DAT311

What's new in Amazon RDS for Oracle

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Agenda

- New features overview
- Container database support
- Oracle auditing – Database Activity Streams (DAS)
- Replica switchover
- Amazon RDS for Oracle at Goldman Sachs Transaction Banking

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New features overview

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Oracle feature support

- Oracle Application Express 20.2 and 21.1
- Oracle Cloud Control Management Agent 13.4 and 13.5
- Oracle Native Network Encryption client parameters
  - Encrypt outbound connections (database links)
  - SHA1, MD5 require explicit settings
- Oracle time zone file autoupgrade option
- Set system events via PL/SQL (October 2020 and later)
  - rdsadmin.rdsadmin_util.list_allowed_system_events
  - rdsadmin.rdsadmin_util.set_system_event(<event>, <level>);
  - rdsadmin.rdsadmin_util.unset_system_event(<event>);

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Oracle version support



My Oracle Support note 742060.1 https://forums.aws.amazon.com/ann.jspa?annID=7341

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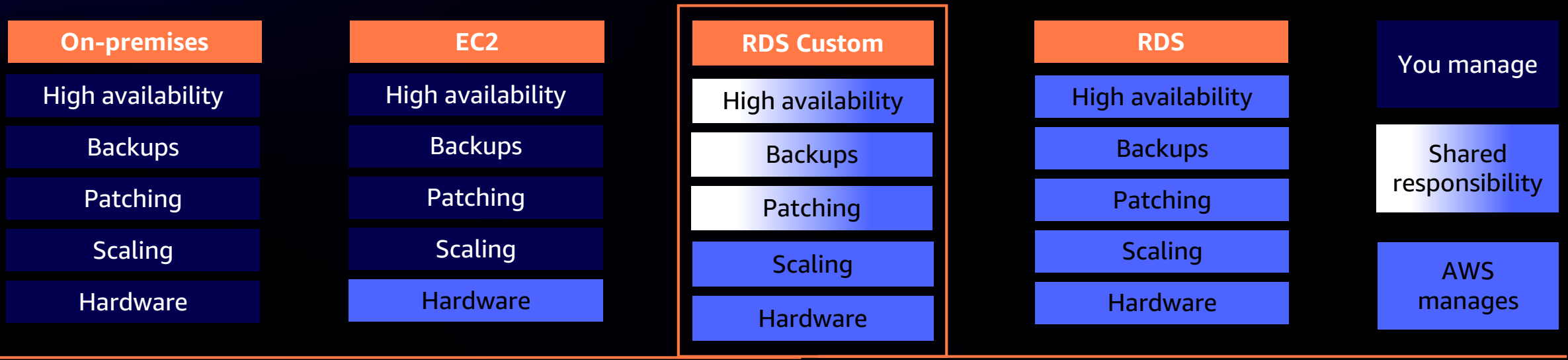
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Amazon RDS features

- Publish OEM agent logs to Amazon CloudWatch
- Cross-Region automated backups
  - Expanded Region support
  - Oracle Transparent Data Encryption and AWS Key Management Service (AWS KMS) encryption
- R5b expanded Region support
- R5 additional memory configurations
  - New instance class naming: db.r5.4xlarge.tpc2.mem2x
  - Up to 768 GiB of memory, **32:1** memory-to-vCPU ratio

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Amazon RDS Custom



NO MANAGEMENT

Host-level access and full database permissions

Allows features not currently supported by RDS

FULL MANAGEMENT

Allows 3rd-party applications on the database host

Initially planned for SQL Server and Oracle

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Amazon RDS Custom use cases

Custom and Packaged Business Applications

Customers looking to install applications directly on the host or applications that require elevated privileges

Example: Customer looking to migrate their Oracle ERP application

Granular Control

Customers looking to install custom drivers or enable features that require elevated privileges

Example: Customers looking to utilize features likes DB Vault and Flashback

Lift and Shift

Customers looking to migrate to a managed service without making any changes to the application

Example: Customer looking to migrate using native DB technologies like RMAN

Disaster Recovery

Customers looking to setup DR from self-managed environments

Example: Customer looking to set up Data Guard Stand-By in the cloud

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Feature deep dive

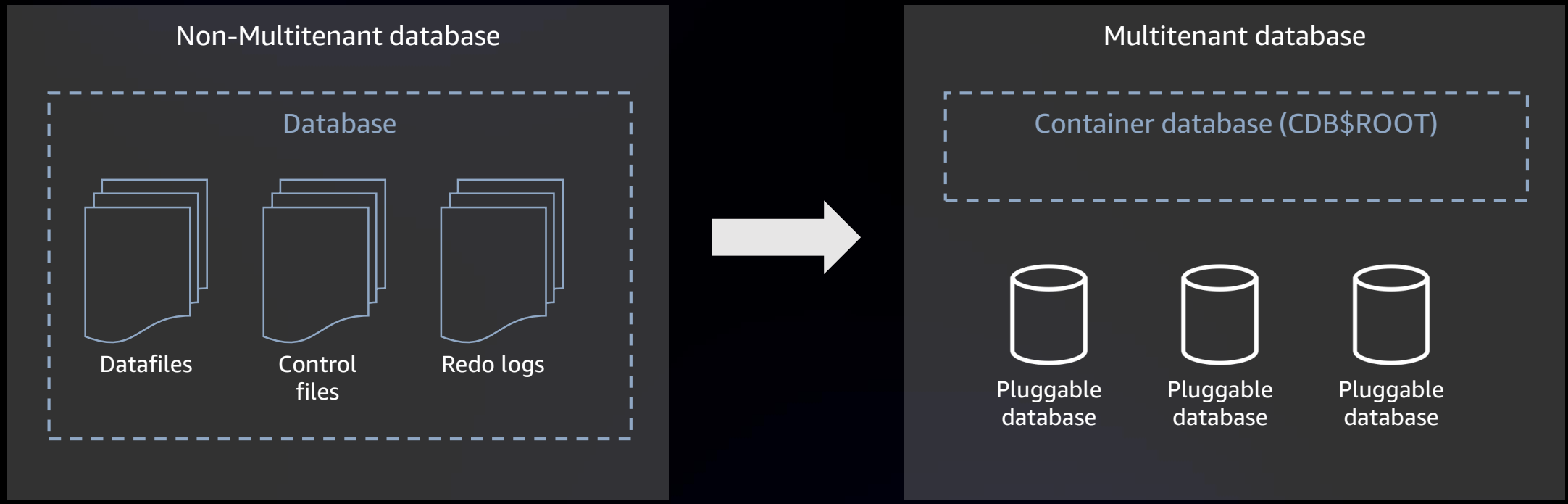
- Container database support
- Database Activity Streams (DAS)
- Replica switchover

