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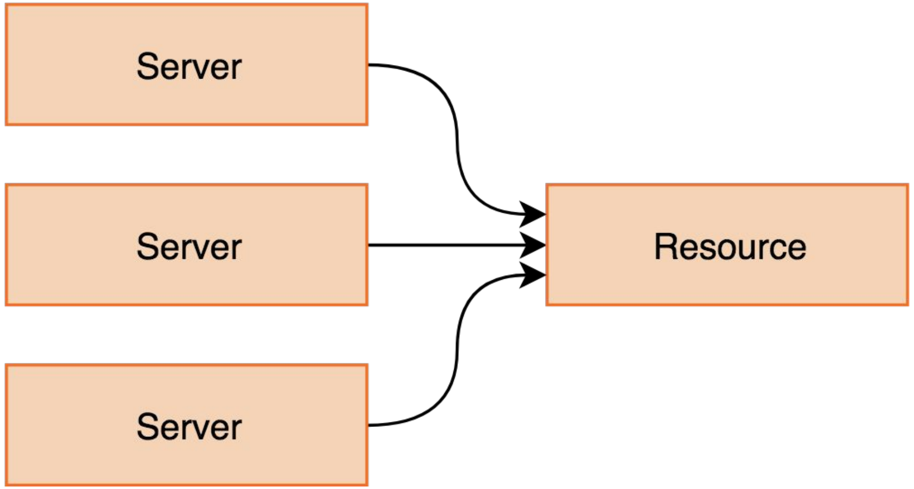
Raft Consensus Algorithm and Kubernetes

MAGNUS BOYE

27-02-2019

Distributed consensus

High availability



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Raft in short

- Strong leader
- Strong consistency
- Designed for ease of understanding and implementation

