JOCOTITLÁN HIGHER STUDIES TECHNOLOGY

Computer Systems Engineering

A C T I V I T Y

“the ISO/IEC 9075 standard (SQL standard)”

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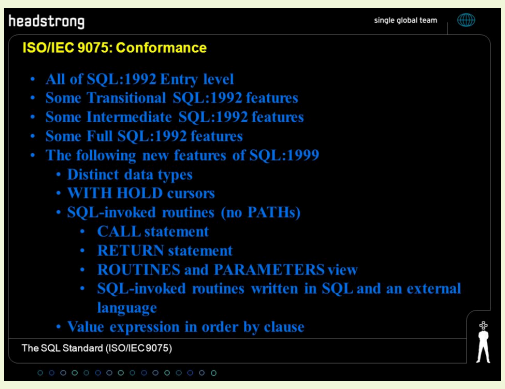
THE ISO/IEC 9075 STANDARD (SQL STANDARD)

WHAT IS ISO/IEC 9075?

ISO/IEC 9075 is the international standard defining SQL (Structured Query Language), used to manage, manipulate, and query relational databases. The standard ensures interoperability and uniformity across different Database Management Systems (DBMS).

HISTORY AND EVOLUTION

- SQL-86 (1986): First official standard establishing the language basics.
- SQL-89 (1989): Minor improvements and corrections.
- SQL-92: Widely adopted version adding many key features; foundation of many modern DBMS.
- SQL:1999: Introduced object-oriented features, triggers, stored procedures, recursion.
- SQL:2003: Added support for XML, analytical/window functions.
- SQL:2008: Enhancements in data management, diagnostics, and security.
- SQL:2011: Introduced temporal data support (historical and future data).
- SQL:2016 and 2019: Extended JSON support, Big Data integration, enhanced security, and extensions for new technologies.

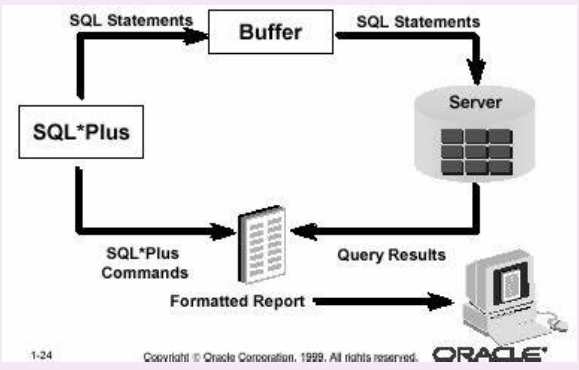


SECURITY AND ACCESS CONTROL

The standard includes specifications to define roles, permissions, and security policies, allowing restriction of access to sensitive data and ensuring transaction integrity. These features are essential to comply with international regulations such as GDPR, HIPAA, and other data protection laws.

TECHNICAL DATA AND STATISTICS

- Over 95% of commercial relational database systems use SQL compliant with ISO/IEC 9075.
- Supported by popular DBMS: Oracle, Microsoft SQL Server, MySQL, PostgreSQL, IBM DB2, among others.
- SQL is one of the most demanded languages in IT industry for data analysis, development, and administration.



STANDARD STRUCTURE

The standard is divided into parts covering different areas:

- SQL/Foundation: Core SQL language.
- SQL/CLI: Call-level interface for embedding SQL in other languages.
- SQL/PSM: Stored procedures and modules.
- SQL/MED: Management of external and federated data.
- SQL/XML: XML data support.
- SQL/OLB: User-defined types and object-oriented programming.

BENEFITS OF THE STANDARD

- Interoperability: Enables applications to work across multiple DBMS without changing basic SQL queries.
- Portability: Facilitates moving databases and applications between platforms.
- Consistency and Stability: Defines clear rules reducing errors and improving maintainability.
- Security: Includes controls for secure data access and manipulation.
- Extensibility: Supports integration with new data types and emerging technologies like JSON and XML.

OPTIMIZATIONS AND ADVANCED QUERIES

ISO/IEC 9075 includes specifications for subqueries, complex joins, aggregations, and window functions that facilitate complex analysis within SQL queries without external processing.

DATA TYPES DEFINED BY THE STANDARD

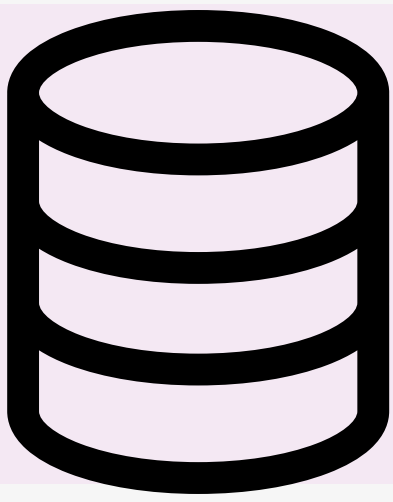
The standard defines a wide range of data types: numeric (integers, decimals, floats), character (text strings), date and time, boolean, binary, and more. It also supports composite and user-defined types, providing flexibility to model complex data.

SUPPORT FOR TRANSACTIONS AND ACID

The standard defines transaction management, ensuring operations on the database adhere to ACID properties (Atomicity, Consistency, Isolation, Durability), essential for data integrity and reliability.

SQL AS A DECLARATIVE LANGUAGE

SQL is a declarative language, meaning users specify what data they want to retrieve or manipulate, but not how to do it. This allows the database engine to optimize query execution for better performance.



CONCLUSION

TThe ISO/IEC 9075 standard is more than just a set of rules for SQL; it is the language that has revolutionized how organizations store, access, and transform their data. Throughout this infographic, we explored its evolution, structure, and benefits, ensuring interoperability, security, and adaptability in an ever-changing digital world. Understanding and mastering this standard is key to building robust systems ready for the future, where data is the most valuable strategic asset.

SQL and its international standard are the solid foundation upon which intelligence and innovation are built in the digital age.

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