MariaDB | CREST

Speaker

Application Modernisation using GenAI capabilities with MariaDB Enterprise Vector Database

Gurusamy Pandikrishnan
Sales Engineering
at MariaDB

REGISTER NOW

📅 **23 October 2025**   🕐 **02:00 pm MYT**

Introducing Crest Infosolutions

- ✔ Founded in 2012 in Singapore
- ✔ Serving customers globally with presence in Singapore, Malaysia, Indonesia, USA and Netherlands
- ✔ **MariaDB distributor** and partner since 2015.
- ✔ Strong MariaDB consulting team with experience in setting-up and securing MariaDB at scale.
- ✔ **Migration team to support** customers in their database migration journey from Oracle, MS SQL, MySQL or PostgreSQL to MariaDB.

Crest Infosolutions LLC Joins MariaDB Foundation as Silver Sponsor
Written by Anna Widenius • 2025-06-24 • Leave a comment

SILVER SPONSOR

Accelerating Digital Transformation Through Open Source Innovation

The MariaDB Foundation is proud to welcome Crest Infosolutions LLC as a Silver Sponsor, marking a significant step forward in fostering enterprise-grade open-source adoption. This partnership underscores Crest's mission to deliver robust, secure, and scalable technologies that empower global organizations to thrive in the era of digital transformation.

Driving Open Source Adoption Across Enterprises

Crest Infosolutions brings over a decade of experience in delivering open-source excellence to its clients. Crest is already a long-standing partner of MariaDB plc and, by joining the MariaDB Foundation's ecosystem of supporters, Crest reinforces its long-standing commitment to open technologies, developer collaboration, and sustainable innovation.
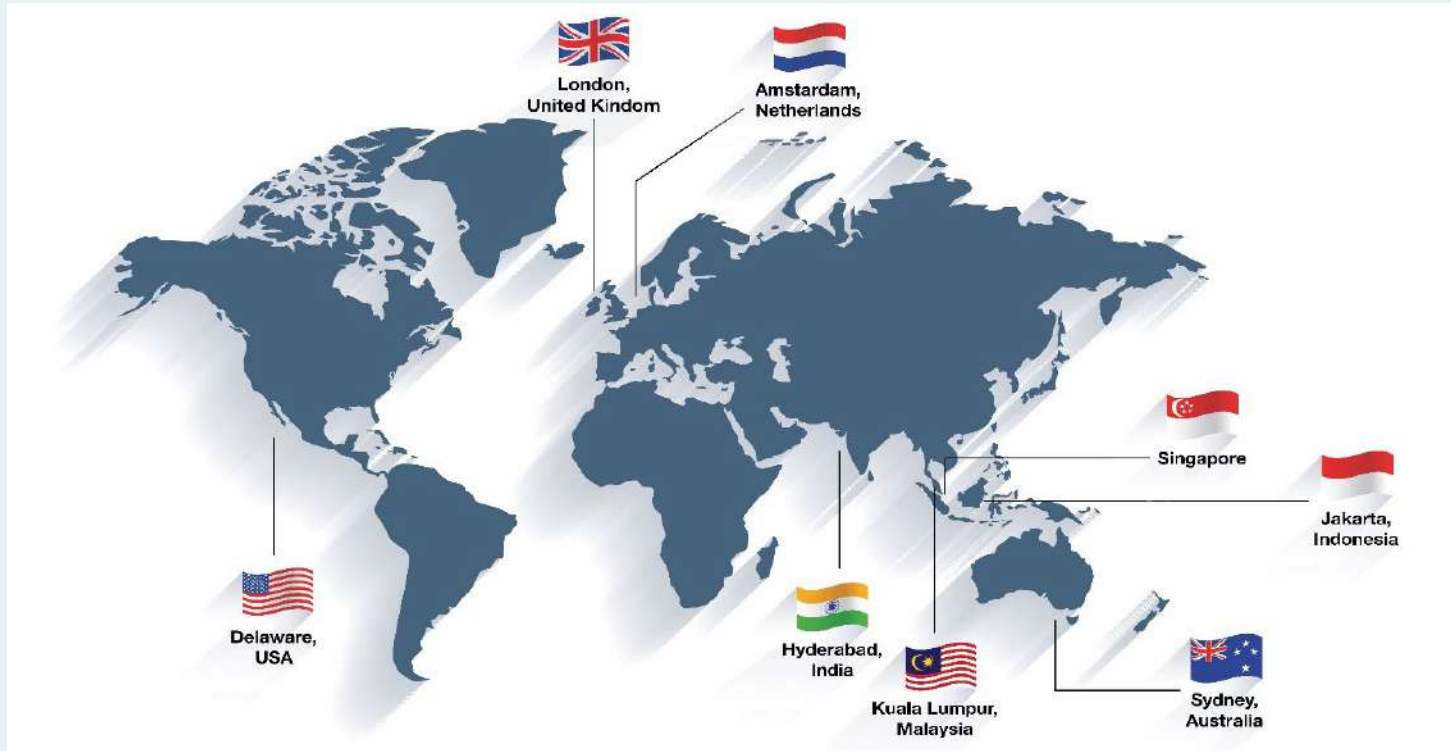
"We are excited to welcome Crest Infosolutions to the MariaDB Foundation sponsor family," said Anna Widenius, CEO of the MariaDB Foundation. "As experts in enterprise content management, BPM, and AI-driven solutions, Crest represents exactly the kind of real-world use case MariaDB Server's vector search capabilities was built for. Their support reflects a shared belief in open source innovation with integrity—where advanced technology like vector search becomes truly enterprise-ready."