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Container database support

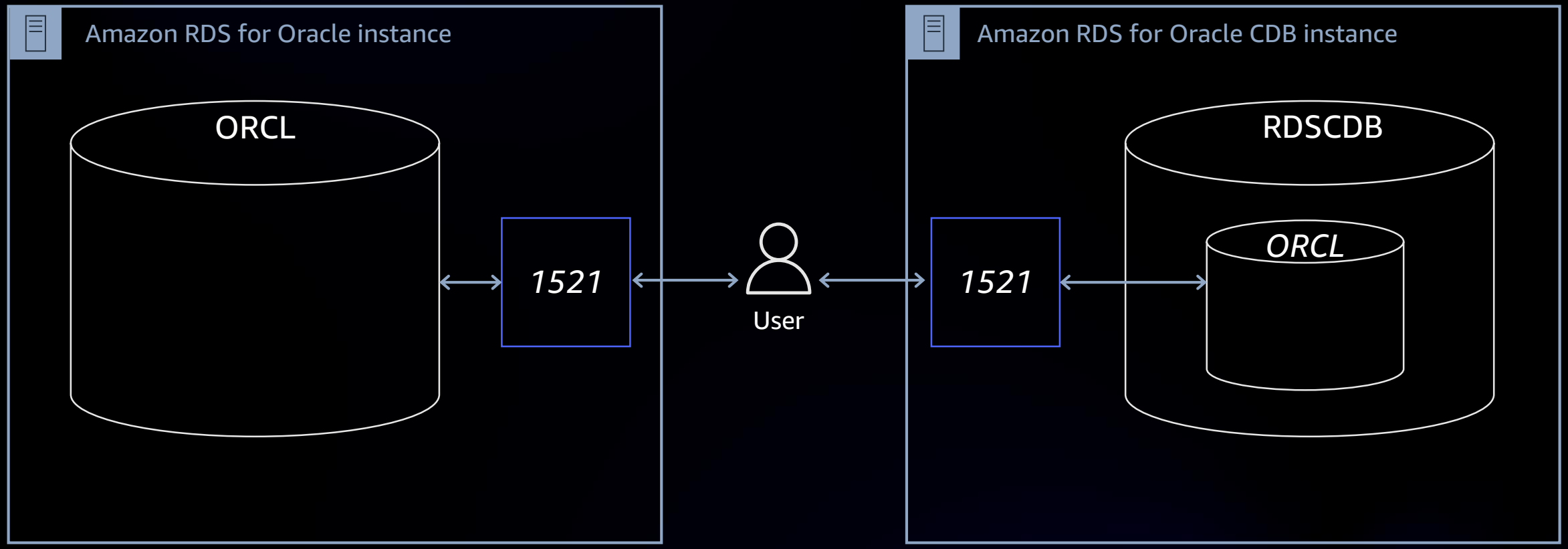
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Oracle Multitenant architecture



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Amazon RDS container database



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Using container databases

- Available with 19c April 2021 and later
  - New engine names: oracle-ee-cdb, oracle-se2-cdb
  - Parameter groups: oracle-ee-cdb-19, oracle-se2-cdb-19
- Single pluggable database
- Snapshots behave the same
- All users and objects local to PDB
- No direct access to container database

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Features not currently supported on CDB

- Conversion/upgrade from 12c to 19c-cdb
- Read or mounted replicas
- Options
  - Oracle Enterprise Manager
  - Oracle Enterprise Manager Agent
  - Oracle Label Security

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Container database use cases

- Applications that require PDB
- Future-proof new applications
- Test out new container architecture

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Oracle auditing – Database Activity Streams (DAS)

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Oracle auditing

- **Use cases**
  - Meet compliance and regulatory requirements
  - Support business processes
  - Know what's going on inside your database

- **Configuring**
  1. Set audit_trail parameter (default NONE, requires restart)
  2. Standard and fine-grained auditing of statements, objects, privileges
  3. Monitor and alarm

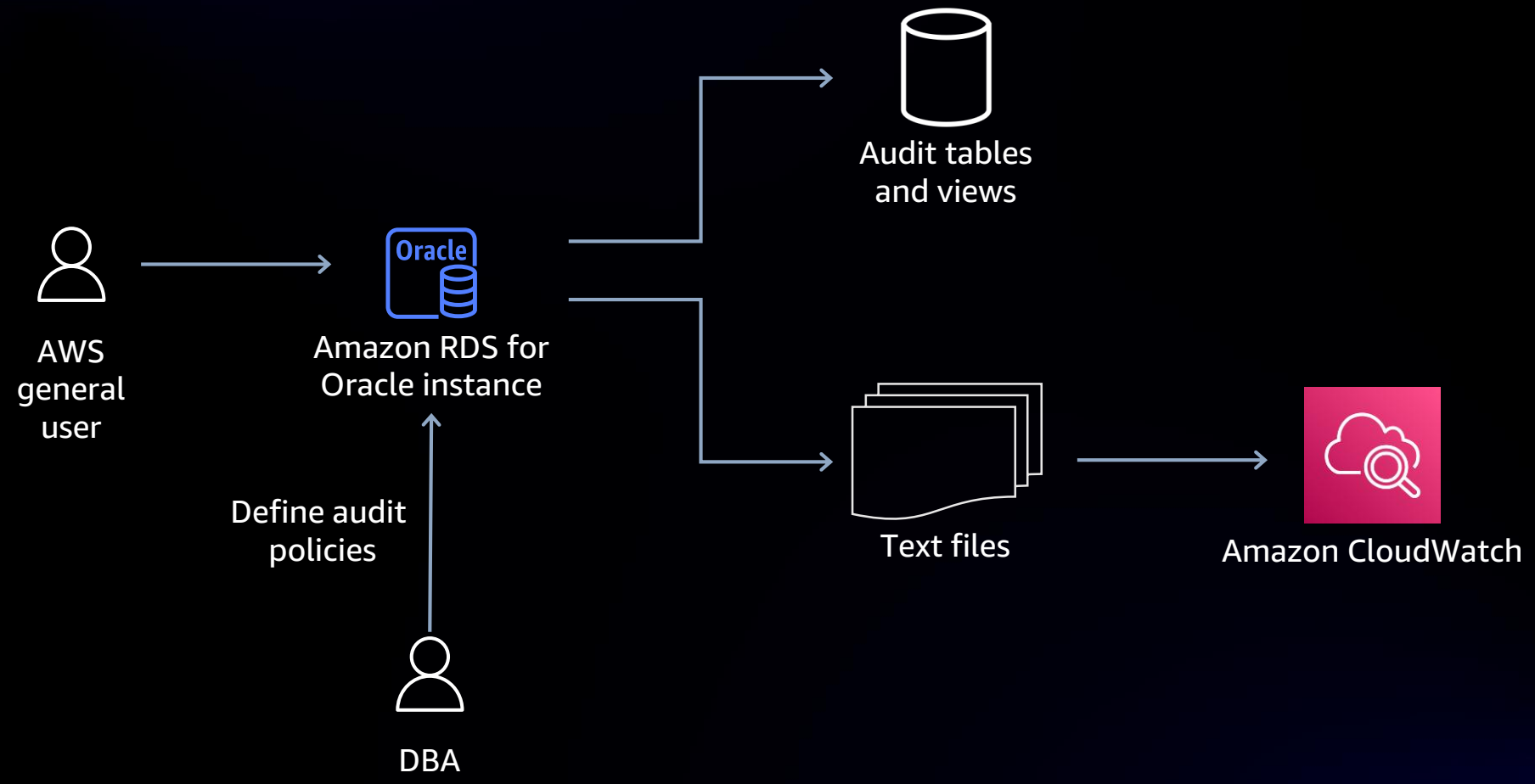
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Oracle audit trails

