Vitess

The Sharding Solution for MySQL 8

Liz van Dijk - @lizztheblizz

Who am I?

Liz van Dijk - Solution Architect

- Howest University > Percona > PlanetScale
- New to Vitess, MySQL has been my world for 8+ years
- liz@planetscale.com
- **@lizztheblizz**

PlanetScale

- Founded in February 2018
- Venture backed: a16z, SignalFire
- 35 employees mostly in Mountain View, CA

It’s 2020. I blinked, and...

- Containers everywhere. Stateless workloads reign supreme.
- Public Cloud diversification. GCP and Azure are fully fledged counterparts to AWS.
    - Competition is fierce and vendor lock-in is a real risk.
- Container provisioning and orchestration are just as common as full VM. Kubernetes appears to be the new standard.

What is Vitess?

Vitess

- Cloud Native
- Massively Scalable
- Highly Available
- Based on MySQL

Vitess Stats

Started
2010

CNCF
Graduated

200
Contributors

★★★★★
9,500
Stars

v5.0
(4 Feb 2020)

Vitess

18,000
Commits

1100
Slack Members

1200
Forks

Key Adopters

YouTube

slack*

JD.COM

Square*

Pinterest*

HubSpot*

nozzle*

GitHub

New Relic.

Flipkart

stitchlabs

peak GAMES

* Employing Active project maintainers

Vitess' Vital, but Vexing Vocabulary

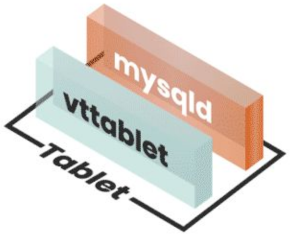
- Think of Vitess as an extension bolted on to MySQL, both from the Dev and the Ops points of view.

- Various components coming together

- We will break down Infrastructural and Logical concepts

Tablet

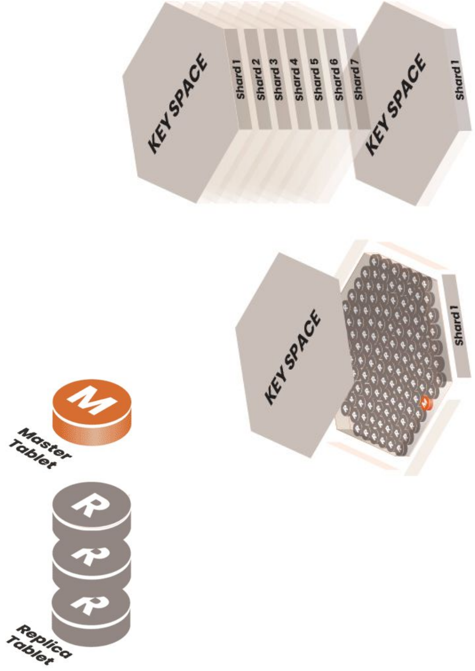
- Most basic “worker” unit of a Vitess Cluster
- MySQL Server may be any flavour
- **VTTablet** is a *sidecar process*
- Tablets can fulfill multiple roles
  - Master
  - Failover Replica
  - Analytics Replica



