



Otimização de Performance No MySQL Utilizando Cache

MySQL Brazil Meetup - 2024
05/10/2024

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 readysettech

 @readysetio

- #MySQLBrazilMeetup



Marcelo Altmann

- Senior Software Engineer @ Readyste
- Senior Software Engineer @ Percona
 - Maintainer of Percona XtraBackup for MySQL
- Long time Community contributor
- MySQL Code Contributor
- Oracle Ace Associate (MySQL)



Gautam Gopinadhan

- CEO @ Readyset
- Past Datarobot, Microsoft Azure, StorSimple, Cisco, Sun Microsystems.
 - Azure Blob Storage, Azure Edge Computing.
 - Distributed Systems, Filesystems, Storage caching, WAN Optimization, Security, Media Streaming
 -



Agenda



Agenda

- **Intro**
- **How Readyset Works**
- **Monitoring**
- **Readyset & ProxySQL**
- **Performance**
- **Demo**



Intro



Intro - Cache landscape in MySQL

- What is Cache



Intro - Cache landscape in MySQL

- **What is Cache**
- **Maintenance / Invalidation**

There are only two hard things in computer science: cache invalidation and naming things.

– Phil Karlton



Intro - Cache landscape in MySQL

- What is Cache
- Maintenance / Invalidation
- MySQL Query Cache



Intro - Cache landscape in MySQL

- **What is Cache**
- **Maintenance / Invalidation**
- **MySQL Query Cache**
- **InnoDB Buffer Pool**



Intro - Cache landscape in MySQL

- **What is Cache**
- **Maintenance / Invalidation**
- **MySQL Query Cache**
- **InnoDB Buffer Pool**
- **ProxySQL**



Intro - Cache landscape in MySQL

- What is Cache
- Maintenance / Invalidation
- MySQL Query Cache
- InnoDB Buffer Pool
- ProxySQL
- External tools (eg.: Redis / Valkey, memcache)



Readyset



 @readysetio

 /company/readysettech

Readyset

- Based on MIT PHD Thesis - Partial State in Dataflow-Based Materialized Views (Noria) by Jon Gjengset
- <https://github.com/readysettech/readyset>
- Self-Hosted / Cloud
- Automatic cache maintenance
- Horizontal Scale
- No application code changes
- Wire compatible with MySQL & PostgreSQL



How Readyset Works



How Readyset Works

- Snapshotting & CDC (Change Data Capture) / Replication
 - RocksDB
 - Replica



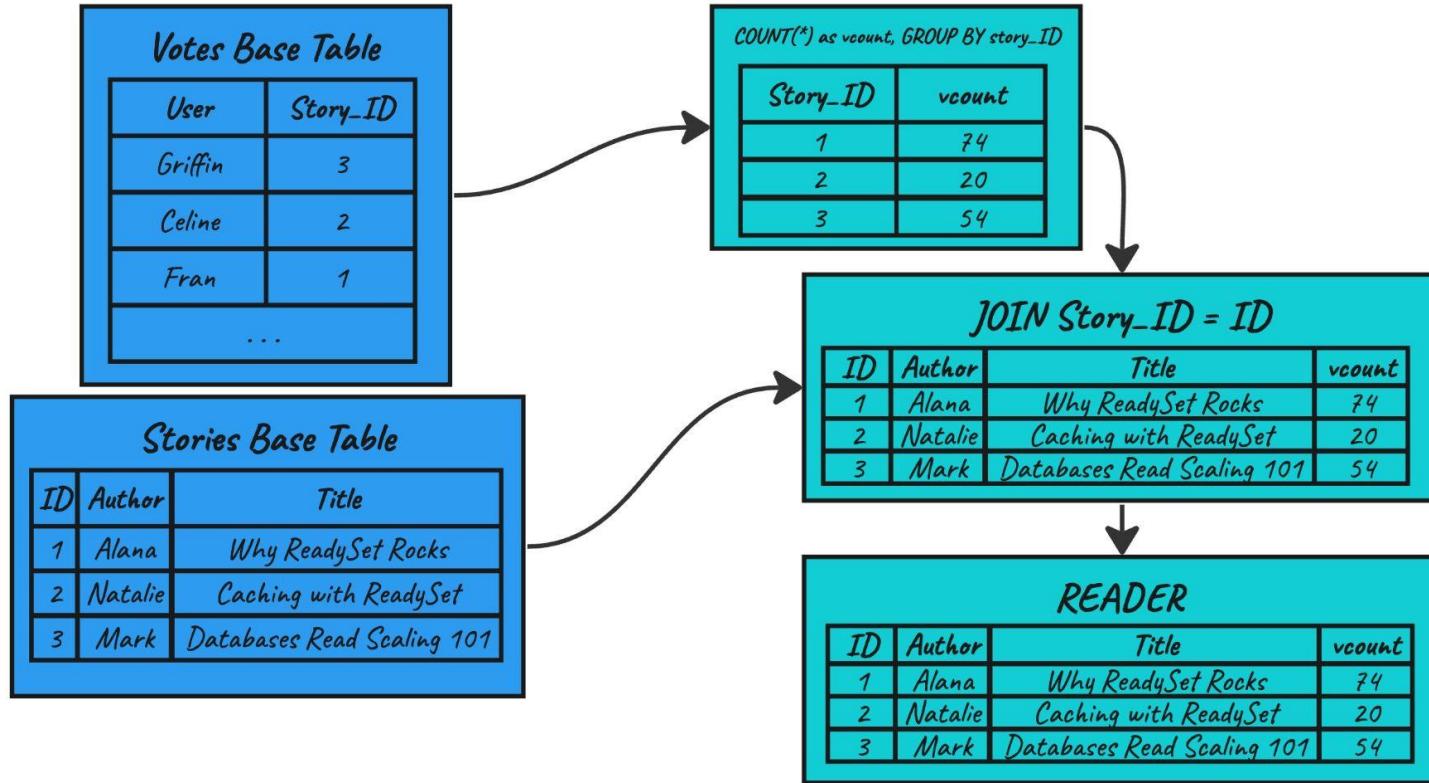
How Readyset Works

- Snapshotting & CDC (Change Data Capture) / Replication
- Dataflow Graph

```
SELECT id, author, title, vcount
FROM stories JOIN
(SELECT story_id, COUNT(*) AS vcount
FROM votes GROUP BY story_id) AS VoteCount
ON VoteCount.story_id = stories.id
WHERE stories.id = ?;
```



How Readyset Works - DataFlow Graph

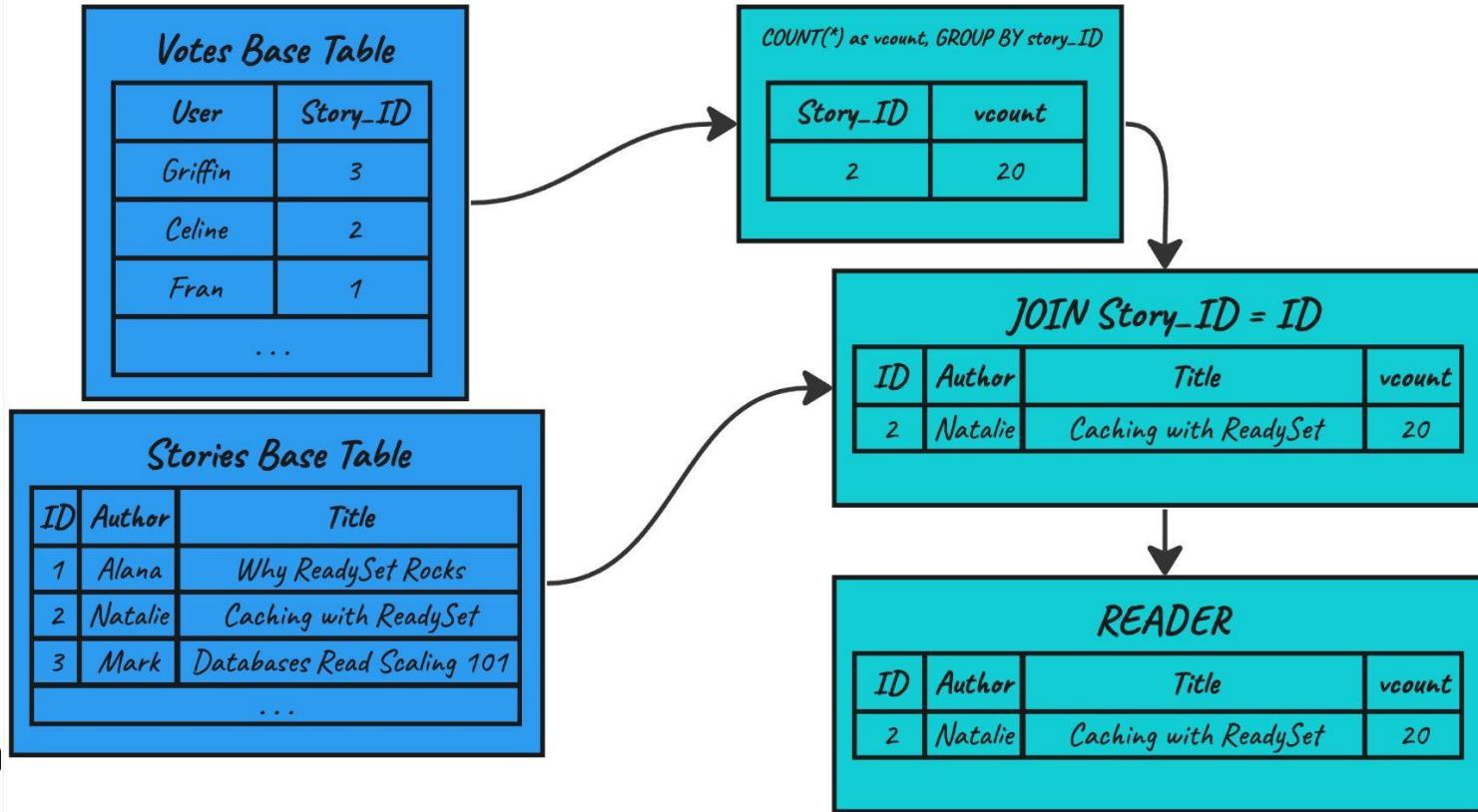


How Readyset Works

- Snapshotting & CDC (Change Data Capture) / Replication
- Dataflow Graph
- Partial Materialization



