
AWS
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DAT316-R

Build resilient applications using Amazon RDS and Aurora PostgreSQL

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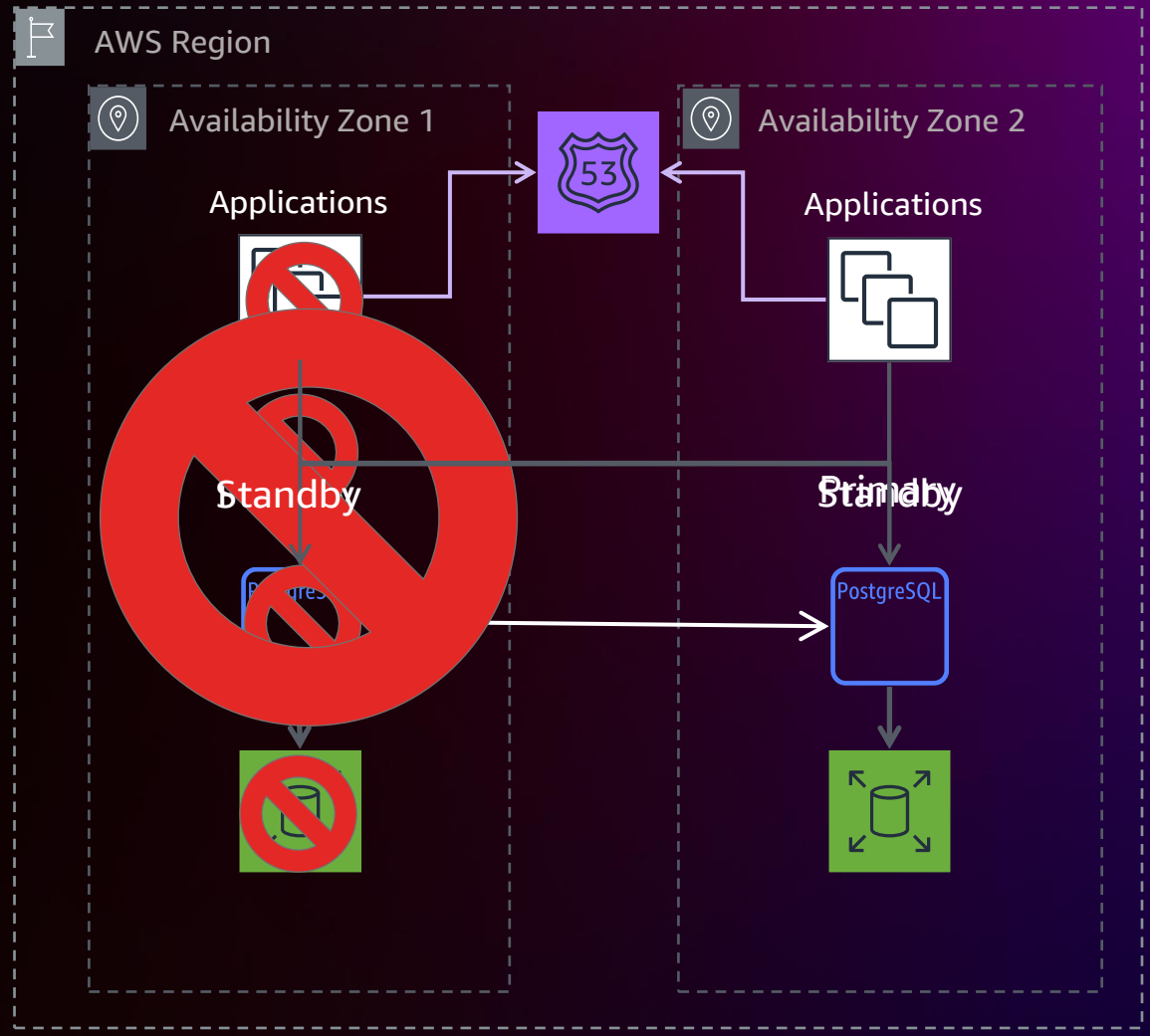
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The case for resiliency

