
AWS
re:Invent

DAT207

What's new in Amazon RDS for Oracle

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AWS

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Agenda

- Oracle feature and version support
- Disaster recovery improvements
- New manageability features



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Oracle feature and version support



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New / updated Oracle features

- Oracle Spatial and Graph (no additional licensing)*
- Oracle OLAP option (requires additional licensing)*
- Oracle Application Express (APEX) 19.2, 20.1
- FIPS 140-2 support
- Quarterly Oracle patch set update / release update

* Requires opt-in for automatic minor version upgrades

Oracle version deprecation



https://forums.aws.amazon.com/ann.jspa?annID=7341

My Oracle Support note 742060.1

Disaster recovery improvements



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Terminology



High availability

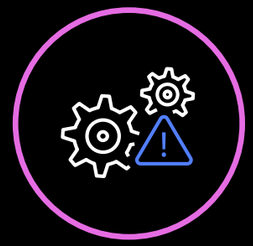
Design features for continuous operation

Leverage multiple Availability Zones within an AWS Region

Supports synchronous replication and automated failover

Fully automated with Amazon RDS Multi-AZ feature

Requires careful testing



Disaster recovery

Policies and procedures for recovering from complete unavailability

Leverage multiple global AWS Regions

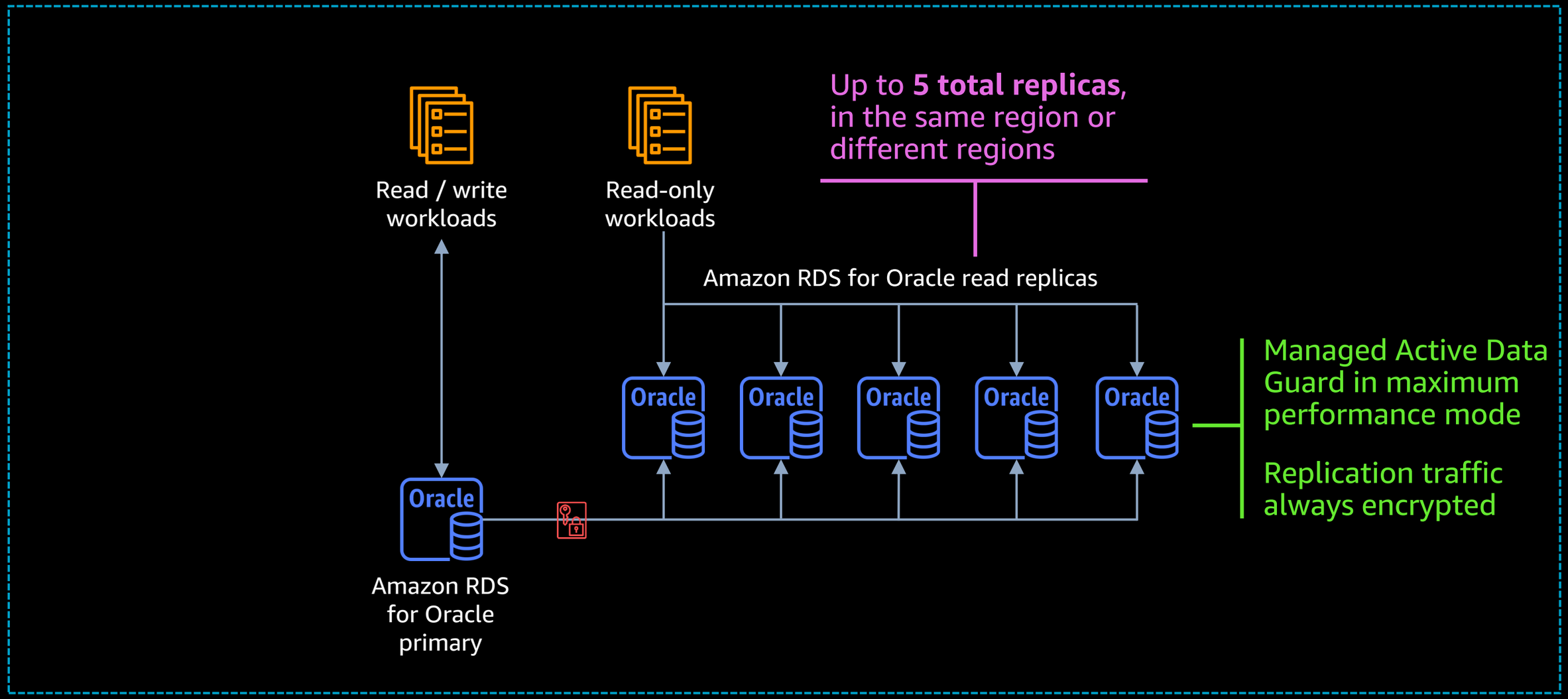
Built on asynchronous replication; failover is a decision

