

AWS re:Invent

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DAT212

How ADP & Twilio realize business vision with purpose-built databases

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Twilio

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Distinguished Engineer
Automatic Data Processing



Agenda

Why choose a purpose-built database approach

How Twilio promote customer trust with a modern data strategy

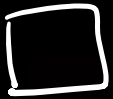
How ADP unlock data value and realize business growth

Why a **purpose-built** database approach?



App architectures & patterns have evolved

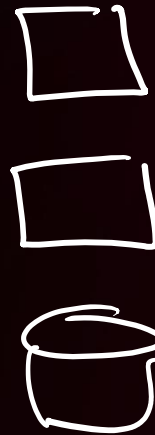
Mainframe



Client Server



Three tier



Microservices

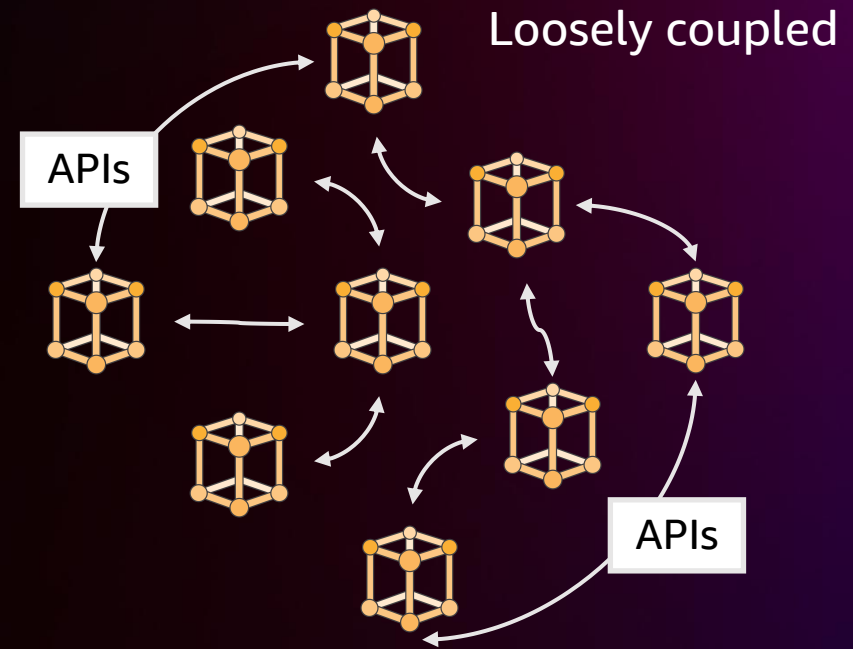
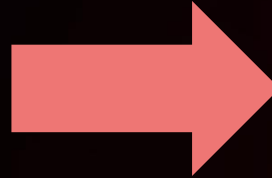
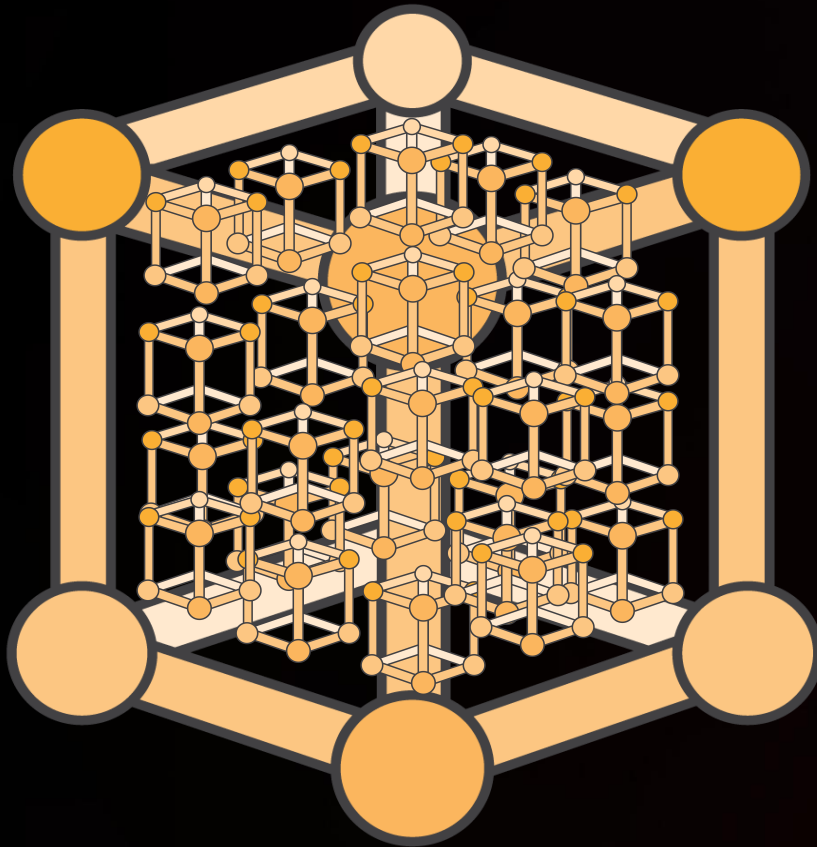


Characteristics of modern applications



Users	One million plus
Data volume	TB to PB to EB
Locality	Global
Performance	Milliseconds to microseconds
Request rate	Millions
Access	Mobile, IoT, devices
Scale	Up-down, out-in
Economics	Pay as you go
Developer access	Instant API access

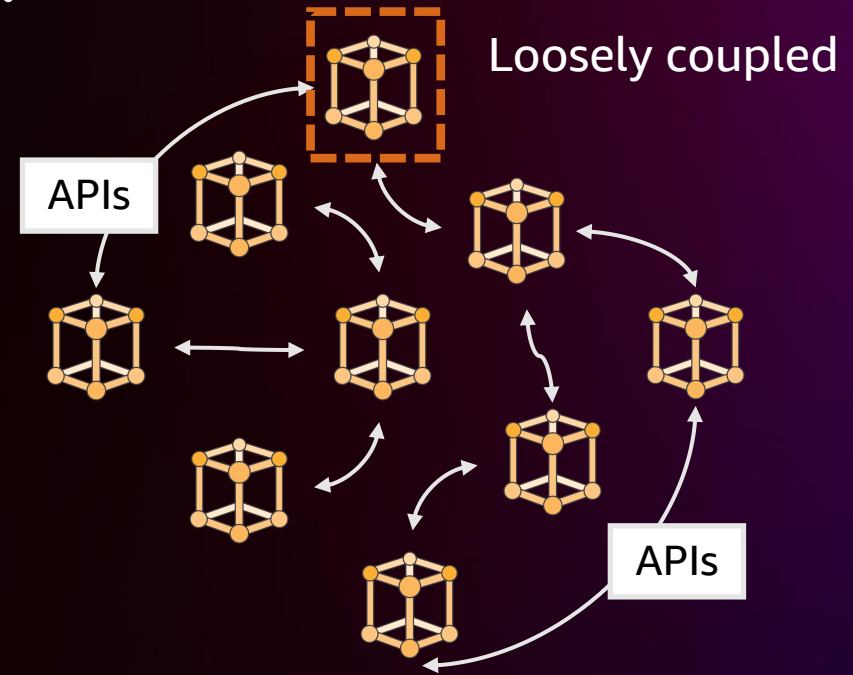
From monolithic to microservices architectures



