
# MARIADB
# Community Server 10.5

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# Agenda

- Analytics for all
- MariaDB ColumnStore 1.5
- Hybrid Transactional/Analytical Processing
- Demo
- The best Community Server yet

# Analytics for All

## MariaDB Community Server 10.5 GA

# Modern applications

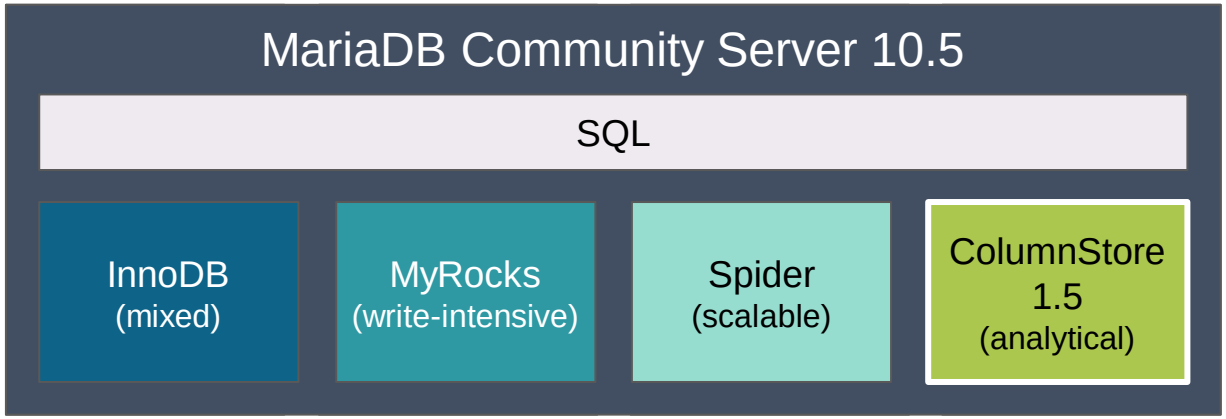
- Transactional
- Customer-facing
- Incorporate real-time analytics and historical data
- Provide customers with…
  - Helpful insights
  - Personalized recommendations
  - Compelling opportunities
  - Better experiences

# The Power of MariaDB

- OLTP – Data stored as rows on block storage
  - Fast and persistent, same as others
- OLAP – Data stored as columns on object storage
  - Low-cost and unlimited capacity, same innovators like Snowflake
- Smart OLTP – Data replicated from row/block storage to columnar/object storage
  - Transaction queries against row/block storage
  - Analytical queries against columnar/object storage
  - Any database instance can transactional queries, analytical queries or both
  - It’s all transparent to the application

# MariaDB ColumnStore 1.5

# MariaDB storage engines

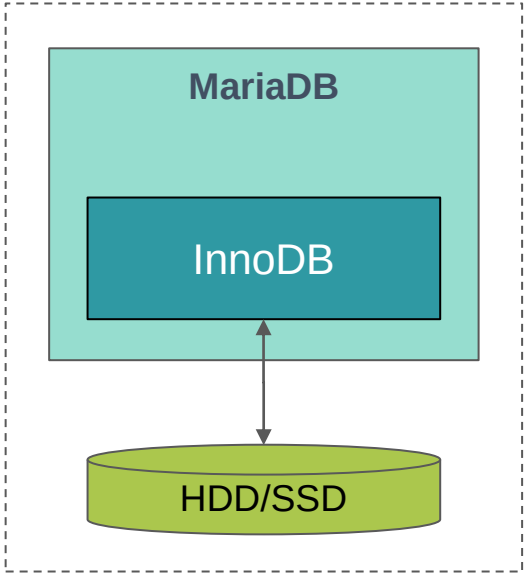


# MariaDB ColumnStore

- Columnar format
  - Stores data by column rather than row
  - File per column vs. file per table
- Up to 90% data compression
- Extremely fast data import via `cpimport` utility
- Low cost cloud-native storage
- No need for indexes
- SQL

