Assessing the Compatibility of Postgres for MongoDB Workloads

Peter Farkas, Co-Fondateur & PDG, FerretDB

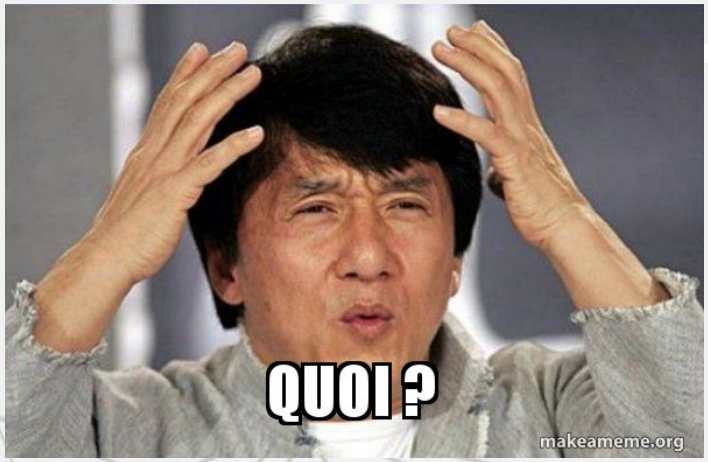
Paris, France 2024

PERCONA UNIVERSITY

FerretDB

BlaBlaCar

L'avenir de MongoDB est Postgres.

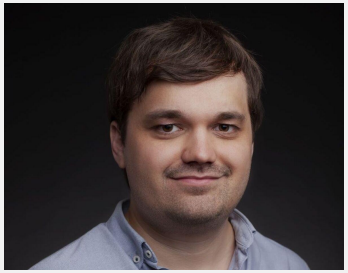


FerretDB

Founders of FerretDB

Alexey Palazhchenko, CTO

Ex-Percona, Talos



Peter Farkas, CEO

Ex-Percona, Cloudera

Peter Zaitsev

Founder and former CEO of Percona

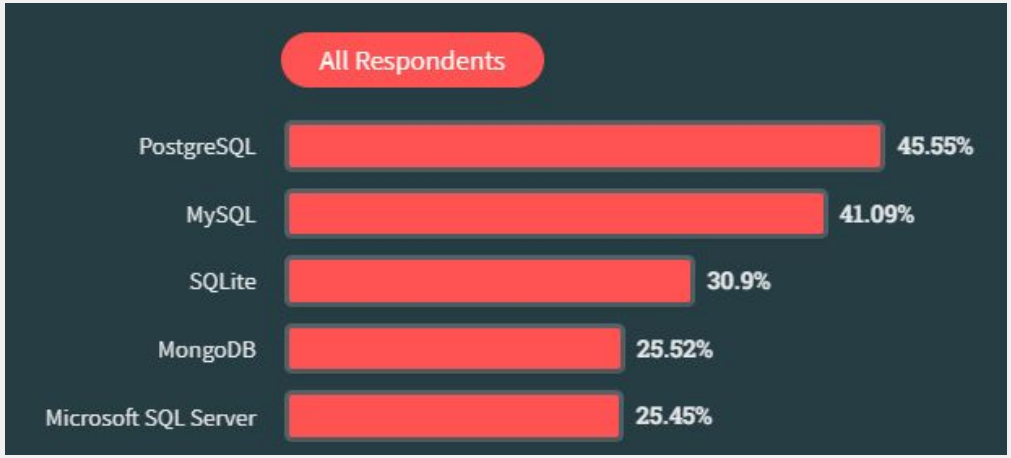
FerretDB

Agenda

- Why move MongoDB to Postgres? MongoDB's licensing
- History of SQL as an Open Standard
- Why Postgres?
- Architecture of FerretDB
- Conclusion

