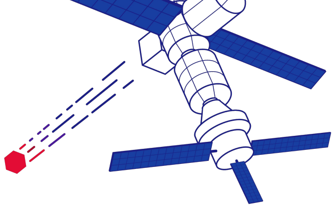
TiDB TechDay 2019

The Evolution of TiKV

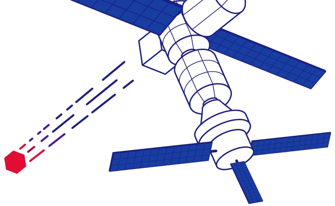
How can we achieve huge performance improvements?

Agenda



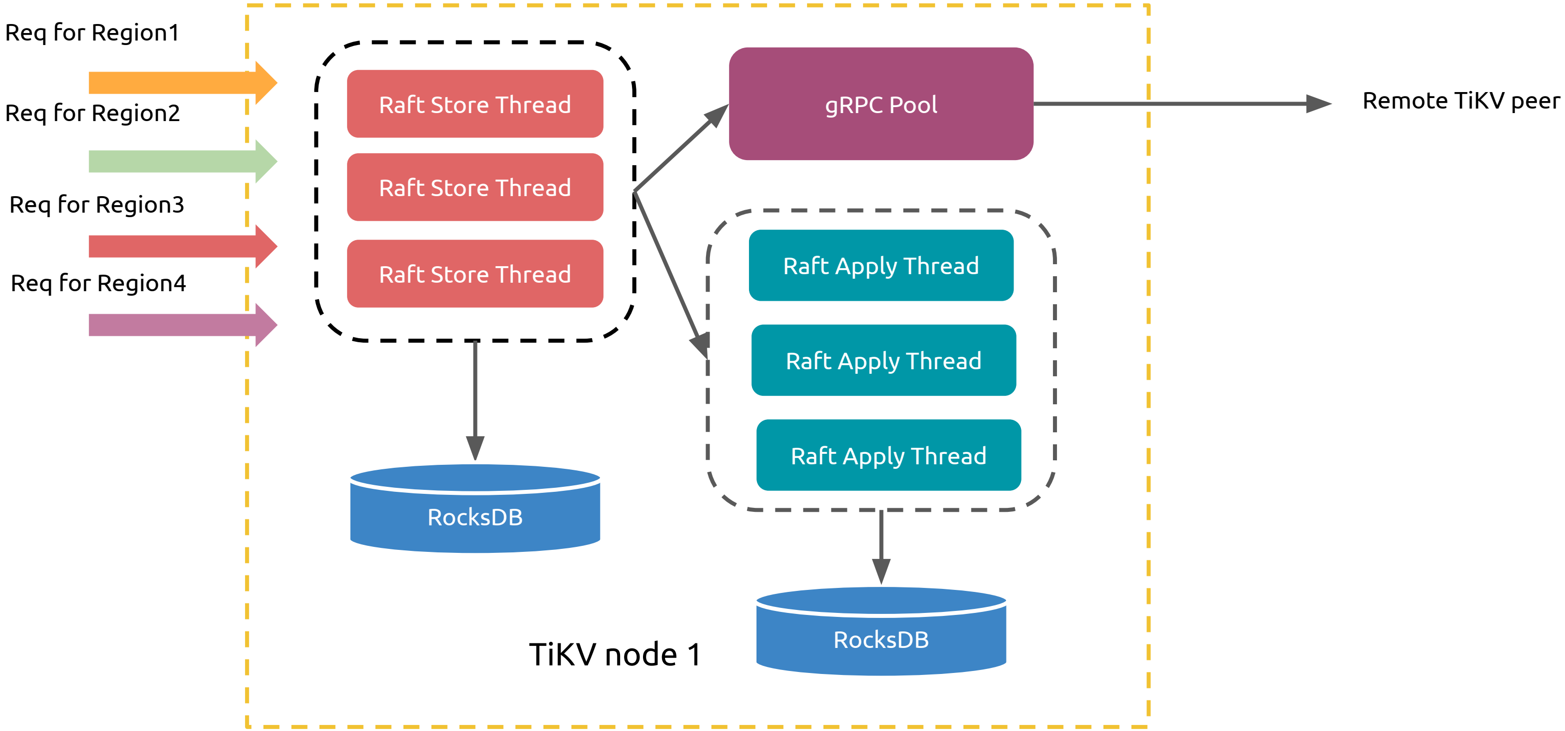
1. **Achievement**
2. Future Plan
3. Community

Performance Problems

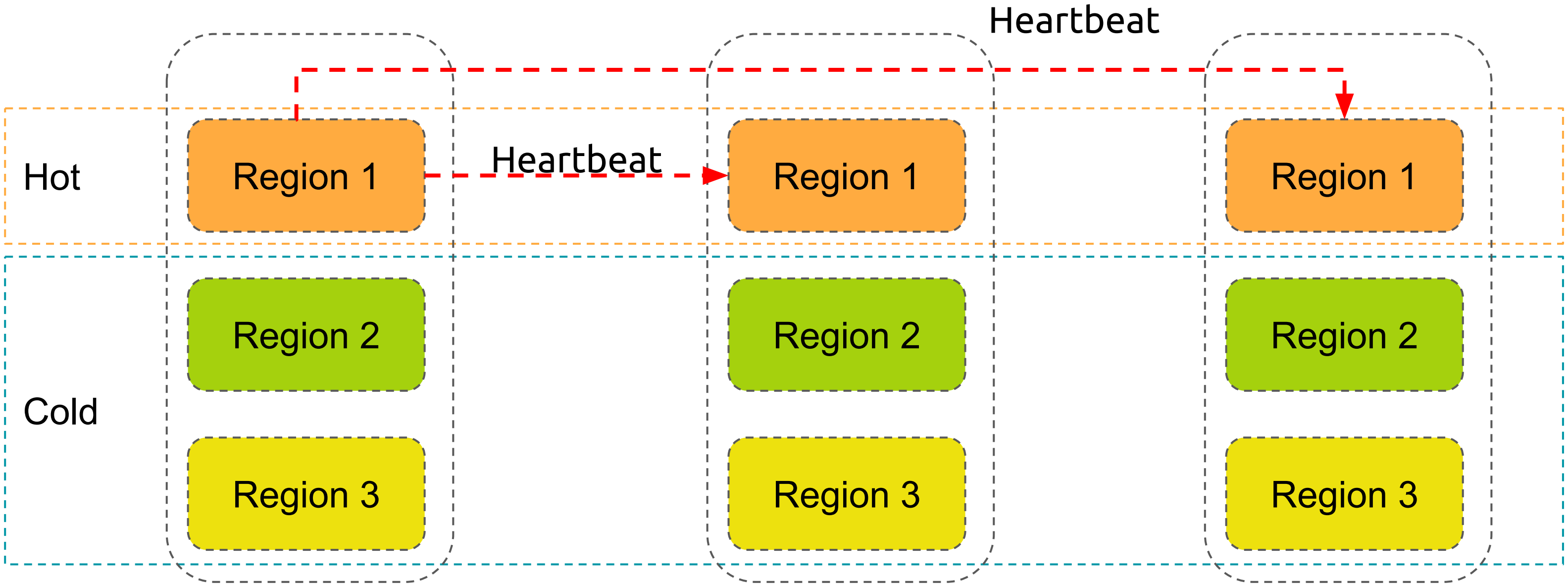


1. Single thread
2. RocksDB write amplification
3. Too many Region heartbeats
4. GC lagging
5. Big query
6. Rough scheduling
7. gRPC
8. Em…

