

From preserving signatures to ordering time

The standardisation and regulation road to qualified electronic ledgers (qDLT)



Evolution, not revolution

Not a technology arriving from outside to reinvent digital trust — but a **very coherent evolution** of something Europe has been building for almost a decade.

The line of reasoning runs from the preservation of qualified signatures and seals to the ordering of archived files by the moment their custody was requested from the Trust Service Provider.



Preserve signatures & seals



Archive documents



Order facts in time

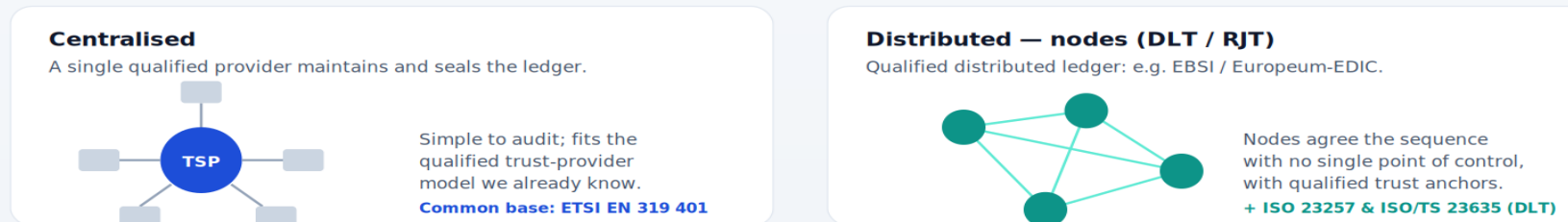
The whole story on one slide

From preserving signatures to ordering time

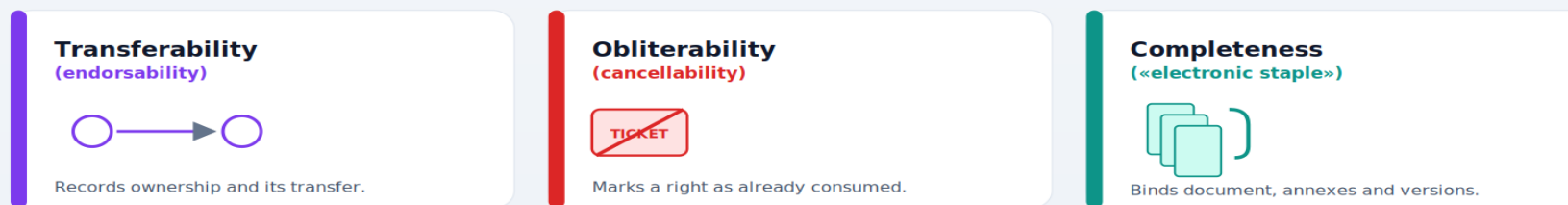
The evolution toward qualified electronic ledgers (qDLT)



The chronological order can be built in two ways



Functionalities it enables (recording owner, state and relationships)



Cartulario · EADTrust

Archive-register recording ownership, state & relationships · 1 ms time stamp per request · pending audit to be a qualified service.

Preserving signatures & seals

1

ETSI TS 119 511 — policy & security requirements for long-term preservation of electronic signatures (or data) using digital-signature techniques.

TS 119 512 — the interoperability protocols for those preservation services.

It keeps the evidence alive: periodic re-stamping, chained hashes and new cryptographic layers — so that twenty years from now you can still prove the document was signed and unaltered.

eIDAS1 · Impl. Reg. (EU) 2025/1946 · Arts. 34(2) & 40

Crypto-agility is not academic

- Certificates expire.
- Authorities change.
- Algorithms age — and post-quantum makes it urgent.

Preserving for the long term means surviving the moment today's algorithms cease to be trustworthy. Post-quantum cryptography does not invalidate this architecture — it makes it more necessary.

“A preservation service is, at heart, a machine designed to migrate algorithms without losing the evidentiary thread.”

Qualified electronic archiving

2

The document as an object to keep intact, legible and available over time — signed or not.



Integrity guaranteed



Access traceability



Retention policies



Reference standard: CEN/TS 18170

eIDAS2 · Impl. Reg. (EU) 2025/2532 · Art. 45j

Not competing — composing

Qualified electronic archiving

Orchestrates the custody of the file: integrity, access, retention, format.

+

Qualified preservation (511)

Keeps the signature evidence alive over the long term. An archiving provider can use a preservation provider for this part.

A layered logic: archiving delegates the long-term care of the cryptographic evidence to the preservation service.

Format conversion

Keeping a document for decades is not only that its bits do not change — it is that it stays legible. Formats age too.

