MariaDB
State of MariaDB

Michael “Monty” Widenius
MariaDB hacker
monty@askmonty.org
http://mariadb.com/
The origin of My (SQL)

At start: Lots of traveling and meeting interesting people
The origin of My (SQL)

Combined with working from home
The origin of My (SQL)

Things were good
The origin of My (SQL)

Even if there were some growing pains
The origin of My (SQL)

Then we came into strange company
The origin of My (SQL)

Which scared some of us a bit...
The origin of My (SQL) and Maria (DB)

Fortunately there is someone else that can continue
The origin of My

While My continues to travel
The origin of My Free as a bird
The origin of Maria (DB)

But is the next generation up to it?
The origin of Maria (DB)

It's a hard job taking over a success
The origin of Maria (DB)

Like pulling out a rabbit from a hat
The origin of Maria (DB)

Just charm is not enough
The origin of Maria (DB)

But we are confident we can pull it off
The origin of Maria (DB)

So let's be happy that...
We still can put our trust in the creators of MySQL
The team behind MariaDB at MP

The project name has changed, but the core team is the same
(Please ignore a couple of innocent bystanders)
Mug shot of the guilty
The team behind MariaDB at MP

Igor Babaev
Since 2002

Timour Katchaounov
Since 2002

Sergey Petrunya
Since 2003

Optimizer team
The team behind MariaDB at MP

Sergei Goulibchik  
Since 2000

Igor Babaev  
Since 2002

Michael “Monty” Widenius  
Since 1993

The Original Architects
The team behind MariaDB

Kristian Nielsen
Since 2005

Replication (and build) team
The team behind MariaDB at MP

Sanja Byelkin
Since 2001

Jani Tolonen
Since 1998

General Team (Optimizer, runtime, engines etc)
The team behind MariaDB at MP

Vladislav “Wlad” Vaintroub
Since 2008

Alexey “Holyfoot” Botchkov
Since 2008

Windows, Performance & GIS
The team behind MariaDB at MP

Hakan Küçükyılmaz
Since 2004

Philip Stoew
Since 2007

QA and performance team
The team behind MariaDB at MP

Colin Charles
Since 2005
Photo by James Duncan Davidson

Kurt von Finck
“The new guy”

Community team
The team behind MariaDB at MP

Bryan Alsdorf  
Since 2004

Daniel Barholomew  
Another new guy

Knowledgebase and Web
The team behind MariaDB at MP

Rasmus Johansson
COO, Since 2010

Camilla Zilliacus
Admin, since 2002

And of course, someone has to take care of this merry group...
There are a lot of others involved

- Most features in MariaDB 5.2, released as stable in November 2010, were contributed by the community!
- In the askmonty.org knowledge base (free MariaDB and MySQL documentation) we have now 1200+ articles

Statistics from the past month:
- Added/Changed Articles: 58
- On Freenode #maria, 227 people wrote 6085 lines
- Launchpad Activity:
  - 15 active branches
  - 210 commits by 10 people
  - Emails: 117 (discuss, dev)
- Hundreds of thousands of downloads of MariaDB 5.2 (since release)
The knowledgebase allows you to:

- Find answers to your problems
- Ask questions and get answers from others
- Add your own documentation.
• We have seen companies converting hundreds of machines to MariaDB in a few days without any problems.
  • We are working with them to produce success stories of these.
• Monty Program Ab has 30+ partners involved in MySQL and MariaDB
• Several companies are now sponsoring features for MariaDB!
  • Monty Program Ab sponsors MariaDB development with 50% of our developers time!
• Some companies with MySQL expertise internally have signed direct support contracts with Monty Program Ab; All other support are done through partners.
SkySQL

- Monty Program Ab has now signed a strategic partnership with SkySQL to be their 3rd level support and main development department.

This is important for me personally because:
- Monty Program Ab can provide a home for MySQL developers, but not for support, training and consulting.
- The MySQL ecosystem need support companies like SkySQL, were the first person you talk to knows more than you about MySQL / MariaDB.

When MySQL AB joined with Sun we were 400-450 persons. I was just told from someone that there are only 54 left at Oracle! Much fewer than I would expect.
When it's time to change support

It's time to change support providers when you get answers like (without a clear reason why this is likely to fix the problem):

- Restart your database server
- Restart your machine
- Dump and restore your data
- Install a new major version and see if it helps.
- We don't support older MySQL versions (or MariaDB)
Is MariaDB a branch or a fork?

Branch or fork, that are the answers. What is the question?
We have forked the MySQL client library (C connector) because:
• Oracle removed the original FOSS exception from the C connector files and replaced it with a link to a web page that can change any time and the text is extremely hard to parse.

