ORACLE

Oracle Property Graphs
Overview of available options

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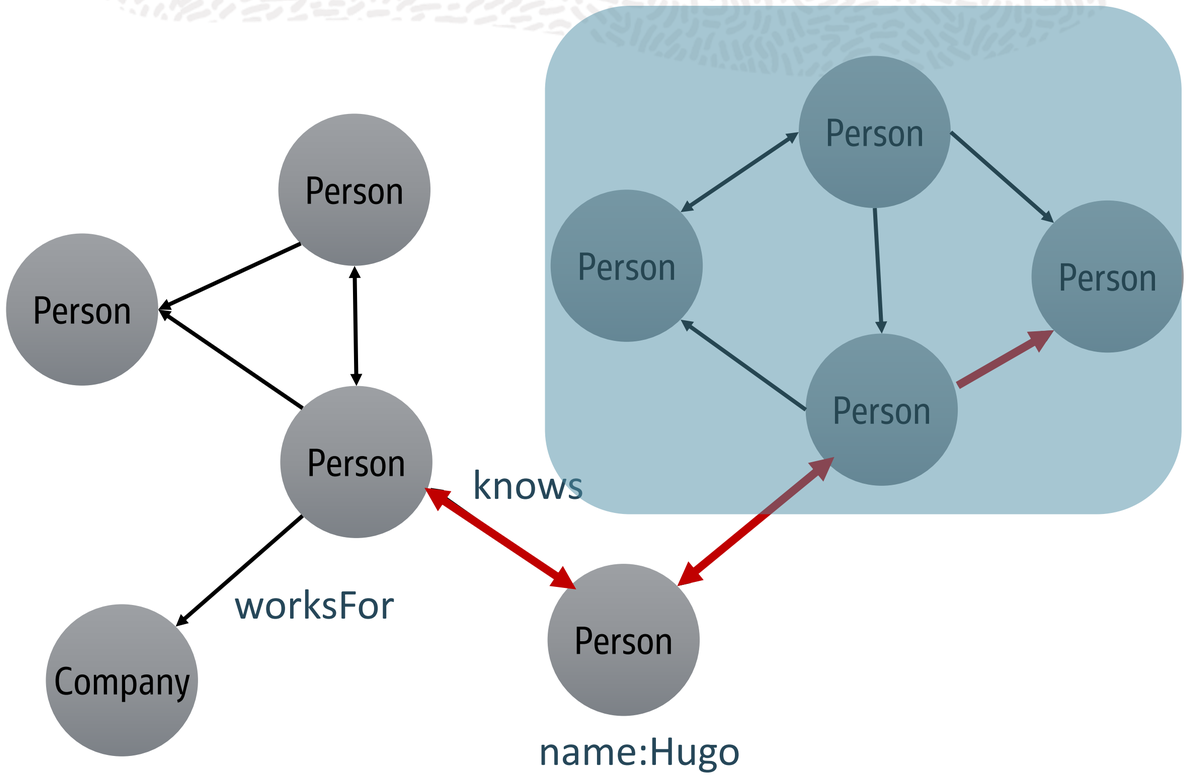
Property Graphs

- **Data model, which puts a pressure on relationships between data**
- **Often used on top of a relational schema**
- **Provides specific methods of analyzing using edges as traversals between data**
  - Path finding
  - Ranking and walking
  - Detecting and evaluating communities
- **Simplify solutions of some relational problems**
  - ”spaghetti” joins
- **Supported by all editions of Oracle Database in all deployment models**
  - SE2, EE, Development/Express
  - Cloud and On-Premises
  - No separate license required



Property Graphs in Oracle Database

Three different query languages

- **PGQL**
  - Supported in all versions of Oracle Database (19c, 21c, 23ai,..), Oracle Graph Server, Oracle Graph Studio for Autonomous Database, SQL Developer and SQL CL
  - Implemented in form of client libraries
  - Needs to be configured and enabled at the client level
  - Property graphs can be defined as data structures or views on top of data structures (recommended)
  - Documented here
- **SQL/PGQ**
  - **New feature of Oracle Database 23ai**
  - Integral part of SQL, implemented at the database level
  - Available for all SQL clients, no need to configure anything
  - Supported also by Oracle Graph Server and Graph Studio
  - Property graphs are views on top of relational data structures
  - Documented here
- **GraphQL**
  - Initially developed by Facebook/Meta as an API interface to Property Graphs
  - Implemented in Oracle REST Data Services component
  - Provides GraphQL support for REST calls
  - Documented here

