
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV



WELCOME

10 Things You Didn't Know Your Data Could Do for You



Karen Huaulme
Principal Developer Advocate



@youoldmaid

Thing 1

Change



Thing 1



Change



Flexible: adapt to change

Add new fields dynamically at runtime

```
{
  "_id" :
  ObjectId("5ad88534e3632e1a35a58d00"),
  "name" : {
    "first" : "John",
    "last" : "Doe" },
  "dob" : ISODate("1977-04-01T05:00:00Z"),
  "address" : {
        "street" : "16 Hatfields",
        "city" : "London” },
+   {...}
  }

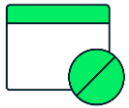
}
```

```
{
  "_id" :
  ObjectId("5ad88534e3632e1a35a58d00"),
  "name" : {
    "first" : "John",
    "last" : "Doe" },
  "dob" : ISODate("1977-04-01T05:00:00Z"),
  "address" : {
        "street" : "16 Hatfields",
        "city" : "London” },
+   phone" : [
    { "location" : "work",
      "number" : "+44-1234567890"},
    {...}
  ]
}
```

Flexible Schema: unlocking developer velocity



No need to update ORM mappings



Schema changes don’t lock the database



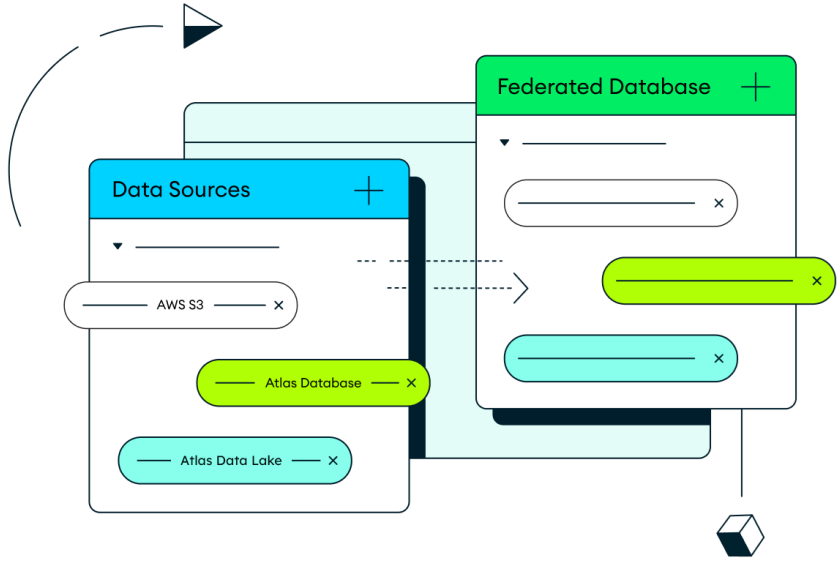
Breaks down complex inter-dependencies

Thing 2

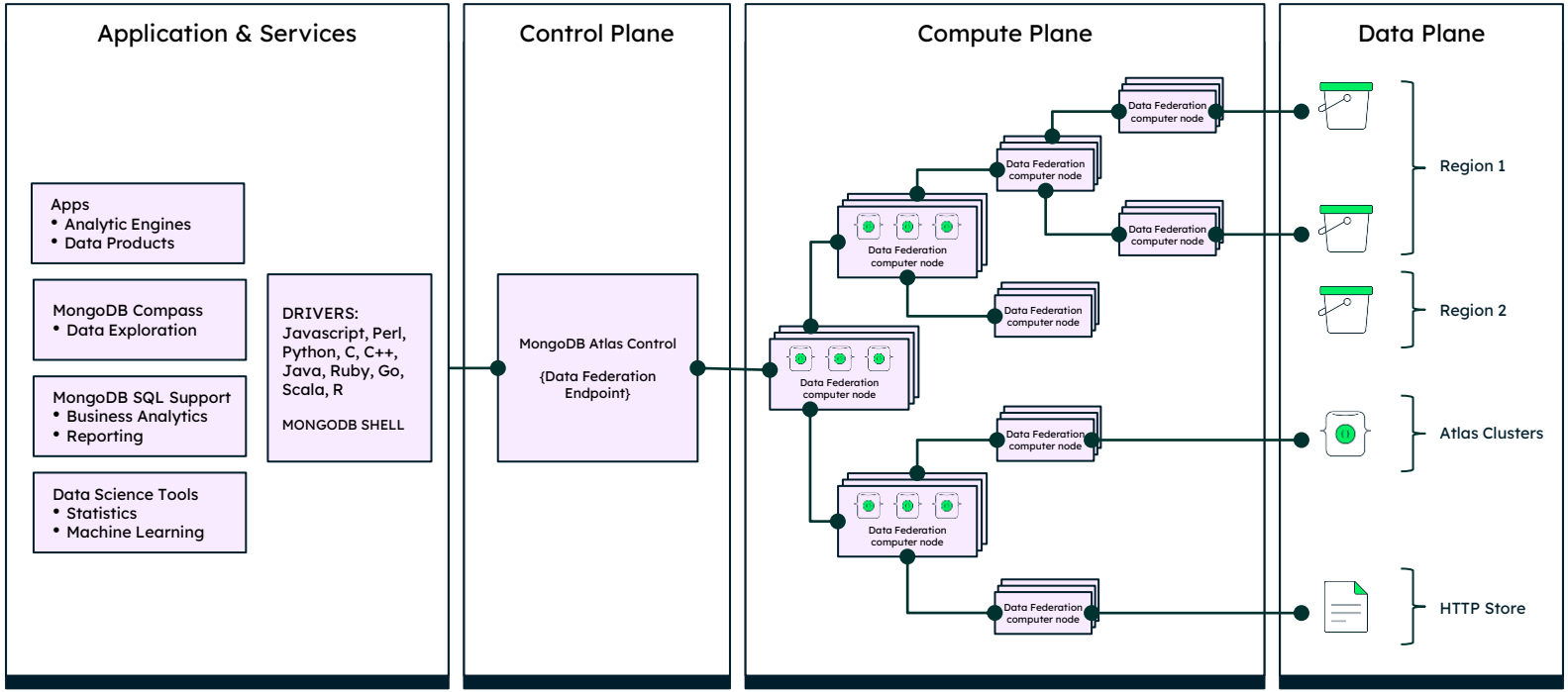
Connect & Combine



Data Federation



Data Federation architecture



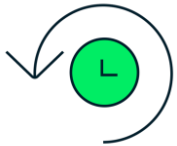
Easily work with data across multiple Atlas clusters, Amazon S3, HTTPS



Simplify Workflows



Get Faster Insights

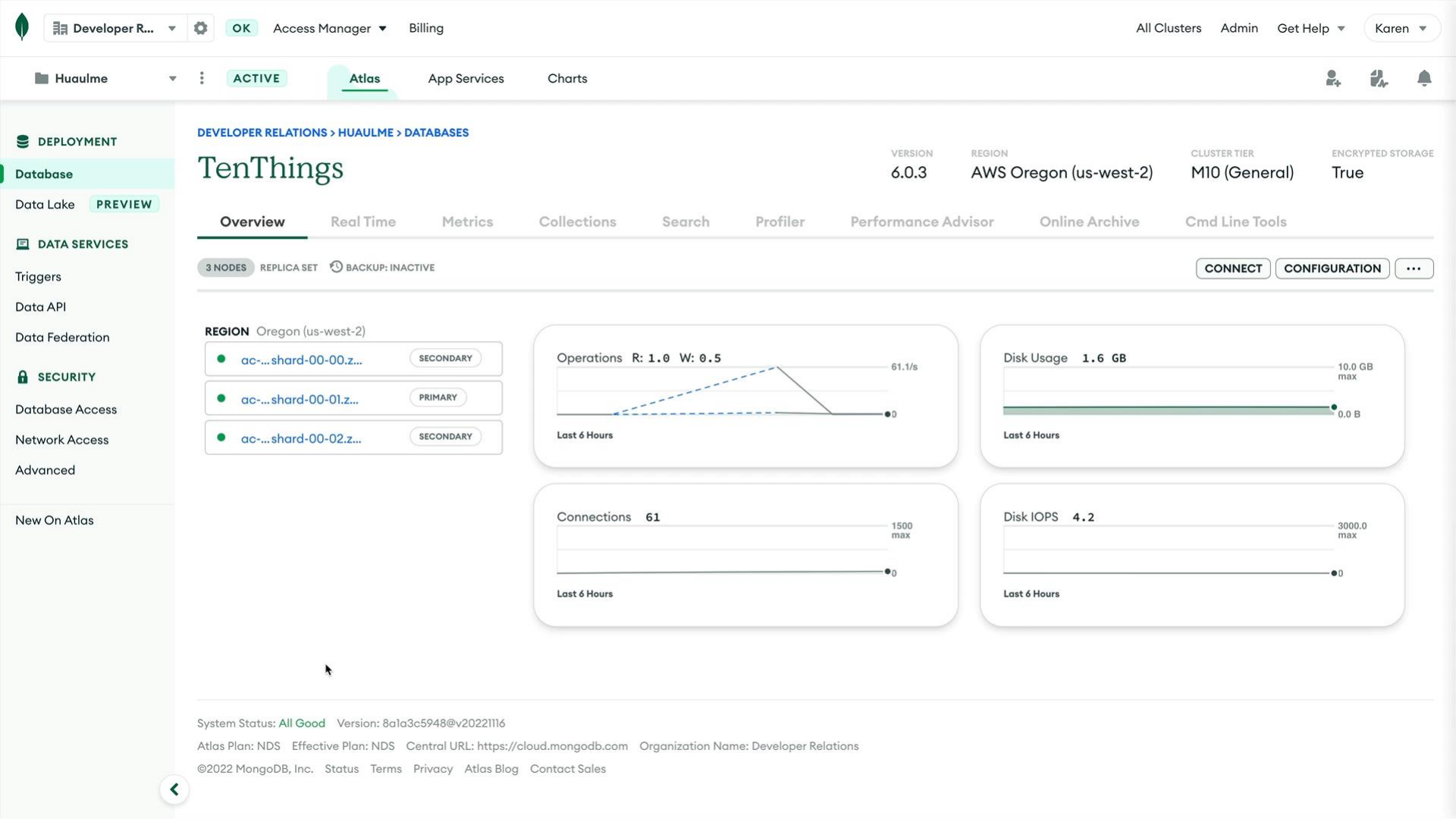


Power Real-Time Apps

Demo

Federated Data

2. Connect & Combine


Developer R...
OK
Access Manager
Billing
All Clusters
Admin
Get Help
Karen
Huaulme
ACTIVE
Atlas
App Services
Charts
DEPLOYMENT
Database
Data Lake
PREVIEW
DATA SERVICES
Triggers
Data API
Data Federation
SECURITY
Database Access
Network Access
Advanced
New On Atlas
DEVELOPER RELATIONS > HUAULME > DATABASES
TenThings
VERSION
6.0.3
REGION
AWS Oregon (us-west-2)
CLUSTER TIER
M10 (General)
ENCRYPTED STORAGE
True
Overview
Real Time
Metrics
Collections
Search
Profiler
Performance Advisor
Online Archive
Cmd Line Tools
3 NODES
REPLICA SET
BACKUP: INACTIVE
CONNECT
CONFIGURATION
REGION Oregon (us-west-2)
ac-...shard-00-00.z...
SECONDARY
ac-...shard-00-01.z...
PRIMARY
ac-...shard-00-02.z...
SECONDARY
Operations R: 1.0 W: 0.5
61.1/s
0
Last 6 Hours
Disk Usage 1.6 GB
10.0 GB max
0.0 B
Last 6 Hours
Connections 61
1500 max
0
Last 6 Hours
Disk IOPS 4.2
3000.0 max
0
Last 6 Hours
System Status: All Good
Version: 8a1a3c5948@v20221116
Atlas Plan: NDS
Effective Plan: NDS
Central URL: https://cloud.mongodb.com
Organization Name: Developer Relations
©2022 MongoDB, Inc.
Status
Terms
Privacy
Atlas Blog
Contact Sales

Apps
SoccerDemo
NO ENVIRONMENT
DATA ACCESS
Rules
Schema
App Users
Authentication
BUILD
Realm SDKs
Device Sync
GraphQL
Functions
Triggers
HTTPS Endpoints
Values
MANAGE
Linked Data Sources
Deployment
Hosting
Logs

SoccerDemo

App ID: soccerdemo-laitu

Get Started With App Services

Guides

Click here to access our in-product guidance whenever you need it.

GOT IT

REALM CLI

Enable Local Development with the Command Line Interface.

SDKS

Install SDKs and get familiar with the SDK syntax.

DOCUMENTATION

Visit App Services documentation to learn how to build with App Services.