# Why columnar storage?

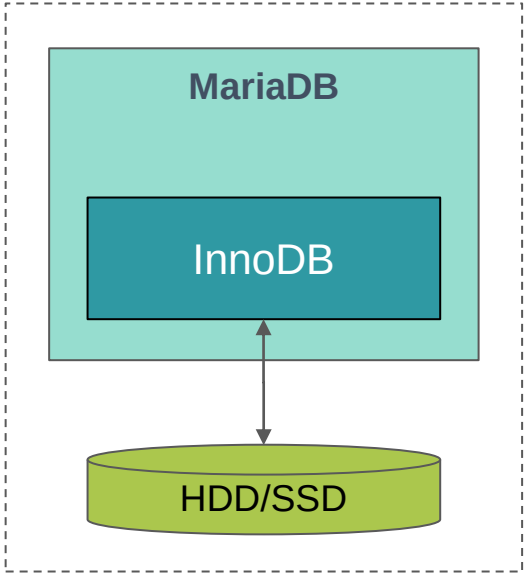
| col1 | col2 | … | col9 |
|---|---|---|---|
| r1col1 | r1col2 | r1coln | r1col9 |
| r2col1 | r2col2 | r2coln | r2col9 |
| r3col1 | r3col2 | r3coln | r3col9 |
| r4col1 | r4col2 | r4coln | r4col9 |




```
SELECT AVG(col9)
FROM my_tbl
```

200 bytes per row, 1B rows

| col1 | col2 | … | **col9** |
|---|---|---|---|
| r1col1 | r1col2 | r1coln | **r1col9** |
| r2col1 | r2col2 | r2coln | **r2col9** |
| r3col1 | r3col2 | r3coln | **r3col9** |
| r4col1 | r4col2 | r4coln | **r4col9** |




SELECT AVG(col9)
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200 bytes per row, 1B rows
**200GB of disk IO**

| col1 | col2 | … | col9 |
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| r3col1 | r3col2 | r3coln | r3col9 |
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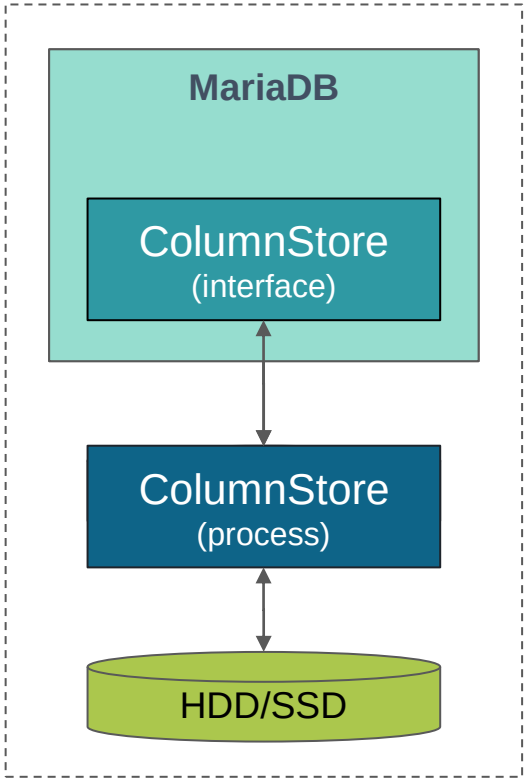


