The MySQL-MariaDB story

MariaDB Roadshow
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Michael "Monty" Widenius
Entrepreneur, MariaDB hacker
monty@mariadb.org
http://mariadb.org/

Time to Celebrate

- 20 Years of MySQL and PHP
  - MySQL was internally released 1995 and publicly 1996
- Some MySQL code is 34 years old
- MariaDB is 6 years

The origin of My (SQL) and Maria (DB)

MySQL and MariaDB are named after Monty's children

Maria and MariaDB is now a bit older

Ready to take on the world

Why MariaDB was created

"Save the People, Save the Product"

- To keep the MySQL talent together
- To ensure that a free version of MySQL always exists
- To get one community developed and maintained branch
- Work with other MySQL forks/branches to share knowhow and code

Monty Program Ab
2009-2013

- Started in February 2009 after Monty's exit from Sun
- Shifted focus from (M)aria storage engine to MariaDB (A branch of MySQL) after Oracle acquired Sun.
- Did drive (but doesn't own) the MariaDB development
- "Virtual company" (no offices) with about 20 employees all over the world. All original 'core' developers of MySQL are employed. (Full optimizer team, 3 of 4 MySQL architects, etc)
- Very technical company (only development, open source consulting and L3 (bug fix & advanced) support)
- Used the Hacking Business Model ('Company is owned by the employees')
- Merged with SkySQL in April 2013

MariaDB Foundation Overview

The Foundation is the **owner** of the main MariaDB server project

Custodian of the code, Guardian of the community

Foundation can never to be controlled by a single entity or person

Note that the Foundation is **not** about the MariaDB trademark or to decide upon the MariaDB roadmap!

The Foundation was created to ensure that anyone can become a contributor to the MariaDB project on equal terms!

MariaDB Foundation Goals

That MariaDB be actively developed in the community and to:

- Increase adoption of MariaDB
- Ensure sustainable high-quality efforts to build, test and distribute MariaDB
- Ensure that community patches are reviewed and adopted
- Guarantee a community voice and define development rules
- Keep MariaDB compatible with MySQL
- Maintain mariadb.org.

The MariaDB foundation now employes:

- Management team: Michael Widenius as CTO
  - Otto Kekäläinen as CEO
  - 4 full time MariaDB developers (including the CTO)
- 1 documentation writer

MariaDB Foundation members

Many of the MariaDB 10.0 features has been developed together with the MariaDB foundation!

The foundation are very grateful to it's 2013-2015 members, who have made MariaDB 10.0 possible:

- **Booking.com**
- SkySQL (now **MariaDB Corporation**) (3 years!)
- **Parallels** (2 years!)
- **Automattic**
- **Zenimax**
- **Visma**

Additional sponsors can be found on mariadb.org

MariaDB Foundation

More members and sponsors are welcome!

If you care about the future of the MySQL ecosystem, please contact us and and ask how you can get involved!

Michael Widenius, CTO, monty@mariadb.org

*MariaDB **server** is a branch of MySQL*

- User level (data, API, replication..) compatible with MySQL
- Drop in replacement
- More plugins, more features, faster, better code quality.
- GPL-only server license.
- LGPL C and Java connectors.
- More open development
  - Source in public repository on launchpad
  - Active external contributors
  - All development plans public on mariadb.com

*MariaDB **server** releases*

- MariaDB 5.1 was released in February 2010
- MariaDB 5.2 was released in November 2010
- MariaDB 5.3 was released in April 2012
- MariaDB 5.5 was released in April 2013
- MariaDB 10.0 was released in March 2014
- MariaDB 10.1 beta released in February 2015

- MariaDB-Galera (multi-master, mesh network) was released as stable (GA) in February 2013 after a lot of testing.

The MariaDB releases

- MariaDB 5.1 (based on MySQL 5.1)
  - Better build & test system, code cleanups, community patches, new storage engines, table elimination.
- MariaDB 5.2 (based on MariaDB 5.1)
  - Community features that did not go into 5.1:
    - Virtual columns
    - Extended User Statistics
    - Segmented MyISAM key cache (faster multi user!)
- MariaDB 5.3 (based on MariaDB 5.2)
  - Optimizer features (faster subquerier, joins etc)
  - Microsecond, dynamic columns, faster HANDLER etc.
  - Better replication (group commit, more options)
- MariaDB 5.5 (based on MariaDB 5.3 and MySQL 5.5)

