

RFP 19/2023

**PROVISION OF GRAPH DATABASE MANAGEMENT
SOFTWARE TOOL WITH MAINTENANCE AND SUPPORT**

BUSINESS REQUIREMENT SPECIFICATION

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SARS RFP ??-2022

Business Requirements Specification

PROVISION OF GRAPH DATABASE MANAGEMENT SOFTWARE

This document forms part of the RFP pack. The document sets out the business requirements that SARS has for the provisioning of Graph Database Management Software.

This document and any appendices must be read in conjunction with all other documents in the RFP pack, as such documents may contain further requirements that must be considered by bidders in compiling a proposal.

Bidders are referred, but not limited to, the following documents in the RFP pack:

- Graph Database Management Software Agreement

The Graph Database Management Software Agreement sets out the provisions of the agreement under which SARS intends contracting with the selected vendor(s).

1. Usage of Terms in This Document

1.1. Glossary Table

The following table provides the definitions for terms used in this document. Capitalized terms are defined in the RFP Main Document.

Term (Word/Phrase)	Meaning
Directory/Desired Requirement	Requirements that are necessary for business operations and should be delivered. These requirements would contribute strongly to a viable solution but will not result in an unviable application.
Edge	Relationship/connection between two nodes.
Graph Database	A Graph Database is a database containing a collection of nodes (or vertices) and edges (or relationships between nodes/vertices). The resulting structure is referred to as a "Graph".
Mandatory Requirement	Requirements that are so important and central to the solution that failure to satisfy any one is highly likely to result in the application being considered unviable.
Node Label	Classification of nodes into specific types.
Node/Vertex	In Graph Databases a node usually represents a discrete object (e.g., a citizen or an enterprise)
SARS	The South African Revenue Service.
Service(s)	The service(s) to be delivered by the Service Provider.
Solution	The solution to be delivered by the Service Provider.
Term	The term of the contract is three years with the right to end for an additional two years.

1.2. Reference to Other Documents in the RFP Pack

Underlined and italicised names are references (or short names) to other documents in the RFP pack. The Bidder is directed to the *RFP Main Document* for the table of documents and their short names.

1.3. Mandatory and Directory Requirements

Bidders are advised to read the business requirements as set out in this document with care. Where SARS has specified a mandatory requirement i.e., explicit instruction indicates that it is mandatory, the Bidder must build and price its solution accordingly. If a proposal fails to meet or does not address a mandatory requirement, the proposal may, at SARS's discretion, be disqualified at any stage of the evaluation process as being non-responsive.

Directory requirements, i.e., explicit instructions that indicate that it is directory, are requirements that SARS does not regard as mandatory.

2. Background

The South African Revenue Service (SARS) is the nation's tax collecting authority. Established in terms of the South African Revenue Service Act 34 of 1997 as an autonomous agency, SARS is responsible for administering the South African tax system and customs service.

SARS' strategic intent is to develop and administer a Tax and Customs system of voluntary compliance, and where appropriate, enforce responsibly and decisively. The intent is translated in nine strategic objectives. One of these objectives is to "Increase and expand the use of **data** to improve integrity, derive insight & improve outcomes"

SARS has identified the need to acquire a Graph Database Management solution. By utilising this solution, SARS is moving to a future state where relationships between discreet *things* are mined efficiently and effectively beyond the capabilities of traditional relational databases. Thereby ultimately enhancing SARS' capability of capturing, visualizing, and analysing large and complex networks of relationships and gaining insight from these relationships. SARS also wishes to employ graph technologies in conjuncture with current and future Network Analysis and Machine Learning endeavours, to aid in achieving the set-out strategic objectives.

Graph Technologies is new to Revenue Authorities globally, with to most advances made in the past three years. Customs Authorities of Singapore and Malaysia have made early successes by applying

graph technologies to detect and identify participants in drug trafficking. The Australian Tax Office introduced graph technology in June 2021 while the IRS (USA) and HMRC (UK) adopted this analytical capability as early as 2016.

