



aws INNOVATE

MODERN APPLICATIONS EDITION

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Build modern applications with purpose-built databases

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Amazon Web Services



Agenda

- Key requirements and evolution of modern applications
- The pursuit of the “ideal” database
- AWS purpose-built databases to deliver performance
- Demo
- Additional resources

Key Requirements of Modern Applications

REQUIRES MORE PERFORMANCE, SCALE, AND AVAILABILITY



Ecommerce



Streaming



Social media



Gaming



Shared economy

Users	1M+
Data volume	Terabytes–petabytes
Locality	Global
Performance	Microsecond latency
Request rate	Millions per second
Access	Mobile, IoT, devices
Scale	Virtually unlimited
Economics	Pay as you go
Developer access	Instance API access
Development	Apps and storage are decoupled

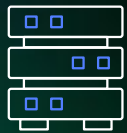
Modern Application Architecture Evolution

FROM MONOLITHIC TO MICROSERVICES WITH PURPOSE-BUILT DATABASES



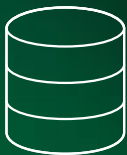
Web servers

Presentation layers



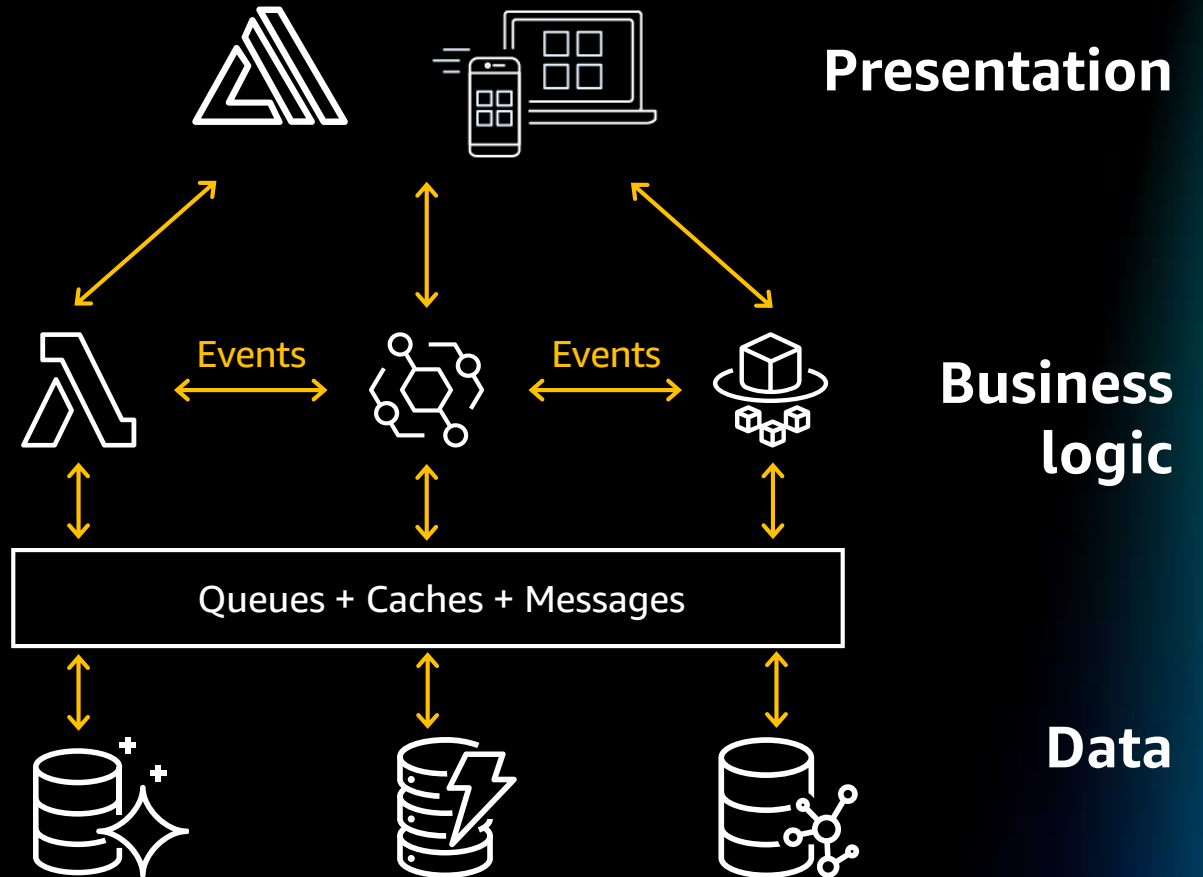
Application servers

Business logic



Database servers

Data layer



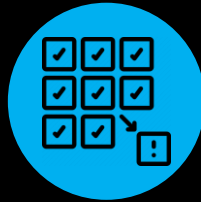
Benefits of Microservices



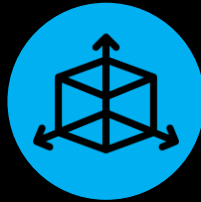
Continuous
Development
and
Deployment



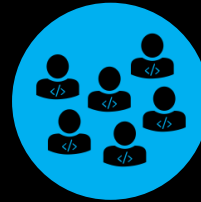
Better
Scalability



Improved
Fault
Isolation



Greater
Flexibility



Smaller
Development
Teams



Higher
Software
Testability



Improved
Maintainability

The pursuit of the “*ideal*” database

THE IDEAL DATABASE SHOULD DO EVERYTHING WELL

Innovation and agility

Supports **all storage**
(data types) and
all access patterns

Implements **ACID**
transactions and
strong consistency

Performance and scalability

Provides **limitless**
scalability and tolerate
load variability

Is **highly performant**
regardless of query
complexity

Cost-effective and easy to manage

Is **continuously**
available (no downtime)

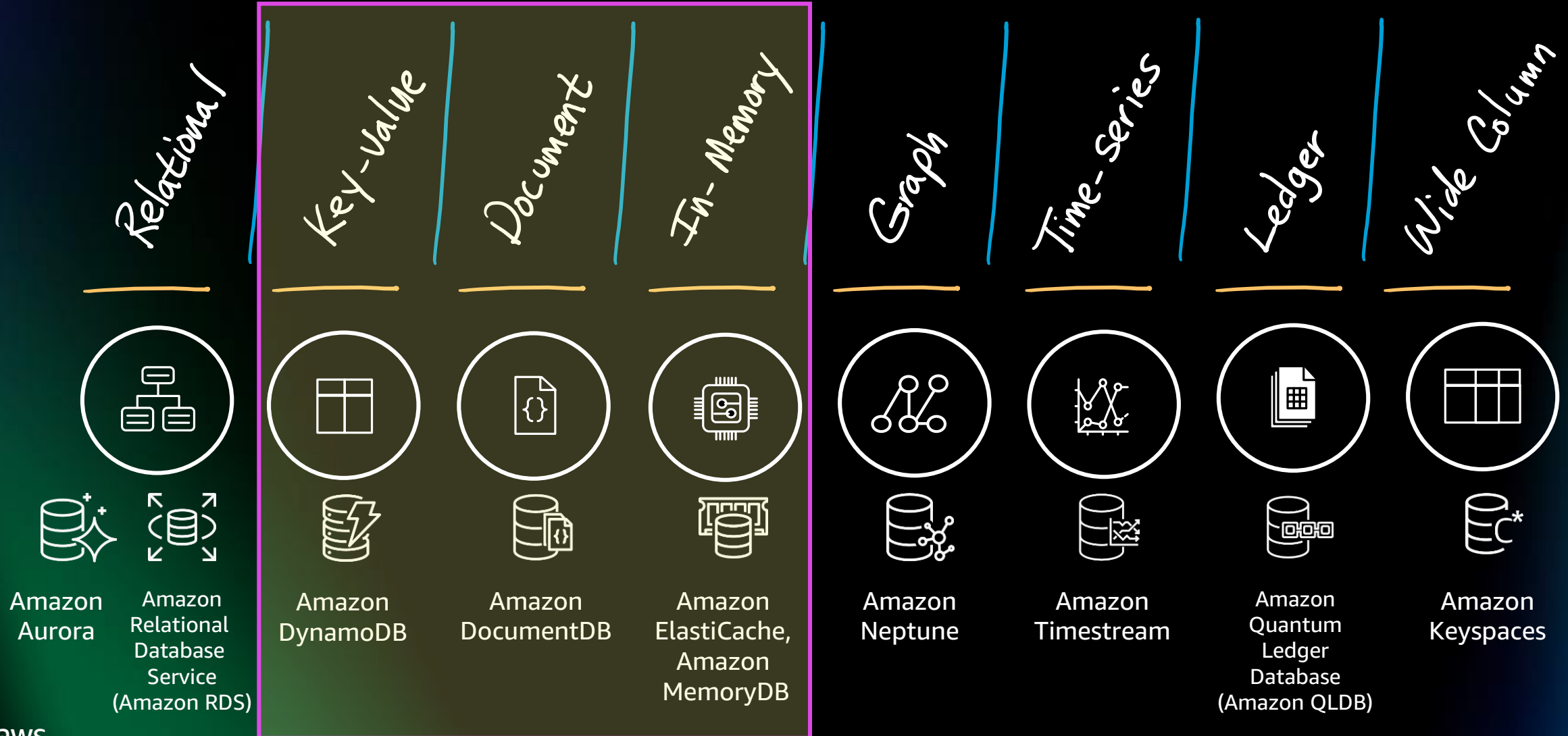
Is **simple and easy to**
use, tune, and maintain