The MariaDB releases

- MariaDB 10.0
  - Most of MySQL 5.6 features
  - Multi-source and Parallel replication
  - Working GTID (Global transaction ID)
- MariaDB 10.1
  - Galera integrated
  - Even better parallel replication
  - Strong encryption

Moving to MariaDB 10.0

MariaDB 10.0 beta should be binary compatible with MySQL 5.6 on:

- Data on disk (Except for some views, which will be fixed shortly)
- Communication on the wire (ie, all MySQL connectors and applications following the MySQL specifications should work with MariaDB)
- Configure options (needs to be verified before gamma)
- SQL Syntax
- Some configure options or optimizations may not be in MariaDB 10.0, but these should only affect performance. Some things will be a lot faster, a few things may be a bit slower in MariaDB than in MySQL.
- We aim to have full compatibility for all important things that MySQL 5.6 supports in MariaDB 10.1 and 10.2.

MariaDB 10.0

MariaDB 10.0 is MariaDB 5.5 + some features from MySQL 5.6 + some new features

Features back ported from MySQL 5.6:

- All InnoDB changes
- Performance schema changes
- Read only transaction (significant InnoDB optimization)
- Online ALTER TABLE

Features from MySQL 5.6 that are reimplemented:

- Better error message (with system error string)
- NOW() as default value for datetime
- **Global transaction ID** (GTID) for replication
- **Parallel replication,** based on master group commit

New features in MariaDB 10.0

- SHOW EXPLAIN (see what other thread is doing) (Also in MySQL 5.7)
- Multi source (one slave can have many masters) (Limited in MySQL 5.7)
- Faster ALTER TABLE with UNIQUE index
- DELETE … RETURNING (See what you delete)
- Storage engine for **Cassandra**
- Storage engine **Connect**
- Full featured storage engine **TokuDB**
- Storage engine **Spider** (automatic sharding)
- Roles (group grant's)
- Much better GIS support (We can run Open Street Map queries)
- **Engine independent statistics**

  For full list see https://mariadb.com/kb/en/what-is-mariadb-100/

Benefits of MariaDB 10
GTID (Global transaction id)

Global transaction ID allows you to easily promote a slave as a new master.

Much simpler and more robust design than in MySQL 5.6 or 5.7

- GTID can be enabled or disabled independently and online for masters or slaves
    - In MySQL 5.6 one has to shut down all servers at once and enable GTID mode globally on both masters and slaves
- Slaves using GTID do not have to have binary logging enabled.
- Supports multiple replication domains (independent streams)
    - Queries in different domains can be run in parallel
- Guarantees that slave will never have a state that the master didn't have.
    - This is optional in MySQL 5.7; Enabling makes things slower
- GTID designs supports multi-source replication

Benefits of MariaDB 10 Parallel replication

- Multi-source replication from different masters executed in parallel
- Queries from different domains are executed in parallel
- Queries that are run in parallel on the master are run in parallel on the slave (based on group commit).
  - Transactions modifying the same table can be updated in parallel on the slave!
- Supports both statement based and row based replication.

Conclusion:

- For the first time in MySQL/MariaDB history, the slave will be as fast as the master!

(By using dynamic domains, you could make the slave even faster than the master...)

Parallel slave benchmark
10x speedup with 12 threads

Sysbench oltp.lua

48 threads, --binlog-commit-wait-usec=10000

Legend:
- binlog, crash-safe
- no binlog, durable
- no binlog, non-durable
- binlog, non-crash-safe

