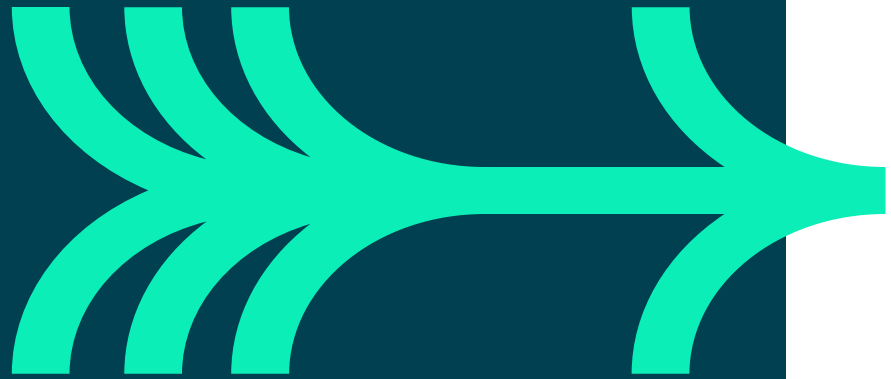
SQL SERVER ADMINISTRATION (QASQLADMIN)

MODULE 1 – SQL OVERVIEW

SQL OVERVIEW

- Introduction to the SQL Server Platform
- Overview of SQL Server Architecture



LESSON 1: INTRODUCTION TO THE SQL SERVER PLATFORM

- SQL Server Components
- SQL Server Instances
- SQL Server Editions
- SQL Server Versions
- Demonstration: Identify the Edition and Version of a Running SQL Server Instance

SQL SERVER COMPONENTS

Database Engine

- SQL Server Agent

Business Intelligence

- Integration Services
- Reporting Services
- Analysis Services
- Master Data Services
- Data Quality Services

Replication

Full Text Search

Distributed Replay

Machine Learning Services

- Java
- Python
- R

SQL SERVER INSTANCES

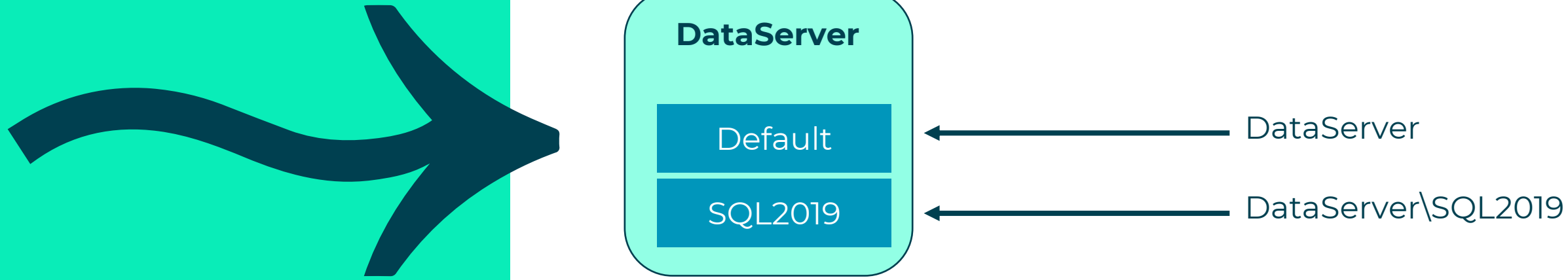
Many SQL Server components are instance-aware

Instances enable isolation of:

- Administration and security configuration
- Performance and SLAs
- Versions and collations

Two types of instance:

- Default instance
- Named instance



SQL SERVER EDITIONS

Principal Editions

- Enterprise
- Standard

Specialised Editions

- Web

Breadth Editions

- Developer
- Express

Cloud Editions

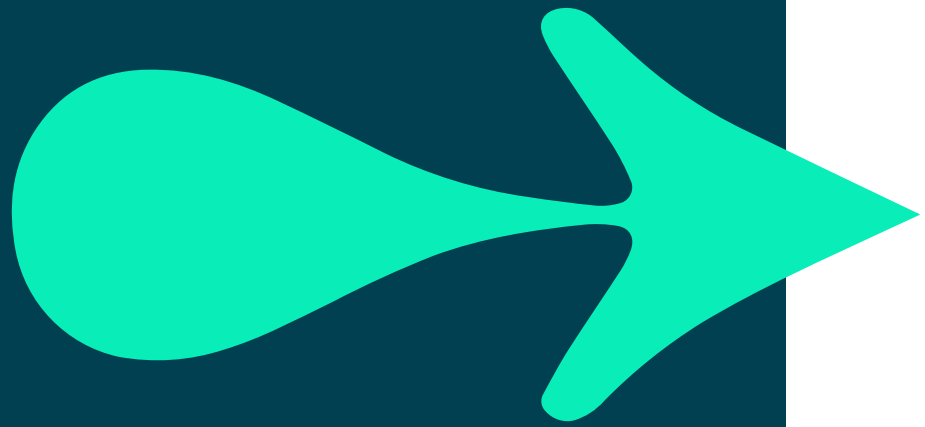
- Microsoft Azure SQL Database
- Azure SQL Managed Instance

SQL SERVER VERSIONS

Release Name	Version Number	Release Year
1.0	1.0	1989
1.1	1.1	1991
4.2	4.2	1992
4.21	4.21	1994
6.0	6.0	1995
6.5	6.5	1996
7.0	7.0	1998
2000	8.0	2000
2005	9.0	2005
2008	10.0	2009
2008 R2	10.5	2010
2012	11	2013
2014	12	2014
2016	13	2016
2017	14	2017
2019	15	2019
2022	(announced)	(announced)

DEMONSTRATION:

Identify the Edition and Version of a Running SQL Server Instance.