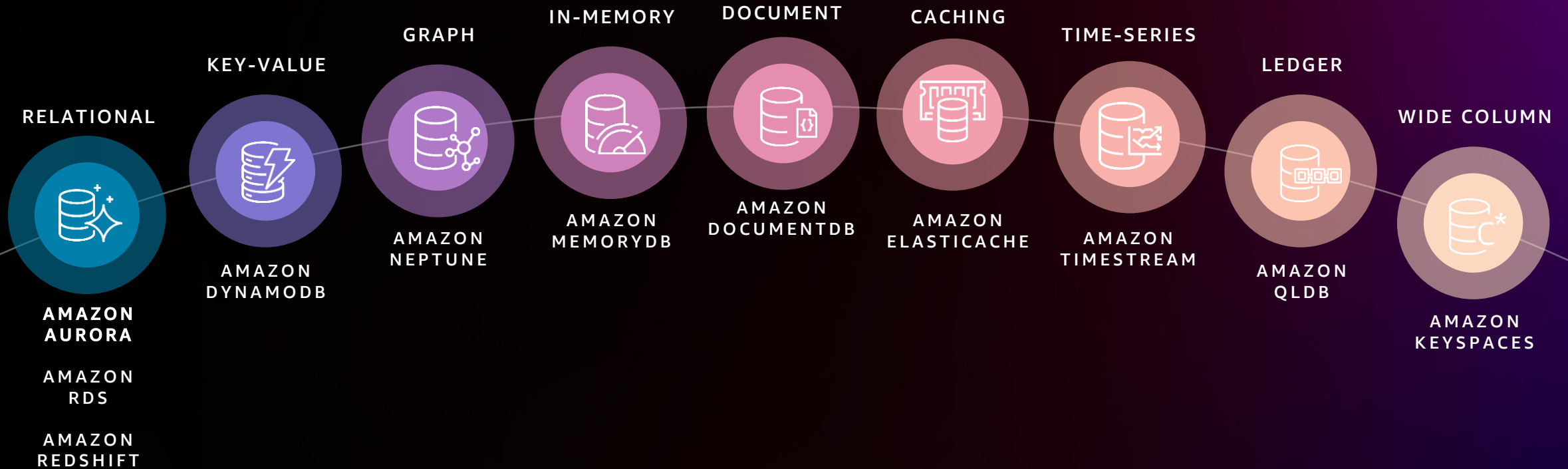
Why choose a purpose-built database approach?

Each service has its own requirements:

- Scalability
- High Availability
- Security
- Performance



Broadest portfolio of purpose-built databases



Agenda

Why choose a purpose-built database approach

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What is Twilio?



- Twilio Customer Engagement Platform
 - Help businesses build direct, personalized relationships with their customers.
- CPaaS at global, enterprise scale
 - Twilio Super Network provides unrivaled global reliability
 - Advanced compliance management to support changing ecosystem regulations
- Twilio Segment CDP
- Twilio Engage Marketing Platform

180+
Countries
reached

144B+
Messages
sent
LTM

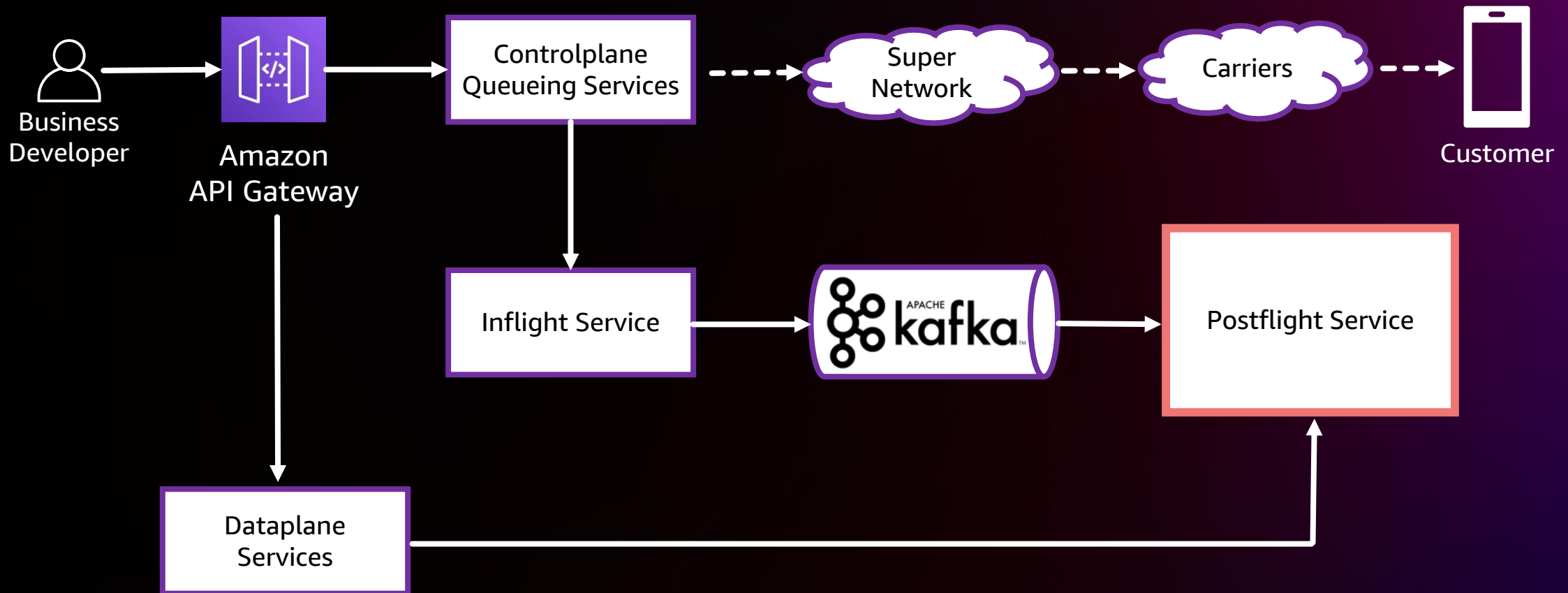
54B+
Voice
minutes per
year

127B+
Emails sent
monthly

200+
Technology
Partners

280K+
Twilio
customer
accounts

What is Messaging Postflight?





