



Azure SQL DBA TRAINING

| | PLAN A | PLAN B | PLAN C |
|---|-----------------------|------------------------|---------------------------------------|
| Description | SQL DBA (Core DBA) | SQL DBA + Azure DBA | SQL DBA + Azure DBA + ETL Admin |
| SQL Server, DB, Agent Architecture | ✓ | ✓ | ✓ |
| SQL Server Concepts, Backups, Restores | ✓ | ✓ | ✓ |
| Jobs, Maintenance, Index Management | ✓ | ✓ | ✓ |
| Database Repairs, Security Management | ✓ | ✓ | ✓ |
| Query Tuning, DTA, Profiler, Exec Plans | ✓ | ✓ | ✓ |
| Database Migrations, Data Recovery | ✓ | ✓ | ✓ |
| HADR: Replication and Log Shipping | ✓ | ✓ | ✓ |
| HADR: DB Mirroring. Errors & Solutions | ✓ | ✓ | ✓ |
| Updates, Upgrades, Server Rebuilds | ✓ | ✓ | ✓ |
| SLA-OLA, Ticketing Tools & Licensing | ✓ | ✓ | ✓ |
| Azure SQL DB Cloud(PaaS), Migration | X | ✓ | ✓ |
| Azure SQL DB Tuning, Security & HA-DR | X | ✓ | ✓ |
| Geo Replication, Failover, PowerShell | X | ✓ | ✓ |
| Virtual Machines (IaaS), Windows Clusters | X | ✓ | ✓ |
| Always-On Availability Groups (AOAG) | X | ✓ | ✓ |
| DP 300 Certification Exam : Guidance | X | ✓ | ✓ |
| ETL Admin (ADE, Snowflake) | X | X | ✓ |
| ADE: Azure Data Factory [ADF] | X | X | ✓ |
| ADE: Azure Synapse | X | X | ✓ |
| ADE: Azure Storage | X | X | ✓ |
| ADE: Stream Analytics | X | X | ✓ |
| ADE: Azure Databricks | X | X | ✓ |
| DP-203 Certification Exam: Guidance | X | X | ✓ |
| Total Duration | 6 Weeks | 9 Weeks | 20 Weeks |

Trainer : Mr. Sai Phanindra T : 18+ Yrs of Real-time Exp. Profile @ [linkedin.com/in/saiphanindra](https://www.linkedin.com/in/saiphanindra)

Azure SQL DBA Training Course Plan

| Training Module | | Dur | SQL DBA Plan A | SQL DBA Plan B | SQL DBA Plan C |
|---|---|---------|-------------------|-------------------|-------------------|
| Module 1 | Core SQL DBA [Tuning, Errors, HA-DR, Upgrades] | 6 Weeks | X | ✓ | ✓ |
| Module 2 | Azure SQL DBA [Migrations, VM, Clusters, Always-On] | 3 Weeks | ✓ | ✓ | ✓ |
| Module 3 | ETL Admin [Azure Data Engineer] | 7 Weeks | X | X | ✓ |
| Total Duration [Including Real-time Project, Resume] | | | 6 W | 9 W | 16 W |

Module 1: SQL DBA (Core DBA)

Applicable for SQL DBA Plan A

Chapter 1: SQL SERVER INTRODUCTION

Data, Databases and RDBMS Software; Database Types : OLTP, DWH, OLAP; Microsoft SQL Server Advantages, Use; Versions and Editions of SQL Server; SQL : Purpose, Real-time Usage Options; SQL Versus Microsoft T-SQL [MSSQL]; Microsoft SQL DBA: Job Roles; Routine SQL DBA Activities; Emergency DBA Activities, Job Work; Maintenance DBA Activities; SQL Server Components; Database Engine Component and OLTP; 24 x 7 Online Lab for Remote DB Access; Software Installation Pre-Requisites;

Chapter 2: SQL SERVER INSTALLATIONS

System Configuration Checker Tool; Versions and Editions of SQL Server; SQL Server and SSMS Installation Plan; SQL Server Pre-requisites: S/W, H/W; SQL Server 2022 / 2019 Installation; SQL Server 2017 Installation Procedure; Instance Name and Server Features; Instances: Types and Properties; Default Instance, Named Instances; Port Numbers, Instance Differences; Service and Service Account Use; Authentication Modes and Logins; Windows Logins and SQL Logins; File Stream and Collation;

Chapter 3: SSMS TOOL, SQL BASICS - 1

SQL Server Management Studio; Local and Remote Connections; System Databases: Master and Model; MSDB, TempDB, Resource Databases; Creating Databases : Files [MDF, LDF]; Creating Tables in GUI; Data Insertion & Storage; SQL : Real-time Usage; DDL, DML, SELECT, DCL and TCL Statements; Data Storage, Inserts - Basic Level; SELECT; Table Data Retrieval & Data Verifications; SELECT Statement;

Chapter 4: SQL BASICS - 2

Creating Databases & Tables in SSMS; Single Row Inserts, Multi Row Inserts; Rules for Data Insertion Statements; SELECT Statement @ Data Retrieval; SELECT with WHERE Conditions; Batch Concept and Go Statement; AND, OR Operators Usage; IN Operator and NOT IN Operator; Between, Not Between Operators; LIKE and NOT LIKE Operators; UPDATE Statement & Conditions; DELETE & TRUNCATE Statements; Logged and Non-Logged Operations; ADD, ALTER & DROP. Aliasing;

Chapter 5: SCHEMAS, TEMPORARY TABLES

Database Objects : Tables and Schemas; Schemas : Group Tables in Database; Schemas : Security Management Object; Creating Schemas & Batch Concept; Using Schemas for Table Creation; Data Storage in Tables with Schemas; Data Retrieval and Usage with Schemas; Table Migrations across Schemas; Import and Export Wizard in SSMS; Data Imports with Excel File Data; Performing Bulk Operations in SSMS; Temporary Tables : Real-time Use; Local and Global Temporary Tables Working;

Chapter 6: CONSTRAINTS & INDEXES BASICS

Constraints and Keys - Data Integrity; NULL, NOT NULL Property on Tables; UNIQUE KEY Constraint; PRIMARY KEY

