Oracle Applications on Amazon RDS Best Practices

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Agenda

1. Oracle Application Landscape
2. AWS Capabilities
3. Best Practices for Oracle Applications
4. AWS Managed Database Services for Oracle Apps

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Oracle Application Landscape

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Oracle Applications

Oracle Built Applications

- E-Business Suite
- OBIEE
- ….and more

Oracle Acquired Applications

- Peoplesoft Enterprise
- JD Edwards EnterpriseOne
- JD Edwards World
- Siebel CRM
- Hyperion
- Primavera
- Micros
- …and more

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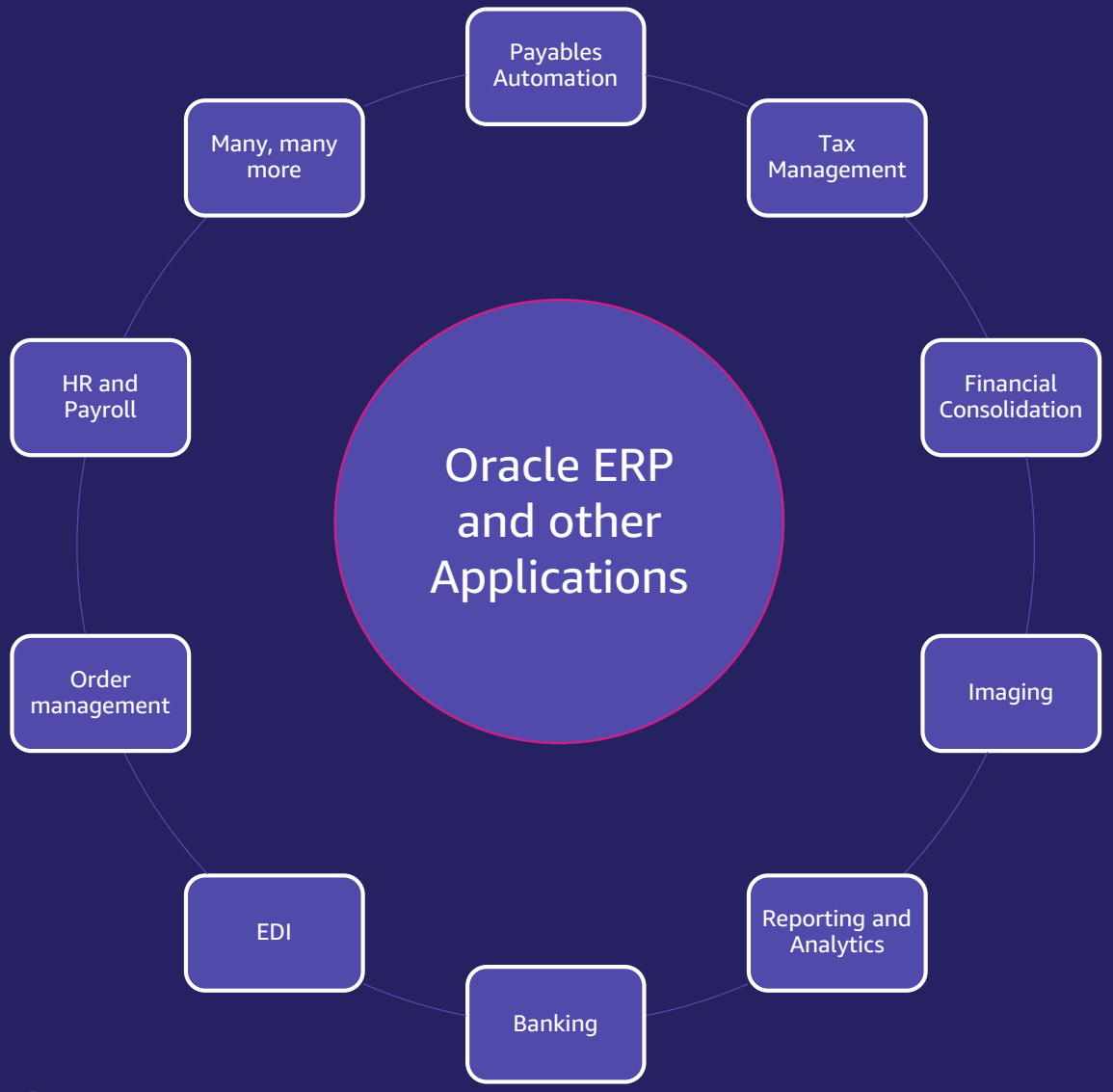
Oracle Applications 3rd party Ecosystem



Each Oracle application environment is typically surrounded by a large ecosystem of complimentary systems from various 3rd party vendors.

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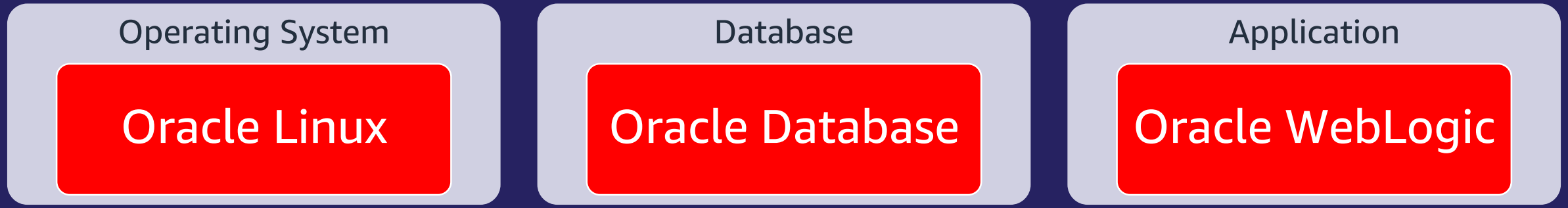
Oracle Applications Ecosystem Platform Diversity

The common perception of Oracle application ecosystem



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Oracle Applications Ecosystem Platform Diversity

The reality of the Oracle application platform ecosystem:

Operating System

- Oracle Linux
- Red Hat Linux
- SUSE Linux
- IBM AIX
- IBM OS400
- Microsoft Windows
- …and more

Database

- Oracle Database
- Microsoft SQL Server
- IBM DB2
- MySQL
- …and more

Applications

- Oracle WebLogic
- IBM WebSphere
- Red Hat JBoss
- Apache Tomcat
- .NET
- C# / C++ / ANSI C
- …and more

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AWS Capabilities

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Migration to AWS creates value

Cost savings (TCO)

Staff productivity

Operational resilience

Business agility

What is it?

Cost savings (TCO)	Staff productivity	Operational resilience	Business agility
Infrastructure cost savings/avoidance from moving to the cloud	Efficiency improvement by function on a task-by-task basis	Benefit of improving SLAs and reducing unplanned outages	Deploying new features/ applications faster and reducing errors

Examples

Cost savings (TCO)	Staff productivity	Operational resilience	Business agility
50%+ reduction in TCO (GE)	Over 500 hours per year of server configuration time saved (Sage)	Critical workloads run in multiple AZs and regions for robust DR (Expedia)	Buildouts and deployments happen 5x faster (Intuit)

← Typical focus →

← Most compelling cloud benefits →

Business/value

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Leveraging AWS services

(Examples for JD Edwards EnterpriseOne)

Amazon Simple Email Services (SES)

Enable CANSPAM compliant emails from E1 and to provide ability to suppress non-production emails.

Amazon CloudWatch

Manage and analyze all the logs from different E1 tiers in a single console with inexpensive S3 storage.

Amazon Single Sign-On (SSO)

Improve both the security of E1 and the end user experience. Requires tools release 9.2.5.4 and higher.

Amazon WorkSpaces

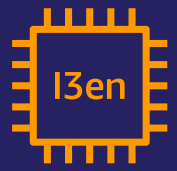
Desktop solution for E1 developer and admin clients.

AppStream 2.0

Solution for deploying stateless E1 bolt-on's applications

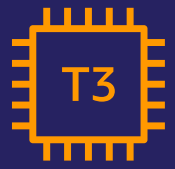
Amazon FSx

File system for E1 databases which allows thin copies of production for non-production test and development.



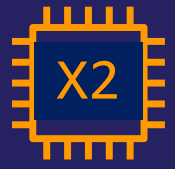
Storage Optimized Instances

NVMe storage acceleration for E1 database tier with ultra low latency.



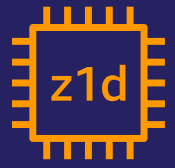
Burstable Instances

Optimize Windows license costs



Memory Optimized Instances

Up to 32GB RAM per vCPU



High Frequency Instances

Sustained all core frequency of up to 4.0 GHz

Some of the many modernization capabilities for EnterpriseOne on AWS

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AFG migrates Siebel on Exadata to AWS

Challenge
"We were not going to see an increase in our IT budget to spend on development, so we needed to find a way to reduce our operational expenditure and redirect that funding to innovation"

Solutions
AFG successfully migrated the Oracle Siebel CRM database, which includes 1.2 TB of CRM data, from the on-premises platform to the Amazon Relational Database Service (Amazon RDS). For the Oracle platform's web and application servers, AFG incorporated instances of Amazon Elastic Compute Cloud (Amazon EC2).

Benefits
"Today, 60 percent of our IT expenditure is dedicated to innovation and our developers are finding new ways for technology to deliver higher-value services to our customers"

"..we've been able to expand the development team by 68 percent. We now have more talent to drive development projects at the company"

...Nowadays we are concentrated on innovation...

We've reduced our IT operational costs by about $372,150 per year using AWS - money we're now spending on driving innovation.

Jaime Vogel Chief Information Officer, AFG

Source: https://aws.amazon.com/solutions/case-studies/afg/

AFG

Company: Australian Finance Group

Industry: Financial Services

Country: Australia

Website: www.afgonline.com.au

About AFG

Australia Financial Group (AFG) is one of the largest mortgage aggregators in Australia. Launched in 1994, the company provides access to more than 2,800 mortgage brokers. It processes about AU$4 billion (US$2.98 billion) of finance each month and manages more than AU$127 billion (US$94.5 billion) in mortgage finance.

Best Practices for Oracle Applications

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“Best Practices” based on Licensing Specialist*

- Layout your infrastructure with lens for license optimization.

AWS Deployment Option	SE License Included	Oracle Cloud Policy	Core-Based License	Unlimited License Agreement
RDS	✓	✓	✗	✓
EC2 Compute	✗	✓	✗	✓
VMware Cloud on AWS	✗	✓	✓	✓
Dedicated Hosts on EC2	✗	✓	✓	✓
EC2 Bare Metal Instances	✗	✓	✓	✓

Deployment Options Licensing Table from House of Brick

- Make sure you understand your licensing agreement.