How Readyset Works - Partial Materialization

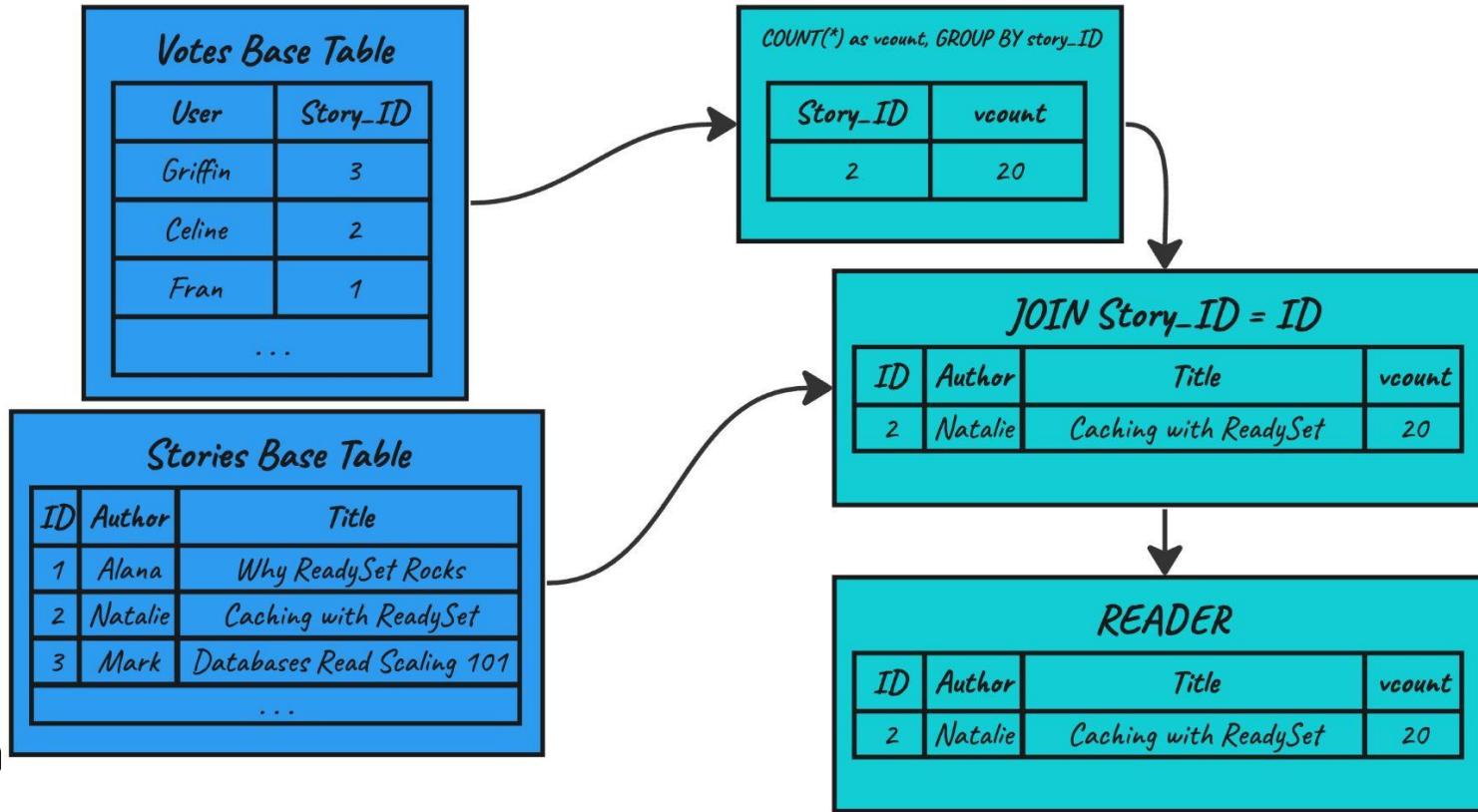


How Readyset Works

- Snapshotting & CDC (Change Data Capture) / Replication
- Dataflow Graph
- Partial Materialization
- Cache Miss



How Readyset Works - Partial Materialization

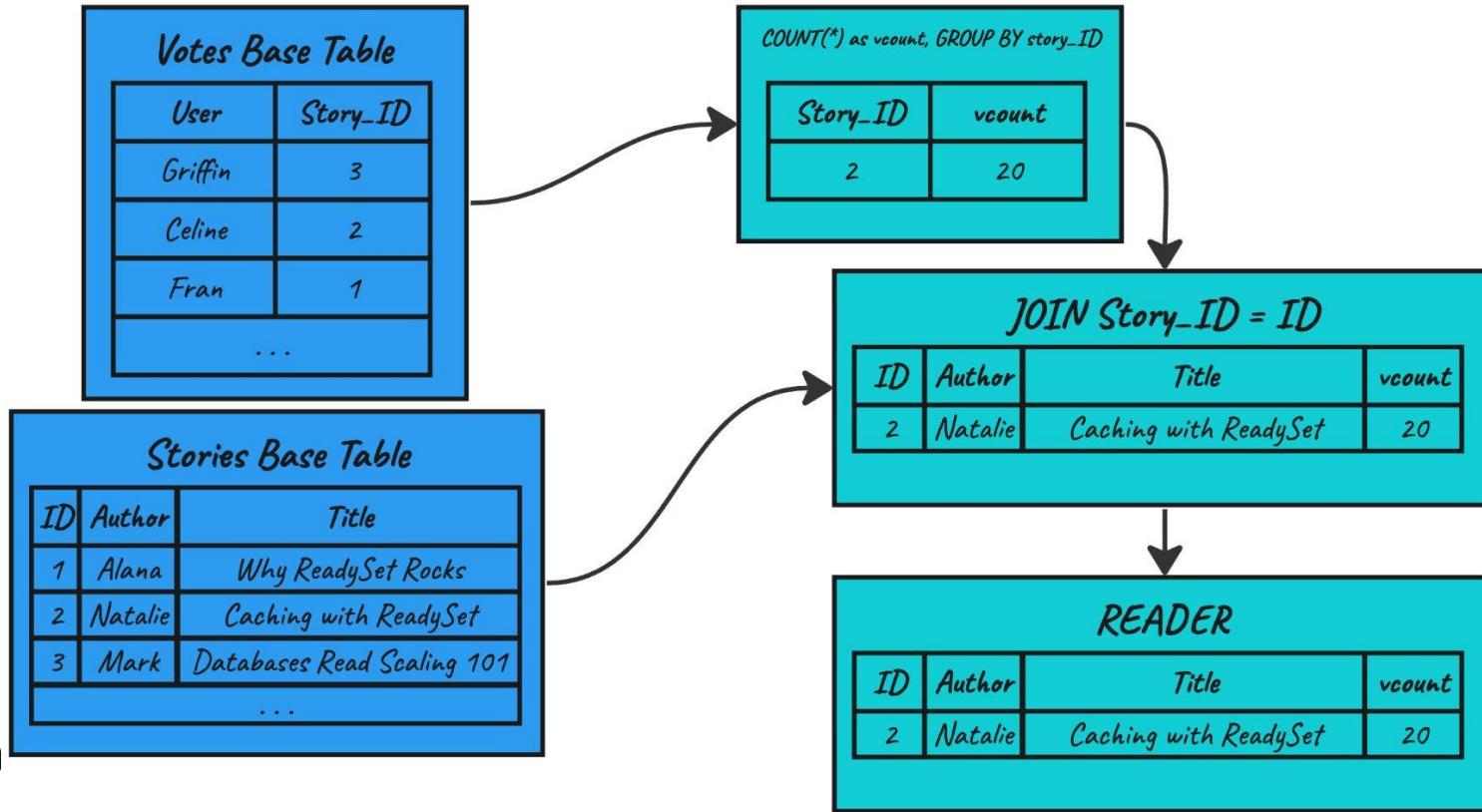


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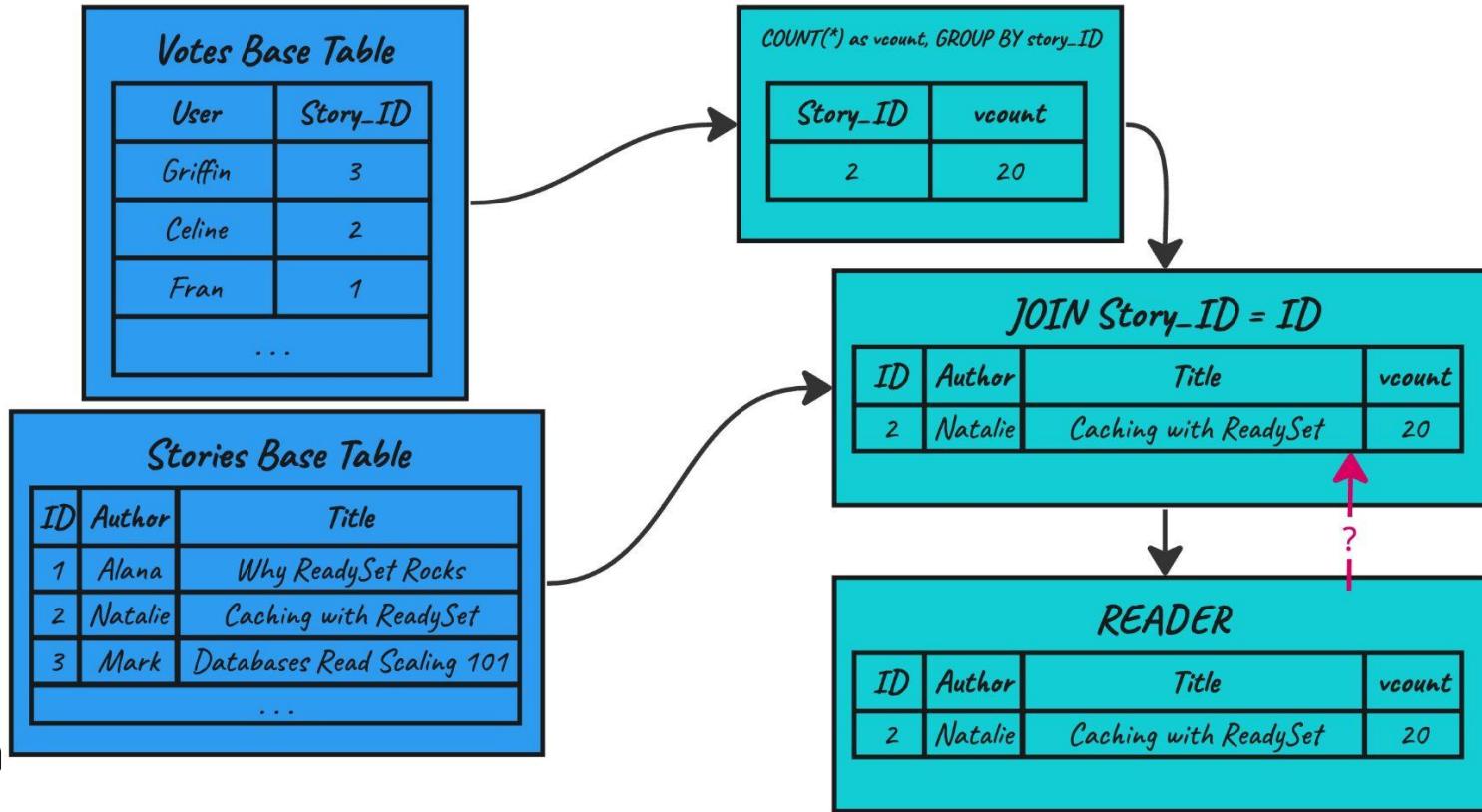


