



MySQL 5.6: Advantages in a Nutshell

Peter Zaitsev,
CEO, Percona
Percona Technical Webinars
March 6, 2013

About Presentation

- Brief Overview
- Birds eye view of features coming in 5.6
- Mainly documentation based review
 - MySQL 5.6 has not been long used in production yet
- Focus on Why and When the feature is important for you

MySQL 5.6

- Looks to be great release!
- Have been GA since 5th of February 2013
- A bit over 2 years since MySQL 5.5 GA
 - Work on some 5.6 features started 4+ years ago
- A lot of focus on conventional MySQL usage

When to Upgrade to MySQL 5.6

- What specific benefits are you looking from upgrade ?
- Start looking at it for development purposes & testing
- Upgrade in 6 months unless you critically need something
 - Let “baby bugs” to be worked out
 - Production usage experience gathered

Percona and MySQL 5.6

- Percona is ready to help you to be successful with MySQL 5.6
- MySQL 5.6 is fully supported by our Support, Consulting, RemoteDBA teams
- Percona Software support for 5.6 is current or on a way
- Learn more
 - <http://bit.ly/W5w5FC>
 - <http://bit.ly/W7zA0H>

Percona Server 5.6

- Currently Alpha
- Release approximately 3 months after MySQL 5.6
- Includes All MySQL 5.6 features plus Percona Improvements



PERCONA
SERVER

Percona XtraDB Cluster 5.6

- Work has started on PXC 5.6
- Great potential of joining MySQL 5.6 replication improvements
 - With Galera Replication technology



PERCONA
XTRADB CLUSTER

Feature Categories

- Scalability
- Optimizer and Execution
- Replication
- Transparency
- Database Operations
- New Functionality
- Security

Scalability

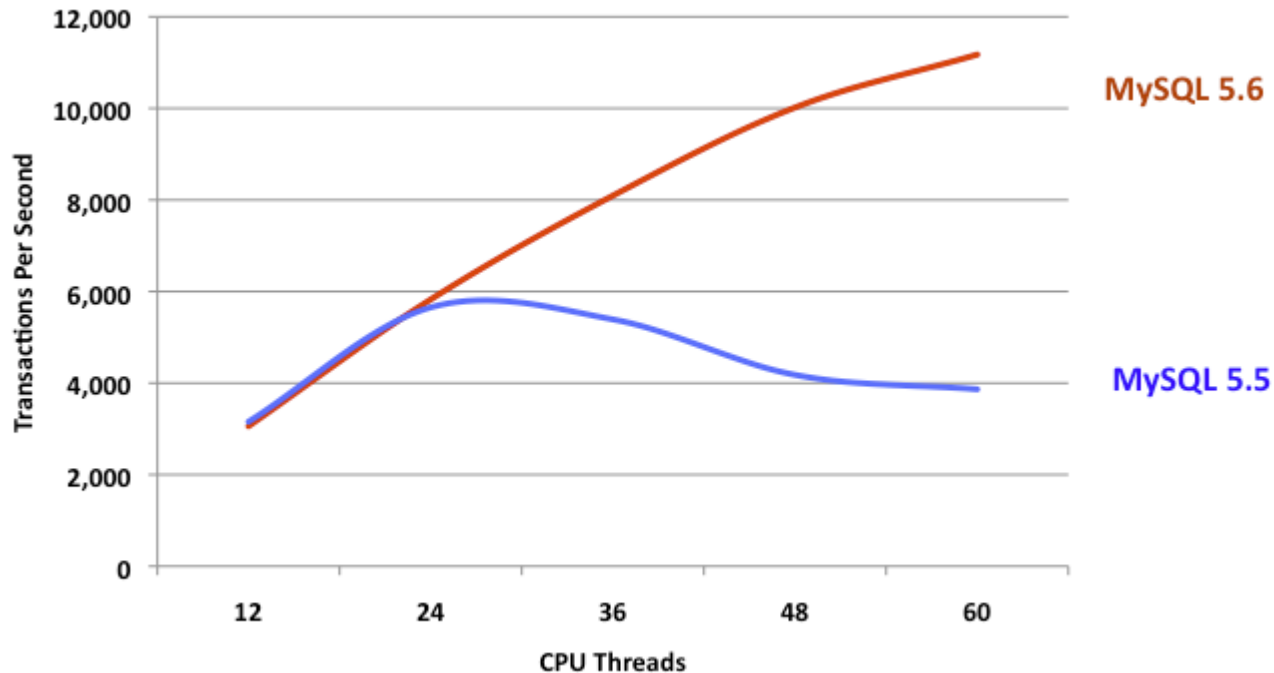
- InnoDB Storage engine in Focus
- Scalable Read Only Transactions
- Concurrent InnoDB Data File Extension
- Non Recursive Deadlock Detection
- Faster Locking Primitives
- Improved InnoDB Thread Concurrency
- Multiple Background Purge Threads
- Improved Purge Lag Control
- Improved Adaptive Flushing
- Support for Large (over 4GB) redo logs