Messaging Postflight responsibilities



Long-term storage and retrieval of message logs



Diverse query patterns

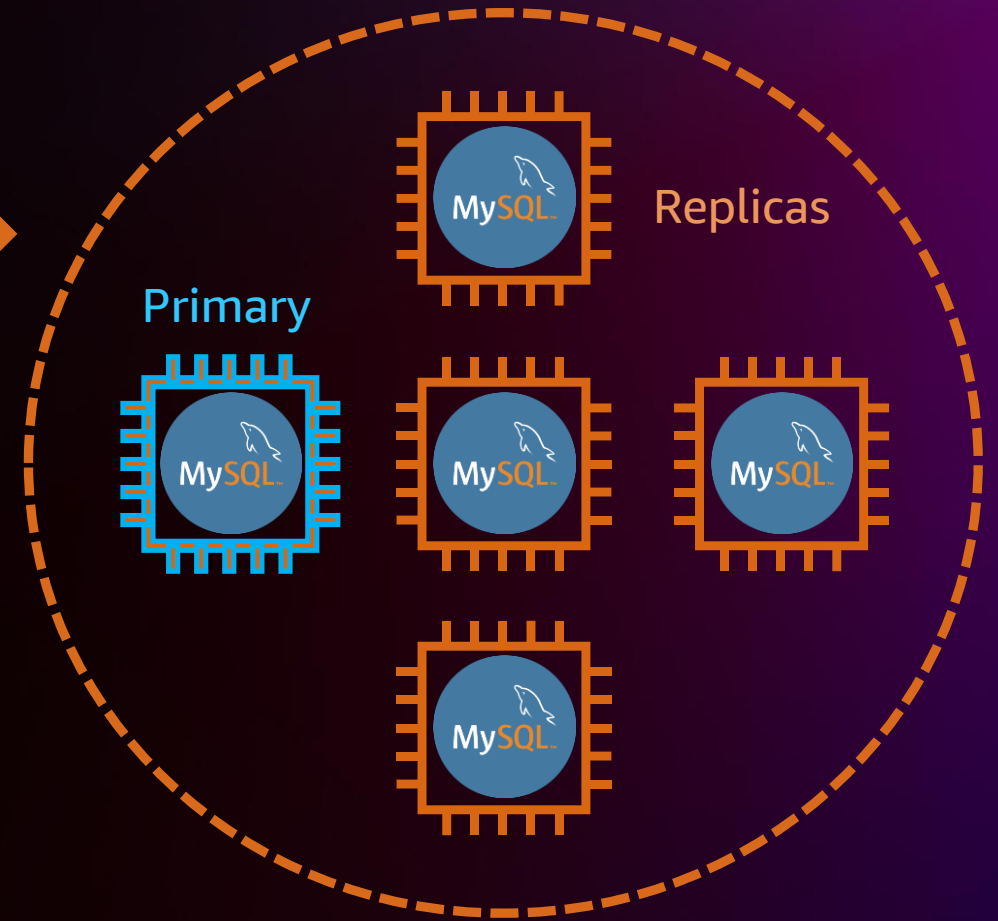


Privacy



Custom data retention policies

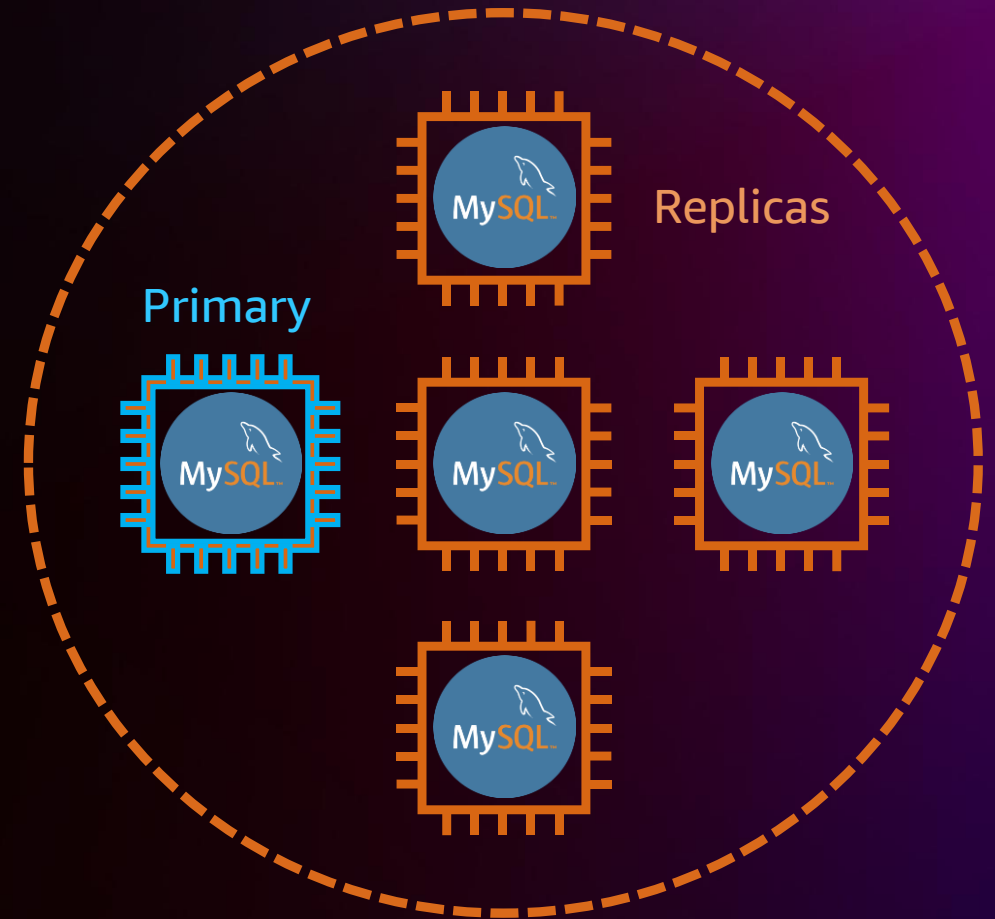
Legacy architecture



I3en.[6-24]xlarge EC2 hosts

Load profile

- 619M peak msg/day
- 260TB storage
- 40K peak write RPS
- 12K peak read RPS

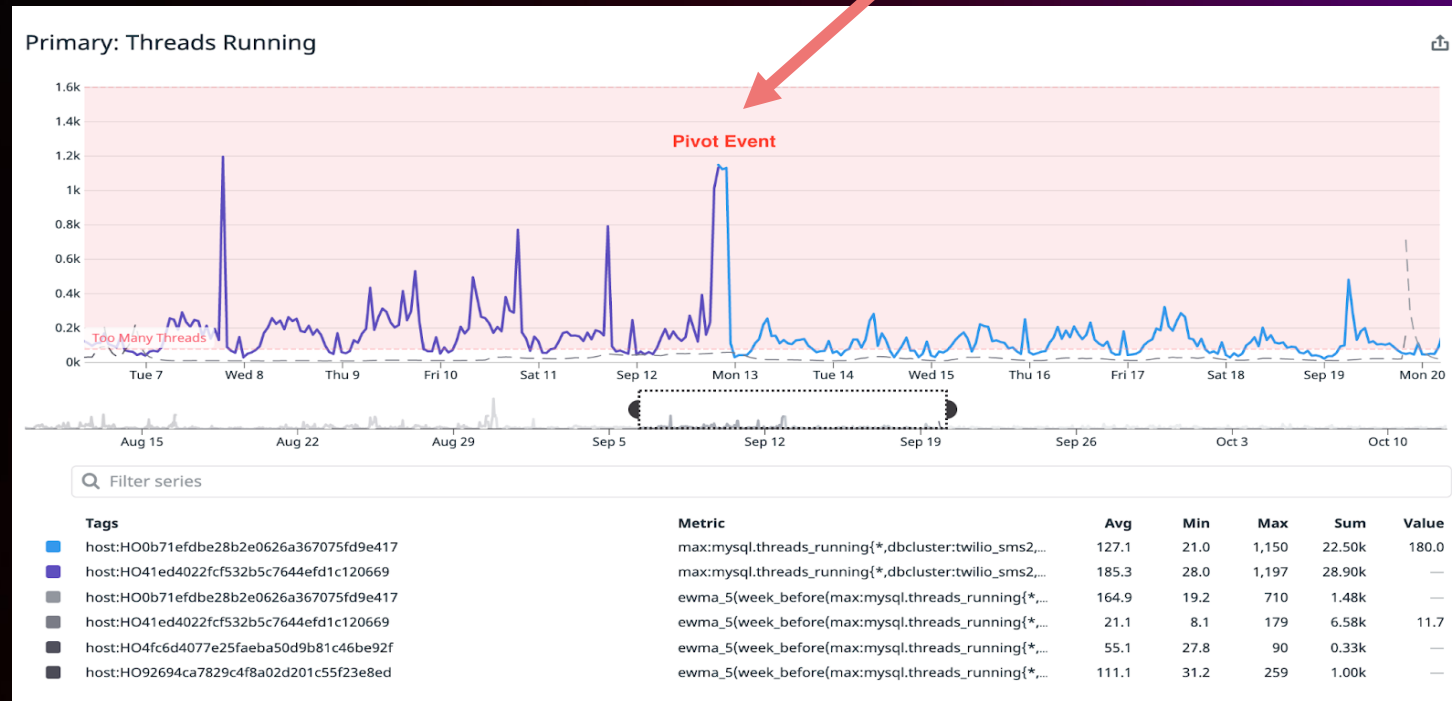


I3en.[6-24]xlarge EC2 hosts

Historical challenges

- “Noisy neighbor” caused data delays
- Maintenance complexity
- Significant unused capacity during off peak hours