(*) Licensing specialists partners like Palisade Compliance and House of Brick

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Cost Optimization

Right-size the solution

- Develop and implement a comprehensive tagging and budgeting strategy.
- Create cadence to review metrics of each resource and adjust them to meet actual requirements.
- Review application configuration alignment with business requirements and provisioned resources including:
  - JVM Count
  - Heap Sizes
  - Buffer Cache sizes
  - Kernel counts

Be Agile

- Quickly adopt new, cost efficient resources and services:

  M6i instances deliver up to 15% better price performance than M5 instances.

- Temporarily scale up instances (i.e. T3a to Z1d) when needed and back to lower cost for steady state.
- Develop strategies to “offline” landscapes when not in use.
- Use lower cost resource for non-production (i.e. GP3 instead of IO2)

“If you can't measure it, you can't improve it.” – attributed to Peter Drucker

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Performance optimization

Optimize performance for application by tier. Each Oracle application exhibit different bottlenecks based on usage patterns. In general, the common characteristics are:

Database tier
- High memory to vCPU ratio
- High storage IOPS
- High storage throughput

Application tier
- Balanced memory to vCPU ratio
- Single-threaded behavior where CPU clock speed drives performance.
- Database IO latency sensitive
  (use same AZ and placement group as DB)

Administrator/Developer Clients
- Balanced memory to vCPU
- Infrequent use / Workspaces

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Get the right support

Leverage a partner that knows both the application and how to optimize it on AWS

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AWS Managed Database Services for Oracle Apps

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Amazon Relational Database Service

Managed relational database service with a choice of six popular database engines

Amazon Aurora | MySQL | PostgreSQL | MariaDB | Microsoft SQL Server | ORACLE

Easy to administer

Easily deploy and maintain hardware, OS and DB software; built-in monitoring

Secure & compliant

Data encryption at rest and in transit; industry compliance and assurance programs

Available & durable

Automatic Multi-AZ data replication; automated backup, snapshots, failover

Performant & scalable

Scale compute and storage with a few clicks; minimal downtime for your application

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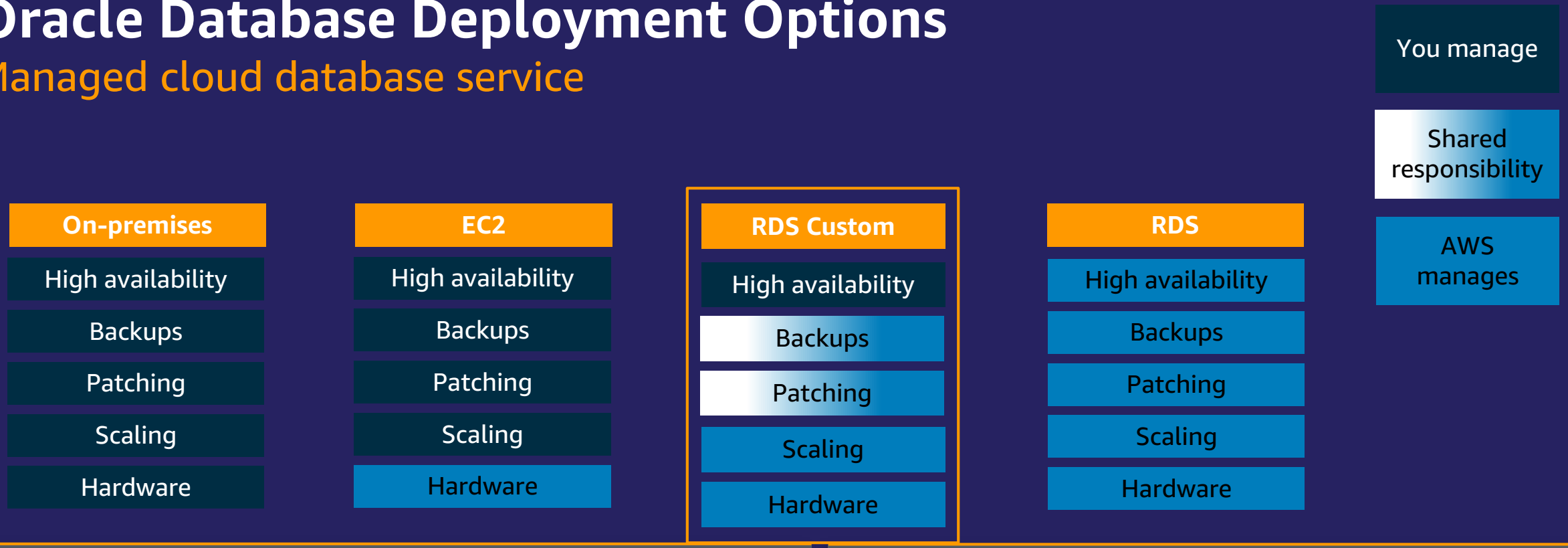
Oracle Database Deployment Options

Managed cloud database service



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

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Choosing the best RDS solution for your needs

Amazon RDS for Oracle License Included (LI)

- Oracle SE2
- No need to purchase Oracle licenses from Oracle
- Support is handled through AWS

Amazon RDS for Oracle Bring Your Own License (BYOL)

- SE2 and EE
- Bring your own licenses and support from Oracle
- Call Oracle for Oracle database support

Amazon RDS Custom for Oracle – Bring Your Own License (BYOL)

- Oracle EE
- Bring your own media, licenses, and support
- Call support provider for Oracle database support

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Key RDS Oracle Features for Oracle Applications

- High Availability/Disaster Recovery
  - Multi-AZ
  - Read Replicas
  - Backups
- Monitoring
  - Performance Insights

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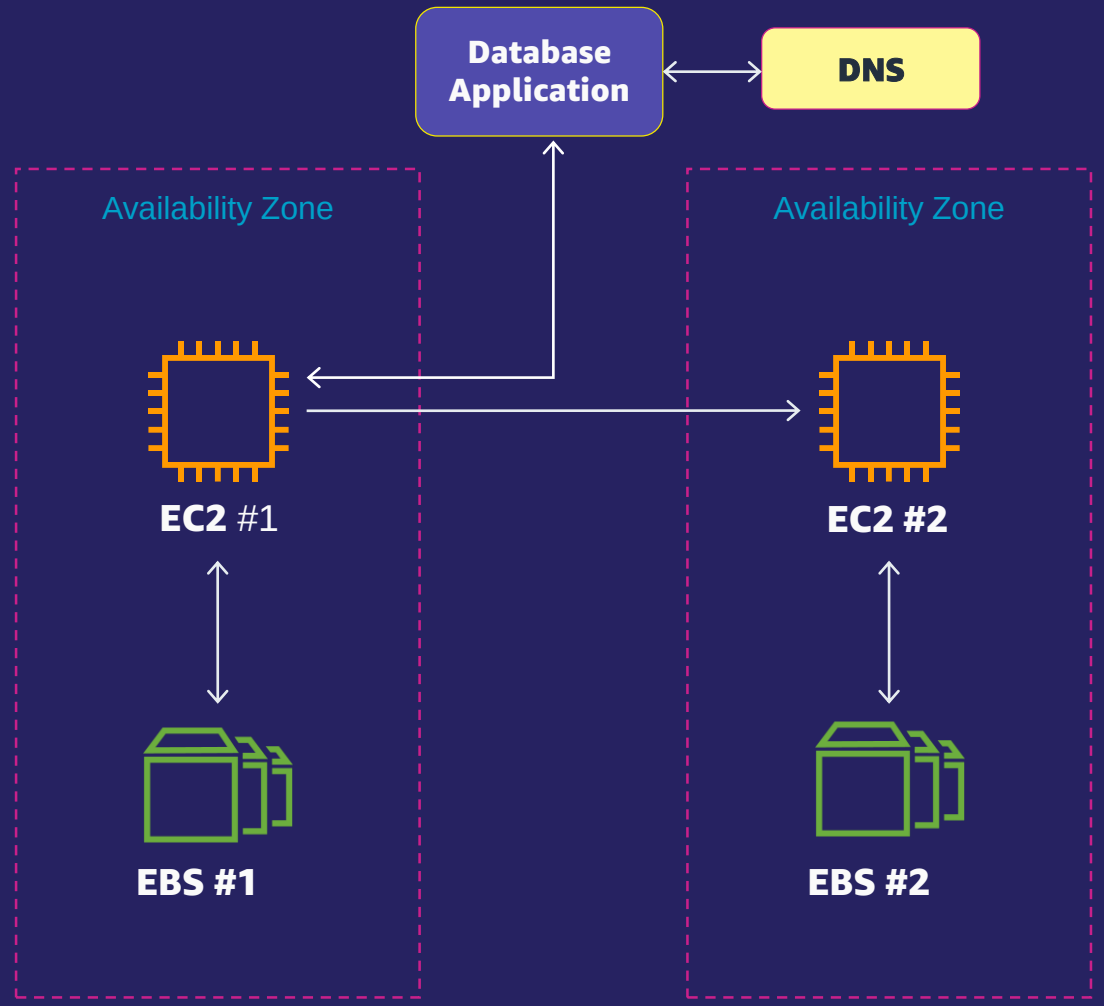
RDS Multi-AZ architecture

Multi-AZ Key Aspects

- Compute instances manage synchronous storage replication
- Writes occur on both instances and storage; reads only from Primary
- Failover results in changing roles (Primary, Standby) and re-establishing Standby
- Snapshots taken from Standby



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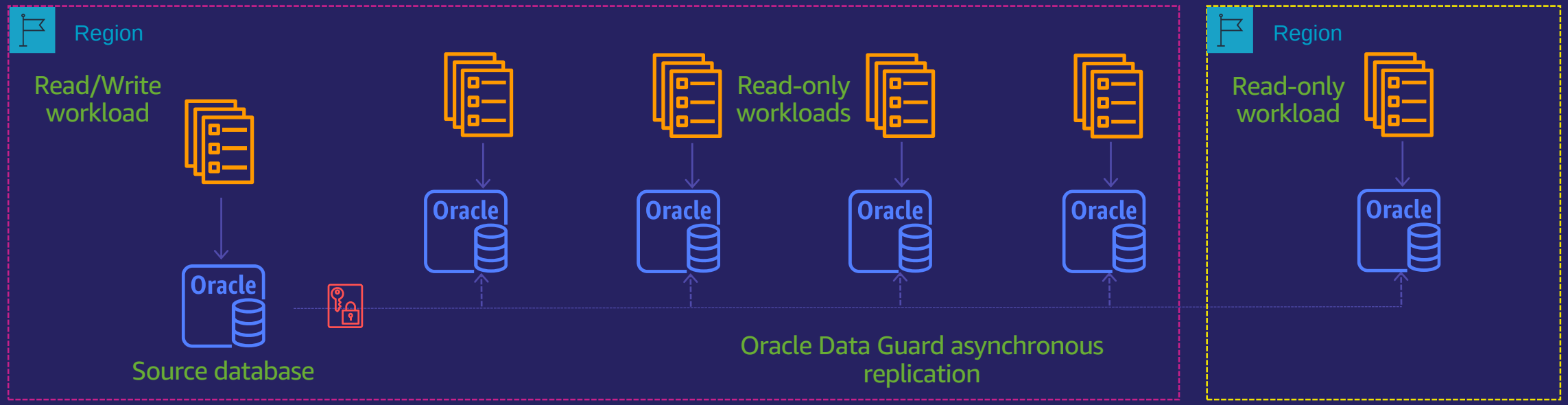
RDS Read Replicas for Read Scalability and DR



