The MySQL Ecosystem in 2023

Colin Charles, Consultant, Galera Cluster
colin.charles@galeracluster.com | byte@bytebot.net
https://bytebot.net/blog | @bytebot on Twitter
FOSDEM, Brussels, Belgium
5 February 2023
whoami

- Consultant at Codership, makers of Galera Cluster

- Active in the MySQL ecosystem: Founding team of MariaDB Server (2009-2016), early at MySQL AB (pre-Sun exit), Percona.

- Past lives include Fedora Project (FESCO), OpenOffice.org

- MySQL Community Contributor of the Year Award winner 2014
Codership are the original makers and engineers of Galera Cluster, a multi-master, virtually synchronous replication solution for the MySQL ecosystem.

If you use Percona XtraDB Cluster (PXC) or MariaDB Galera Cluster, you directly benefit from the work done by the team at Codership.

Remember that beyond engineering, you may also purchase 24/7 support, training, consulting, Galera Cluster Enterprise Edition (EE) and a whole lot more!

Codership sponsored my travel to FOSDEM 2023.
Fast forward, what changed in 3 years?

- MariaDB Corporation is now public as MariaDB plc, trading as MRDB; rapid release model + LTS releases
- Percona has re-branded
- Oracle has made 14 GA releases of MySQL 8
- Amazon RDS uses semi-sync
- Facebook has Raft-based replication
A mature ecosystem

- **MySQL**: 28 years — May 1995
- **Percona Server**: 15 years — November 2008
- **MariaDB Server**: 13 years — February 2010
Branch vs. Fork
# Release Matrix

MySQL 8 minor releases make all the difference

<table>
<thead>
<tr>
<th>MariaDB</th>
<th>MySQL</th>
<th>Percona Server for MySQL</th>
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<tbody>
<tr>
<td>5.2: 10 Nov 2010</td>
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<td>5.3: 29 Feb 2012</td>
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<td>5.5: 11 Apr 2012</td>
<td>5.5: 3 Dec 2010</td>
<td>5.5.11-20.2: 18 Apr 2011</td>
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<td>10.1: 17 Oct 2015</td>
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<td>10.3: 25 May 2018</td>
<td>8.0: 19 Apr 2018</td>
<td>8.0.13-3: 21 Dec 2018</td>
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<td>10.4: 18 Jun 2019</td>
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<td>10.5: 24 Jun 2020</td>
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<td>10.6 LTS: 6 Jul 2021</td>
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<td>10.7: 9 Feb 2022</td>
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<td>10.8: 20 May 2022</td>
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<td>10.9: 22 Aug 2022</td>
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<td>10.10: 17 Nov 2022</td>
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<td>10.11:</td>
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Open Source Community

- MariaDB Server: takes external contributors/committers, participates in Google Summer of Code to nurture new developers
- MySQL: takes external contributors, typically after signing a CLA; commits not welcome
- Percona Server: bug reports are welcome, commits aren’t
- Contributor Agreements: Oracle Contributor Agreement (OCA), MariaDB Contributor Agreement (MCA), and the BSD New
Contributors Recognised

Twitter: @bytebot | bit.ly/MySQL2023
MySQL 5.7

http://www.thecompletelistoffeatures.com/

- Multi-source replication
- Dynamic replication filters
- Lossless semisync
- SHOW EXPLAIN for connection_id
- GIS functionality
- Statement timeouts
- Change master without stopping SQL thread
- Online GTID implementation
- GTID no longer requires log-slave-updates to be enabled
- Virtual columns (generated columns)
- Online buffer pool resize
- Username size increase
- LOCK/UNLOCK accounts
- JSON + MySQL Shell + X DevAPI
- Encryption at rest

Twitter: @bytebot | bit.ly/MySQL2023
MySQL 8.0

https://mysqlserverteam.com/the-complete-list-of-new-features-in-mysql-8-0/

- Recursive Common Table Expressions (CTEs)
- Window functions
- Instant ADD/RENAME COLUMN
- SET PERSIST
- Invisible indexes
- New REGEXP library + functions
- JSON support, schema validation
- caching_sha2_password
- Resource groups
- GIS support for Spatial Reference Systems
- UTF-8 (utf8mb4) as default character set (👍)
- Histograms
- EXPLAIN ANALYZE
- InnoDB improvements
- Transactional data dictionary
- Binary log compression
- Group replication
- SQL Roles
- MySQL Shell
- X Protocol
MariaDB Feature Highlights

• DML only Flashback - rollback instances/databases/tables to an older snapshot
• ed25519 password plugin
• simple_password_check, cracklib_password_check
• Accounts, passwords, and global privileges are stored in mysql.global_priv
• Progress reporting
• Table elimination (think anchor modelling — https://mariadb.com/kb/en/what-is-table-elimination/)
• Dynamic columns
• Column compression
• PROXY protocol support

• Instant DROP COLUMN
• LIMIT ROWS EXAMINED
• Usernames up to 80 characters, roles up to 128 characters
• MariaDB threadpool
• LIMIT ROWS EXAMINED
• Extended KILL syntax
• User statistics
• Oracle PL/SQL support
• Invisible columns
• System versioned tables, AS OF queries
• InnoDB AHI off by default
Storage Engines