Is **cost-effective**
and **predictable**

. . . and more!

AWS Purpose-Built databases

THE MOST COMPLETE FAMILY OF PURPOSE-BUILT DATABASES



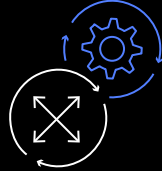
Amazon DynamoDB

A FAST AND FLEXIBLE KEY-VALUE DATABASE SERVICE FOR ANY SCALE



Performance at scale

- Delivers consistent, single-digit millisecond latency
- Handles millions of requests per second



No servers to manage

- Maintenance free
- Auto-scaling
- On-demand capacity mode
- Up to 99.999% SLA



Enterprise-ready

- ACID transactions
- Encryption at rest
- Continuous backups, on demand backup and restore
- Integration with other AWS services



Global tables

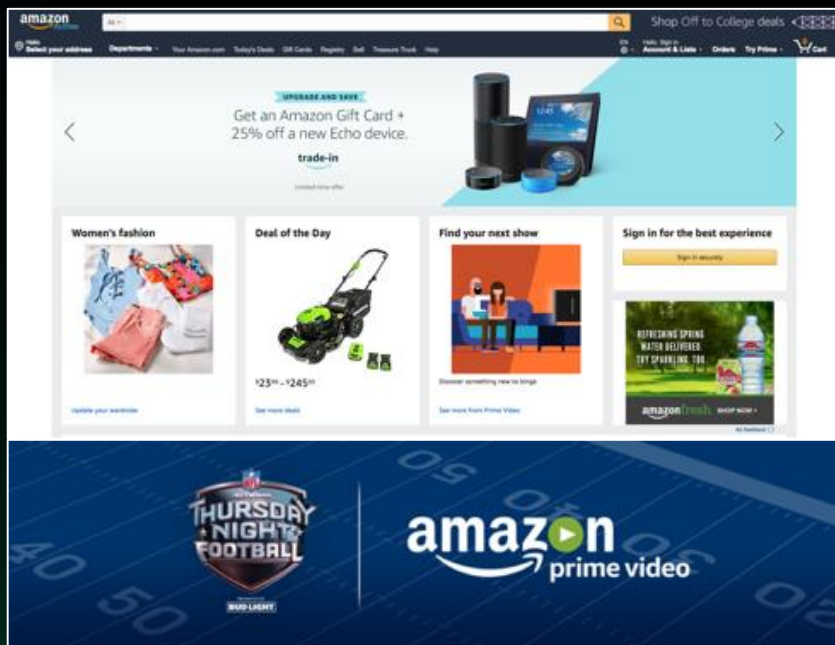
- Build global applications
- Get fast access to local data
- Automated global replication

Amazon DynamoDB is ideal for

Serverless and event-driven architectures

Globally resilient services

High-throughput workloads



Amazon DynamoDB supports multiple high-traffic sites and systems including Alexa, the Amazon.com sites, and 442 Amazon fulfillment centers. Across the **66-hour 2020 Prime Day**, these sources made **16.4 trillion calls to the DynamoDB API**, peaking at **80.1 million requests per second**.

