Replication and Consistency

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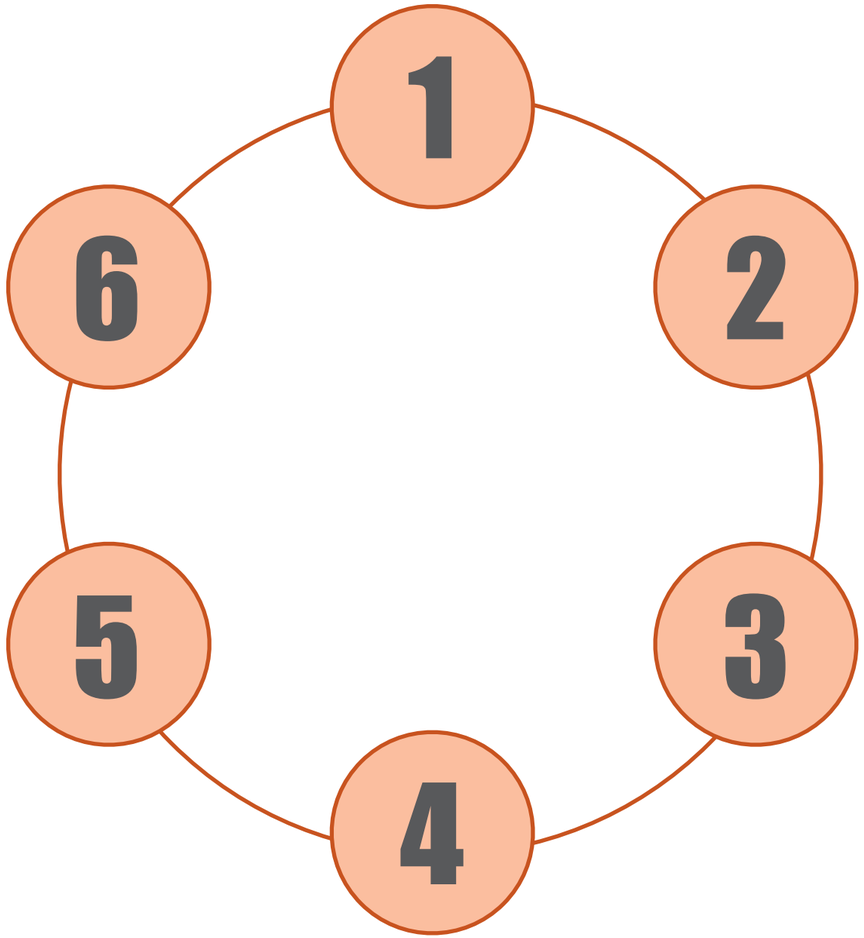
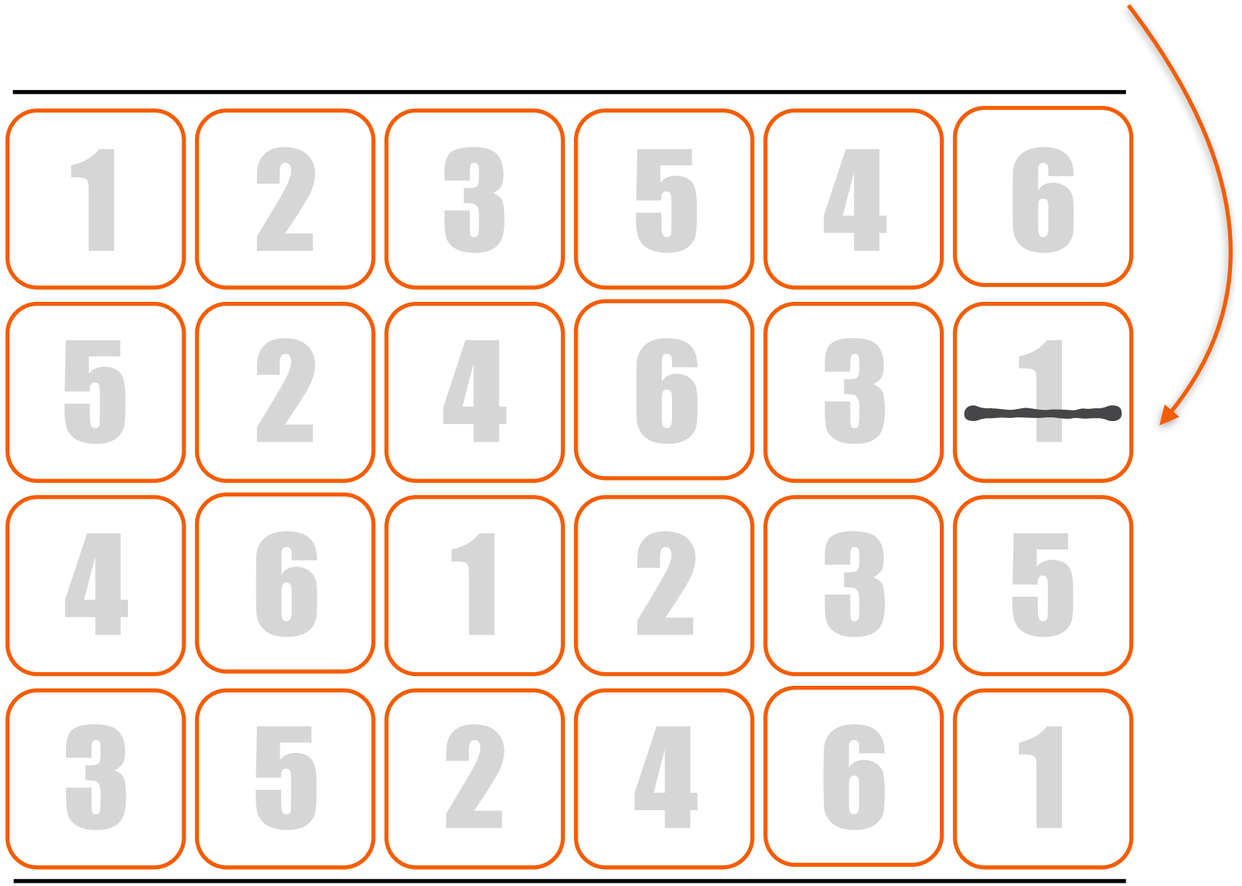
Overview

Replication strategies

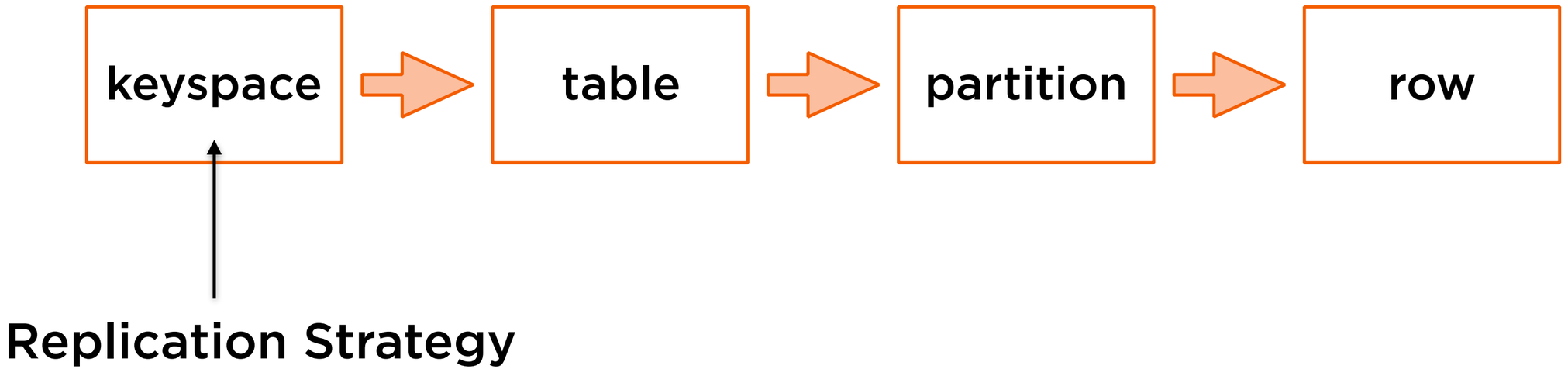
Tunable consistency

Replication



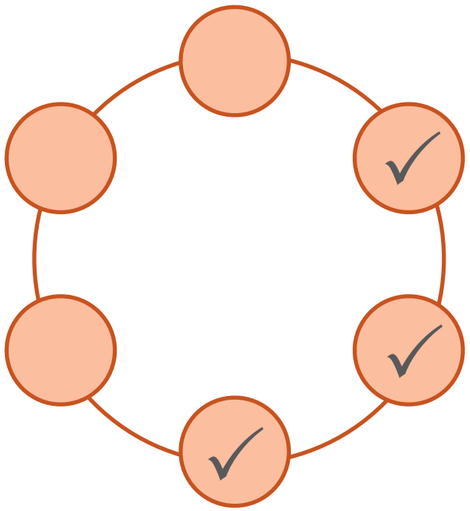


Cassandra Terminology



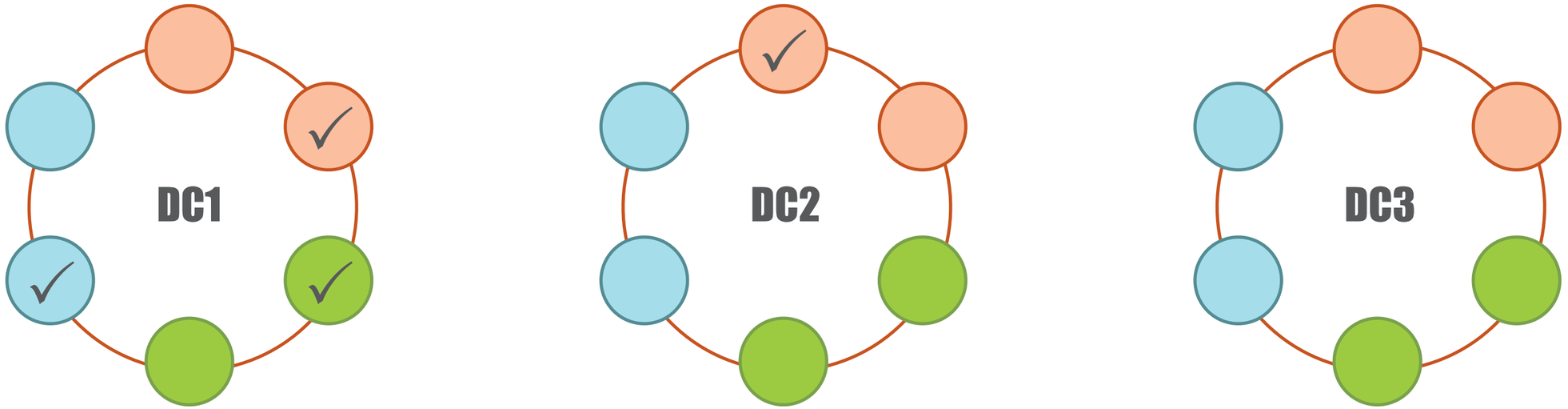
SimpleStrategy

```
create keyspace pluralsight with replication =
  {'class': 'SimpleStrategy', 'replication_factor': 3};
```