Requires careful planning, testing, and runbooks

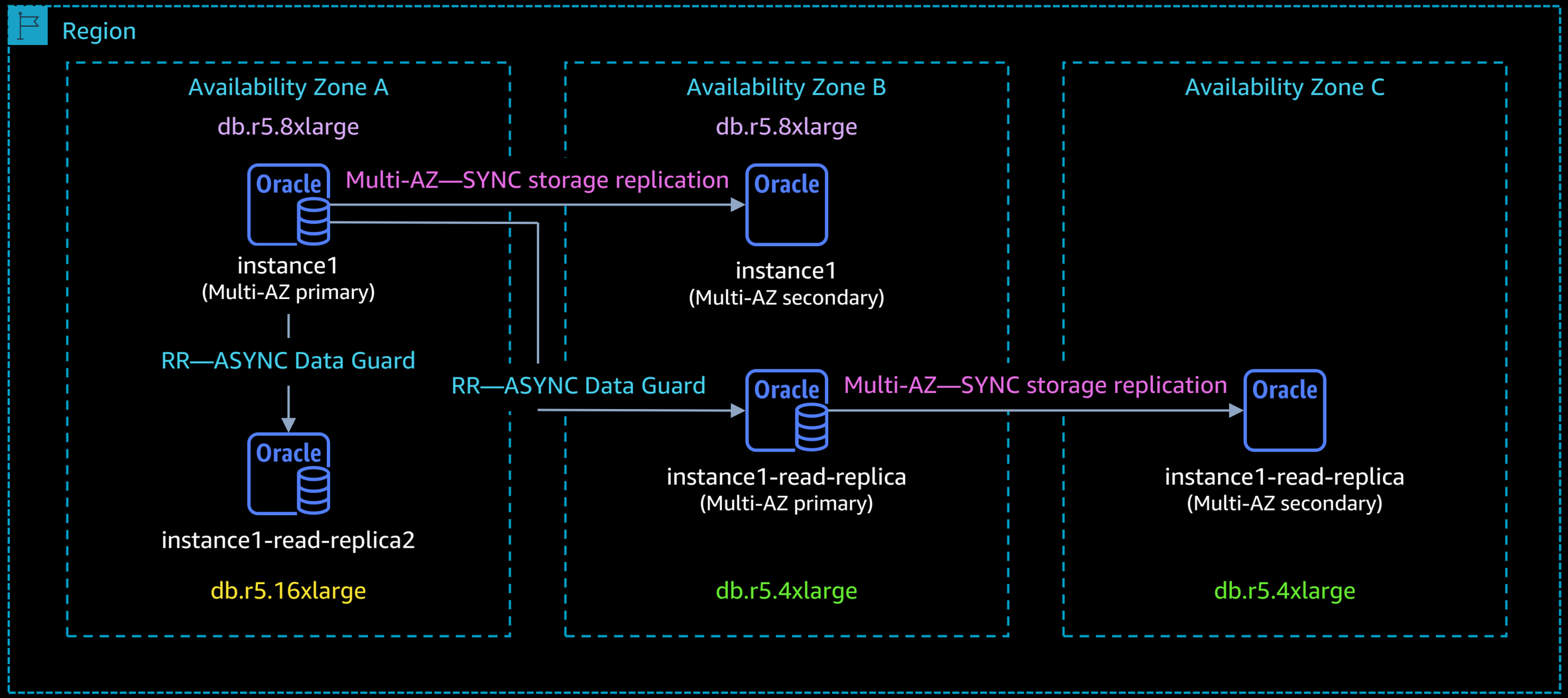
Disaster recovery improvements

1. Read replicas
2. Mounted replicas
3. Automated cross-region backups

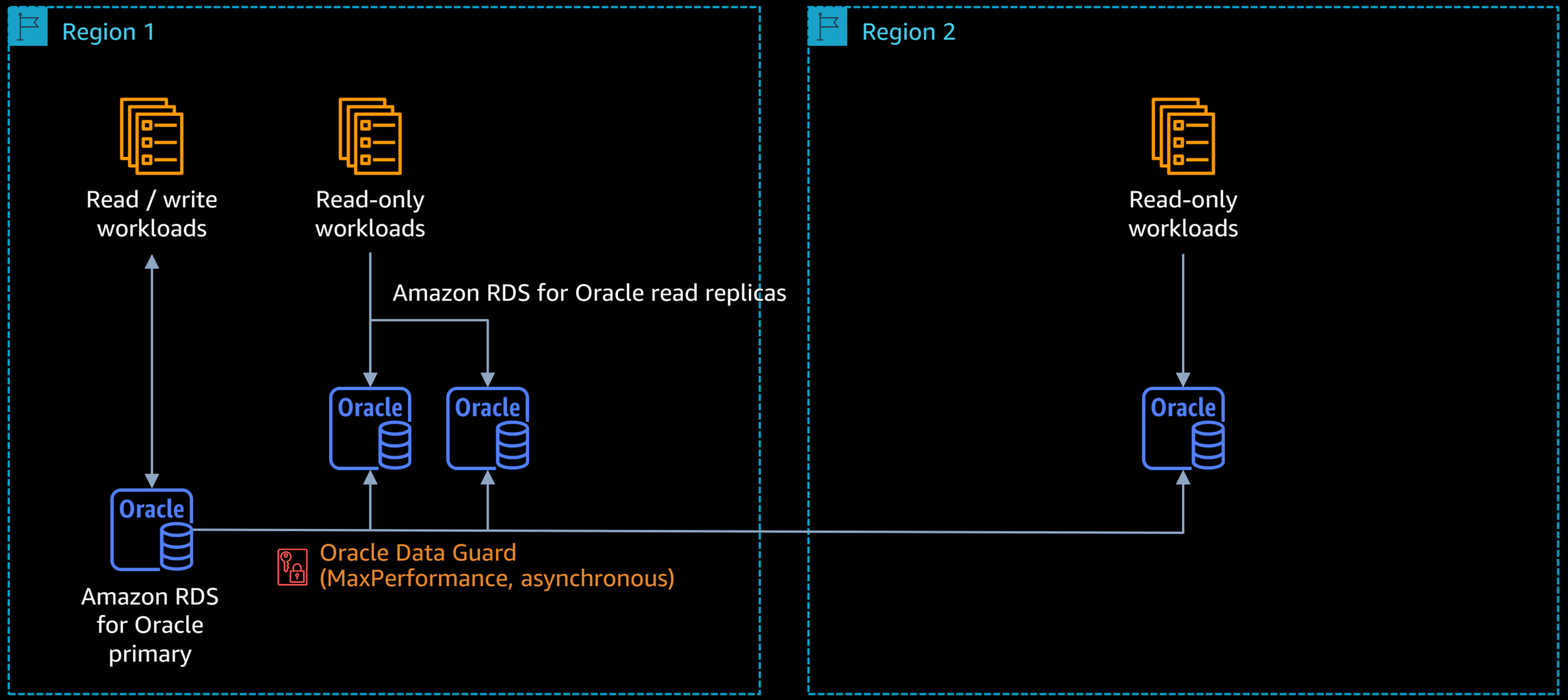
Amazon RDS for Oracle read replicas



