

# How to Migrate to Amazon ElastiCache

Jim Gallagher – ElastiCache Specialist Solutions Architect  
[jimgall@amazon.com](mailto:jimgall@amazon.com)

May 26<sup>th</sup>, 2021

# Agenda

- Overview
- Drivers for Moving to ElastiCache
- Migration Considerations
- Approach 1: Backup/Restore
- Approach 2: Online Migration Tool
- Customer Stories
- Tips & Additional Resources

# ElastiCache Overview

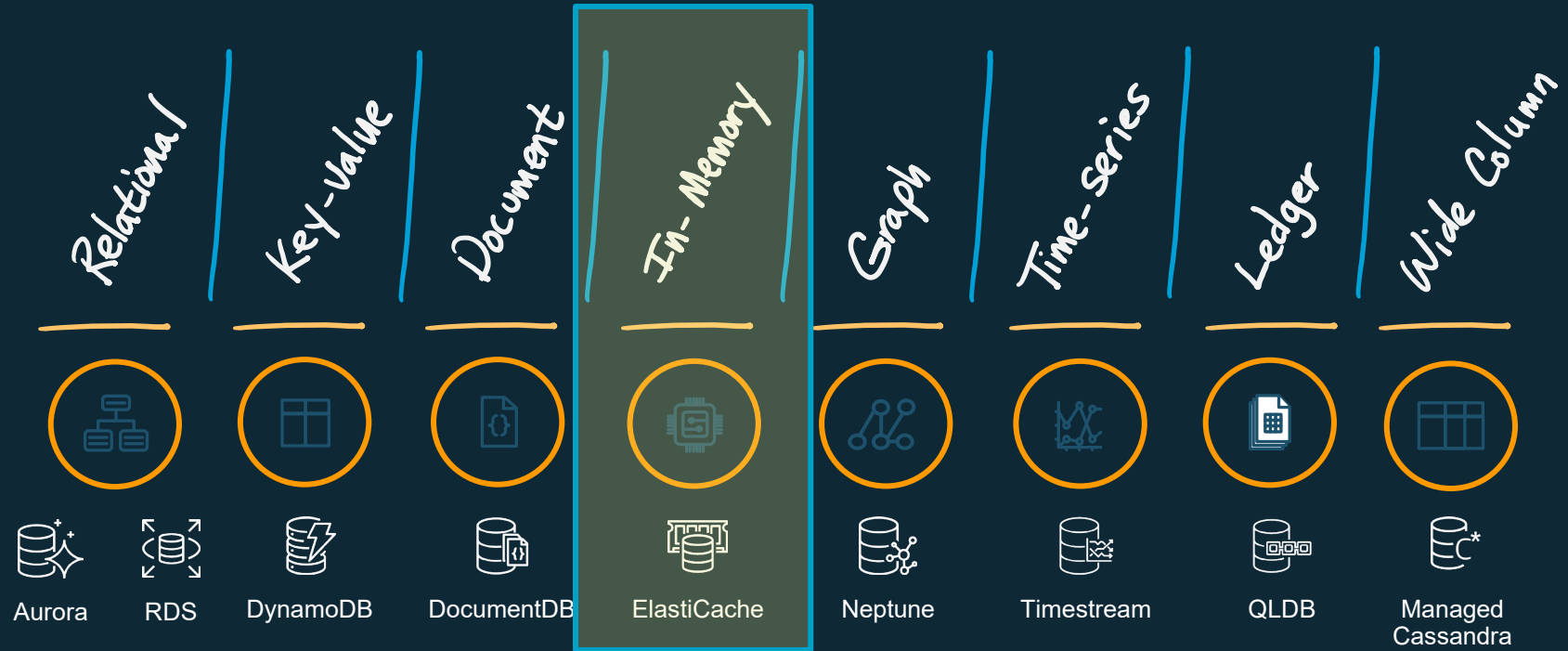
# Modern real-time applications require

## Performance, Scale, & Availability



Users	1M+
Data volume	Terabytes—petabytes
Locality	Global
Performance	Microsecond latency
Request rate	Millions per second
Access	Mobile, IoT, devices
Scale	Up-out-in
Economics	Pay-as-you-go
Developer access	Open API

# Purpose-built databases



# Amazon ElastiCache – Fully Managed Service

Redis &  
Memcached compatible



Fully compatible with  
open source Redis  
and Memcached

Extreme  
performance



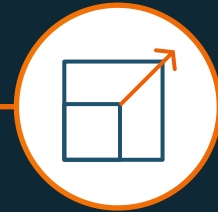
In-memory data store  
and cache for microsecond  
response times