ID = 3

How Readyset Works - Partial Materialization



How Readyset Works - Partial Materialization



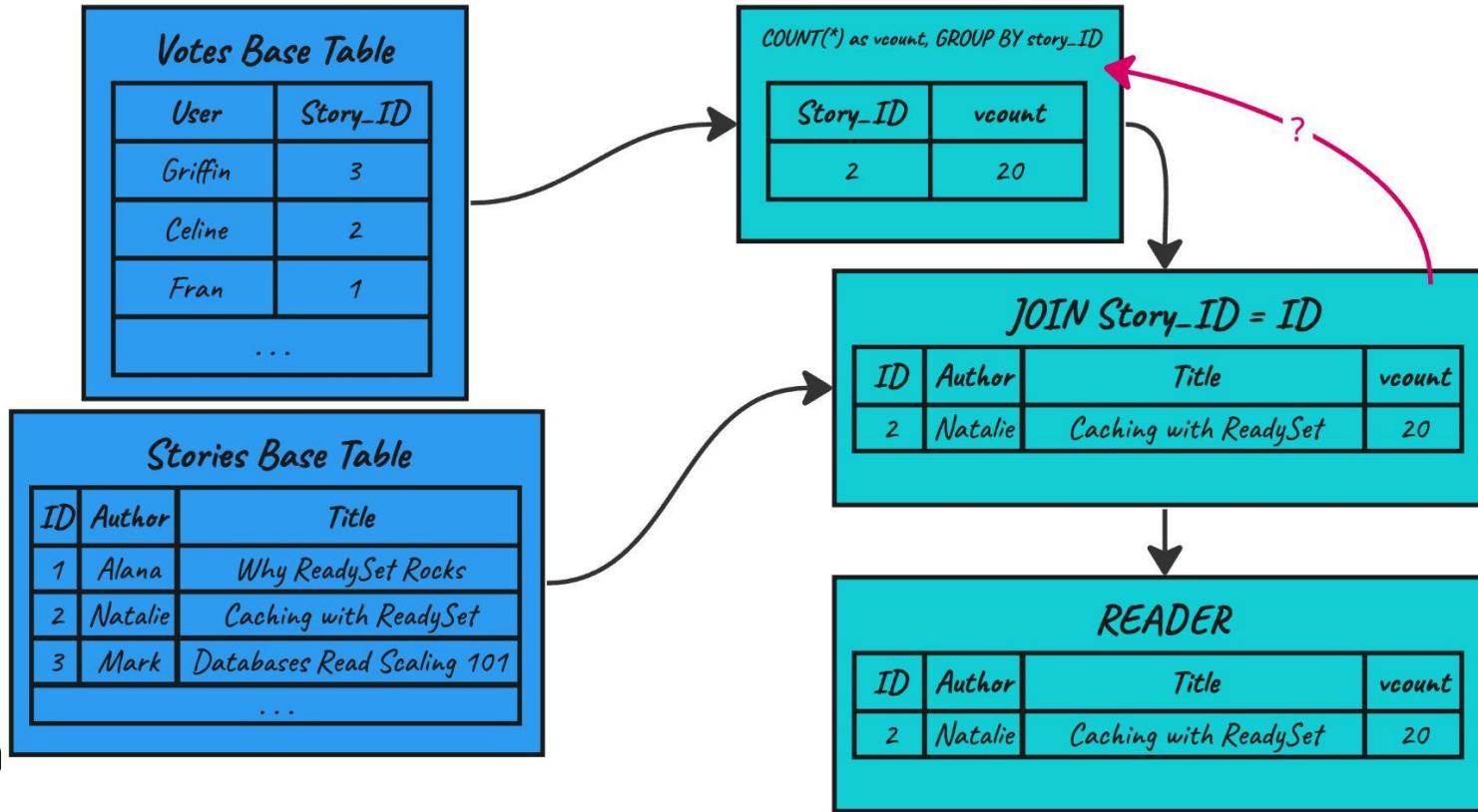
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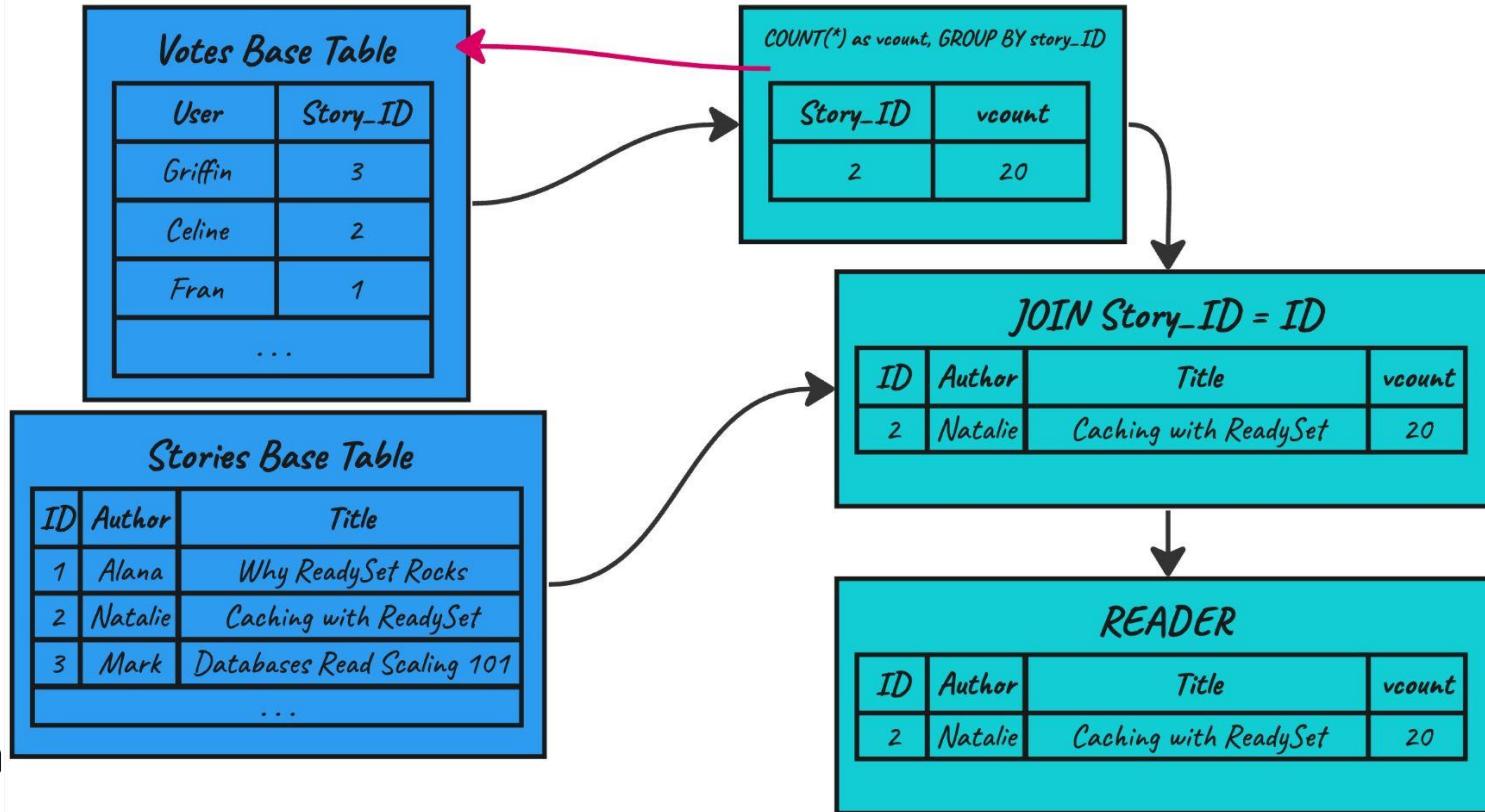
How Readyset Works - Partial Materialization



