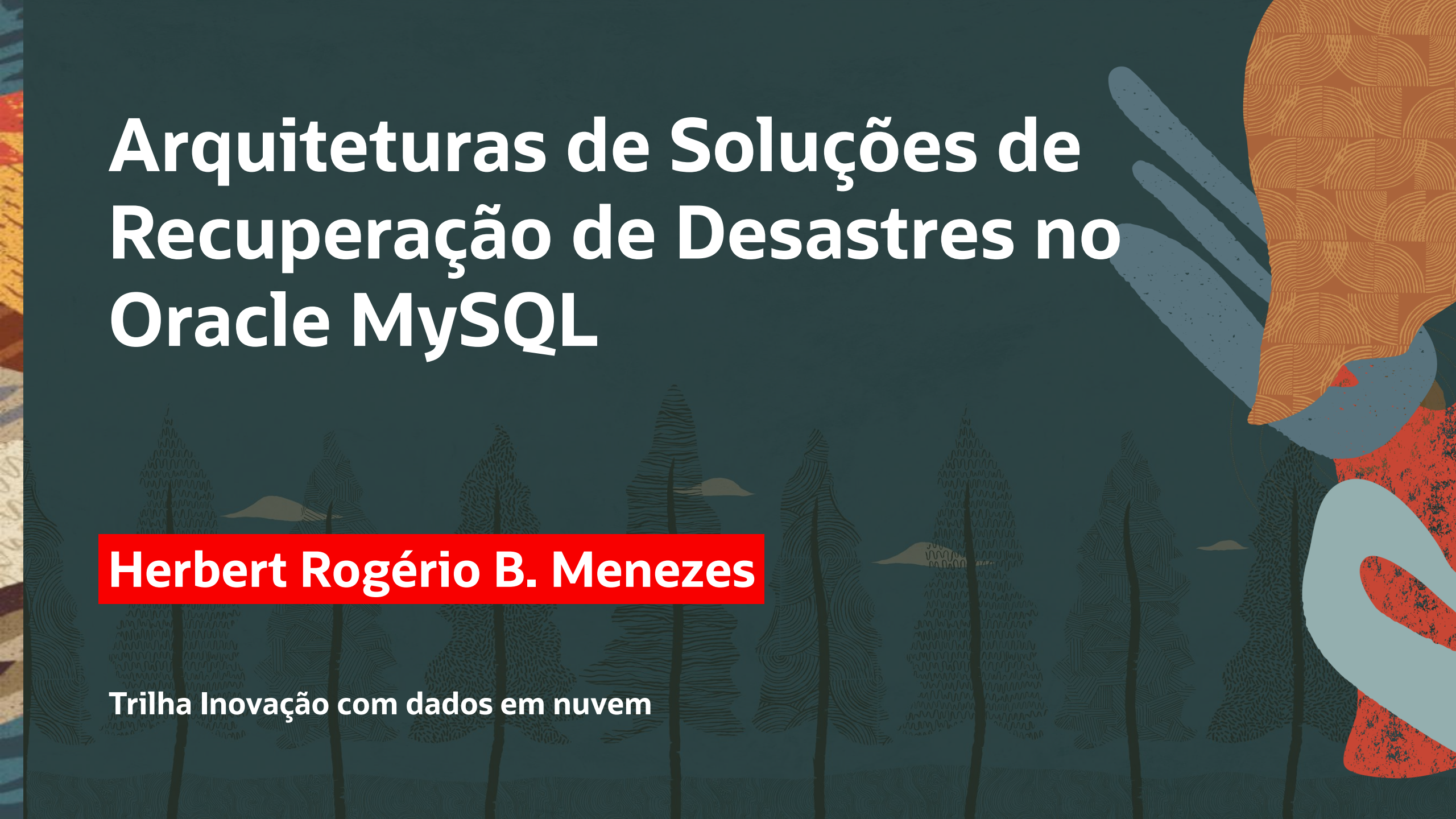
Arquiteturas de Soluções de Recuperação de Desastres no Oracle MySQL

Herbert Rogério B. Menezes

Trilha Inovação com dados em nuvem



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Trilha Inovação com dados em nuvem

Herbert R. B. Menezes

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ORACLE Certified Professional

MySQL 5.7 Database Administrator OCP

ORACLE Certified Associate Oracle Cloud Infrastructure Architect 2020

TDC ONLINE Sala ORACLE

Inovação com dados em nuvem

PALESTRANTE

#TheDevConf Oracle

Agenda

1. Introdução ao Oracle MySQL
2. Arquiteturas de Recuperação de Dados com MySQL
3. Demo: Como criar uma arquitetura de DR do MySQL na OCI

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1. Introdução ao Oracle MySQL
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Top 10 Database Management System

DB-Engines Ranking* (DB-Engines.com Nov, 21)

1. ORACLE
2. MySQL
3. Microsoft SQL Server
4. PostgreSQL
5. mongoDB
6. redis
7. IBM DB2
8. elastic
9. SQLite
10. Apache CASSANDRA

*DB Engines measure system popularity by monitoring search engines queries, frequency of online discussions, Jobs in which the system is mentioned, social media mentions and other sources.

É bem provável que você use o MySQL...

Social Network	ECommerce	SaaS	Financial	Manufacturing
facebook	Booking.com	AppDynamics	Bank of America	TESLA
Twitter	NETFLIX	GitHub	J.P.Morgan	Volkswagen
LinkedIn	UBER	HubSpot	citi	TOYOTA
YouTube	airbnb	zendesk	Fidelity INVESTMENTS	SIEMENS
WeChat 微信国际营销平台	淘宝网 Taobao.com	intuit mint	VISA	CAT
Pinterest	Alibaba.com	New Relic	Crédit Agricole	


MySQL™
1995
MySQL™
ORACLE
2010
2020
2021
MySQL™
8.0
2018

MySQL™
Community Edition

GPL2 License Model

MySQL™
Enterprise Edition

- Oracle Premier Support
- Suporte Consultivo
- MySQL Enterprise Monitor
- MySQL Enterprise Backup
- MySQL Enterprise DataMasking
- MySQL Enterprise Audit
- MySQL Enterprise Firewall
- MySQL Enterprise Encryption
- MySQL Enterprise TDE
- MySQL Enterprise Authentication
- MySQL Enterprise Thread Pool

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1. Introdução ao Oracle MySQL
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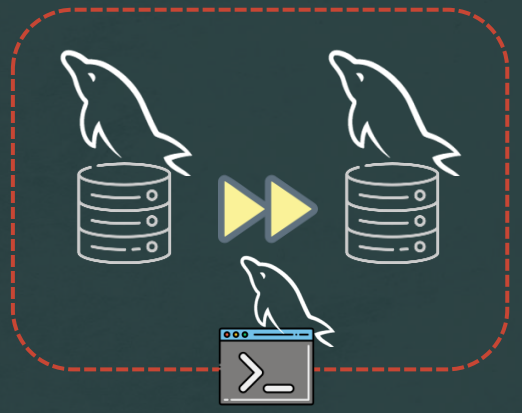
3. Demo: Como criar uma arquitetura de DR do MySQL na OCI

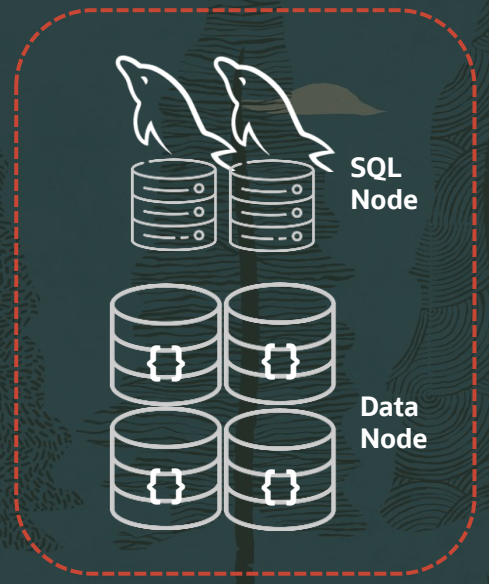
Em Ambiente On-Prem ou Infrastructure-As-A-Service

