
# MySQL 5.6 and Percona Server 5.6

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# About Presentation

- Brief Overview
- Birds eye view of features coming in 5.6 and Percona Server 5.6
- Documentation + Limited Production Experience based
  - MySQL 5.6 is not very broadly used yet (around 5%)
- 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
- Reasonably safe to upgrade
  - Especially if not relaying on bleeding edge features

# 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 Release Candidate
- Release expected late September
- Includes All MySQL 5.6 features plus Percona Improvements

PERCONA
SERVER

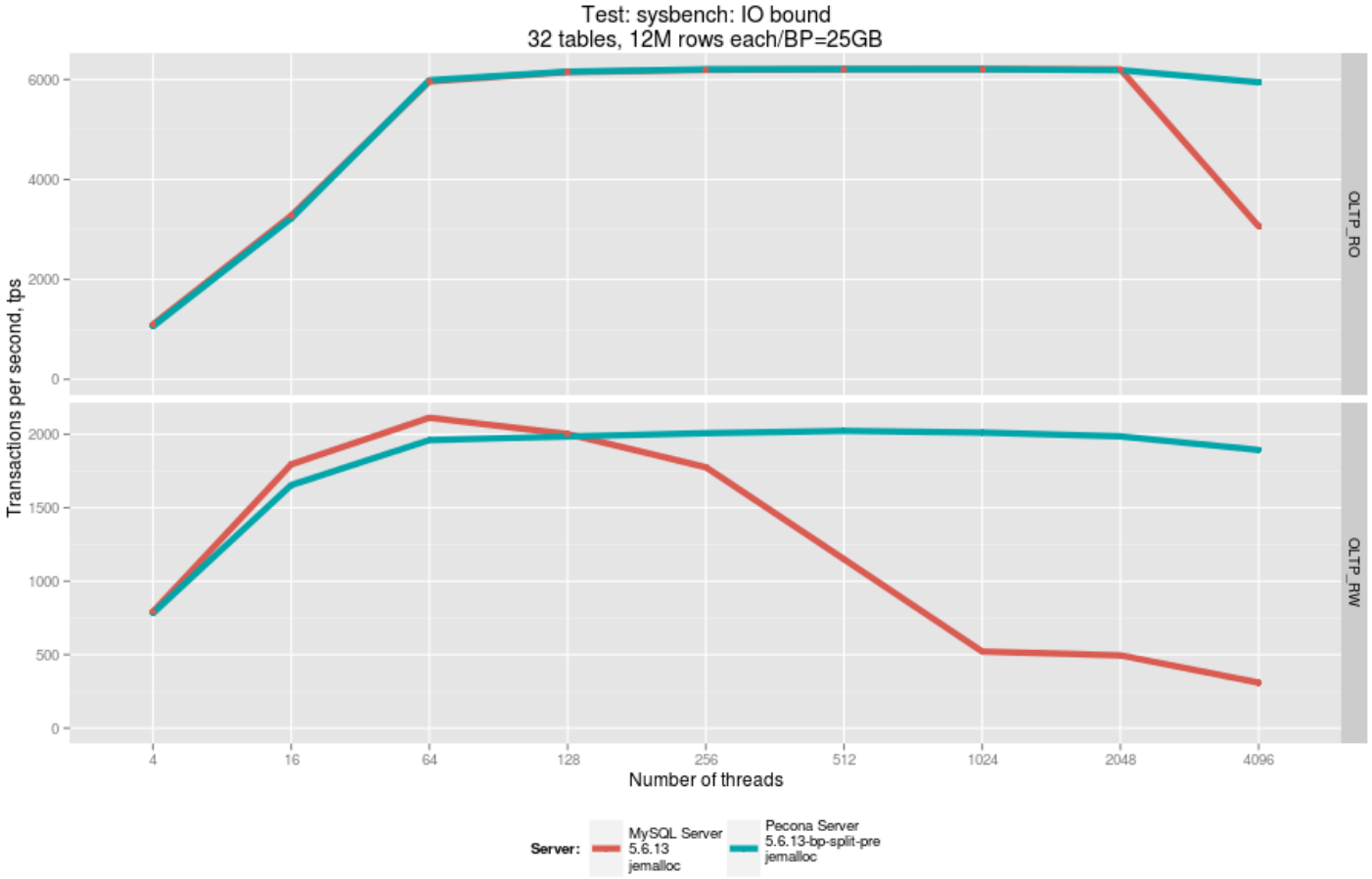
# Percona Server 5.6 Value

- Performance and Scalability
- Operational Features
- Transparency
- Access to features which are close source in MySQL

