DAT213

How Fidelity Investments and Reltio modernized with Amazon DynamoDB

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"CIOs say that 80% of developers' time is spent on the operations and maintenance of applications and only 20% of the time is actually spent on innovation"

Source: Deloitte

This impacts the **business**

Long release cycles
for new products
and features

Operational
inefficiencies resulting
in overhead costs

**Lost revenue due to
missed opportunity, loss
of competitive edge**

**Lost productivity or
high costs for
undifferentiated skills**

The Amazon NoSQL journey

2004:
Database scalability challenges

2007:
Dynamo paper published

2012:
DynamoDB general availability

2016:
DynamoDB leader in Gartner MQ, Forrester Wave
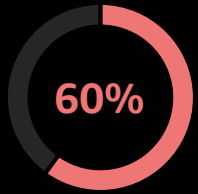
Today:
Tier 0 service powering most of Amazon
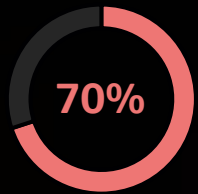
Migrating Amazon's consumer business

Project Rolling Stone:

7,500 databases migrated

40% Reduction in latency

60% Reduction in costs

70% Reduction in overhead

Modern application architecture

From traditional . . .   . . . to microservices, decoupled architectures

Web servers
Presentation layers

Application servers
Business logic

Database servers
Data layer

Presentation

AWS Lambda   Events   Amazon EventBridge   Events   AWS Fargate

Business logic

Queues + Caches + Messages
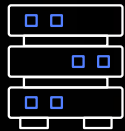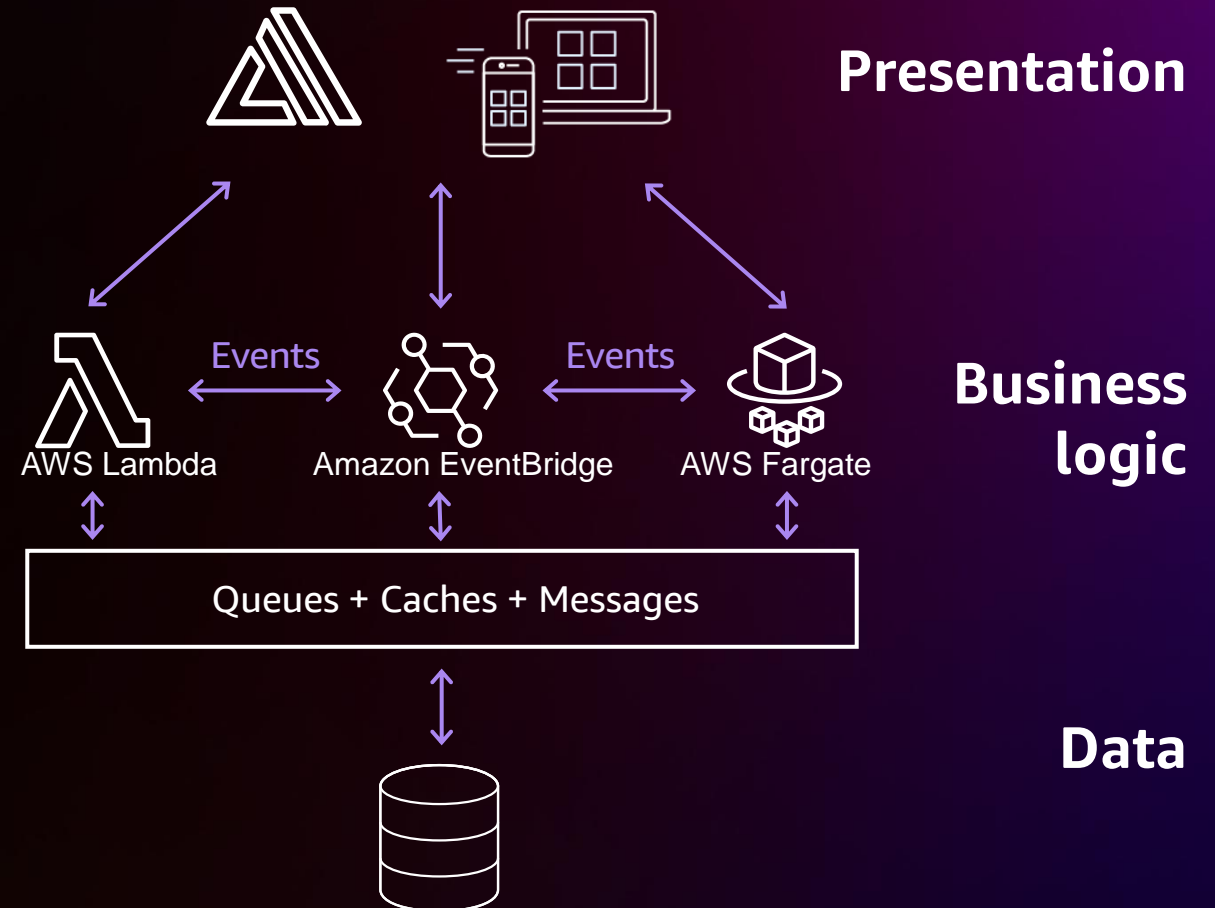
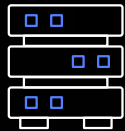**Data**

