Introduction to CQL

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Introduction to CQL

Keyspaces, Tables and Basic Data Types

Selecting, Inserting, Updating and Deleting

Counters

A Brief History of Communicating with Cassandra

2008: Originally just a Thrift API

2011: CQL introduced in Cassandra 0.8

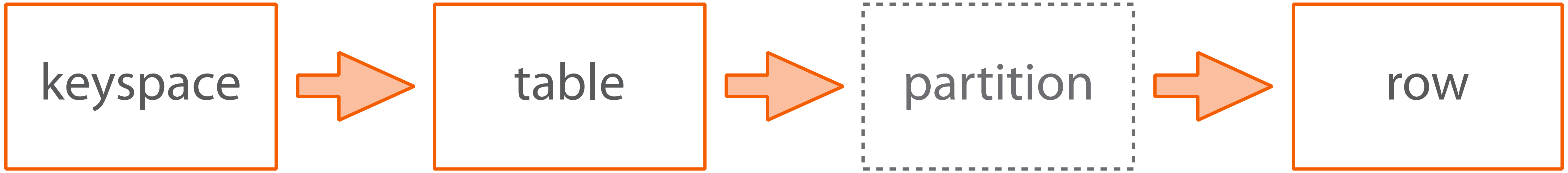
2012: CQL 3 introduced in Cassandra 1.1

2013: CQL 3.1 introduced in Cassandra 2.0

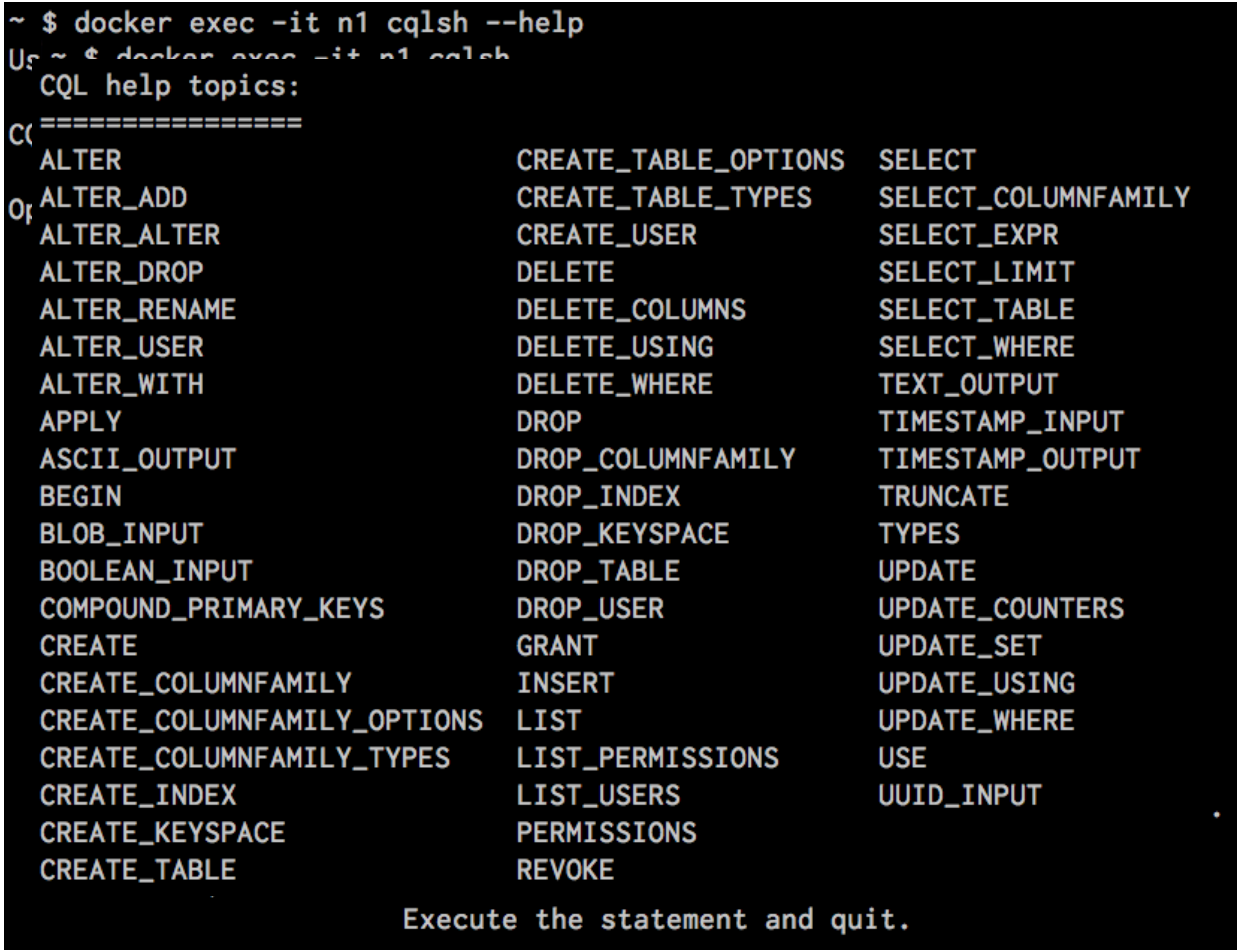
2014: CQL 3.2 introduced in Cassandra 2.1

