

# Administering a SQL Database Infrastructure & High Availability with Performance Tuning

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**Duration : 05 Days**

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**Course Contents**

## **Section A : SQL Server Administration**

### **Module 1:**

'SQL Server Security' introduces SQL Server security models, logins and users.

### **Module 2:**

'Assigning Server and Database Roles' covers fixed server roles, user-defined server roles, fixed database roles and user-defined database roles.

### **Module 3:**

'Authorizing Users to Access Resources' describes permissions and the assignment of permissions,

### **Module 4:**

'Backup of SQL Server databases' describes the SQL Server backup and the backup types. Restoring SQL Server Databases' describes the restoration of databases.

### **Module 5:**

'Automating SQL Server management' describes how to use SQL Server agent for automation. It also explains the benefits of using master and target servers to centralize the administration of automation.

### **Module 6:**

'Monitoring SQL Server with Alerts and Notifications' covers the configuration of database mail, alerts and notifications.

### **Module 7:**

'Tracing Access to SQL Server with Extended Events' introduces how to use SQL Profiles and SQL Trace stored procedures to capture information about SQL Server. The module also describes how to use Distributed Replay to capture trace information from multiple servers and how to monitor locking.

## **Section B**

### **High Availability & PT**

#### **REPLICATION For HA**

- Merge Replication and Merge Agent Job
- Replication Conflicts and ROWGUIDCOL
- Subscription Reinitialization, Expiry Setting
- Server Subscription & Client Subscription
- Peer-Peer Replication Connections, Nodes
- Common Errors and Solutions

#### **LOG SHIPPING (HA - DR)**

- Log Shipping Topology for HA and DR
- Primary and Secondary: Recovery Plan
- Log Shipping Monitor, Jobs and Alerts
- NORECOVERY Mode - Configuration
- STANDBY Mode Configuration & Jobs
- Log Shipping Jobs and Manual Failover
- Disconnections and Delay in Restores
- Log Shipping Mode Changes - cautions
- Re-Restoring Log Backups for Recovery
- LSBackup, LSCopy & LSRestore Jobs
- LS Job Audits, Dashboards (Reports)
- Broken Log Shipping Chains & Issues
- Common Errors and Solutions

#### **DB MIRRORING (HA - DR)**

- DB Mirroring Architecture For HA & DR
- Log Shipping Versus Database Mirroring
- TCP Endpoints, TCP Network Security
- Heartbeat and Polling Concepts in DM

- Automatic Fail-Over Procedures, Tests
- PARTNER OFFLINE Conditions, Options
- DB Mirroring Monitors and Commit Loads
- SYNCHRONOUS & ASYNCHRONOUS
- DB Mirroring and Port Configurations
- Mirroring Monitor, Stop/Resume Options
- Need for Always-On & Higher Availability
- DB Recovery without Witness. Failover
- Mirroring Monitor Jobs - Real-time Usage
- Common Errors and Solutions

## **CLUSTER CONFIGURATION**

- Windows Clusters for HA and DR
- Domain Controller (DC) Configuration
- Active Directory (AD) Accounts, Use
- Public IP Address, Private IP Address
- Windows Level Clusters, MSCS Service
- SQL Clustering Service & RAID Levels
- SQL Cluster Groups, Domain Accounts
- Quorum and MSDTC Disks. LUN Grows
- MSCS Service Startup Options, Drains
- Need for Always - On Availability (AAG)

## **ALWAYS ON AVAILABILITY**

- Always On Availability Group [AOAG]
- Synchronous and Asynchronous Modes
- Policy Based Management for AOAG
- Facets and Conditions for Policies
- Backup Preferences, Location Options
- Synchronization, Automated Seeding
- Data Synchronization for AOAG
- Port Settings, Backup Strategies in AAG

- AOAG Verifications and Dashboards
- Adding Availability Replica, Database
- Adding Availability Listeners and DNS
- Automated Failovers, Manual Failovers
- Always-On Availability Groups Health

## **Section C : Performance Tuning**

### **Tuning - Tuning Tools, Locks**

- Tuning Tools : Workload Files, Trace Files
- Profiler Tuning Template, SP Events
- DTA, Profiler Trace : Recommendations
- Perfmon Tool Counters, Real-time Tracking
- Execution Plan Analysis and Internals
- Query Costs : IO Cost and CPU Cost
- Query Costs: SubTree & Operator Cost
- NUMA Nodes, Processor, IO Affinity
- Thread Count, Degree of Parallelism
- LOCKS : Types and Isolation Levels
- S, X, IX,U, MD, Sch-M and Sch-S
- Lock Audits : SP\_WHO2 and SP\_LOCK
- sysprocesses and Lock Waits : Audits
- Deadlock Audits and Deadlock Graphs
- XDL Files and Deadlocks Prevention

### **Tuning - INDEX MANAGEMENT**

- PARTITIONS : Advantages, Performance
- Partition Functions & Partition Schemes
- Partitioning Un-partitioned Tables: GUI
- Partition Compression : ROW and PAGE
- Auditing Table Partitioned Structures

- Statistics : Purpose, Auto Creation
- Statistics : Audits and Updates
- Working with Indexes and Partitions
- Internal and External Fragmentation
- Index Rebuilding Process and Audits
- Database Maintenance Plans Jobs
- Last Used, Page Count, Fragmentation
- Index Page Count and Index Condition
- Degree Of Parallelism [DOP] Settings
- Resumable Indexes: ONLINE, RESUME
- PAUSE & RESUME in Index Rebuilds