MySQL / alternatives comparative benchmark

Database engines:

- **MySQL 5.1.42-gpl-advanced-log** (currently used as the backend of the EhBackup system in production)
- **MySQL 5.5.16-community**
- **MySQL 5.5.18-enterprise-commercial** (30 days trial)
- **MariaDB 5.2.10**

Hardware configuration:

The server software was installed on bkpschdmass01, bkpschdmass02, bkpctrlmass01 (.schlund.de). All 3 servers have identical hardware configurations (Xeon CPUs, 16 cores, 16 GB memory).

The data partition was shared between bkpschdmass01 and bkpschdmass02 via DRBD and to bkpctrlmass01 via NFS. All the servers are connected via Gigabit Ethernet.

Benchmarking software:

The only software used was the sql bench suite included with all MySQL source distributions. The graph generating perl script was improved for readability.

Software set-up:

- MySQL 5.1 was installed and benchmarked on bkpctrlmass01
- MySQL 5.5 (both) were installed and benchmarked on bkpschdmass01
- MariaDB was installed and benchmarked on bkpschdmass02
- The configuration file (my.cnf) was identical for all engines
- The test suite was run locally on each machine
- All the tests were performed on the database “test” created for this purpose alone
- Connection type was tcp (enforced)

How to read the graphical result

- “smaller” means better result
- x10 / x100 / … mean that the indicated number of operations were performed in that amount of time
- 0.0 readings may indicate both that the database system was very fast or that it did not support a certain SQL extension; ignoring these lines is the recommended option
- The last line of the graph is the so-called “Wisconsin benchmark” (described here: http://www.slideshare.net/Tess98/wisconsin-benchmark-june-2001-prof-sang-ho-lee)

Color codes:

- MySQL 5.1.42 is **blue**
- MySQL 5.5.16-community is **red**
- MySQL 5.5.18-enterprise is **magenta**
- MariaDB 5.2.10 is **green**

Benchmark conclusions

MySQL 5.1.42 exhibited very poor performance on creating tables and defining indexes. This is not relevant for EhBackup where most operations are selects with joins using indexes. Unfortunately poor performance was also noted when inserting rows into tables with many indexes (possibly due to updating indexes?), this having the potential of affecting EhBackup master scheduler performance. Selecting using joins seems to be 5-10x slower compared to MySQL 5.5 and MariaDB. Wisconsin benchmark showed a 2x worse result than the other databases benchmarked.

MySQL 5.5-community surprisingly exhibited very poor performance on deletes, inserts and updates while the basic select operations (without joins) proved also to be slower than on the 5.1.42. The entire suite ran in nearly 22 minutes, a bit longer than the run time on the 5.1.42.

MySQL 5.5-enterprise proved to be marginally better on most write operations than the community version but didn't get close to MariaDB. Basic selects seemed very fast, though; in certain scenarios being the fastest from all variants tested. Wisconsin benchmark is in line with the community version and MariaDB.

MariaDB 5.2.10 exhibited balanced performance on most operations, being the fastest in most select operations (what is relevant for EhBackup) or in line with the MySQL enterprise version. The entire suite ran in about 11 minutes, which is about half the time measured with the other engines.

