The Bones of High Availability

Setting Expectations

RPO

Recovery Point Objective
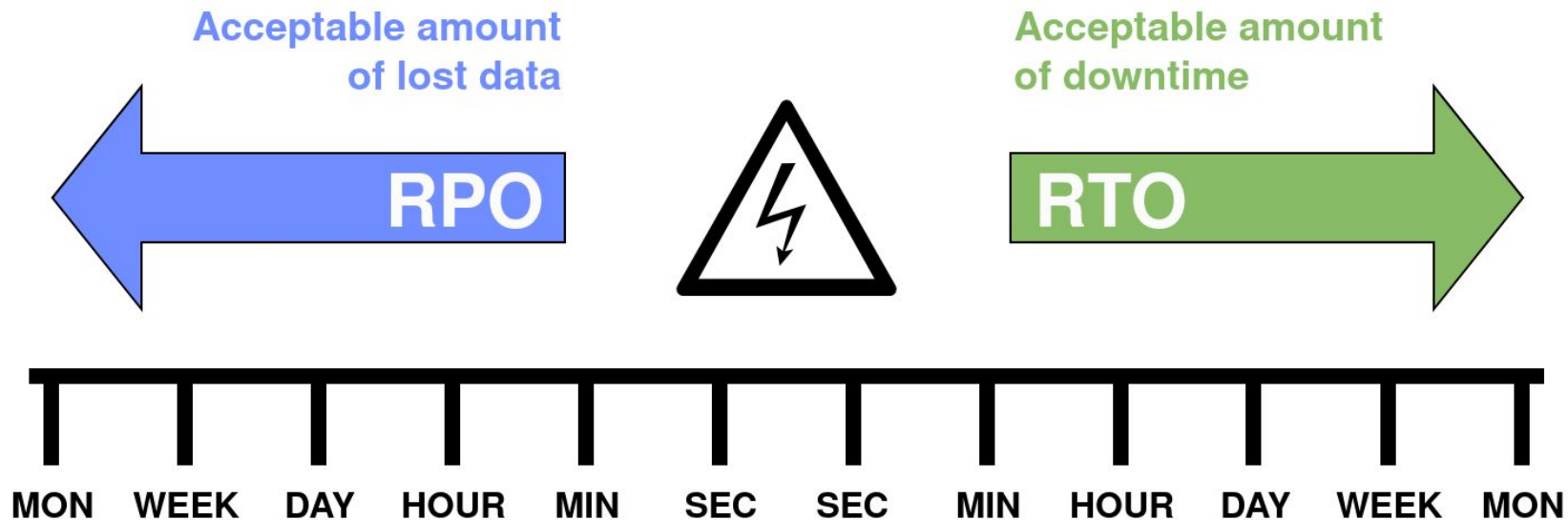
RTO

Recovery Time Objective

Percent	Per Year	Per Day
99%	3.7 days	14 minutes
99.9%	8.8 hours	86 seconds
99.99%	53 minutes	8.6 seconds
99.999%	5.3 minutes	0.86 seconds

RPO and RTO at a Glance

Acceptable amount of lost data

RPO

Acceptable amount of downtime

RTO

MON WEEK DAY HOUR MIN SEC SEC MIN HOUR DAY WEEK MON

Glossary

What is High Availability?

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What is HA?

What is it, really?