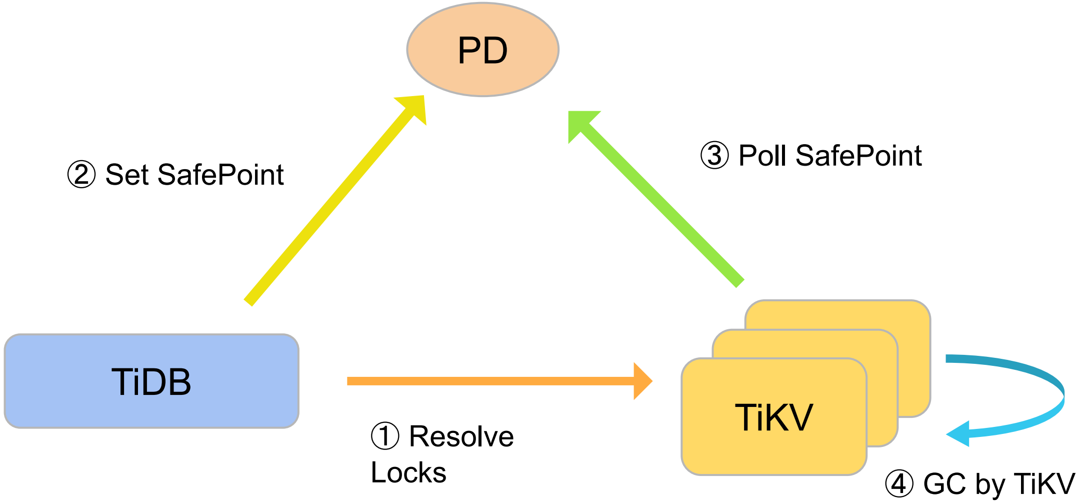
Threaded Raft



Hibernate Region

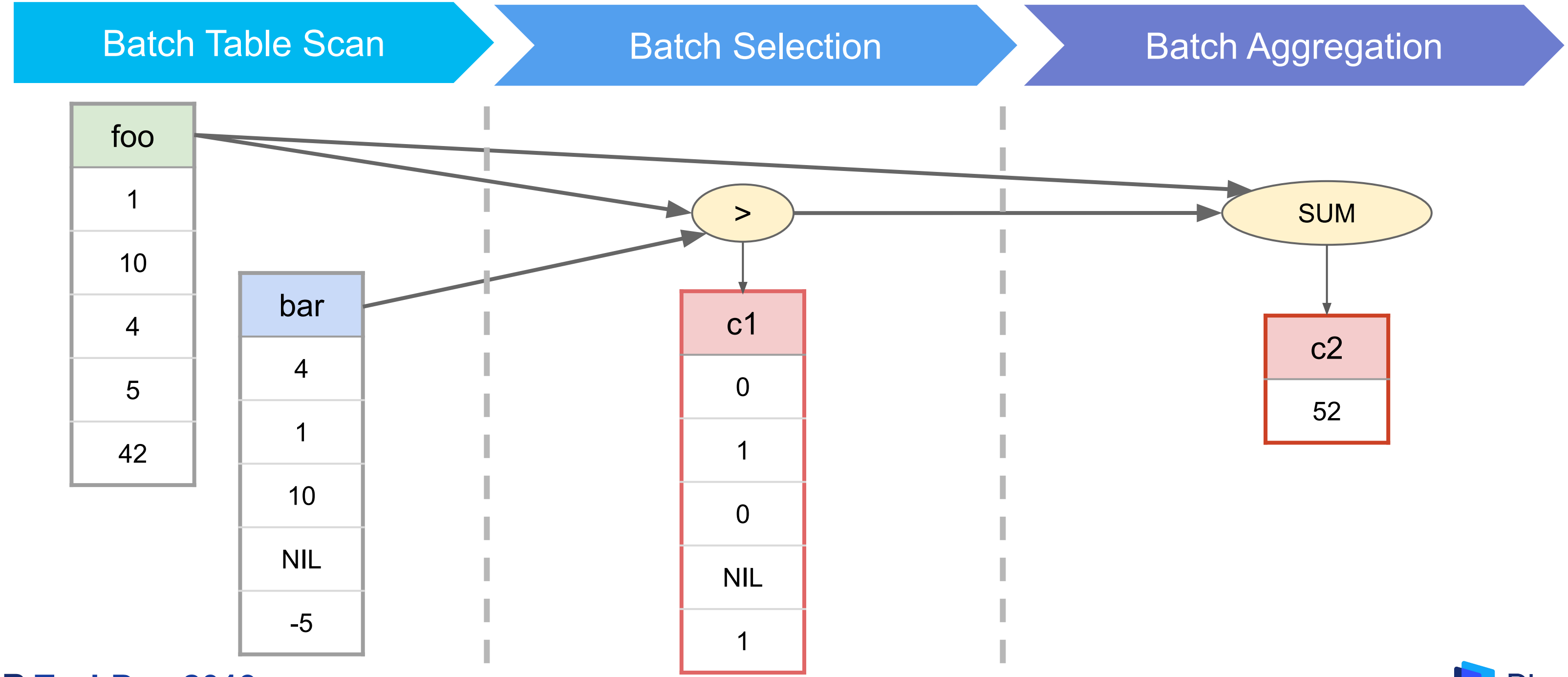


Distributed GC