Replicação Source-Replica

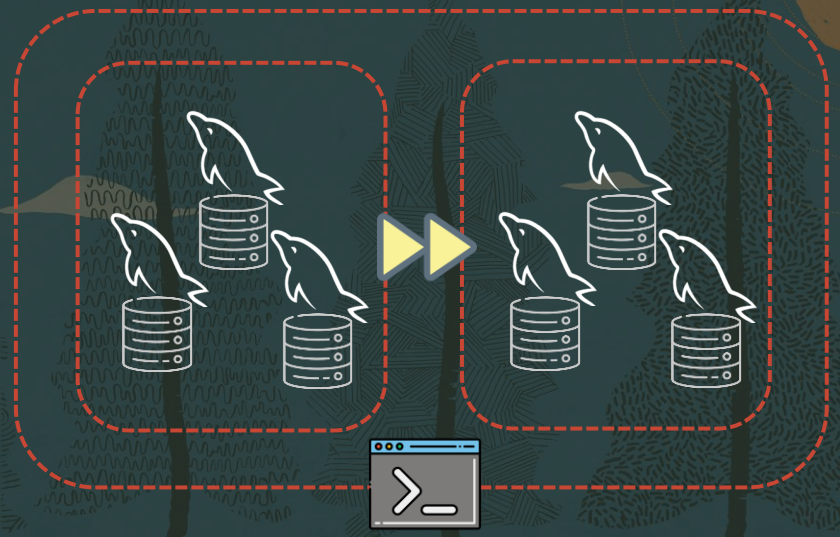


InnoDB ReplicaSet

InnoDB Cluster



NDB Cluster

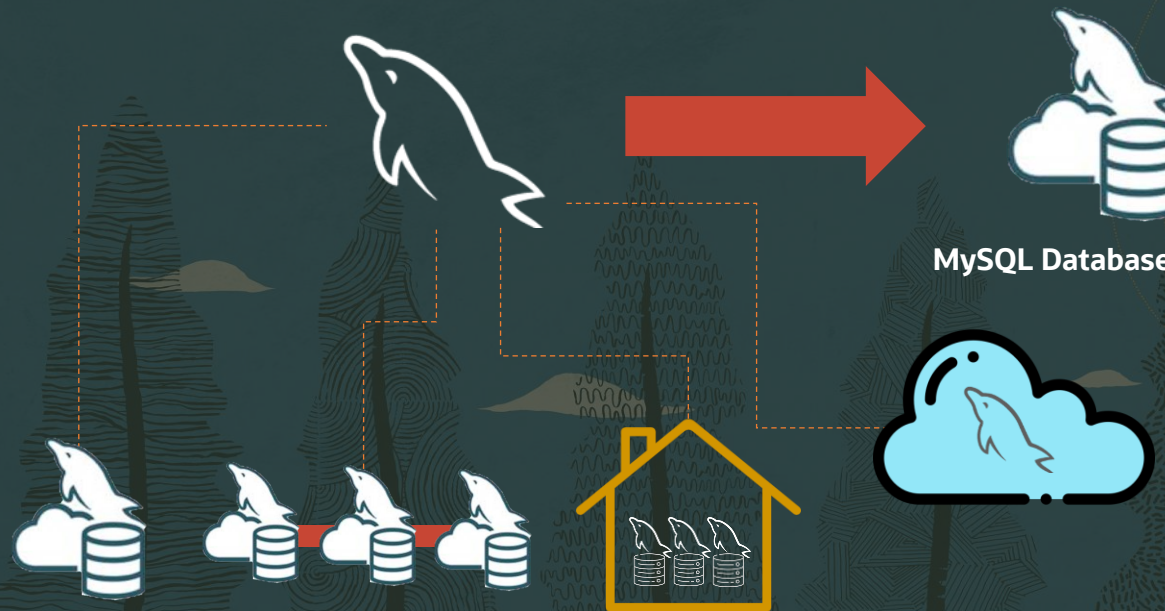


InnoDB ClusterSet

MySQL Database Service na Oracle Cloud Infrastructure

MySQL Database Service
com Alta Disponibilidade

Replicação Source-Replica



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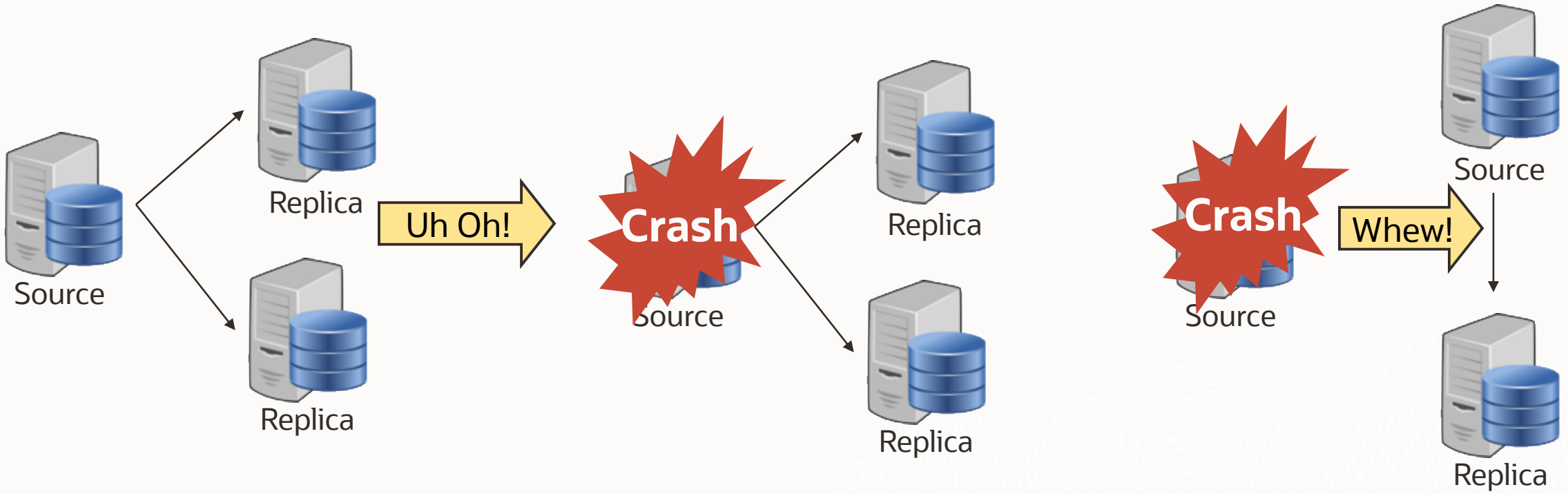
MySQL Replication Overview

Background: Popular Solutions

Redundancy: If Source crashes, **promote** Replica to Source



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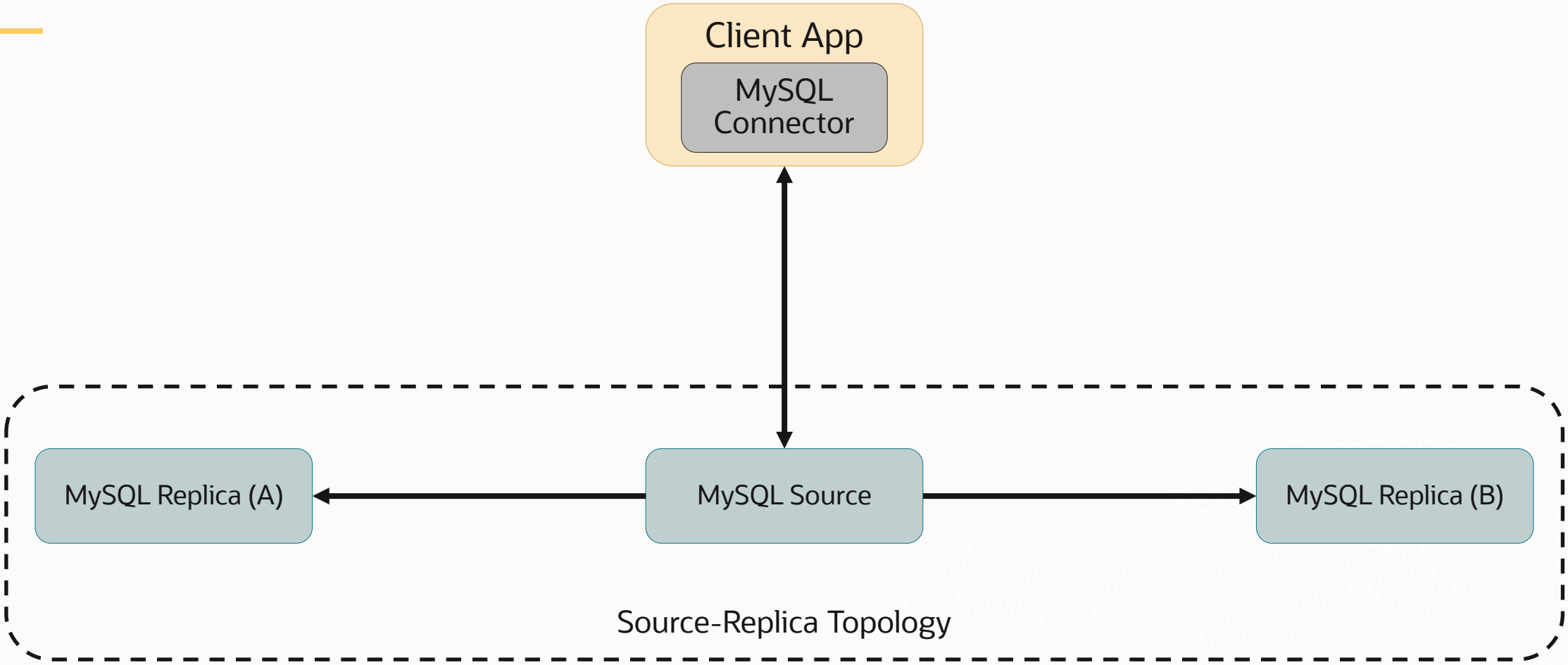
MySQL InnoDB Cluster

What is MySQL InnoDB Cluster?

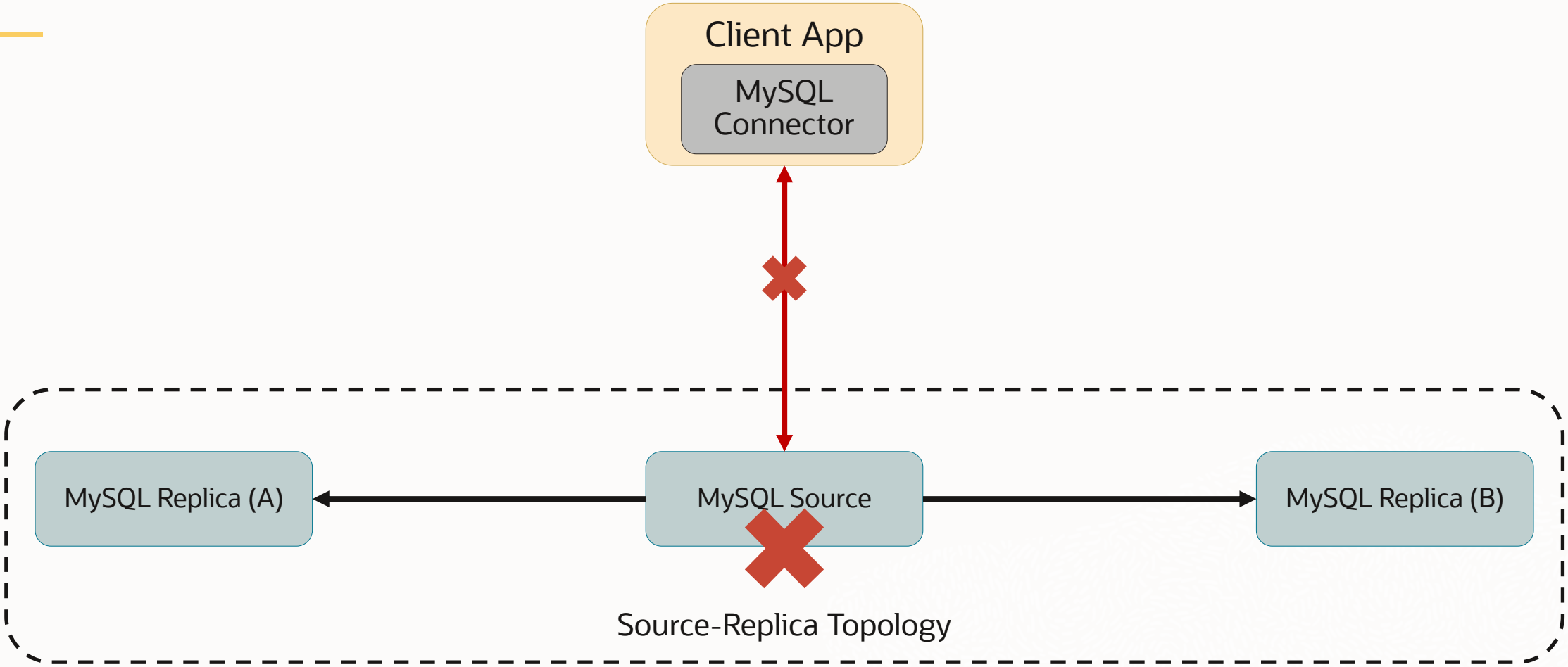
"A single product [MySQL] with high availability and scaling features baked in; providing an integrated end-to-end solution that is easy to use."

