AUGUST 19, 2021

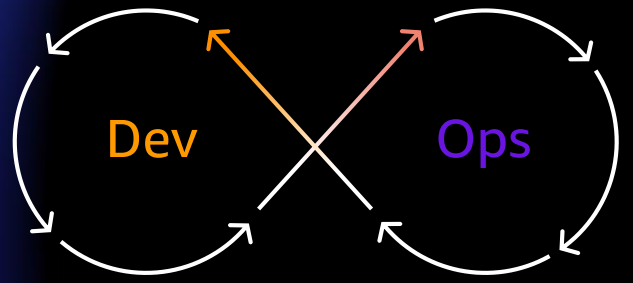
Transform your Oracle database operating model by leveraging AWS managed databases

Matt McClernon
Data Transformation Architect
Amazon Web Services

What is covered

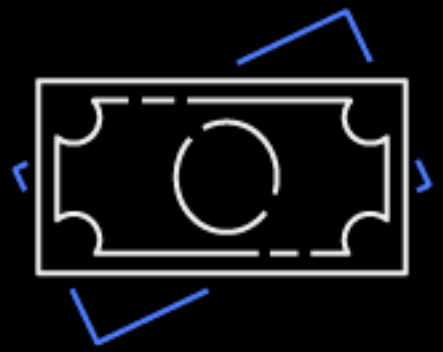
- Changing IT landscape
- Customers looking for a better model
- Why ‘managed databases’?
- Value proposition of Amazon Relational Database Service (Amazon RDS) for Oracle
- Optimization levers
- Amazon RDS for Oracle migration methods
- Minimal downtime migration
- Further benefits attainable from AWS purpose-built databases

Changing IT landscape



Faster time to market

"Data is the new oil"



