



Welcome

Accelerate Your Development with the Latest MongoDB Innovations



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MongoDB

Safe Harbor Statement



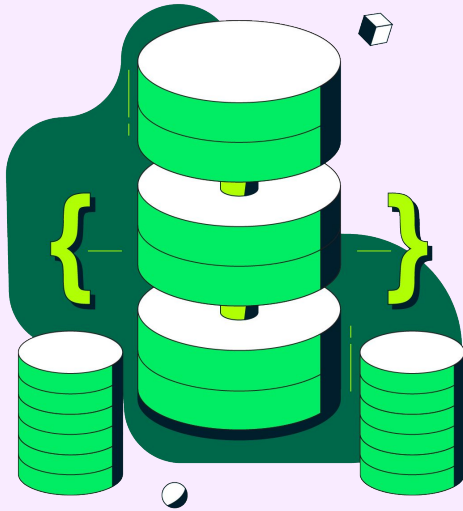
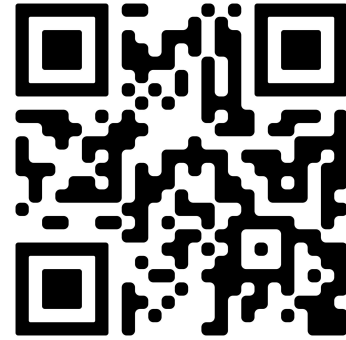
This presentation contains “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Such forward-looking statements are subject to a number of risks, uncertainties, assumptions and other factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by the forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those identified our filings with the Securities and Exchange Commission. You should not rely upon forward-looking statements as predictions of future events. Furthermore, such forward-looking statements speak only as of the date of this presentation.

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Try it out!

