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DBMS Architecture

COMP3211 Advanced Databases

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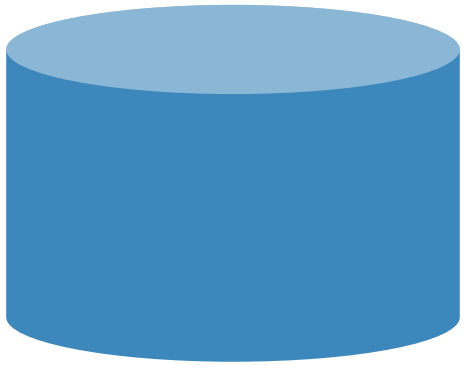
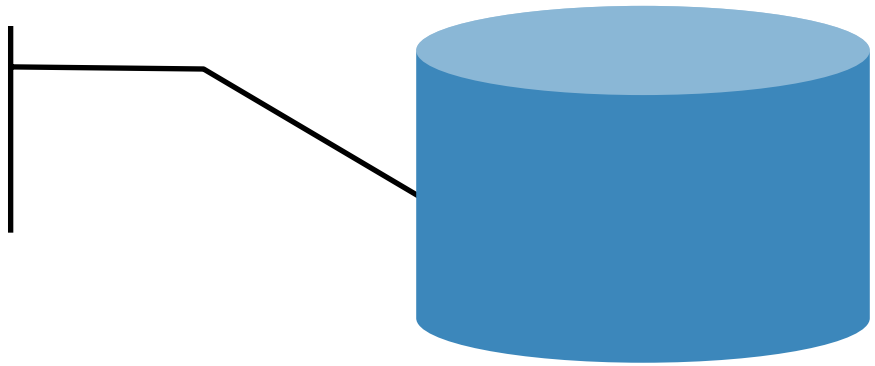
Two Questions:



Two Questions:

what's inside a DBMS?



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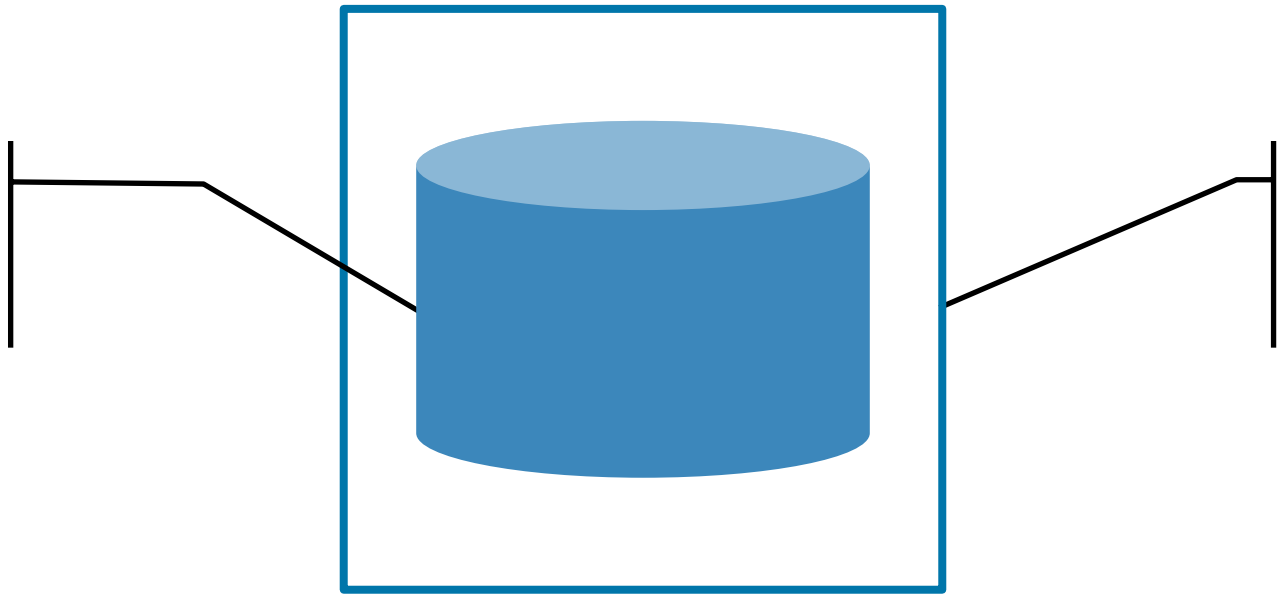

what's the interface to the DBMS?

