SQL SERVER 2022

https://vikasrajput.github.io

Its the most Azure-enabled release with improvements across performance, security, availability. It is part of MSFT Intelligent Data Platform, unifying database, analytics & governance.

HOW TO USE THIS FIELD MAP?

If new to Azure SQL, you can start with Foundations, then check References, and finally step through WAF Pillars. Alternatively, feel free to jump through What's New or specific WAF pillars.

FOUNDATIONS

Pages and Extents
Index Architecture
Memory Management
Query Processing
Thread Architecture
Transaction Log
Transaction Locking
Execution Plans
Statistics
Query Profile

System DB, Contained DB, Files & FGs
Collation, Remote Storage (Stream, Table, BLOB),
Full Text Search, Service Broker
MDS, DQS. Spatial, Graph, XML, JSON, CLR,
Language Extension
Tables, Views, Indexes, Sequence, Triggers,
Procedures, Functions, Track Changes

SQL Server on Linux, Container (Linux)
Big Data Cluster
Migration Tools: DB Experiment Assistant, DB Migration Assistant, SQL Migration Assistant, Azure Migrate

WHAT'S NEW

Synapse Link
S3 Integration
Data Virtualization
SQL MI Link
Contained AG, Distributed AG
Defender, Purview, AAD, Arc Integration
Encrypt with TDS 8.0
Intelligent Query Processing
Query Store: Hints, Forced Plans, Secondary Replica
ML Service for Python, R
Database Ledger

REFERENCES

SQL Server 2022 Preview Download
Microsoft Intelligent Data Platform
Early Adoption Program for SQL 2022
Mechanics Channel for SQL 2022
SQL Server Sessions on Data Exposed
Microsoft SQL Server Blog
Microsoft Tech Community Channel
Labs: SQL for App Dev, ML on SQL Server
SQL Server End of Support (2012 or less)
SQL Server Migration Enablement
MSFT Partner Resources for SQL Server

SECURITY

Security is the most critical WAF pillar. Let's get to it and categorize Security measures as Identity Management, Access Management, Surface Management, Protect Data and finally, Monitor/Audit.

Authentication Modes. Roles: Server, Database, App
Principal, Credentials, Securables. Permission, Permission Hierarchy
Encryption, Encryption Hierarchy. Transparent Data Encryption (TDE)

Always Encrypted, Secure Enclaves. Encrypt Connection with TDS 8.0
Extensible Key Management (EKM). EKM with Azure Key Vault (AKV)
Row Level Security, Dynamic Data Masking, SQL Server Audit

COST OPTIMIZATION

After Security, generally Cost holds the next priority for clients. Though it's very difficult to talk about this pillar in isolation. Firstly, every Org needs to establish a baseline Consumption (capacity, cost) Forecast, Budget & Ownership and then be able to Track and Report consumption. And then, we need to approach Architecture as such to elevate Demand Management (e.g., throttle) and Supply Management (e.g., scale).

Software Assurance to save on SQL Licenses
Review Features by Edition to reduce costs (SQL2019)
(Azure) SQL VM on Windows, Linux, Dedicated Host, SQL IaaS VM Extension
Shift Capex to Opex (Azure Migration):

- Right Sizing, Azure Hybrid
- Reserved Instance, HADR on Azure
- SQL Server Standard VM Scale Sets
- Azure SQL Serverless

Azure Advisor (Cost Pillar), Azure Cost Management

OPS EXCELLENCE

Ops Excellence proves the real-world agility and maturity of a business in managing Business Systems. At its core, Ops Excellence is all about how SDLC is managed, underscoring practices around Development, Deployment and Operation with Security, Monitoring and Automation embedded every step of the way.

Database Lifecycle Management
Policy Based Server Management
Data Compression: Row, Page, Unicode. Resource Governor
Maintenance Plans, SQL Assessment API, SQL Server PowerShell
CD with Azure DevOps (lab). DACPAC (lab). ARM Templates. SSDT. Retry Logic

RESILIENT

Business should take lead on this and define must-have or preferred Availability and Recovery Metrics (SLA, MTTR, MTBF etc). This should inform Architecture – outlining High Availability (scale, prevent failure), Disaster Recovery (recognize failure, and recover) and Monitoring (service uptime, chaos engineering, testing).

Know your Target SLA and Achieved SLA
Always on Availability Group [setup] [reference]
Always on Failover Cluster [setup] [reference]
Database Mirroring. Log Shipping. Replication: Transactional, Merge
Stretch Database. Backup Restore, Accelerated Recovery

PERFORMANCE EFFICIENCY

Performance is an interesting pillar – for it can be negatively impacted by almost all other pillars, but positive impact must be weaved in! Low-cost commitment or subpar operations or security measures can limit it. For this, establish Monitoring (workload, resources, baseline), Design for Performance, and Remediate Contention.

Monitoring. *Most critical input in performance tuning is Baseline – workload & consumption. Workload expectation is business driven, and Consumption Baseline should be established via monitoring (and adjusted) over a period.*

Configure Server for Performance

- Data & Log Files, Temp DB, Server / DB Config

Options for Query Performance

- Index, Partition, Parallelization, Statistics

Tune SQL Server for IO, Memory, CPU
Database Tuning Advisor, Query Tuning Assistant. Automatic Tuning, Query Store