



KubeCon



CloudNativeCon

North America 2024





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Vitess: Introduction, New Features and Running In Production

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Agenda

Vitess Overview

Production Deployments

New and Upcoming Features

Q&A

Vitess Overview

The background of the slide is a solid blue gradient. Overlaid on this is a stylized, low-poly illustration of a mountain range in various shades of blue. Several white snowflake icons are scattered across the mountain slopes. At the bottom of the image, there is a row of dark blue evergreen trees.

Sharding



- Backup / Restore times

Fixed disk size

- Write contention

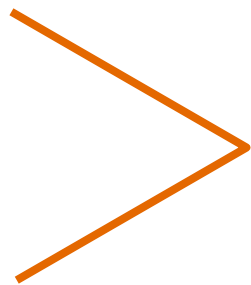
- Deadlocks

- IOPS

- Eventual consistency

- Replication lag

- Max instance size



Multiple disks

Read from primary

Parallel workers

Horizontal scaling

Platform

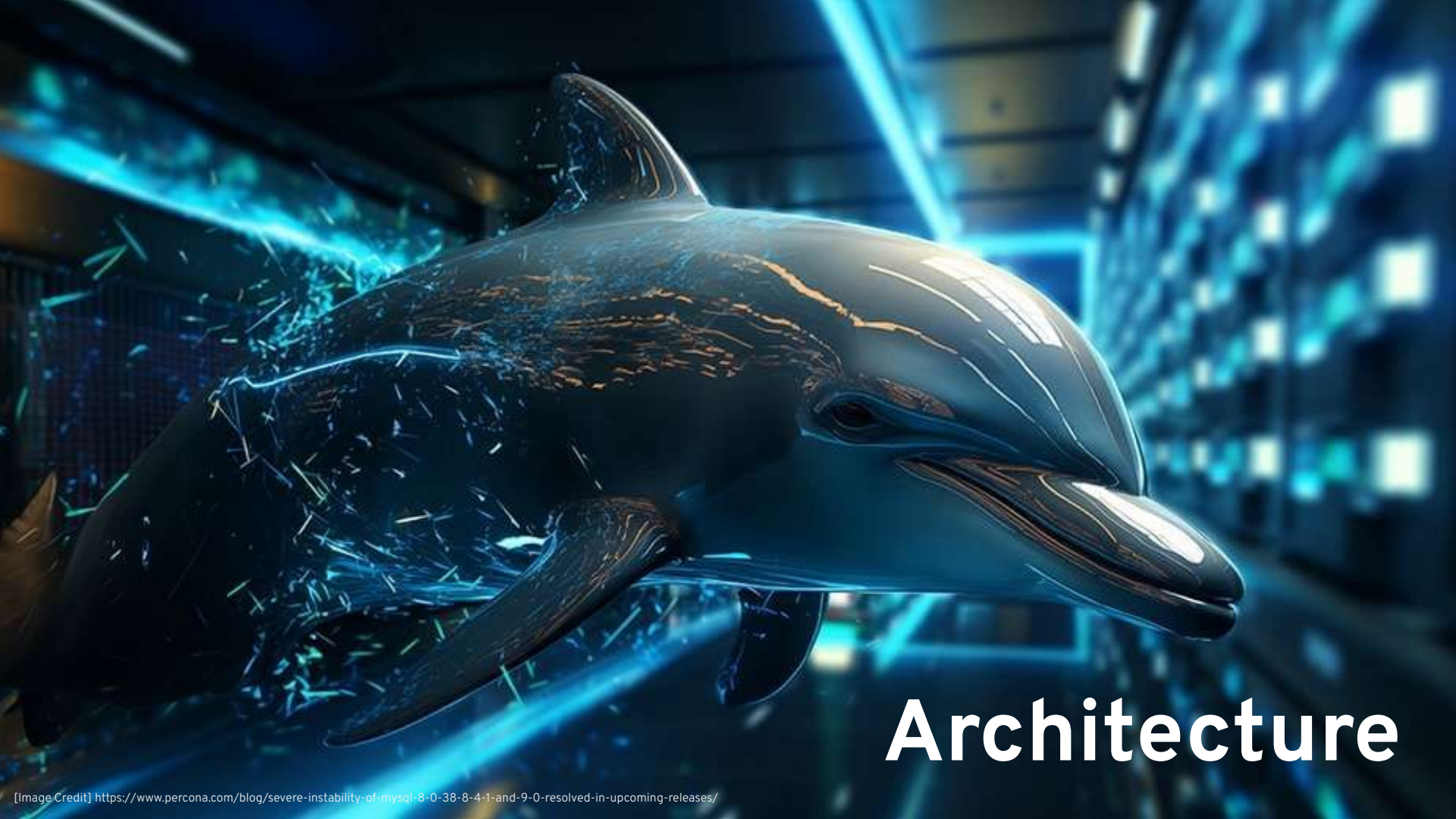


- High availability
- Automatic failovers
- Backup / Restore
- Connection pooling
- Online schema changes
- Query consolidation
- Materialized views

Compatibility



- WordPress
- Ruby on Rails
- Drizzle
- Django
- SQLAlchemy
- DBBeaver
- And many more ...



Architecture

Vitess Architecture



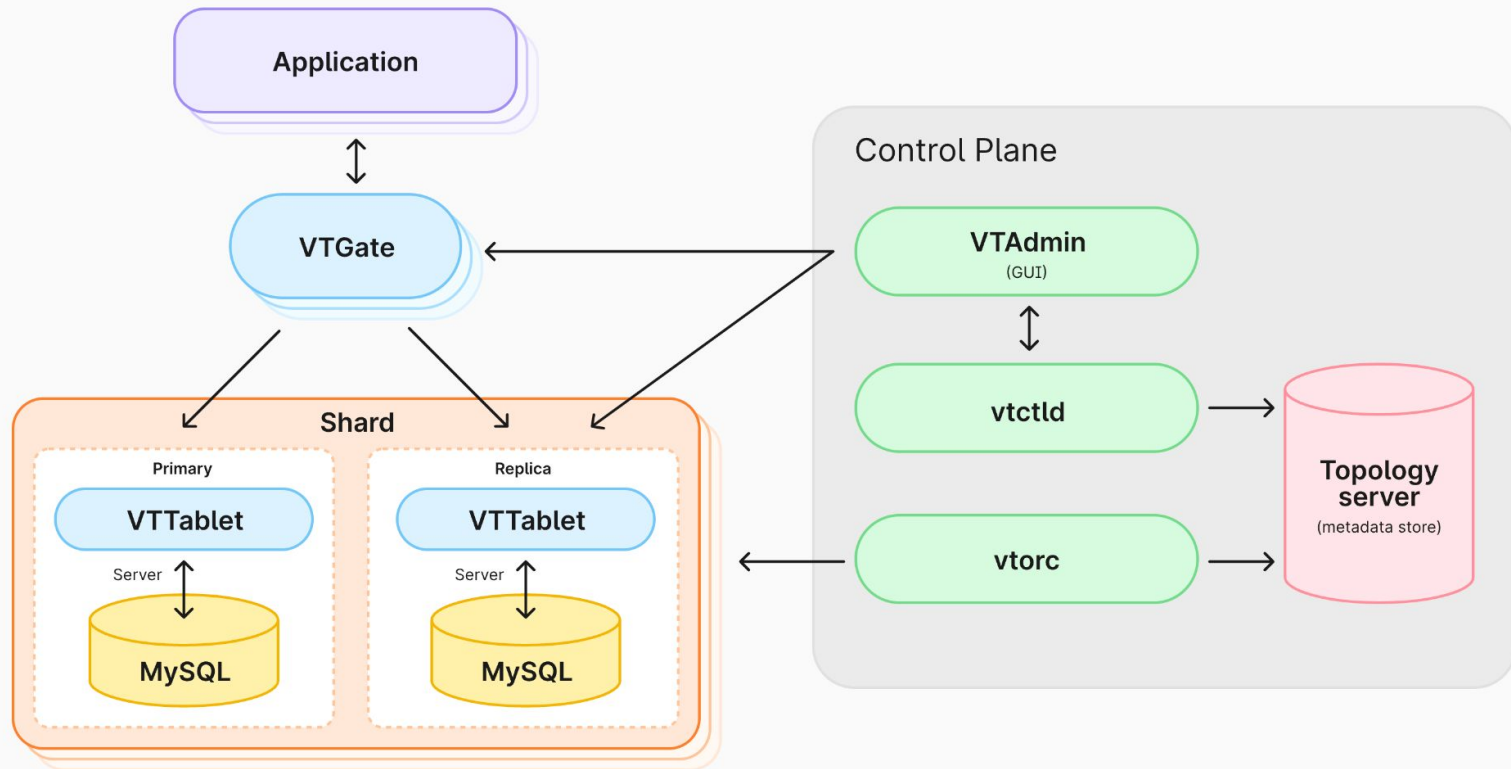
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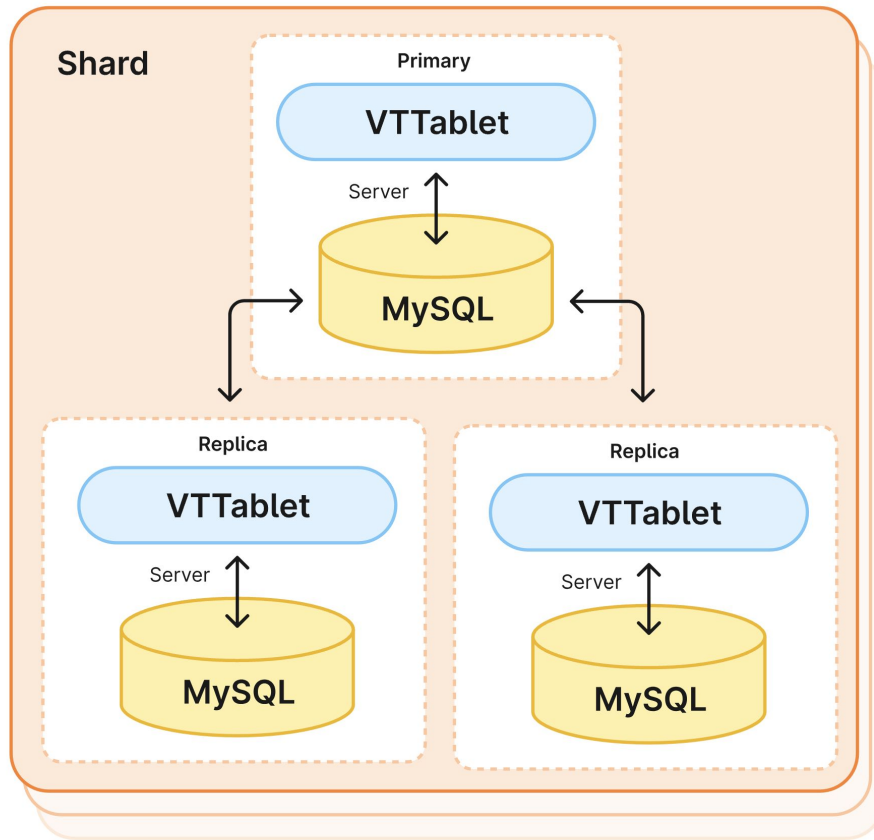