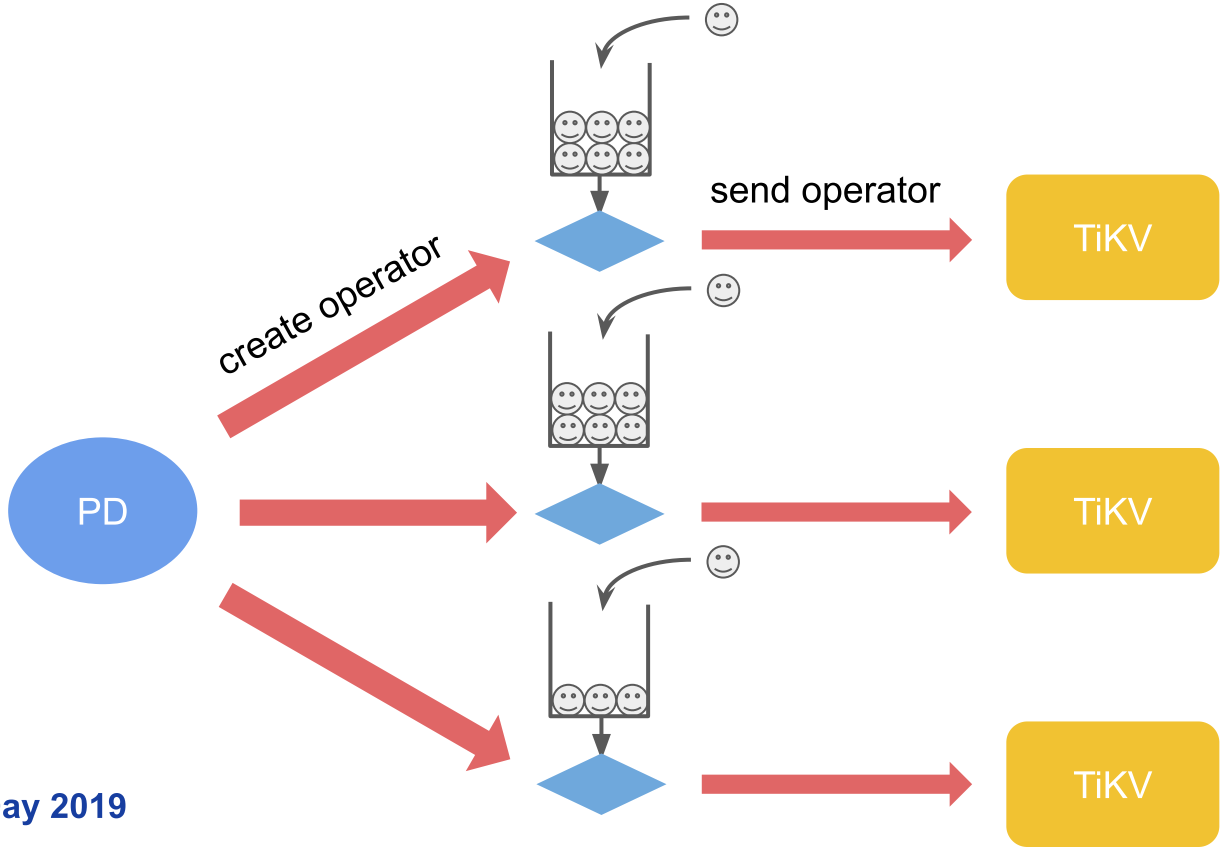


Coprocessor Vectorization

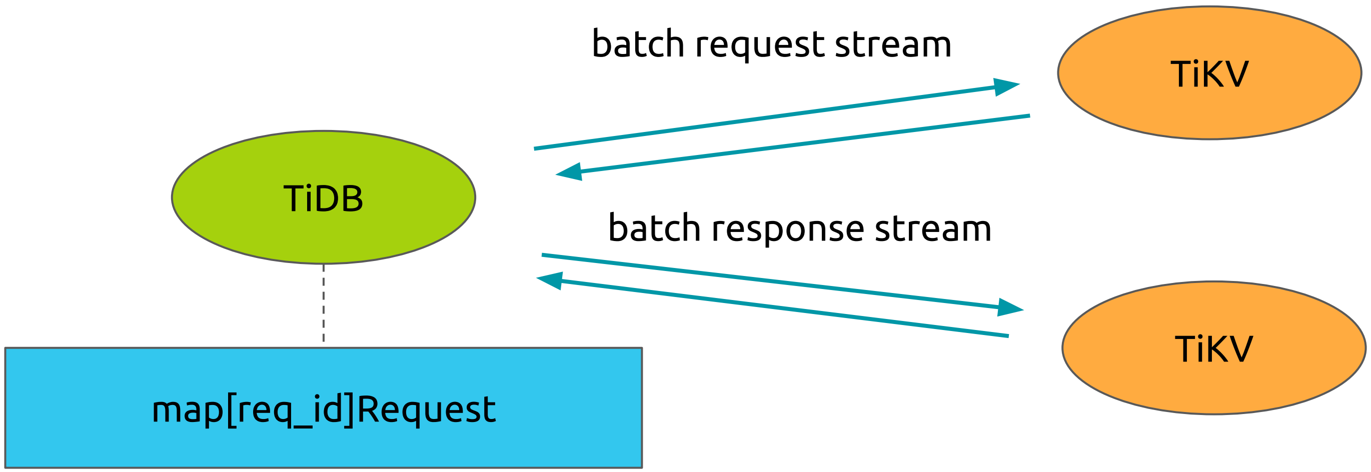
```
SELECT SUM(foo) FROM Table WHERE foo>bar
```



