

## Subject: *Why the Sentry CIS DataCube is the right solution to query the SentrySuite™ database*

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### Introduction

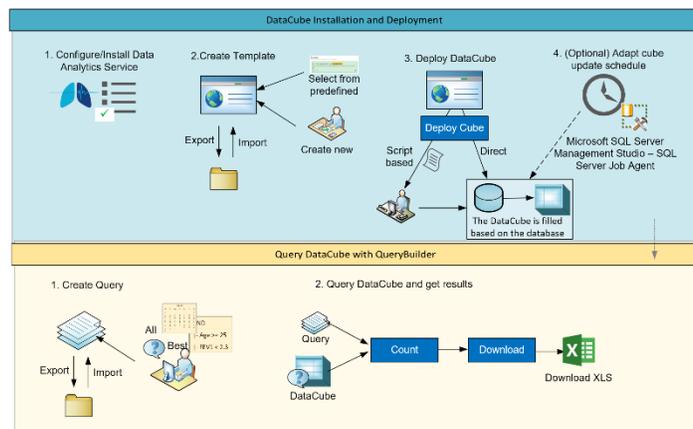
The Sentry CIS DataCube is a tool offered by Vyairé to query the SentrySuite™ database for statistical and research purposes and is unlocked through a software option. Unlike other vendor solutions in the RDx market, Vyairé does not provide direct access to the SQL database without using a tool. The following aspects discuss why the Sentry CIS DataCube is the right solution for quality and security conscious customers as well as the advantages of this tool compared to direct access to the database related to the following aspects: Cybersecurity, data integrity of queries and the database, performance and data size, ease of use and feature set.

### Setup and operating principles

**Setting up a Sentry CIS DataCube** takes a few steps: First, the DataCube is defined based on customer requirements. This is done either by using predefined access templates or by creating your own custom access templates. A browser-based template editor makes it easy to define these templates. Multiple templates can be defined if required. Export and import of templates are possible. This is typically a one-time DataCube setup.

The second step is to create the defined Data cubes. The roll out can be a scripted one-time deployment, a direct deployment via the browser interface, or a scheduled deployment using Microsoft SQL Server functionality. With the scheduler it is possible to recreate the content of the DataCube every week or night or at a certain point in time. The DataCube is an abstracted snapshot of the SentrySuite™ database, limited to the content defined by the access templates used.

The last step is querying the database with the integrated query analyzer and exporting the result set e.g., to Excel. Alternatively, the DataCube database can also be directly accessed via external tools.

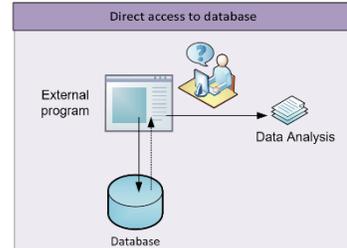


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**Direct access to the database** is provided through a common interface supported by Microsoft SQL Server. The administrator is responsible for granting the necessary access rights in the database and providing the appropriate tool for accessing the database. The database can be accessed by querying the physical tables without intermediate abstraction layers. This requires a deep knowledge of the relationships between the tables.



## Cybersecurity

Vyairé takes Cybersecurity threats very seriously. *There is no direct access to the SentrySuite™ database without a dedicated, well defined, and secure software interface.* The controlled interface ensures that access to the database is only possible for authenticated services. The SentrySuite™ database can only be accessed by using the Sentry CIS Data Service. Direct access to a database exposes it to potential security vulnerabilities. Without an interface acting as a protective layer, malicious actors may exploit database vulnerabilities directly, leading to unauthorized access, data breaches, or data manipulation. Depending on the hospital's needs, the access of SentrySuite™ database via the Sentry CIS data service can provide security features such as access controls, encryption, and authentication, which help mitigate risks and safeguard sensitive data.

All of this is done in the background of your system when a DataCube is utilized.

