DATABASE DESIGN

W3Schools and Documentation

Database Design (Know It All)
SQL (W3Schools)
MySQL (W3Schools)
MongoDB (W3Schools)
Introduction
Entity-Relationship Concepts
Data Modeling in UML
Requirements Analysis and Conceptual
Logical Database Design
Normalization
Physical Database Design
De-normalization
Business Metadata Infrastructure
Storing: XML and Databases
Modeling and Querying Current Movement

MongoDB Documentation (Database Manual)
Introduction
1. Getting Started
2. Create an Atlas Free Tier Cluster
3. Databases and Collections – Views (Topics 6)
4. Databases and Collections – On-Demand Materialized Views
5. Databases and Collections – Capped Collections (Topics 6)
6. Databases and Collections – Clustered Collections
7. Documents
8. MongoDB Query API
9. BSON Types (Topics 3)
Installation
1. Install MongoDB Community Edition – Install On Linux (Topics 5)
2. Install MongoDB Community Edition – Install On macOS
3. Install MongoDB Community Edition – Install On Windows
4. Install MongoDB Community Edition – Install With Docker
5. Install MongoDB Enterprise – Install on Linux (Topics 5)
6. Install MongoDB Enterprise – Install on macOS
7. Install MongoDB Enterprise – Install on Windows
8. Install MongoDB Enterprise – Install with Docker
9. Upgrade MongoDB Community to MongoDB Enterprise – Standalone
10. Upgrade MongoDB Community to MongoDB Enterprise – Replica Set
11. Upgrade MongoDB Community to MongoDB Enterprise – Shared Cluster
12. Verify Integrity of MongoDB Packages
MongoDB Shell (Mongosh)
MongoDB CRUD Operation
1. Insert Documents – Insert Methods
2. Query Documents (Topics 7)
3. Update Documents (Topics 2)
4. Delete Documents – Delete Methods
5. Bulk Write Operations
6. Retryable Writes
7. Retryable Reads
8. SQL to MongoDB Mapping Chart
9. Text Search – MongoDB Atlas Search
10. Text Search – Text Search on Self-Managed Deployments (Topics 4)
11. Geospatial Queries (Topics 2)
12. Read Isolation (Read Concern) (Topics 5)
13. Write Acknowledgement (Write Concern) – Write Lifecycle Diagrams
14. MongoDB CRUD Concepts – Atomicity and Transactions
15. MongoDB CRUD Concepts – Distributed Queries
16. MongoDB CRUD Concepts – Field Names with Periods and Dollar Signs (Topics 2)
17. MongoDB CRUD Concepts – Read Isolation, Consistency, and Recency (Topics 1)
18. MongoDB CRUD Concepts – Query Optimization – Analyze Query Performance – Explain Results (Topics 1)
19. MongoDB CRUD Concepts – Query Optimization – Analyze Query Performance – Database Profiler (Topics 1)
20. MongoDB CRUD Concepts – Query Optimization – Optimize Query Performance

21. MongoDB CRUD Concepts – Query Optimization – Write Operation Performance
22. MongoDB CRUD Concepts – Query Plans
23. MongoDB CRUD Concepts – Tailable Cursors

Aggregation Operations

1. Aggregation Pipeline (Topics 5)
2. Aggregation Reference – Aggregation Commands
3. Aggregation Reference – Aggregation Stages (Topics 43)
4. Aggregation Reference – Aggregation Operators (Topics 173)
5. Aggregation Reference – Variables in Aggregation Expressions
6. Aggregation Reference – SQL to Aggregation Mapping Chart
7. Aggregation Reference – Aggregation Commands Comparison
8. Aggregation Reference – Practical MongoDB Aggregations (e-book)
9. Map-Reduce (Topics 7)