ID = 3

26

How Readyset Works - Partial Materialization

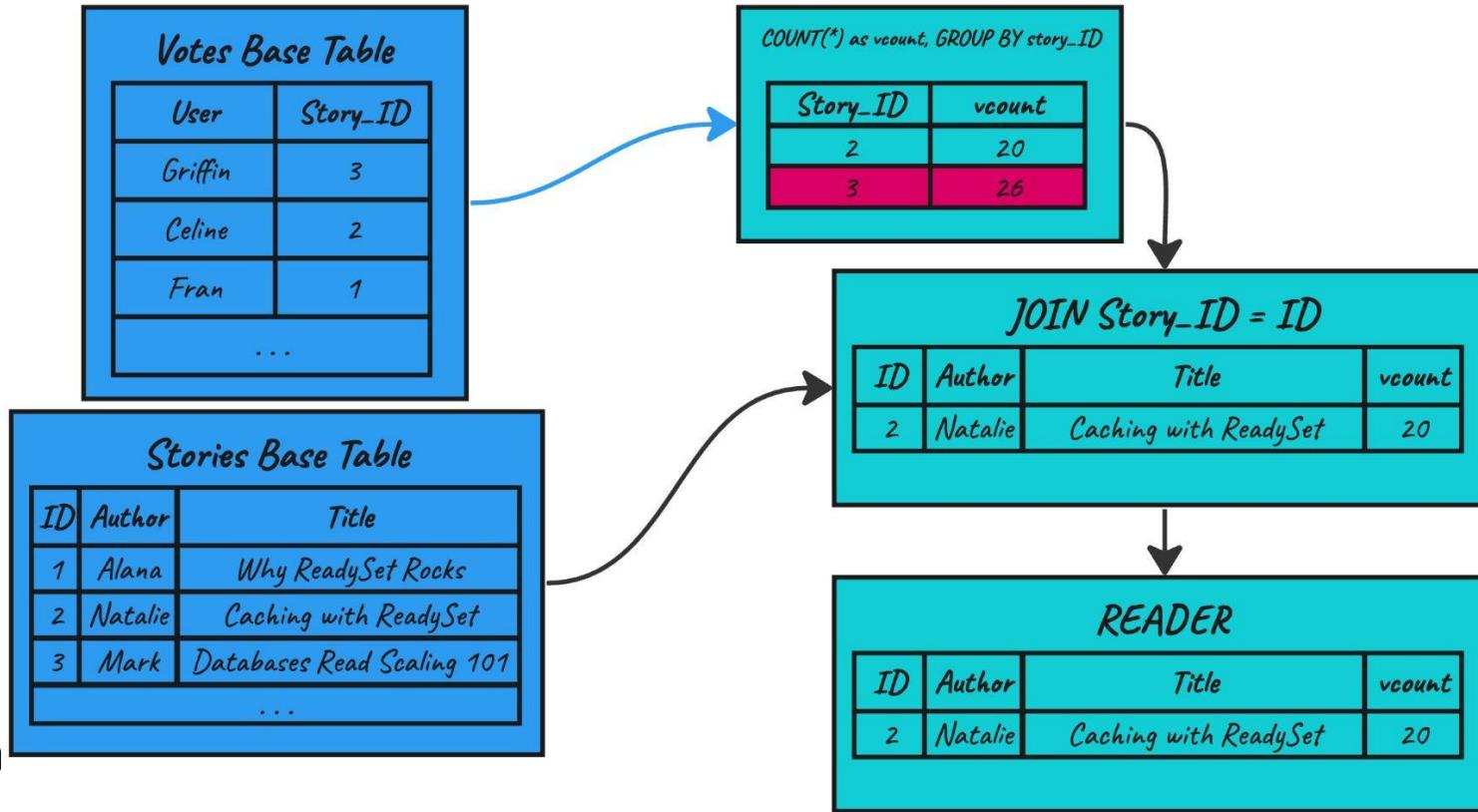


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ID = 3

How Readyset Works - Partial Materialization

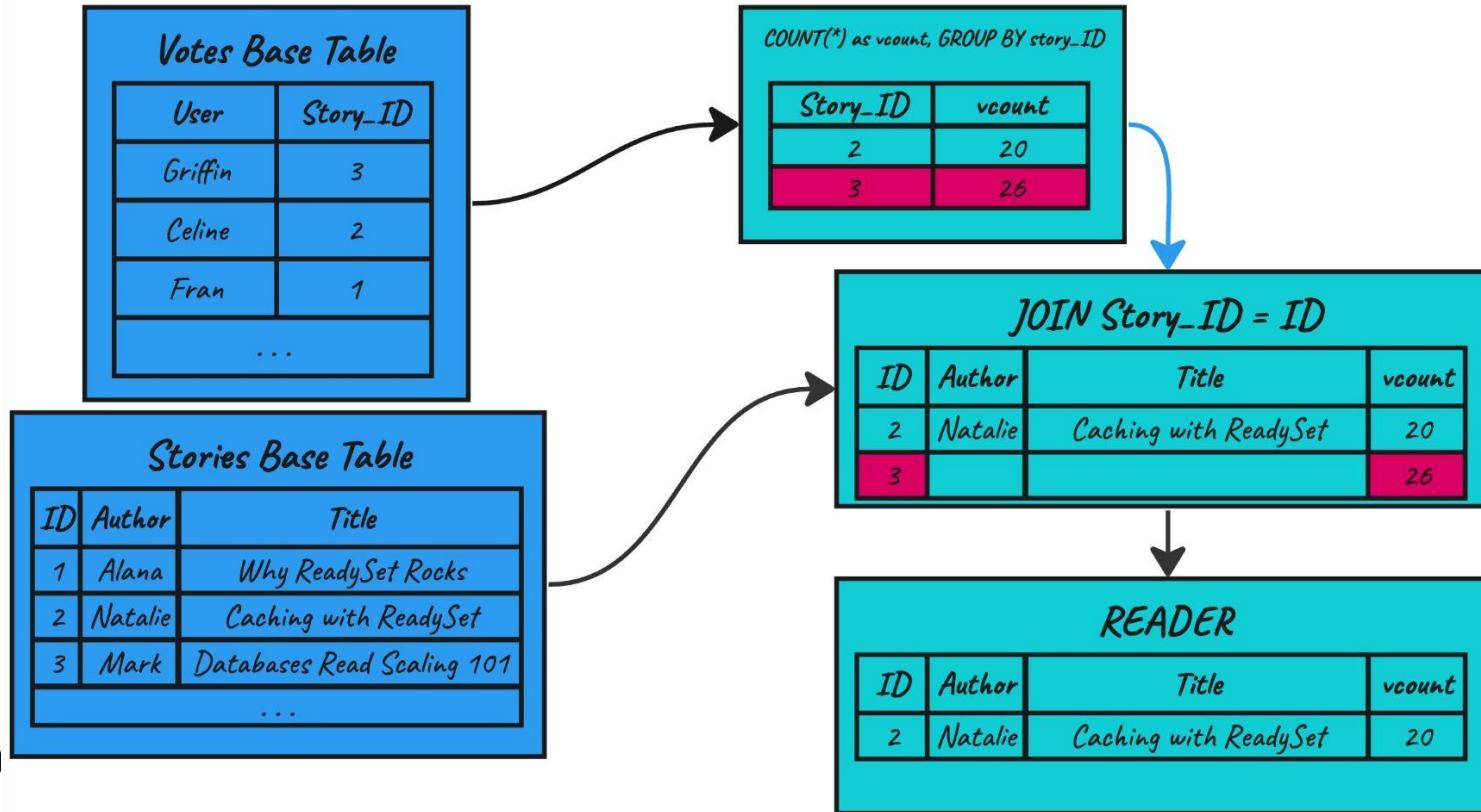


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ID = 3

How Readyset Works - Partial Materialization

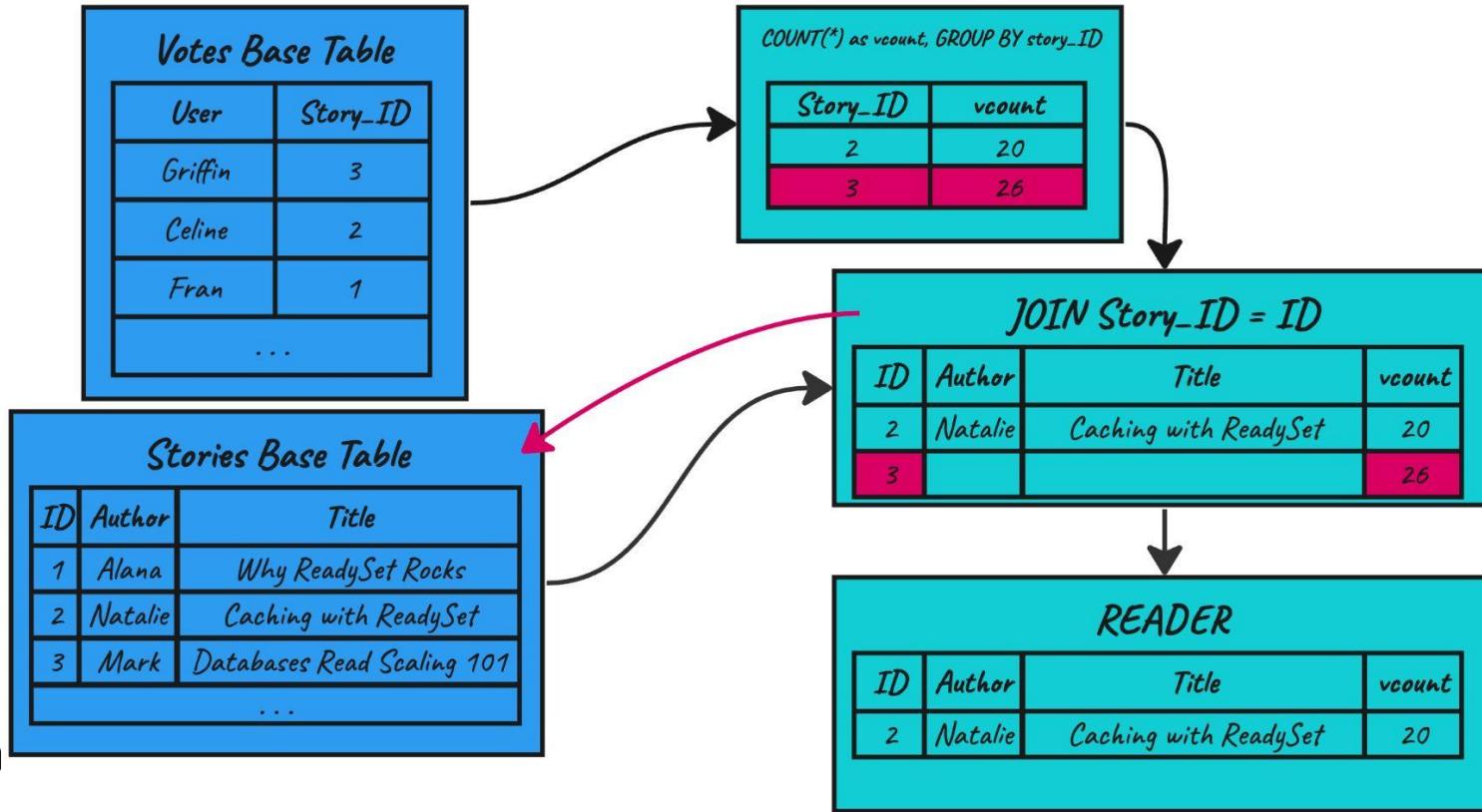