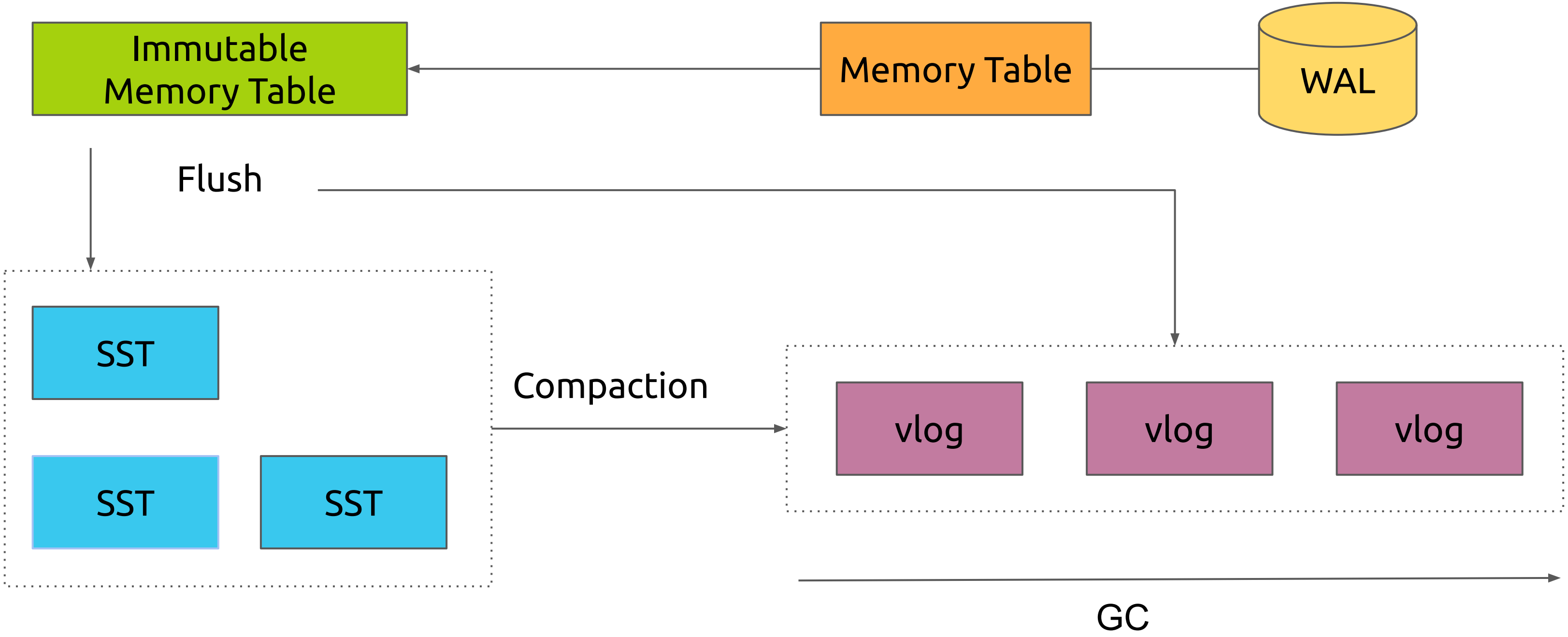
Store Limit Scheduler

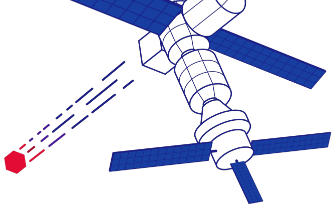


gRPC Batch messages

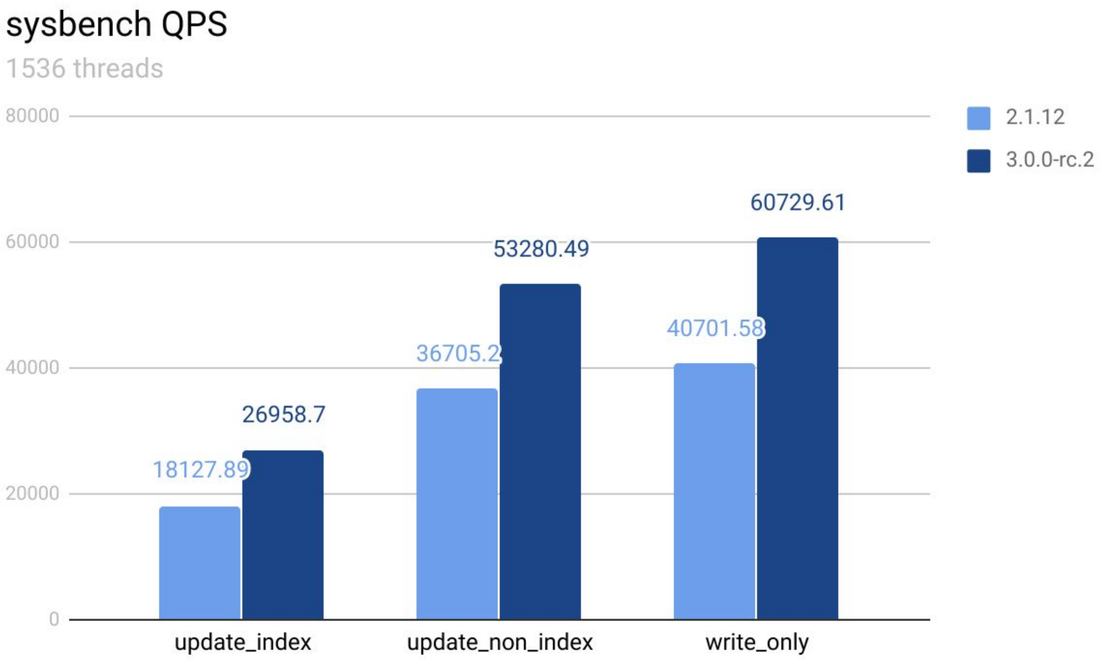


Titan

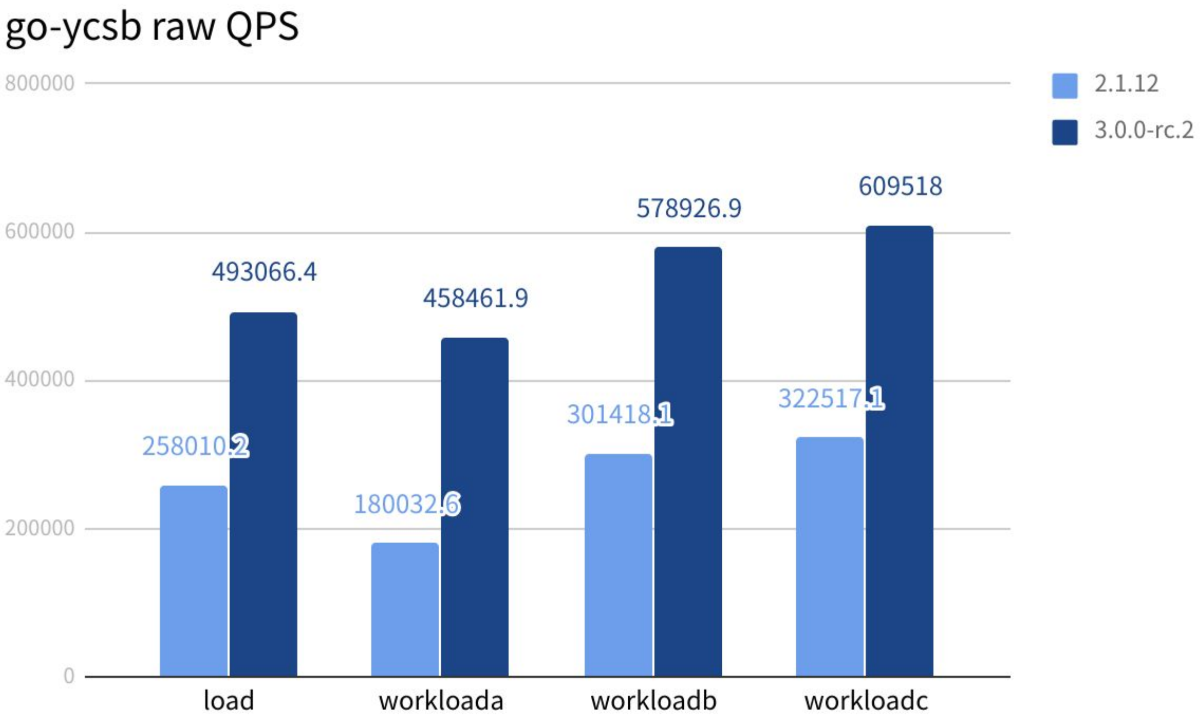

Immutable Memory Table
Memory Table
WAL
Flush
SST
SST
SST
Compaction
vlog
vlog
vlog
GC