SELECT AVG(col9)
FROM my_tbl

4 byte column, 1B rows

MariaDB

| col1 | col2 | … | **col9** |
|---|---|---|---|
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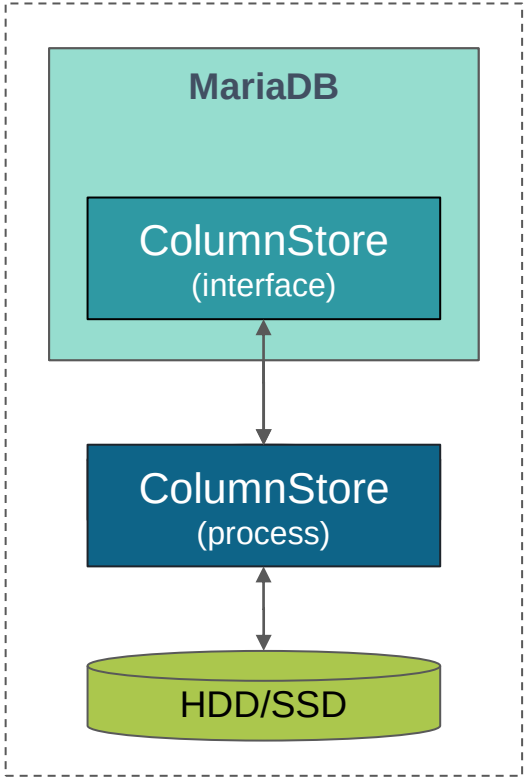
| r2col1 | r2col2 | r2coln | **r2col9** |
| r3col1 | r3col2 | r3coln | **r3col9** |
| r4col1 | r4col2 | r4coln | **r4col9** |




SELECT AVG(col9)
FROM my_tbl

4 byte column, 1B rows
**4GB of disk IO**

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# Storage architecture – extent map

- The data for a column is stored in a partition
- A partition contains multiple segments (i.e., files)
- A segment contains multiple extents
- An extent contains 8 million rows

<table>
<tr><td colspan="9">Partition 1</td></tr>
<tr><td colspan="6">Segment 1 (file)</td><td colspan="3">Segment 2 (file)</td></tr>
<tr><td colspan="3">Extent 1 (1st 8M rows)</td><td colspan="3">Extent 2 (2nd 8M rows)</td><td colspan="3">Extent 1 (3rd 8M rows)</td></tr>
<tr><td>Block 1</td><td>Block 2</td><td>Block n</td><td>Block 1</td><td>Block 2</td><td>Block n</td><td>Block 1</td><td>Block 2</td><td>Block n</td></tr>
</table>

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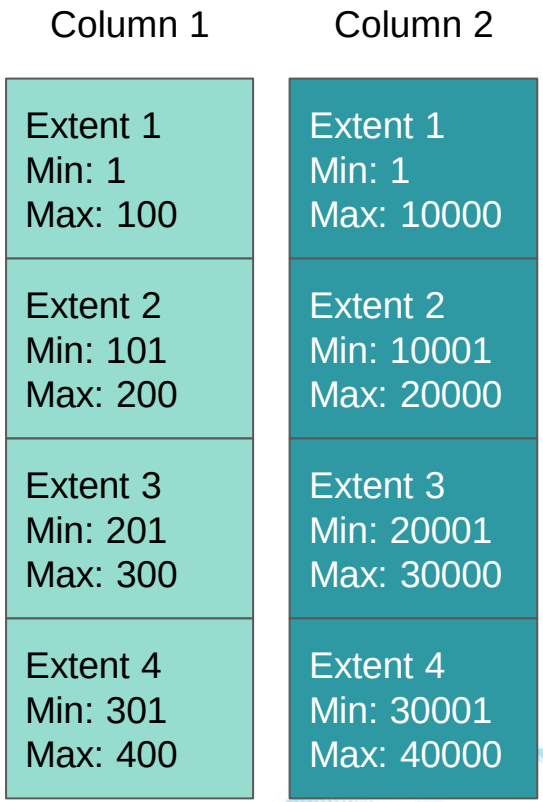
```
SELECT *
FROM my_table
WHERE COL1
     BETWEEN 220 AND 250
```



