MongoDB Training

Duration: **3 Day**

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Overview

MongoDB is a flexible and scalable document-based NoSQL database, widely used in modern application architectures. This **intensive 3-day classroom {*training}** provides hands-on experience from basic CRUD operations to advanced data modeling, indexing, sharding, replication, and real-world application integration.

Prerequisites

- Basic understanding of SQL or NoSQL databases
- Programming background (e.g., JavaScript or Python)
- Comfort using terminal/command-line tools is helpful

Who Should Attend

This {*training} is ideal for:

- Software and backend developers
- Database administrators (DBAs)
- DevOps and IT operations engineers
- Data analysts and BI professionals

Outline

Module 1: Introduction to NoSQL & MongoDB

- NoSQL database types and characteristics
- MongoDB architecture and use cases
- JSON vs BSON data formats
- Lab: Create structured document schema with JSON

Module 2: Installation & Tools

- MongoDB setup: local and MongoDB Atlas (cloud)

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- Using Mongo Shell and Compass GUI
- Lab: Set up free cloud cluster and connect with Compass

Module 3: CRUD Operations

- Create, Read, Update, Delete documents
- Filters, projections, sort(), limit()
- Lab: Build a user management CRUD demo

Module 4: Data Modeling & Schema Design

- Embedded vs Referenced document models
- Normalization/denormalization strategies
- Data relationship design in MongoDB
- Lab: Blog-posts and comments relation mapping

Module 5: Indexing for Performance

- Index types: single, compound, TTL, text
- Performance tuning with explain()
- Lab: Measure query time before and after indexing

Module 6: Data Validation & Security

- JSON schema validation
- Role-based access control (RBAC)
- User creation and secure authentication
- Lab: Build RBAC roles and simulate permission denial

Module 7: Replication, Backup & Sharding

- Replica set concepts and node types
- High availability with failover
- Sharding for distributed scale
- Lab: Setup 3-node replica set and test failover

Module 8: Aggregation Framework

- Aggregation pipeline structure

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- Operators: $match, $group, $project, $lookup
- Lab: Generate revenue reports using $group and $sum

Module 9: App Development with MongoDB

- Integration with Node.js (Mongoose ORM)
- Python integration using PyMongo
- Building REST APIs with Express.js
- Lab: Develop login/register backend using MongoDB

Module 10: Monitoring & Troubleshooting

- Performance insights and slow queries
- Query profiler and logging
- MongoDB Atlas monitoring tools
- Lab: Debug real query with profiler and logs