Raft concepts

Leader election

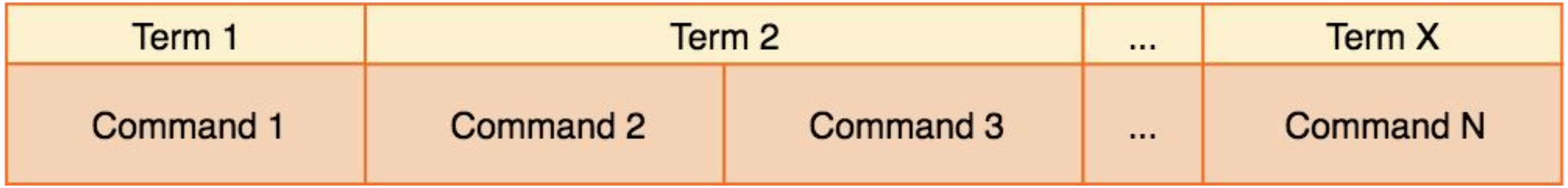
Log replication

Log compaction

Membership changes

Leader election

Raft log



Term 1	Term 2		...	Term X
Command 1	Command 2	Command 3	...	Command N

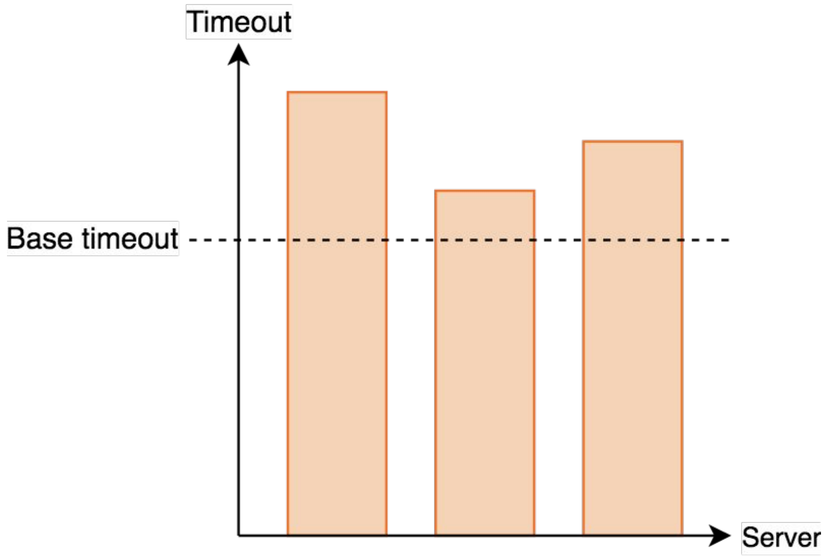
Server states

Leader

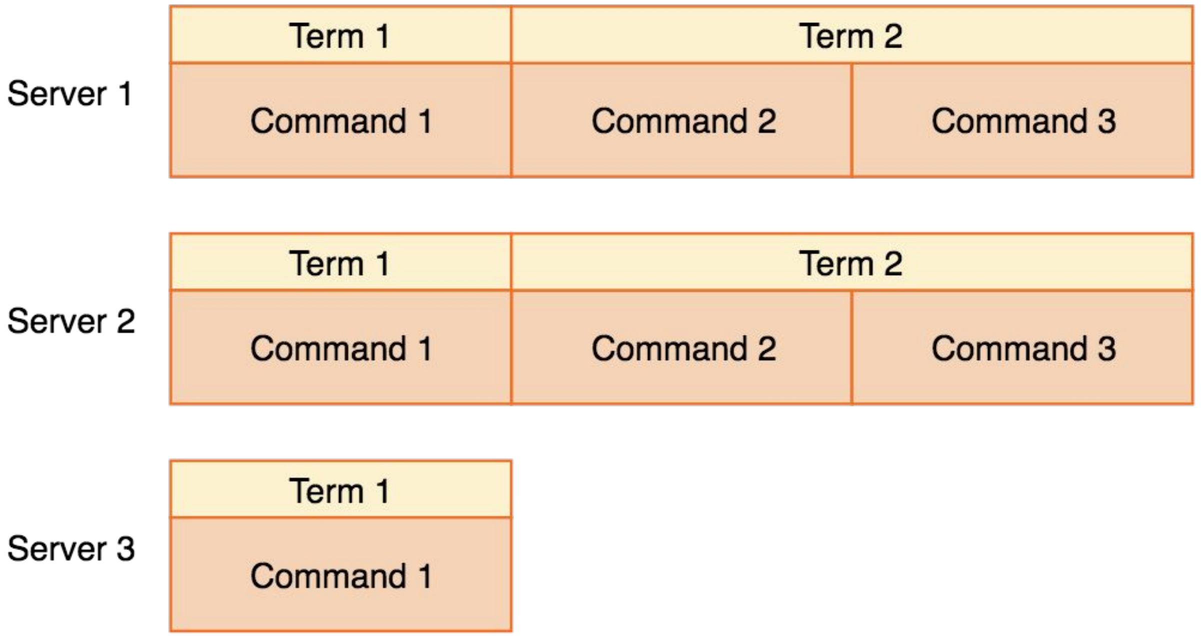
Follower

Candidate

Election timeout

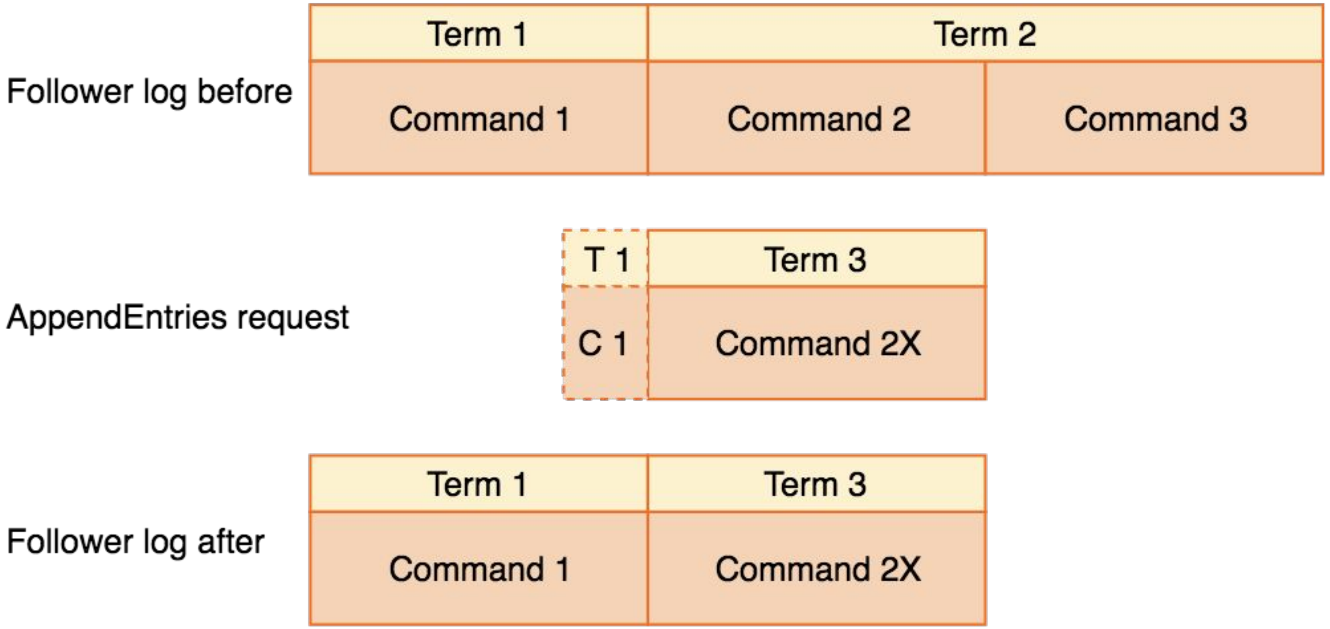


Voting criteria