- ✓ **Up to five replicas per source RDS instance, in same region or cross-region**
- ✓ **Scale out or back, and size each replica instance independently**
- ✓ **Replicas may be mounted or available for reads (Active Data Guard)**
- ✓ **Promote replica as new standalone database**
- ✓ **Source has no downtime during creation or promotion**

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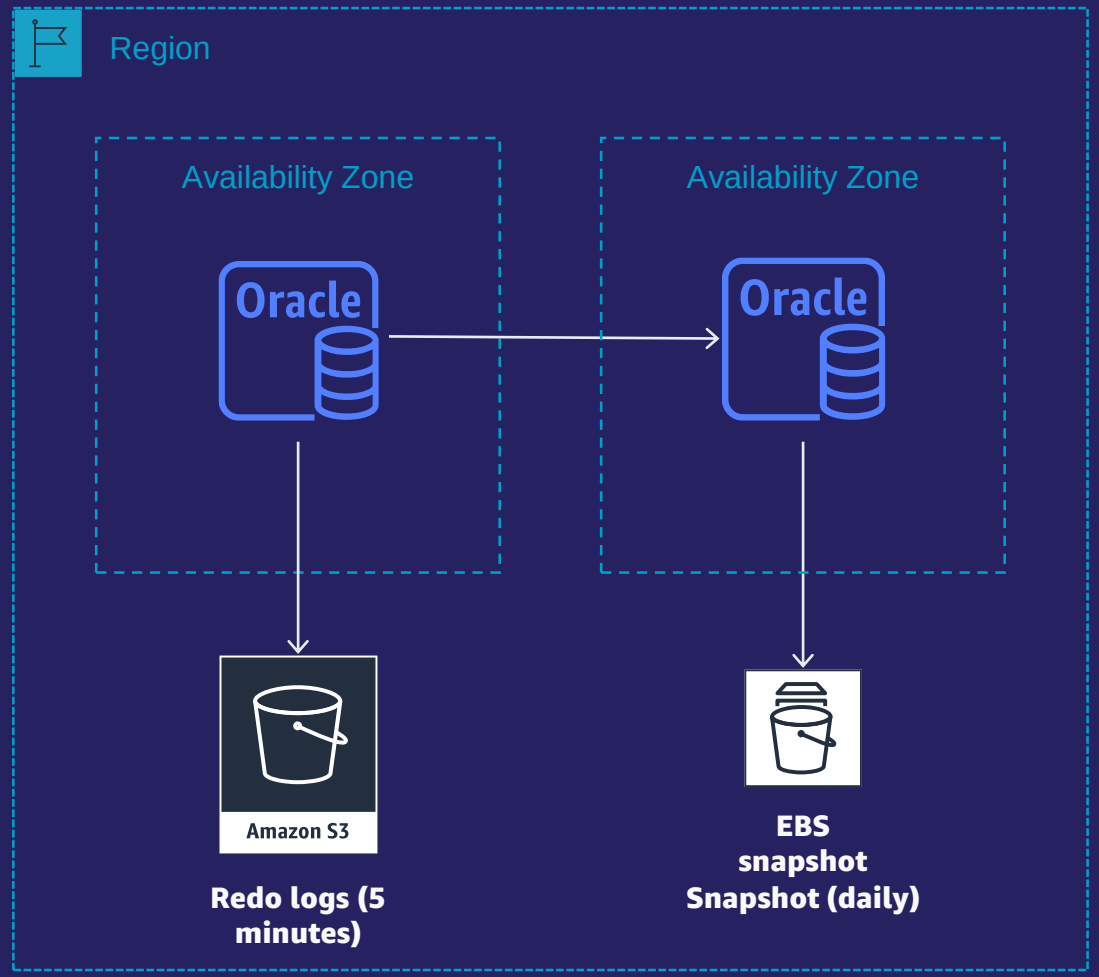
RDS for Oracle – Backups

Automated backups

- Daily snapshot during backup window
- Redo logs to S3 every 5 minutes
- Retained 1-35 days