# PS 5.6 Performance

- MySQL 5.6 focuses a lot of Performance issues
  - Many Previous Percona Server ideas have been implemented in MySQL
- Our Development team found more great opportunities for optimizations
  - Performance, Stable Performance
  - Mutexes; Flushing Code; Balancing

# Scalability with Many Threads



# Many Concurrent Transactions

# Better Backup

- Features to support better backup with Percona Xtrabackup
  - Page Change Tracking
    - Supporting real incremental backup
  - Log Archiving
    - Recover from full backup using innodb transactional logs

# Make it Open

- Thread Pool for handling very large number of connections
- PAM Plugin

# Percona XtraDB Cluster 5.6

- Work on the way 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

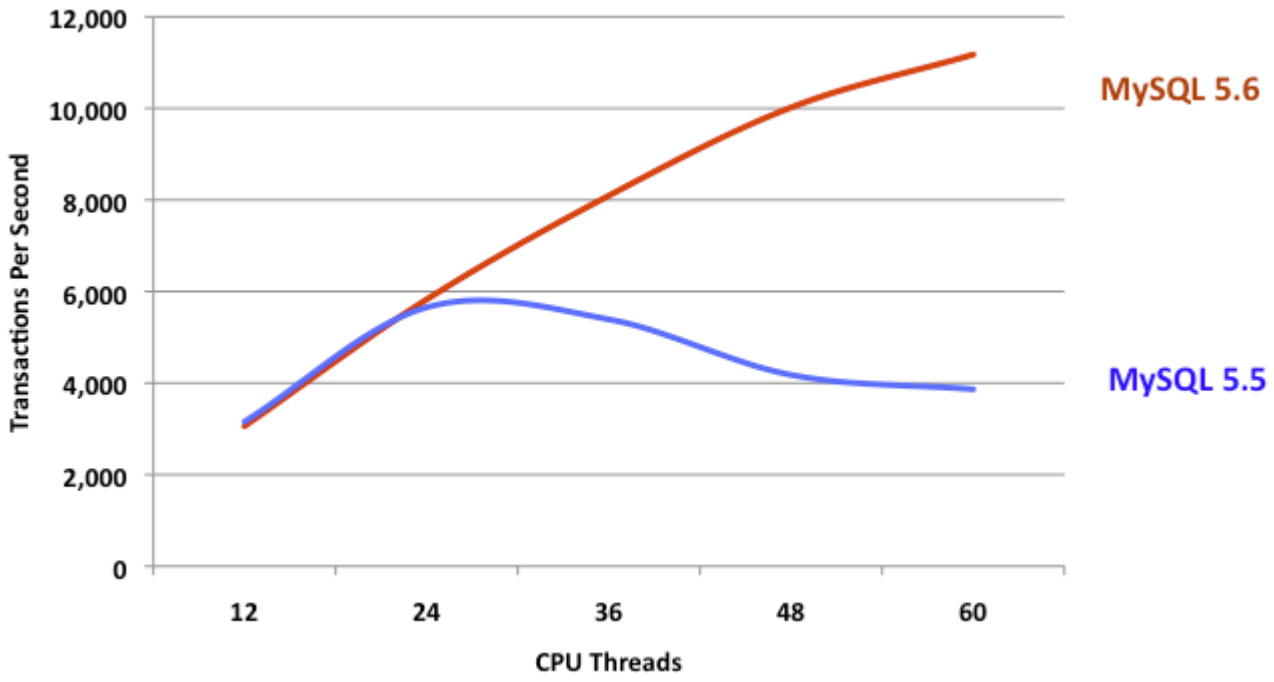
- Innodb Storage engine in Focus
- Scalable Read Only Transactions
- Non Recursive Deadlock Detection
- Improved Innodb Thread Concurrency
- Multiple Background Purge Threads
- Improved Purge Lag Control
- Improved Adaptive Flushing
- Support for Large (over 4GB) redo logs

