Migrating Microsoft SQL Server 2008 Databases to AWS

Tom Staab, AWS Partner Solutions Architect

October 23, 2018

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Who am I?

Tom Staab, AWS Partner Solutions Architect

Almost 20 years working with SQL Server since version 6.5

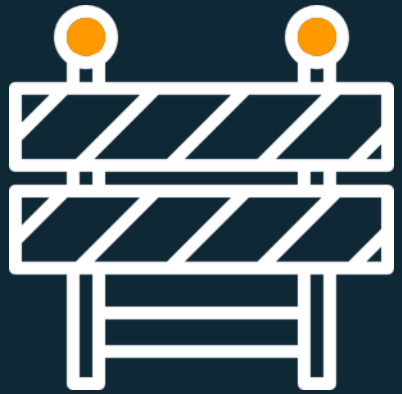
AWS Partner Solutions Architect for 2.5 years

Help partners and customers optimize solutions on AWS

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

What is happening?

July 9, 2019	January 14, 2020
SQL Server 2008 and 2008 R2 End of Support	Windows Server 2008 & 2008 R2 End of Support



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

What does this mean?

Microsoft Mainstream Support ended on July 8, 2014

- No more enhancements

Microsoft Extended Support will end on July 9, 2019

- **No more security or reliability fixes**

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

What am I going to do?

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

The Road Forward

aws

Windows Workloads

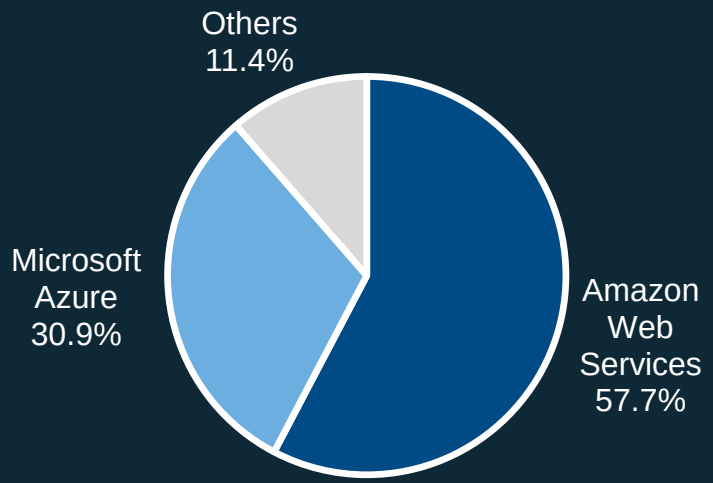
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

aws

Public cloud market leaders dominate the Windows segment of the Infrastructure as a Service Market

aws ♡ Windows Workloads

Worldwide Windows Public Cloud IaaS Instances by Cloud Provider, 2017



Note: Includes Windows instances deployed in the public cloud IaaS market during 2017
Source: IDC estimates, 2018

IDC estimates AWS accounted for approximately 57.7% of total Windows instances deployed in the public cloud IaaS market during 2017, followed by Microsoft Azure at 30.9%. The rest of the market collectively accounted for the remaining 11.4% of Windows instances deployed in the public cloud IaaS market during 2017.

IDC notes the Windows public cloud IaaS market continues to expand due to the growing usage of public cloud IaaS among enterprises and the movement of Windows workloads into public cloud IaaS.

IDC, Windows Server Operating Environment Market Update, Doc # US44217118, Aug 2018

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

aws

What sets AWS apart?

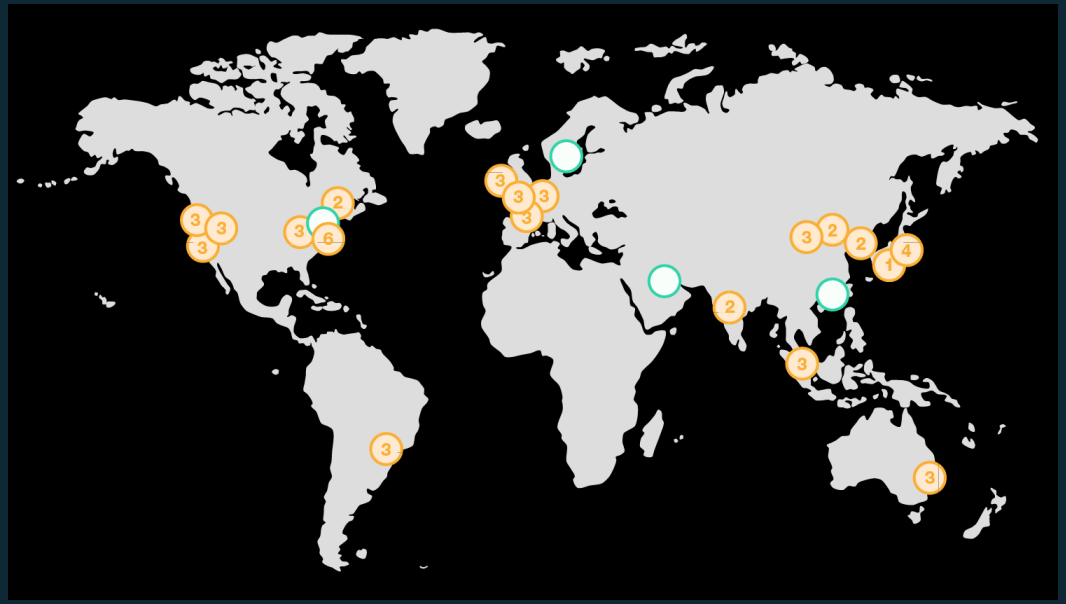
aws ♥ Windows Workloads

Security	#1 priority; fine-grained control; certifications/accreditations
Agility, Elasticity, & Scalability	Quickly spin up; scale up or down as needed
Cost Savings	Economies of scale; 65 price drops since inception
Global Footprint	18 Regions, 55 Availability Zones, 119 Edge Points of Presence
Experience & Innovation	Building and managing cloud since 2006; millions of active customers; rapid customer-driven releases
Partner Community	Tens of thousands of partners; 4,000+ Marketplace products