Y-axis: TPS

X-axis: Number of slave worker threads
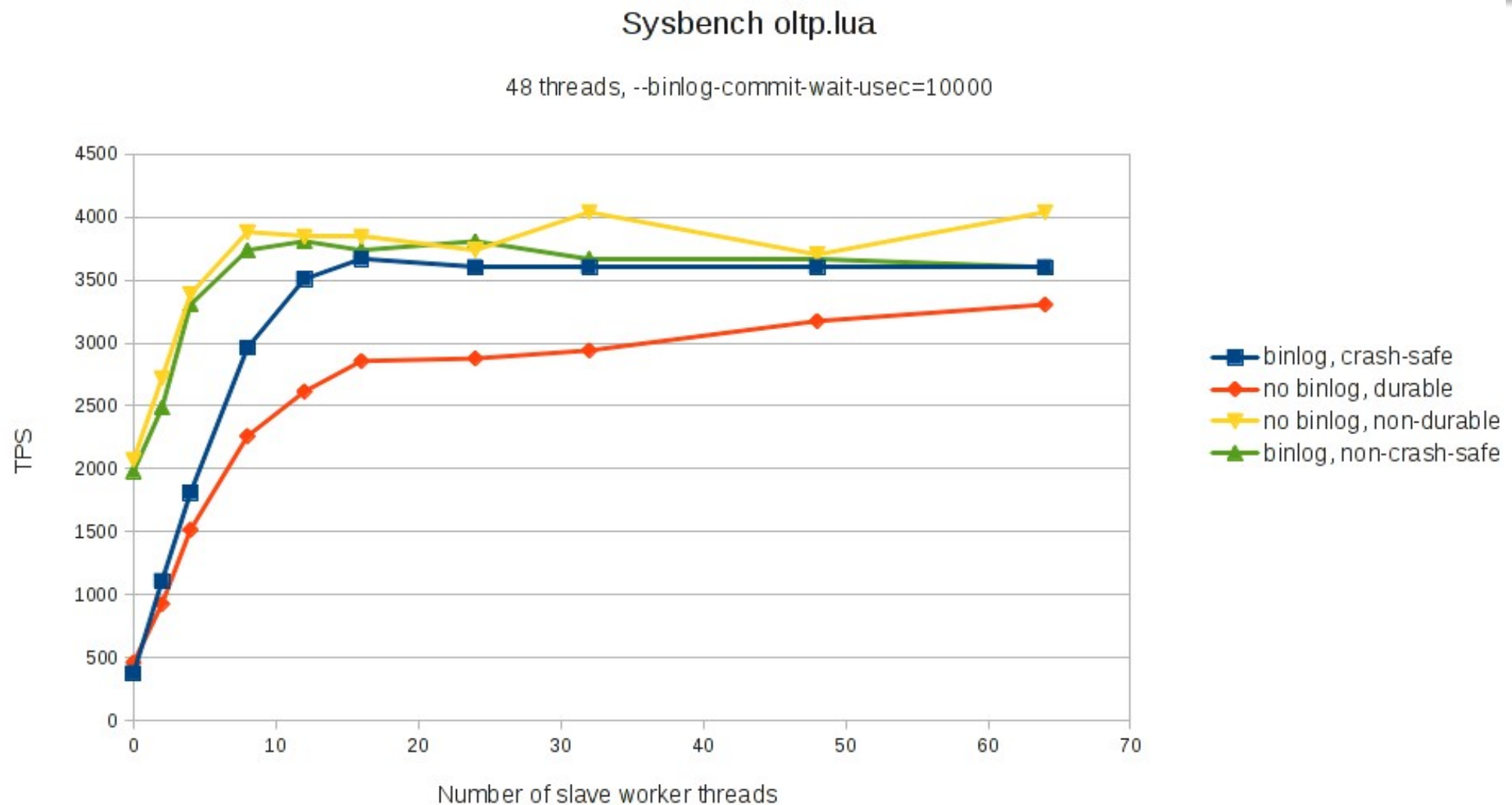
From: http://kristiannielsen.livejournal.com/18435.html
Crash safe: --log-slave-updates --sync-binlog=1 --innodb-flush-log-at-trx-commit=1

