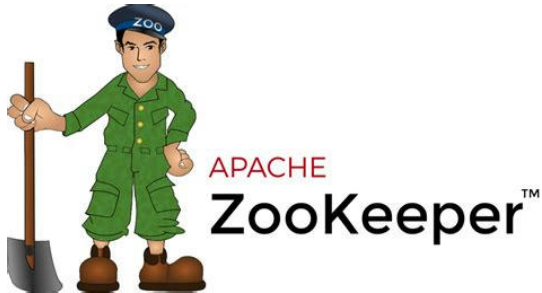# Migrating Key-Value Data Stores to the Edge

Andrew Jeffery, Heidi Howard, and Richard Mortier

13th July 2023

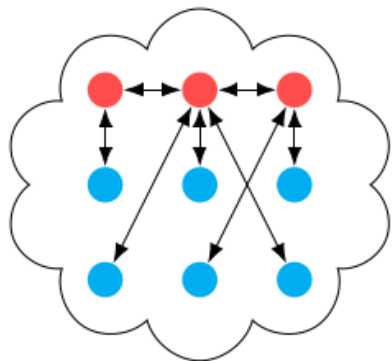# Orchestration platforms and their Key-Value stores
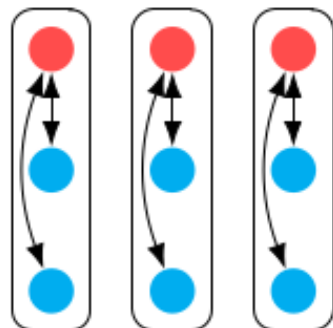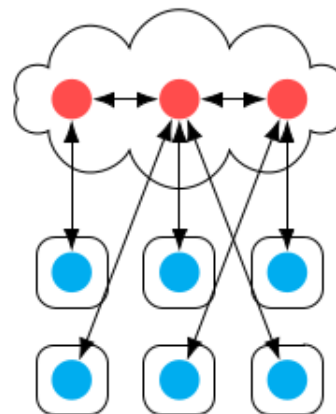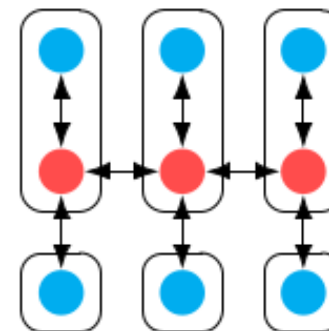
Motivation