Modern data architecture

From traditional . . .

. . . to microservices, decoupled architectures

Web servers
Presentation layers

Application servers
Business logic

Database servers
Data layer

Presentation

AWS Lambda — Events — Amazon EventBridge — Events — AWS Fargate

Business logic

Queues + Caches + Messages

Data

Amazon Aurora

Amazon DocumentDB

Amazon DynamoDB

Amazon Keyspaces

Amazon Neptune
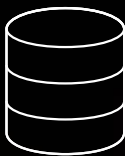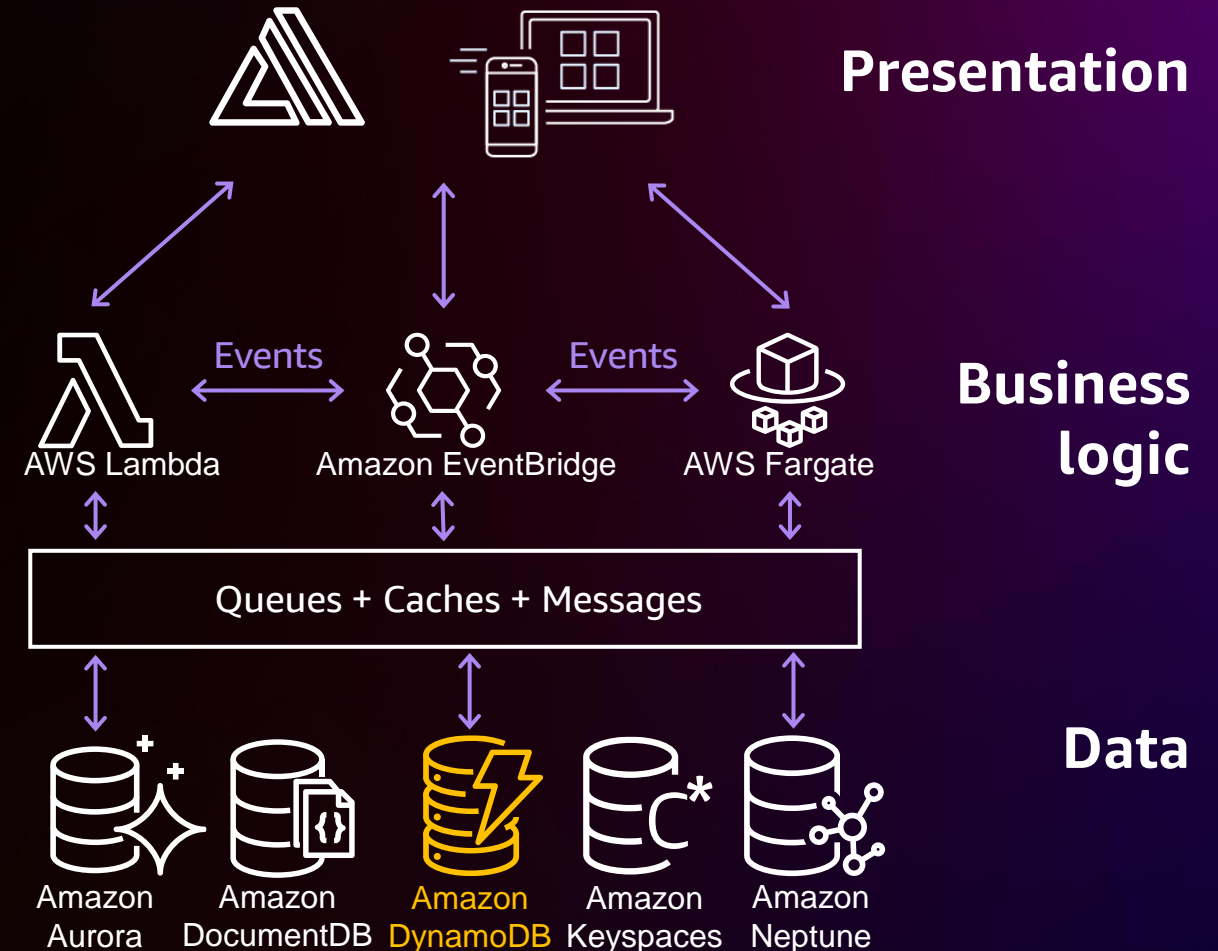
The DynamoDB experience by Fidelity Investments