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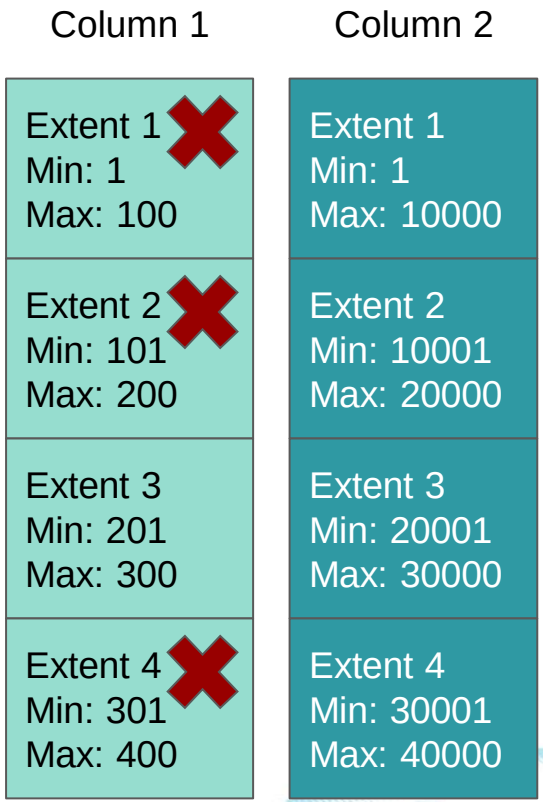
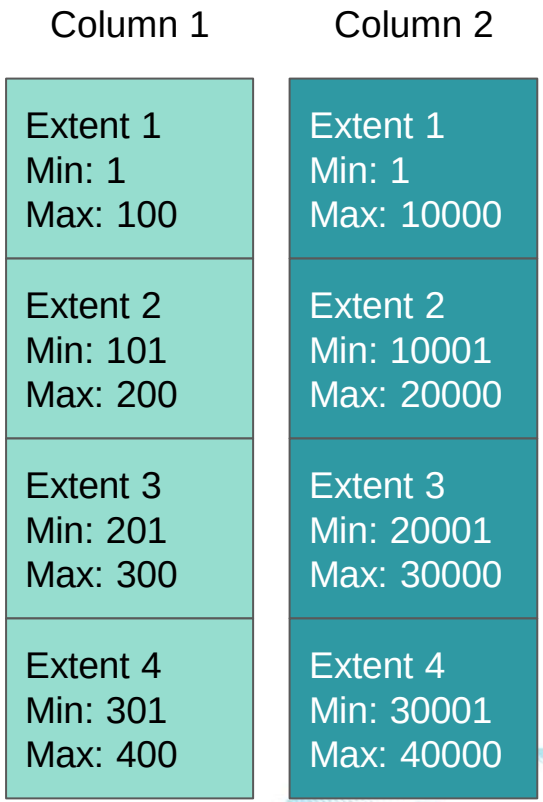


```
SELECT *
FROM my_table
WHERE
   COL1 BETWEEN 220 AND 250 AND
   COL2 < 10000
```



```
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FROM my_table
WHERE
   COL1 BETWEEN 220 AND 250 AND
   COL2 < 10000
```