Parallel slave, no wait
Slave performance relative to master

slave performance relative to master
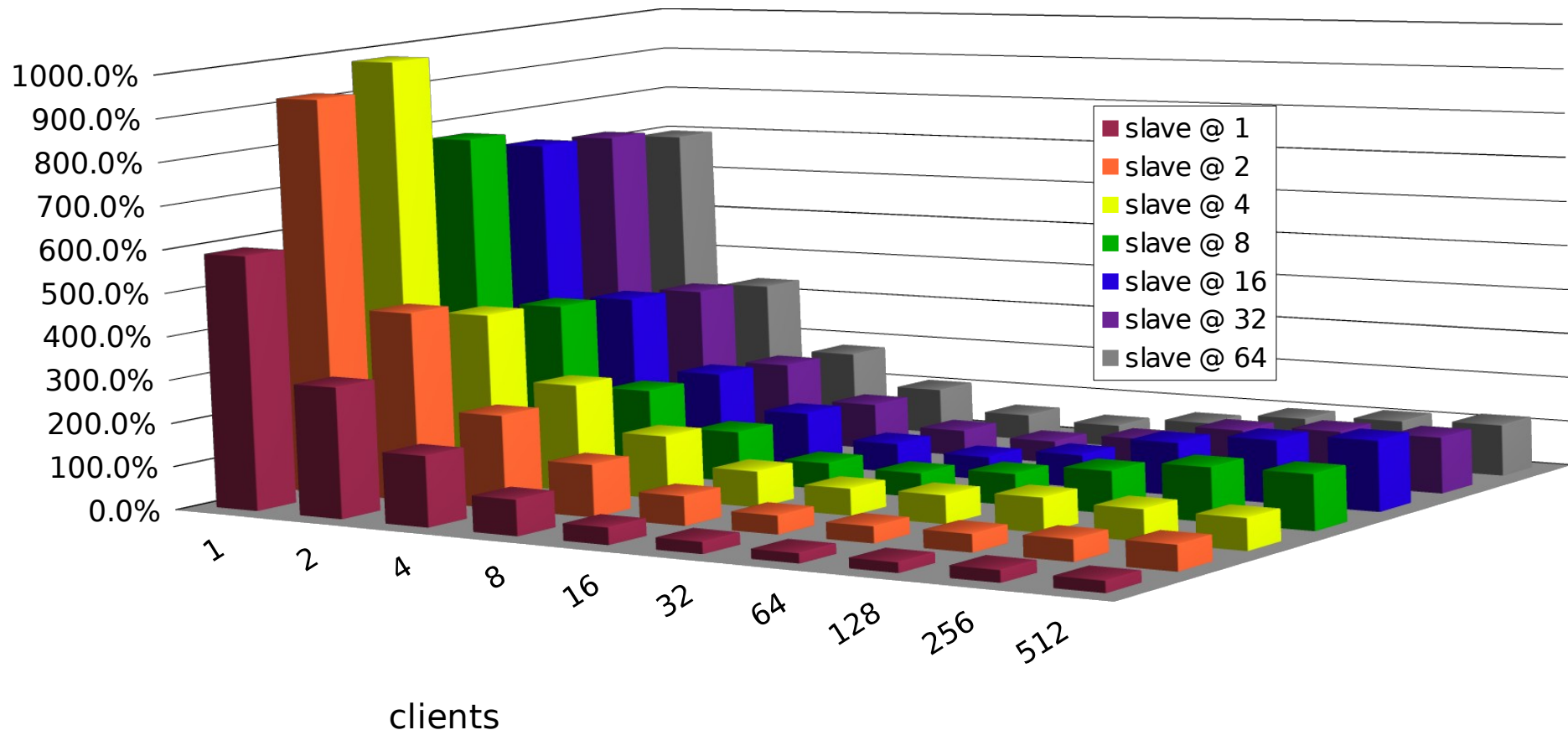
Benchmark: sysbench OLTP rw, 64 tables, data fits in memory
Master config: trx_commit=1, sync_binlog=1, SBR
Slave config: trx_commit=1

Features in MariaDB 10.1 beta

Full list is at https://mariadb.com/kb/en/what-is-mariadb-101/

- **Galera** (multi-master, Mesh network)
- **True parallel replication**; Makes slave in some cases faster than the master!
- Strong encryption for InnoDB and Aria (per page)
  - From Eperia: Selected InnoDB tables, different keys
  - From Google: All InnoDB tables, requires key manager
- Better GIS support
- ANALYZE statement (better EXPLAIN)
- Don't create .frm files for temporary tables (speeds up temporary table creations)
- Improvements from WebScaleSQL

Features in MariaDB 10.1

- Disable performance schema by default (gives 1% → 20% speedup)
- Improvements for FusionIO
    - Atomic writes
    - Real time compression (about 2x space saving)
- Statement timeout (MySQL 5.7 has a more limited version of this)
- Per query values: **SET MAX_STATEMENT_TIMEOUT=5** SELECT …
- Compound statement / anonymous blocks
    - IF (…) THEN CREATE TABLE … ; END IF
- Added variable default-tmp-storage-engine (From MySQL 5.6)
- SELECT … UNION ALL doesn't require temporary tables (From MySQL 5.7)
- SET DEFAULT ROLE

Features in MariaDB 10.1

- Allowing storage engine to shortcut group by queries (In review, for **scaledb**)
- Speed up connection speed by moving creation of THD to new thread (In testing)
- Automatic discovery of performance schema tables (simpler mysql_install_db code)
- Allow up to 64K pages in InnoDB (old limit was 16K).
- **mysqld --help --verbose** now shows valid values for ENUM variables.
- **information_schema.system_variables** gives information, like description and value origin, for system variables.
- Optimizations for IBM Power8 architecture.

