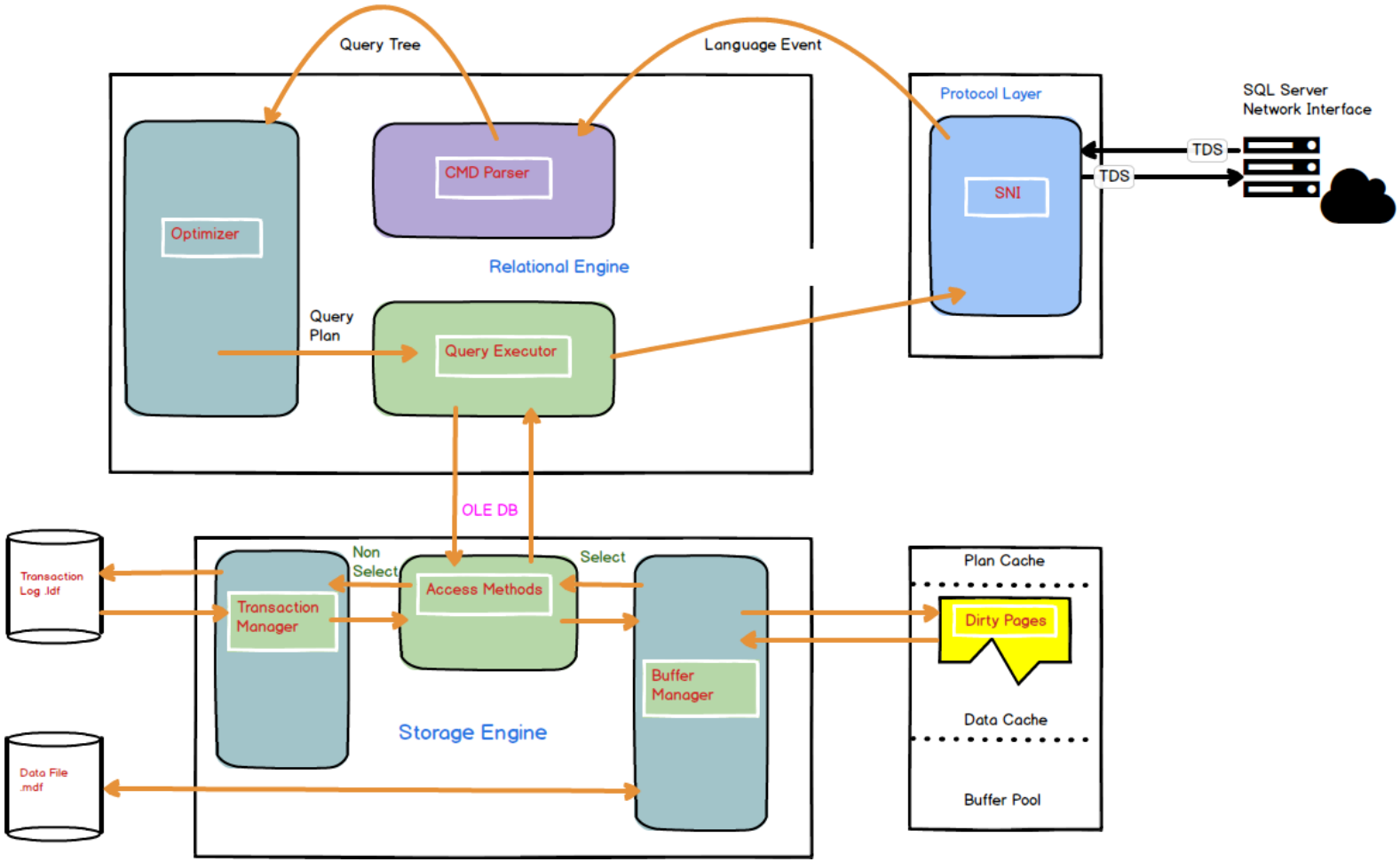
SQL Server basic architecture



SQL Server basic architecture - Part 1 - Protocol Layer

MS SQL SERVER PROTOCOL LAYER supports 3 Types of Client Server Architecture.

- Shared Memory

  SQL Server provides a shared memory pool such that MS SQL Server and the Client are running on the same machine , as such both communicate via the SMP e.g. Connection from SSMS to a local db (i.e. on our PC installation)

- TCP/IP

  SQL Server provides the capability to interact via TCP/IP; hence we can connect to a remote instance i.e. a machine with SQL Server running on it on another network or geographical location.