NetworkTopologyStrategy

```
create keyspace pluralsight with replication =
  {'class': 'NetworkTopologyStrategy', 'DC1': 3, 'DC2', 1};
```

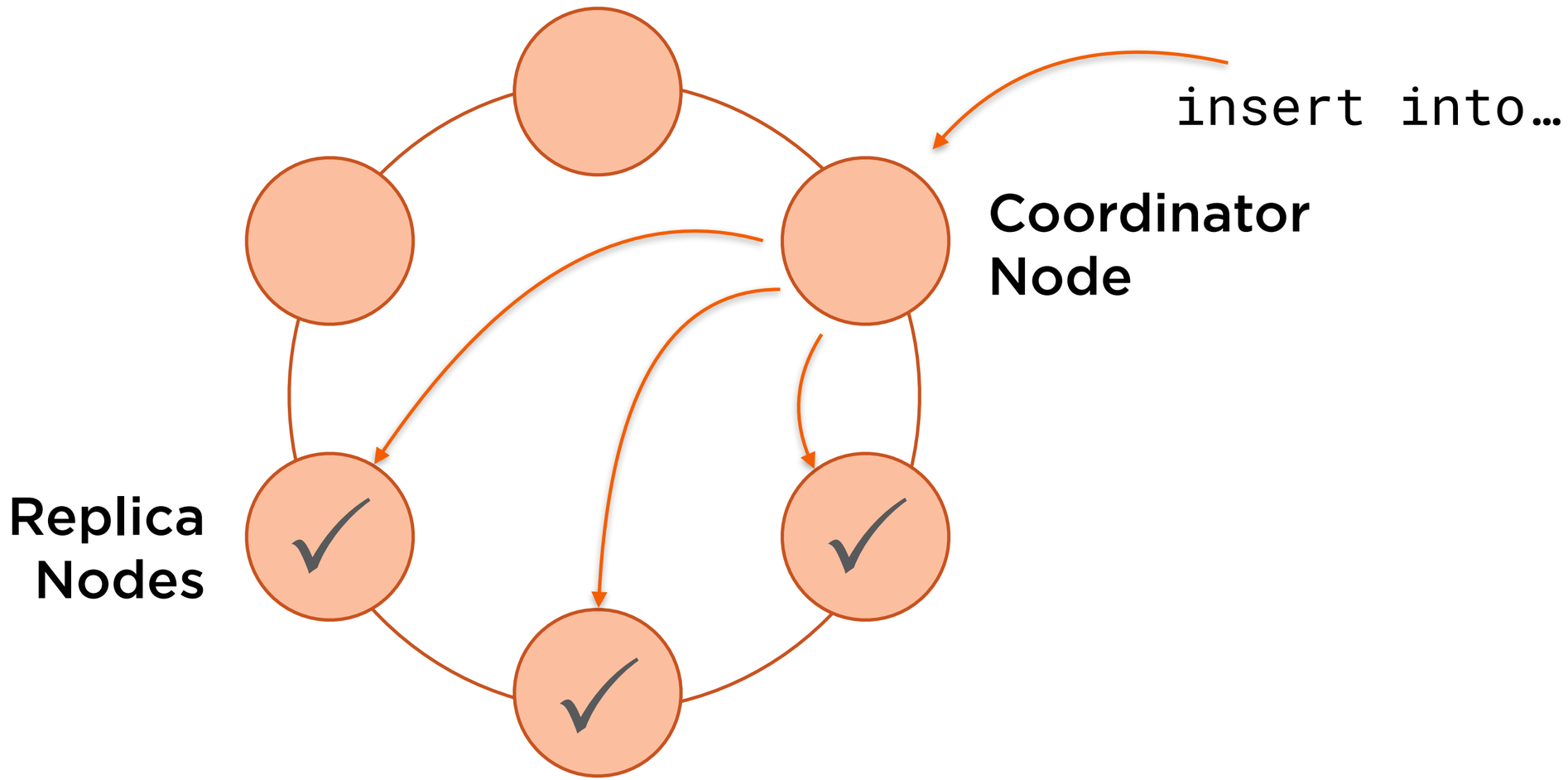


Demo

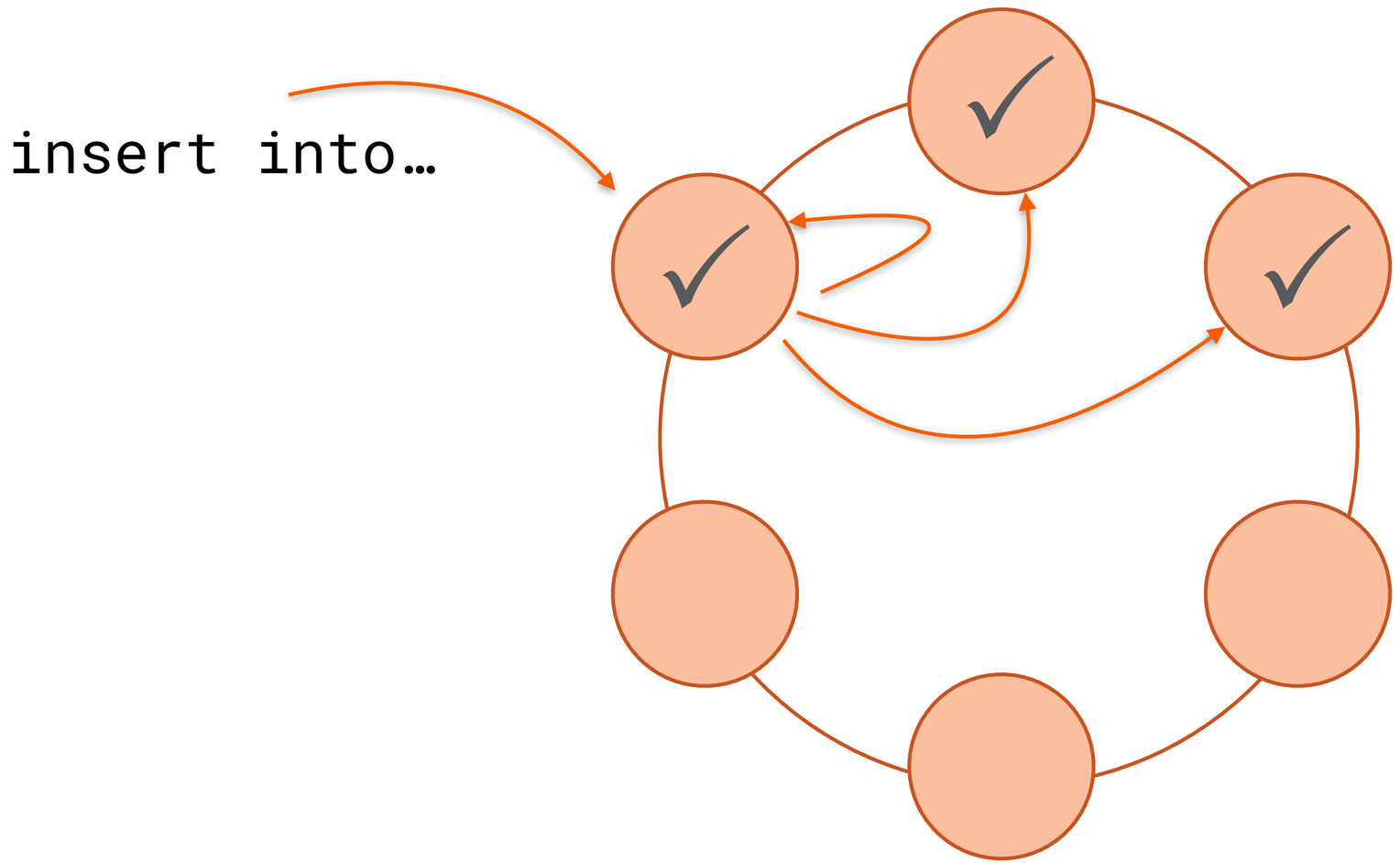
Keyspaces and replication strategies

Single and multi-datacenter clusters

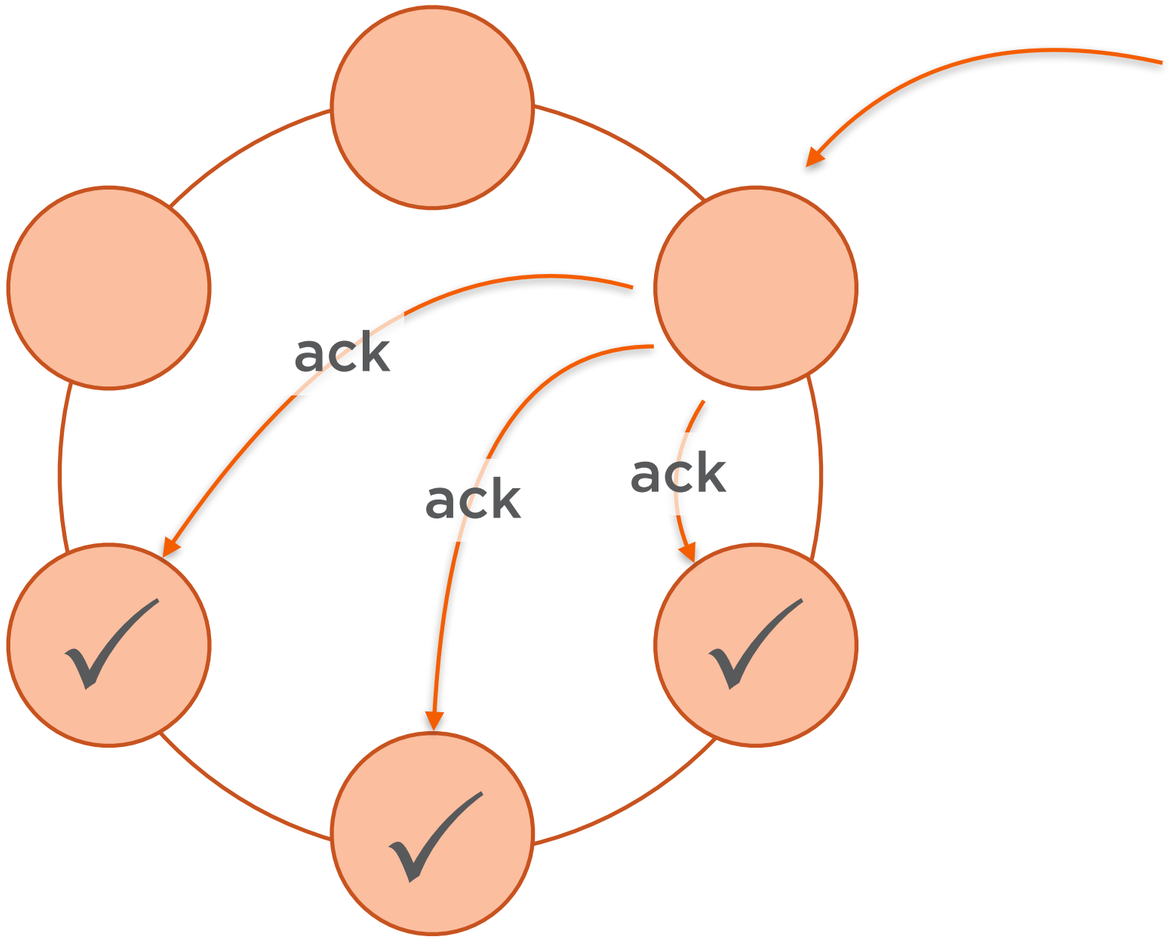