Scalability

- Split of “Kernel Mutex”
- Data Dictionary Cache
- Page Cleaner / Separate Flush Thread
- Group Commit for Binary Log
- Fight Cache Coherence and False Sharing Issues
- Reduced Innodb Memory Fragmentation
- Reduced Locking for Partitioned Tables
- Reduced Contention for **LOCK_open**
- Multiple **table_open_cache** instances

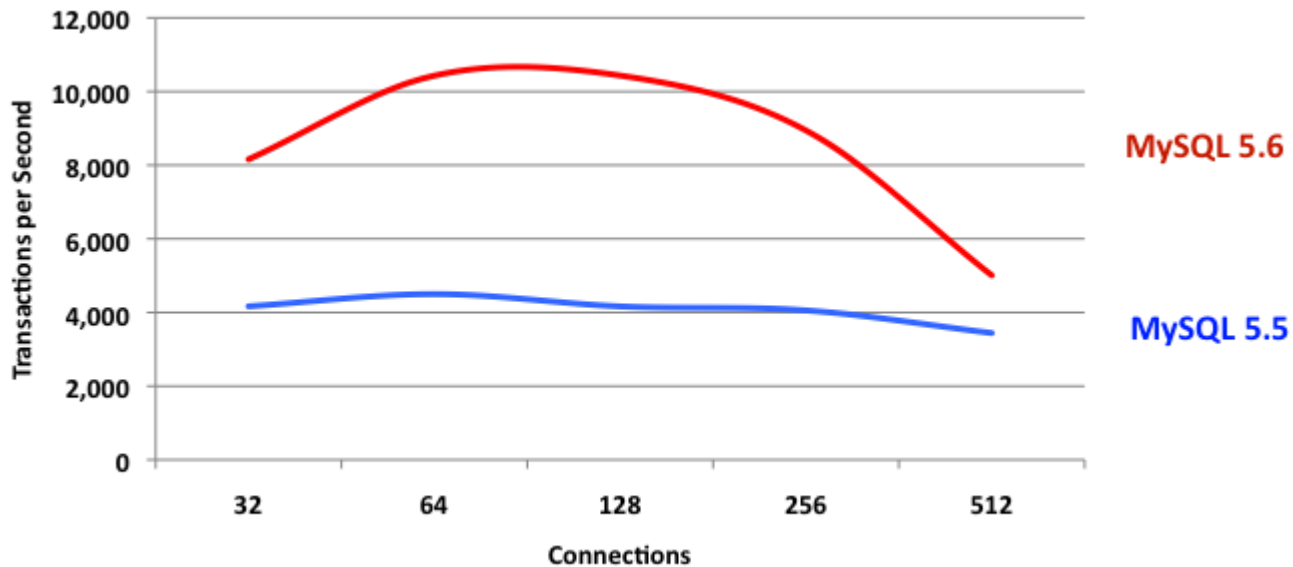
MySQL 5.6 performance

- Multiple CPU cores at focus
 - Results from Oracle



