Amazon RDS Custom for SQL Server Overview

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Agenda

- Introduction

- Use Cases and Benefits

- Technical Overview

  - Concepts and Terminology
  - Architecture
  - Setting up Amazon RDS Custom for SQL Server

- Demo

- Q&A

Introduction

Why Amazon RDS Custom for SQL Server

1 Customer feedback requesting features that are in RDS Custom

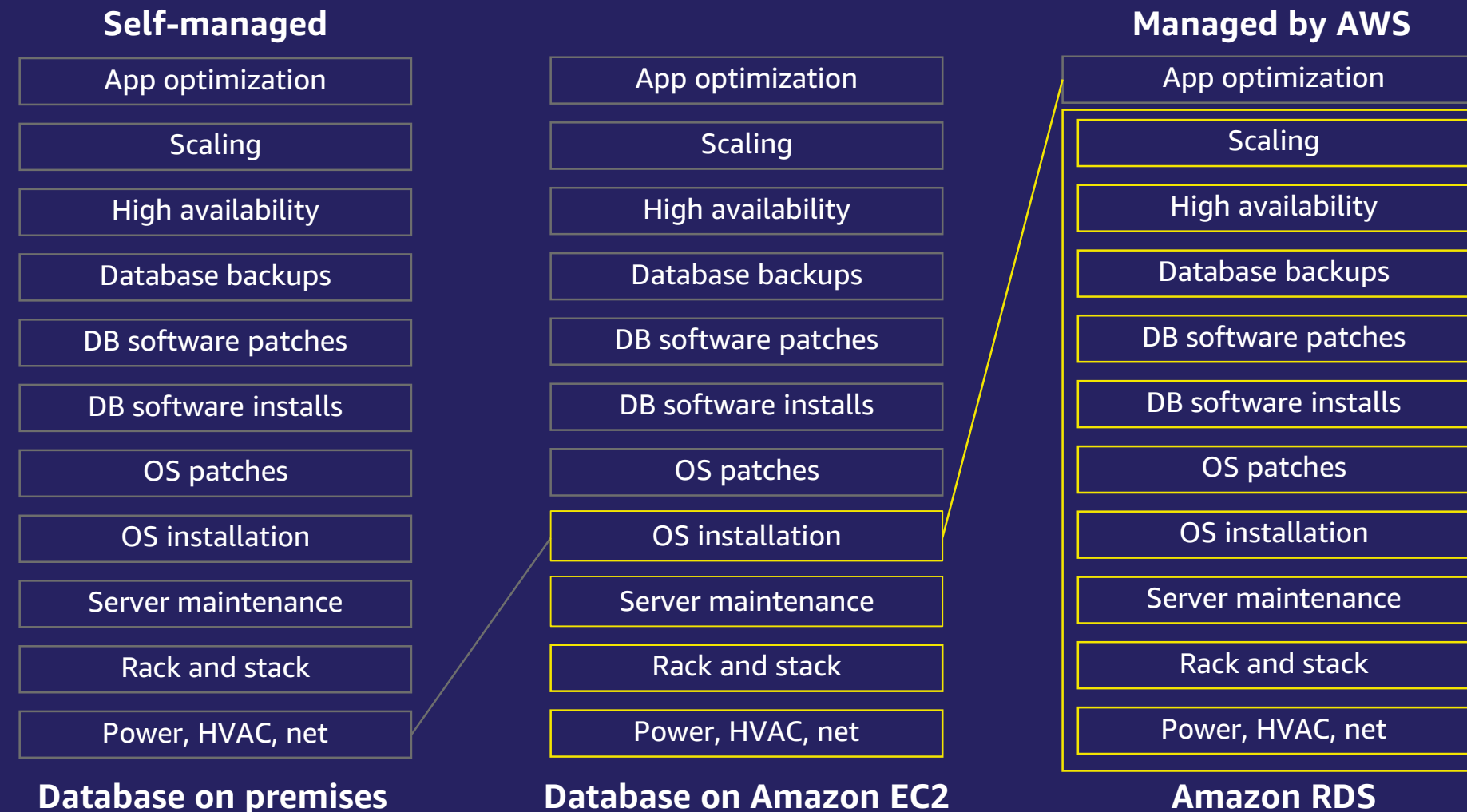**2** Granular control over operating system and database