A Powerful Technology Stack Built on MariaDB

As part of its open-source enterprise portfolio, Crest integrates MariaDB as the backbone of high-performance applications. Their stack includes:

CREST Presence

London, United Kindom

Amstardam, Netherlands

Delaware, USA

Hyderabad, India

Kuala Lumpur, Malaysia

Singapore

Jakarta, Indonesia

Sydney, Australia

Celebrating 15+ Years of MariaDB !!

The first version of MariaDB, 5.1.38, was released on **29th of October 2009 !**

We have come a long way since then!

Creator of MySQL and MariaDB - Michael Widenius(Monty)

More information at
https://monty-says.blogspot.com/2024/10/celebrating-15-years-of-mariadb.html

About MariaDB

Created by the original developers of MySQL, MariaDB provides a powerful, open-source core database for enterprises. Now the default in the majority of Linux distributions, it gives businesses the strategic freedom to break from proprietary databases and build modern, scalable applications for the future.

Market Leadership

75%
Of Fortune 500 companies use MariaDB

1B+
Docker Hub downloads

2.5B+
Reach via Linux distros

200K+
Open source contributions

700+ Customers Globally

Amdocs
Deutsche Bank
Development Bank of Singapore(DBS Bank)
Nokia
Samsung
SelectQuote
ServiceNow
Virgin Media O2

200+ Employees

Proven leadership team

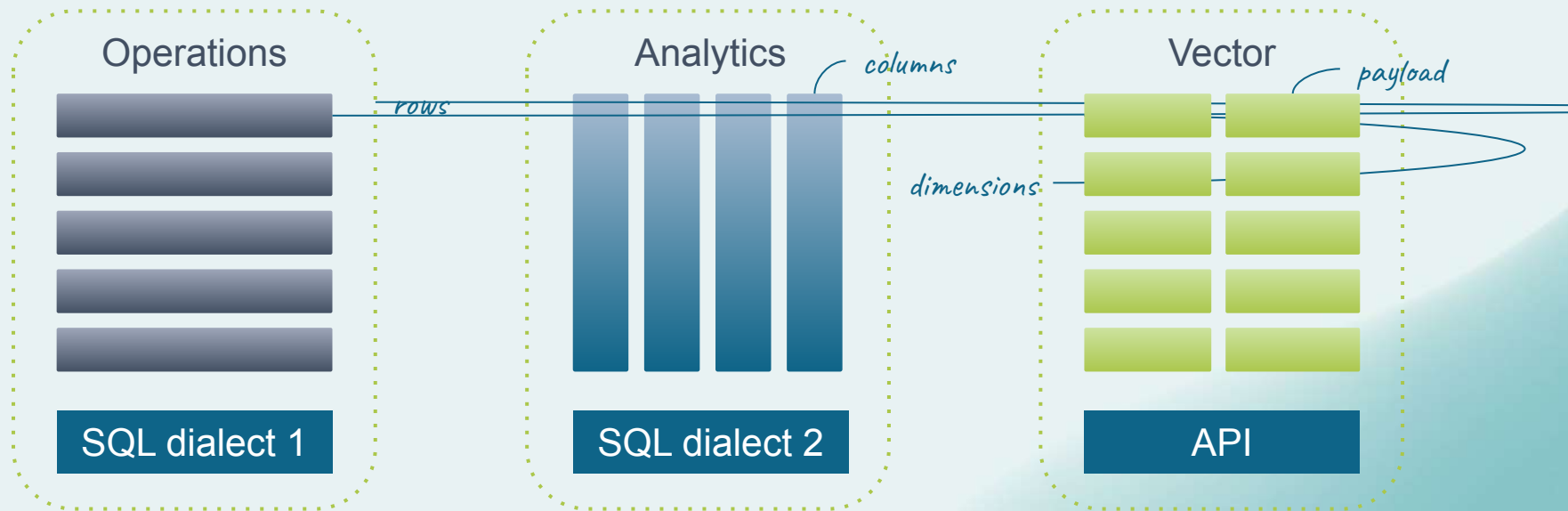World class relational database engineering team, including the original core MySQL team

