MariaDB: The New M in LAMP?

Colin Charles, Monty Program Ab
colin@montyprogram.com
http://montyprogram.com / http://mariadb.org/
http://bytebot.net/blog / @bytebot on Twitter
SCALE10x, Los Angeles, CA, USA
20 January 2012

whoami

- Chief Evangelist, MariaDB
- Formerly of MySQL AB/Sun Microsystems
- Past lives included FESCO (Fedora Project), OpenOffice.org

fb.com/MariaDB.dbms |
@mariadb

Monty Program

Aims

- Give you an update of what we've done with MariaDB
- Discuss the broader MySQL ecosystem

fb.com/MariaDB.dbms |
@mariadb

Monty Program

MariaDB

What is it?

- A branch of MySQL with more features?
- A branch of MySQL with better features?
- A fork?

fb.com/MariaDB.dbms |
@mariadb

Monty Program

MariaDB is...

- Community Developed
- Feature Enhanced
- Backward Compatible

fb.com/MariaDB.dbms |
@mariadb

Monty Program

Who's behind it?

- MySQL (database) owned by MySQL AB (company)
- Monty Program is just a sponsor of MariaDB
- maria-captains: 64% Monty Program, 36% community (+16% MP 3Q/2011)

fb.com/MariaDB.dbms |
@mariadb

Monty Program

When did this begin?

- Sun buys MySQL AB in January 2008
- Oracle proposes acquisition of Sun Microsystems in April 2009
- Widenius decides that beyond the engine (Febuary 2009), focus on MariaDB, a complete database solution

fb.com/MariaDB.dbms |
@mariadb

Monty Program

Why MariaDB?

- MySQL - an open source product or project?
- MariaDB is an open source project

fb.com/MariaDB.dbms |
@mariadb

Monty Program

Aims of MariaDB

- 100% compatible, drop-in replacement to MySQL
- Stable (bug-free) releases
- GPLv2

fb.com/MariaDB.dbms |
@mariadb

Monty Program

Compatibility with MySQL

- There is no NDB cluster storage engine
- Client libraries, client-server protocol, SQL dialect, replication master-slave all similar
- Data files are supported as long as its similar between versions

fb.com/MariaDB.dbms | @mariadb

- Tools are similar (some additional tools for Aria, PBXT)
- XtraDB enabled by default; InnoDB included, but not enabled by default
- http://kb.askmonty.org/v/mariadb-versus-mysql-compatibility

Monty Program

What's in MariaDB 5.1

- Released February 2010
- Create external buildsystem using Buildbot + VMs for test +builds
- Release filled with storage engines
  - *XtraDB, PBXT, FederatedX,* (M)Aria
- *Croatian collations*
- Numerous bug fixes
- Test cases and coverage improvements
- Removal of mutexes
- Compiler warnings gone!

fb.com/MariaDB.dbms | @mariadb

Monty Program

What's in MariaDB 5.1

- XtraDB (ENGINE=InnoDB)
  - enhanced InnoDB designed to better scale on modern hardware; backward compatible, scale better on many cores, use memory more efficiently
- http://www.percona.com/docs/wiki/percona-xtradb:start

fb.com/MariaDB.dbms | @mariadb

Monty Program

What's in MariaDB 5.1

- PrimeBase PBXT
  - Transactional, foreign keys, ACID, MVCC (read w/o locking)
  - Row-level locking during (SELECT FOR) UPDATE
  - Rollback transactions, recovery after restart very fast (identifies garbage making *undo* unnecessary)
  - Write once w/log-based storage; write data to DB, without first writing in transaction log
  - http://kb.askmonty.org/v/about-pbxt

fb.com/MariaDB.dbms | @mariadb

Monty Program

What's in MariaDB 5.1

- *Extended statistics for slow query log*
  - based on *microslow* from Percona http://kb.askmonty.org/v/slow-query-log-extended-statistics

```
MariaDB [(none)]> select id, time, time_ms, command, state from information_sche
ma.processlist, (select sleep(2)) t;
+----+------+---------+---------+-----------+
| id | time | time_ms | command | state     |
+----+------+---------+---------+-----------+
|  2 |    2 | 2002.822 | Query   | executing |
+----+------+---------+---------+-----------+
1 row in set (2.01 sec)
```