DEPLOYMENT

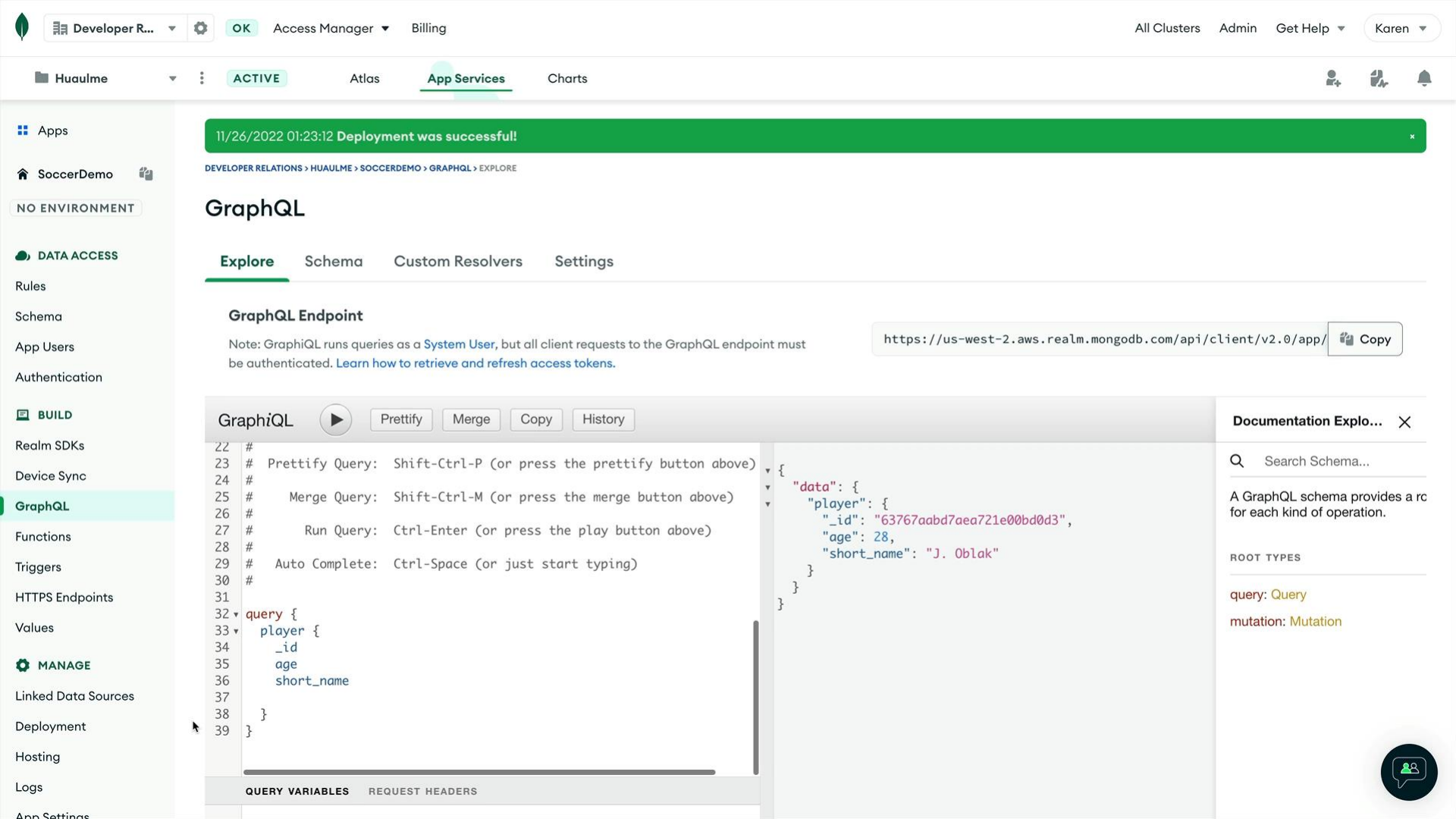
Connect to a Github account and repo to use Git.

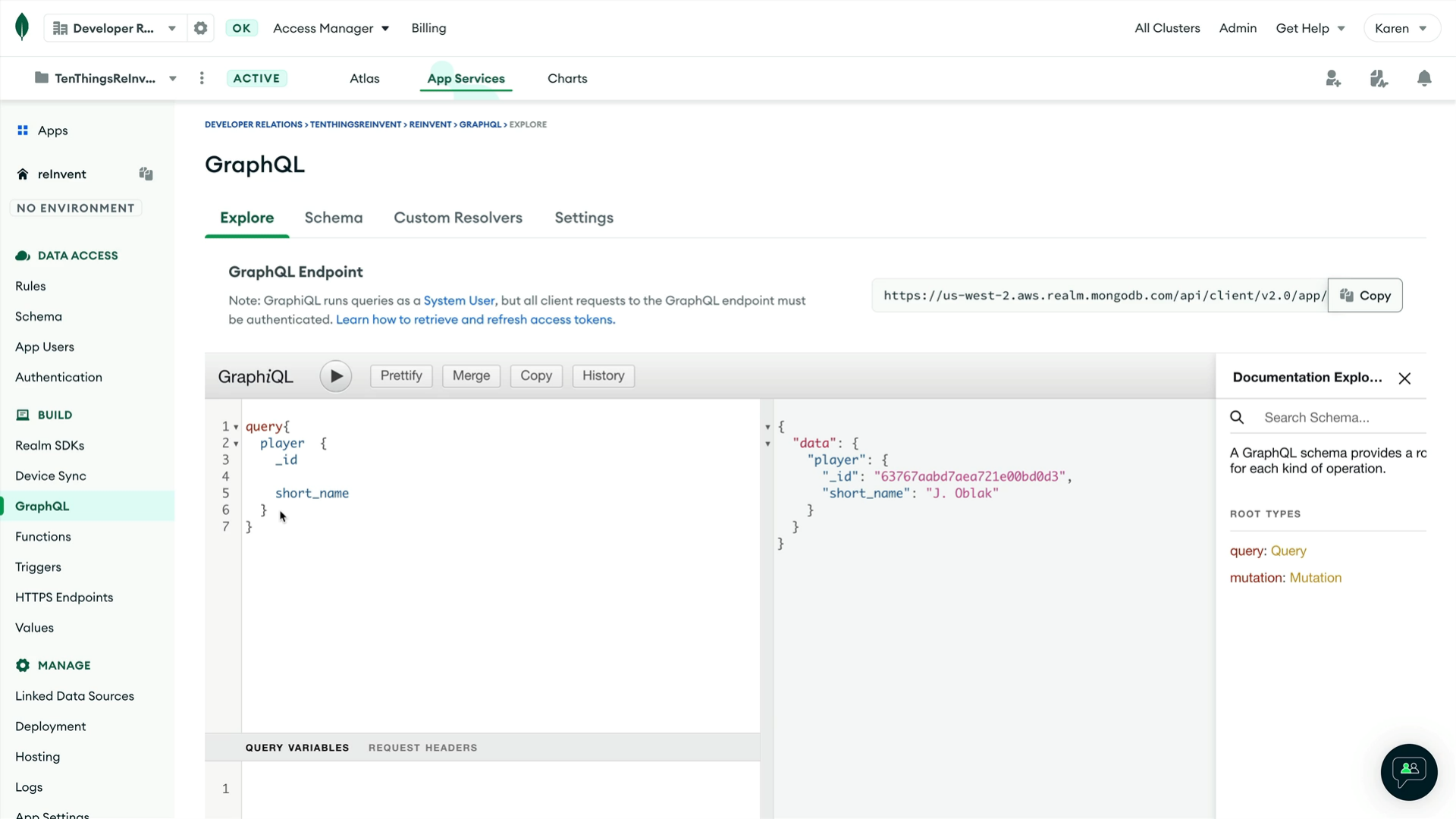
Usage This Month

View docs for more info on tracking usage. You can also check the total usage for the project this app belongs to.

Requests	Data Transfer	Compute Runtime	Sync Runtime
0	0.00 GB	0.00 Hours	0.00 Hours

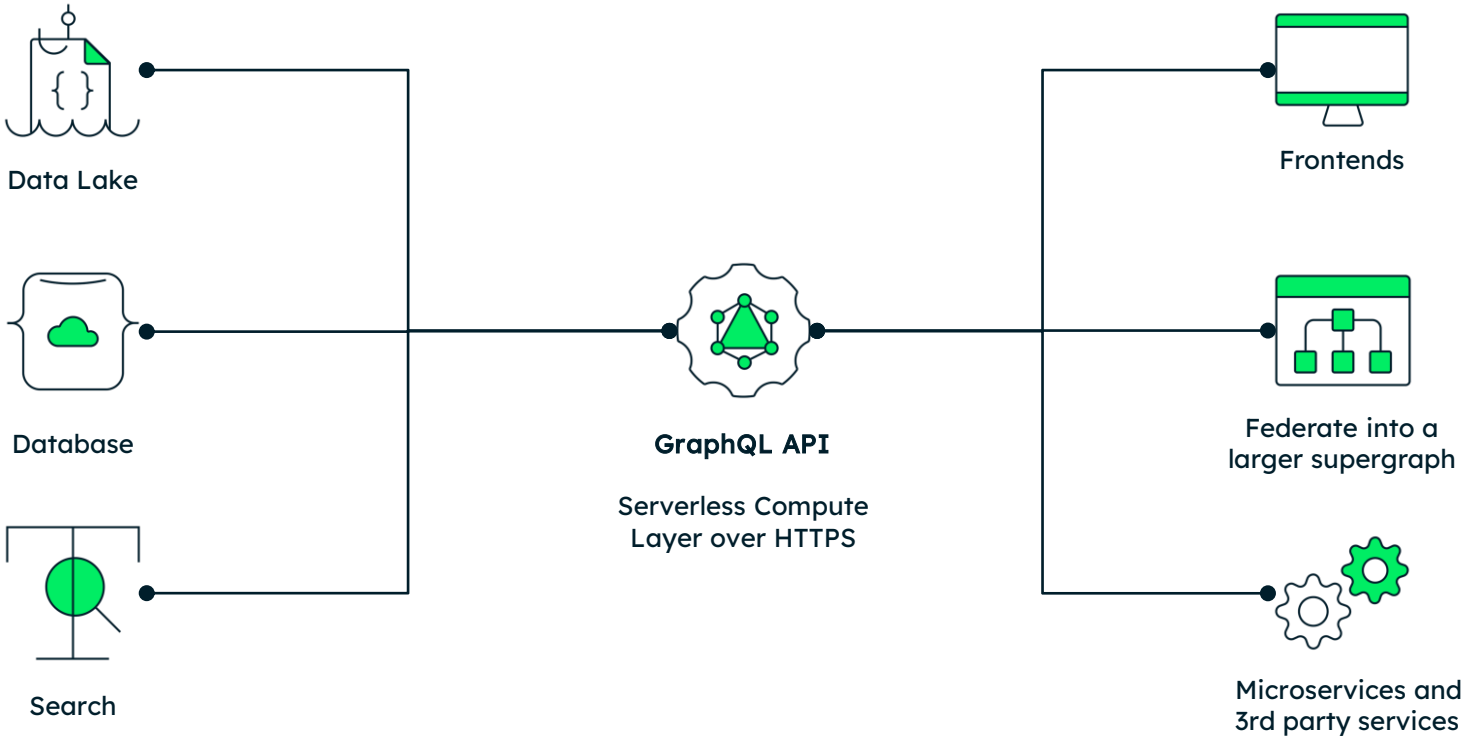
Recently Opened


Developer R...
OK
Access Manager
Billing
All Clusters
Admin
Get Help
Karen
Huaulme
ACTIVE
Atlas
App Services
Charts
Apps
SoccerDemo
NO ENVIRONMENT
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Authentication
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Realm SDKs
Device Sync
GraphQL
Functions
Triggers
HTTPS Endpoints
Values
MANAGE
Linked Data Sources
Deployment
Hosting
Logs
App Settings
11/26/2022 01:23:12 Deployment was successful!
DEVELOPER RELATIONS > HUAULME > SOCCERDEMO > GRAPHQL > EXPLORE
GraphQL
Explore
Schema
Custom Resolvers
Settings
GraphQL Endpoint
Note: GraphiQL runs queries as a System User, but all client requests to the GraphQL endpoint must be authenticated. Learn how to retrieve and refresh access tokens.
https://us-west-2.aws.realm.mongodb.com/api/client/v2.0/app/
Copy
GraphiQL
Prettify
Merge
Copy
History
# Prettify Query: Shift-Ctrl-P (or press the prettify button above)
# Merge Query: Shift-Ctrl-M (or press the merge button above)
# Run Query: Ctrl-Enter (or press the play button above)
# Auto Complete: Ctrl-Space (or just start typing)
query {
player {
_id
age
short_name
}
}
{
"data": {
"player": {
"_id": "63767aabd7aea721e00bd0d3",
"age": 28,
"short_name": "J. Oblak"
}
}
}
QUERY VARIABLES
REQUEST HEADERS
Documentation Explo...
Search Schema...
A GraphQL schema provides a rc
for each kind of operation.
ROOT TYPES
query: Query
mutation: Mutation