Secure  
and reliable



Network isolation, encryption  
at rest/transit, HIPAA  
eligible, PCI compliant,  
FedRAMP authorized, multi  
AZ, and automatic failover

Easily scales to  
massive workloads



Scale writes and  
reads with sharding  
and replicas

# Redis #1 in-memory data store, most loved database



Rank			DBMS	Database Model	Score		
Mar 2020	Feb 2020	Mar 2019			Mar 2020	Feb 2020	Mar 2019
1.	1.	1.	Redis +	Key-value, Multi-model ⓘ	147.58	-3.84	+1.46
2.	2.	2.	Amazon DynamoDB +	Multi-model ⓘ	62.51	+0.38	+8.02
3.	3.	↑ 4.	Microsoft Azure Cosmos DB +	Multi-model ⓘ	31.63	-0.32	+6.81
4.	4.	↓ 3.	Memcached	Key-value	24.80	-0.50	-3.93
5.	5.	5.	Hazelcast +	Key-value, Multi-model ⓘ	9.07	+0.79	+1.05
6.	↑ 7.	6.	Aerospike + ⓘ	Key-value, Multi-model ⓘ	7.19	+0.32	+0.46

\* <https://db-engines.com/en/ranking/key-value+store>

Developers love it because:

1. Blazing fast
2. Versatile
3. Feature rich and easy to use



# Drivers for Moving to ElastiCache



# Drivers for Migrating to Amazon ElastiCache



Difficult  
to manage

---

Manage server provisioning,  
software patching, setup,  
configuration, and backups



Hard to make  
highly available

---

Need to implement  
fast error detection  
and remediation



Difficult  
to scale

---

Online scaling can be error  
prone, replication  
performance needs  
to be monitored



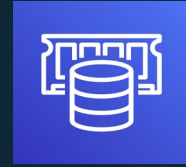
Expensive

---

Invest in people, processes,  
hardware, and software

# Amazon ElastiCache for Redis

Fully-managed, Redis compatible, in-memory data store in the cloud



## Extreme Performance

In-memory data store and cache for microsecond response times

## Fully Managed

AWS manages all hardware and software setup, configuration, monitoring

## Easily Scalable

Read scaling with replicas  
Write and memory scaling with sharding  
Non disruptive scaling

## Reliable

Multi-AZ  
Deep monitoring  
Automatic failover

## Secure & Compliant

Amazon VPC  
HIPAA, PCI, FedRAMP  
Encryption at-rest and in-transit  
Authentication

## Redis Compatible

Redis 6 Support  
Redis clients compatible

# Recent ElastiCache for Redis Enhancements

## Global Datastore

---

Provides fully managed, fast, reliable and secure cross-region replication

## Online Resharding

---

Scales your ElastiCache for Redis dynamically with no downtime

## AWS Nitro

---

Optimizes Amazon Linux OS configuration to maximize network performance

## Enhanced I/O

---

Transparently delivers up to 83% increase in throughput and up to 47% reduction in latency per node

# Migration Considerations



# Migration Considerations

- Data Classification
- Online vs Offline
- Cutover Strategy
- ElastiCache Cluster Topologies / Sizing
- Cleanup