- *PROCESSLIST with microsecond precision*
  - TIME_MS in INFORMATION_SCHEMA.PROCESSLIST http://kb.askmonty.org/v/time_ms-column-in-information_schemaprocesslist

fb.com/MariaDB.dbms | @mariadb

Monty Program

What's in MariaDB 5.1

- Table elimination
  - Query highly normalised data, it is sometimes possible to resolve a query without accessing some tables the query refers to e.g. http://kb.askmonty.org/v/what-is-table-elimination
- Pool of threads (MySQL 6 backport)
  - Use a limited set of threads to handle all queries vs one-thread-per-connection. Win if most queries are short running, and there are few table/row locks. http://kb.askmonty.org/v/pool-of-threads

fb.com/MariaDB.dbms | @mariadb

Monty Program

What's in MariaDB 5.2

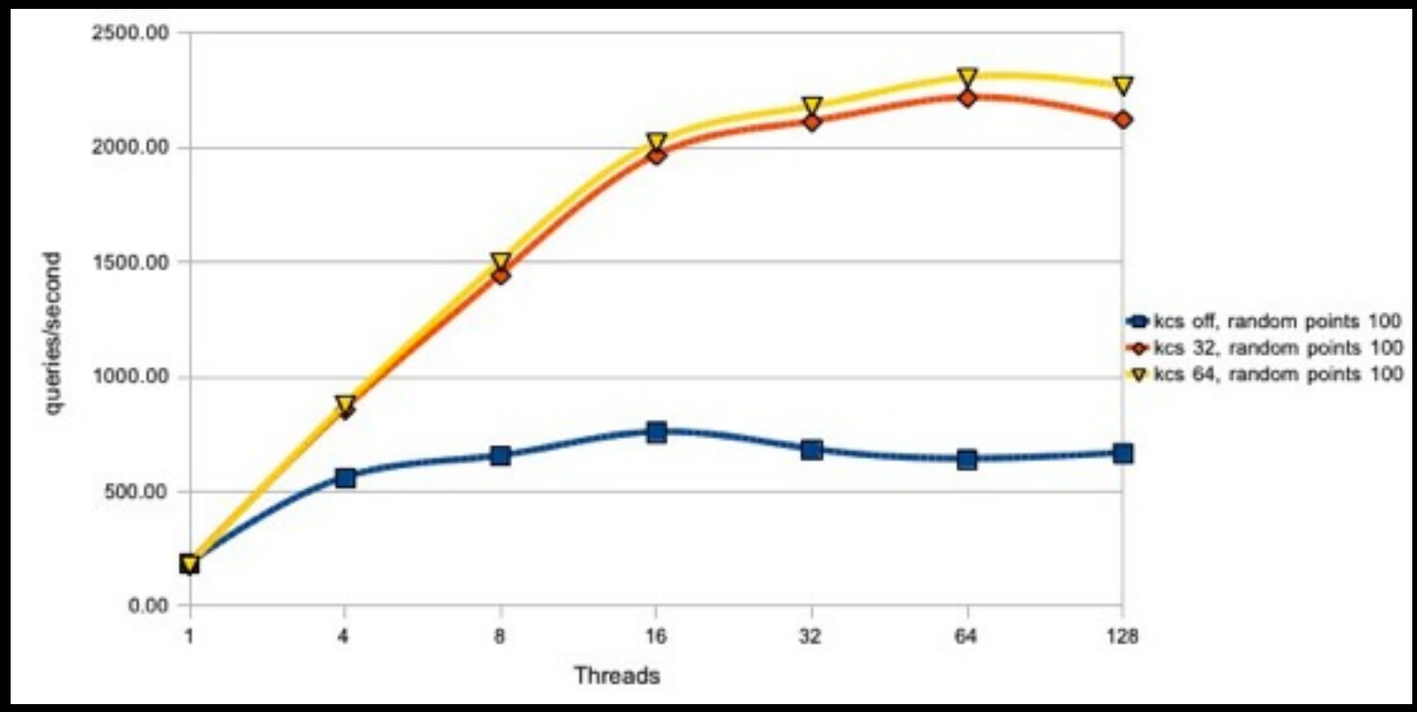
- Released November 2010
- MariaDB 5.2.10 (MariaDB 5.1.60 - changes up to MySQL 5.1.60)
- Pluggable authentication
  - authentication of users handled by plugins
  - mysql_native_password (20 byte) and mysql_old_password (8 byte) included by default
  - CREATE USER foo IDENTIFIED VIA mysql_native_password USING 'pass'; == CREATE user foo IDENTIFIED BY PASSWORD 'pass';
  - Use socket_peercred - if already logged in via Unix credentials, MariaDB will trust it
  - http://kb.askmonty.org/v/development-pluggable-authentication
  - **Now with a PAM authentication plugin!**
    - http://kb.askmonty.org/en/pam-authentication-plugin
- *User Statistics (userstatsv2)*
  - Percona, Google, Weldon Whipple. Understand server activity better, identify database loads http://kb.askmonty.org/v/user-statistics
  - Client, user, index, table statistics

fb.com/MariaDB.dbms | @mariadb

Monty Program

What's in MariaDB 5.2

- Segmented MyISAM keycache
  - mitigates thread contention for key cache lock, with notable 250% performance improvements http://kb.askmonty.org/v/segmented-key-cache



fb.com/MariaDB.dbms | @mariadb

Monty Program

MariaDB 5.2: SphinxSE

- CREATE TABLE t1 (..) ENGINE=SPHINX CONNECTION="sphinx://localhost:9312/test";
- SELECT * from t1 WHERE query='test it;mode=any';
  - matching modes, limits, filters, ranges supported
- monitor it - SHOW ENGINE SPHINX STATUS;
- can JOIN a SphinxSE search table and tables using other engines as well
- https://kb.askmonty.org/v/about-sphinxse

