

Oracle on AWS

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Pop-up Loft

AMAZON RELATIONAL DATABASE SERVICE

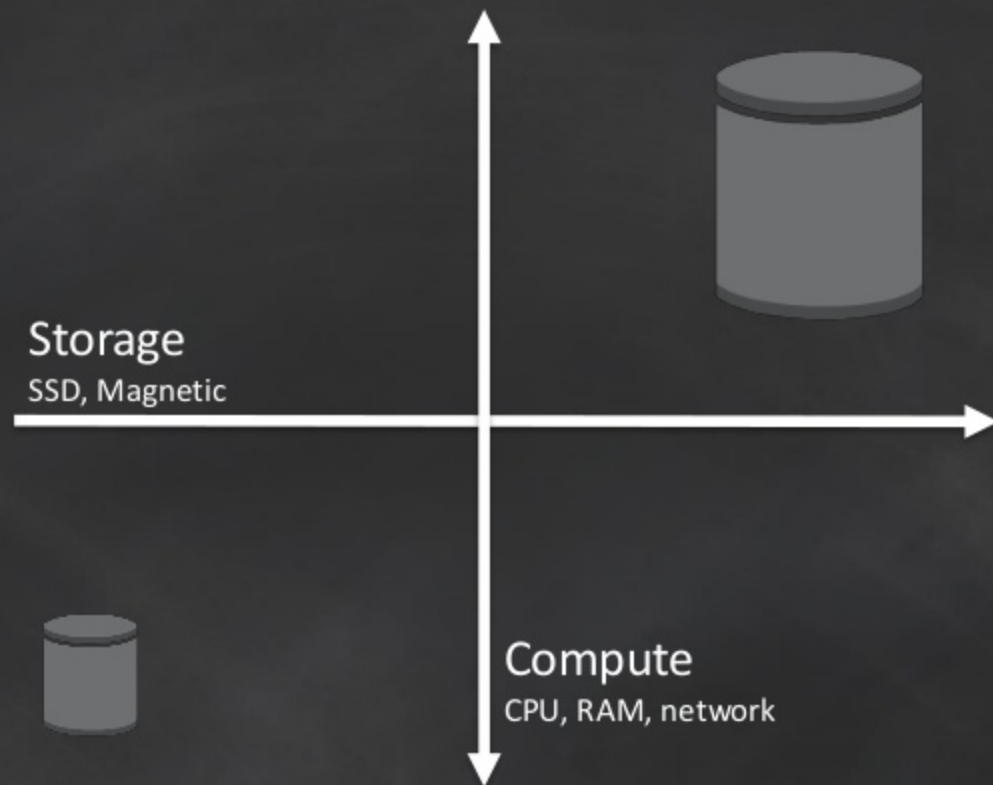
- **Easy to Administer**
- Scalable and fast
- Available and durable
- Secure
- Inexpensive
- Oracle licensing
- Managed infrastructure
- Available in minutes
- Manage parameters and options across instances
- Web console, CLI, SDK, AWS CloudFormation templates

ORACLE



AMAZON RELATIONAL DATABASE SERVICE

- Easy to administer
- **Scalable and fast**
- Available and durable
- Secure
- Inexpensive
- Oracle licensing



AMAZON RELATIONAL DATABASE SERVICE

- Easy to administer
- Scalable and fast
- **Available and durable**
- Secure
- Inexpensive
- Oracle licensing
- Automatic host replacement
- Managed high availability
- Managed backups
- Durable storage—Amazon EBS and Amazon S3

AMAZON RELATIONAL DATABASE SERVICE

- Easy to administer
- Scalable and fast
- Available and durable
- **Secure**
- Inexpensive
- Oracle licensing
- VPC by default
- VPN/Direct Connect to on-premises
- Encryption at rest—KMS, TDE, HSM
- Encryption in transit
- Strong account controls

AMAZON RELATIONAL DATABASE SERVICE

- Easy to administer
- Scalable and fast
- Available and durable
- Secure
- **Inexpensive**
- Oracle licensing
- Pay for what you use
- Trade CAPEX for OPEX
- Scale down when appropriate
- Reserved instances

AMAZON RELATIONAL DATABASE SERVICE

- Easy to administer
 - Scalable and fast
 - Available and durable
 - Secure
 - Inexpensive
 - **Oracle licensing**
- License included (LI)
 - License included in instance price
 - **11.2.0.4 SE1**
 - **12.1.0.2 SE2**
 - Bring your own license (BYOL)
 - Use existing licenses/agreements
 - Manage your own licenses and support
 - **11.2.0.4 EE, SE, SE1**
 - **12.1.0.2 EE, SE2**

AMAZON RELATIONAL DATABASE SERVICE

• On-Premises

App optimization
Scaling
High availability
Database backups
DB s/w patching
DB s/w install
OS patching
OS installation
Server maintenance
Hardware lifecycle
Power/HVAC/Network