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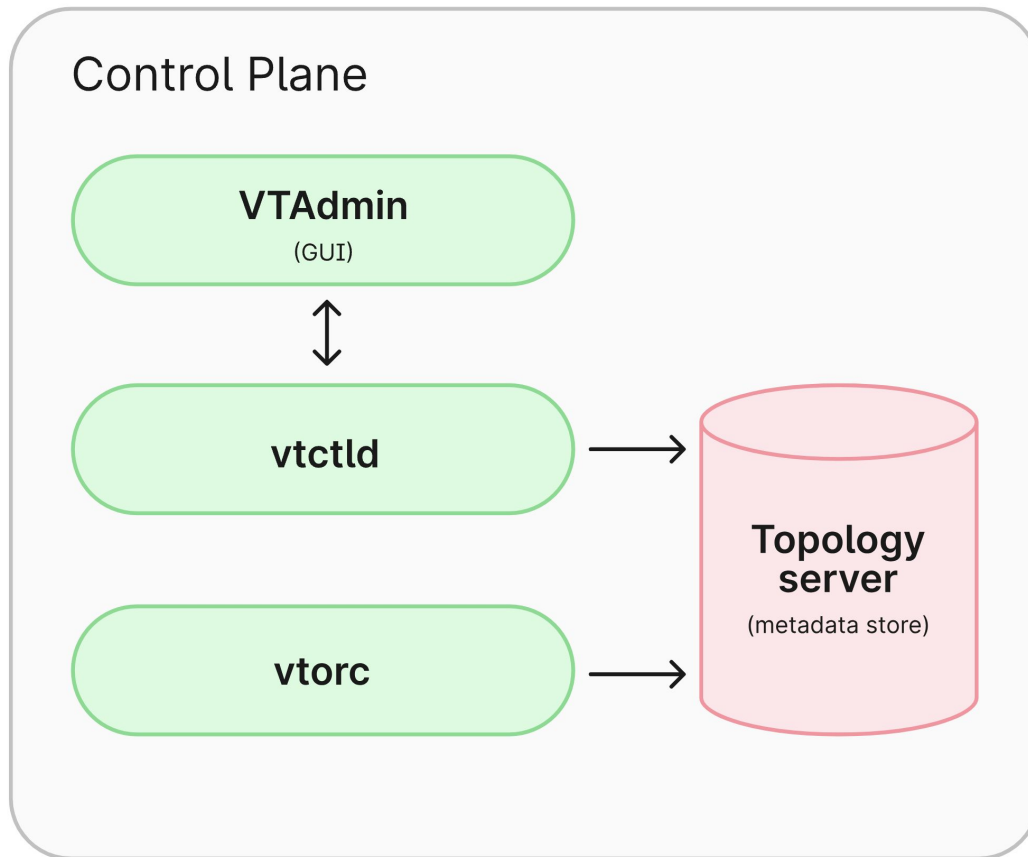
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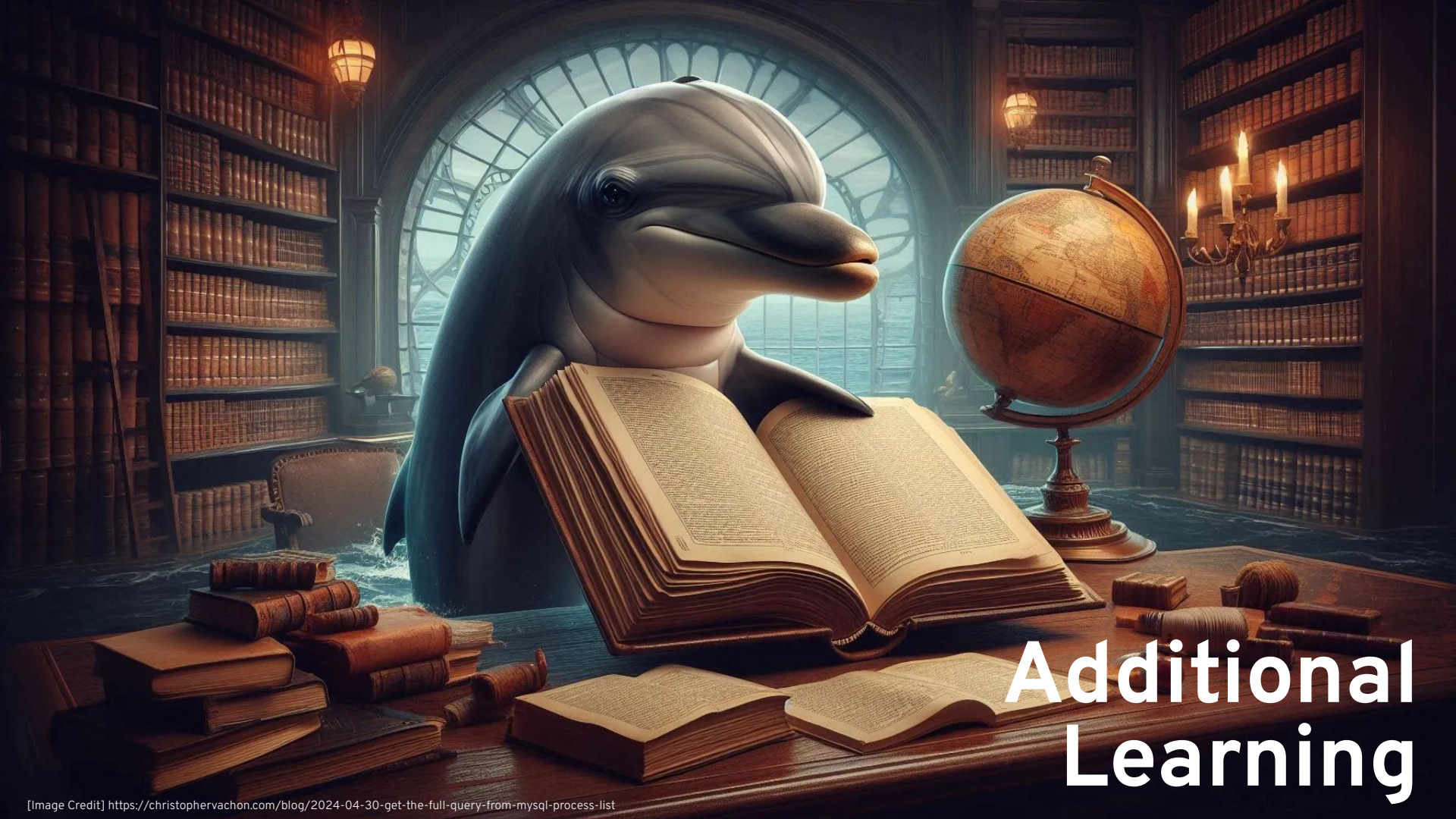
Vitess Runtime