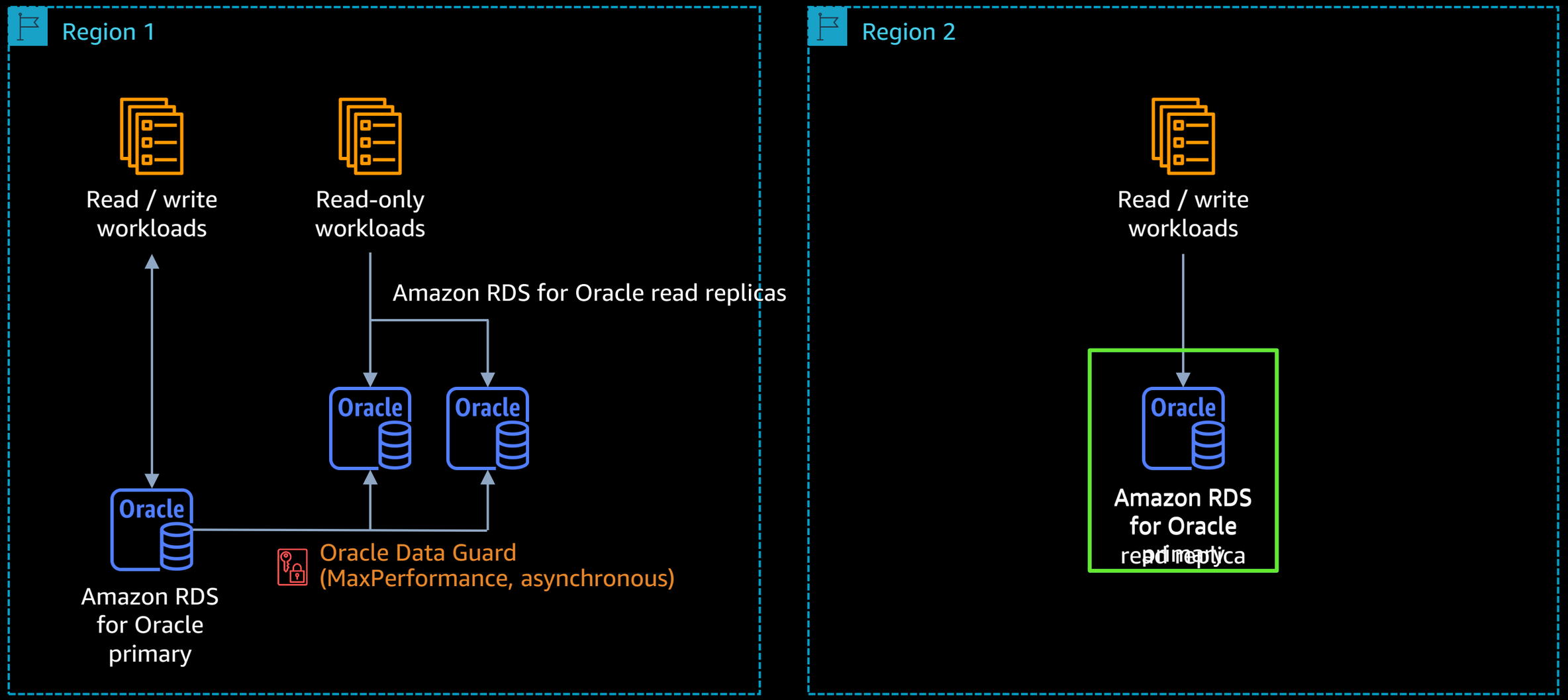
Amazon RDS for Oracle read replicas



Read replica promotion



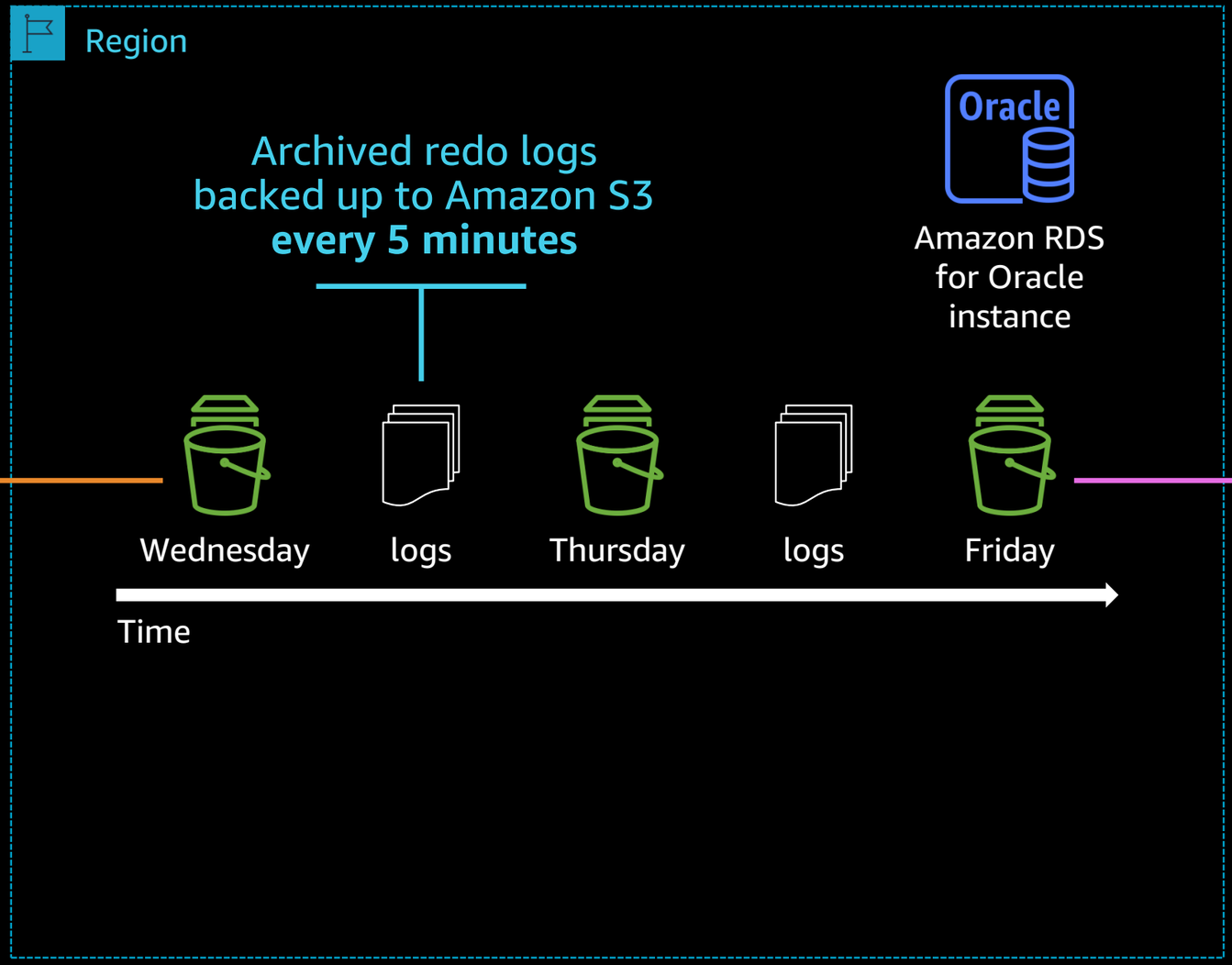
Read replica promotion



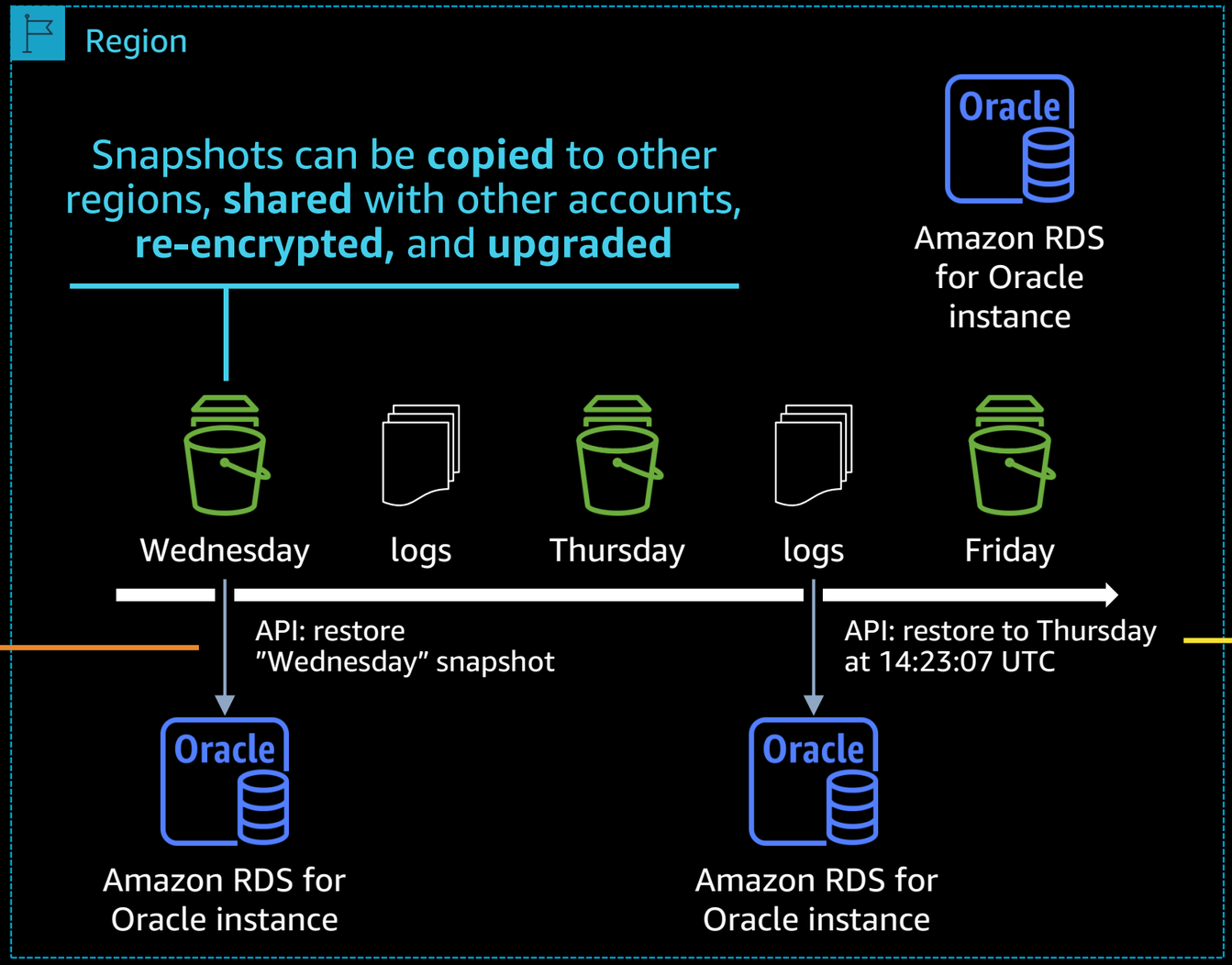
Amazon RDS for Oracle mounted replicas

- Fully managed Oracle Data Guard physical standby
