Databases on AWS

Yasser Quraishi, AWS Solutions Architect – yquraish@amazon.com

Jeff Hosley, AWS Account Manager – jhosley@amazon.com

Agenda

- AWS Database Services
- Traditional vs AWS Data services model
- Amazon RDS
- Redshift
- DynamoDB
- ElastiCache
- Neptune

AWS Database Services

Amazon RDS

Managed Relational Database Service

Amazon Redshift

Petabyte-scale Data Warehouse Service

Amazon ElastiCache

In-Memory key Value Store Service

Amazon DynamoDB

NoSQL Key Value Oriented Service

Amazon Neptune

NoSQL Graph Oriented Service

Amazon DocumentDB

NoSQL Document Oriented Service Mongo Compatible

(Preview)

Amazon Timestream

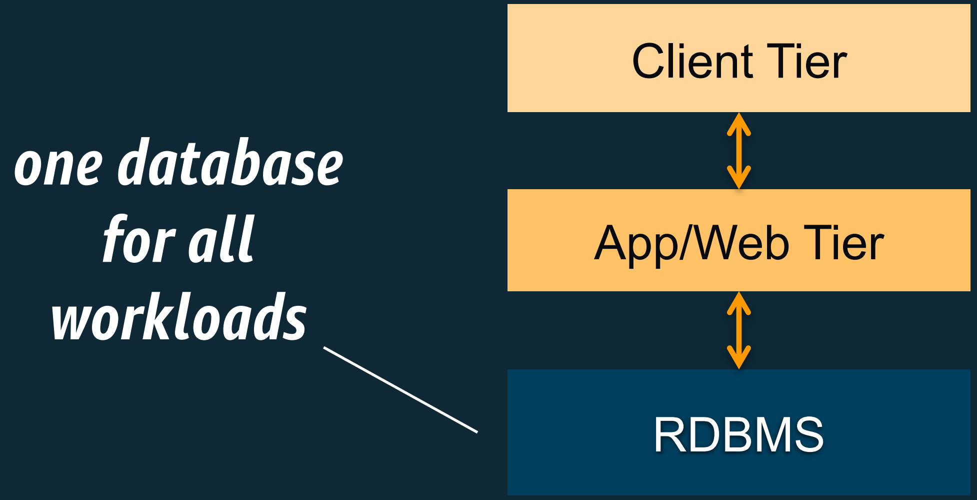
Time Series Database Service

(Preview)