Dennis Healy

Director of Software Engineering,
Fidelity Investments

Fidelity Order Management Systems (OMS)

Why did we do this?

Multi-region / hot-hot

Multi-availability zone

Keep latencies low

Scale up/down to meet market conditions

Architecture

Order Routing running EKS

➢ Multi-region / hot-hot

➢ Multi-Availability Zone

➢ DynamoDB

➢ Multi-region/global tables
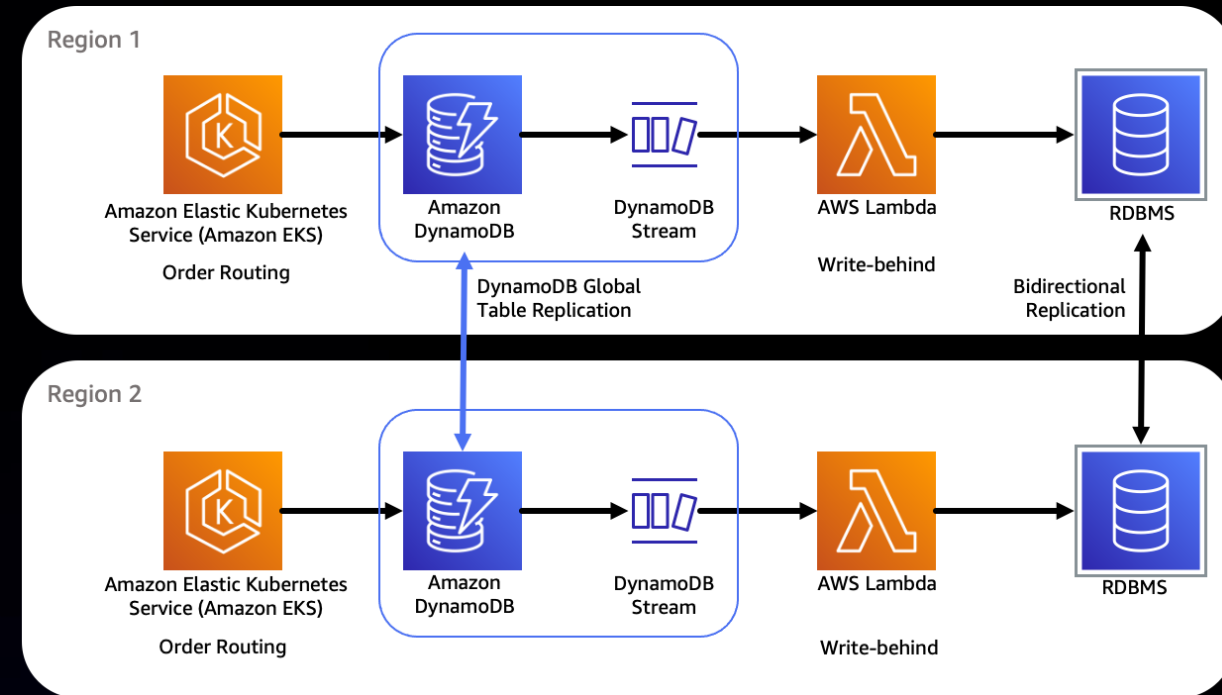
What did we accomplish?

1 POC up and running in 3 days

2 We were able to PERF test at 10x previous rates

3 We slid DynamoDB in between the EKS apps and RDBMS

4 We went live with 6 months (mostly due to internal provisioning)

Why do we continue to write-behind to RDBMS?