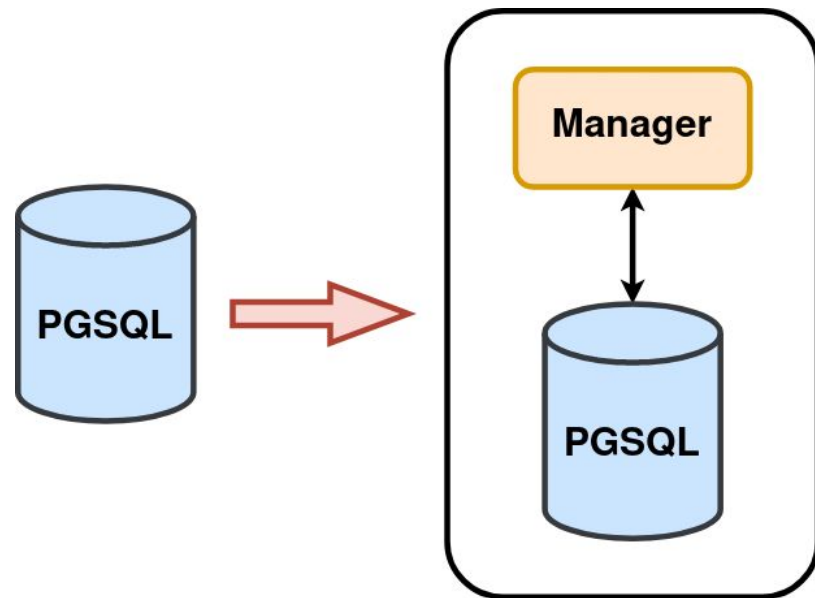PHASE 1 · PHASE 2 · PHASE 3

Stay Online · ? · Profit

What is Quorum?

A bit odd

What is a Node?

What are Bones?

Fun Fact:
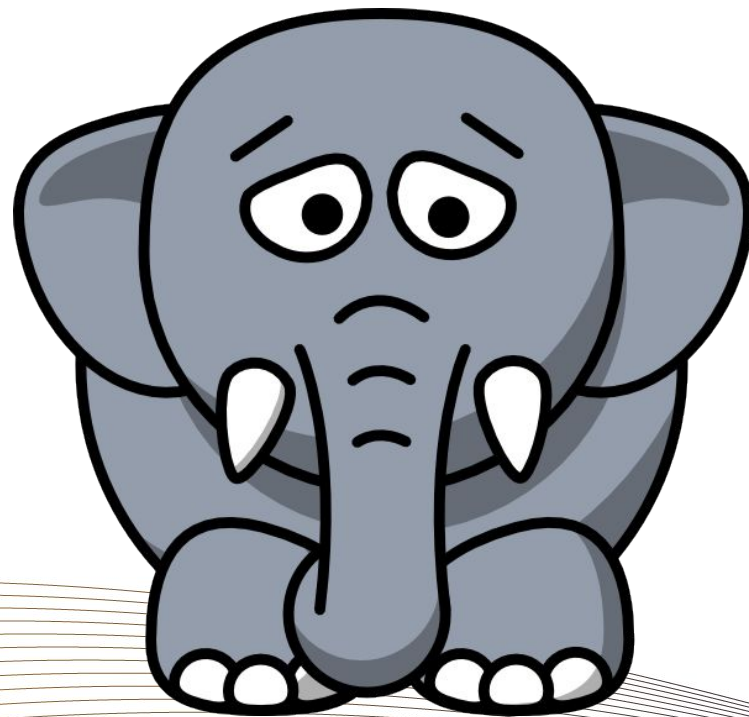You contain a spooky skeleton!

Giving Postgres Bones

EDB
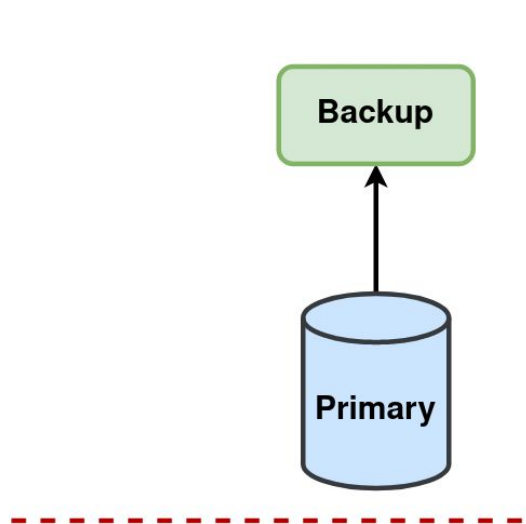
One is the Loneliest Number

Poor Postgres

Just look at him!

Eggs in One Basket

1. What happens if the node fails?
2. Where are backups in this scenario?
3. These actually exist "in the wild"

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Two Can Be as Bad as One

Zone 1

Backup

Primary

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Preventing Utter Disaster

3 – 2 – 1 Backup rule

3 copies of your data	2 different media	1 copy off site

What About Backup Software?