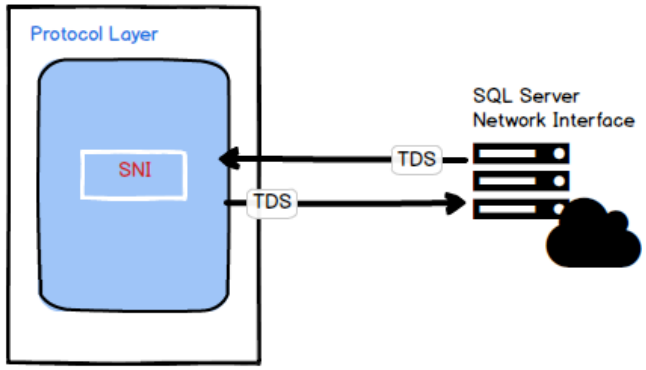
- Name Pipes

  This configuration is disabled by default, but SQL Server provides the capability to interact via the 'Named Pipe' protocol which means the Client and SQL Server are connected via a LAN

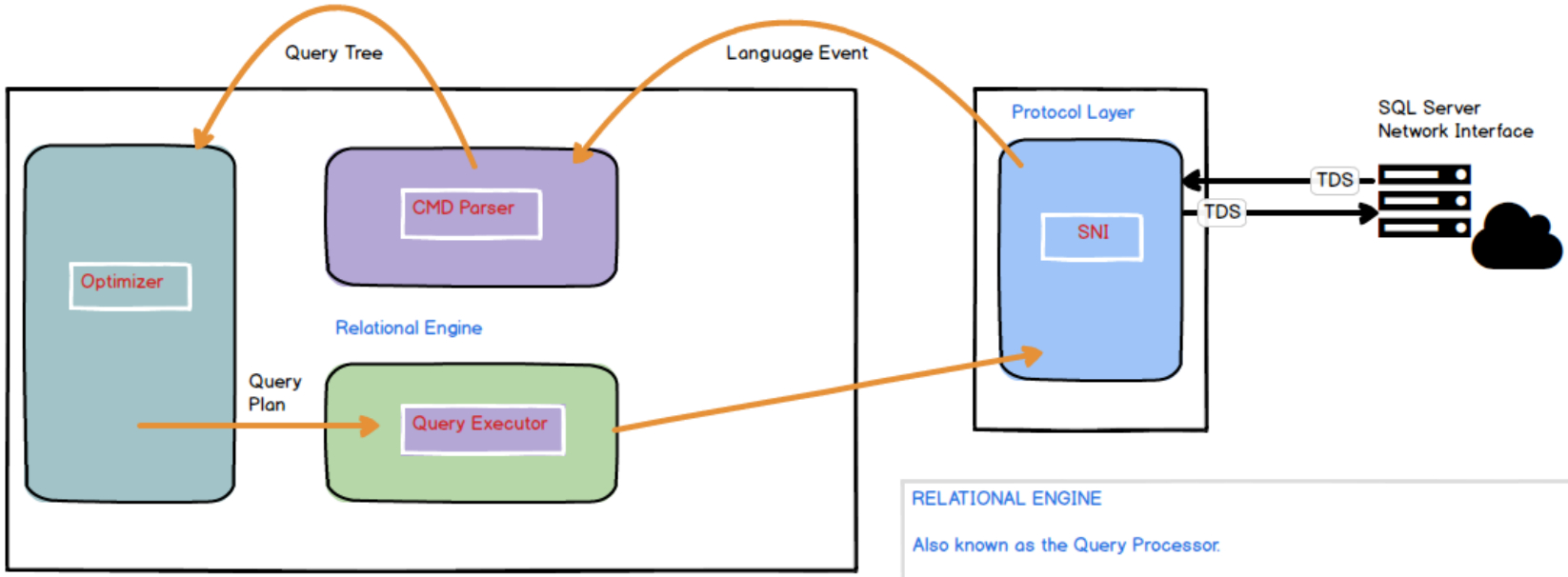
  Nb: Mostly you will connect via a TCP/IP protocol in the enterprise.

- TDS (What's that ?)

  - TDS - Tabular Data Stream
  - All 3 protocols listed above use TDS
  - TDS is encapsulated in network packets this enabless data transfer from the client machine to the server machine
  - Factoid: This was first developed by Sybase (which was the original SQL Server version back in the 90's) and now owned by MS



SQL Server basic architecture - Part 2 - Relational Engine



RELATIONAL ENGINE

Also known as the Query Processor.

It is responsible for the execution of user queries by requestion data from the storage engine (next diagram)
and processes the results.