3 Run legacy, 3rd party, and packaged business applications

4 Addressing the challenge of database and application customization

With fully managed services on AWS
Customers can spend time innovating, not managing infrastructure

Self-managed

| App optimization |
| Scaling |
| High availability |
| Database backups |
| DB software patches |
| DB software installs |
| OS patches |
| OS installation |
| Server maintenance |
| Rack and stack |
| Power, HVAC, net |

Database on premises

| App optimization |
| Scaling |
| High availability |
| Database backups |
| DB software patches |
| DB software installs |
| OS patches |
| OS installation |
| Server maintenance |
| Rack and stack |
| Power, HVAC, net |

Database on Amazon EC2

Managed by AWS

| App optimization |
| Scaling |
| High availability |
| Database backups |
| DB software patches |
| DB software installs |
| OS patches |
| OS installation |
| Server maintenance |
| Rack and stack |
| Power, HVAC, net |

Amazon RDS

Amazon RDS Custom

Amazon RDS Custom is a managed database service for legacy, custom, and packaged applications that require access to the underlying operating system and database environment.

Use Cases and Benefits

Use cases

Granular Control

Install custom drivers, enable features or applications that require elevated privileges

Example: Extended stored procedures, CLR, Resource governor, Linked server (various DB engines)

Lift and Shift Business Apps

Third-party or packaged applications with minimal changes

Example: Microsoft SharePoint, Microsoft Dynamics

Disaster Recovery

Setup DR from a self-managed environment

Example: SQL Server Always On Availability Groups, Replication

SQL Server deployment options

On-premises	EC2	RDS Custom	RDS
High availability	High availability	High availability	High availability
Backups	Backups	Backups	Backups
Patching	Patching	Patching	Patching
Scaling	Scaling	Scaling	Scaling
Hardware	Hardware	Hardware	Hardware