Running with EhBackup

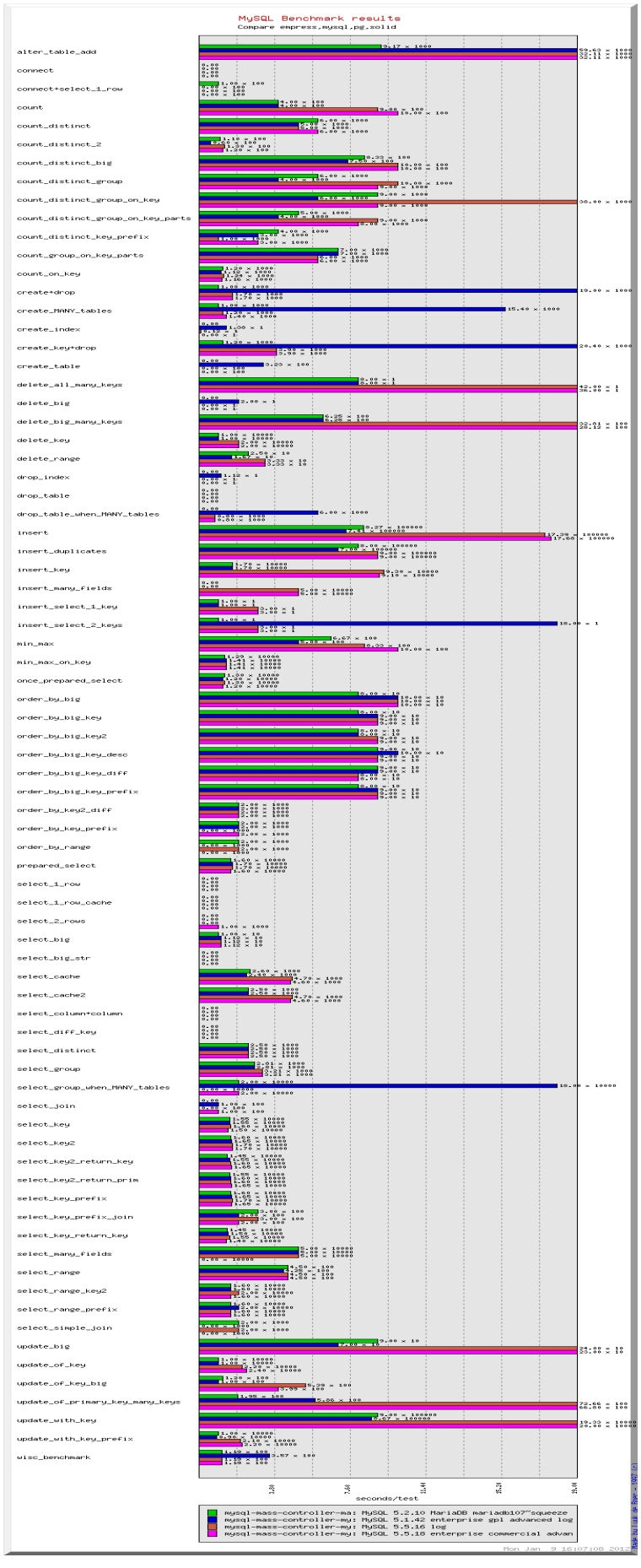
All database engines worked with EhBackup in the mass testing environment without any changes (other than server address) so the only evaluation was performed on scaling and CPU load. The tool used was **top** with core usage display enabled (key 1 pressed).

MySQL 5.1.42 appeared to use just a single core (out of 16); the overall CPU load was ~40%

MySQL 5.5-community, MySQL 5.5-enterprise and MariaDB appeared to scale evenly on multiple cores; the overall CPU load was for all of them ~30%

Comparative summary

	MySQL 5.1	MySQL 5.5-community	MySQL 5.5-enterprise	MariaDB 5.2
Benefits	• No change needed	• Easy to deploy • Free of charge	• Easy to deploy • Corporate technical support	• Easy to deploy (drop in replacement for MySQL 5.1) • Free of charge • The fastest of all free alternatives • The community and the interest around this project is growing
Costs	-	-	• License fees (to be determined)	-
Risks	• Obvious scalability problems and load limitations	• Possible future issues due to the Oracle business strategy focused on investing most of the efforts in the enterprise version only • Poor performance in write operations • No official support by default (community support and 3rd party support are available)	• "Not so good" performance in write operations • Scalability may be limited by the licensing terms (e.g. different fees for multiple core support)	• Long term stability not yet determined • No official support by default (community support and 3rd party support are available)


MySQL Benchmark results
Compare empress,mysql,pg,solid
alter_table_add
connect
connect+select_1_row
count
count_distinct
count_distinct_2
count_distinct_big
count_distinct_group
count_distinct_group_on_key
count_distinct_group_on_key_parts
count_distinct_key_prefix
count_group_on_key_parts
count_on_key
create+drop
create_MANY_tables
create_index
create_key+drop
create_table
delete_all_many_keys
delete_big
delete_big_many_keys
delete_key
delete_range
drop_index
drop_table
drop_table_when_MANY_tables
insert
insert_duplicates
insert_key
insert_many_fields
insert_select_1_key
insert_select_2_keys
min_max
min_max_on_key
once_prepared_select
order_by_big
order_by_big_key
order_by_big_key2
order_by_big_key_desc
order_by_big_key_diff
order_by_big_key_prefix
order_by_key2_diff
order_by_key_prefix
order_by_range
prepared_select
select_1_row
select_1_row_cache
select_2_rows
select_big
select_big_str
select_cache
select_cache2
select_column+column
select_diff_key
select_distinct
select_group
select_group_when_MANY_tables
select_join
select_key
select_key2
select_key2_return_key
select_key2_return_prim
select_key_prefix
select_key_prefix_join
select_key_return_key
select_many_fields
select_range
select_range_key2
select_range_prefix
select_simple_join
update_big
update_of_key
update_of_key_big
update_of_primary_key_many_keys
update_with_key
update_with_key_prefix
wisc_benchmark
1.88
7.46
14.64
25.24
35.84
seconds/test
mysql-mass-controller-ma: MySQL 5.2.10 MariaDB maria@d107~squeeze
mysql-mass-controller-my: MySQL 5.1.42 enterprise gpl advanced log
mysql-mass-controller-my: MySQL 5.5.16 log
mysql-mass-controller-my: MySQL 5.5.16 enterprise commercial advan
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