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ID = 3

How Readyset Works - Partial Materialization



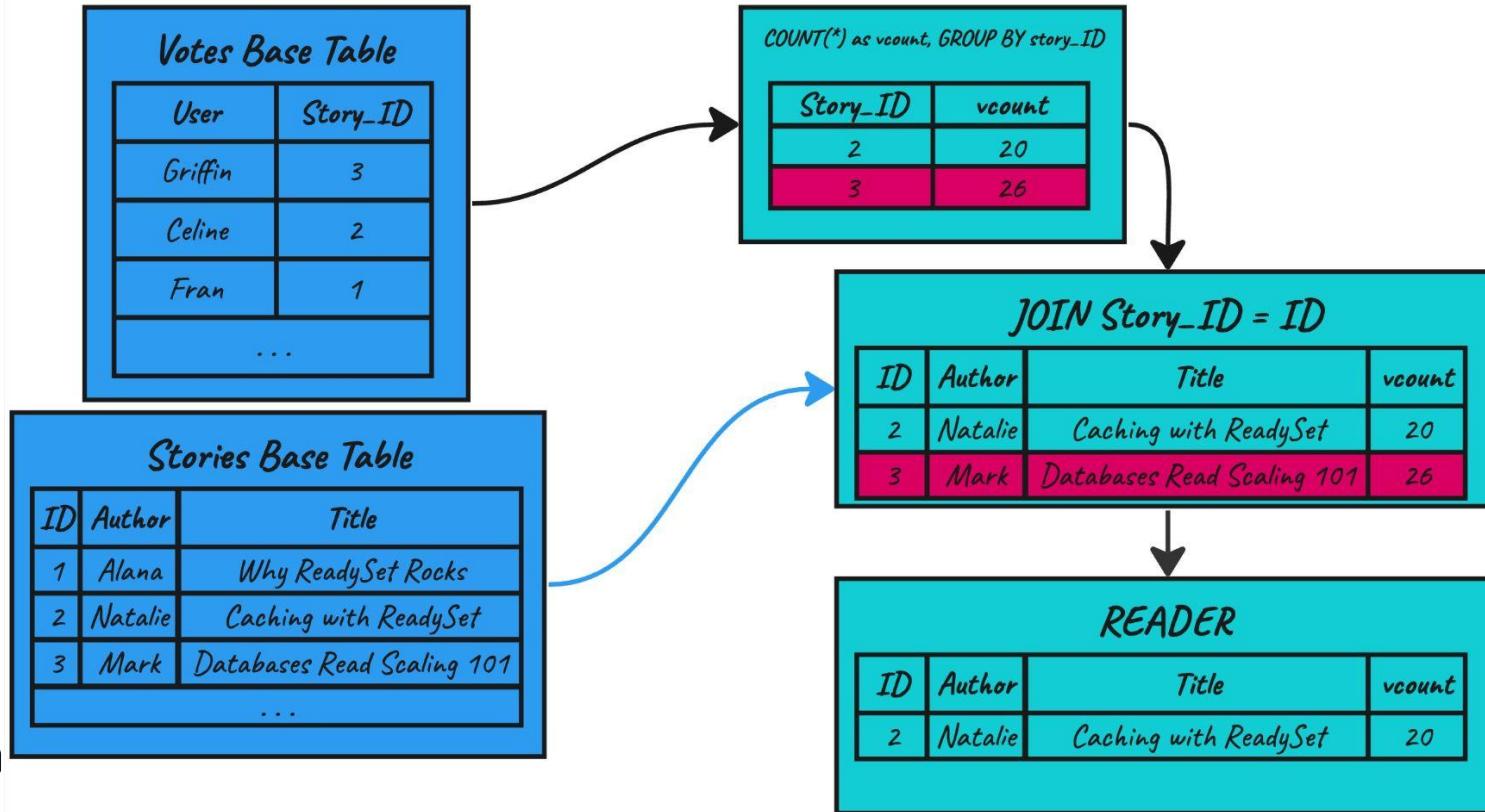
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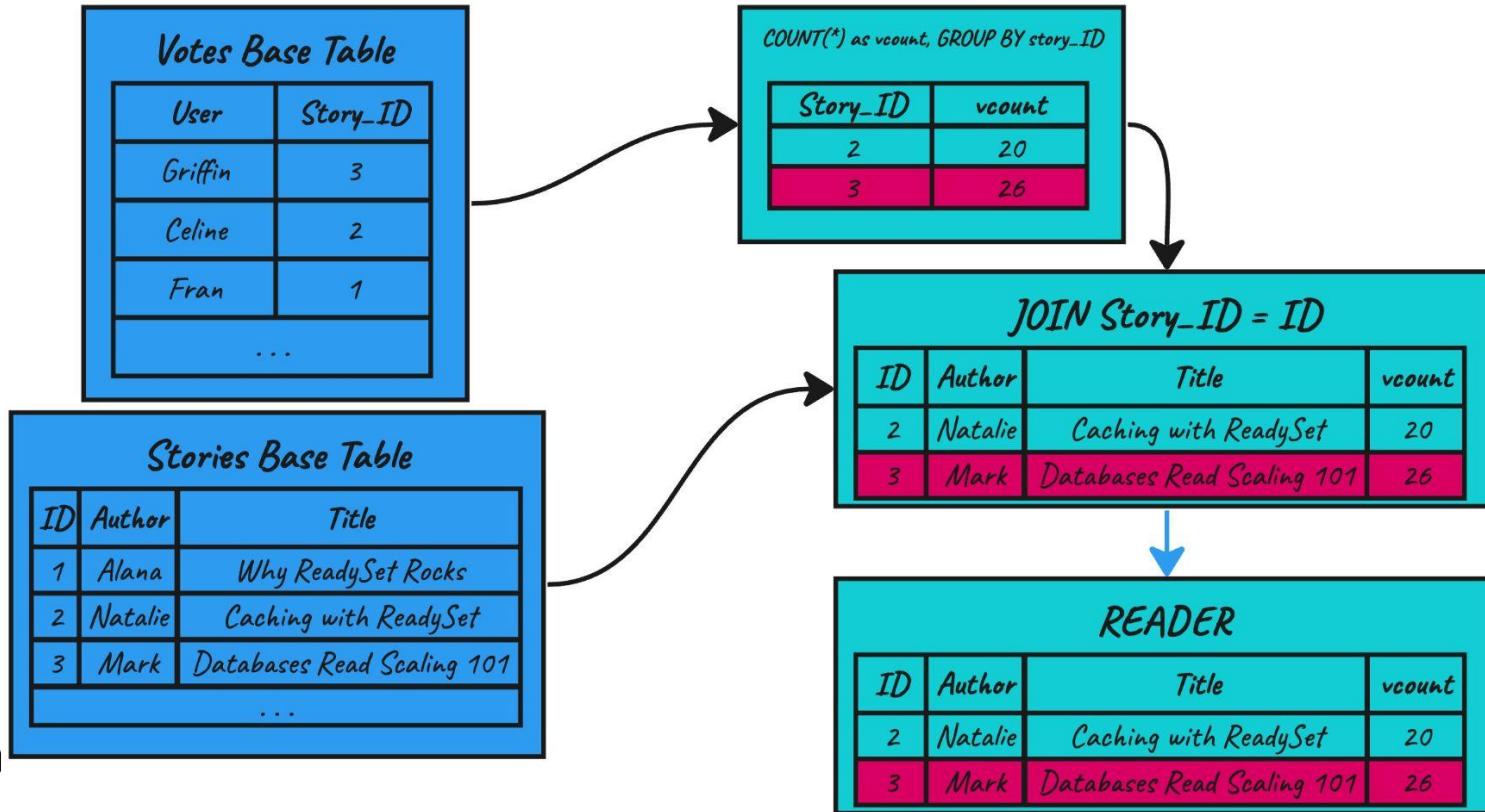
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30

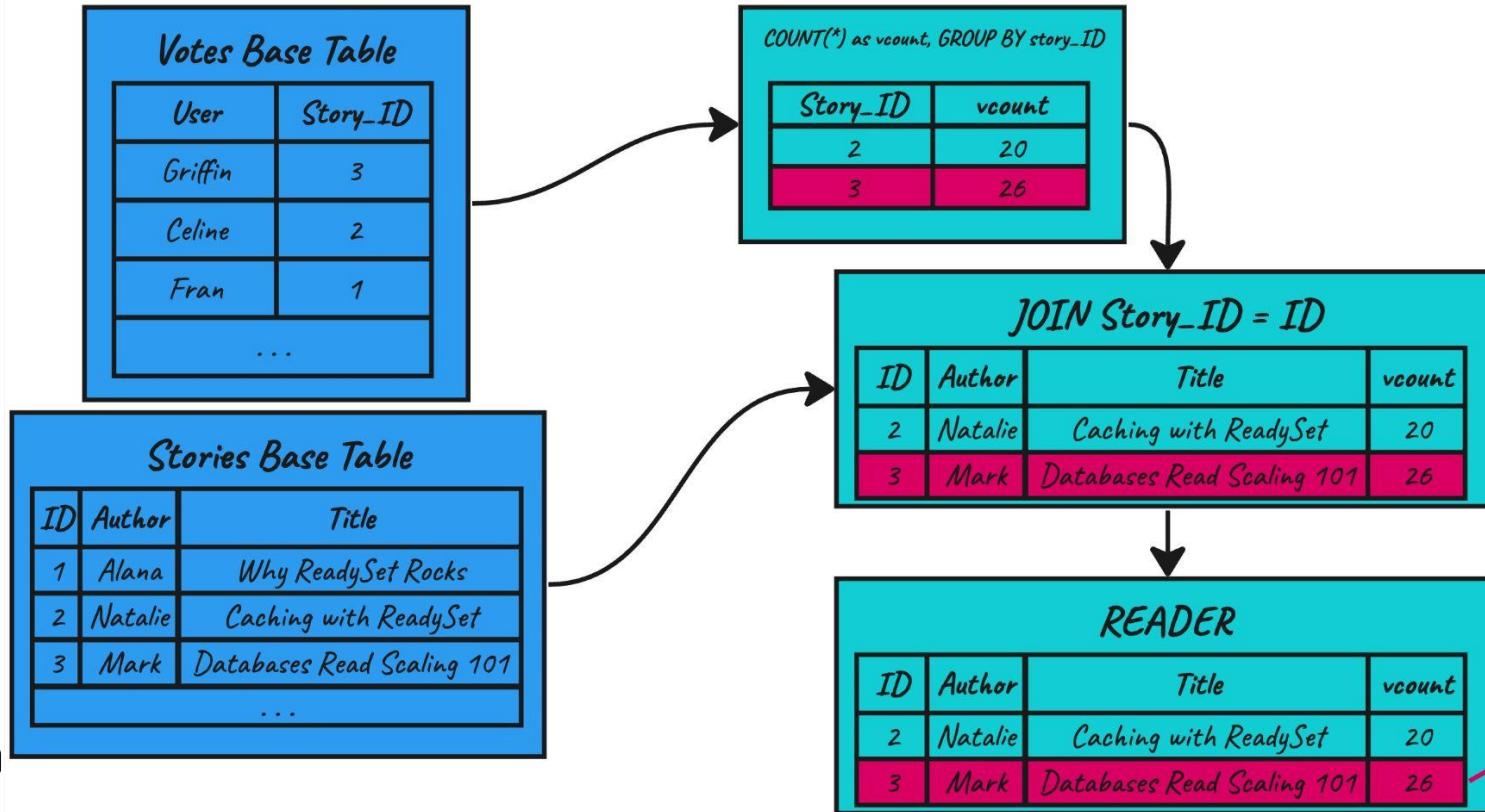
How Readyset Works - Partial Materialization