# Redis Cluster Mode – Enabled vs. Disabled

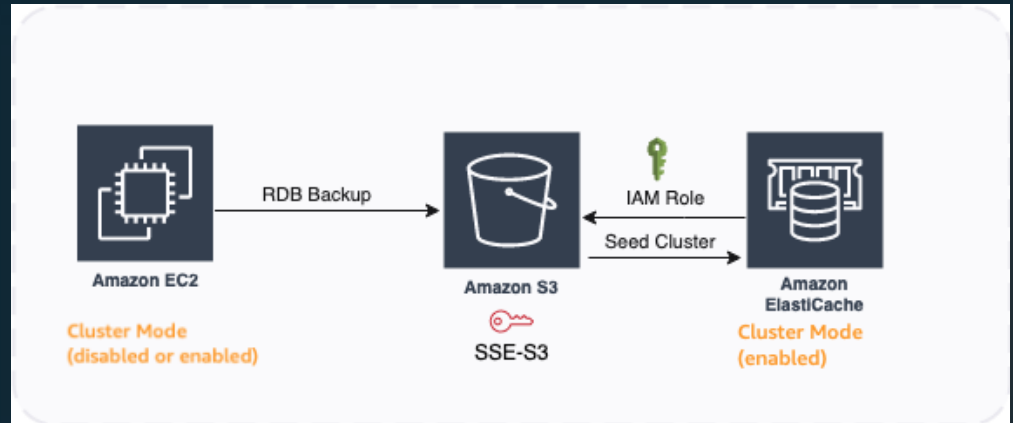
Feature	Redis Cluster (enabled)	Redis Cluster (disabled)
Recovery Time	10-20 sec (non-DNS)	~30+ sec (DNS)
Failover Impact	Writes affected on failed shard. Reads available	Writes affected on entire data set. Reads available
Node Scale	Up to 500 nodes 0-5 replicas per shard	1 primary 0-5 replicas (max. 6 nodes)
Storage	340 TB (635 GB x 500)	635 GB
Max Connections	32.5 million (65,000 x 500)	390,000 (65,000 x 6)
Migration Path	Backup/Restore Snapshot	Online Migration Tool
Scalability and Performance	<ul style="list-style-type: none"> <li>Achieve greater throughput through horizontal scaling</li> <li>Horizontal/Vertical scaling Supported</li> </ul>	<ul style="list-style-type: none"> <li>Throughput limited by 1 primary, 5 replicas</li> <li>Horizontal Scale for Reads (Replicas) supported</li> <li>Vertical scaling for Replicas/Primary also supported</li> </ul>
Scaling Operation	Cluster Resizing (zero-downtime) <ul style="list-style-type: none"> <li>Horizontal Scaling to add/remove shards</li> <li>Read Scalability to add/remove replicas</li> </ul>	<ul style="list-style-type: none"> <li>Vertical Scaling</li> <li>Writes/Reads continue during scale up/down operation</li> </ul>

# Migration Approach 1: Backup & Restore



# Migrate using Backup/Restore

1. Create a Redis Backup
2. Create an Amazon S3 Bucket and Folder
3. Upload Your Backup to Amazon S3
4. Grant ElastiCache Read Access to the .RDB File
5. Seed the ElastiCache Cluster with the .RDB File Data



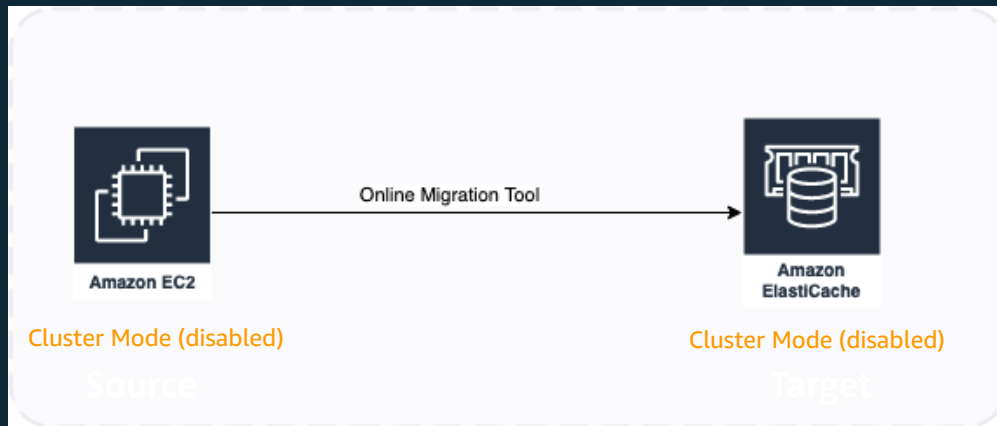


# Backup & Restore Demo

# Migration Approach 2: Online Migration Tool



# Migrate using the Online Migration tool



## Overview:

- Replicates data in real-time
- Monitors health during and after migration
- Allows customer to decide when to cutover to the migrated cluster

# Online Migration Prerequisites - Cluster Settings

	Redis on EC2 (Source)	ElastiCache for Redis (Target)
Cluster Mode	Disabled	Disabled
Redis Version	2.8.21+	5.0.5+
Encryption In Transit	Unsupported	Disabled
Encryption At Rest	N/A	Disabled
Multi-AZ w/ Auto Failover	N/A	Enabled
Redis AUTH	Disabled	Configurable
protected-mode	Set to 'no'	N/A
bind config	Allow from ElastiCache Nodes	N/A
Number of Logical DBs	Same as Target	Same as Source
Renamed Commands	Disabled	Configurable

# Online Migration Tool Demo

# Additional Resources



# Customer Stories



# Additional Resources

- [AWS ElastiCache Migration Guide & Labs](#)
- [Sizing Guide](#)
- Documentation Links [\[1\]](#) [\[2\]](#)
- Customer References [\[1\]](#) [\[2\]](#) [\[3\]](#)
- Open Source Tools



# Thank You!

[jimgall@amazon.com](mailto:jimgall@amazon.com)