Manual backups

- Take a snapshot any time
- Kept until you delete



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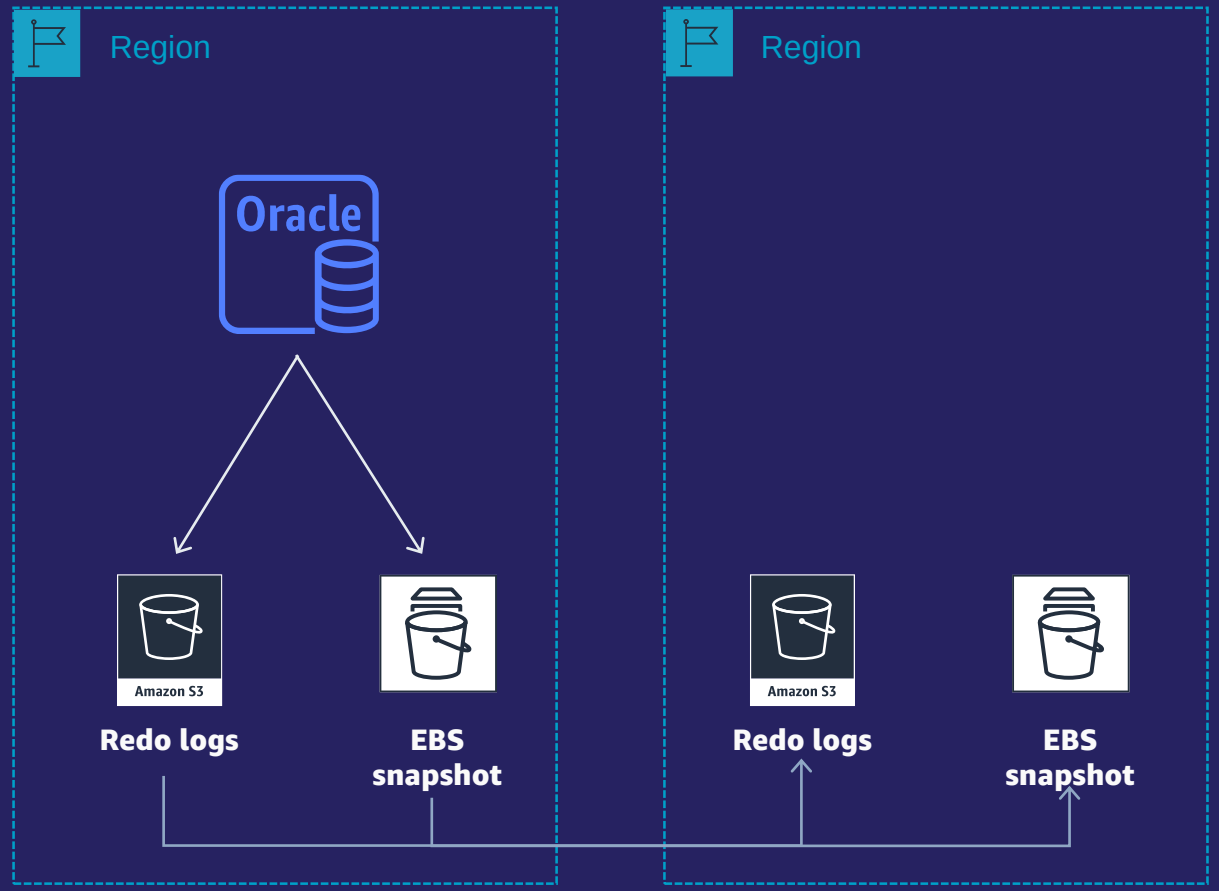
RDS for Oracle – Cross region automated backups

Cross-Region Key Aspects

- Automated snapshots and archived redo logs replicated to target region as soon as available in source region
- Specify independent recovery window for replicated backup region
- Enables Point In Time Restore (PiTR) in second region for mission-critical databases



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RDS Oracle HA / DR

Feature	RPO (approx)	RTO (approx)	Licensing
Multi-AZ for high availability	0	1 to 2 minutes	All editions
Snapshot restore	Hours	< 1 hour	All editions
Point-in-time restore (cross-region)	25 minutes	Hours	All editions
Point-in-time restore (in-region)	5 minutes	Hours	All editions
Mounted replica promotion (in-region)	Minutes	Minutes	Enterprise edition
Mounted replica promotion (cross-region)	Minutes	Minutes	Enterprise edition
Read replica promotion (in-region)	Minutes	Minutes	EE + Active DG
Read replica promotion (cross-region)	Minutes	Minutes	EE + Active DG

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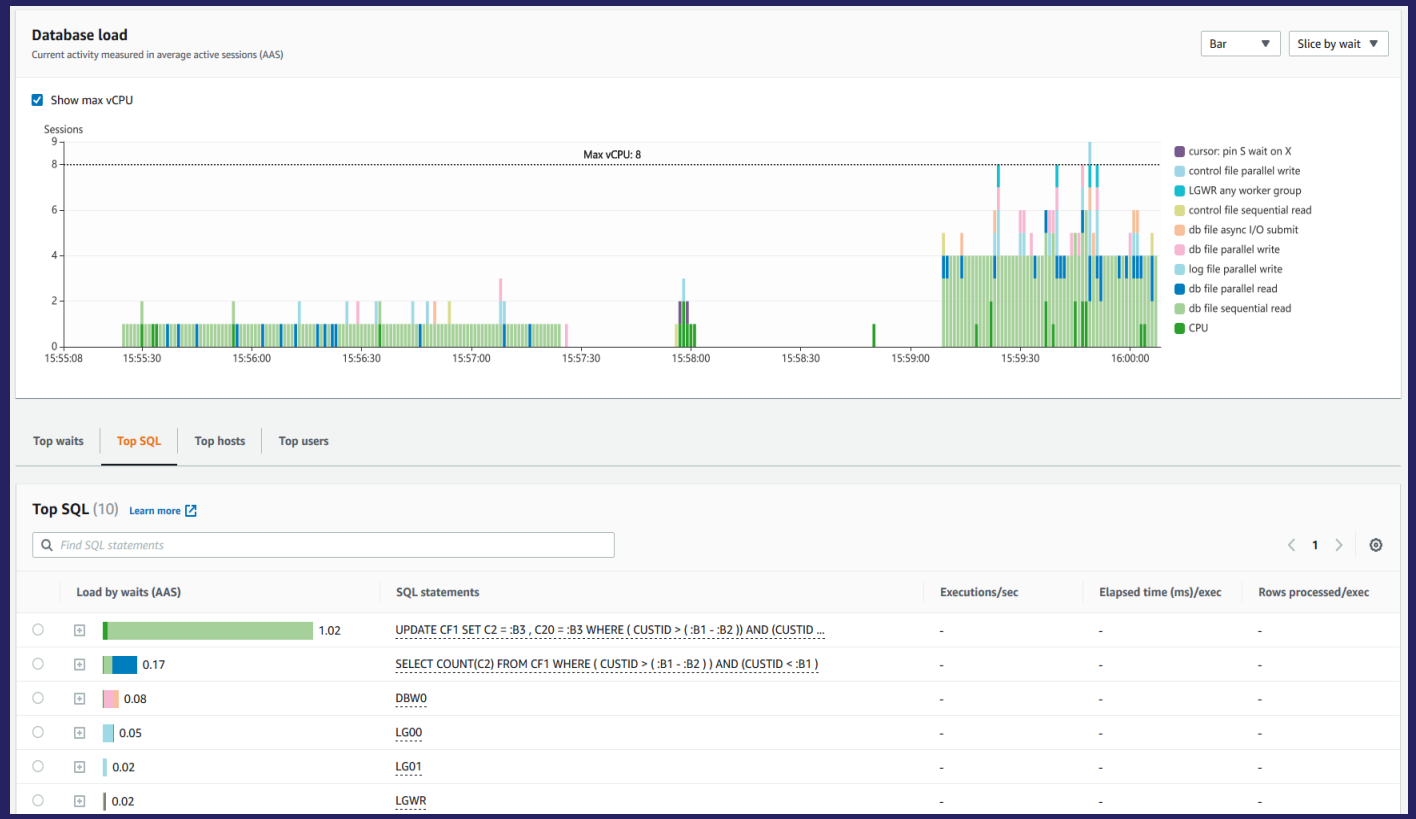
Performance Insights for real-time analysis