Barman

pgBackRest

- WAL archival
- WAL streaming
- Compression
- Incrementals
- Cloud options

- WAL archival
- Encryption
- Compression
- Incrementals
- Cloud options

Three Isn't a Crowd

Zone 1
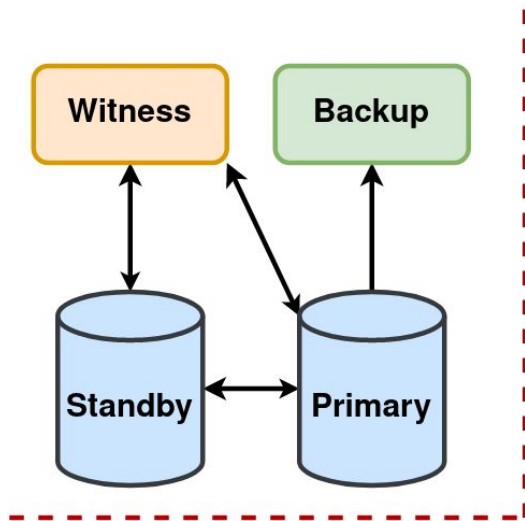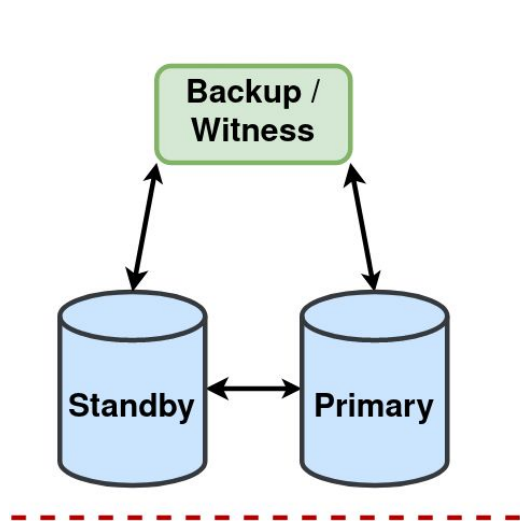
Backup

Standby ← Primary
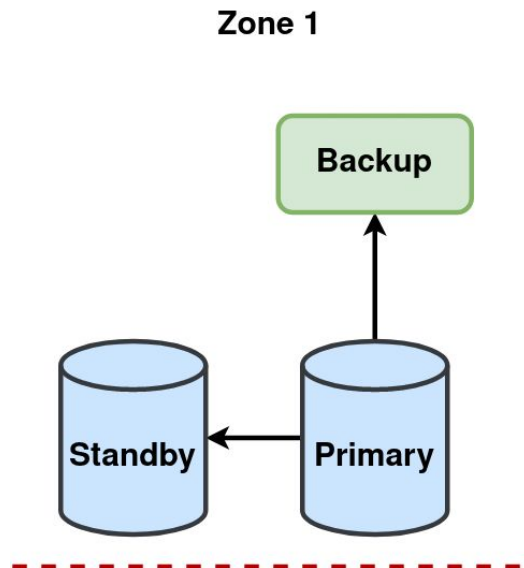
Three Amigos?