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

aws

AWS Global Infrastructure



18 Geographic Regions

55 Availability Zones

134 Points of Presence

Minimum 2 Availability Zones per Geographic Region

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

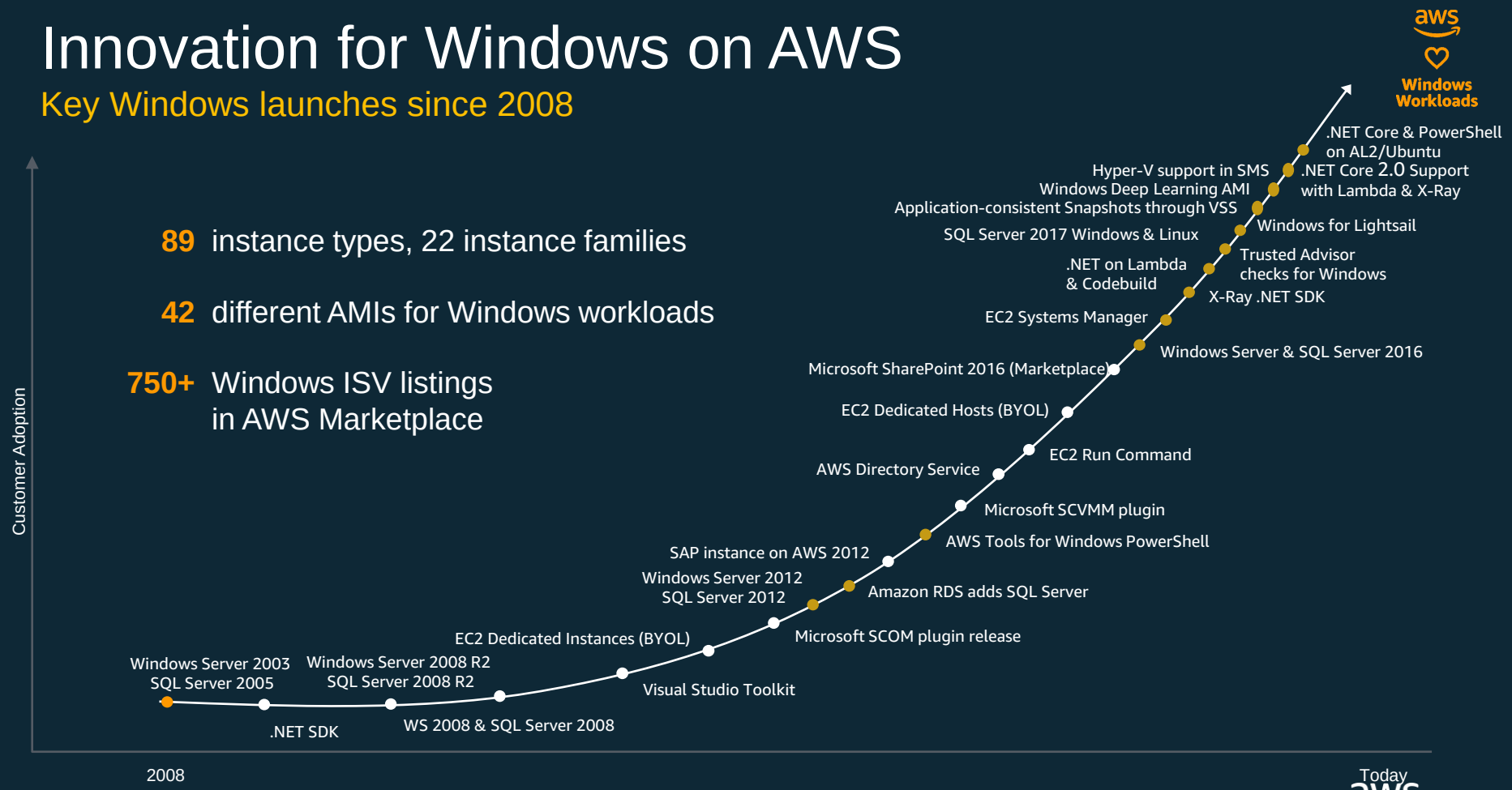
Innovation for Windows on AWS

Key Windows launches since 2008

89 instance types, 22 instance families

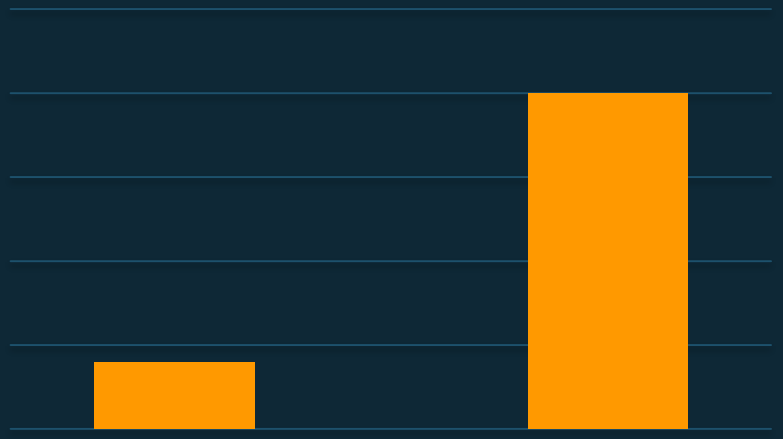
42 different AMIs for Windows workloads

750+ Windows ISV listings in AWS Marketplace



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Enterprise Customer Driving Growth



400%

Growth

Between 2014 and 2017, the number of AWS enterprise customers using Amazon EC2 for Microsoft Windows Server grew by over 400%

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Our Customers are Seeing the Impact

Moving with ease

"Through collaboration, deliberate planning, and [APN Microsoft Competency Partner] Pariveda's expertise, our team quickly evaluated and upgraded to Microsoft SQL 2016 on AWS."

- **John Schoonover, Director of Enterprise Technology**

Driving Innovation

"AWS' big data services help us to bring together parcels transactional data stored in Microsoft SQL Server with streaming data from IoT devices and parcel tracking data"..."one of the biggest benefits we saw was cloud acceleration"

- Olga Lagunova, VP Commerce Cloud Technologies

Realizing Tangible Benefits

We needed more agility, and building data centers did not make sense for our customers and the business. We're running 1000's of SQL databases on AWS and are saving 75% on our monthly back-up costs."

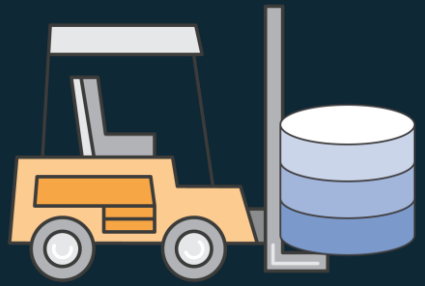
-Richard Sharp, Director of Databases

When we moved our SQL Server licenses to Amazon EC2 Dedicated Instances and Dedicated Hosts, we saved 15% on SQL licensing costs.

– Cris Carlin, VP Operations, Deltek

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Migrating SQL Server to AWS



Amazon RDS
Managed service with up to 64 vCPU, 488 GB RAM, and 16 TB storage

Amazon EC2
Self-managed virtual machine with up to 128 vCPU, 4 TB RAM, and 400 TB storage

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Options for Deploying SQL Server on AWS

Amazon RDS for SQL Server

SQL Server on Amazon EC2

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Options for Deploying SQL Server on AWS

Amazon RDS for SQL Server

- **Consider RDS first**
- Focus on business value tasks
- High-level tuning
- Schema optimization
- No in-house database expertise
- Automatic Host Replacement

Scaling
High Availability
Database Backups
DBMS Patching
DBMS Install/Maintenance
OS Patching
OS Install/Maintenance
Power, HVAC, net

SQL Server on Amazon EC2

AWS managed

Customer managed

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Options for Deploying SQL Server on AWS

Amazon RDS for SQL Server

- **Consider RDS first**
- Focus on business value tasks
- High-level tuning
- Schema optimization
- No in-house database expertise
- Automatic Host Replacement

Scaling
High Availability
Database Backups
DBMS Patching
DBMS Install/Maintenance
OS Patching
OS Install/Maintenance
Power, HVAC, net

SQL Server on Amazon EC2

- Need full control over DB instance
- Replication
- Clustering
- Options that are not available in Amazon RDS

Scaling
High Availability
Database Backups
DBMS Patching
DBMS Install/Maintenance
OS Patching
OS Install/Maintenance
Power, HVAC, net

AWS managed

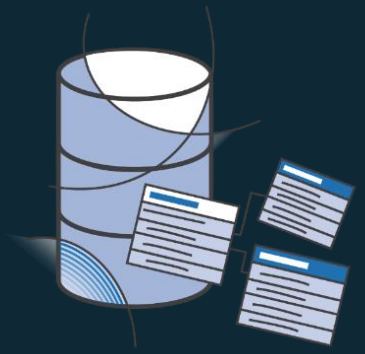
Customer managed

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Amazon RDS: Hassle-free Flexibility