~~Column Family~~

~~Super Column Family~~



CQL on the Command Line



```
~ $ docker exec -it n1 cqlsh --help
Us ~ $ docker exec -it n1 cqlsh
  CQL help topics:
CC================
  ALTER                        CREATE_TABLE_OPTIONS  SELECT
Op ALTER_ADD                   CREATE_TABLE_TYPES    SELECT_COLUMNFAMILY
  ALTER_ALTER                  CREATE_USER           SELECT_EXPR
  ALTER_DROP                   DELETE                SELECT_LIMIT
  ALTER_RENAME                 DELETE_COLUMNS        SELECT_TABLE
  ALTER_USER                   DELETE_USING          SELECT_WHERE
  ALTER_WITH                   DELETE_WHERE          TEXT_OUTPUT
  APPLY                        DROP                  TIMESTAMP_INPUT
  ASCII_OUTPUT                 DROP_COLUMNFAMILY     TIMESTAMP_OUTPUT
  BEGIN                        DROP_INDEX            TRUNCATE
  BLOB_INPUT                   DROP_KEYSPACE         TYPES
  BOOLEAN_INPUT                DROP_TABLE            UPDATE
  COMPOUND_PRIMARY_KEYS        DROP_USER             UPDATE_COUNTERS
  CREATE                       GRANT                 UPDATE_SET
  CREATE_COLUMNFAMILY          INSERT                UPDATE_USING
  CREATE_COLUMNFAMILY_OPTIONS  LIST                  UPDATE_WHERE
  CREATE_COLUMNFAMILY_TYPES    LIST_PERMISSIONS      USE
  CREATE_INDEX                 LIST_USERS            UUID_INPUT
  CREATE_KEYSPACE              PERMISSIONS
  CREATE_TABLE                 REVOKE

                        Execute the statement and quit.
```

Keyspaces

Create

```
CREATE KEYSPACE pluralsight WITH REPLICATION = {
  'class': 'NetworkTopologyStrategy', 'DC1': 3
} AND DURABLE_WRITES = false;
```

Alter

```
ALTER KEYSPACE pluralsight WITH REPLICATION = {
  'class': 'SimpleStrategy', 'replication_factor': 3
} AND DURABLE_WRITES = true;
```

`nodetool repair` required

Drop

```
DROP KEYSPACE pluralsight;
```

Tables

Create

```
CREATE TABLE pluralsight.courses (id varchar PRIMARY KEY);
```

Alter

```
ALTER TABLE pluralsight.courses ADD name varchar;
ALTER TABLE pluralsight.courses DROP title;
```