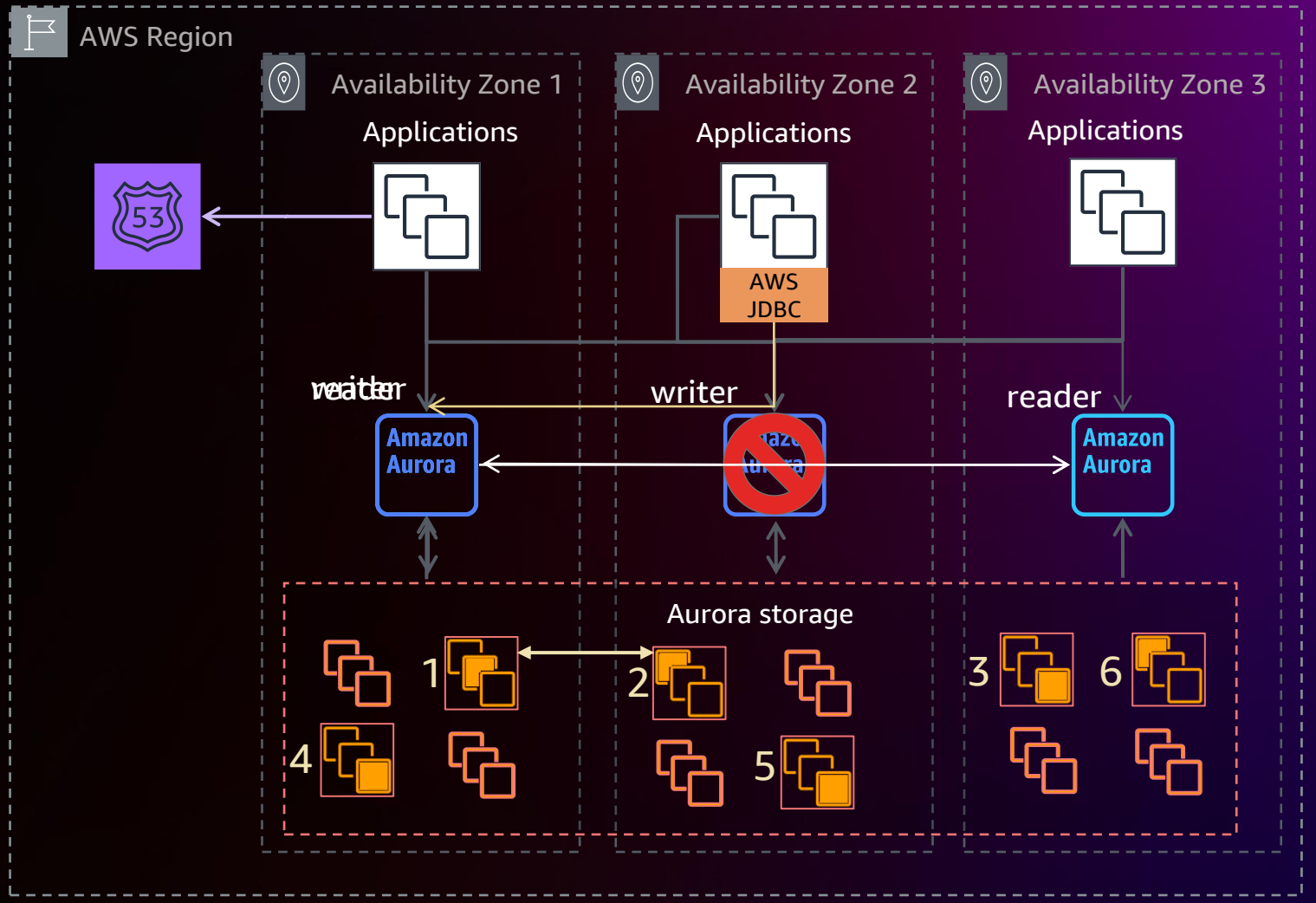
- Everything fails at some point
- Planned and unplanned
- Does the system operate as designed
- Grey failures



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Amazon Aurora with PostgreSQL compatibility

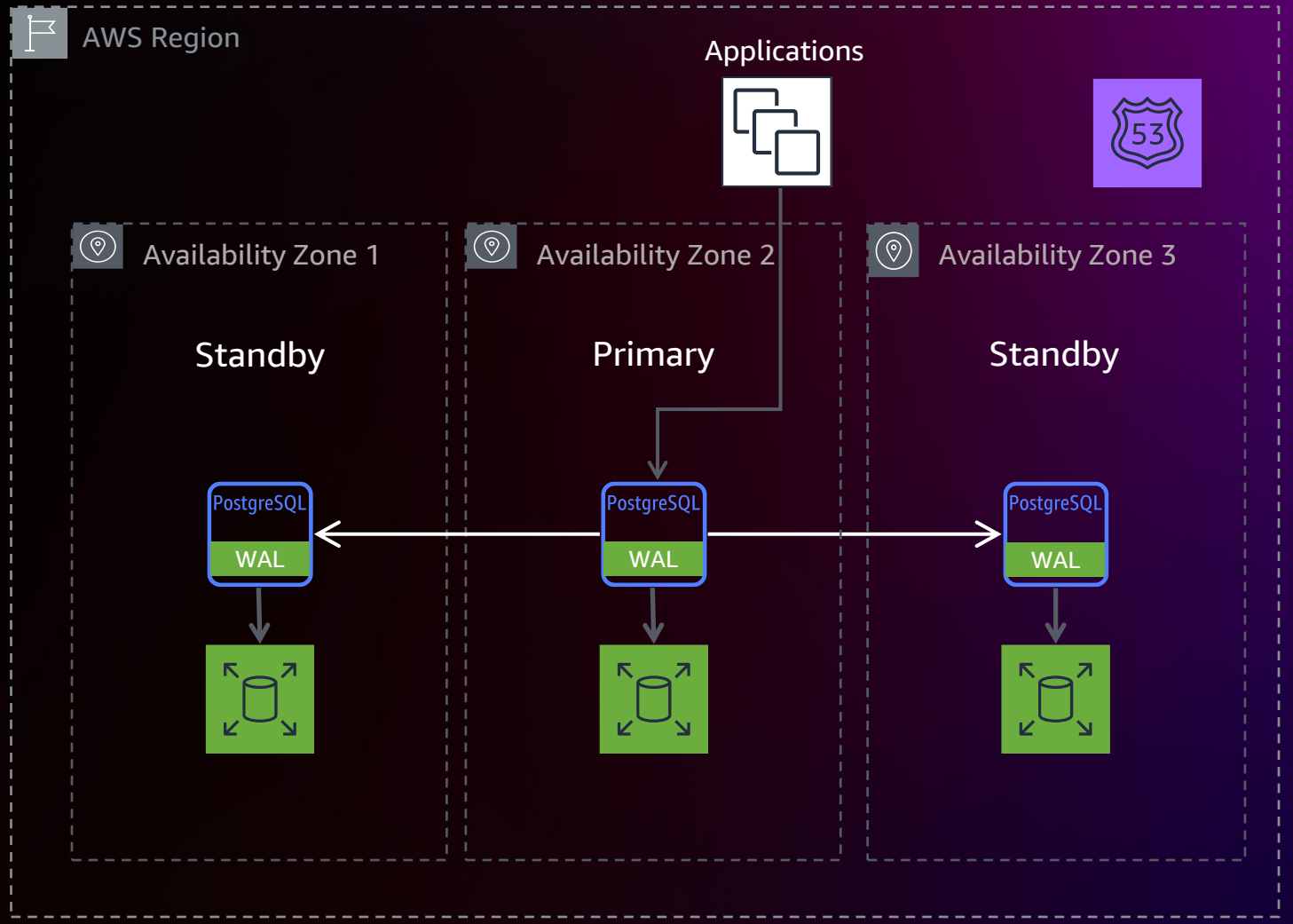
- 4 of 6 write quorum across 3 Availability Zones
- Self repairing storage system
- 1 or more DB instances per Availability Zone
- AWS JDBC driver for faster failover