Dual headquartered
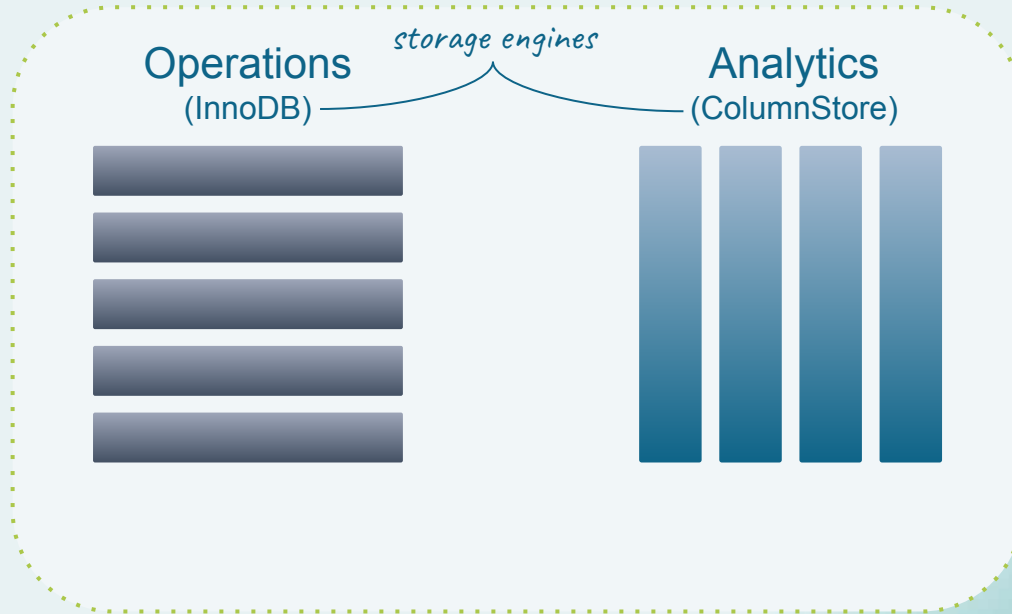- Europe: Dublin, Ireland
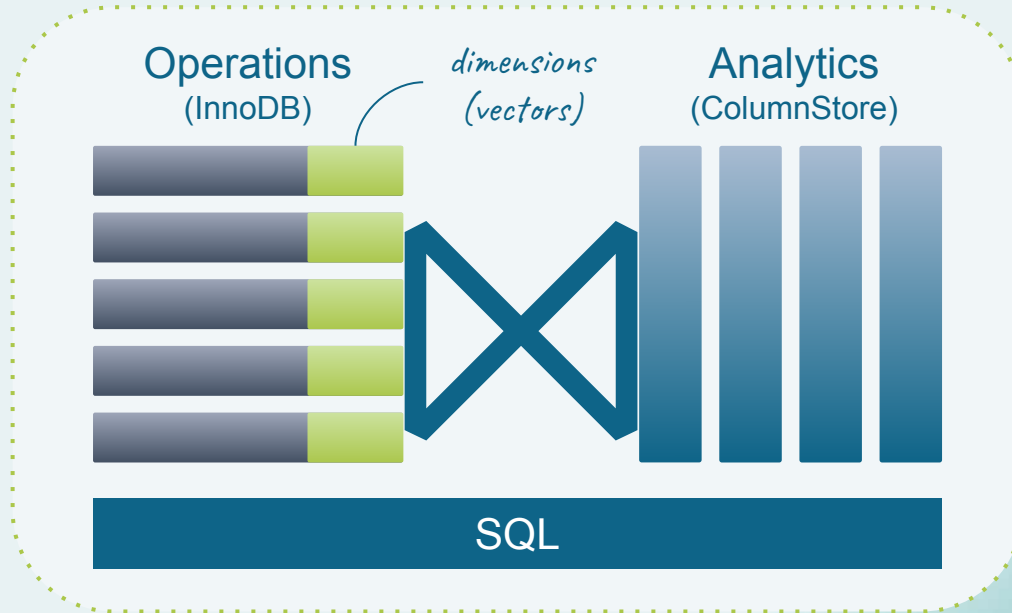- USA: Silicon Valley, California

MariaDB

AI / Vector

Database Systems

Simplified Architecture with MariaDB

Operations
(InnoDB)

storage engines

Analytics
(ColumnStore)

MariaDB

Simplified Architecture with MariaDB

Operations (InnoDB) — dimensions (vectors) — Analytics (ColumnStore) — SQL

*Starting with MariaDB Enterprise Server 11.4

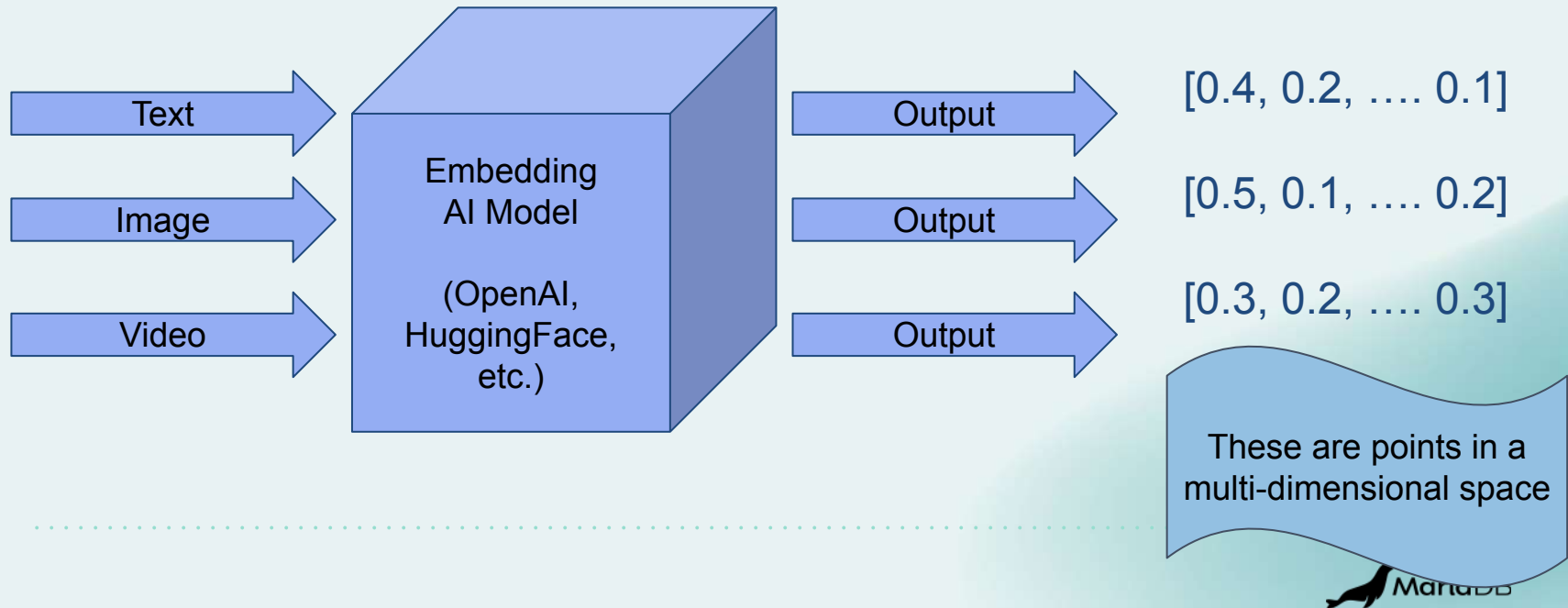# What is MariaDB Vector useful for?