fb.com/MariaDB.dbms | @mariadb

Monty Program

MariaDB 5.3: NoSQL

- HandlerSocket
  - direct access to InnoDB/XtraDB
  - no SQL, simple CRUD operations on tables
- Dynamic columns
  - different set of “virtual columns” for each row in your table
  - store different attributes for each item (see: e-commerce shops)

fb.com/MariaDB.dbms | @mariadb

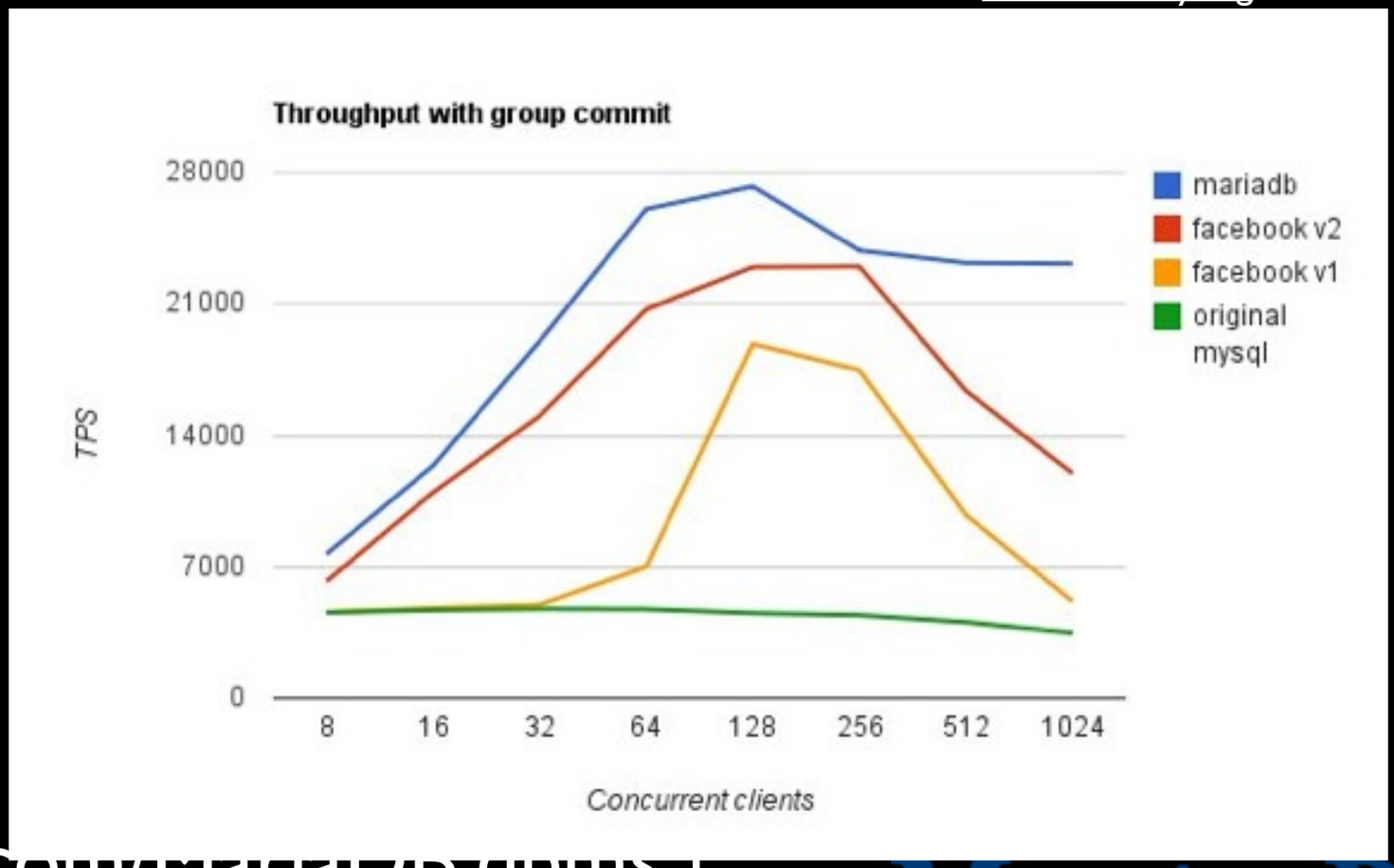
Monty Program

```
MariaDB [test]> create table t1 (id int auto_increment primary key,
    ->                  name varchar(40),
    ->                  type enum ("shirt", "phone", "computer"),
    ->                  price decimal(10,2),
    ->                  dynstr mediumblob);
Query OK, 0 rows affected (0.05 sec)

MariaDB [test]> insert into t1 (name, type, price, dynstr) values
    -> ("Funny shirt", "shirt", 10.0, COLUMN_CREATE(1, "blue", 10, "XL")),
    -> ("nokia", "phone", 649, COLUMN_CREATE(1, "black", 2, "touchscreen")),
    -> ("htc Desire hd", "phone", 579, COLUMN_CREATE(1, "black", 3, "Android")),
    -> ("BM/Lenovo Thinkpad X60s", "computer", 419, COLUMN_CREATE(1, "black", 3, "Linux"));
Query OK, 4 rows affected (0.00 sec)
Records: 4  Duplicates: 0  Warnings: 0

MariaDB [test]> select id, name, type, price, length(dynstr) as len, column_list(dynstr) as list from t1;
+----+-------------------------+----------+--------+------+------+
| id | name                    | type     | price  | len  | list |
+----+-------------------------+----------+--------+------+------+
|  1 | Funny shirt             | shirt    |  10.00 |   17 | 1,10 |
|  2 | nokia                   | phone    | 649.00 |   27 | 1,2  |
|  3 | htc Desire hd           | phone    | 579.00 |   23 | 1,3  |
|  4 | BM/Lenovo Thinkpad X60s | computer | 419.00 |   21 | 1,3  |
+----+-------------------------+----------+--------+------+------+
4 rows in set (0.00 sec)

MariaDB [test]> SELECT name FROM t1 WHERE COLUMN_GET(dynstr, 1 as char(10)) = "black";
+-------------------------+
| name                    |
+-------------------------+
| nokia                   |
| htc Desire hd           |
| BM/Lenovo Thinkpad X60s |
+-------------------------+
3 rows in set (0.00 sec)

MariaDB [test]> SELECT COLUMN_GET(dynstr, 1 as char(10)) as colour, count(*) FROM t1 group by COLUMN_GET(dynstr, 1 as char(10));
+--------+----------+
| colour | count(*) |
+--------+----------+
| black  |        3 |
| blue   |        1 |
+--------+----------+
2 rows in set (0.00 sec)
```

