ProvenDB for Provable Open Banking

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Background

Open Banking represents a paradigm shift for data in Australia, with massive implications for regulators, consumers, and banking service providers. Open Banking and the Consumer Data Right (CDR) aims to increase consumer control over data and to encourage competition and transparency between service providers.

Although the CDR assumes and requires a high level of data integrity, the mechanisms for data integrity are not defined within the CDR, leading to the risk of disputes or inconsistent data between providers, consumers and regulators. In the worst of all possible worlds, there might be no indisputable resolution mechanism for disputes relating to data accuracy or to definitely prove the absence of tampering or other faults of commission or omission.

Blockchain technologies represent a quantum leap forward for data ownership, transparency, and tamper resistance. For this reason, we believe that the addition of Blockchain technology to CDR and Open Banking will result in a superior solution.

ProvenDB Compliance Vault is a cost-effective software solution that provides a tamper-resistant digital store for your critical compliance information. The ownership and creation date of information stored in ProvenDB Compliance Vault can be definitively proven by stringent industry-standard cryptography. With ProvenDB Compliance Vault, you can be certain that your compliance data will satisfy the most rigorous compliance audit.

Open Banking, Blockchain and ProvenDB

The problem with integrating Blockchain technologies with Open Banking is that the Blockchain is too expensive, slow, and overly complicated to function as a database. These problems are resolved by ProvenDB. ProvenDB creates a bridge between traditional database technologies and the Blockchain, allowing for the throughput and low cost of a modern database with the immutability of the Blockchain.

ProvenDB augments the popular MongoDB document database with the public Ethereum or Bitcoin Blockchains. Updates to the ProvenDB database create new versions of existing data. These versions can be economically and efficiently "proved" to the Blockchain by creating a hash tree that links potentially hundreds of thousands of documents to an immutable root hash stored on the Blockchain. This root hash can be used to validate the origin, time and integrity of the entire database version, or of any individual document. These proofs can be combined with PKI digital signatures to prove the ownership of the transactions as well[1].

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[1] https://provendb.com/homepage/litepaper/

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In short, a ProvenDB database can irrefutably prove the "who, what, and when" of every data element stored in the database.

Benefits

The primary benefit of integrating ProvenDB with an Open Banking Solution is the ability to prove beyond doubt the origin, time and integrity of any CDR data transaction at any point within the CDR lifecycle.

Specifically:

- For regulators, the existence of an immutable and tamper-resistant record of CDR transactions will ensure a higher degree of compliance and will reduce the overhead of audit and verification processes.
- For consumers, the sure knowledge that their CDR transactions are traceable and immutable will increase confidence in the open banking process and encourage participation.
- For Data Holders, an immutable and irrefutable Blockchain-based record of transactions will ease the burden of regulatory compliance and dispute resolution and will encourage consumer confidence in that entity's Open Banking implementation.
- For System Integrators and Solution Providers, the addition of Blockchain mediated data integrity will provide a competitive advantage over alternative Open Banking solution providers.

Regulatory perspective

Regulators and government bodies across the globe are increasing the burden of compliance when it comes to consumer data. Solution providers are under increasing pressure to be capable of proving data integrity and origin.

In Australia, the relevant regulator APRA (Australian Prudential Regulation Authority) has issued the following guidelines (our emphasis):

> *Auditability (the ability to **confirm the origin of data** and provide **transparency of all alterations**) is a key element to verifying data quality. It involves the examination of data and associated audit trail, data architecture and other supporting material. APRA envisages that a regulated entity would ensure that **data is sufficiently auditable** in order to satisfy the entity's business requirements (including regulatory and legal), facilitate independent audit, assist in **dispute resolution** (**including non-repudiation**) and assist in **the provision of forensic evidence** if required.[2]*

- [2] **APRA**, *The Prudential Practice Guide CPG 235 — Managing Data Risk)*

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ProvenDB provides the ability to establish the timestamp and integrity (through Blockchain proofs) and ownership (through Public Key signatures) of every data element in the database. As such, ProvenDB – and arguably only ProvenDB – can fully meet the requirements outlined by APRA.

Which Open Banking Data Should Be Proven?

The following key pieces of Open Banking information could all be secured in ProvenDB to provide benefits to the consumer, regulator, and data holder.

- **CDR Data Sets** (*Accounts, Transactions, Users, Products,...*)
- **Consumer Consent Data** (*Consent, Authorizations, Register,...*)
- **ACCC Register** (*Accreditation info, Product Metadata Refresh,...*)

Proving these data elements would allow an Open Banking Solution to confirm the origin time and transparency of all alterations during the complete flow of CDR data, from Consumer Request to Account updates.