Reads and Writes in Cassandra



Reads and Writes in Cassandra



Tunable Consistency - Writes



ONE

TWO

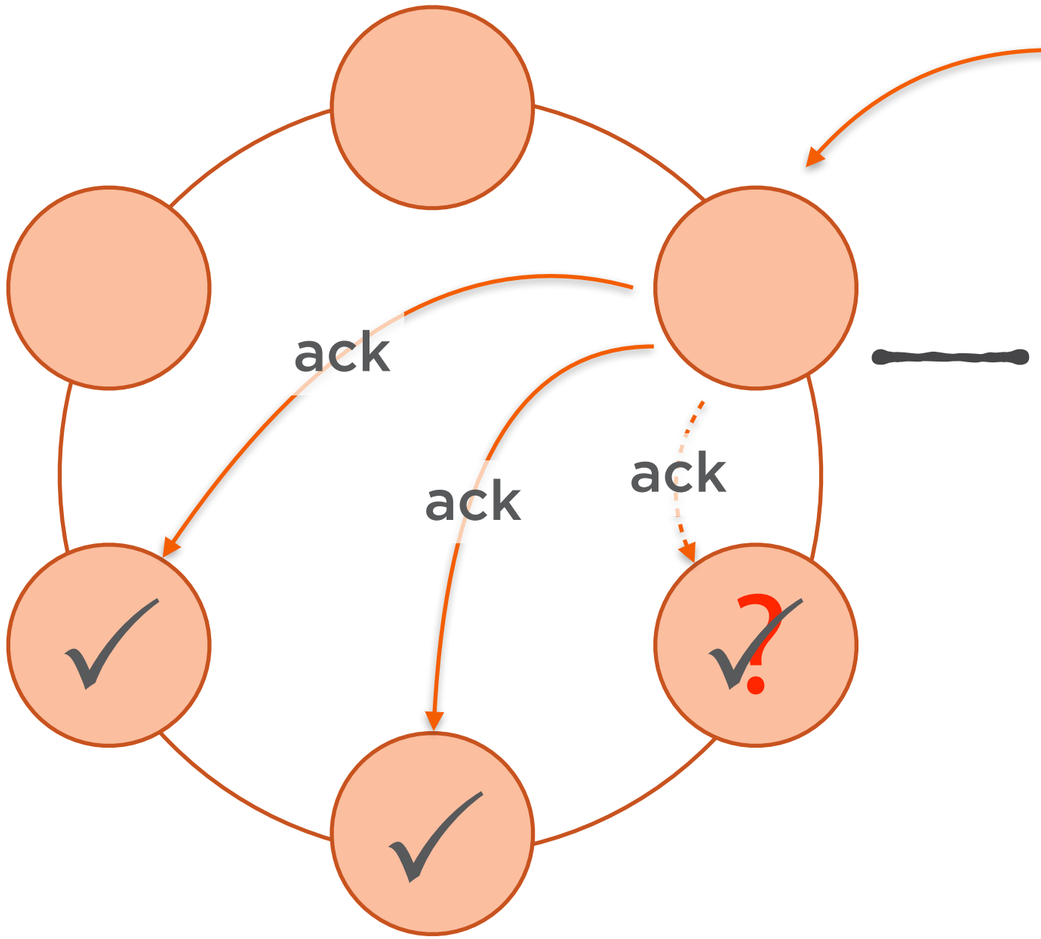
THREE

QUORUM

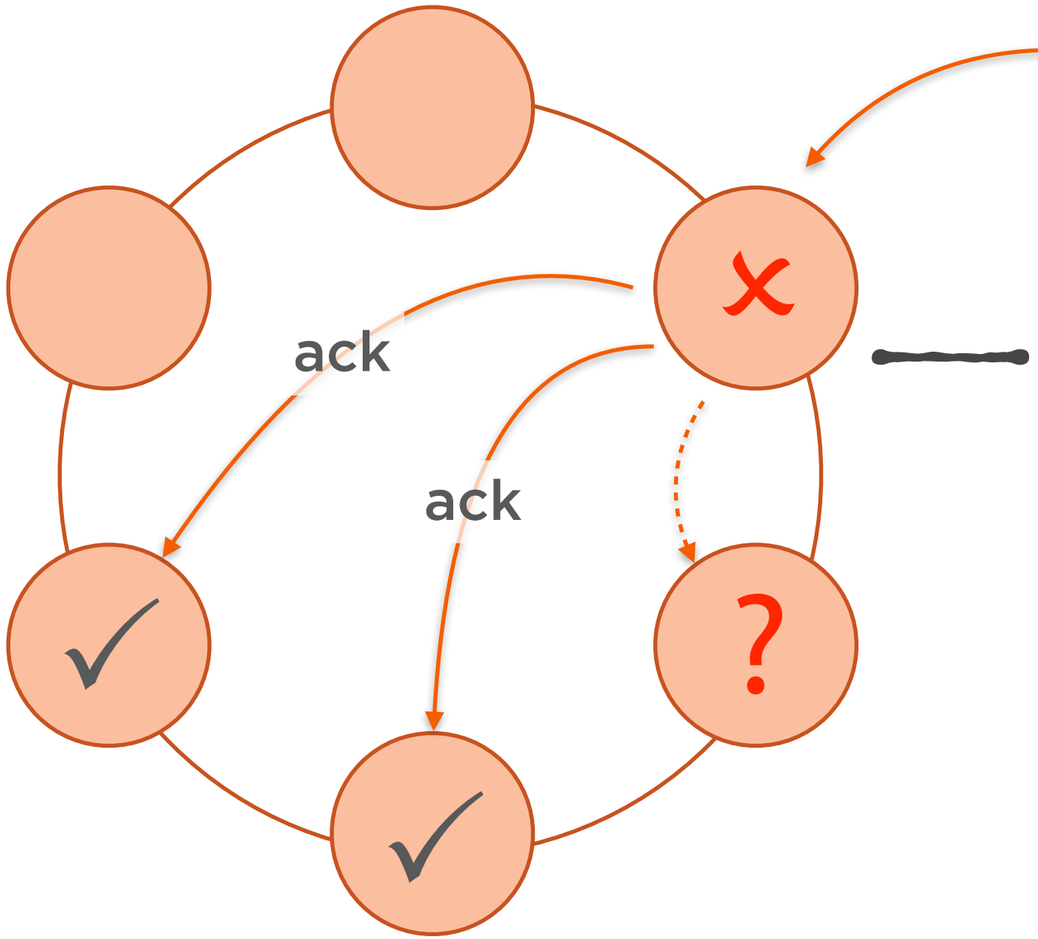
ALL

ANY

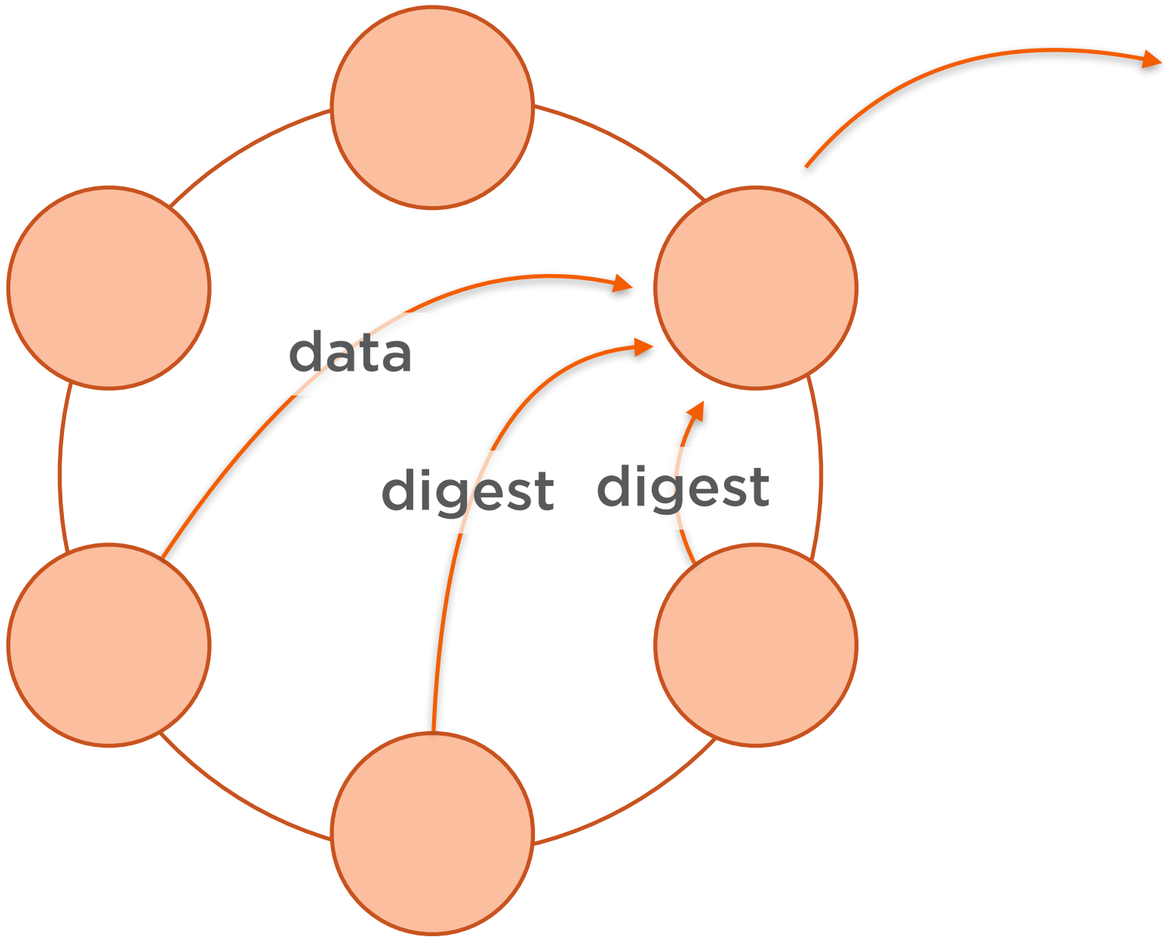
Hinted Handoff



Hinted Handoff



Tunable Consistency - Reads