Interfaces: DDL vs DML

DDL – Data Definition Language

- Creating tables, indices
- Manipulating database schema

DML – Data Manipulation Language

- Queries
- Updating table contents

DBMS Interfaces

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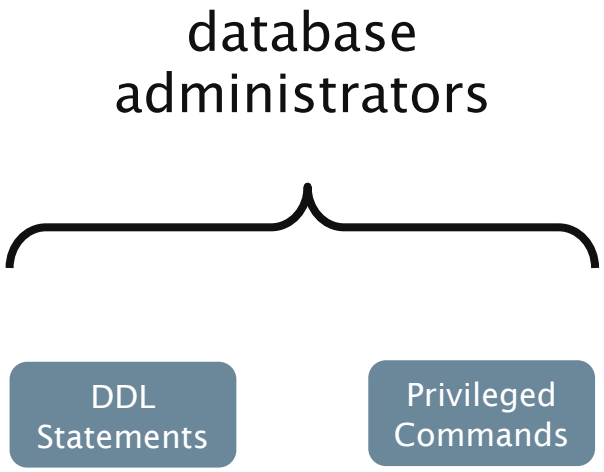

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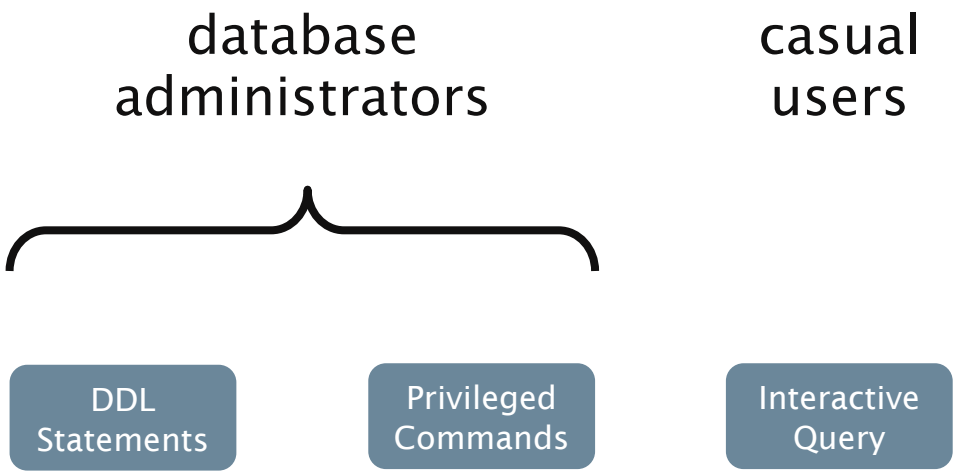

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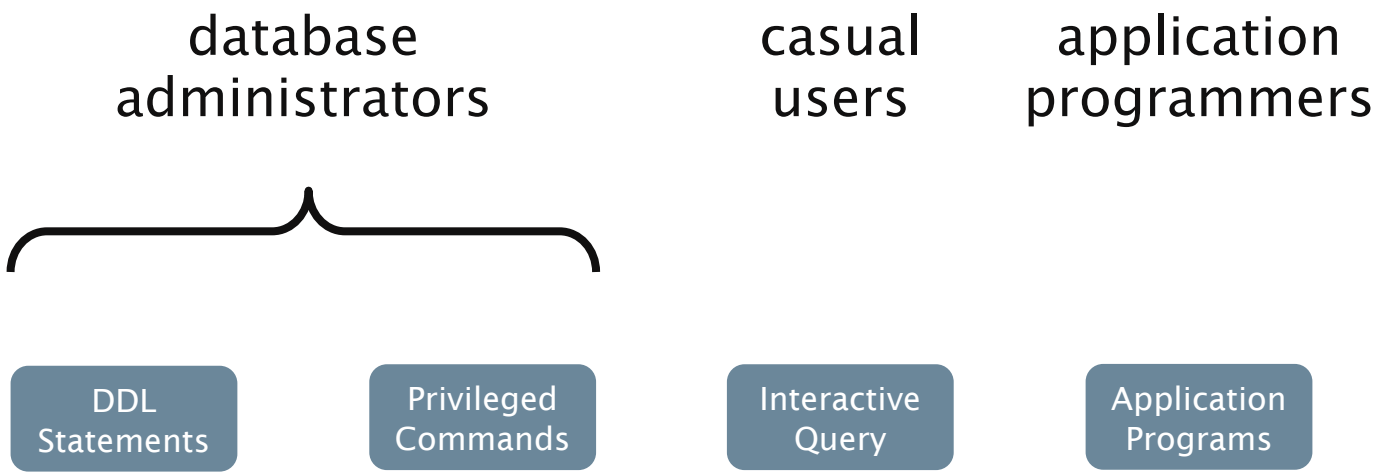
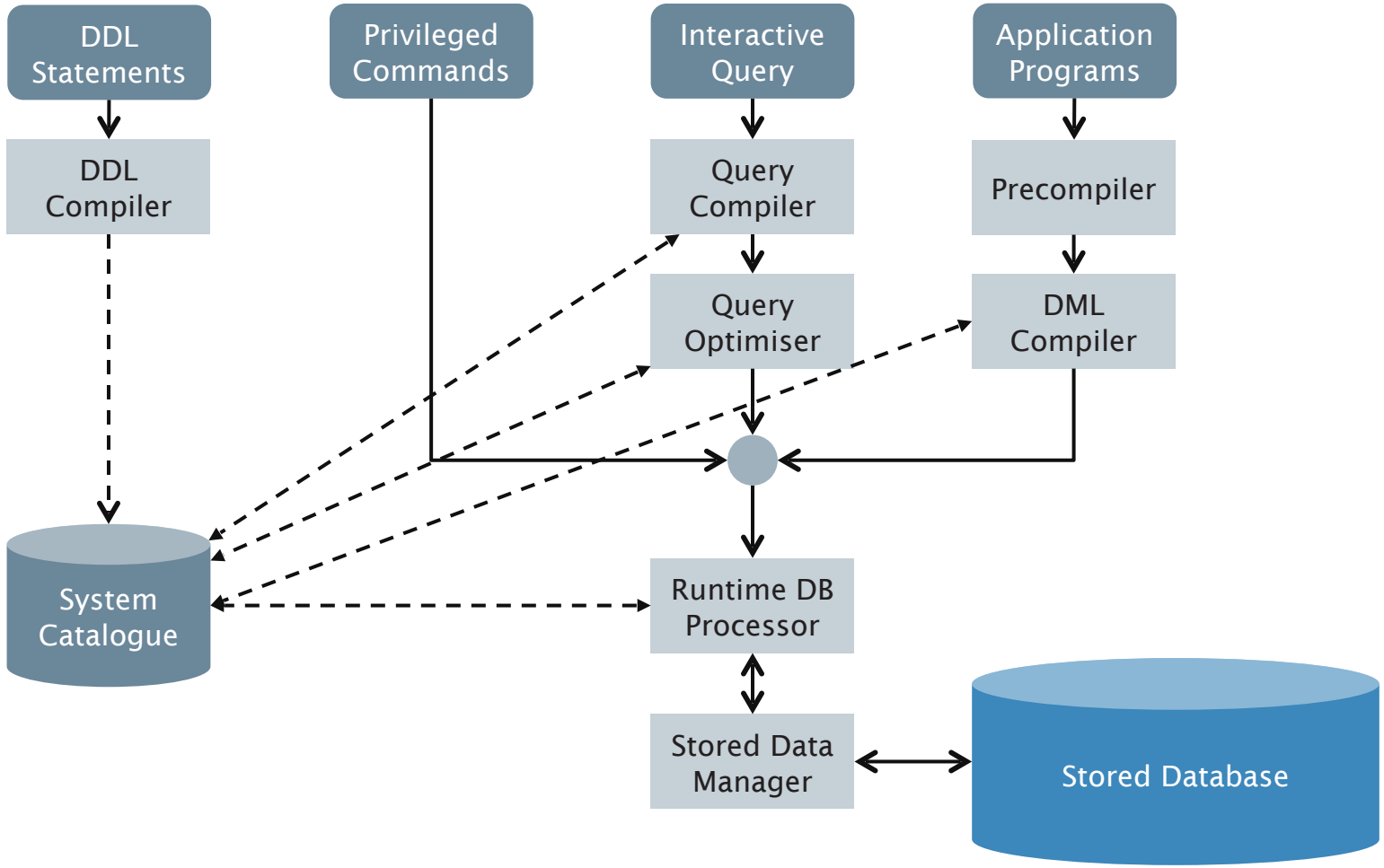