MariaDB 5.3: group commit

- Group commit for the binary log
  - sync_binlog=1, innodb_flush_log_at_trx_commit=1

- https://www.facebook.com/note.php?note_id=10150261692455933
- http://kb.askmonty.org/en/group-commit-for-the-binary-log



fb.com/MariaDB.dbms | @mariadb

Monty Program

MariaDB 5.3: replication

- Checksums for binlog events (5.6 backport)
- START TRANSACTION WITH CONSISTENT SNAPSHOT works w/ binlog
- obtain binlog pos. w/o blocking other queries
- mysqldump --single-transaction --master-data => non-blocking backup! (new slave provisioning?) Works w/XtraDB+PBXT
- row-based replication for tables w/no primary key

fb.com/MariaDB.dbms | @mariadb

Monty Program

MariaDB 5.3

- Progress reporting for ALTER TABLE/LOAD DATA INFILE

```
MariaDB [test]> alter table my_mail engine=maria;
Stage: 1 of 2 'copy to tmp table'  5.37% of stage done
```

- mytop included
- Optimiser changes
  - @@optimizer_switch flags (default=off)

fb.com/MariaDB.dbms | @mariadb

- disk access: Index Condition Pushdown (ICP), Multi-Range Read (MRR)
- join: Classic Hash Join, Batched Key Access (ordered retrievals via MRR), and many many more optimizations

Monty Program

MariaDB 5.3: Subqueries finally!

- DBT-3, 60M line item rows, 29GB XtraDB database
- optimizer_switch='semijoin=on' / materialization=on

Query: orders from customers with negative balance:

```
SELECT * FROM orders
WHERE o_custkey IN
      (SELECT c_custkey FROM customer
       WHERE c_acctbal < -500);
```

MariaDB 5.2 (any MySQL): 45 sec (slow)

id	select_type	table	type	key	ref	rows	Extra
1	PRIMARY	orders	index	i_o_custkey	NULL	1493631	Using where; Using index
2	SUBQUERY	customer	range	c_acctbal	NULL	10536	Using where; Using index

MariaDB 5.3: 0.43 sec (faster ~ 100x)

id	select_type	table	type	key	ref	rows	Extra
1	PRIMARY	customer	range	c_acctbal	NULL	10536	Using where; Using index
1	PRIMARY	orders	ref	i_o_custkey	dbt3sf1.customer.c_custkey	7	Using index

Query: find customers with top balance in their nations:

```
SELECT c_name, c_address
FROM customer
WHERE c_acctbal IN (SELECT max(c_acctbal)
                    FROM customer GROUP BY c_nationkey);
```

MariaDB 5.2 (any MySQL): > 1.5 hours (impossible)

id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	PRIMARY	customer	ALL	NULL	NULL	NULL	NULL	149637	Using where
2	DEPENDENT SUBQUERY	customer	index	NULL	i_c_nationkey	5	NULL	3117	

MariaDB 5.3: 3.2 sec (faster ~ INF)