Proposed Integration

No large-scale alterations of the existing Open Banking solution would need to be made. ProvenDB would simply be embedded or attached to the current endpoint as a Monitoring and Audit module. Although there are some differences in the IT ecosystem, in an Open Banking architecture, there is always a Monitoring Audit component in the integration space[3], for example:

![ProvenDB logo]
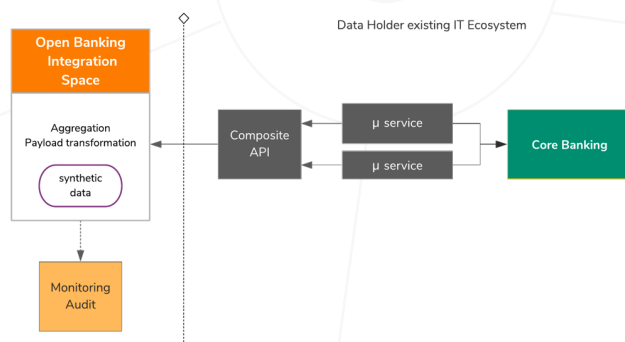
In the same way that this monitoring audit generically attaches to an Open Banking Integration, ProvenDB could attach and provide Blockchain-capable audits of transactions through the system.

As a more specific example of how integration could occur, here is a simplified version an architecture for an Open Banking solution[4]:
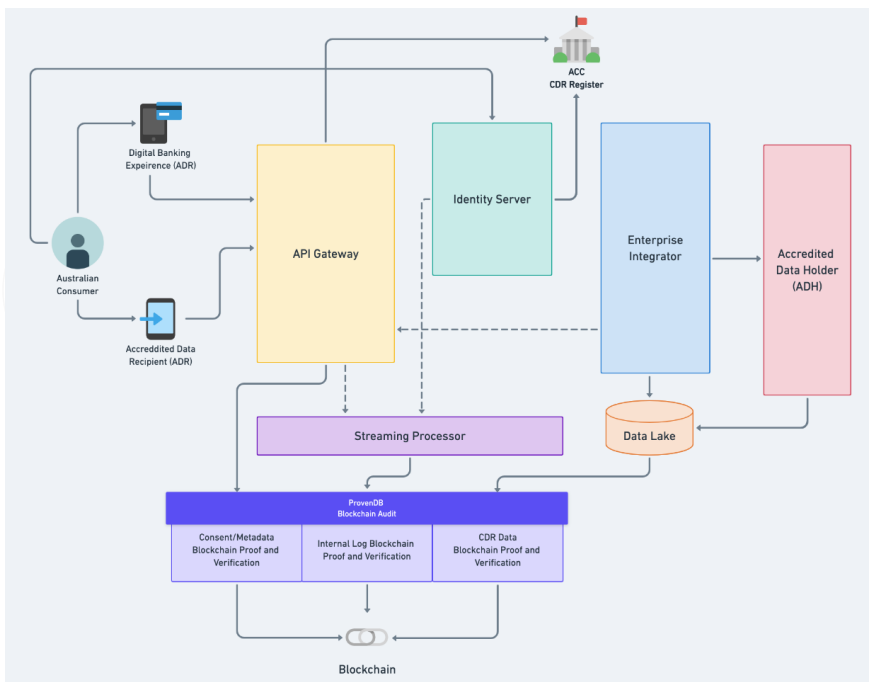
In the diagram above, the only new element added is the ProvenDB Blockchain Audit module (*in purple*), everything above this already exists in the solution, meaning little to no functional modifications would be required to add Blockchain capabilities. The ProvenDB module would serve as a middle point between the API Manager, the Streaming Processor, the Data Lake, and the Blockchain.

- Calls to the API manager for consent or banking requests could be forwarded to the ProvenDB Audit, which would regularly create Blockchain proofs of these requests.
- The Streaming Processor could also forward internal logging information, to create an immutable audit trail for the system itself.

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[4] https://medium.com/@dassana.p.wijesekara/end-to-end-architecture-fit-of-wso2-open-banking-solution-for-australia-f84ae87fa832

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- The CDR Data, which is being replicated into the data lake and consumed by the Enterprise Integrator, could also be forwarded to the Blockchain Audit in the form of a changelog, allowing the CDR data itself to have a tamper-evident record.

The advantage of this integrated approach is that the scope, scale, and specifics of the data anchored on the Blockchain will not change the implementation.

Conclusion

Although Blockchain is a relatively nascent technology, it already represents the gold standard for data integrity and provenance. The technological advantages of Blockchain in Open Banking and Consumer Data Rights are clear. The desire for increased data integrity within the Banking industry following the Australian Banking Royal Commission is very strong. We believe, therefore, that Blockchain integration can offer competitive advantages within any Open Banking solution and that ProvenDB technology offers a fast path to enabling those capabilities.

Eliminate the costs and risks involved in regulatory compliance with ProvenDB Compliance Vault. Visit www.provendb.com to sign up for a ProvenDB cloud service, or email us at support@provendb.com to explore options for deploying ProvenDB Compliance Vault within your organization.

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