Vitess Control Plane





Additional Learning

What is Vitess?



planetscale.com/learn/courses/vitess



vitess.io/docs/learning-resources/

Vitess in production

Flipkart

GitHub

HubSpot

JD.京东.COM

 Square

 New Relic®

 nozzle

peak

 Pinterest

 PlanetScale

 shopify

 slack

 stitchlabs

Vinted

 Backblaze

Vitess @ BackBlaze

The background of the slide is a solid blue color. Overlaid on this is a stylized, low-poly illustration of a mountain range. The mountains are rendered in various shades of blue, with some peaks being darker and others lighter. Scattered across the mountain slopes are several white snowflake icons. At the base of the mountains, there is a row of dark blue evergreen trees. The overall aesthetic is clean and modern, with a winter theme.

Backblaze is a leader in the open cloud movement

Founded 2007; Public as BLZE 2021

- >500,000 customers worldwide
- >3,000 petabytes
- >250,000 spinning drives

B2 Cloud Storage

- Always-hot S3 compatible cloud object storage
- 100% performance at 1/5 AWS S3 cost
- 3x free egress

AI & applications

Store raw datasets, including training models, LLMs, and application data.

Backup & archive

Safeguard backups for business continuity, disaster recovery, and compliance.

Media management

Keep content instantly accessible from pre- to post-production.

Featured use cases

Old

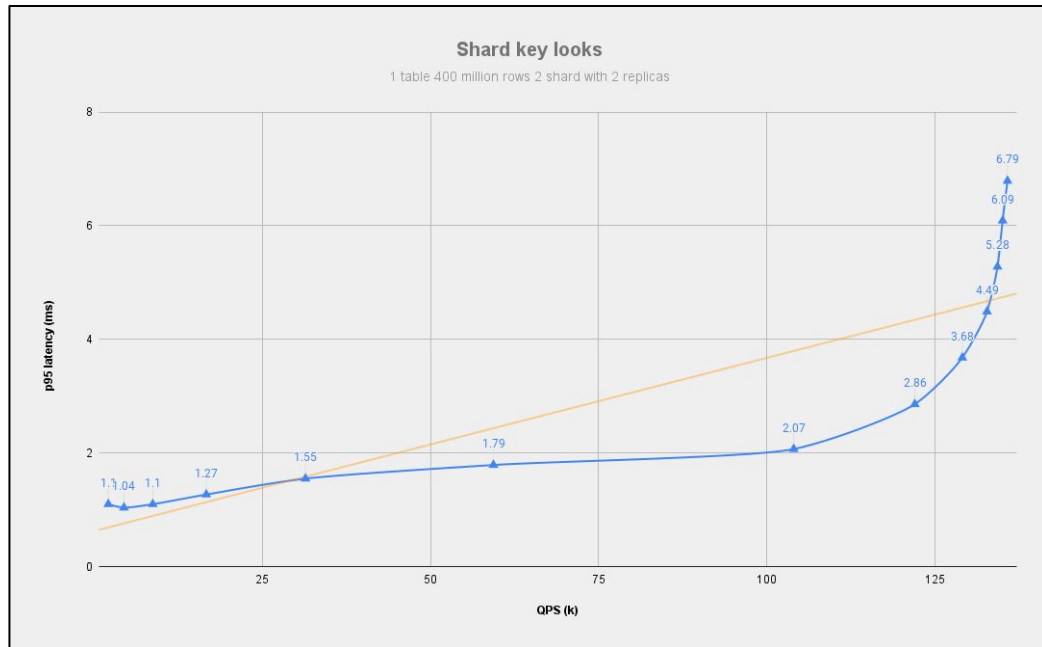
- Doesn't use database
- Expensive “find” operations
- Lengthy backlogs