What does MySQL InnoDB Cluster Solve?

Traditional MySQL Replication (file/position)

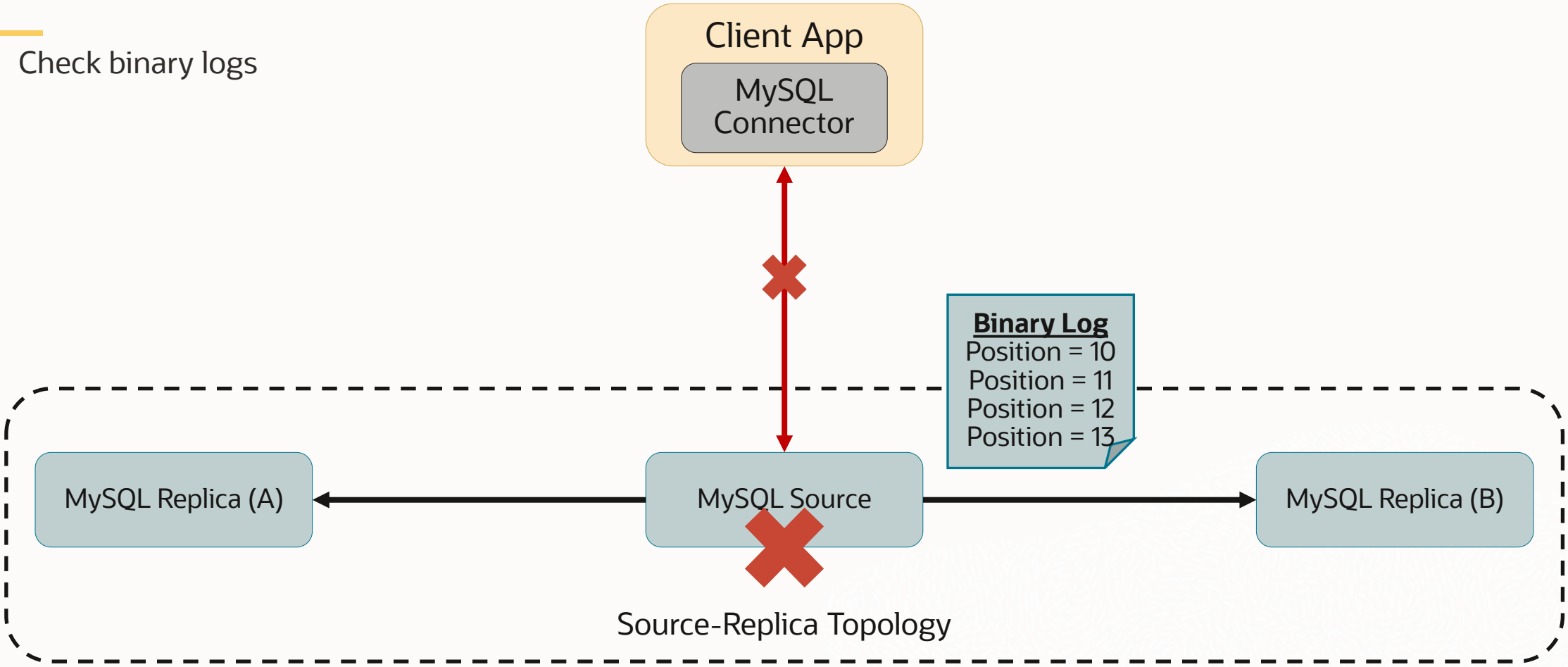


Traditional MySQL Replication: Failure



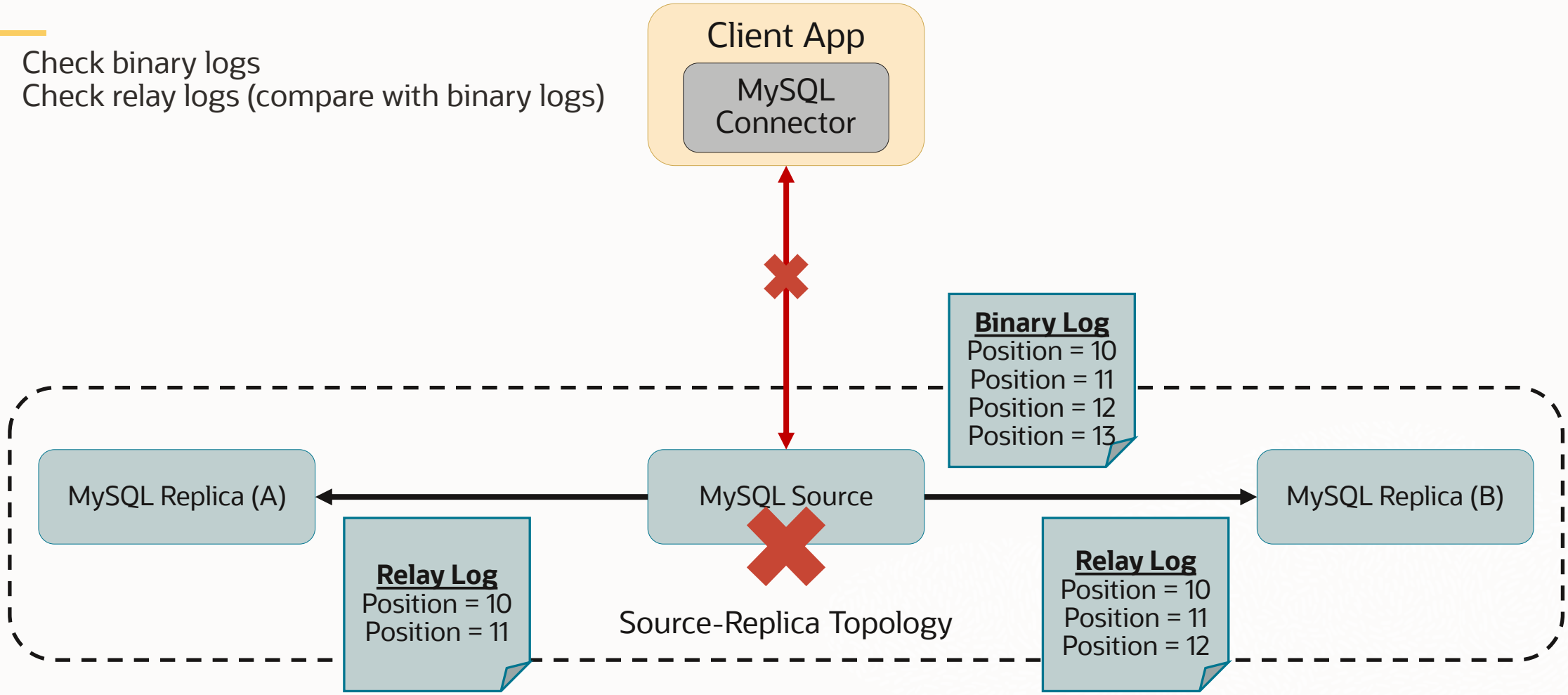
Traditional MySQL Replication: Failover

1. Check binary logs



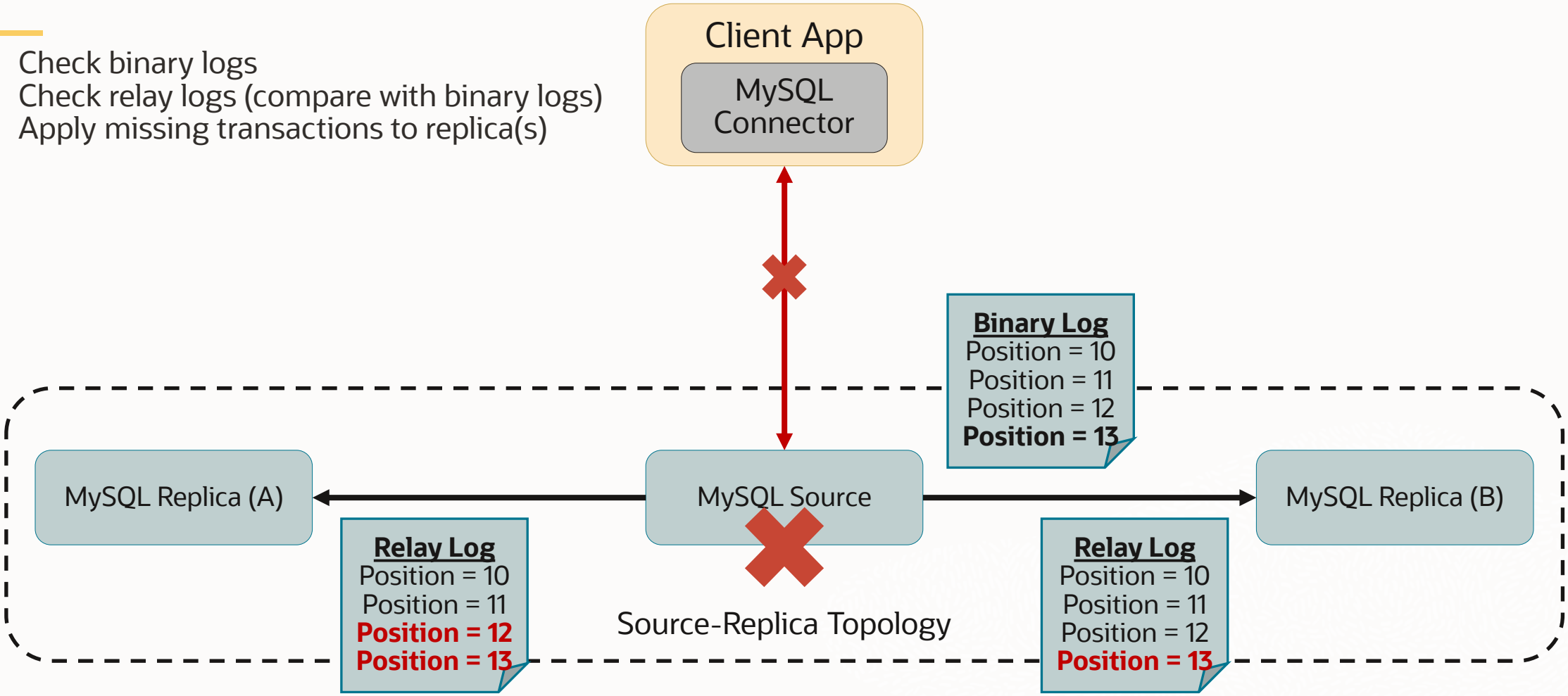
Traditional MySQL Replication: Failover

1. Check binary logs
2. Check relay logs (compare with binary logs)



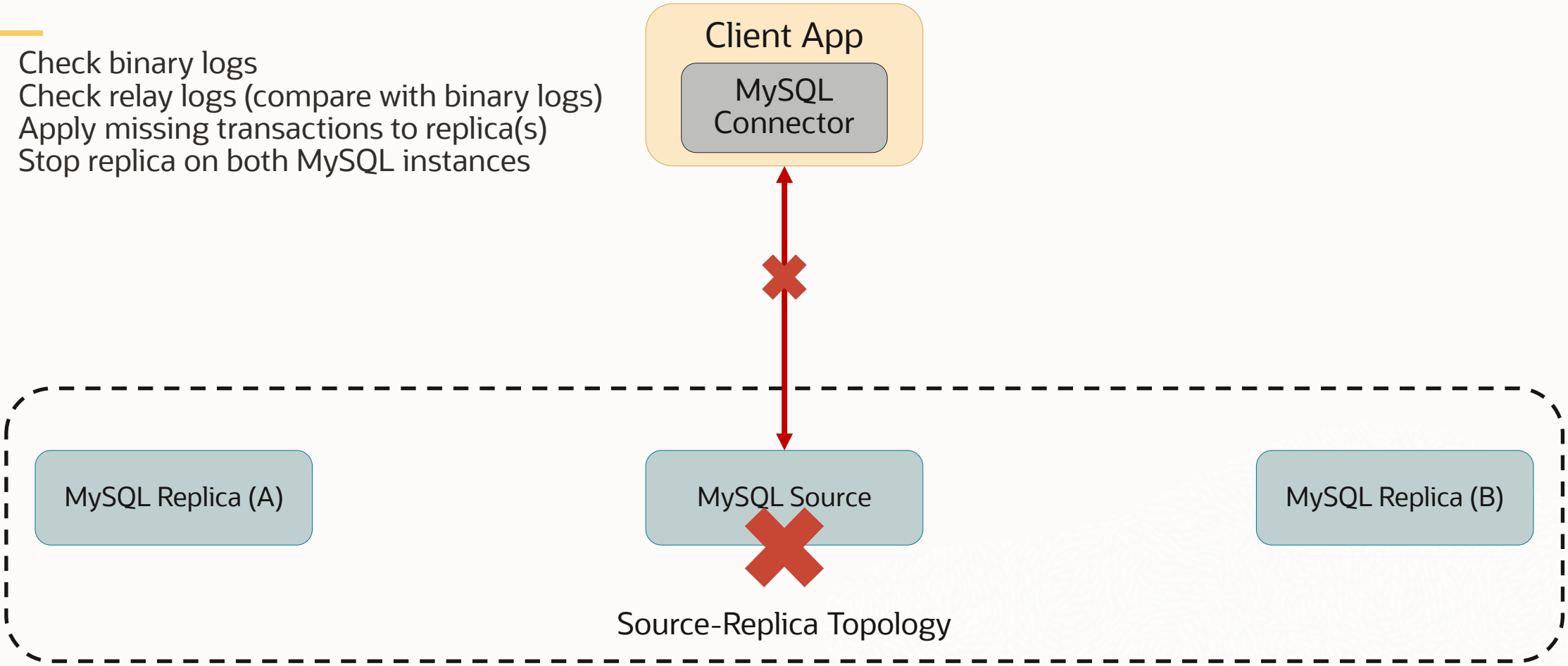
Traditional MySQL Replication: Failover

1. Check binary logs
2. Check relay logs (compare with binary logs)