How you can help

- Help develop features in MariaDB 10.x
- Help with writing, answering questions or translating documentation in the knowledge base at https://mariadb.com/kb/en/
- Be active on the MariaDB email lists (maria-developers@lists.launchpad.org)
- Spread the word about MariaDB
    - Talk about MariaDB in your blogs or at conferences.
- Convince your company to support, become a member or hire a developer for the MariaDB foundation.
- Become a support partner to MariaDB Corporation or work with the MariaDB corporation to develop new features in MariaDB that your company needs!

You can find information of how to be part of the MariaDB development team at: https://mariadb.com/kb/en/community/

New LGPL client libraries

- LGPL client libraries for C and Java
  - C is based on the LGPL library from MySQL 3.23
  - API compatible with latest MySQL client libraries.
  - Java is based on the drizzle driver.
  - LGPL ODBC driver.
- Works with MariaDB, Percona server and MySQL
- Developed by Monty Program Ab and SkySQL.
- Announced and released 2012-10-29

You can download these from
https://downloads.mariadb.org/

MariaDB and TokuDB

TokudB is now a native plugin for MariaDB and is distributed together with MariaDB 10.0

About TokuDB

- TokuDB uses Fractal Tree® indexing to improve insert and query speed, compression, replication performance, and online schema flexibility.

- TokuDB is created by Tokutek Inc. See www.tokutek.com for details.

Connect storage engine

MariaDB 10.0 includes the Connect storage engine by Olivier Bertrand.

With the connect storage engine you can read, write and update files in a lot of different storage formats:

- Various fixed and dynamic text formats
- .DBF (dBASE format)
- .CSV
- .INI
- .XML
- ODBC ; Table extracted from an application accessible with ODBC; You can for example connect MariaDB to an Oracle database with this.
- JSON

Free MariaDB/MySQL/SQL99 documentation

The knowledgebase allows you to:

- Find answers to your problems
- Ask questions and get answers from others
- Add your own documentation or help with translations

There are a lot of others involved

- Most features in MariaDB 5.2 were contributed by the community!
- Many of the advanced features in MariaDB 5.3 are sponsored features
- In the mariadb.com knowledge base (free MariaDB and MySQL documentation) we have now 3000 (mostly English) articles
- Encryption in 10.1 was developed by Google and Eperi.

Statistics from the March 2014:

- Added/Changed Articles: 262
- On Freenode #maria, 550 people wrote 10173 lines
- Launchpad Activity (note that 10.1 is in github):
    - 25 active branches
    - 395 commits
- Hundreds of thousands of downloads of MariaDB. Probably >> 2M users
- Google has employed people to work on MariaDB.
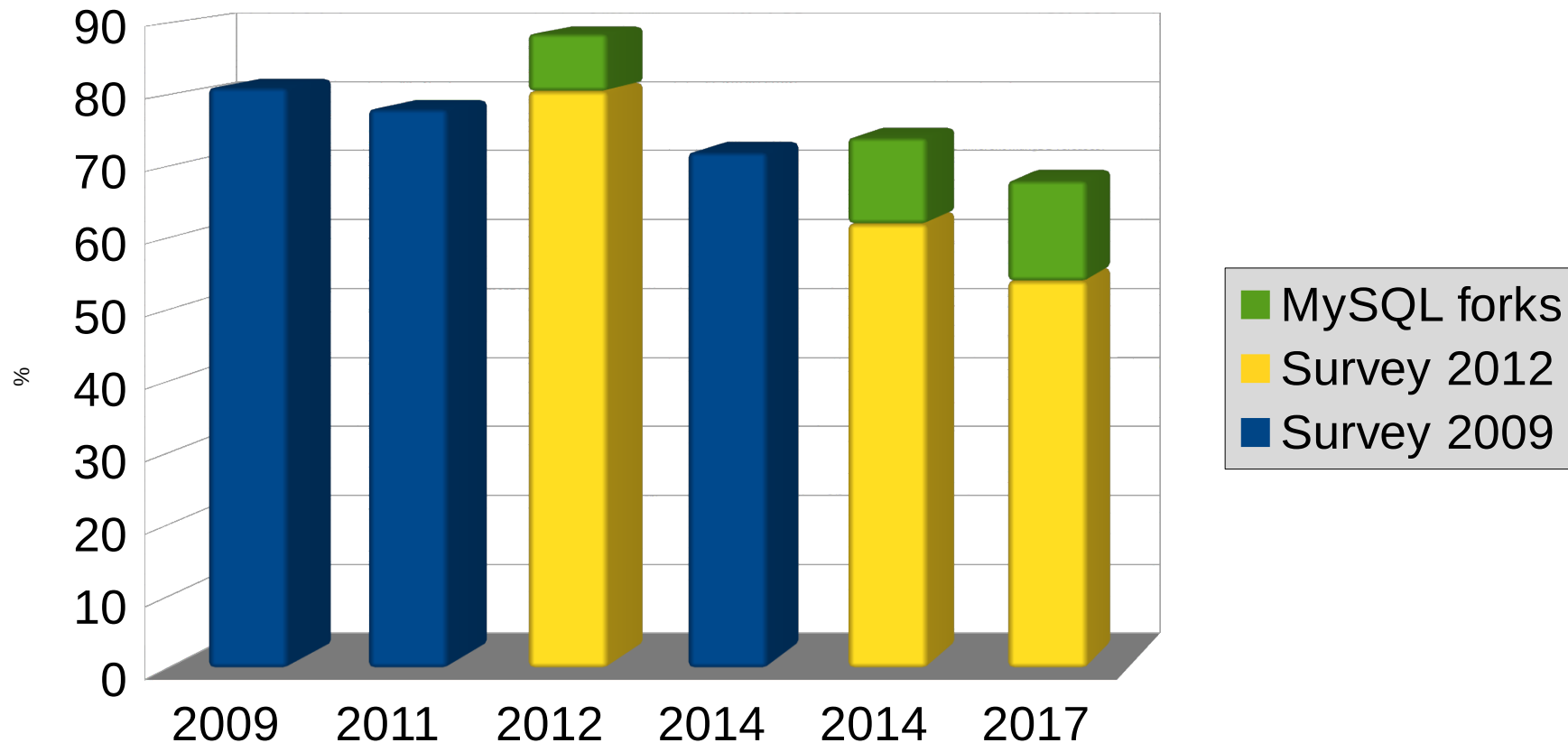
MariaDB popularity is increasing