Amazon RDS Performance Insights measures database load over time

Easy to identify database bottlenecks

- **Top SQL/most intensive queries**

Enables problem discovery for real time or historical analysis

Adjustable timeframe

- **Hour, day, week, and longer**

Available for all Amazon RDS database engines

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Key differences between RDS and RDS Custom

Amazon RDS

- OS fully managed by AWS, limited permissions model for DB
- AWS provides an DB endpoint to connect to the database
- More consistent experience
- 99.95 SLA

Amazon RDS Custom

- Full access to DB/OS environment
- All resources are in customer's AWS account
- Mixed experience owing to shared control
- No SLA

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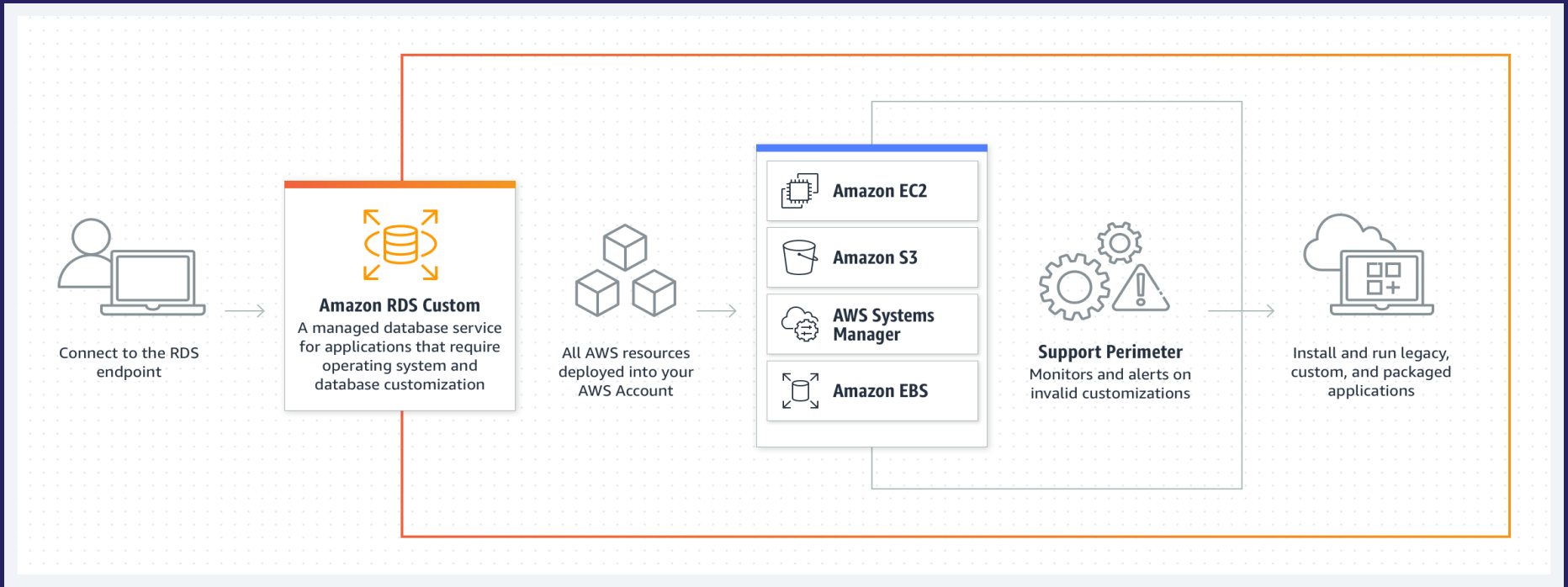
RDS Custom for Oracle – How it Works