- Same promotion functionality
- Up to 5 total replicas per primary instance
- Only require Oracle Database Enterprise Edition licensing (BYOL)
- Change replica modes via CLI (read-only requires Active Data Guard option licensing)
- Modify-db-instance – replica mode (mounted|read-only)

Amazon RDS automated backups



Amazon RDS automated backups



Restore snapshot as a new instance

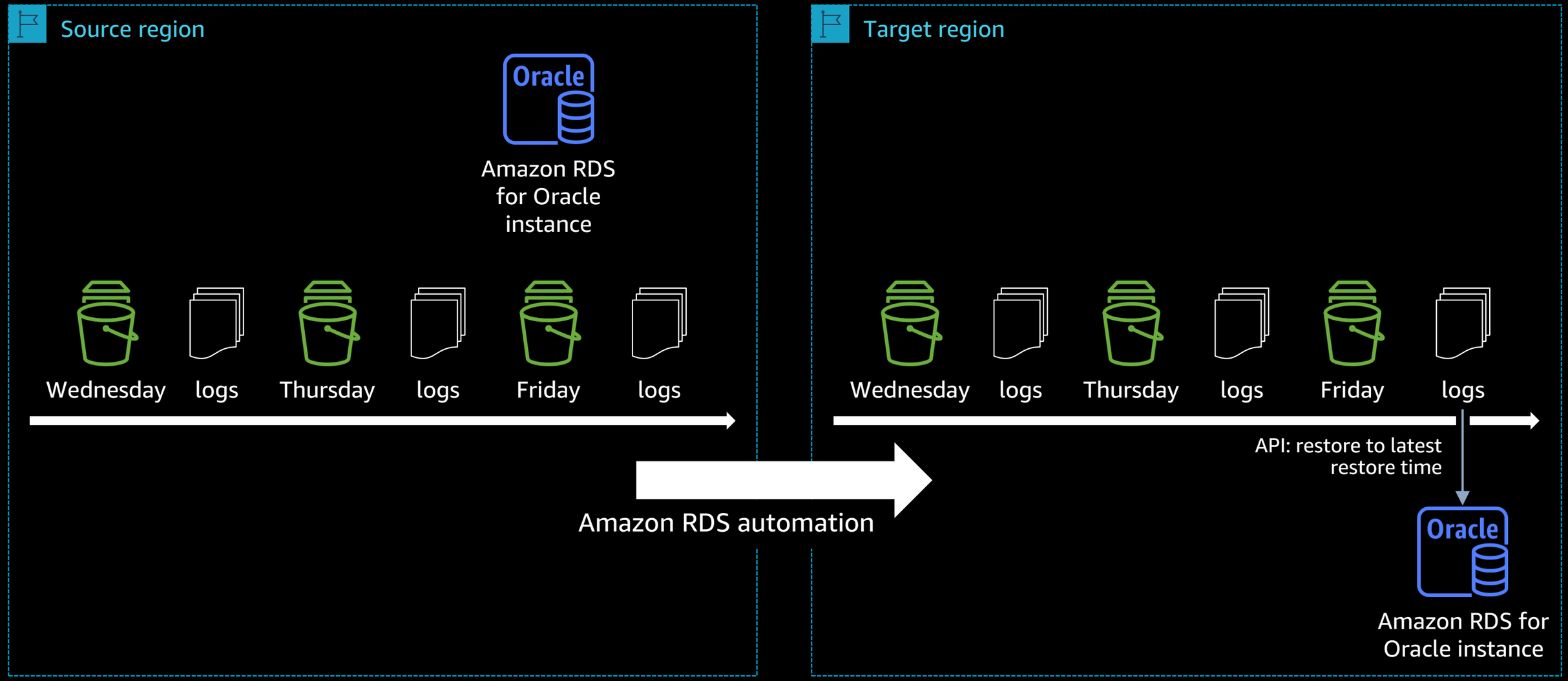
Exact state of database as of snapshot

Point-in-time restore to create an instance as of **any second** in your automated backup retention