	Database audit trail	Filesystem audit trails
audit_trail parameter	DB DB,EXTENDED *Mixed-mode Unified Auditing supported by default in 12.2+*	OS XML XML,EXTENDED
Audit records	Accessible via system tables/views	Appended to text files on the filesystem (.aud or .xml)
Retention	Self-managed using DBMS_AUDIT_MGMT	Service-managed (default 7 days)
Access	SQL	PL/SQL Console/API Publish to Amazon CloudWatch

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Customer-managed Oracle auditing



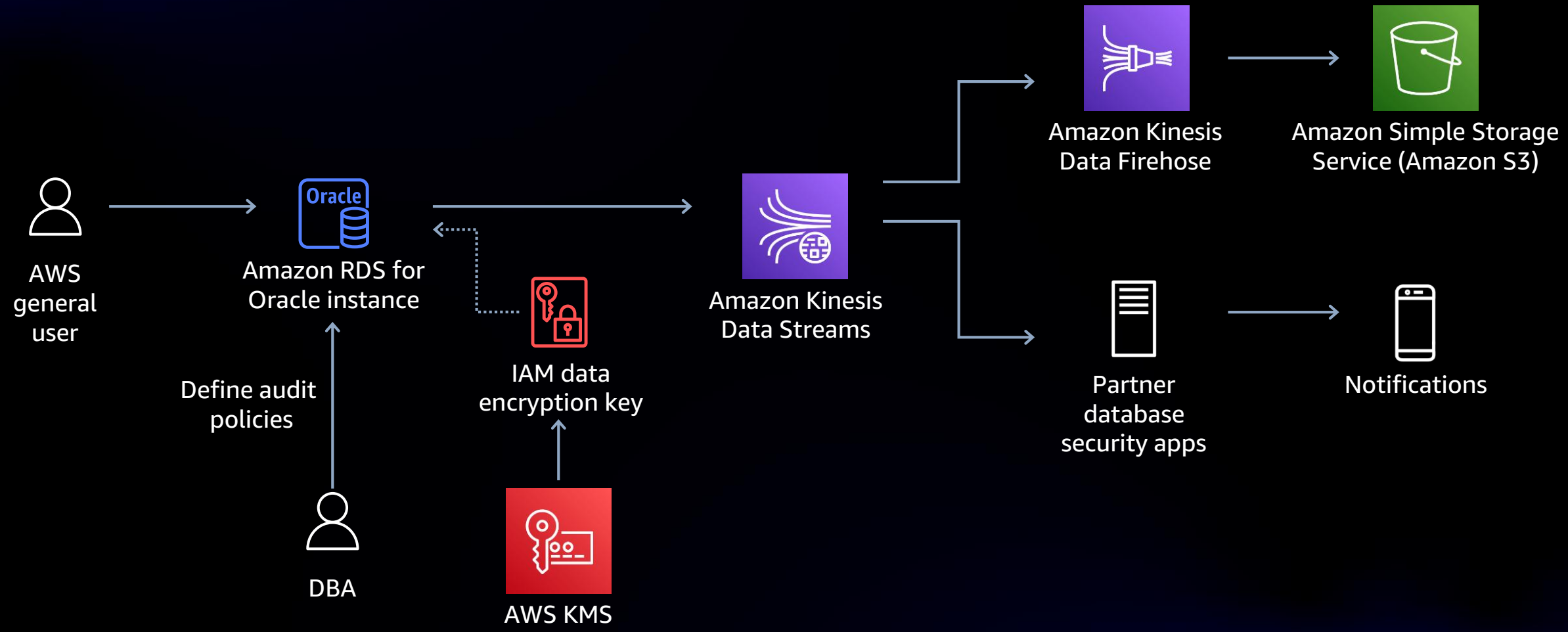
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Database Activity Streams (DAS)

- Automates collection, transmission, storage, and processing of audit data
- Near-real-time stream of Oracle Unified Audit Trail to Amazon Kinesis
- Common log format across Amazon RDS and Amazon Aurora
- Read replica not currently supported
- Consume audit data
  - Amazon Kinesis Data Firehose and AWS Lambda
  - IBM Security Guardium
  - Imperva SecureSphere Database Audit and Protection

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Database Activity Streams (DAS)



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Configuring DAS

Database administrator

- Set audit trail
- Define and enable audit policies
- Preserve any existing audit data

Security administrator

- Manage DAS access using IAM context keys
  - rds:StartActivityStream
  - rds:StopActivityStream
- Enable with StartActivityStream
- Enabling DAS purges existing Unified Audit data