You manage

• EC2

App optimization
Scaling
High availability
Database backups
DB s/w patching
DB s/w install
OS patching
OS installation
Server maintenance
Hardware lifecycle
Power/HVAC/Network

AWS manages

• RDS

App optimization
Scaling
High availability
Database backups
DB s/w patching
DB s/w install
OS patching
OS installation
Server maintenance
Hardware lifecycle
Power/HVAC/Network

RECENT NEW FEATURES

- Deprecation of 11.2.0.2, 11.2.0.3, 12.1.0.1
- Huge pages
- Snapshot upgrade
- R4 instance class
- Start/stop (all engines)
- Flexible Reserved Instances (all engines)
- Storage—up to 16 TB, faster scaling (all engines)

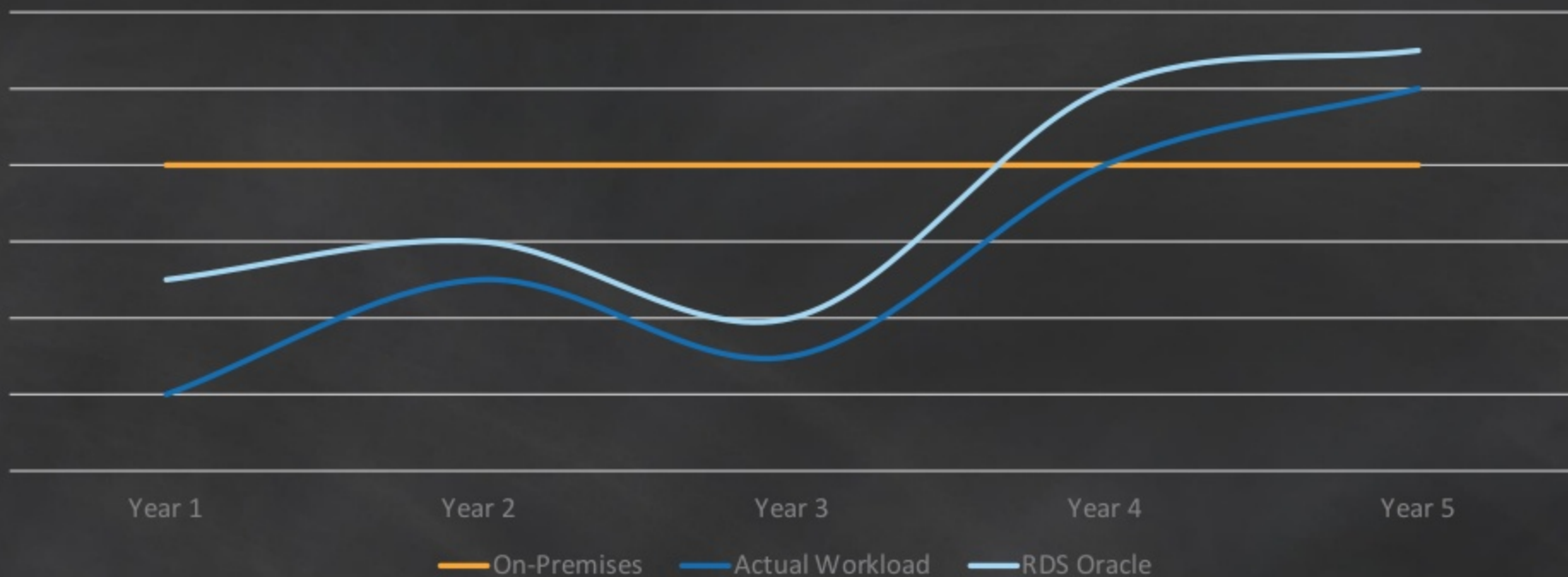
RECENT NEW/UPDATED OPTIONS

- Spatial (requires EE + Spatial and Graph Option license)
- Locator
- Multimedia
- Oracle Application Express—now supports 5.0.4, 5.1.2 (4.1.1, 4.2.6)
- Oracle SQLTXPLAIN (SQLT)
- Oracle Enterprise Manager Agent—now supports OMS 13cR1, 13cR2

SCALING RDS

Compute	Storage
<ul style="list-style-type: none">• Change CPU/Memory/Networking via instance class• Scale up or down as needed• Brief outage• Consider new instance classes	<ul style="list-style-type: none">• Change<ul style="list-style-type: none">• Size (increase only)• Type• IOPS• Online (with some performance impact)

SCALING RDS



HUGE PAGES

- Improved memory and CPU utilization
- Enable via RDS Parameter Group
 1. Disable Automatic Memory Management
 2. Enable Automatic Shared Memory Management
 3. Set `use_large_pages` to "ONLY"
- RDS automation takes care of kernel parameters
- Will be enabled by default on future instance classes (>100 GiB)
- Improved memory utilization
- Improved CPU utilization