- Should we try to match hardware?
- Why isn't it safe to automate this?
- What does the RTO look like now?
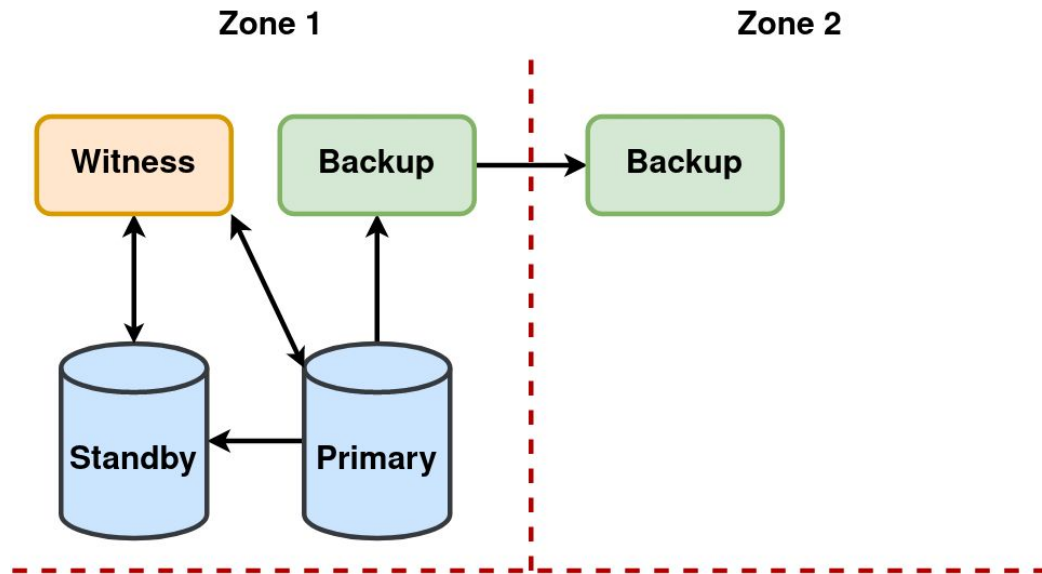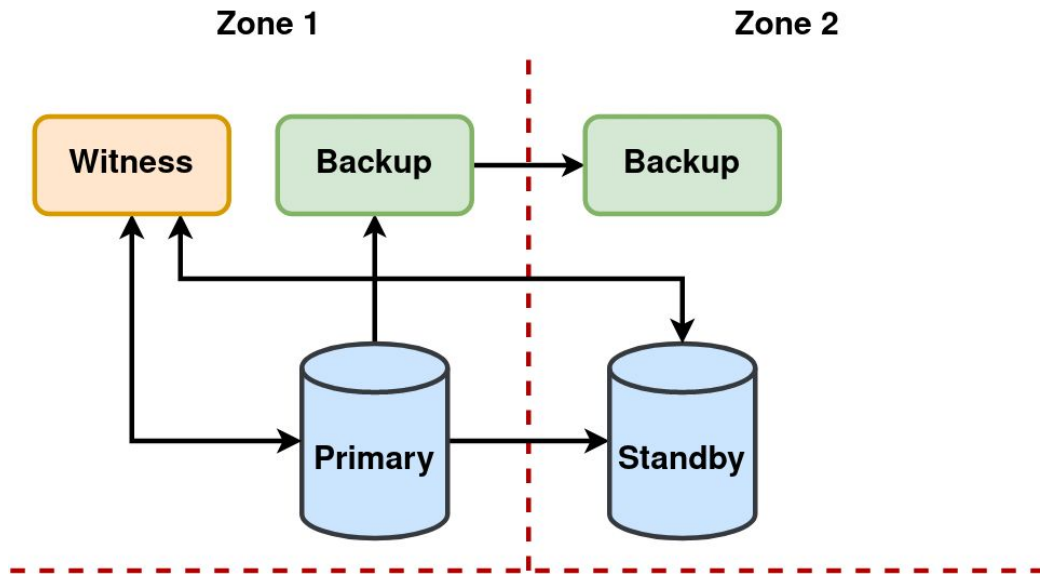
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Remember our Quorum

I Need a Witness

- Our first real HA cluster
- Remember the Management software
- What makes this better than the last example?

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One for the Road

Two for the Road?

But Why?

"Anything that can go wrong, will go wrong"

- **Murphy's Law**

"... and at the worst possible time."