1   This allowed us to see immediate impact on order flow

2   We could migrate more functionality to DynamoDB over time

3   We kept the GUI and reports on RDBMS

Lessons learned

1 Take advantage of TTL

2 Structure tables to support GSIs

3 OK for data to be redundant

4 Some extra latency (ms) is worth it

5 Leverage Lambdas for async processing

6 Because of the double replication we had to filter at the Lambda level

Fueling data-driven transformations with Reltio

Manish Sood
CEO, Founder & Chairman, Reltio

Reltio overview

FOUNDED
2011

CEO/ FOUNDER/CHAIRMAN
Manish Sood

EMPLOYEES
450+ worldwide

LOCATIONS
Redwood City, Bangalore, Lisbon

INVESTORS
NewView Capital, Sapphire Ventures, Crosslink Capital, .406
Ventures, Brighton Park Capital

INDUSTRIES
Financial Services, Insurance, Life Sciences, Healthcare, Retail,
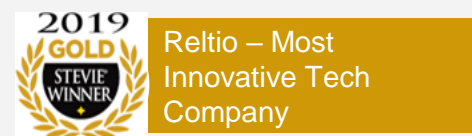CPG, High-Tech, Travel & Hospitality

GROWTH
6 years on INC. 5000 company with 138% revenue growth

RECOGNIZED AS AN INNOVATIVE LEADER

FORRESTER® WAVE LEADER 2021 — Master Data Management

500™ Technology Fast 500 2020 NORTH AMERICA Deloitte.

The CLOUD Awards — WINNER 2020-21

Inc. 5000 LIST 2020

CALIFORNIA Inc. 5000 SERIES

VENTANA RESEARCH — 13th and 14th Annual Digital Innovation AWARD WINNER

Corporate Content Awards North America 2020

TSR The Software Report — Top 25 Data Software Companies 2022

2019 GOLD STEVIE WINNER — Reltio – Most Innovative Tech Company

The world's top brands run on Reltio

2 top healthcare services companies

9 of top 10 global pharmaceutical companies

3 global luxury goods companies

2 top hospitality brands

Fulton Bank
AstraZeneca
Fidelity INVESTMENTS
equinor
GE Healthcare
PennyMac®

McDonald's
CARMAX
beazley
xerox
Takeda
Mallinckrodt

L'ORÉAL
D•N Dodge Construction Network™
SUN PHARMA
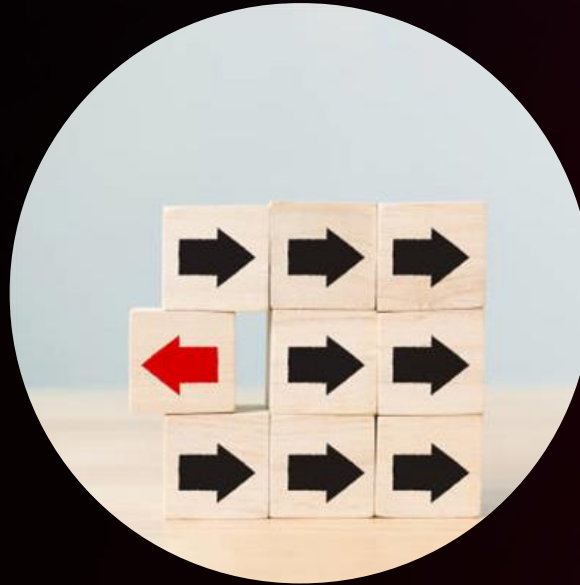petco
KOHLER

