread network topology information to all the nodes in a Cassandra cluster?

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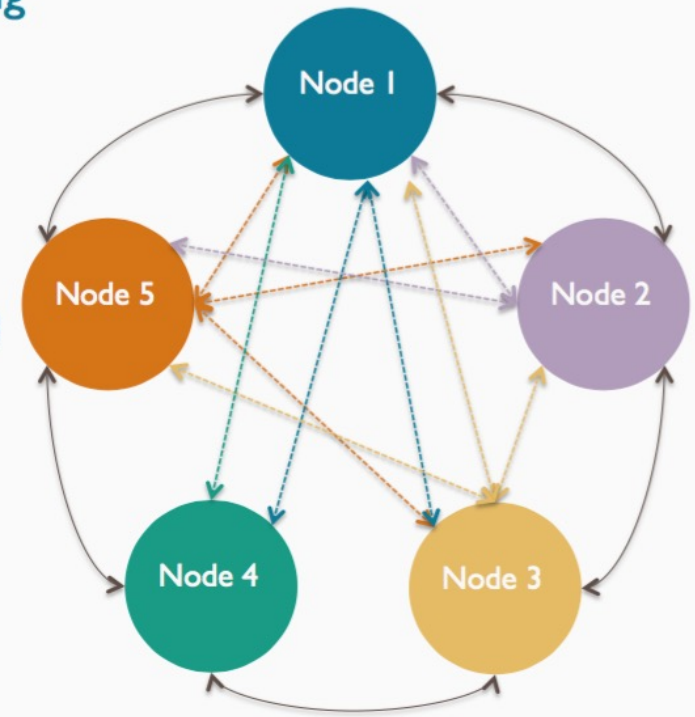
What is the Gossip protocol?

DATASTAX

- Once per second, each node contacts 1 to 3 others, requesting and sharing updates about
  - Known node states ("heartbeats")
  - Known node locations
  - Requests and acknowledgments are timestamped, so information is continually updated and discarded



Which one of the following is true about columns in Cassandra data model?

All rows should have the same column keys
The column keys in a row are always sorted
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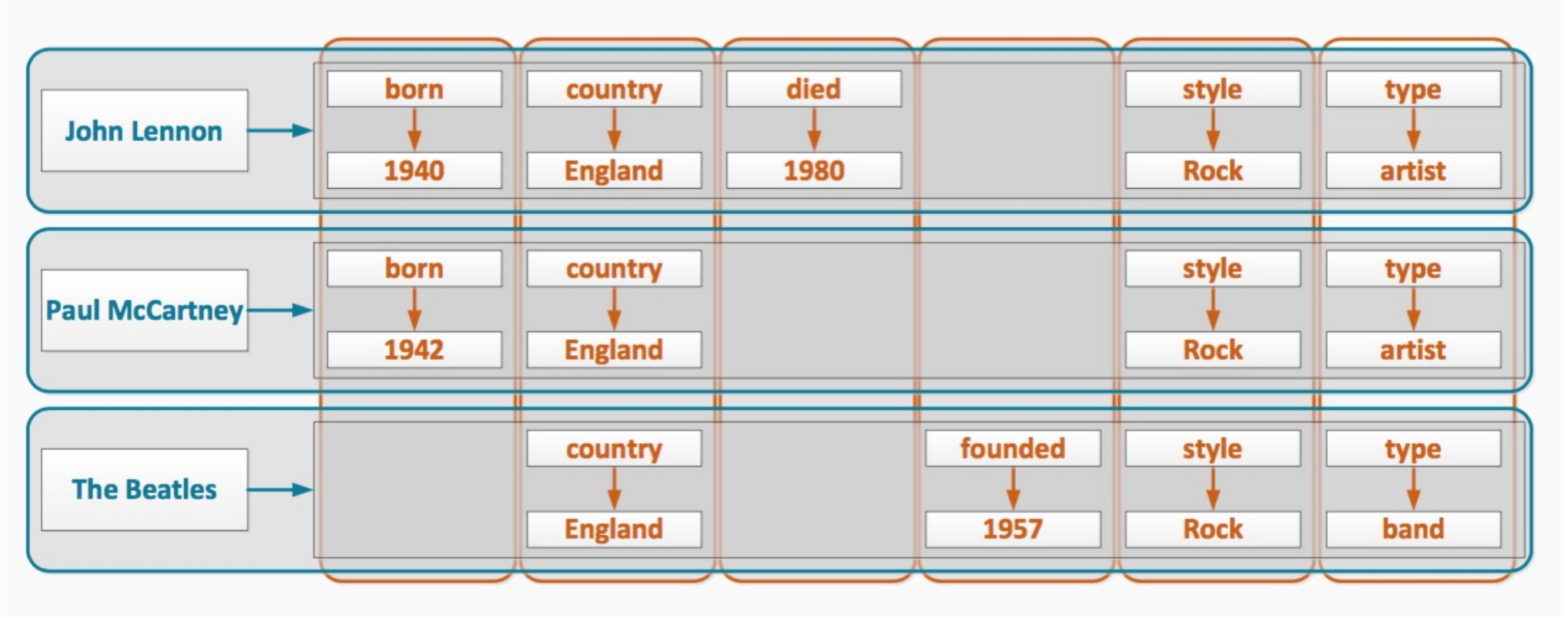
A set of rows having similar column structure



What is a partition ? What is the use of a clustering key column within a partition?