K8s
The cloud

K3s
Single-site
Isolated

KubeEdge
Cloud-centric
Blast radius

K8s
The edge

Control plane + *etcd*

Worker

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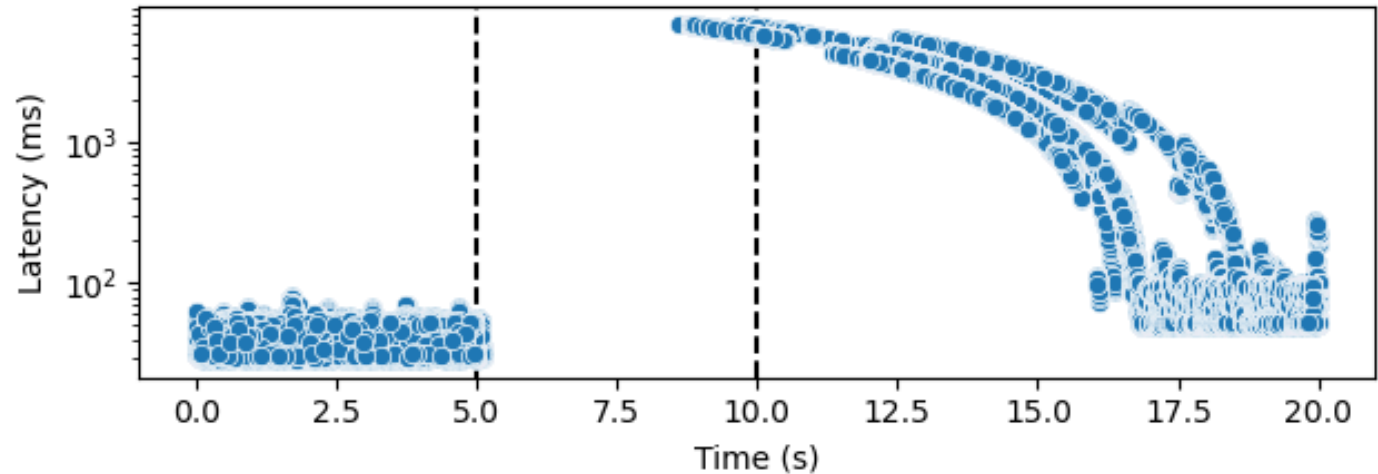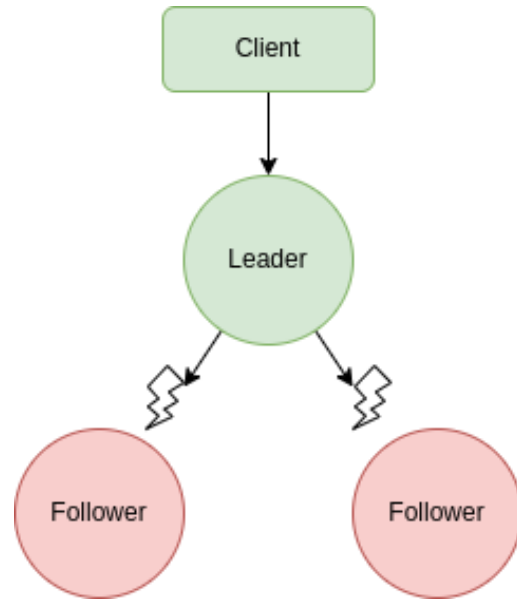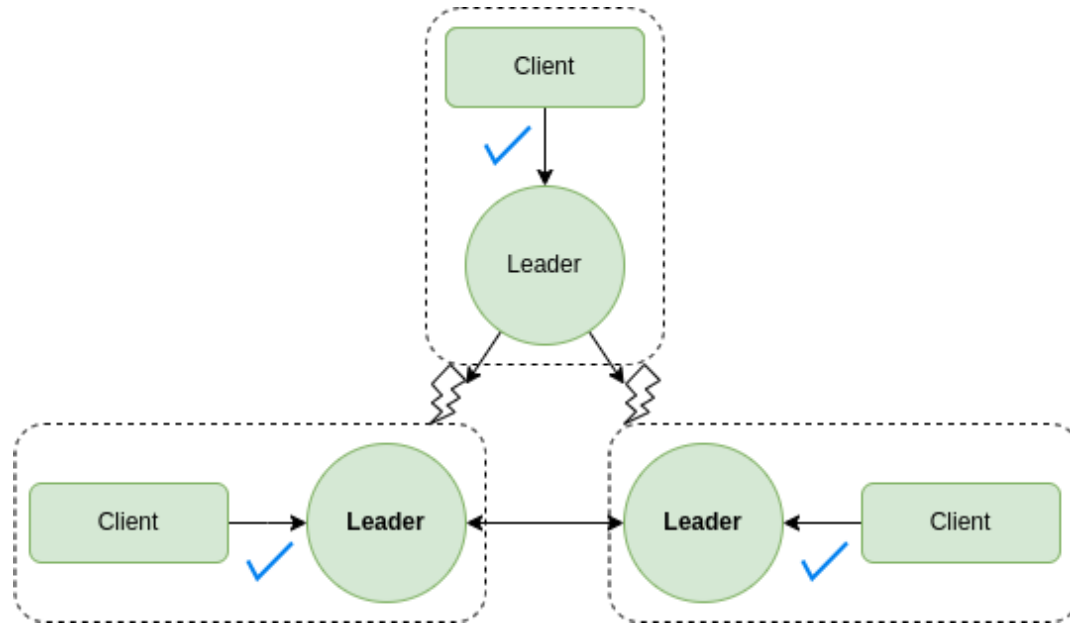
etcd is the problem

3 nodes, leader partitioned between t=5 and t=10,
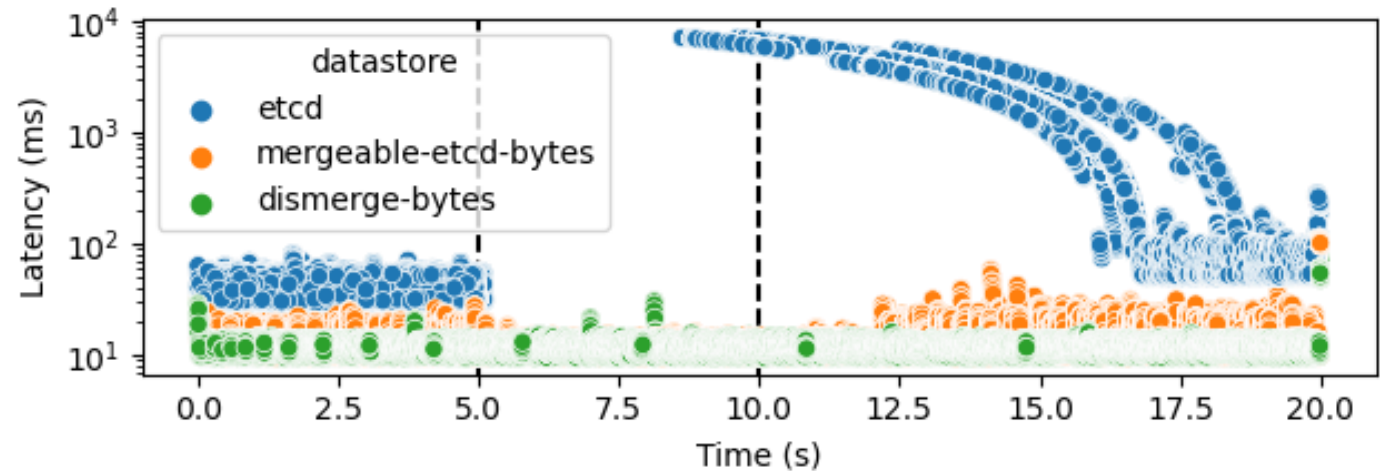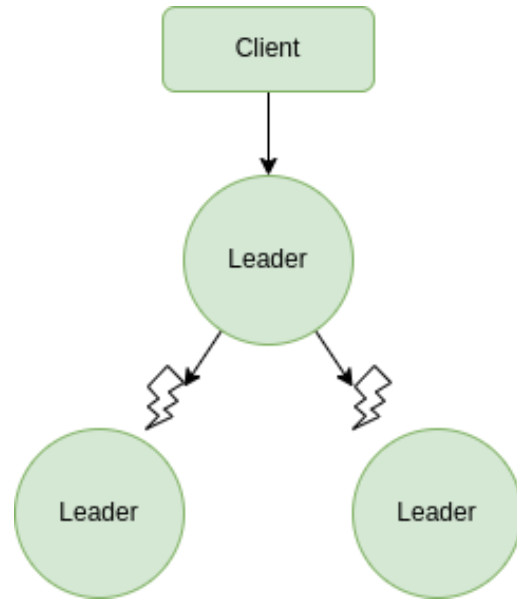10ms link delay, successful requests, 10,000 rps

