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English IV **Data Science**

Introduction to **Structured Query Language**

Presentation Topics

What is this language?

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What is SQL?

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History of SQL

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Data Science

What is SQL?

SEQUEL

What is SQL?

Programming language for interacting with databases

Purpose: Store, retrieve, manage, and manipulate data within a database management system.

```
e_year, length, replacement_cost from
and replacement_cost > 29.50
;
se_year | length | replacement_cost
--------+--------+------------------
   2006 |    159 |            29.99
   2006 |    179 |            29.99
   2006 |    172 |            29.99
   2006 |    142 |            29.99
   2006 |    165 |            29.99
   2006 |    179 |            29.99
   2006 |    154 |            29.99
   2006 |    149 |            29.99
   2006 |    153 |            29.99
   2006 |    177 |            29.99
   2006 |    159 |            29.99
   2006 |    140 |            29.99
   2006 |    181 |            29.99
   2006 |    124 |            29.99
   2006 |    171 |            29.99
   2006 |    135 |            29.99
   2006 |    163 |            29.99
   2006 |    145 |            29.99
   2006 |    131 |            29.99
   2006 |    122 |            29.99
   2006 |    163 |            29.99
   2006 |    147 |            29.99
   2006 |    139 |            29.99
   2006 |    143 |            29.99
   2006 |    173 |            29.99
```

Global Standard

Globally accepted as the standard for relational database management systems (RDBMS).

Key Functionalities

Utilizes sets of keywords (statements) to retrieve data.

Common Management Systems

SYBASE®

INGRES

Microsoft® SQL Server®

Access

ORACLE

Unique properties with proprietary extensions in some systems.

What is SQL used for?

- Organized collection of data crucial for digital businesses.
- Efficient storage, sorting, retrieval, and searching of information.

VARIETY OF DATABASE TYPES:

Choice of type depends on the data to be stored

Practical Use of SQL

Querying databases in various ways using English-like statements.

Employed in websites (e.g., Facebook), music apps (Spotify), banking apps (Revolut), and social media (Twitter and Instagram).

CRUD and SQL's Versatility: CRUD: "Select," "Insert," "Update," "Delete," "Create," and "Drop."

Data Science

History of SQL

IBM, 1970s

Origins of SQL

Created in the early 1970s at IBM's San Jose Laboratories.

Part of the System R project demonstrating the feasibility of the relational model proposed by Edgar Frank.

Acronym for "Structured English Query Language." Pronounced as "sequel," influencing its common pronunciation to this day.

Original Name

SEQUEL

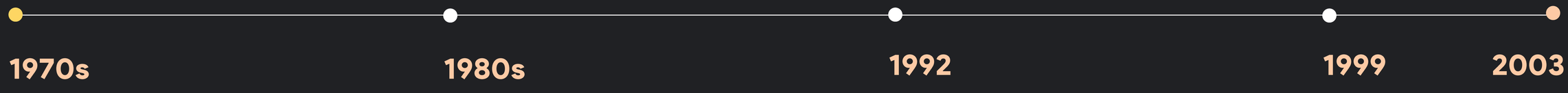
1st Commercial System & Diversity

1st Commercial System & Diversity

Successive evolutions made SQL the most powerful tool for defining and manipulating relational databases.

- Widely used in the vast majority of relational database systems today.

First SQL-based Database System



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- Diverse "dialects" developed by various producers.

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Demonstration

SELECT * FROM

SQL has many uses, from creating and querying records to directly interacting with the database objects. We can divide SQL into three main topics, but all of them belong to SQL.

DDL (Data Definition Language)

Commands for creating, deleting, and manipulating database objects (database, tables)

Example: Creating a college database for student data, modifying table structure.

```
CREATE SCHEMA College;

CREATE TABLE students(
    id int PRIMARY KEY,
    name varchar(20))
```

```sql
ALTER TABLE students
ADD phone_number int

/* Remove a column in TABLE students
*/
ALTER TABLE students
DROP COLUMN phone_number int

/* Change the column in TABLE students with new name and type respectivly
*/
ALTER TABLE students
RENAME COLUMN name TO student_name
ALTER COLUMN student_name varhcar(100)
```

DDL

Columns in the table can be added, removed, or updated.