# Scalability

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

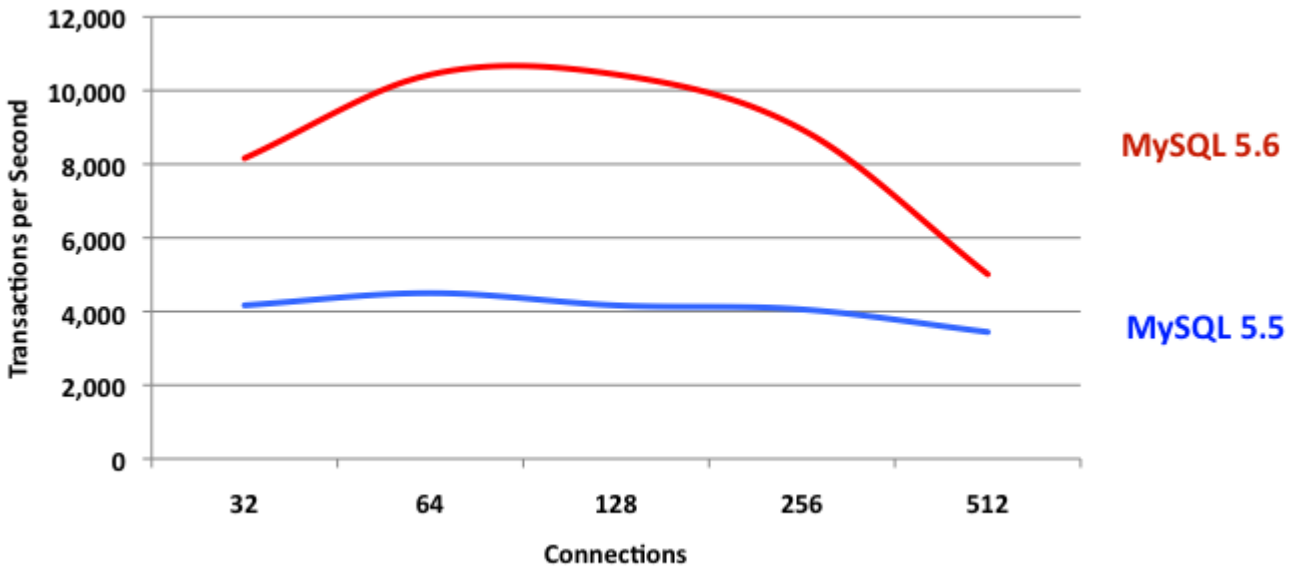
# MySQL 5.6 performance

- Multiple CPU cores at focus
  - Results from Oracle



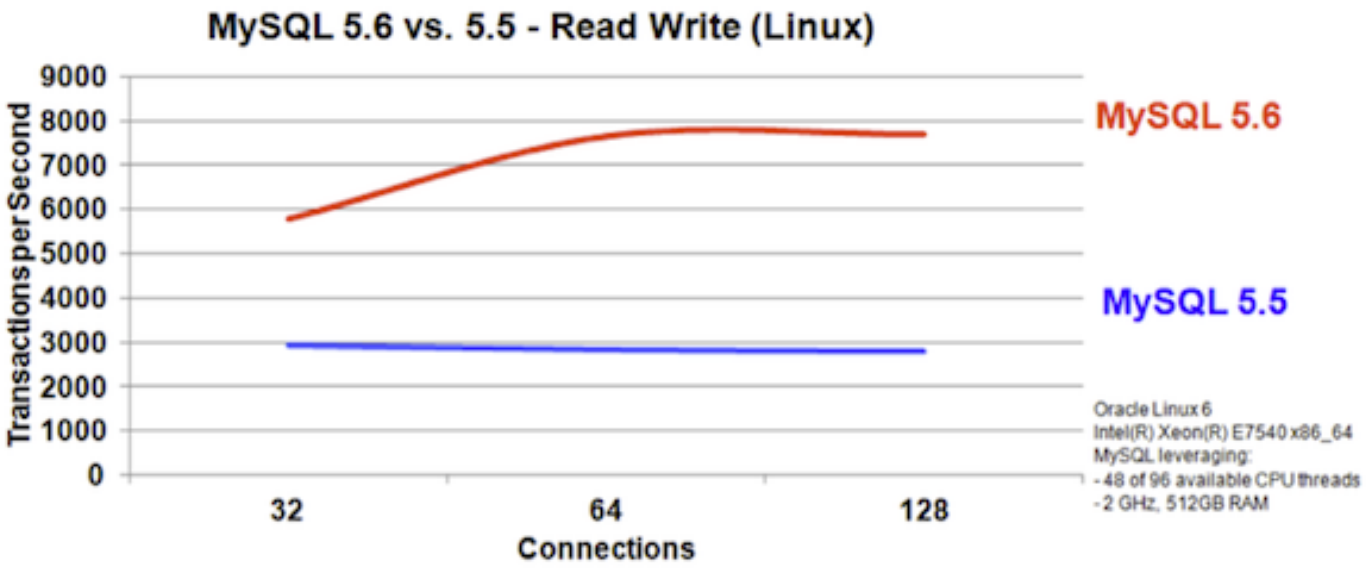
# MySQL 5.6 Performance

- Number of connections at Focus
  - Results from Oracle



