

MySQL for Developers

SQL, application connectors, JSON and query performance

FA-0794 · 3–4 days

Software Development · Data & Analytics

Introduction

Develop console and web applications that store, retrieve and present data with MySQL. Work through SQL refreshers and selected guided exercises covering schema design, queries, application access, transactions, JSON and performance analysis.

The 3–4-day programme assumes prior SQL experience. Use a prepared, supported MySQL environment such as MySQL 8.4 LTS with a compatible connector for PHP, Java or Python. Broader routine, engine and optimisation topics are introduced through focused examples rather than comprehensive administration training.

Learning outcomes

- Use MySQL clients and choose a compatible application connector.
- Design tables and use appropriate data types, keys and metadata.
- Retrieve and modify data with expressions, aggregates, joins, subqueries and views.
- Use transactions, prepared statements, import/export operations and stored-program features.
- Work with JSON and spatial data and distinguish SQL access from X DevAPI document operations.
- Inspect query plans and apply measured indexing and query improvements.

Prerequisites

For developers creating MySQL-backed applications. Prior experience with relational databases, SQL and the programming language selected for the exercises is expected.

Training outline

1. Environment, architecture and clients

- MySQL Overview, Products and Services
- MySQL Enterprise Services
- Supported operating systems and version compatibility
- Installing MySQL and the World Database
- MySQL General Architecture
- How MySQL uses Disk Space
- How MySQL uses Memory
- Invoking Client Programs
- Using Option Files
- The MySQL Client
- Current client tools: MySQL Shell and a compatible graphical SQL client
- MySQL Connectors
- Third-Party APIs

2. Retrieving data and handling SQL expressions

- The SELECT Statement
- Aggregating Query Results
- Using UNION
- SQL Modes
- Handling Missing or invalid Data Values
- Interpreting Error Messages
- SQL Comparisons
- Functions in SQL Expressions
- Comments in SQL Statements

3. Data types and metadata

- Data Type Overview
- Numeric Data Types
- Character String Data Types

- Binary String Data Types
- Temporal Data Types
- NULL values
- Metadata Access Methods
- The INFORMATION_SCHEMA Database / Schema
- Using SHOW and DESCRIBE
- The mysqlshow Command

4. Database and table design

- Database Properties
- Good Design Practices
- Identifiers
- Creating Databases
- Altering Databases
- Dropping Databases
- Creating Tables
- Table Properties
- Column Options
- Creating tables based on existing tables
- Altering Tables
- Dropping Tables
- Foreign Keys

5. Data changes and transactions

- The INSERT Statement
- The DELETE Statement
- The UPDATE Statement
- The REPLACE Statement
- INSERT with ON DUPLICATE KEY UPDATE
- The TRUNCATE TABLE Statement
- What is a Transaction?
- Transaction Commands
- Isolation Levels
- Locking

6. Joins, subqueries and views

- What is a Join?
- Joining Tables in SQL
- Basic Join Syntax
- Inner Joins
- Outer Joins
- Other Types of Joins
- Joins in UPDATE and DELETE Statements
- Types of Subqueries
- Table Subquery Operators
- Correlated and Non-Correlated Subqueries
- Converting Subqueries to Joins
- What are Views?
- Creating Views
- Updatable Views
- Managing Views
- Obtaining View Metadata

7. Prepared statements and data exchange

- Why use Prepared Statements?
- Using Prepared Statements from the mysql Client
- Preparing a Statement
- Executing a Prepared Statement
- De-allocating a Prepared Statement
- Exporting and Importing Data
- Exporting and Importing Data using SQL
- Exporting and Importing Data using MySQL Client Programs
- Import Data with the SOURCE Command

8. Stored routines and triggers

- What is a Stored Routine?
- Creating, Executing and Deleting Stored Routines
- Compound Statements

- Assign Variables
- Parameter Variables
- Parameter Declarations
- Flow Control Statements
- Declare and use Handlers
- Cursors
- What are Triggers?
- Creating and deleting triggers
- Restrictions on Triggers

9. Storage engines and measured optimisation

- SQL Parser and Storage Engine Tiers
- Storage Engines and MySQL
- The MyISAM Storage Engine
- The InnoDB Storage Engine
- The MEMORY Storage Engine
- Other Storage Engines
- Overview of Optimization Principles
- Using Indexes for Optimization
- Using EXPLAIN to Analyze Queries
- Query Rewriting Techniques
- Optimizing Queries by Limiting Output
- Using Summary Tables
- Optimizing Updates
- Choosing Appropriate Storage Engines

10. Application development with connectors, JSON and spatial data

- Aggregate and summarize data
- Analyze queries for optimization
- Choose between connectors for a given application
- Control transactions in SQL applications
- Create and store JSON documents
- Explain application development with NoSQL and XDevAPI

- Process data in JSON documents
- Store and process numeric data, spatial data, string data
- Use MySQL Shell to access document stores through X Protocol
- Use prepared statements

Select the connector and API for the application. Use parameter binding through the connector where appropriate; distinguish connector APIs from SQL PREPARE syntax. Practise transactions and JSON SQL operations, and demonstrate X DevAPI document access using a configured X Protocol environment.