

## **Tuning MySQL for High Performance**

### **Course Summary**

#### **Description**

This course is designed for MySQL administrators that need to manage MySQL databases as typically found in a large enterprise. Students practice creating scalable and highly available MySQL solutions.

#### **Objectives**

At the end of this course, students will be able to:

- Understand the differences between MySQL storage engines
- Benchmark MySQL server performance
- Develop indexing strategies for optimized queries
- Configure and manage replication
- Tune MySQL servers for better performance
- Develop a backup and recovery plan that limits downtime
- Secure their MySQL system

#### **Topics**

- MySQL Fundamentals Review
- MySQL Storage Engines
- Benchmarks
- Index Optimization
- Hardware and Operating System Optimization
- Load Balancing
- High Availability

#### **Audience**

This course is designed for IT personnel tasked with maintaining and securing MySQL servers and databases.

#### **Prerequisites**

Before attending this class student should have Basic knowledge of operating systems, Implementing MySQL databases and MySQL Administration experience.

#### **Duration**

Four days

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### Course Outline

- I. Exploring MySQL Architecture**
  - A. The Logical Structure
  - B. Controlling Concurrency
  - C. Working with Transactions
  - D. Understanding Storage Engines in MySQL
- II. Benchmarking**
  - A. Implementing Benchmark Strategies
  - B. Choosing Tools for Benchmarking
  - C. Profiling
- III. Managing Indexing and Optimizing Schema**
  - A. Choosing Optimal Data Types
  - B. Indexing Review
  - C. Indexing Strategies for High Performance
  - D. Performing Index and Table Maintenance
  - E. When to Normalize
  - F. When to Denormalize
  - G. Speeding Up ALTER TABLE
- IV. Optimizing Query Performance**
  - A. Optimizing Data Access
  - B. Restructuring Queries
  - C. Executing Basic Queries
  - D. Getting Past the Limitations of the MySQL Query Optimizer
  - E. Working with User-Defined Variables
- V. Optimizing Server Settings**
  - A. Optimizing Configuration
  - B. General Tuning
  - C. Tuning MySQL's I/O Behavior
  - D. Tuning MySQL Concurrency
  - E. Configuring Workload-Based Tuning
  - F. Tuning Per-Connection Settings
- VI. Optimizing the Operating System and Hardware**
  - A. What Limits MySQL's Performance?
  - B. Selecting CPUs for MySQL
  - C. Balancing Memory and Disk Resources
  - D. Choosing Hardware for a Slave
  - E. Optimizing MySQL RAID Performance
  - F. Working Storage Area Networks and Network-Attached Storage
  - G. Using Multiple Disk Volumes
  - H. Understanding Network Configuration
- Choosing an Operating System**
- Choosing a Filesystem**
- Understanding Threading**
- Understanding Swapping**
- VII. Working with Replication**
  - A. Replication Overview
  - B. Setting Up Replication
  - C. Replication Under the Hood
  - D. Choosing a Replication Topology
  - E. Planning for Replication and Capacity
  - F. Administrating and Maintaining Replication
  - G. Troubleshooting Replication Problems
- VIII. Scaling and High Availability**
  - A. Scaling MySQL
  - B. Load Balancing
  - C. Configuring High Availability
  - D. Optimizing Applications
  - E. Application Performance Overview
  - F. Understanding Web Server Issues
  - G. Configuring Caching
  - H. Extending MySQL
  - I. Alternatives to MySQL
- IX. Working with Backup and Recovery**
  - A. Overview
  - B. Planning Backup and Recovery
  - C. Managing and Backing Up Binary Logs
  - D. Backing Up Data
  - E. Recovering from a Backup
  - F. Selecting Backup Tools
  - G. Scripting Backups
- X. Securing MySQL**
  - A. Terminology
  - B. Account Basics
  - C. Operating System Security
  - D. Network Security
  - E. Data Encryption

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