

ProvenDB Features



Document Model

- MongoDB compatible database service.
- Data is represented as JSON documents.
- Documents contain metadata to track and manage version information.



Versioning

- ProvenDB keeps multiple versions of documents.
- Updates creates new versions of a document leaving the original intact.
- A delete operation marks documents as logically deleted without destroying their content.
- ProvenDB users can query against any previous version of the database.



Right to be Forgotten

- "Forget" allows all data for a document to be redacted without compromising existing blockchain proofs.
- Viewing data from a forgotten document is impossible, however, other documents in the database version are still provable.



Full Blockchain Proofs

- The entire state of the database can be established with a single Blockchain proof.
- Proofs can also be obtained for individual documents.



Strict Consistency

- Serializable consistency ensures that versioning requests execute as if they had completed one at a time.



Bulk Load

- ProvenDB can be placed in a fast load mode in which only inserts are permitted.
- Inserts may be submitted without the overhead of creating new database versions.



Export

- ProvenDB can export the data and proofs for the entire database, a database version or individual documents.
- Exports can be independently verified against Blockchain proofs using open source tools, ensuring that your Blockchain proofs remain valid even if you no longer have access to ProvenDB.



Compaction

- ProvenDB allows data between two proven versions to be compacted.
- This reduces storage overhead without compromising the integrity of any database proofs.

Proven^{DB}

Blockchain made easy.

Proven^{DB}

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datasheet

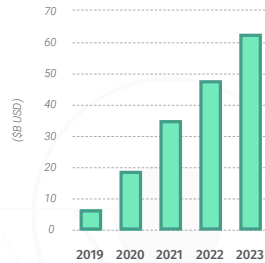
The Blockchain Revolution

“*The business value-add of blockchain will grow to slightly more than \$176 billion by 2025, and then it will exceed \$3.1 trillion by 2030.*” - Gartner (G00325744)

Blockchain is arguably one of the most revolutionary technologies since the internet itself. Spending on Blockchain solutions is expected to reach \$12B annually by 2022 and the impact of the Blockchain will be felt across almost every industry segment.

The immutability of data within a Blockchain constitutes a revolution in computer science. For the first time, we have a way of storing data which cannot be altered and whose creation date and integrity can be cryptographically proven.

Data in a traditional database can be altered at any time by a database administrator or a privileged developer. In contrast, data in a public Blockchain is immutable – once created it cannot be altered and its creation date is completely reliable.



Blockchain Business Value (Source: Gartner)

“*Blockchain is revolutionary and has the potential to revolutionize nearly every industry.*” - Forbes (<https://bit.ly/20c23C5>)

Blockchain Project Risks

As with any new technology, Blockchain projects face increased risks because of the novelty of the technology and scarcity of experienced developers. Perhaps more significantly, while Blockchain technology offers capabilities not available in traditional platforms, it cannot match the functionality, performance and developer productivity of these traditional platforms. These issues are magnified in applications that seek to use the Blockchain as a data store.

“*Through 2021, 95% of data management projects using blockchain will fail due to either performance challenges or misapplication of the technology.*” - Gartner (G00325744)

Blockchain and The Law

Blockchain cryptographic proofs are increasingly being recognized as legal proofs. Blockchain records are eventually expected to be held to the same evidentiary standard as DNA or fingerprint records. For example, there is Blockchain legislation pending or passed in at least 18 US states (<https://bit.ly/2L40ksc>).

Why use ProvenDB?

ProvenDB presents a familiar database API, developing applications in ProvenDB is as simple and safe as developing any database-oriented application. ProvenDB can be used with all modern development frameworks and programming languages. ProvenDB is compatible with MongoDB, the most popular database for new applications (<http://bit.ly/2LxCx8H>).

ProvenDB reduces the risks, delays and performance problems inherent in Blockchain projects.

ProvenDB layers on top of a standard database engine adding core Blockchain characteristics to the database. The resulting database respects all usual database “CRUD” operations (Create-Read-Update-Delete) but also provides the following:



Immutability

By default, all versions of a data item are retained. Previous versions of a data item can be superseded, but original versions are never destroyed.



Tamper Detection

Selected versions of the database are hashed upon the Blockchain. These versions can be proven to have been created at the specified time and can be proven to have been unaltered.



Point-in-time History

The state of a database at any point in time can be retrieved.



Data Provenance

The complete history of any item can be retrieved, showing its initial contents, and the changes made to the document at each point in time.

ProvenDB is particularly useful for:



Document Management Systems



Legal Records



Accounting Systems



Intellectual Property and Media Management Solutions



Government and Regulatory Applications



Audit and Access Management Systems

Performance and Economics

Blockchain is sometimes called “the world’s worst database”; it offers truly terrible transactional throughput and storage costs. For instance, the Ethereum Blockchain can process only 15 transactions per second with a storage cost of hundreds of thousands or millions of dollars per Gigabyte.

The architecture of ProvenDB results in a penalty on storage overhead and throughput. However, this overhead is trivial compared to that of the Blockchain. While ProvenDB might be marginally slower and more expensive than a traditional database server, it is massively faster and cheaper than the Blockchain. ProvenDB offers a perfect compromise between the two technologies:

