

MySQL 8.0: Performance Tuning

Course Duration: 32 Hours

Course code:MySQL 8.0

1. Course Overview

This course focuses on optimizing MySQL 8.0 performance for high-traffic, high-volume database environments. Participants will learn techniques to analyze queries, tune indexes, optimize schema design, configure server parameters, and monitor database performance. Practical exercises will provide hands-on experience in troubleshooting and improving MySQL efficiency.

2. What you'll learn?

By the end of this course, participants will be able to:

- Understand key MySQL 8.0 performance concepts
- Analyze query execution plans and slow queries
- Optimize indexes and database schema for performance
- Tune server configuration parameters for workload efficiency
- Monitor MySQL performance metrics and bottlenecks
- Implement caching strategies and connection pooling
- Troubleshoot common performance issues

3. Target Audience

- Database Administrators (DBAs)
- Developers working with MySQL databases
- System Architects and IT Professionals managing MySQL workloads

4. Pre-Requisites

Familiarity with:

- MySQL 8.0 architecture and administration
- SQL and basic query optimization
- Basic knowledge of Linux/Windows server environments

5. Course content

Module 1: Course Introduction

- Introduction
- Course Contents

Module 2: MySQL Performance Fundamentals

- MySQL Architecture Overview
- Storage Engines and Their Impact on Performance
- Understanding Query Execution Flow
- Identifying Performance Metrics

Module 3: Query Optimization

- Using EXPLAIN and EXPLAIN ANALYZE
- Analyzing Query Execution Plans
- Optimizing SELECT, JOIN, and Subqueries
- Reducing I/O Bottlenecks

Module 4: Indexing Strategies

- Types of Indexes in MySQL 8.0
- Creating and Managing Indexes
- Indexing Best Practices for Performance
- Covering Indexes and Composite Indexes

Module 5: Schema and Table Design Optimization

- Normalization vs. Denormalization
- Partitioning Strategies
- Optimizing Data Types for Performance
- Foreign Keys and Constraints Impact

Module 6: Server Configuration and Tuning

- Key Configuration Parameters for MySQL 8.0
- Memory Allocation and Buffer Pool Tuning
- Thread Pooling and Connection Management
- Optimizing Disk I/O and Storage Performance

Module 7: Performance Monitoring Tools

- MySQL Performance Schema
- Using SHOW STATUS, SHOW VARIABLES
- Monitoring with MySQL Enterprise Monitor
- Detecting Bottlenecks and Slow Queries

Module 8: Caching and Query Acceleration

- Query Cache (Deprecation Considerations)
- Using In-Memory Tables
- Application-Level Caching Strategies
- Connection Pooling for Performance

Module 9: Troubleshooting Performance Issues

- Identifying and Resolving Deadlocks
- Detecting and Fixing Long-Running Queries
- Resource Contention and Locking Issues
- Logging and Auditing for Performance Analysis

Module 10: Hands-On Labs and Exercises

- Query Analysis and Optimization Exercises
- Index Tuning Scenarios
- Configuring MySQL Parameters for Workload
- Performance Monitoring and Troubleshooting Labs

Module 11: Best Practices and Wrap-Up

- Summary of Performance Tuning Techniques

- Checklist for Ongoing Performance Optimization
- Q&A and Further Learning Paths