Amazon QLDB

Quantum Ledger Database Service

Traditional Database Architecture



one database for all workloads

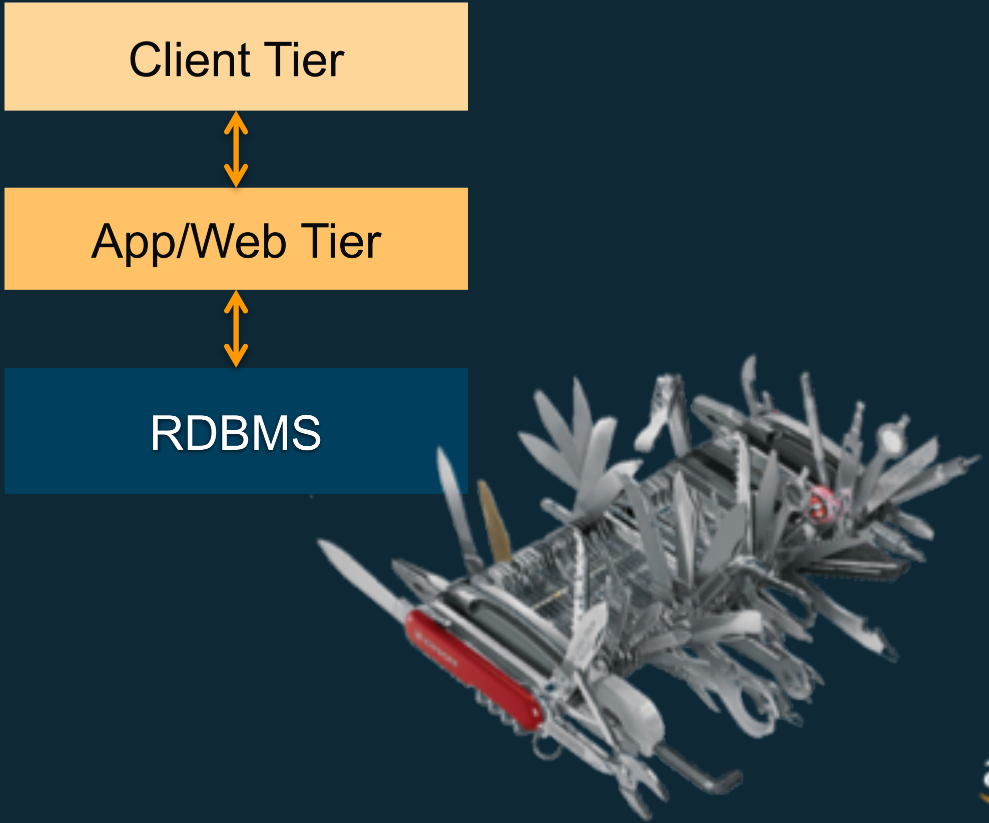
Traditional Database Architecture

Key-value access

Complex queries

OLAP transactions

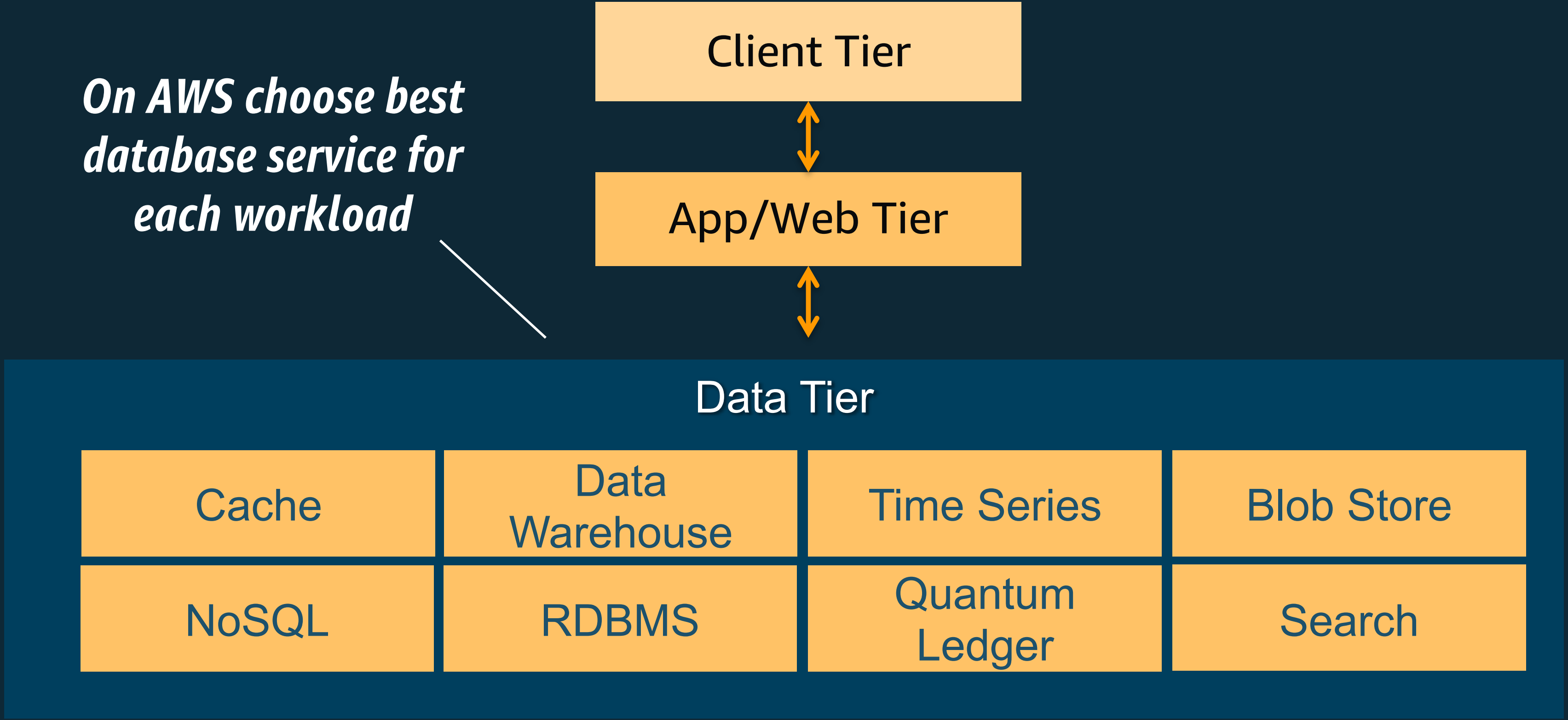
Analytics



All forced into the relational database

AWS Data Tier Architecture