- In brief:

    Much smarter document search

- Each document is converted to a vector and stored.
- When a user asks a question, convert the question to a vector.
- Find the closest document-vectors to the question-vector.

MariaDB

What is an embedding model vs generative model?

- ChatGPT is a generative model.
  - It takes a prompt.
  - Generates the most likely "correct" sequence of words as response.

- An embedding model generates a vector embedding for a particular prompt.

MariaDB

What is a Vector Embedding?

Simply a list of numbers (that describe "features" of the original)

Text →

Image →

Video →

Embedding
AI Model

(OpenAI,
HuggingFace,
etc.)

Output → [0.4, 0.2, …. 0.1]

Output → [0.5, 0.1, …. 0.2]

Output → [0.3, 0.2, …. 0.3]

These are points in a
multi-dimensional space

What is Semantic Search and how is Vector Search Different from normal search?

Semantic Search

A search technique that understands the meaning and context of words, rather than just matching keywords.

The search is approximate - (searching for a word that is similar - queen or woman), not exact vs. (searching for the word "woman").

Vector Space

King

Man
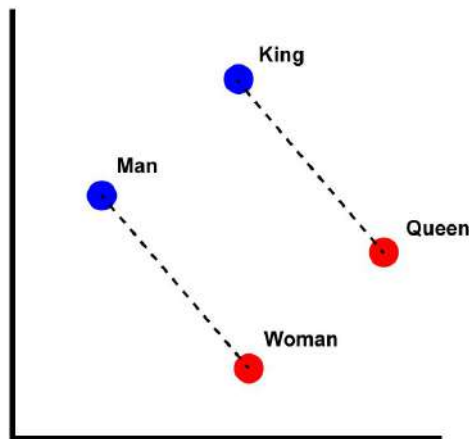
Queen

Woman

Queen is closer to woman, than King is to woman

vs.

Exact Match

```
SELECT * FROM my_table WHERE
description LIKE %wom%
```

Find "woman"

Not found

The "queen" is female

MariaDB

MariaDB: A Vector Database for Modern AI Frameworks

MariaDB's native vector search capabilities allow it to act as a powerful and efficient backend for leading AI frameworks, simplifying the development of generative AI applications by unifying your data stack

Key Framework Integrations

- **Langchain & LLamaindex:** Use MariaDB as a native Vector Store to power RAG pipelines, grounding LLMs/AI Agents in your data for more accurate and context-aware responses.
- **Spring AI:** Easily add vector search to enterprise Java applications with a MariaDB Vector Store implementation, providing a familiar data layer for Spring developers.
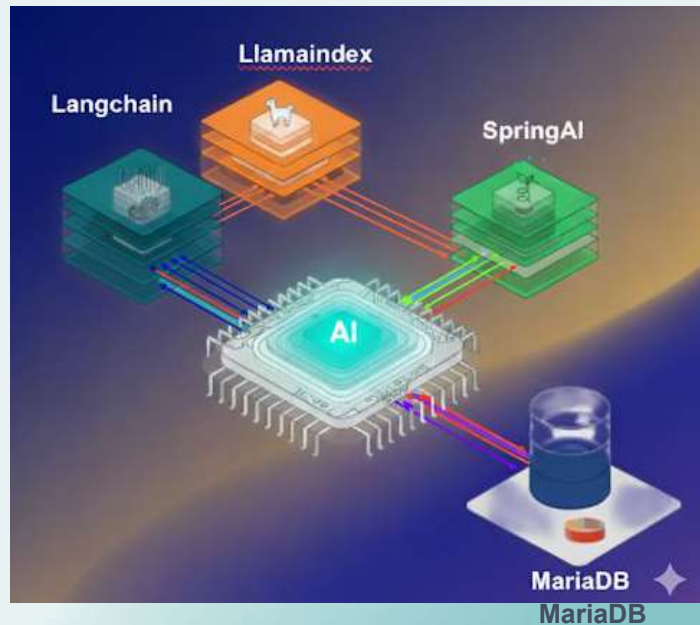
MariaDB Empowers Fast Vector Search in an OLTP Database

Our own internal testing shows great QPS

Single Threaded QPS (GIST 960 Euclidean)

Legend: MariaDB Vector, PGVector, QDrant
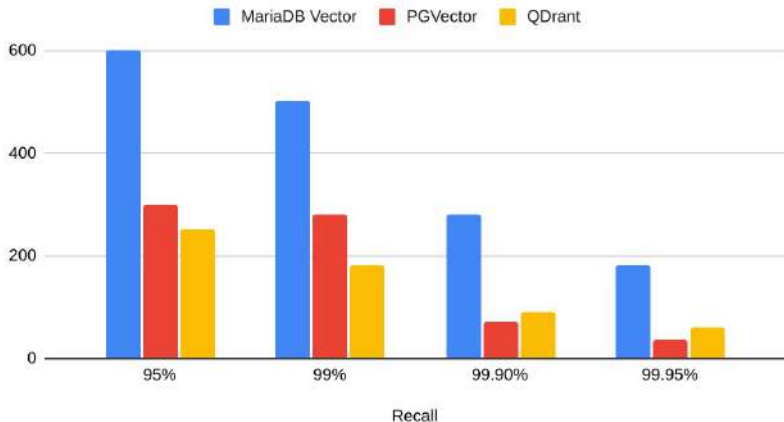
How MariaDB helps you with vector search