For the main server, we are still doing merges to ensure MariaDB continues to be a drop in replacement of MySQL.
Current state of C connector

- We re-released the 3.23 LGPL client
  - Works for many applications except:
    - Not link-level compatible with the newest one (you have to recompile)
    - Does not support the new authentication protocol
- The MariaDB source code and releases contains a C connector with still has the original FOSS exception (we don't apply new code from Oracle to it)
- We have created a new LGPL C Connector that will be released shortly (this was sponsored by several companies)
  - Alpha in April
  - Beta in May
Why a free C connector is important

The C connector is the only MySQL/MariaDB connector where the GPL affects your application. All others are free to use with any program! (No commercial licenses)
MariaDB server is a branch of MySQL

- User level (data, API, replication..) compatible with MySQL
  - Drop in replacement (MariaDB 5.1 is even more compatible with MySQL 5.0 than MySQL 5.1).
  - More plugins, more features, faster, better code quality.
- GPL-only license. C Client library with FOSS exception.
- More open development
  - Source in public repository on launchpad
  - Active external contributors
  - All development plans public on askmonty.org
- Current state
  - MariaDB 5.2 was released as stable in November 2010
  - MariaDB 5.3 out in alpha. Beta during April.
  - MariaDB 5.5 beta planned for May.
Major new features in MariaDB 5.2

- **SphinxSE**: Text search within MariaDB
  - Built-in Sphinx client which allows MariaDB to talk to searchd, run search queries, and obtain search results.

- **Virtual columns**
  - Columns that are an expression and are calculated on retrieval.

- **Extended User Statistics**
  - Client, User, Index and Table statistics.

- **Segmented MyISAM key cache** (see separate slide)

- **Pluggable Authentication**

- **Storage-engine-specific CREATE TABLE**

- **Very fast 'copying to temp table' phase.**

- **Group commit & better recovery for the Aria engine.**
  - Speeds up multi-user inserts.

Blue means developed by the community
MyISAM Segmented key cache

- Blue line is without segmented key cache.
- Solves one of the major read bottlenecks for MyISAM
- We see up to 250% performance gain depending on the amount of concurrent users.
- Fix applies to all MyISAM usage with many readers!
• 5.3 estimated to be in beta (all new features pushed) this month

• 5.3 → 5.5 merge is in the works. Estimated to be finished in April/May.
This is the biggest redesign of the MariaDB optimizer in 10 years and it will finally make all subqueries usable in MariaDB.

- Faster subqueries
  - Back porting and extending subquery optimization from MySQL 6.0
  - No materialization for many kinds of subqueries or VIEW's in the FROM clause. SELECT * from (SELECT ....)
  - Caching of subquery results

In applicable cases, you can get 10x – 100x speedups.

- Faster joins (of big tables) thanks to
  - Multi-Read-Range (MRR) access (better than in MySQL 5.6)
  - Batch key access (BKA)
  - Index condition pushdown
  - Classic Hash joins
What's new in MariaDB 5.3

Some common sub queries that are now significantly faster:

- No materialization or materialization with keys:
  - `SELECT anything FROM (SELECT ....) AS a WHERE a=...`
- Caching of common values (Good if outer_ref has a few values)
  - `SELECT (SELECT ... WHERE outer_ref=xxx) FROM ...`
- Transformations
  - `SELECT * FROM big_table WHERE big_table.col IN (SELECT anything FROM small_table) ->`
    Reorders SELECT:s to use sub query as driving table
- Materialization with keys in temporary table also for WHERE
  - `SELECT ... WHERE a [NOT] IN (SELECT not-a-key ...) `
New Batched Key Access Speedups

- Join benchmark with BKA

```sql
select max(l_extendedprice) from orders, lineitem where o_orderdate between $DATE1 and $DATE2 and l_orderkey=o_orderkey
```
What's new in MariaDB 5.3

- Full **microsecond** support. This includes TIMESTAMP, TIME DATETIME types, NOW() and all CAST and TIME related functions, replication etc.
- **Group commit** between binary log and storage engines
  - FASTER and safer replication
- Lots of small optimizations, code cleanups, better error messages and bug fixes.
Group commit scales well!

Commits per second vs. number of connections, RAID 1 HDD

- Yellow line shows group commit performance
- Now get scalability, only pay the cost of the 3 * fsync()
The main reasons for using NoSQL are:

- Handling of unstructured data (not everything is table and fixed number of columns)
- Faster replication (usually with 'unconventional' shortcuts)

The same way MySQL with its storage engine interface can handle both transactional and datawarehousing, we are extending MariaDB to be a bridge between SQL and NoSQL.