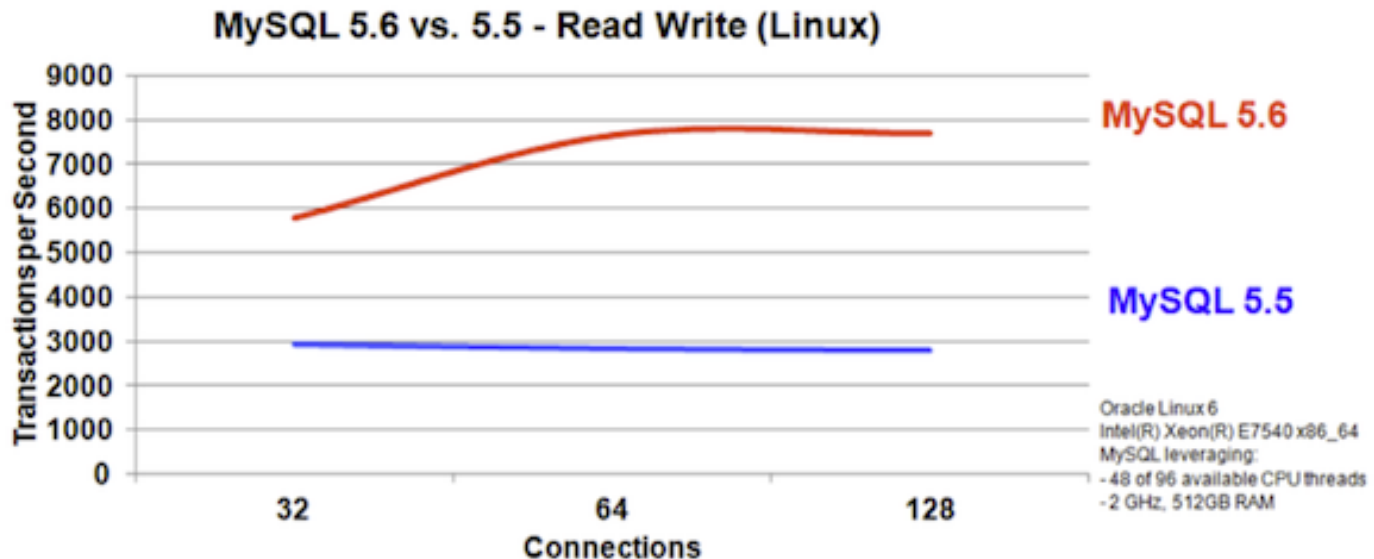
MySQL 5.6 Performance

- Number of connections at Focus
 - Results from Oracle



Binary log Group Commit

- Gains with sync_binlog=1
 - Results by Oracle



Optimizer and Execution

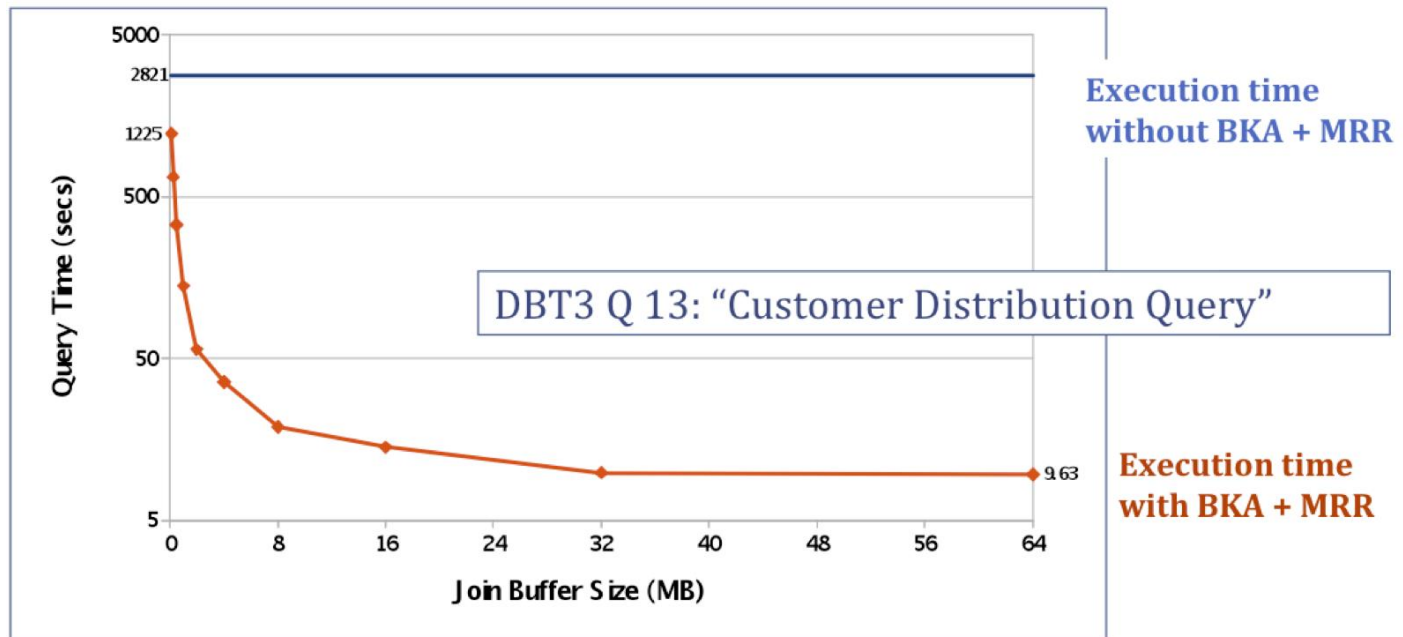
- Index Condition Pushdown (ICP)
- Batched Key Access Joins (BKA)
- Multi Range Read (MRR)
- Faster **ORDER BY nidxcollimit N**
- Persistent Statistics for Innodb
- Improvements to Innodb Compression