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Access Manager
Billing
All Clusters
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TenThingsReInv...
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https://us-west-2.aws.realm.mongodb.com/api/client/v2.0/app/
Copy
GraphiQL
Prettify
Merge
Copy
History
query{
player {
_id
short_name
}
}
{
"data": {
"player": {
"_id": "63767aabd7aea721e00bd0d3",
"short_name": "J. Oblak"
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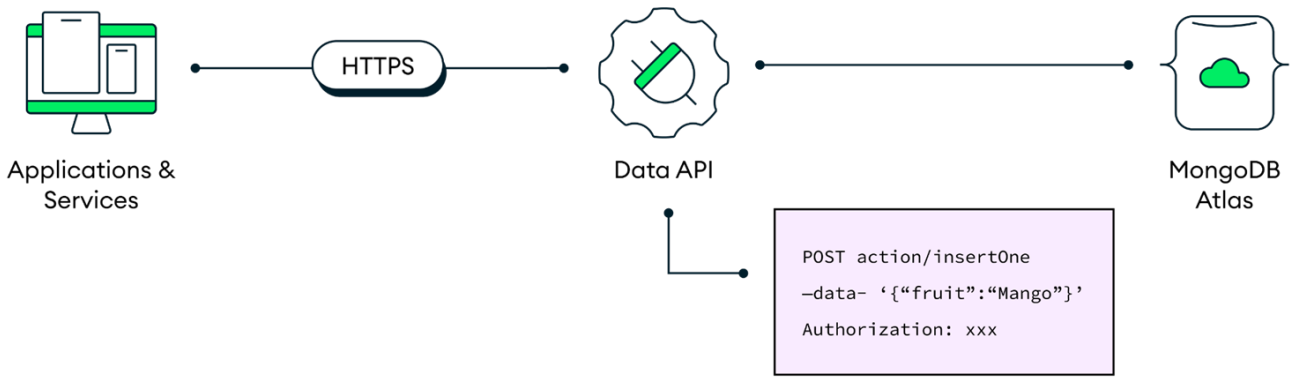
Atlas GraphQL API

Integrate all of Atlas into your apps via a single endpoint

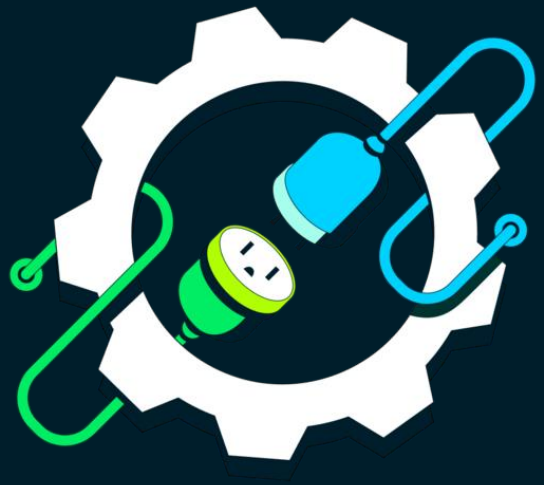


Atlas Data API

Integrate Atlas data into your cloud apps and services via HTTPS



Connectors

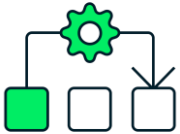




Atlas SQL Interface



Connect to Kafka,
Spark, other tools



Easily integrate into larger
ecosystems

Thing 3

Drive Diverse Workloads







Demo

Atlas Search Soccer

www.atlassearchsoccer.com

3. Diverse Workloads

Atlas Search Soccer

Build Your Soccer Dream Team



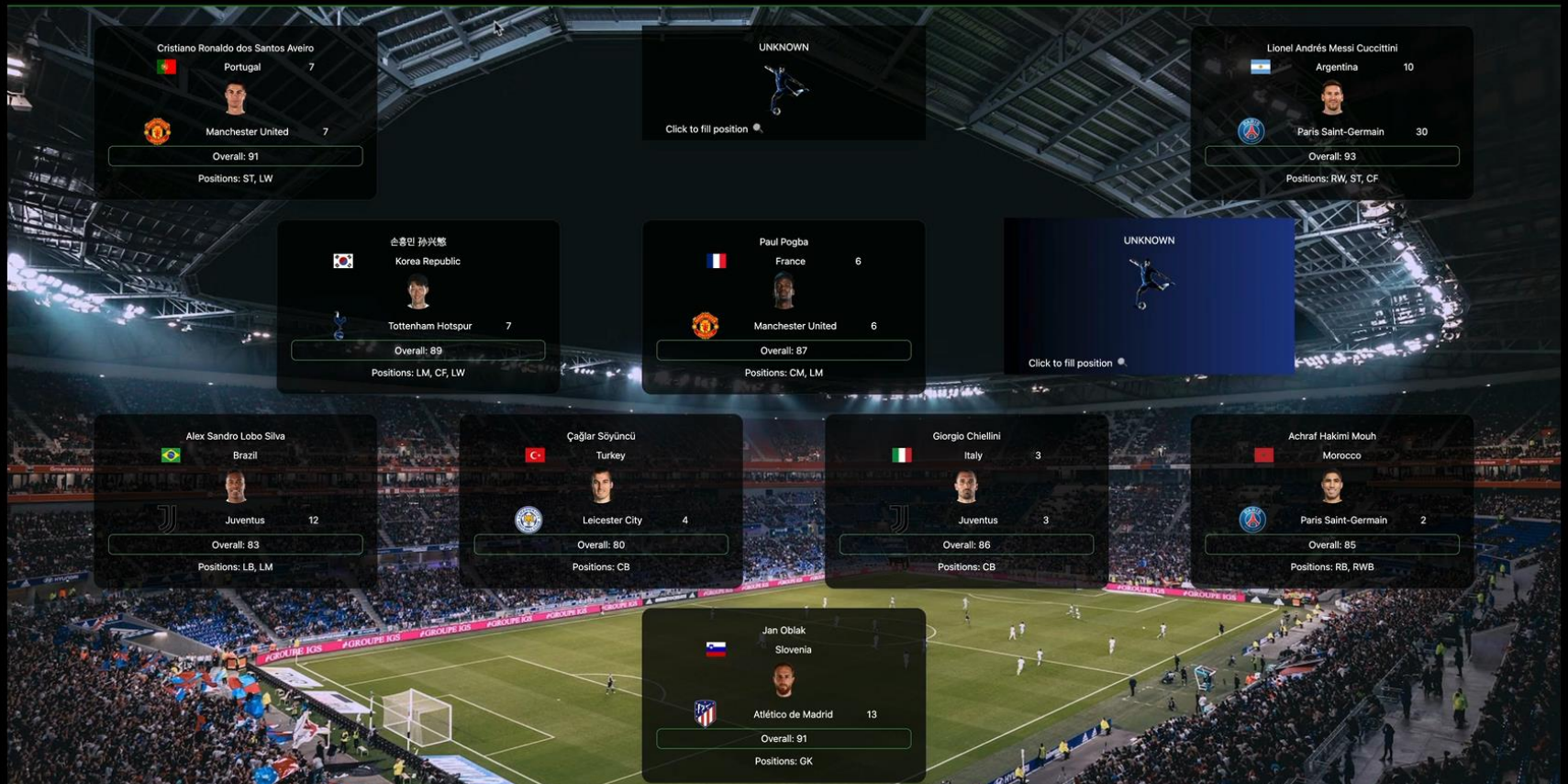
Advanced Scouting

type to find players...

text

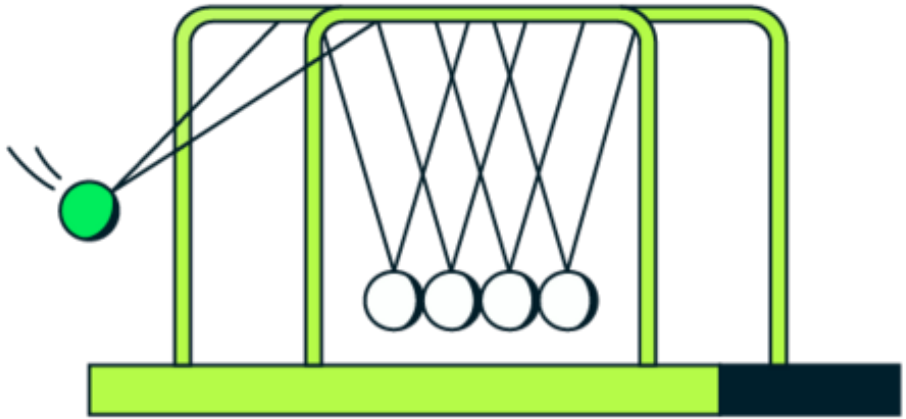
Function Score



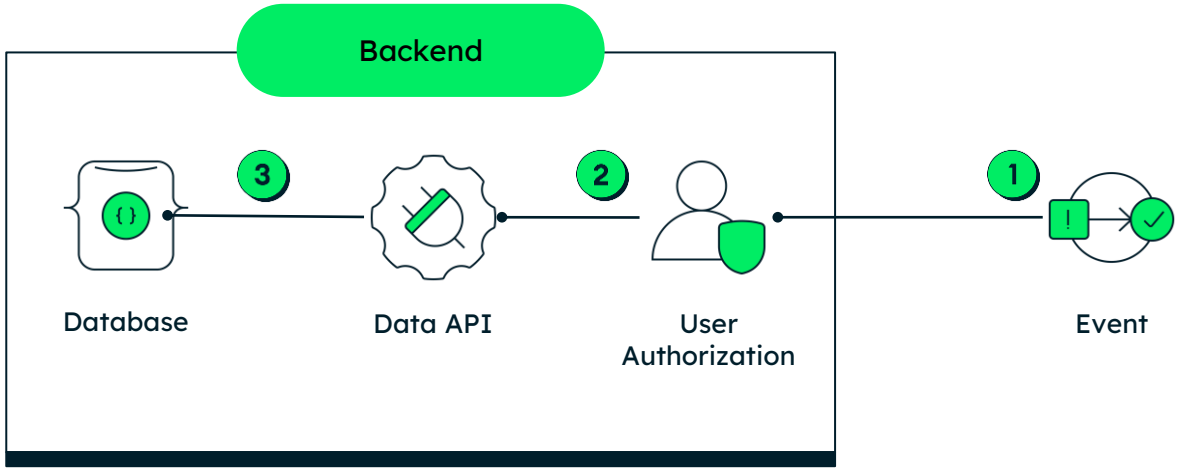


Thing 4

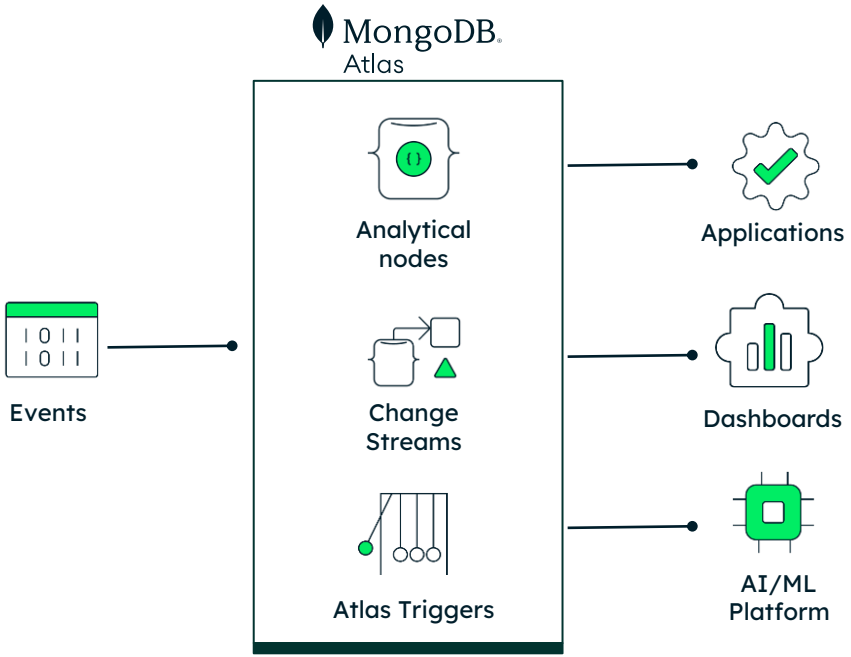
Drive Application Functionality



Event-driven architecture



Event-driven analytics



Continuous analytics reacting to application events

Publish database changes to subscribing applications

Triggers and functions execute logic in response to event

- Change price
- Recalculate delivery times
- Trigger a service call

Demo

Atlas Search Soccer

www.atlassearchsoccer.com

2. Combine & Connect

3. Diverse Workloads

4. Drive Functionality

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18	0.00 GB	0.00 Hours	0.00 Hours

Recently Opened

No recently opened items.