Unresponsive Primary Node



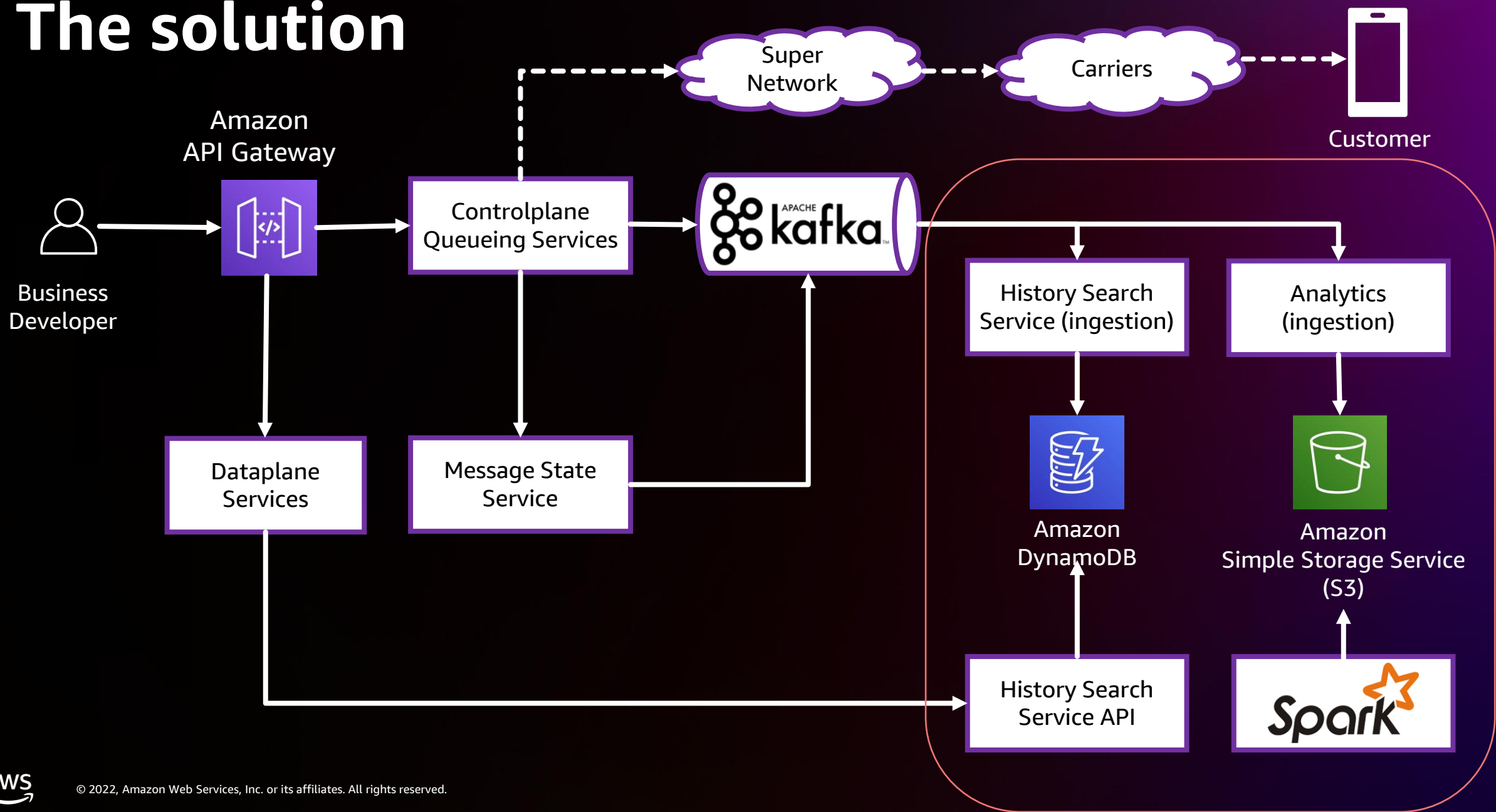


Why Amazon DynamoDB?



- Compatible with application access patterns
- Fully managed service
- Low latency for key-value lookups and range queries
- Virtually unlimited storage
- (Auto)scaling capability

The solution



Results

Promoting Customer Trust



of Delay
Incidents

~1 per month



0 per month



BFCM Data Delays

10-19 hours



0 hours



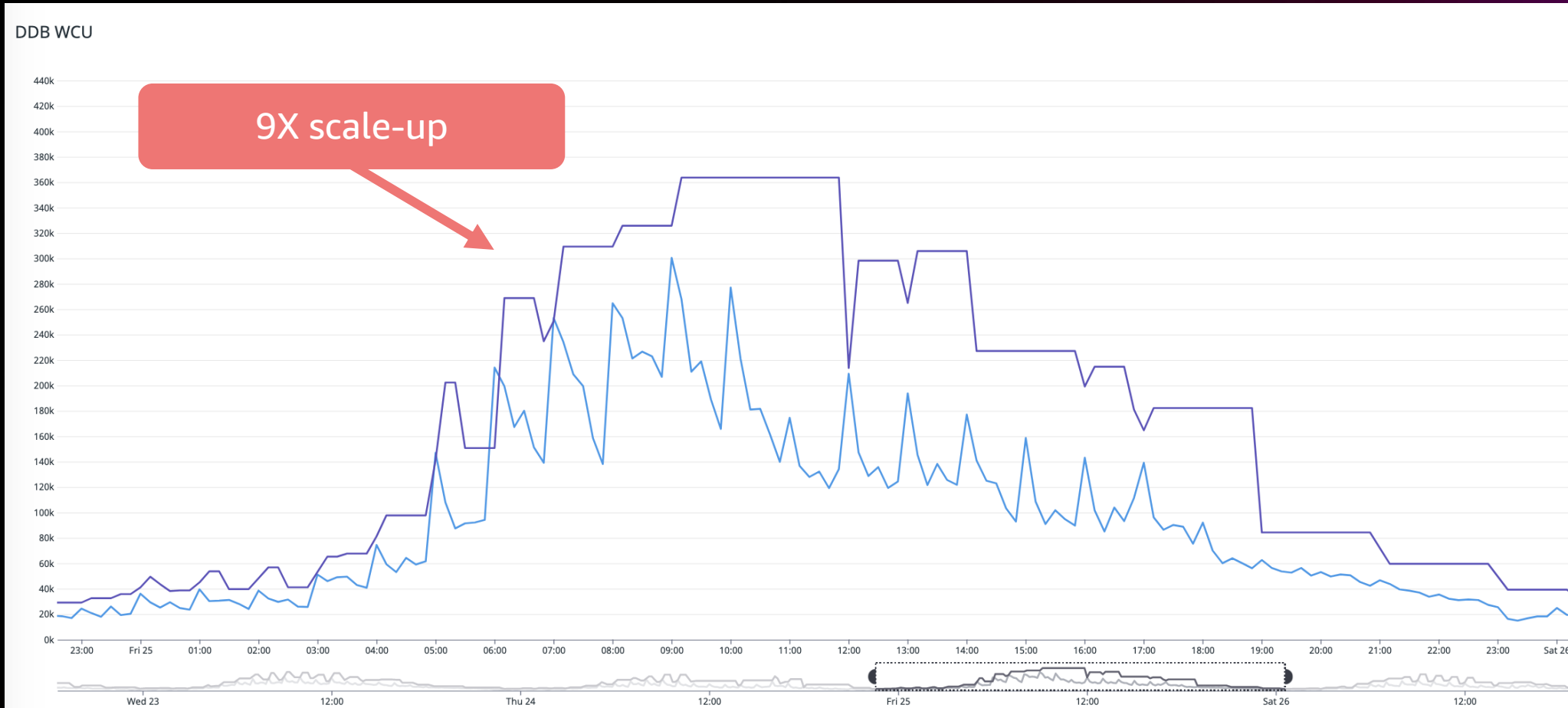
INFRASTRUCTURAL
COSTS

Annual Savings

\$ 2.5 M

Results

Amazon DynamoDB Write Capacity (WCU)

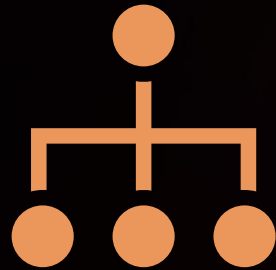




How we met the goal



Analyze &
monitor your
current workload



Proxy
approach



Data
validation



Partner with
AWS Proserv

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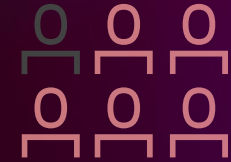
ADP in numbers