Constraint; FOREIGN KEY Constraint, References; CHECK Constraint; DEFAULT Constraint; Identity Property : Seed & Increment; Database Diagrams; Relationships Verification; Indexes : Basic Types and Creation; Clustered and Non Clustered Indexes; Index Sorting and Search Advantages; Clustered & Non Clustered Indexes; Primary Key and Unique Key Indexes; Need for Indexes and Keys;

Chapter 7: JOINS BASICS & AUDITS

JOINS - Table Comparisons Queries; INNER JOINS For Matching Data; OUTER JOINS For (non) Match Data; Join Queries with "ON" Conditions; Left Outer Joins with Example Queries; Right Outer Joins with Example Queries; FULL Outer Joins - Realtime Scenarios; CROSS JOIN and CROSS APPLY; One-way, Two way Data Comparisons; Table Aliases with Join Queries; Using Table Aliases and Column Aliases; Optimizing Join Queries with Indexes; Choosing Correct Comparison Columns; Joining Unrelated Tables ;

Chapter 8: VIEWS, PROCEDURES, FUNCTIONS BASICS

Database Objects: Overview & Usage; Views: Types, Usage in Real-time; Creating, Executing & Verifying Views; System Predefined Views and Audits; sys.databases, sys.schemas, sys.tables; Functions: Creation, Usage in Real-time; Using table Data Type with Functions; Functions for Dynamic, Condition Joins; Dynamic Joins for Database Audits; Procedures: Usage in Real-time; Creating and Executing Stored Procs and Parameters in SQL Server; Verify Database Objects; sp_helpdb; sp_help, sp_helptext, sp_helpindex;

Chapter 9: TRIGGERS, TRANSACTIONS

Triggers - Purpose, Real-world Usage; FOR/AFTER Triggers - Real time Use; INSTEAD OF Triggers - Real time Use; INSERTED, DELETED Memory Tables; Using Triggers for Data Replication; Enable Triggers and Disable Triggers; Database Level, Server Level Triggers; Auditing Triggers and Real World Use; Transactions : Types, ACID Properties; Transaction and Auto Commit; EXPLICIT & IMPLICIT Transactions; COMMIT and ROLLBACK; Open Transaction; Query Blocking Scenarios; NOLOCK & READPAST Lock Hints;

Chapter 10: GROUP BY & LINKED SERVERS

GROUP BY: Importance, Realtime Use; GROUP BY Queries and Aggregations; Group By Queries with Having Clause; Group By Queries with Where Clause; Using WHERE and HAVING in T-SQL; Using Group By in Data Audits; Using Group By with Joins, Audits; Linked Servers Configurations; Linked Servers: RPC Settings & Tests; Data Access & Windows Security; Linked Servers, Remote Joins in TSQL; Multi Server Connections, DB Access; 2 Part, 3 Part, 4 Part Naming Styles; Remote Joins Queries and Aliases;

Chapter 11: DB ARCHITECTURE, MEMORY CONCEPTS

Database Architecture : Data & Log Files; Primary Data File (mdf) and Metadata; Secondary Data Files (ndf) & Table Data; Filegroups: Realtime Use, Data Mapping; Using Filegroups for Table Creations; File Size, Max Size and Auto Growth; Log Files (ldf) : Realtime Usage, Sizing; Cursors - Benefits, Cursors in SProcs; Using Cursors in Real-world Scenarios; Cursors : Declaring Variables, Life Cycle; Declaration, Open / Close Cursors; CTE: Common Table Expressions; Real-time Scenarios with CTEs - Usage; Using CTEs for Data Retrieval, SELECT;

Chapter 12: BACKUPS - DB, FILE, FILEGROUP

Database Backups; Filegroup Backups; Log File Backups; COPY_ONLY Backups; Mirror Backups; Split Backups; FORMAT; Partial Backups and Backup Media Files; UNLOAD; INIT; FORMAT; VERIFY; SKIP; Compression; Checksum; RetainDays; Stats; ContinueOnError and Backup Validations; Backup History Tables in MSDB – Joins; Backup Audits. HOT and COLD Backups; Common Errors & Solutions;

Chapter 13: RESTORES & DB RECOVERY

Restore Phases – COPY, REDO, UNDO; RECOVERY and NORECOVERY Options; STANDBY; REPLACE Options in Restores; File; File Group and Meta Data Restores; Backup Verifications using GUI; Scripts; FILELISTONLY and VERIFYONLY Options; HEADERONLY; STATS; UNLOAD; STOPAT; PARTIAL / PIECEMEAL Restores; Tail Log Backups. UNDO; REDO Phases; GUI & T-SQL Restores; MOVE for File Level Restores; Point-In-Time Restore; Checkpoint LSN; Standby and Read-Only State; Common Errors and Solutions

Chapter 14: JOBS, MAINTENANCE PLANS

SQL Server Agent Service & Agent XPs; SQL Agent Jobs - GUI; Script Creations; Job Steps - Creation; Edits and Parse; Job Executions; Disable/Enable Options; Job History Purge. Job Activity Monitor; Database Maintenance - Backup Jobs; Maintenance Plans; Backup Cleanup & History Cleanup Jobs; Backup Strategies For Minimal Data Loss; Backup Options: Block Size; Transfer Size; DB Mail Configurations and Alert System; DB Mail Profiles; SMTP Email Accounts; Operators; Job Notifications

Chapter 15: SECURITY MANAGEMENT - 1

Authentication Types & Modifications; Windows Logins & SQL Server Logins; Logins - Users Mapping, DB Access; Server Roles & Database Roles - Usage; Object, Column and Schema Security; GRANT, WITH GRANT, DENY, REVOKE; CONTROL, OWNERSHIP, Authorization; GRANT, WITH GRANT, DENY, REVOKE; CONTROL, OWNERSHIP, Authorization; Execute, References, View Definition; Keys and Certificates; Data Encryptions; Data Encryption: Keys and Certificates; Security Scripts;