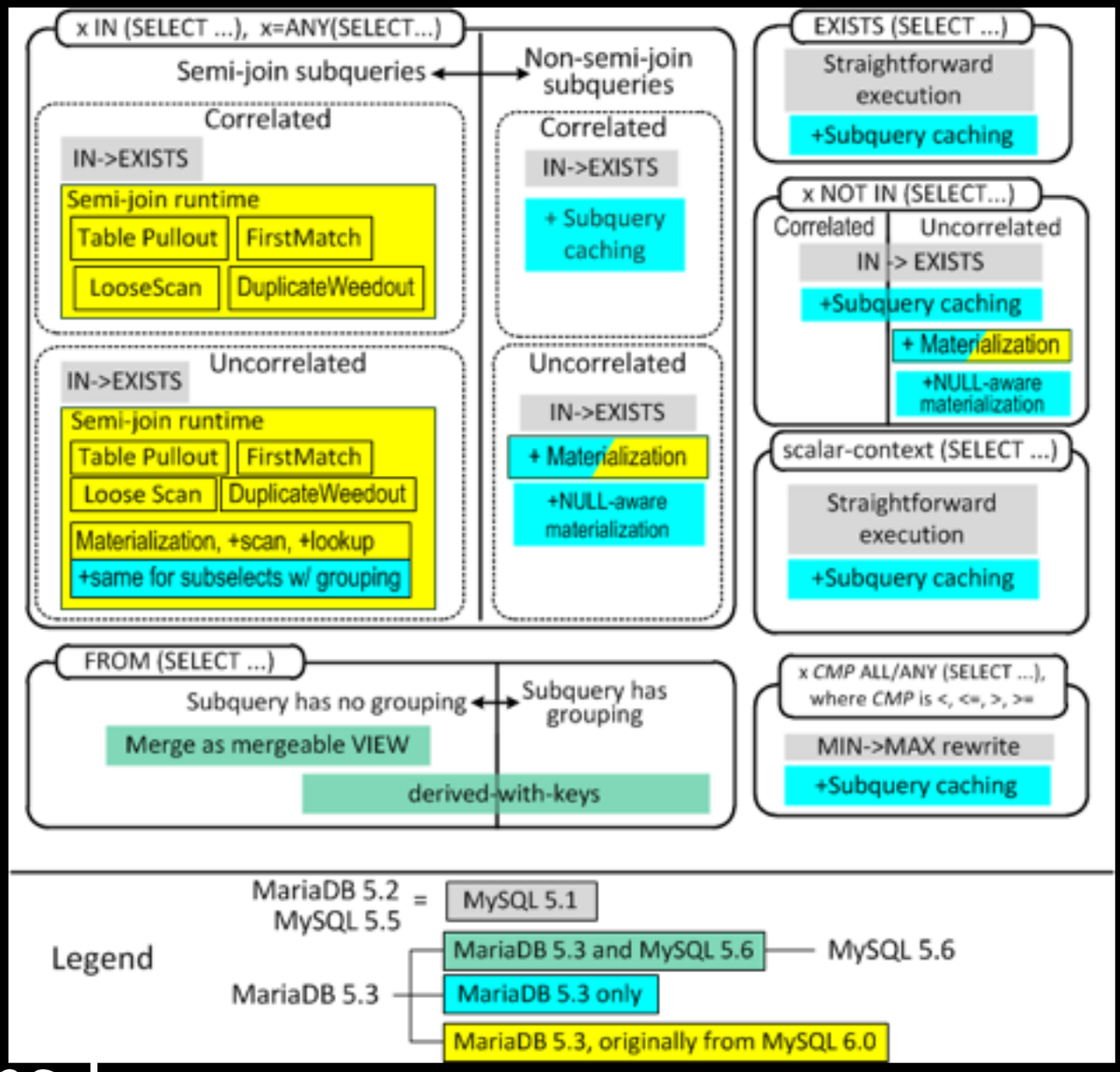
id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	PRIMARY	<subquery2>	ALL	distinct_key	NULL	NULL	NULL	149637	Using where
1	PRIMARY	customer	ref	c_acctbal	c_acctbal	9	<subquery2>.max(c_acctbal)	1	
2	SUBQUERY	customer	index	NULL	i_c_nationkey	5	NULL	149637	