<https://aws.amazon.com/blogs/aws/amazon-prime-day-2020-powered-by-aws/>

The internal Amazon.com Herd system supports 100s of millions of active workflows.

Migrated from Oracle to DynamoDB

- **Improved customer experience:** Workflow processing delays dropped from 1 second to 100 milliseconds
- **Reduced cost:** Scaling and maintenance effort dropped 10 times.
- **Reduced complexity and risk:** Retired more than 300 Oracle hosts

<https://aws.amazon.com/solutions/case-studies/herd/>

Amazon DocumentDB

FAST, SCALABLE, AND FULLY-MANAGED MONGODB-COMPATIBLE DATABASE SERVICE



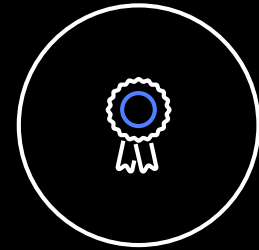
Fast and scalable

- Scale compute in minutes
- Storage and I/O autoscaling
- Storage scales to 64 TB
- Scale out to 15 replicas for millions of reads
- Globally distributed



Enterprise-ready

- Built-in high availability
- Backups enabled by default
- Durable by default
- Security best practices by default
- Automatic patching
- Monitoring and alerting



MongoDB-compatible

- Applications, drivers, and tools can be used with little or no change
- Supports hundreds of APIs, operators, and stages
- Continually working backward from customers to deliver the capabilities they need

Amazon DocumentDB is ideal for

- Content management
- Real-time big data
- User or product profiles

Why Performance Matters

ALL APPLICATIONS CAN USE MORE SPEED, MANY DEMAND IT



FAST: Memory is at least 200x faster than SSDs

PREDICTABLE: No disk seek time for memory

"A 100-millisecond delay in website load time can hurt conversion rates by 7 percent"

"A two-second delay in web page load time increases bounce rate by 103 percent"

Amazon ElastiCache

FULLY MANAGED SERVICE FOR REDIS AND MEMCACHED

Redis &
Memcached compatible



Fully compatible with
open source Redis
and Memcached

Extreme
performance



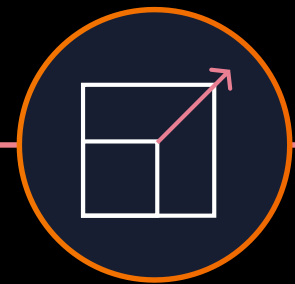
In-memory data store
and cache for microsecond
response times

Secure
and reliable



Network isolation, encryption
at rest/transit, HIPAA, PCI,
FedRAMP, multi AZ, global
datastore, and automatic
failover

Easily scales to
massive workloads



Scale reads and writes
with sharding
and replicas

Amazon MemoryDB for Redis

REDIS-COMPATIBLE, FULLY MANAGED AND DURABLE IN-MEMORY DATABASE SERVICE

Ultra-fast performance

Lowest latency database offered by AWS

Fully managed

AWS-managed hardware and software setup, configuration, monitoring, and snapshots

Security

Amazon VPC, encryption at rest and in transit, Access Control Lists (ACLs)

