

**MySQL Database Administrator Training**  
NIIT, Gurgaon India  
31 August-10 September 2015

**AGENDA**

**Day 1:**

**Introduction to MySQL**

- MySQL Overview
- MySQL Database Server Editions
- MySQL Products
- MySQL Services and Support
- MySQL Resources
- Example Databases

**MySQL Architecture**

- The client/server model
- Communication protocols
- The SQL Layer
- The Storage Layer
- How the server supports storage engines
- How MySQL uses memory and disk space
- The MySQL plug-in interface

**MySQL Server and Client**

- MySQL Client/Server Model
- Communication protocols
- MySQL Connectors
- The LAMP Stack
- Installation of the MySQL server



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- MySQL Server and Client Startup
- Keyboard Editing
- Session Logging With the tee File

## Database Basics

- Basics of Relational Databases
- Spreadsheet Versus Database
- Entities and Relationships
- Relationship Categories
- SQL Language and MySQL
- SQL data definition language
- SQL data manipulation language

## Day 2:

### Database Design

- Database Modeling
- Structure and Cardinality Diagram (ERD)
- Keys
- Normalization
- Database Design
- Viewing and Evaluating a Database

### Table Data Types

- Data Types as Part of Database Design



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- Numeric Data Types
- Temporal Data Types
- Character String Data Types
- Character Set and Collation Support
- Binary String Data Types
- Data Type Considerations
- The Meaning of NULL

## Day 3:

### Database and Table Creation

- Creating a Database
- Creating a Table
- Showing How a Table Was Created
- Column Options
- Table Options
- Table Indexing
- Table Constraints

### Basic Queries

- The SELECT Statement
- Troubleshooting
- SQL Modes for Syntax Checking
- Common SQL Modes
- MySQL Workbench for SQL Development



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## Database and Table Maintenance

- Deleting databases and tables
- Creating a new table using an existing table
- Confirming the creation of a new table
- Copying an existing table structure
- Creating a temporary table
- Adding, removing and modifying table columns
- Adding, removing and modifying indexes and constraints

## Table Data Manipulation

- Manipulating Table Row Data
- The INSERT Statement
- The REPLACE Statement
- The UPDATE Statement
- The DELETE Statement

## Day 4:

### Functions

- Functions in MySQL Expressions
- Using Functions
- String Functions
- Temporal Functions
- Numeric Functions
- Control Flow Functions
- Aggregate Functions



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- Spaces in Function Names

## Exporting and Importing Data

- Exporting with a Query
- Exporting with a MySQL Utility
- Importing from a Data File
- Importing with a MySQL Utility

## Day 5:

### Joining Tables

- Combining Multiple Tables
- Joining Tables with SELECT
- Comma-Separated Joins
- Inner Joins
- Outer Joins
- Table Name Aliases

### Table Subqueries

- Advantages of Using a Subquery
- Placement of Subqueries
- Subquery Categories
- Subquery Result Table Types
- Subquery Type/Placement
- Finding Mismatches
- Modifying Tables using Subqueries
- Converting Joins to Subqueries



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**MySQL Graphical User Interface Tools**

- MySQL Workbench
- MySQL Enterprise Monitor

**Day 6:**

**Supplementary Information**

- Storage Engines
- Creating Views
- Transactions
- Retrieving Metadata
- Performance Schema
- MySQL Enterprise Backup

**System Administration**

- Choosing between types of MySQL distributions
- Installing the MySQL Server
- The MySQL Server installation file structure
- Starting and stopping the MySQL server
- Upgrading MySQL
- Running multiple MySQL servers on a single host

**Day 7:**

**Server Configuration**

- MySQL server configuration options
- System variables
- SQL Modes



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- Available log files
- Binary logging

## Clients and Tools

- Available clients for administrative tasks
- MySQL administrative clients
- The mysql command-line client
- The mysqladmin command-line client
- The MySQL Workbench graphical client
- MySQL tools
- Available APIs (drivers and connectors)

## Obtaining Metadata

- Available metadata access methods
- Structure of INFORMATION\_SCHEMA
- Using the available commands to view metadata
- Differences between SHOW statements and INFORMATION\_SCHEMA tables
- The mysqlshow client program
- Using INFORMATION\_SCHEMA queries to create shell commands and SQL statements

## Day 8:

### Transactions and Locking

- Using transaction control statement to run multiple SQL statements concurrently
- The ACID properties of transactions
- Transaction isolation levels
- Using locking to protect transactions



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## Storage Engines

- Storage engines in MySQL
- InnoDB storage engine
- InnoDB system and file-per-table tablespaces
- NoSQL and the Memcached API
- Configuring tablespaces efficiently
- Using foreign keys to attain referential integrity
- InnoDB locking
- Features of available storage engines

## Partitioning

- Partitioning and its use in MySQL
- Reasons for using partitioning
- Types of partitioning
- Creating partitioned tables
- Subpartitioning
- Obtaining partition metadata
- Modifying partitions to improve performance
- Storage Engine Support of Partitioning

## Day 9:

### User Management

- Requirements for user authentication
- Using SHOW PROCESSLIST to show which threads are running
- Creating, modifying and dropping user accounts



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- Alternative authentication plugins
- Requirements for user authorization
- Levels of access privileges for users
- Types of privileges
- Granting, modifying and revoking user privileges

## Security

- Recognizing common security risks
- Security risks specific to the MySQL installation
- Security problems and counter-measures for network, operating system, filesystem and users
- Protecting your data
- Using SSL for secure MySQL server connections
- How SSH enables a secure remote connection to the MySQL server
- Finding additional information for common security issues

## Programming Inside MySQL

- Creating and executing Stored Routines
- Describing stored routine execution security
- Creating and executing triggers
- Creating, altering and dropping events
- Event execution scheduling

**Day 10:**

**MySQL Backup and Recovery**



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- Backup basics
- Types of backup
- Backup tools and utilities
- Making binary and text backups
- Role of log and status files in backups
- Data Recovery

## Replication

- Managing the MySQL Binary Log
- MySQL replication threads and files
- Setting up a MySQL Replication Environment
- Designing Complex Replication Topologies
- Multi-Master and Circular Replication
- Performing a Controlled Switchover
- Monitoring and Troubleshooting MySQL Replication
- Replication with Global Transaction Identifiers (GTIDs)

## Introduction to Performance Tuning

- Using EXPLAIN to Analyze Queries
- General Table Optimizations
- Monitoring status variables that affect performance
- Setting and Interpreting MySQL server Variables
- Overview of Performance Schema