## Data integrity of queries and the database

Data integrity is the overall accuracy, completeness, and consistency of data. Sentry CIS DataCube provides an offline extract to the SentrySuite™ database. Unlike direct access to the database, this is a read only functionality, that will never change the content of the database and therefore ensures integrity.

The queries to a separate abstraction layer to the database (changes in database will not change the abstraction layer) ensure that queries are still working when the underlying database is changed (e.g., because of system updates).

By querying a dedicated snapshot, the original database remains unaffected. Any modifications made to the database after the snapshot creation do not impact the snapshot, ensuring the integrity of the original data. This is particularly useful when performing analytical queries or generating reports, as the data remains static and reliable for analysis.

A dedicated snapshot provides isolation from concurrent transactions and modifications occurring in the live database. This means that the snapshot is not affected by changes made by other users or applications, ensuring consistent results for the query. It prevents data inconsistencies or interference caused by concurrent updates, deletions, or inserts.

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## Performance and data size

Using a dedicated snapshot for querying can improve performance, especially when dealing with large or complex databases. Since the snapshot is a static view of the data, it eliminates the need to handle concurrent transactions or locks during the query process. This can result in faster query execution and improved overall performance. But querying the database during operation time can also impact daily business. Complex queries can result in delays accessing the data when measuring or during the review process. An offline copy of the database like Sentry CIS DataCube provides decouples daily business from research activities. Therefore, an update of a DataCube at the weekend or at night makes most sense for the majority of customers.

Snapshots are particularly useful for historical analysis or trend analysis where accessing data from a specific point in time is crucial. It allows users to analyze data as it existed at a specific moment, enabling comparisons, trend identification, or performance analysis based on historical data.

Because the DataCube is not just a 1:1 copy of the database the size of each DataCube is typically only a fraction of the size of the original database.

## Ease of Use

The Sentry CIS DataCube provides a higher-level abstraction layer compared to direct access to the database. It is shielding researchers from the intricacies of the underlying database system. It offers a standardized and user-friendly interface and query functionality simplifies database interactions. This abstraction layer enhances researchers' productivity, reduces the risk of errors, and ensures compatibility for different versions of databases. It handles compatibility and schema migration issues, or version upgrades transparently, minimizing the impact on external applications that use the database. This simplifies the maintenance process, reduces downtime, and enhances overall system availability. Any other application which will directly access the SentrySuite<sup>™</sup> database will sooner or later have compatibility issues when the database versions are updated.

## Feature set

Through the abstraction layer the Sentry CIS DataCube can provide additional features which are not or only difficult covered by direct accessing the database and therefore provides additional benefits to the customer.

- The Sentry CIS DataCube enables delivery of predefined templates, so that less experienced researchers can easily create queries without limiting expert user's functionality.
- DataCube databases are separated from the SentrySuite<sup>™</sup> database. The installation can be on the same or a separate SQL Server.
- User can define templates (database tables) for output. Multiple Templates and multiple databases supported with one license.
- User defined combination of parameters possible. E.g. FRC value can be defined to be min, max or average value of FRC from Body, N2washout, Diffusion SB measurements.
- Predicted values can be added to export.
- New Query Builder integrated in Sentry CIS DataCube Solution enables access to the database as well for less experienced users and for expert users.

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- Performance optimized queries
- Full data dictionary available
- DataCube can be enhanced by data which is not directly in the SentrySuite™ database.

## Summary

Overall, SentrySuite™ dedicated Sentry CIS DataCube solution helps to ensure data integrity by implementing robust validation, security controls, transaction management, error handling, synchronization, abstraction, monitoring, and auditing mechanisms. It provides a reliable and secure way to access the databases, reducing the risks of data corruption, unauthorized access, and inconsistent data. This is also beneficial for the performance of the system related to the daily business and to the research activities and the better solution compared to providing direct access to the SentrySuite™ database.

## Your RDx Product Management Team

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