Instance Type Selection:

- M4 instances for lower cost
- R4 instances for more RAM



EBS Volume Type Selection

- GP2 volumes for lower cost
- IO1 volumes for I/O intensive, critical workloads

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

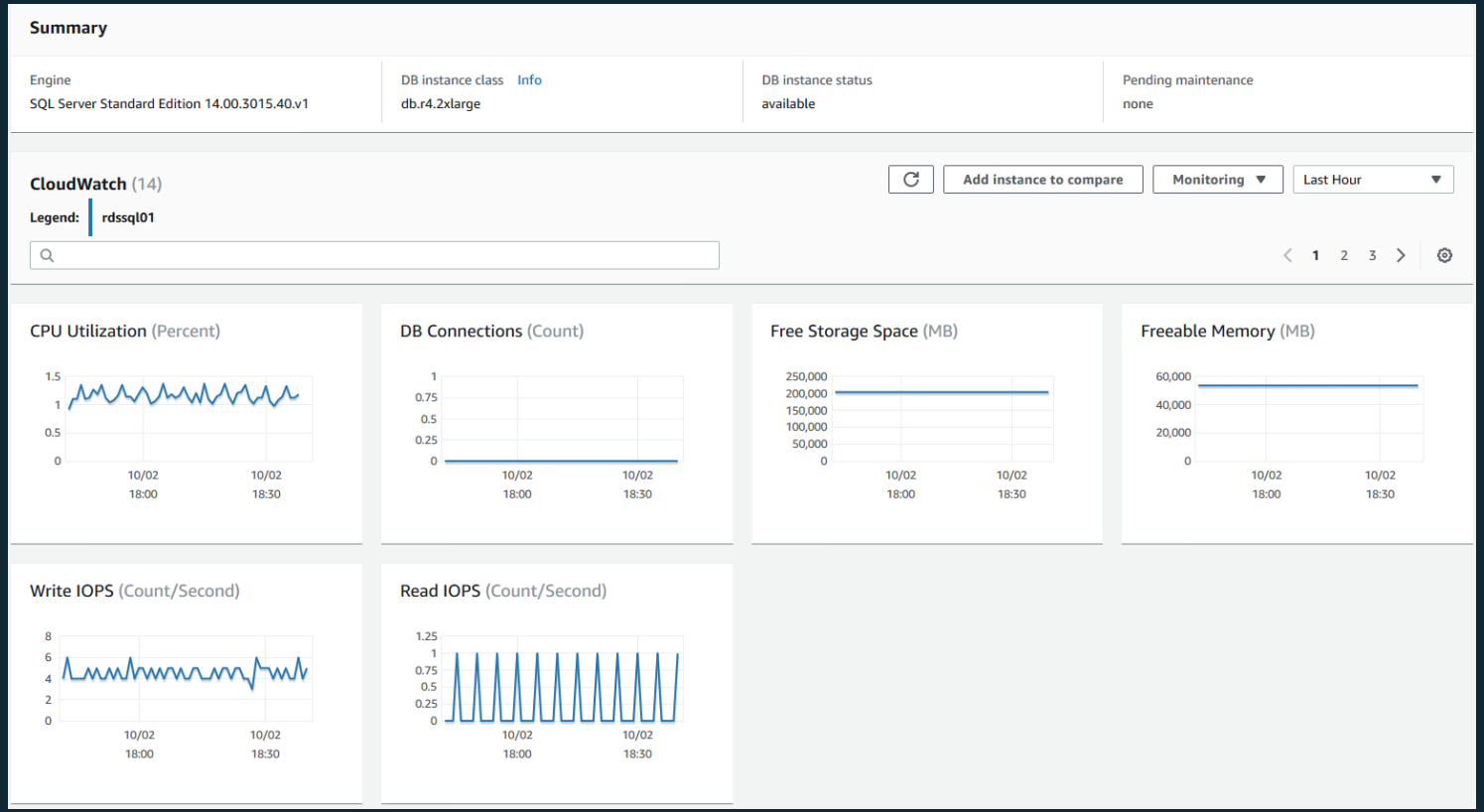
Amazon RDS for SQL Server Instance Types

Instance Type	vCPU	Memory (GiB)	PIOPS-Optimized	Network Performance
General Purpose - Latest Generation				
db.m4.large	2	8	Yes	Moderate
db.m4.xlarge	4	16	Yes	High
db.m4.2xlarge	8	32	Yes	High
db.m4.4xlarge	16	64	Yes	High
db.m4.10xlarge	40	160	Yes	10 Gbps
db.m4.16xlarge*	64	256	Yes	20 Gbps

Memory Optimized - Latest Generation				
db.r4.large	2	15.25	Yes	Up to 10 Gbps
db.r4.xlarge	4	30.5	Yes	Up to 10 Gbps
db.r4.2xlarge	8	61	Yes	Up to 10 Gbps
db.r4.4xlarge	16	122	Yes	Up to 10 Gbps
db.r4.8xlarge	32	244	Yes	10 Gbps
db.r4.16xlarge*	64	488	Yes	25 Gbps

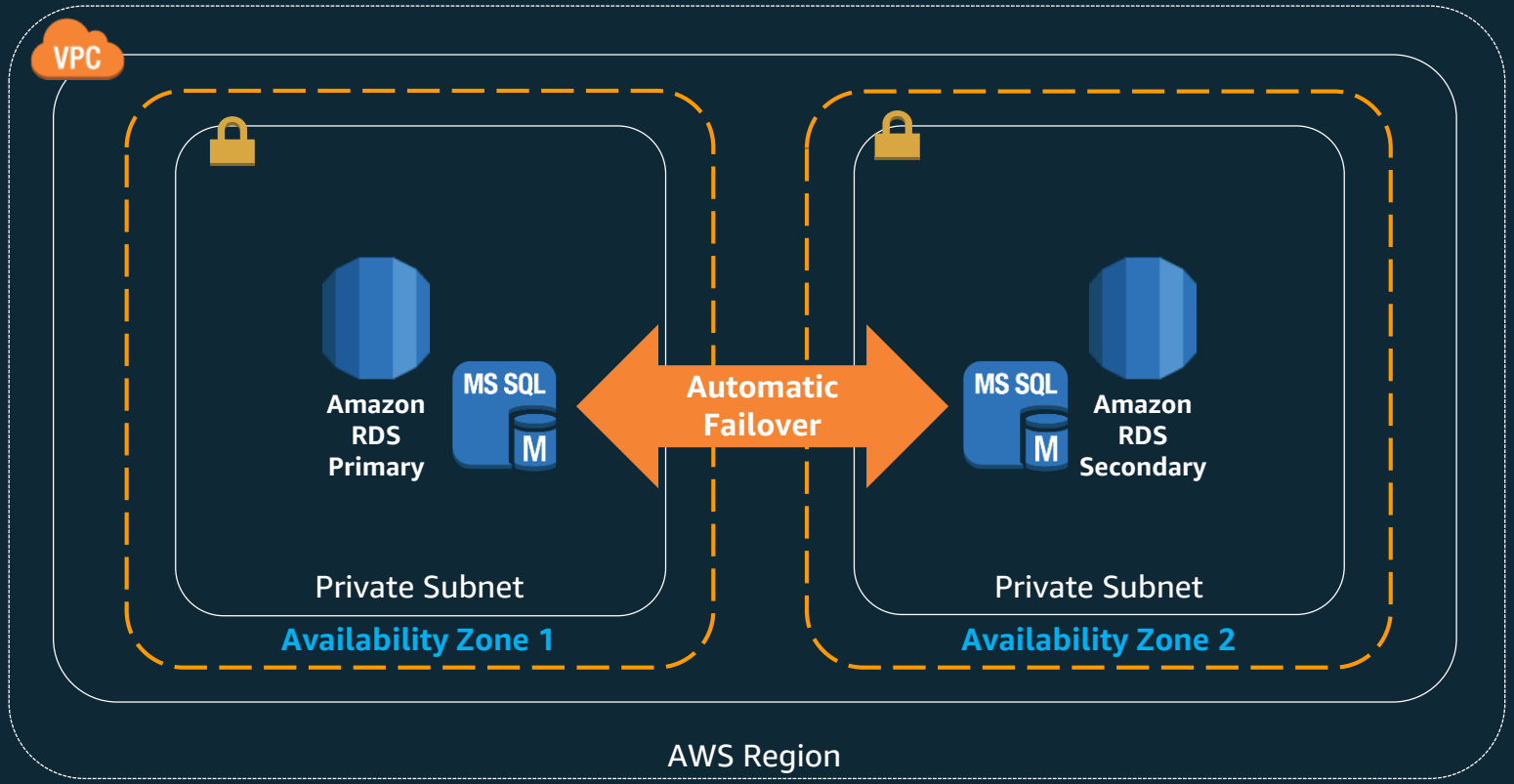
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