https://vitess.io/docs/concepts/tablet/

Keyspace & Shards

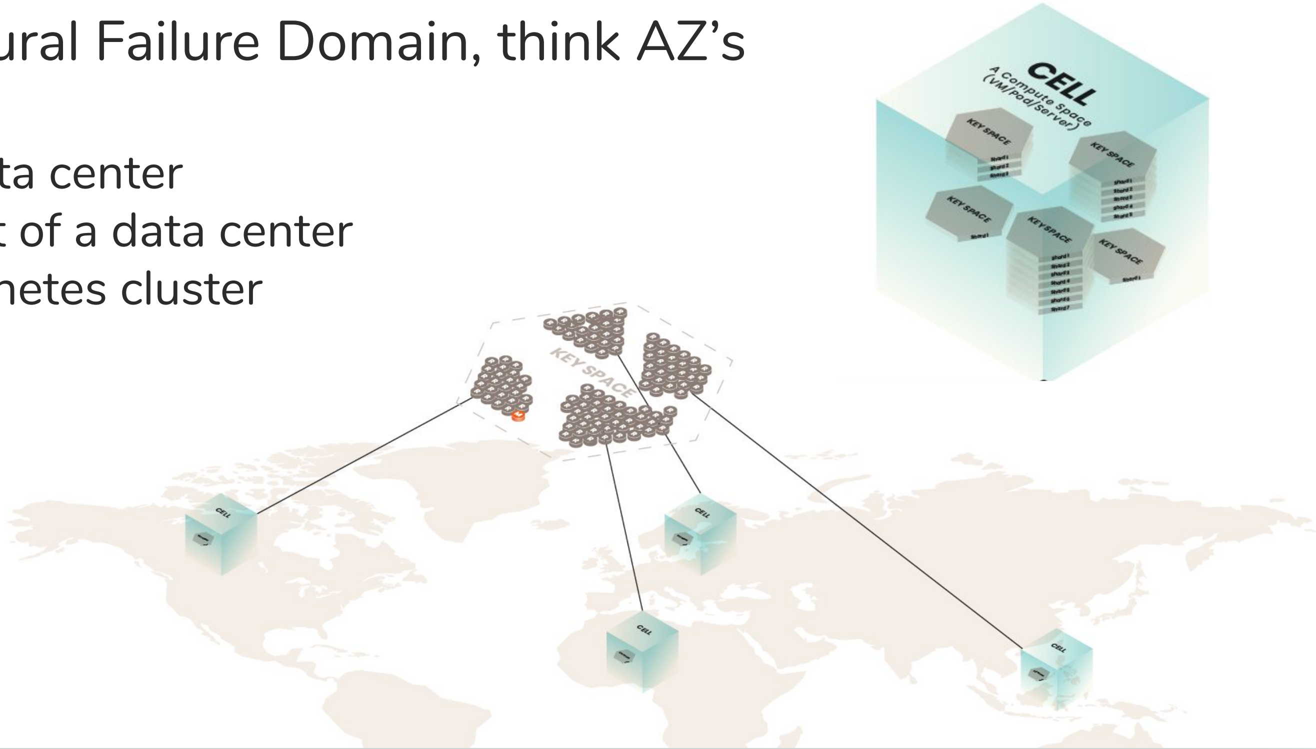
- **Keyspace** is an analog to what we call a *logical database.*
- A single keyspace can be logically divided into **Shards**, internally identified by a **Keyspace ID**.
- Keyspaces don't *need* to be sharded.
- A Keyspace Shard will contain 1 Master Tablet and as many Replica Tablets as desired.



https://vitess.io/docs/concepts/keyspace/
https://vitess.io/docs/concepts/shard/

Cell

- Infrastructural Failure Domain, think AZ’s
- Examples:
    - a full data center
    - a subset of a data center
    - a Kubernetes cluster