Do more with less

Technology Democratization

Zero downtime

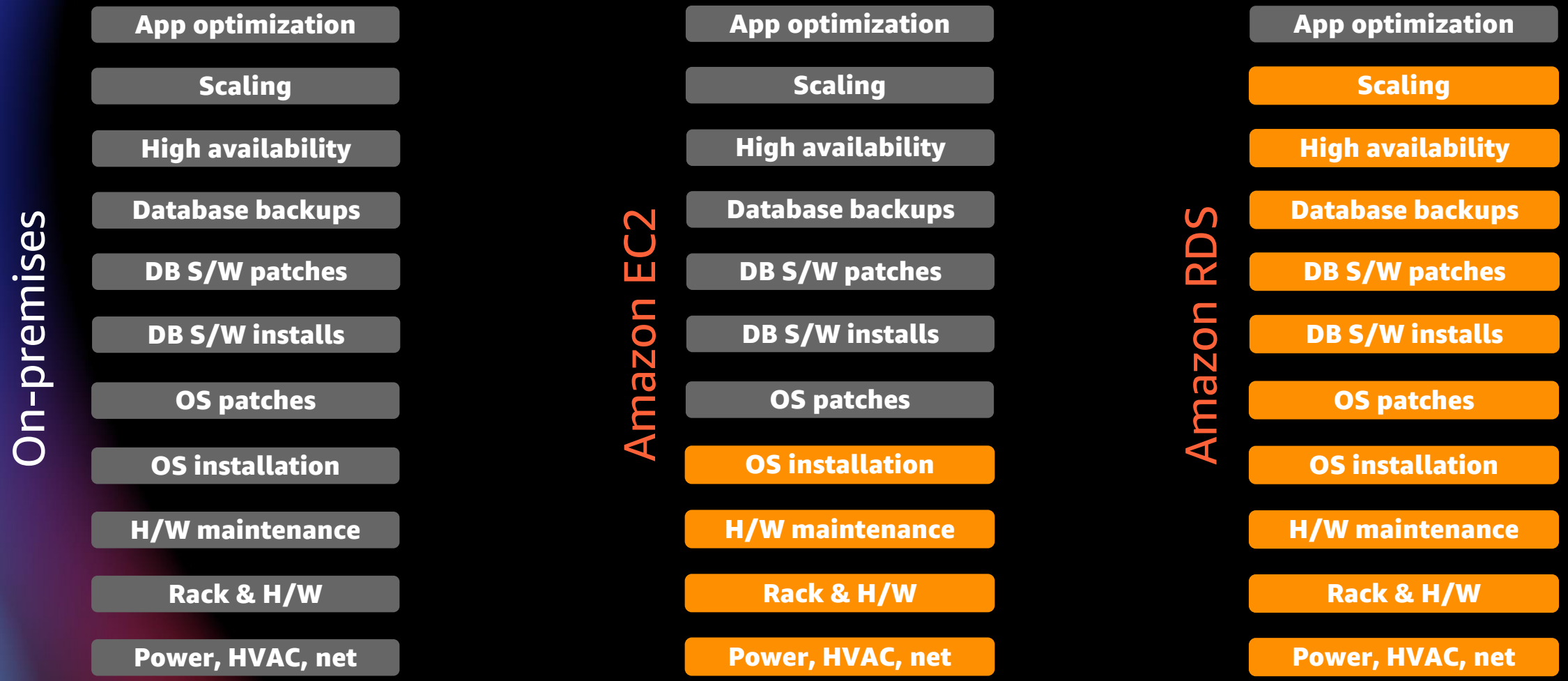
Security is paramount

Looking for a better model

- **Lack of agility –** Slow reaction to changing business and market demands
- **Lack of flexibility –** Database infrastructure & architecture difficult to change
- **Lack of scalability –** Difficult or prohibitive to introduce new application features, users or capacity
- **Performance issues –** Sub-optimal application performance and service quality
- **Missing data insights –** Data silos, integration complexity, opaque data stores
- **Heightened security risks –** Platforms without security baked in, perimeter-only security focus
- **Lack of extensibility –** Inability to add new services, impeding adoption of new technologies
- **Higher costs –** Provision for *theoretical* peak, in-elastic resource deployment, impedance mismatch
- **Inefficient compliance –** Periodic, slow and cumbersome audit processes

Managed databases on AWS

Spend time innovating and optimizing applications, not managing infrastructure



Relational databases are high touch

Our experience running Amazon.com taught us that relational databases are challenging to manage and operate with high availability

It's expensive and complex to manage administrative functions including regular patching cycles, performance optimization, and backup and disaster recovery - all for constantly changing applications

Amazon RDS for Oracle value

Focus on business and applications and have AWS take care of the routine tasks

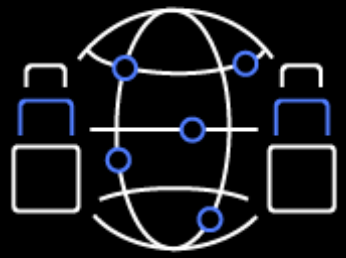
Fully managed	**Remove mundane and repeatable tasks** Frees up DBA resources to focus on higher value activity
Highly available & durable	**Multi-AZ out of the box** Provides automated, zero data loss HA solution without need for additional replication licenses
Flexible scalability	**Horizontal & vertical scalability** Scale up compute and storage separately; scale out with read replicas
Commercial flexibility	**License included and on-demand pricing** Move from up-front commitment to flexible pay-as-you-go
Enterprise-grade security	**Encryption at-rest & in-flight** Provides storage-level encryption without need for enterprise licenses

Streamline with Amazon RDS for Oracle

Optimize costs

Right size servers

Align compute resources to workload demands



High availability & disaster recovery

HA & DR protection without need for Enterprise Edition or additional options

Encryption at-rest

Secure storage without need for Enterprise Edition or additional options

Pay-as-you-go

'License Included' model for cost elasticity and flexibility

Improve resilience

Automate everything

Leverage managed services and automate infrastructure deployment. Improve consistency and reduce human error

Strengthen observability

Gain better insights into operational health via richer observability and centralized logging and parameter configuration

Tighten security posture

Implement least privilege scheme to reduce attack surface using AWS IAM, security defense in-depth with security groups, NACLs, and database activity streams

Foster DevOps

Enable frequent, small, reversible changes to reduce frequency and impact of failure

Frictionless integration

Codify compliance

Integrate with AWS Config and AWS CloudFormation to automate auditing and compliance procedures

Gain insight from data

Seamlessly integrate with rich ecosystem of AWS analytics services (Amazon Redshift, AWS Glue, Amazon Athena, Amazon QuickSight)

Centralized key management

Integrate with AWS Key Management Service (KMS) for robust, secure, and performant key management

Secrets management

Centralize credentials, connect strings, and other secrets in secure and resilient repository

Australia Finance Group

- One of the largest mortgage aggregators in Australia
- Provides access to more than 2,800 mortgage brokers
- Processes about AU$4 billion of finance each month
- Manages more than AU$127 billion in mortgage finance
- **Migrated their mission critical 1.2TB Siebel CRM system from Exadata to Amazon RDS for Oracle**

"Nowadays we are concentrated on innovation. We've reduced our IT operational costs by about AUD$500,000 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/

Amazon RDS for Oracle anti-patterns

- Commercial off the shelf applications (with restrictive platform requirements)
- Databases that are larger, or growing larger, than Amazon RDS limits:
  - > 64TB in size
  - > 128 vCPU
  - > 80,000 IOPS
  - > 4TB Memory
- Databases requiring one-off Oracle patches
- Full control of operating system and database stack required

What are the ingredients for migration success?