Empire Life
CLARIO.
SANOFI
RedHill Biopharma
janssen

RELTIO

Organizations are navigating great complexity today

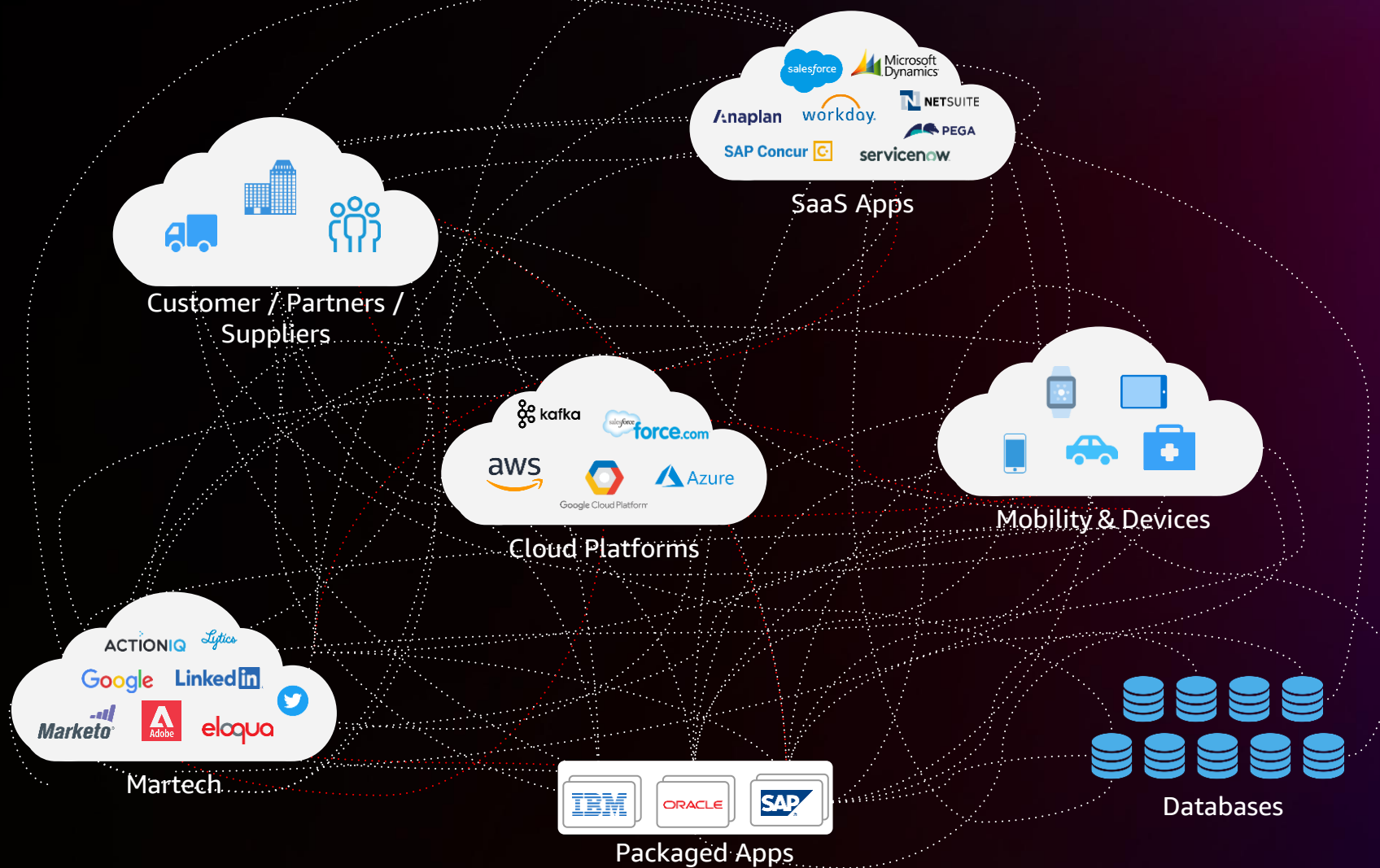

Every company is becoming digital-first

Innovate, or be disrupted

The speed of business is increasing

RELTIO

Data is highly siloed and fragmented

Fueling data-driven transformation across industries

COLLECT DATA
from disparate sources

UNIFY DATA
for high-value Data Domains

ACTIVATE DATA
for key Customer Initiatives

CRM

ERP

Marketing

Data Lake

First-Party Data

D&B

TransUnion

BvD

Acxiom

Third-Party Data

RELTIO

Person   Organization   Supplier

Product   Asset   Location

Data API

360 View

MultiDomain MDM

Reltio Universal ID

Omnichannel Engagement

Digital Self-Service

Fraud Detection

Customer Centricity and Targeted Marketing

Intelligent Process Automation

Privacy and Consent Adherence

Sales Effectiveness

M&A Integration and Partner Collaboration

Auditing and Compliance Reporting

Growth

Efficiency

Risk & Compliance

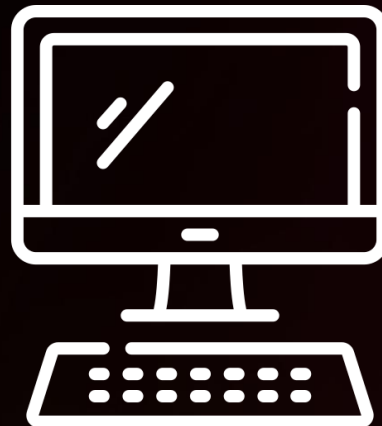# Our Journey from cloud-agnostic to cloud-specific