Avoiding coordination with *dismerge*

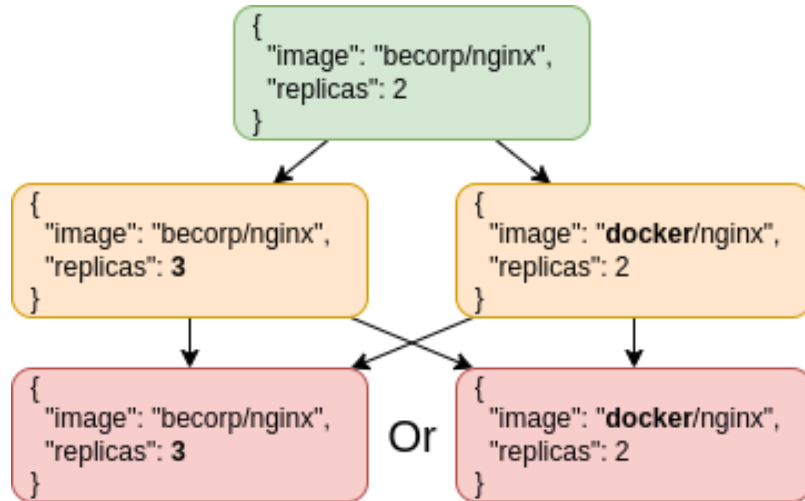Bringing datastore nodes closer to clients with *dismerge*

- All nodes are leaders
- Leaders are now local
- Replication is lazy
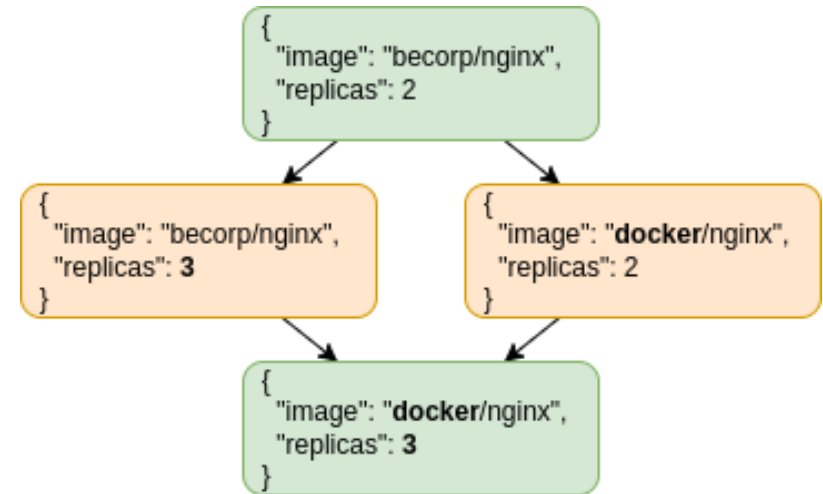
dismerge is a solution

3 nodes, leader partitioned between t=5 and t=10,
10ms link delay, successful requests, 10,000 rps
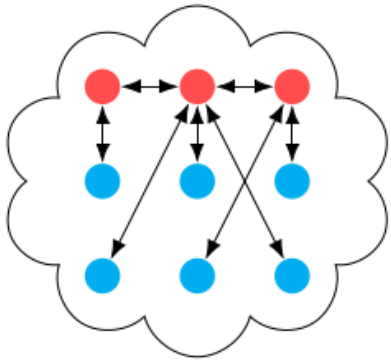
Handling conflicts with custom datatypes

Coarse grained
Using raw values

Fine grained
Introspecting values
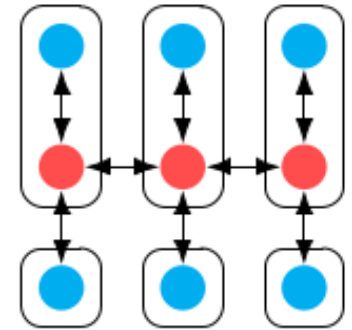
Linking back to orchestrators

etcd -> dismerge

- Local operation
- Availability
- Resiliency

Some modifications
needed to orchestrators
e.g. StatefulSets

K8s
The cloud

K8s
The edge

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Conclusion

Orchestration platforms are being *pushed* to, not *designed* for the edge

dismerge places new edge-focused orchestration platforms on strong foundations, providing local operation, availability and resiliency.

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