Indexes

1. Create an Index – Specify an Index Name
2. Drop an Index
3. Index Types – Single Field Indexes (Topics 2)
4. Index Types – Compound Indexes (Topics 2)
5. Index Types – Multi-key Indexes (Topics 3)
6. Index Types – Text Indexes – Create a Text Index
7. Index Types – Text Indexes – Create a Wildcard Text Index
8. Index Types – Text Indexes – Specify the Default Language for a Text Index (Topics 2)
9. Index Types – Text Indexes – Assign Weights to Text Search Results
10. Index Types – Text Indexes – Limit Number of Text Index Entries Scanned
11. Index Types – Text Indexes – Text Index Properties
12. Index Types – Text Indexes – Text Index Restrictions
13. Index Types – Text Indexes – Text Index Versions
14. Index Types – Wildcard Indexes – Create a Wildcard Index on a Single Field
15. Index Types – Wildcard Indexes – Include or Exclude Fields in a Wildcard Index
16. Index Types – Wildcard Indexes – Create a Wildcard Index on All Fields
17. Index Types – Wildcard Indexes – Compound Wildcard Indexes
18. Index Types – Wildcard Indexes – Wildcard Indexes Reference (Topics 3)
19. Index Types – Geospatial Indexes – 2dsphere Indexes – Create a 2dsphere Index
20. Index Types – Geospatial Indexes – 2d Indexes – Create a 2d Index (Topics 2)
21. Index Types – Geospatial Indexes – 2d Indexes – Query a 2d Index (Topics 2)
22. Index Types – Geospatial Indexes – 2d Index Internals
23. Index Types – Geospatial Indexes – 2d Index Convert Distance to Radians for Spherical Operations
24. Index Types – Geospatial Indexes – Geospatial Index Restrictions
25. Index Types – Hashed Indexes – Create a Hashed Index
26. Index Properties – Case-Insensitive Indexes
27. Index Properties – Hidden Indexes
28. Index Properties – Partial Indexes
29. Index Properties – Sparse Indexes
30. Index Properties – TTL Indexes – Expire Data from Collections by Setting TTL
31. Index Properties – Unique Indexes – Convert an Existing Index to a Unique Index
32. Index Builds on Populated Collections (Topics 2)
33. Manage Indexes
34. Measure Index Use
35. Indexing Strategies (Topics 5)
36. Indexing Reference

Atlas Search

Atlas Vector Search

Time Series

1. Create and Query a Time Series Collection
2. List Time Series Collections in a Database
3. Set up Automatic Removal for Time Series Collections (TTL)
4. Set Granularity for Time Series Data
5. Add Secondary Indexes to Time SERIES Collections
6. Migrate Data into a Time Series Collection
7. Build Materialized Views on Top of Time Series Data
8. Shard a Time Series Collection
9. Best Practices for Time Series Collections
10. Reference (Topics 2)

Change Streams

1. Change Streams Production Recommendations
2. Change Events (Topics 15)

Transactions

1. Drivers API
2. Production Considerations
3. Production Considerations (Shared Clusters)
4. Transactions and Operations

Data Modeling

1. Schema Design Process (Topics 3)
2. Schema Design Patterns – Group Data (Topics 2)
3. Schema Design Patterns – Document and Schema Versioning (Topics 2)
4. Data Modeling Concepts (Topics 2)
5. Handle Duplicate Data
6. Data Consistency (Topics 2)
7. Schema Validation – Specify JSON Schema Validation (Topics 2)
8. Schema Validation – Specify Validation with Query Operators
9. Schema Validation – View Existing Validation Rules
10. Schema Validation – Modify Schema Validation
11. Schema Validation – Specify Validation Level for Existing Documents
12. Schema Validation – Choose How to Handle Invalid Documents
13. Schema Validation – Query for and Modify Valid or Invalid Documents
14. Schema Validation – bypass Schema Validation
15. Data Model Examples and Patterns – Model Relationships Between Documents (Topics 3)
16. Data Model Examples and Patterns – Model Tree Structures (Topics 5)
17. Data Model Examples and Patterns – Model Specific Application Contexts (Topics 6)
18. Data Model Reference – Database References