Login

Atlas Search Soccer

Build Your Soccer Dream Team ⚽



Advanced Scouting

type to find players...

text

Function Score



UNKNOWN
Click to fill position

UNKNOWN
Click to fill position

UNKNOWN
Click to fill position

UNKNOWN
Click to fill position

UNKNOWN
Click to fill position

UNKNOWN
Click to fill position

UNKNOWN

UNKNOWN

UNKNOWN

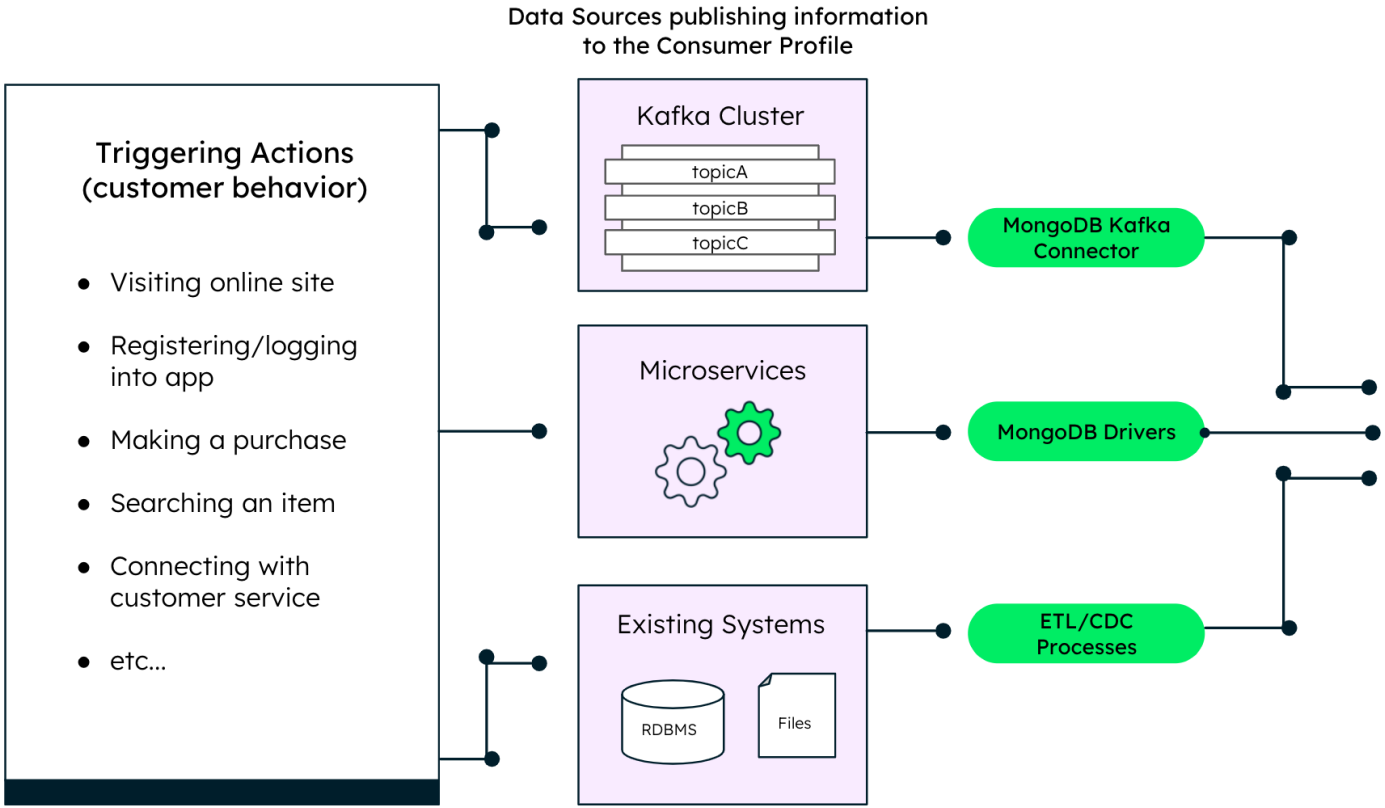
UNKNOWN

Thing 5

Drive Deeper User Engagement



Data Ingestion



1. Json Documents representing the consumer /client profile

1. Core Customer Data (“the basic info”)

1. Sub Documents with supplementary specifics

Welcome, Karen

Atlas Search Soccer

Build Your Soccer Dream Team



Advanced Scouting

type to find players...

text

Function Score



UNKNOWN

Click to fill position

Lionel Andrés Messi Cuccittini

Argentina 10

Paris Saint-Germain 30

Overall: 93

Positions: RW, ST, CF

Harry Kane

England 9

Tottenham Hotspur 10

Overall: 90

Positions: ST

손흥민 孙兴慜

Korea Republic

Tottenham Hotspur 7

Overall: 89

Positions: LM, CF, LW

UNKNOWN

Click to fill position

UNKNOWN

Click to fill position

Events



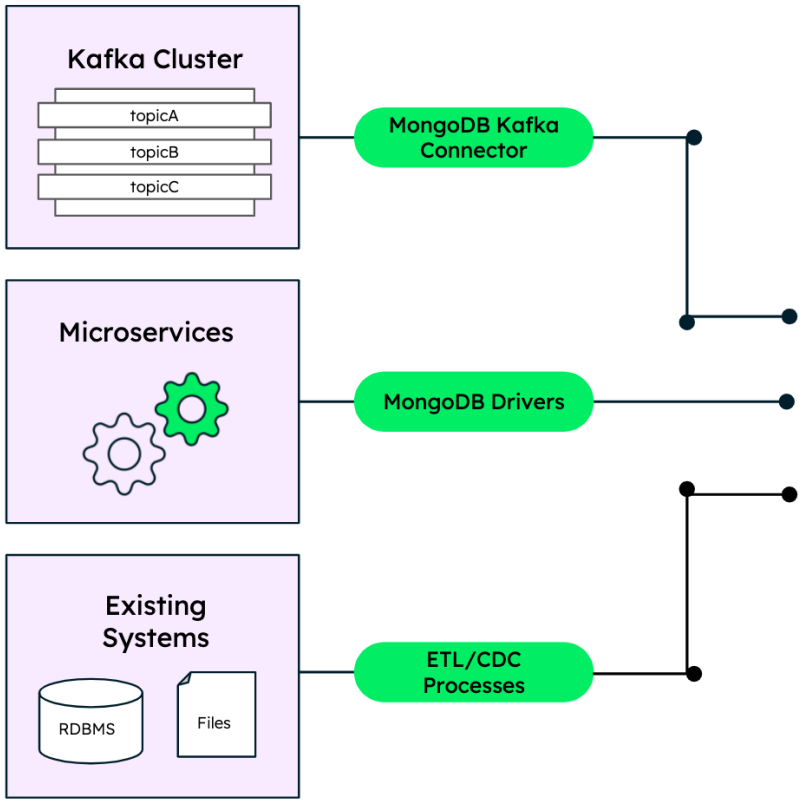






Data Enrichment

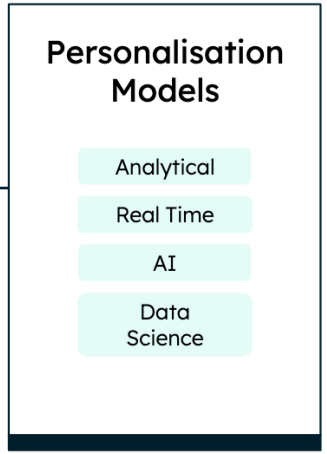
Data Sources publishing information to the Consumer Profile



Trigger action gets sent to personalization model, and returns a response update to Customer Profile

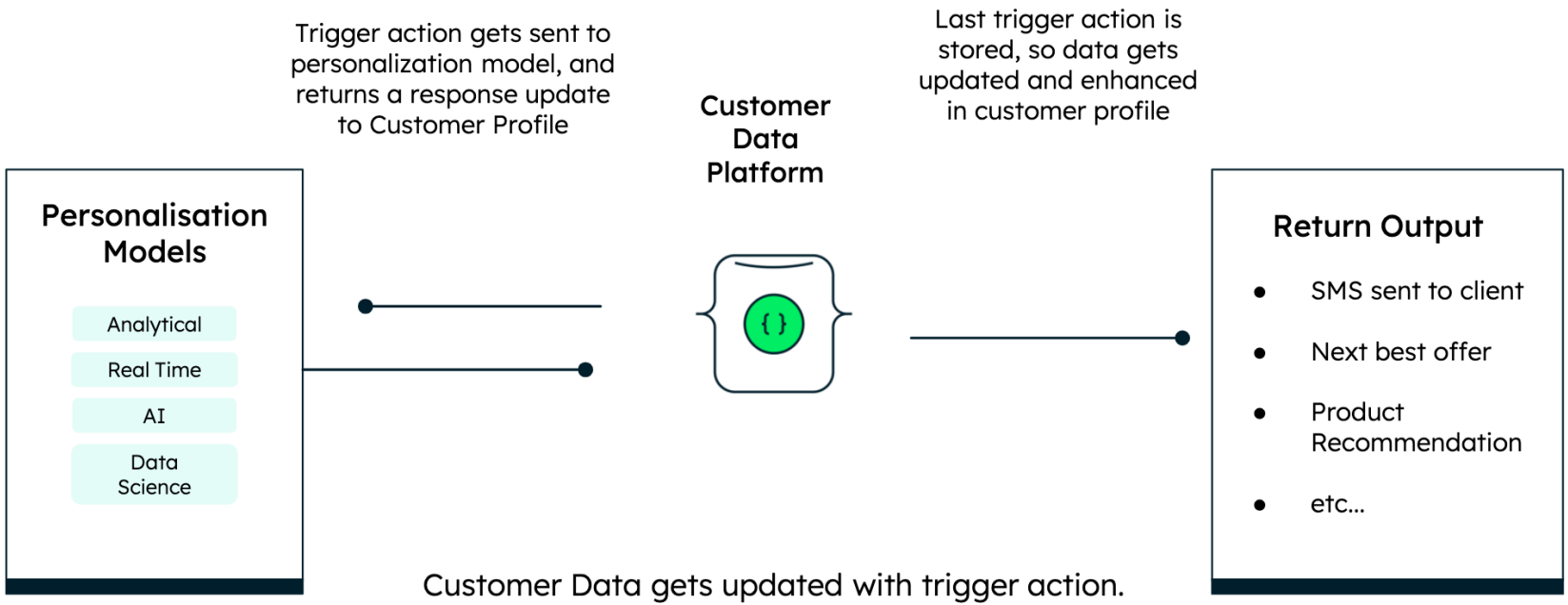
Customer Data Platform





1. Json Documents representing the consumer /client profile
1. Core Customer Data (“the basic info”)
1. Sub Documents with supplementary specifics

Data Output



Customer Data gets updated with trigger action.
For example:

```
“Last web visit” : 33.44.2021
“page” : “https://www.mongodb.com/”
```

Thing 6

Inspire



Designer, Developer Creativity

Thing 6

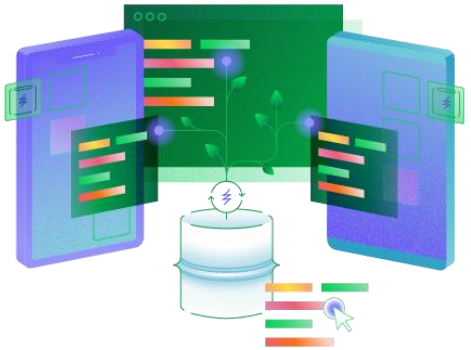
Inspire



Designer, Developer Creativity

Thing 7

Inform

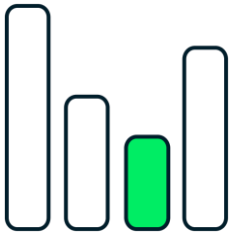


Analytics, Business Decisions

Traditional separation of domains



Applications
run the business



Analytics
manages the business

Built by **different teams**, serving **different audiences**, with data duplicated and stored in **different systems**.