Chapter 16: DATABASE MIGRATIONS, SECURITY MANAGEMENT - 2

Creating Credentials @ Server Security; Creating Proxies & Agent Security; Linking Credentials and Proxies; Scripting Credentials and Proxies; Proxies For SQL Server Job Security; Using Proxies for DB Migrations; CDW: Copy Database Wizard @ SSMS; Database Detach and Attach Options; SMO Method and Database Scripting; CDW SSIS Packages, SSIS Proxies; Scheduling Database Migration Jobs; Detecting and Resolving Orphan Users; Containment DB Authentication; SSMS Connections & Containment;

Chapter 17: TUNING 1 - DB ARCH & AUDITS

Database Architecture and File System; Pages: Data Pages, Index Pages; Extents: Uniform Extents, Mixed Extents; Filegroups: PRIMARY & Secondary; File Types: Data Files, Log Files; Log Sequence Number, Storage Engine; Mini LSN and Virtual Log Files (VLF); Audit Long Running Queries: DMV, DMF; Activity Monitor Tool, Server Dashboards; CPU - Memory Consumption Reports; Logical I/O, Physical I/O, Database I/O; Recent Expensive Queries; Active Expensive Queries, Plan Handle; Perfmon Tool;

Chapter 18: TUNING 2 - AUDITS & INDEXES

Indexes: Architecture and Index Types; B Tree Structure, IAM Page [Root]; Clustered Indexes: SORT IN TEMPDB; Fill Factor and Pad Index Options; Non Clustered Indexes: Regular Index; Included, Columnstore and Online; Index Selectivity and Query Optimizer; Filtered Indexes and Covering Indexes; Indexed Views [Materialized Views]; Statistics: DB Objects & Realtime Use; Statistics: Auto Creation at Colum Level; Indexes & Statistics; Statistics: Column Conditions; Manual Update of Statistics;

Chapter 19: TUNING 3 - PARTITIONS, INDEX MANAGEMENT

Partitions: Advantages, Performance; Table Partitions: Creation & Advantages; Partition Functions & Partition Schemes; Partitioning Un-partitioned Tables: GUI; Verifying / Auditing Partitioned Tables; Table Compressions: ROW and PAGE; Partition Compressions and Effects; Index Fragmentation: Real-world Issues; Internal and External Fragmentation; Index Rebuilding Process and Audits; Database Maintenance Plans : Jobs; Last Used, Page Count, Fragmentation; Index Page Count, Degree Of Parallelism; Index Maintenance Schedules, Sequence;

Chapter 20: TUNING 3 - TUNING TOOLS, EXECUTION PLANS

Tuning Tools and Real-time Usage; SQL Profiler Tool and DTA Tool; Creating Workload Files, .trc Files; Profiler Tuning Template, SP Events; DTA, Profiler Trace: Recommendations; PDS: Physical Design Structures; Index, Stats, Partition Recommendations; DTA with Query Execution Cache; 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; Stored Procedure Recompilation & Use;

Chapter 21: TUNING 4 - LOCK MANAGEMENT

LOCKS : Types and Isolation Levels; S, X, IX,U, MD, Sch-M and Sch-S; Intent Locks & Performance Options; Lock Audits : SP_WHO2 & SP_LOCK; sysprocesses and Lock Waits : Audits; Open Transactions, Query Blocking; Lock

Hints and Isolation Levels; Read Committed, Read Uncommitted; Serializable and Repeatable Read; Snapshot Isolation, Page Versioning; Read Committed Snapshot Row Version; Choosing Correct Isolation Level; Profiler Tool and Lock Templates; Profiler Filters, Column Selections; Deadlock Audits & Deadlock Graphs;

Chapter 22: REPLICATION For HA - LEVEL 1

Replication Architecture and Topology; Publication Types - Purpose, Importance; DB Articles, Publications, Subscriptions; Distributor and Distribution Database; Replication Topologies and HA DR Plan; Replication Jobs: Types and Usage; One Way and Two Way Replication; PUSH and PULL Subscriptions; Snapshot Publication: Creation, Filters; Snapshot Replication and Repl Agents; Log Reader Agent - Configuration, Keys; Transactional Replication Configuration; Security Options with Log Reader Agent; Replication Monitor - Tracer Tokens; Replication Monitor - Warnings, Alerts;

Chapter 23: REPLICATION For HA - LEVEL 2

Merge Replication and Merge Agent Job; Replication Conflicts and ROWGUIDCOL; Subscription Reinitialization & Expiry; Server Subscription & Client Subscription; Scripting Snapshot Replication; Scripting Transactional Replication; Limitations with Traditional Replication; Peer - Peer Replication : Realtime Usage; Configure Peer-Peer Replication; Multi Master Replications & Node IDs; Peer-Peer Replication Connections; Replication Conflicts and Priority Settings; Disabling, Cleaning Replication Topology; Replication: Load Balancing Topologies; Common Replication Errors, Solutions;

Chapter 24: 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; Log Shipping Mode Changes – cautions; Re-Restoring Log Backups for Recovery; LSCopy; LSCopy & LSRestore Jobs; LS Job Audits; Dashboards (Reports); TUF Files & Standby Options in LS; Broken Chains & Issues; Common Errors and Solutions

Chapter 25: 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 & Port Configurations; Mirroring Monitor; Stop/Resume; Need for Always-On; DB Recovery without Witness; Common Errors and Solutions

Chapter 26: HEALTH CHECKS, REAL-TIME ISSUES & SOLUTIONS

Alerts : Creation and Notifications; DB Suspect Event Alerts (023); Performance Counters for Alerts; Log Space, Memory, Tempdb Alerts; Scheduling Alerts & Notifications; Allocation Errors, Consistency Errors; DBCC ShowContig, Extent Fragmentation; Trace Flags and EstimateOnly; DBCC Page: GAM, SGAM and PFS; Consistency Errors : Cause & Solutions; Allocation Errors : Cause and Solutions; Log Space Issues and Log Rebuilds; Memory & TempDB Issues, Solutions; DBCC ShrinkDB & Page Restores;