3. In Scope Elements

3.1. Key Elements

The following items fall in the key scope of the required solution:

- a) On premise installation and support, to make it SARS environmentally compatible.
- b) **Graph Database** - to store data about objects (nodes) and relationships (edges).
- c) **Graph Queries** - to provide graph related data in real time to users and other interfaces.
- d) **Graph Exploration** - to visualize the data in the graph and allows users to navigate and query the data without any query language or programming.
- e) **Graph Algorithms** (graph analytics) - to derive insight from stored graph related data.

4. Design Principals

The following design principles should be considered when providing a response to the solution requirements outlined in the [Functional Requirements](#) and [Non-Functional Requirements](#) sections of this document.

Reference	Design Principle	Description
DP01	Interoperability	The solution should conform to defined standards that promote interoperability for data, applications, and technology.
DP02	Scalability	The solution should be scalable and flexible to meet any future change in business requirements.
DP03	Usability	The solution should be easy to use and enable users to achieve their desired outcomes.
DP04	Reliability	The solution should be able to continuously perform as intended.

Reference	Design Principle	Description
DP05	Availability	The solution should be available to perform required service on a continuous basis.
DP06	Efficiency	The solution should perform the required service in a timely fashion.
DP07	Maintainability	The solution must be easy to maintain.
DP08	Data	The solution should provide industry standards-based mechanisms (APIs) and formats to expose and export data for internal and external use.
DP09	Self Service	The solution should allow users to service/help themselves for non-technical issues.

5. General Requirements for The Service

5.1. Accountability

SARS requires a single, accountable Service Provider to deliver the desired Services/Products. The Service Provider can partner with other service providers within the same category level or higher. However, such arrangements will be regarded by SARS as internal operations, and whilst the Service Provider remains responsible for such arrangement, SARS reserves the right to query, audit and obtain information to determine if such arrangement are compliant with procurement prescripts, BBBEE, Companies Act, to name a few.

5.2. Variation

SARS will provide the final quantities of the number of licenses before the commencement date of the agreement and during the Term, at no penalty whatsoever and subject to SARS's procurement governance processes and procedures additional licenses can be acquired at tender/contract related prices.

5.3. Procurement

Due to envisaged growth and expansion in the future, SARS requires the option to procure new licenses or to reinstate licenses (procured previously) as part of this scope of service. Such procurement or reinstatement will be subject to SARS' procurement governance processes and procedures and tender/contract-related prices.

5.4. Transformation

SARS has no specific and immediate requirement to undertake a major transformation in terms of technology or processes as part of the services. If SARS undertakes a transformation of technology or processes during the term, the Service Provider may be engaged on a project basis to provide services supporting the transformation.

5.5. Training

The Service Provider must provide formal classroom and/or online training to SARS users and technical staff. As and when required by SARS, the Service Provider may be required to provide ad hoc user and/or technical training, for example, as part of a project.

5.6. Knowledge transfer

The Service Provider will be required, during the term, to provide knowledge transfer to SARS, including its personnel, which shall be planned appropriately in accordance with SARS' knowledge and skills gaps and needs. The Service Provider will work together with SARS to design and develop a knowledge transfer plan, including the scope and performance measurement thereof.

5.7. Disaster Recovery and Business Resumption

- a) Ensuring continuity of the services is business critical to SARS. To mitigate the effects of any disaster incident, the Service Provider must implement and maintain a proven Business Continuity Plan that is satisfactory to SARS
- b) The Business Continuity Plan must include a Disaster Recovery Plan, evidencing the Service Provider's ability to resume service delivery within the period allowed.

- c) The cost of developing, implementing, and maintaining the Business Continuity Plan shall be borne by the Service Provider.
- d) SARS or its nominee shall have the right to review and assess the Service Provider's Business Continuity Plans in respect of each Deliverable.

5.8. Consulting

The Service Provider must provide SARS with ad hoc advisory services related to the services, including advising and recommending continuous improvements and possible technological enhancements to SARS at no additional cost, which form part of the agreement/contract (included in pricing).

Formal additional consulting assignments may be engaged on a paid-for basis. Formal paid-for consulting assignments will only be provided upon written authorization by SARS to the Service Provider.

5.9. Process, Procedures, Schedules Work Practices

- a) The Service Provider is required to execute the processes, procedures, schedules and work practices developed in accordance with the Graph Database Management Agreement/contract.
- b) The Bidder must note the obligations to adhere to the Graph Database Management Agreement/contract.