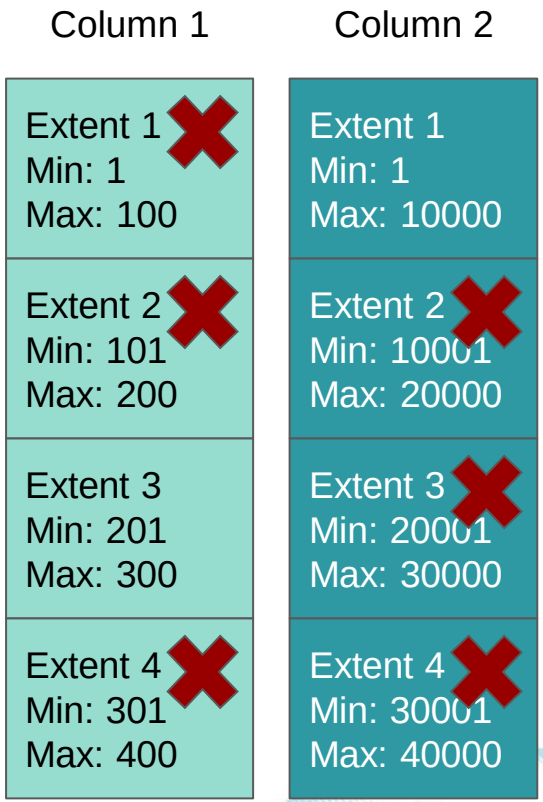

# The Future of Analytics

- ✓ Data will continue to grow
- ✓ Customer expectations continue to grow

Modern problems require modern solutions

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# MariaDB HTAP

Hybrid Transactional/Analytical Processing

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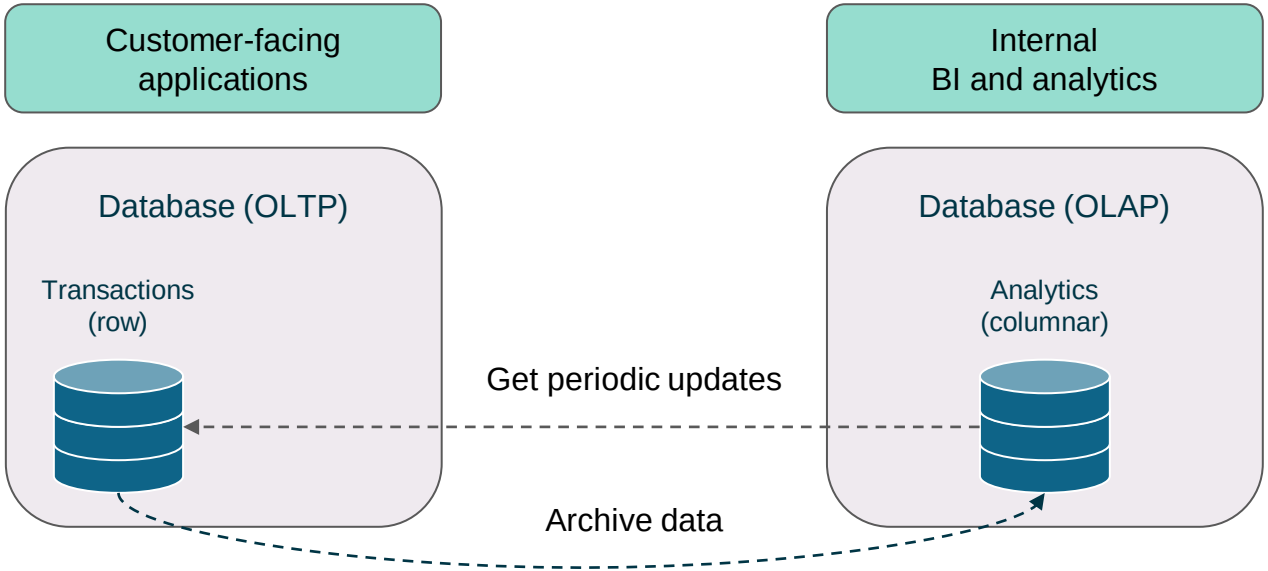
# Traditional approach