Demands of the Digital Economy



Retail: Hyper-personalization



FSI:
Fraud prevention



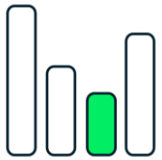
Manufacturing
Preventative maintenance



Telco:
Single subscriber view

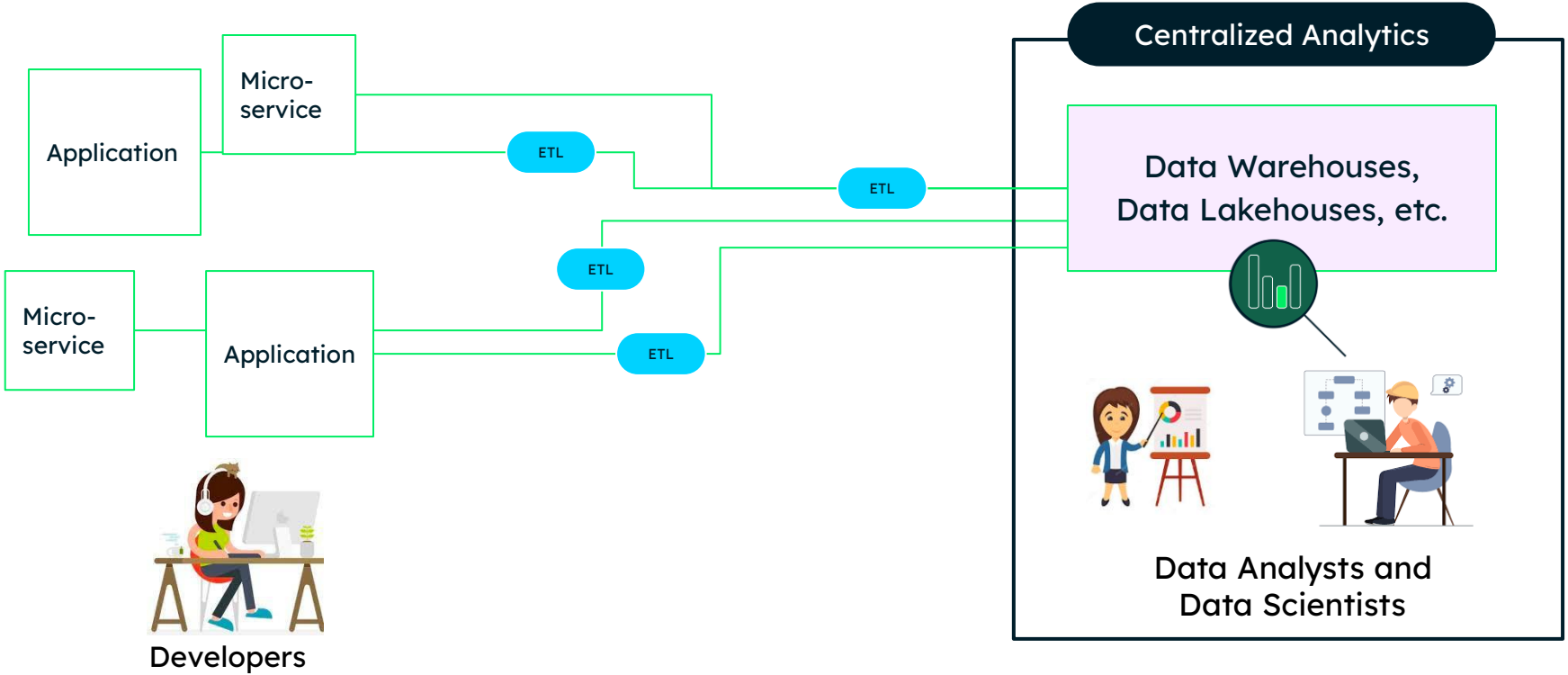


Healthcare:
Fitness tracking

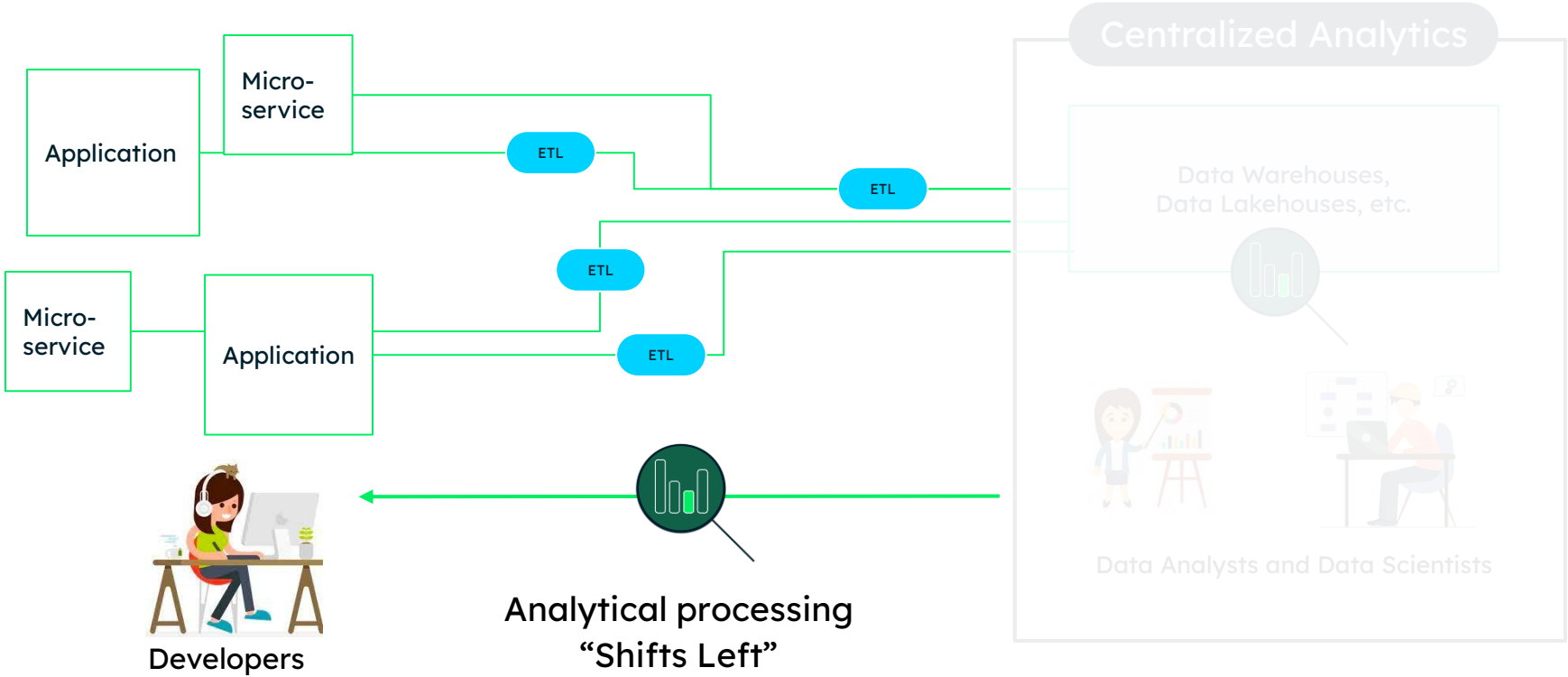


Gaming:
A/B testing

Moving data into separate systems takes time



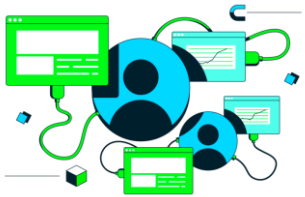
Bringing analytics to the application



What changes when analytics “shifts left”?

Application-driven analytics: **Developers**

Developers: **In-app analytics**



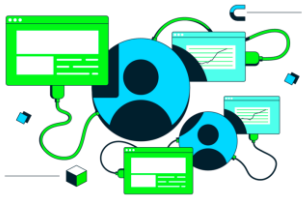
Tools & APIs to build sophisticated queries

Analytics optimized storage and indexing

Integration into enterprise data ecosystem

Application-driven analytics: **Analytics**

Developers: **In-app analytics**



Tools & APIs to build sophisticated queries

Analytics optimized storage and indexing

Integration into enterprise data ecosystem

Analysts: **Real-time business visibility**



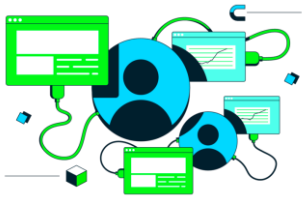
Direct access to raw & messy app data

Using familiar tools and skills

Isolated from live app

Application-driven analytics: **Analytics**

Developers: **In-app analytics**



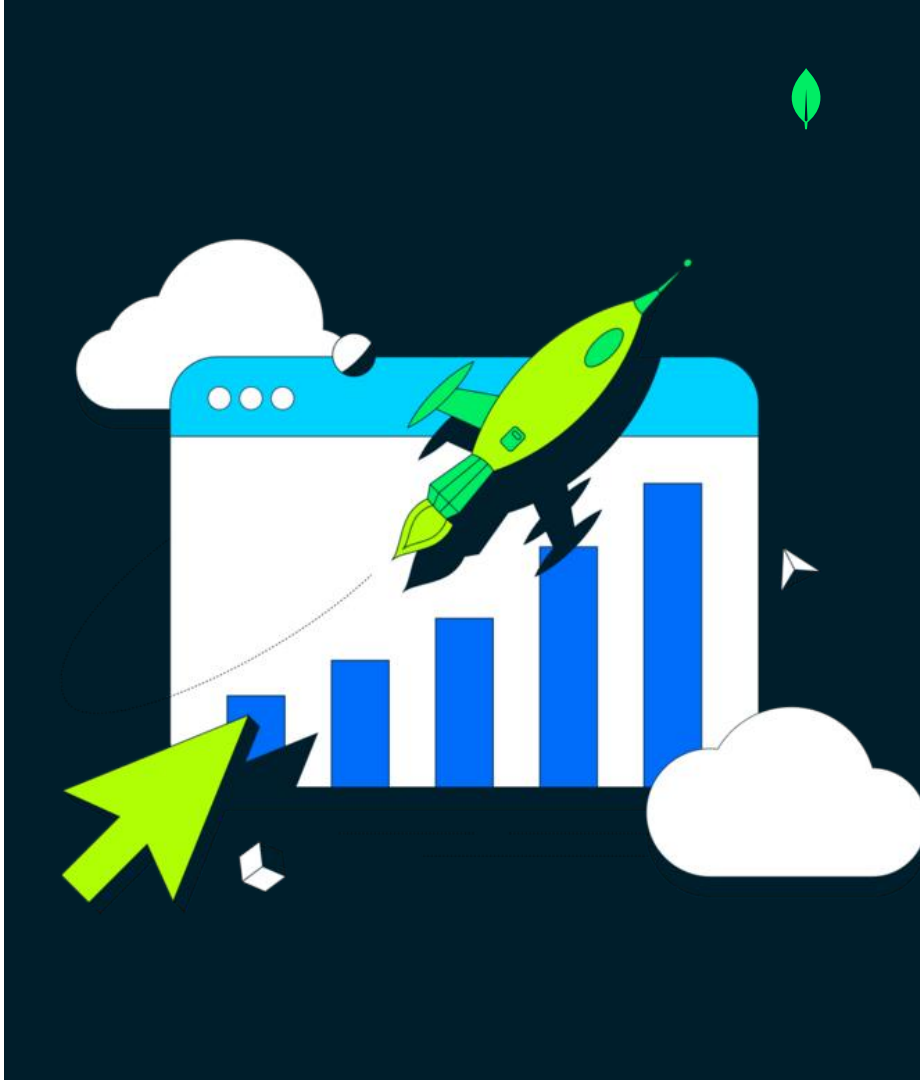
Analysts: **Real-time business visibility**



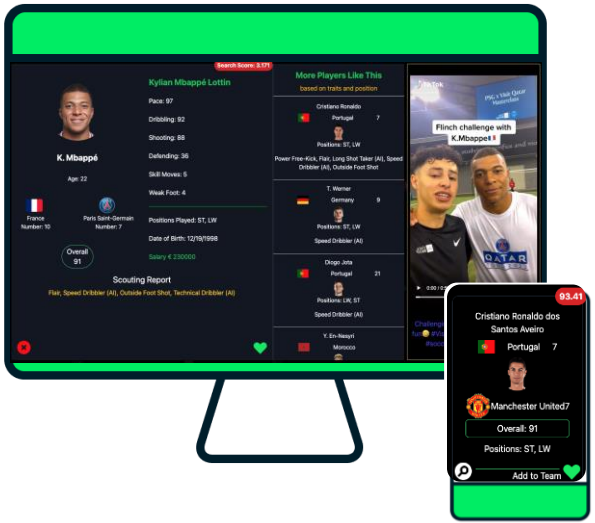
Demands **a single platform** managing shared data sets that power new classes of transactional and analytical workloads for different teams

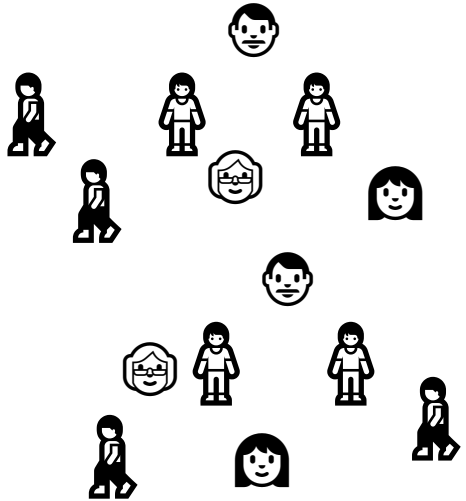
Thing 8

Grow as You Grow

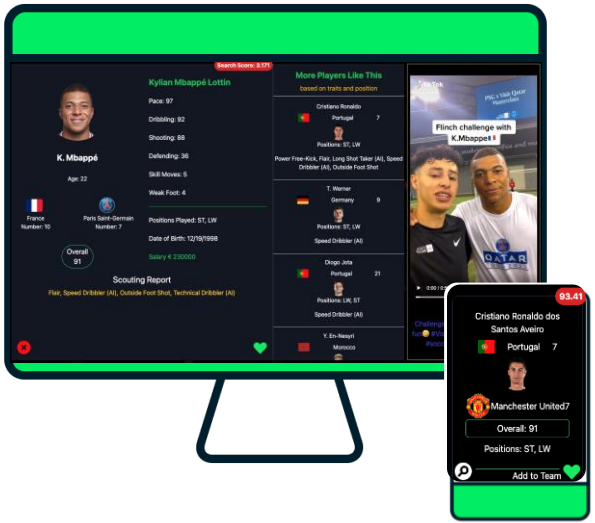


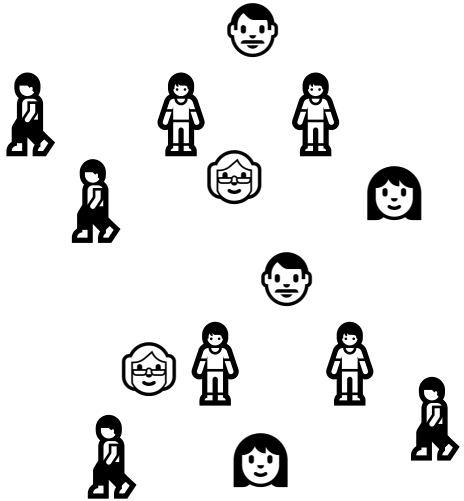
Thing 8


Search Score: 3.171
Kylian Mbappé Lottin
Pace: 97
Dribbling: 92
Shooting: 88
Defending: 36
Skill Moves: 5
Weak Foot: 4
K. Mbappé
Age: 22
France
Number: 10
Paris Saint-Germain
Number: 7
Positions Played: ST, LW
Date of Birth: 12/19/1998
Salary € 230000
Overall
91
Scouting Report
Flair, Speed Dribbler (AI), Outside Foot Shot, Technical Dribbler (AI)
More Players Like This
based on traits and position
Cristiano Ronaldo
Portugal 7
Positions: ST, LW
Power Free-Kick, Flair, Long Shot Taker (AI), Speed Dribbler (AI), Outside Foot Shot
T. Werner
Germany 9
Positions: ST, LW
Speed Dribbler (AI)
Diogo Jota
Portugal 21
Positions: LW, ST
Speed Dribbler (AI)
Y. En-Nesyri
Morocco
TikTok
Flinch challenge with
K.Mbappé
93.41
Cristiano Ronaldo dos
Santos Aveiro
Portugal 7
Manchester United7
Overall: 91
Positions: ST, LW
Add to Team



