# SentinelDB: Product Overview

SentinelDB is an advanced database solution for master data management that provides top-notch data security through sophisticated encryption and brings full compliance with data privacy regulations and standards (GDPR, PSD2, ISO 27001, PCI DSS) through easy integration with existing IT systems. All modifications and access to data are logged using a blockchain-driven module, and all activity can be monitored real-time in a BI-enabled dashboard. This solution addresses two major concerns:

- **Personally-identifiable data needs to be carefully protected** in full accordance to good practice and regulatory requirements in the EU and beyond
- This process needs to complete in a **fast and cost-efficient way**, whereby legacy systems are easily integrated, and the provider takes full care of storage, infrastructure administration, security, and responding to compliance requirements

SentinelDB can store any type of data but is particularly useful for personal data, including sensitive data like medical records. This advanced database solution uses complex encryption so that every single entry of the database is encrypted, and data breaches are practically impossible. SentinelDB leverages a sophisticated key management system, and anomalous behavior is detected through a combination of rule-based and machine learning algorithms.
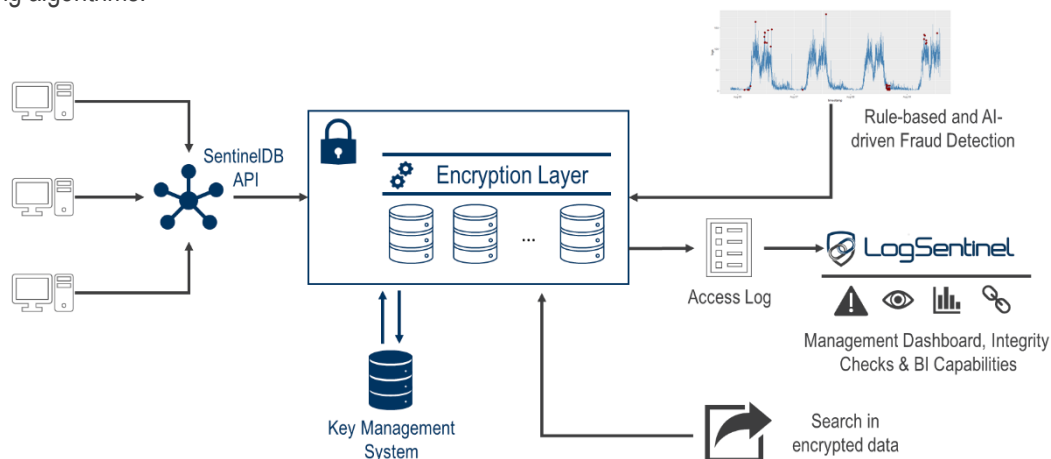


*Figure: SentinelDB is a key tool that ensures the security and compliance of personal data in any organization*

SentinelDB consists of the following components:

- A **horizontally-scalable NoSQL database layer**, on top of which a proprietary encryption layer is deployed. This layer encrypts every single database entry, providing extreme security.
- A **key management system**, which is responsible for managing customer private keys. The technological solution makes it impossible for anyone but the key-holder to decrypt and read data.
- A **blockchain-enabled audit trail** – the award-winning Sentinel Trails – which stores every single activity in an unmodifiable blockchain with qualified or advanced time-stamp. Qualified time-stamping and electronic signatures are also supported.
- **Search functionalities in encrypted data** through a proprietary module, that does not decrypt data for searching.
- An **anomaly detection module** that supports both rule-based and machine-learning for flagging suspicious behavior. Notifications for anomalies can be pushed through e-mails, SMS, instant messengers.

SentinelDB is built on the principle of **privacy by design** and is the enabling technology that allows the fast and secure implementation of ever-tightening data privacy regulations. SentinelDB stores an organization's personal data residing on a secure cloud infrastructure and feeds this data into other applications via web services. Such

an architecture allows for minimum interference in the information flow and the business processes of the user. In addition to that, SentinelDB's powerful dashboard provides real-time monitoring of all activity per application, per user, or per action, as well as developed BI capabilities for slicing and dicing data, aggregations, and report generation. The blockchain technology guarantees that both for forensics and for compliance purposes, the protected logs have legal strength and can be used during inspections, or in the court.

SentinelDB provides the following functionalities to enhance the information security and compliance infrastructure:

- **Secure storage for personal data**, where every record is encrypted on its own, and all requirements set out in regulations and standards are met by design. This includes an in-built data processing register as per article 30 of the GDPR.
- Secure **management of private encryption** key to ensure limited access of only authorized personnel to decrypted data in plain view
- **Utilization of the blockchain technology** (including a private one and optionally the public blockchain Ethereum) to ensure immutability and utmost security of logs
- Techniques for **fraud and anomaly detection** to aid both information and operational security, together with multiple-channel notifications
- **Structured data for business and data audits** that allows logs audits by business users and from a business perspective

The application is feature-rich, with additional customization possible to meet the clients' specific needs. **SentinelDB offers out-of-the-box**:

- ✓ Compliance and security as a service
- ✓ Encryption per record
- ✓ Blockchain-enabled audit trail
- ✓ Runs on the cloud
- ✓ Fast and reliable queries
- ✓ Search in encrypted data
- ✓ Scalable
- ✓ Easy integration with existing systems
- ✓ Cost-efficient and powerful

SentinelDB can be implemented either in existing (legacy) systems or directly integrated in newly developed systems. We offer cloud deployment and end-to-end service and recommend that the security-conscious organization synergizes organizational measures with this technological solution, so that SentinelDB fits seamlessly in the overall security architecture.

## SentinelDB Features in Focus

- ✓ **Compliance and security as a service** – the database is designed in such a way that it fully conforms to the privacy and data protection requirements in the General Data Protection Regulation (GDPR), the requirements on payment service providers in the Second Payment Services Directive (PSD2) and information security standards (ISO 27001 and PCI DSS)
- ✓ **Encryption per record** – every single record is encrypted with a separate private key to ensure that when the database is breached information cannot be read
- ✓ **Blockchain-enabled audit trail –** every modification or access to data is securely logged in an unmodifiable way using blockchain technology
- ✓ **Runs on the cloud** – easy integration through API and seamless maintenance on a secure cloud environment, meaning less cost for DBAs and less compliance hassle
- ✓ **Fast and reliable queries** – despite sophisticated layers of security, queries are virtually as fast as standard relational databases, meaning no degradation in performance of other systems using the data

- ✓ **Search in encrypted data** – proprietary search module allows for the search in encrypted data without prior decryption in a way that neither the cloud provider, nor the solution administrator can have access to plain-text data
- ✓ **Scalable** – using advanced NoSQL database technologies, SentinelDB provides for horizontal scaling that allows arbitrary increase in the amount of stored data.
- ✓ **Easy integration with existing systems** – integrates through API with minimal changes to existing systems, infrastructure, processes and information flow. We offer options for end-to-end service.