On AWS choose best database service for each workload



Client Tier

App/Web Tier

Data Tier

Cache

Data Warehouse

Time Series

Blob Store

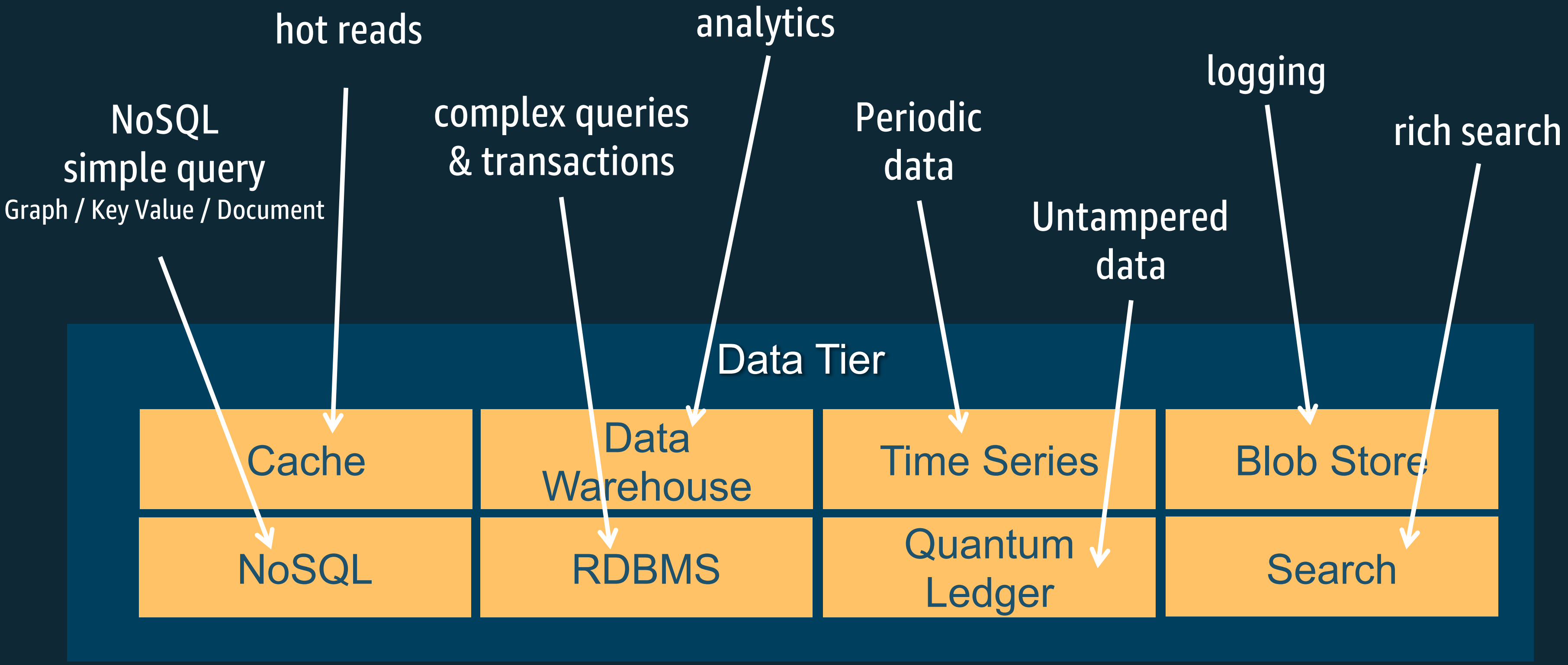
NoSQL

RDBMS

Quantum Ledger

Search

Workload Driven Data Store Selection



NoSQL
simple query
Graph / Key Value / Document

hot reads

complex queries
& transactions

analytics