Vector Search and Retrieval *alongside the transactional database* - no need to move data to try vector embedding retrieval

Technicals:
1. Indexing via HNSW
2. Support for ultra fast search and retrieval of vector embeddings w/ filters

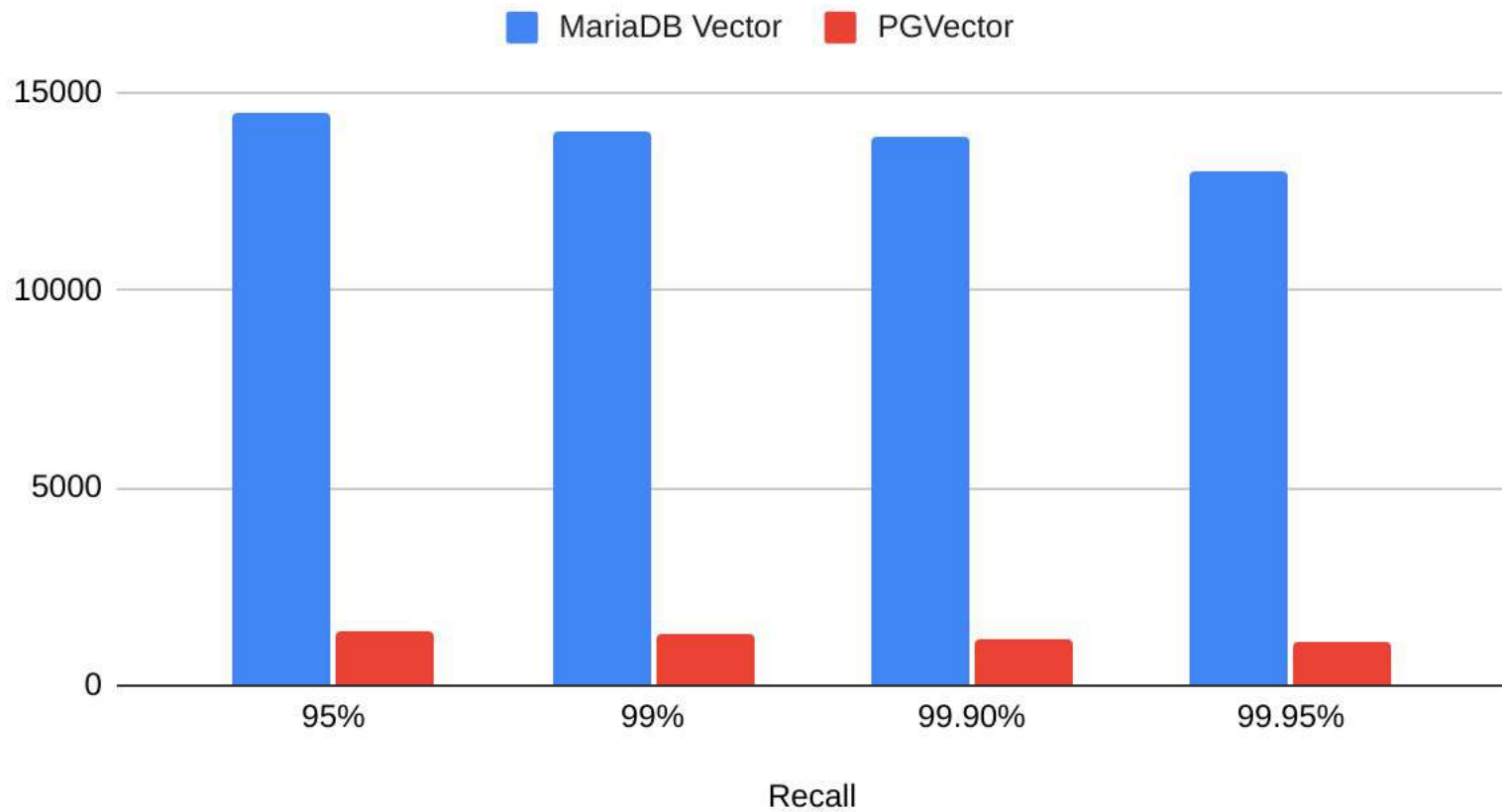According to a recent external analysis of our vector search via smalldatum:
1. Index creation time is **2x faster** than pgvector
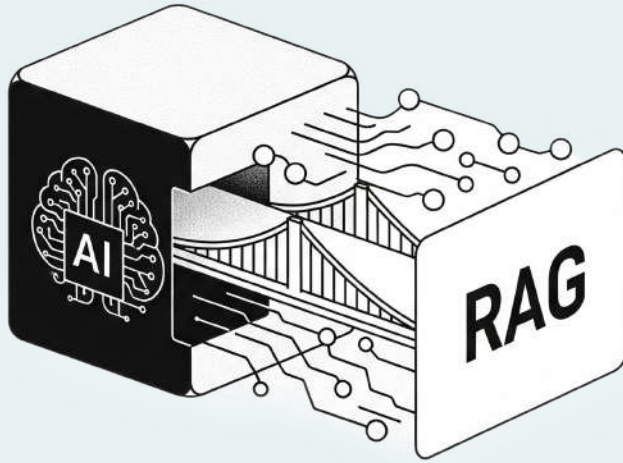2. Vector search was 1**.5x - 2x faster** than pgvector

Source: https://mariadb.com/es/resources/blog/how-fast-is-mariadb-vector/
Source: https://smalldatum.blogspot.com/