2.8B 

Annual mobile logins

1 in 6

Americans paid



39M

People paid globally

1M

Clients

3.1T

Moved globally per year



25M

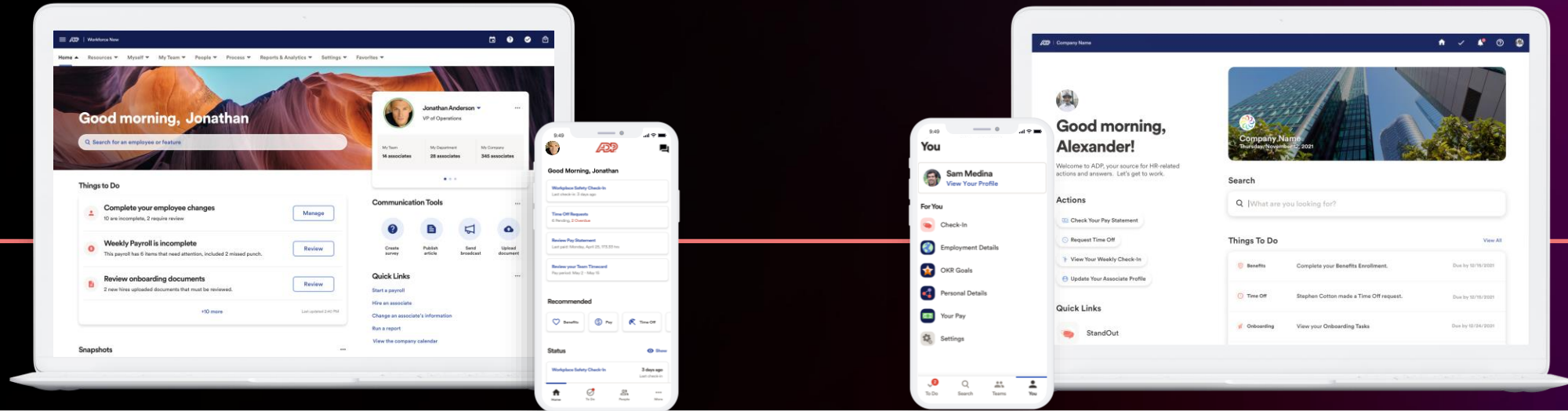
In the U.S.

14M

Outside the U.S.