New

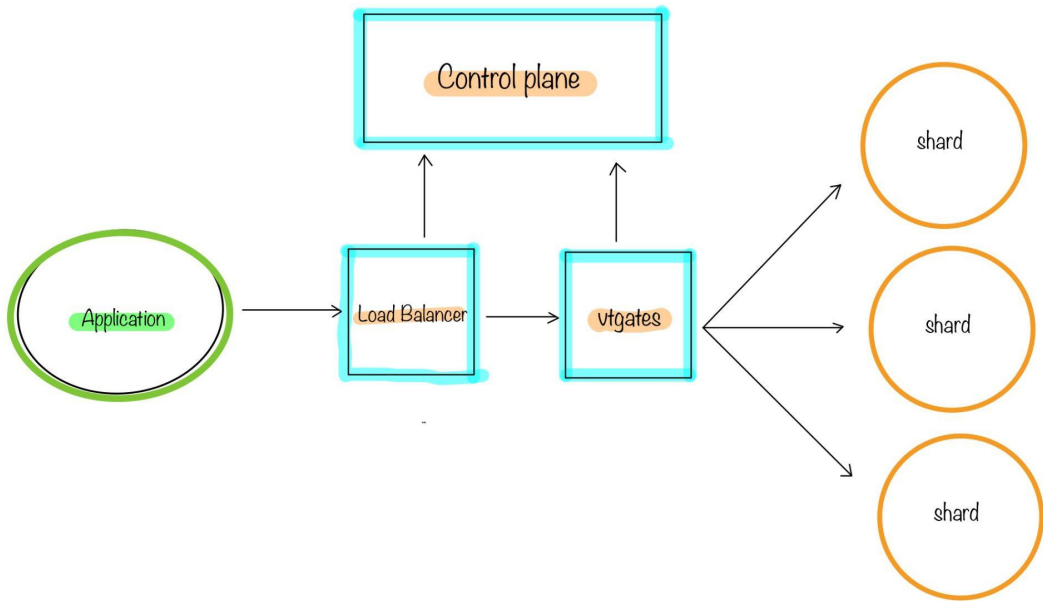
- Uses database
- Frees IOPS
- (8-10)x improvement
- Upload speed improvement
- Millions of savings

Node Configuration & Benchmarking

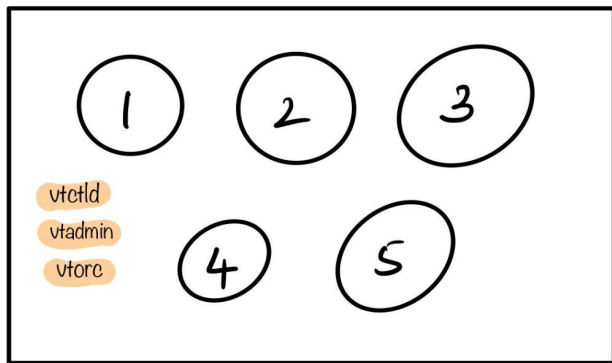
- AMD 16 C / 32 T
- 64GB of Memory
- 2T of NVME
- 25 Gb NIC
- Modified sysbench for tests
- 125k+ QPS