Truncate

```
TRUNCATE pluralsight.courses;
```

Drop

```
DROP TABLE pluralsight.courses;
```

Table Properties

```
CREATE TABLE pluralsight.courses (id varchar PRIMARY KEY)
WITH comment='A table of courses';
```

- comment
- caching (keys, rows_per_partition)
- read_repair_chance
- dclocal_read_repair_chance
- default_time_to_live
- gc_grace_seconds
- bloom_filter_fp_chance
- compaction
- compression
- min/max_index_interval
- memtable_flush_period_in_ms
- populate_io_cache_on_flush
- speculative_retry

Basic Data Types in Cassandra

Numeric

`bigint, decimal, double, float, int, varint`

String

`ascii, text, varchar`

Date

`timestamp, timeuuid`

Other

`boolean, uuid, inet, blob`

Naming Your Keyspaces, Tables and Columns

- No hyphens: 2015-stats ✗
- No spaces: 2015 stats ✗
- Double quotes required for initial digits: “2015stats”
- Mixed case is lowercased unless surrounded in double quotes: “firstName”

DON’T GET CREATIVE

Primary Keys and Composite Partition Keys

```
CREATE TABLE pluralsight.courses (
  id varchar PRIMARY KEY,
  title varchar,
  author varchar
);
```

ONE ROW PER PARTITION

(for now…)

```
CREATE TABLE pluralsight.courses (
  id varchar,
  title varchar,
  author varchar,
  PRIMARY KEY ((id, author))
);
```

Selecting Data

```
SELECT id, title FROM pluralsight.courses;

SELECT title, duration AS length FROM pluralsight.courses
WHERE id = 'cassandra-developers';

SELECT title, published FROM pluralsight.courses
WHERE id IN ('cassandra-developers','node-intro');

SELECT * FROM pluralsight.courses LIMIT 100;
```

Inserting and Updating Data

Insert

```
INSERT INTO pluralsight.courses (id, author)
VALUES ('cassandra-developers','paul-ofallon');
```

UPSERT!

Update

```
UPDATE pluralsight.courses SET author = 'paul-ofallon'
WHERE id = 'cassandra-developers';
```

```
UPDATE pluralsight.courses SET author = 'paul-ofallon'
WHERE id in ('cassandra-developers','node-intro');
```

When Was the Data Written?

```
SELECT id, WRITETIME(author) FROM pluralsight.courses;
```

Unix time (e.g. 1430825689)

Deleting Data

Deleting a row

```
DELETE FROM pluralsight.courses WHERE id = 'node-intro';
```

Deleting a column

```
DELETE author FROM pluralsight.courses
WHERE id = 'node-intro';
```

```
UPDATE pluralsight.courses SET author = null
WHERE id = 'node-intro';
```

```
INSERT INTO pluralsight.courses (id, author)
VALUES ('node-intro', null);
```

Expiring Data with TTLs

Set the TTL for a single column value

```
UPDATE pluralsight.users USING TTL 32400
SET reset_token = '1GRhEs1' WHERE id = 'john-doe';
```

Retrieve the TTL for a column value

```
SELECT TTL(reset_token) FROM pluralsight.users
WHERE id='john-doe';
```