3. Apply missing transactions to replica(s)



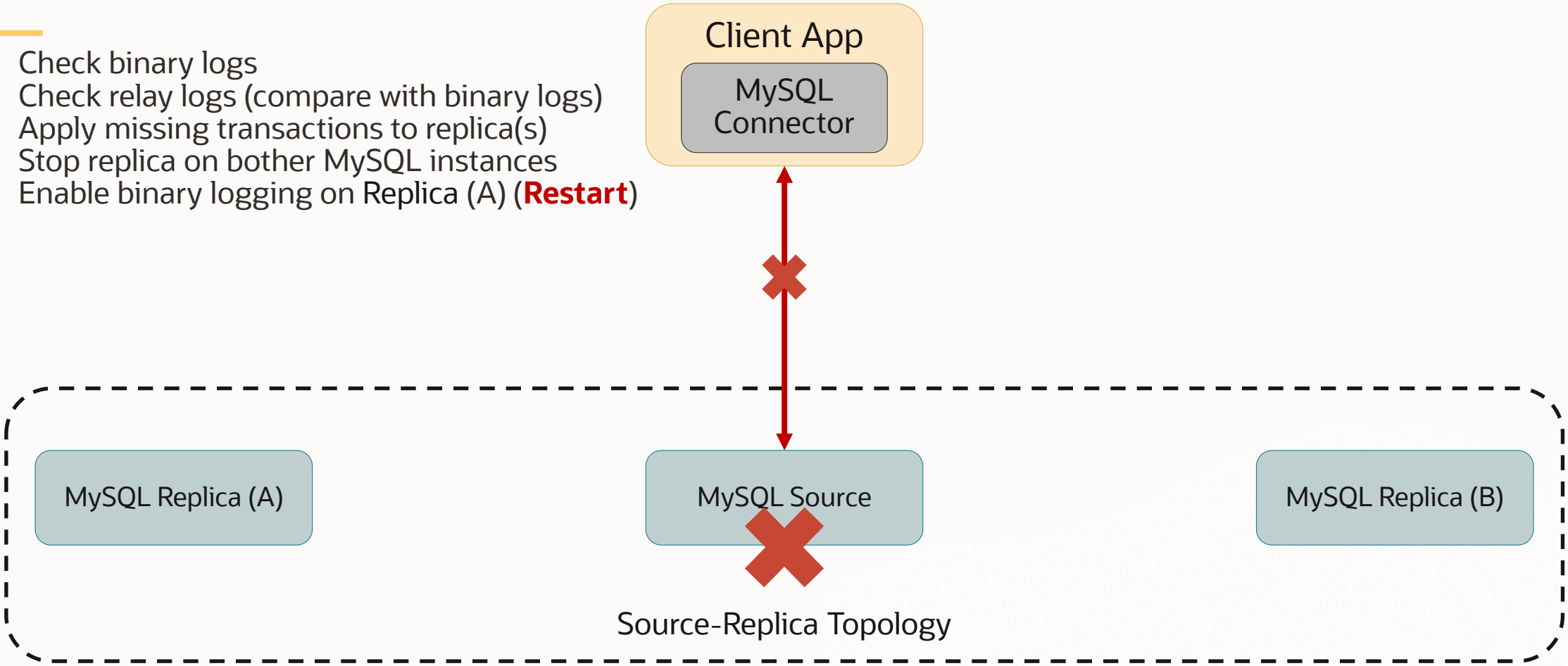
Traditional MySQL Replication: Failover

1. Check binary logs
2. Check relay logs (compare with binary logs)
3. Apply missing transactions to replica(s)
4. Stop replica on both MySQL instances



Traditional MySQL Replication: Failover

1. Check binary logs
2. Check relay logs (compare with binary logs)
3. Apply missing transactions to replica(s)
4. Stop replica on bother MySQL instances
5. Enable binary logging on Replica (A) (**Restart**)