ADP Workforce Now

ADP Next Gen HCM



PLATFORM

ADP ECOSYSTEM

Mobile

Payroll

PUBLIC CLOUD NATIVE



FEDERATED COUNTRY LOCALIZATIONS



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ADP use cases journey

On premises to public cloud migration

1. ADP mobile

Cloud native

2. ADP Nextgen Payroll

ADP Mobile

Desktop and ADP Mobile

15.5M

Monthly Unique Users

279.5M

Monthly Visits

ALL WEB TRAFFIC



12.5M monthly users

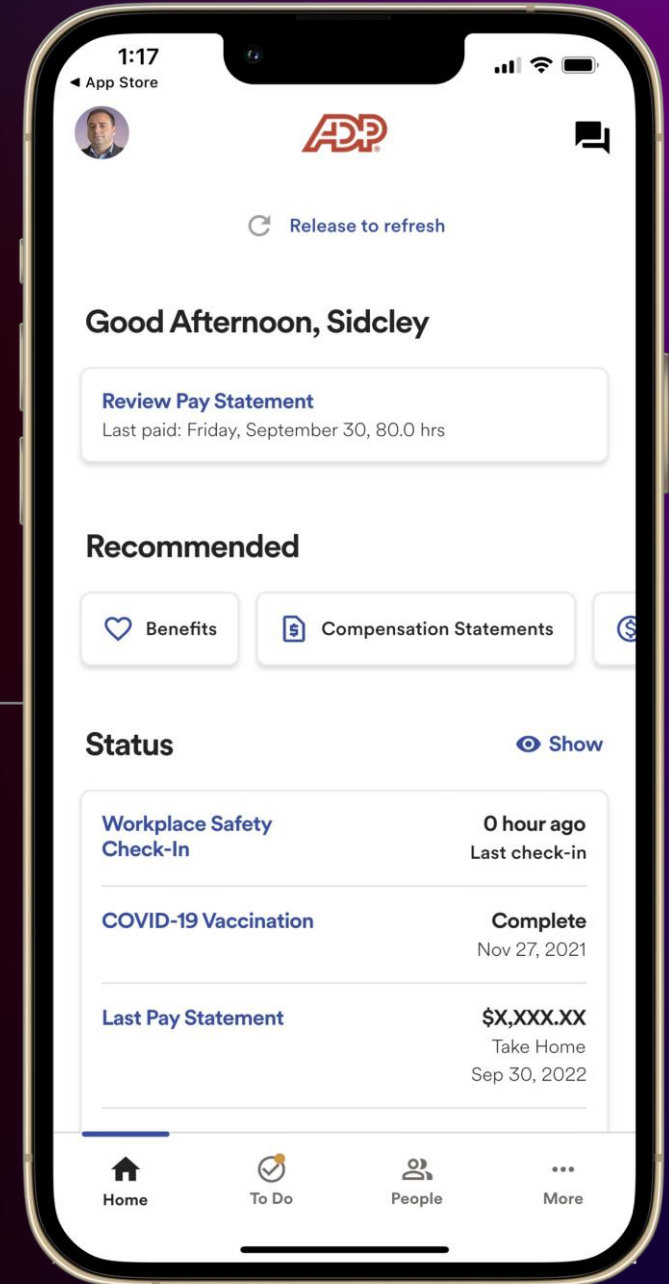
158.4M monthly visits

ADP MOBILE APP



10.4M monthly users

121.1M monthly visits



Business challenge



Reduce call
orchestration to
different SORs

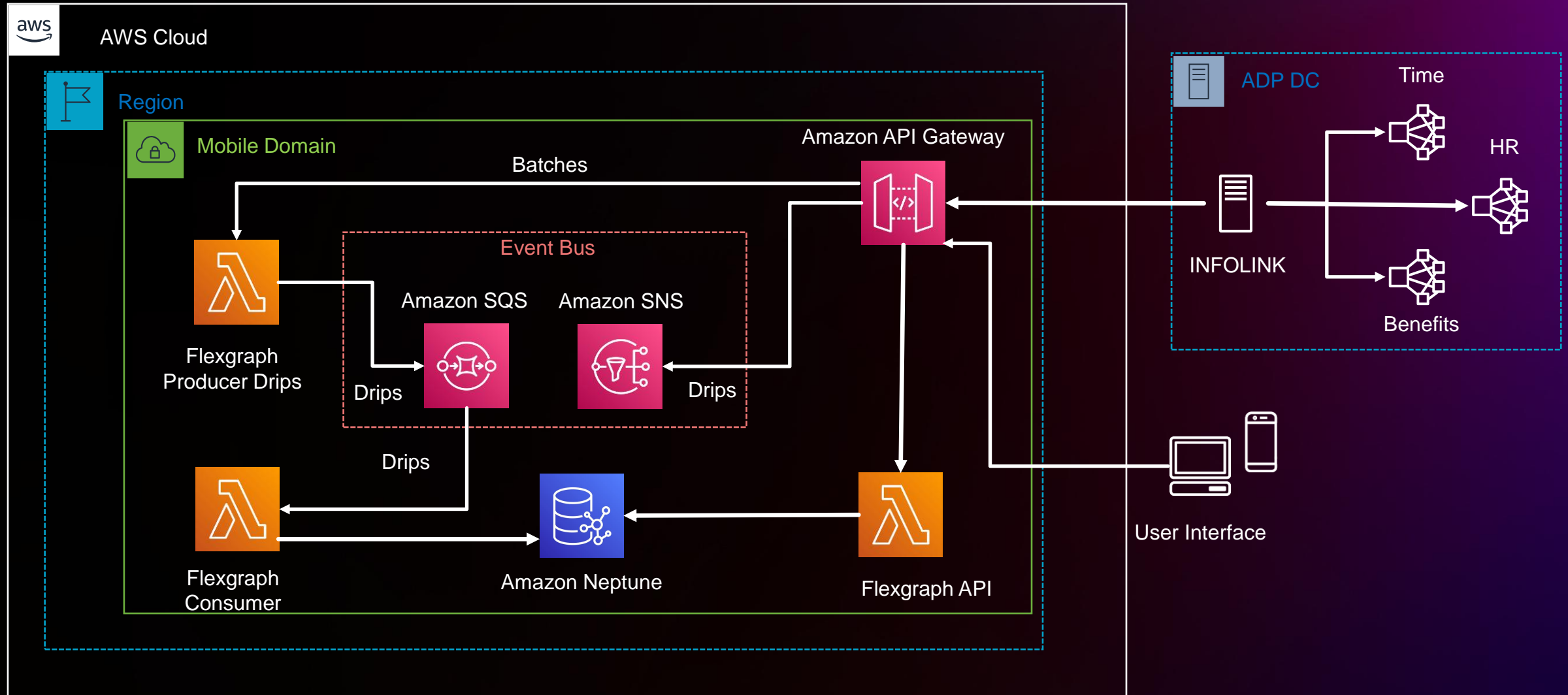


Consolidate data
as it changes on
different systems



Simplify
integration
between
frontend and
many different
backends

ADP Mobile - Solution



Amazon Neptune



- Moved to a managed service
- Moved from cypher to gremlin as GraphQL language
- Instance size tuning for write intensive operations
- Writer/reader replicas needs to have same size/type (failover)