DQL (Data Querying Language)

Commands for searching data with diverse filters.

```sql
/* All students*/
SELECT * FROM students

/*All students with name starting with letter ‘A’;*/
SELECT * FROM students WHERE student_name LIKE "a%"

/*All students with ID greater than 10*/
SELECT * FROM students WHERE ID > 10
```

Examples: Retrieving all students, filtering by names starting with 'A', and by IDs greater than 10.

DML (Data Manipulation Language)

Commands for creating, modifying, or deleting data.

Example: Creating, modifying, and deleting a student from the database

```
/*Adding new value to database (ID 50 and name 'Gabriel')*/
INSERT INTO students VALUES (0,"Gabriel")

/*Modify the name of the student with ID 50 to 'Gabriel Luiz'*/
UPDATE students SET student_name = "Gabriel Luiz" WHERE ID = 50

/*Delete the data of the student with ID 50*/
DELETE students WHERE ID = 50
```

Except of those topics we have more of two of them that is more complex, they are

DCL (Data Control Language) is used to control the security of a dataset, including commands for granting or revoking access control

DTL (Data Transaction Language)
Commands for creating transactions.
Example: Initiating credit transfers with rollback capabilities in case of failure

Trends

Is this language currently in use?

Almost 50 years old, but...

Still is one of the most languages of all time, according to db-engines.com, only 3 of the top 10 data management systems don´t use SQL.

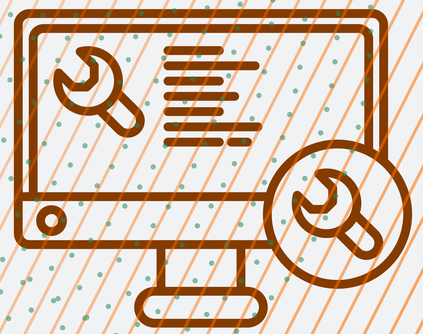
Today, it boasts one of the largest and most collaborative communities.

SQL is both simple and intuitive, allowing for complex operations to be performed in a easy way.