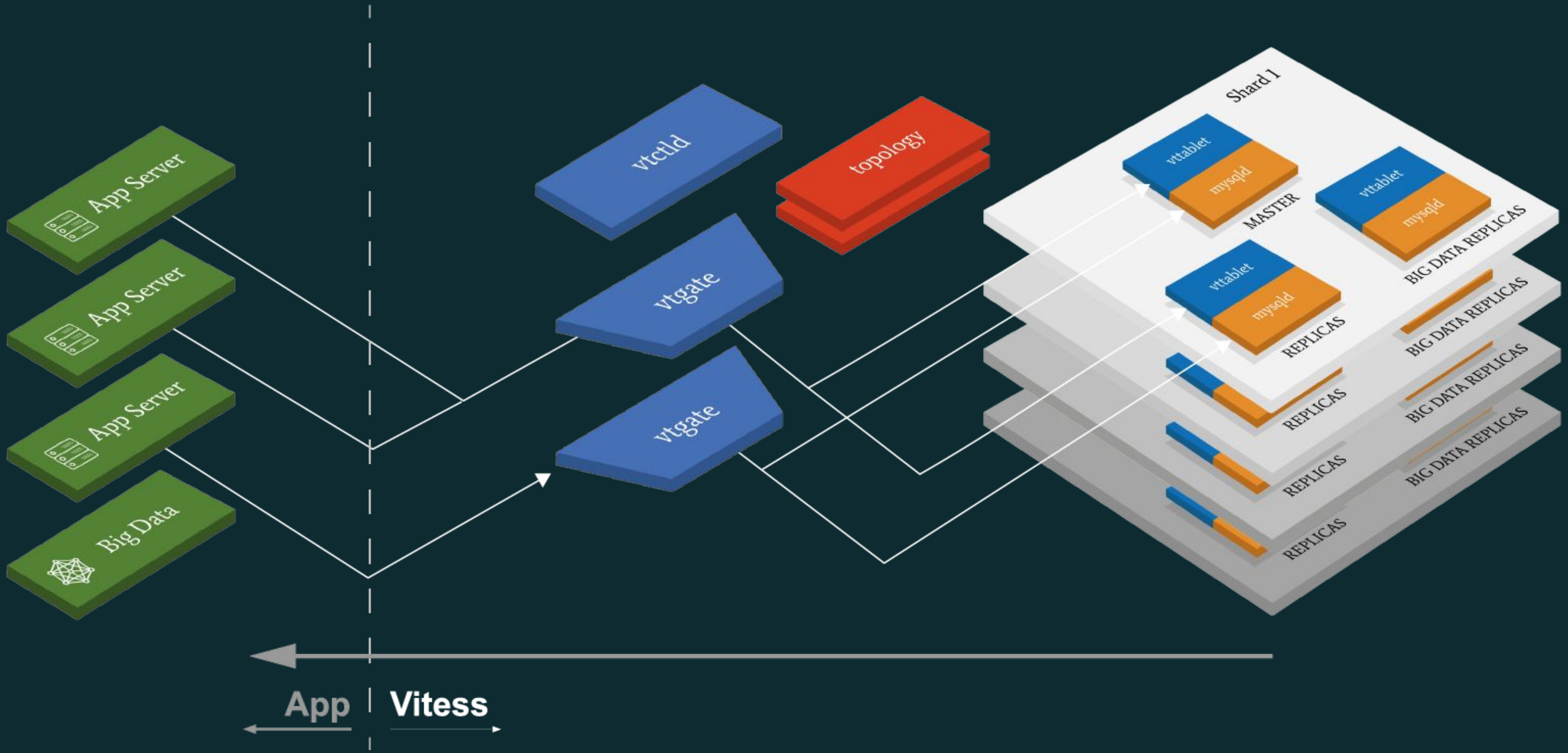
https://vitess.io/docs/concepts/cell/

VTGate

- **VTGate** is a stateless proxy, and the entry point into the cluster
  - Speaks MySQL protocol as well as gRPC
  - Can be connected to and presents the cluster as a monolithic database
  - Interprets SQL and supports Vitess-specific hints
  - Considers the cluster topology and routes requests accordingly

