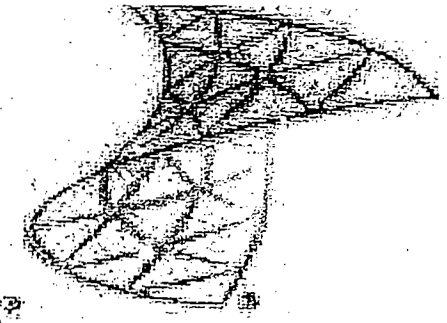


Microsoft® SQL Server 2012

SQLSERVER DBA

SQLSERVER DBA CONTENTS

DATABASE ADMINISTRATION

Database Administrator is a person responsible for the database design, Implementation, Maintenance and repair of the database.

The Main goals of DBA is to Keep the database server always up and make it available to users. Incase of any failures DBA should minimize the dataloss by implementing powerful backup and restoring Techniques.

DBA responsibilities

As a DBA We have to perform these.

1. Maintaining the availability of databases by minimizing the down time.
2. Data recovery, We have to Minimize the data loss incase of failures by implementing High availabities.
3. Provide high security in accessing the databases Externally.
4. Need to monitor the performance of servers, Implement various techniques to increase the Performance
5. Regularly Monitor database growth, diskspace sql server logs Event viewer logs to avoid issues and to identify any bottlenecks.

DBA Roles / Daily Activities

1. As part of DBA team need to provide 24/7 production support to client and users.
2. Work on user requirements and problems which comes in the form of tickets.
3. Responding to alerts which we receive in the form of email from Third party monitoring tools.
4. Make sure all the maintainence jobs are running sucessfully.
5. Make sure all backup jobs executed sucessfully with out any issues on all servers.
6. checking sql server logs to identify bottlenecks.
7. Checking drive spaces on critical servers to ensure that there is ample amount of space
8. Regularly monitor data file growth, log file growth database growth as part of capacity planning.
9. Maintain documentation of all the tasks and issues that you encounter for future reference.
10. check whether all sql services are running (or) not.

SQL SERVER ARCHITECTURE

SQL server follows client-server architecture. When ever user performs any action on client machine, it converts in the form of query. This query mores from client to server in the form of Network packets using protocols for connection and communication between source and destination servers.

SQL server is mainly divided into 2 Engines

1. Relational Engine
2. Storage Engine

Relational Engine (Query processor) Prepares execution plan and handover to storage Engine.

Storage Engine is a central repository, responsible in execution of query using execution plan, response sent to user.

Buffer pool is another important component contains Plan cache and data cache which is used for query Execution.

SQLOS is core to SQL server architecture, used for scheduling, I/O completion, Memory management and resource management. It is a thin layer between Windows OS and SQL server.

Components of sqlserver

SqL Server Network Interface (SNI) :

SNI is a protocol layer that establishes the network connection between the client and server. It uses TCP/IP Protocol to send queries in the form of TDS packets.

Command parser

Command parser first checks for syntax errors, then it generates query plan (or) find an existing plan. Query plan contains detail steps how query is going to execute. Command parser checks whether a plan already exists in plan cache of Buffer pool. If finds Plan passes to query executor for execution. If it does not find then query passes to optimizer.

optimizer

optimizer prepares query plans for one query in that sql server select best plan based on response time, the query plan passes to query executor for execution.

Query Executor.

Query executor requires data to read the query plan it passes to Access Methods of storage Engine

Access Methods

Access methods requires data to complete the query it asks buffer manager to provide data page. once it receives required data, the query results passes back to Relational Engine and there to users.

Buffer Manager

Buffer Manager checks in Data cache of buffer pool to see if it has page already in cache memory. If Page exists, it passes results to Access methods. If not exists it pulls required pages from mdf datafile. Put in data cache and passed it back to Access methods.