All code and scripts



tinyurl.com/5cn9wpj2

The evolution of MongoDB



Latest Innovations in MongoDB

8.0



Persistent Query Settings

Time Series Block Processing

Queryable Encryption with Range
Query

Server Side Timeout

Query Insights

Embedded Config Server

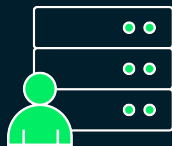
Performance Improvements

... **and more**

What's new in MongoDB 8.2



Hybrid Search

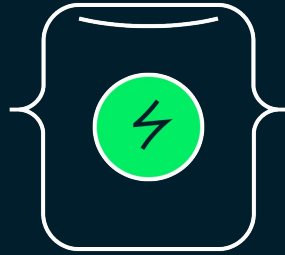


Search/Vector Search
on Community



Prefix, Suffix, Substring
Support with QE

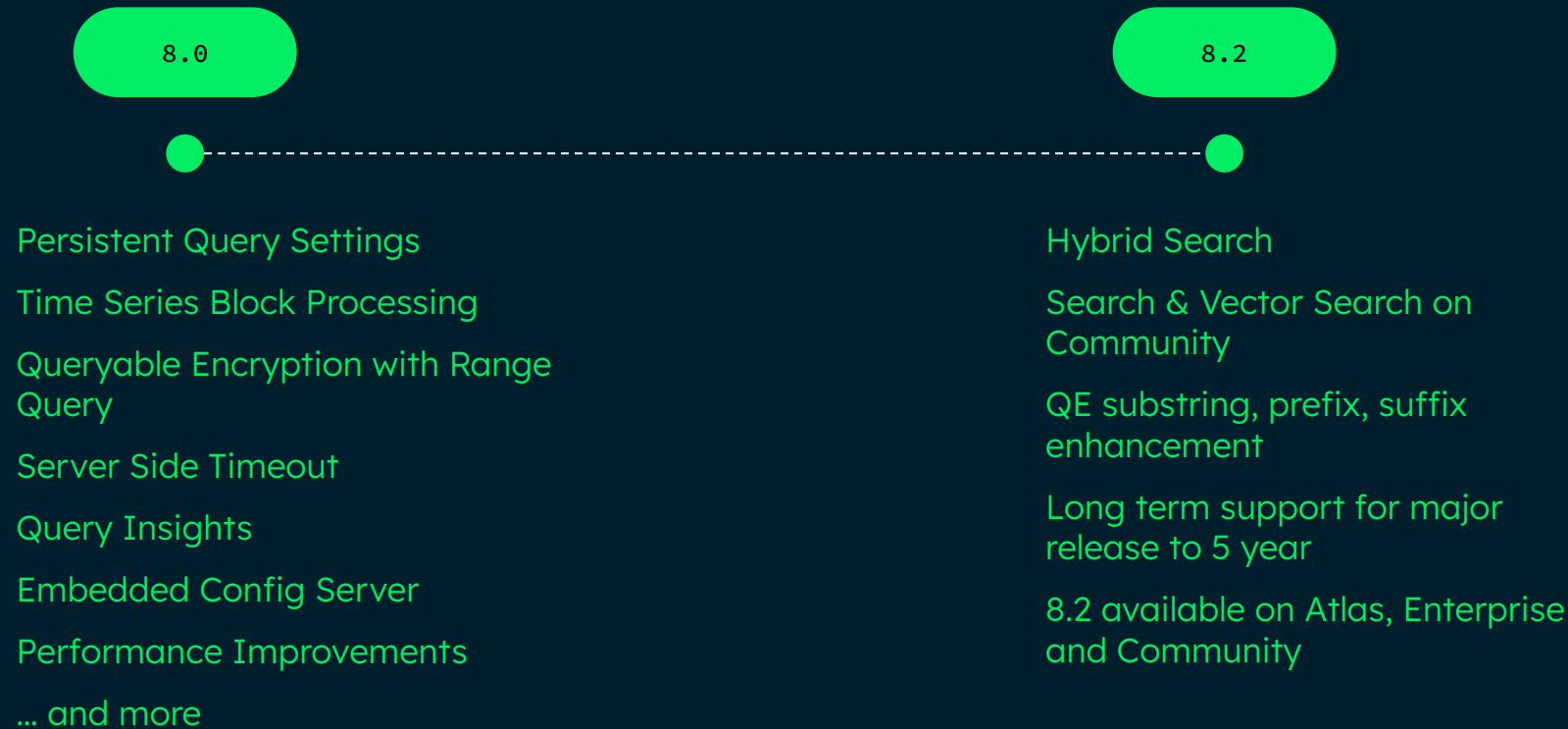
What's new in MongoDB 8.2



5 year long term
support for major
version release

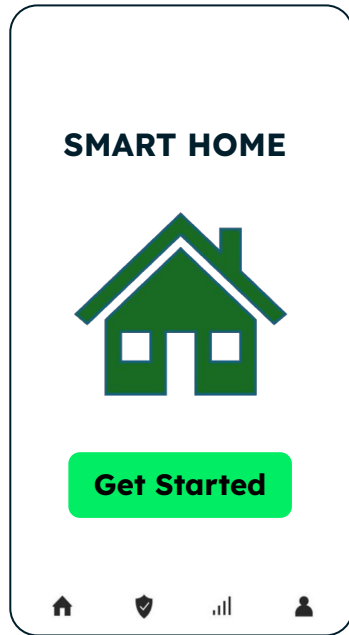
8.2 available on Atlas
Enterprise & Community
Customers

Latest Innovations in MongoDB





Smart Home App Overview



- Ingest sensor data from various devices
 - HVAC
 - EV-Charger
 - Lighting
 - Washer
 - Fridge
- Understand energy consumption pattern
- Goal
 - Use less electricity
 - Lower carbon footprint

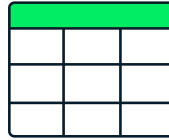


Smart Home App Requirements



Ingest Sensor Data

Ingest data from all sensors



View Sensor Data

View electricity usage over the last 3 days



Support Multiple Users

I want others to be able to use this too



User Data

```
{  
  "user_id": 123,  
  "name": "Nishith Atreya",  
  "email": "nishith@smartapp.com",  
  "location": {  
    ...  
  },  
  "global_region": "North America",  
  "birthday": "1999-02-28",  
  "devices": [  
    ...  
  ]  
}
```



User Data

```
{
  "user_id": 123,
  "name": "Nishith Atreya",
  "email": "nishith@smartapp.com",
  "location": {
    ...
  },
  "global_region": "North America",
  "birthday": "1999-02-28",
  "devices": [
    ...
  ]
}
```

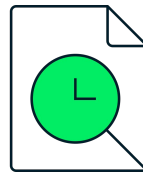
Sensor Data

```
{
  "timestamp": {
    "$date": "2025-04-05T00:03:00.000Z"
  },
  "deviceId": "HEAT001",
  "pressure": 1016.7,
  ...,
  "current_usage": 0.0870838490924282,
  ...
}
```

Time-series Collections

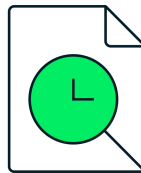


```
db.createCollection("weather", {  
  timeseries: {  
    timeField: "timestamp",  
    metaField: "sensorId",  
    granularity: "minutes"  
  }  
})
```



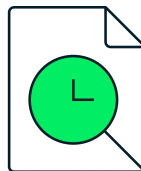
Efficient Storage and Querying

Natively store and query time-stamped data at scale



Optimized Columnar Format

Drastically reduces storage costs and speeds up analytical queries.



Built for modern workloads

Perfect for IoT, financial data, performance monitoring, and more.



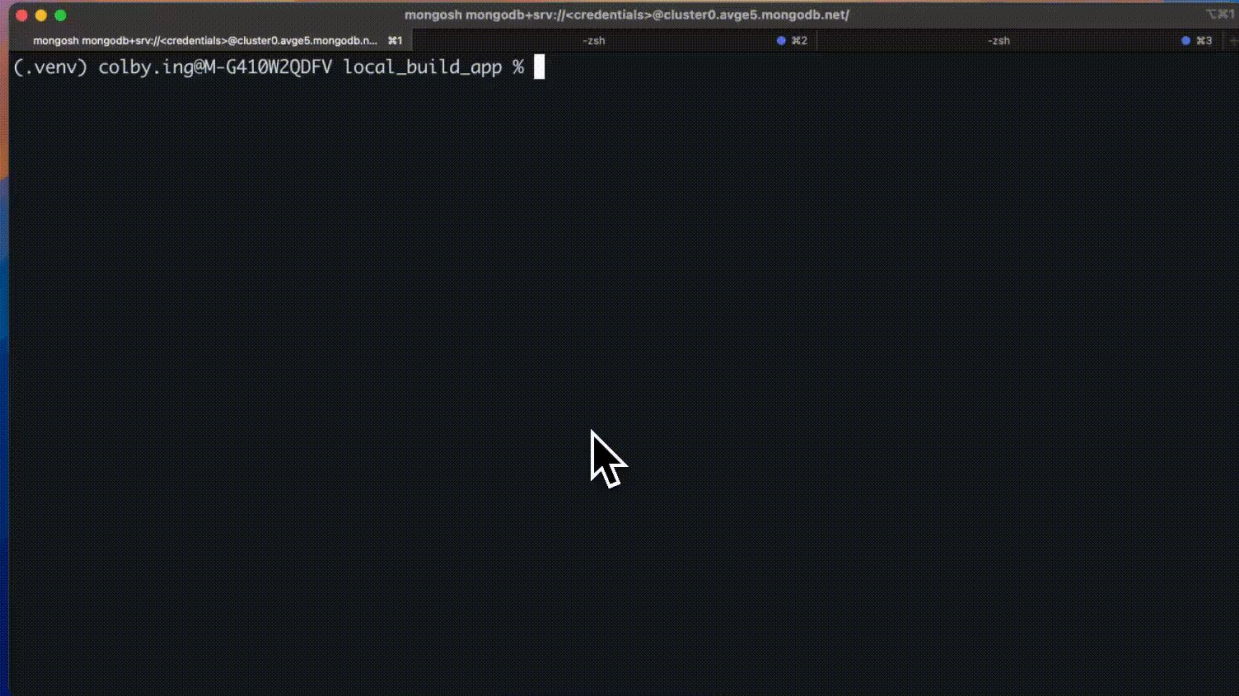
New in 8.0

Block Processing with Time Series



- **Block-based query execution** model that leverages time series architecture and columnar format
- **Optimized for analytical operations** such as complex \$group queries
- **20x faster** large-scale aggregations