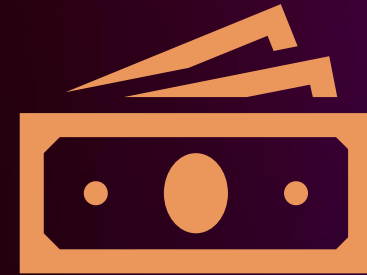
Results



10x performance
improved loading
drips



Speed up time to
market



Serverless
dramatically
reduced cost

ADP use cases journey

On premises to public cloud migration

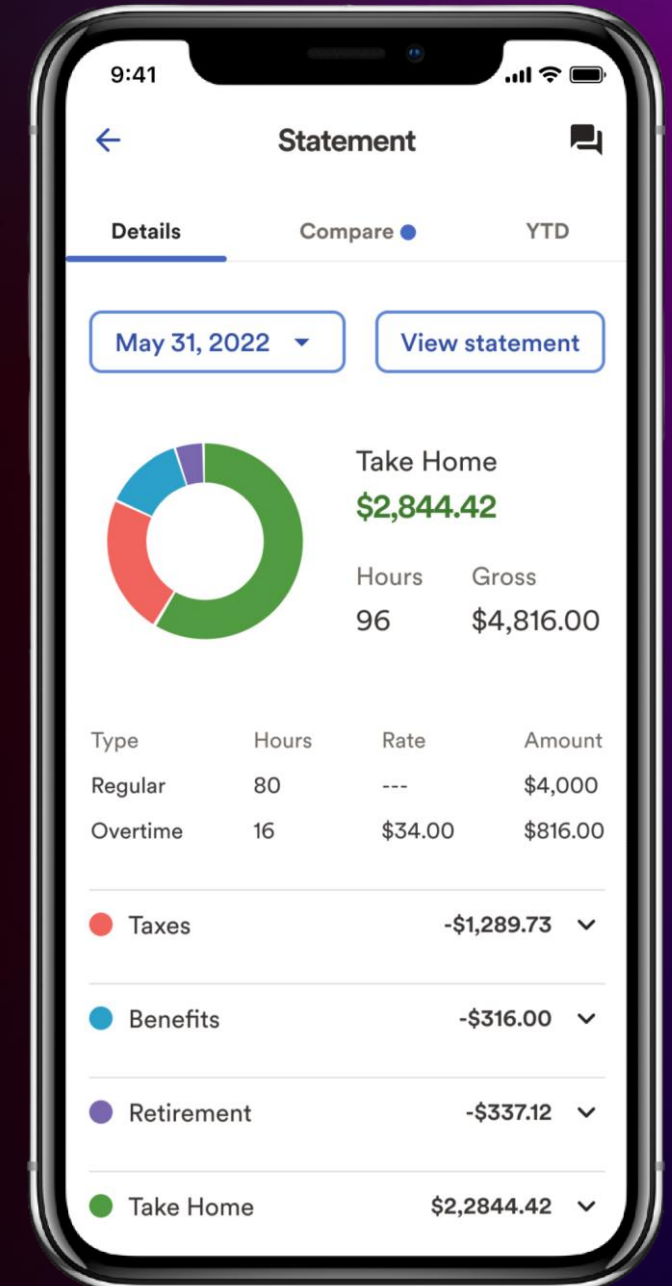
1. ADP mobile

Cloud native

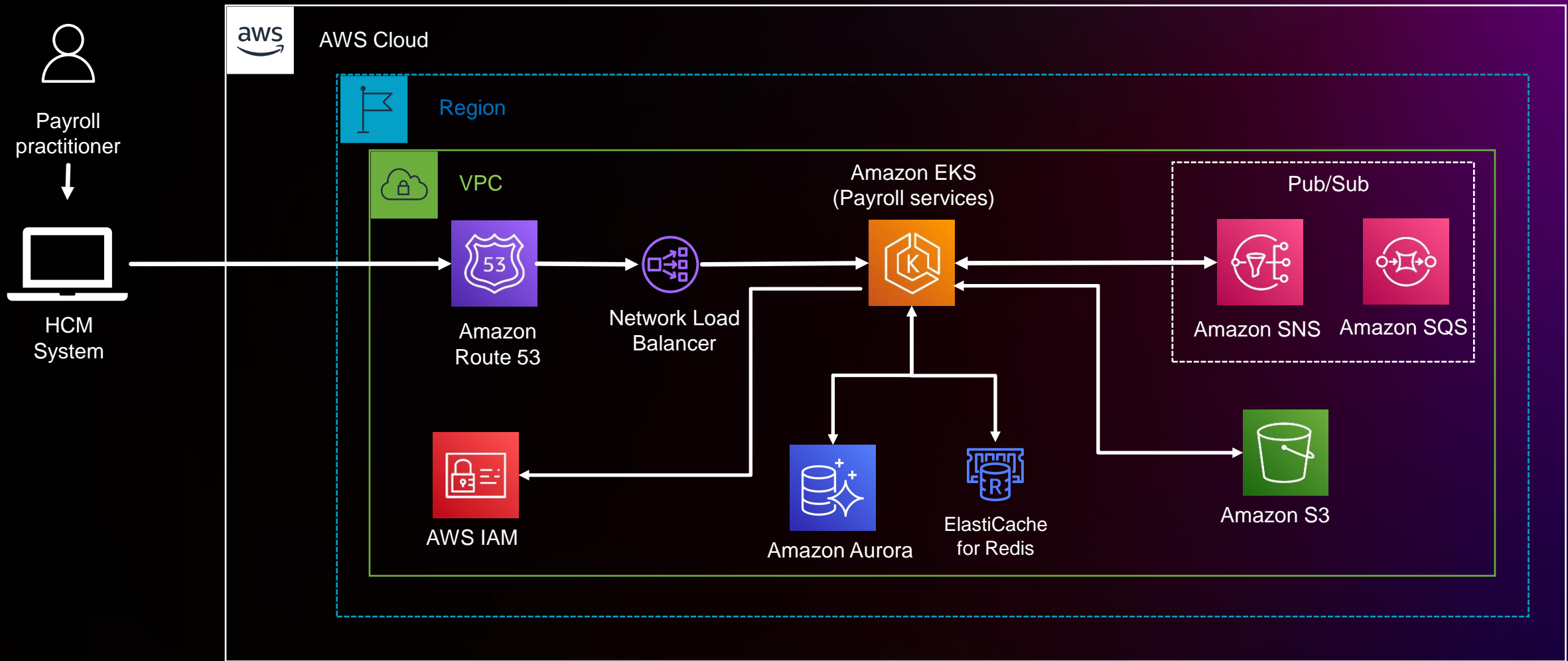
2. ADP Nextgen Payroll

Nextgen payroll

- +3,000 clients
- 6 countries (USA, MEX, CAN, IRL, AUS, NZL)
- Global-first approach
- Policy-driven taxonomy
- Built-in transparency



Nextgen Payroll - Solution

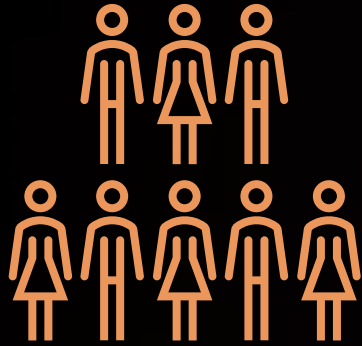


Why Amazon Aurora? (and Why RDBMS)



- Payroll is essentially a transactional, OLTP system
 - “Nobody wants to be “eventually paid 😊 “