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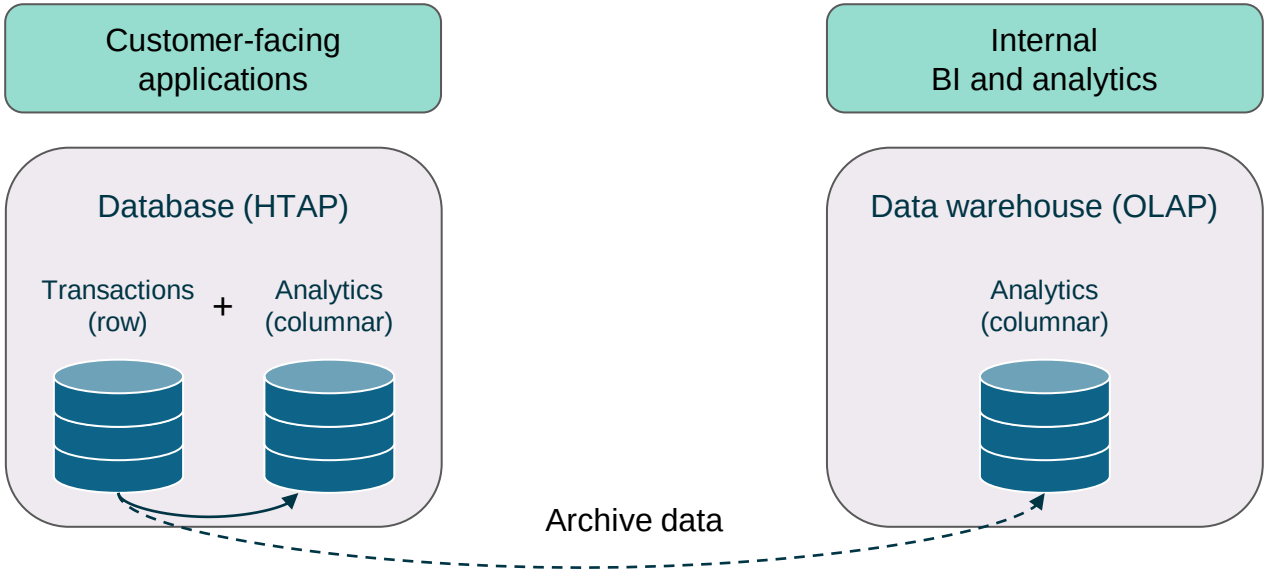
# Solutions Powered by HTAP




HTAP = Hybrid Transactional/Analytical Processing

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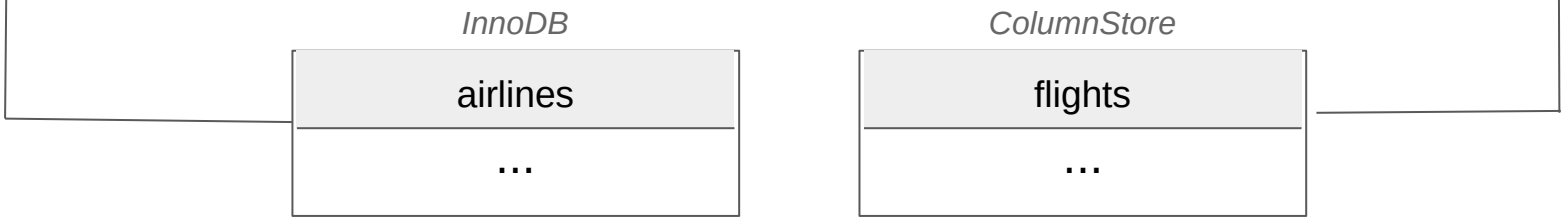
# Cross-Engine Queries

```
SELECT
        a.airline, AVG(f.dep_delay)
FROM
                innodb_db.airlines a
        INNER JOIN
                columnstore_db.flights f
                ON a.iata_code = f.carrier
GROUP BY
                a.airline
```