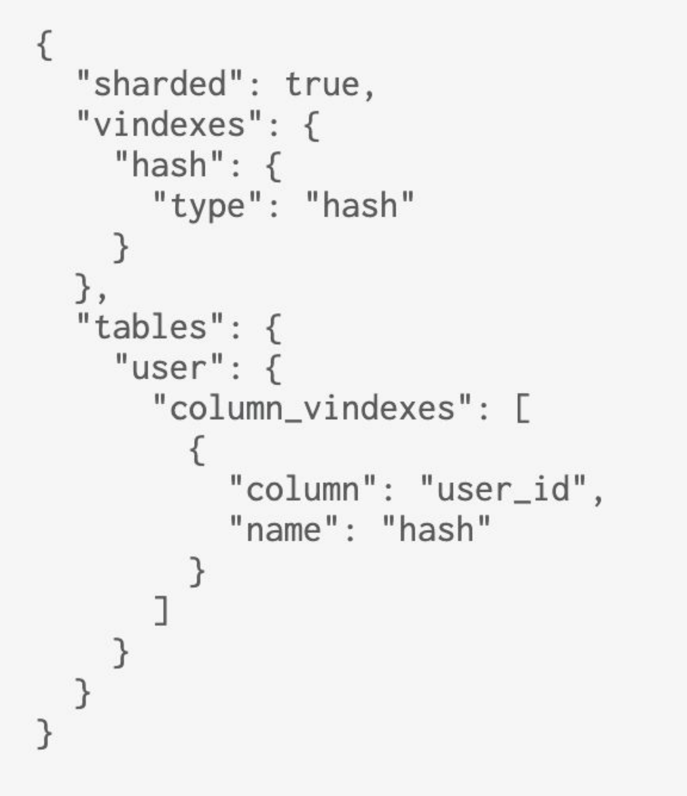
https://vitess.io/docs/concepts/vtgate/

Architecture



VSchema

- Extension of the database schema as we know it
- JSON format
- Describes sharding logic & additional Vitess functionality like sequences

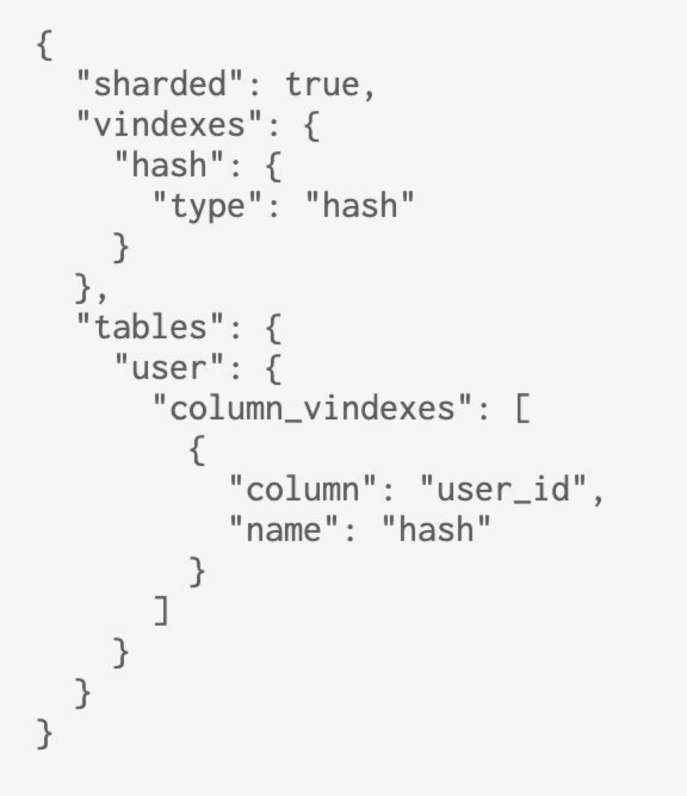


```
{
  "sharded": true,
  "vindexes": {
    "hash": {
      "type": "hash"
    }
  },
  "tables": {
    "user": {
      "column_vindexes": [
        {
          "column": "user_id",
          "name": "hash"
        }
      ]
    }
  }
}
```

https://vitess.io/docs/concepts/vschema/

VIndex

- Builds the bridge between a table's column values and the correct Keyspace ID
- Sharded tables should have at least a Primary **VIndex**, but many secondary VIndex types are available.



```
{
  "sharded": true,
  "vindexes": {
    "hash": {
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    }
  },
  "tables": {
    "user": {
      "column_vindexes": [
        {
          "column": "user_id",
          "name": "hash"
        }
      ]
    }
  }
}
```