How Readyset Works - Partial Materialization



How Readyset Works - Partial Materialization

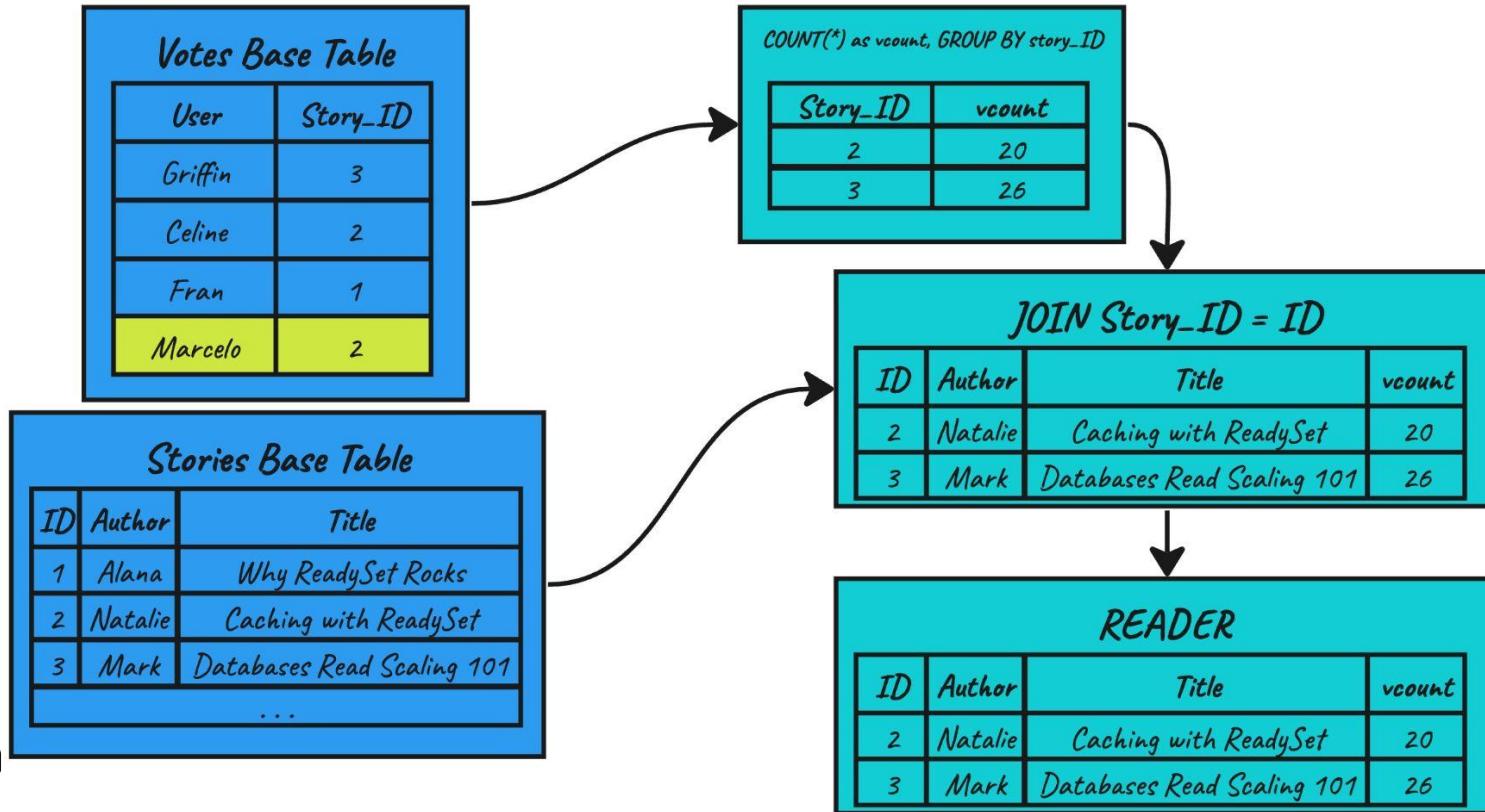


How Readyset Works

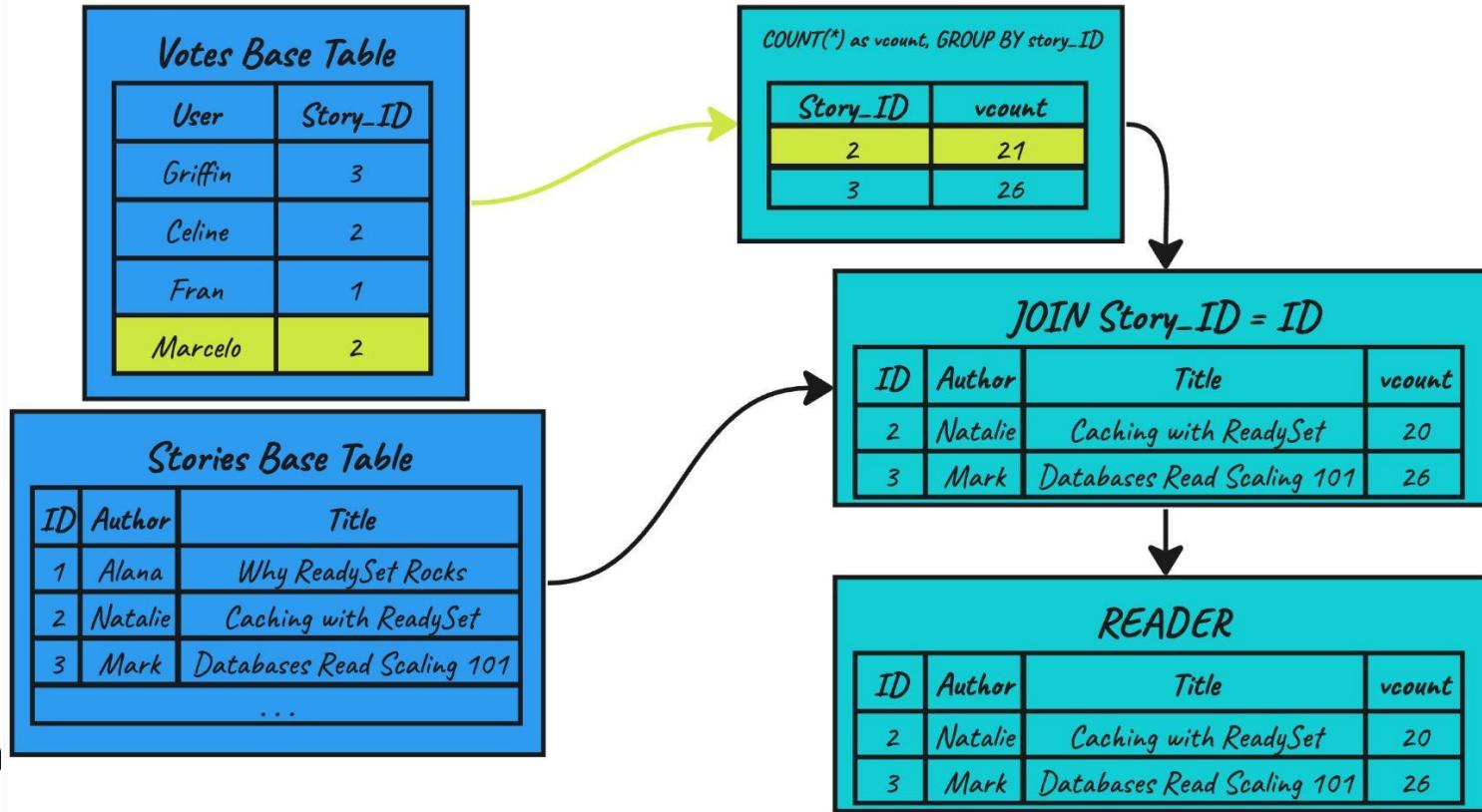
- Snapshotting & CDC (Change Data Capture) / Replication
- Dataflow Graph
- Partial Materialization
- Cache Miss
- Cache Maintenance