Separation of duties

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DAS best practices

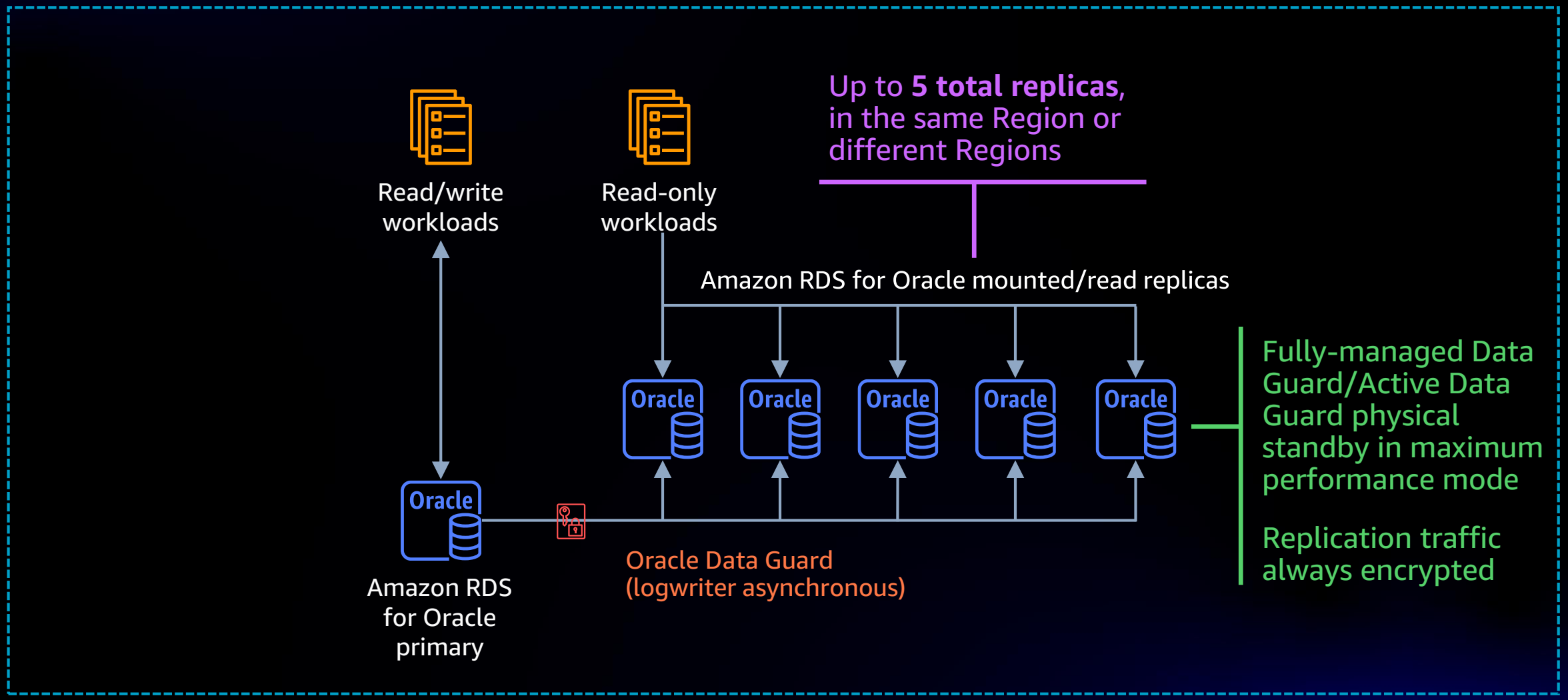
- Define privileges for separation of duties
- Configure audit policies before enabling
- Carefully test high-volume configurations
- Monitor audit trail space
- Monitor stream status

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Replica switchover

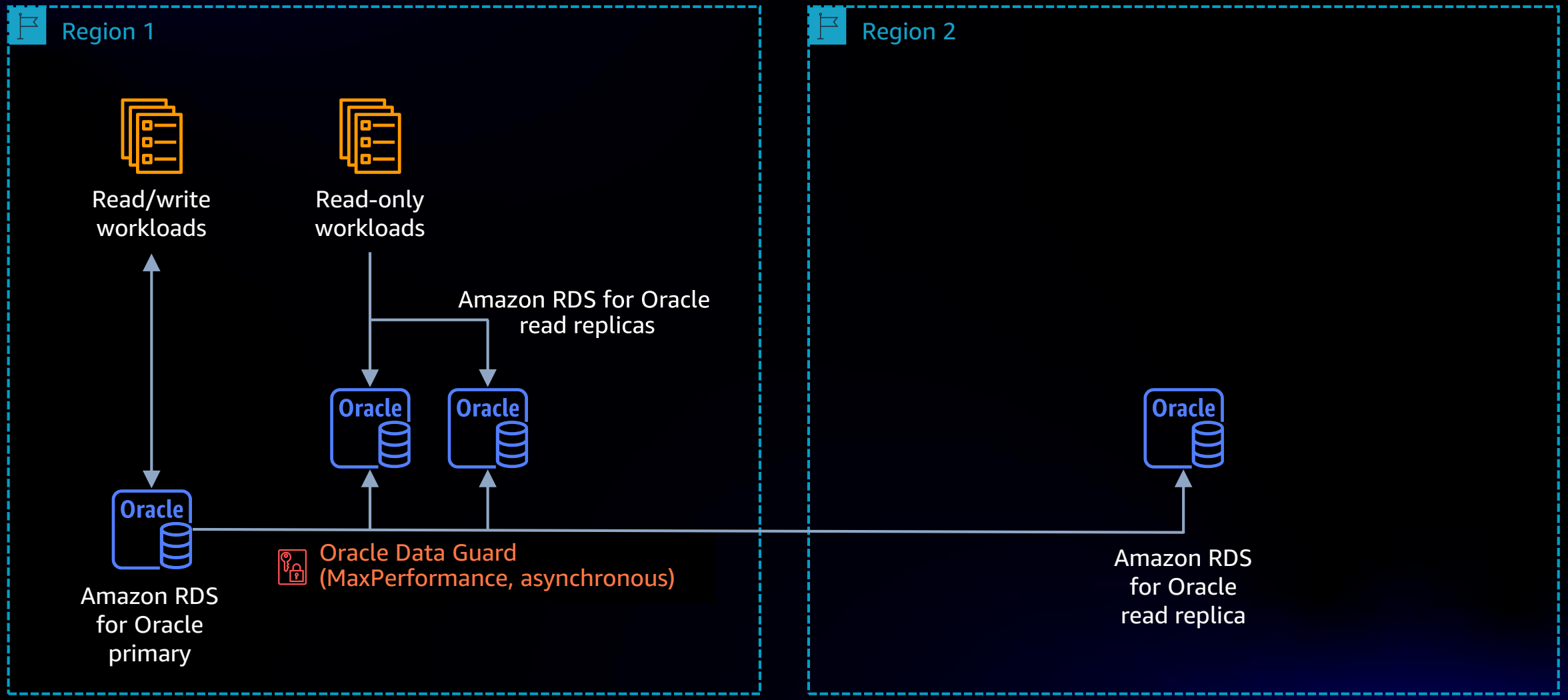
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Amazon RDS for Oracle replicas