Periodic
data

Untampered
data

logging

rich search

Data Tier

Cache

Data Warehouse

Time Series

Blob Store

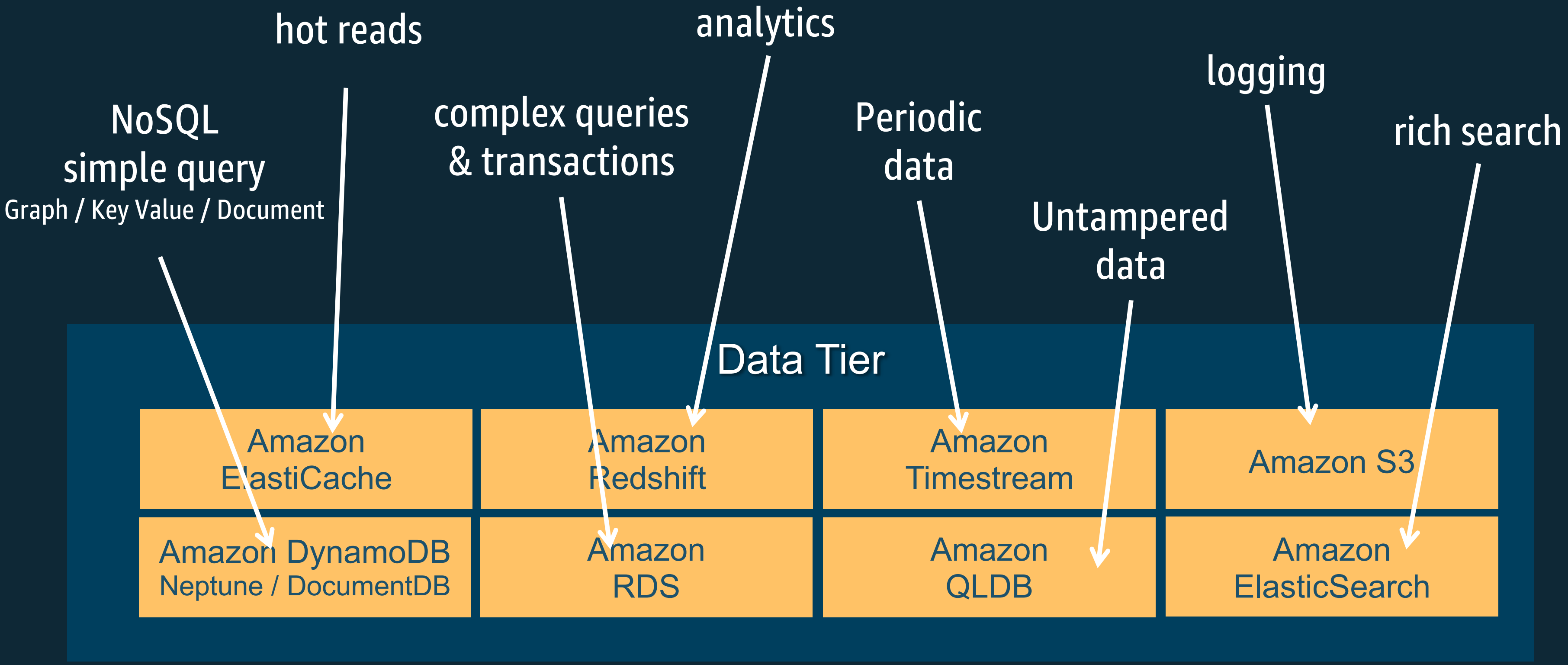
NoSQL

RDBMS

Quantum Ledger

Search

AWS Database Services for the Data Tier



NoSQL
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Periodic
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rich search