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Amazon RDS multi-AZ with 2 readable standbys

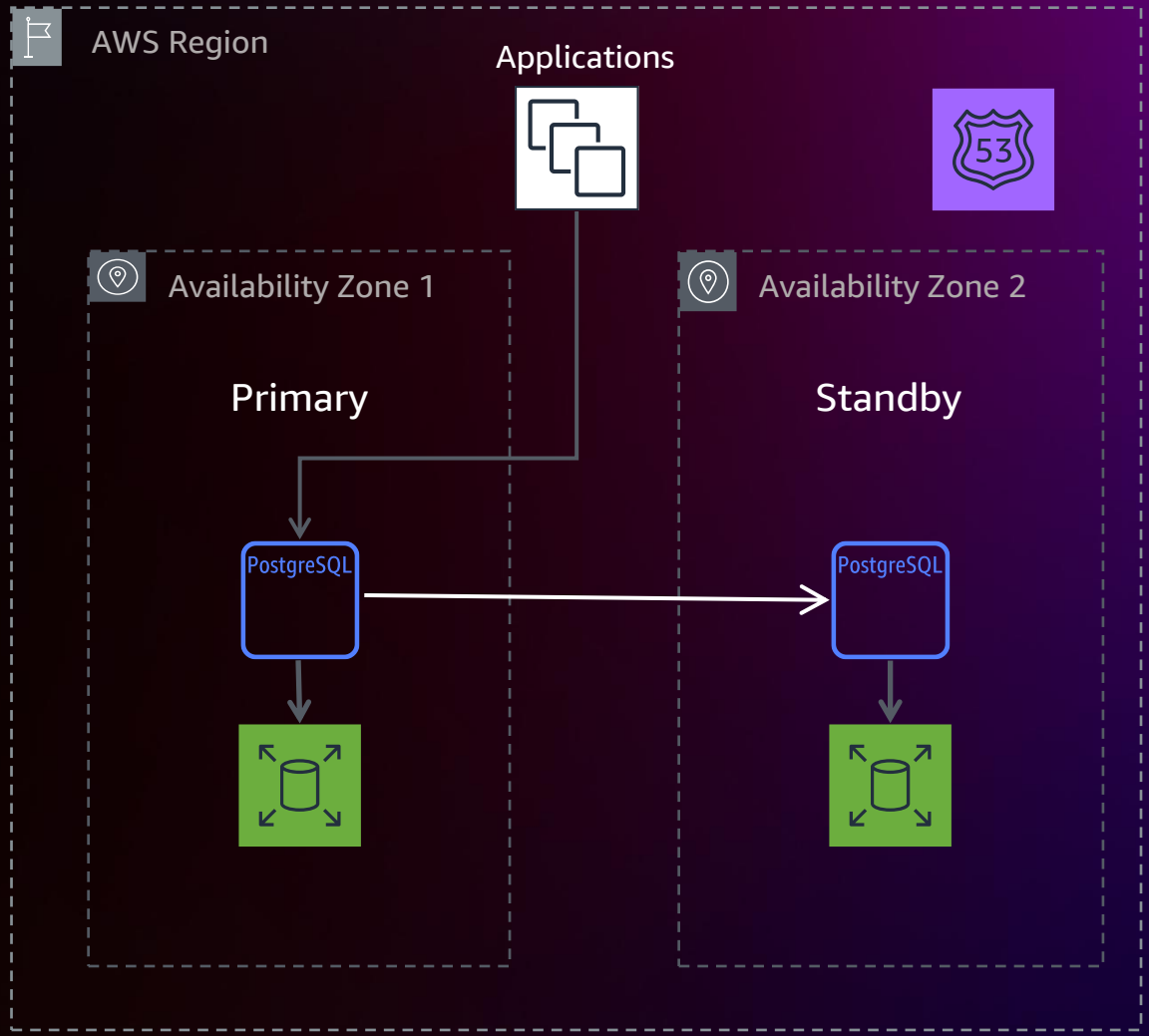
- PostgreSQL replication across 3 Availability Zones with a 2 of 3 quorum
- Write ahead log written to local storage
- Failover time a factor of transaction apply lag