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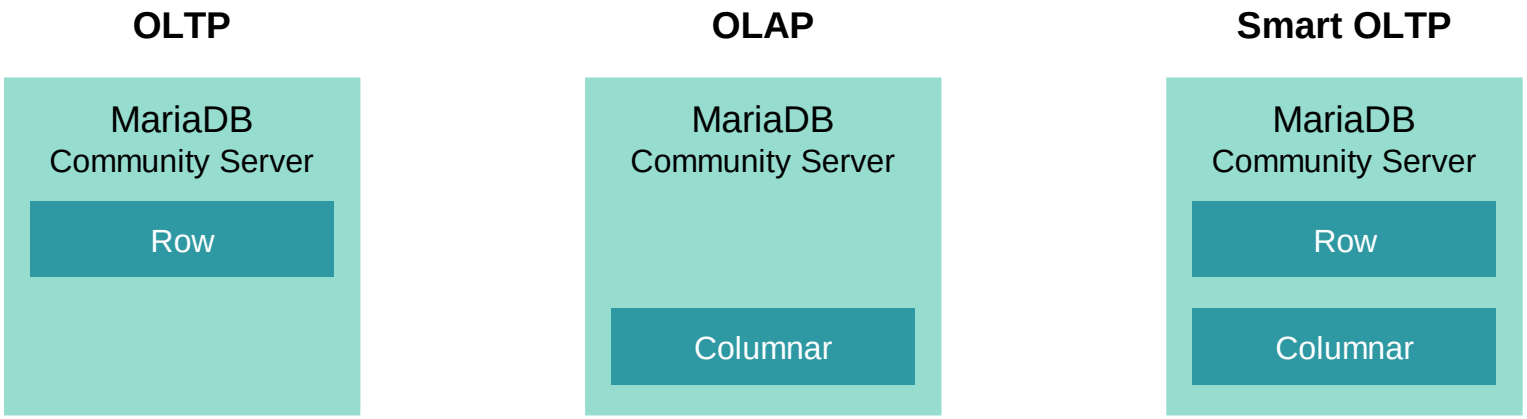
# Ultimate flexibility



# DEMO

# So much more!

# Community Server 10.5 Updates

- Embracing the MariaDB name
  - With MariaDB Community Server 10.5, binaries are now 'mariadb'-named
  - Server error messages changed to only use MariaDB
- Multiple SQL enhancements
- New Data Type Plugin API
  - New Plugin API to create custom data types via plugins
  - New Data type as example implementation (INET/4, INET/6)

# Community Server 10.5 Updates

- Enhancements to temporal tables
  - WITHOUT OVERLAP for application-time period tables
  - Configurable start date/time for interval partitioned history of system versioned tables
  - Automatic creation of history partitions when partitions are defined
- Security updates
  - New privileges as subset of the SUPER privilege
  - SUPER still acts as an alias for all of the above where needed
  - Server enforced TLS encrypted connections

# Community Server 10.5 Updates

- InnoDB refactoring
  - Optimized tablespace handling
  - New InnoDB thread pool for background tasks
  - Redo log changed to a more efficient format
  - InnoDB internal foreign key parser removed
  - Deprecated InnoDB system and status variables removed
  - Cleanup of InnoDB Data Scrubbing code
  - Several variables from SHOW ENGINE INNODB STATUS added to SHOW GLOBAL STATUS

# Community Server 10.5 Updates

- Replication and binary logging
  - SQL statements for controlling the replication now allow the use of the term REPLICA instead of SLAVE.
  - Default slave_parallel_mode changed from “conservative” to “optimistic”
  - New parameter binlog_row_metadata for adding meta information to the binary log file
- System information and tracing
  - Information schema updates
  - ANALYZE for statements shows the time spent for checking the WHERE clause
  - Performance Schema has been refactored

# Community Server 10.5 Updates

- Galera
  - Enforcement to allow DDL for engines supported by Galera
  - Cluster now has full MariaDB GTID support
  - Inconsistency voting protocol
- Information about pre-10.0 temporal data types
  - always displayed with a /* mariadb-5.3 */ comment in:
    - SHOW CREATE TABLE
    - DESCRIBE
    - INFORMATION_SCHEMA.COLUMNS.COLUMN_TYPE
- Increase Aria and S3 index length limit from 1000 to 2000 bytes

# Q&A

# Thank you!

https://mariadb.com/downloads/

https://hub.docker.com/r/mariadb/columnstore

**Open Source Developer Examples**

https://github.com/mariadb-corporation/developer-examples

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 @mariadb

 mariadb-corporation

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