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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

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Introduction

This document defines GQL, a database language for modeling structured data as a graph, and for storing, querying, and modifying that data in a graph database or other graph store. There are two major graph data models in current use: the Resource Description Framework (RDF) model and the Property Graph model. The RDF model has been standardized by W3C in a number of specifications. GQL addresses the Property Graph model.

Property graphs organize data as entities called nodes (or, alternatively, vertices) and edges (or, alternatively, relationships). Each graph element (a node or an edge) can have associated labels and properties. The flexibility and intuitiveness of the data model and its emphasis on interconnections between graph elements make property graphs suitable for storing complex knowledge and for analytical tasks such as entity resolution, fraud detection, cyber security, and forecasting.

GQL is declarative and transactional, taking inspiration from SQL and from leading independently-developed property graph languages. Property graphs select data primarily through path pattern matching. Defining path pattern searches in a graph is often simpler or more flexible than defining the equivalent joins in SQL. The flexible data model, the availability of path pattern matching, and the efficiency of traversing edges compared to joining tables have led to increasing interest in property graph databases.

Various graph data models have been around for many decades, but it is only since the early 21st century that the demand has driven the rise of commercial graph database and graph analytical systems for property graphs.

GQL provides a standard yet flexible common language for this growing market. GQL supports the same graph pattern matching syntax as SQL Property Graph Queries, ISO/IEC 9075-16, Information technology — Database languages SQL— Part 16: Property Graph Queries (SQL/PGQ). While SQL/PGQ provides the property graph data model and graph pattern matching on top of a relational SQL database, GQL is intended for pure property graphs that provide graph data management independent from SQL.

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Information technology — Database languages — GQL

1 Scope

This document defines data structures and basic operations on property graphs. It provides capabilities for creating, accessing, querying, maintaining, and controlling property graphs and the data they comprise.

This document specifies the syntax and semantics of a data management language for specifying and modifying the structure of property graphs and collections thereof. This document provides a vehicle for portability of data definitions and manipulation among GQL-implementations.

Implementations of this document can exist in environments that also support application programming languages, end-user query facilities, and various tools for database design, data administration, and performance optimization.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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