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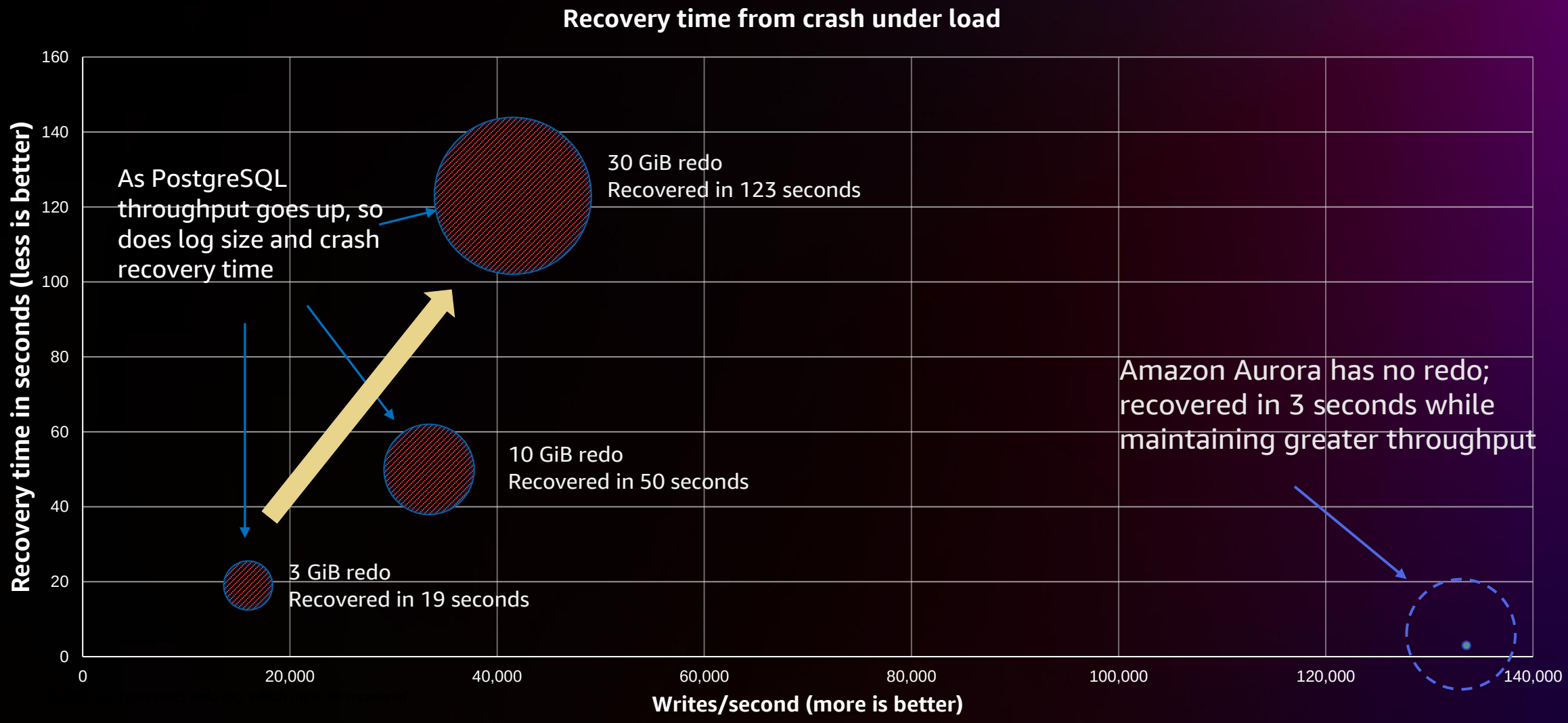
Amazon RDS multi-AZ with one standby

- PostgreSQL community version with easy configuration and management
- High availability across two Availability Zones
- All writes synchronously replicated to the standby
- Failover a factor of checkpoints