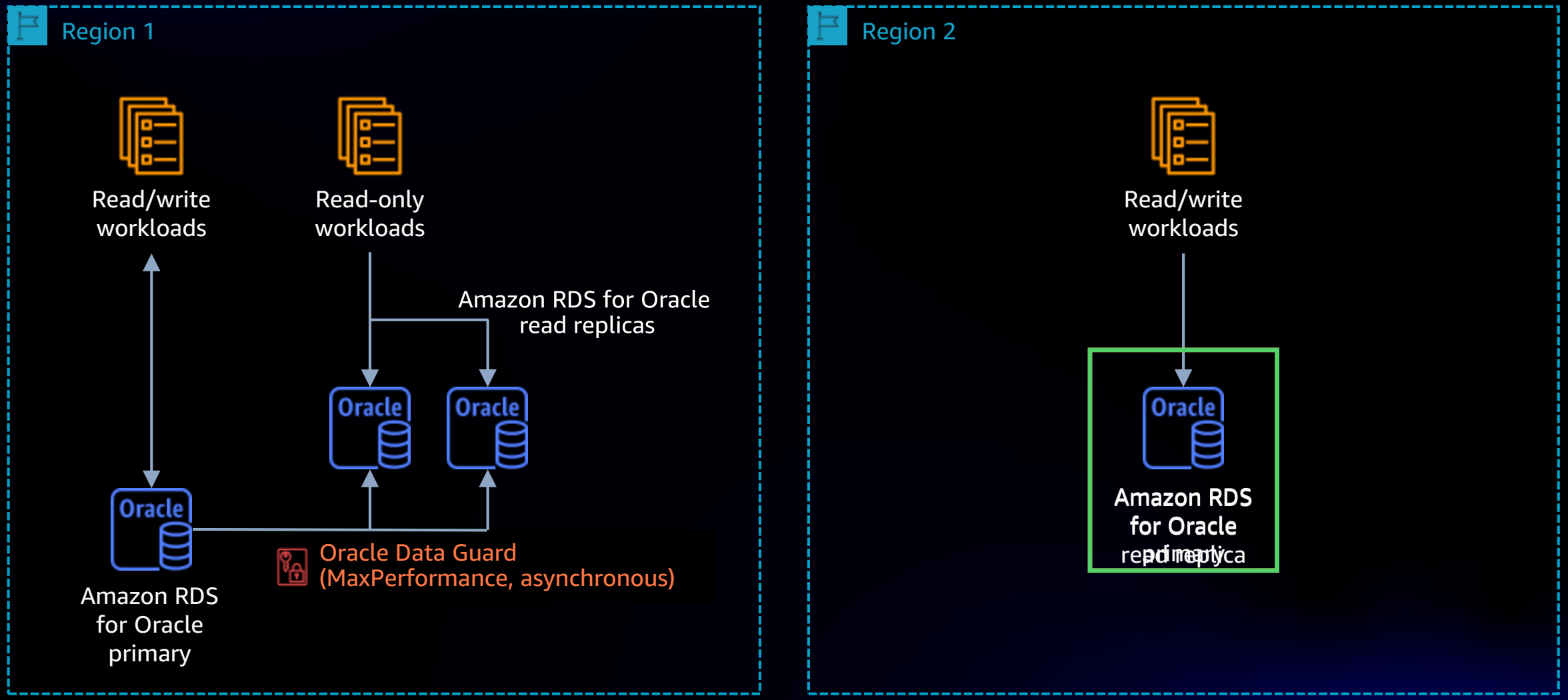
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Replica promotion



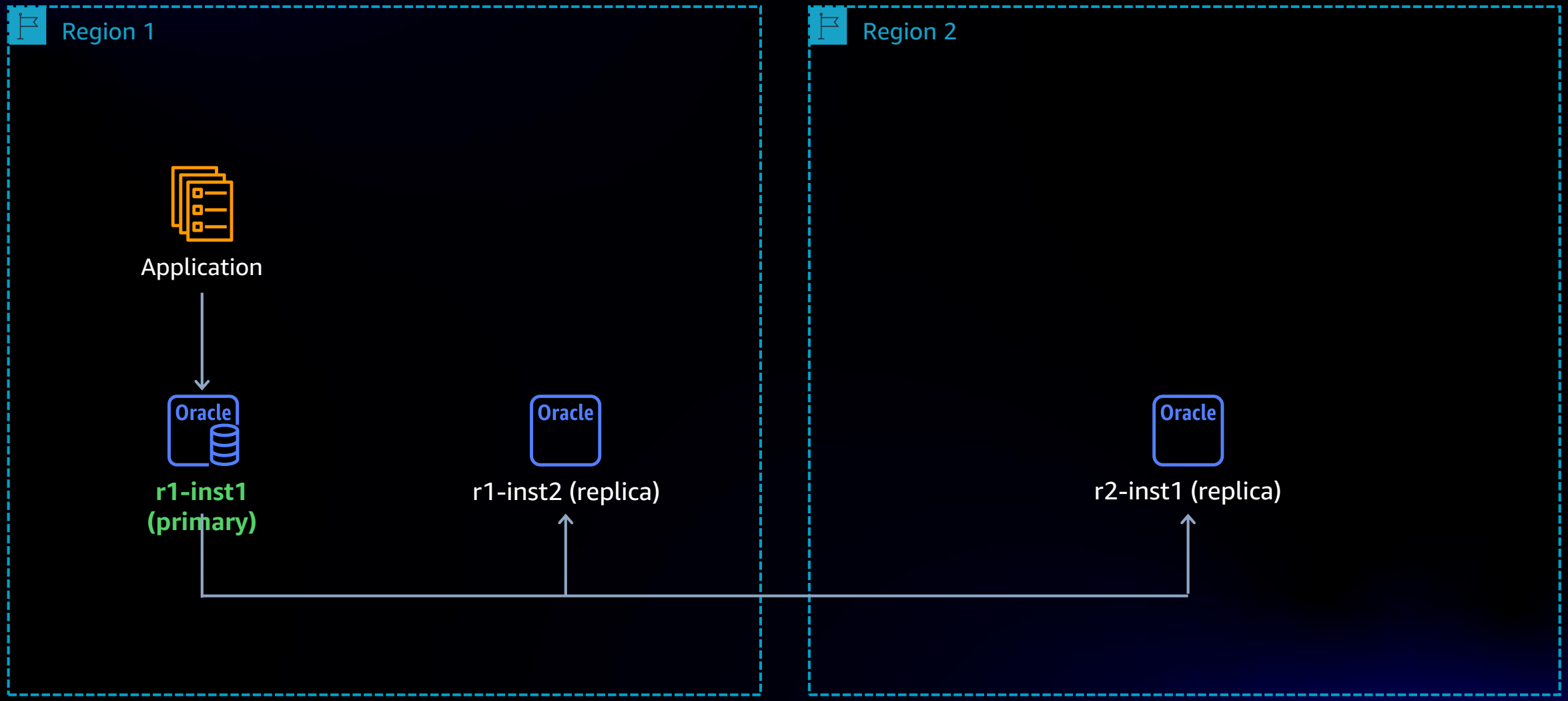
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Replica promotion