RDS automatically selects the closest snapshot (automatic or manual) and rolls forward with redo

Available in same region/account as source instance

Amazon RDS cross-region automated backups



Amazon RDS cross-region automated backups

- Automatically copies snapshots and transaction logs to second region
- Independent retention
- Available now on Amazon RDS for Oracle
  (other engines coming in 2021)
- Latest restore time typically
  25 minutes or less
- **New / updated APIs**

  `start-db-instance-automated-backups-replication`

  `stop-db-instance-automated-backups-replication`

  Replicated backups added to
  `describe-db-instance-automated-backups`

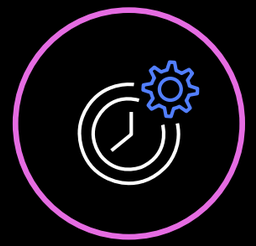
  New flag in restore commands –
  `source-db-instance-automated-backups-arn`

Terminology



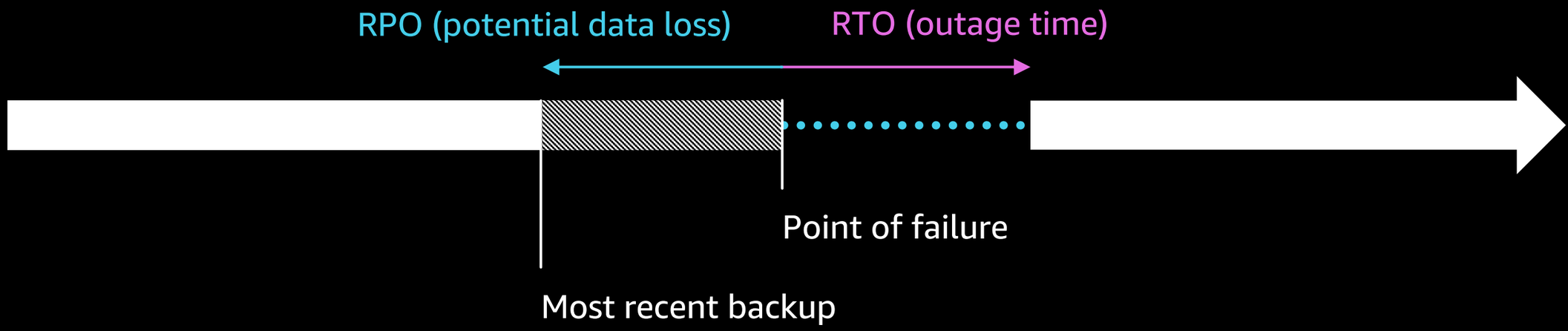
Recovery point objective (RPO)

Amount of data loss tolerable in a disaster scenario



Recovery time objective (RTO)

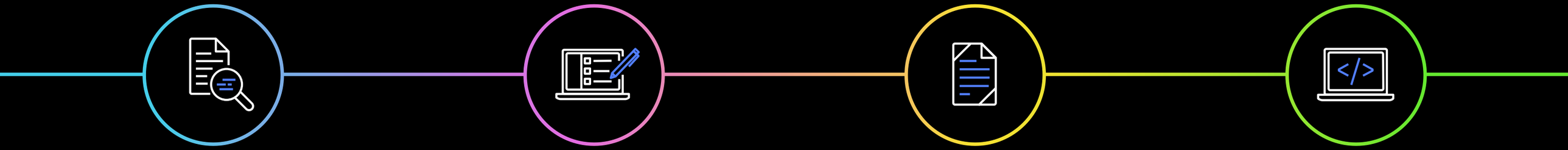
Acceptable time window when service is unavailable



Disaster recovery comparison

Feature	RPO	RTO	Licensing
Snapshot restore	Hours	<1 hour	
Point-in-time restore (in-region)	5 minutes	Hours	All editions
Point-in-time restore (cross-region)	25 minutes	Hours	
Mounted replica promotion	Minutes	Minutes	Enterprise Edition
Read replica promotion	Minutes	Minutes	Enterprise Edition + Active Data Guard option

Disaster recovery planning



Define

Understand the specific requirements for your application

Design

Choose the Amazon RDS features and options that help you meet your objectives

Plan

Develop runbooks and procedures to handle common scenarios

Test

Test and iterate on procedures; ensure team knows how to quickly recover

New manageability features



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AWS License Manager integration