Replication

1. Replica Set Members – Replica Set Primary
2. Replica Set Members – Replica Set Secondary Members (Topics 3)
3. Replica Set Members – Replica Set Arbiter
4. Replica Set Oplog
5. Replica Set Data Synchronization
6. Replica Set Deployment Architectures (Topics 2)
7. Replica Set High Availability (Topics 2)
8. Replica Set Read and Write Semantics – Write Concern for Replica Sets
9. Replica Set Read and Write Semantics – Read Preference (Topics 4)
10. Replica Set Read and Write Semantics – Server Selection Algorithm
11. Replica set Deployment Tutorials (Topics 8)
12. Member Configuration Tutorials (Topics 6)
13. Replica Set Maintenance Tutorials (Topics 1)
14. Replication Reference (Topics 5)

Sharding

1. Sharded Cluster Components (Topics 3)
2. Shard Keys – Shard a Collection
3. Shard Keys – Choose a Shard Key
4. Shard Keys – Change a Shared Key (Topics 2)
5. Shard Keys – Change a Document's Shard Key Value
6. Shard Keys – Set Missing Shard Key Fields
7. Shard Keys – Find a Shard Key
8. Shard Keys – Troubleshoot Shard Keys
9. Hashed Sharding
10. Ranged Sharding
11. Deploy a Sharded Cluster
12. Zones (Topics 6)
13. Data Partitioning with Chunks (Topics 4)
14. Balancer (Topics 3)
15. Administration (Topics 12)
16. Sharding Reference – Config Database
17. Sharding Reference – Defragment Sharded Collections (Topics 3)
18. Sharding Reference – Inconsistency Types (Topics 14)
19. Sharding Reference – Operational Restrictions
20. Sharding Reference – Troubleshoot Sharded Clusters

Storage

1. Storage Engines – WiredTiger Storage Engine (Topics 3)
2. Storage Engines – In-Memory Storage Engine
3. Journaling – Manage Journaling
4. GridFS
5. FAQ: MongoDB Storage

Administration

1. Production Notes

2. Operations Checklist
3. Development Checklist
4. Performance – Connection Pool Overview – Tuning Your Connection Pool Settings
5. Performance – Disable Transparent Huge Pages (THP)
6. Performance – Manage Shared Cluster Health with Health Manages
7. Performance – UNIX ulimit Settings
8. Configuration and Maintenance (Topics 5)
9. Data Center Awareness – Workload Isolation in MongoDB Deployments
10. MongoDB Backup Methods – Buck Up and Restore with Filesystem Snapshots
11. MongoDB Backup Methods – Back Up and Restore with MongoDB Tools
12. MongoDB Backup Methods – Restore a Replica Set from MongoDB Backups
13. MongoDB Backup Methods – Backup and Restore Sharded Clusters (Topics 4)
14. MongoDB Backup Methods – Recover a Standalone after an Unexpected Shutdown
15. Monitoring for MongoDB

Security

1. Security Checklist
2. Enable Access Control
3. Authentication – SCRAM – Use SCRAM to Authenticate Clients
4. Authentication – x.509 – Use x.509 Certificates to Authenticate Clients
5. Authentication – Kerberos Authentication (Topics 4)
6. Authentication – LDAP Proxy Authentication (Topics 3)
7. Authentication – OpenID Connect Authentication – Configure MongoDB with OpenID Connect
8. Authentication – Internal/Membership Authentication (Topics 13)
9. Authentication – Localhost Exception
10. Authentication – Users (Topics 3)
11. Role-Based Access Control (Topics 6)
12. Encryption – In-Use Encryption – Queryable Encryption – Feature
13. Encryption – In-Use Encryption – Queryable Encryption – Installation Requirements
14. Encryption – In-Use Encryption – Queryable Encryption – Quick Start
15. Encryption – In-Use Encryption – Queryable Encryption – Fundamentals (Topics 6)
16. Encryption – In-Use Encryption – Queryable Encryption – Tutorials (Topics 5)
17. Encryption – In-Use Encryption – Queryable Encryption – Reference (Topics 7)
18. Encryption – In-Use Encryption – Client-Side Field Level Encryption – Features
19. Encryption – In-Use Encryption – Client-Side Field Level Encryption – Installation Requirements
20. Encryption – In-Use Encryption – Client-Side Field Level Encryption – Quick Start
21. Encryption – In-Use Encryption – Client-Side Field Level Encryption – Fundamentals (Topics 6)
22. Encryption – In-Use Encryption – Client-Side Field Level Encryption – Tutorials (Topics 4)
23. Encryption – In-Use Encryption – Client-Side Field Level Encryption – Reference (Topics 13)
24. Encryption – Encryption at Rest (Topics 2)
25. Encryption – TLS/SSL (Transport Encryption) (Topics 4)
26. Auditing (Topics 3)
27. Network and Configuration Hardening (Topics 3)
28. Implement Field Level Redaction
29. Security Reference (Topics 4)
30. Create a Vulnerability Report
31. Appendix (Topics 3)