FerretDB

Find the outlier on this graph

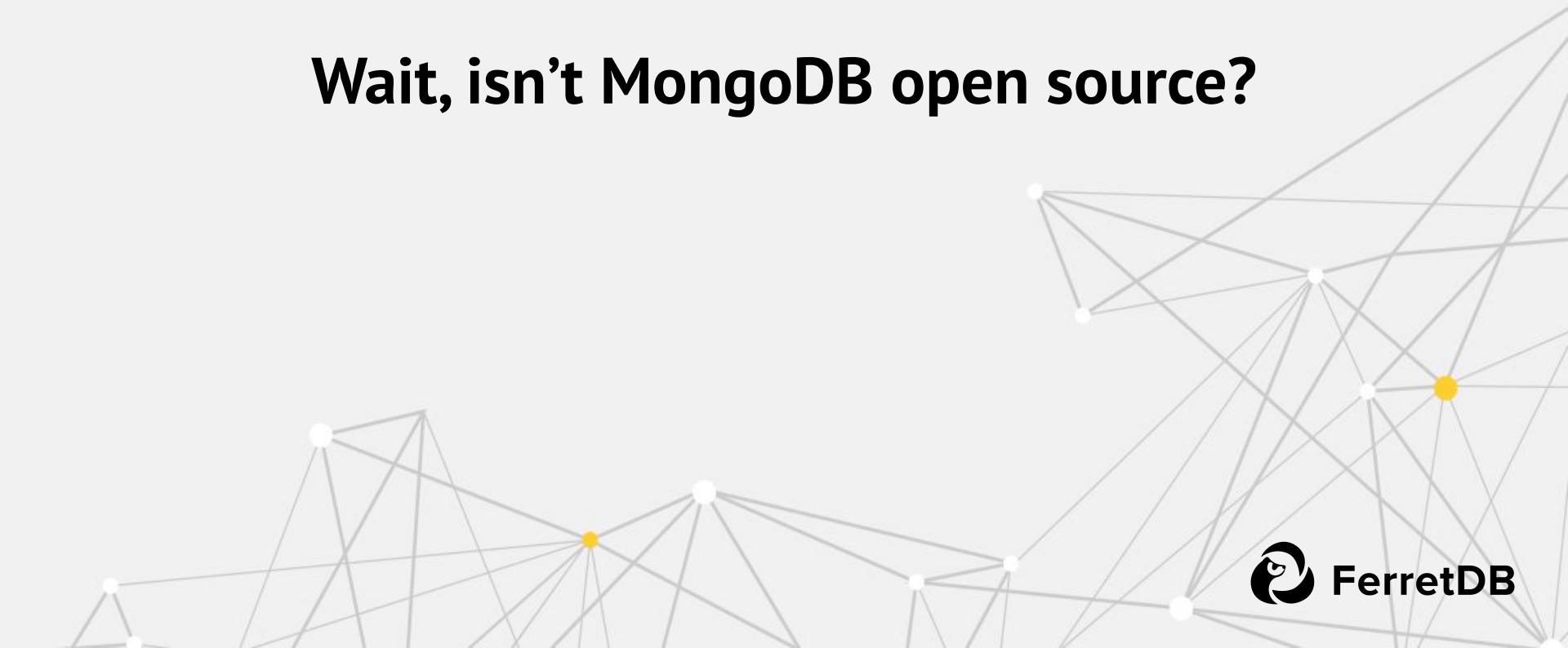


“Which database environments have you done extensive development work in over the past year, and which do you want to work in over the next year? “ 76k responses

Source: StackExchange Developer Survey, 2023 (excerpt)
“Which database environments have you done extensive development work in over the past year, and which do you want to work in over the next year? “

FerretDB

Wait, isn’t MongoDB open source?



FerretDB

MongoDB is not Open Source

MongoDB - since 2018, released under the Server Side Public Licence (SSPL).

If MongoDB is used as part of a Cloud Service…

… source code of everything you use to provide that service needs to be licensed under SSPL.
Or you pay a licence fee.