Some professionals that uses SQL

Business Intelligence

Web Developer

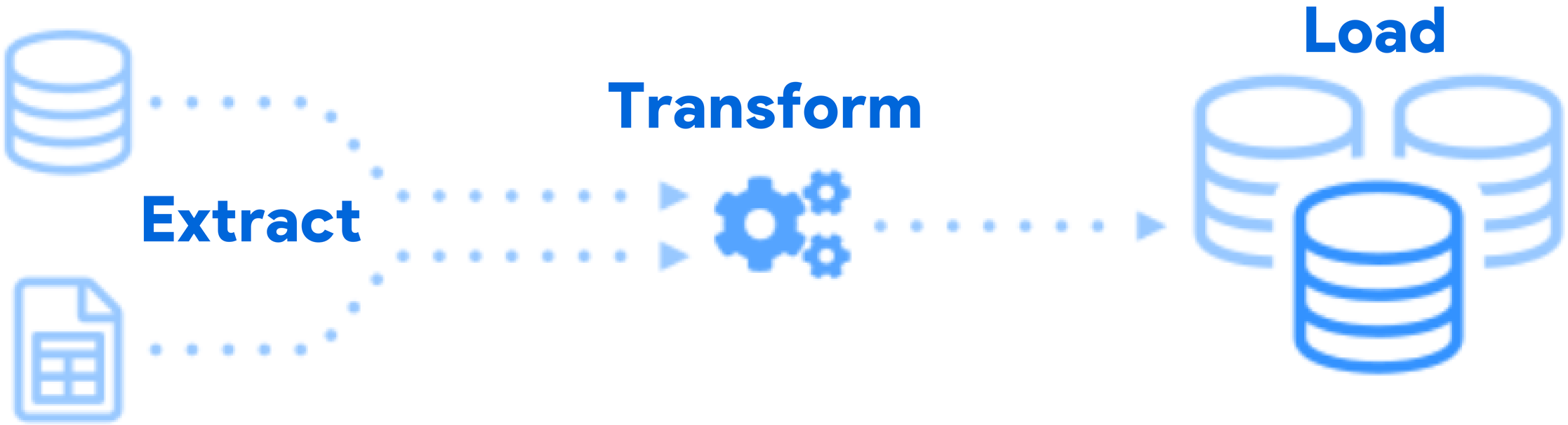


Software Engineering

How it's used in Data Science

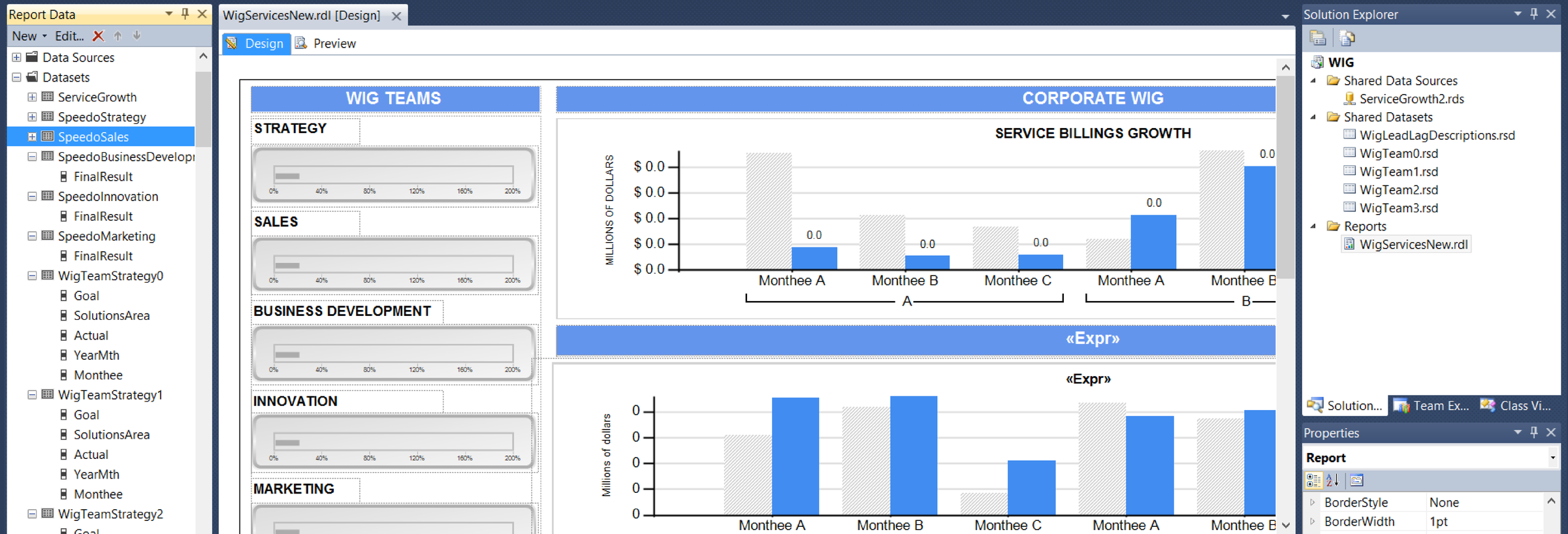
Data Science & Analytics

SQL is essential for data science and analytics, allowing data scientists and analysts to extract, transform, and analyze large datasets from multiple sources. Its ability to filter, aggregate, and join data is vital for data-driven decision making.