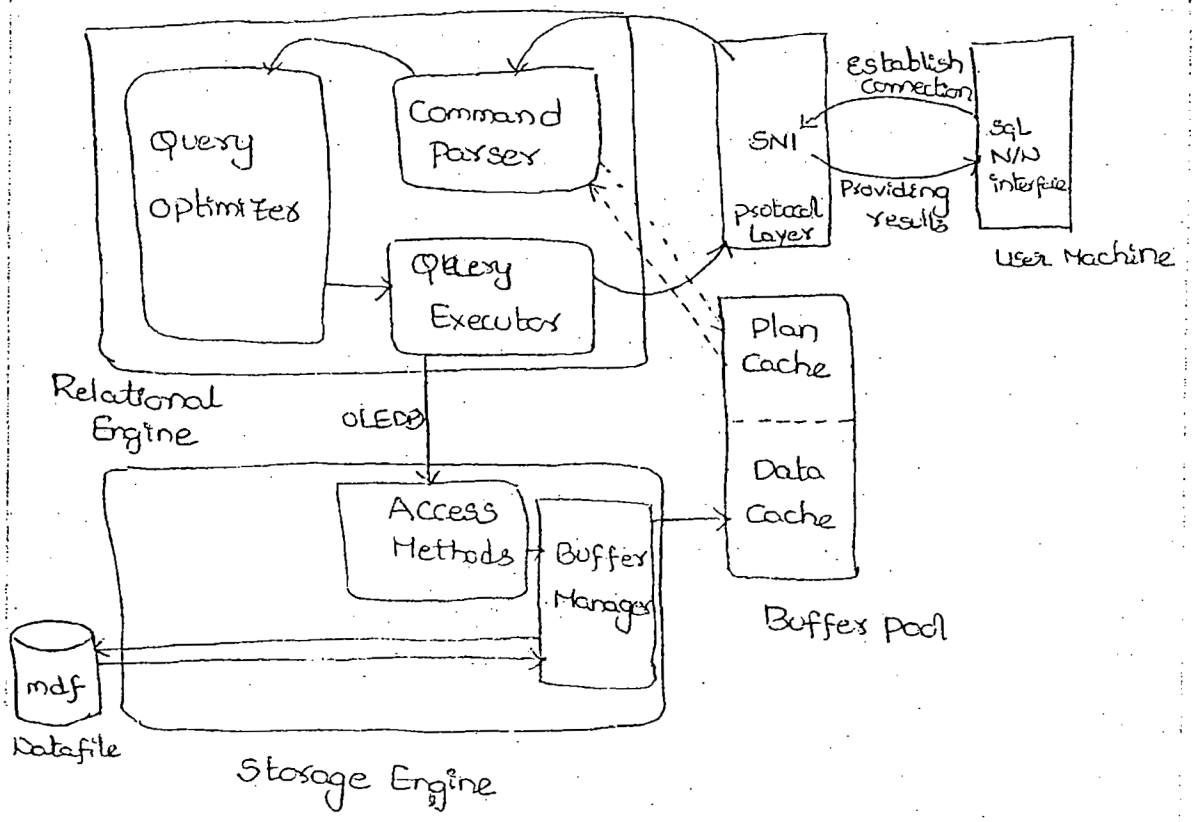
Plan cache

Part of sql servers buffer pool used to store previously executed execution plans. incase they are needed Later.

Data Cache

Datacache is largest part of buffer pool. Every data Page that is read from disk is written a copy here before using. under Memory pressure these pages are flushed from cache using LRU (Least recently used) Policy.

Sql Server architecture



Steps in executing a query.

1. SNI of user establish connection between client and server using TCP/IP protocol, sends query in TDS packets
2. query at command parser checks syntax errors then checks plan in plan cache of bufferpool. If plan not exists, passes the query to optimizer.
3. optimizer generates best plan and pass to query executor, it reads the plan and passes to Access Method of storage engine through OLEDD.
4. Access method requests Buffer Manager to

Provide the data.

5. Buffer Manager checks in data cache of buffer pool for existing page. If Page not exists it pulls the required pages from Data (mdf) file, put in data cache and pass to access method.

6. Finally Access Methods passes the results back to relational Engine, from there it sent back to user who executed the query.

Protocols available in Sql server

Sql Server Network interface (SNI) is a Protocol Layer that establishes the network connection between the Client and server. Sql server supports 4 protocols

1. Shared Memory
2. Named Pipes
3. TCP/IP
4. VIA

Shared Memory

It is default protocol used to connect client and sql Server on the same machine

Named Pipes

Client and server will connect with in a LAN.

It has certain Limitation.

TCP/IP

TCP/IP is most used protocol for sqlserver. Client Establishes connection with sqlserver using an Ipaddress and a port number, 1433. We can access the databases using internet hence there are no boundaries for this protocol.

VIA (Virtual Interface Adaptor)

VIA is a wireless intranet protocol for connecting client and server with in a certain range.

To Establish a secure sql connection we need a port number along with protocol.

Default port number for TCP/IP Protocol is 1433

We can change the port number from

Configuration Manager → sqlserver Network Configure → Protocols We can change.