- MariaDB 5.3 has now even better “NoSQL” support:
  - Faster HANDLER commands; HANDLER READ now also work with prepared statements.
  - HandlerSocket compiled in (Direct access to InnoDB)
  - Dynamic columns (each row can have different set of columns)
HANDLER READ improvements

- Streamlined HANDLER READ interface
- Added support for prepared statements
- Added support for MEMORY tables.

Effect is:
- All HANDLER READ calls are now 7% faster
- 20-50% speedup when using prepared statements and better concurrency.
- You can now get up to 530,000 queries/second through SQL with NO-SQL commands (60% of HandlerSocket).

Stephane Varoqui's blog:
SQL doesn't solve all common problems

The (web) store problem:
All items needs: ID, Type, Price, Country, Manufacturer

A T-Shirt has the following additional properties:
  Size, color...
A computer has the following additional properties:
  CPU, MHz, memory, Watt...

There is no easy way to store many different types into a relational database!
(It will not work by having one table/types as joins becomes impossible to manage).
Dynamic columns in MariaDB 5.3

- With dynamic columns all extra columns are stored in one or many packed blobs, maintained by the database.
- You can instantly add more columns, remove or query them for a row.
- You can access columns in the server or retrieve the full blob to the client and manipulate it there.
- You can use virtual columns to create indexes on some values.
  - True indexes for dynamic columns is planned for later.
- Implemented through functions to enable use by ODBC etc.
- First implementation uses an integer to access columns.
Dynamic columns in MariaDB 5.3

- Simple set of functions (available in server and client):
  - COLUMN_CREATE(column_nr, value,[column_nr,...])
  - COLUMN_ADD(blob,column_nr, value, [column_nr,...])
  - COLUMN_DELETE(blob, column_nr, column_nr...);
  - COLUMN_EXISTS(blob, column_nr);
  - COLUMN_LIST(blob, column_nr);
  - COLUMN_GET(blob, column_nr, type);

As a proof of concept we plan to create an experimental storage engine for **HBASE** where we use dynamic columns as a bridge.

More about Dynamic columns at today's talk at 3.05 PM.
What are planned for MariaDB 5.6?

At the Lisbon MariaDB meeting we created the following list of proposed features. This list is still work in progress, contact us if you want to get something added / ensure something is done!

- GIS
  - OpenGIS compliance
  - Deeper integration of GIS with optimizer
- More online operations
  - Analyze table
  - ALTER ONLINE TABLE
- Compatibility & usability
  - IPv6
  - Query logging and summary per query
  - Audit for specific users
What is planned for MariaDB 5.6?

- Replication
  - Extend group commit to have on sync per group commit
  - Global transaction id
  - Parallel applying of binary log in slave
- Statistics and monitoring
  - Phone home (code done for 5.3)
  - Better EXPLAIN
  - Persistent table statistics
  - Log all SQL errors
  - Progress indicator for LOAD DATA and SELECT
  - Better monitoring for replication
What is planned for MariaDB 5.6?

- **Optimizer**
  - Implement UNION ALL without usage of a temporary table
  - Grace HASH join (Need sponsor)
  - Sort merge join (Need sponsor)
- **Performance**
  - Better multi CPU performance above 16 cores
  - Better thread pool (we already have a prototype for this)
  - More scalable query cache under higher concurrency
    - Optionally with stale data
  - Faster VIEW (don't open & parse view for every query)
- **Easy of use**
  - VARCHAR and BLOB support for memory tables
  - Table functions

For full list, see http://kb.askmonty.org/v/plans-for-56
New thread pool for 5.6

Thread pools solves a couple of problems:
• Allows you to limit the number of worker threads at your machines peek performance.
• More fair scheduler; Less query time distribution
• If too many queries, machine can run at 1% of peek performance

• New thread pool for 5.6: (Tested with 24 CPU's):
  • Always better on Windows
  • Better one Linux than thread-per-connection after 1024 connections
  • Much less performance degradation when more connections (60% performance instead of 1%)
Announcements

We are arranging a Plugin & Storage Engine Summit on Friday, to be held at Facebook. http://kb.askmonty.org/v/storage-engine-summit-2011
• Contact Sergei, Colin or me if you are interested!

We are launching an MariaDB ambassador program to spread knowledge about MariaDB / MySQL. http://montyprogram.com/ambassadors/

We have a T-Shirt + dinner auction to support Japan at Monty Program Ab boot #411
Come to the MariaDB boot & Bof

• You can find MariaDB developers at the MariaDB / Monty Program Ab booth #411.
• There is a Bof about the 5.6 features at 8.30 pm

Please come by if you want to
• Know more about MariaDB
• Participate in its development
• Sponsor features
• Get support for MySQL or MariaDB!

There is also a lot of sessions today and tomorrow about MariaDB!