Log replication

Appending log entries



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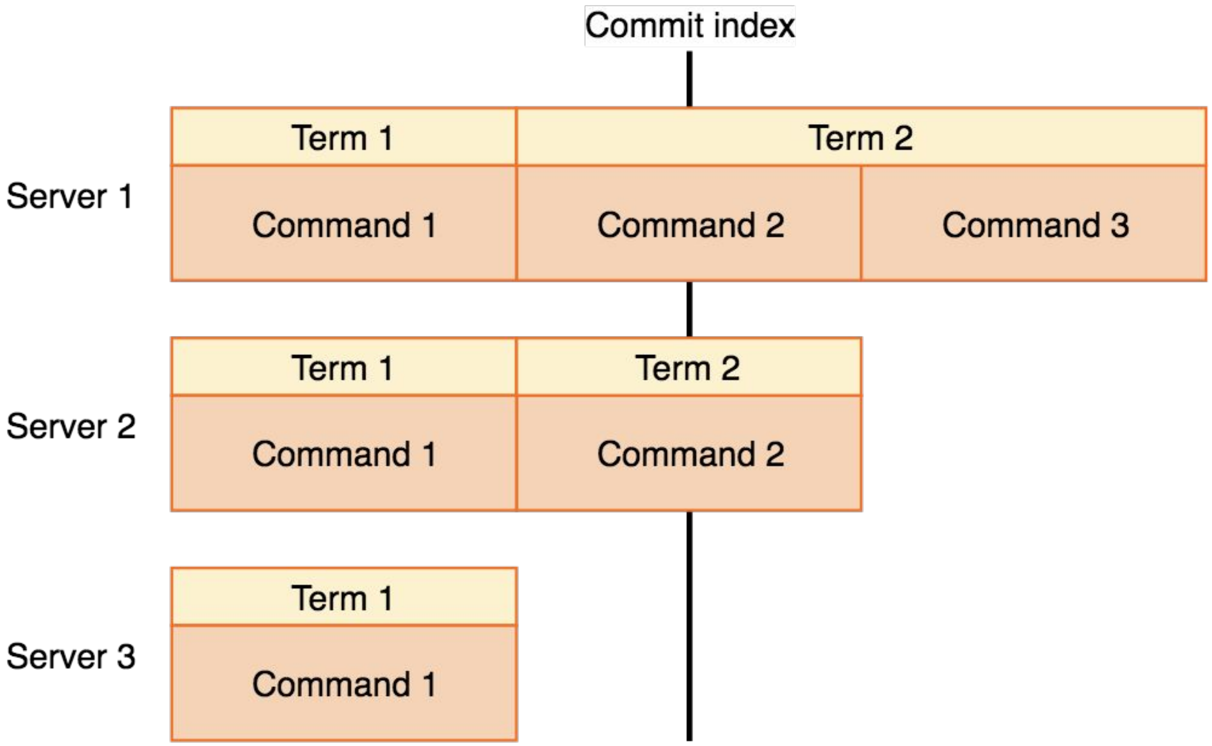
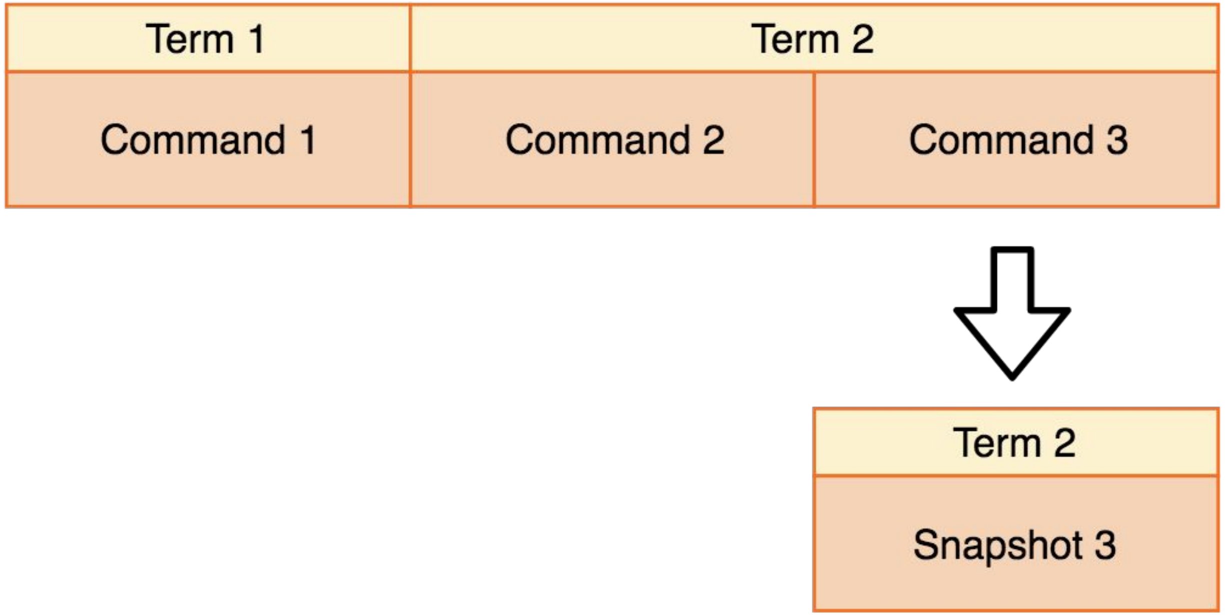
Committing log entries