Track

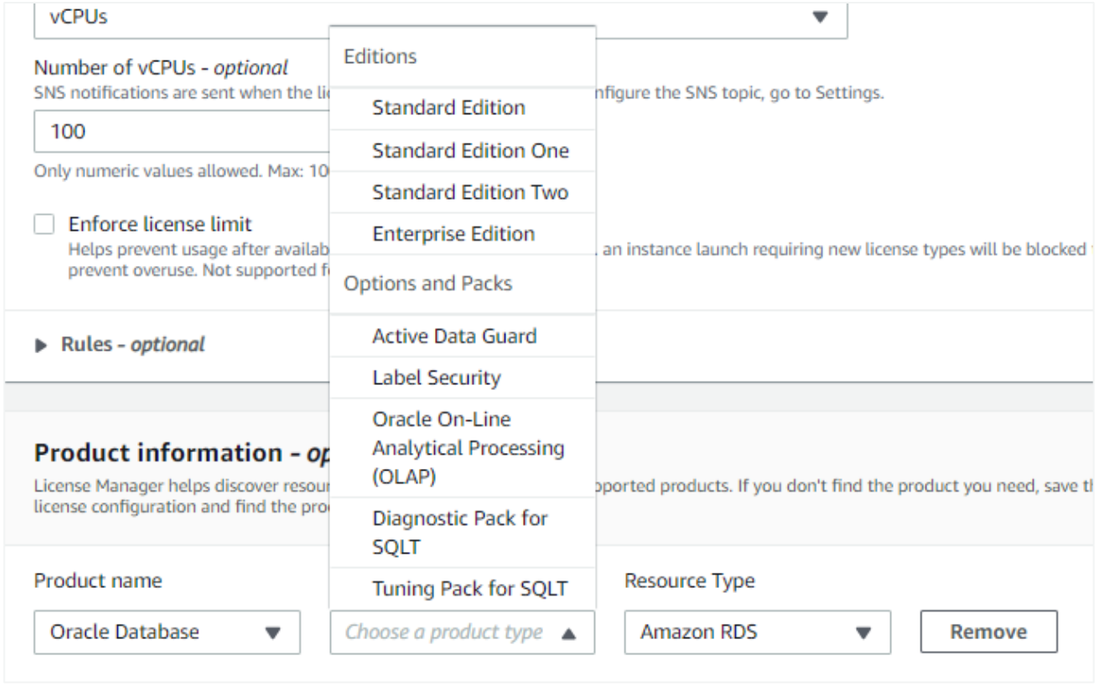
commercial software license counts

Hard limits

not supported for Amazon RDS

Monitor vCPU

for Oracle edition and feature
(Active Data Guard, Label Security, OLAP, Diagnostics Pack for SQLT, Tuning Pack for SQLT)



Oracle diagnostic tasks



rdsadmin_diagnostic_util

Requires Enterprise Edition plus Diagnostic and Tuning packs

Generate ASH, AWR, and ADDM reports

Export AWR statistics



rdsadmin_adrci_util

PL/SQL task interface to Oracle Automatic Diagnostic Repository Command Interpreter (ADRCI)

List incidents and problems

Generate IPS packs for Oracle Support

View incident and trace files

Oracle diagnostic tasks

```
SQL> @/tmp/badsql
select count(*) from dba_objects
*
ERROR at line 1:
ORA-03113: end-of-file on communication channel
Process ID: 9200
Session ID: 1281 Serial number: 5598


SQL> select * from table(rdsadmin.rds_file_util.read_text_file('BDUMP', 'alert_MBORCL.log'))
  2  where text like 'ORA%' or text like 'Incident%';
ORA-07445: exception encountered: core dump [qcsabe_worker()+14] [SIGSEGV] [ADDR:0x7FFC37095FF8] [PC:0x12A2E80E] [Address n
ot mapped to object] []
Incident details in: /rdsdbdata/log/diag/rdbms/mborcl_a/MBORCL/incident/incdir_40080/MBORCL_ora_9200_i40080.trc
```

Oracle diagnostic tasks

RDS > Databases >

Watching Log: trace/alert_MBORCL.log (3.1 kB)

text: background:

```
2020-11-02T05:14:42.563883+00:00
Exception [type: SIGSEGV, Address not mapped to object] [ADDR:0x7FFC37095FF8] [PC:0x12A2E80E, qcsabe_worker()+1
count: 1]
Errors in file /rdsdbdata/log/diag/rdbms/mborcl_a/MBORCL/trace/MBORCL_ora_9200.trc (incident=40080):
ORA-07445: exception encountered: core dump [qcsabe_worker()+14] [SIGSEGV] [ADDR:0x7FFC37095FF8] [PC:0x12A2E80E
mapped to object] []
Incident details in: /rdsdbdata/log/diag/rdbms/mborcl_a/MBORCL/incident/incdir_40080/MBORCL_ora_9200_i40080.trc
Use ADRCI or Support Workbench to package the incident.
See Note 411.1 at My Oracle Support for error and packaging details.
2020-11-02T05:14:48.657234+00:00
********************************************************************
An internal routine has requested a dump of selected redo.
This usually happens following a specific internal error, when
```