DBMS Components



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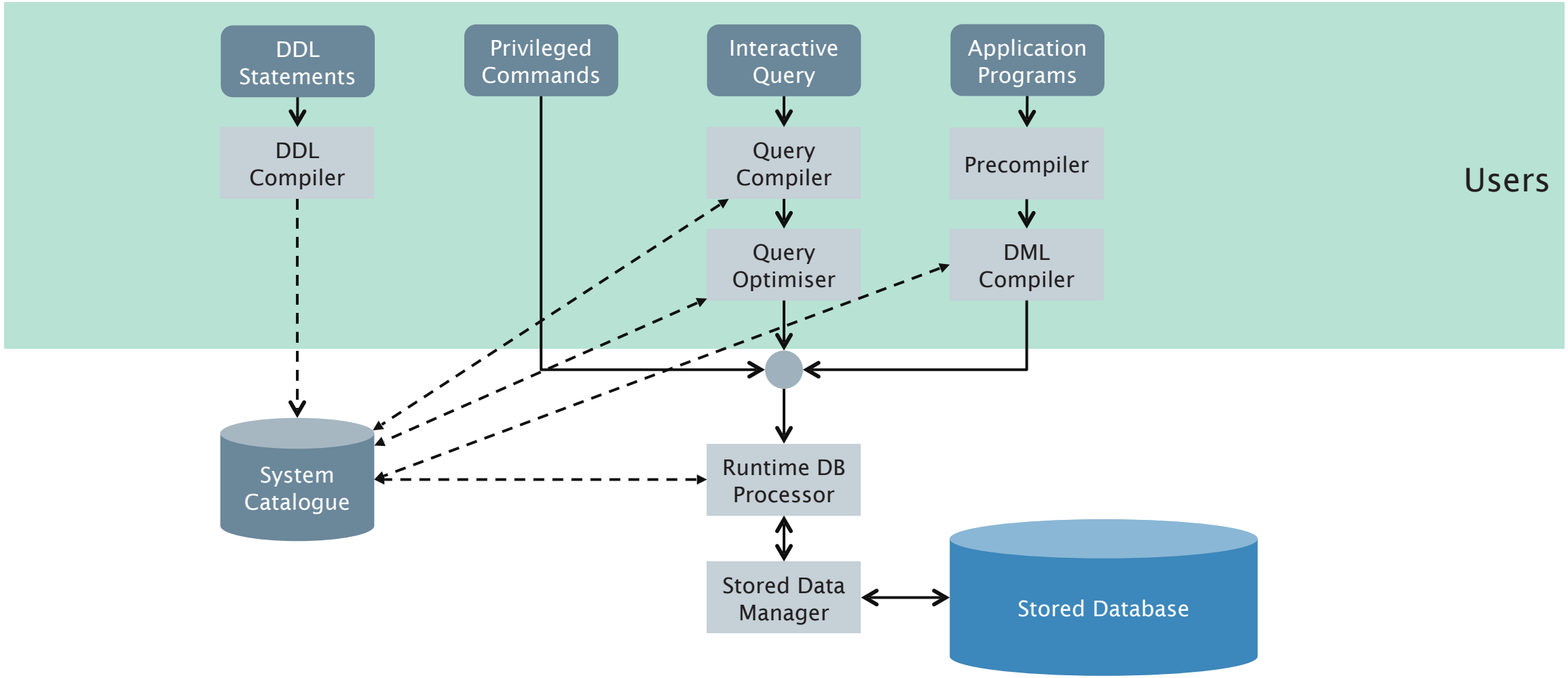