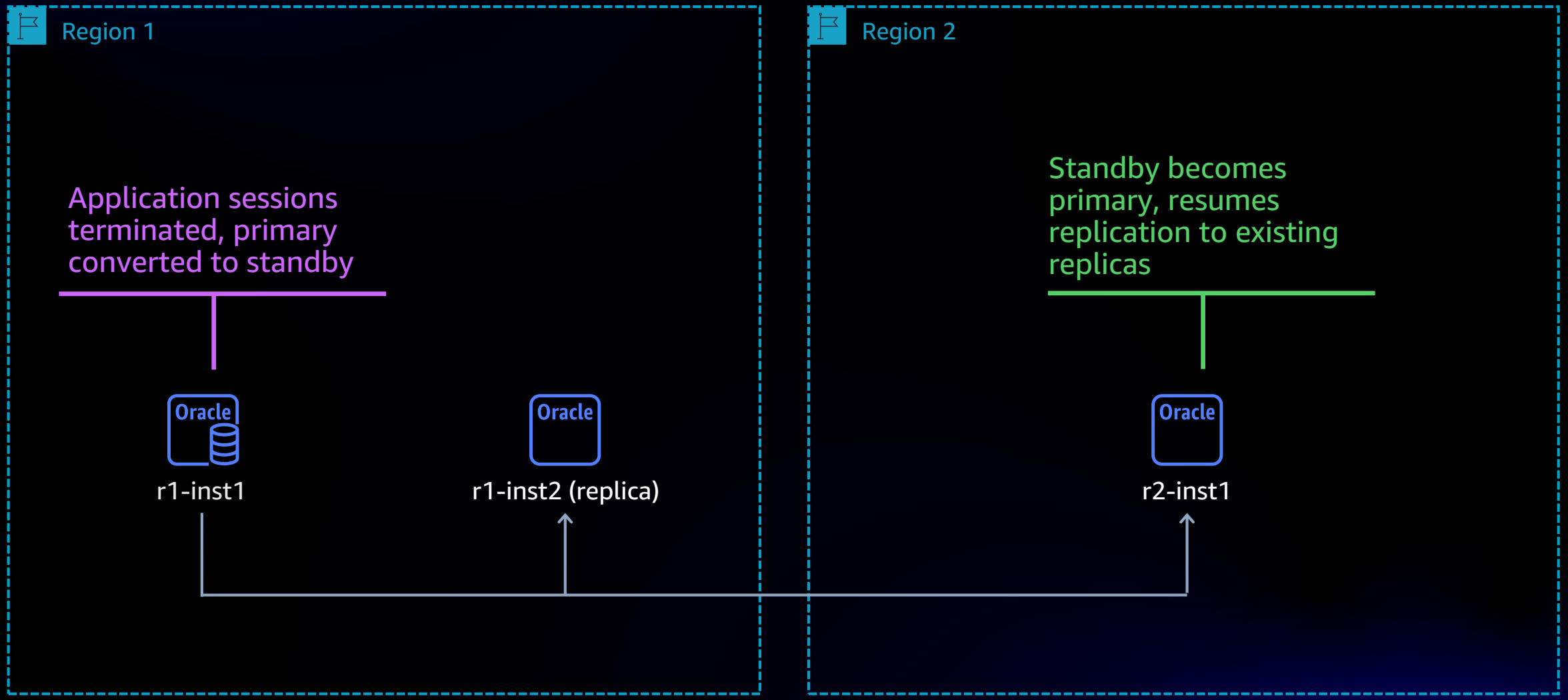
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Replica switchover



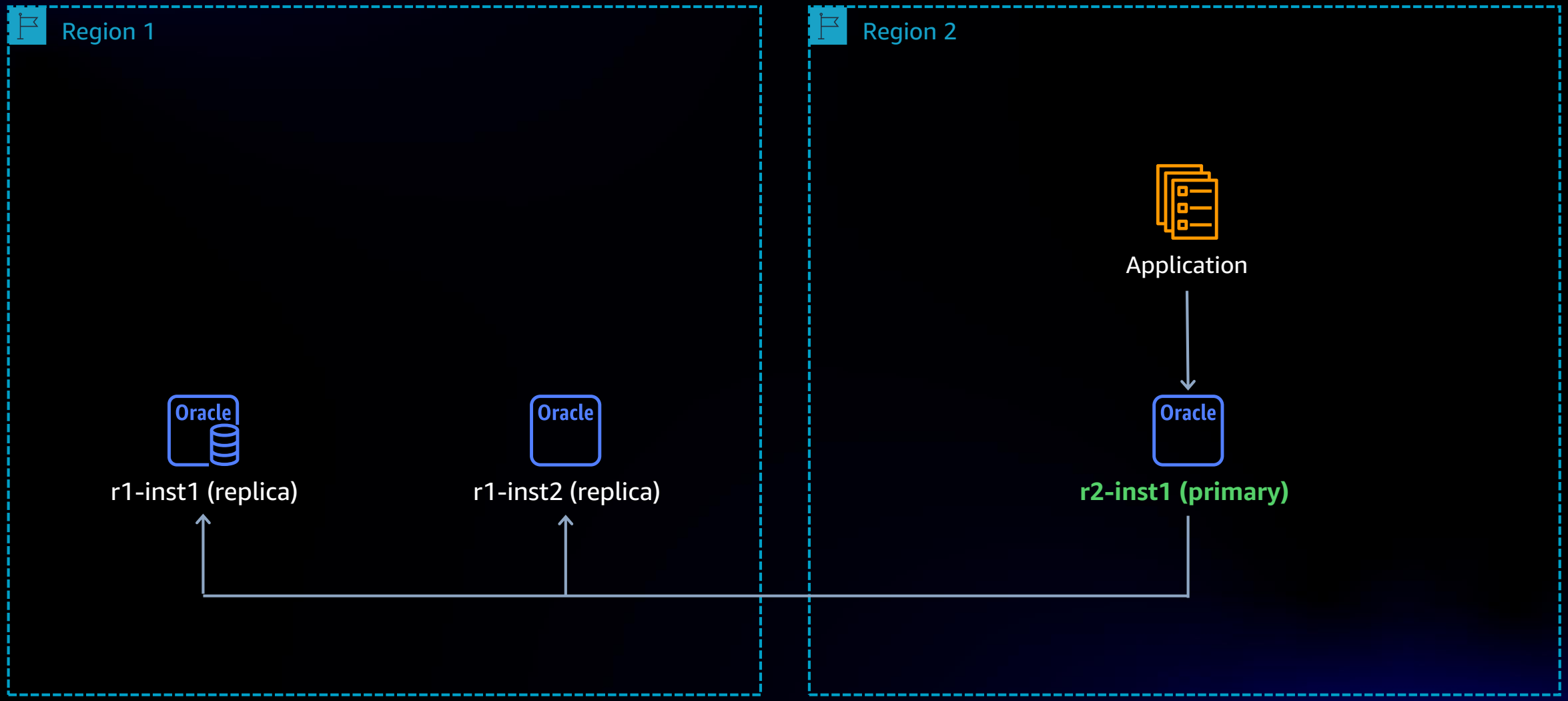
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Replica switchover