You manage

Shared responsibility

AWS manages
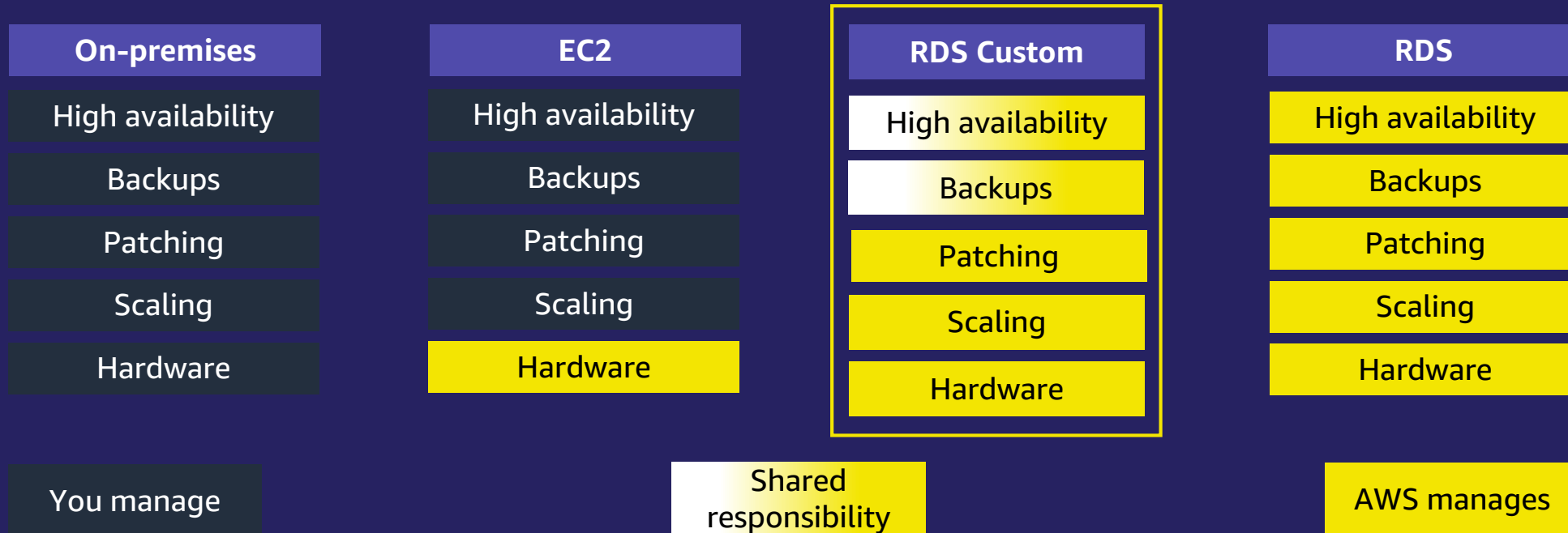
NO MANAGEMENT

Host-level access and full database permissions

Allows use cases not currently supported by RDS

FULL MANAGEMENT

Allows 3rd-party applications on the database host

Amazon RDS or Amazon RDS Custom

Amazon RDS

- Consider RDS first to take advantage of a fully managed service
- Focus on higher value tasks
- Perform high-level database tuning
- Spend more time on schema design

RDS
High availability
Backups
Patching
Scaling
Hardware

AWS manages

Amazon RDS Custom

- Granular control over the OS and database
- Option to install third-party applications
- No Option or Parameter Groups required
- Configure file systems to share files with applications

RDS Custom
High availability
Backups
Patching
Scaling
Hardware

Shared responsibility

Feature overview

- Managed database service

- Granular access to operating system and database system

- SQL Server 2019 (Enterprise, Standard, Web editions)

- Self-managed high availability (AWS-managed HA coming soon)

- M5/R5 instance types

- Host up to 5,000 databases

- Point-in-time restore (PiTR) for up to 100 databases

- Licensed-included only

Technical Overview

Concepts and terminology

Automation mode

Controls the Amazon RDS Custom automation such as monitoring, backups, and database status.

Customers can pause Automation mode when performing customizations to prevent unintended interference with RDS Custom automation

Support perimeter

Determines if a customization breaks our automation (once automation mode is resumed if previously paused).

Customers have full access to the EC2 host. The action is supported as long as the change does not put the database outside of the perimeter.

Automation mode

- Automation software that runs outside of the DB instance
- Automates common DBA tasks
- Communicates with monitoring agents
- Similar recovery and monitoring features to Amazon RDS

- Primary responsibilities:
  - Collect metrics and send notifications
  - Perform automatic instance recovery

Pausing and resuming RDS Custom automation

Pause or resume RDS Custom Automation for up to 24 hours in order to make customizations and avoid interfering with automation.

What gets paused?

- Database status monitoring

- Storage monitoring

- EC2 instance status

- Automated backups

- Manual snapshots

- RDS Custom agent

- Support perimeter

Support perimeter

- Checks for a list of requirements

- If requirements unmet, instance is considered Unsupported Configuration

- Address the issue(s) to bring it back to support perimeter

While Unsupported Configuration state:

- You cannot modify the DB instance

- You cannot take snapshots

- No automated backups are created

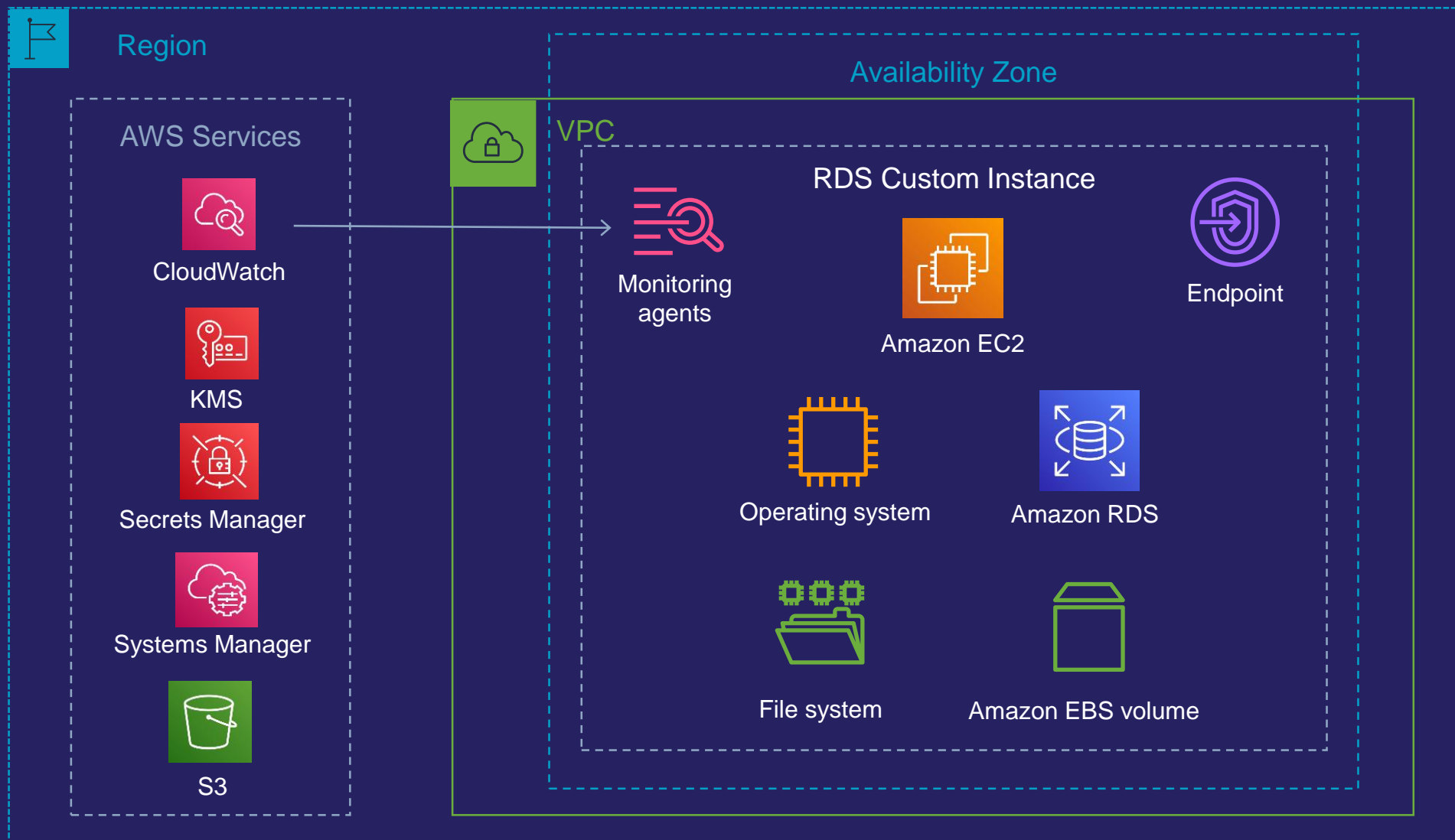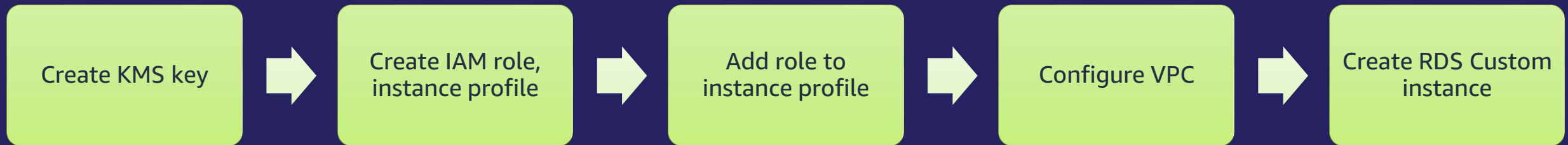- If the underlying EC2 instance is impaired, RDS Custom cannot replace it

Examples of support perimeter checks:
- RDS Custom agent is not running
- SSM agent is not running
- Database created outside of RDS managed EBS volume

Architecture

Setting up Amazon RDS Custom for SQL Server

Create KMS key → Create IAM role, instance profile → Add role to instance profile → Configure VPC → Create RDS Custom instance

RDS Custom for SQL Server availability options

→ RDS built-in reliability and durability
- EC2 instance
- EBS volume
- SQL Server services