fb.com/MariaDB.dbms | @mariadb

Monty Program

MariaDB 5.3: Subqueries

- Instant EXPLAIN
- http://kb.askmonty.org/en/the-query-optimizer



fb.com/MariaDB.dbms | @mariadb

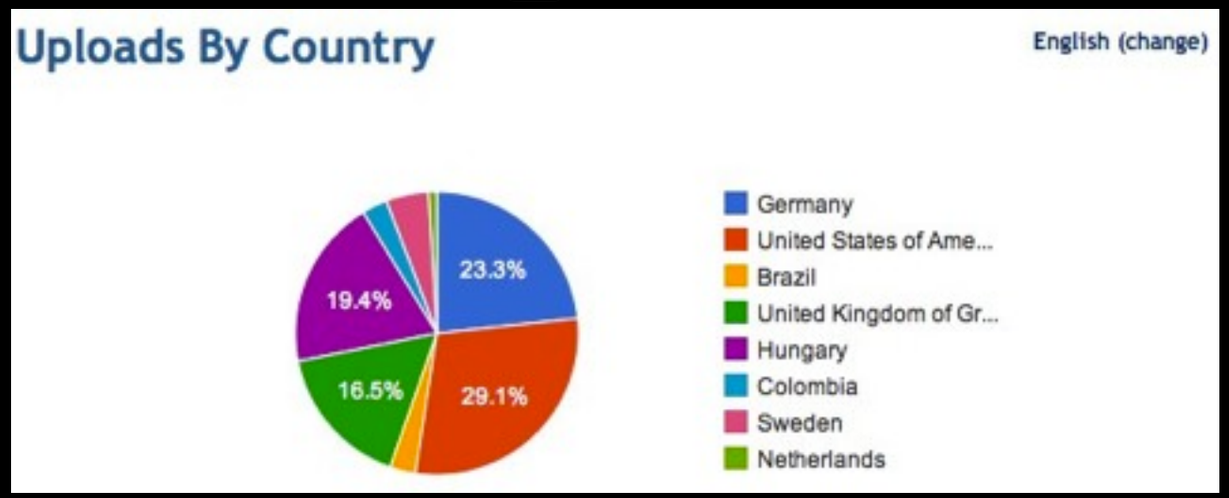
Monty Program

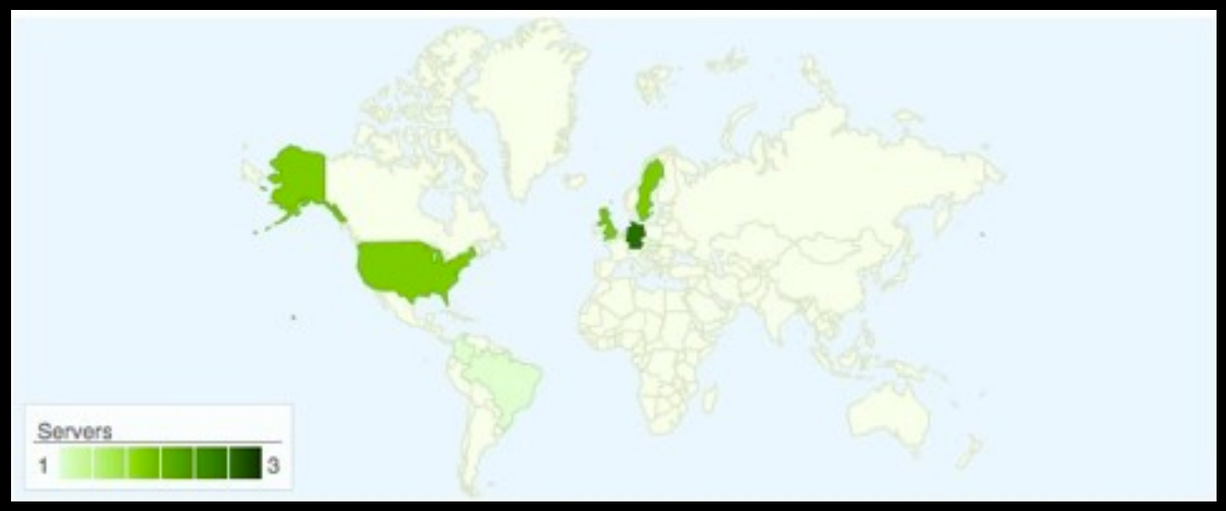
MariaDB 5.3: User Feedback Plugin

- New "phone home" plugin (works with Percona server, MySQL)

- disabled by default -- please consider enabling it (feedback=on)

- http://mariadb.org/feedback_plugin/





fb.com/MariaDB.dbms | @mariadb

Monty Program

MariaDB 5.3 & 5.5

- MariaDB 5.3 - RC now
- MariaDB 5.3.3 - 21/12/2011
- MariaDB 5.5 - Beta any day now
- https://launchpad.net/maria/5.5

fb.com/MariaDB.dbms |
@mariadb

Monty Program

How open is MariaDB?

