MySQL

New Features 5.6

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Oli Sennhauser
Senior MySQL Consultant, FromDual

oli.sennhauser@fromdual.com
FromDual

- FromDual provides neutral and independent:
  - Consulting
  - Remote-DBA
  - Support for MySQL, Galera, Percona Server
  - Training

- Oracle Silver Partner (OPN)

- More information about us: http://www.fromdual.com
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**Milestone Release Model**

- Between 5.4 and 5.5 MySQL introduced the new “Milestone Release Model”

- Dynamic Model for development in theory:
  - Starts and always is at least in beta quality
  - Milestone releases, with RC quality, every 3 – 6 months
  - Between Milestones new features allowed
  - GA releases every 12 – 18 months (5.5: Oct. 2010)
  - No more than 2 releases in active support!

- MySQL Lab releases
Milestone Release Model

• Look at the schedule:
  • 5.6.0+1 Milestone 4+5, not released
  • 5.6.2 no Milestone number, released April 2011
  • 5.6.3 + 5.6.4 (M6 + M7) both October 2011
  • 5.6.5 (M8) not released yet (February 2012)

• In practice:
  → I cannot see much practical differences

• My guess: 5.6 GA at Collaborate in April 2012
  → As a consequence: 5.0 and 5.1 EOL!

• Who is still at 5.0 and 5.1?
NF 5.6 / Partitioning

• Explicit Partition Selection

```sql
SELECT *
FROM sales PARTITION (p2010, p2011)
WHERE sum < 100;
```

→ Caution: implicit WHERE clause!

• Exchanging Partitions

```sql
ALTER TABLE sales_hist
EXCHANGE PARTITION p2011
WITH TABLE sales;
```

• ETL, DWH
NF 5.6 / InnoDB

- InnoDB INFORMATION_SCHEMA tables
  - INNODB_BUFFER_*
  - INNODB_FT_*
  - INNODB_METRICS
  - INNODB_SYS_*

```sql
SELECT name, subsystem, count, comment
FROM INFORMATION_SCHEMA.innodb_metrics
WHERE name LIKE '%rseg%';
```

```
<table>
<thead>
<tr>
<th>name</th>
<th>subsystem</th>
<th>count</th>
<th>comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>trx_rseg_history_len</td>
<td>transaction</td>
<td>654</td>
<td>Length of the TRX_RSEG_HISTORY list</td>
</tr>
<tr>
<td>trx_rseg_current_size</td>
<td>transaction</td>
<td>0</td>
<td>Current rollback segment size in pages</td>
</tr>
</tbody>
</table>
```

- Most of InnoDB Monitor is now obsolete!
NF 5.6 / InnoDB performance

- Page cleaner thread (before master thread)
- `innodb_purge_threads` can be set > 1
- Kernel mutex split → improved concurrency
- Concurrent read while creating secondary index
- Improved warm-up:
  - `innodb_buffer_pool_dump_at_shutdown`
- InnoDB REDO log size up to 512 Gbyte
- InnoDB threads scheduling better > 16 threads
- UNDO log → separate TS (random I/O → SSD!)
- Improved concurrency extending TS files `innodb_file_per_table`
InnoDB and Optimizer:

- Persistent Optimizer Statistics
- Control of Statistics sampling (random dives)

```
SET GLOBAL innodb_analyze_is_persistent = 1;
ANALYZE TABLE valuemaps;
SELECT * FROM mysql.innodb_table_stats;
```

<table>
<thead>
<tr>
<th>database_name</th>
<th>table_name</th>
<th>n_rows</th>
<th>clustered_index_size</th>
<th>sum_of_other_index_sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>zabbix</td>
<td>valuemaps</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Deadlocks to the error log

- `innodb_print_all_deadlocks`

InnoDB page size can be: 16k, 8k, 4k

- `innodb_page_size`
NF 5.6 / Optimizer

- ORDER BY on non indexed columns
  → sort_buffer avoid sort merge passes
- Multi-Range Read (MRR)
  → optimize Range Scan on secondary indexes
- Index Condition Pushdown (ICP)
  → WHERE is evaluated in the Storage Engine
- Query Execution Plan for DML Statements!
- Optimization of derived tables (FROM clause)
  → Postponed materialization and index on derived table
- Batched Key Access (BKA) → improved JOIN performance
- Optimizer trace!
MySQL introduced with 5.5 the P_S

- The idea measure everything!
- Has some performance impact!

New instrumentation for:

- Table read and write (row-level accesses)
- Stages and statements (stage = state)
- Connections, Sockets
- Table lock wait events
- Table and index I/O wait events

Filter by

- thread
- object
Sergei Petrunia at 15:00

Replication features of 2011
NF 5.6 / Replication

- Globally Unique Server ID

```bash
cat $datadir/auto.cnf
[auto]
server-uuid=db731167-2b4c-11e1-928c-bcaec586ca65
```

- Delayed Replication
  - Before: `mk-slave-delay` (Maatkit)

```sql
CHANGE MASTER TO MASTER_DELAY = 42;
```

- Timestamp added to `SHOW SLAVE STATUS`:

```sql
SHOW SLAVE STATUS\G
...
  Last_IO_Error_Timestamp: 120130 16:59:12
  Last_SQL_Error_Timestamp:
```
NF 5.6 / Replication

- Row Image Control
  - RBR
  - Save: disk space, network resources, memory

\[
\text{binlog\_row\_image} = \{\text{full} \mid \text{minimal} \mid \text{noblob}\}
\]

- Crash safe Binary Logs
  - Event length + CRC32 checksum
  - Reading and writing on Master and Slave
  - Complete Events/Trx from/to binary log
NF 5.6 / Replication

- Slave Log Tables
  - `master.info` and `relay-log.info` into tables:
  - `mysql.slave_*_info`
  - MyISAM :( → convert to InnoDB?

```
master-info-repository = TABLE
relay-log-info-repository = TABLE
```

Parallel Event Execution (multi-threaded slave)
- Per schema

```
slave_parallel_workers = <n>
```
NF 5.6 / Various

- Fractional seconds
  - Up to microseconds (0.000001 s)
- GET DIAGNOSTICS
  - For Stored Programs
- Fulltext indexes on InnoDB tables!
- Pluggable authentication (Socket)
- Memcached Plug-in (still in Labs :(
- mysqlbinlog --read-from-remote-server --raw
Summary

- Bugs fixed: +400 bugs
- Clean-up!
- And many many more smaller features...
- Incompatible changes!
  → Upgrade
Q & A

Questions ?

Discussion?

We have some time for face-to-face talks...

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