Property Graphs in Oracle Database

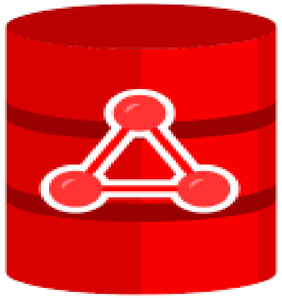
Three different solutions

- **Oracle Database (all editions, all deployment models)**
  - All versions support PGQL Property Graphs
  - **SQL/PGQ and SQL property graphs are one of new features of Oracle Database 23ai**
- **Graph Server and Graph Studio**
  - Property Graph Analytic Layer
    - Graph Studio is integrated with Oracle Autonomous Database
    - Graph Server can be used with all editions of Oracle Database
  - Support PGQL and SQL/PG Property Graph
    - **SQL/PGQ and SQL property graphs are supported when a tool is used with Oracle Database 23ai**
  - Provide 60+ advanced, parallelized algorithms to analyze graph data
  - Java and Python interfaces
  - REST API is provided by Graph Server
  - Storage/cache layer for graph data
- **Oracle REST Data Services**
  - **REST API for SQL/PGQ, when used with Oracle Database 23ai**
  - REST API for GraphQL

Scenario #1: Simple, single-layer architecture

Simple, single-layer architecture consisting of Oracle Database(s) only can be considered when

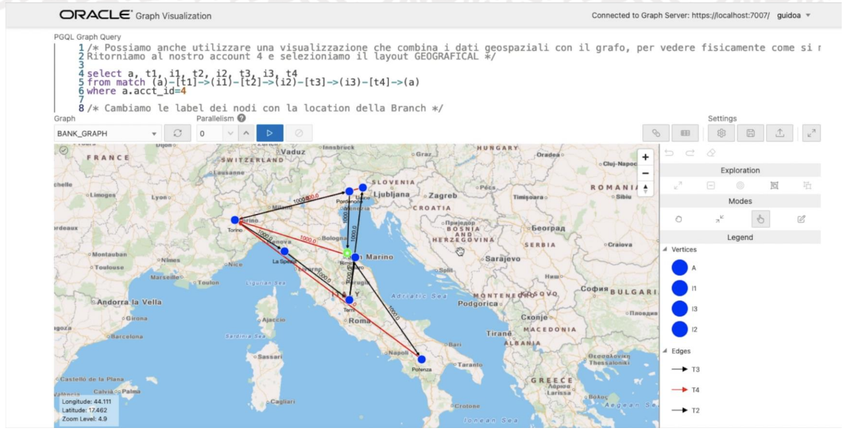
- There is no need to use graph analytics layer provided by Oracle Graph Server/Oracle Graph Studio
- For use cases, where operational property graphs with CRUD operations are used
- **If Oracle Database 23ai is used, or it is possible to upgrade the database to this version then SQL/PGQ and SQL property graphs are recommended**
- **Note:**
  Property graphs are fully supported by all performance, security and availability options



Scenario #2: Graph Server

Graph Server should be considered when

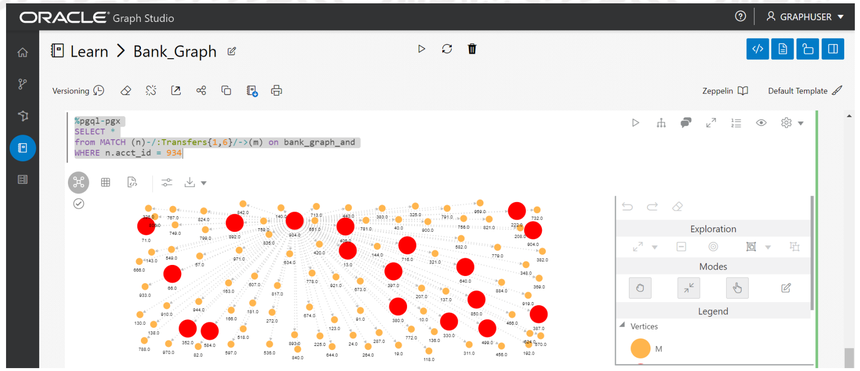
- There is need to use advanced graph analytics, when a non-autonomous database is used
- A separate storage/cache layer is considered as a way of distributing a heavy workload into different layers
- There is need to use REST API to access PGQL graphs