Data Tier

Amazon
ElastiCache

Amazon
Redshift

Amazon
Timestream

Amazon S3

Amazon DynamoDB
Neptune / DocumentDB

Amazon
RDS

Amazon
QLDB

Amazon
ElasticSearch

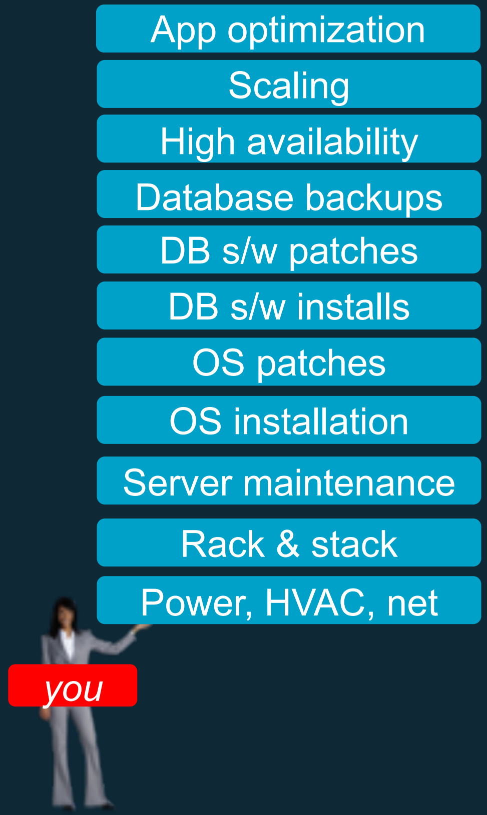
Amazon RDS

Relational Databases

Amazon Aurora, MySQL, PostgreSQL, Oracle, SQL Server, MariaDB

Fully managed

If you host your databases on-premises



App optimization

Scaling

High availability

Database backups

DB s/w patches

DB s/w installs

OS patches

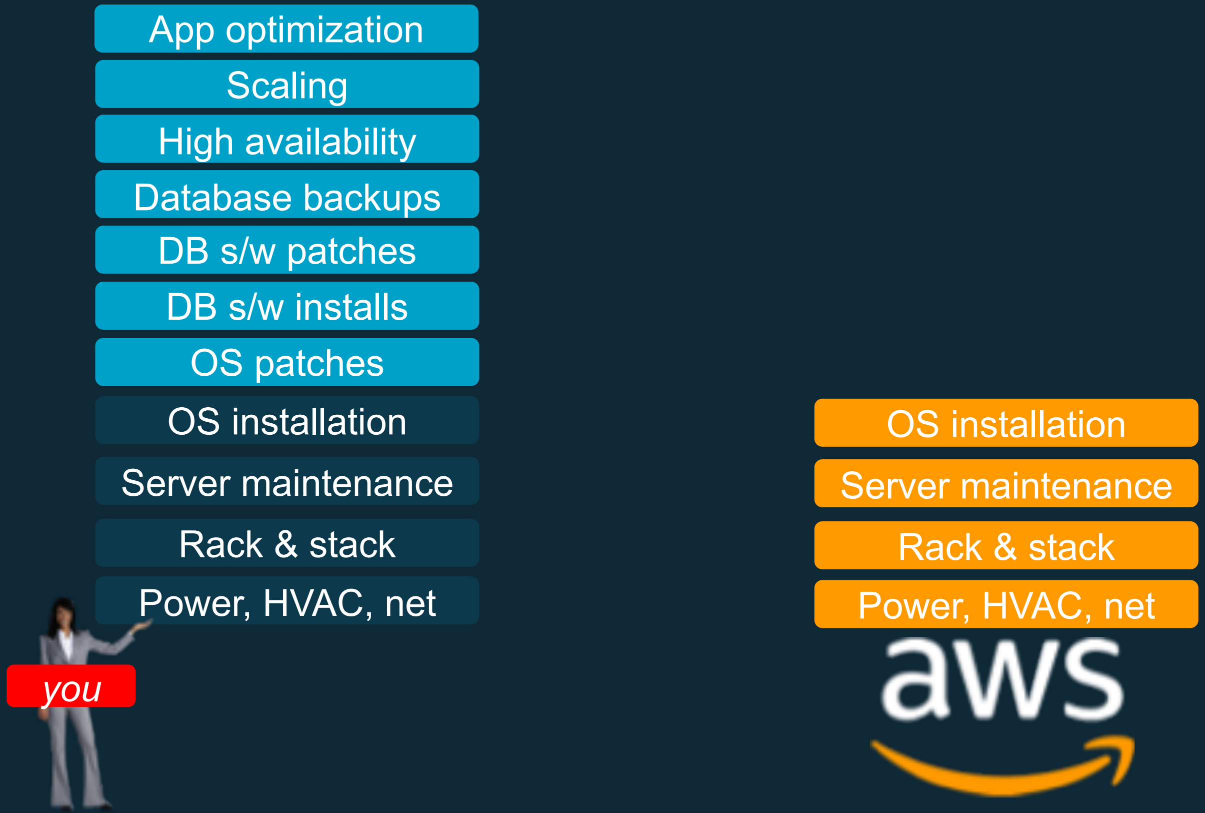
OS installation

Server maintenance

Rack & stack

Power, HVAC, net

If you host your databases in Amazon EC2



App optimization

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Database backups

DB s/w patches

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Rack & stack

Power, HVAC, net

you

OS installation

Server maintenance

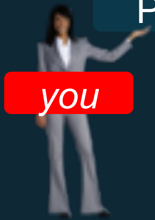
Rack & stack

Power, HVAC, net

aws

If you choose Amazon RDS

- App optimization
- Scaling
