Architecting, Designing and Deploying Data Storage Solutions with mongoDB and ASP.Net Core Distributed Database Systems

Customized Training Contents for

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Contents

1 Revision History

Revision No.	Remarks
1.0	❖ Customized Contents based on requirements and discussions with Dell Team coordinated by Vidyashree

2 Course Pre-requisites

- ❖ Working knowledge of Relational Database system
- ❖ Working knowledge of JavaScript
- ❖ Experience in .NET, .NET Core Application Development

3 Lab Requirements

3.1 Hardware Requirements

1. Intel i5/i7 with at least 16 GB RAM

3.2 Operating System

1. Windows 10 – 64 bit

3.3 Software Requirements

1. MongoDB Community Edition
2. Visual Studio 2019 – updated
3. .NET 5 SDK

3.4 Other Requirements

1. Enterprise-grade network connectivity

4 Course Delivery

Location(s)	Online Virtual Session
Mode	Lecture + Hands-on
Hands-On : Theory	70:30
No. of Participants	Upto 15
Participant: Machine ratio	1:1
Duration	5 Days (40 Hrs)
Schedule	<TBD>
Course Material	Soft copies of Presentations, Materials and Hands-on shall be provided on completion of training.

5 Course Contents

5.1.1 NoSQL Database Introduction

- What is NoSQL?
- Why NoSQL?
- Difference Between RDBMS and NoSQL Databases
- Benefits of NoSQL
- Types of NoSQL
- Key-Value Database
- Document Database
- Column-Based Database
- Graph Database
- CAP Theorem
- Mongo DB as Per CAP
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5.1.2 MongoDB - A Database for the Modern Web

- What is MongoDB?
- JSON
- Architecture and features of mongodb
- BSON
- MongoDB Structure
- Document Store Example
- MongoDB as a Document Database
- Transaction Management in MogoDB
- Easy Scaling
- Scaling Up vs. Scaling Out
- Vertical Scaling and Horizontal Scaling
- Features of MongoDB
- Secondary Indexes
- Replication
- Memory Management
- Replica Set
- Auto Sharding
- Aggregation and MapReduce
- Collection and Database
- Schema Design and Modeling
- Reference Data Model
- Embedded Data Model
- Data Types
- Core Servers of MongoDB
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- MongoDB's Tools
- MongoDB Installation
- MongoDB Communicty vs Enterprise Editions

- Specify Equality Condition
- $in, “AND” Conditions
- $or Operator
- Specify AND/OR Conditions
- Regular Expression
- Array Exact Match
- Array Projection Operators
- $Where Query

- Cursor
  - Pagination
  - Advance query option
  - Update Operation
  - $SET
  - $Unset and $inc Modifiers
  - $Push and $addToSet
  - Positional Array Modifications
  - Upsert
  - Removing Documents

5.1.4 Working with Geo-spatial Data

- Geospatial Data
  - Geospatial Indexes
  - Geospatial Queries
  - Geopspatial Operators
  - $geoIntersects
  - $geoWithin
  - $near

5.1.5 Indexing and Aggregation

- Introduction to Indexing
  - Types and Properties of Index
  - Sort Order
  - Text Indexes
  - Text Search
  - Index Creation
  - Index Creation on Replica Set
  - Remove, Modify, and Rebuild Indexes
  - Listing Indexes
  - Measure Index Use
  - Control Index Use
  - Aggregate Pipeline Stages
  - MapReduce
  - Aggregation Operations

5.1.6 Replication and Sharding

- Introduction to Replication
- Master-Slave Replication
- Replica Set in MongoDB
- Automatic Failover
- Replica Set Members
- Sharding
- When to Use Sharding?
- What is a Shard?
- Choosing a Shard Key
- Range-Based Shard Key
- Hash-Based Sharding
- Impact of Shard Keys on Cluster Operation
- Add Shards to a Cluster
- Enable Sharding for Database and a Collection
- Splitting
- Chunk Size and Type
- Shard Balancing

5.1.7 GRIDFS

- When all to use gridFs
- Using GridFs to store video and audio data

5.1.8 Performance, Optimization and Monitoring

- Diagnosing Performance Issues
- Optimization Strategies for MongoDB
- Configure Tag Sets for Replica Set
- Query Planning and Execution
- Optimize Query Performance
- Monitoring Strategies for MongoDB
- MongoDB Utilities and Tools
- Upgradation of mongodb versions from 4.2 to 4.4 and 5.1
- MongoDB Commands

5.1.9 BACK UP AND RESTORE

- Back up strategies available in mongo db
- Backing up a server, database and collection
- How to restore in mongodb
- Restoring a database or server or collection
- How to set up profiler in mongodb
- Levels of profiling
- Identify the slow running queries using profiler
- Identifying the log files and rotation of log files

5.1.10 Integrating ASP.NET Core Applications with mongoDB

- Introduction to Mongo DB Drivers
- Creating Entities
- Implementing a Repository Pattern for CRUD Operations
- Dependency Injection of mongoDB Services
- ASP.NET Core MVC Application

Compatibility with the drivers

Driver versions

Connecting mongodb with asp.net core application