→ Manually configure HA (AWS-managed coming soon)
- Always On Availability Group

→ Read scale-out with manual configuration
- Always On Availability Group
- SQL Server Replication / CDC
- AWS Database Migration Service (DMS)
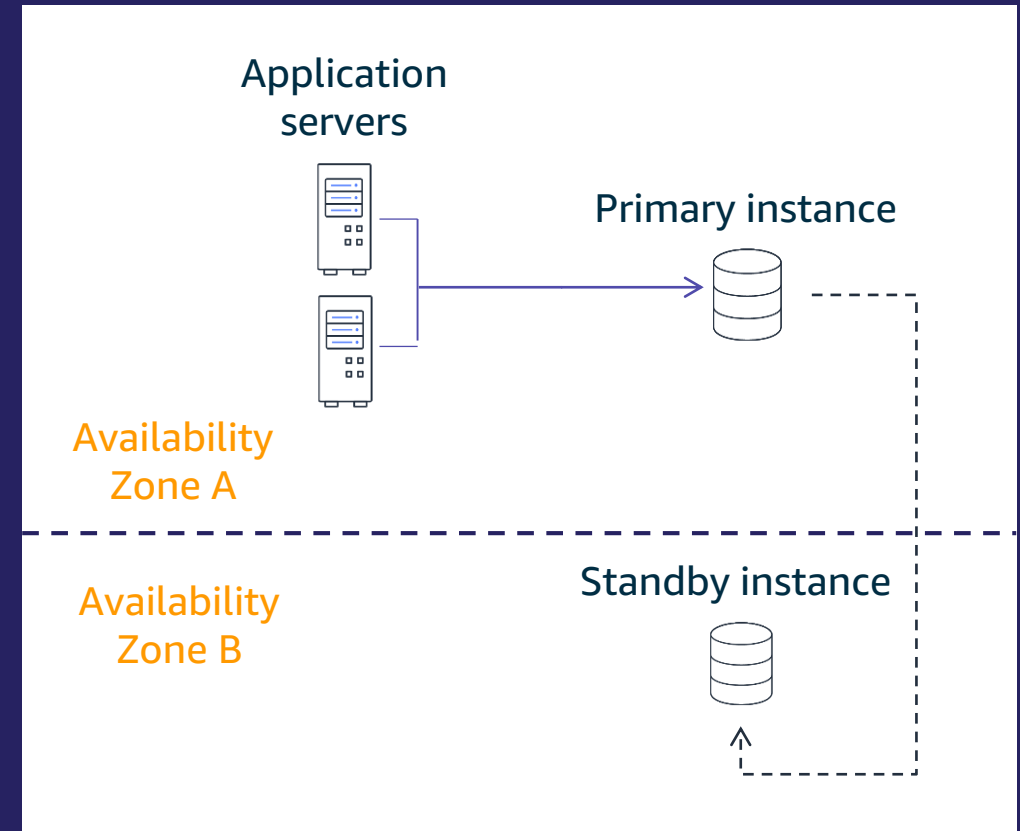
Migration options

→ **Backup and restore**
Leverage SQL Server native backup functionality and upload backup files to Amazon S3

→ **SQL Server replication**
Pull subscriptions from transactional replication

→ **Always On Availability Groups**
Migrate multiple databases at the same time with minimum downtime

→ **AWS Database Migration Service**
Perform one-time migrations, and you can replicate ongoing changes to keep sources and targets in sync

Demo

Demo overview

- **Scenario**

  Migration of multiple databases, from a SQL Server on-premises instance to RDS Custom for SQL Server instance

- **Technology used**

  - Active directory (AWS Directory service)

  - Windows Server Failover cluster

  - Amazon FSx for Windows file server

  - Always On Availability Groups

    - Primary replica (Amazon EC2)

    - Secondary replica (RDS Custom for SQL Server)