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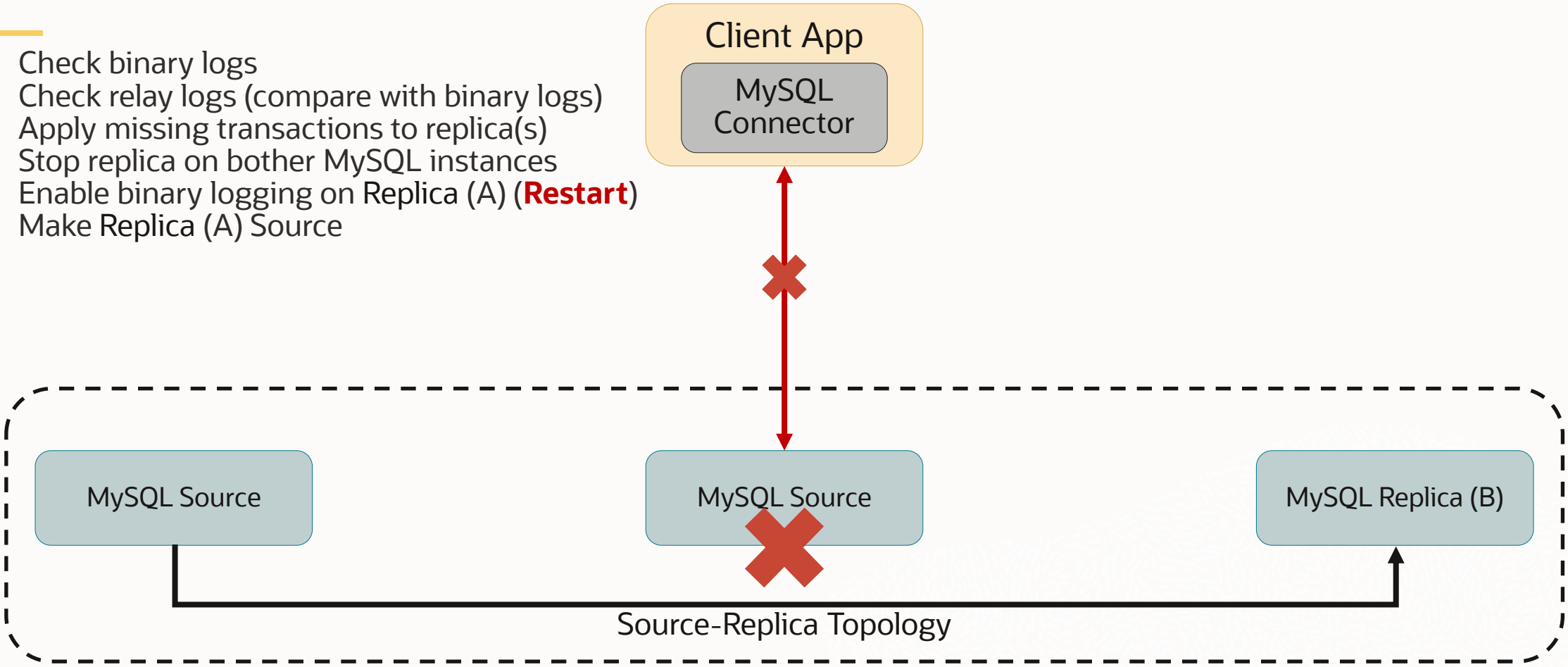
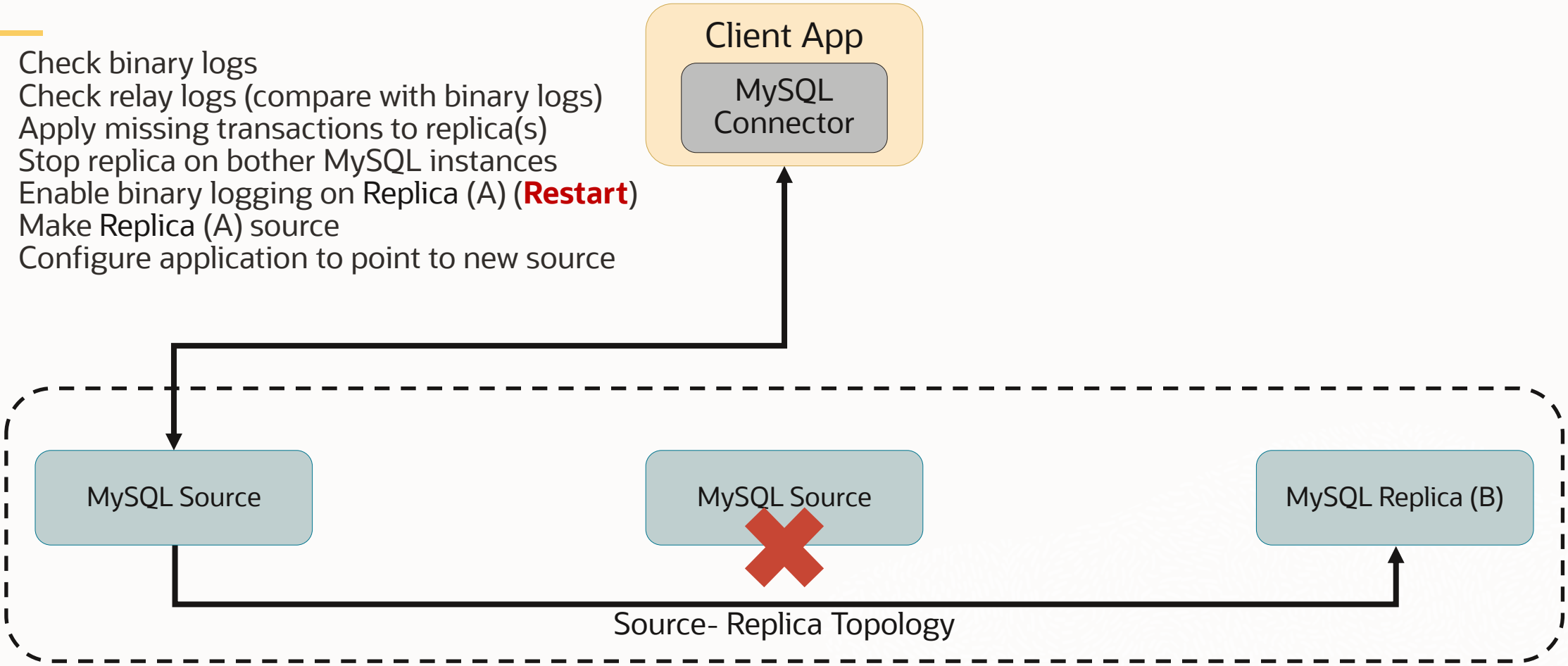
6. Make Replica (A) Source

