



# MySQL Performance Basics

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PERCONA

**Consulting  
Support  
Training  
Development**

**For MySQL**

# Percona Server



- Replaces MySQL
- Faster Queries
- More Consistent
- More Measurable
- More Features

# Percona XtraBackup



PERCONA  
XTRABACKUP

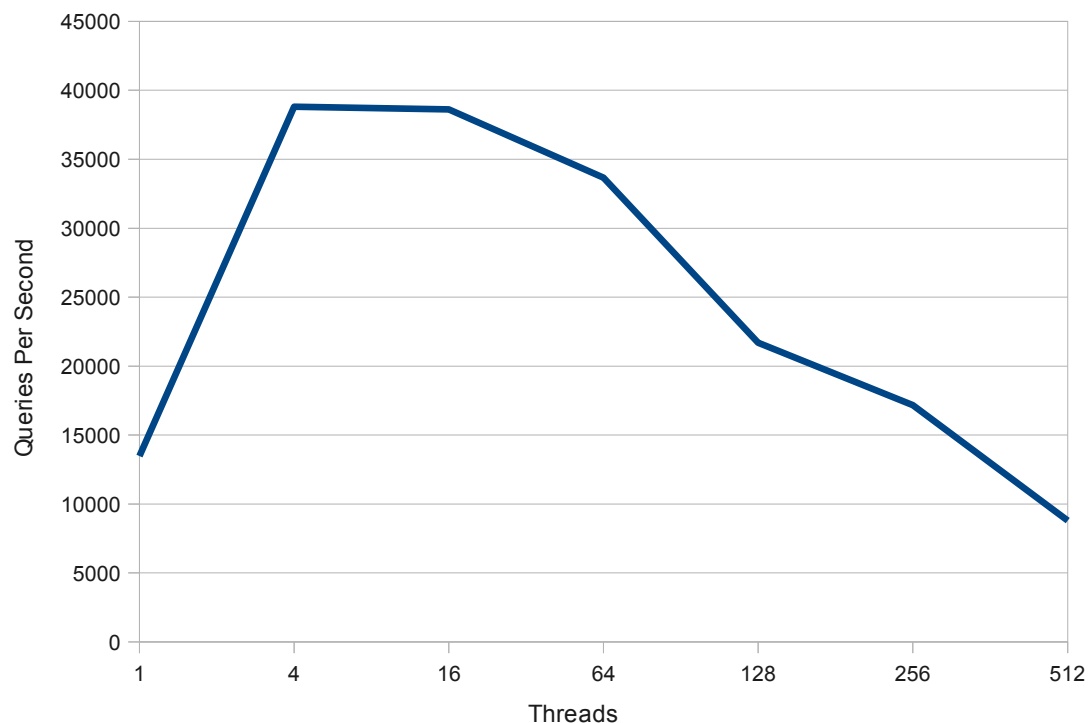
- Backs Up InnoDB
- Non-Blocking

# Performance Fundamentals

Performance	Response Time
Throughput	Queries Per Second

# Usable System Capacity

- Typical plot of throughput versus concurrency
  - Ignore the numbers; the shape is what counts
  - This is from a very old benchmark



# The Four Basic Resources

- CPU
- Memory
- Storage
- Network

# Choosing CPUs

- Speed is very important.

# Choosing CPUs

- It's now OK to buy lots of CPUs.
  - A few years ago, more than 4 was not scalable.
  - You must use a modern MySQL version though!

# Choosing Persistent Storage

- Depending on the workload...
  - Low latency is important.
  - Throughput is important.

# Choosing Persistent Storage

- Use RAID with a Battery Backup Unit
- Depending on the workload...
  - RAID 10
  - RAID 5

# Choosing Persistent Storage

- Solid-state storage
  - For example, PCI-E or SSD drives
  - Very fast (low latency) random reads

# Configuring Storage

- Rarely need separate log volume

# Configuring Storage

- Configure the RAID cache for writes, not reads

# Configuring Storage

- Use the XFS filesystem on Linux

# Configuring Storage

- Tune swappiness to zero on Linux
- Tun the block scheduler to noop or deadline

# Configuring Storage

- If you use LVM, leave snapshot space

# Choosing Memory

- Use ECC DRAM

# Configuring Storage

- Depending on the workload...
  - More is better if you can fit your data in RAM
  - The “working set size” is important
  - You might need faster disks instead

# Choosing Network Hardware

- Throughput and latency both matter
- Use fast, dedicated network
- Beware of DNS
  - Set `skip_name_resolve`

# Benchmarking

- Never assume the server is configured OK
- Always benchmark new hardware
- Use sysbench
- Benchmark the Four Fundamental Resources

# Choosing a MySQL Version

- Use a recent MySQL version

# Choosing a MySQL Version

- Prefer official MySQL releases instead of OS packages

# Choosing a MySQL Version

- Consider Percona Server, Drizzle, and MariaDB

# Choosing a Storage Engine

- Use InnoDB
- Don't let MyISAM sneak back in

# Choosing a Storage Engine

- Special-purpose engines exist for some needs
  - Data warehousing
  - Long-term archiving
- However, prefer simplicity, and make InnoDB work for whatever you can.

# Configuring MySQL

- Cut out the noise and fluff

# Configuring MySQL

- Leave most things at their defaults
- Especially don't tune most buffers

# Configuring MySQL

- Essential InnoDB Tunables:
  - `innodb_buffer_pool_size`
  - `innodb_log_file_size`
  - `innodb_flush_method`
  - `innodb_file_per_table`

# Configuring MySQL

- Disable query cache

# Inspecting MySQL Performance

- “Slow query log”
  - Maatkit's mk-query-digest
  - Percona's enhancements to the log
  - By far the best tool for performance analysis

# Inspecting MySQL Performance

- **INNODB STATUS**
  - Counters and present-value statistics
  - Useful for bottleneck analysis

# Inspecting MySQL Performance

- GLOBAL STATUS
  - Counters only, no timing information
  - Limited usefulness (throughput, not performance)

# Inspecting MySQL Performance

- PERFORMANCE\_SCHEMA
  - MySQL 5.5 and newer
  - A great start on deeper instrumentation
  - In 5.5, lacks query-level metrics

# Percona Live, May 26, New York



[www.percona.com/live](http://www.percona.com/live)



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