- Database server OS access available
- Sys or system access to database available
- Third party backup or replication solution can be used

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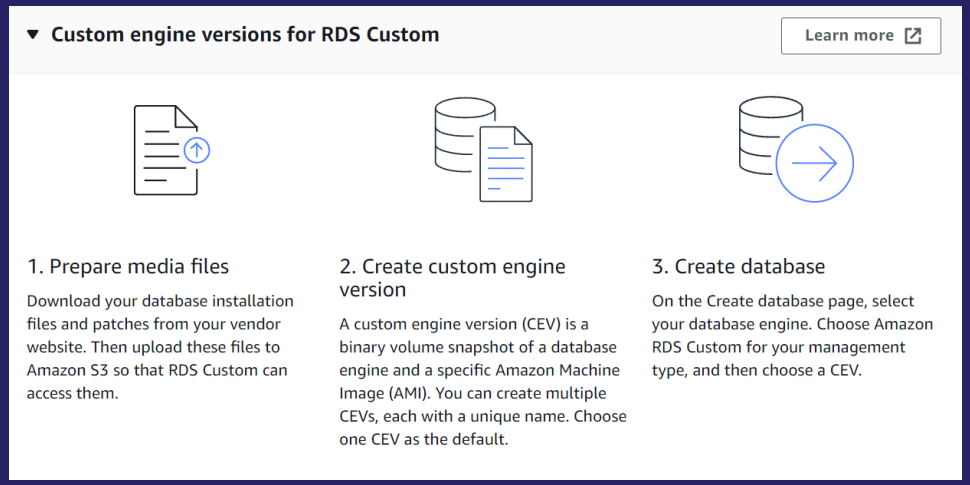
RDS Custom for Oracle Relevant Terminology/Concepts

Bring your own media for Oracle

Customers supply their Database Media Installation Files to create different versions of the database (e.g. Customers will supply Oracle 19c and the corresponding patches and release updates (RU) they want to use on RDS Custom).

Custom engine version (CEV) for Oracle

Customers supply their Database Media Installation Files to create different versions of the database called CEV to suit their needs. Customers can then create DB instances using the CEV in RDS Custom.



Educational card shown in RDS console

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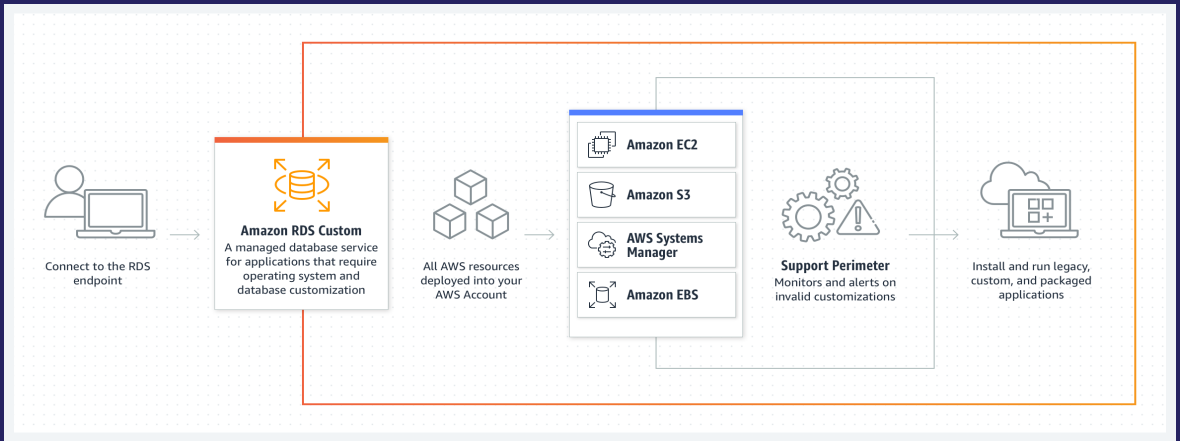
RDS Custom for Oracle Relevant Terminology/Concepts

Automation mode

Automation mode controls the RDS Custom automation such as monitoring, backups, and database statuses. Customers can pause Automation mode when performing customizations to prevent unintended interference with RDS Custom automation

Support perimeter

RDS Custom provides customers full access to the host to make changes. As long as the changes do not interfere with RDS Custom automation, then the host will be within the support perimeter otherwise it will be outside the support perimeter. Customers will be notified when a host is outside the support perimeter



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Managed Database options for Oracle Applications

Amazon RDS

- Consider RDS first
- Focus on business value tasks
- High-level tuning asks
- Schema optimization

Amazon RDS Custom

- Full control over the instance
- Third-party applications
- Additional customer responsibility

	RDS Oracle	RDS Custom for Oracle
Oracle PeopleSoft	✓	✓
Oracle JD Edwards	✓	✓
Oracle Siebel	✓	✓
Oracle ATG Dynamo	✓	✓
Oracle SOA	✓	✓
Oracle OBIEE	✓	✓
Oracle Fusion Middleware	✓	✓
Oracle Hyperion	✓	✓
Oracle Primavera	✓	✓
Oracle EBS		✓

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Summary

- The Oracle Application landscape is diverse, AWS with 200+ services is well positioned to host even the most complex Oracle architectures
- AWS has been hosting Oracle workloads since 2011 across a wide customer base
- Customers should look to optimize their Oracle solution by considering licensing, performance, and right-sizing; AWS has many partners who can help
- Customers should consider AWS Managed Database services to host the database for Oracle Applications

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Q&A

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