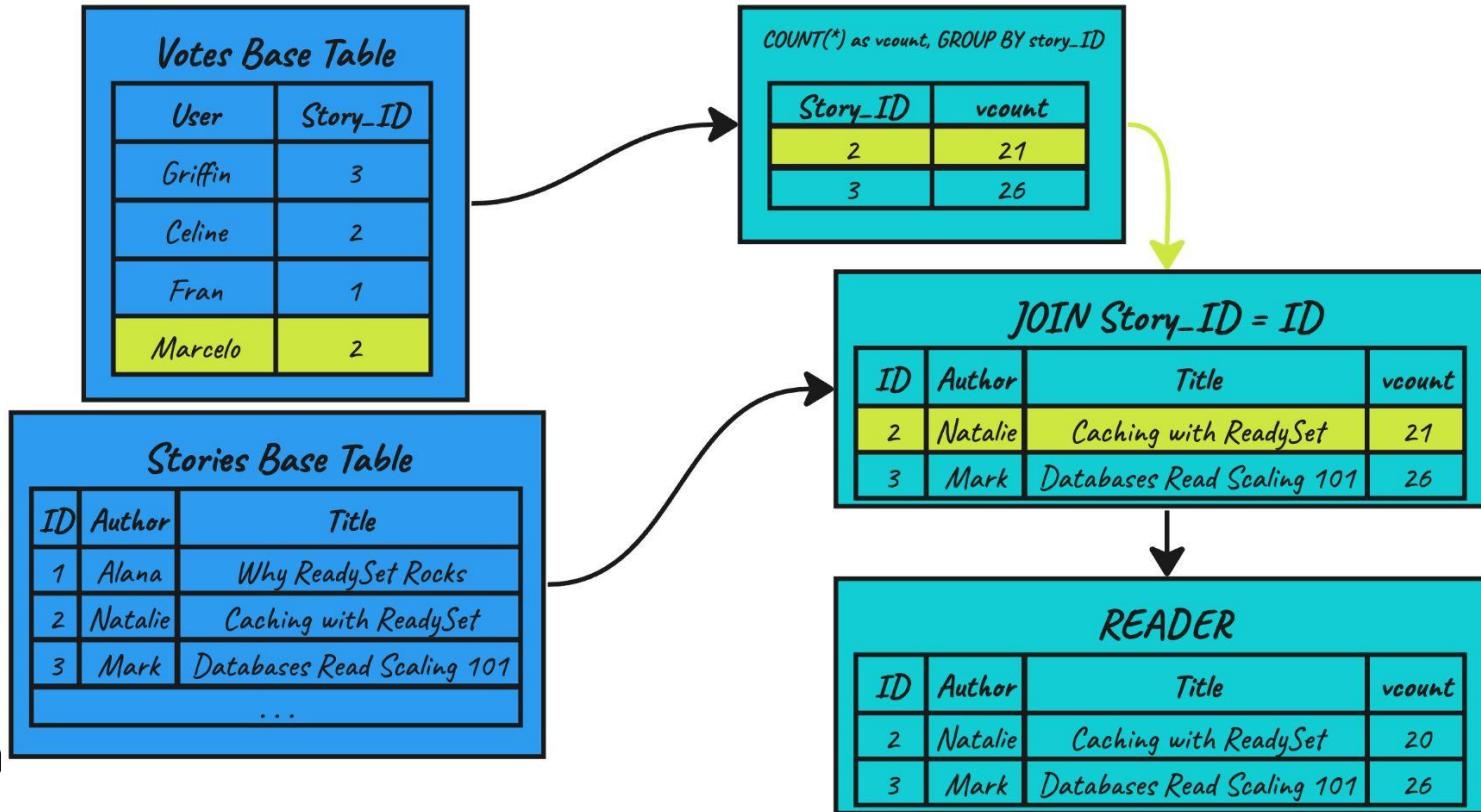
How Readyset Works - Cache Maintenance



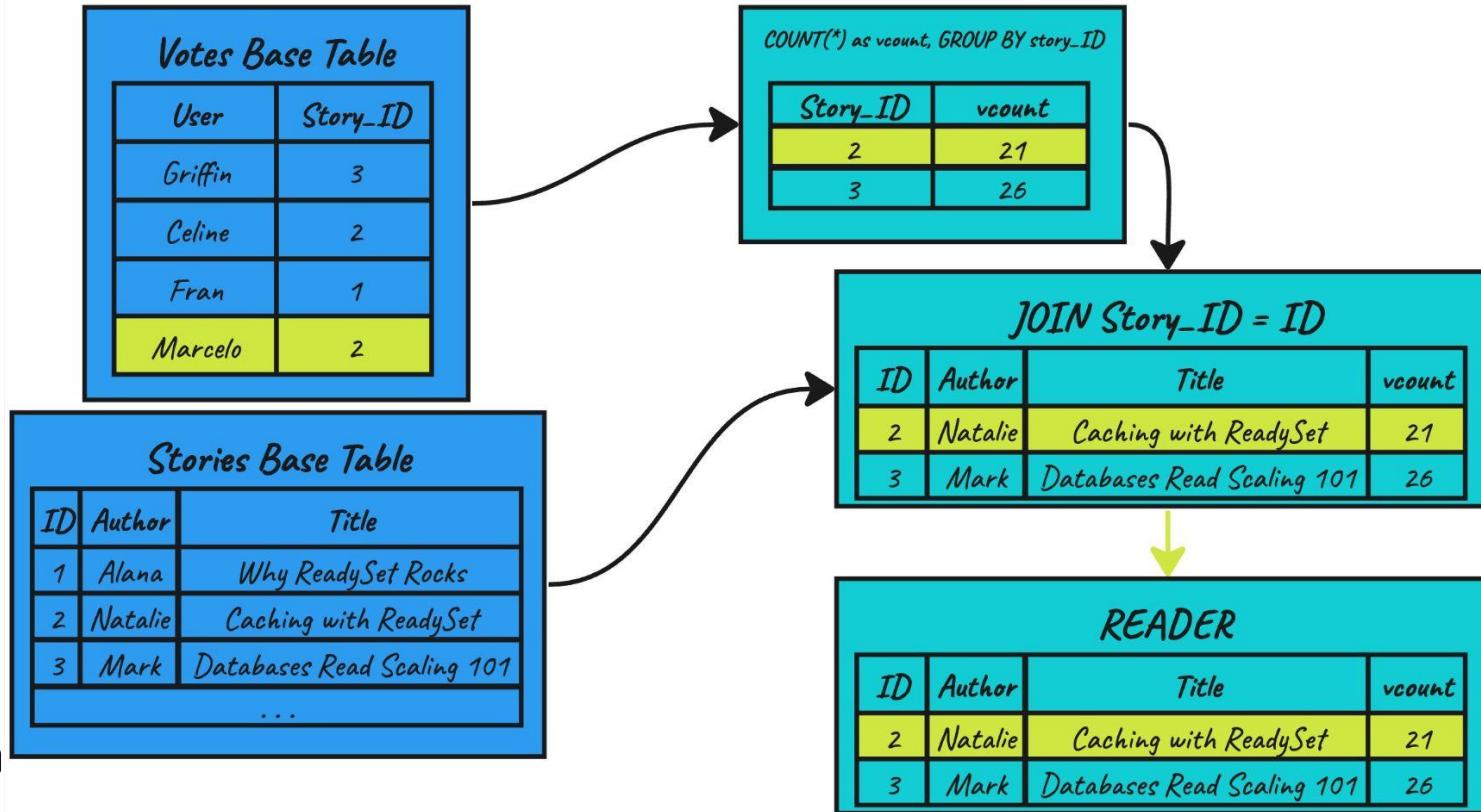
How Readyset Works - Cache Maintenance



How Readyset Works - Cache Maintenance



How Readyset Works - Cache Maintenance



Monitoring & Performance



Monitoring & Performance

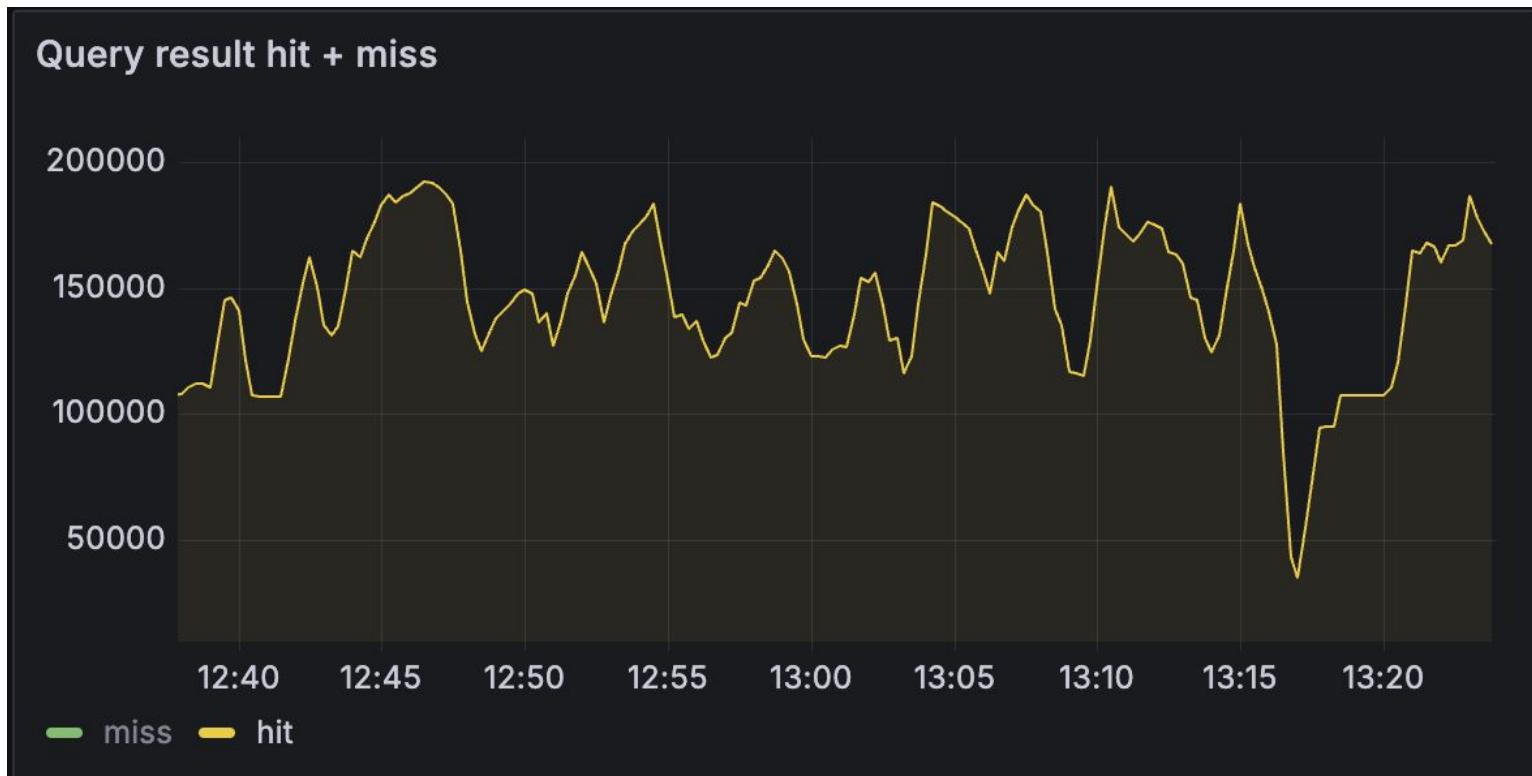
- **Prometheus Metrics**
- **Grafana Dashboards**
 - <https://github.com/readystechnology/readystechnology/tree/main/build/docker/grafana/dashboards>
- **Percona Monitoring & Management (PMM)**