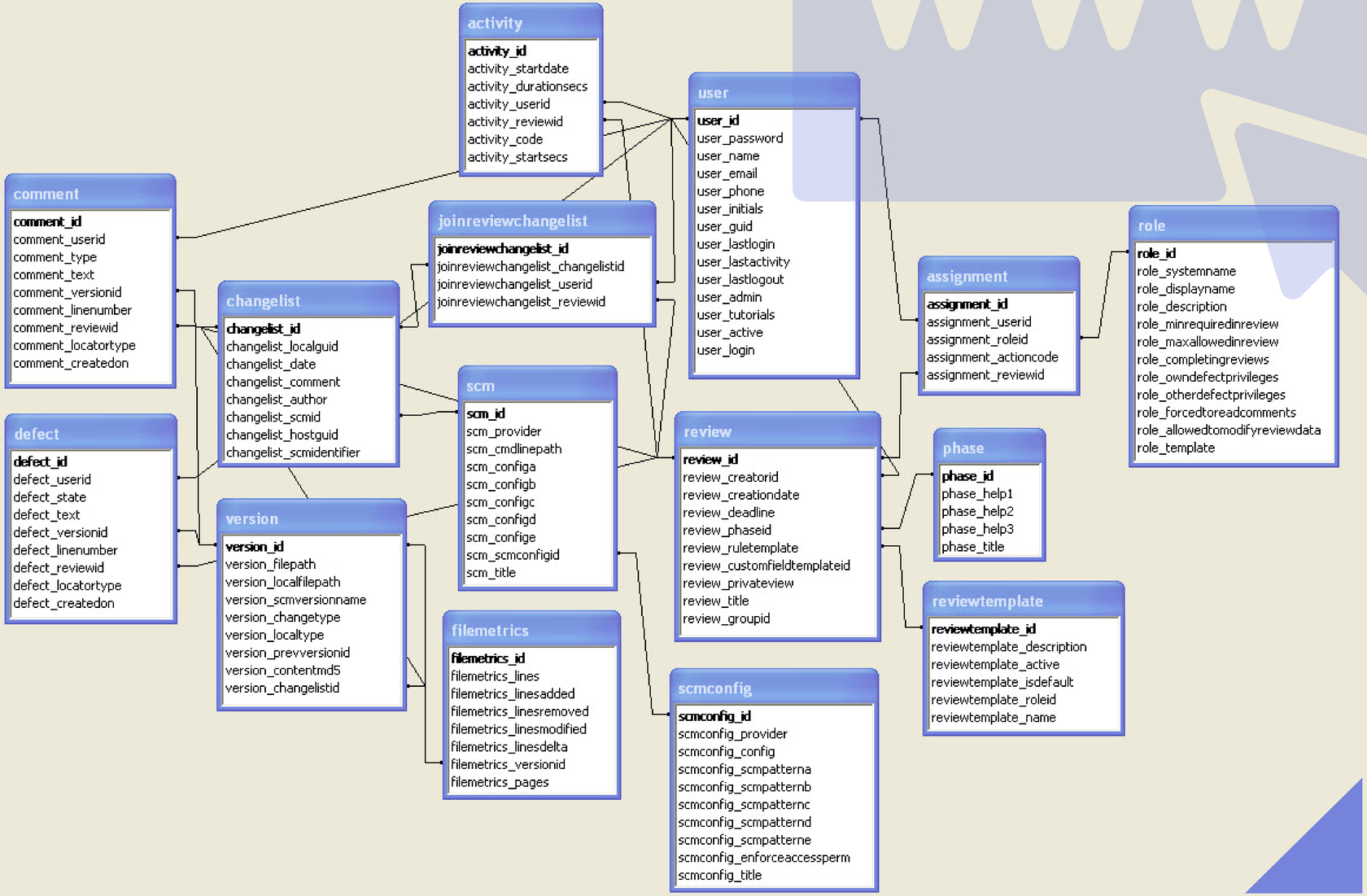
Business Intelligence

Business intelligence tools and platforms use SQL to retrieve and visualize data, allowing organizations to monitor performance and track trends through custom reports and dashboards.

