



PERCONA TRAINING FOR MYSQL

Take your professional growth to the next level—deepen your understanding and practical knowledge of MySQL



Percona for
MySQL

Learn more at percona.com/mysql

Why Take MySQL Training?

Our MySQL material is up to date with the latest features and caveats of MySQL 8.4, and contains the current industry best-practice standards.

Most modules contain exercises to reinforce the topic being discussed and to keep the class and students engaged in the material.

START LEARNING NOW

*According to Stack Overflow Annual Developer Survey 2022

MySQL Operations and Troubleshooting

Duration: Two days

What you get: This 2-day course is geared for the “operations” role; the person who will be responsible for standing up new MySQL instances, performing backups and recovery, monitoring, tuning, and troubleshooting. This course covers the following modules:

Basics and Tools

- Storage Engines
- Versions and Flavors
- Built-In Tools
- Percona Toolkit

Backup and Recovery

- Strategies
- Logical vs Physical
- Incremental Backups
- Point-in-time Recovery
- Delayed Replication
- Validating Backups

Replication

- Setting Up Replication
- Internals
- Topologies
- Administration, and Maintenance
- GTIDs
- Common Problems
- Ensuring Data Consistency

Server Troubleshooting

- Understanding Server Components
- Diagnostic Tools
- Understanding MySQL Global Status

Monitoring

- Using Percona Monitoring and Management

Security

- OS/Network Security/SSL/TLS
- MySQL Privileges
- Resource Controls



MySQL Operations and Troubleshooting

Continuation

InnoDB Basics

- History
- MySQL Pluggable Architecture
- Basic Operations
- Redo Log
- Undo Operations
- Checkpoints

InnoDB Concurrency, and Locking

- Multi-Version Concurrency Control
- ACID
- Row Locking Behaviors

InnoDB Internals

- Tablespaces, Row Formats
- Memory Information
- Clustered Indexes
- Adaptive Hash Index
- Change Buffer
- Double Write Buffer
- Common Tuning Parameters

InnoDB Diagnostics

- Engine Status
- Global Variables, Status
- Information Schema
- Performance Schema

MySQL Developer Scaling and Optimizations

Duration: Two days

What you get: This 2-day course is targeted for the application developers; the person who is programming against MySQL, designing and writing queries. This course covers the following modules:

Query Optimization

- Query Planning
- Explaining EXPLAIN
- Composite Indexes
- Finding Unoptimized Queries
- Explain Analyze
- Beyond EXPLAIN

Application Architecture

- Topologies
- Hardware Solutions
- Caching Reads
- Read/Write Splitting
- Functional Partitioning / Sharding
- Connection Management

Schema Design

- Database, and Table Design
- MySQL Data Types
- Normalization
- Index Design
- SQL Constraints
- Extensible Schemas

Partitioning

- Overview, Caveats, Restrictions, Limitations
- Partitioning Types
- Partition Management
- Partition Pruning
- Tools

SQL Injection

- Overview
- Avoiding, Filtering
- Stored Procedures
- Prepared Statements
- Proxies, Firewalls

MySQL Group Replication 101

Duration: Two days

What you get: This 2-day hands-on tutorial course takes the student from a standard source/replica setup and migrates them to a 3-member Group Replication cluster. Along the way, the fundamentals of Group Replication are discussed, along with explanations of many configuration parameters. Additionally, the following topics are presented:

- Overview of Group Replication
- Migrating to Group Replication
- Basic Configuration Options
- Securing Group Replication
- Monitoring Group Replication
- Achieving High Availability with ProxySQL and MySQL Router
- Disaster Scenarios, Node Failures, Network Partitioning

Percona XtraDB Cluster Tutorial

Duration: Two days

What you get: This 2-day hands-on tutorial course takes the student from a standard source/replica setup, and migrates them to a 3-node Percona XtraDB Cluster, complete with ProxySQL (for load balancing and failover). This session covers many topics detailing PXC behavior, including:

- Migrating to PXC
- Application Considerations
- Galera Replication and Behavior
- Online Schema Changes
- Application High Availability
- Monitoring Galera
- State Transfers
- Node Failures, Arbitration, and Bootstrapping
- Avoiding SST
- Tuning Replication

ProxySQL Tutorial

Duration: One day

What you get: This 1-day hands-on tutorial course introduces the learner to ProxySQL. It is highly hands-on, and exercise-based. Topics include:

- Installation, and Basic Concepts of ProxySQL
- Use with traditional replication*, Percona XtraDB Cluster*, or Group Replication*
- Monitoring
- Advanced query rules (rewriting, blocking, firewalling)
- High-Availability
- Disaster Scenarios

• **Client can choose one of these three depending on which one applies to their environment*

Percona Operator for MySQL XtraDB Cluster Tutorial

Duration: Two day

What you get: This 2-day hands-on tutorial course covers all of the basic usage of the Percona XtraDB Cluster Operator for Kubernetes. It is highly hands-on and exercise-based. Topics include:

- What is Kubernetes?
- Installing the Percona XtraDB Cluster Operator
- Adding resources/namespaces/roles to K8S
- Creating a Percona XtraDB Cluster
- Connecting to PXC via ProxySQL/HAProxy
- Taking and restoring backups
- Managing scheduled backups
- Modifying the running configuration
- Scaling up/down the number of nodes
- Monitoring PXC

Individual Training Modules – Included in Training Offerings Above (alphabetical)

The above courses are broken into individual chapters/modules as detailed below. The durations listed on each module are rough estimates for minimum amount of delivery time. Depending on the class size, knowledge, and proficiency, the duration may change.

Application Architecture

- Target: Developer, Operations
- Duration: 1 hour

This module covers example architecture topologies. Hardware solutions, caching, replication and sharding are also discussed.

Architecture Mistakes

- Target: Developer, Operations
- Duration: 30 minutes

This module covers a series of general architecture mistakes seen in the field over the past several years. The scenario is discussed along with the mistakes made. Better solutions to the issues are presented and discussed as well.

Backup and Recovery

- Target: Operations
- Duration: 2 hours

In this module, discussion topics include: backup strategies, logical vs physical backups, incremental backups, delayed slaves and backup validation.

Basics and Tools

- Target: Operations
- Duration: 30 minutes

The different storage engines, the different MySQL versions, the supplied tools and the Percona Toolkit are touched on in this module.

Hardware and Operating Systems

- Target: Operations
- Duration: 30 minutes

This short module discusses various concerns (OS, RAID, Virtualization, Hardware, etc) when building a new MySQL instances.



High Availability Overview

- Target: Operations
- Duration: 1 hour

Various high availability solutions are presented and discussed with their pros and cons.

InnoDB Basics

- Target: Developer, Operations
- Duration: 1 hour

This module covers the basics of InnoDB's operation, including the transaction log, undo operations and checkpointing.

InnoDB Internals, Locking and Diagnostics

- Target: Operations
- Dependent Module: InnoDB Basics
- Duration: 1.5 hours

This module deep-dives into many specific InnoDB internals, including: tablespace usage, the clustered index, the adaptive hash, the change and doublewrite buffers, multi-version concurrency control, purging old data, locking structures, and diagnostic information.

Partitioning

- Target: Developer, Operations
- Duration: 1.5 hours

In this module, the different partitioning types, how to manage partitions, their benefits, tools and tips, and restrictions are discussed.

Query Optimization

- Target: Developer
- Duration: 2 hours

This module covers the basics of query optimization within MySQL. Students learn how to use, read and understand the `*EXPLAIN*` syntax to improve query performance. Single, prefix and multi-column indexes are discussed as are JOIN optimizations and covering indexes.

Replication

- Target: Operations
- Duration: 2 hours

This hands-on module takes the student through the process of setting up a slave replica. How replication works, various topologies, administration, maintenance, various problems and solutions along with ensuring replication integrity are all discussed.



Schema Design

- Target: Developer, Operations
- Duration: 2 hours

This module covers database design, SQL data types, table design, normalization, SQL constraints, and extensible schema design methodology.

Server Troubleshooting

- Target: Operations
- Duration: 1 hour

The student is taken through various server components to understand the inner-workings at all levels. Various diagnostic tools, and MySQL-supplied information is also discussed.

Stored Procedures

- Target: Developer
- Duration: 30 minutes

This module discusses all of the ins and outs of stored procedures within MySQL. The why, the basics, performance and other issues are discussed.

SQL Modes

- Target: Developer, Operations
- Duration: 30 minutes

What is 'SQL Mode', the various settings and their impact on the data stored within the database is discussed in this module.

SQL Injection

- Target: Developer
- Duration: 30 Minutes

This module discusses how SQL injection is still a very serious threat. How it happens and what can be done to protect against it are topics of discussion.

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