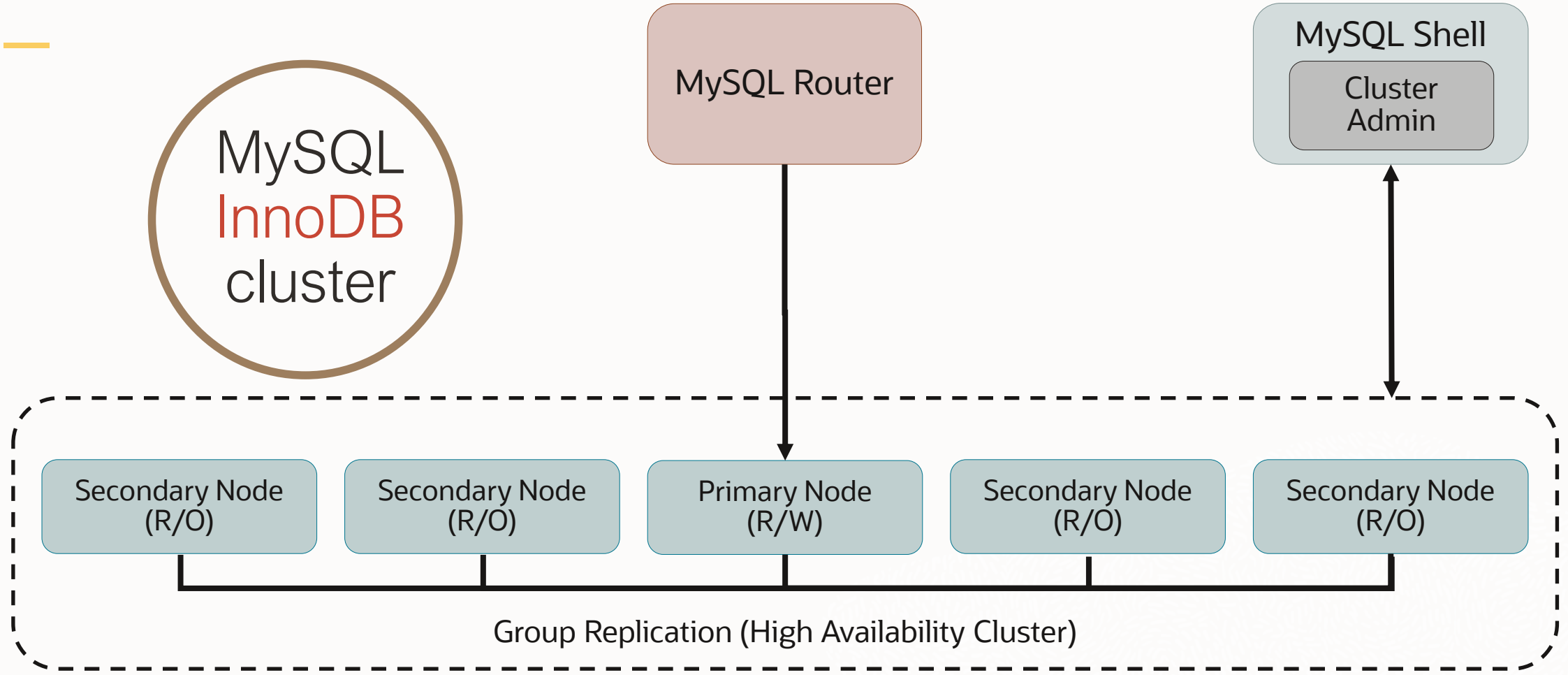


Traditional MySQL Replication: Failover

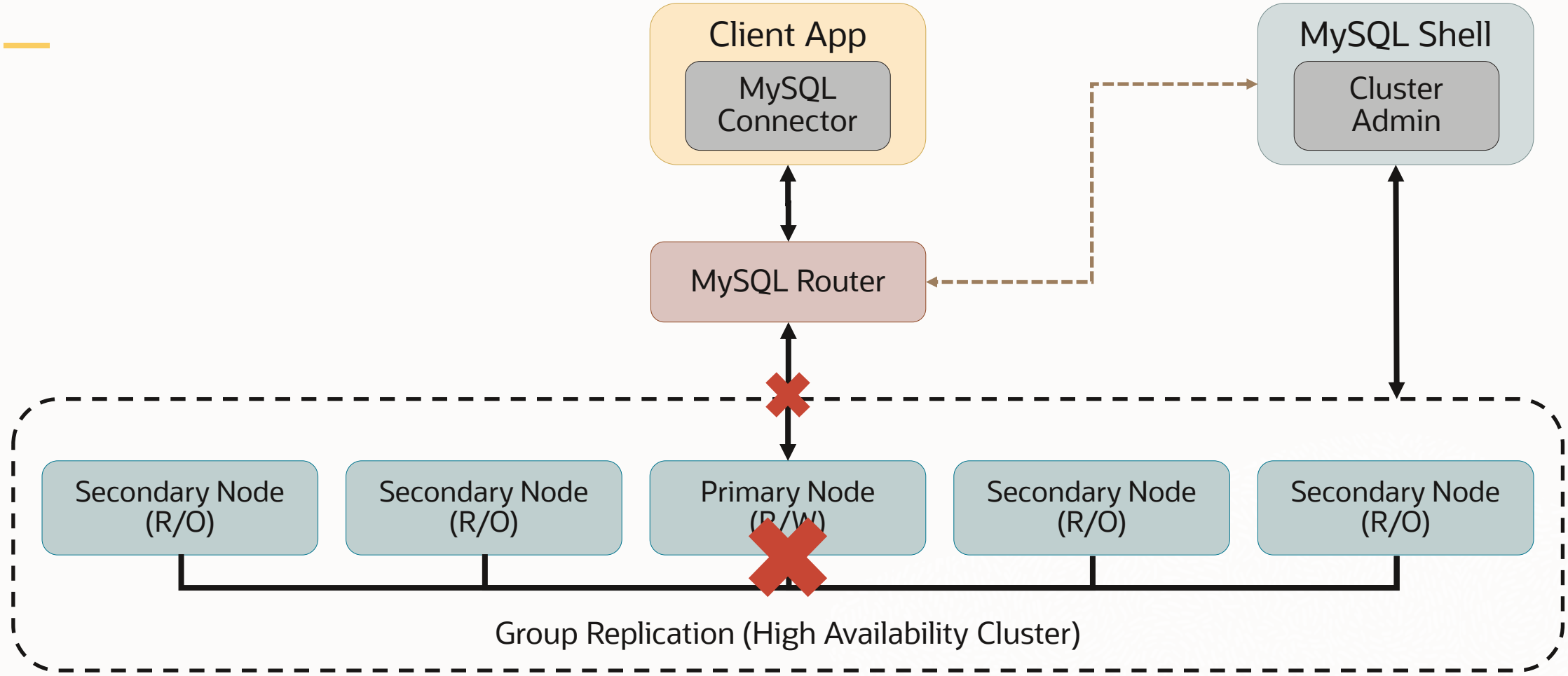
1. Check binary logs
2. Check relay logs (compare with binary logs)
3. Apply missing transactions to replica(s)
4. Stop replica on bother MySQL instances
5. Enable binary logging on Replica (A) (**Restart**)
6. Make Replica (A) source
7. Configure application to point to new source