MongoDB's approval (and license) is needed. This **kills innovation and creates vendor lock-in.**

More info:

www.ssplisbad.com

Also: Peter Zaitsev and Matt Yonkovit's articles on Percona Blog

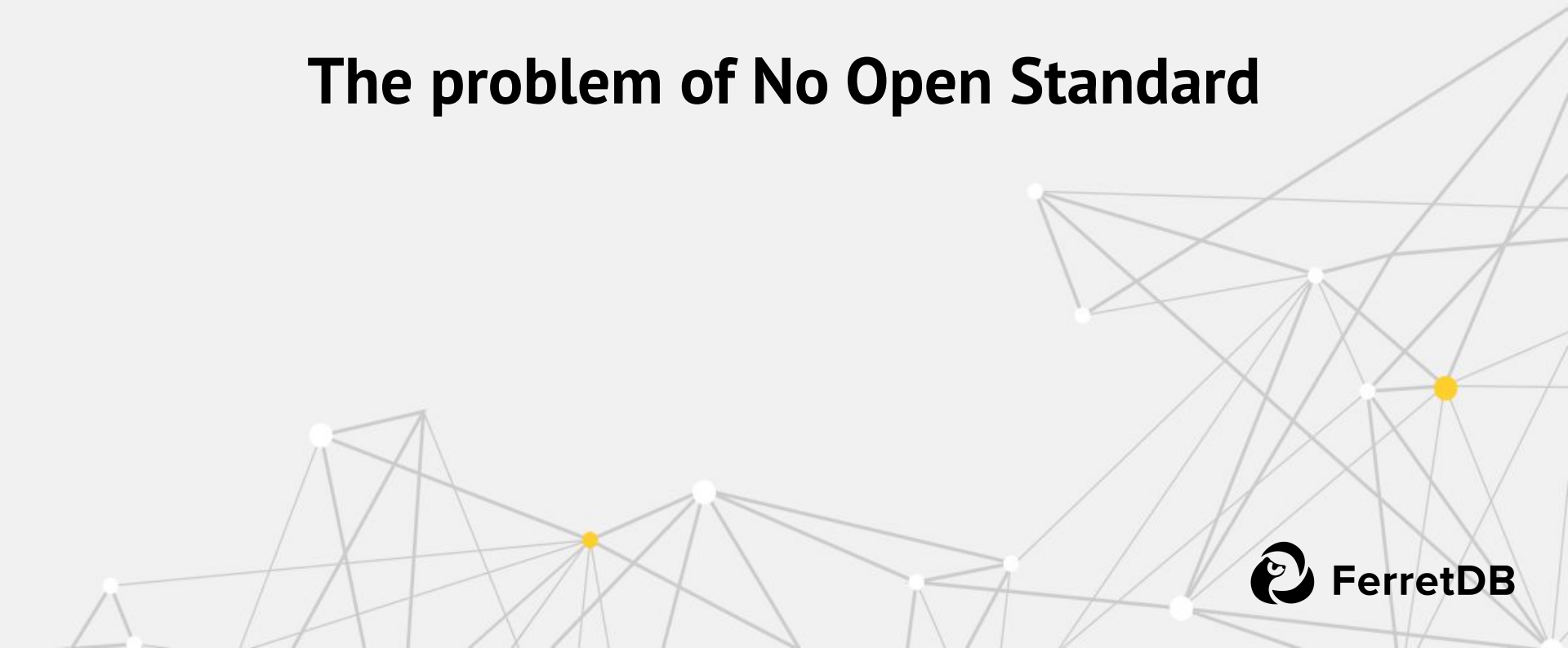
FerretDB

Why not just use Postgres and JSON instead of MongoDB?

MongoDB has a large ecosystem. Many JS frameworks, stacks (MERN, MEAN, MEVN…) and other tools include or depend on MongoDB compatibility to work.