- **Finagle's Law**
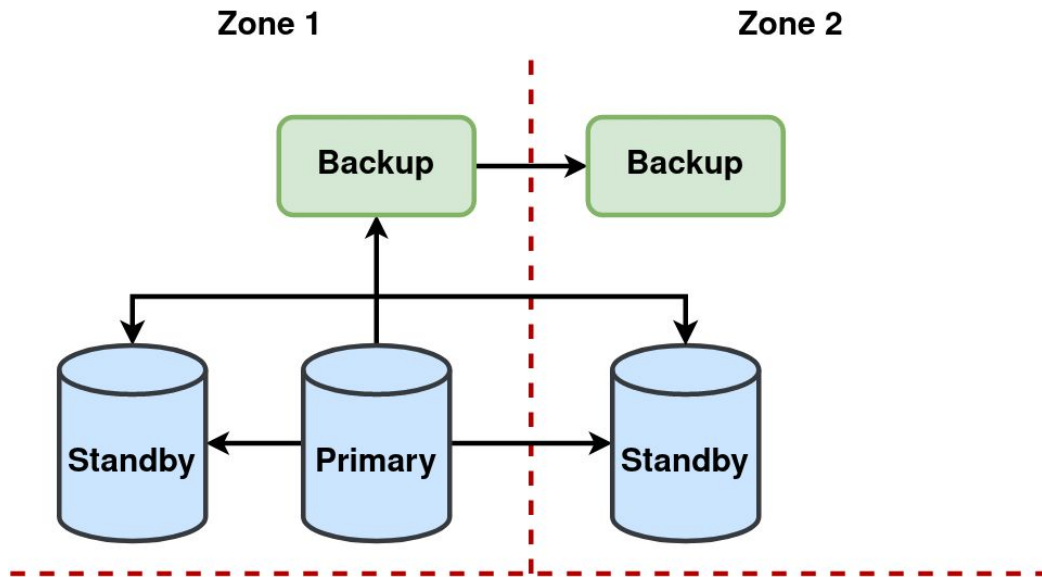
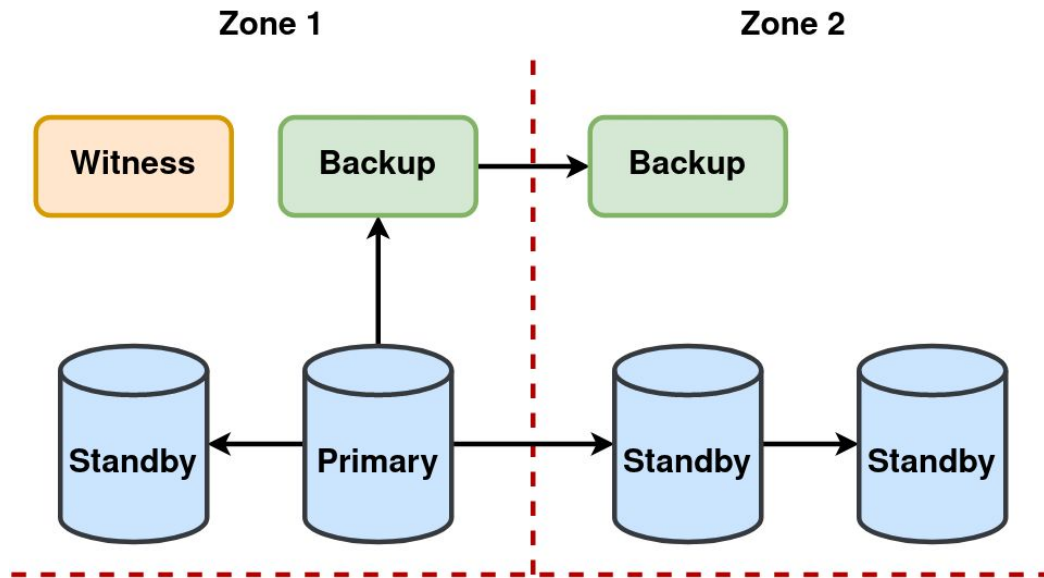# Floods!

Earthquakes!

Tornados!

Backhoes!

What's Missing?

Five… Golden… Servers!

Skipping Six

Maintaining Quorum

- Why did we add the witness again?
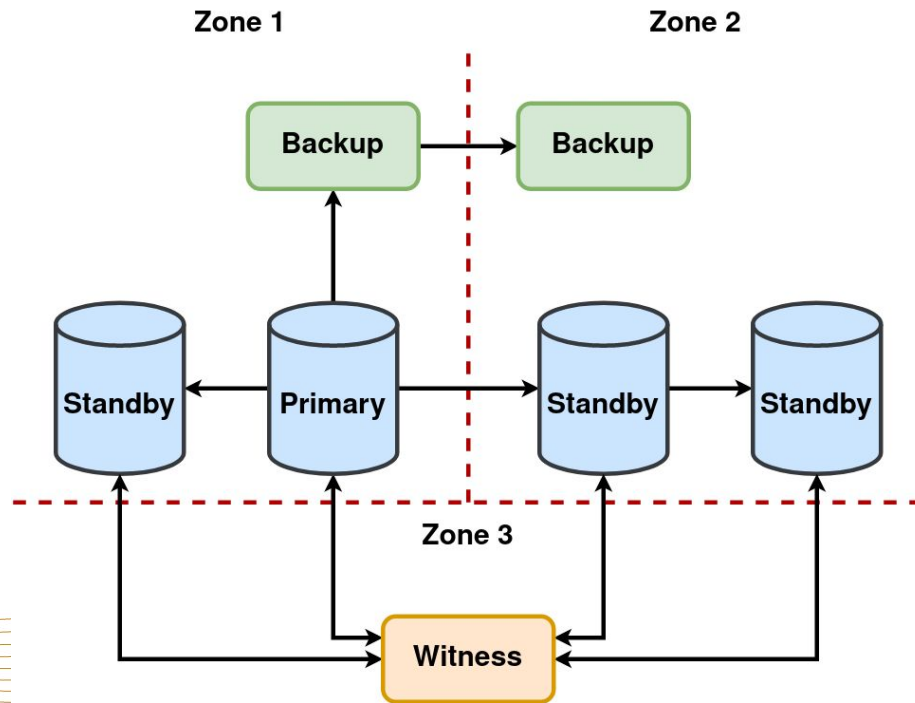- What happens if Zone 1 fails?