Data migration types

One-time migration

(Downtime window based on data size)

Big bang, full data extract & load

Ongoing replication

(Minimal downtime)

Initial data copy and change data capture (CDC)

Amazon RDS for Oracle migration toolbox

AWS Database Migration Service

Database migration and replication managed service

Benefits

- Easily and securely migrate or replicate your databases to AWS
- Supports ongoing change replication (CDC)
- Minimal downtime migration
- Low cost and global availability

Native tooling

Migration tools included with Oracle software (Data Pump)

Benefits

- Leverage a familiar toolset
- Full support for native features

Commercial

GoldenGate, Informatica, Attunity, and others (AWS Marketplace)

Benefits

- Solutions available for a wide range of migration use cases and feature usage scenarios
- Support ongoing change replication & minimal downtime migration

Open source

Broad ecosystem of open source migration tools

Benefits

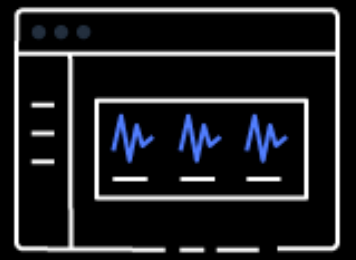
- Tailored solution for a specific problem
- Multiple tools can be combined to provide greater flexibility
- Free