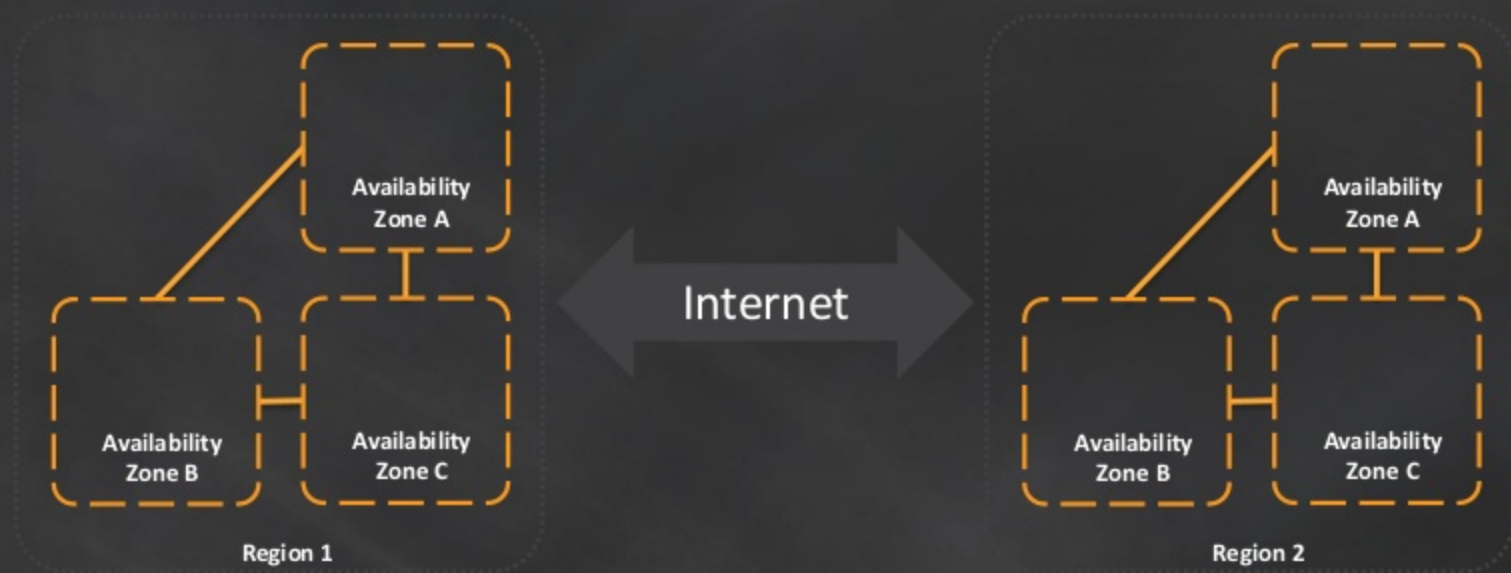
ADMINISTERING RDS ORACLE

On-Premises	Amazon RDS
ALTER SYSTEM...;	RDS Parameter Groups
Install features	RDS Option Groups
ALTER DATABASE...; GRANT...;	exec rdsadmin.rdsadmin_util...; grant...;
Backups/RMAN	RDS Snapshots
OEM, tools	OEM, tools