Chapter 27: PATCHES, UPGRADES, CUs

SQL Server Architecture: Protocols; Named Pipes, TCP IP; Storage Engine; Query Processor: Parser, Optimizer; Transaction Services, Buffer Manager; CLR, WAL, Lazy Writer, Checkpoint; Lock Manager, IO Manager, MDAC; Updates and Upgrades in SQL Server; Establishing Downtime For Maintenance; Precautions for Maintenance Activities; Database Backups and Scripting; Service Packs and Patch/Hotfix Activities; Cumulative Updates (CU), Hotfix Process; Verifications, Smoke Test and Rollbacks; Server Upgrades and Version Changes; Server Startup Issues;

Chapter 28: SYSTEM DB REBUILDS, SLA & OLA PROCESS

System Database REBUILDS using CMD; Silent Installation & Installation Repairs; SQLCMD Tool and Instance Connections; DAC : Dedicated Administration Console; Versions and Editions Comparisons; SQL Server Licensing

and Pricing; User CALs and Multiplexing Concept; Database Recovery Models: Selection; SLA and OLA Process, Ticketing Tools; KB Articles; Realtime Job Environment: SLA; Immediate, High, Normal Priorities; Impact, Urgency and SLA Metrics; Client Protocols, Ports & Server Aliases;

Chapters 29, 30: SQL DBA PROJECT WORK

Routine SQL DBA Activities: Audit Login Failures : Server Logs; Monitor Connectivity Issues; Auditing Long Running Queries; Memory Issues; PLE (Page Life Expectancy) Issues; MSDTC; Job Monitoring; Monitoring HA & DR Mechanisms; DB Refresh; Schema Refresh; Dump Files; Idle Sessions and Precautions; Index Management; Deadlock : Prevention; Monitor Server Health; Emergency SQL DBA Activities: Server Down : Issues; Solutions; Database Down : Issues; Solutions; Data Synchronization : Issues; Solutions; Slow Running Queries : Issues; Solutions; Database Response : Issues; Solutions; Slow Replication : Issues; Solutions; Hot CPU & Processor Node; Priority; Orphan Users; Service Startup Issues; Trace Flags; Always-On (AAG): Issues and Solutions; Ticketing Tools : SLA & OLA Concepts; Incident Management; Immediate, High and Medium Priority; 3rd Party Tools; Automated Backups, Log File Readers; Licensing and Pricing, CALs; Device CALs and User CALs; Multiplexing with Server Licenses;

Module 2: Azure DBA

Applicable for **SQL DBA A, B**

Chapter 31: AZURE CLOUD INTRODUCTION

Introduction to Cloud & Advantages; Cloud Architecture: IaaS, PaaS and SaaS; Microsoft Cloud Advantages, Azure Platform; Azure Products and Services - Market Place; Database Implementations in Azure Platform; Comparing PaaS and IaaS Implementations; PaaS Implementations For SQL Server; IaaS Implementations For SQL Server; Logical, Virtual Machine, Managed Instance; Installing SSMS and Azure Data Studio; Azure Account and Free Subscription; Azure Resources: Resource Groups Usage; Azure SQL: Realtime Implementations; Logical Server, Virtual Machine Options;

Chapter 32: AZURE SQL SERVER CONFIGURATION

Installing SSMS and Azure Data Studio; Azure Account and Free Subscriptions; Azure SQL Server (Logical Server); Azure SQL Server Logical Server Firewall; Firewall Rules - IP for Remote Access; Server Properties and Status Format; Password Resets in Azure SQL Server; Azure SQL Databases & Pricing Tiers; Azure SQL Database Access from SSMS; Elastic Scaling with Azure Databases; General Purpose and Business Critical; Basic, Standard and Premium Plans;: Gen 4, Gen 5; Resource Groups;

Chapter 33: DATABASE MIGRATIONS, DTU, ELASTIC QUERIES

Data Migration and Database Migration in Azure; Azure Storage : Creation & Containers; LRS, GRS and RA-GRS Azure Storage Accounts; Storage Containers, Storage Explorer Tool; Data Migration Assistant (DMA), Assessment; Migrations To Azure SQL; DB Exports & Imports with bacpac; Schema Generation & Compatibility; DTU : Data Transaction Unit, Resource Allocations; Basic, Standard & Premium Plans For SQL DB; vCore Based Purchasing : Gen 4 and Gen 5 Types; General Purpose & Business Critical Plans; Compute Tier: Provisioned and Server less; Bounding Box Model, Elastic Pools & Queries; eDTUs and Elastic Pool, per DB Settings; Elastic Scaling with Azure SQL Databases;

Chapter 34: AZURE SQL DATABASE TUNING

Azure SQL Server Level Tuning Options; Azure SQL Database Level Tuning Options; Automated Tuning Options and Peak-Loads; Force Plan, Create Index and Drop Index; Query Performance Insight, Recommendations; IO Metrics, CPU Metrics & Query Statistics; Data File IO, Log File IO, Custom Reports; Query Level Recommendations; Azure Search Service; Azure Search; Suggester and Analyzer Index Modes for Tuning; Retrievable, Filterable Indexes; Facetable and Searchable Indexes for Tuning; Change Tracking Options, Watermark Columns;

Chapter 35: ALERTS, AZURE BACKUPS & RESTORES

Azure SQL Server Activity Log and Options; Events, Operations and Event Categories; Quick Insights from Events and Filters; Events Exports to Event Hub, Log Analytics; Log Analytics Workspace, Alert Rules; Email / SMS Notifications and Schedules; Log Analytics Settings and Azure Storage; Activity Logs and Audit Reports, Insights; Automated Backups; Long Term & Automated Backup Retentions (bacpac); Backups - Retentions, Audits. LTR Policy; Restore Points, Database Recovery; Geo-Redundant Backups in Azure; Azure Storage Explorer For Backups; Disaster Recovery (DR) Advantages in Azure;

Chapter 36: HA - DR : Geo Replication, DB Sync

Failover Groups and Active Geo-Replication; Read-Write Failover Policy, Automated Failover; Geo Replication Configurations - Azure Locations; Primary-Secondary and Read / Write Modes; Geo Replication : Monitoring and Forced Failover; Azure Server Failover Process, Strategies; Automated SQL Data Sync Service and Sync Groups; HUB, MEMBER and SYNC DATABASE; Sync Direction, Sync Schema and Sync Interval; bi-directional Load Balancing and Failover; Conflict Resolution Policy;