Thing 8


Search Score: 3.171
Kylian Mbappé Lottin
Pace: 97
Dribbling: 92
Shooting: 88
Defending: 36
Skill Moves: 5
Weak Foot: 4
K. Mbappé
Age: 22
France
Number: 10
Paris Saint-Germain
Number: 7
Positions Played: ST, LW
Date of Birth: 12/19/1998
Salary € 230000
Overall
91
Scouting Report
Flair, Speed Dribbler (AI), Outside Foot Shot, Technical Dribbler (AI)
More Players Like This
based on traits and position
Cristiano Ronaldo
Portugal 7
Positions: ST, LW
Power Free-Kick, Flair, Long Shot Taker (AI), Speed Dribbler (AI), Outside Foot Shot
T. Werner
Germany 9
Positions: ST, LW
Speed Dribbler (AI)
Diogo Jota
Portugal 21
Positions: LW, ST
Speed Dribbler (AI)
Y. En-Nesyri
Morocco
TikTok
Flinch challenge with K.Mbappe!
93.41
Cristiano Ronaldo dos Santos Aveiro
Portugal 7
Manchester United7
Overall: 91
Positions: ST, LW
Add to Team

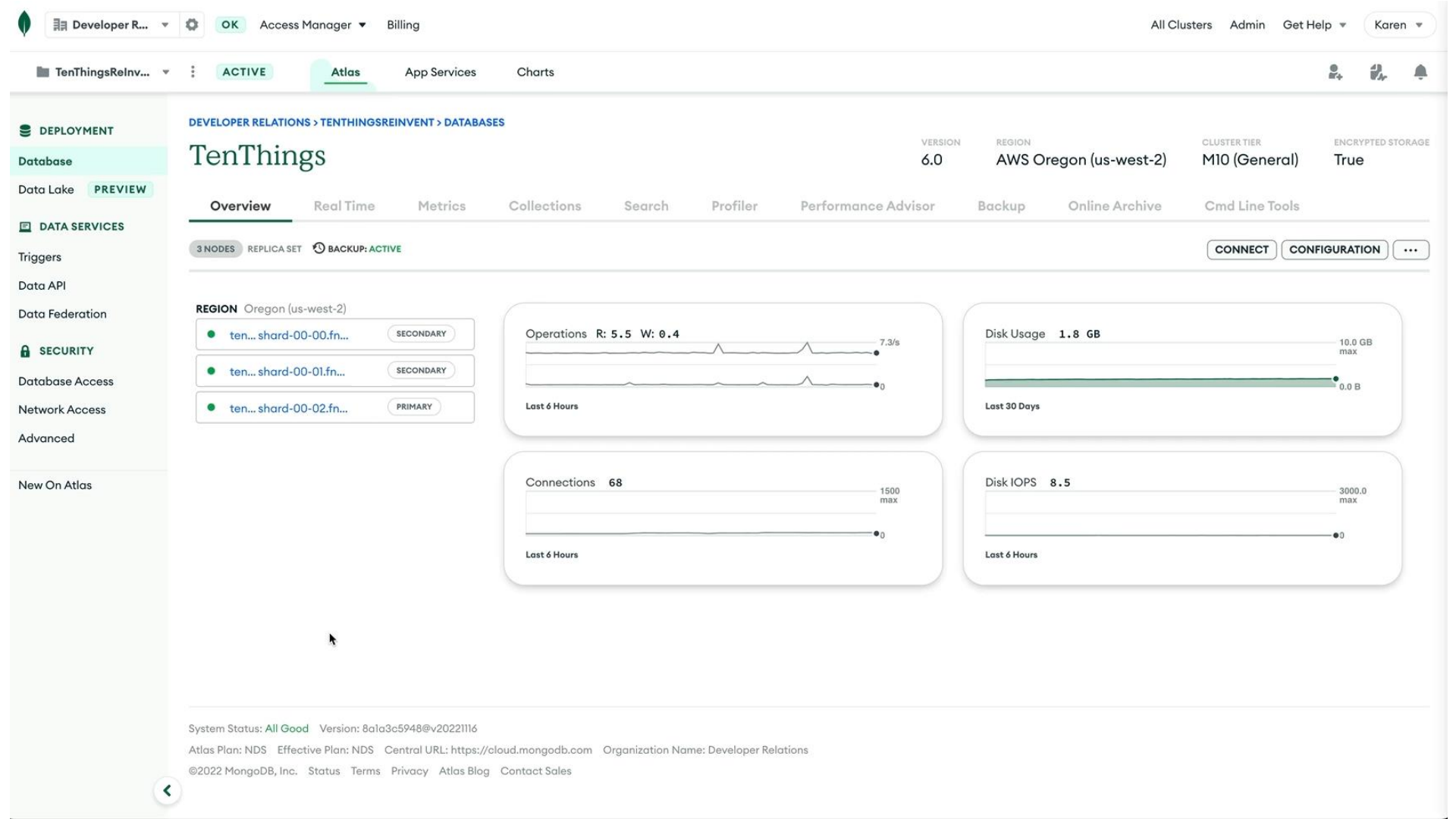




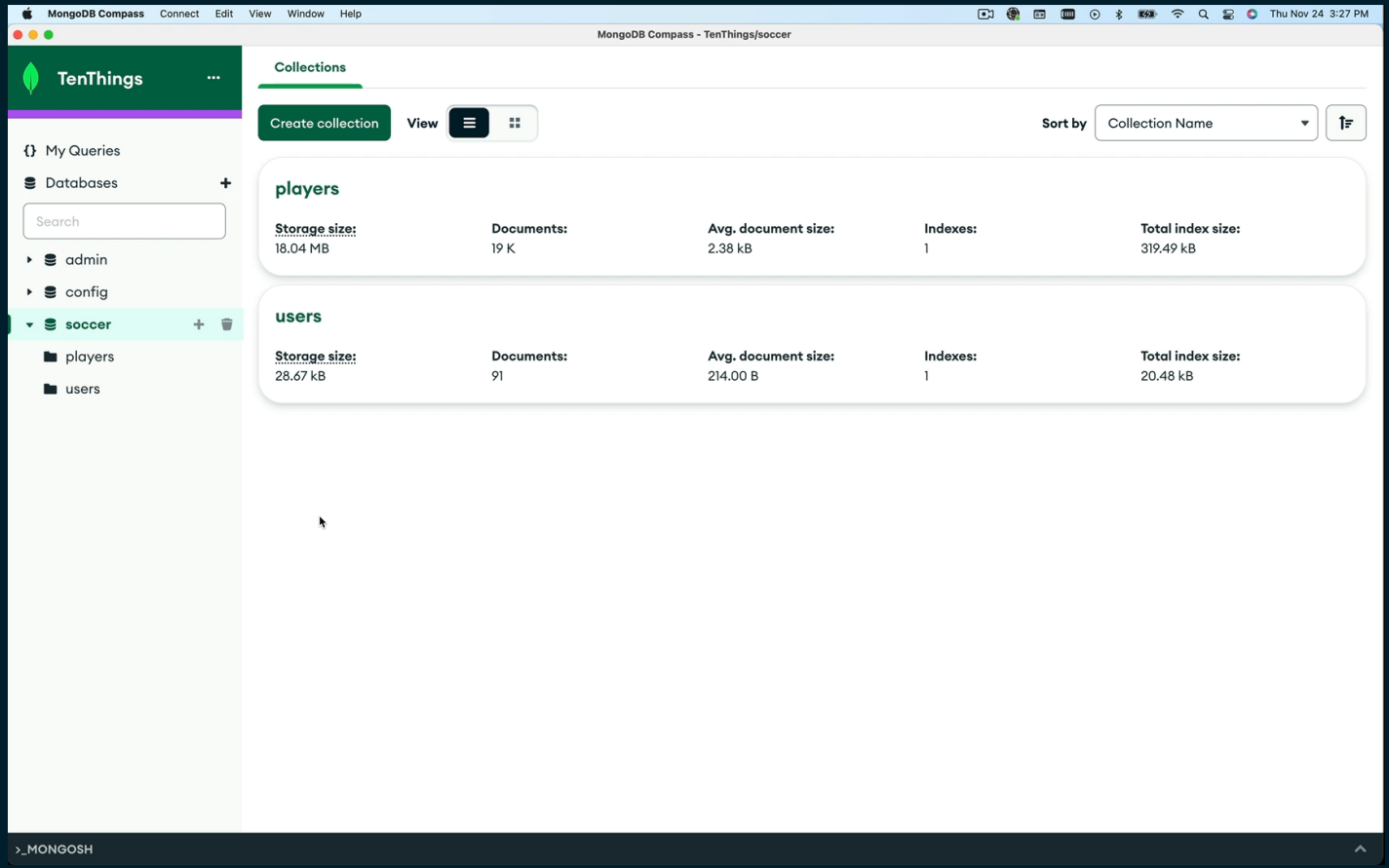
Demo

Global Clusters

8. Grow as You Grow


Developer R...
OK
Access Manager
Billing
All Clusters
Admin
Get Help
Karen
TenThingsReInv...
ACTIVE
Atlas
App Services
Charts
DEPLOYMENT
Database
Data Lake
PREVIEW
DATA SERVICES
Triggers
Data API
Data Federation
SECURITY
Database Access
Network Access
Advanced
New On Atlas
DEVELOPER RELATIONS > TENTHINGSREINVENT > DATABASES
TenThings
VERSION
6.0
REGION
AWS Oregon (us-west-2)
CLUSTER TIER
M10 (General)
ENCRYPTED STORAGE
True
Overview
Real Time
Metrics
Collections
Search
Profiler
Performance Advisor
Backup
Online Archive
Cmd Line Tools
3 NODES
REPLICA SET
BACKUP: ACTIVE
CONNECT
CONFIGURATION
REGION Oregon (us-west-2)
ten... shard-00-00.fn...
SECONDARY
ten... shard-00-01.fn...
SECONDARY
ten... shard-00-02.fn...
PRIMARY
Operations R: 5.5 W: 0.4
7.3/s
0
Last 6 Hours
Disk Usage 1.8 GB
10.0 GB max
0.0 B
Last 30 Days
Connections 68
1500 max
0
Last 6 Hours
Disk IOPS 8.5
3000.0 max
0
Last 6 Hours
System Status: All Good
Version: 8a1a3c5948@v20221116
Atlas Plan: NDS
Effective Plan: NDS
Central URL: https://cloud.mongodb.com
Organization Name: Developer Relations
©2022 MongoDB, Inc.
Status
Terms
Privacy
Atlas Blog
Contact Sales

Users


MongoDB Compass Connect Edit View Window Help
Thu Nov 24 3:27 PM
MongoDB Compass - TenThings/soccer
TenThings
My Queries
Databases
Search
admin
config
soccer
players
users
Collections
Create collection
View
Sort by
Collection Name
players
Storage size: 18.04 MB
Documents: 19 K
Avg. document size: 2.38 kB
Indexes: 1
Total index size: 319.49 kB
users
Storage size: 28.67 kB
Documents: 91
Avg. document size: 214.00 B
Indexes: 1
Total index size: 20.48 kB
>_MONGOSH

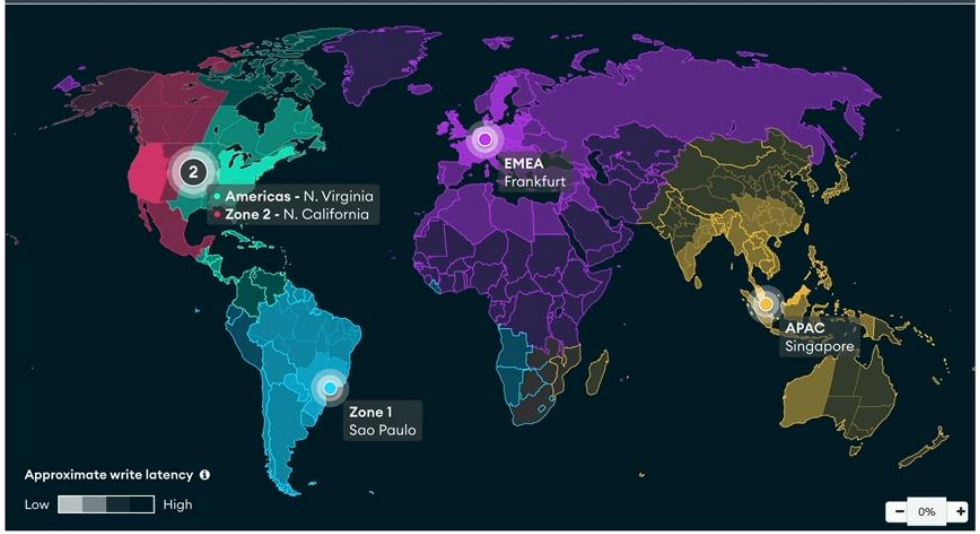
Karen

View your latency across the globe

Customize your deployments with primaries in high-volume areas to suit your application's needs.

CONFIGURE LOCATION MAPPINGS

VIEW ZONE TEMPLATES



Zone configuration summary

CONFIGURE LOCAL READS IN ALL ZONES

Zone 2 (N. California)

+ Add a Zone

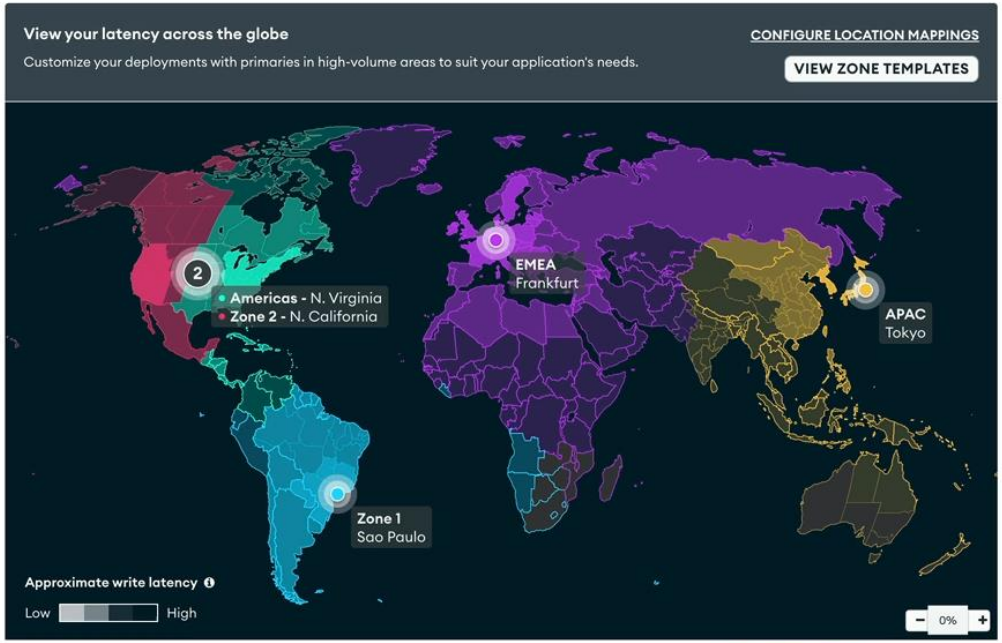
Please note: Global Write Clusters require configuring shard keys after deployment. You can finish configuring your cluster after it has deployed.

Pay-as-you-go! You will be billed hourly and can terminate your cluster anytime. Excludes variable data transfer, backup, and taxes.

Cancel

Review Changes

Privacy - Terms



Zone configuration summary

CONFIGURE LOCAL READS IN ALL ZONES

Zone 1 (Sao Paulo)

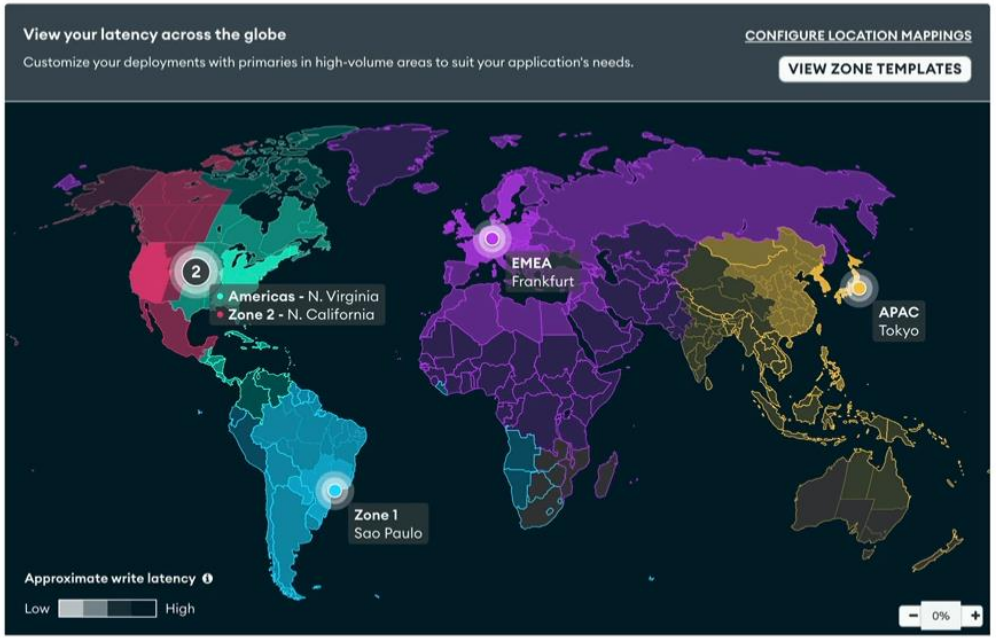
+ Add a Zone

Please note: Global Write Clusters require configuring shard keys after deployment. You can finish configuring your cluster after it has deployed.

Pay-as-you-go! You will be billed hourly and can terminate your cluster anytime. Excludes variable data transfer, backup, and taxes.

Cancel

Review Changes



Zone configuration summary

CONFIGURE LOCAL READS IN ALL ZONES

EMEA (Frankfurt)

+ Add a Zone

Please note: Global Write Clusters require configuring shard keys after deployment. You can finish configuring your cluster after it has deployed.

Pay-as-you-go! You will be billed hourly and can terminate your cluster anytime. Excludes variable data transfer, backup, and taxes.

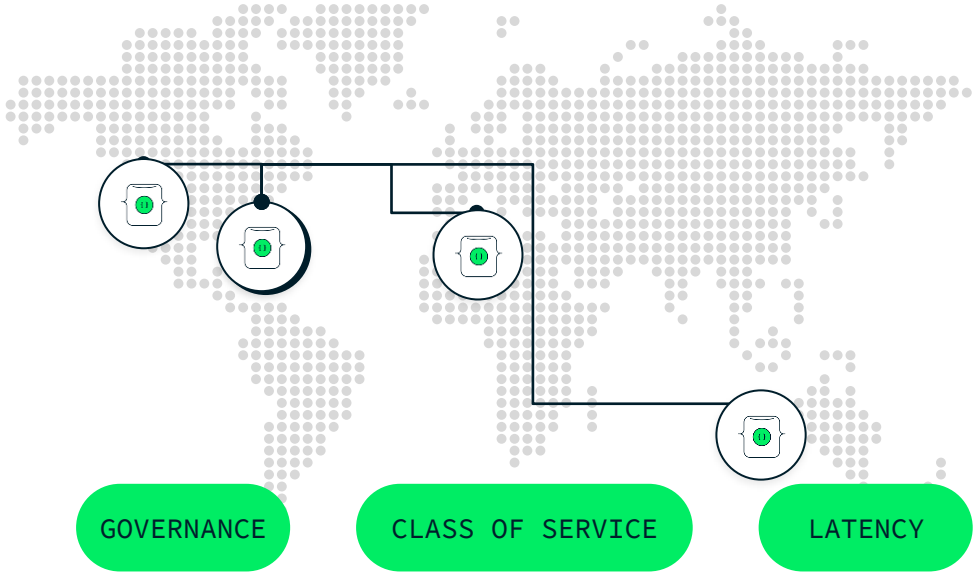
Cancel

Review Changes

Global clusters for data residence

Intelligent Distribution via Zoned Sharding

- Policies to define data placement
- Name a server by region, tag your documents by region and MongoDB does the rest
- Documents automatically migrated as shard key ranges are modified
- Global queries across all data in all zones

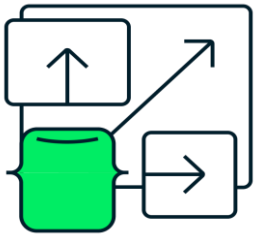


Developers don’t like to size infrastructure.

Serverless



No Scaling Trade-offs



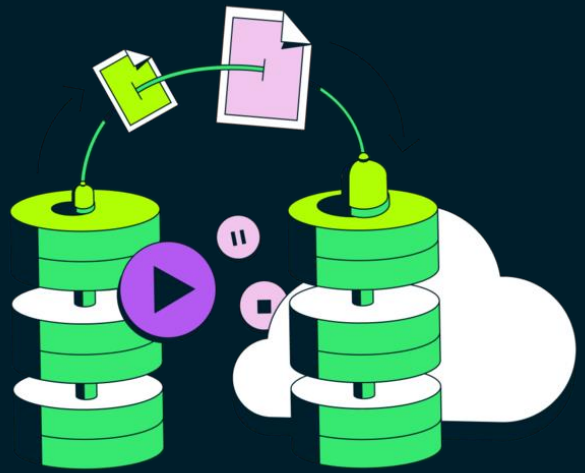
Deployment Flexibility

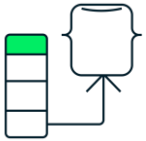


Consumption-based pricing

Thing 9

Go with the Flow





Migrate, Connectors



Sync:

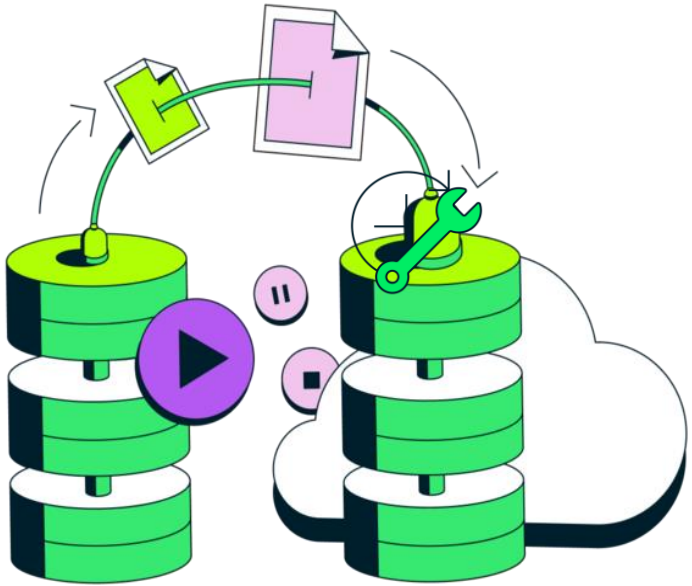
- Flexible
- Asymmetric
- Cluster to Cluster