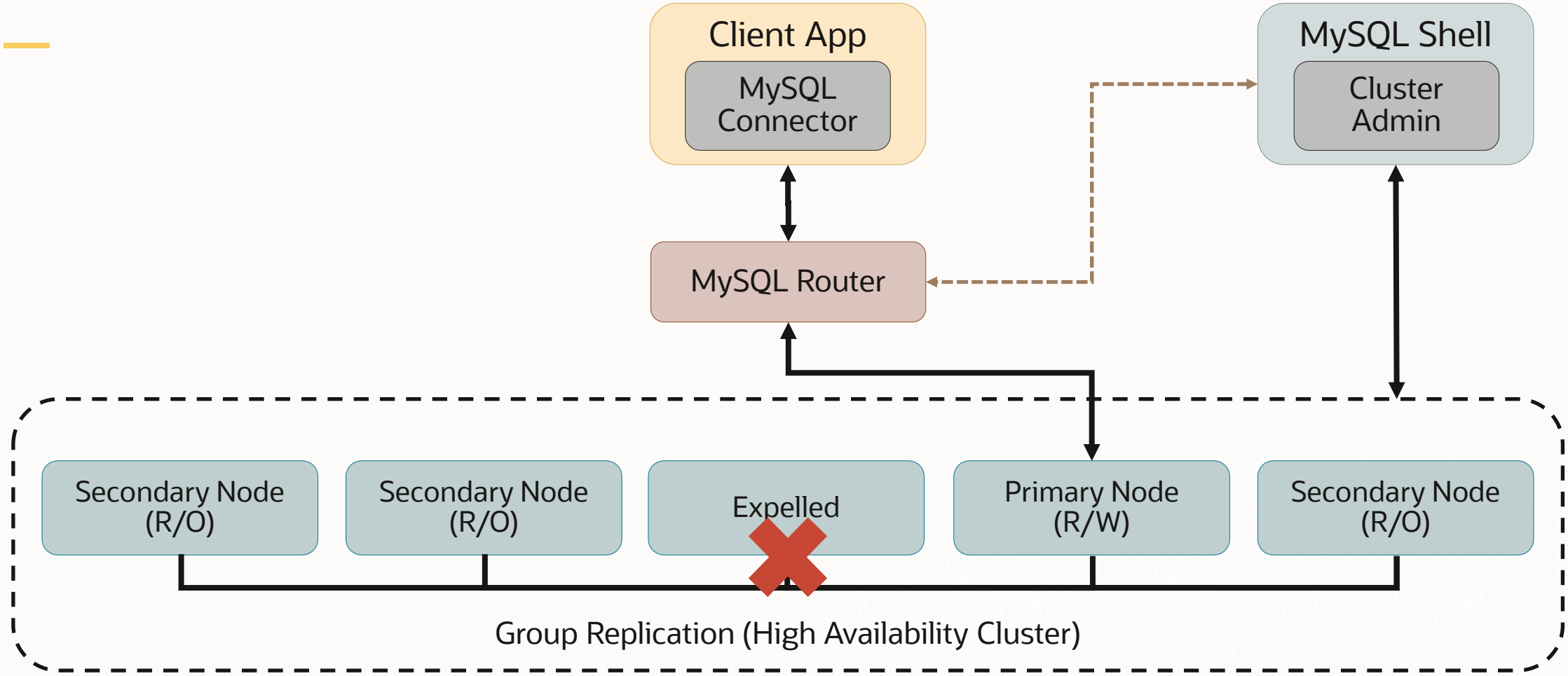
MySQL InnoDB Cluster: Components



MySQL InnoDB Cluster: Failover

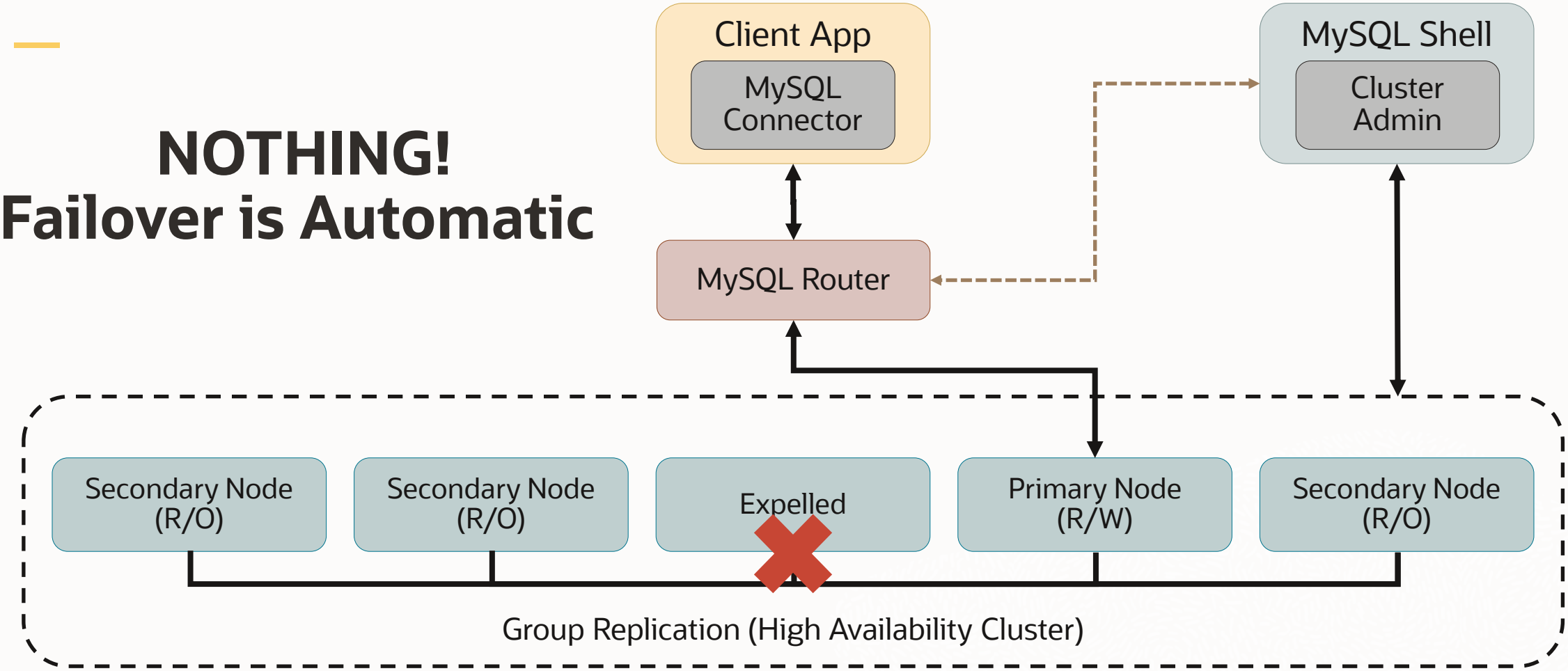


MySQL InnoDB Cluster: Failover



MySQL InnoDB Cluster: Failover

NOTHING!
Failover is Automatic



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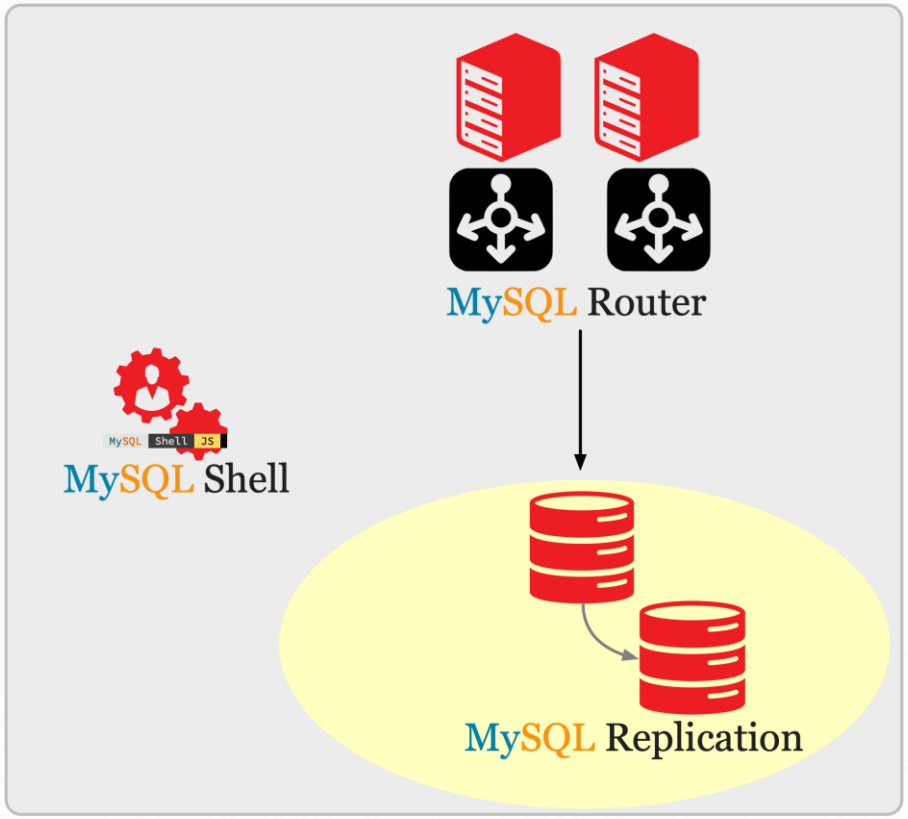
MySQL InnoDB Replicaset

Asynchronous Replication made easy

MySQL InnoDB Replicaset

- 8.0.19 Feature!
- **Fully integrated MySQL Router**
- **Ease of use with MySQL Shell**
  - Configuring, Adding, Removing members Automatic Member Provisioning (CLONE)
- **Replication Architecture**
  - Single tiered replication support
  - Manual Switchover & Failover (asynchronous) Read Scaleout
  - No network/hardware requirements
- **No multi-primary as such topology cannot guarantee data consistency**
  - No data reconciliation
  - No conflict handling



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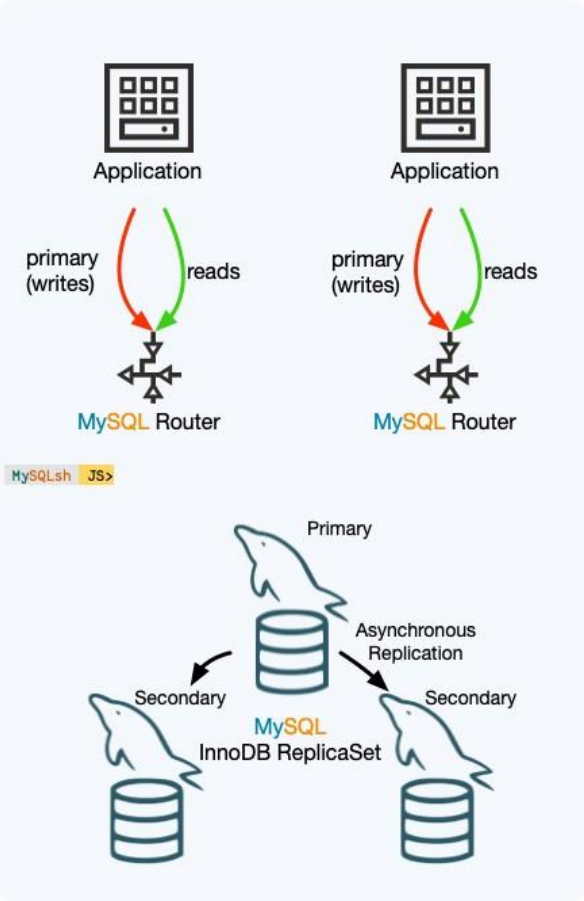
MySQL InnoDB ClusterSets

Asynchronous Replication made easy

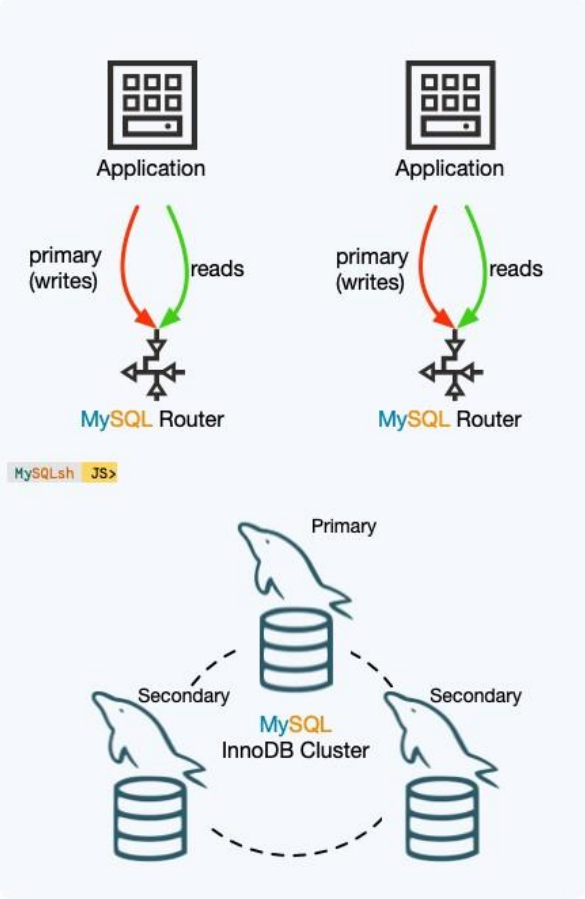
MySQL InnoDB ReplicaSet



RPO != 0

RTO = minutes (manual failover)

MySQL InnoDB Cluster

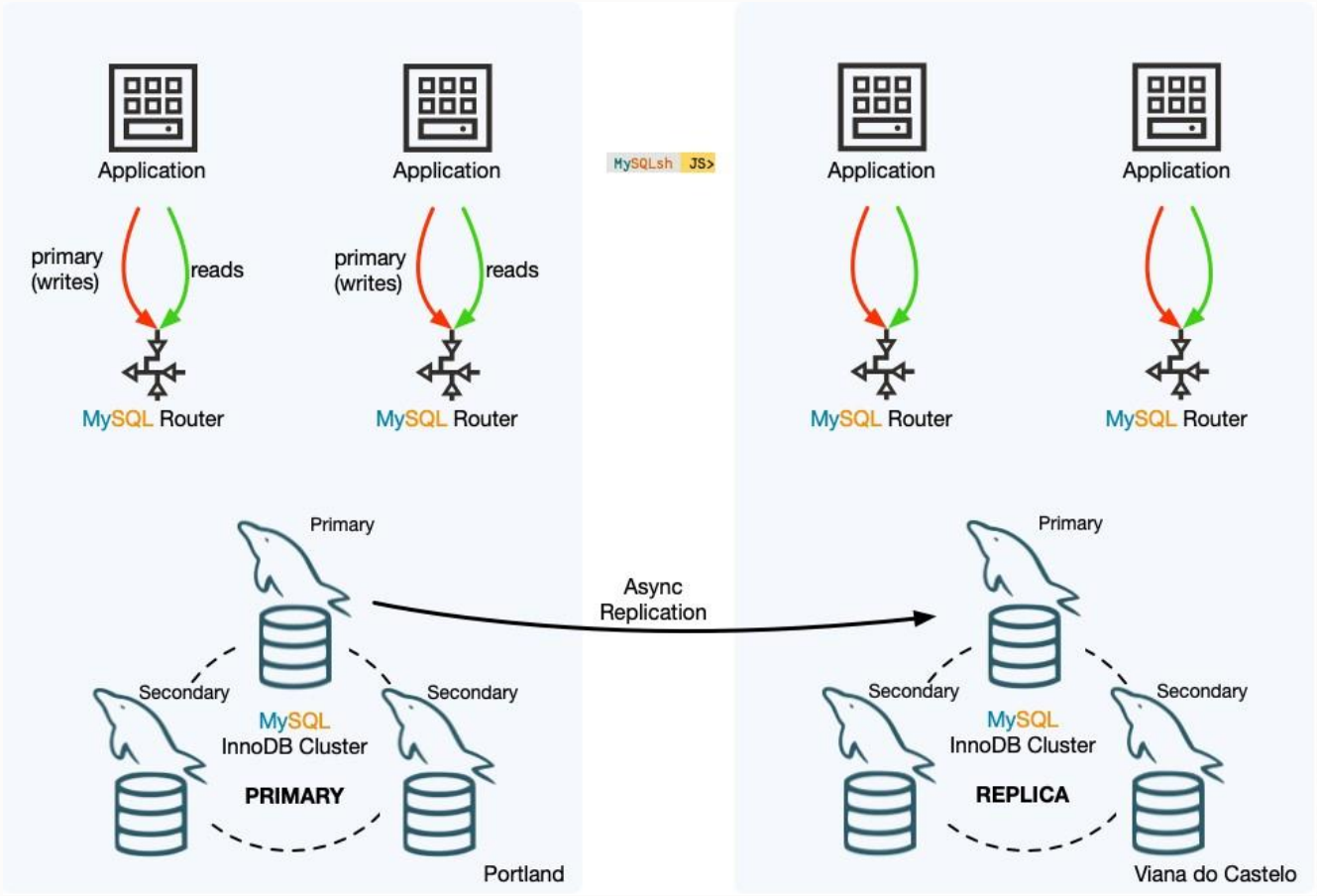


RPO = 0

RTO = seconds (automatic failover)