ONE

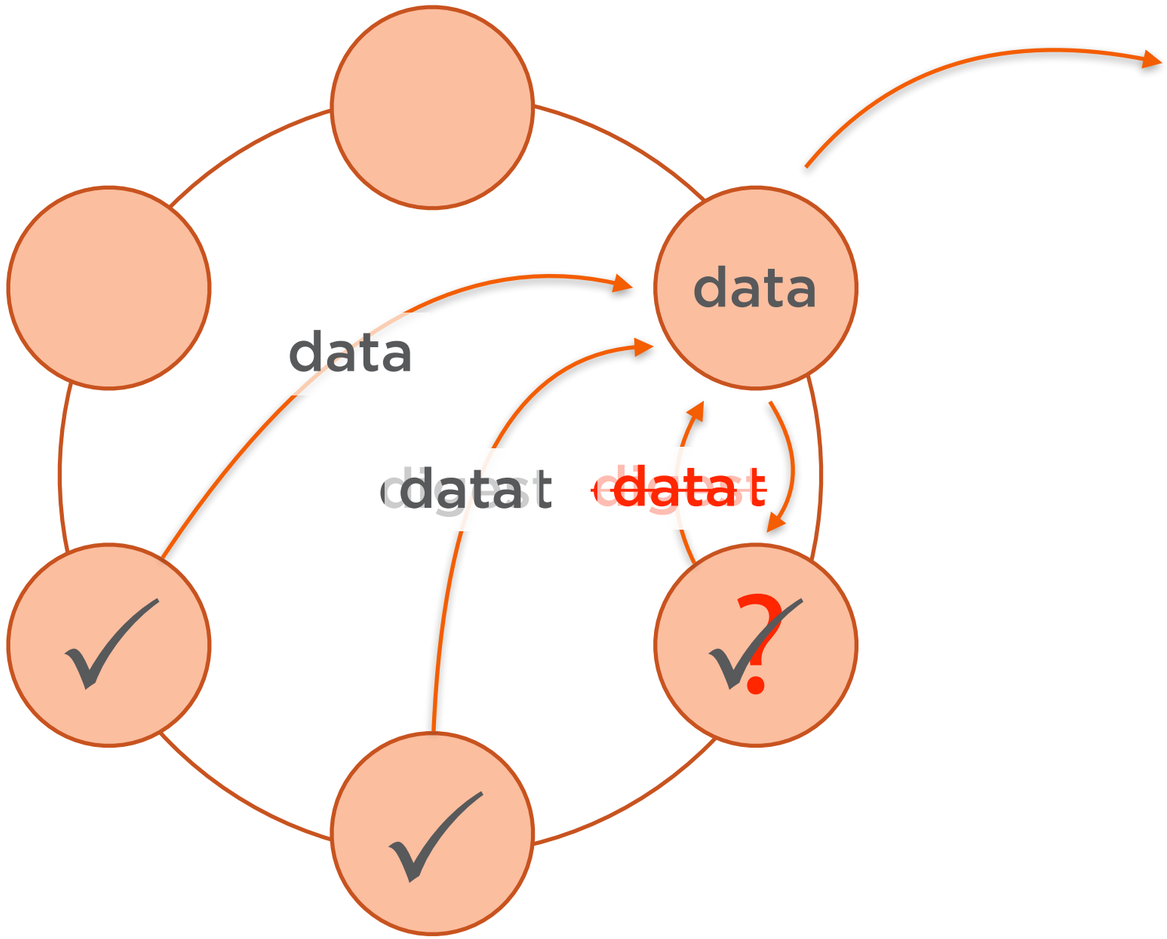
TWO

THREE

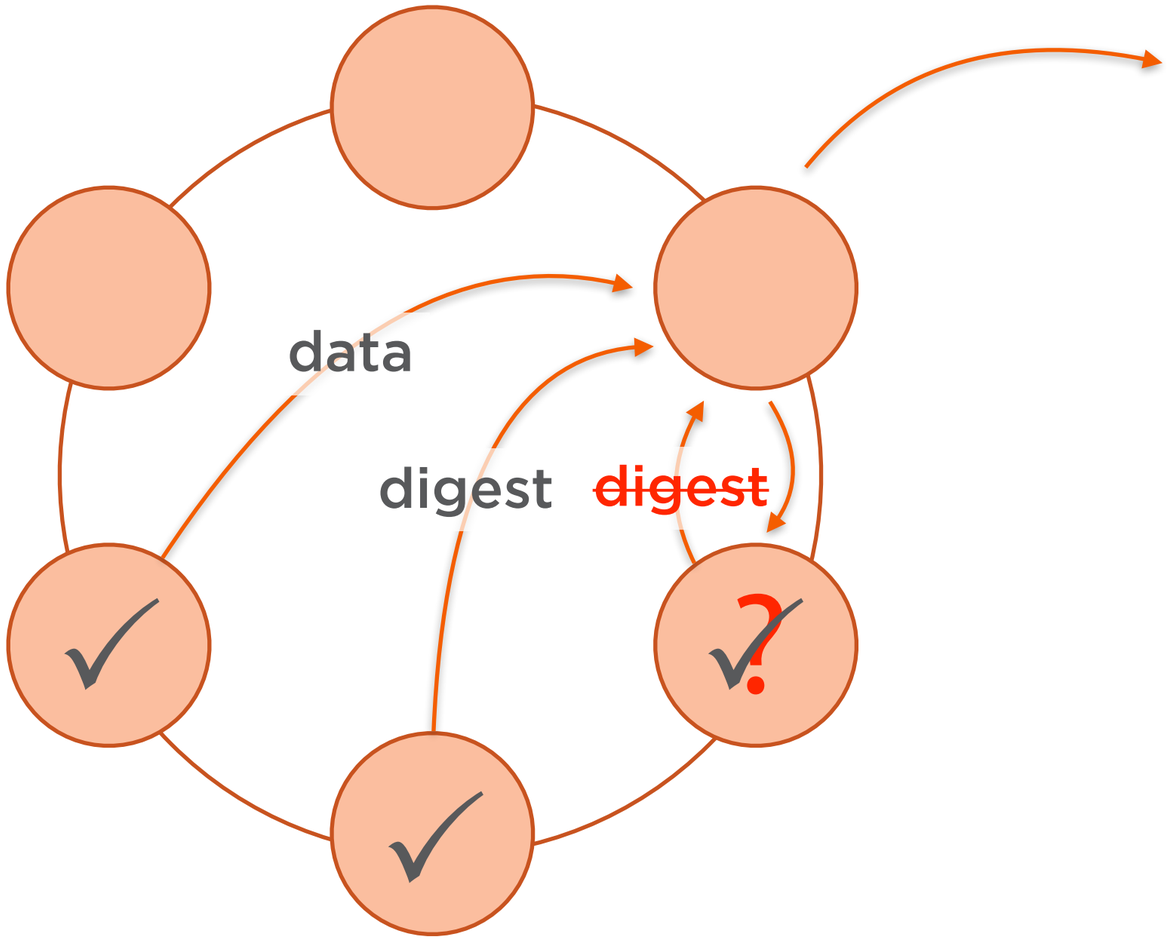
QUORUM

ALL

Read Repair



Read Repair



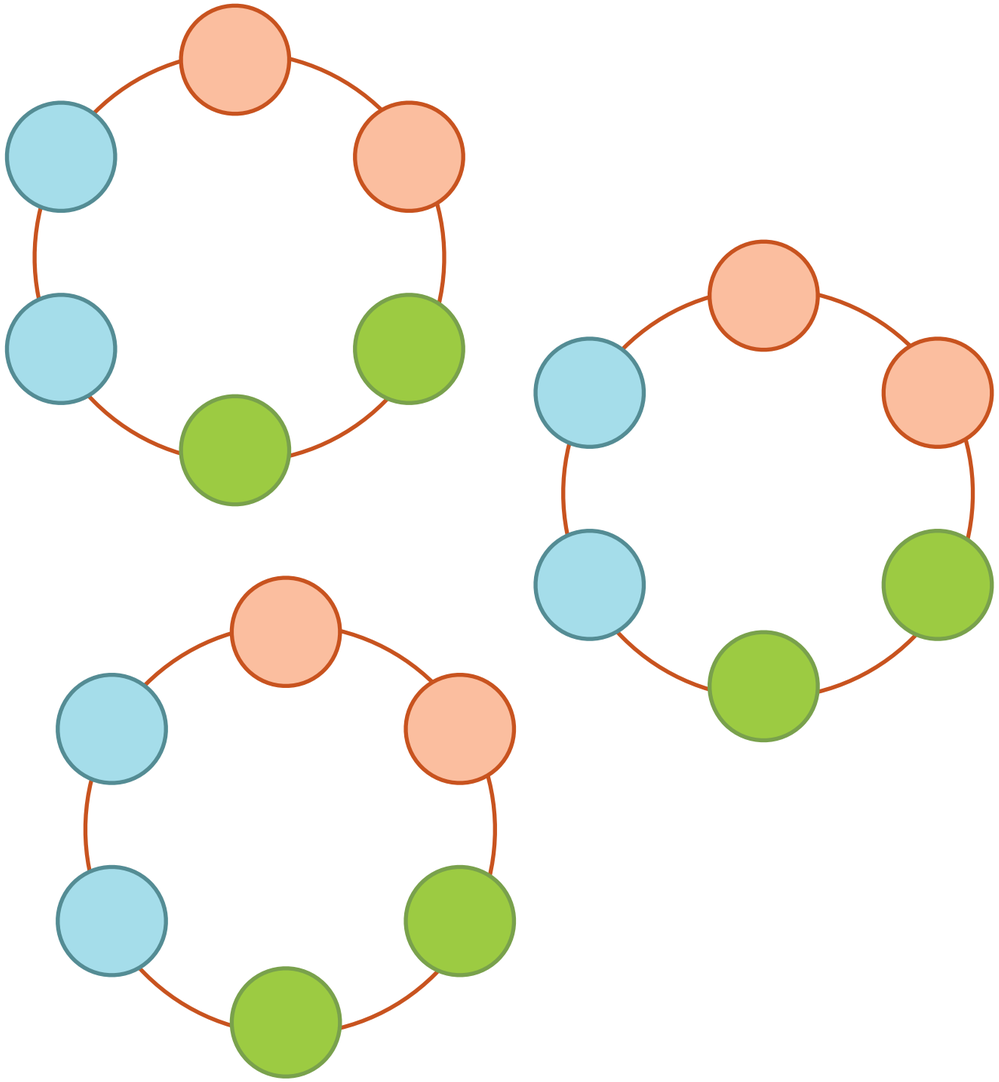
`nodetool repair`

Achieving Strong Consistency

(Write Consistency + Read Consistency) > Replication Factor

ONE	QUORUM	3	✗
ONE	ALL	3	✓
ONE	ONE	3	✗
QUORUM	QUORUM	3	✓

Consistency with Multiple Data Centers



EACH_QUORUM

LOCAL_QUORUM

LOCAL_ONE

Demo

Consistency examples

Single and multi-datacenter clusters

Extra Credit: Tracing a Read Repair

- Launch a three node, single DC cluster with “docker-compose up -d”
- Create “pluralsight” keyspace with SimpleStrategy and replication factor of 3
- Create “courses” table in the “pluralsight” keyspace
- Run the “nodetool pausehandoff” command
- Shutdown one of the nodes with “docker-compose stop n2”
- Run cqlsh and insert one row into the courses table
- Bring up the node you just shutdown with “docker-compose start n2”
- Run cqlsh and set the consistency to “all”
- Set tracing to “on”
- Run a select statement to retrieve the row you inserted above
- Look for “DigestMismatchException” in the tracing output

Conclusion

Cassandra terminology

Replication strategies

Read & write consistency

Achieving strong consistency

Hinted handoff and read repair