AWS Database Migration Service (AWS DMS) highlights

Secure

Change Data Capture

Minimal downtime



Data validation

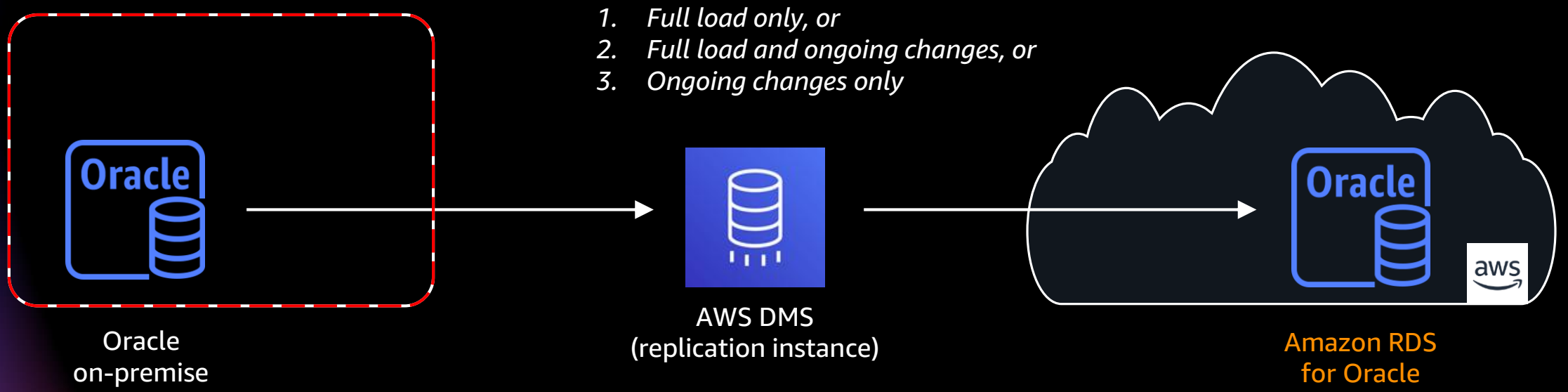
Comprehensive observability

AWS Snowball integration

Low cost

Flexible configuration

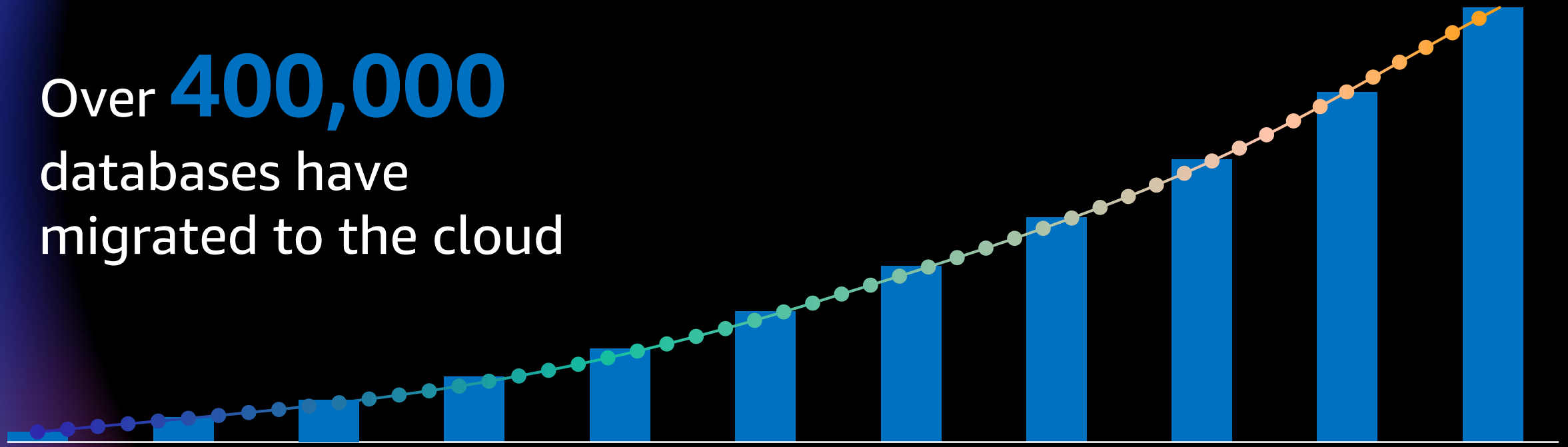
AWS DMS architecture



- *Logical replication*
- *Full or partial database*
- *Encryption in-flight for source and target connections*

Over 400,000+ databases migrated to AWS

Over **400,000**
databases have
migrated to the cloud



VA | U.S. Department of Veterans Affairs

Expedia

SAMSUNG

DOW JONES

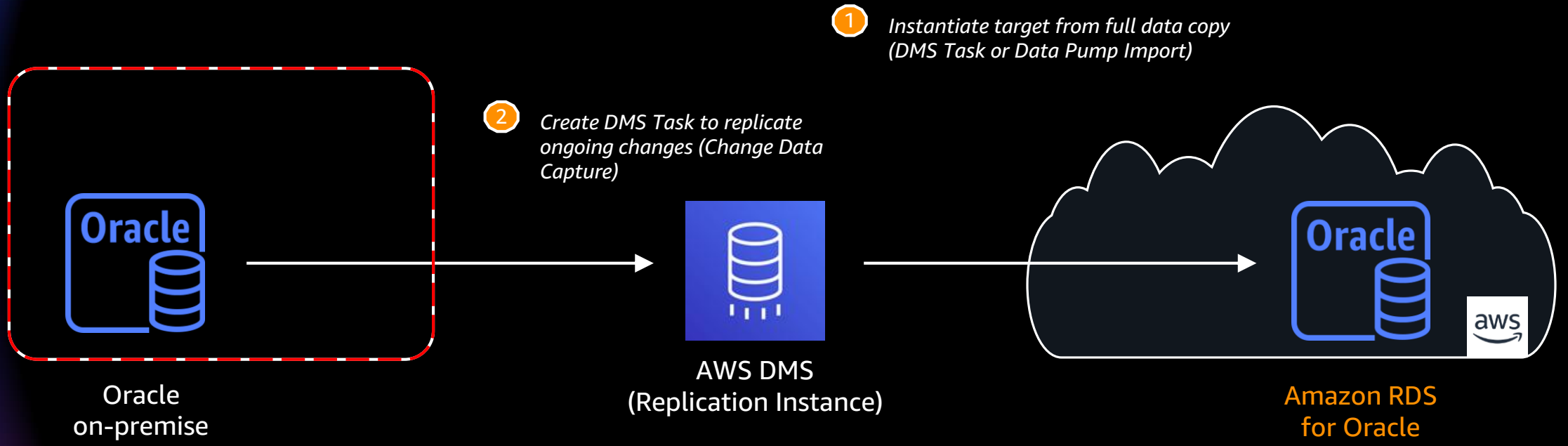
verizon

aws

AWS DMS best practice for Amazon RDS for Oracle

- Use latest version of AWS DMS on replication instance
- Instantiate initial data load with data pump
- Leverage ‘network-mode’ data pump for large databases
- Create a ‘replicate changes only’ AWS DMS task for continuous replication (minimal downtime)
- Enable data validation on AWS DMS task to verify data integrity
- Enable Amazon CloudWatch logging for AWS DMS task to aid diagnosis
- Run Amazon RDS for Oracle as single-AZ instance until *after* cutover (disable Multi-AZ)
- Use compression and parallelization appropriately
- Monitor AWS DMS metrics in Amazon CloudWatch
  - Replication Task metrics: CDCLatencySource / CDCLatencyTarget
  - Replication Instance metrics: CPUUtilization / FreeMemory / Read IOPS / Write IOPS