SQL Server on Amazon RDS



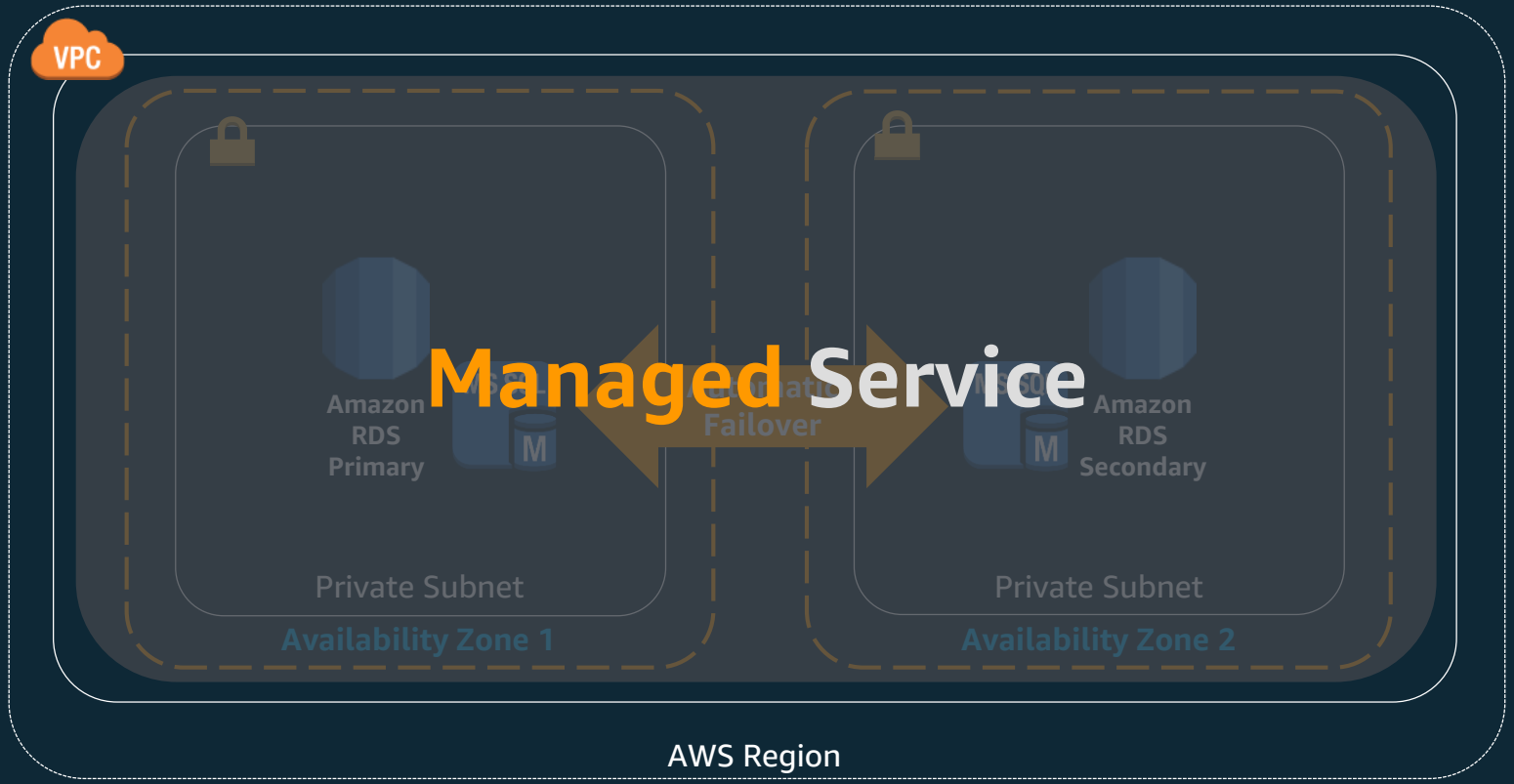
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Multi-AZ SQL Server on Amazon RDS