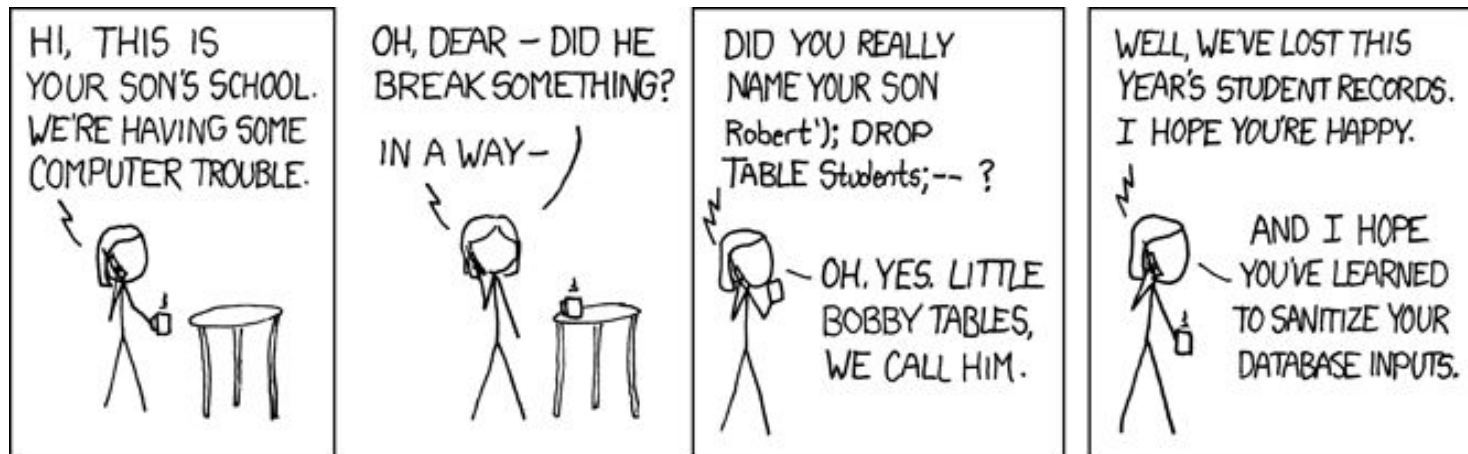# Something is Missing
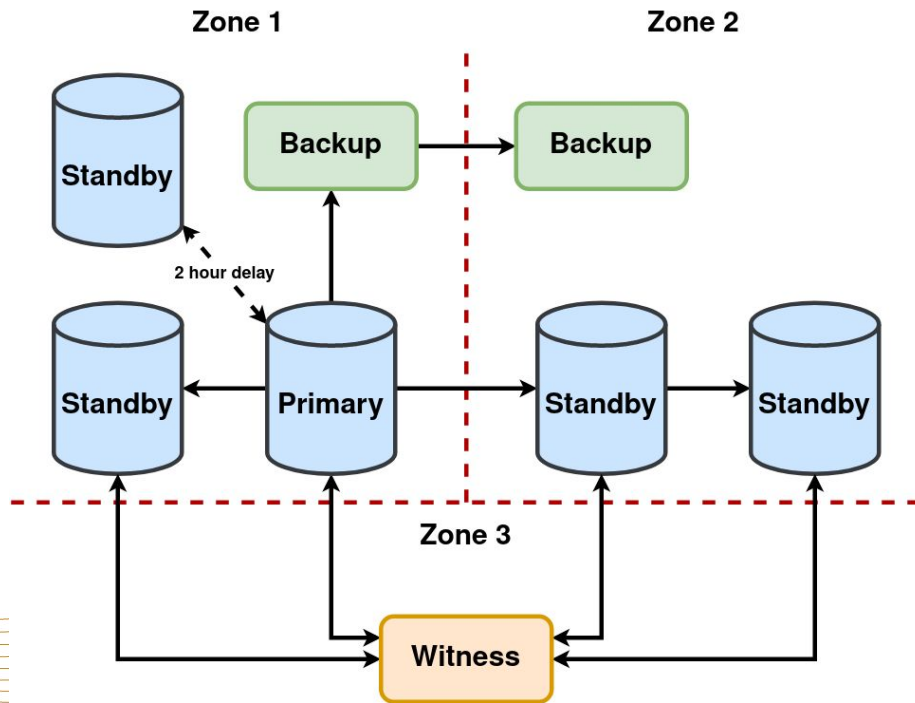
What can we add?