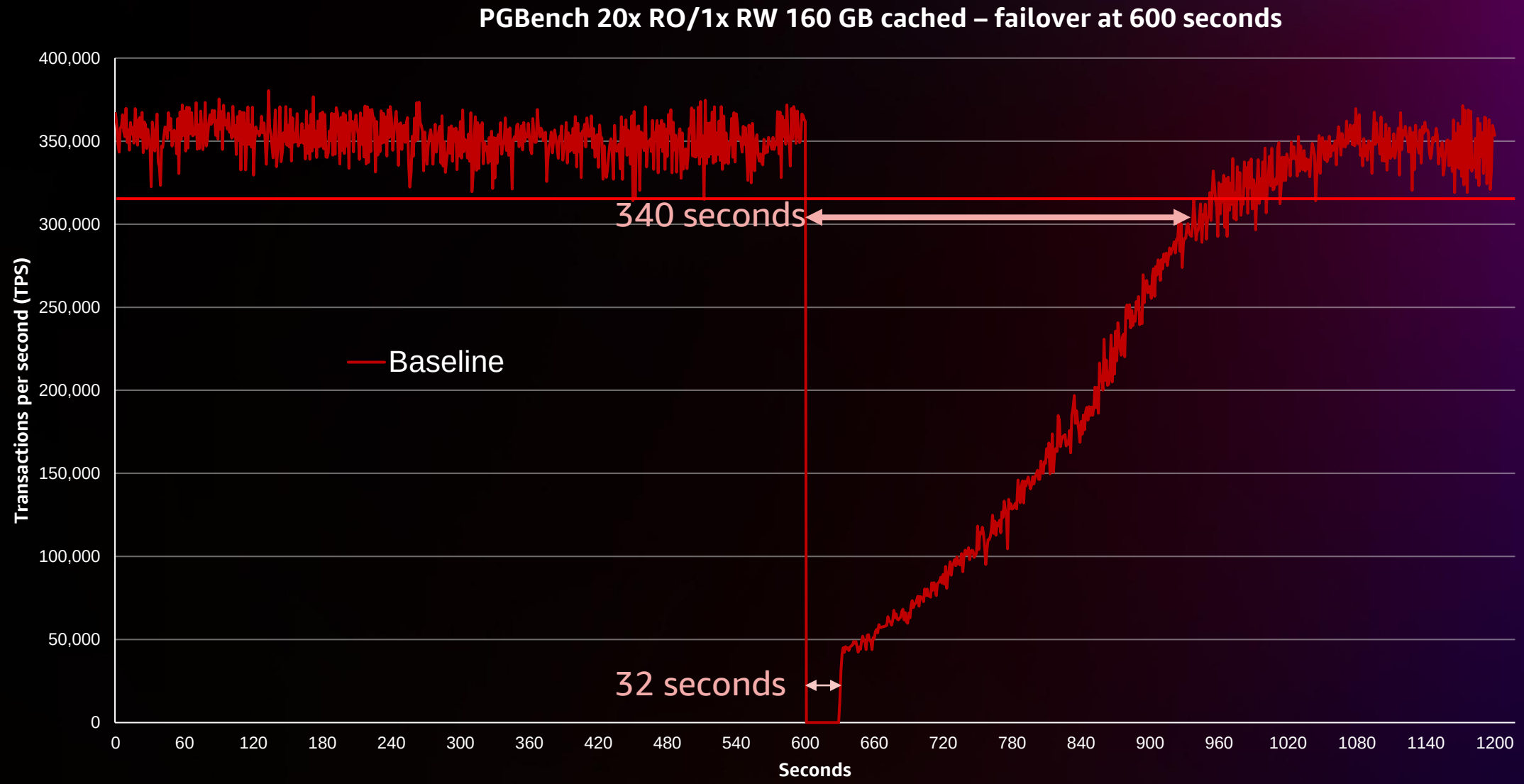
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Recovery time



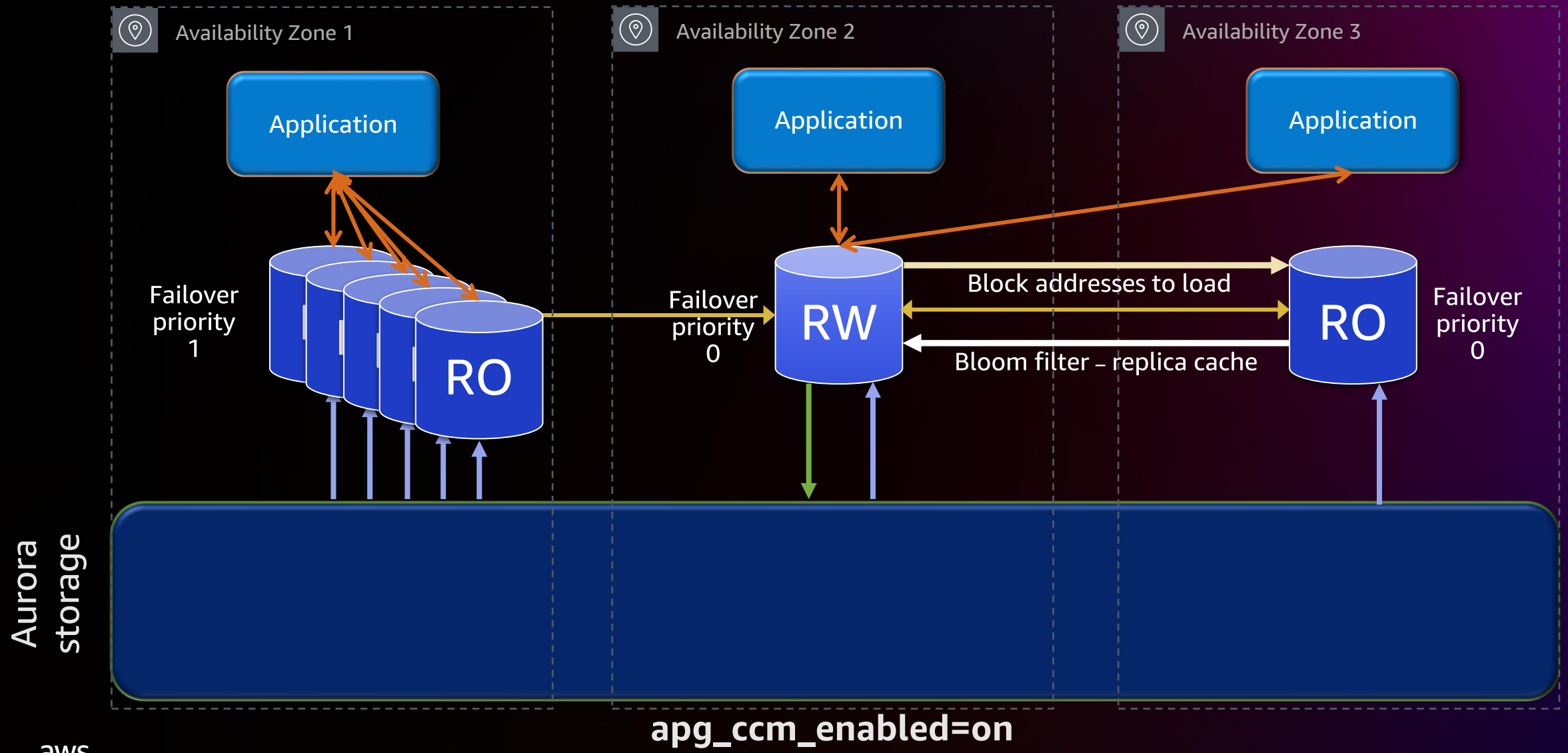
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Failover time



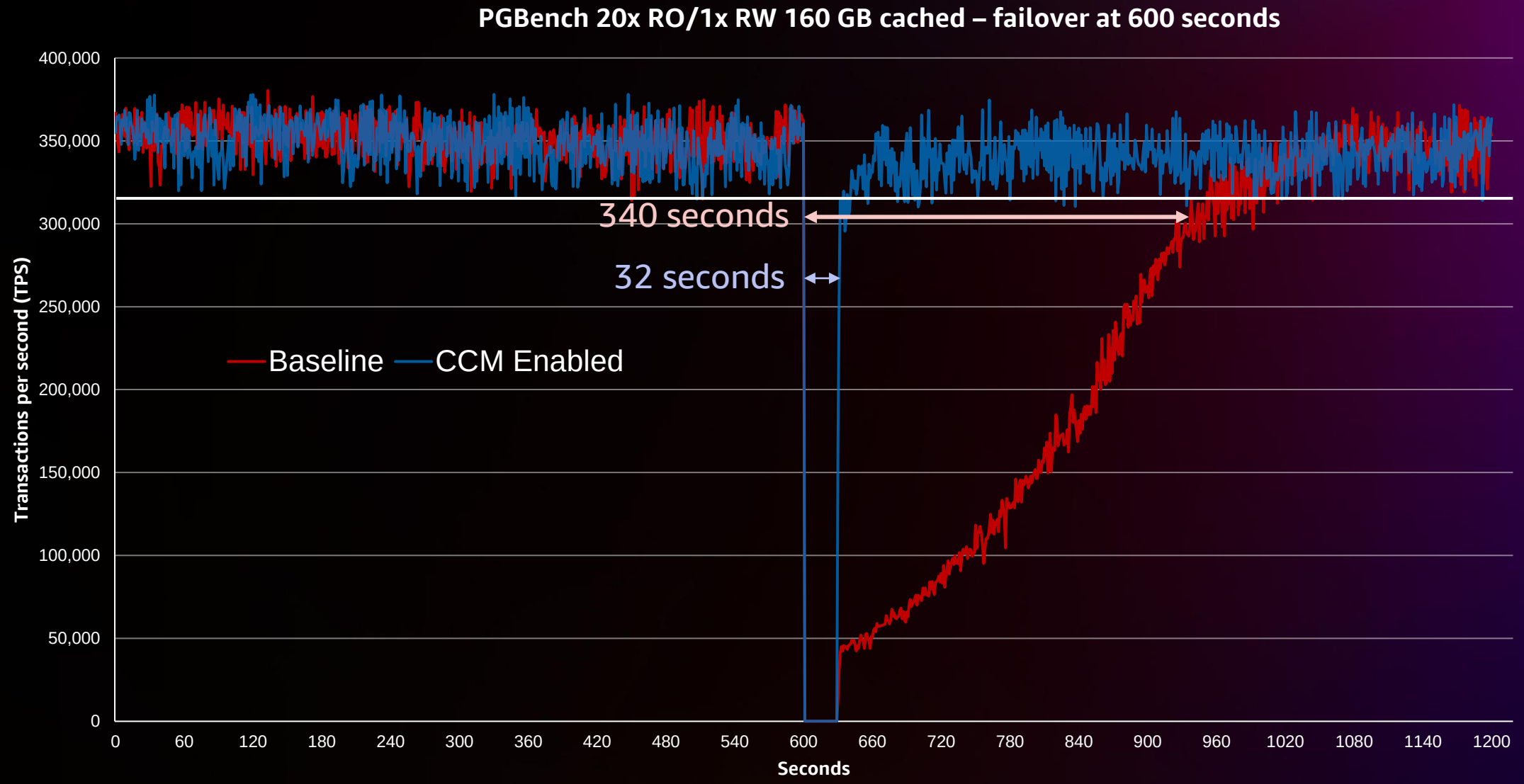
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Cluster cache management (CCM) feature