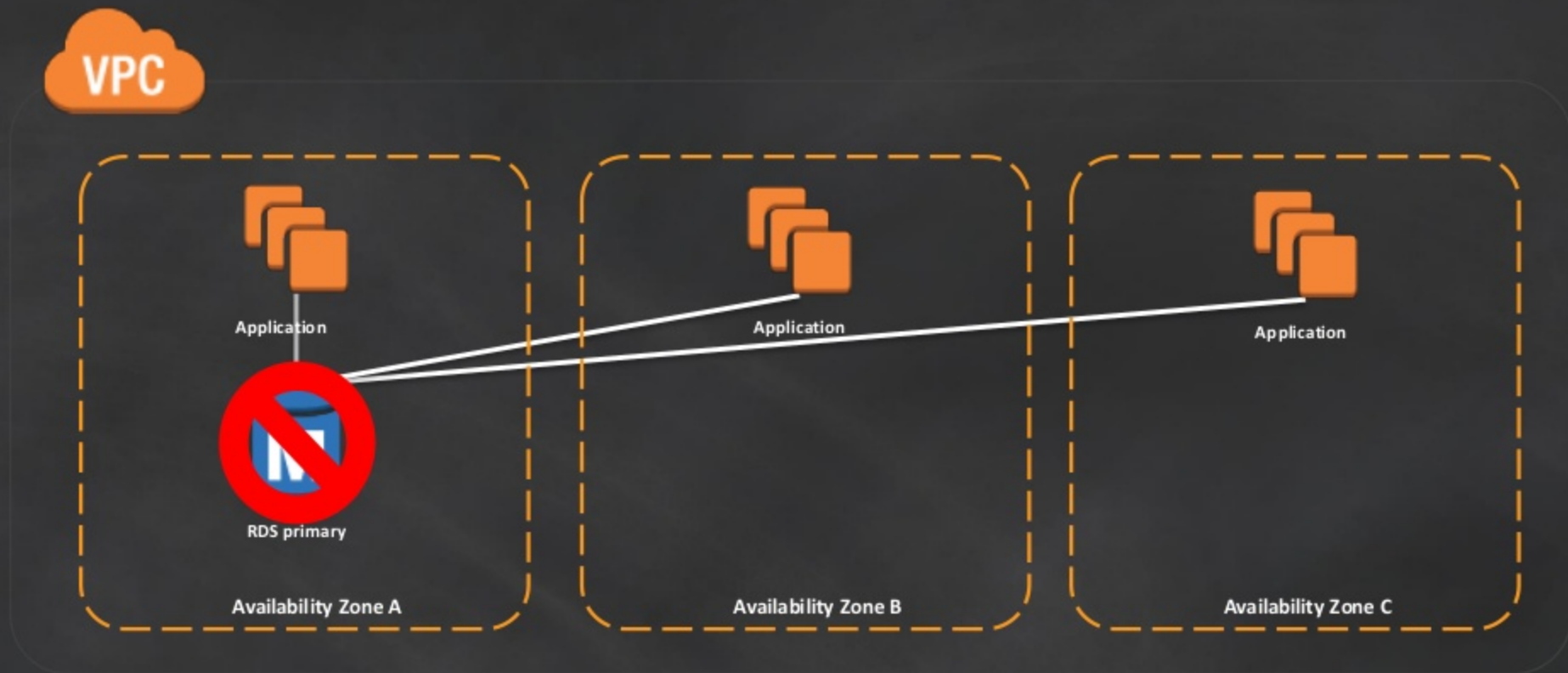
AWS GLOBAL INFRASTRUCTURE



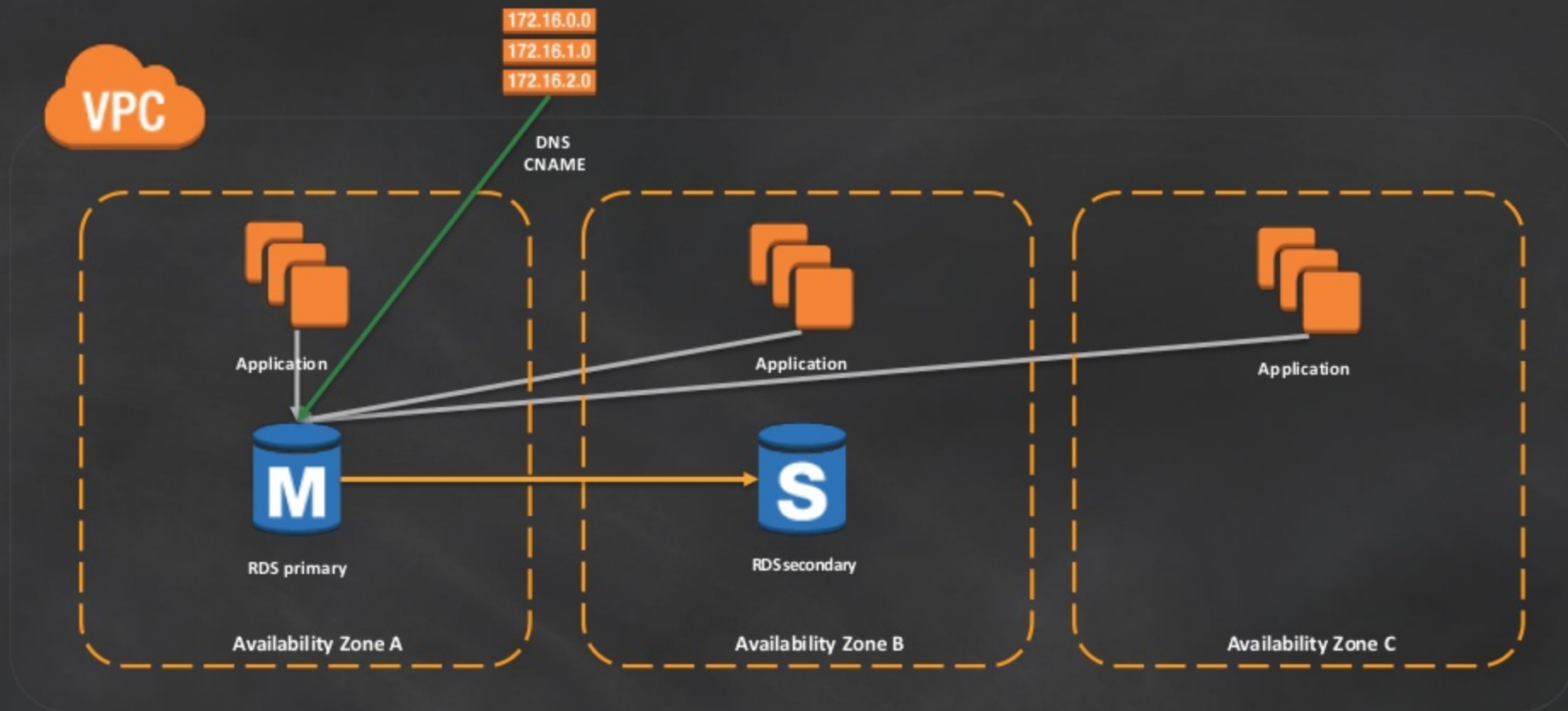
REGIONS AND AVAILABILITY ZONES



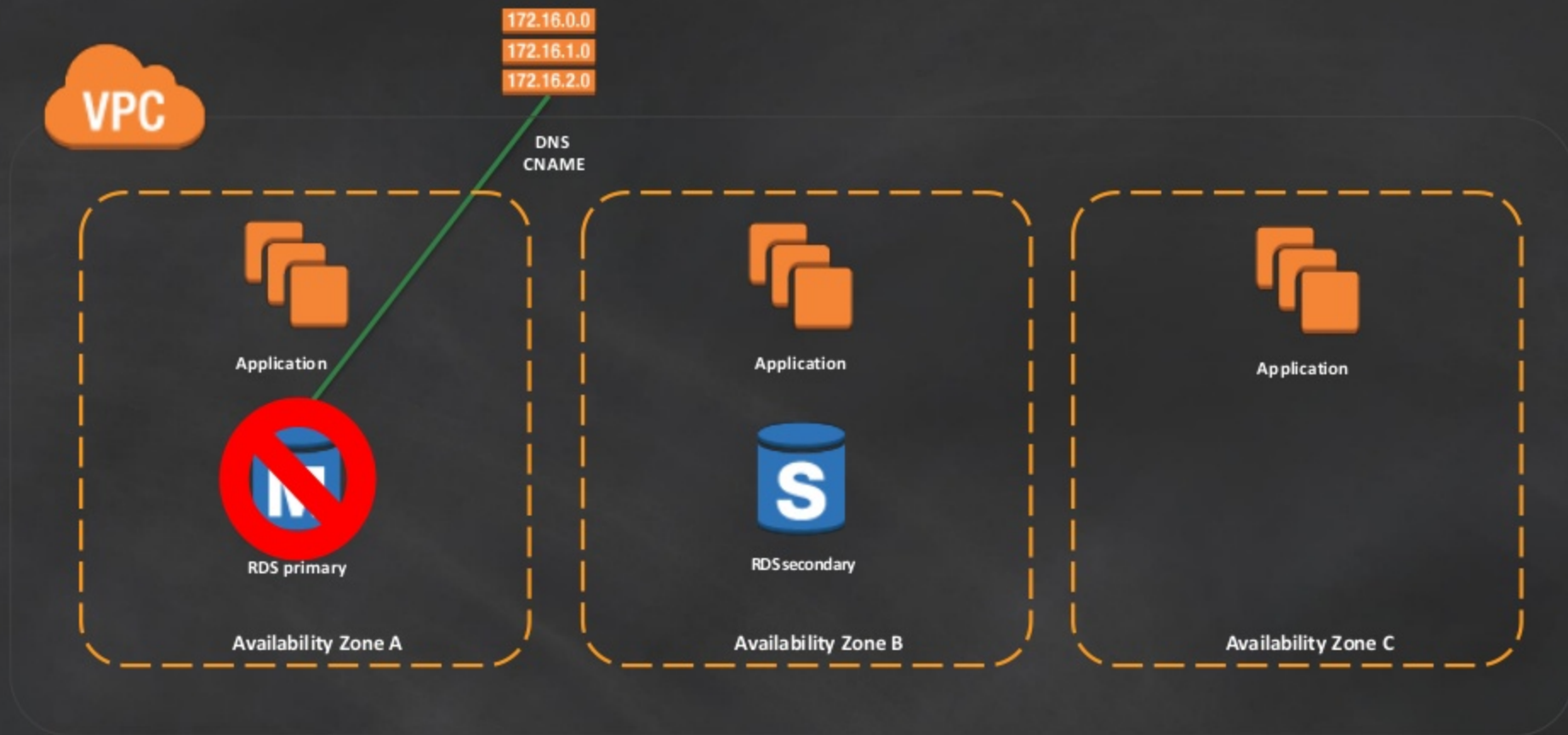
RDS SINGLE-AZ



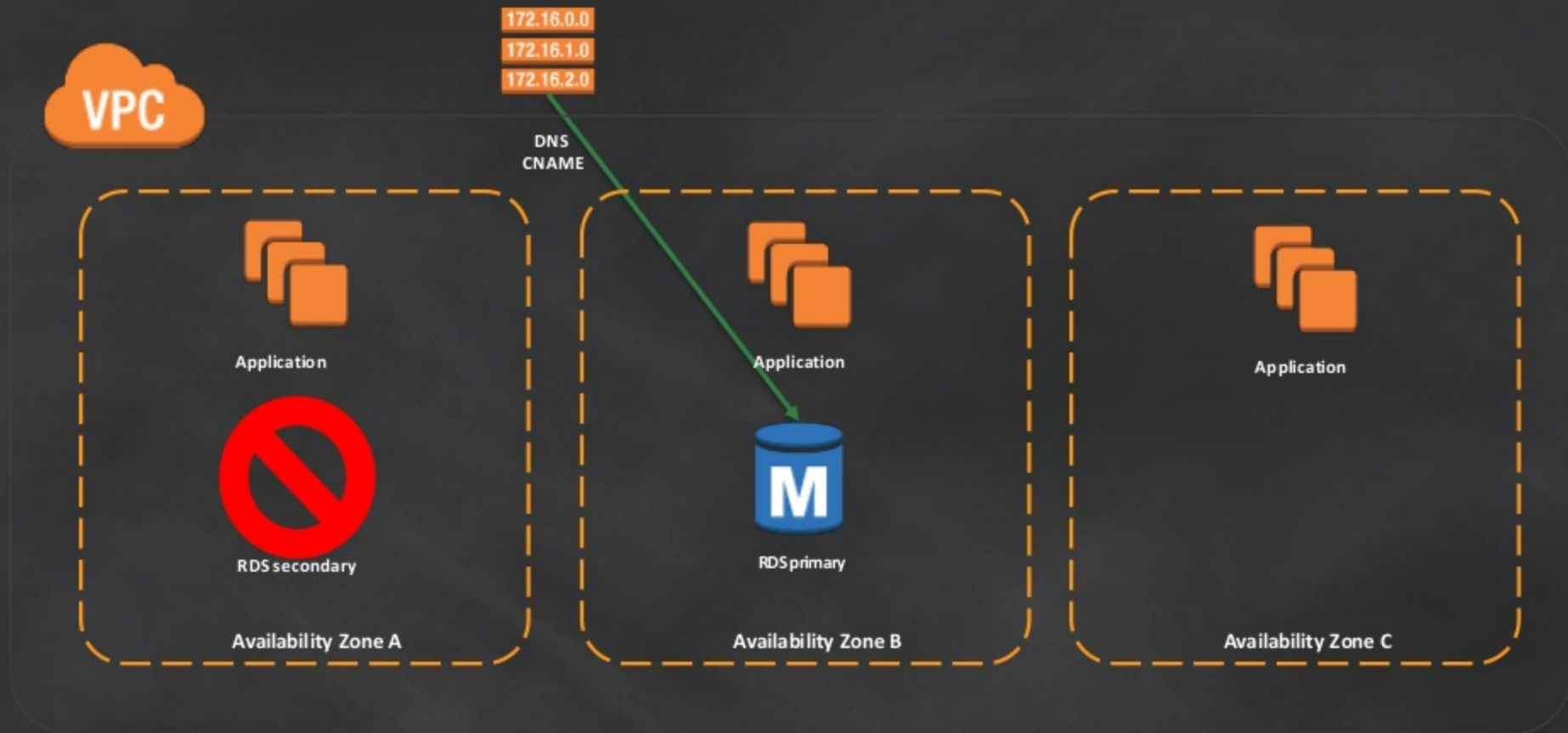