MariaDB

48 Conncurent Connections Total QPS (GIST 960 Euclidean)

https://mariadb.com/es/resources/blog/how-fast-is-mariadb-vector/

MariaDB AI RAG - RAG-in-a-Box for MariaDB

- Introducing RAG-in-a-Box for MariaDB
- Securely bring AI capabilities to your data
- Simple, scalable GenAI integration solution

Why MariaDB AI RAG matters

- Enterprises want to adopt AI using **their own data**

- Current GenAI models can **hallucinate** without proper context

- Customers need to **ground** AI in their **private databases**

- RAG solves this, but setup is complex → **we make it simple**

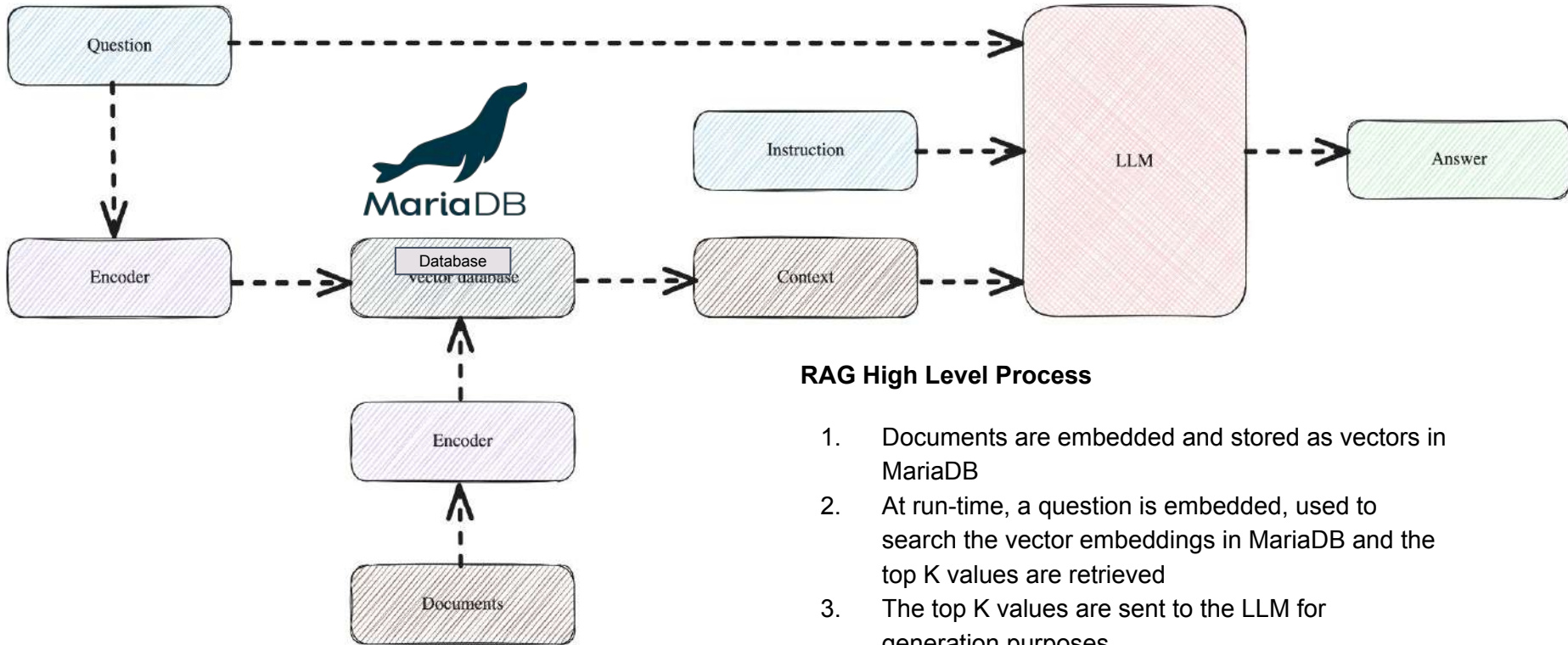# What is RAG?

- Retrieval Augmented Generation = **"AI answers grounded in your own data."**
- Instead of just *guessing*, the AI looks up facts in the DB first
- Benefits:
    - **More accurate answers**
    - **Trustworthy responses**
   - **Works with private customer data**

RAG Process w/ GenAI

RAG High Level Process

1. Documents are embedded and stored as vectors in MariaDB
2. At run-time, a question is embedded, used to search the vector embeddings in MariaDB and the top K values are retrieved
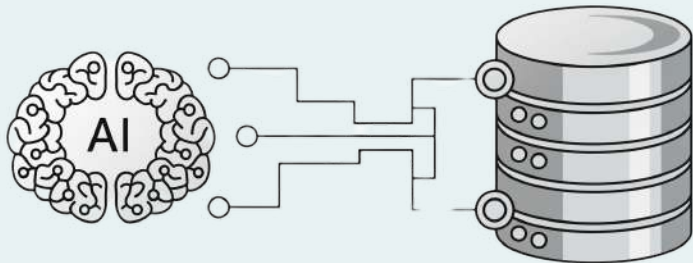3. The top K values are sent to the LLM for generation purposes.