Reference

1. Collation –
2. Configuration File Options –
3. Connection Strings
4. Database Commands –
5. Default MongoDB Port
6. Default MongoDB Read Concerns/Write Concerns
7. Exit Codes and Statuses
8. Error Codes
9. Glossary
10. Log Messages
11. MongoDB Cluster Parameters
12. MongoDB Limits and Thresholds
13. MongoDB Package Components –
14. MongoDB Server Parameters
15. MongoDB Wire Protocol –
16. mongosh Methods –
17. Operators –
18. Server Sessions
19. Slot-Based Query Execution Engine
20. Stable API –

21. System Collections
22. Legacy mongo Shell
23. Legacy mongo Shell
24. Release Notes –
25. Technical Support
Migrators, Tools, and Connectors
1. Migrators, Tools, and Connectors
2. Migrators
3. Data Exploration and Visualization
4. IDE Integrations
5. Connectors
6. Management Tools
7. Generative AI Information
MongoDB Atlas
1. Get Started
2. Create & Connect to Clusters
3. Configure Security Features
4. Configure UI Access
5. Migrate or Import Data
6. Interact with Data
7. Access Data Lake
8. Query Federated Data
9. Atlas Search
10. Atlas Vector Search
11. Atlas Stream Processing
12. Deploy Apps and Services
13. Backup, Restore, and Archive
14. Resource Tags
15. Manage Clusters
16. Monitor Clusters
17. Related Services
18. Manage Billing
19. Programmatic Access
20. Atlas CLI
21. Atlas Kubernetes Operator
22. Reference
23. Production Notes

MySQL Documentation (8.4 Reference Manual)
General Information
1. About this manual
2. Overview of the MSQL Database Management System
3. MySQL Standards Compliance
Installing MySQL
1. General Installation Guidance
2. Installing MySQL on Microsoft Windows | macOS | Linux
3. Installing MySQL from source
4. Post installation setup and testing
5. Perl installation notes
Upgrading MySQL
1. Before you began
2. Upgrade parts
3. Upgrade best practice
4. What the MySQL upgrade process upgrades
5. Changes in MySQL 8.4
6. Preparing your installation for upgrade
7. Upgrading MySQL on Windows | macOs | Linux
8. Upgrading a Docker installation of MySQL
9. Upgrade troubleshooting
10. Rebuilding or repairing tables or indexes
11. Coping MySQL database to another machine
12. Downgrading MySQL
Tutorial
1. Connecting to and disconnecting from the server
2. Entering queries
3. Creating and using a database

4. Getting information about databases and tables
5. Using mysql in batch mode
6. Examples of common queries
7. Using mysql with apache

MySQL Program

1. Overview of MySQL programs
2. Using MySQL programs
3. Server and server-startup programs
4. Installation-related programs
5. Client programs
6. Administrative and utility programs
7. Program development utilities
8. Miscellaneous programs
9. Environment variables
10. Unix signal handling in MySQL

MySQL Server Administration

1. The MySQL server
2. The MySQL data directory
3. The mysql system schema
4. MySQL server logs
5. MySQL components
6. MySQL server plugins
7. MySQL server loadable functions
8. Running multiple MySQL instances on one machine
9. Debugging MySQL