Oracle diagnostic tasks

```
SQL> var task_id varchar2(80);
SQL> exec :task_id := rdsadmin.rdsadmin_adrci_util.list_adrci_problems;

PL/SQL procedure successfully completed.

SQL> select * from table(rdsadmin.rds_file_util.read_text_file('BDUMP', 'dbtask-'||:task_id||'.log'));
2020-11-02 05:20:07.583 UTC [INFO ] Listing ADRCI problems.
2020-11-02 05:20:07.898 UTC [INFO ]
ADR Home = /rdsdbdata/log/diag/rdbms/mborcl_a/MBORCL:
*************************************************************************
PROBLEM_ID           PROBLEM_KEY                                             LAST_INCIDENT        LASTINC_TIME
-------------------- ------------------------------------------------------- -------------------- --------------------

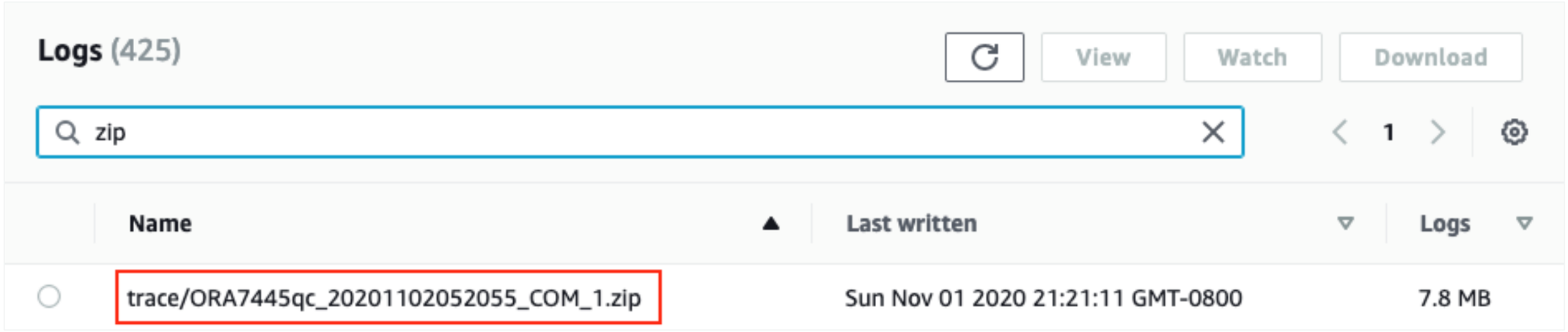
3                    ORA 7445 [qcsabe_worker]                                40080                2020-11-02 05:14:42
2                    ORA 800                                                 39696                2020-11-02 05:08:49
1                    ORA 700 [pga physmem limit]                             39655                2020-11-02 05:08:47
3 rows fetched

SQL> exec :task_id := rdsadmin.rdsadmin_adrci_util.create_adrci_package(problem_id=>3);

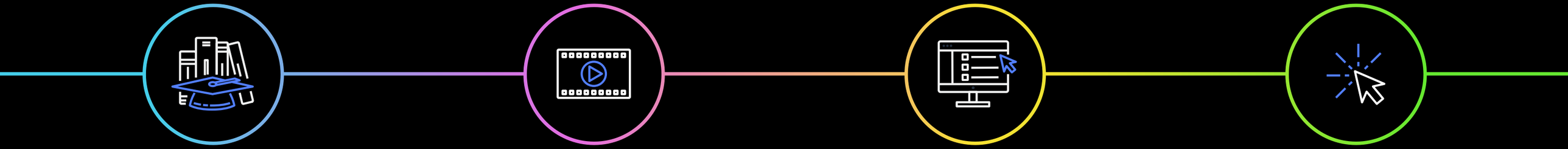
PL/SQL procedure successfully completed.

SQL> select * from table(rdsadmin.rds_file_util.read_text_file('BDUMP', 'dbtask-'||:task_id||'.log'));
2020-11-02 05:20:55.059 UTC [INFO ] The ADRCI package is being created.
2020-11-02 05:21:11.754 UTC [INFO ] Generated package 1 in file /rdsdbdata/log/trace/ORA7445qc_20201102052055_COM_1.zip, mode complete
2020-11-02 05:21:11.754 UTC [INFO ] The ADRCI package was successfully created.
2020-11-02 05:21:11.754 UTC [INFO ] The task finished successfully.
```

Oracle diagnostic tasks



Learn more



Read

Amazon RDS documentation, whitepapers, and case studies

Watch

videos on features, best practices, and virtual workshops

Follow along

with step-by-step blog posts

Try it out

– create an instance and take it for a spin!

https://aws.amazon.com/rds/oracle

Learn more

- Getting started with Amazon RDS – Step-by-step instructions for creating an instance (https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_GettingStarted.html)
- Understanding Your Options for Deploying and Licensing Oracle on AWS – AWS Partner House of Brick discusses Oracle licensing on AWS (https://aws.amazon.com/blogs/apn/understanding-your-options-for-deploying-and-licensing-oracle-on-aws/)
- Role of the DBA when moving to Amazon RDS – AWS Database Blog post discusses DBA role with managed databases (https://aws.amazon.com/blogs/database/part-1-role-of-the-dba-when-moving-to-amazon-rds-responsibilities/)
- Best practices for upgrading from 11.2.0.4 to 19c – Learn best practices and common issues upgrading major versions on Amazon RDS for Oracle (https://aws.amazon.com/blogs/database/best-practices-for-upgrading-amazon-rds-for-oracle-db-instances-from-11-2-0-4-to-19c/)
- Managed disaster recovery and managed reader farm with Amazon RDS for Oracle – Use cases and walkthrough of setting up read replicas for read scaling and disaster recovery (https://aws.amazon.com/blogs/database/managed-disaster-recovery-and-managed-reader-farm-with-amazon-rds-for-oracle-using-oracle-active-data-guard/)
- Case study: Cathay Pacific – See how Cathay Pacific improved performance by 20% and improved their security posture by moving to Amazon RDS for Oracle (https://aws.amazon.com/solutions/case-studies/cathay-pacific-rds-case-study/)

Related Sessions

DAT202

What's New in Amazon RDS

DAT208

What's New in Amazon RDS for SQL Server

DAT216

Planning and executing your database migration to Amazon RDS for Oracle

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