Insert Sensor Data

A screenshot of a terminal window with a dark background and light gray text. The window title bar shows 'mongosh mongodb+srv://<credentials>@cluster0.avge5.mongodb.net/'. The terminal content shows a shell prompt '(.venv) colby.ing@M-G410W2QDFV local_build_app %' followed by a cursor. The window has three tabs labeled 'zsh', 'zsh', and 'zsh'. A white mouse cursor is pointing at the bottom center of the terminal window.

```
mongosh mongodb+srv://<credentials>@cluster0.avge5.mongodb.net/
(.venv) colby.ing@M-G410W2QDFV local_build_app %
```

Time Series Data in MongoDB



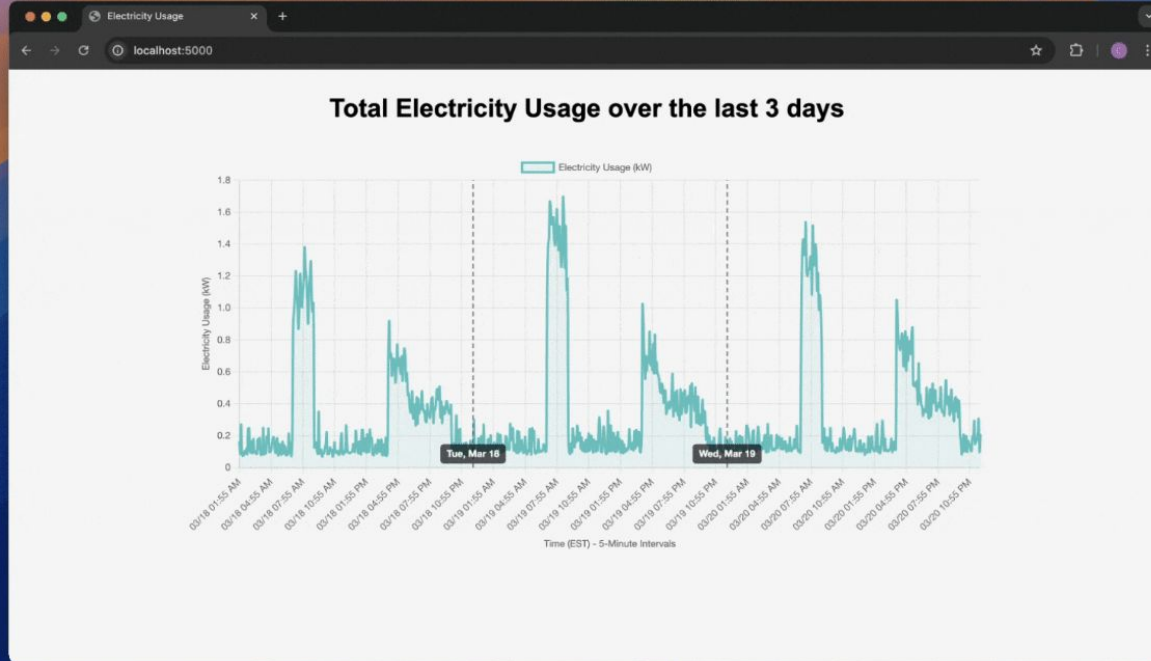
```
mongosh mongodb+srv://<credentials>@demo.avge5.mongodb.net/
colby.ing@M-G410W2QDFV ~ % mongosh "mongodb+srv://demo.avge5.mongodb.net/" --apiVersion 1 --username admin
Enter password: *****
Current Mongosh Log ID: 67f6c4548b8d9ac54fa5c00f
Connecting to:      mongodb+srv://<credentials>@demo.avge5.mongodb.net/?appName=mongosh+2.4.2
Using MongoDB:      8.0.6 (API Version 1)
Using Mongosh:      2.4.2
mongosh 2.5.0 is available for download: https://www.mongodb.com/try/download/shell

For mongosh info see: https://www.mongodb.com/docs/mongodb-shell/

-----
The server generated these startup warnings when booting
2025-04-08T23:49:38.927+00:00: We suggest setting swappiness to 0 or 1, as swapping can cause performance problems.
-----

Atlas atlas-ufjdv1-shard-0 [primary] test> use smart_home
switched to db smart_home
Atlas atlas-ufjdv1-shard-0 [primary] smart_home> []
```

Electricity Consumption Over Time





My project went viral on Hackernews!

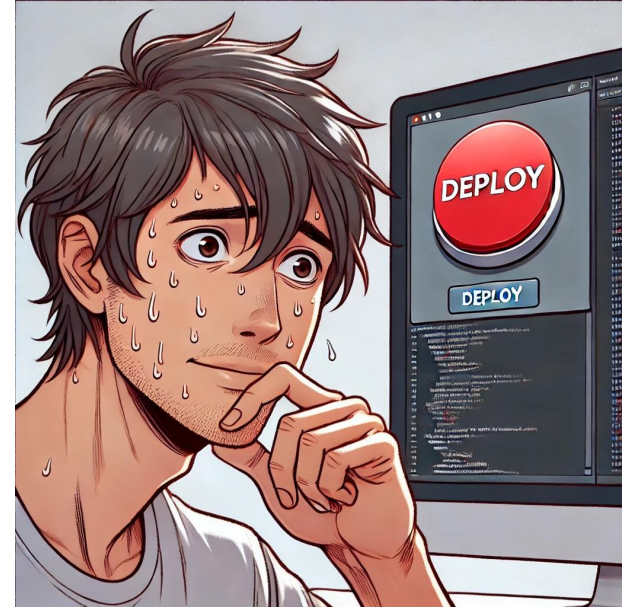
- Huge traffic surge
- Thousands of signups
- Infrastructure Strain: Servers and database now handle a much bigger load





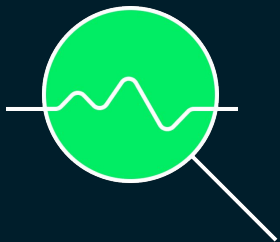
More users, more problems

- Even a small mistake could impact thousands.
- We have a critical performance problem, but we don't know where it is
- *Continuous Deployment Under Pressure*: Rolling out new features or fixes quickly becomes risky

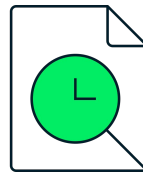




Query Insights

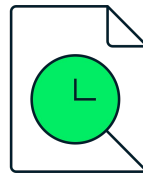


Monitoring tool for
slow-running
database
operations.