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

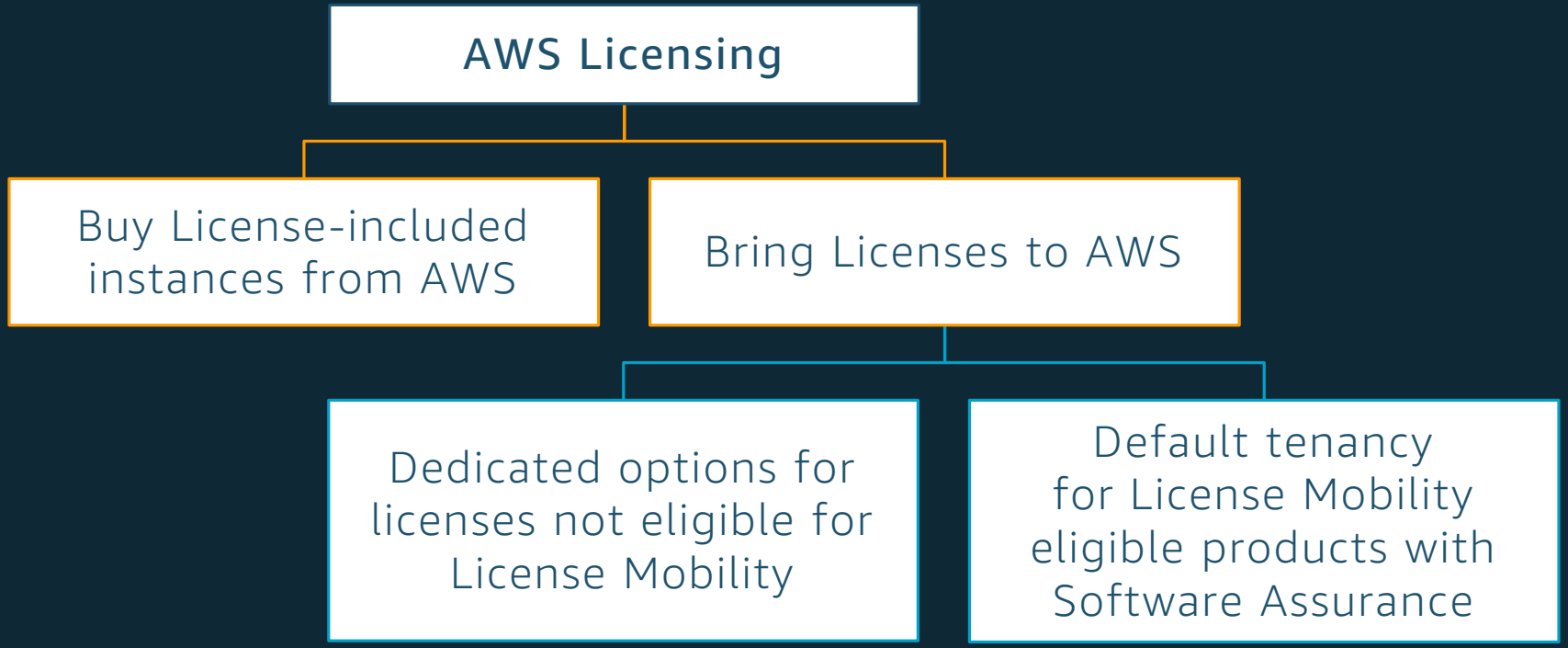
Multi-AZ SQL Server on Amazon RDS



Managed Service

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Microsoft Licensing on AWS



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Amazon EC2: Purpose-built Compute Families

Current Instance Families and Generation	Family/Usage
M5, M4	General Purpose Compute
T2	Burstable Performance
C5, C4	Compute Optimized
X1, X1E, R5, R5d, R4, R3	**Memory Optimized**
P2, G3, F1	Accelerated Computing
I3	Storage Optimized (I/O)
D2	Storage Optimized (Density)

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Amazon EC2: Scaling to Meet Your Needs

Model	vCPU	Mem (GiB)	Networking Perf.	SSD Storage (GB)
r5d.large	2	16	Up to 10 Gigabit	1 x 75 NVMe SSD
r5d.xlarge	4	32	Up to 10 Gigabit	1 x 150 NVMe SSD
r5d.2xlarge	8	64	Up to 10 Gigabit	1 x 300 NVMe SSD
r5d.4xlarge	16	128	Up to 10 Gigabit	2 x 300 NVMe SSD
r5d.12xlarge	48	384	10 Gigabit	2 x 900 NVMe SSD
r5d.24xlarge	96	768	25 Gigabit	4 x 900 NVMe SSD

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

License Optimization with Optimize CPUs

Control active vCPUs and Hyper-Threading status when launching new EC2 instances

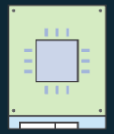
Reduce the number of SQL Server licenses

Instance Type	Total vCPUs	Active vCPUs with Optimize CPUs	SQL Server license savings
r5.4xlarge	16	8	50%
r5.8xlarge	32	8	75%

*Sample licensing example only

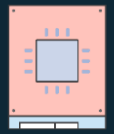
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Amazon EBS Offerings



GP2

IOPS performance for most workloads with predictable baseline and burst



IO1

Critical and IO intensive workloads needing consistent performance

SC1

Colder throughput oriented workloads (e.g. log processing)

ST1

Big data & analytics workloads needing consistent high throughput

Snapshots

Highly durable regional backups for EBS Volumes

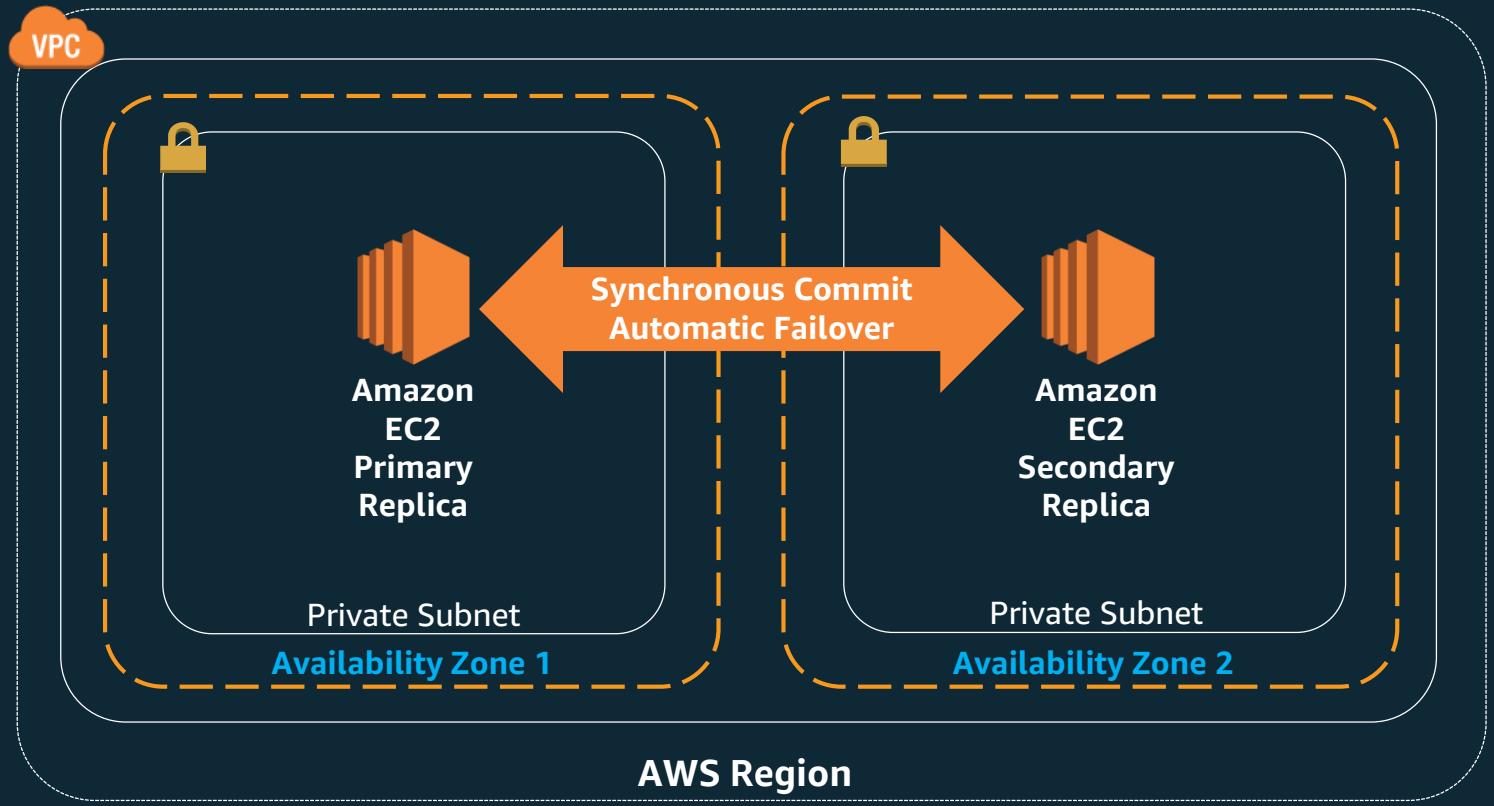
SAN-like features at Cloud-scale – Performance and Data Services