# Binary log Group Commit

- Gains with sync_binlog=1
  - Results by Oracle



# Optimizer and Execution

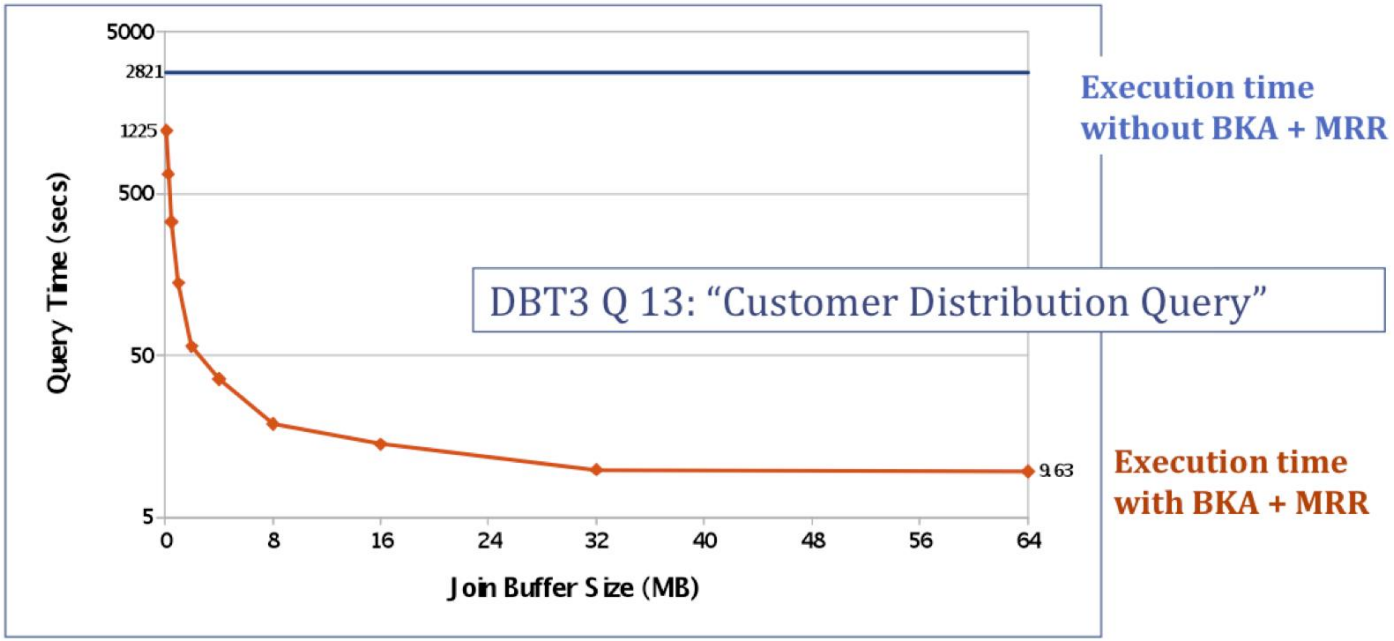
- Index Condition Pushdown (ICP)
- Batched Key Access Joins (BKA)
- Multi Range Read (MRR)
- Faster **ORDER BY nidxcol LIMIT N**
- Persistent Statistics for Innodb
- Improvements to Innodb Compression