LAB A: REVIEW AND RECORD SQL SERVER SETUP

Exercise 1: Review SQL configuration

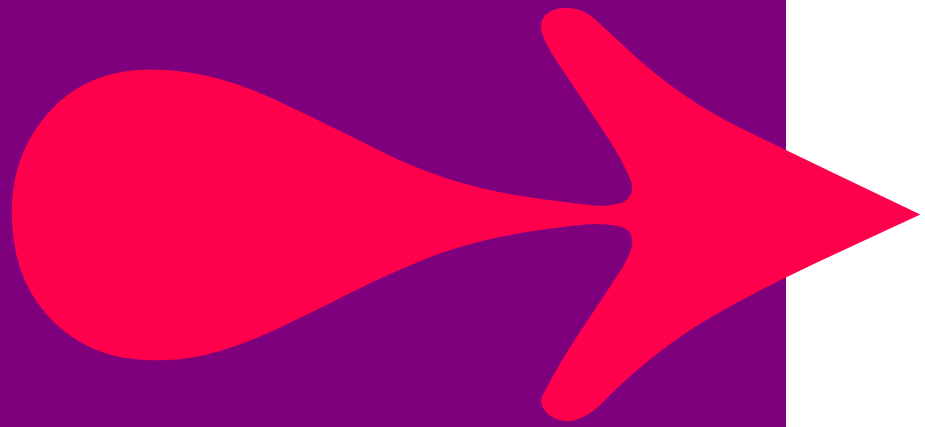
Exercise 2: Review available databases

Virtual machine: SQLADMIN1

User name: SQL\Student

Password: Pa55w.rd

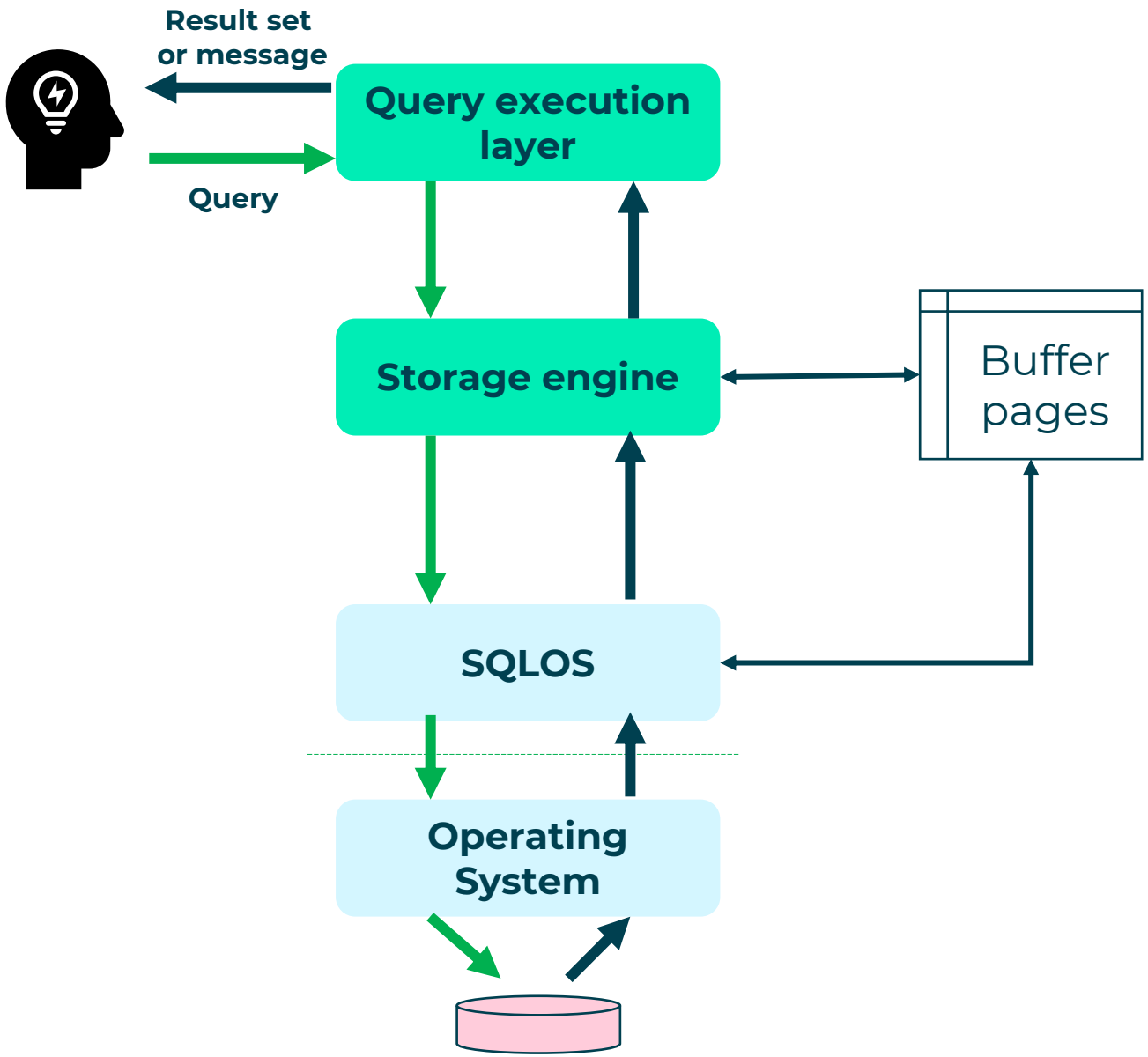
Estimated Time: 15 minutes



LESSON 2: OVERVIEW OF SQL SERVER ARCHITECTURE

- SQL Server Architecture
- CPU Usage
- Parallelism
- Memory Management
- Physical I/O and Logical I/O
- Demonstration: CPU and Memory Configurations in SSMS