Architecture



Control Plane



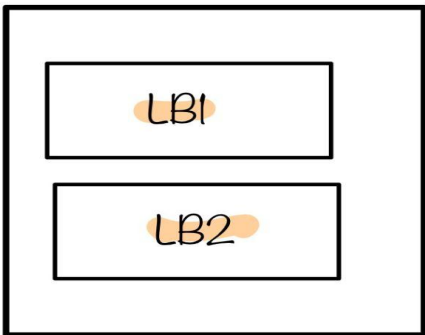
etcd

→ 5 node etcd cluster

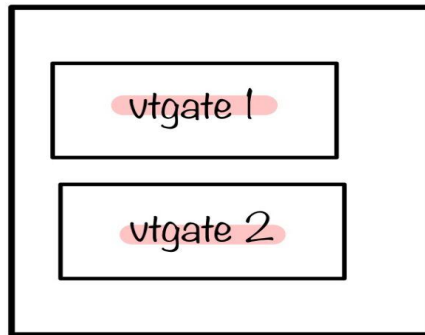
→ node 1 runs vitess admin components

→ VIP for topo address

Load balancer and vtgates

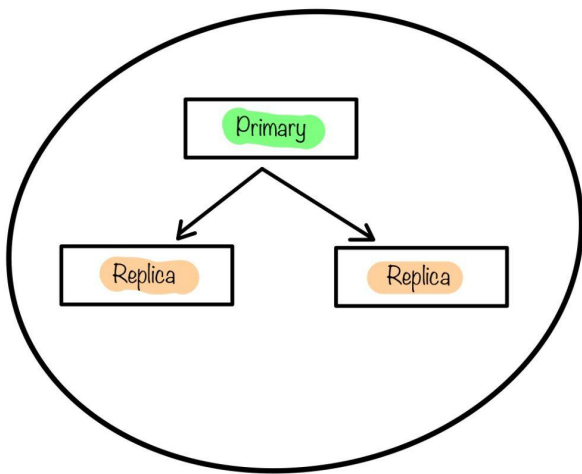


- 2 load balancers per keyspace
- VIP to gates
- VIP to control plane



- 2 gates per keyspace
- round robin of requests
- clients use VIP to access
- more gates can be added

Shard



Each shard consists of:

→ a primary tablet

→ 2 replica tablets

Deployment

- Single cell vitess cluster per DC
- All services converted to **systemd** service
- Ansible playbooks

Monitoring & Alerting

- **node_exporter** for node metrics
- **mysqld_exporter** for MySQL
- Vitess metrics
- Prometheus/Grafana combination
- Zabbix/Grafana for alerting

- Convert to kubernetes
- Automate operational tasks
- In-house DB-as-a-Service (DBaaS)
- Push button service model

New and Upcoming Features

The background of the slide is a stylized winter landscape. It features several jagged, blue mountains of varying heights and shades of blue. Scattered across the mountains are several white snowflakes of different sizes and designs. At the base of the mountains, there is a dark blue silhouette of a forest of evergreen trees. The overall color palette is monochromatic, using various shades of blue and white.

New Features: Query Serving

- Atomic Distributed Transactions (Experimental)
- Recursive CTEs
- Revamped benchmarking website (arewefastyet)
- VEXPLAIN trace and keys
- Balanced query routing to tablets
- UPDATE with LIMIT
- Multi-table and multi-target UPDATE
- Multi-target DELETE
- DELETE with subqueries
- Vindex hints
- Metrics for VTTablet query plan cache hits and misses

New Features: VReplication

- Traffic mirroring during migrations
- Reference table materialization
- Dynamic workflow configuration
- Multi-tenant imports (Experimental)
- Workflow creation and management UI
- ENUM and SET columns in VStream
- Automatic handling of auto_inc columns during migrations
- Improved error handling
- VStream heartbeats and journal events

New Features: Online DDL

- Enum re-ordering
- Instant DDL where possible
- Range partitioning
- Performance improvements
- Multi-metrics throttler
- VDiff for Online DDL
- Error handling improvements
- Usability improvements
- Schemadiff improvements

New Features: Backups, VTOrch etc.

- Support for MySQL 8.4 (Experimental)
- Mysqlshell backups (Experimental)
- ErrantGTID metrics
- Easier configuration of “unmanaged” mode
- Allow cross-cell planned failovers

New Features: K8s operator

- Automated, scheduled backups
- VTGate auto-scaling
- K8s 1.31 support
- Image customization

Upcoming Features

- Performance optimizations
 - Query performance
 - VReplication / Migration performance
- Improved monitoring of workflows
- VSchema decision support

Q&A