Optimizing Value: Price to Performance

Simplifying customer experience

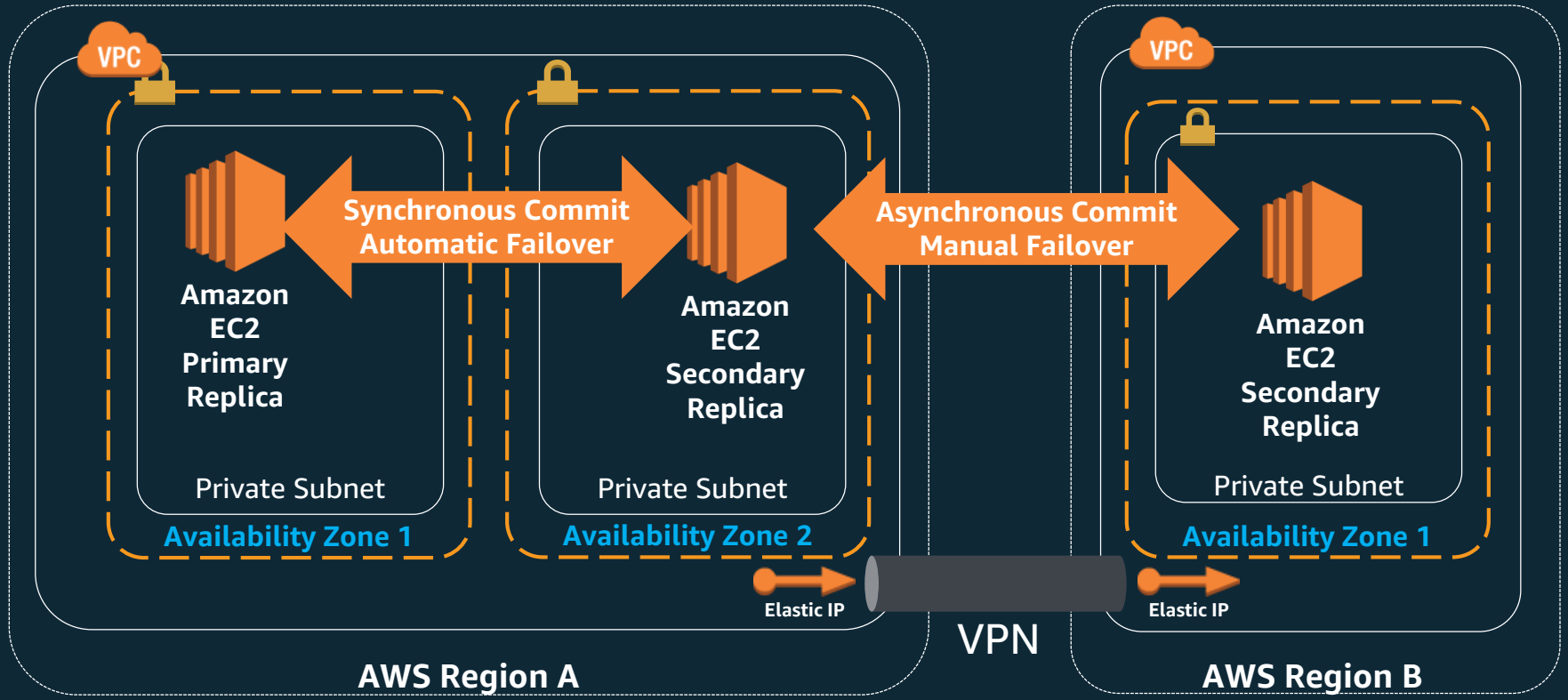
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Multi-AZ Always On Availability Group



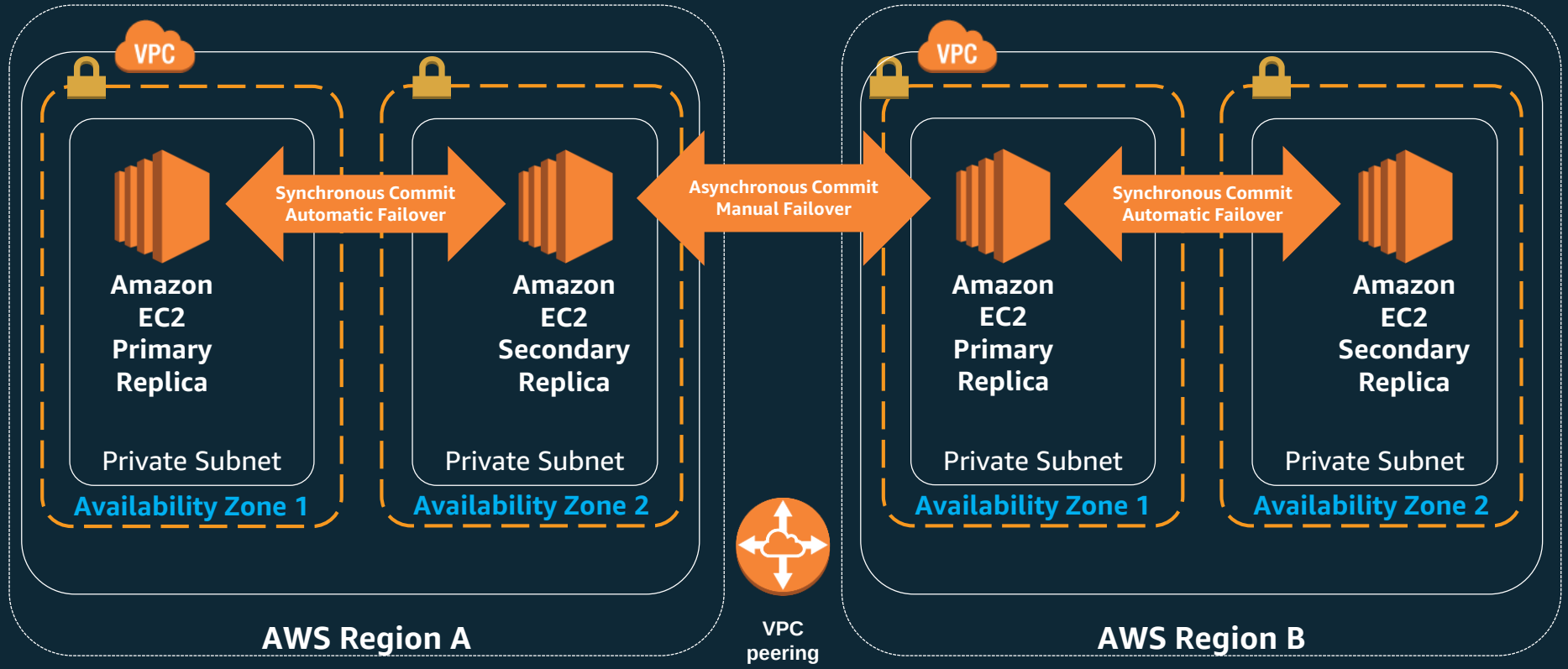
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Multi-region Always-On Availability Group



