

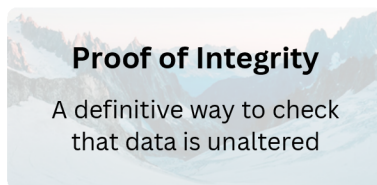


# Integrity, Provenance and Validity

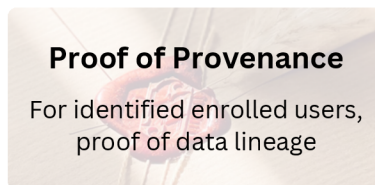
Across all industries, **safeguarding** data against **malicious threats** and rigorously **verifying** its **origin** and **history** is business critical.

## Our Solution

Our state-of-the-art technology, **Codelmarking**, combines a **digital fingerprinting process** and **searchable reference registry** to create an unchangeable **audit trail** giving certainty to any type of digital data



**Proof of Integrity**  
A definitive way to check that data is unaltered



**Proof of Provenance**  
For identified enrolled users, proof of data lineage



**Proof of Validity**  
Check if held data is current, revoked or superseded

## Our Unique, Patented Approach

Codel uniquely combines two “**tamper-evident**” methods, **hash-chain** technology and **chain-entanglement**, into a **hybrid Client-Server model** where they are developed further. We do this to mitigate inherent issues with blockchain’s consensus mechanism, such as Proof of Work or Stake. One result of this is that, unlike blockchain, our model **improves with scaling** whilst maintaining **minimal unit power consumption** and **cost**

Without the need for Consensus, Codel Links are **instantly verifiable** once they appear on the Chain. Validation, by Relying Parties, may be delayed by limitations on internet connectivity similar to all services accessed via the Web. The difference, is in our minimum validation times. With the right connectivity, Codel's Relying Parties can **validate in milliseconds**. The fastest block-chain validations take seconds and some require minutes



More importantly, **any** assessment of "truth" based on Consensus is open to the threat of subversion, where the strongest members might overwhelm the majority of weaker members. **The Codel algorithm cannot be subverted**. The hashes and links are either provably valid or invalid the moment they appear on the chain. No subsequent tinkering can change their state without near immediate detection, and can **never deceive** a Relying Party

Though Codelmarks will never disappear from the Chain, their status can change, either for any reason determined by their Authors or a breach of our conditions. These controls are essential for promoting **accountability**, protecting **intellectual property rights** and preventing **malicious attacks** by third parties

## Key Benefits

- Attacks can not deceive a Relying Party
- Quantum secure and No data on chain
- Provides trust without needing consensus
- Immutability is faster than any other blockchain
- Does not need to be tied to a Cryptocurrency
- Ecologically sound - Lowest energy consumption
- Enforces privacy of data
- Identity enrolment ensures accountability
- Integration into existing systems is simple
- Scalable



Visit our website

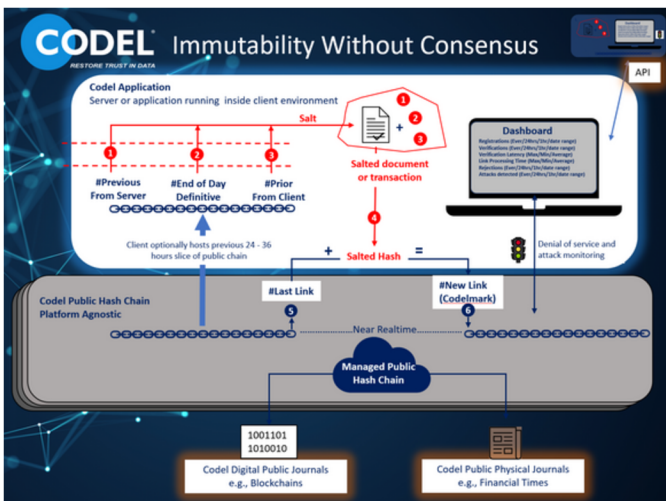


## How we do it

Our globally approved patented technology uses our **hashing algorithm** that creates unique digital fingerprints. Taking **data of any type and size**, it creates a **unique unreadable 32 byte code** which becomes its identity - **Codelmark**

This process is **non-reversible** as all **original data is kept off chain** and the resulting code is **not** an encrypted version of the original data. Unlike normal hashes, the Codel Algorithm prevents all attempts at “brute forcing” the content, even for very short messages. So it is **impossible to re-generate** the original data from a Codelmark

- ✓ Globally Patented Technology
- ✓ Improved With Scaling
- ✓ Near Real Time Verification
- ✓ Lowest Energy Consumption



This image (left) provides a necessarily limited overview of the way the Codel Algorithm enables Trust without requiring Consensus. **The secret is in the Salt.** The links in our Chain are constructed in a manner that even an attacker in full control of the Chain cannot replicate

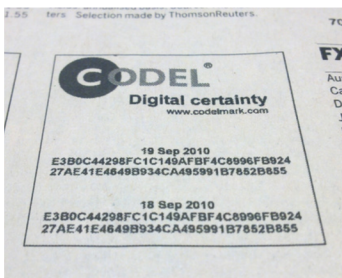
At least 3 hashes already on the chain - 2 of which are protected by Print Publication and selected randomly from data unavailable to the Chain attacker - are randomised into a 96 character Anagram which forms half of the “Salt String” we append to the Source before we submit its hash to create a new Link on the Chain

Validation entails proving that this process took place and that the 3 hashes still exist on the Chain. If an attacker modifies **any Link anywhere on the Chain**, this Validation fails and exposes the attack. Hence a successful Validation proves not just that the Source Integrity remains intact but that the entire Chain also remains intact

## A Necessary Industry Standard

The **Codel public chain** provides an **openly viewable** registry for **everyone**. Any Relying Party can use it for verification without the need for permissions or enrollment - a **vital mechanism for enabling Trust**

This even extends to Blockchain hashes, which can be echoed so their transactions can be trusted more quickly; or clients may simply wish to make their own permissioned environments verifiable externally



## How we differ

- Codel **owns several patents** that underpin **our technology**
- Our service is the **closest to “real-time” verification**
- **No consensus** required achieves **lowest energy consumption**
- **No data on chain**, sensitive or otherwise, Codelmarks only
- Codel creates trust anchors in the physical world, publishing in the **Financial Times** (left)

For more information or to discuss your requirements in greater detail, please contact email: [james.zorab@codemark.com](mailto:james.zorab@codemark.com) | phone: +44 7730 456 463