MariaDB AI RAG

- **One vendor, one stack:** No multi-tool headaches
- **Security-first:** Keep data in customer's DB, not third parties
- **Lower TCO:** Existing MariaDB deployment + RAG in same platform
- **Skills: No** AI knowledge required
- **Simplicity: "RAG without the plumbing"**
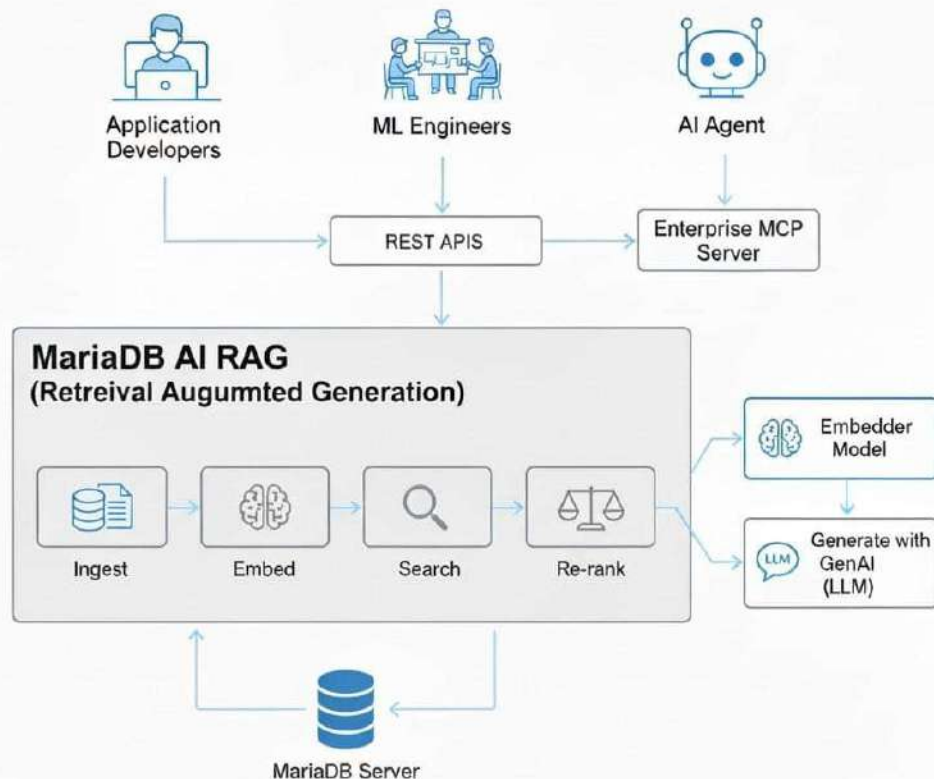
Sample Customer Use Cases

- AI can answer customer support FAQs using knowledge bases.
- It can query internal documentation for engineers.
- AI assists with compliance for policies and regulatory documents.
- In financial services, it can analyze compliance documents and answer regulatory questions.
- For healthcare, AI can search medical literature and provide patient data insights.

MariaDB RAG: Why It Wins

- **Typical RAG =** vector DB (Pinecone/Weaviate) + connectors + orchestration
- **Our edge:** integrated with MariaDB Platform → less cost, less risk, less friction
- *Why buy 4 tools when you can do it in one box?*

- **One vendor, one stack:** No multi-tool headaches
- **Security-first:** Keep data in customer's DB, not third parties
- **Lower TCO:** Existing MariaDB deployment + RAG in same platform
- **Performance:** Tuned for scale and low latency
- **Simplicity: "RAG without the plumbing"**

MCP Server

MariaDB MCP Server: Your Database is powering your AI

What it is

- Connects your AI to your MariaDB existing database
- Runs both **standard** database **tasks** and **advanced AI operations** like semantic search

Key Features

- **Normal database operations:** Lets AI run queries such as **listing databases** or **fetching data**
- **AI search: Create vector stores** and **search** based **on meaning**
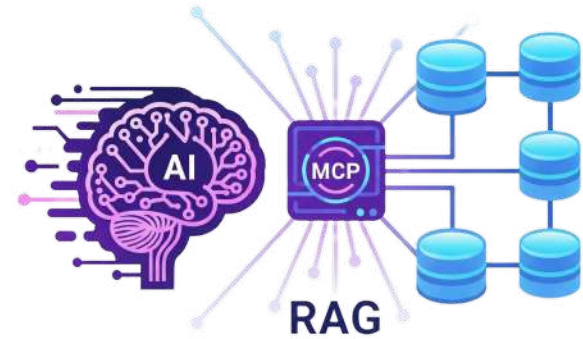
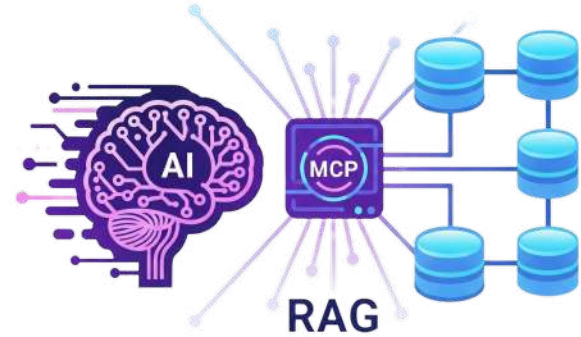**Open Source and available at MariaDB Github**

MariaDB MCP Server – Features and Benefits

Additional Features

- **Uses popular AI:** Works with leading frameworks such as **OpenAI** and **Google Gemini**

Benefits

- **Faster AI development:** Developers can **add AI features quickly**
  Better AI applications: AI engineers can build more powerful tools
- **More data value:** Database administrators gain deeper insights

Open Source and available at MariaDB Github

MariaDB: Your Secure Gateway for Enterprise AI Agents with our Enterprise MCP Server

The Big Idea: Think of our MCP Server as the "JDBC for AI"—a universal, secure data adapter for any model to use MariaDB

1. ACCELERATE AI DEPLOYMENT

Problem: Every AI integration is a slow, brittle, custom-coded project.

Our Solution: The MariaDB MCP Server provides a standardized, plug-and-play interface. AI agents can instantly discover and use your data without custom engineering.

Customer Outcome: Go from Proof-of-Concept to production in weeks, not months.

