

Course's Code	S7GA-IT-04
Course's Description	S7GA-IT- 04 - SQL SERVER TRAINING Advance Training(DBA)
Duration :	45 hours
S.NO	Topics
1	SQL Server Architecture and SQL Server Database Administration
	Responsibilities of Database Administrator
	Types of DBA's
	History of SQL Server – Versions
	What's new in SQL Server 2016 for Administrators?
	Service Packs
	Editions of SQL Server
	Differences between Enterprise and standard Editions
2	Installing and Configuring SQL Server
	Installing SQL Server 2016
	Pre –Installation Steps
	Installations
	Viewing Installation process with Log files
	Adding or removing components
	Installing Service Packs
	Configuration: Post-installation checks
	Configuration of Various Services
	Startup Parameters
	Configuring data files and log file paths
	Memory Configuration
	Remote Connections
	Configuring network protocols, Ports
	Configuring Services
	Configuring default backup folder
3	Working with Databases
	SQL Server Database and its Objects
	Server level and database level objects
	System Defined databases
	Database states
	Configuring TempDB database
4	Database Architecture
	Data Files
	Log Files
	Logical structure of LDF (log file)
	Filegroups
	Extents
	Pages
	Page Architecture
	Tracking Free Space
	Log file full – How to troubleshoot.
	Creating Databases
	Adding files, Filegroups
5	SQL Server Authentication, Logins and Users
	Implementing Security
	Security in SQL Server 2016
	Types of Authentications.
	Windows Authentication
	Creating logins from windows users and groups
	Orphan logins

	SQL Server Authentication
	Creating SQL logins and testing logins
	Setting Authentication Mode
	Security Auditing
	Understanding Server roles
	Working with users
	Resolving Orphan users
	Understanding database roles
	Understanding permissions
	Working with schemas
6	Backup and Restoration
	Understanding Transaction Log Files
	Understanding Checkpoints and Lazy writer
	Truncation log file
	Database Recovery
	Scenarios in which recovery is performed
	Phases of recovery
	Recovery Models
	Setting Recovery Model
	Full
	Bulk Logged
	Simple
	Database Backups
	Why we need backups?
	Backup Types
	Copy-Only, Mirrored and Tail log backups
	Full
	Differential
	Transaction Log
	File or Filegroup
	Backup Devices
	Performing Restoration
	Backup System Databases
	Compressions
	Row Compression
	Page Compression
	Compressing Backups
	Point-in-time Recovery
	Viewing complete details of backup process
	Issues related to backups
7	Indexes
	RowStore and ColumnStore Indexes
	Clustered and Non-Clustered Indexes
	Dealing with Index Fragmentation
	Statistics and their Role in Query Optimization
	Creating and Updating Statistics
	In-Memory Optimized Tables and
	Natively Compiled Stored Procedures
8	Automating Administrative Tasks
	Maintenance Plans
	Working with Database Mail
	Mail Architecture
	Configuring Profiles and Accounts
	Sending Mails
	Implementing Automation

	Configuring SQL Server Agent
	Creating Operators, Alerts, Jobs
	Managing jobs and resolving errors
	Monitoring Jobs
	Auto alert when jobs are enabled, disabled or failed
9	Concurrency Control in SQL Server
	Concurrency Issues: Phantom reads, non-repeatable reads and Lost update problems
	Isolation Levels
	Optimistic and Pessimistic Concurrency Control approach
	Locking
	Lock types
	Row-Versioning
	Locks and Blocking Analysis
	Locks
	Lock Operations and Modes
	Lock Granularity
	Isolation Levels
	Blocking
	Capturing Blocking Information
	Blocking Resolutions
	Automation to Detect and Collect Blocking Information
10	Deadlock Analysis
	Deadlock Fundamentals
	Using Error Handling to Catch a Deadlock
	Collecting Deadlock Information
	Analysing the Deadlock
	Avoiding Deadlocks
11	Securing Data with Encryption in SQL Server
	What is Transparent Data Encryption(TDE)
	Implementing TDE for encrypting data at rest
	Overview of other encryption features
	SSL for encrypting data in transit
	AlwaysEncrypted
	Dynamic Data Masking
12	High Availability and Disaster Recovery Technologies in SQL Server
	Introduction to High Availability and Disaster Recovery
	Working with Log Shipping
	Architecture of Log Shipping
	Features
	Jobs
	Requirements to implement Log Shipping
	Configuring Log Shipping
	Monitoring Log Shipping
	Manually performing Fail Over
	Transferring Logins
	Log Shipping tables and stored procedures
13	Working with Database Mirroring
	Advantages
	Architecture of Database Mirroring
	Operating Modes
	Server involved in Mirroring
	Requirements for Mirroring
	Configuring
	Monitoring Mirroring Fail Over
	Mirroring System Tables and Stored Procedures