https://vitess.io/docs/concepts/vindex/

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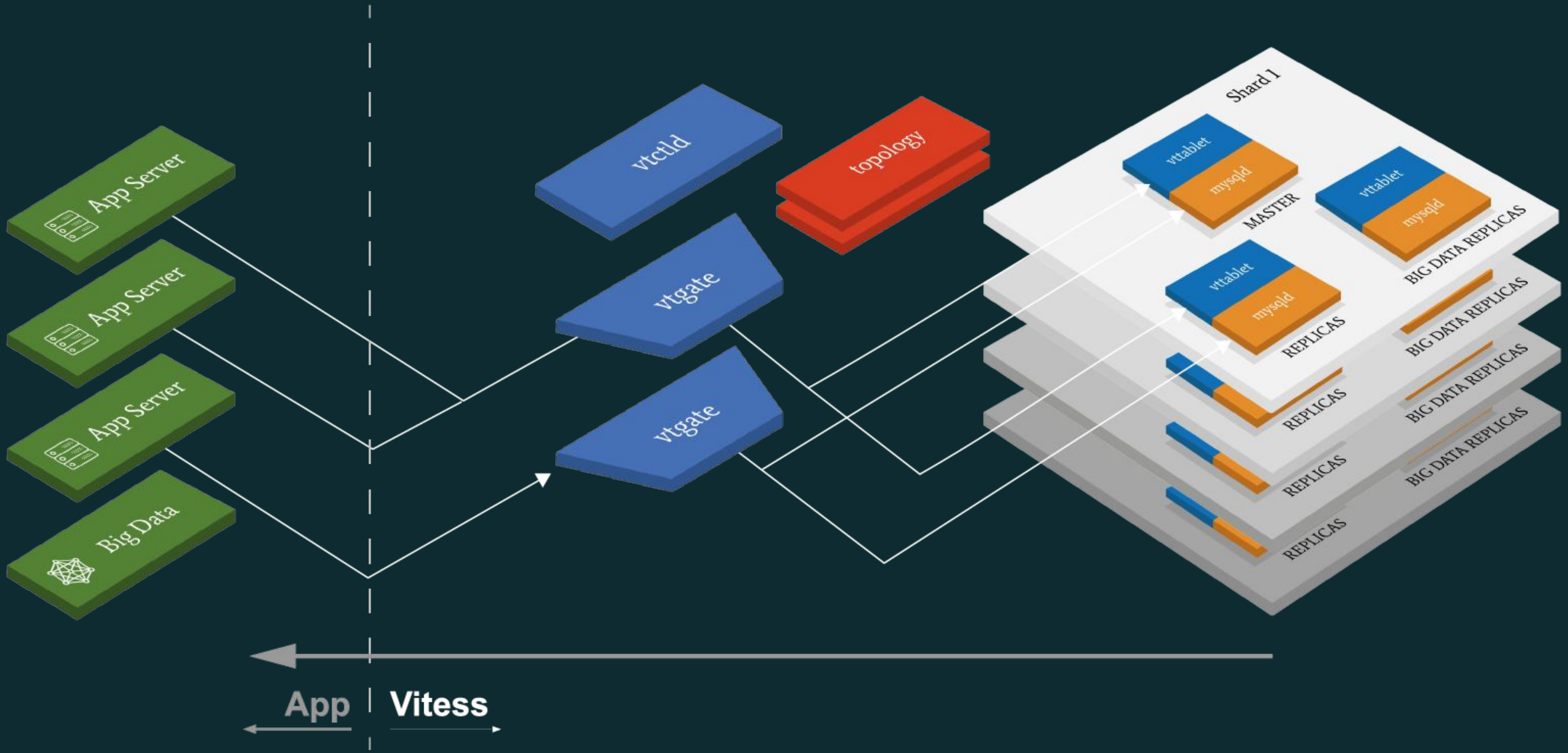
DEMO

Architecture



One more thing...

- Running Vitess on Kubernetes just got a whole lot easier
    - https://github.com/planetscale/vitess-operator

- We eat our own dog food and make sure it stays fresh.
    - PlanetScale CNDb runs on this operator
    - We have 3 dedicated contributors

- Eager to get feedback. Please try it out and tell us all about it!

Call us, maybe?

- **Project website:** vitess.io
- **Official docs:** vitess.io/docs
- **Slack Community:** vitess.io/slack - Highly recommended!

Come say hi at:

- SCALE18x
- KubeCon EU
- Percona Live Austin ... ?

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Questions?

Concepts: Sharding Functions

Or, add your own custom sharding function!

binary	Identity
binary_md5	md5 hash
hash	3DES null-key hash
numeric	Identity
numeric_static_map	A JSON file that maps input values to keyspace IDs
unicode_loose_md5	Case-insensitive (UCA level 1) md5 hash
reverse_bits	Bit Reversal