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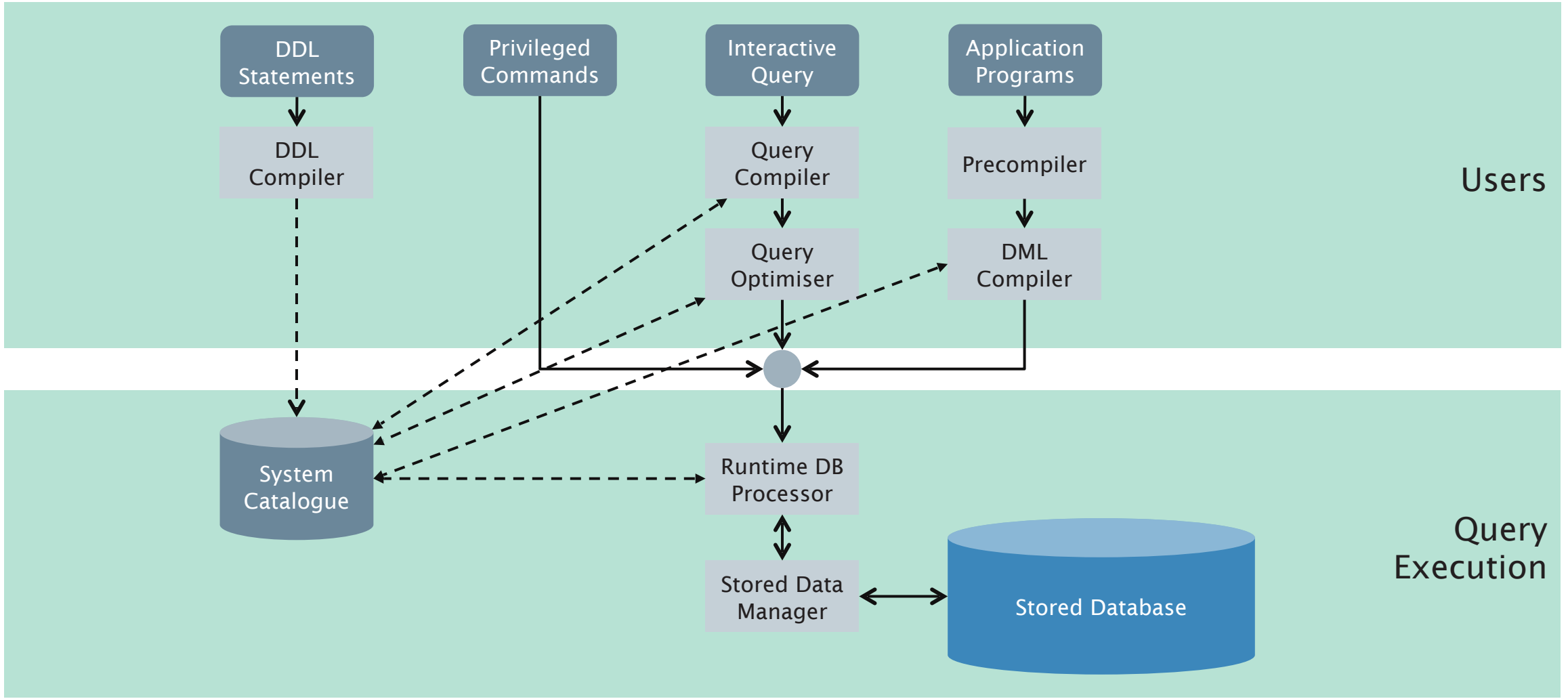
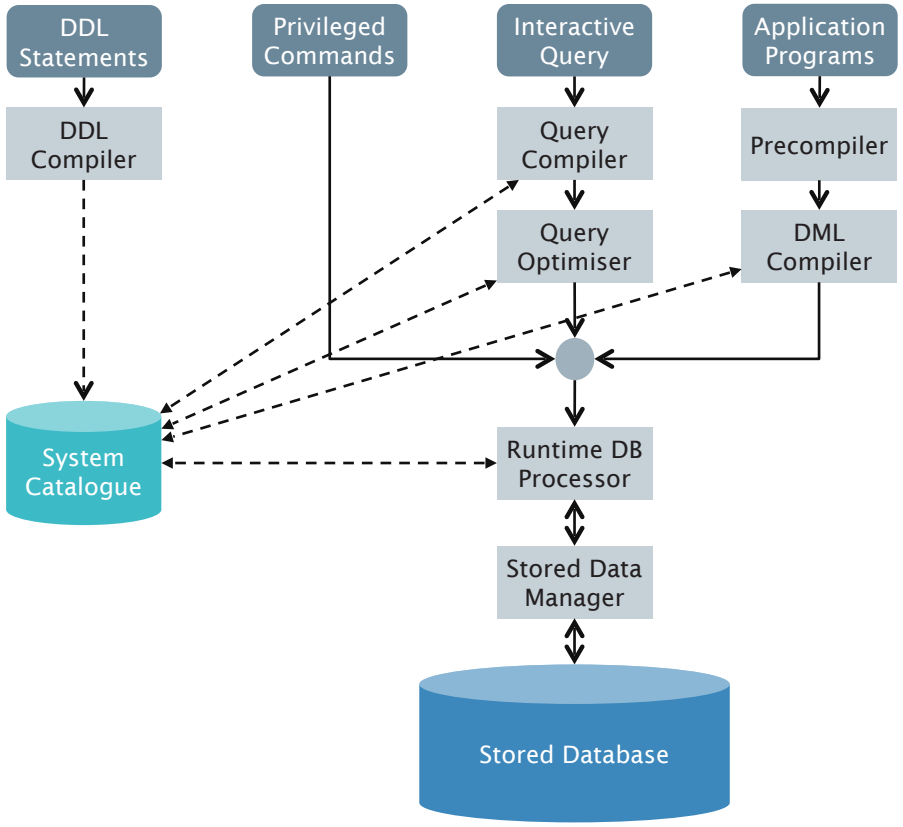