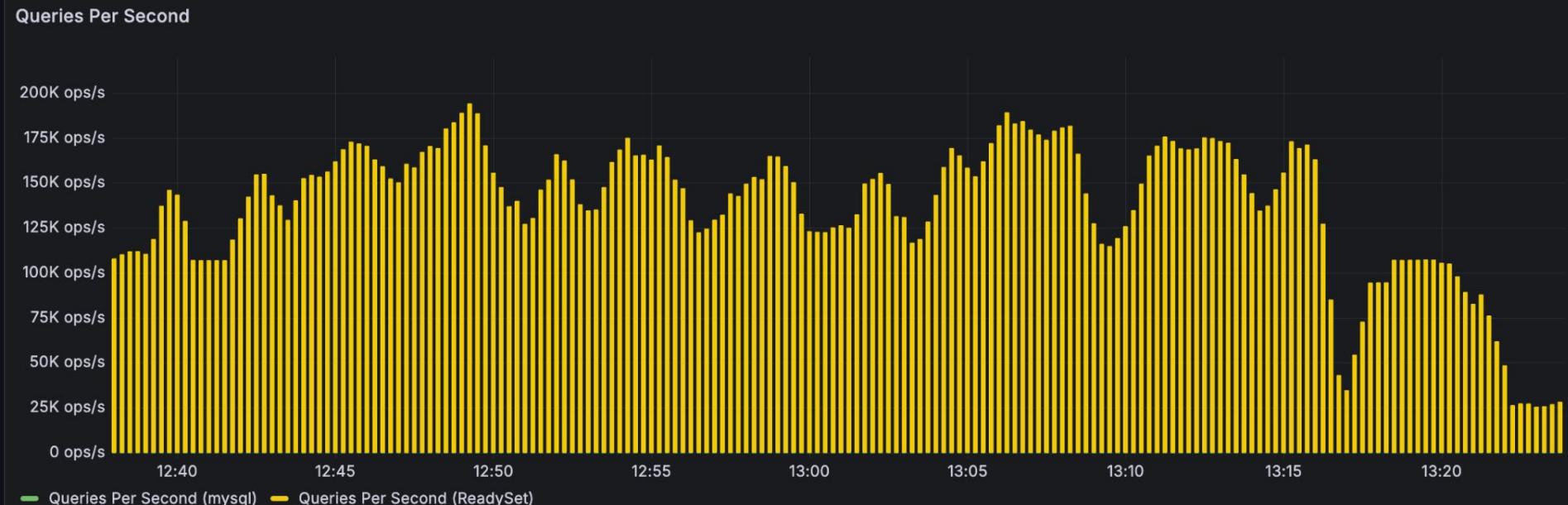
Monitoring & Performance



Monitoring & Performance



Monitoring & Performance



Monitoring & Performance

Query Text

```
SELECT `c` FROM `sbtest1` WHERE (`id` = $1)
```

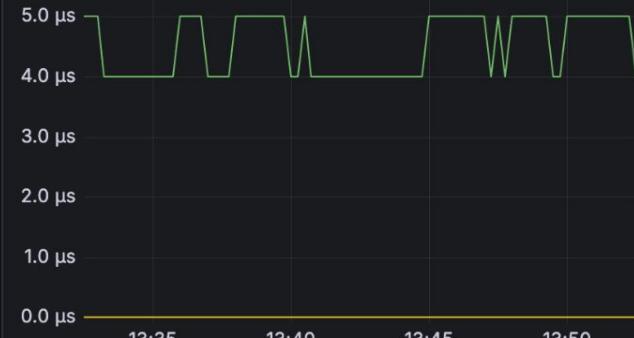
Query Status ⓘ

Cached

50p Query Latency ⓘ



90p Query Latency ⓘ



99p Query Latency ⓘ



Monitoring & Performance

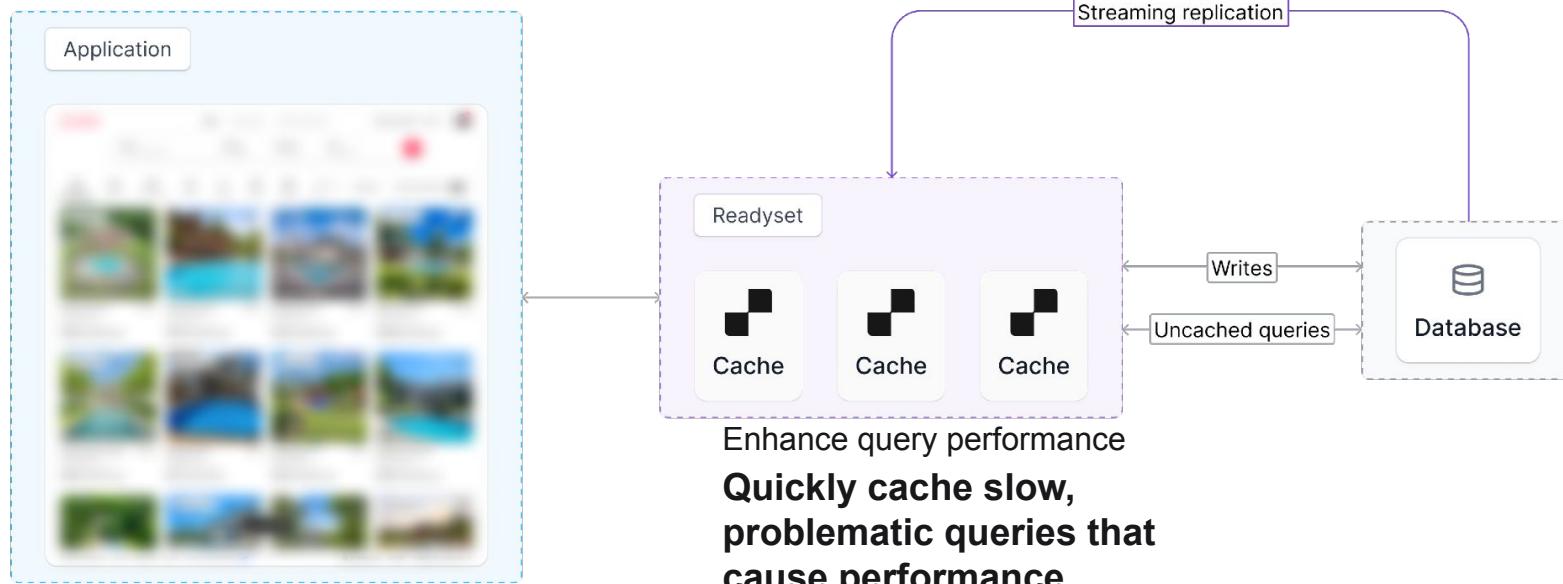
- **Query Throughput**
 - **~200K QPS**
- **Query Latency**
 - **P99 - 11us (~90qp/ms)**
 - **P90 - 5us (200qp/ms)**
- **OLTP - Scan (30 sec MySQL vs Readyset)**
 - **MySQL - 24**
 - **Readyset - 30562 (1273x Improvement)**



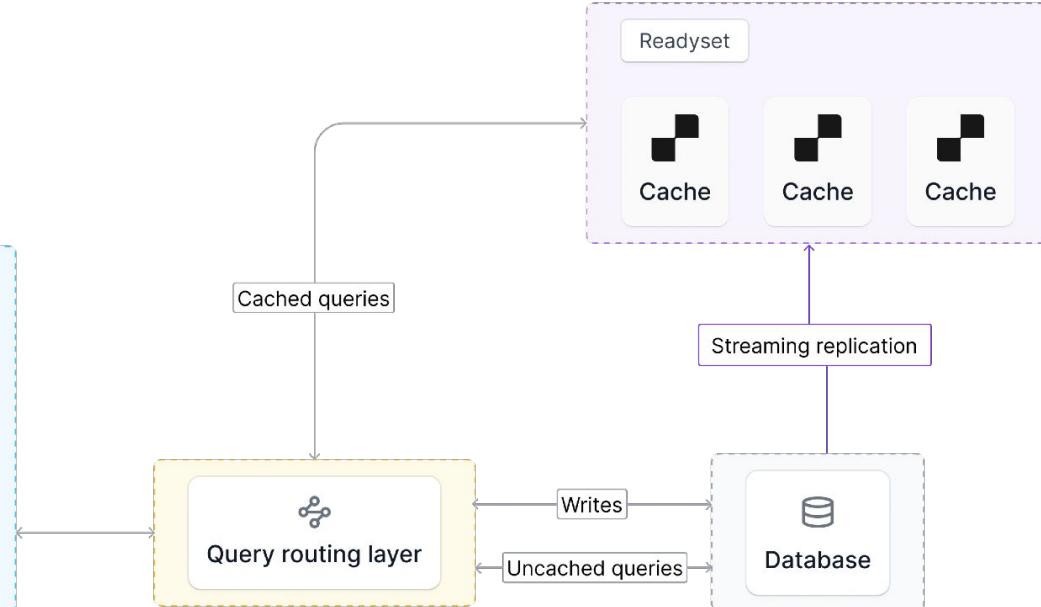
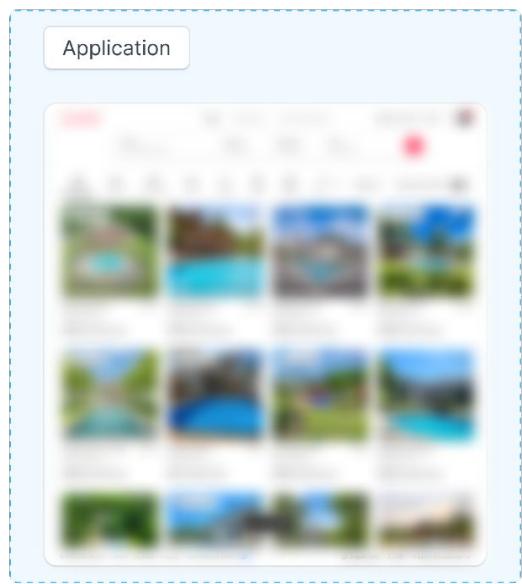
Deployments



Readystream as a proxy



Readyset as Read Replica



ProxySQL & Readyset



ProxySQL & Readyset

- Scheduler - https://github.com/readystech/proxysql_scheduler
- Automatic Query Caching
- 9 Query Discovery Modes
- Cache Warm-up



Demo



Summary

Happy Hour

Hosted by Readyset

@Pirajá Shopping Morumbi

6PM

RSVP - <https://bit.ly/readysetbrazil>



Give it a try

readyset.cloud



@readysetio



/company/readysettech