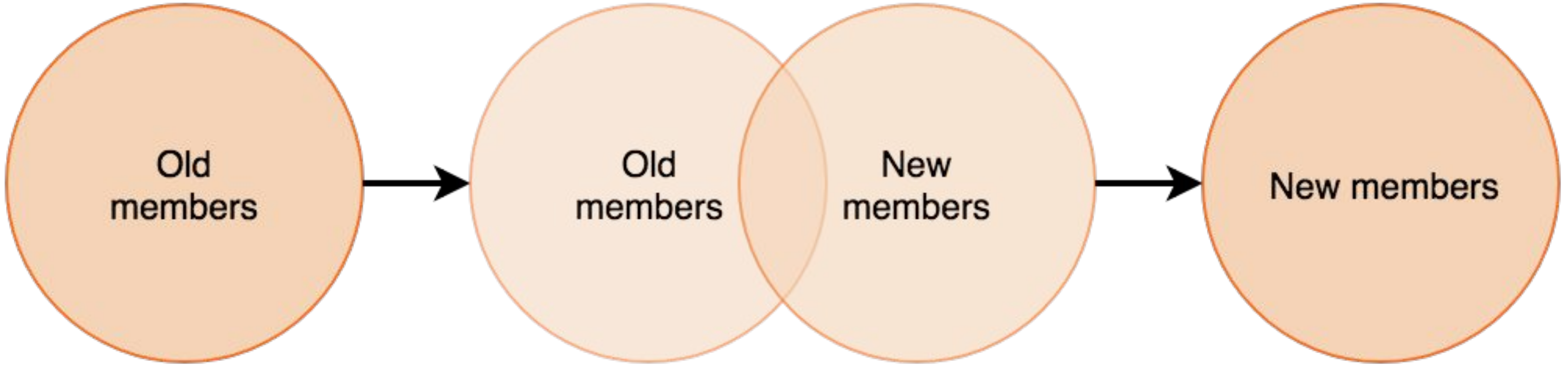
Log compaction

State machine snapshot



Membership changes

Joint consensus



Client access

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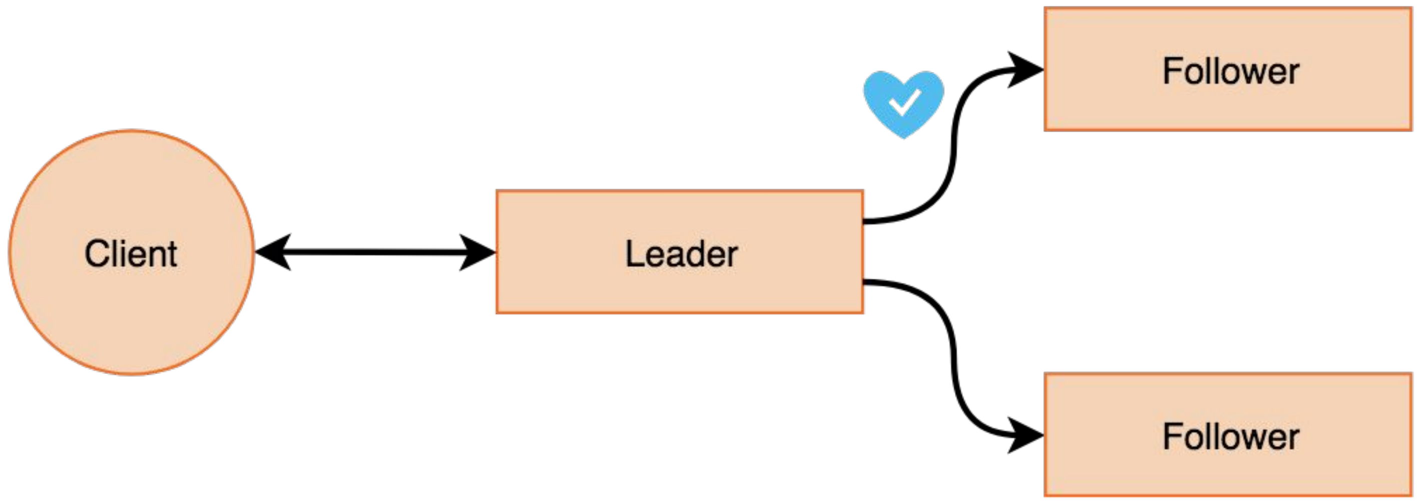
Strong reads



Etcd

Features

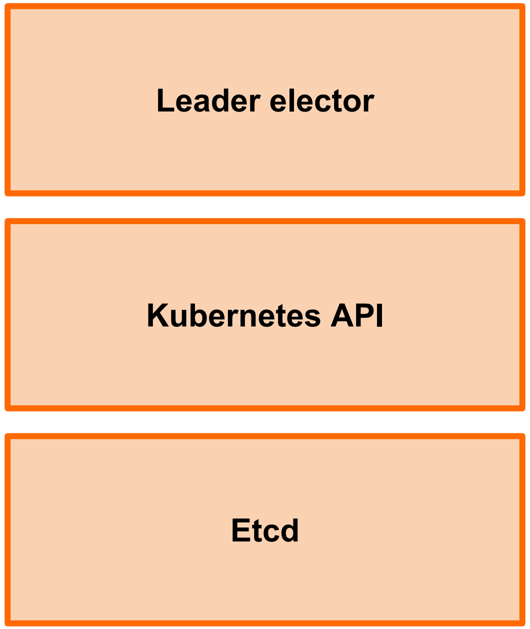
Key-value store

Transactions

Change notification

Leader Election for Applications in Kubernetes

Building on strong foundation



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Endpoint annotations

```
control-plane.alpha.kubernetes.io/leader: '{
  "holderIdentity": "mboye-leader-election-demo-54df6685cf-n5bm4",
  "leaseDurationSeconds": 10,
  "acquireTime": "2019-02-26T15:43:53Z",
  "renewTime": "2019-02-26T15:57:11Z",
  "leaderTransitions": 0
}'
```

Demo

Questions

Thanks for listening

- Raft: https://raft.github.io
- Etcd: https://github.com/etcd-io/etcd
- Demo application: https://github.com/mboye/raft-talk
- Leader election for applications in Kubernetes