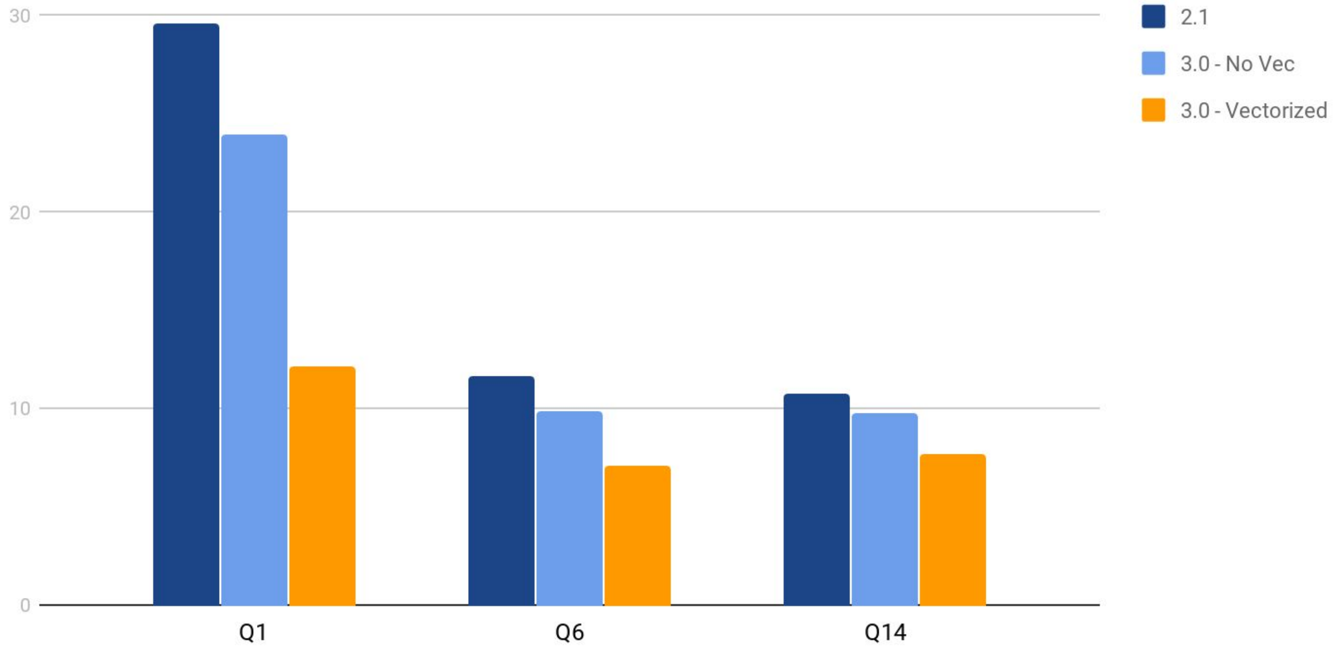
Improvements - Sysbench



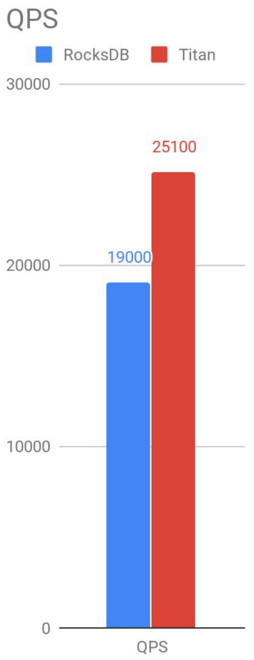
Improvements - YCSB

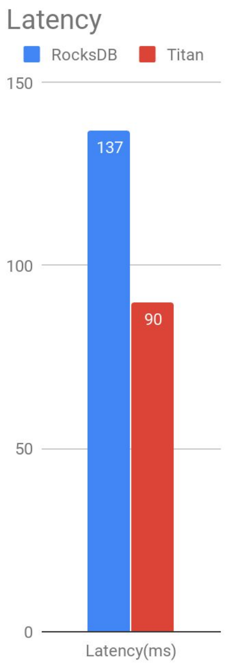


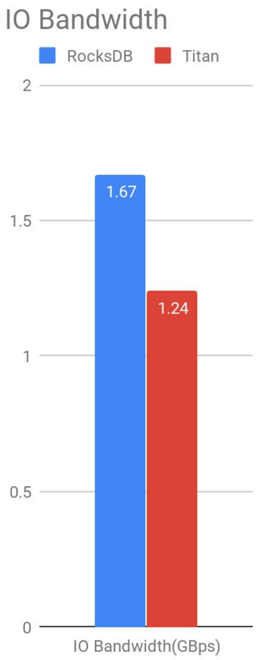
Improvements - TPC-H



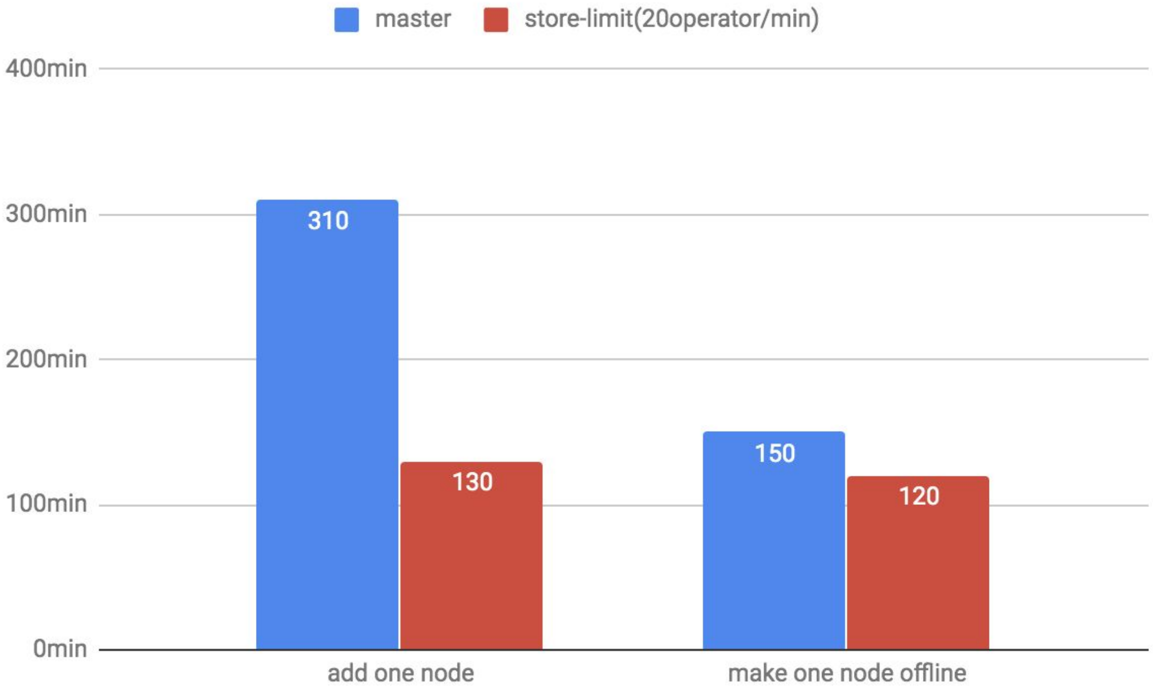
Improvements - Titan