	Major issues with Mirroring
14	Replication
	Replication and Advantages
	New Features
	Replication Entities
	Replication Architecture
	Replication Agents
	Types of Replications
	Configuring Replication
	Snapshot Replication
	Transactional Replication
15	Other Types of Replication
	Merge Replication
	Peer to Peer replication
	Managing Replication
	Monitoring and Tuning Replication
16	AlwaysOn(HA+DR Solution)
	HA/DR Internals & advantages
	Setting up HA/DR
	Adding a DB to the AG
	Patching in Always on
	Adding Replica in AG
	Setting up Listener & read-only Replicas in AG
	Troubleshooting and maintenance
17	Process and Thread Management in SQL server
	Process overview
	Process Sates
	Schedulers
	Workers Threads
	Process Management by SQL OS through Schedulers
	SPID
	Sessions
	Connections
	MAX Degree of Parallelism(MAXDOP)
	Cost Threshold for Parallelism
18	Important tools for Administrators
	SQL Profiler
	Xtended Events
	Activity Monitor
	Job Monitor
	Query Store (introduced in 2016)
	Performance Monitor
19	Troubleshooting High CPU, Memory and Disk Utilization Issues
	Using Performance Monitor and DMVs for troubleshooting
	Troubleshooting High CPU Utilization Issues
	Troubleshooting High Memory Utilization Issues
	Latches in SQL Server
	Troubleshooting High Disk Utilization Issues
20	SQL Server Configuration Settings for Performance Optimization
	Affinity Mask
	Memory Configuration Options
	Cost Threshold for Parallelism
	Max Degree of Parallelism
	Optimize for Ad Hoc Workloads
	Query Governor Cost Limit

	Fill Factor (%)
	Blocked Process Threshold
	Database File Layout
	Database Compression
	Database Administration
	Keep the Statistics Up-to-Date
	Maintain a Minimum Amount of Index Defragmentation
	Cycle the SQL Error Log file
	Avoid Database Functions Such As AUTO_CLOSE or AUTO_SHRINK
	Database Backup
	Incremental and Transaction Log Backup Frequency
	Backup Distribution
	Backup Compression
21	What's New in SQL Server 2016
	Columnstore indexes
	Database Scoped Configurations
	In-Memory OLTP
	TempDB Database
	Built-in JSON Support
	PolyBase
	Transparent Data Encryption
	AES Encryption for Endpoints
	New Credential Type
	High Availability Enhancements
22	SQL Server Upgradation and Patching
	Upgrade Strategy
	Migration Upgrade using New Hardware
	Side-By-Side Upgrade using same Hardware
	Upgrade from 2005 or older
	Upgrade from 2008 or later
	In-Place Upgrade
	Upgrade from 2005 or older
	Upgrade from 2008 or later
	Benefits and Limitations of each strategy
	Upgrade Methods
	Manual Schema Build with Data Import/Export
	Detach and Attach
	Upgrade from 2005 or older
	Upgrade from 2008 or later
	Copy Database Wizard
	Backup and Restore
	Upgrade Planning
	Data Migration Assistant (Replacement for Upgrade Advisor)
23	SQL Server Upgradation and Patching
	Minimum Requirements for Installing SQL Server 2016
	Hardware and Software Requirements
	Memory, Processor, and Operating System Requirements
	Hard Disk Space Requirements
	Issues that need to be resolved prior to an Upgrade
	Always On Considerations
	Pre-Upgrade Application & Connection Requirements
	Pre-Upgrade Planning Steps
	Performing the Upgrade
	Side-by-Side Upgrade Steps
	Always On Upgrade Steps

	Post Upgrade
	Post Upgrade Steps
	Always On Post Upgrade Steps
	Troubleshooting the Upgrade