Security

1. General security issues
2. Access control and account management
3. Using encrypted connections
4. Security components and plugins
5. MySQL enterprise data masking and de-identification
6. MySQL enterprise encryption
7. SELinux
8. FIPS support

Backup and Recovery

1. Backup and recovery types
2. Database backup methods
3. Example backup and recovery strategy
4. Using mysqldump for backups
5. Point-in-time (incremental) recovery
6. MyISAM table maintenance and crash recovery

Optimization

1. Optimization overview
2. Optimizing SQL statements
3. Optimization and indexes
4. Optimizing database structure
5. Optimizing for InnoDB tables
6. Optimizing for MyISAM tables
7. Optimizing for MEMORY tables
8. Understanding the Query Execution Plan
9. Controlling the query optimizer
10. Buffering and caching
11. Optimizing locking operations
12. Optimizing the MySQL server
13. Measuring performance (Benchmarking)
14. Examining server thread (process) information

Language Structure

1. Literal values
2. Schema object names
3. Keywords and reserved words
4. User-defined variables
5. Expressions
6. Query attributes
7. Comments

Character Sets, Collations, Unicode

1. Character sets and collations in general
2. Character sets and collations in MySQL

3. Specifying character sets and collations
4. Connection character sets and collations
5. Configuring application character set and collation
6. Error message character set
7. Column character set conversion
8. Collation issues
9. Unicode support
10. Supported character sets an collation
11. Restrictions on character sets
12. Setting the error message language
13. Adding a character set
14. Adding a collation to a character set
15. Character set configuration
16. MySQL server locale support

Data Types

1. Numeric data types
2. Date and time data types
3. String data types
4. Spatial data types
5. The JSON data types
6. Data type default values
7. Data type storage requirements
8. Choosing the right type for a column
9. Using data types from other database engines

Functions and Operators

1. Build-in function and operator reference
2. Loadable function reference
3. Type conversion in expression evaluation
4. Operators
5. Flow control functions
6. Numeric functions and operators
7. Date and time functions
8. String functions and operators
9. Full-text search functions
10. Cast functions and operators
11. XML functions
12. Bit functions and operators
13. Encryption and compression functions
14. Locking functions
15. Information functions
16. Spatial analysis functions
17. JSON functions
18. Replication functions
19. Aggregate functions
20. Window functions
21. Performance schema functions
22. Internal functions
23. Miscellaneous functions
24. Precision math

SQL Statements

1. Data definition statements
2. Data manipulation statements
3. Transactional and locking statements
4. Replication statements
5. Prepared statements
6. Compound statement syntax
7. Database administration statements
8. Utility statements

MySQL Data Dictionary

1. Data dictionary schema
2. Removal of file-based metadata storage
3. Transactional storage of dictionary data
4. Dictionary object cache
5. INFORMATION_SCHEMA and data dictionary integration
6. Serialized dictionary information (SDI)
7. Data dictionary usage differences
8. Data dictionary limitations