2. ENABLE TRUSTED AI

Problem: Giving AI direct access to your production database is a massive security and compliance risk.

Our Solution: Our server acts as a secure gatekeeper. It translates AI requests into safe, governed SQL queries, enforcing all your existing permissions and providing a full audit trail.

Customer Outcome: Connect AI to your most valuable data with complete confidence and control.

3. UNLEASH HYBRID DATA

Problem: AI needs to understand both structured data (revenue, customers) and unstructured data (reports, tickets) to be truly smart.

Our Solution: MariaDB can act as an MCP Server for **both** traditional SQL and modern Vector Search—in a single, efficient query.

Customer Outcome: Answer complex questions and power sophisticated RAG applications that competitors can't.

# MariaDB MCP Server: AI Power for Your Database

What it is:

- It's a new technology that connects your existing MariaDB database to AI.
- It lets you do standard database tasks **AND** powerful AI operations like semantic search.

Key features:

- **Normal database operations:** Lets AI run regular operations with MariaDB (list databases, get data, etc.).
- **AI search:** Can create "vector stores" and search for information based on meaning.
- **Uses popular AI:** Works with well-known AI technologies like OpenAI and Google Gemini.
- **Enterprise Only Features (Oct 2025): Authentication, Accessible Orchestration APIs for easy to use ingestion and retrieval, and integration with MariaDB MariaDB AI RAG.**

Benefits:

- **Faster AI development:** Developers can add AI features more easily.
- **Better AI applications:** AI engineers can build more powerful tools.
- **More data value:** Database administrators can get more insights from their data.
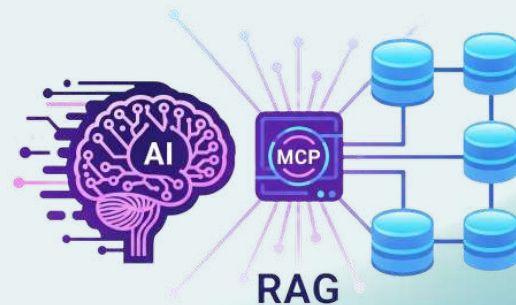
MCP in AI App Builders
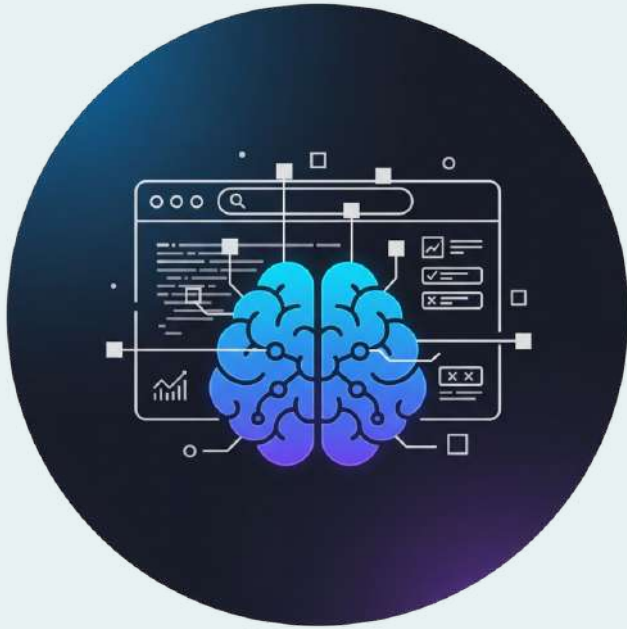
- A developer enters a prompt in an AI app builder: **"Build me a web app to track my gym workouts, with a dashboard showing progress."**
- The AI front-end builder generates the UI and necessary APIs.
- Simultaneously, the builder communicates with a MariaDB MCP Server to provision the database schema, tables, and secure endpoints automatically.
- The result is a fully functional, data-backed application generated in minutes.
- **Example**
    - With MCP support, Cursor or Windsurf let developers chat, code, and auto-provision databases right from the IDE.

MariaDB Enterprise MCP Server Capabilities

Core tools 🟢
Status: Available 24/7

Database Operations:
- list_databases - Discover all databases
- list_tables - Enumerate tables
- get_table_schema - Inspect schemas
- execute_sql - Run SQL queries
- create_database - Create new databases

Vector Store Operations:
- create_vector_store - Create vector tables
- search_vector_store - Semantic search
- insert_docs_vector_store - Add documents
- list_vector_stores - List vector tables
- delete_vector_store - Remove vector stores

Core Operations:
- get_server_status - Server health
- health_check - System status

Conditional tools 🟠
Status: Available when AI RAG API running

RAG Pipeline:
- rag_ingestion - Document ingestion
  - File parsing
  - Chunking
  - Embedding
  - Metadata
- rag_generation - AI powered response
  - Query embedding
  - Context retrieval
  - LLM generation

AI Roadmap

| | Available Now | Coming Next | Future |

Ecosystem Integrations
Langchain / Llamaindex / SpringAI → MariaDB MCP Server → Enterprise MariaDB MCP Server → Cloud - API endpoints for Serverless → Vercel Native Integration

DB Query Processing
Vector Search / Vector Data Type → HNSW Indexing → Vector Retrieval Enhancements (Matryoshka) → Full Text Search Performance Enhancements → New Algorithms for Indexing and Performance

RAG / AI Enablement (Stand-alone + Cloud)
Native MariaDB AI Tool for RAG → Vector Sync & RAG Advanced Retrieval → Text to SQL → Advanced Pre-processing & Agentic Retrieval Pipeline

AI Agents (Cloud Only)
DBA Agent → Performance Tuning Agent

MariaDB

Thank You for Attending

Application Modernisation using GenAI capabilities with
MariaDB Enterprise Vector Database