5.10. Service Level Requirements

- a) It is of critical importance to SARS that the Service Provider supports the services in a way that meets or exceeds the agreed-upon Service Levels.
- b) The services to be rendered are categorized as services related to supporting and renewing licenses for Graph Database Management.
- c) There can be financial implications or remunerations built into the SLA if the standards are not met.

5.11. Service Conditions

The following conditions should apply for the rendering of the desired services:

- a) Software must be licenced for the enterprise, allowing for various installation instances.
- b) Software must be licensed as an on-premises solution.

5.12. Service Provider Managed Personnel

- a) The Service Provider should provide a Service Delivery Manager and Account Manager for the management of the SARS account.
- b) The Service Delivery Manager is not required to maintain a presence at a SARS site. SARS will neither provide office space for the Service Delivery Manager, nor for any other Service Provider staff, if required.
- c) SARS may also require the presence of Service Delivery Manager at ad hoc meetings at SARS' premises with reasonable advance notice. Reasonable advance notice will be determined considering the urgency with which the subject matter of a meeting is to be addressed.
- d) No separate charge is to be levied by the Service Provider for the Service Delivery Manager and/or for any time spent by the Service Delivery Manager servicing the SARS account.

5.13. Maintenance and Support Services

- a) The Service Provider will be required to provide maintenance and support services for incidents and problems that might arise.
- b) Any ad hoc services, including those listed in the sections on [Non-Exclusivity](#) and [Consulting](#), will be formally agreed upon by SARS and the Service Provider as required.
- c) The Service Provider must provide complete documentation for the design and installation procedures.
- d) The Service Provider must provide advice to SARS on software updates and new enhancements for the solution.

5.14. OEM Relationship

- a) The Service Provider must have a back-to-back agreement in place with an applicable Original Equipment Manufacturer (or their official representatives) in support of the equipment/ licenses for which the Service Provider is contracted to provide services to SARS.
- b) The Service Provider must ensure that the back-to-back agreement remains effective throughout the term of the Graph Database Management Agreement.
- c) During the term of the agreement, SARS may elect to change the equipment/licenses currently used within SARS or introduce new equipment/licenses from a new supplier.

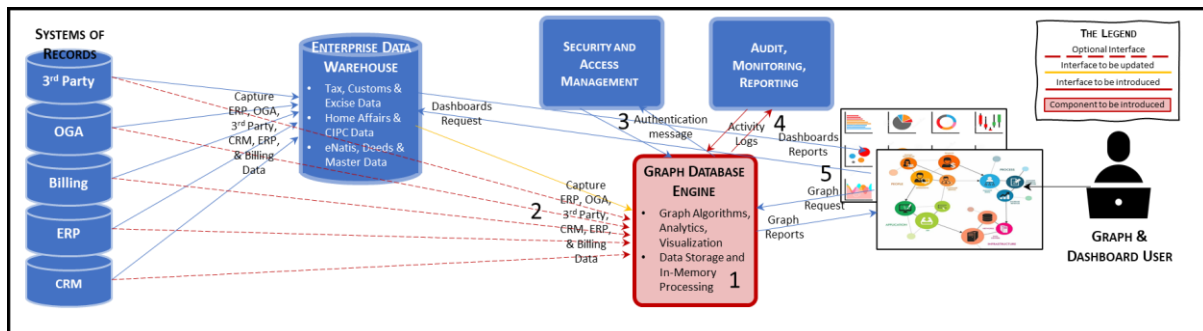
6. Professional Service Requirements

The following table details the Professional Services requirements that SARS may need.

ID#	Requirement
6.1.	TheBidder must provide services to support both the Graph Database Management solution design and Graph Database Management solution technical architectures.
6.2.	TheBidder must provide professional services to assist SARS with implementation (installation and integration) of the software. TheBidder must provide details and a project implementation plan of the Professional Service proposed including resources to be used and timelines.
6.3.	Providing proof of implementation and operating Graph Database Management solutions in organisation(s) comparable in size and complexity to SARS would be beneficial.
6.4.	TheBidder should work with SARS architects to ensure the solution fits within the defined architecture framework.
6.5.	TheBidder must provide details as to how the proposed solution may be best supported and maintained within SARS. TheBidder must outline any experience in providing such support and maintenance services.
6.6.	TheBidder should train and transfer knowledge to SARS technical resources to enable them to maintain the proposed solution.
6.7.	The vendor, and all assigned personnel, must sign an Oath of Secrecy before commencing work with SARS.