RDS MULTI-AZ



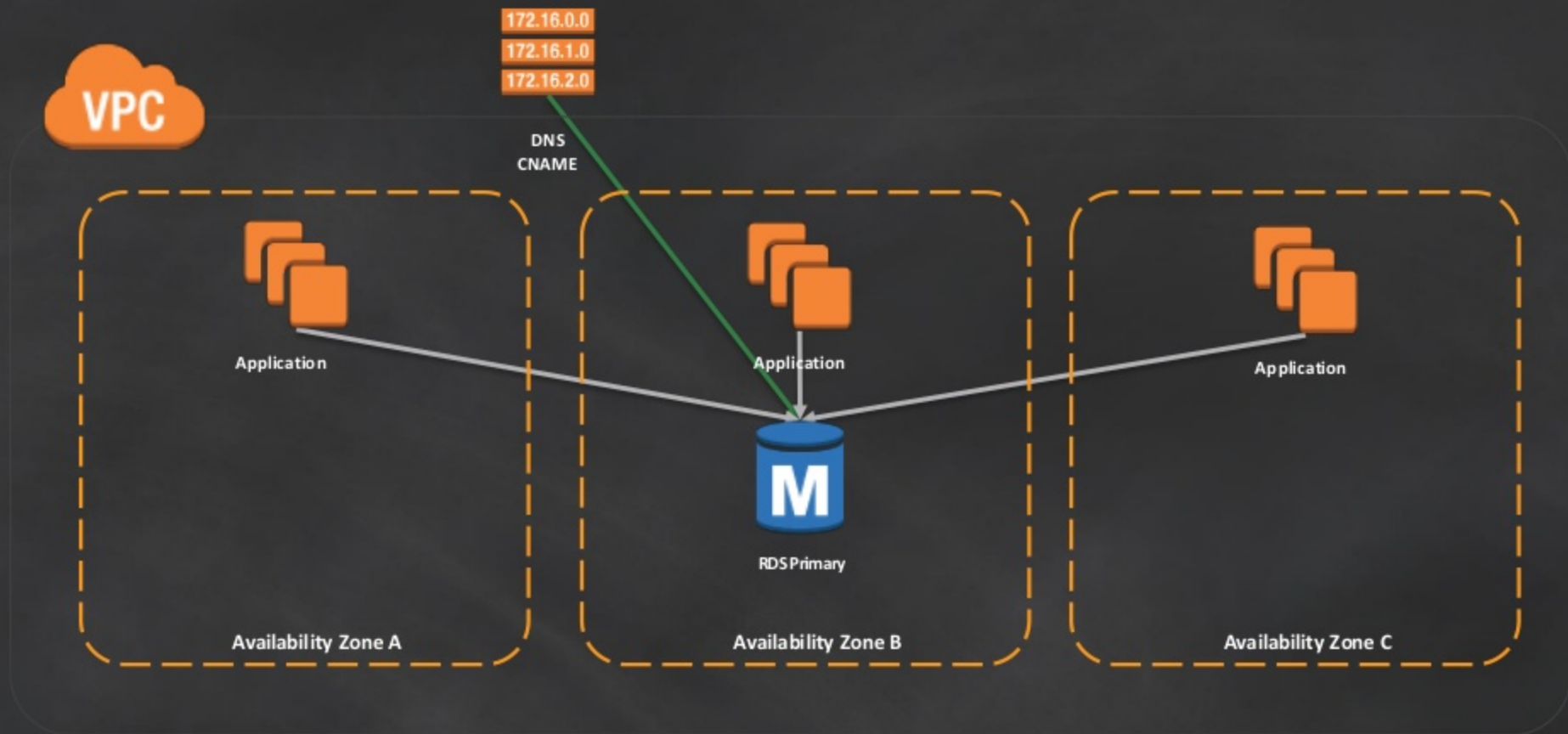
RDS MULTI-AZ FAILOVER



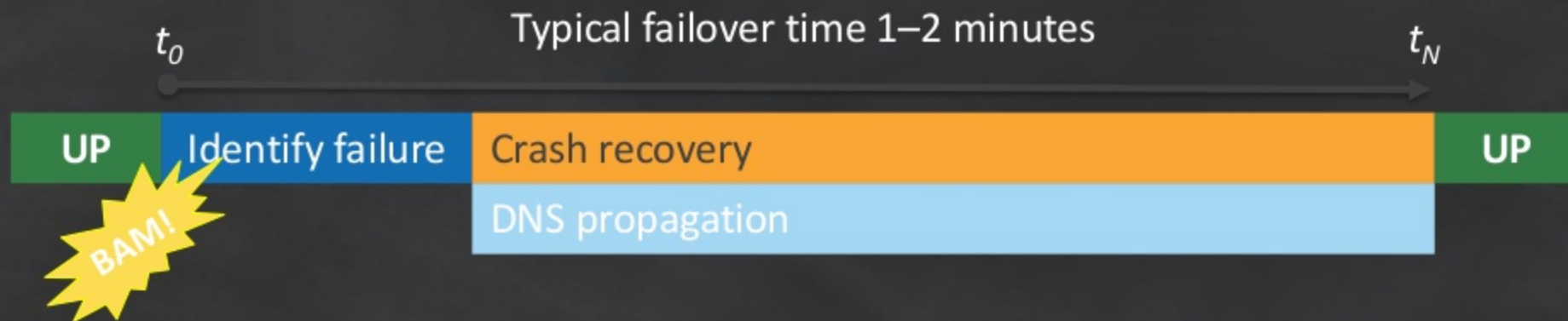
RDS MULTI-AZ FAILOVER



RDS MULTI-AZ FAILOVER



MULTI-AZ FAILOVER



ENCRYPTION AT REST

Oracle Transparent Data Encryption (TDE)	Oracle TDE with Hardware Security Module (TDE_HSM)	RDS Storage Encryption
EE + ASO	EE + ASO	All editions/engines
<ul style="list-style-type: none">• RDS manages wallet and keys	<ul style="list-style-type: none">• RDS manages wallet• Customer manages HSM device	<ul style="list-style-type: none">• EBS volume encryption• Completely transparent to host/database• Customer manages keys with Amazon KMS

