MongoDB Operations Training Program

Overview

Get ramped quickly on MongoDB with a comprehensive training program for database administrators and operations professionals. Our operations training program comprises a graduated, modular curriculum in two main parts:

![Foundation Training](image1)  
**Foundation Training**
An entry-level training course comprising a series of five instructor-led classroom days.

![Advanced Training](image2)  
**Advanced Training**
Two instructor-led, small group, practical workshops.

The entire program can be completed in 2 consecutive weeks, or the parts can be spread out over a longer time. Students can also choose to complete only part of the program according to their learning objectives.

Who Should Attend?

All operations professionals who use MongoDB will benefit from this training program. Students may enter the program at one of the foundation training days or advanced training workshops according to their existing knowledge and skills.

Outcome

A student completing the program will go from knowing little or nothing about MongoDB to having a complete set of skills to size, deploy, upgrade, manage and tune MongoDB deployments in a mission-critical environment. At every stage of the program, they will learn a new facet of MongoDB and how to apply their knowledge to real-world operations. Students can choose to follow a learning path geared towards either MongoDB Atlas or self-managed MongoDB.

Course Logistics

- Public and private training options are available. See [mongodb.com/training](http://mongodb.com/training) for the public course schedule.
- Public classes are only delivered remotely.
- Private classes can be delivered in person or remotely. For in-person classes, all students must attend the class in person.
- A minimum of two consecutive days of delivery must be scheduled.
- Each class accommodates up to 12 students.
- To fully participate in a class, students should be equipped with a computer that has:
  - full access to the [strigo.io](https://strigo.io) training delivery platform via a supported web browser
  - for remote classes - the ability to join a [Zoom](https://zoom.us) meeting via the desktop client or web browser, and a microphone and webcam to share their audio and video

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Foundation Training: Overview

Our entry-level operations training course comprises a series of five classroom days. Each day introduces new concepts and skills and builds towards competency in managing mission-critical MongoDB deployments at scale. Training focuses on operations best practices - for uptime, safety and performance - and includes hands-on exercises throughout the course. Days four and five follow two distinct paths for MongoDB Atlas or self-managed MongoDB as students progress to learning management tooling for human and programmatic administration of their MongoDB deployment.

Students are provided with a copy of the training slides and comprehensive lecture notes.

Atlas Track

Self-Managed Track

Foundation training can be delivered in sessions of between 2 and 5 consecutive days. Each training day builds on knowledge and skills acquired from the preceding prerequisite days. Students may choose to schedule all five days in a row, or space them out according to their schedule or project timeline.

Each day includes a short, end-of-day student assessment with real-time results provided to students.
# MongoDB Operations Training Program

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<th>Audience</th>
<th>Core Track</th>
<th>Production System Design (OF300)</th>
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<td>Database Administrators / Ops Professionals</td>
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<tr>
<td>Duration</td>
<td>1 day</td>
<td>1 day</td>
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<tr>
<td>Prereqs</td>
<td>None</td>
<td>OF100, OF200</td>
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<tr>
<td>Topics</td>
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<td>Replication</td>
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<tr>
<td></td>
<td>• What is MongoDB?</td>
<td>• Sharding</td>
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<td>• How to access MongoDB</td>
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<td>• Storage and Retrieval</td>
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<td>• Security</td>
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<tr>
<td>Summary</td>
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<td></td>
<td>This training day covers in detail the MongoDB, its strengths and where you should use it, and how to set it and running. It then covers interacting with data in the database, along with a primer on the caching, durability and minimal security options that need to be correctly configured and understood.</td>
<td>This training day covers key design decisions for availability, durability, scalability, archival, and disaster recovery. We also cover techniques for deploying database configuration changes, database version upgrades and even operating system upgrades without any downtime of the database service.</td>
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<tr>
<td>Outcome</td>
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<td>On completion of this training day you will have an understanding of what MongoDB is and how MongoDB administration compares to managing a traditional RDBMS. This is an ideal training to take to understand what will be required to support a new development initiative.</td>
<td>On completion of this training day you will be able to evaluate different MongoDB cluster architectures and select an appropriate architecture to meet your production system requirements. You will have a set of skills to manually manage a cluster and back it up using basic tooling. You will also have a complete understanding of MongoDB concepts relevant to operations, which provides the foundation to explore advanced management tooling in subsequent training days.</td>
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# MongoDB Operations Training Program