Architecture
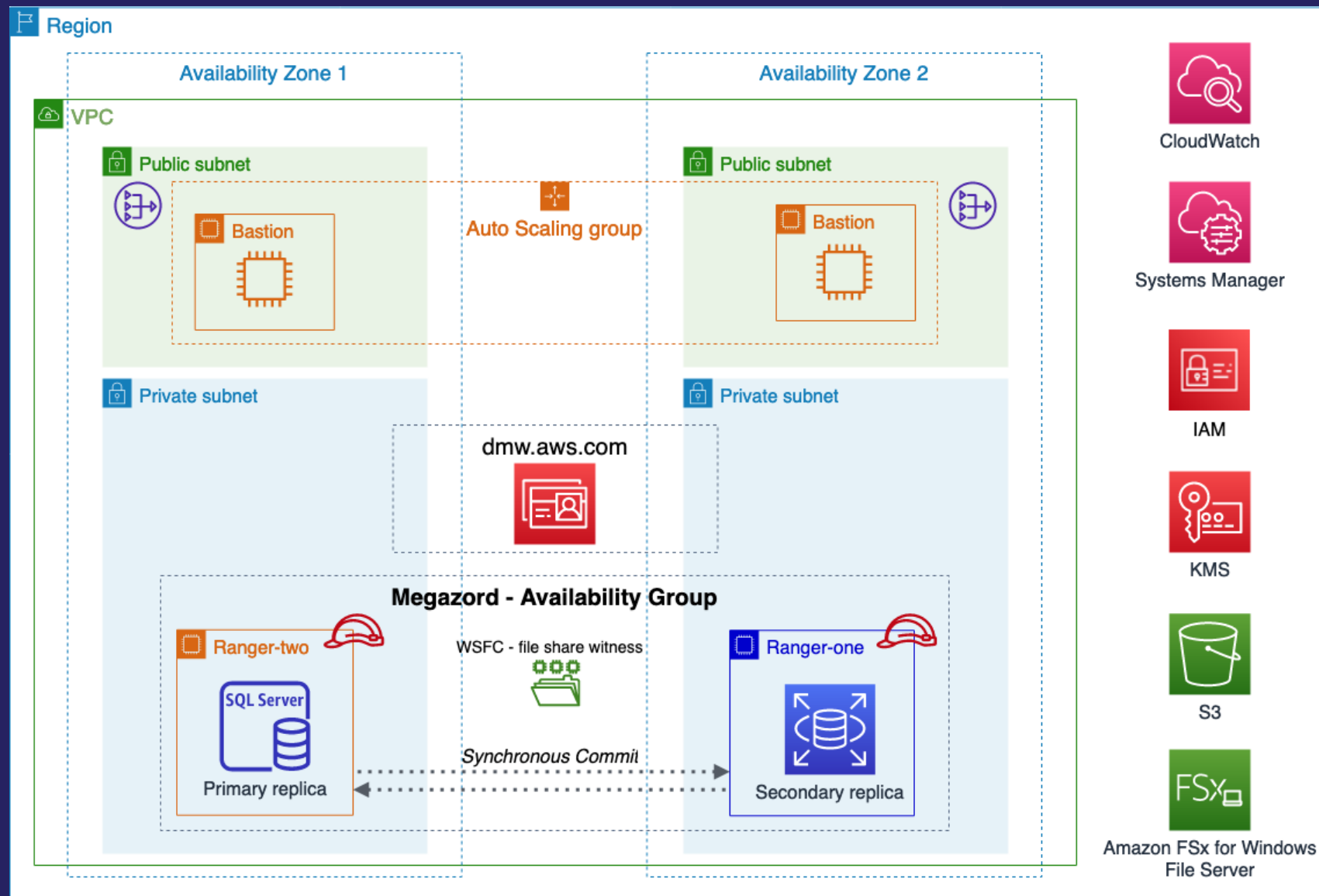
Summary

1 Managed experience

Pause/resume automation, automatic provisioning, monitoring, backup/restore and scale compute.

2 Flexibility

Use customer managed AD, bring third-party monitoring tools, and configure custom high availability (Always On Availability Groups).

3 Granular control

Host level access, resource ownership, enable features like CLR, xp_cmdshell or MS replication.

4 Lift & shift

Make little to no application changes and bring your third-party / packaged applications to RDS Custom. Migrate using any database native technology or use Amazon Database Migration Service to minimize downtime.

Call to action

- Reach out to your account team to conduct a workshop to dive deeper into RDS Custom for SQL Server

- Identify SQL Server workloads that are a fit for RDS Custom or RDS SQL Server

- Consider a proof of concept to validate your use case

Q&A

Thank you!