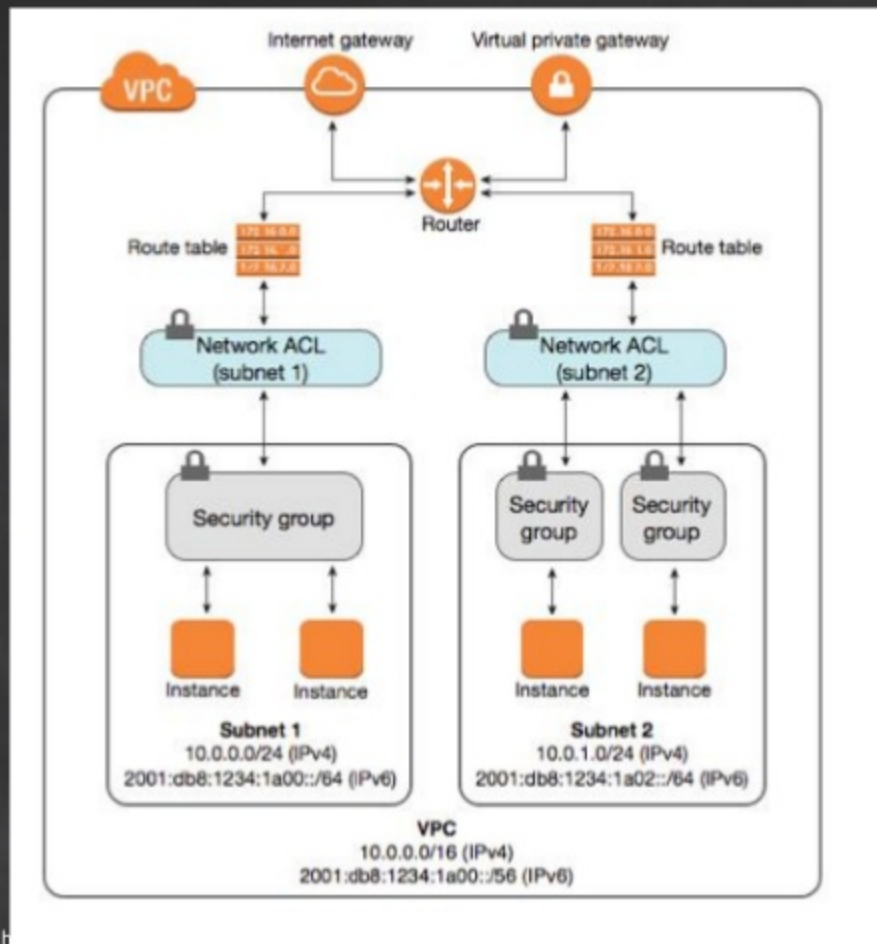
ENCRYPTION IN TRANSIT

SSL Option	Native Network Encryption (NNE)
All Oracle editions (no longer requires ASO as of 11.2)	
<ul style="list-style-type: none">• RDS manages wallets, certificates• Customer imports RDS root certificates into client wallets• Separate TCPS listener port	<ul style="list-style-type: none">• RDS manages sqlnet.ora• Choose algorithms and level (requested/required/allowed)

DATABASE SECURITY

RDS Manages	Customer Manages
<ul style="list-style-type: none">• Physical infrastructure controls• Host access• Operating System version/patches• HOW database patches are applied	<ul style="list-style-type: none">• Database users and privileges• Access to data (Virtual Private Database, Oracle Label Security)• Database Audit• Network controls (VPC Security Groups, Network ACL)• WHEN database patches are applied

NETWORK SECURITY



AUDITING

AWS API Auditing (AWS CloudTrail)	Database Auditing (AUDIT_TRAIL)
<ul style="list-style-type: none">• Audit user API calls (e.g. Create-, Modify-, DeleteDBInstance)• Integrates with AWS CloudWatch Logs and Events• Stored in Amazon S3	<ul style="list-style-type: none">• Audit in-database operations (AUDIT/NOAUDIT)• Retention managed by customer• Stored on RDS instance (DB, OS, XML)• DBMS_AUDIT_MGMT<ul style="list-style-type: none">• Location• Retention

COMPLIANCE

- Assurance programs for finance, health care, government, and more
- Shared responsibility model
 - AWS → Security *of* the cloud
 - Customer → Security *in* the cloud
- <https://aws.amazon.com/compliance/>



Data Privacy

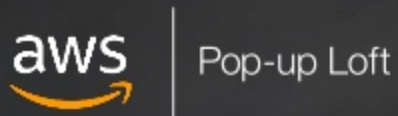


AMAZON RDS RECAP

- Simplify infrastructure management
- Allow DBAs to focus on high-value tasks
- Automation and standardization let you
 - Iterate fast and deploy quickly
 - Build highly-available, reliable applications
 - Run securely

RESOURCES/WHITEPAPERS

- Amazon RDS
<https://aws.amazon.com/rds>
- Amazon RDS User Guide
<https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide>
- AWS Free Tier
<https://aws.amazon.com/free>
- Oracle whitepapers and best practices
<https://aws.amazon.com/oracle/resources>



Everything and Anything Startups Need to Get Started on AWS

aws.amazon.com/activate