

MongoDB Administration for Database Administrators (DBAs)

Duration: 5 days (40 hours)

Target Audience

- Database Administrators (Oracle / MySQL / SQL Server / PostgreSQL)
 - System Administrators transitioning to NoSQL
 - DevOps Engineers managing databases
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Prerequisites

- Basic understanding of databases (tables, indexes, queries)
- Familiarity with Linux/Windows command line
- Basic networking concepts

Day 1: MongoDB Fundamentals & Installation

◆ Module 1: NoSQL & MongoDB Overview

- RDBMS vs NoSQL (Key Differences)
- MongoDB Architecture Overview
- Use cases & when to use MongoDB
- BSON vs JSON

◆ Module 2: MongoDB Installation & Setup

- Installing MongoDB (Windows/Linux)
- MongoDB directory structure
- Configuration files (mongod.conf)
- Starting/stopping MongoDB services

◆ Module 3: MongoDB Shell & Basic Operations

- MongoDB Shell (mongosh)
- Database & Collection creation
- CRUD operations (Insert, Find, Update, Delete)

◆ Module 4: Data Modeling Basics

- Schema design principles
- Embedding vs Referencing
- Document structure best practices

Labs

- Install MongoDB locally

- Create database & collections
 - Perform CRUD operations
 - Design sample schema (e.g., E-commerce)
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Day 2: Querying, Indexing & Performance Basics

◆ Module 1: Querying Data

- Query operators (\$eq, \$gt, \$in, etc.)
- Projection & sorting
- Pagination techniques

◆ Module 2: Indexing in MongoDB

- Types of indexes (Single, Compound, Multikey, Text)
- Creating & dropping indexes
- Index performance impact

◆ Module 3: Query Optimization

- Explain plan analysis
- Covered queries
- Performance tuning basics

◆ Module 4: Aggregation Framework

- Aggregation pipeline
- Stages (\$match, \$group, \$project, \$sort)
- Real-world use cases

Labs

- Write complex queries
 - Create and analyze indexes
 - Use explain() for optimization
 - Build aggregation pipelines
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Day 3: Security & User Management

◆ Module 1: MongoDB Security Overview

- Authentication vs Authorization
- Role-based access control (RBAC)

◆ Module 2: User & Role Management

- Creating users & roles
- Built-in roles
- Custom roles

◆ **Module 3: Encryption & Data Protection**

- TLS/SSL setup
- Encryption at rest
- Data masking basics

◆ **Module 4: Auditing & Compliance**

- Auditing operations
- Logging & monitoring access

Labs

- Enable authentication
 - Create users with roles
 - Configure secure connections
 - Audit user activities
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Day 4: Backup, Restore & High Availability

◆ **Module 1: Backup Strategies**

- mongodump & mongorestore
- Filesystem snapshots
- Backup best practices

◆ **Module 2: Restore Techniques**

- Full restore vs selective restore
- Point-in-time recovery basics

◆ **Module 3: Replication (Replica Sets)**

- Replica set architecture
- Primary vs Secondary nodes
- Failover mechanism

◆ **Module 4: High Availability Setup**

- Setting up replica sets
- Monitoring replication lag

Labs

- Perform backup & restore
 - Configure replica set
 - Simulate failover scenarios
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Day 5: Sharding, Monitoring & Production Best Practices

◆ **Module 1: Sharding (Horizontal Scaling)**

- Sharding concepts
- Shard key selection
- Cluster architecture (mongos, config servers)

◆ **Module 2: Monitoring & Troubleshooting**

- MongoDB logs
- Performance metrics
- Tools (mongostat, mongotop)

◆ **Module 3: Maintenance & Operations**

- Database profiling
- Routine maintenance tasks
- Capacity planning

◆ **Module 4: Production Best Practices**

- Deployment strategies
- Security hardening
- Backup & HA planning checklist

Labs

- Setup sharded cluster (demo/simulation)
- Monitor database performance
- Troubleshoot real scenarios