NEW!!!: MySQL InnoDB ClusterSet

One or more REPLICA MySQL InnoDB Clusters attached to a PRIMARY MySQL InnoDB Cluster



High Availability (Failure Within a Region)

- RPO = 0
- RTO = seconds (automatic failover)

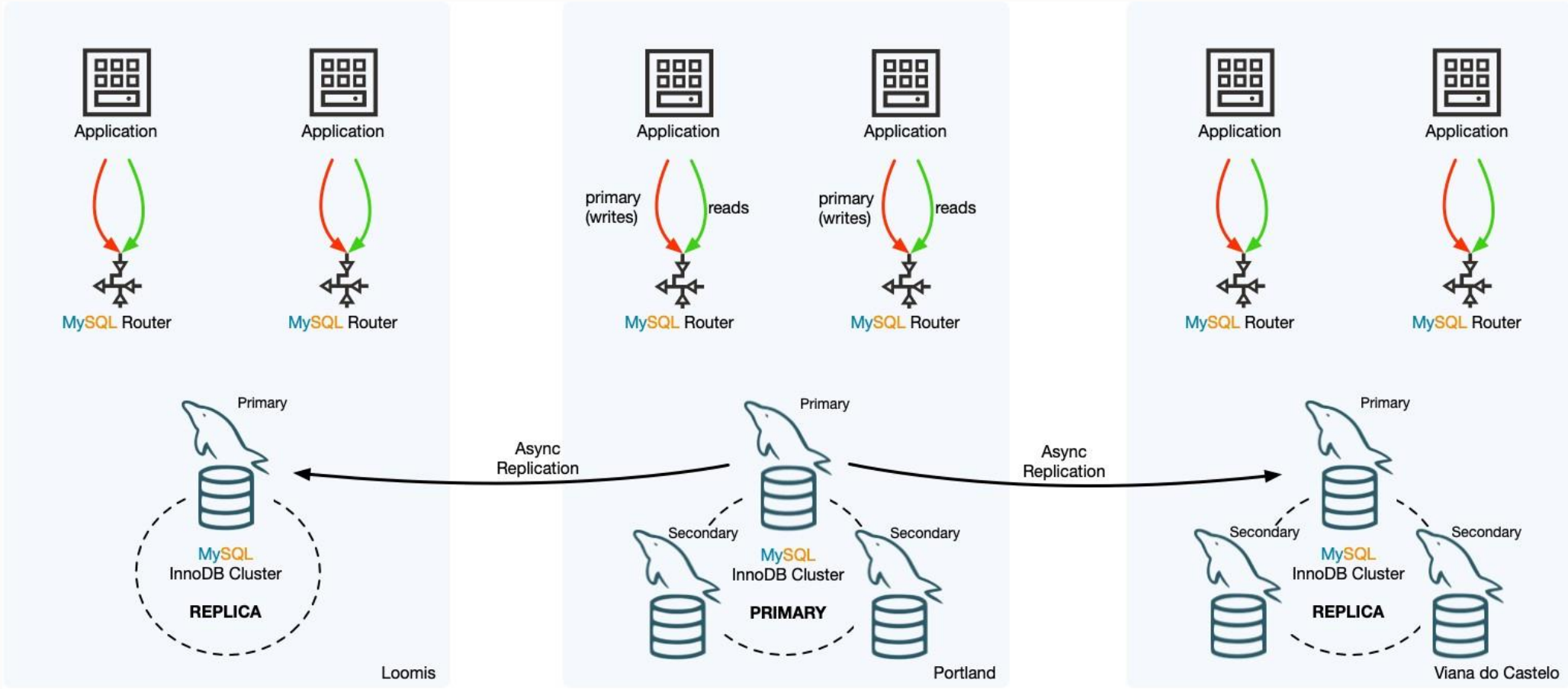
Disaster Recovery (Region Failure)

- RPO != 0
- RTO = minutes or more (manual failover)
- No write performance impact

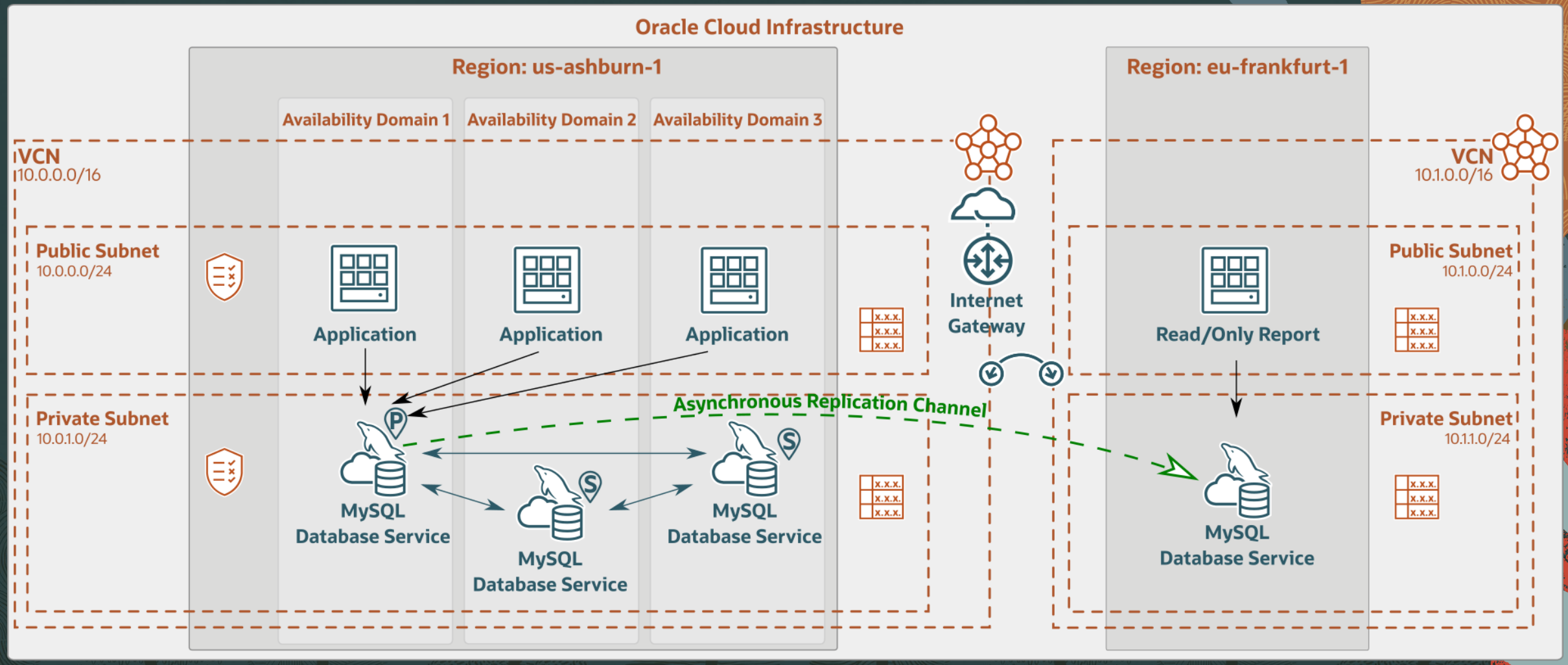
Features

- Easy to use
- Familiar interface and usability
  `mysqlsh`, `CLONE`, ...
- Add/remove nodes/clusters online
- Router integration, no need to recon gure application if the topology changes

MySQL InnoDB ClusterSet - Not every Cluster has to be 3 nodes



Each replica is a MySQL InnoDB Cluster which can have 1-9 members.


Oracle Cloud Infrastructure
Region: us-ashburn-1
Availability Domain 1
Availability Domain 2
Availability Domain 3
VCN
10.0.0.0/16
Public Subnet
10.0.0.0/24
Private Subnet
10.0.1.0/24
Application
Application
Application
P
MySQL
Database Service
S
MySQL
Database Service
S
MySQL
Database Service
x.x.x.
Internet
Gateway
Asynchronous Replication Channel
Region: eu-frankfurt-1
VCN
10.1.0.0/16
Public Subnet
10.1.0.0/24
Read/Only Report
Private Subnet
10.1.1.0/24
MySQL
Database Service

O que vamos criar?

- DRG (Dynamic Routing Gateway) para conectar duas regiões
- Criar um usuário dedicado para a replicação do MySQL que irá doar os dados
- Dump dos dados do MySQL HA para um Object Storage usando o MySQL Shell
- Criar uma nova instância do MySQL Database Service em outra região usando o Object Storage
- Criar um canal de replicação

Vamos juntos nesta trilha!

linkedin.com/groups/8984009

youtube.com/c/Inovaçãocomdadosemnuvem

anchor.fm/inova-dados-nuvem

github.com/taborda-cbip/inovacao-com-dados-em-nuvem