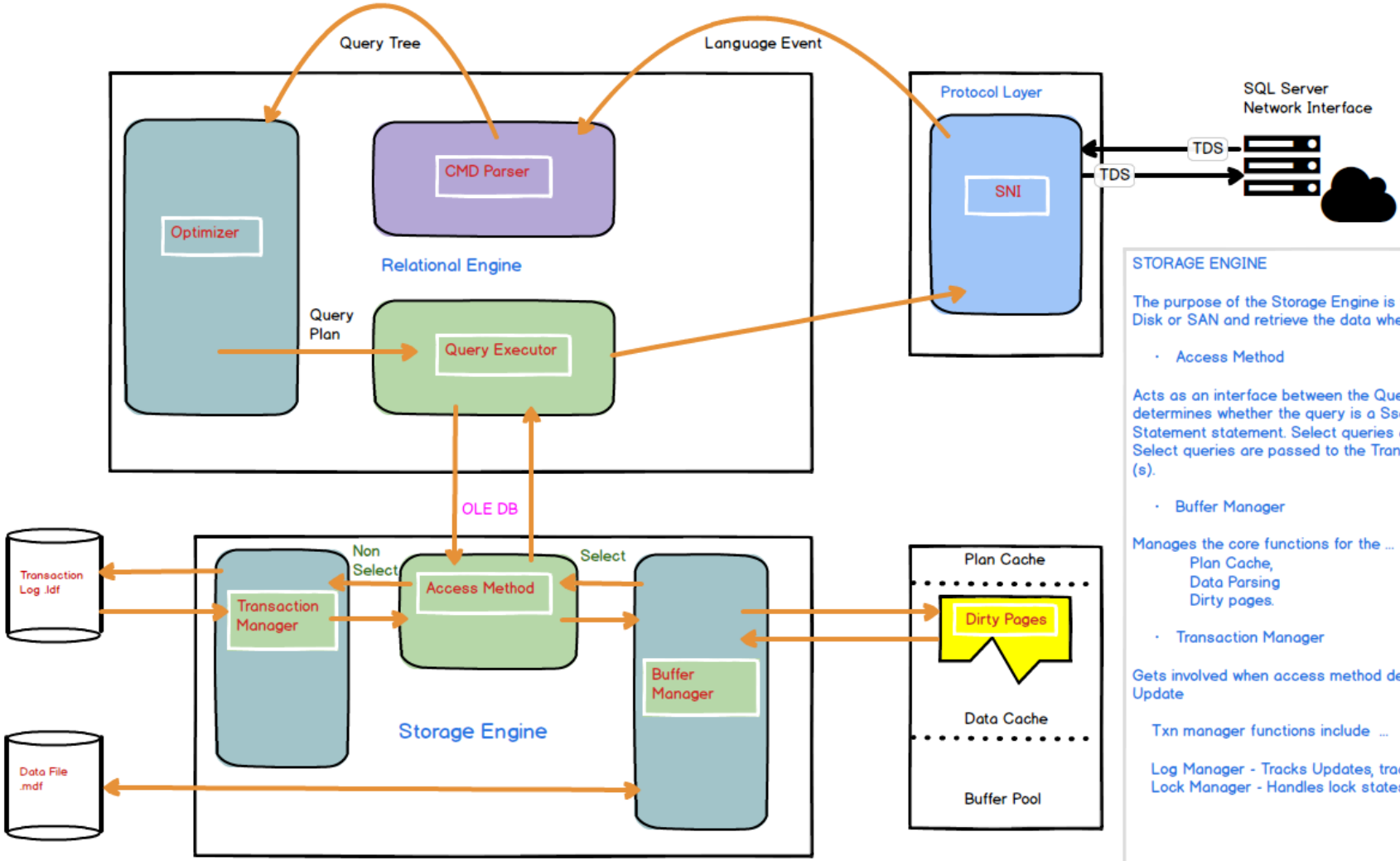
The CMD Parser will ensure that the syntax of the query is correct (as with all languages) this is visible in the SSMS Intellisense feedback.

The Optimizer will create query plans for queries, which determines how the query will be executed in other words the Optimizer (as the name suggests) will ensure the query is executed in the most efficient way.

The Query Executer calls 'Access Method'. It provides an execution plan for data fetching logic required for execution. Once data is received from Storage Engine, the result gets published to the Protocol layer.

Finally, data is sent to the end user.

SQL Server basic architecture - Part 3 - Storage Engine



STORAGE ENGINE

The purpose of the Storage Engine is to store data in a storage system like Disk or SAN and retrieve the data when needed.

- Access Method

Acts as an interface between the Query Executor & Buffer Manager, it determines whether the query is a Sselect Statement or Non Select Statement statement. Select queries are passed to the Buffer manager non Select queries are passed to the Transaction Manager e.g. Update statement (s).

- Buffer Manager

Manages the core functions for the ...
Plan Cache,
Data Parsing
Dirty pages.

- Transaction Manager

Gets involved when access method determins the Query is Non Select e.g. Update

Txn manager functions include ...

Log Manager - Tracks Updates, tracks transaction commits/rollbacks
Lock Manager - Handles lock states during transactions