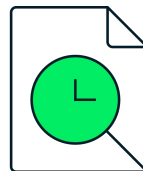
Diagnose Performance Spikes

Instantly see why query latency increased after a release.



Pinpoint Problematic Queries

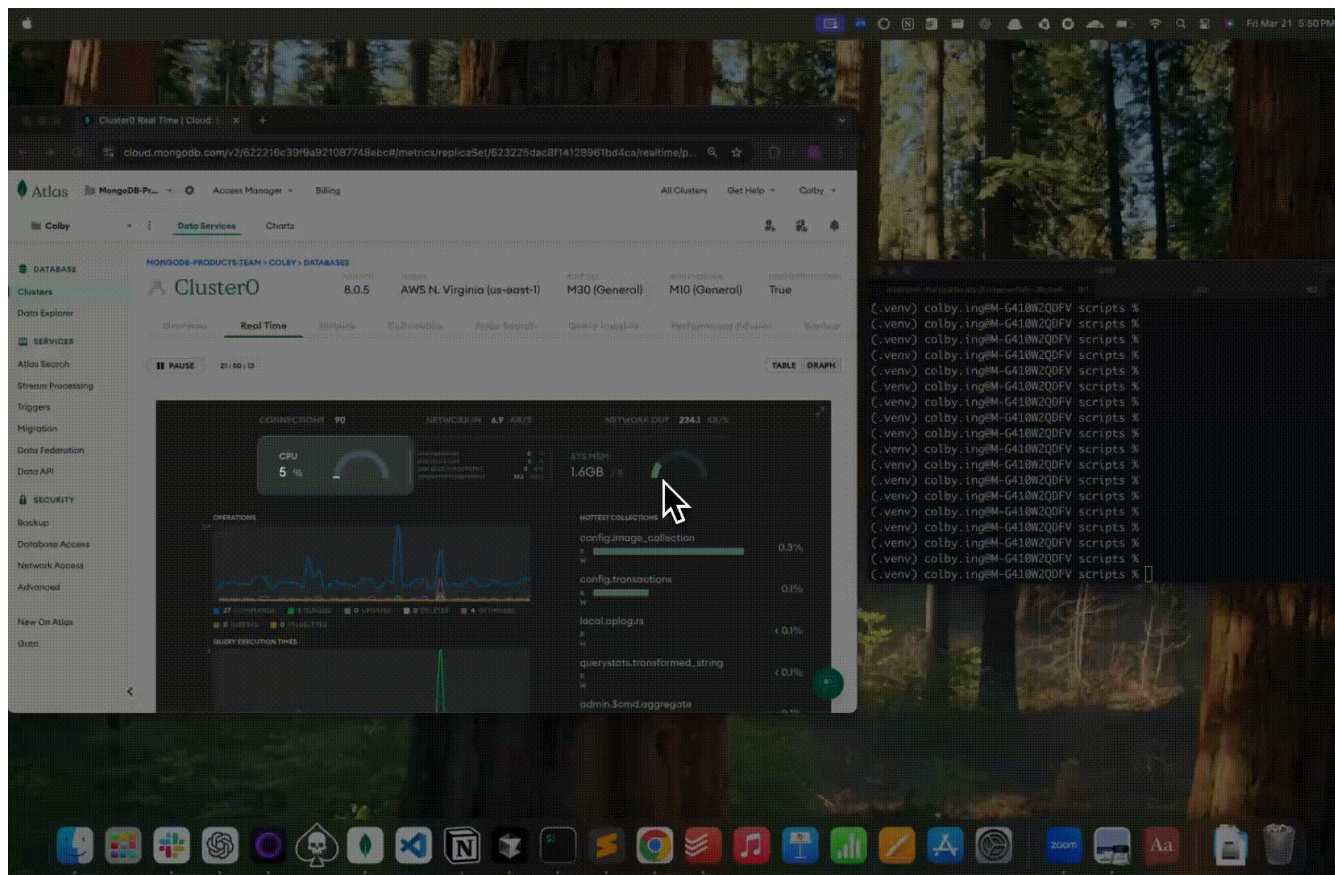
Isolate the exact operations causing database degradation.



Gain Enhanced visibility

Understand query performance trends over time.

Under Pressure: Overloaded Cluster



CPU pegged at 100%



[← Back to Cluster Metrics](#)

Real Time

atlas-yupvu3-config-0

VERSION

8.0.6

REGION

AWS N. Virginia (us-east-1)

CLUSTER TIER

M30 (General)