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<tr>
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<tbody>
<tr>
<td>Database Administrators / Ops Professionals / Developers responsible for Atlas provisioning</td>
<td>Database Administrators / Ops Professionals / DevOps Engineers</td>
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<td>OF100, OF200, OF300</td>
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<tr>
<th>Topics</th>
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<tr>
<td>What is Atlas?</td>
<td>Intro to Atlas API</td>
<td>What is Ops Manager?</td>
</tr>
<tr>
<td>Deploying a Cluster</td>
<td>API Authentication</td>
<td>Configuring Agents</td>
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<tr>
<td>Interacting with Data</td>
<td>Deploying Clusters</td>
<td>Automation</td>
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<tr>
<td>Security</td>
<td>Creating Users</td>
<td>Security</td>
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<tr>
<td>Monitoring and Alerting</td>
<td>Monitoring</td>
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<tr>
<td>Backups</td>
<td>Network Peering</td>
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<td>This training day introduces MongoDB Atlas specific features and operational considerations. Atlas is a fully-managed global cloud database service running in or across AWS, GCP and Azure clouds.</td>
<td>This training day moves beyond the Atlas GUI - covering how to use the Atlas API to fully automate operational tasks in the database lifecycle and integrate MongoDB Atlas with other enterprise systems.</td>
<td>This training day covers how to deploy, monitor, back up, secure, and scale MongoDB on your own infrastructure using the Ops Manager management platform.</td>
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<td>On completion of this training day you will know how to deploy and manage clusters in MongoDB Atlas from small development environments to large global clusters with hundreds of nodes.</td>
<td>On completion of this training day you will have all the skills needed to script and automate best practices for managing MongoDB, facilitating the consistent management of larger database estates, and enabling you to integrate MongoDB Atlas with your preferred CI/CD and monitoring platforms.</td>
<td>On completion of this training day you will be confident using Ops Manager to significantly reduce risk and effort involved in managing one or more production MongoDB clusters.</td>
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*February 2021*
Foundation Training Agenda: Core Track

**OF100: MongoDB Operations Fundamentals**

**Introduction**
- Why a new database?
- What are documents?
- MongoDB
  - Agility
  - Usability
  - Utility/Scalability
- When to use MongoDB
- Common mistakes

**Caching and Durability**
- Journals and checkpoints
- Compression
- The database cache
- Locking and transactions

**Accessing MongoDB**
- Starting a cluster *
- Installing a shell *
- Using the web shell
- Connecting to your cluster *

**Operations Basics**
- Comparison with RDBMS
- Running database scripts
- Simple CRUD examples *

**Storage and Retrieval**
- Bulk versus single writes
- Filtering and projection
- Querying arrays
- Expressive queries
- Using cursors
- Update operations
- Advanced atomicity models

**Security Best Practices**
- Authentication, Authorization and Auditing
- Encryption

**End of day test**

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**OF200: Diagnostics and Performance Tuning**

**Indexes and Optimization**
- What are indexes?
- MongoDB misconceptions
- Single field indexes
- Reading explain plans *
- Indexes and performance
  - Limits
  - Best practices
  - Compression
- Multikey indexes
- Compound index design *
- Covered queries
- Geospatial indexing *
  - 2d indexes
  - Spherical indexes
- TTL indexes
- Text indexes
- Wildcard indexing
- How indexes are chosen
  - Query planner
  - Query optimizer
  - Hints and tips

**Database Profiling**
- Finding slow operations
  - Slow query log
  - Enabling the profiler
- Causes of slow operations
- Identifying locking issues
- Listing and killing operations

**Basic Monitoring for Diagnosis**
- mongostat
- mongocacheview *
- Processing logs
- Compass and the real-time panel

**End of day test**

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**OF300: Production System Design**

**Replication**
- Reasons to replicate data
- Components of a replica set
- Drivers and replica sets
- The concept of majority
- Elections simplified
- Failure modes *
- Write Concern *
- The Majority Commit Point
- Read Concern
- Read Preference

**Sharding**
- What is sharding?
- Horizontal versus vertical scaling
- When to shard
- Sharding infrastructure
- Shard keys *
- How sharding works
  - Reads/Writes
  - Chunks
- Sharding in slow motion
- Sharding pitfalls
  - A cautionary tale
- Managed sharding technique
  - Computed keys
  - Presplitting
  - Scaling out

**Basic Backup Options**
- mongodump and mongorestore
- Using the oplog
- OS level backups

**Rolling Management**
- Rolling reconfiguration
- Rolling upgrades
- Rolling index builds

**End of day test**

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* includes hands-on exercise
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Foundation Training Agenda: Atlas Track

**OF400: MongoDB Atlas**

Overview
- MongoDB Cloud
- What is Atlas?
- Atlas vs. self-managed MongoDB
  - key differences
- Atlas Organizations, Teams and Projects

Deploying a Cluster *
- Deployment Sizing
- Deployment Options

Security
- Atlas Users
- Database Users *
- Network Access Lists *
- Integration Options
- VPC peering

Interacting with Data *
- Real Time
- Data Explorer

Monitoring and Alerting
- Reading the monitoring metrics
- Setting Alerts *
- Logs *
- Performance Monitor *
- Profiling

Backups
- Atlas Backup Options
- Restoring a Backup *

End of day test

**OF500: DevOps: Atlas API**

Overview
- Infrastructure as Code
- REST
- Utilities: curl, jq, bash

API Authentication *
- API Keys
- Access List

Clusters *
- Listing Clusters
- Deploying Clusters
- Checking Cluster Status

Database Users *
- Adding a User
- Listing Users
- Network Access Lists

Monitoring *
- Retrieving Slow Query Logs
- Retrieving Live Metrics
- Using Performance Advisor