Expiring Data with TTLs

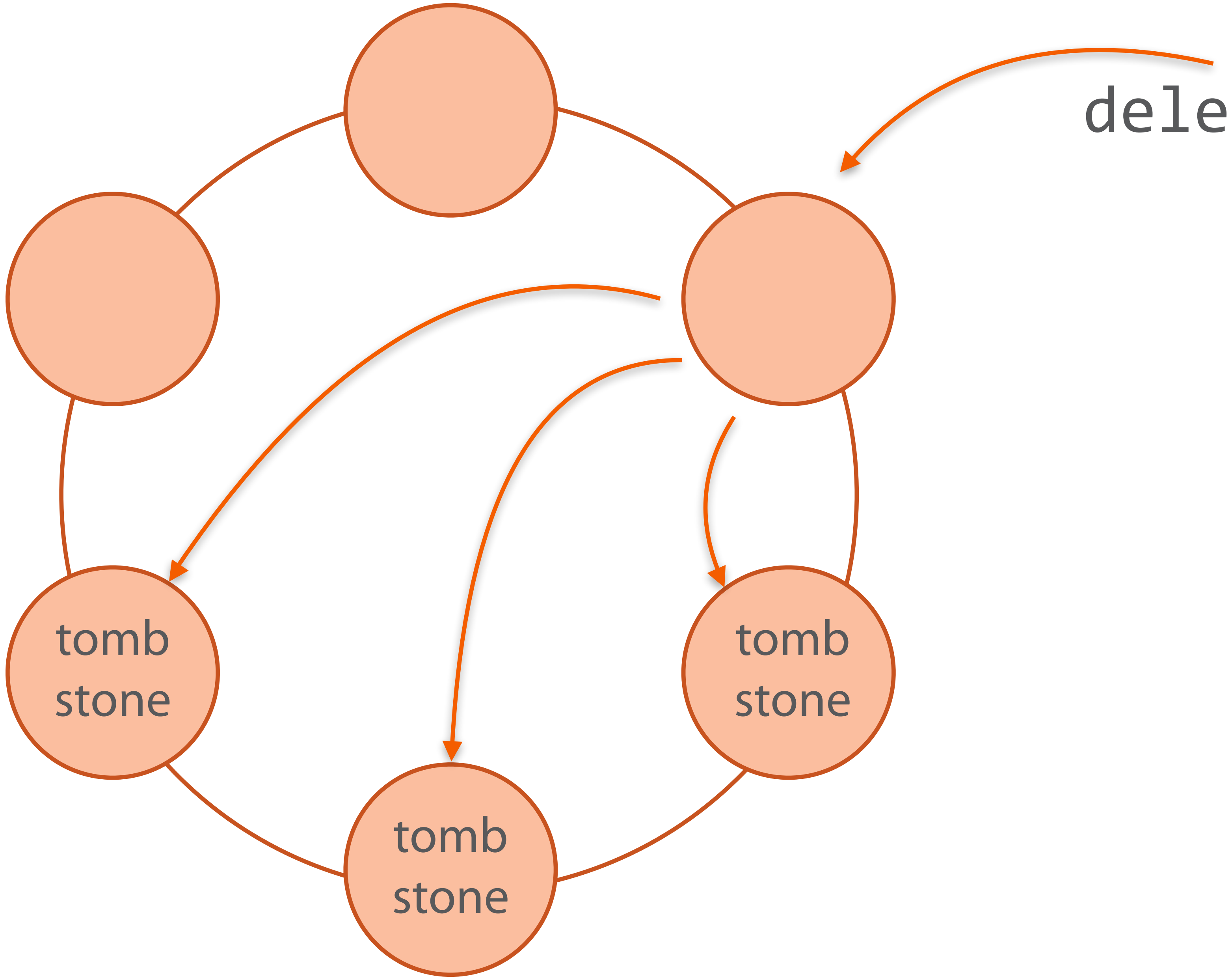
Set the TTL for an entire row

```
INSERT INTO pluralsight.reset_tokens (id, token)
VALUES ('john-doe','1GRhEs1') USING TTL 10800;
```