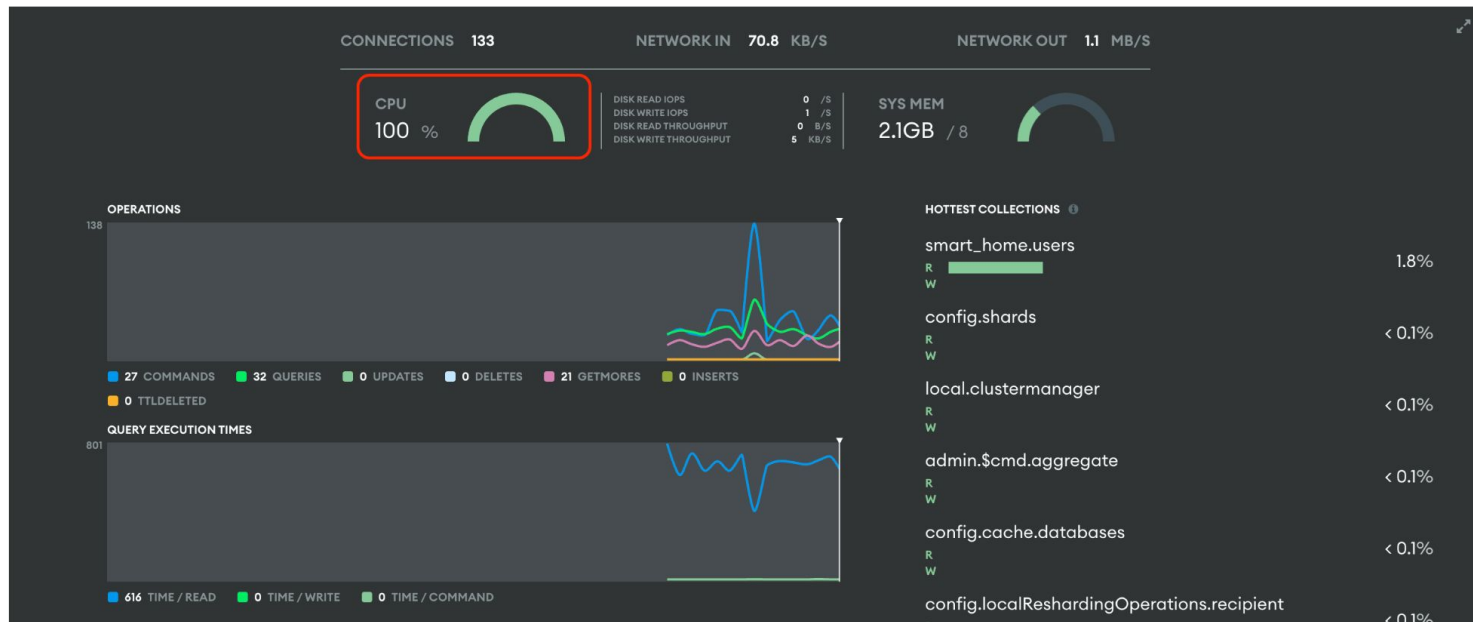
ENCRYPTED STORAGE

True

⏸ PAUSE

21:50:15

TABLE GRAPH



Find the culprit with Query Shape Insights



[← Back to Clusters](#)

Query Insights

Cluster2

VERSION
8.0.11

REGION
AWS N. Virginia (us-east-1)

CLUSTER TIER
M40 (General)