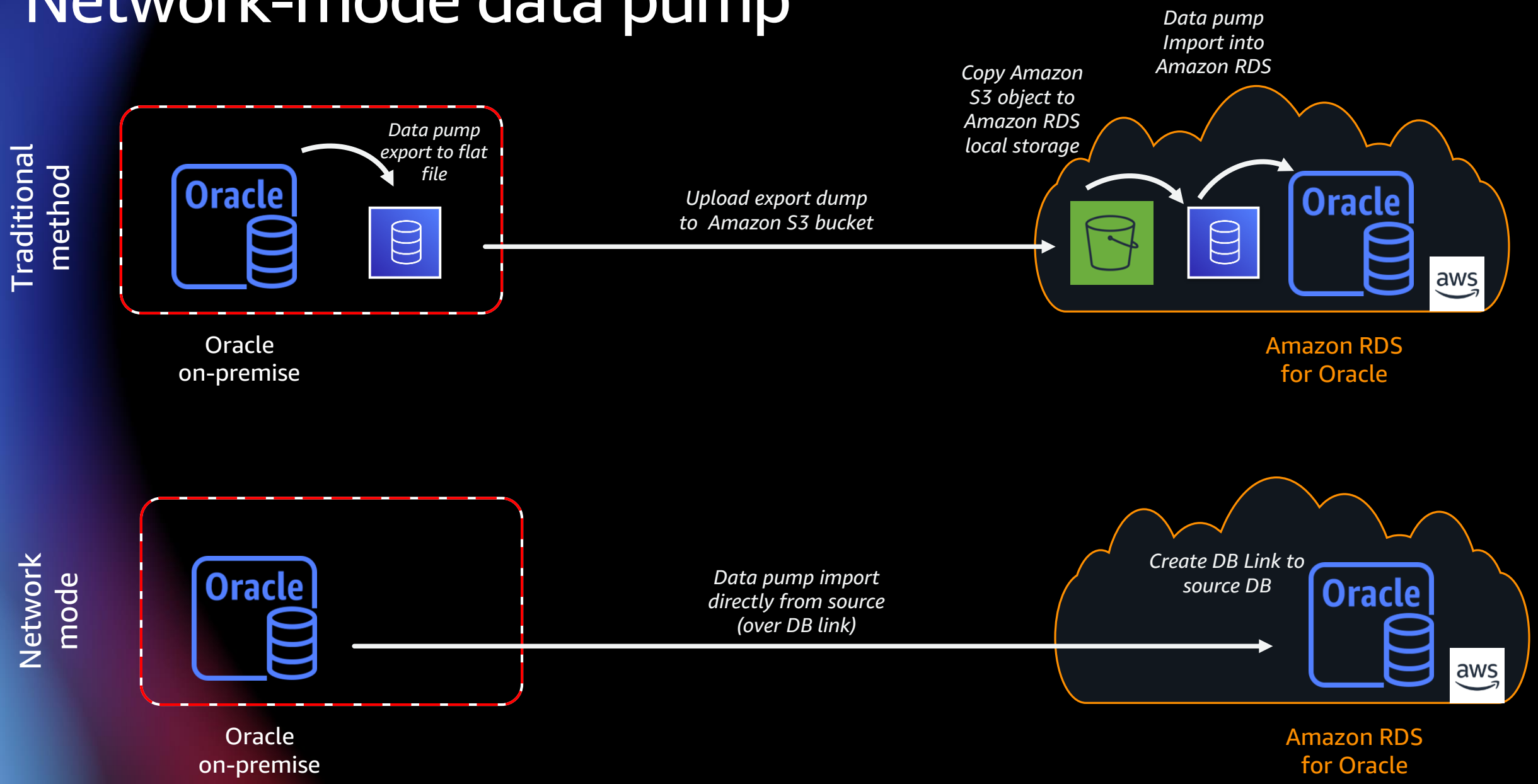
Minimal downtime migration



4 *Schedule brief outage, and shutdown application and source DB*

5 *Point application server to new target database (DNS redirection, or TNS connect string update)*

Network-mode data pump



The art of the possible….