- High availability
- Database backups
- DB s/w patches
- DB s/w installs
- OS patches
- OS installation
- Server maintenance
- Rack & stack
- Power, HVAC, net



- Scaling
- High availability
- Database backups
- DB s/w patches
- DB s/w installs
- OS patches
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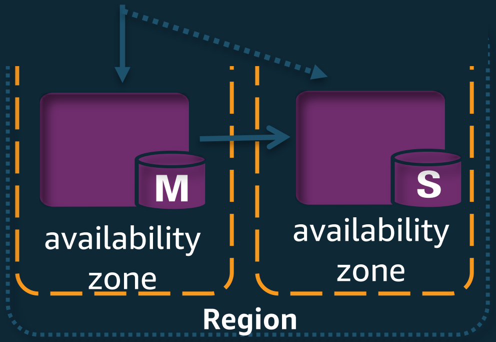
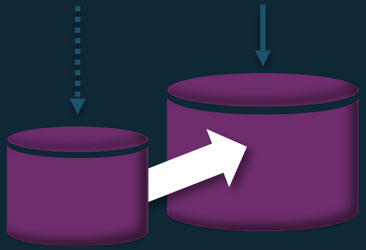
Key Amazon Amazon RDS Features

Amazon RDS Configuration	Improve Availability	Increase Throughput	Reduce Latency
Push-Button Scaling		✓	
Multi AZ	✓		
Read Replicas		✓	
Provisioned IOPS		✓	✓

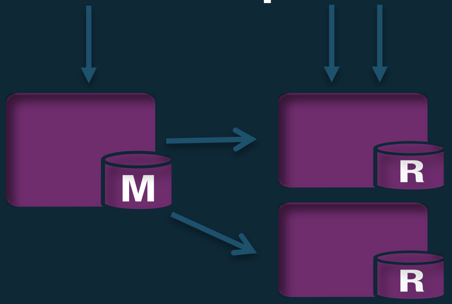
Multi-AZ



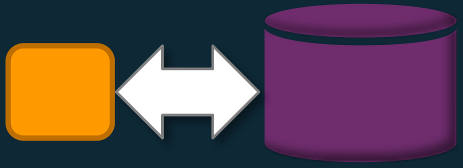
Push-Button Scaling



Read Replicas



Provisioned IOPS



Amazon RDS -- Aurora

Amazon Aurora is a MySQL-compatible relational database engine

- Built from the ground up to leverage AWS
- Speed and availability of high-end commercial databases
- Simplicity and cost-effectiveness of open source databases