ENCRYPTED STORAGE
True

Group By

Namespaces

Query Shapes

Query Profiler

Filter by Shards and Nodes

Filter by all Shards and Hosts

Time Range

1 hr

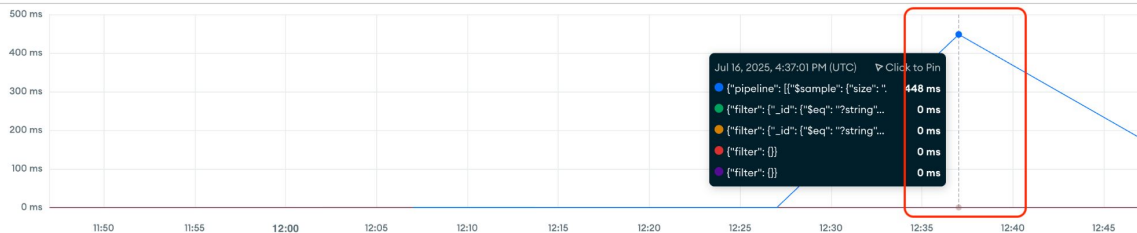
Filter by Date and Time

Filter by time range

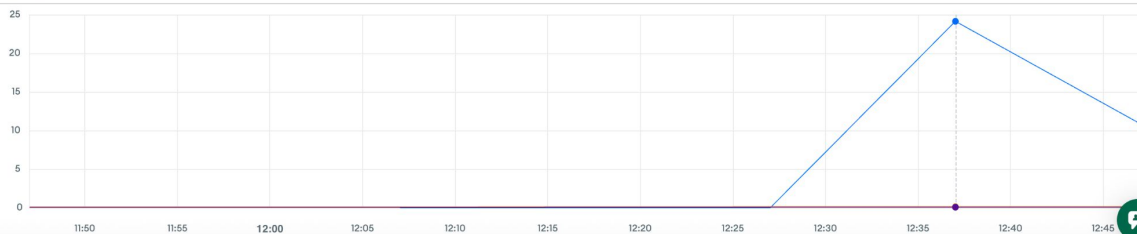
Query Shape Statistics

Total Execution Time **X** Execution Count **X**

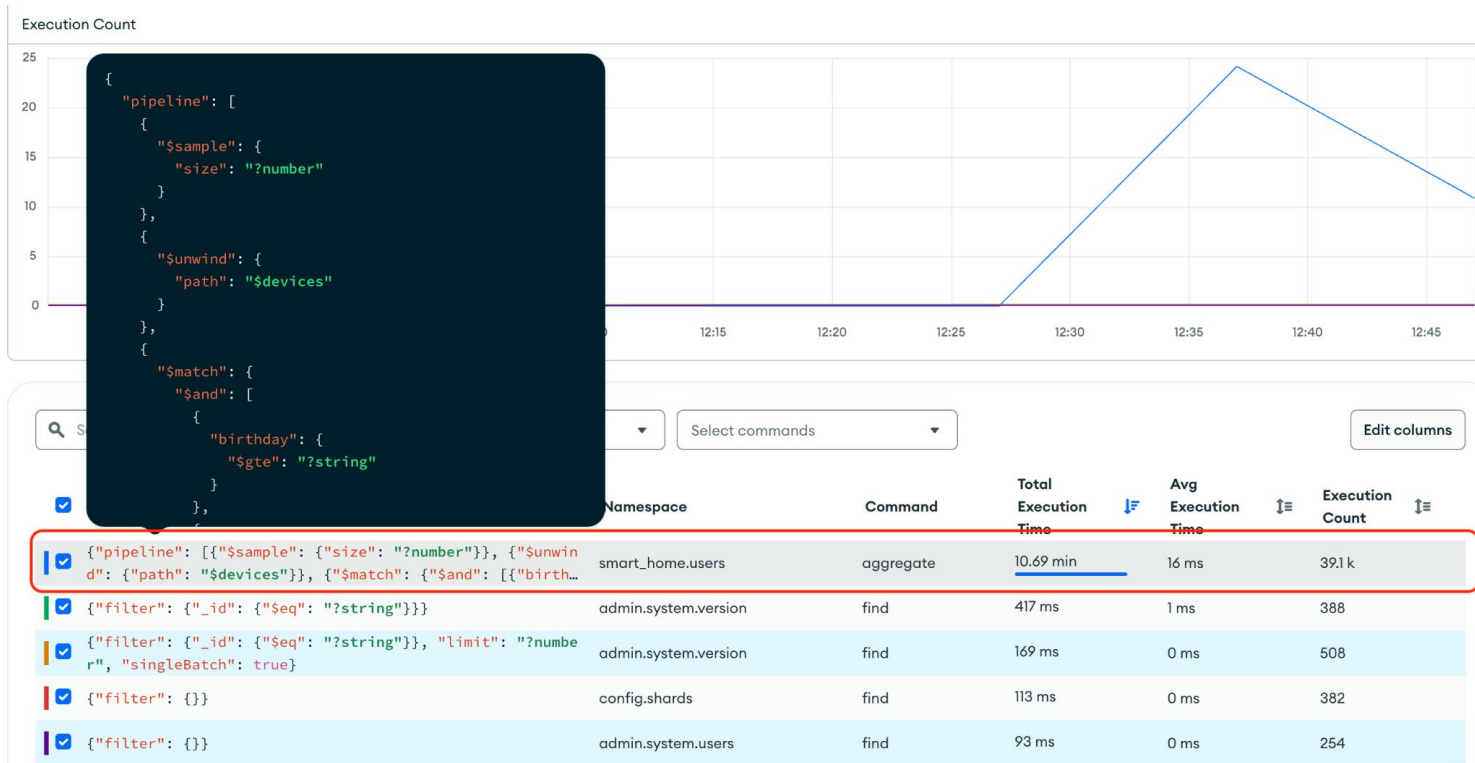
Total Execution Time



Execution Count



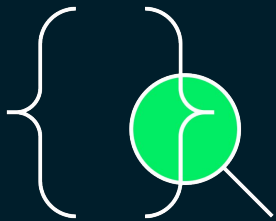
View Top Queries



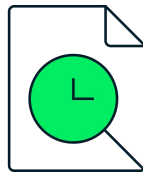




Operation Rejection Filters

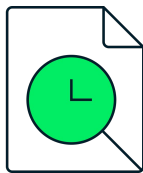


Take action
against
suboptimal
operations



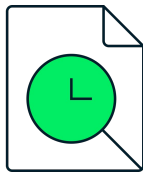
Fix before it gets worse

Prevent resource-consuming queries from causing further issues



Protect System Resources

Prevent resource-intensive operations from degrading database performance.



Minimal changes

Requires no changes to your application code

Identify queryShapeHash



Chrome File Edit View History Bookmarks Profiles Tab Window Help

DemoCluster Query Insights | x +

cloud.mongodb.com/v2/64dbfcccdea0330c82bf95f#/metrics/replicaSet/67d33c33eb698751e0b93a7a/queryinsights/profiler/details/smart_home_data.power_readings/command

Atlas MongoDB-Pr... Access Manager Billing All Clusters Get Help Nishith

NishithA Data Services Charts

Overview

DATABASE

Clusters

Data Explorer

SERVICES

Atlas Search

Stream Processing

Triggers

Migration

Data Federation

SECURITY

Backup

Database Access

Network Access

Advanced

New On Atlas 2

Goto

← ALL QUERIES

namespace: smart_home_data.power_readings operation: command

Filter by Hosts 24 hr Filter by time range

EDIT COLUMNS

Timestamp	Operation Execution Time	Docs Returned	Keys Examined
Mon, 03/24/25 - 09:30:51.634	2.01 min	10	0.00
Mon, 03/24/25 - 09:30:54.586	18.91 s	403	0.00
Mon, 03/24/25 - 09:30:44.585	18.91 s	403	0.00
Mon, 03/24/25 - 09:30:41.576	45.60 s	101	0.00
Mon, 03/24/25 - 09:30:41.575	45.60 s	101	0.00
Mon, 03/24/25 - 09:30:40.325	46.58 s	101	0.00
Mon, 03/24/25 - 09:30:40.324	46.58 s	101	0.00
Mon, 03/24/25 - 09:30:35.031	45.37 s	101	0.00
Mon, 03/24/25 - 09:30:35.030	45.37 s	101	0.00
Mon, 03/24/25 - 09:30:25.604	44.55 s	101	0.00
Mon, 03/24/25 - 09:30:25.603	44.55 s	101	0.00
Mon, 03/24/25 - 09:29:55.377	16.12 s	403	0.00
Mon, 03/24/25 - 09:29:55.376	16.12 s	403	0.00
Mon, 03/24/25 - 09:29:53.048	17.29 s	403	0.00
Mon, 03/24/25 - 09:29:53.047	17.29 s	403	0.00
Mon, 03/24/25 - 09:29:48.989	17.91 s	403	0.00
Mon, 03/24/25 - 09:29:48.988	17.91 s	403	0.00

Docs Returned 13

Keys
Examined

EDIT COLUMNS

NOTE

QUERY RAN WITHOUT AN INDEX

This query ran without an index. If you plan to use this query heavily, you should create an index to optimize this query. [Learn More](#).