Round and Round we Go

All's Well that Ends Well

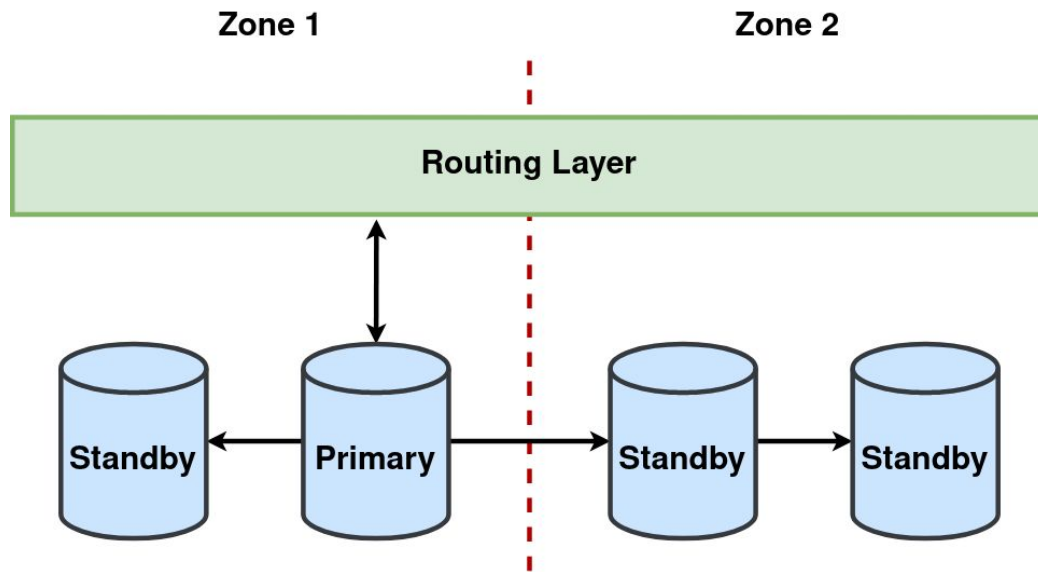# Sudden Synchronization

When the Worst Happens

Delayed Gratification

- recovery_min_apply_delay parameter
- Goes well with:
    - pg_wal_replay_pause()
    - pg_wal_replay_resume()

