

DATABASES

INTERMEDIATE

3 DAYS

MySQL and MariaDB Administration

Three days of practical administration for teams running MySQL or MariaDB in production. Covers architecture and InnoDB internals, configuration, users and authentication, backup and recovery, replication topologies, monitoring, query tuning, security hardening and upgrades. Taught on MySQL 8.4 LTS and MariaDB 11.4 LTS with the behavioural differences between the two called out explicitly rather than glossed over.

Why MySQL and MariaDB Administration Training?

Both engines, differences named

MySQL and MariaDB have diverged significantly. The course covers both and is explicit about where they behave differently.

Replication that survives failure

GTID based replication, lag diagnosis and failover are taught as operational skills, not configuration snippets.

Recovery you have actually rehearsed

Participants restore from binary logs to a point in time rather than reading about it.

Self-managed and cloud

Covers self-hosted servers alongside RDS, Aurora MySQL, Azure Database and Cloud SQL operations.

What you'll be able to do

- ✓ Explain MySQL and MariaDB architecture, threading and memory structures
- ✓ Install, configure and secure a server for a defined workload
- ✓ Describe InnoDB internals including the buffer pool, redo log and undo
- ✓ Manage users, privileges, roles and authentication plugins
- ✓ Design and execute backup strategies using logical and physical methods
- ✓ Perform point-in-time recovery using binary logs
- ✓ Build and operate GTID based replication topologies
- ✓ Diagnose replication lag, errors and failover safely
- ✓ Read execution plans and tune indexes and queries
- ✓ Monitor a server using performance schema, sys schema and slow query analysis
- ✓ Harden and upgrade a server with a documented rollback path

Who this is for

- Database administrators supporting MySQL or MariaDB
- DevOps, platform and site reliability engineers
- Backend developers responsible for their own database servers
- Cloud engineers managing RDS, Aurora or Cloud SQL instances
- Teams migrating between MySQL and MariaDB or consolidating both

Curriculum

01 Architecture, Editions and Fork History

- Server layers: connection handling, parser, optimiser and storage engines
- Thread model, memory allocation and per-connection buffers
- MySQL and MariaDB divergence and what it means for portability
- Release and support lifecycle for both projects
- Percona Server and other distributions in the ecosystem
- **Hands-on:** inspect a running server's configuration, threads and status

02 Installation, Configuration and Instance Management

- Package, binary and container based installation
- Configuration file structure, precedence and dynamic variables
- Data directory layout and file placement decisions
- Running multiple instances on a single host
- Startup, shutdown, safe restarts and recovery on start
- **Hands-on:** deploy and configure a server for a stated workload profile

03 InnoDB Internals and Storage Engines

- Buffer pool structure, sizing and warm-up behaviour
- Redo log, undo tablespaces and the doublewrite buffer
- Clustered index organisation and the cost of a wide primary key
- Tablespace layout, file-per-table and compression options
- Alternative engines and where they still make sense
- **Hands-on:** size the buffer pool against a working set and measure hit ratio

04 Users, Privileges and Authentication

- Account naming, host matching and privilege scope
- Global, database, table and column level grants
- Roles and privilege grouping in both MySQL and MariaDB
- Authentication plugins, caching_sha2_password and legacy migration
- Password policies, expiry and account locking
- **Hands-on:** build a least-privilege account model and audit effective grants

05 Schema, Table and Data Management

- Data type selection and its effect on storage and index size
- Character sets, collations and the utf8mb4 migration trap
- Online DDL, instant ALTER and lock behaviour by operation
- pt-online-schema-change and gh-ost for large table changes
- Partitioning options and their limitations
- **Hands-on:** alter a large table with no meaningful downtime

06 Indexes and Execution Plans

- B-tree index structure and leftmost prefix behaviour
- Covering indexes, index-only reads and secondary index lookups
- EXPLAIN and EXPLAIN ANALYZE output interpretation
- Optimiser hints, index hints and histogram statistics
- Detecting unused, duplicate and redundant indexes
- **Hands-on:** tune a slow query set using plan evidence alone

07 Transactions, Locking and Isolation

- Isolation levels and MySQL's repeatable read specifics
- Row locks, gap locks and next-key locking behaviour
- Deadlock detection and reading the deadlock report
- Metadata locks and why a long query blocks a DDL statement
- Designing transactions for short duration and consistent ordering
- **Hands-on:** reproduce a deadlock and redesign the transaction to avoid it

08 Backup, Recovery and Binary Logs

- mysqldump and mysqlpump for logical backups and their limits
- Percona XtraBackup and MariaBackup for physical hot backups
- Binary log formats, retention and their role in recovery
- Point-in-time recovery using a base backup plus binary logs
- Backup verification, retention policy and offsite storage
- **Hands-on:** recover a dropped table to the second before it was dropped

09 Replication and Topologies

- Asynchronous, semi-synchronous and their consistency implications
- GTID based replication setup and administration
- Multi-source replication and read scaling topologies
- Replication lag causes, parallel appliers and lag monitoring
- Group Replication, InnoDB Cluster and MariaDB Galera compared
- Failover, promotion and rebuilding a broken replica
- **Hands-on:** build a replica, break replication deliberately and repair it

10 Monitoring, Diagnostics and Tuning

- Performance schema and sys schema views that matter operationally
- Slow query log configuration and pt-query-digest analysis
- Status variables worth alerting on and the ones that only create noise
- Prometheus exporters and dashboard design
- Memory, I/O and connection level tuning
- **Hands-on:** triage an unknown performance incident from instrumentation

11 Security, Upgrades and Day-Two Operations

- Network exposure, TLS enforcement and certificate management
- Encryption at rest and keyring management
- Audit plugin configuration for compliance evidence
- Minor patching and major version upgrade paths for both engines
- Migrating between MySQL and MariaDB and the compatibility gaps
- Operational differences on RDS, Aurora, Azure Database and Cloud SQL
- **Hands-on:** capstone upgrade of a replicated pair with a rollback plan