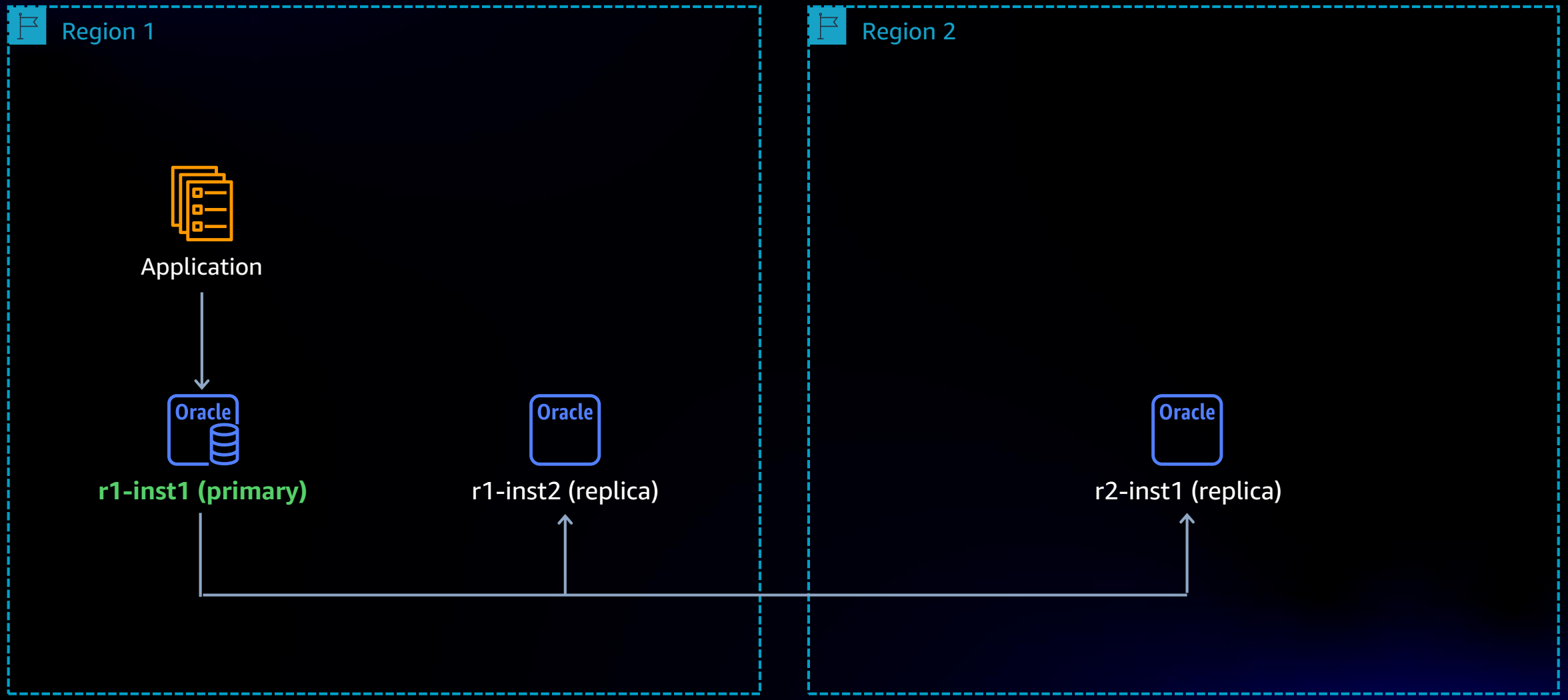
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Replica switchover



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Switch back



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Role transition use cases

- Promotion
  - Seed dev/test environments
  - Seed logical replication
  - Create new primary instance while preserving old primary
- Switchover
  - Disaster recovery
  - Disaster recovery drills
  - Migrate to a new region while maintaining replicas

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Customer presentation: Goldman Sachs

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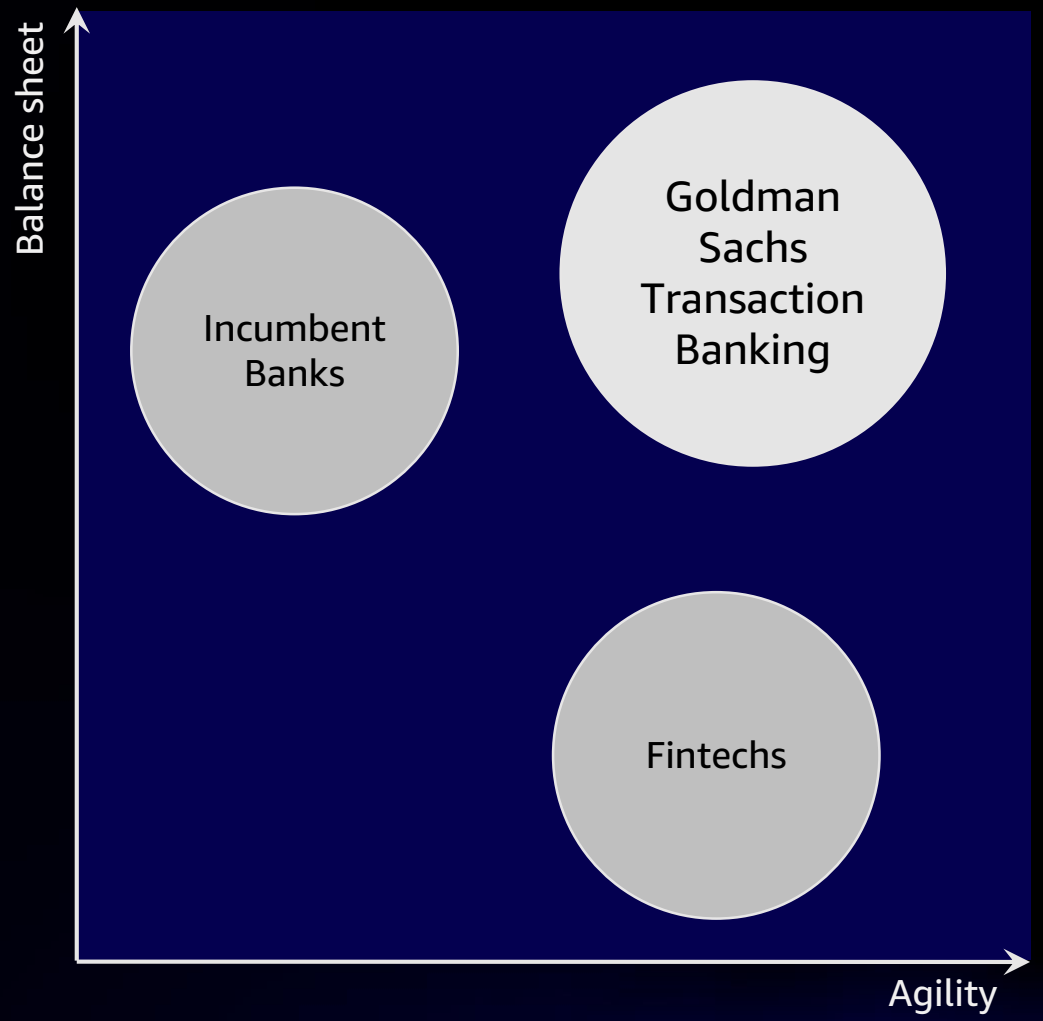
Goldman Sachs Transaction Banking (TxB)

Goldman Sachs has created a digital-first, built-from-scratch transaction banking platform. The firm is uniquely positioned to launch this product, leveraging over 150 years of financial and risk management expertise, yet unencumbered by legacy banking infrastructure.