- Mailing lists: Launchpad
  - maria-developers@lists.launchpad.net
  - maria-discuss@lists.launchpad.net
- Code hosting: Launchpad
  fb.com/MariaDB.dbms | @mariadb
- http://launchpad.net/maria
- Bugs database:
  - https://bugs.launchpad.net/maria/
- #maria on FreeNode IRC

Monty Program

MariaDB

Worklog

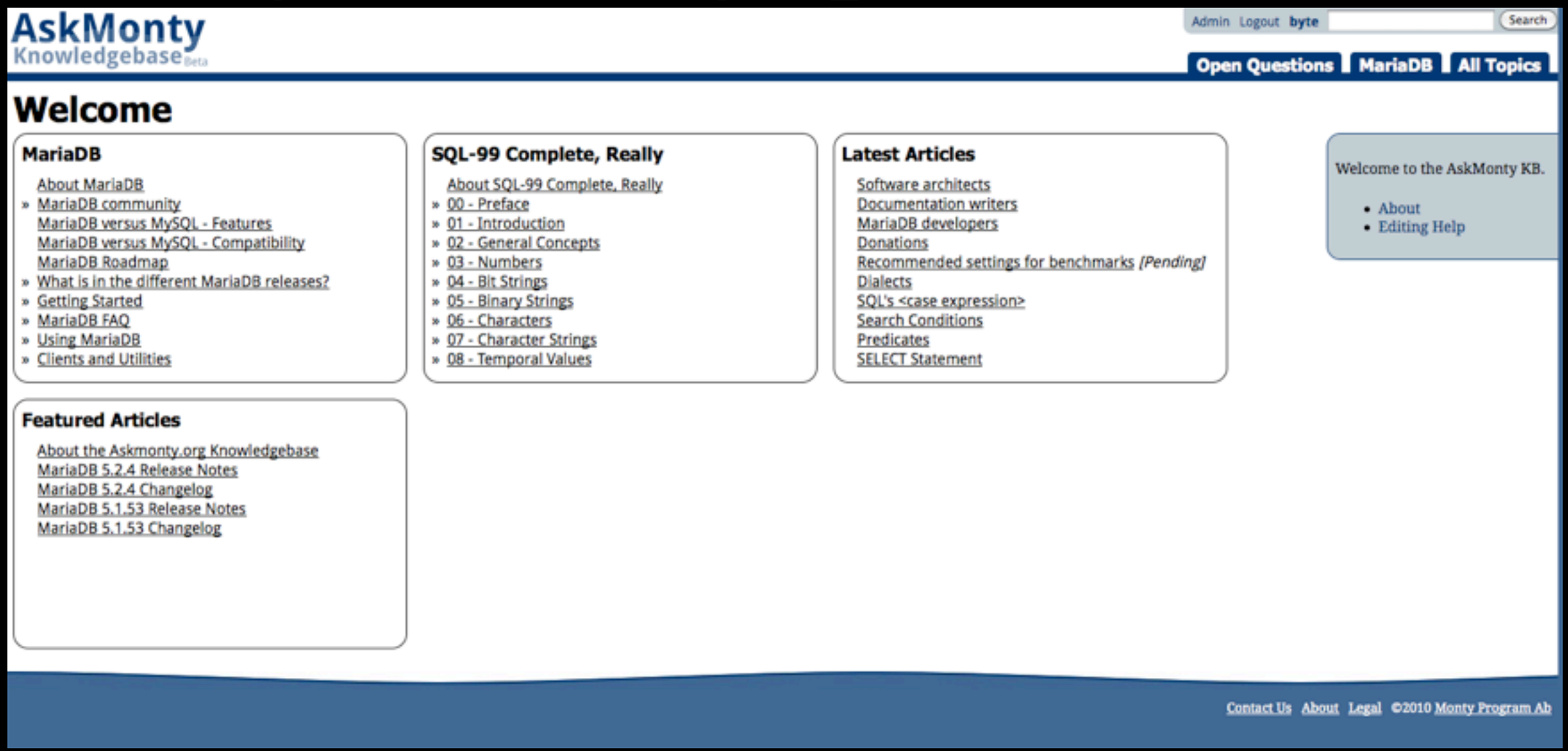
- Funding (bounties)
- Votes
- http://askmonty.org/worklog/

fb.com/MariaDB.dbms | @mariadb

Monty Program

Knowledgebase

- http://kb.askmonty.org/



fb.com/MariaDB.dbms |
@mariadb

Monty Program

Deployments, deployments, deployments

happy users: pap.fr, wabtec, Paybox Services, OLX, Jelastic, etc.

"MariaDB had these same bugs that we ran into with MySQL. However the big difference was that when we reported these bugs, they were quickly resolved within 48 hours!" -- Dreas van Donselaar, Chief Technology Officer, SpamExperts B.V. after migrating over 300 servers from MySQL 5.0 to MariaDB 5.1.

"We made the switch on Saturday -- and we're seeing benefits already -- our daily optimization time is down from 24 minutes to just 4 minutes" -- Ali Watters, CEO, travelblog.org

"Migrating from MySQL 5.1 to MariaDB 5.2 was as simple as removing MySQL RPMs and installing the MariaDB packages, then running mysql_upgrade." - Panayot Belchev, proprietor, Host Bulgaria on providing MariaDB to over 7,000 of their web hosting customers.