Retains compatibility with MySQL 5.6

Up to 5x better performance than MySQL

At a price point 1/10 of a commercial database

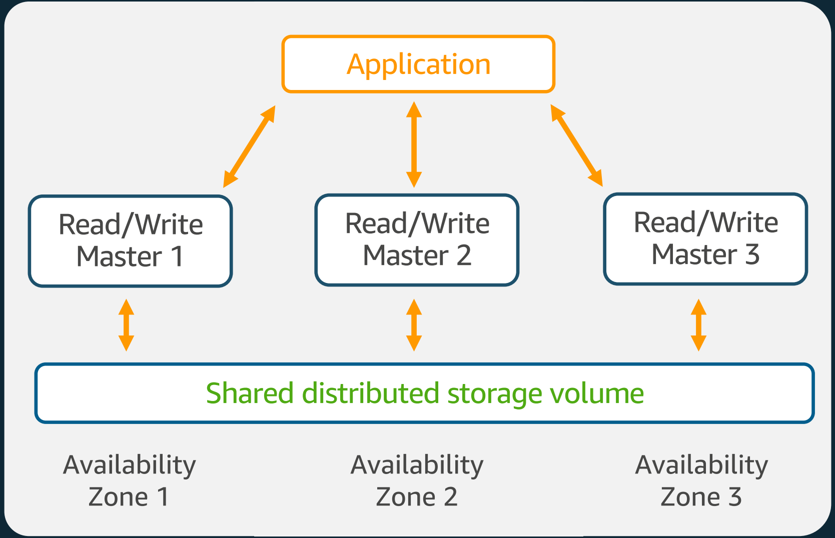
- Data is transparently replicated 6 ways among 3 Availability Zones
- Encryption at rest and in transit
- Add up to 15 Replicas

Compatibility with PostgreSQL

Aurora Multi-Master

First relational DB service with scale-out reads and writes, across multiple datacenters

Scale out both reads **and writes**



Zero application downtime from ANY instance failure

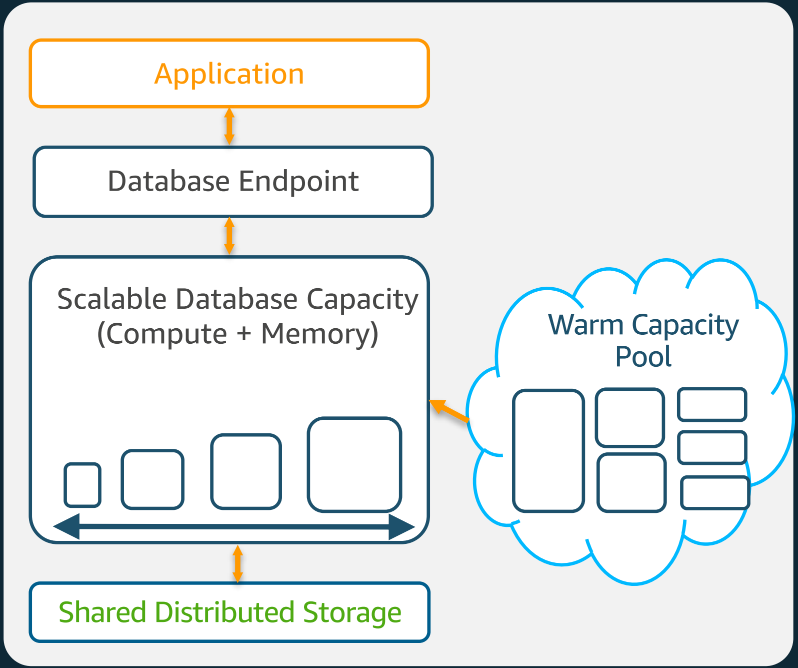
Zero application downtime from ANY AZ failure

Faster write performance and higher scale

Sign up for single-region multi-master preview today; multi-region multi-master **coming in 2019**

Aurora Serverless

On-demand, auto-scaling database for applications with variable workloads


Application
Database Endpoint
Scalable Database Capacity (Compute + Memory)
Warm Capacity Pool
Shared Distributed Storage