System Catalogue

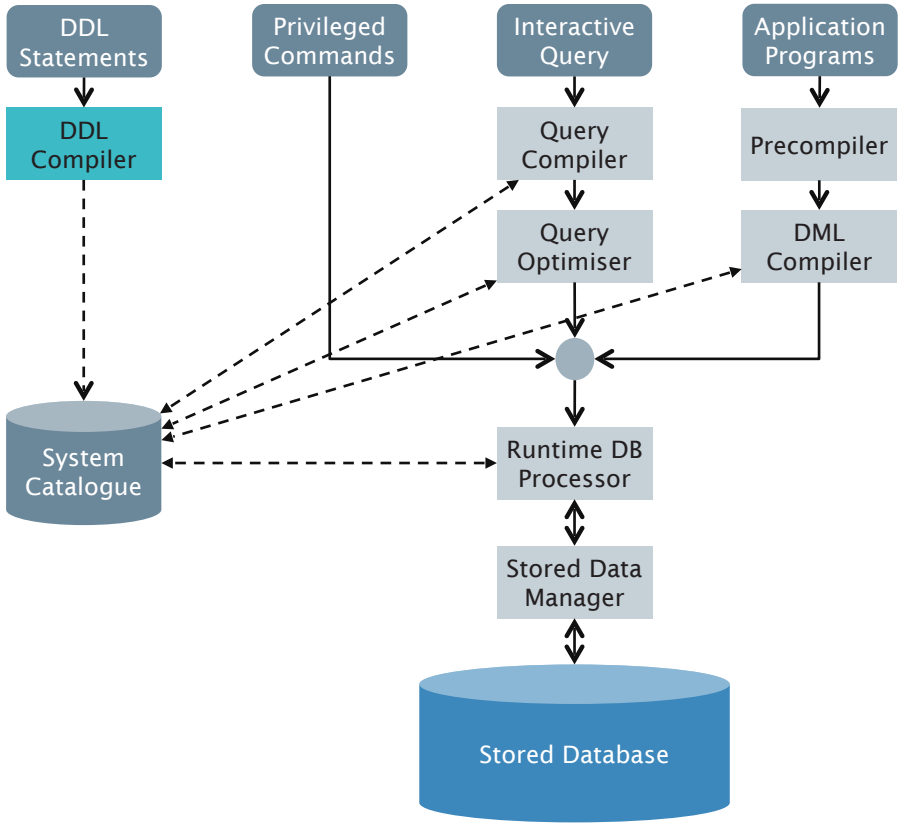
Contains metadata about stored data and schemas:

- names and sizes of files
- storage details of files
- names and data types of data items
- mappings between schemas
- constraints
- statistical information