Maintenance
- Create an index in a rolling fashion

Security
- Enabling LDAP Authentication *
- Configuring private networking (VPC peering)

`mongocli`
- Installing mongocli
- Configuring mongocli
- Creating a cluster

* includes hands-on exercise
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Foundation Training Agenda: Self-Managed Track

**OF450: MongoDB Ops Manager**

Overview
- Ops/Cloud Manager
- The MongoDB Platform
- Organizations, Teams and Projects

Agents
- Agent based management
- Deploying Agents
- The agent logs

Monitoring and Alerting
- Reading the Graphs
- Setting alerts
- Logs
- Performance Monitor
- Profiling

Managing Security
- GUI Users
- Database Users
- TLS
- Integration Options

Automation
- Deployment
- Upgrading

Admin
- System Warnings
- Maintenance Windows
- Global and project diagnostics

Backups
- Configuring Backup
- Backing up a cluster
- Restoring a cluster

End of day test

**OF550: DevOps: Ops Manager API**

Overview
- Infrastructure as Code
- REST
- Utilities: curl, jq, bash

API Authentication *
- API Keys
- Access List

Clusters *
- Listing Clusters
- Deploying Clusters
- Checking Cluster Status

Database Users *
- Adding a User
- Listing Users

Monitoring *
- Retrieving Slow Query Logs
- Retrieving Live Metrics
- Using Performance Advisor

Maintenance
- Create an index in a rolling fashion

Security
- Enabling LDAP Authentication *

**mongocli**
- Installing mongocli
- Configuring mongocli
- Creating a cluster

* includes hands-on exercise
Advanced Training: Overview

Classroom training, even with exercises, is no substitute for deep practical experimentation and observation. MongoDB advanced training workshops enable much more in-depth exploration of a topic through a series of technical challenges.

In these workshops students typically investigate and demonstrate the impact made by a change to design or the use of a feature. Students work together, with each other and with the instructor – evolving code, answering questions and discussing the observed behaviors.

Students can choose any subset of workshops according to the areas in which they would like to deepen their skills. Workshops can be taken in any order.

Advanced workshops are technically demanding and as a prerequisite require students to have successfully completed the first four days of foundation training (OF100 to OF400 / OF450). Workshops are limited to 12 students per class.

- **Benchmarking and Capacity Planning**
  - 1 day

- **Ops Manager Sizing, Installation and Configuration**
  - 1 day
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Advanced Workshop:
Benchmarking and Capacity Planning (OA610)

Overview

If you want to provision the right infrastructure for your MongoDB cluster to satisfy your production workload without over-paying for unnecessary resources, it’s essential to understand the implications of infrastructure changes for your workload and how to measure what components of your infrastructure are under-, over-, or right-sized.

In this training workshop, we use an open-source tool to create a number of synthetic workloads, observe their behavior both externally and using internal database metrics, and modify our hardware configuration to observe the impact on performance. In doing so, we learn best practices for MongoDB benchmarking and how to interpret the monitoring metrics in Atlas / Cloud Manager / Ops Manager correctly.

This training workshop will arm you with the skills to determine when adding CPU, RAM, or disk IOPS will be necessary to improve the performance of your workload, and whether you are spending too much on one thing or not enough on another.

Intended Audience

This training workshop is intended for operations professionals who have completed foundation training to at least OF200 (Diagnostics and Performance Tuning) and want to be able to right-size their database infrastructure.

Workshop Objectives

In this training workshop, you will learn how to:

- simulate client workloads using POCDriver, an open-source MongoDB workload generator
- identify which resource is currently limiting performance
- determine how the performance of common workloads relates to the number of available CPU cores
- quantify the impact of too little RAM and estimate required RAM for your workload
- identify when disk IOPS is a bottleneck and how many is enough
- identify whether a bottleneck is in the database or elsewhere and avoid wasting time looking in the wrong place for a solution

Duration

1 day
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Advanced Workshop:
Ops Manager Sizing, Installation and Configuration (OA620)

Overview

MongoDB Ops Manager is the management platform that makes it easy to deploy, monitor, back up, and scale MongoDB on your own infrastructure.

Ops Manager is a feature-rich, complex software package with various configurations to suit all enterprise environments and production requirements, and is typically sized and installed by a MongoDB consultant. If you wish to learn the skills to install it yourself, this one-day workshop will teach you how to set up the most common configurations with the confidence that your Ops Manager deployment is ready for prime time.

Intended Audience

This training workshop is intended for operations teams who have completed OF450 (Using Ops Manager) and are responsible for installing Ops Manager in their organization.

Workshop Objectives

In this training workshop, you will learn how to:

- select appropriately-sized hardware for your Ops Manager installation
- install and configuring a backing database for the Ops Manager application
- install and configuring the Ops Manager application
- enable high-availability for your Ops Manager application
- secure your Ops Manager installation using HTTPS
- integrate your Ops Manager deployment with LDAP for user authentication
- configure a backup capability in Ops Manager and installing the required backing data stores
- configure Ops Manager for fully isolated operation for environments with no internet access

Duration

1 day