

## MySQL Cluster Ed 2

**Duration:** 4 Days

### What you will learn

This MySQL Cluster training teaches you how to install and configure a real-time database cluster at the core of your application. Expert instructors will teach you how to design and maintain your clusters for high availability and scalability by using MySQL Cluster's open-source and enterprise components.

Learn To:

- Install and configure MySQL Cluster nodes.
- Design simple and advanced cluster topologies.
- Secure cluster nodes and data.
- Backup and restore cluster data.
- Troubleshoot common cluster problems.
- Monitor and optimize cluster performance.
- Use enterprise tools to manage large cluster deployments.

### Benefits to You

After taking this course, you will be able to evaluate MySQL Cluster in your application, and design a secure cluster topology to provide scalability and high availability. You will have developed the knowledge and skills to monitor and optimize the performance of your existing clusters and troubleshoot any problems that arise. You'll also be able to replicate between clusters that are separated by function or geography.

### Participate in Hands-on, Interactive Labs

In addition to benefiting from interactive instruction, you'll also get a chance to create and configure several different clusters through hands-on exercises. You'll start by creating simple clusters manually, or with the MySQL Cluster Auto Installer. You will then create multiple clusters that are separated by a firewall, as well as clusters that use replication. These hands-on exercises will help you troubleshoot common problems and examine and optimize the performance of the cluster.

### Audience

- Application Developers
- Database Administrators
- Database Designers
- Support Engineer
- System Administrator
- Technical Administrator
- Technical Consultant
- Web Administrator

## Related Training

### *Required Prerequisites*

Must have a working knowledge of UNIX/Linux command-prompt usage

Must have a working knowledge of database concepts

Must have a basic knowledge of computer networking

### *Suggested Prerequisites*

Familiarity with VirtualBox

Linux administration skills

MySQL for Beginners Ed 2

MySQL for Beginners Ed 3

MySQL for Database Administrators Ed 3.1

MySQL server configuration and usage

Oracle Linux 5 & 6 System Administration

## Course Objectives

Identify and correct common cluster problems

Describe common cluster use cases

Configure replication between MySQL Clusters

Describe MySQL Cluster operation in virtualized and Cloud environments

Explain the concepts associated with MySQL Cluster

Describe the MySQL Cluster architecture

List features of the NDB Storage engine

Describe MySQL Cluster design considerations

Install MySQL Cluster

Configure a basic MySQL Cluster

Perform backup and recovery operations

Secure a MySQL Cluster

Maintain a MySQL Cluster by using the Management console and MySQL Cluster Manager

## Course Topics

### Introduction to MySQL Cluster

MySQL Overview, Products, Services  
Websites and Other Documentation  
Key Benefits and Use Cases  
Node types

### Installing MySQL Cluster

Hardware, Software, and Network Requirements  
Choosing and Installing Cluster Distributions  
Installing and Configuring Cluster Nodes  
MySQL Cluster Auto-Installer  
Starting a Cluster with a Basic Configuration  
Upgrading a Cluster

### MySQL Cluster Architecture

The NDB storage engine  
Clustered tables  
SQL and NoSQL API nodes  
Data Nodes and Node Groups  
Partitions and Replicas  
Checkpoints and the Redo Log  
Redundancy and Resilience

### Configuring MySQL Cluster

MySQL Cluster Configuration Files  
Basic Configuration Options: NodeId and HostName  
Management Node Configuration  
Data Node Configuration  
Configuring Multi-Threaded Data Nodes  
Cluster Program Startup Options  
Viewing Cluster Configuration Information

### Designing a MySQL Cluster

Design Guidelines  
Sizing Memory Usage  
In-Memory and Disk Data Storage  
Configuring Disk Data Storage  
Designing Clusters for Scale and High Availability  
Cluster Configuration Examples

### Maintaining a MySQL Cluster

Modifying Table Structure  
Accessing the Cluster with Command-Line Tools  
Single-User Mode  
Backing Up a Cluster  
Restoring a Cluster from Backup

## **Securing MySQL Cluster**

- Securing MySQL Cluster
- Configuring Connection Security
- Configuring Firewall Rules
- Data Security
- MySQL Server Node Security

## **MySQL Cluster Manager**

- Installing MySQL Cluster Manager Agent and Clients
- Sites, Clusters, Hosts, Processes, Packages, and Configuration Attributes
- Creating Managed Clusters
- Importing a Configuration from an Unmanaged Cluster
- Viewing Information About Your Sites and Clusters
- Maintaining Your Sites and Clusters

## **Replicating Between MySQL Clusters**

- Replication in MySQL Cluster
- Transaction Ordering and Epochs
- Configuring Replication
- Starting, Stopping, and Resetting Replication
- Backups Using Replication Tables
- Replication Resilience
- Replication Information Repositories
- Multi-Master Replication and Conflict Resolution

## **Monitoring MySQL Cluster**

- Introduction to Monitoring
- Monitoring with the `ndb_mgm` Client
- Using the Cluster Log
- `ndbinfo` Database
- Status Variables
- MySQL Enterprise Monitor

## **Troubleshooting MySQL Cluster Problems**

- Starting to Troubleshoot
- Heartbeats
- Configuration Problems
- Disk Activity Problems
- Application Design Problems

## **Optimizing MySQL Cluster Performance**

- Performance Concepts
- Identifying Queries for Optimization
- Optimizing with Indexes
- Using EXPLAIN
- Adaptive Query Localization
- Distribution Awareness
- The Process of Optimizing and Benchmarking

## **MySQL Cluster Environments**

- MySQL Cluster and Virtualization
- Node Deployment in Cloud Environments

Connecting to a Cluster with SQL and NoSQL APIs  
Comparing MySQL Cluster with Other High-Availability Solutions

## **Conclusion**

Summary course contents and objectives

Recap of MySQL Products, services, websites, training, documentation