View Index Documentation

Query Log ⓘ

View Full Parsed Log

```
{
  "type": "command",
  "isFromUserConnection": true,
  "ns": "smart_home.users",
  "collectionType": "normal",
  "queryShapeHash": "C6DB285AF427FC4515A6EE87B46B4FD3C66364C
F4A0892F2C07C0E63CDF01DF1",
  "command": {
    "aggregate": "users",
    "pipeline": [
      {
        "$sample": {
          "size": 13120
        }
      },
      {
        "$unwind": "$devices"
      },
      {
        "$match": {
          "birthday": {
            "$gte": "1968-03-27"
          }
        }
      }
    ]
  }
}
```

Reject Query Filter



```
mongosh mongodb+srv://<credentials>@demo.avge5.mongodb.net/
...ongodb+srv://<credentials>@cluster0.avge5.mongodb.net/ (-zsh) ㉿1  ...mongodb+srv://<credentials>@demo.avge5.mongodb.net/ (-zsh) ㉿2  ...sh mongodb+srv://<credentials>@demo.avge5.mongodb.net/ (node) ㉿3  +

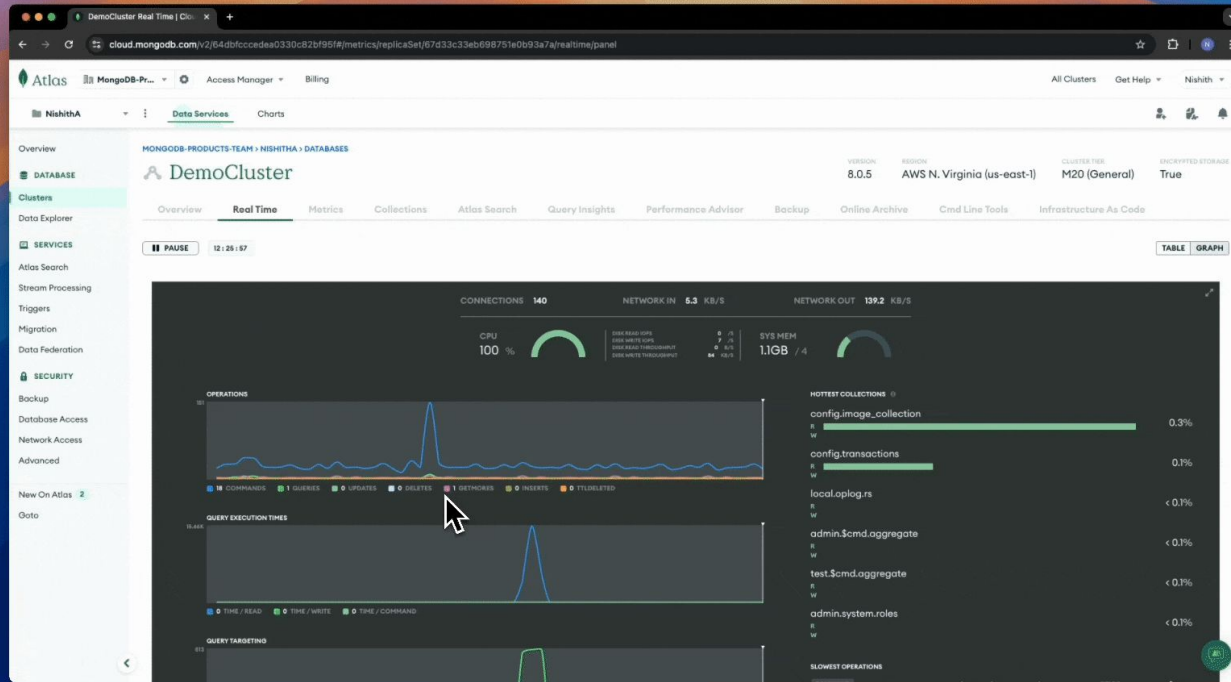
Using MongoDB:      8.0.6 (API Version 1)
Using Mongosh:      2.4.2
mongosh 2.5.0 is available for download: https://www.mongodb.com/try/download/shell

For mongosh info see: https://www.mongodb.com/docs/mongodb-shell/

-----
  The server generated these startup warnings when booting
  2025-04-08T23:49:38.927+00:00: We suggest setting swappiness to 0 or 1, as swapping can cause performance problems.
-----

Atlas atlas-ufjdv1-shard-0 [primary] test> use smart_home
switched to db smart_home
Atlas atlas-ufjdv1-shard-0 [primary] smart_home> db.adminCommand({
...   setQuerySettings: "C6DB285AF427FC4515A6EE87B46B4FD3C66364CF4A0892F2C07C0E63CDF01DF1",
...   settings: {
...     reject: true
...   }
... })
```

CPU utilization levels out



CPU utilization levels out



[← Back to Clusters](#)

Real Time

demo

VERSION

8.0.6

REGION

AWS N. Virginia (us-east-1)

CLUSTER TIER

M40 (General)