FerretDB

The problem of No Open Standard



FerretDB

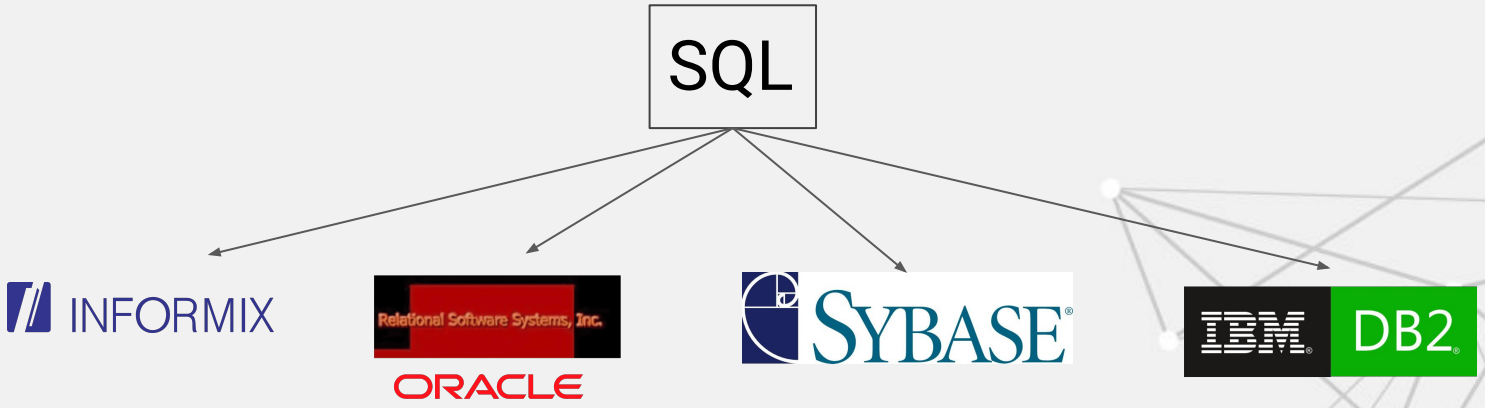
The short history of SQL - late 70s

- IBM releases multiple relational database products speaking SQL
- Vendor lock-in,
  no other commercially available SQL database
- Like SQL? Use IBM.

FerretDB

The evolution of SQL as an Open Standard - 1980s

SQL is great, let's implement it in dozens of different ways!



Many different dialects, no conformity between products.

FerretDB

The evolution of SQL as an Open Standard - 86-87

- SQL Becomes an ANSI and later ISO Open Standard called SQL86.
- Anyone can implement them
- Features can be added on top (standard extension)

All vendors were proprietary, this still meant vendor lock-in.

FerretDB

SQL, an Open Standard. Here comes Open Source!

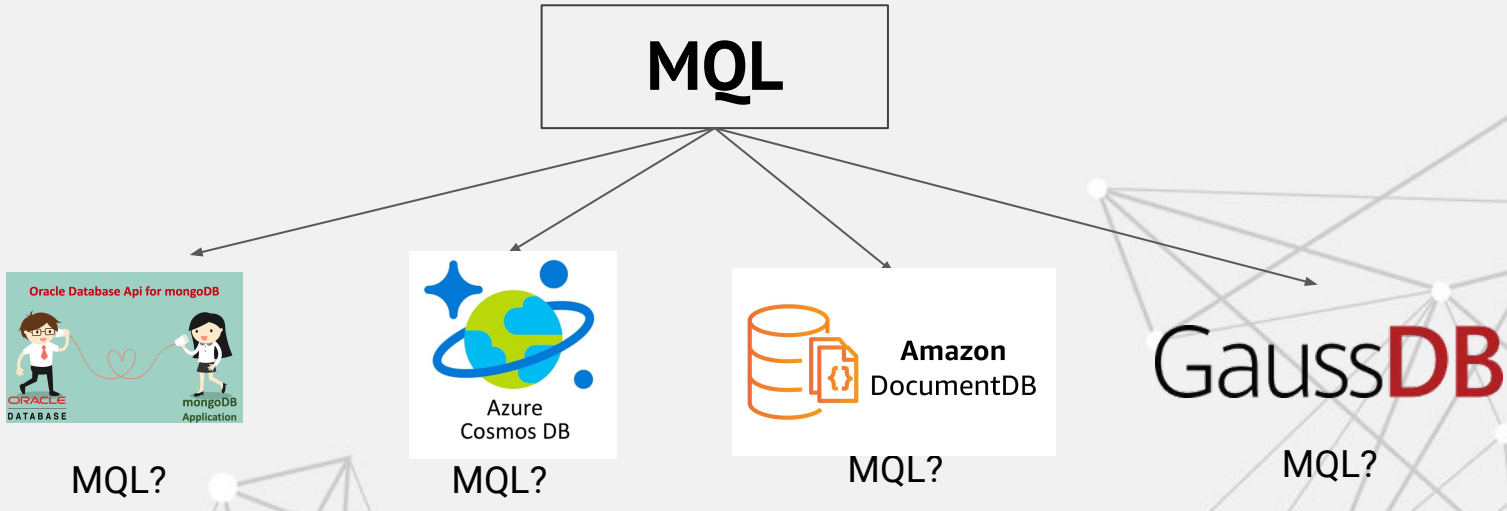
Mid 90s, early 2000s: Open Source projects started adopting SQL, partial implementations of the standard.