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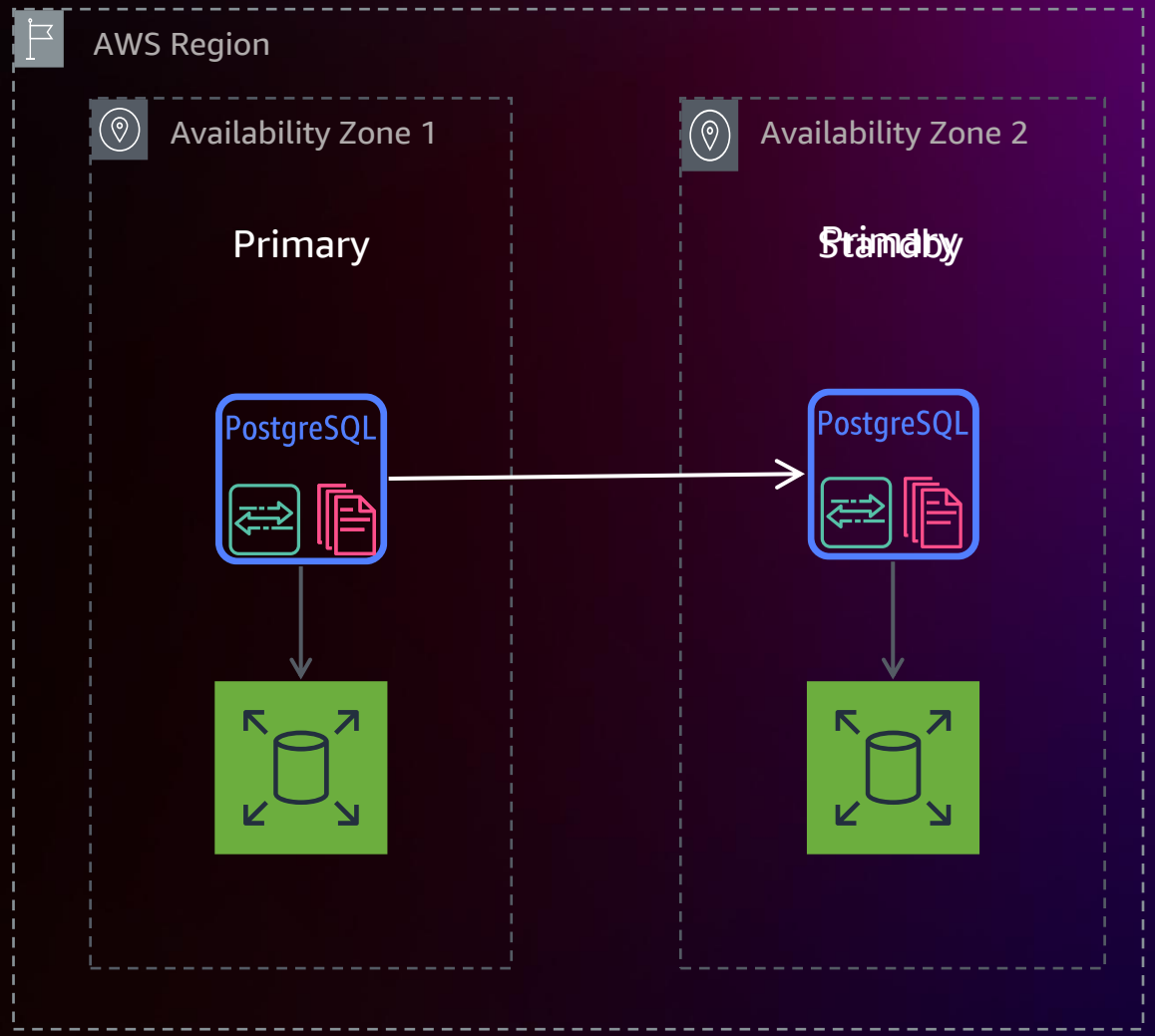
Failover time – Cluster cache management



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Pg_prewarm

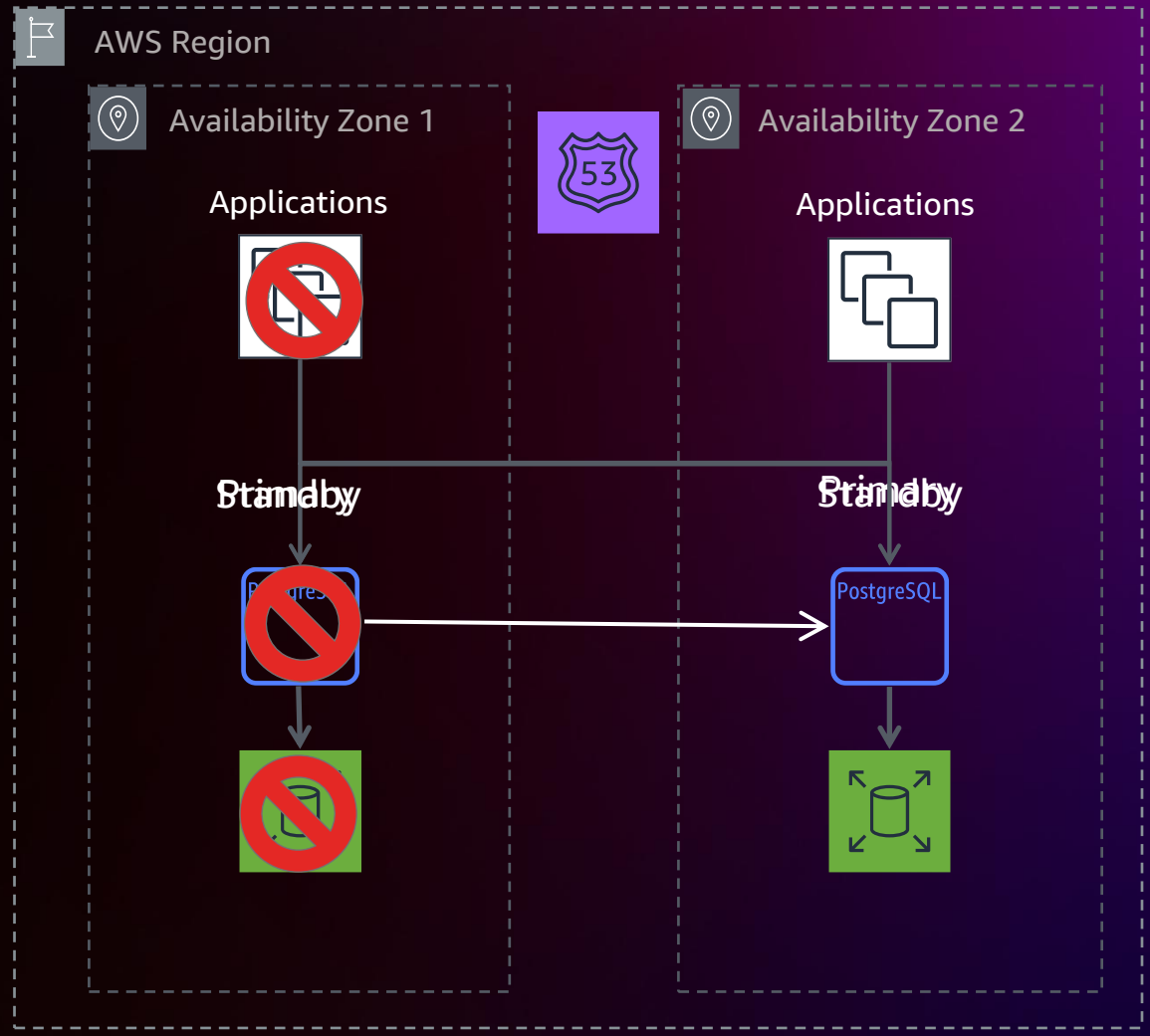
- Extension available in all supported versions of PostgreSQL
- Can manually load tables and indexes into cache
- PostgreSQL 11 introduced auto prewarm to restore the cache after a restart or failover