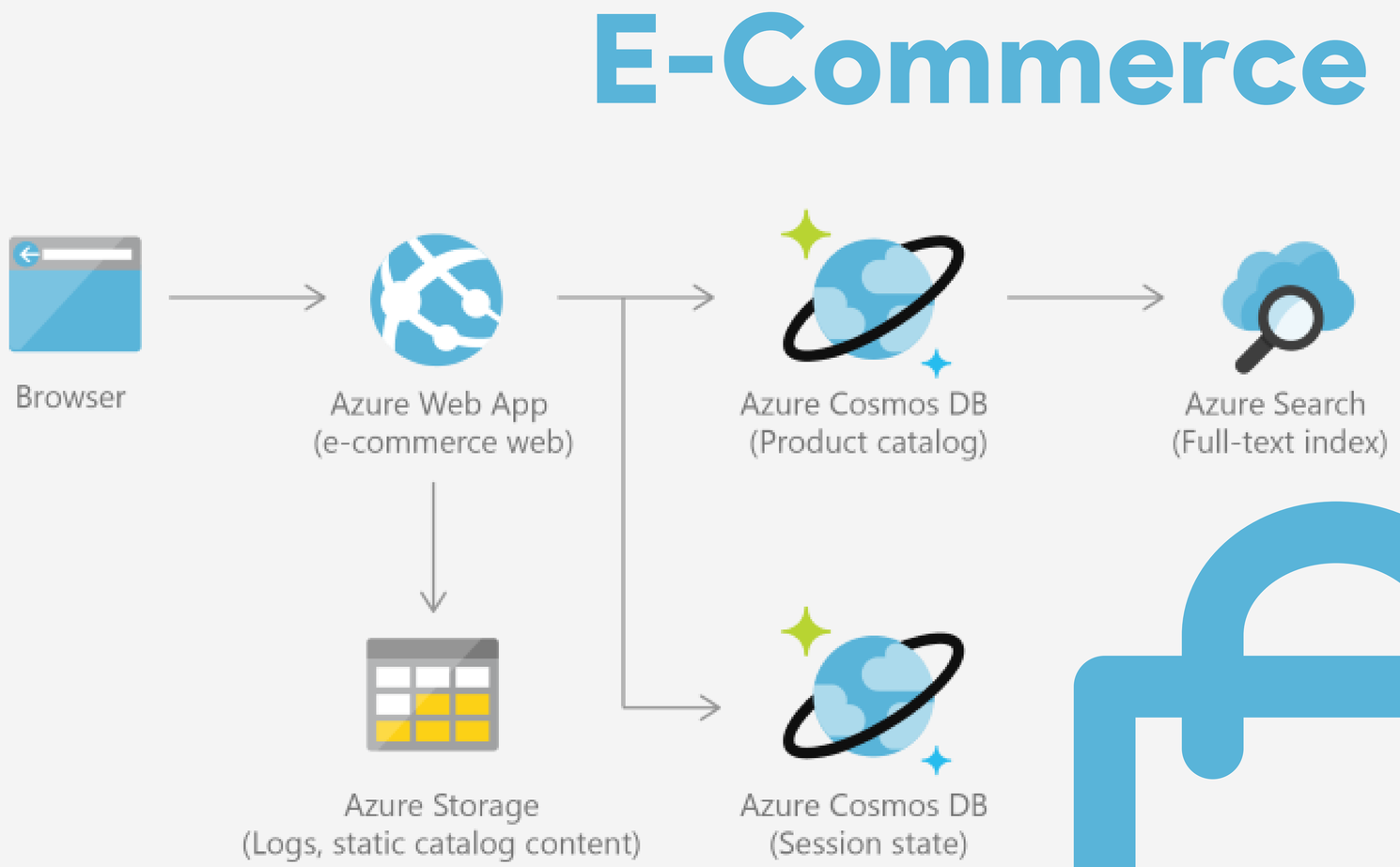


Web Development

SQL databases are crucial in web development, allowing for the storage and retrieval of dynamic content such as user data and product information. SQL queries enable developers to interact with these databases seamlessly.



Online stores use SQL databases to manage product catalogs, customer profiles, and order histories, ensuring efficient inventory management and personalized shopping experiences through its ability to handle complex queries.



Content Management Systems CMS

CMS platforms like WordPress and Joomla utilize SQL databases to store website content, user accounts, and configuration settings for easy management of content and users.

References Bibliogr

Help : ITS : University of Sussex. Disponível em: <https://www.sussex.ac.uk/its/help/faq?faqid=897#:~:text=SQL%20is%20used%20to%20communicate>

FUTURELEARN. What is SQL used for? Disponível em: <https://www.futurelearn.com/info/blog/what-sql-used-for>.

WIKIPÉDIA. SQL. Disponível em: <https://pt.wikipedia.org/wiki/SQL>.

História do SQL :: SQL Pédia. Disponível em: <https://sqlpedia.webnode.pt/sql/historia-do-sql/>.

Subconjuntos SQL: DDL, DQL, DML, DCL, DTL e TCL: Disponível em: <https://blog.betrybe.com/linguagem-de-programacao/subconjuntos-sql/>.

SQL is 43 years old - here’s 8 reasons we still use it today. Disponível em: <https://blog.sqlizer.io/posts/sql-43/>.

Is SQL Still Relevant? Disponível em: <https://www.srgsoftware.io/blog/is-sql-still-relevant/>.

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