SQL is available to be used by anyone.

Since then: hundreds of derivatives

A familiar situation

MQL is great, let's implement it in dozens of different ways!



All proprietary. Products look similar, but incompatible with each other.
Once you choose one, you may be stuck with that.

FerretDB

We are in need of a new Open Standard

FerretDB

MQL, an Open Standard?

- A standardized, core feature set based on MongoDB
- A JSON query language
- Can be extended at the expense of portability

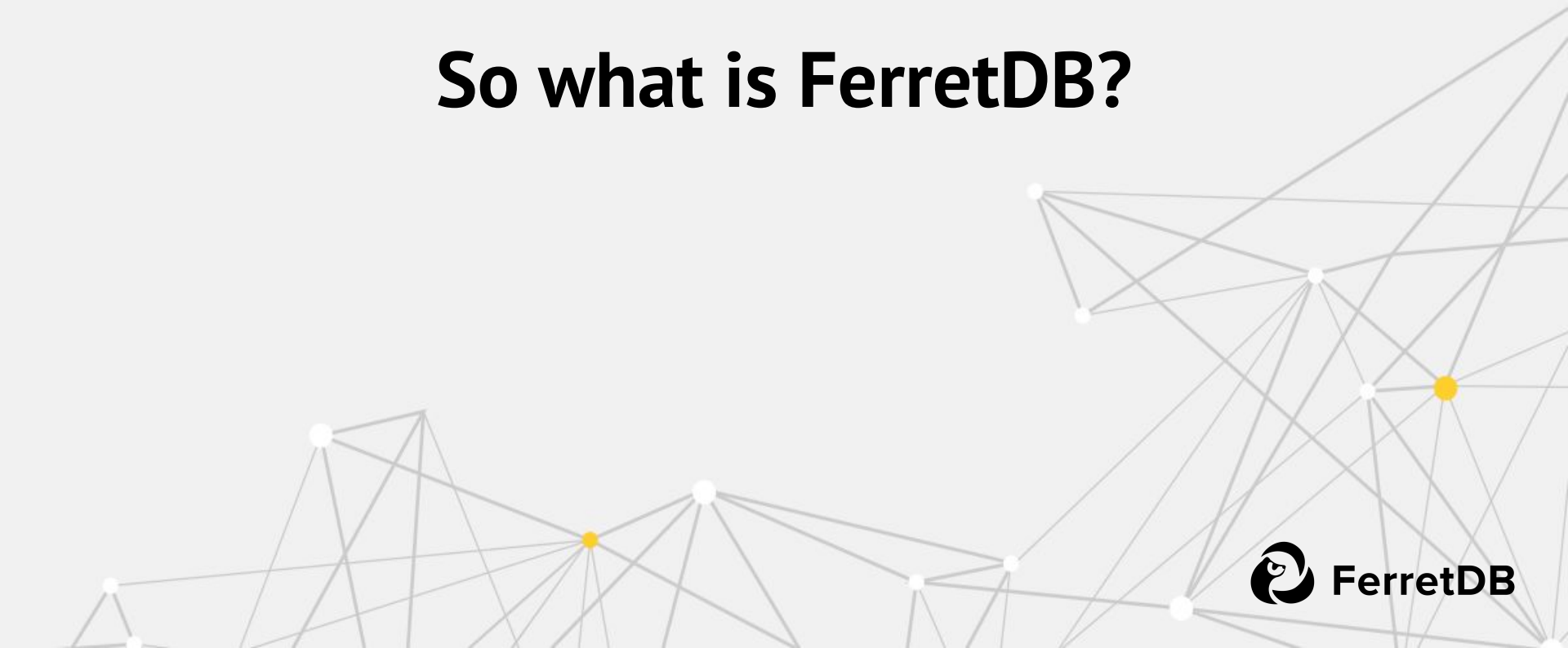
Overwhelming interest from vendors and developers in the industry.