The current landscape informed what we built



- High availability via cloud-based platform
- Real-time information via APIs driving intelligent decision-making
- Faster onboarding
- Data-driven actionable insights
- Integration with leading treasury workstations



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Goldman Sachs TxB – Amazon RDS for Oracle

- Reduction in administrative overhead
  - No cycles spent managing infrastructure further down the stack
    - OS upgrades, maintenance, etc.
    - Storage capacity management
  - Amazon RDS parameter groups increase standardization
  - Automated backups for point-in-time recovery (PITR)
  - Auto minor version upgrade
- Scalability
  - Ability to easily modify instance sizes in response to specific events

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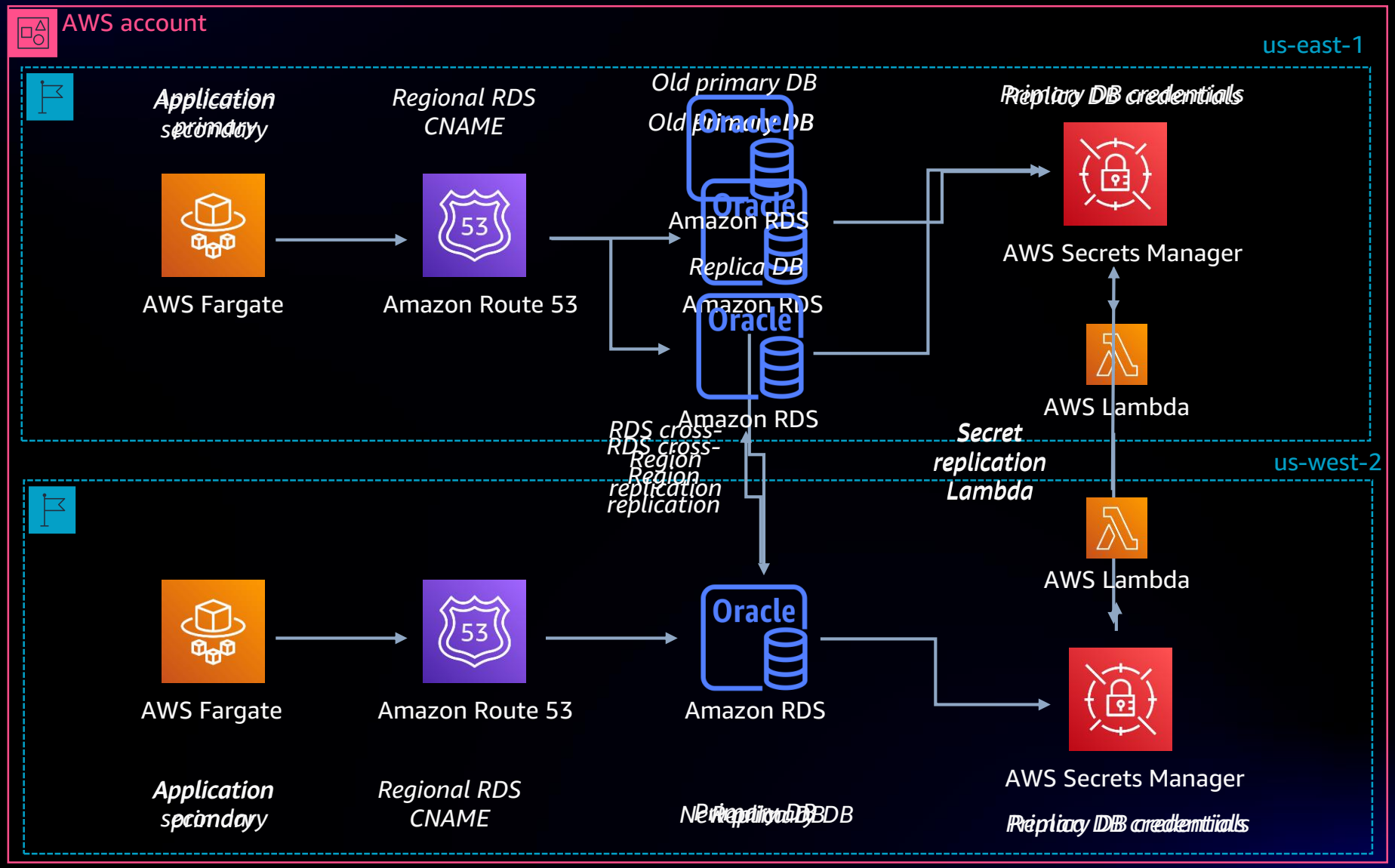
Goldman Sachs TxB – Amazon RDS for Oracle

- Availability
  - Both in-Region and cross-Region availability options
  - Multi-AZ for in-Region resiliency
    - Automated failover – low expected downtime
    - Automated rebuild of new secondary to re-establish full resiliency
  - Cross-Region resiliency takes advantage of Amazon RDS cross-Region read replicas
    - A lot of additional customer engineering was added to build a complete failover orchestration engine

aws

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Goldman Sachs TxB – Amazon RDS for Oracle



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Learn more

- AWS documentation – Getting started with Amazon RDS – step-by-step instructions (https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_GettingStarted.html)
- AWS Partner, House of Brick – Understanding your options for deploying and licensing Oracle on AWS (https://aws.amazon.com/blogs/apn/understanding-your-options-for-deploying-and-licensing-oracle-on-aws/)
- AWS Database Blog – Role of the DBA when moving to Amazon RDS (https://aws.amazon.com/blogs/database/part-1-role-of-the-dba-when-moving-to-amazon-rds-responsibilities/)
- AWS Database Blog – Category: Amazon RDS for Oracle (https://aws.amazon.com/blogs/database/category/database/amazon-rds/rds-for-oracle/)
- Amazon RDS for Oracle additional resources (https://aws.amazon.com/rds/oracle/resources/)

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