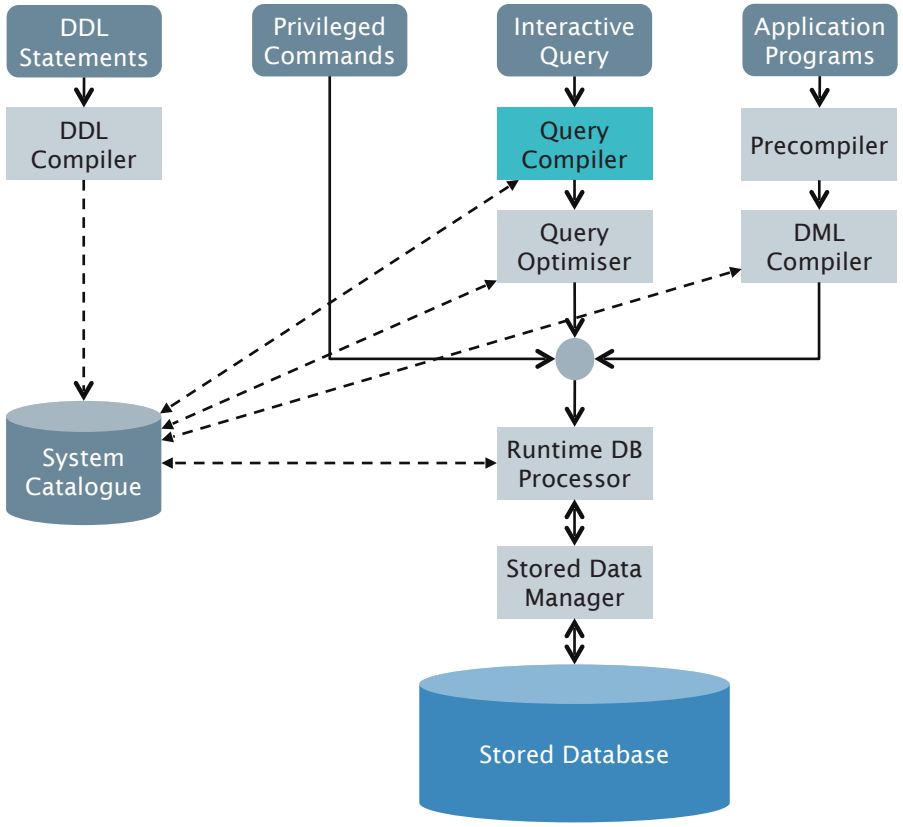
DDL Compiler

- Processes schema definitions
- Stores schema descriptions in the *system catalogue*



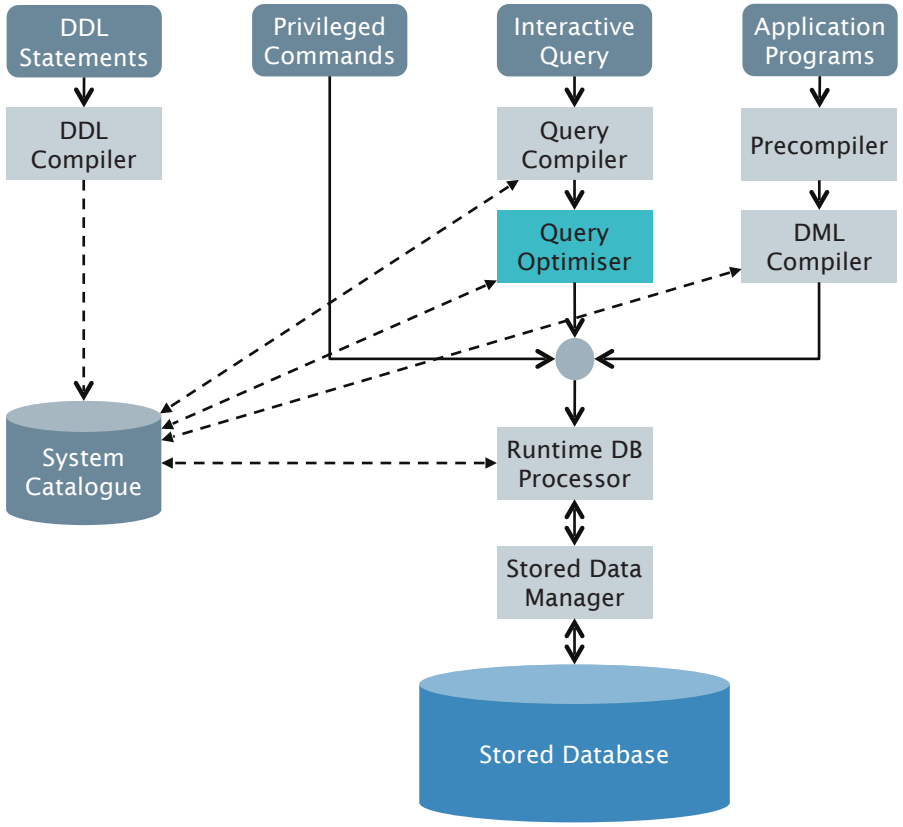
Query Compiler

- Parses and validates queries
- Compiles queries to internal form (query plan)
- Passes compiled queries to *query optimiser*