It will:

- Ensure portability between products
- Can be extended, just like SQL
- Stimulates innovation, increase competition
- Be very good for users

FerretDB

So what is FerretDB?



FerretDB

FerretDB

- A MongoDB compatibility layer (proxy)
- Written in Go
- PostgreSQL as backend
- Usable on-prem or in the cloud
- Released under Apache 2.0
- Already in use in prod, 8500 stars on GitHub!

FerretDB

MongoDB compatibility means that existing elements of the MongoDB Ecosystem (tools, frameworks and applications) are possible to use with FerretDB

FerretDB

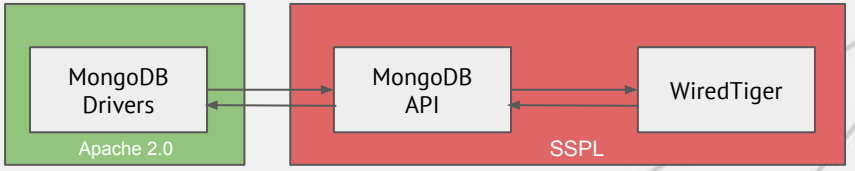
FerretDB vs. MongoDB architecture and licensing

MongoDB Drivers

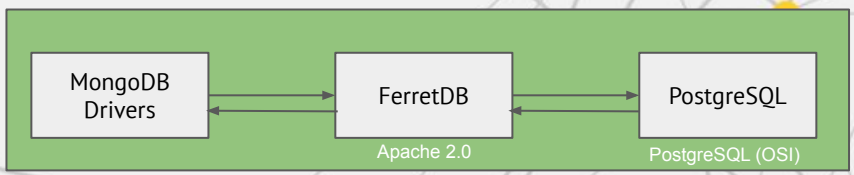
- Main reason behind high adoption of MongoDB
- Provides unmatched Developer Experience
- Free to use under Apache 2.0

MongoDB Backend

- Licensed under SSPL
- Proprietary vendors (Amazon, IBM, Oracle, etc.) replaced it in their own implementations of a compatible product