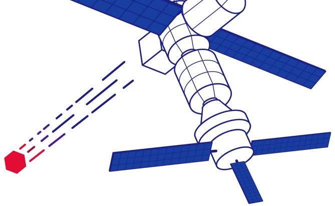

QPS


Latency


IO Bandwidth

Improvements - Scheduling





Agenda

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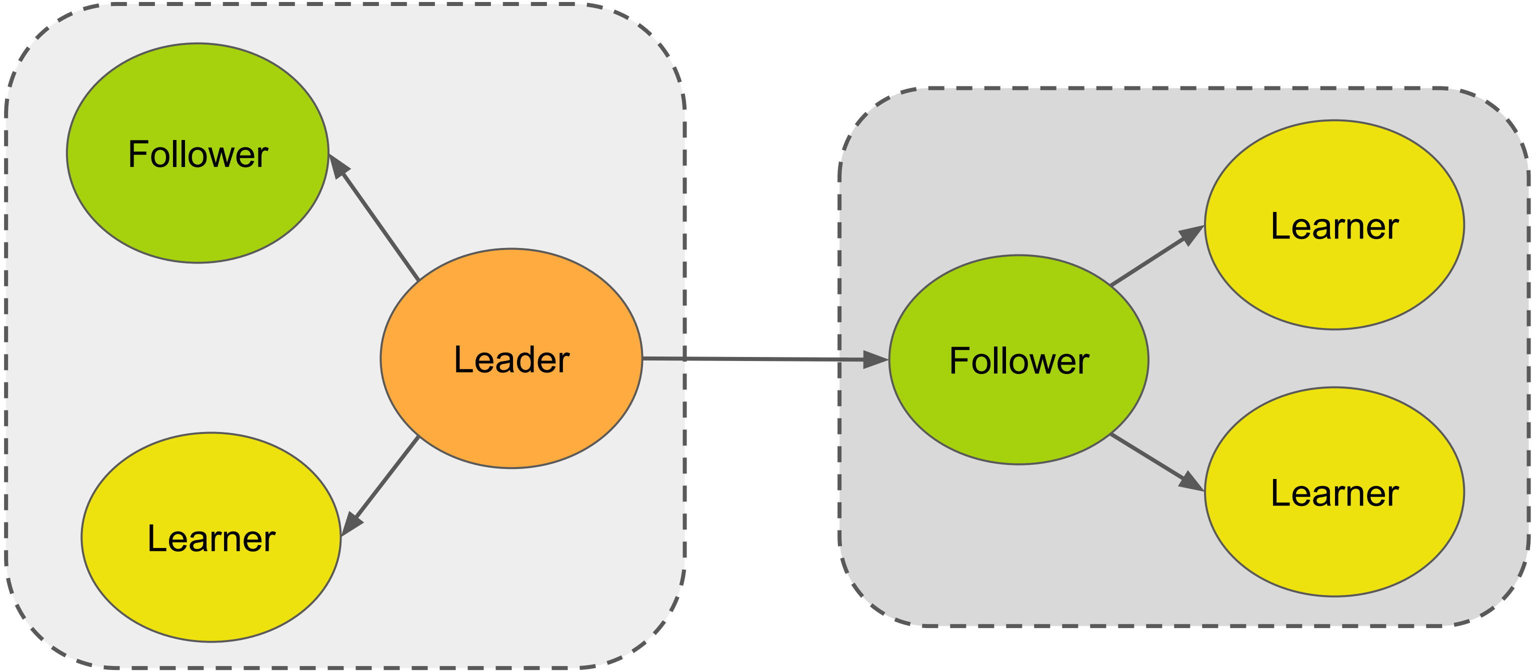
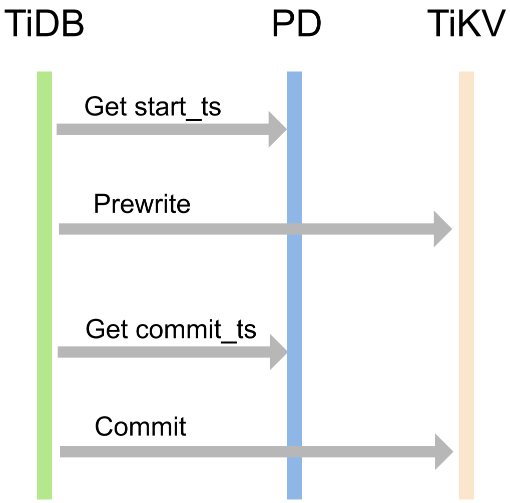
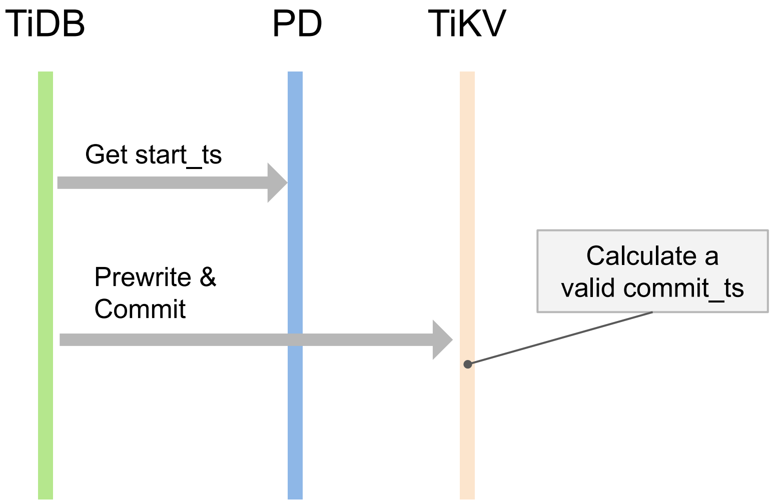
Raft - Chain Replication