SQL SERVER ARCHITECTURE



CPU USAGE

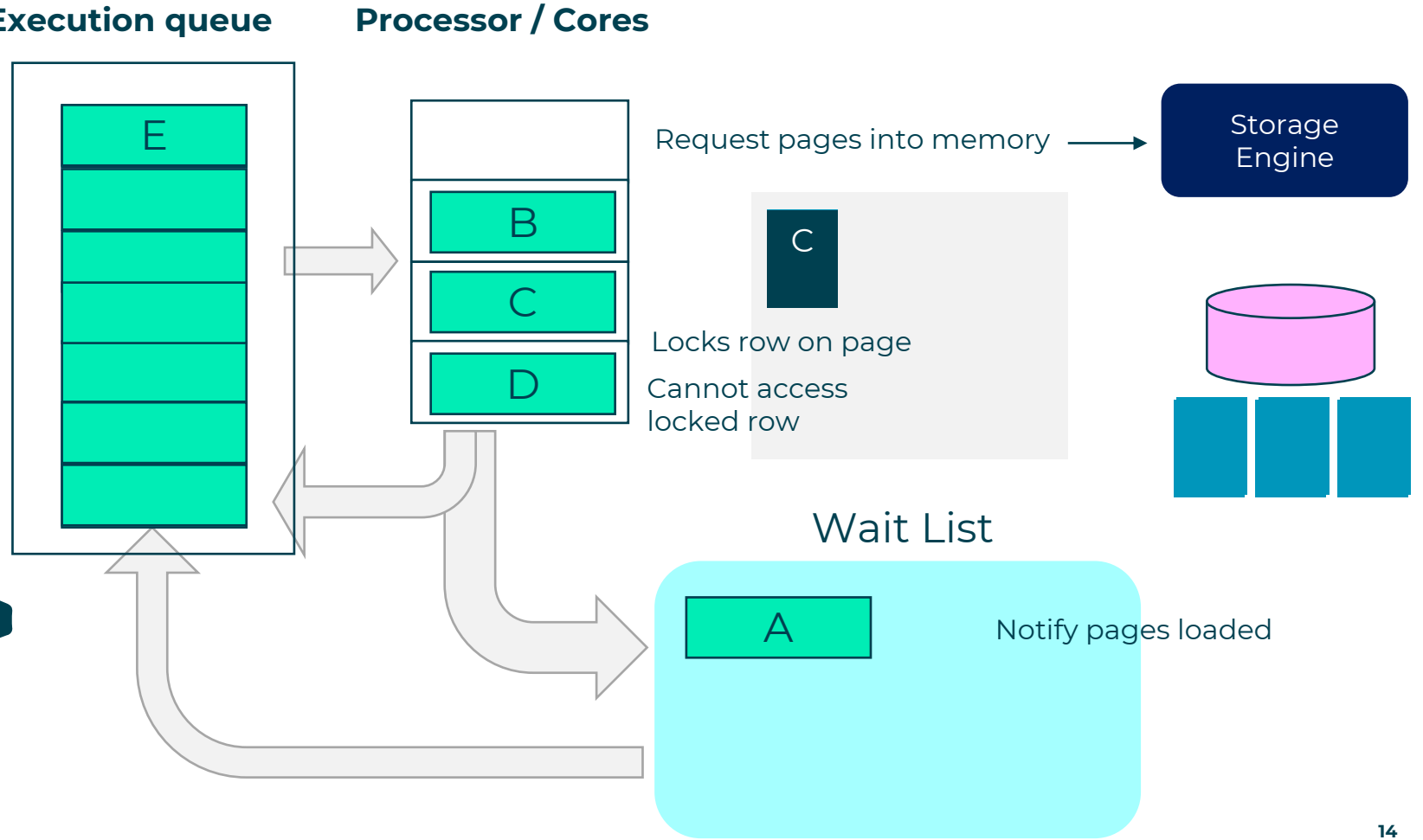
Windows uses pre-emptive scheduling of threads

SQL Server uses non-pre-emptive scheduling

One scheduler for every logical CPU created in SQLOS

CPU availability can be configured without restart

Tasks waiting on a resource are moved to a waiting list



PARALLELISM

Parallelism refers to multiple processors cooperating to execute a single query at the same time

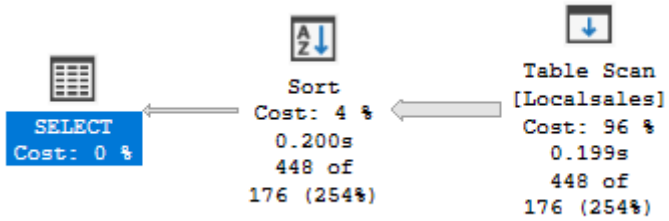
SQL Server can decide to distribute queries to more than one processor

SELECT

Cached plan size	48 KB
Estimated Operator Cost	0 (0%)
Degree of Parallelism	0
Estimated Subtree Cost	43.799
Memory Grant	1024 KB
Estimated Number of Rows for All Executions	0
Estimated Number of Rows Per Execution	176.413

Statement

```
select *
from dbo.localsales
where Customerkey = 21969
order by DueDate, ProductKey
option (maxdop 1)
```