Chapter 37: SECURITY MANAGEMENT, RLS

Firewall and Virtual Network Configurations; Server-level Firewall & Database Firewall Rules; System Stored Procedures for Firewall Settings; Logins, Users, Roles and Permissions using T-SQL; Creating Logins without Logins. Containment Users; GRANT, DENY, REVOKE, WITH GRANT Permissions; Threat Detection, Transparent Database Encryption; Vulnerability Assessment, Dynamic Data Masking; Implementing RLS - Row Level Security; Creating Users with & without Logins; Using SECURITY Schema for RLS Functions; Creating Security Predicates and Filters; EXECUTE AS options for RLS. STATE ON/OFF;

Chapter 38: POWERSHELL, AZURE VMs

Azure Virtual Machines : Deploy, Configure; Configure Windows Server, Redhat Linux; Azure Storage Blades and Pricing Options; Azure VM - Settings, Access & DB Creation; On-Premise & Azure VMs: Similarities; SQL Server Instance, Agent in Azure VM; Azure SQL Database in VM to SQL Cloud; Azure SQL Database in VM to OnPrem; Deployment Automation Scripts in Azure; Azure Cloud Shell - PowerShellGet; Power Shell Scripts for Configurations; Power Shell Scripts for Job Schedules; Power Shell Scripts for Firewall, ARM; Azure CLI - Purpose, Real-time Use;

Chapter 39: Windows Clusters with Azure VM

Windows Clusters For HA and DR; Virtual Networks, Subnets and IPs; Availability Sets and Availability Zones; Fault Domains and Update Domains; DC Deployment & Configurations; Active Directory Domain Services; SAN [Storage Area Network] and LUN; DNS Server, DSRM and Private IP; Windows Level Clusters, MSCS Service; Active-Active, Active-Passive Clusters; DNS, AA Hosts; SQL Clustering & RAID Levels; SQL Cluster Groups, Domain Accounts; Quorum and MSDTC Disks. LUN Grows;

Chapter 40 : Always-On with SQL Server Clusters

SQL Server VMs and File Share Witness (FSW); Joining Machines to Domain Network (AD); Adding Install Accounts to Active Directory; Install Failover Cluster (FCI) Features; Firewall Configurations and Port Exceptions; FSW File Shares and Usability Options; Need for Always - On Availability (AAG); Always On Availability Group [AOAG]; Multi-Database Replication Options; Backup Preferences, Location Options; Synchronous and Asynchronous Modes; Synchronization, Automated Seeding; Data Synchronization for AOAG; AOAG Dashboards & Automated Failover; Failover Connection Tests;

Module 3: Azure Data Factory [ADF], Synapse

Applicable for SQL DBA A, B, C

Chapter 1: Cloud Introduction & Azure Basics

Azure Implementation: IaaS, PaaS, SaaS, Benefits of Azure Cloud Environment, Azure Data Engineer: Job Roles, Azure Storage Components, Azure ETL & Streaming Components, Need for Azure Data Factory (ADF), Need for Azure Synapse Analytics, Azure Resources and Resource Types, Resource Groups in Azure Portal, Azure SQL Server [Logical Server], Firewall Rules and Azure Services, Connections with SSMS & ADS Tools, DB Migration: OnPremise to Azure, Schema Migration & Data Migration;

Chapter 2: Synapse SQL Pools

Dedicated SQL Pools in Azure; Enterprise Data Warehouse with Synapse; DWU: Data Warehouse Units, Resources; Massively Parallel Processing (MPP); Control Nodes and Compute Nodes; SQL Pool Access from SSMS Tool; T-SQL Queries @ SQL Pools; Start/Resume/Pause, Scaling Options; Creating Tables in Azure SQL Pool; Compression, MAX DOP & Indexes; Distributions: Round Robin, Hash; Distributions: Replicate and Usage; Data Imports; Dynamic Views with PDW; Data Loads Monitoring, Resource Class;

Chapter 3: Azure Data Factory Concepts

Azure Data Factory (ADF) Concepts; Hybrid Data Integration at Scale; ADF Pipeline Components & Usage; Configure ADF Resource in Azure; Understanding ADF Portal and IR; Linked Services and Connections; Datasets and Tables / Files for ETL; ADF Pipelines: Design, Publish & Trigger; ADF Pipeline with Copy Data Tool; Creating Azure Storage Account; Storage Container, BLOB File Uploads; Data Loads with Azure BLOB Files; DIU Allocations & Concurrency; Linked Services, Datasets; Pipeline Trigger, Author and Monitor;

Chapter 4: ADF Pipelines & Polybase

Copy Data Tool For ETL Operations; Azure SQL DB to Synapse Data Loads; Working with Multi Tables Data Loads; Query Options for Source Datasets; Transformations with Copy Data Tool; Rename, Rearrange & Remove Options; Pipeline Execution: DTU & DOCP; ADF Pipeline Monitoring Options; ADF Pipelines: Execution Settings; ADF Logging Options & Storage Account; Compression Option, DOP and DOCP; ETL Staging & Performance; Staging with Storage Account, Container; ADF Pipeline Monitoring; Polybase;

Chapter 5: OnPremise Data Loads with ADF

On-Premise Data Sources with Azure; Self Hosted Integration Runtime (IR); Access Keys, Remote Linked Services; Synapse SQL Pool (DW) with OnPremise; Staged Data Copy and Performance; Pipeline Executions and Monitoring; Pipeline RunIDs and Audits / Tracing; Incompatible Rows Skips, Fault Tolerance; Incremental Loads with Files (BLOB); Pipeline Executions and Schedules; Regular Schedules and Tumbling Window; Execution Retry and Delay Options; Binary Copy, Last Modified Date in Blob; Automated Loops and Trigger Schedules; Incremental Loads Verification Tests;

Chapter 6: ADF Data Flow - 1

Limitations with Copy Data Tool; Data Flow Task, Data Flow Activity; Transformations with Data Flow; Spark Cluster For Debugging; Cluster Node Configurations; Data Preview Options with DFT; SELECT Transformation & Options; JOIN Transformation and Usage; Conditional Split Transformation; Aggregate & Group By Transformations; Synapse Sink Options with DFT; DFT Optimization Techniques; Pipeline Debug Runs and ETL Testing; Spark Cluster For Pipeline Executions; Pipeline Monitoring & Run IDs;