Tier

- Go away with the flow

Thing 9



Cluster-to-Cluster Sync

- Migration
- Software Development Lifecycle
- Auditing & Compliance
- Analytics

Thing 9



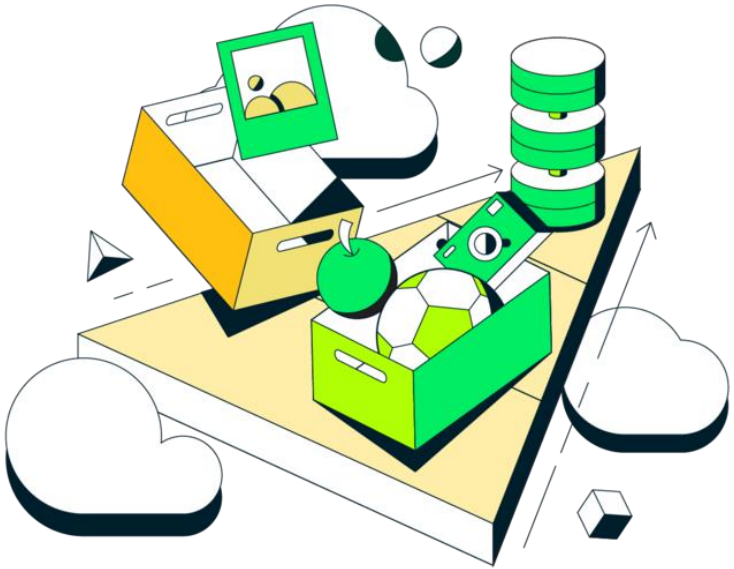
Realm Mobile

Mobile apps

Edge to cloud data sync, flexible, asymmetric

Built-in conflict resolution, networking code – simplifies code

Thing 9



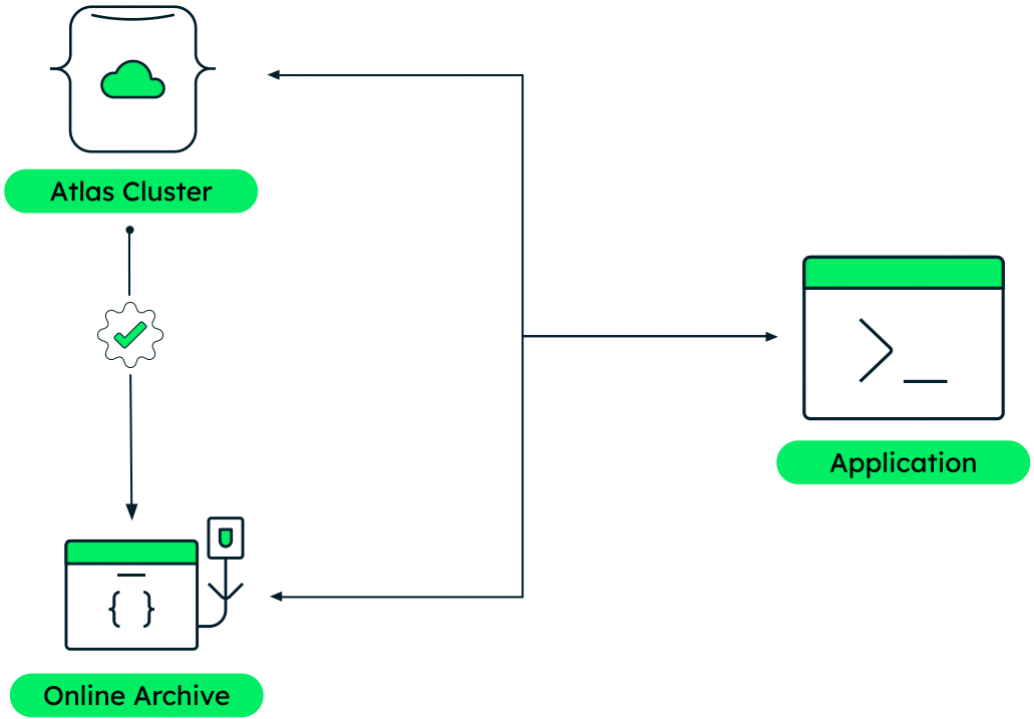
Online Archive

Automate data tiering to reduce storage costs

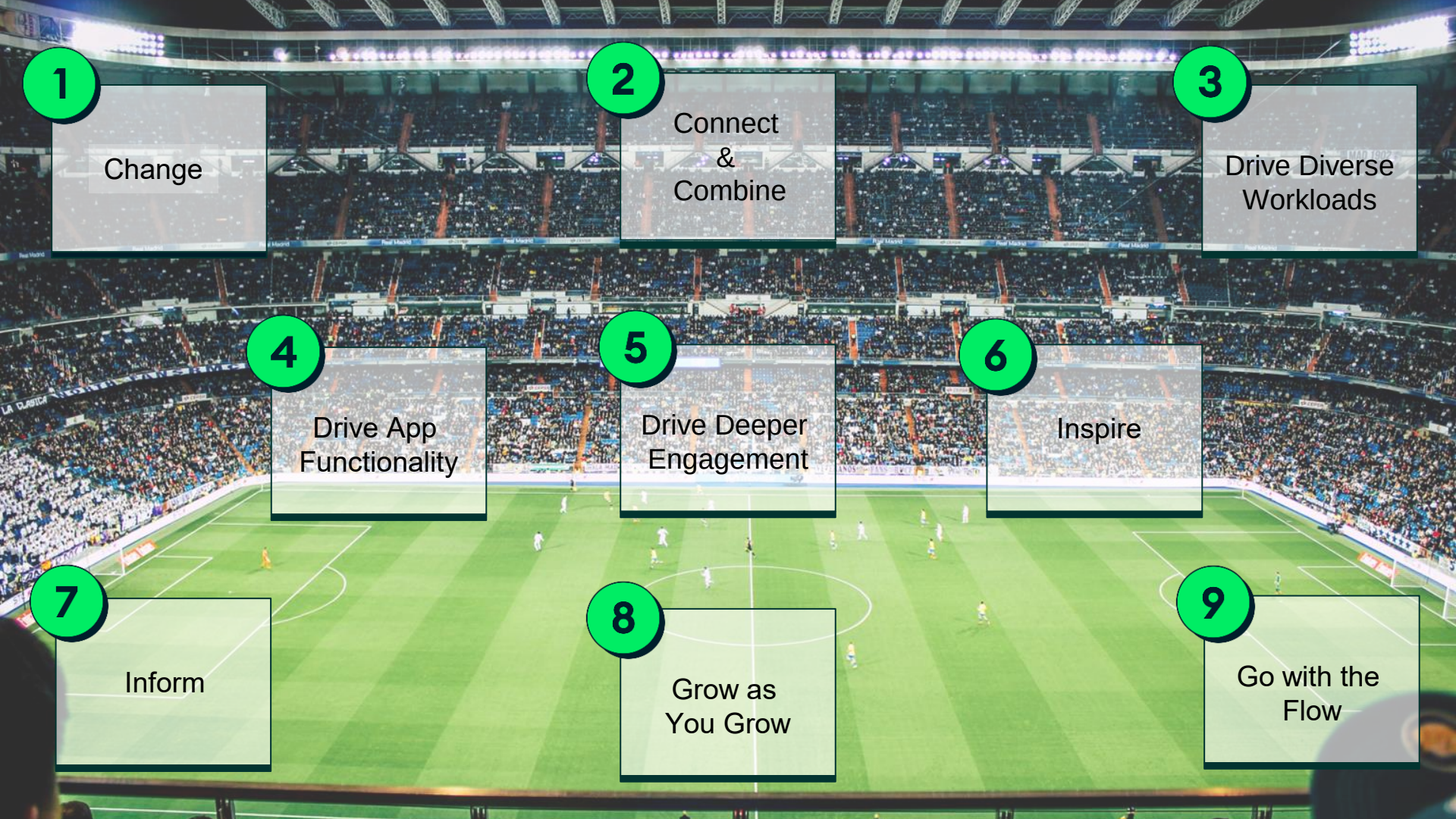
Set custom, date-based rules to offload data

Run federated queries to access data on demand

Archive data to fully managed, queryable storage



1. Change
2. Connect & Combine
3. Drive Diverse Workloads
4. Drive App Functionality
5. Drive Deeper Engagement
6. Inspire
7. Inform
8. Grow as You Grow
9. Go with the Flow


1
Change
2
Connect & Combine
3
Drive Diverse Workloads
4
Drive App Functionality
5
Drive Deeper Engagement
6
Inspire
7
Inform
8
Grow as You Grow
9
Go with the Flow

Thing 10

Protect Users

Security, Compliance, and other things you don’t want to think about …

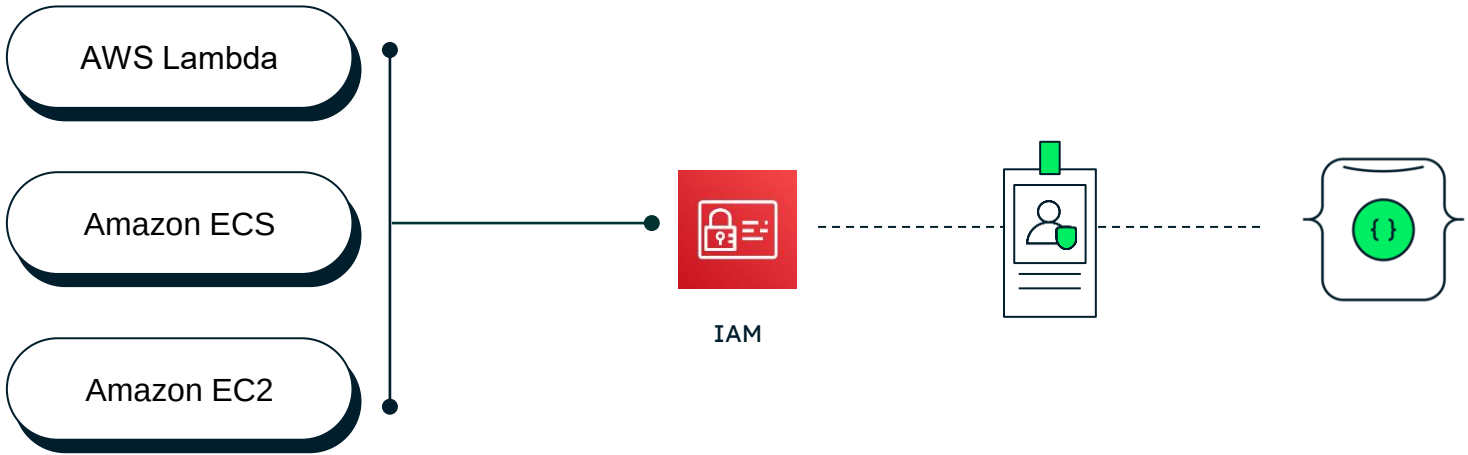


Secure wherever you put your data

All MongoDB Atlas customer projects are deployed into their own VPC for network isolation. Private network peering is available for databases on all three clouds.

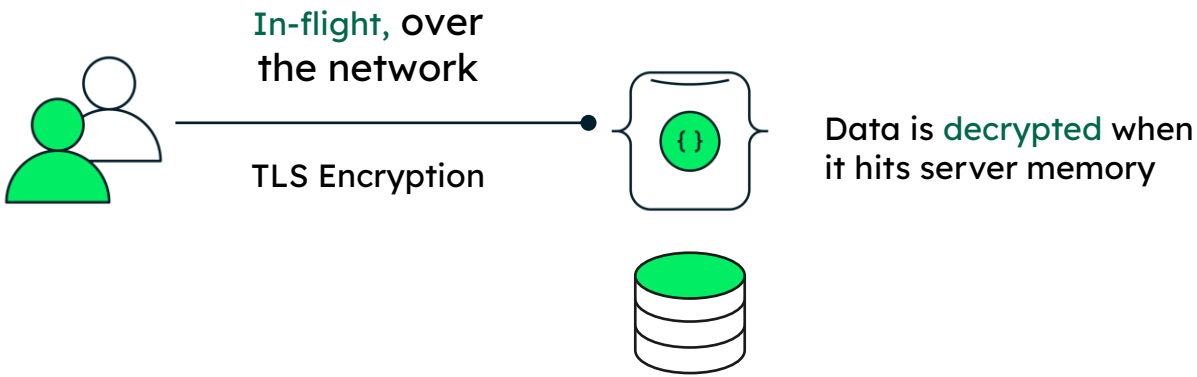
Business Trust Needs	Security Features
Authentication	SCRAM, X.509, LDAPS, AWS IAM, IP Access Lists
Authorization	RBAC, Read-Only Views, Field-Level Redaction
Auditing	Admin, DML, DDL, DCL, Role-based
Encryption	In-Flight: TLS 1.2+ At-Rest: Encrypted Hardware, Volume and Database Storage Engine (AES-256) In-Use: Client-Side Field Level Encryption Key Management: Cloud Services (AWS KMS, Azure KV, Google Cloud KMS)

IAM database authentication



Moving and storing data:

Most databases have it covered



Moving and storing data:

Most databases have it covered

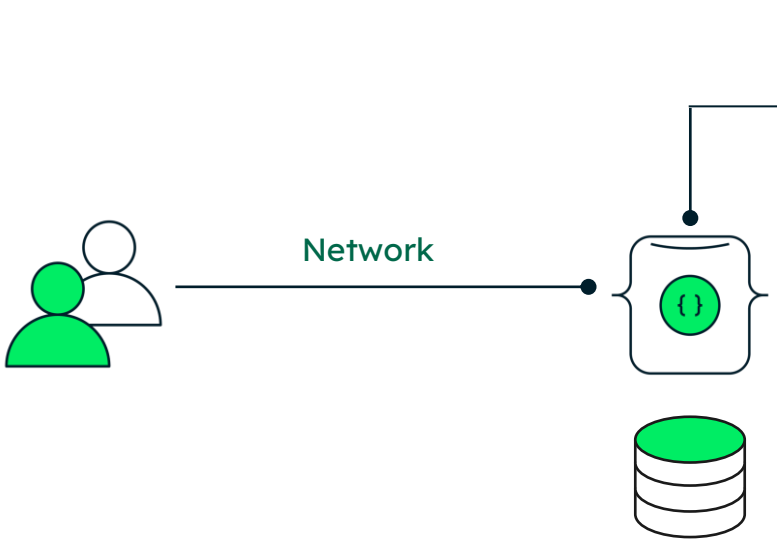


Data is decrypted when it is loaded back into server memory

At-rest, on disk

Volume Encryption
BYO Key, Storage Engine Encryption

But what about data **here?**



In-use, in memory

Data is vulnerable to insider access and active database breaches:

- Authorized and compromised administrators & users
- RAM scraping
- Process inspection

Thing 10

Client-Side Field Level Encryption



Queryable Encryption – Key Benefits

Reduce institutional risk

Confident in storing and processing your sensitive workloads in MongoDB Atlas (Cloud)

Faster app development

No crypto experience required
Intuitive and easy for developers to set up and use

Rich querying on encrypted data

Run expressive queries like range, equality, prefix, suffix, substring, and more on encrypted data



Strong technical controls for critical data privacy use cases

Meet the strictest data privacy requirements for confidentiality on security critical workloads

End-to-end fully randomized encryption

Data never exists in the clear outside of the client
Dramatically reduces attack surface

Ground-breaking query technology, standards-based cryptography

Based on strong, standards-based cryptographic primitives

Queryable Encryption – Key Benefits

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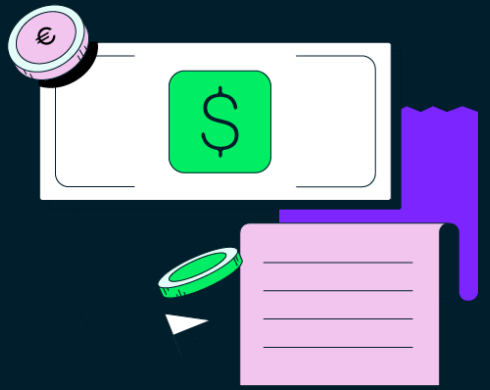
All Things



Automate, Automate



Simple



Cost-Effective

MongoDB

Find & Connect @ Booth #1611

The Desert Disco



w/ DJ Malibu Cathy

The Emerald Lounge @ Sugarcane

the Venetian Hotel

9PM – 1AM

Wednesday, November 30

From RDBMS to NoSQL



w/ Rick Houlihan

Director Developer Relations

Caesar's Forum 113

2PM – 3AM

Thursday, December 1

CONFLUENT

Thank you.



Karen Huaulme
Principal Developer Advocate, MongoDB
@youoldmaid



> Data! Data! Data!
> I can’t make bricks without clay.

The Adventure of the Copper Beeches,
a Sherlock Holmes Short Story

- Arthur Conan Doyle

Thank you!



Please complete the session survey in the **mobile app**

aws

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