FerretDB replaces the MongoDB Backend with PostgreSQL

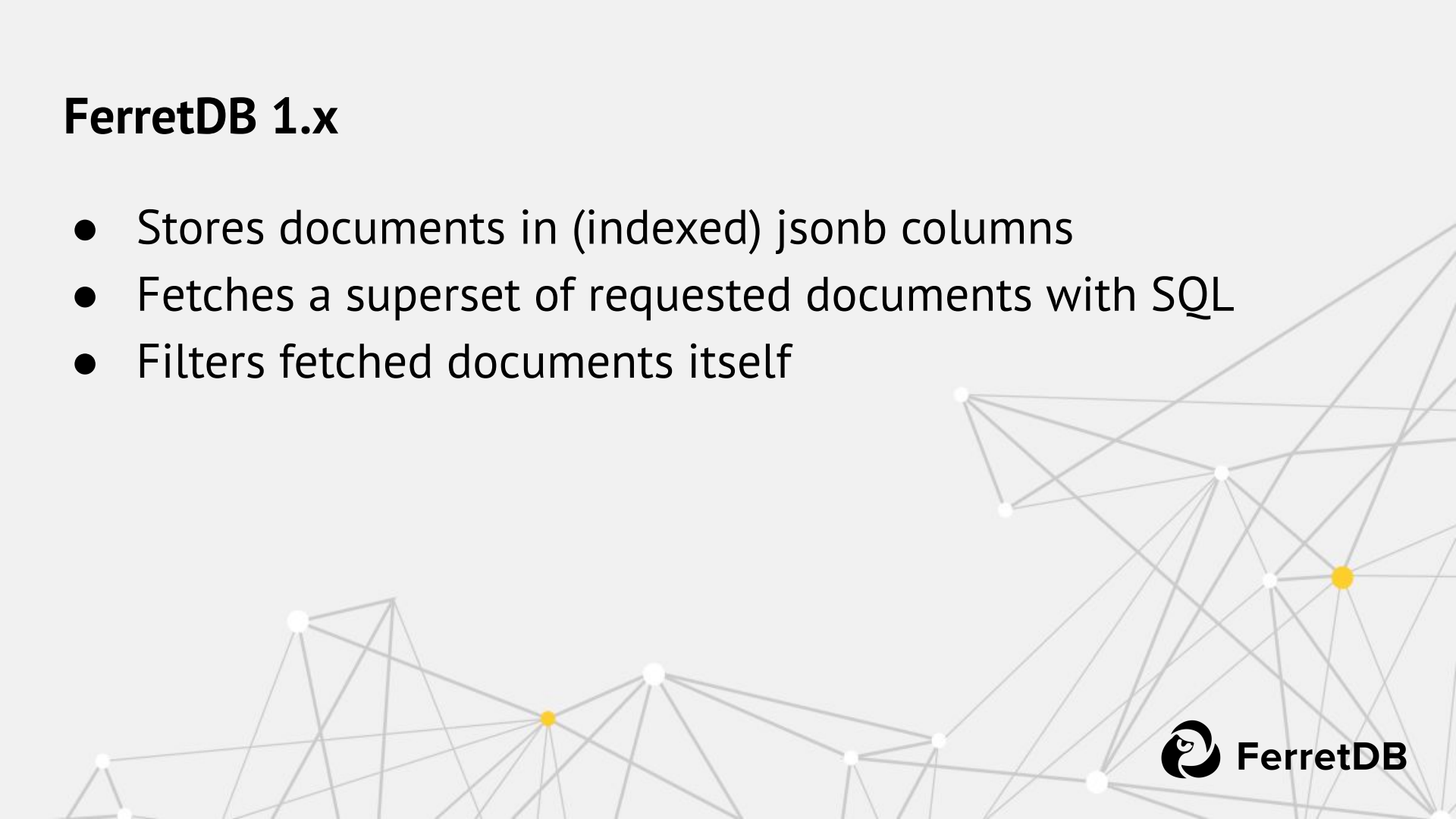


FerretDB

Runs with a lot of derivatives and providers of PostgreSQL...

FerretDB 1.x

- Stores documents in (indexed) jsonb columns
- Fetches a superset of requested documents with SQL
- Filters fetched documents itself



FerretDB 1.x: Storage

- BSON has more data types than JSON
  - int32, int64, double
  - Timestamp
  - JavaScript code

```
{
  "$s": {
    "p": {
      "v": {
        "t": "int"
      },
    },
  },
  "v": 42.0
}
```

FerretDB

FerretDB 1.x: Querying

```
NaN < 1
null < NaN
[ ] < null
[ ] < [null]
null </> [null]
```

(depends on sorting order)

FerretDB

FerretDB 2.x: What should we do?

- Roadmap: https://github.com/orgs/FerretDB/projects/2

FerretDB

Conclusion

- There is a need for an Open Standard for MQL
- MongoDB will become a commodity, like SQL
- The best database this can be built on is Postgres

Best outcome for developers and the industry.