- MyRocks: for write-intensive workloads
- SPIDER: for scalability and sharding*
- InnoDB: default for read/write operations (no longer Percona XtraDB since MariaDB 10.2); getting different from MySQL
- ColumnStore: analytical purposes
- Aria stores all system tables in 10.4+
- OQGRAPH: leaves algorithm
- PARTITION: updates to make SPIDER work better
- CONNECT: for ETL operations
- S3: store data in Amazon S3
- Cassandra: disabled in 10.5, removed in 10.6
- TokuDB: disabled in 10.5, removed in 10.6
Percona Server Feature Highlights

- Storage Engines: MyRocks, TokuDB (EOL 8.0.28-19)
- InnoDB full-text search improvements
- Extra diagnostic features (e.g. in INFORMATION_SCHEMA, user statistics)
- InnoDB improvements, e.g. parallel doublewrite buffer
- Column compression for VARCHAR/BLOB, JSON
- Compressed columns with dictionaries
- PAM authentication, audit logging
- Keyring in Hashicorp Vault
- A lot more, highlighted at https://www.percona.com/doc/percona-server/LATEST/feature_comparison.html but remember that comparison stops at 8.0.13 (and MySQL adds new features in latest releases... currently 8.0.32)
Governance

• MariaDB
  • MariaDB plc
  • MariaDB Foundation
  • https://mariadb.org/about/#governance

• MySQL
  • Oracle (by way of Sun Microsystems, MySQL AB)

• Percona
  • Percona Inc
Mix & Match?

• Percona Server will work with MySQL since there is compatibility maintained

• MariaDB Server, your mileage will vary, but you can’t have MySQL attached to it as a secondary

• Tools like MySQL Shell won’t work on MariaDB Server (also, mysql_ssl_rsa_setup, etc.)

• ERROR 2059 (HY000): Authentication plugin 'caching_sha2_password' cannot be loaded: /usr/lib64/mysql/plugin/caching_sha2_password.so: cannot open shared object file: No such file or directory

• MariaDB MySQL 8 compat tracker: https://jira.mariadb.org/browse/MDEV-28906

• There can be strategies with separate deployments and proxies, but nowadays the path is clear — pick a server and stick with it
Clouds

- Amazon Web Services: RDS for MySQL (5.5, 5.6, 5.7, 8.0) and MariaDB Server (10.3-10.6), and of course Aurora MySQL

- Google Cloud SQL: MySQL (5.6, 5.7, 8.0 — default)

- Microsoft Azure: MySQL (5.7, 8.0) and MariaDB Server (10.2, 10.3)

- Alibaba Cloud: RDS MySQL (still supports 5.5->new upgrades), RDS MariaDB TX

- Oracle Cloud: MySQL Heatwave is exciting
High Availability Clustering Options

- MySQL 8
  - Group replication with MySQL InnoDB Cluster
  - InnoDB ClusterSet
- MariaDB Server
  - MariaDB Galera Cluster rolled into it
- Codership MySQL 8 with Galera Cluster
- Percona XtraDB Cluster (PXC) 8.0
Proxies

- MySQL integrates MySQL Router
- MariaDB Server recommends MariaDB MaxScale
- Percona recommends HAProxy, ProxySQL
- ProxySQL works with all the above
Ecosystem Tools

- Percona Toolkit
- Percona XtraBackup
- MariaBackup
- mydumper
- MHA (2018)
- vitess
- Orchestrator (2021)
- Signal18 Replication Manager
- dbdeployer
Commercial Ecosystem Tools

- Continuent Tungsten Clustering/Proxy/Replicator
- PlanetScale
- SeveralNines ClusterControl
- The continued need for Enterprise variants to move subscriptions
  - Oracle MySQL
  - MariaDB plc is a good example of pushing this around the open source MariaDB Server
  - Codership Galera Manager
- The cloud changes everything: Oracle MySQL Heatwave, MariaDB SkySQL
Distribution

- Linux distributions were golden, but even with them, you can see changes (e.g. Percona XtraDB Cluster (PXC) not being updated in Ubuntu LTS releases)
  - MariaDB Server was a choice during drop-in compatibility, but now is shipped alongside latest MySQL
- Docker
- Kubernetes
- OpenStack
Money Sloshing Around The Ecosystem

- Altinity (ClickHouse) raised $4M (Accel lead)
- PlanetScale (vitess) raised $105M in Series C (was: $25M) (Kleiner Perkins, A16Z)
- PingCap (TiDB) raised $341.6M (was: $71.6M)
- MariaDB is public
- Cloud providers have huge revenue selling MySQL and MariaDB Server
Exciting stuff

• Go driver community contributions — https://github.blog/2020-05-20-three-bugs-in-the-go-mysql-driver/


  • yes, they have an 8.0 tree https://github.com/facebook/mysql-8.0

• A new, non-censored planet (thanks JF): https://planet.oursqlcommunity.org/
Providers galore

- There are service providers for the entire ecosystem
- People are going to ask for information about the software supply chain (even though the license is AS IS, there are expectations when companies exist)
- Trust the small player, they lack G&A overhead, they’re unlikely to sell you something you don’t need
Conclusion

• Make yourself heard: Bugs databases are awesome

• 28 years, tools come and go

• MySQL and the ecosystem is not going anywhere :)

• Immerse yourself!

• Worrying though: new software packages, are they PostgreSQL or SQLite first, and MySQL later (or never)?
Thank You!

Colin Charles

colin.charles@galeracluster.com / byte@bytebot.net

http://bytebot.net/blog | @bytebot on twitter