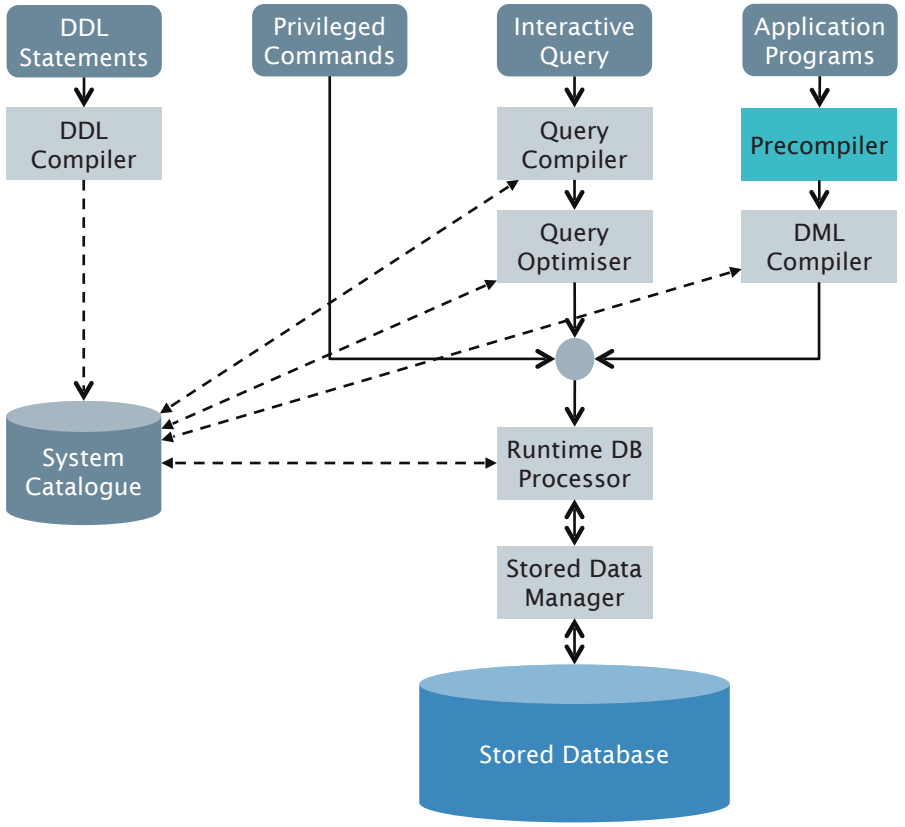
Query Optimiser

- Rearranges and reorders operations within query plan
- Eliminates redundancies
- Identifies appropriate algorithms and indexes used to implement operations
- Consults *system catalogue* for statistical and other information
- Generates executable code



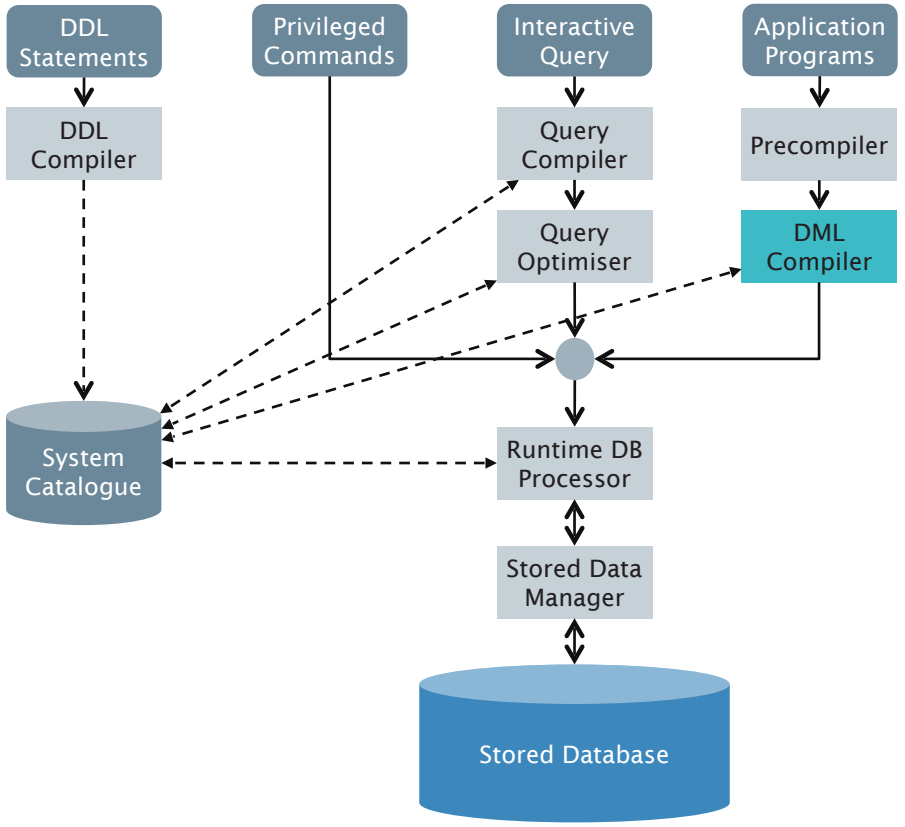
Precompiler

- Extracts DML commands from application programs and sends them to the *DML compiler*