- FerretDB leads the way opening up the Document Database market
- We build FerretDB with the community
- We are looking for Postgres experts and service providers to work with us on making this happen

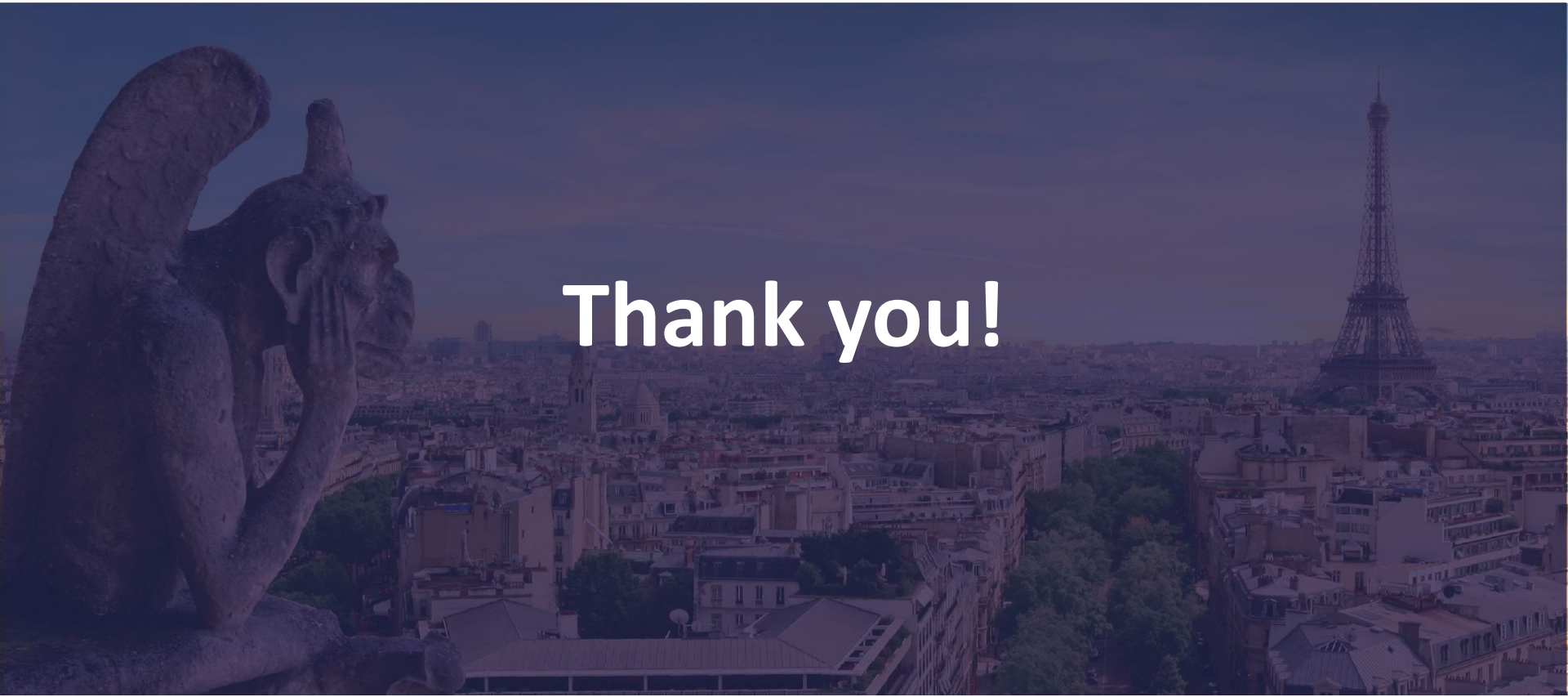
FerretDB

Questions

Try FerretDB: try.ferretdb.io
Run it on prem: docs.ferretdb.io
Star us on GitHub: github.com/FerretDB/FerretDB

www.ferretdb.com

FerretDB



FerretDB

BlaBlaCar