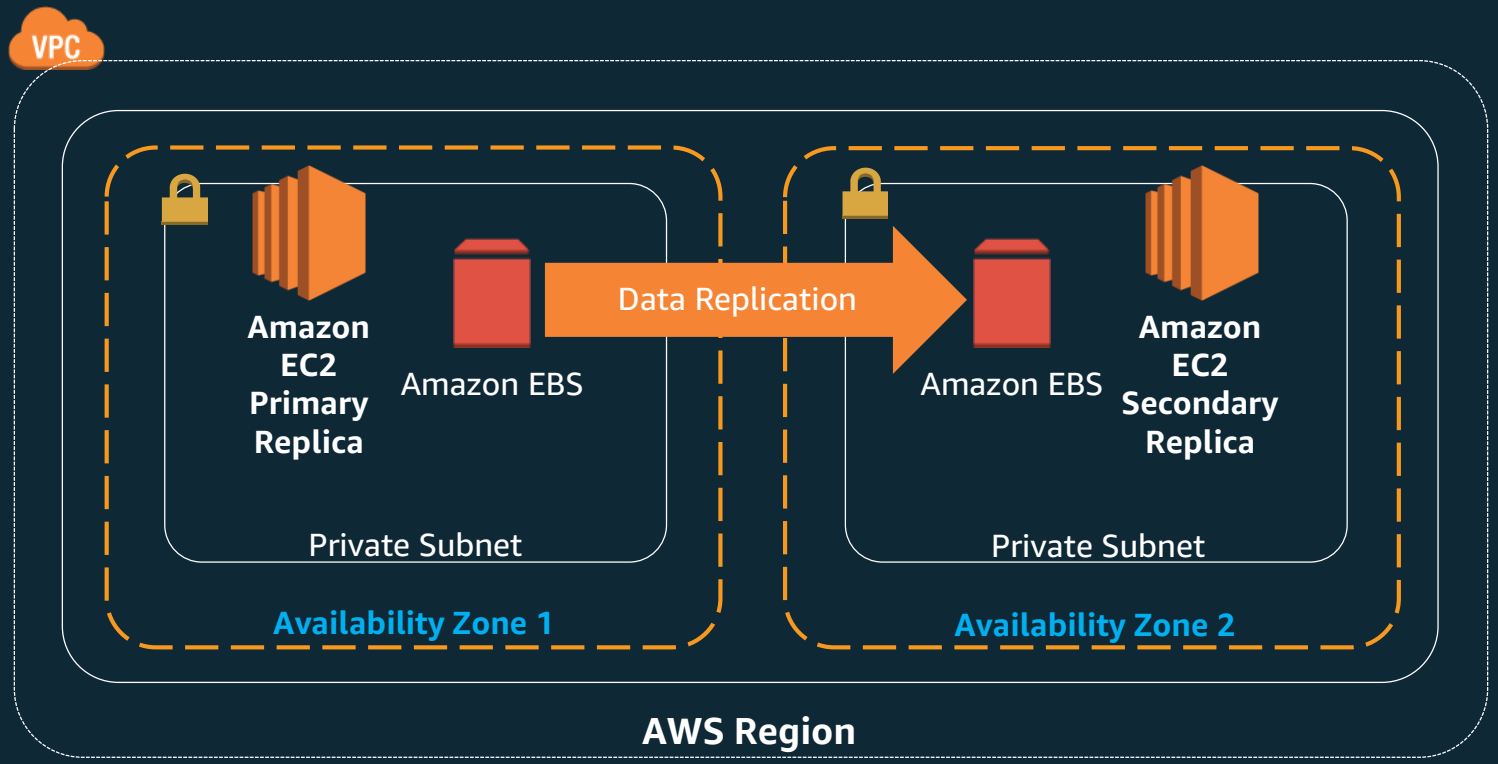
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Multi-region Distributed Availability Group



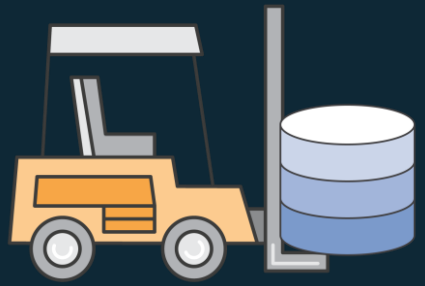
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Multi-AZ Failover Cluster Instance



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Migrating SQL Server to AWS

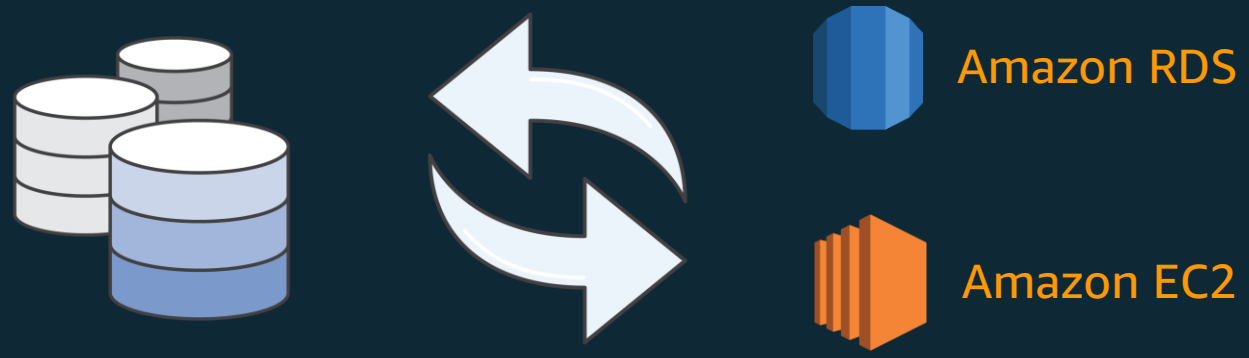


Amazon RDS
Managed service with up to 64 vCPU, 488 GB RAM, and 16 TB storage

Amazon EC2
Self-managed virtual machine with up to 128 vCPU, 4 TB RAM, and 400 TB storage

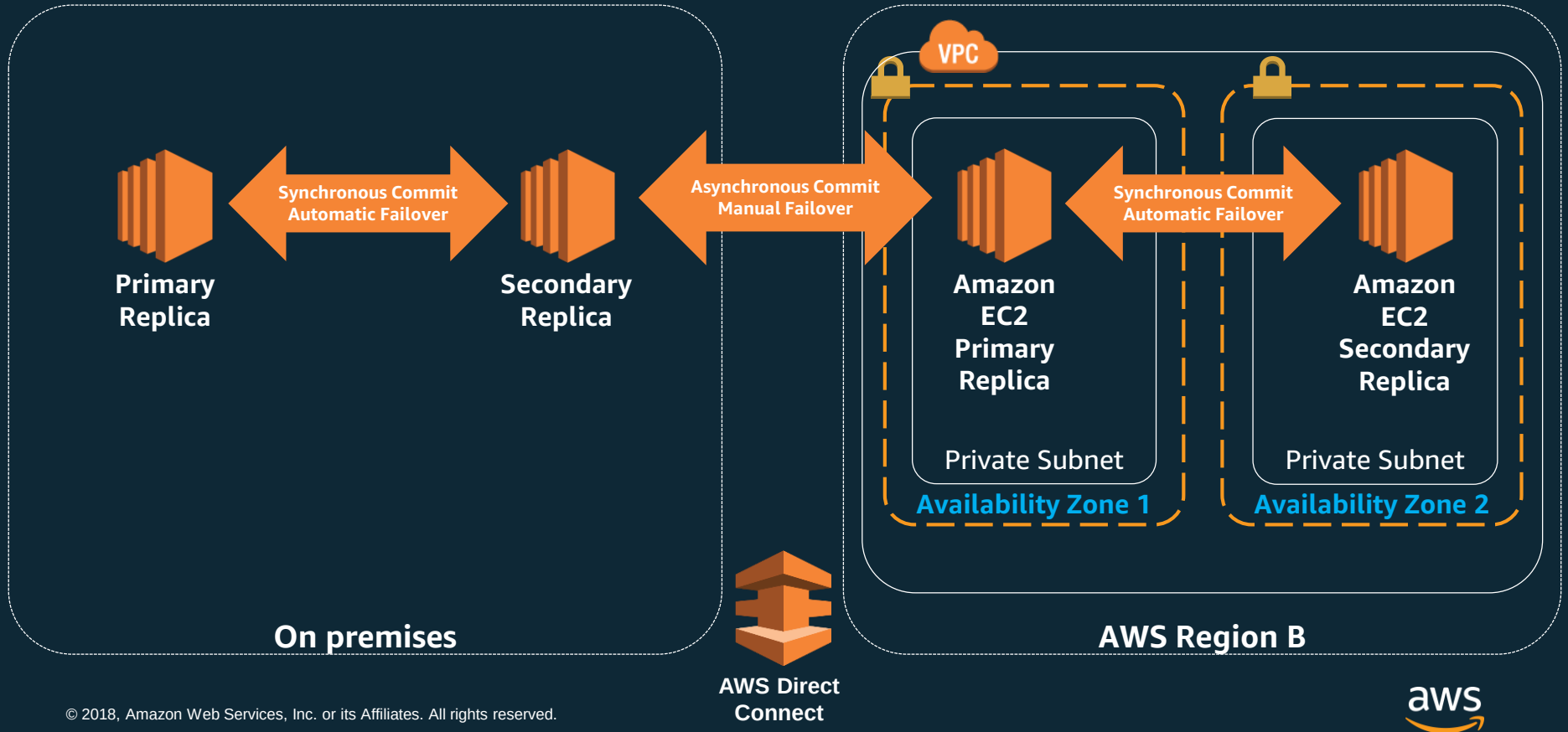
© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Simple Backup/Restore Migrations