Customer Journey

- Customers feel friction and capacity constraints, desire "instant" capacity

- Tier 0 reliability, but underlying DB does not support it

Technology Journey

- Limited scale up, extremely hard to scale down

- Complex maintenance

- Error prone provisioning

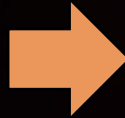- Speed of turnaround does not match demand

FinOps Journey

- Large percent of COGS is related to storage and query

- Difficult to predict per customer by usage

aws

RELTIO

Move to modern, fully-managed DB

Cassandra Data Storage:

- Limited capability to scale

- Extremely hard to scale down

- Requires complex maintenance

- Error prone provisioning

Amazon DynamoDB

- OOTB 99,999 DB availability SLA

- Automated real-time autoscaling

- OOTB multiregional resilience

- Simple provisioning and maintenance

RELTIO

Reltio Shield with DynamoDB

Reltio Shield

- Supports Data at Rest Encryption of Primary & Match Data in DynamoDB with CMK

- Customers can create & manage the encryption keys to encrypt their Reltio tenant(s), within their own AWS KMS account

New with Shield for DynamoDB

- Supports **Bring Your Own Key** policy with customer owned AWS KMS

- Automated policy creation and encryption process

- Key operations log and audit

- OOTB key rotation policy

aws

RELTIO

Amazon DynamoDB: Scaling with Reltio

Reltio's global scale

40b	8.3b	5.5b	140+
Total API calls per year	Consolidated profiles under management	Relationships under management	Countries with Reltio users

DynamoDB @ Reltio

67 TiB	86m	11.2m	5.3m	900k
DynamoDB data under management at Reltio	Average read/day	Average writes/day	Peak reads per hour	Peak writes per hour

RELTIO

Lessons learned:

What went well

- Zero customer effect

- Fully scalable and cost-transparent infrastructure

- Major old legacy data cleanup while migrating

- AWS team proved that our migration design is the best solution

- Unlocks future infrastructure and cost model optimization

https://aws.amazon.com/blogs/database/why-reltio-chose-an-all-in-migration-to-amazon-dynamodb/

Challenges

- Some tenants migration delay

- Legacy data issues greater than expected

- Cost savings dependencies

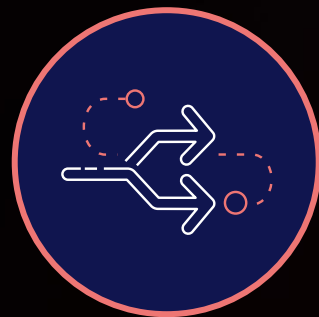- Q1 changes in the world required planning adjustments

RELTIO

In conclusion . . .

Customers modernize to . . .
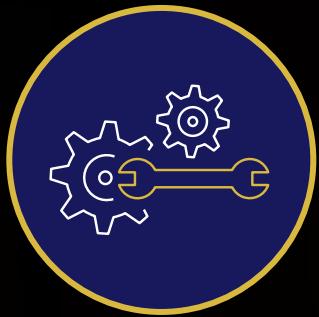
Increase **developer efficiency** by using the right tool for the right job

Start small and **scale** up seamlessly, meet **performance** requirements without rearchitecting apps

Optimize for specific **data models** and access patterns based on use case

Lower total cost of ownership with **managed database services**

AWS "Start Anywhere" modernization journey

BOTH ORGANIZATIONALLY AND TECHNOLOGICALLY

Manage less to innovate more: Move relational workloads to managed DB services

Amazon Aurora, Amazon RDS

Improve: agility, ease of management, cost efficiency

Improve user experience: Implement caching and offload in-memory workloads

Amazon ElastiCache, Amazon MemoryDB

Improve: scalability and performance

Make innovation easier: Move nonrelational query patterns to NoSQL

Amazon DynamoDB, Amazon DocumentDB, Amazon Keyspaces

Improve: agility, innovation, scalability, performance, ease of management, cost efficiency

Innovate and differentiate: Move specialized datasets to specialized databases

Amazon Neptune, Amazon Timestream, Amazon QLDB

Improve: agility, innovation, scalability, performance, ease of management, cost efficiency

Thank you!

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