Chapter 7: ADF Data Flow - 2

ADF Pipelines For ETL Operations; Data Flow Tasks and Activities in Synapse; Pivot Transformation For Normalization; Generating Pivot Column, Aggregations; Pivot Transformation and Pivot Settings; Pivot Key Selection, Value and Nulls; Pivoted Columns and Column Pattern; Column Prefix, Help Graphic & Metadata; Window Functions & Usage in Data Flow; Rank / DenseRank / Row Number; Over Clause and Input Options;

Derived Column Transformations; Exists & Lookup Transformations; Reusing Data Flow Tasks in Synapse; Pipeline Validations & Executions;

Chapter 8: Azure Synapse Analytics

Azure Synapse Analytics Resource; Azure Synapse Analytics Workspace; Managed Resource Group, SQL Account; SQL Admin Account and its Purpose; Operations with Synapse Workspace; ADLS Gen 2 Storage Account, Container; Synapse Studio (Synapse Portal); Dedicated SQL Pools & Spark Pools; Creating Dedicated SQL Pools; Synapse Tables, Data Loads with T-SQL; COPY INTO Statements with T-SQL; Clustered Column Store Indexes; Compressions; Aggregation with Data Loads in Azure Synapse;

Chapter 9: Synapse Analytics with Spark

Apache Spark Pool in Azure Synapse; Spark Cluster Nodes: Vcores, Memory; Creating Spark Clusters @ Synapse Studio; Python Notebooks For Remote Access; Creating Databases in Apache Spark Pool; Data Loads from Dedicated SQL Pools; Table Creations, Aggregation Operations; PySpark Code for Data Operations, Writes; Serverless Pool in Azure Synapse; Connections, Usage with Serverless Pool; Using Azure OpenDatasets in Synapse; OPENROWSET and BULK Data Loads; Azure Storage Account : Data Analysis; Working with Parquet Files in Synapse; Python Notebooks (Pyspark) in Synapse;

Chapter 10: Incremental Loads @ Synapse

Incremental Loads with Synapse Studio; Multi Table Merge Operations; On-Premise Data Sources & Timestamps; Azure SQL DB Destinations, Watermarks; Watermark Table Usage & Audits; Stored Procedures for Timestamp Updates; Table Data Type and Dynamic MERGE; SQL Queries for Datasets and Fetch; Lookup Activity and its Usage in Synapse; Expressions in ADF Portal for Lookup; Expressions in ADF Portal for Source; Output Pipeline Expression, Data Window; Concat Function, Run IDs Expressions; JSON Parameters, Pipeline Scheduling; Pipeline Validation, Trigger and Monitoring;

Chapter 11: Optimizations, Power Query

ADF ETL with GUI : Power Query; Power Query Resource Creation, Use; Source Data Configurations & Settings; Rename, Remove, Pivot, Group By, Order; Index, Filter, Remove Error Rows; Using Power Query Activity, ADF Pipelines; Spark Cluster Configurations for Pipelines; Concurrency, Big Data Recommendations; Storage Optimization Techniques; ETL Optimization Techniques; SQL Pool (Synapse) Optimizations; Indexes, Partitions, Distributions, DOP; Pipeline Optimization Techniques; Partitions, DOP, Compressions, DIU; Staging, Polybase and Core Counts;

Chapter 12: Pipeline Monitoring, Security

Azure Monitor Resource and Usage; Pipeline Monitoring Techniques; ADF: Pipeline Monitoring and Alerts; Synapse: Pipeline Monitoring and Alerts; Synapse: Storage Monitoring and Alerts; Conditions, Signal Rules and Metrics; Email Notifications with Azure; Concurrency, Big Data Recommendations; Azure Active Directory (AAD) Users, Groups; IAM: Identity & Access Management; Synapse Workspace Security with RBAC; ADF Security with RBAC: Owner, Contributor; Azure Synapse SQL Pool Security: Logins; Users, Roles and Resource Classes (RC); Assigning RCs to Users. Object Level Security;

Azure Storage & Stream Analytics

Chapter 1: Azure Storage & Containers

Storage Components in Microsoft Azure; Azure Storage Services and Types - Uses; High Availability, Durability & Scalability; Blob: Binary Large Object Storage; General Purpose: Gen 1 & Gen 2 Versions; Blobs, File Share, Queues and Tables; Data Lake Gen 2 Operations with Azure; Azure Storage Account Creation; Azure Storage Container: Usage; Azure Data Explorer: Operations; File Uploads, Edits and Access URLs; Azure Storage Explorer Tool Usage; Azure Account Options in Explorer; Directory Creation, File Operations; End User Access Options With Files; Data

Explorer Vs Storage Explorer Tool;

Chapter 2: Azure Migrations, BLOB Imports

SQL Server (On-Premise) to Azure Migration; Source Database Scripts & Validations; BACPAC File Generation From SSMS Tool; Azure Data Lake Storage and SSMS Access; Azure Storage Container, BACPAC Files; Azure SQL Server Creation From Portal; Azure SQL DB Imports, Storage SAS Keys; Azure SQL Database Migrations, Verification; BLOB Data Access from On-Premise; Data Imports From Excel and CSV Files; BLOB Data Imports using T-SQL Queries; SAS - Shared Access Signature Generation; CSV File - Uploads, Downloads, Edits, Keys; Master Keys, Credentials, External Sources; BULK INSERT Statement and Data Imports; T-SQL Imports : Practical Limitations;

Chapter 3: Azure Tables, Shares

Azure Tables - Real-time Usage; Schema-less Design and Access Options; Structured and Relational Data Storage; Tables, Entities and Properties Concepts; Azure Tables: Creation and Data Inserts; Azure Tables in Portal - GUI and Data Types; Azure Tables: Data Imports in Explorer; Data Edits, Queries & Delete Operations; Azure Files - SMB Protocol, Creation, Usage; Shared Access, Fully Managed & Resiliency; Performance, Size Requirements for Shares; Azure Storage Explorer Tool for File Shares; Azure Queues: Message Queues, Limitations; Adding Messages, Queuing and De-Queuing; Data Access & Clear Queue from Explorer; End Points for Azure Message Queues;