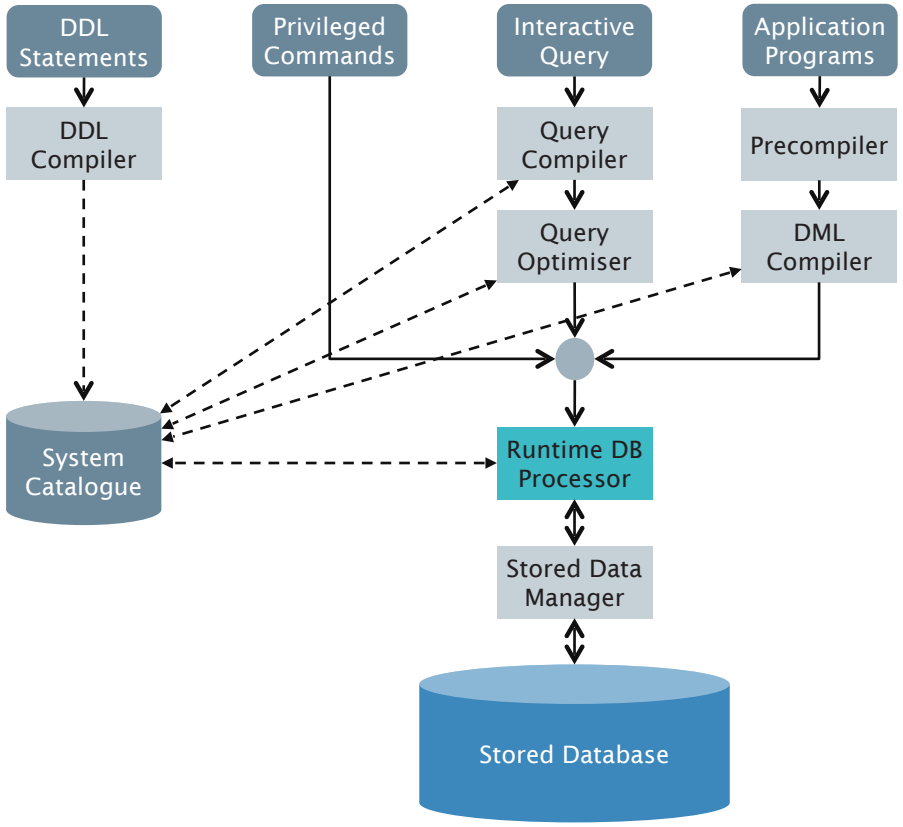
DML Compiler

- Compiles DML into executable code that can be sent to the *runtime processor*



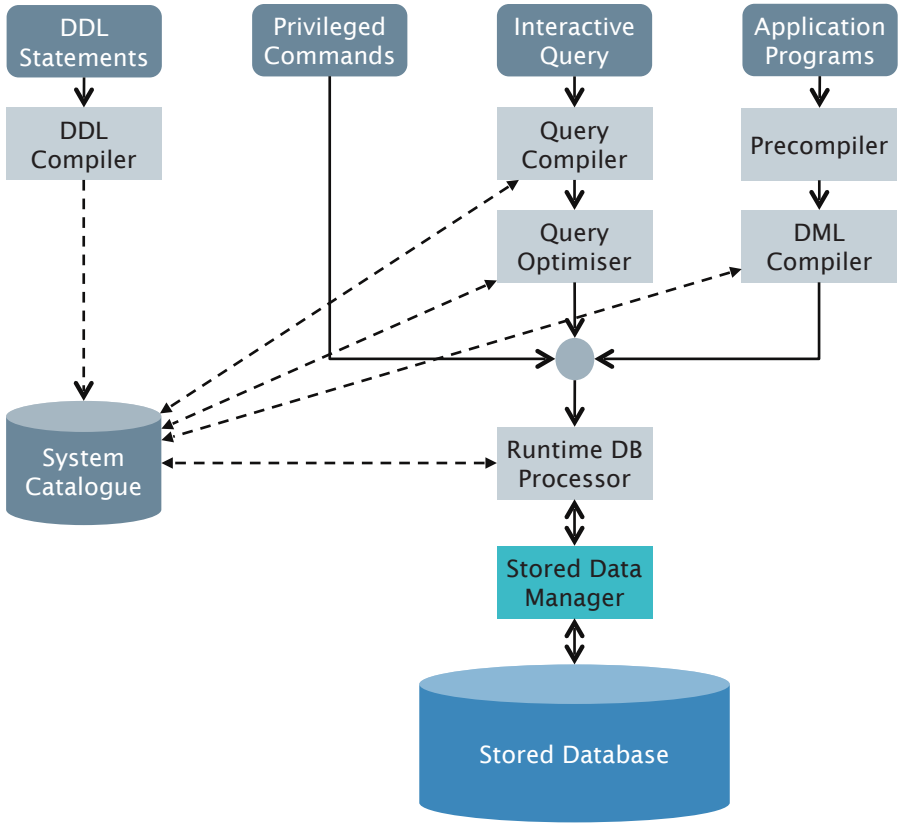
Runtime Database Processor

- Executes privileged commands
- Executes query plans from the *query optimiser*
- Accesses database through *stored data manager*



Stored Data Manager

- Controls access to information on disc, using basic operating system services
- Manages shared buffer pool (available main memory used for transferring data to and from disc)



Other Component Modules

- *Loading utility* loads files into DB
- *Backup utility* dumps DB to secondary storage (tape, typically)
- *Recovery utility* deals with failure using backup information
- *File reorganisation utility* improves performance
- *Performance monitoring* provides statistics for DBA to decide whether to reorganise

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Next Lecture: Data Storage