Set a table-wide, default TTL

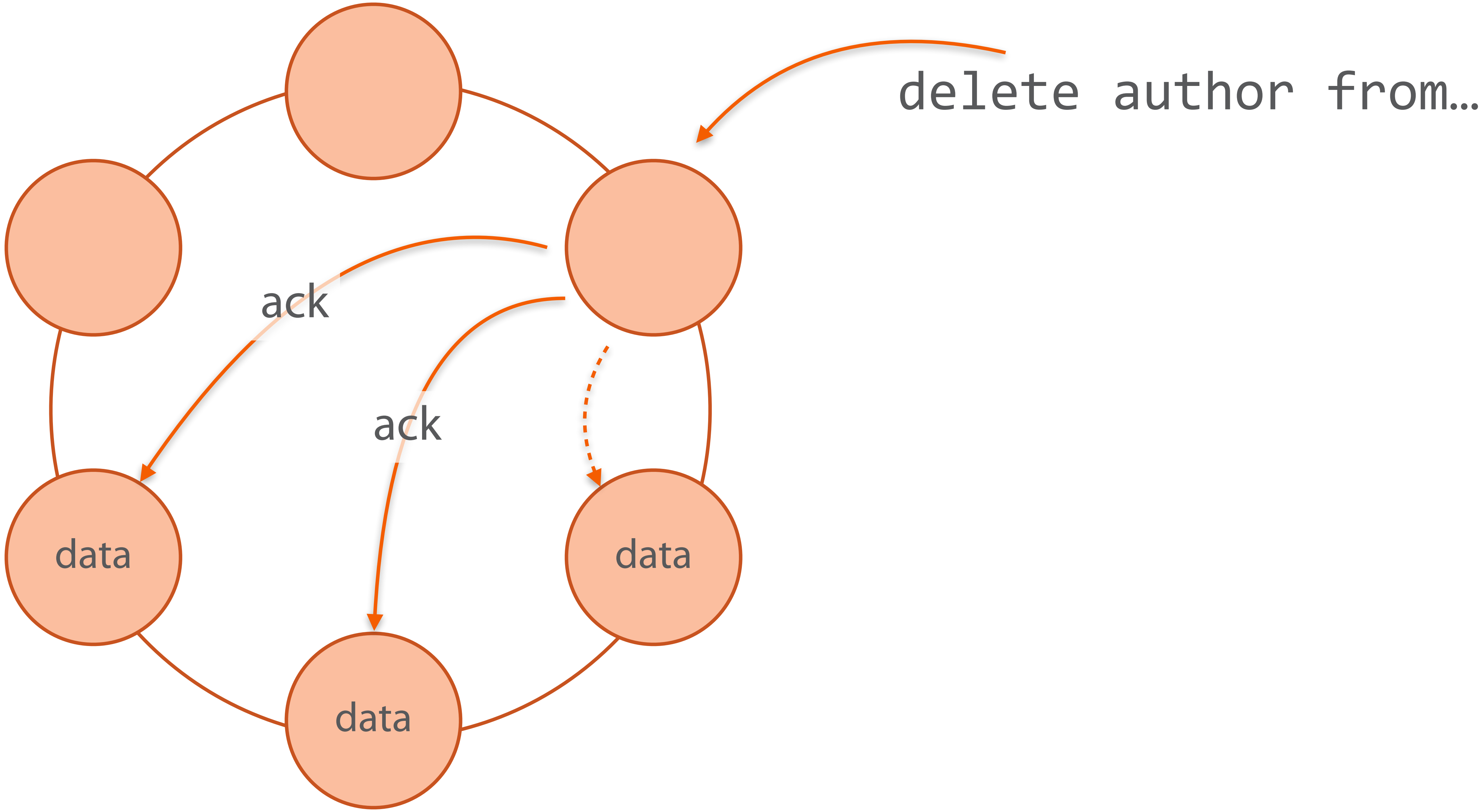
```
CREATE TABLE reset_tokens (
  id varchar PRIMARY KEY,
  token varchar
) WITH default_time_to_live = 10800;
```