Parallelism	
Cost Threshold for Parallelism	5
Locks	0
Max Degree of Parallelism	8
Query Wait	-1

SELECT

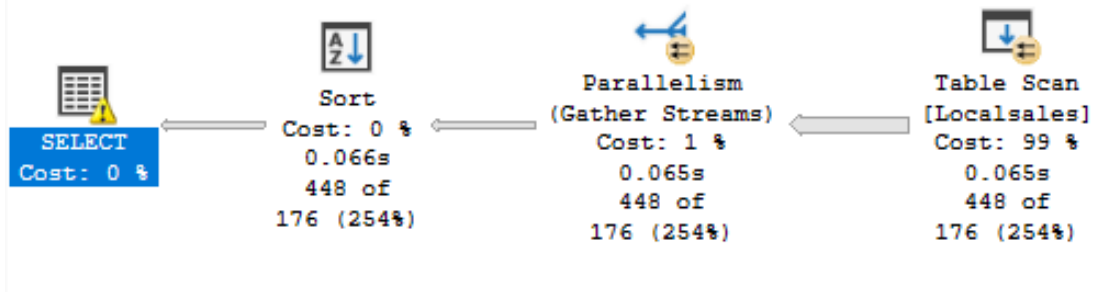
Cached plan size	56 KB
Estimated Operator Cost	0 (0%)
Degree of Parallelism	8
Estimated Subtree Cost	39.2478
Memory Grant	4360 KB
Estimated Number of Rows for All Executions	0
Estimated Number of Rows Per Execution	176.413

Statement

```
SELECT * FROM [dbo].[localsales] WHERE [Customerkey]=@1
ORDER BY [DueDate] ASC,[ProductKey] ASC
```

Warnings

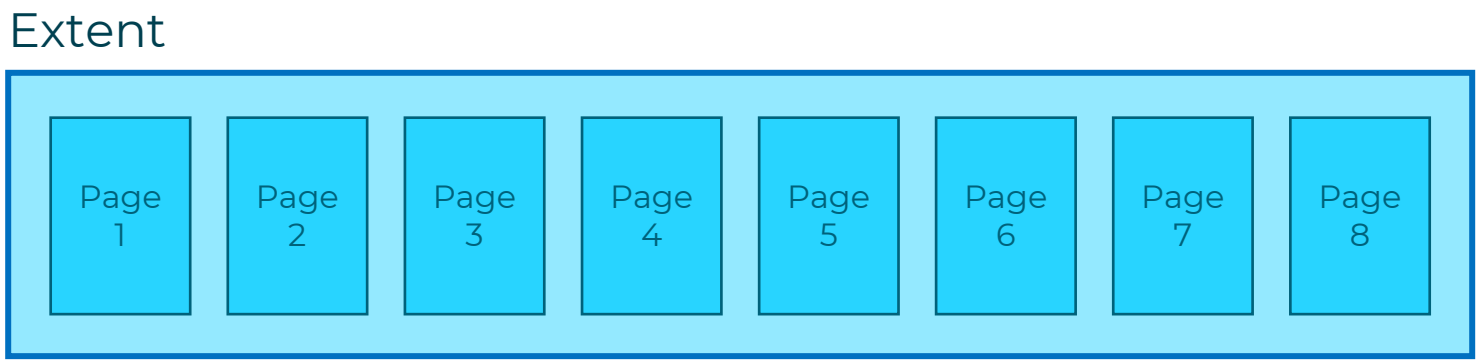
The query memory grant detected "ExcessiveGrant", which may impact the reliability. Grant size: Initial 4360 KB, Final 4360 KB, Used 200 KB.



MEMORY MANAGEMENT

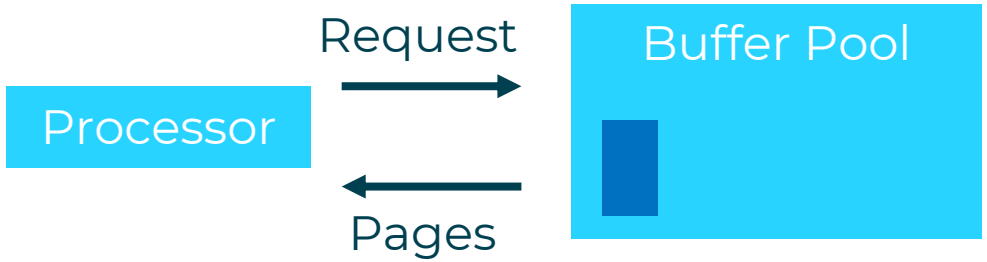
Buffer pool is the main memory object of SQL Server:

- Holds data cache
- Provides memory for other SQL Server components
- Is divided into 8 KB pages
- An extent is a collection of 8 pages

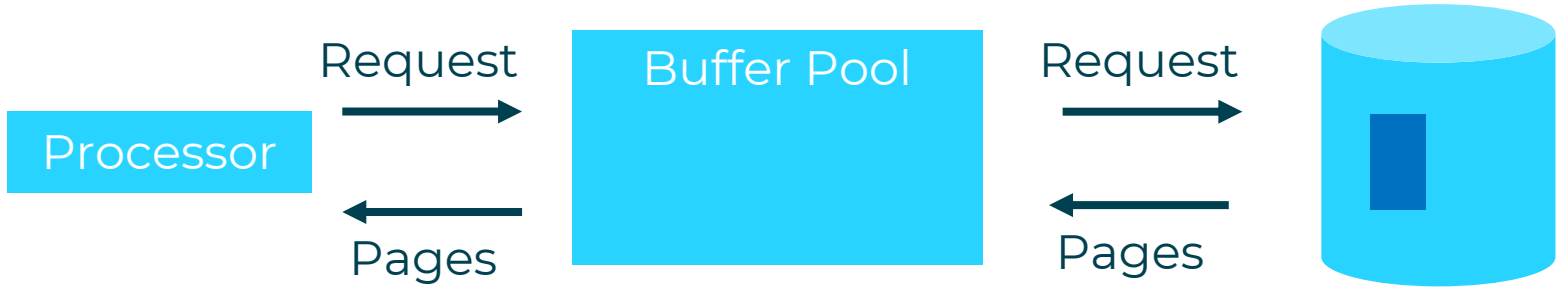


PHYSICAL AND LOGICAL I/O

Logical I/O



Physical I/O

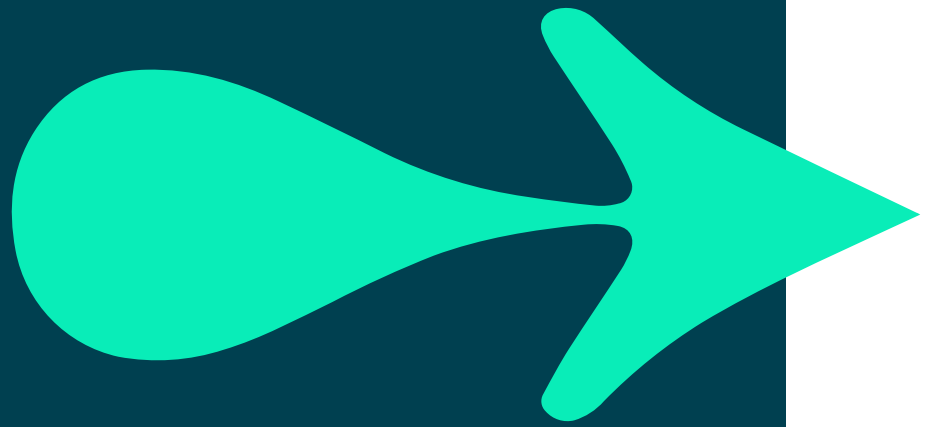


SQL SERVER SERVICES

- A SQL Server instance is made up of a number of Windows services.
- Install only the services required to support the intent of the installed SQL Server features.
- Many services are installed once per SQL Server instance.
- If a service is linked to an instance, the instance name will appear in brackets after the service name—SQL Server (MSSQLSERVER).
- Use SQL Server Configuration Manager to configure services.

DEMONSTRATION:

CPU and processor configuration in SQL Server.



LAB B: DESIGNING INSTANCE REQUIREMENT

Exercise 1: Review the exercise document.

Exercise 2: Answer questions based on requirements.

No virtual machine required.

Estimated time: 15 minutes.