Redis compatibility

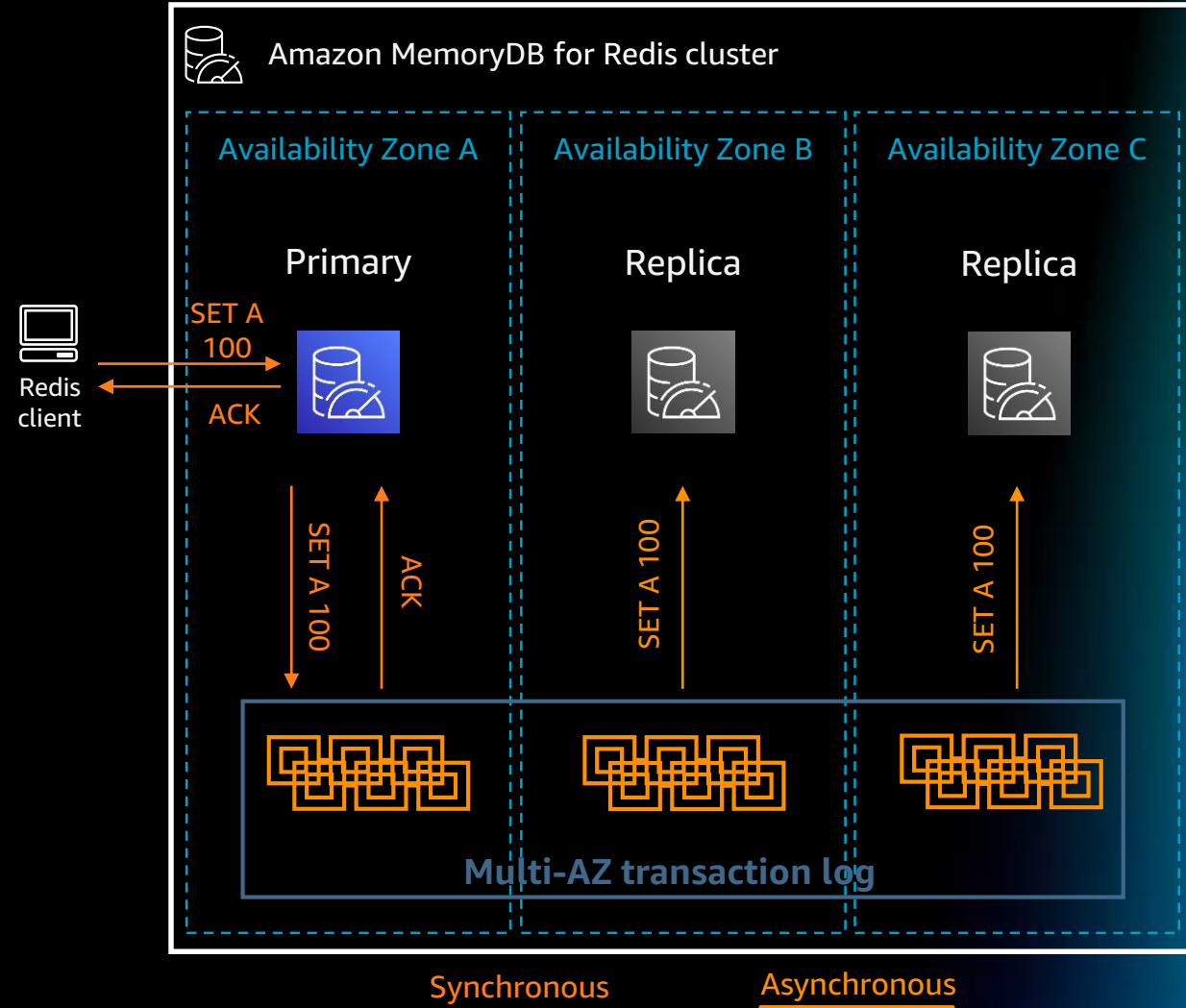
Flexible and friendly Redis APIs and data structures

High scalability

Up to 500 nodes and 128 TiB of in-memory storage per cluster (with 1 replica per shard)