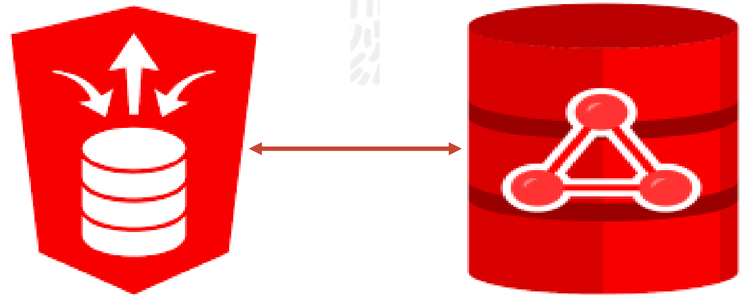
Scenario #3: Graph Studio

Graph Studio should be considered when

- Oracle Autonomous Database is used
- Advanced graph analytics layer is required
- A separate storage/cache layer is considered as a way of distributing a heavy workload into different layers
- There is no need to use REST API to access PGQL graphs



Scenario #4: ORDS with Oracle Database

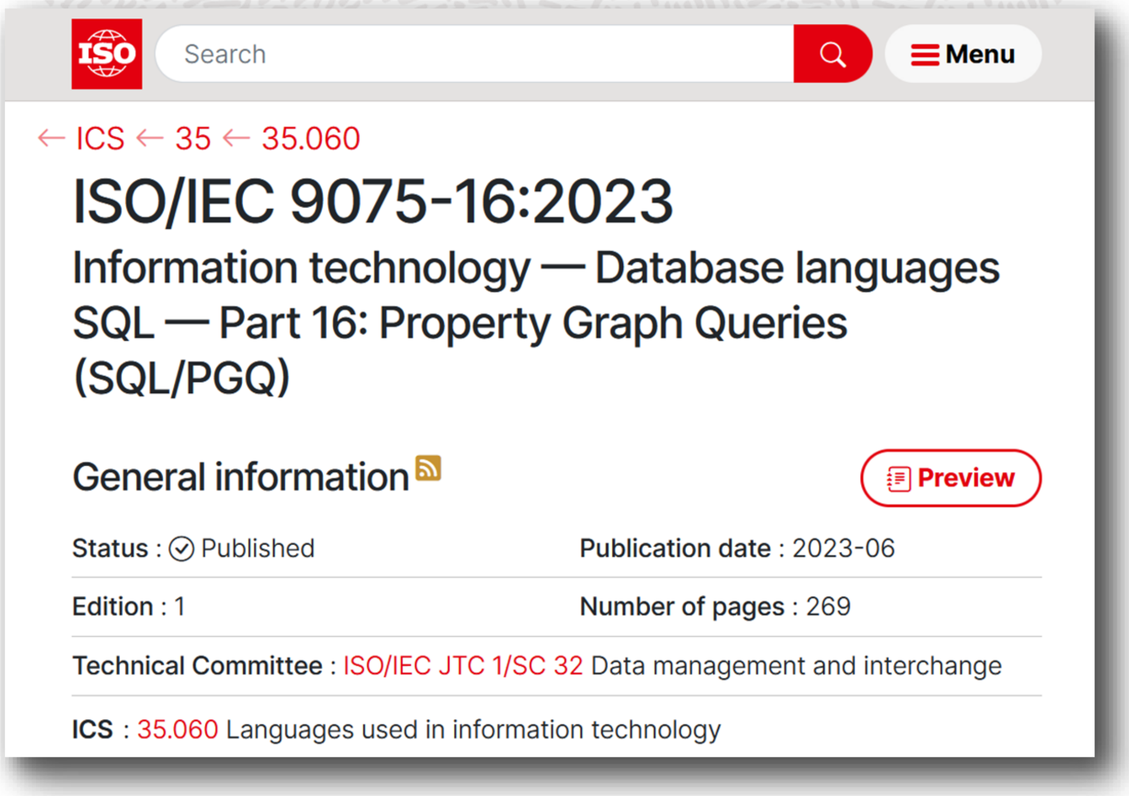


ORDS with Oracle Database should be considered when

- **REST API is required for accessing SQL/PGQ and SQL property graphs in Oracle Database 23ai**
- There is need to use GraphQL and REST API to access the data
- There is no need to use advanced analytics provided by Oracle Graph Server or Oracle Graph Studio
- There is no need to use PGQL Property Graphs

Oracle Database 23ai and SQL/PGQ

- **One of the most important new features in Oracle Database 23ai**
- Part of SQL 2023 ISO/IEC industry standard
- Fully integrated with SQL, implemented at the database level
  - Immediate support for all SQL Oracle clients
- Fully documented in data dictionary
- SQL property graphs are implemented as views
  - No need to replicate the data
  - No performance overhead
- Not all functionalities available yet
  - Advanced analytics will be implemented in future releases



Thank you