

Primary terms and sequence numbers

Primary terms

- A way to distinguish between old and new primary shards
- Essentially a counter for how many times the primary shard has changed
- The primary term is appended to write operations

Sequence numbers

- Appended to write operations together with the primary term
- Essentially a counter that is incremented for each write operation
- The primary shard increases the sequence number
- Enables Elasticsearch to order write operations

Recovering when a primary shard fails

- Primary terms and sequence numbers are key when Elasticsearch needs to recover from a primary shard failure
 - Enables Elasticsearch to more efficiently figure out which write operations need to be applied
- For large indices, this process is really expensive
 - To speed things up, Elasticsearch uses *checkpoints*

Global and local checkpoints

- Essentially sequence numbers
- Each replication group has a *global* checkpoint
- Each replica shard has a *local* checkpoint
- Global checkpoints
 - The sequence number that all active shards within a replication group have been aligned *at least up to*
- Local checkpoints
 - The sequence number for the last write operation that was performed

Lecture summary

- Write operations are sent to primary shards
- The primary shard forwards the operation to its replica shards
- Primary terms and sequence numbers are used to recover from failures
- Global and local checkpoints help speed up the recovery process
- Primary terms and sequence numbers are available within responses