# Optimizer and Execution

- Fast Page Checksums (CRC32)
- 4K and 8K Page sizes for Innodb
- Subquery Optimizations
- More efficient Optimizer
  - Especially handling many tables in JOIN

# BKA+MRR May rock your world

- Reporting Query Benchmark
  - Results from Oracle

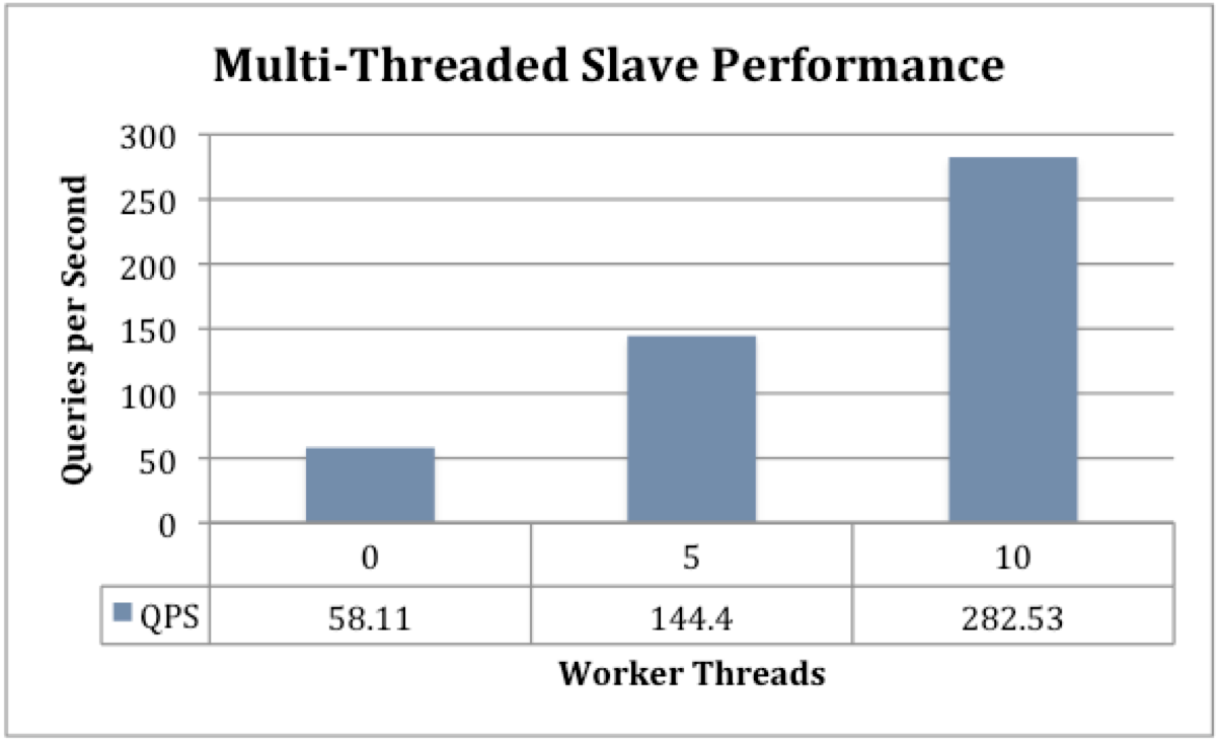


# Replication

- Optimized 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 DIRECTORY** for Innodb tables

# New Functionality for Developers

- MemcacheD 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

# Thank You!

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