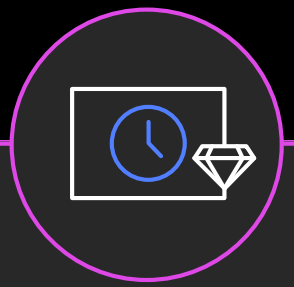
Amazon Aurora

MySQL and PostgreSQL-compatible relational database built for the cloud
Performance and availability of commercial-grade databases at 1/10th the cost

Performance and scalability

5x throughput of standard MySQL and 3x of standard PostgreSQL; scale-out up to 15 read replicas

Availability and durability



Fault-tolerant, self-healing storage; six copies of data across three availability zones; continuous backup to Amazon Simple Storage Service (Amazon S3)

Highly secure

Network isolation, encryption at rest/transit, compliance and assurance programs

Fully managed

Managed by Amazon RDS: No server provisioning, software patching, setup, configuration, or backups

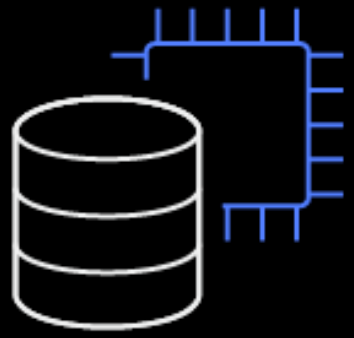
Source: https://aws.amazon.com/rds/aurora

aws

Modernize with Amazon Aurora

Break free from commercial constraints

Leverage Autoscaling



Serverless

Multi-master

What we have covered

- Relational databases are high touch and expensive to manage
- Legacy operating models are hindering business transformation
- DBA teams can overcome legacy constraints by leveraging managed databases
- To realize the full benefits of Amazon RDS for Oracle, re-think your operating model
- Migration success comes down to understanding the technology *and* learning from experience
- Carefully pick the right migration tool and method that fits your use case
- Hundreds of thousands of customers have migrated to AWS with DMS
- To further transform your database operating model, consider modernizing with Amazon Aurora

Additional resources

1. Amazon RDS for Oracle user guide
2. Amazon RDS for Oracle FAQs
3. Role of the DBA when moving to Amazon RDS
4. AWS Database Migration Service (AWS DMS) getting started guide
5. AWS Database Migration Service (AWS DMS) homepage
6. AWS DMS pricing
7. Amazon Aurora user guide

Visit the AWS Data Resource Hub

Dive deeper with these resources, get inspired and learn how you can use data to make better decisions and innovate faster.

- Building a winning data strategy
- The new leadership mindset for data & analytics
- Harness data to reinvent your organization
- Put your data to work with a modern analytics approach
- Breaking free from on-premises database constraints
- Cloud storage adoption: From cost optimization to agility & innovation
- A strategic playbook for data, analytics, and machine learning
- … and more!

https://tinyurl.com/aws-data-resource

Visit resource hub

AWS Training and Certification

Empower your teams with comprehensive training

By building skills with AWS Training and Certification, businesses and individuals can see the bigger picture understanding the reasoning behind every data point. As training progresses and teams become data-fluent, previously hidden insights come into view.

Leverage free digital training

Learn how to harness the world's most valuable resource: data. Access digital and virtual instructor-led courses on data analytics and databases built by the experts at AWS and start your learning journey to become data-driven.

Take a digital course »

Get certified

Earn industry-recognized credibility and set tangible goals for success with industry-recognized certifications, like *AWS Certified Data Analytics – Specialty.*

Learn more »

Ramp-up your skills

Deep dive into new topics and focus on knowledge gaps at your own pace with the *AWS Ramp-Up Guide: Database* and *AWS Ramp-Up Guide: Data Analytics*. With a wide range of whitepapers, blog posts, videos, webinars and peer resources available for data professionals to leverage for independent learning.

Download ramp-up guides »

Thank you for attending AWS Innovate – Data Edition

We hope you found it interesting! A kind reminder to **complete the survey.**
Let us know what you thought of today's event and how we can improve the event experience for you in the future.


aws-apj-marketing@amazon.com


twitter.com/AWSCloud


facebook.com/AmazonWebServices


youtube.com/user/AmazonWebServices


slideshare.net/AmazonWebServices


twitch.tv/aws

Thank you!