Chapter 4: Azure Storage Security, Admin

Azure Data Lake Storage Security Options; Shared Access Keys - Primary, Secondary Keys; SAS Key Generation: Container, Tables, Files; SAS Key Permissions, Validation Options; Access Keys: Account Level Permissions; Azure Active Directory (AAD): Users, Groups; Azure AD Security: RBAC with IAM, ACLs; Owner Role, Contributor and Reader Role; Azure Admin Operations: Replication Options; Azure Regions and Azure Zones, Availability; Locally & Geo Redundant Storage: LRS, GRS; Read Access (RA-GRS) & Geo Zone (GZRS); Classic Deployment Model, Encryption at REST; CORS Support (Cross Origin Resource Sharing); Auditing Access and Network Access Rules; Firewalls and Advanced Threat Protection;

Chapter 5: Azure Monitoring, Power BI

Azure Monitor, Metrics & Logs; Monitoring Azure Storage Namespaces; Add KQL Metrics; Account, Blob and File; Total Ingress and Egress Metrics: Charts; Average Latency, Transaction Count; Request Breakdowns, Signal Logic Options; Azure Alerts and Conditions, Notifications; Signal Logic Conditions and Emails; Power BI Desktop Tool Installation; Binary Data and Record Data Access; Azure Data Lake Storage: Access Keys; Azure Data Lake Storage with Power BI; BLOB File Access with Power BI; Azure Tables Creation and File Imports; Azure Table Access with Power BI;

Chapter 6: Azure Stream Analytics, IoT

Azure Stream Analytics: Real-time Usage; Real-time Data Processing, Event Tracking; Ingest, Deliver and Analysis Operations; Azure Stream Analytics Jobs Concept; Understanding Input & Output Options; SAQL Queries for Stream Analytics Jobs; IoT: Internet Of Things For Real-time Data; Need for IoT Hubs and Event Hubs; Creating IoT Device for Data Inputs; Creating Azure Stream Analytics Resource; Stream Analytics Jobs for Historical Data; Azure SQL Database Options for ASA Jobs; SAQL: Query Formatting and Validation; Historical Data Uploads, ASA Job Execution; Stream Analytics Job Monitoring Options;

Chapter 7: IoT Hubs & Event Hubs

Azure Stream Analytics For API Data; IoT Hubs & IoT Devices, Connection Strings; Raspberry APP Connections with IoT Hub; Azure Storage Account and Container; Creating Azure Stream Analytics Job; Configuring Input Aliases with IoT Hub; Configuring Output Alias with ADLS Gen 2; SAQL Query and Job Executions; Monitoring; Azure Event Hubs and Event Instances; Event Hub Namespaces, Partition Counts; Access Policies, Permissions & Defaults; RootManageSharedAccessKey & Options; Connection Strings & Event Service Bus; Telco App Installation, Executions. LIVE Data; On-Premise Integration with ASA Jobs;

Chapter 8: Azure Stream Analytics Security

Securing Azure Stream Analytics Resource; RBAC: Role Based Access Control & IAM; Owner, Contributor, Reader, Resource Owner; Network Level and IP Address Security; Virtual Machine and Virtual Network Options; Port Level Configuration and Stream Apps; Data Feed Security for Event Hub, IoT Hub; Azure Virtual Machine (VM) Security Options; Azure Key Vaults & ADLS [Data Lake] Security; Azure Passwords, Keys and Certificates; Azure Key Vaults - Name and Vault URI; Inbuilt Managed Key and Azure Key Vault; Standard Type, Premium Type Azure Key Vaults; Secret Page, Key Backups and Key Restores; Adding Keys to Azure Vaults. Key Type, Size;

Azure Databricks and SparkSQL

Chapter 1: Azure Intro, Azure Databricks

Cloud Introduction and Azure Basics For Databricks; IaaS, PaaS, SaaS; Benefits of Azure Cloud Environment; Storage, ETL and Streaming Components; Need for Azure Databricks (ADB); ETL and Data Storage Components; Databricks File System (DBFS) and Usage; Azure Databricks Service Creation; Azure Databricks Workspace Operations; Spark Cluster Configurations & Capacity; Driver Nodes and Worker Nodes in Spark; Master Node & Cluster Creation Process; Databricks Runtime Service & DBUs; File Uploads into DBFS; Table Creations; Promoting Headers, Data Type Changes; DBFS Storage Navigations;

Chapter 2: SQL Notebooks & Python

Notebooks: Concept, Usage Options; Creating SQL Notebooks in Databricks; Using DBFS Tables in SQL Notebooks; Data Access and Analytics Options; SparkSQL Queries: SELECT, GROUP BY; SparkSQL Queries: Aggregates, Conditions; Notebook Operations: Download, Clone; Notebook Operations: Upload, Reuse; SQL Notebooks with Python Code; Using DBFS Sample Data Sources (CSV); Dataframes: Creation and Real-time Use; Pandas Dataframe, Virtual Table Creation; Dataframe Data Access, Caching Options; Take() and Display() Functions in PySpark; Temporary View Creation and Access; SparkSQL Queries, Analytics, Chart Reports;

Chapter 3: Python Notebooks

Azure SQL Server Configurations; Azure SQL Database Creation; Azure Firewall Rules and IP Address; Allow Azure Services, Remote Access; Connection Tests with SSMS Tool; Python Notebooks with Azure Databricks; Data Imports and Table Creations (Code); Parquet Files and Usage in Databricks; Using Dataframes for Data Operations; SparkSQL Queries with SELECT, TOP; Establishing Connections to Azure SQL DB; JDBC Connection Strings, DataframeWriter; JDBC Properties, Port Settings & Options; Data Extraction, SQLContext & Dataframes; Pandas Data Frame for Big Data Analytics; JDBC URL Options & PySparkSQL Modules;