Durability and high availability

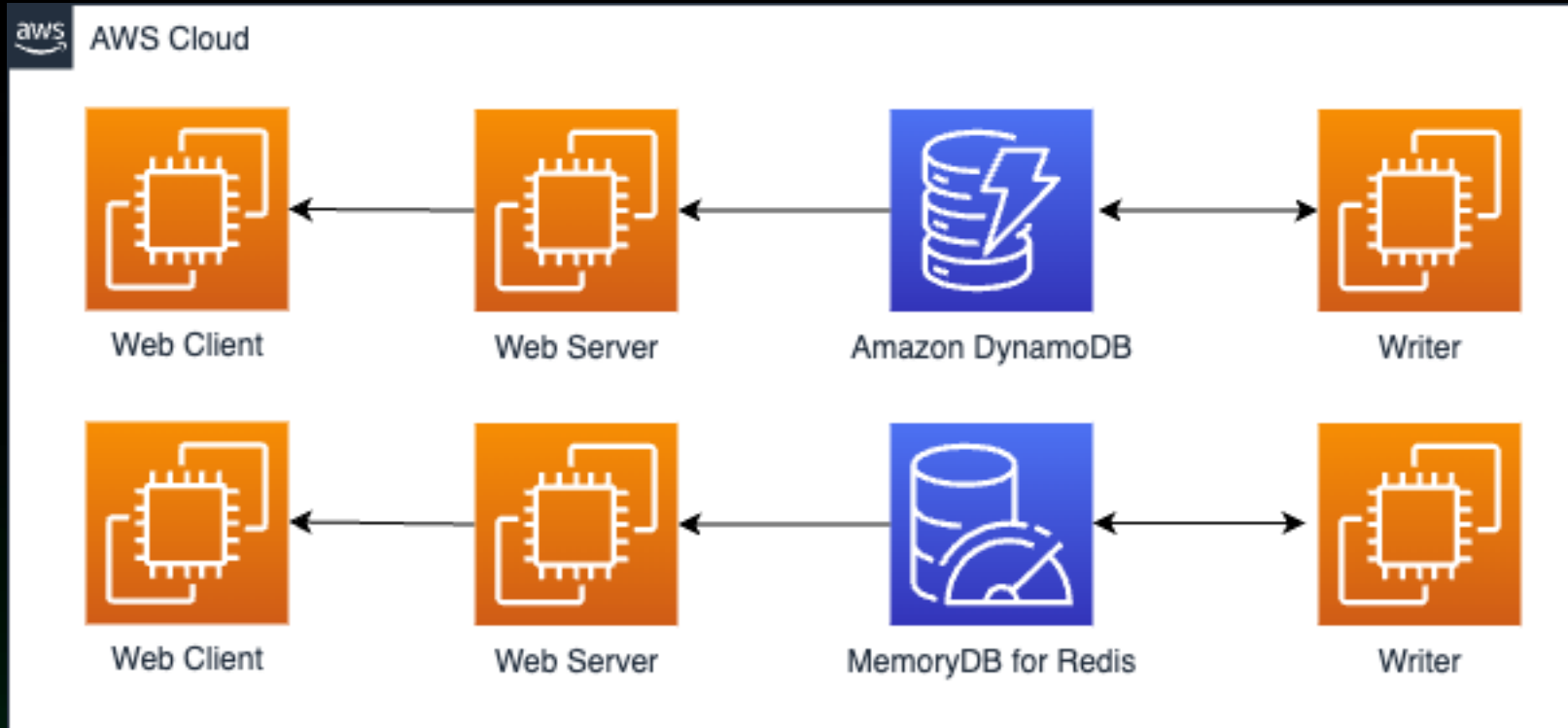
Multi-AZ transactional log for durability and replicas for high availability



Demo



Demo Scenarios



- Amazon EC2 instance simulates many producers writing into system of record
- ApacheBench web client simulates many consumers reading from system of record via EC2 web server

Additional Resources

- Learn more at aws.amazon.com/products/databases/learn
- Amazon DynamoDB Hands-on Labs: <https://amazon-dynamodb-labs.workshop.aws/hands-on-labs.html>
- Amazon DocumentDB Workshop: <https://catalog.us-east-1.prod.workshops.aws/workshops/464d6c17-9faa-4fef-ac9f-dd49610174d3/en-US>
- Build a real-time leaderboard with Amazon Aurora Serverless and Amazon ElastiCache: <https://aws.amazon.com/getting-started/hands-on/real-time-leaderboard-amazon-aurora-serverless-elasticache/>

Visit the Modern Applications resource hub

Dive deeper with these resources to help you develop an effective plan for your modernization journey.

- Build modern applications on AWS
- Business value of cloud modernization
- An introduction to event-driven architectures
- Accelerate full-stack web and mobile app development
- Determining the total cost of ownership: Comparing serverless and server-based technologies
- Building event-driven architectures with AWS
- Continuous learning, continuous modernization



<https://tinyurl.com/modern-apps-aws>

Visit resource hub

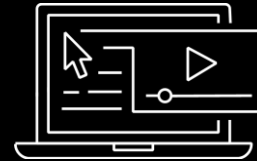


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Create a self-paced learning roadmap
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Thank you!