Optimizer and Execution

- Fast Page Checksums (CRC32)
- 4K and 8K Page sizes for Innodb
- Subquery Optimizations
- More efficient Optimizer

BKA+MRR May rock your world

- Reporting Query Benchmark
 - Results from Oracle

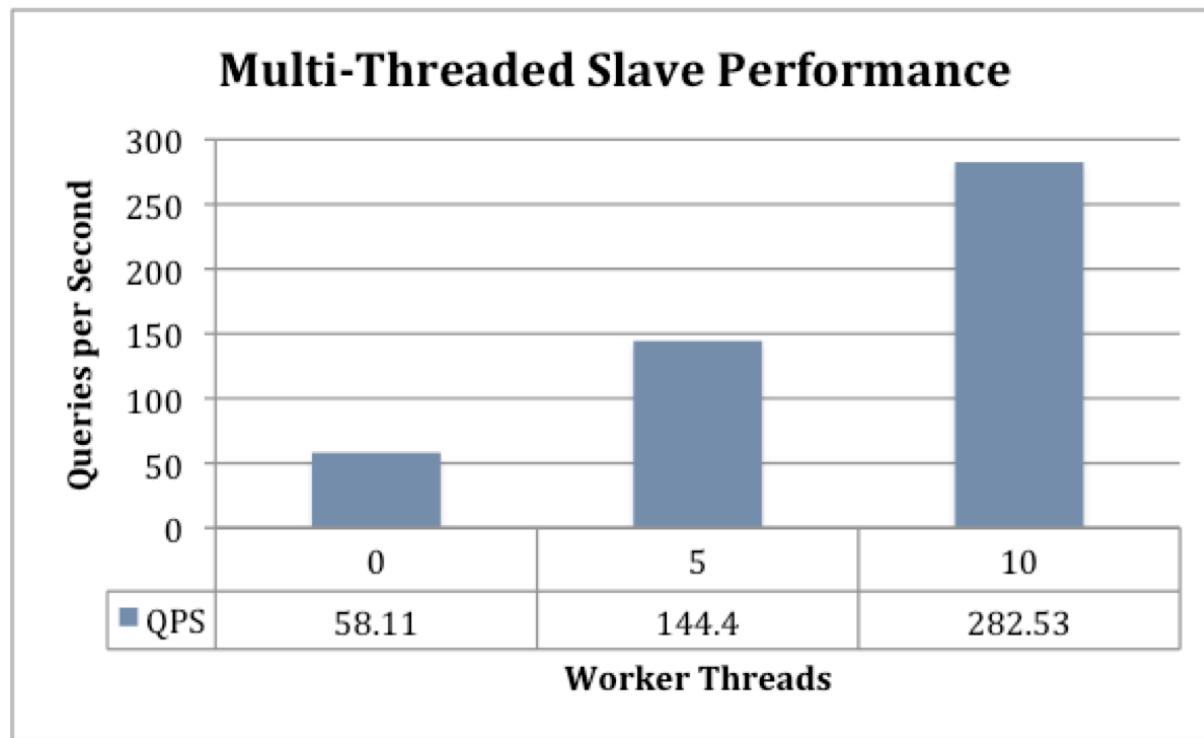


Replication

- Optimizer ROW Based Replication
- Multi-Threaded Slave
- Global Transactions Identifiers
- Crash Safe Slave and Binlog
- Replication Event Checksums
- Time Delayed Replication
- Server UUID
- Improved Logging for ROW based Repl.
- Replication Utilities for Failover and Adm.