7. Functional Requirements

The proposed solution includes Enterprise Data Warehouse, Security and Access Management, Graph Database Engine, and Business Intelligence Dashboards and Graphs. The underlying System of Records may be involved optionally for missing data gaps from the Enterprise Data Warehouse.



Solution Architecture Overview

The following table details the functional requirements of the envisaged Graph Database Management solution.

ID#	Requirement
7.1.	The solution must be a native commercial-off-the-self (COTS) graph database (in other words, the solution is built as a graph database by design/out-of-the-box and not as an additional feature). The Bidder must include the COTS name and version proposed.
7.2.	The solution must retain all versions of data captured in the graph database or an alternative retrievable storage location.
7.3.	The solution must allow attributes to be defined for nodes and edges. These attributes must be stored in the graph database.
7.4.	The solution should be able to provide historical (point-in-time) views of the network (graph) data.
7.5.	The solution should allow for the efficient computation of complex, multi-layered relationships in a timely manner.
7.6.	The solution should provide a User Interface for network visualisation to convey the content of the graph. This can be provided natively by the solution or by supported third-party tools. The Bidder must provide details of the User Interface features provided by the recommended solution.
7.7.	The solution should allow users to interact with the network/graph without the need for code ("No Code"), preferably in a search-and-expand and/or drag-and-drop fashion. The Bidder must provide details how the recommended solution will allow for this.
7.8.	The solution should allow for a data loading interface support, including but not restricted to bulk data loads. The solution must be able to load bulk data from an MS SQL Server database source.
7.9.	The solution must support graph theory/algorithms. The Bidder needs to provide details of the graph algorithms supported/provided by the recommended solution.
7.10.	The solution must have the ability to label entities and relationships by one or more properties, and these labels must be searchable.
7.11.	The solution must provide industry-standard and/or SQL-like query language support. The Bidder needs to provide details of query language supported/provided by the recommended solution.
7.12.	The solution should support the concurrent manipulation of data.
7.13.	The solution should allow for a triggering capability based on changes to data to support event detection and notification.

ID#	Requirement
7.14.	The solution should have the ability for users to persist derived links and/or commentary directly from the User Interface to be written back into the Graph Database via seamless API integration.
7.15.	The solution should be able to interact with Analytics Execution platforms (e.g., Python, R)
7.16.	The solution must provide the ability to change regionalised settings to align with SARS standards (e.g., ability to view logs in ZAR date format)
7.17.	Browser based web application management/access tools must be compatible with MS Edge.

8. Non-Functional Requirements

This section lists solution requirements which include non-functional requirements.

ID#	Requirement
8.1.	Scalability & Performance - The solution must be an enterprise-scale solution capable of handling 300m+ nodes and 2b+ links growing at 20% per annum in a single cluster.
8.2.	For Graph Exploration, the solution should maintain a user base of approximately 2,500 users with an average 1.5 visits per day per user and with expected average sub-second response time to 3 hops. In peak periods expecting 200 concurrent users.
8.3.	For Graph Queries, the solution must maintain a user base of approximately 50 users with all 50 working concurrently.
8.4.	For Graph Analytics, the solution must maintain a user base of approximately 15 users with all 15 working concurrently.
8.5.	The solution must have the ability to encrypt and/or mask data. The Bidder must provide details of the encryption or data masking capability provided by the recommended solution.
8.6.	The Bidder must provide well documented/community-supported reference materials.
8.7.	The Bidder should provide computer-based staff training and upskilling material, which can be easily obtained via online resources or similar means.
8.8.	The Bidder should provide well-defined patching and version upgrade approaches, including schedules
8.9.	The Bidder should provide well-supported, established escalation processes/quick turnarounds for incidents of varying severity. The Bidder should provide details of the escalation process and service level agreements.
8.10.	The solution should have the ability to track and report license/user utilization.
8.11.	The solution should have the ability to prioritise workloads within the system.
8.12.	The Bidder and solution must comply with SARS information security policies and procedures.
8.13.	It should be possible to maintain and support the solution in South Africa
8.14.	Monitoring & Auditing – All activities on the Graph Database Engine will be logged against the existing transaction logs for future audit purposes. Monitor resources such as network connectivity, memory usage, etc.