Routing
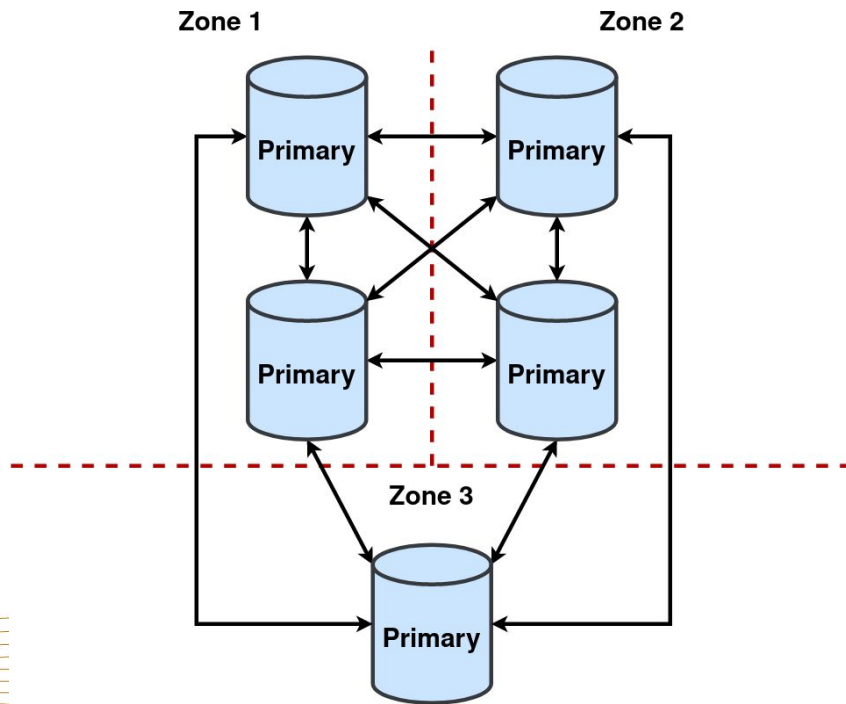
Indirection!

Traffic Controller

- Controlled by HA management service
- PgBouncer
- Pgpool-II
- HAProxy (Patroni)
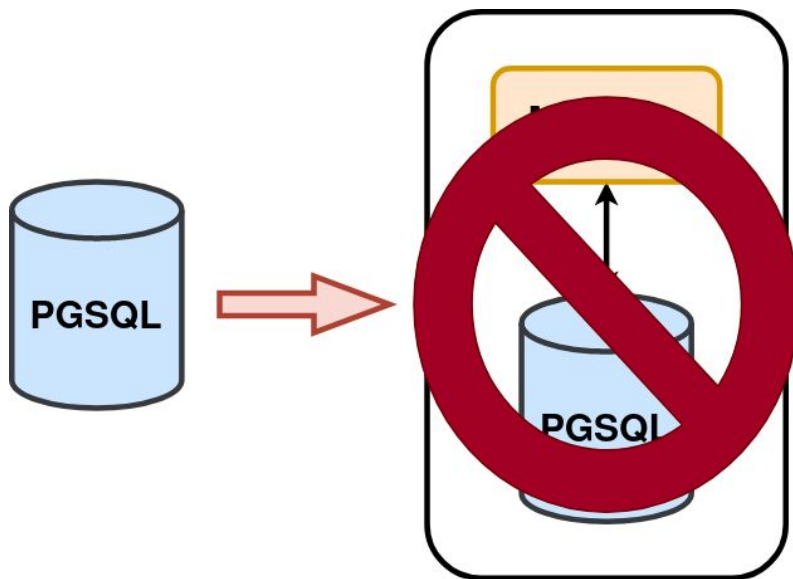- Load balancer

Hive Mind

Multi-Master Logical Replication

The Final Cog

- Near instant failover (no promotion)
- Zero downtime major version upgrades
- Simplified routing
- And…

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No more of this!

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Alternatives

Why Bother?

"All of that looks really complicated. I think I'll just use Firebase instead."

-   **THAT Conference Attendee**

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Postgres Expertise

Expertise beyond the generalist cloud provider; we help steer the database roadmap and patch its bugs

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Leave Oracle and further your cloud journey with a fully managed Postgres service

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Managed Services

- High Availability
- Routing
- Backup
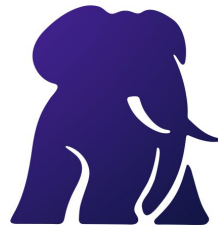
Kubernetes Operators

- Configure with Yaml
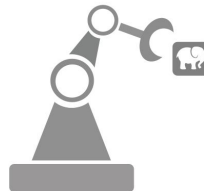- Manage whole cluster
- Many to choose from

EDB CloudNativePG

Crunchy Data PGO

Zalando postgres-operator

More Kubernetes Operators

Percona Operator for PostgreSQL

AppsCode KubeDB

OnGres StackGres

Join us for Part 2

Register Today

How to Achieve Zero Database Downtime

August 31st @ 11am ET

How to achieve up to five 9s availability on your Postgres implementation

Gianni Ciolli
VP of Solutions Architecture
& Field CTO

END

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