fb.com/MariaDB.dbms | @mariadb

Monty Program

Getting MariaDB

- http://mariadb.org/ is the site + downloads
- Get it via OpenSUSE build service
- Its in Gentoo, FreeBSD, Homebrew
- http://kb.askmonty.org/v/distributions-which-include-mariadb

fb.com/MariaDB.dbms |
@mariadb

Monty Program

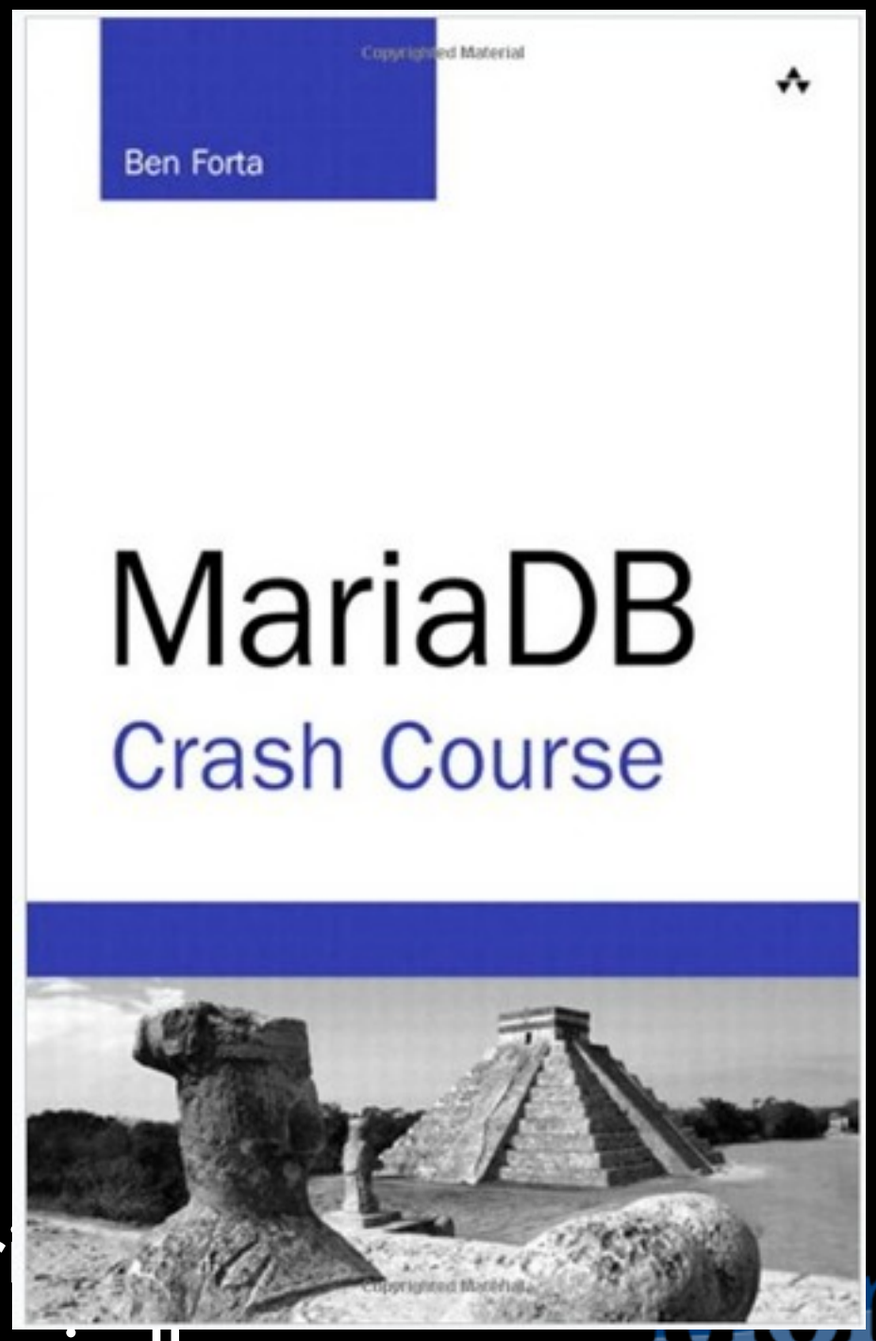
The future?

- GIS features making it into MariaDB 5.3
- Merging takes time
- Features (different implementations) make it into upstream
- Getting into distributions (Fedora/EPEL policies), Ubuntu/Debian, etc ?

fb.com/MariaDB.dbms |
@mariadb

Monty Program

We have a book



fb.com/Mari

@mariadb

Monty Program

Support

- Monty Program does NRE/engineering work for MySQL/MariaDB (not L1/L2 support)
- Support via capable **service providers**
  - http://mariadb.org/service-providers/
  - SkySQL (here), FromDual, Open Query, SoftMethod GmbH, Percona

fb.com/MariaDB.dbms | @mariadb

Monty Program

We're on social media

- facebook: fb.com/MariaDB.dbms
- twitter: @mariadb
- google plus: search for mariadb

fb.com/MariaDB.dbms |
@mariadb

Monty Program

Q&A?

email: colin@montyprogram.com
http://montyprogram.com/ | http://mariadb.org/
twitter: @bytebot / url: http://bytebot.net/blog/