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Hybrid Distributed Availability Group



© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

What are AWS DMS and AWS SCT?

AWS Database Migration Service (AWS DMS) easily and securely migrate and/or replicate your databases and data warehouses to AWS

AWS Schema Conversion Tool (AWS SCT) converts your commercial database and data warehouse schemas to open-source engines or AWS-native services, such as Amazon Aurora and Amazon Redshift

Over 64,000 databases migrated and counting …

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

When to use AWS DMS and AWS SCT?

Modernize

Modernize your database tier –

- Commercial to open-source
- Commercial to Amazon Aurora

Modernize your Data Warehouse –

- Commercial to Amazon Redshift

Migrate

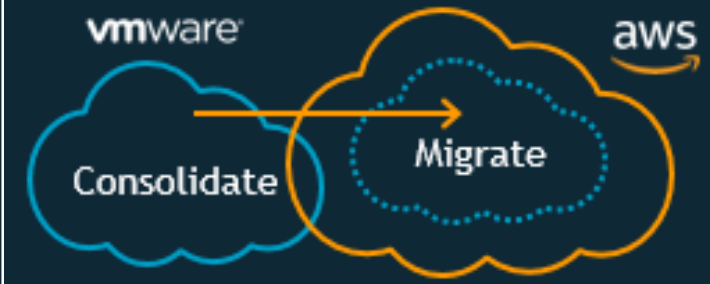
- Migrate business-critical applications
- Migrate from Classic to VPC
- Migrate data warehouse to Amazon Redshift
- Upgrade to a minor version
- Consolidate shards into Aurora

Replicate

- Create cross-regions Read Replicas
- Run your analytics in the cloud
- Keep your dev/test and production environment sync

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Migration Acceleration with VMware Cloud on AWS



Application-Specific Migration

Data Center-wide migration

Application Refresh

Customer examples:

- Global Retailer – Migrated 143 VMs in a weekend; CIO said “That’s migration acceleration!”
- Large Partner – Migrated over 350 VMs in 2 days
- Large University – migrated 100 VMs in a day using HCX

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

How to Upgrade on RDS (in just 4 clicks)

RDS > Instances

Instances (2)

Instance actions | Restore from S3 | Create database

Filter instances

1

- Modify
- Stop
- Reboot
- Delete
- Take snapshot
- Restore to point in time

DB instance	Engine		Current activity	Maintena
demo	SQL Server Express Edition	1.80%	0 Connections	none
[illegible]	[illegible]	1.17%	0 Connections	none

Modify DB Instance: demo

Instance specifications

License model
License type associated with the database engine
license-included

DB engine version
Version number of the database engine to be used for this instance.
SQL Server 2014 12.00.5571.0.v1
SQL Server 2017 14.00.3035.2.v1 (default)
SQL Server 2016 13.00.4522.0.v1
SQL Server 2014 12.00.5571.0.v1

2

Storage type Info
Magnetic

20 GiB

Scheduling of modifications

When to apply modifications

- Apply during the next scheduled maintenance window
  Current maintenance window: mon:06:43-mon:07:13

3

- Apply immediately
  The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

Modifications will not be applied immediately
Modifications will be applied during the next scheduled maintenance window (mon:06:43-mon:07:13). To apply these modifications immediately, choose "Apply immediately" above.

4

Cancel | Back | Modify DB Instance

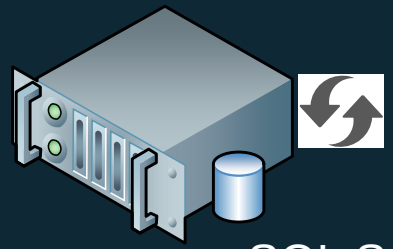
©

How to Upgrade on EC2

Side by Side upgrade

SQL Server 2008 SQL Server 2016

In place upgrade



SQL Server 2008 → SQL Server 2016

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Still have questions?

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Programs to Accelerate and Aid Migration

Rapid Migration POCs

Migrate your first Windows application in a week.

Rapid Migration offers customers a partner-led migration of one qualifying application build in a one-week engagement.

re:Think

Accelerate time to value with re:Think.

re:Think for Windows is designed to help customers who want to migrate or build significant Windows Server, SQL Server, and .NET workload on AWS.

Migration Acceleration Program (MAP)

Leverage AWS expertise in migrating your workloads with MAP.

MAP provides tools, training, migration methodology, partner support and investment benefits to help with all things migration.

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Ask a Friend

aws partner network

Microsoft Competency Consulting Partners

2ND WATCH
accenture
AllCloud
cascadeo
CloudHesive securing your enterprise in the cloud
datAvail
ECS
ensono
kloia
NEUDESIC
ONICA
PARIVEDA
rackspace
REAN CLOUD
RELUS CLOUD
TriNimbus Cloud Management Solutions
six nines
stackArmor

https://aws.amazon.com/windows/partner-solutions/#database

+thousands of additional APN partners

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

aws

Helpful Resources

Windows Server on AWS

https://aws.amazon.com/windows/

SQL Server on AWS

https://aws.amazon.com/sql/

Amazon Relational Database Service (RDS)

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

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Windows Training & Resources to Get Started

Windows technical bootcamps
Onsite for partners and/or customers

- Windows Workloads on AWS Bootcamp
- AWS Developer Dojo
- Migrating Windows Applications to AWS
- EC2 Systems Manager Bootcamp

Microsoft licensing on AWS
Live or on-demand webinars

Dedicated licensing specialist

Overview video:
https://www.youtube.com/watch?v=ZZm8U9S6Prk

Contact Us
microsoft@amazon.com

Learn more at:
http://aws.amazon.com/windows/

Take a free Test Drive:
http://aws.amazon.com/testdrive/

Take a Hands-on Lab:
https://www.qwiklabs.com/quests/13

Sign up for free at:
http://aws.amazon.com/getting-started

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.

Thank you!

© 2018, Amazon Web Services, Inc. or its Affiliates. All rights reserved.