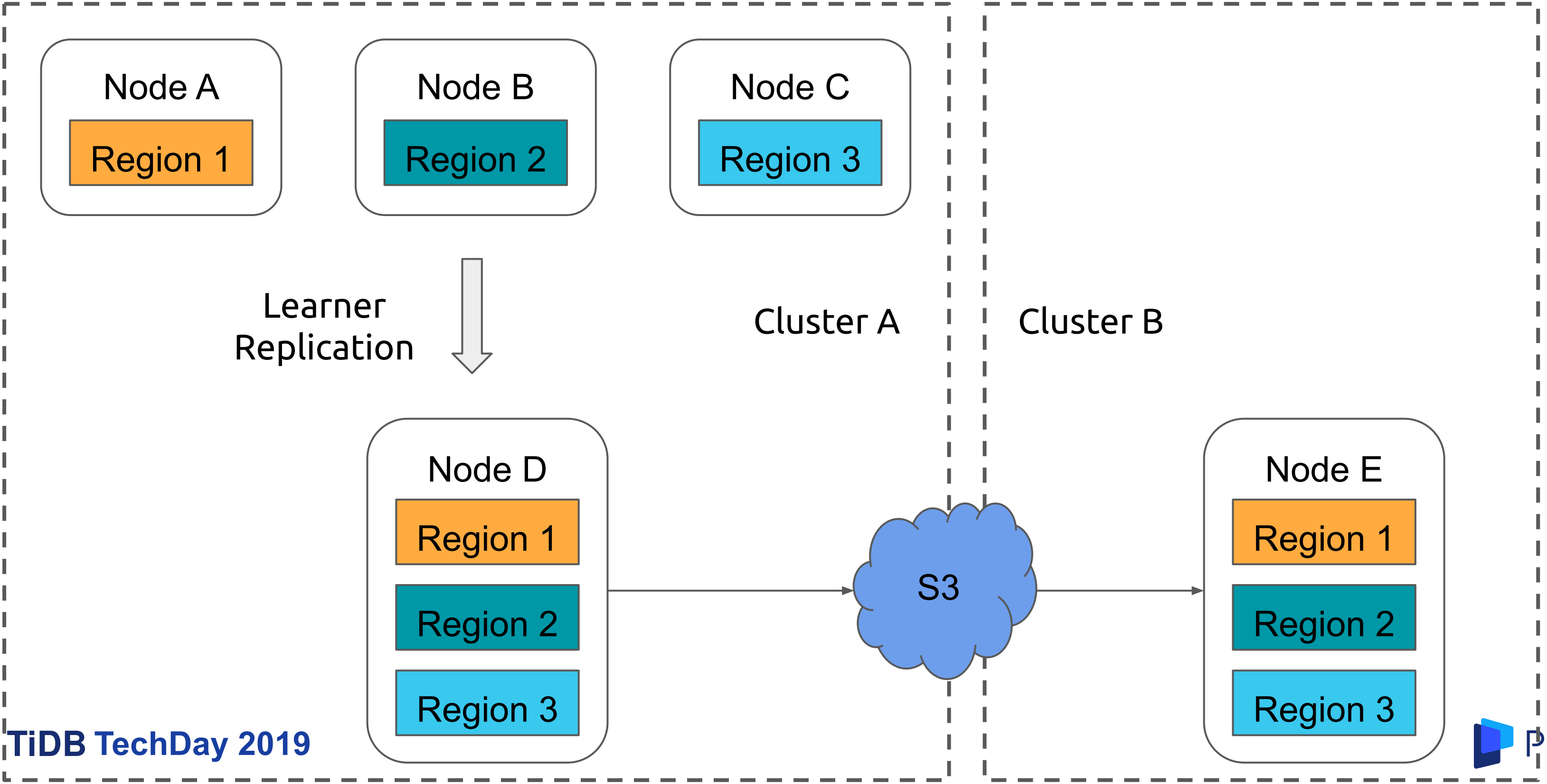
Transaction - 1 PC



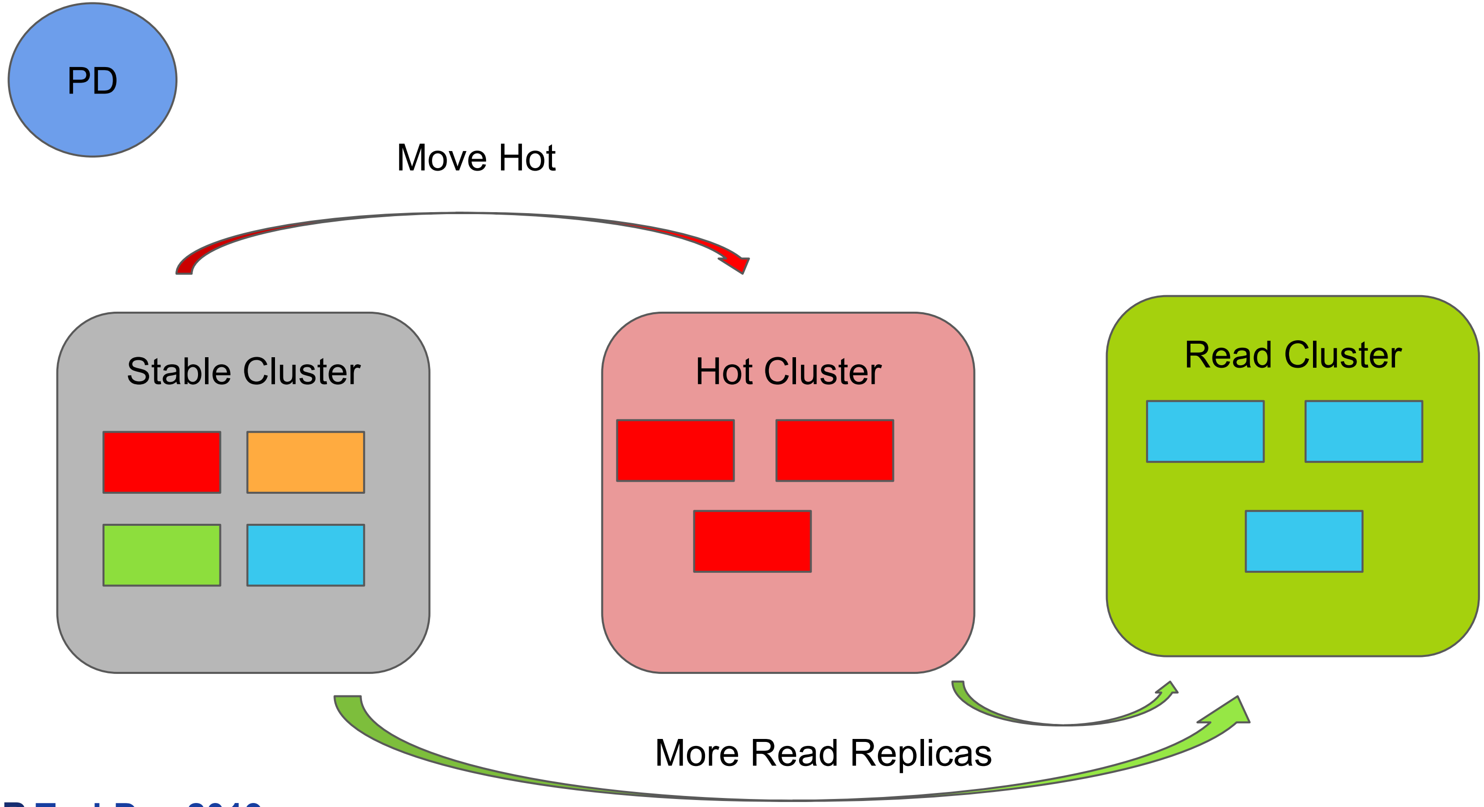


When there’s only one Region affected by the transaction...

Backup, Restore and Replication



Elastic Scheduling



PD

Move Hot

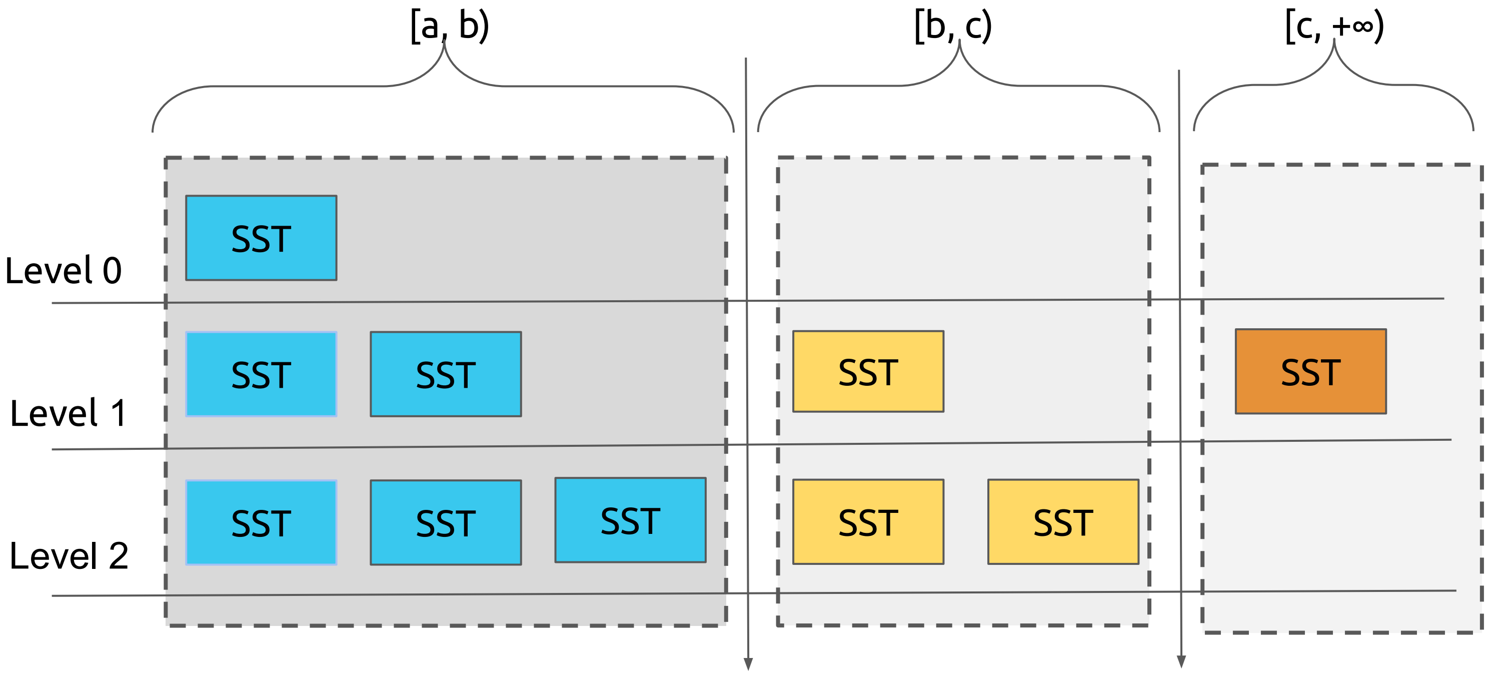
Stable Cluster

Hot Cluster

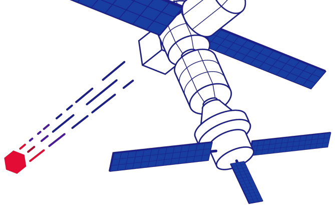
Read Cluster

More Read Replicas

RocksDB Guard



Agenda



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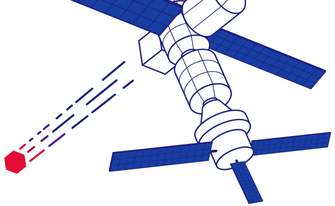
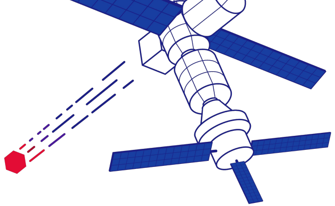
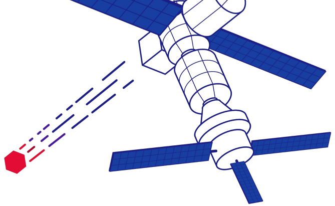


CNCF



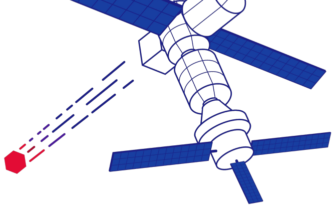
Timeline

- July 2018: First presentation to CNCF Technical Oversight Committee (TOC)
- August 2018: Enters CNCF as a Sandbox level member project
- April 2019: Begins technical review and due diligence for Incubating status
- May 2019: TiKV reaches Incubating status



Talent Plan

- Practical Networked Applications in Rust
- Distributed Systems in Rust



Test

1. jepsen-io/jepsen
2. pingcap/chaos

Thank You !