Multi Threaded Slave

- Peak gains with Multiple Schema
 - Results by Oracle



Transparency

- Many new **INFORMATION_SCHEMA** tables
 - **INNODB_METRICS**
 - Table Meta Data Information Tables
 - Buffer Pool Contents Information Tables
- Improved EXPLAIN
 - Handling **INSERT/UPDATE/DELETE**
 - **JSON** output with additional information
- Optimizer Tracing
- Deadlock Logging
- **GET DIAGNOSTICS**

Innodb Metrics Example

```
mysql [localhost] {msandbox} (information_schema) > select * from innodb_metrics where
status!="disabled" and count!=max_count limit 1 \G
***** 1. row *****
      NAME: buffer_pool_pages_free
      SUBSYSTEM: buffer
      COUNT: 2359
      MAX_COUNT: 7957
      MIN_COUNT: 2359
      AVG_COUNT: NULL
      COUNT_RESET: 2359
      MAX_COUNT_RESET: 7957
      MIN_COUNT_RESET: 2359
      AVG_COUNT_RESET: NULL
      TIME_ENABLED: 2013-03-06 09:43:43
      TIME_DISABLED: NULL
      TIME_ELAPSED: 471
      TIME_RESET: NULL
      STATUS: enabled
      TYPE: value
      COMMENT: Buffer pages currently free (innodb_buffer_pool_pages_free)
1 row in set (0.01 sec)
```

JSON Explain Example

```
mysql [localhost] {msandbox} (sbtest) > explain format=json delete from sbtest where k>2 \G
***** 1. row *****
EXPLAIN: {
  "query_block": {
    "select_id": 1,
    "table": {
      "delete": true,
      "table_name": "sbtest",
      "access_type": "range",
      "possible_keys": [
        "PRIMARY",
        "k"
      ],
      "key": "k",
      "used_key_parts": [
        "k"
      ],
      "key_length": "4",
      "rows": 1,
      "filtered": 100,
      "attached_condition": "(`sbtest`.`sbtest`.`k` > 2)"
    }
  }
}
1 row in set (0.00 sec)
```

Transparency

- Improved **PERFORMANCE_SCHEMA**
 - Reduced Overhead
 - Simplified Configuration
 - Table Access Instrumentation
 - Statement Instrumentation
 - Stages Instrumentation
 - Aggregation by User, Host etc
 - Network IO Instrumentation
 - Host Cache contents
 - Improved File I/O Instrumentation

PERFORMANCE_SCHEMA Example

```
mysql [localhost] {msandbox} (performance_schema) > select  
* from users;
```

USER	CURRENT_CONNECTIONS	TOTAL_CONNECTIONS
NULL	18	21
msandbox	1	2

```
2 rows in set (0.00 sec)
```

.. Not replacement for User Statistics

```
mysql> select * from information_schema.user_statistics limit 1\G
***** 1. row *****
      USER: root
TOTAL_CONNECTIONS: 2
CONCURRENT_CONNECTIONS: 0
CONNECTED_TIME: 4
  BUSY_TIME: 0
   CPU_TIME: 0
  BYTES_RECEIVED: 67
   BYTES_SENT: 0
BINLOG_BYTES_WRITTEN: 0
   ROWS_FETCHED: 2
   ROWS_UPDATED: 0
TABLE_ROWS_READ: 0
  SELECT_COMMANDS: 2
  UPDATE_COMMANDS: 0
  OTHER_COMMANDS: 0
  COMMIT_TRANSACTIONS: 0
ROLLBACK_TRANSACTIONS: 0
  DENIED_CONNECTIONS: 0
  LOST_CONNECTIONS: 0
   ACCESS_DENIED: 0
   EMPTY_QUERIES: 0
TOTAL_SSL_CONNECTIONS: 0
1 row in set (0.00 sec)
```


Operational Improvements

- Separate Tablespaces for UNDO Logs
- Fast Restart – Innodb BP preloading
- Online DDL
- Import/Export for Partitioned Tables
- Remote Binlog Backup
- Innodb Transportable Tablespaces
- New configuration variables defaults
- User defined **DATA DICTIONARY** for Innodb tables
- Connection Attributes

New Functionality for Developers

- MemcachedD API for Innodb
- Explicit Partition Selection in Queries
- Full Text Search indexes for Innodb
- Microsecond TIME precision
- Precise spatial operations for GIS

Security

- Passwords hashes in Query Logs
- SHA256 hashing w salt for Authentication
- Support obfuscated password storage for command line tools
- Policy Based password validation
- Plugin based Authentication support in Replication

Where to Learn More ?

- MySQL 5.6 Manual is great
 - <http://dev.mysql.com/doc/refman/5.6/en/mysql-nutshell.html>
- Blogs
 - <http://blogs.innodb.com>
 - <http://www.planetmysql.org>
 - <http://www.mysqlperformanceblog.com>
- Percona MySQL Conference and Expo
 - <http://www.percona.com/live/mysql-conference-2013/>
 - Use “PerWebinar1” discount code for 15% off

Santa Clara, April 22-25, 2013



PERCONA
LIVE

www.percona.com/live

Thank You!

Peter Zaitsev
pz@percona.com