Starts up on demand, shuts down when not in use

Automatically scales with no instances to manage

Pay per second for the database capacity you use

Amazon Redshift

for as low as $934/TB per year

Petabyte scale

Massively parallel

Columnar Store

Relational data warehouse

Fully managed = no admin

Amazon Redshift

Fast and powerful, petabyte-scale data warehouse

- Fully managed Relational Database
- Highly-parallel
- Columnar Data Store

Data warehouse-type queries

- Aggregations, historical analysis
- BI Tool integration

Grow with your data

- 160 GB → 1.6 PB

SSD and SAS Options

- SSD provides 10-15x perf @ 5.5x the cost per TB/year

AWS DMS & AWS SCT

AWS Database Migration Service (DMS) easily and securely migrates and/or replicates your databases *and* data warehouses to AWS

AWS Schema Conversion Tool (SCT) converts your commercial database and data warehouse schemas to open-source engines, Amazon Aurora and Redshift. Converts and loads data warehouse data into Amazon Redshift

We have migrated over 103,000 unique databases. And counting…

Amazon DynamoDB

NoSQL Database

Seamless scalability

Zero admin

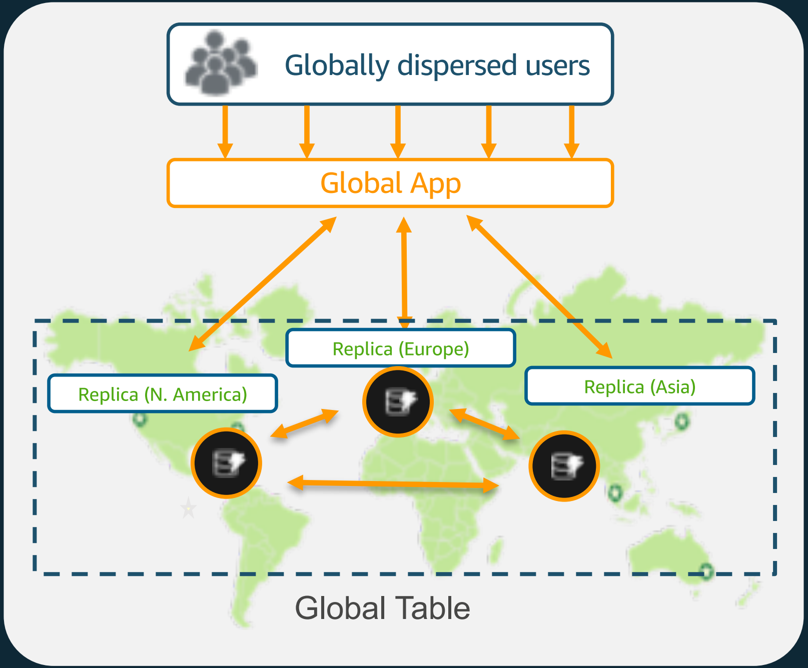
Single digit millisecond latency

Multi-Master

Multi-Region

DynamoDB Global Tables

First fully managed, multi-master, multi-region database



Build high performance, globally distributed applications

Low latency reads & writes to locally available tables

Disaster proof with multi-region redundancy

Easy to setup and no application re-writes required

NoSQL vs. SQL for a new app: how to choose?

Want simplest possible DB management?

Want app to manage DB integrity?

Amazon DynamoDB

Need joins, transactions, frequent table scans?

Want DB engine to manage DB integrity?

Team has SQL skills?

Amazon RDS

Amazon ElastiCache

Amazon
ElastiCache

In-memory cache in the cloud

Improve latency and throughput for read-heavy workloads

Supports open-source caching engines

- Memcached
- Redis

Fully managed

Multi-AZ

Examples

- Caching of MySQL database query results
- Caching of post-processing results
- Caching of user session & frequently accessed data

Amazon Neptune

Fully managed graph database for highly connected data

Amazon Neptune

Open

Supports Apache TinkerPop™ & W3C RDF graph models

Fast & Scalable

Store billions of relationships; query with millisecond latency

Reliable

6 replicas of your data across 3 AZs with full backup and restore

Easy

Build powerful queries easily with Gremlin and SPARQL
+
GRAPHQL with AppSync

It’s all about choice

Performance-oriented
Cost-oriented

Any Questions?