Chapter 4: Scala Notebooks, Transformations

Scala Notebooks with Azure Databricks; Azure SQL Database Connections with Scala; Util Properties, Connection Settings For Driver; Connection Settings for Worker Node @ Spark; Dataframe Creation and Data Access in Scala; Display Options and Data Transformations; Data Loads to Azure SQL Database Tables; Data Reads from Azure SQL DB & Analytics; Databricks Jobs : Creation Options, Usage; Job Limits, Workspace & Concurrency Limits; Notebooks with and without Parameters; Jobs with Default Parameters, Executions; Interactive, Automated Clusters for ADB Jobs; Job Schedules and Manual Executions; Active Jobs, Recently Run Jobs & Monitoring; Job Execution Reports & Workspace Options;

Chapter 5: ADB with Virtual Network

Azure Virtual Network Configuration; Azure VNets, Address Spaces & Range; Subnet and Subnet Address Range; Azure Databricks Deployments with VN; CIDR Range and IP Addresses; Public Subnet and Private Subnet; Spark Cluster Creation with ADB; End User Access using Virtual Network; Spark Cluster Notebook Operations; Notebook Exports, Imports, ReUse; Spark Cluster Configuration Changes; Power BI Connections, JDBC, User Token; Notebook Scheduling and Jobs; Interactive Clusters and Real-time Use; All Purpose Clusters and Advantages;

Chapter 6: DeltaLakes & ADF Integration

Azure Delta Lake Implementation; ACID Properties and Upsert Advantages; Delta Engine Optimizations & Uses; Pipeline Creation with JSON Files in DBFS; Delta Tables Creation, Data Loads; Spark Cluster Settings: Auto Optimize; Auto Compact and Delta Table Optimize; Delta Locations; Data Retrieval, Versions; Azure Databricks Integrations with ADF; Defining Scala Notebooks in ADB; Using Notebooks in Azure Data Factory; spark.conf.set & fs.azure.account.key; spark.read.format, Option() and Head(); dbutils() with wasbs & BLOB Data Sources; ADF Pipelines and Trigger Schedules;

Chapter 7: Databricks Integrations

Azure Databricks with Data Lake Storage; Handling Unstructured Data in Azure; Data Preparation and Staging Operations; Azure App (Service Principal) Registration; Azure Key Vault Creation & Key Usage; Service Principal Permissions @ Data Loads; Tenants and Authorization Settings; Client Credentials, Token Provider Options; Azure Databricks Clusters, Spark Notebooks; Dynamic Connections and Blob Access; Data Preparation & Big Data Ingestion; Data Extraction and ADLS Storage; show(), transformations, wasbs; Azure SQL Server & Synapse; Incremental Changes & Data Loads;

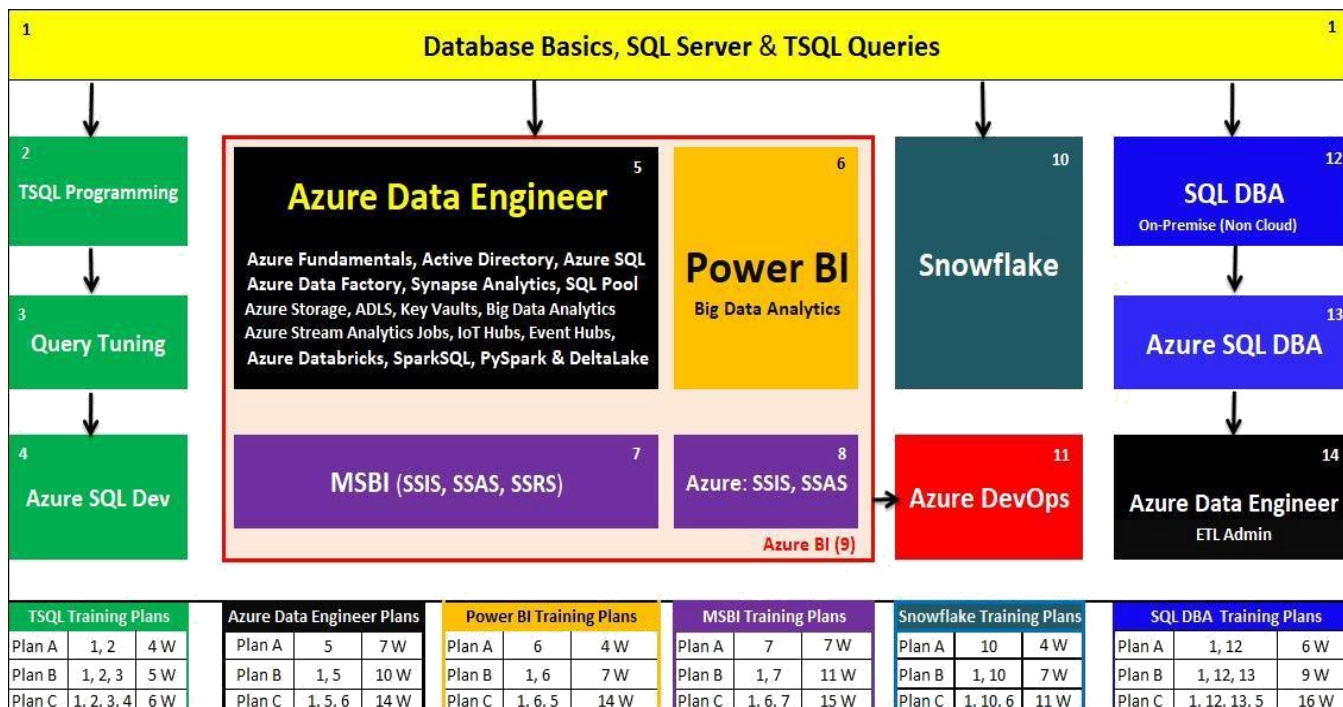
Real-time Project (End to End)

Online Retail Database Data Source; Azure Migrations and ETL Concepts; Azure SQL Pool (Synapse DWH) Tables; Apache Spark Pool : Databases, Tables; Azure Data Lake Storage (ADLS Gen 2); Azure Stream Analytics Jobs with IoT; Azure Data Bricks and DBFS, Notebooks; Big Data Analytics & Power BI Reports;

Project Requirement; Project Solution; Project FAQs; Concept wise FAQs; Resume Guidance; Mock Interviews; DP 203 Certification Guidance;

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