Tombstones

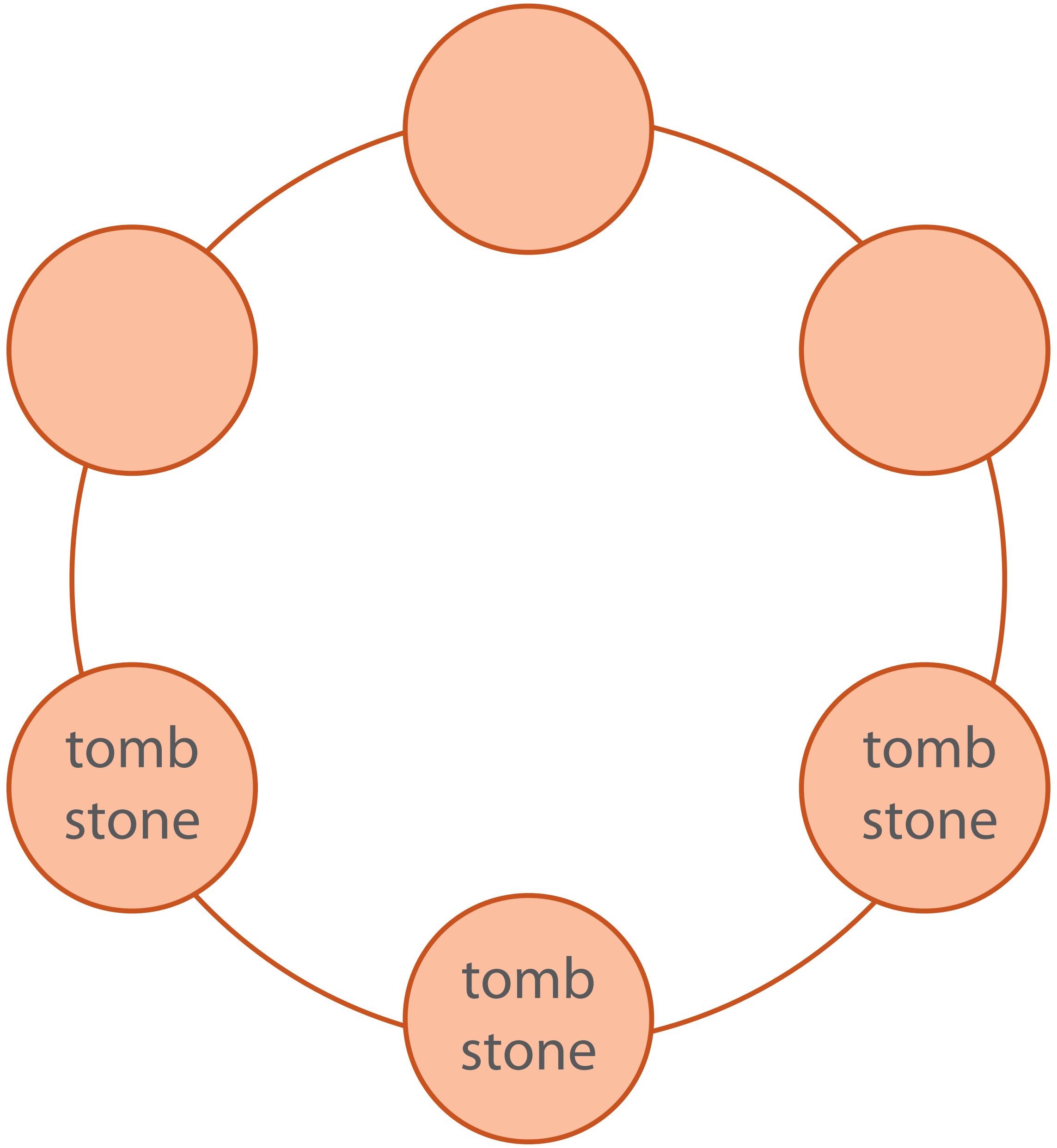


`delete author from…`

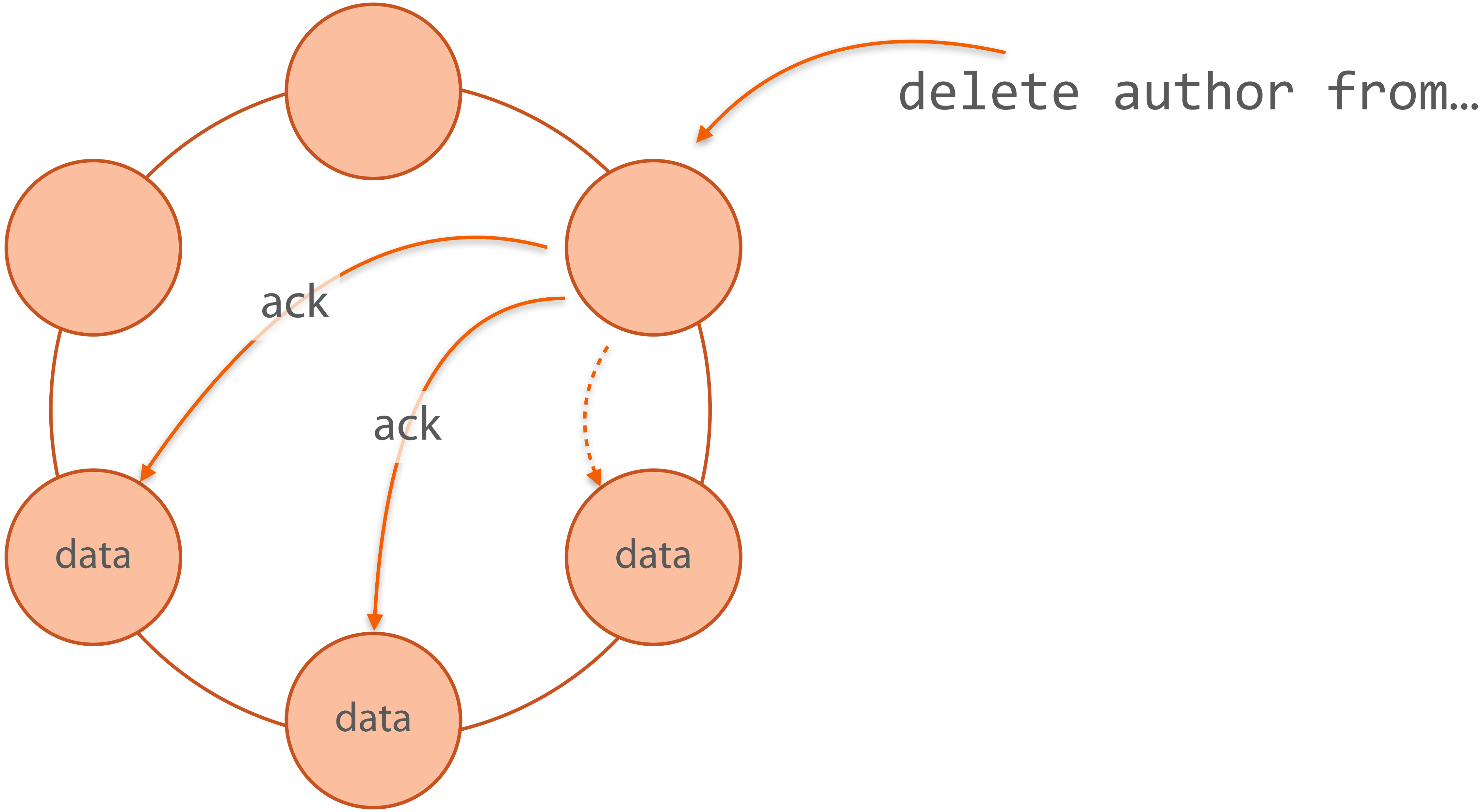
Tombstones



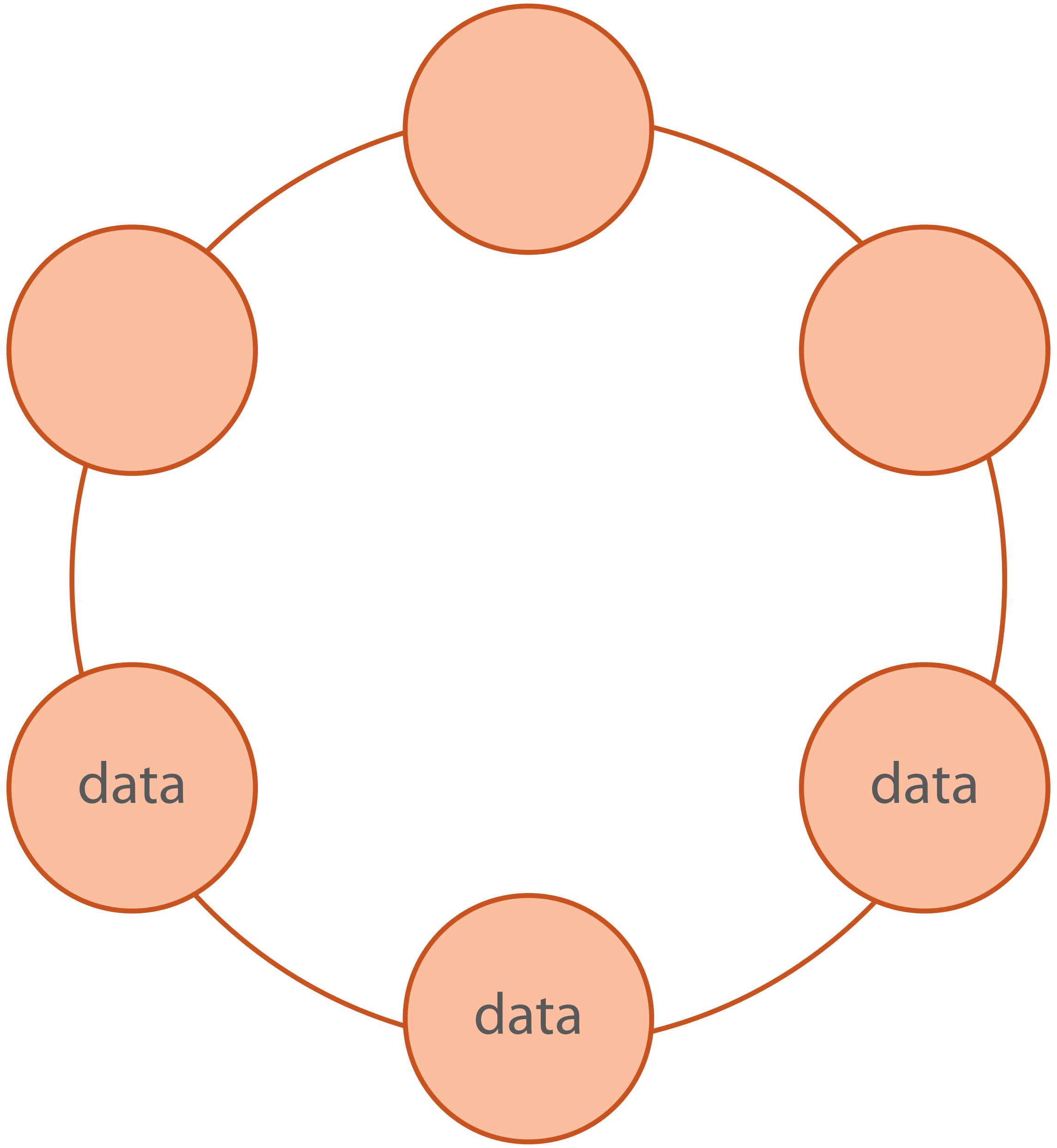
Tombstones



Tombstones



Tombstones



gc_grace_seconds

(default is 10 days)

Counters

Creating a table that includes a counter

```
CREATE TABLE pluralsight.ratings (
  course_id varchar PRIMARY KEY,
  ratings_count counter,
  ratings_total counter
);
```

Incrementing a counter

```
UPDATE pluralsight.ratings
SET ratings_count = ratings_count + 1,
    ratings_total = ratings_total + 4
WHERE course_id = 'node-intro';
```

Conclusion

- CQL as the primary method for interacting with Cassandra
- Creating keyspaces and tables
- Basic data types
- Select, Insert, Update and Delete commands
- TTLs and Tombstones
- Counters