- Compatible with open-source engine (projected started before sticking with AWS)
- Managed service

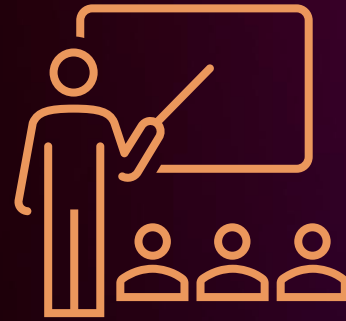
Business benefits



Focusing
resources on our
core business

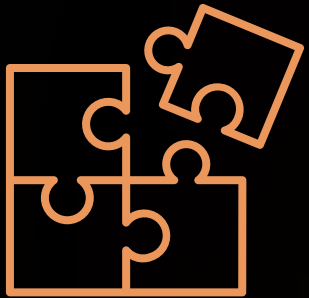


Region segregation
for compliance

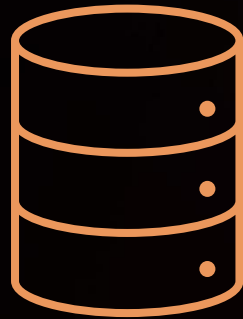


Global policy
taxonomy for MNC
companies

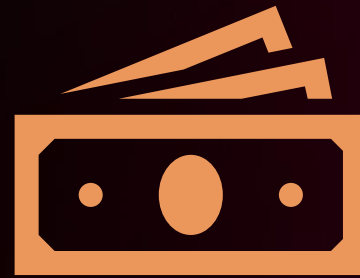
Aurora MySQL benefits



Out of the box
compatibility



Automated
backups



Cost-effective
for development
workloads

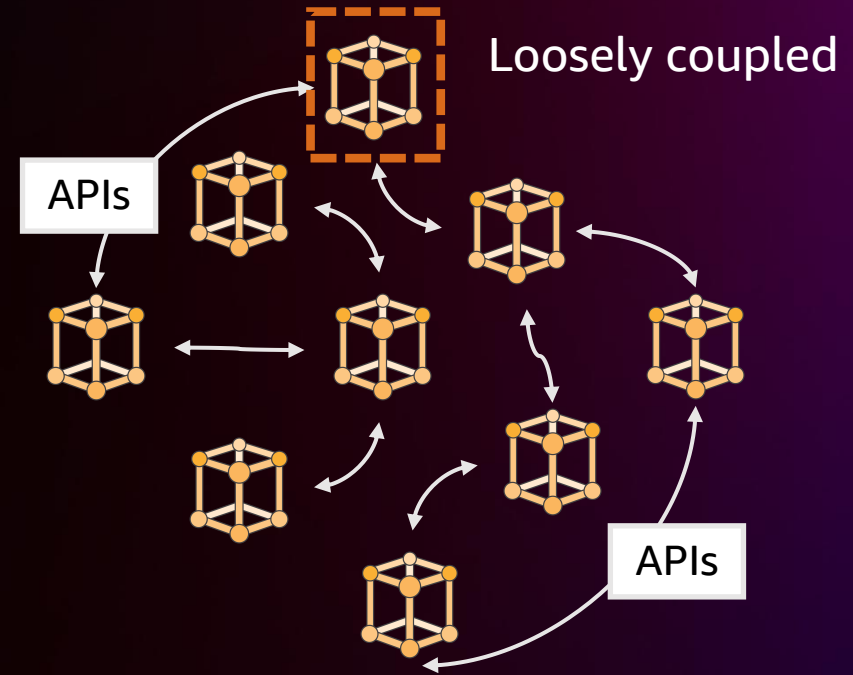


Easy for
prototyping

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- High availability
- Security
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Thank you!

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