The InnoDB Storage Engine
1. Introduction ot InnoDB
2. InnoDB and the ACID model
3. InnoDB multi-versioning
4. InnoDB architecture
5. InnoDB in-memory structures
6. InnoDB on-disk structures
7. InnoDB locking and transaction model
8. InnoDB configuration
9. InnoDB table and page compression
10. InnoDB row formats
11. InnoDB disk I/O and file space management
12. InnoDB and online DDL
13. InnoDB data-at-rest encryption
14. InnoDB startup options and system variables
15. InnoDB INFORMATION_SCHEMA tables
16. InnoDB integration with MySQL performance schema
17. InnoDB monitors
18. InnoDB backup and recovery
19. InnoDB and MySQL replication
20. InnoDB troubleshooting
21. InnoDB limits
22. InnoDB restrictions and limitations
Alternative Storage Engines
1. Setting the storage engine
2. The MyISAM storage engine
3. The MEMORY storage engine
4. The CSV storage engine
5. The ARCHIVE storage engine
6. The BLACKHOLE storage engine
7. The MERGE storage engine
8. The FEDERATED storage engine
9. The EXAMPLE storage engine
10. Other storage engines
11. Overview of MySQL storage engine architecture
Replication
1. Configuration replication
2. Replication implementation
3. Replication security
4. Replication solutions
5. Replication notes and tips
Group Replication
1. Group replication background
2. Getting started
3. Requirements and limitations
4. Monitoring group replication
5. Group replication operations
6. Group replication security
7. Group replication performance and troubleshooting
8. Upgrading group replication
9. Group replication variables
10. Frequently asked questions
MySQL Shell
Using MySQL as a Document Store
1. Interfaces to a MySQL document store
2. Document store concepts
3. Javascript quick-star guide: MySQL shell for document store
4. Python quick-start guide: MySQL shell for document store
5. X plugin
InnoDB Cluster
InnoDB ReplicaSet
MySQL NDB Cluster 8.4
1. General information
2. NDB cluster overview
3. NDB cluster installation
4. Configuration of NDB cluster
5. NDB cluster programs

6. Management of NDB cluster
7. NDB cluster replication
8. NDB cluster release notes

Partitioning

2. Overview of partitioning in MySQL
3. Partitioning types
4. Partition management
5. Partition pruning
6. Partition selection
7. Restrictions and limitations on partitioning

Stored Objects

2. Defining stored programs
3. Using stored routines
4. Using triggers
5. Using the event scheduler
6. Using views
7. Stored object access control
8. Stored program binary logging
9. Restrictions on stored programs
10. Restrictions on views

INFORMATION_SCHEMA Tables

2. Introduction
3. INFORMATION-SCHEMA table reference
4. INFORMATION-SCHEMA general tables
5. INFORMATION-SCHEMA InnoDB tables
6. INFORMATION-SCHEMA thread pool tables
7. INFORMATION-SCHEMA connection-control tables
8. INFORMATION-SCHEMA MySQL enterprise firewall tables
9. Extensions to SHOW statements

MySQL Performance Schema

2. Performance schema quick start
3. Performance schema build configuration
4. Performance schema startup configuration
5. Performance schema runtime configuration
6. Performance schema queries
7. Performance schema instrument naming conventions
8. Performance schema status monitoring
9. Performance schema atom and molecule events
10. Performance schema tables for current and historical events
11. Performance schema statement digests and sampling
12. Performance schema general table characteristics
13. Performance schema table descriptions
14. Performance schema option and variable reference
15. Performance schema command options
16. Performance schema system variables
17. Performance schema status variables
18. The performance schema memory-allocation model
19. Performance schema and plugins
20. Using the performance schema to diagnose problems
21. Restrictions on performance schema

MySQL sys Schema

2. Prerequisites for using the sys schema
3. Using the sys schema
4. Sys schema progress reporting
5. Sys schema object reference

Connectors and APIs

2. MySQL connector/C++
3. MySQL connector/J
4. MySQL connector/NET
5. MySQL connector/ODBC
6. MySQL connector/Python
7. MySQL connector/Node.js
8. MySQL C API
9. MySQL PHP API
10. MySQL Python API
11. MySQL Eiffel wrapper

MySQL Enterprise Edition

1. MySQL enterprise backup overview
2. MySQL enterprise security overview
3. MySQL enterprise encryption overview
4. MySQL enterprise audit overview
5. MySQL enterprise firewall overview
6. MySQL enterprise thread pool overview
7. MySQL enterprise data masking and de-identification overview
8. MySQL enterprise monitor overview
9. MySQL telemetry
MySQL Workbench
MySQL on the OCI Marketplace
2. Prerequisites to deploying MySQL EE on Oracle Cloud Infrastructure
3. Deploying MySQL EE on Oracle Cloud Infrastructure
4. Configuring Network Access
5. Connecting
6. Maintenance
Telemetry
1. Installing OpenTelemetry support
2. OpenTelemetry TRACE
3. OpenTelemetry Metrics