- In December 2012
    - Wikipedia announced they are moving to MariaDB.
- In January-March 2013
    - DB at Mozilla blogged they have moved to MariaDB
    - Fedora voted 7-0 to make MariaDB the default MySQL database
    - OpenSuse 12.3 included MariaDB as default.
    - Slackware, Chakra Linux and Arch Linux has MariaDB as default.
- In April 2013
    - Google is basing their new SQL offerings on MariaDB
    - FusionIO is showing benchmarks with MariaDB.
- June 2013
    - RedHat announced it will include MariaDB in RedHat Enterprise.
- December 2013
    - MariaDB was added to Debian and later included in Ubuntu
- 2014
    - RedHat Enterprise Linux 7, Suse Enterprise and Oracle unbreakable Linux has MariaDB as default

Reasons to switch to MariaDB today

- MariaDB has 20 man years of more development than MySQL (and the gap will continue growing).

- MariaDB is maintained by the people that originally created MySQL and has the best knowledge of the MySQL code.

- MariaDB is binary compatible (data and API) with MySQL, so its trivial to replace MySQL with MariaDB (minutes).

- Reasons to switch to MariaDB
  - Faster queries thanks to XtraDB (InnoDB plugin fork from Percona), TokuDB, a much better optimizer, better replication and better code.
  - Open source development: Anyone can be part of the development at all stages. Developer meetings are public!
  - More features, including critical ones like true parallel replication, better statistics, dynamic columns and TokuDB & Cassandra storage engines.
  - Less risk as MariaDB will not remove features like MySQL is doing (thread pool, storage engines, safemalloc (developer feature), older OS)

MariaDB 10.0 was made possible thanks to

- Oracle
  - Updated InnoDB, Updated Performance schema, online alter table
- SkySQL
  - Global Transaction Id, Parallel replication, Engine independent statistics, DELETE RETURNING, Cassandra engine, GIS support, QA
- MariaDB Foundation
  - Merge of MySQL 5.6, reviews of community patches, builds, speed optimizations, new character sets
- The MariaDB Community. Some bigger contributors:
  - CONNECT ENGINE by Olivier Bertrand
  - Spider by Kentoku Shiba
  - Multi-source replication, by Lixun Peng @ taobao
- Google, through Google summer of code
  - Roles by Vicențiu Ciorbaru (Works now at MariaDB Foundation)
  - Move to new regexp library (PRCE) by Sudheera Palihakkara

Questions ?

For questions later, use the public MariaDB email list at
maria-discuss@lists.launchpad.net or #maria on Freenode.

For questions regarding the MariaDB foundation:
monty@mariadb.org