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Fault injection

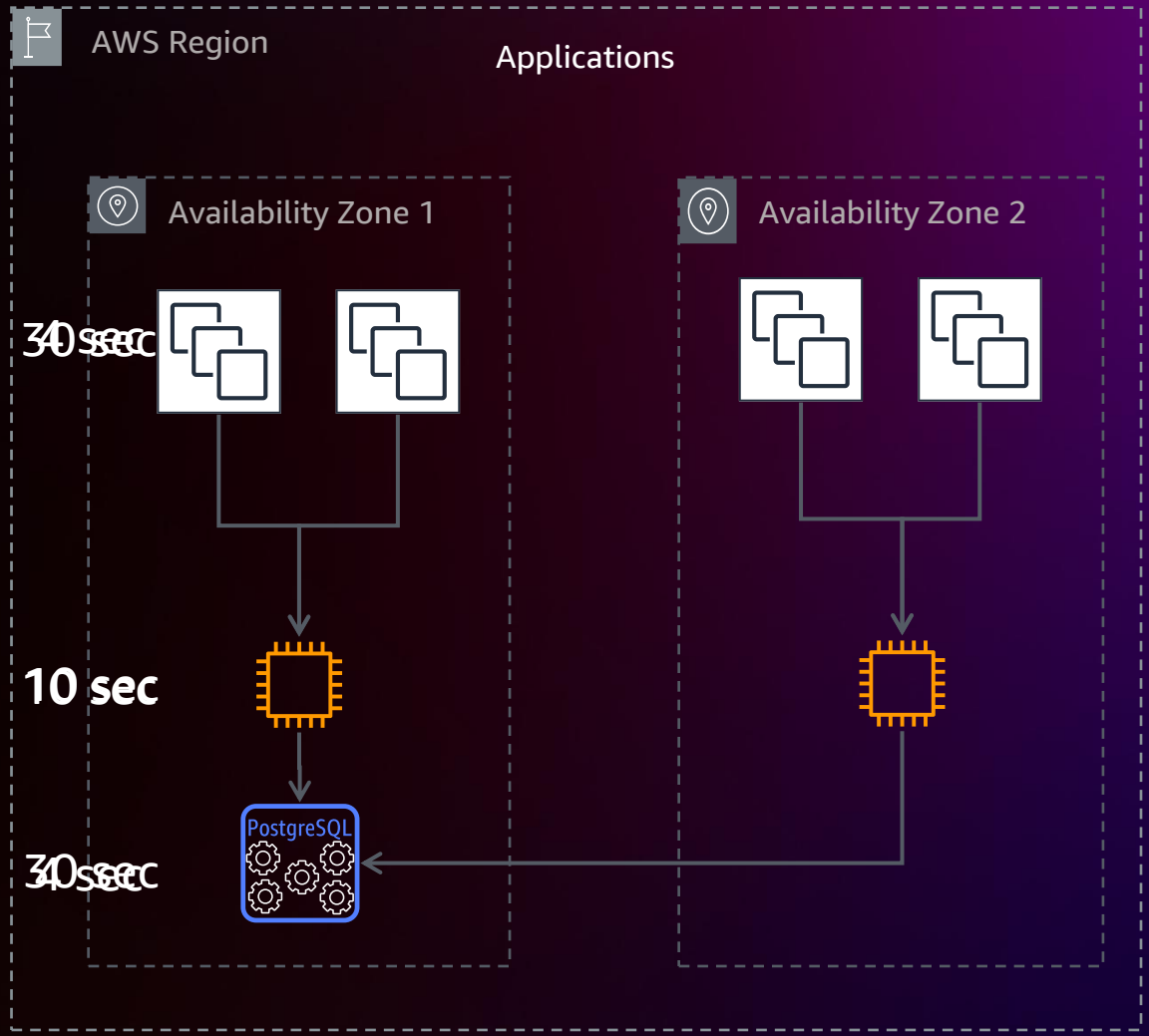
- AWS fault injection simulator
- Service APIs/CLI
  - Amazon EC2 – stop-instances
  - Amazon RDS – reboot-instance --force-failover
  - Aurora – failover-db-cluster



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Timeouts

- Timeouts prevent runaway queries
- Timeouts can be implemented at any or all layers in the application stack
- Improperly coordinated timeouts can cause connection storms
- The database statement timeout needs to be the shortest duration



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