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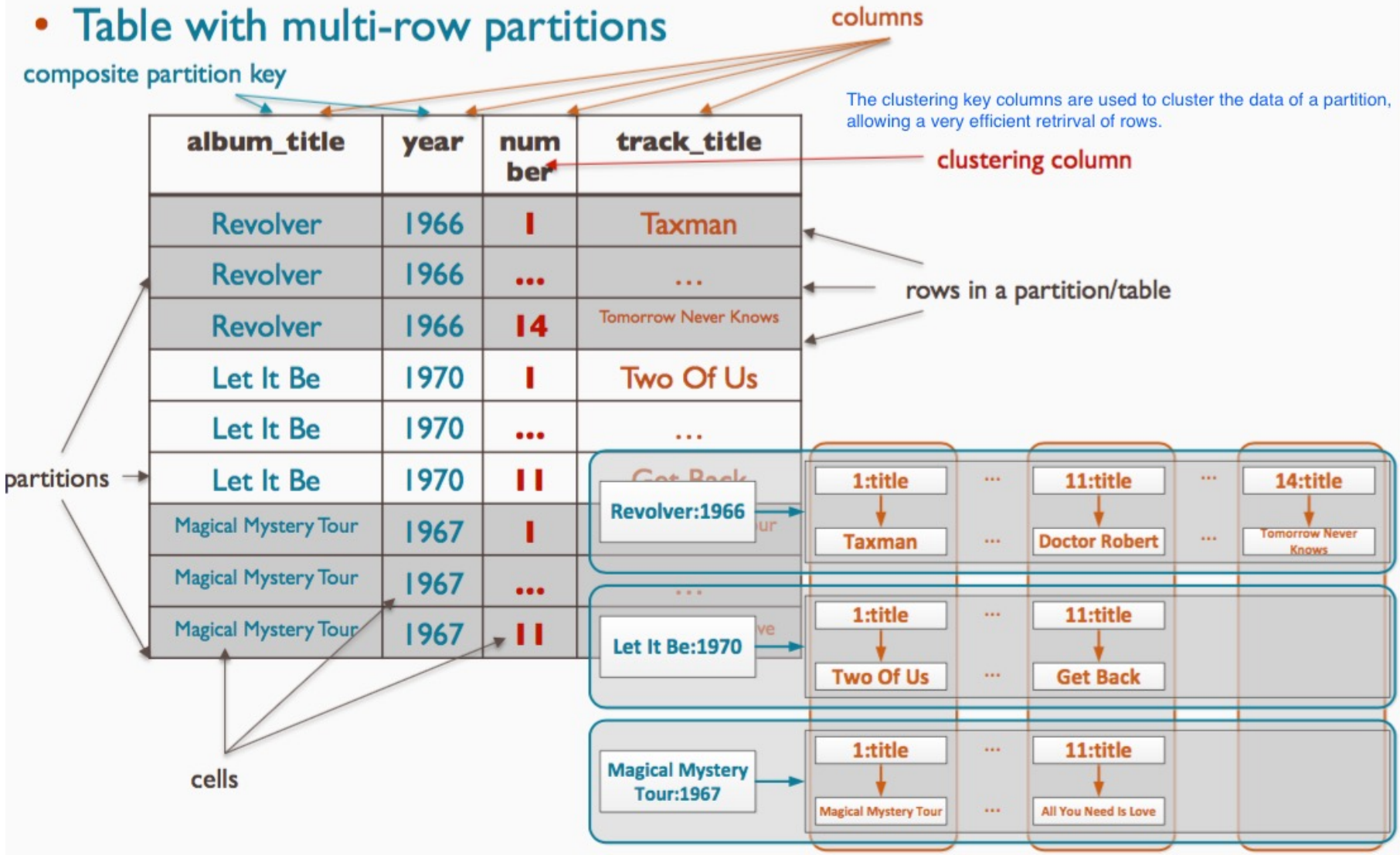
Partition – a group of rows with the same value of the partitioning columns.
Clustering key column within a partition allows for efficient retrieval of rows.

- Table with multi-row partitions



Why does HBase provide less availability than Cassandra?

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HBase runs on top of HDFS, which has a single point of failure.
HBase has a single master called HMaster that is responsible for various RegionServers (each RegionServer manages a region, which is a group of contiguous rows)

In which of the following cases would you store data in HBase as compared to files in HDFS?

- You require low latency data access.
- You require random read access to individual data items.
- You would like higher throughput batch processing of data items.
- You are storing semi-structured data that share a number of key values that can be grouped together.

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- Row key
- Column key
- Timestamp

A RegionServer manages a region of the HBase table. How is region defined:

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- a portion of the sorted column keyspace.
- it could be either row or column keyspace.
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- data storage
- assigning regions to regionservers
- processing data
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What is ZooKeeper?

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- If you are building a distributed application and require fault tolerance, ability to recover from partial failures, provide synchronization, and group services, then you can use ZooKeeper.
- ZooKeeper is a centralized service that provides high performance coordination among the nodes in a distributed application