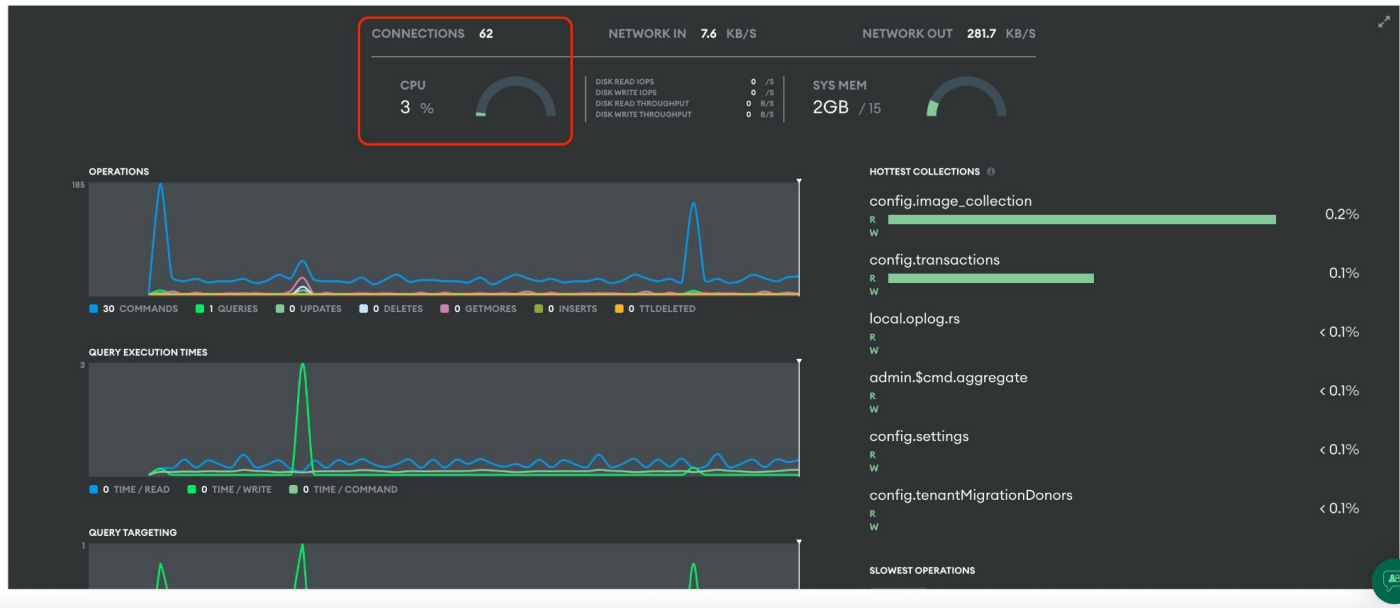
ENCRYPTED STORAGE

True

PAUSE

15:13:00

TABLE GRAPH



Putting it all together



Take a breath.
Investigate the Root Cause.

Operation Rejection Filter

Query Insights

Leverage real-time metrics



**Visibility &
control
without
application
changes**



From Side Project to Viable Business

- **Opportunity** - it's no longer just a hobby. Our app with huge user data now has real revenue & monetization potential
- **New Challenge** - How do we protect user data and maintain trust? Security is essential for growth



Queryable Encryption



Encrypt fields while
still supporting
expressive queries



Protect Sensitive PII

Encrypt user data like names, emails, and locations end-to-end.



Maintain Full Functionality

Run expressive queries directly on encrypted data.



Build trust and maintain compliance

Simplify your data infrastructure, reduce operational overhead, and improve security.

Latest enhancements with QE on version 8



Range query support
on 8.0

Prefix, suffix and substring
support on 8.2



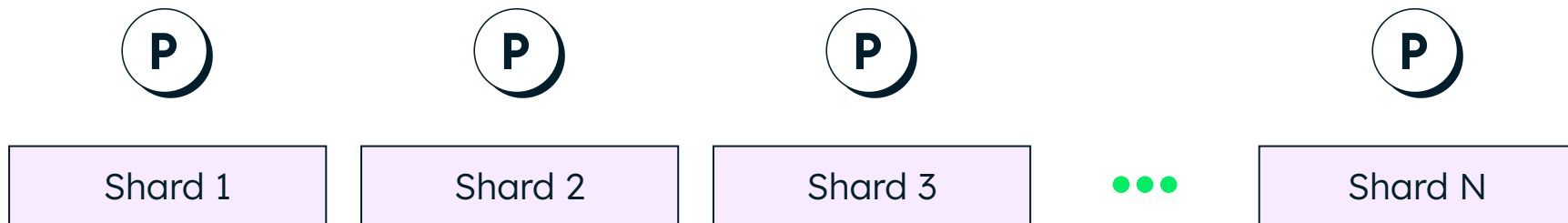
Global Surge!

- **Unexpected surge:** We woke up to find thousands of new users from Germany, Japan, and the UK!
- **Increased Volume:** Our cluster is slowing down due to increased data volume
- **The Next Challenge:** We need to handle this new wave of growth without sacrificing performance or reliability





Horizontal scaling



Step 1: Add Shard



Termination Protection



When enabled, prevent any user from accidentally deleting this cluster. Termination protection will need to be disabled before this cluster can be deleted.

[Learn more.](#)

Advanced Settings

Shard your cluster (M30 and up)



[Sharding](#) supports high throughput and large datasets, and can be increased as data requirements grow. Sharded clusters cannot be converted to [replica sets](#).



Config server type: Embedded. You can manage your configuration se

1 Shards

1

2

3

4

5

6

DEPRECATING SEPTEMBER 2026

Enable Business Intelligence Connector (M10 and up)

The [BI Connector](#) allows you to visualize your data on relational business intelligence tools (e.g. Tableau, MicroStrategy, Qlik).

BI Connector
pricing for M30

\$3.82/day for sustained monthly usage
or **\$10.82/day**, up to \$116.28/month maximum



Freedom, Flexibility and Global Scale



Consistent developer experience

One database and API regardless of where you run.



Avoid vendor lock-in.

Deploy individual clusters across different clouds



True hybrid experience

Deploy a single cluster across multiple clouds

Performance



8.0 set a new
standard



Major improvements
on industry
benchmarks

- YCSB
- LinkBench
- TSBS

Resilience



Scalability



Security



Performance

8.0 vs 7.0 Performance

Throughput



36%

FASTER

reads-only



32%

FASTER

reads and updates



56%

FASTER

bulk inserts



200%

FASTER

time series queries

Source: YCSB and TSBS Benchmarks

New in MongoDB 8.2



42%

faster unindexed
query performance

10%

faster in memory
reads

20%

faster array
traversals

3x

time-series bulk
insert throughput



Key MongoDB Innovations

Time Series Collections with Block Processing

Query Insights & Query Settings

Queryable Encryption

Sharding Enhancements

Multi-cloud and multi-region support

Performance

A decorative green line starts from the top right, curves down and left, then curves down and right, ending near the bottom right. A small green leaf icon is positioned at the top right end of this line.

Put together your
upgrade plan in
advance

A solid dark green curved shape is located in the bottom left corner of the slide.