ID#	Requirement
8.15.	The solution must support the auditing and logging of transactions and access to graph data. Logs must be extractable to allow forwarding to a corporate audit logging database.
8.16.	The solution should be able to perform high-volume graph analysis of graph data at speed. The Bidder must provide details of computational metrics and algorithmic features provided by the recommended solution.
8.17.	The solution must support vertical and horizontal scaling to increase storage capacity, compute capacity, and read/write capacity. The Bidder must provide details of their largest implementation. Please align the response particularly with the “Scalability” design requirements.
8.18.	The solution should support automated security updates
8.19.	It would be beneficial if solution can integrate with Identity Management Systems (specifically Microsoft Active Directory) and align with industry-standard Role-Based Access Control (RBAC) or Attribute-Based Access Control (ABAC). The Bidder must provide details of the identity management and security features provided by the recommended solution.
8.20.	The solution should provide network security functions and encryption using industry standard tools and protocols.
8.21.	The solution should support fault-tolerant high availability replication architectures that automatically compensate for system failure (e.g., network issues or loss of a server) with no data loss.
8.22.	The solution must be able to create auditable logs of security-based events e.g., failed authentications. Logs must be extractable to allow forwarding to a corporate audit logging database.
8.23.	The solution must have the ability to be loaded to on-premises SARS hardware.
8.24.	High Availability - The solution must be capable of achieving 99.00% availability with the appropriate underlying infrastructure and support arrangements.
8.25.	The solution must support duplication across standard disaster recovery patterns for high availability purposes.

9. Legislative Requirements

Prospective must demonstrate compliance with the relevant South African Legislation in their proposed solution and working methodologies, specifically with regards to:

- a) The Tax Administration Act, 2011.
- b) The Promotion of Access to Information Act, 2000.
- c) BBBEE act (Act 53 of 2003), PFMA (Act 1 of 1999), NT act, PPPFA (Act 5 of 2000).

10. Cost Requirements

- a) The Bidder is requested to provide a financial response detailing the Whole-of-Life solution cost and cost structure to support their response to this Request for Tender for a Commercial-off-the-shelf native graph database management solution.
- b) For the purposes of this Request for Tender, Whole-of-Life should be taken to mean a minimum of three years, with the right to extent for an additional two years.
- c) The Bidder must provide a break-down of the following in their financial response:
 - Professional services milestone costs and associated rates.
 - Base product, by module (if appropriate) and describing the cost basis (e.g., detailing perpetual licence, annual subscription fee, or as a service model).
 - Support and Maintenance costs.
 - Training costs (please align to ongoing support model/s).
 - Any other costs based on the response outlined above.
 - Any auxiliary capabilities consider necessary and/or appropriate in the delivery of a graph database solution.
 - Professional services rates for potential future ad-hoc service requirements.

11. Use Case(s), Proposed Solution Context and Architecture

Please provide explanations/ examples of the following:

- a) Explain how the proposed Graph Database Management Solution usually fits into an organisation's existing system architecture.
- b) Clearly specify the minimum required infrastructure and hardware that will be required for an on-premises solution in terms of processing, memory, storage, etc. Also, mention the system's ability to be migrated to the cloud in the future.
- c) Clearly explain the Operating System and versions that will be required for the software to operate effectively.
- d) Provide an overview of the different components of the proposed Graph Database Management Solution, including storage and indexing.
- e) Explain the functionality/process for matching, resolving conflicts, and transforming an organisation's existing data into a graph format.
- f) If applicable, clarify the API module through which downstream applications will access the proposed Graph Database Management Solution.
- g) Describe the Graph Algorithm/Analytics Modelling and Reporting component(s) of the proposed Graph Database Management Solution.
- h) Explain what architecture will be required for resolving conflicts between versions.
- i) Provide feedback/examples of other big clients where they have implemented the system.
- j) Provide the last three years financial statements to confirm that your institution is a running concern.