511 · Preservation

migrates cryptographic algorithms before they cease to be trustworthy

Archiving

migrates formats before they cease to be openable

Future legibility of the data and future robustness of the cryptography are two sides of the same promise.

Electronic ledgers: ordering time

3

A chronologically ordered archive.

It guarantees the temporal sequence so that no entry can be inserted, deleted or reordered without it showing. Time-stamping raised to the level of a structure: the ordering is itself the proof.

Reference specification: CEN/TS 18264 (2025) — a new qualified trust service under eIDAS2.

eIDAS2 · Impl. Reg. (EU) 2025/2531 · Art. 45I

Two legitimate answers

Centralised

A single qualified provider maintains and seals the ledger.

Simple to audit; fits the qualified-provider model we already know.

Distributed (DLT)

Interconnected nodes replicate the data and agree the sequence by governance rules.

Provided with qualified guarantees, this is qDLT — a qualified distributed ledger.

I'd rather call it **RJT** — Replicated Journal Technology.

In double-entry bookkeeping, the chronological order lives in the **journal** (the day book, recording events as they happen) — not in the **ledger** (which groups entries by account).

The Regulation enshrines “DLT” and I use it for rigour — but what we preserve is the temporal sequence, and that points to the replicated journal, not the distributed ledger.

The act recognises both variants

All providers

ETSI EN 319 401

General policy requirements for trust service providers.

Distributed variant · additionally

ISO 23257:2022 · ISO/TS 23635:2022

DLT reference architecture and governance guidelines — reserved for the distributed (qDLT) case.

EBSI / Europeum-EDIC — the European example: nodes operated by identified administrations and providers, with governmental trust anchors. Distribution's resilience + eIDAS legal accountability.

Regulatory continuity

511

Keep a signature fully effective



CEN/TS 18170

Hold a document (signed or not), recoverable in the future



CEN/TS 18264

Order & relate the facts, when that order has legal effect

Three layers of one idea that keeps gaining ambition — each standard adds to the previous, it does not replace it.

Register more than the document

Record the owner, the state and the relationships — ordered in time so it cannot be tampered with. Three capabilities that were hard to bring to the digital world with full guarantees:

1

Transferability

(**endorsability**)

Records ownership and its transfer.

2

Obliterability

(**cancellability**)

Marks a right as already consumed.

3

Completeness

(**electronic staple**)

Binds document, annexes and versions.

Transferability — endorsability

If the ledger records who the holder is, it can record the transfer of that ownership. An electronic file becomes an asset that changes hands.

Commercial paper · documents of title to goods · any right traditionally “endorsed” on paper. The chain of endorsements becomes a verifiable sequence of entries.

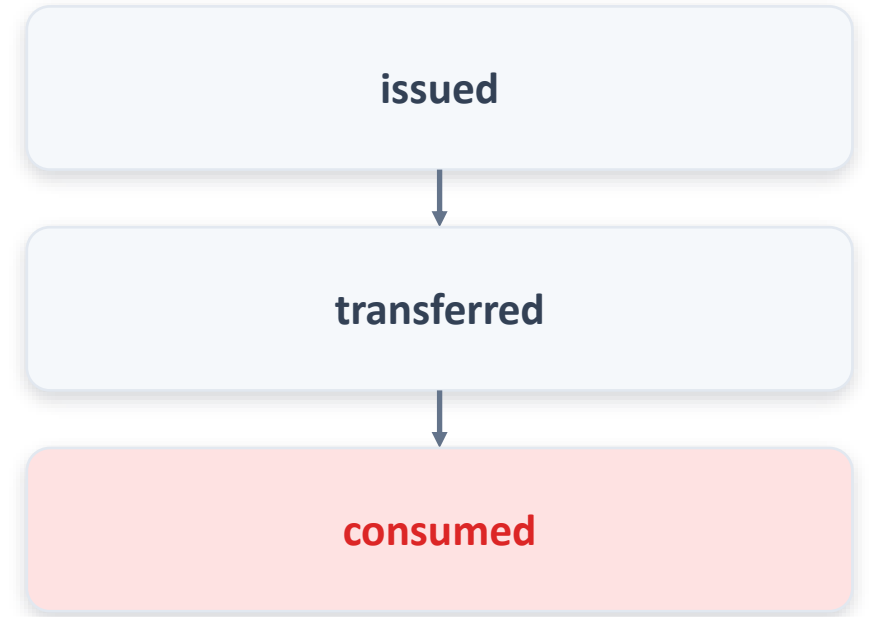


transfer of ownership

Obliterability — cancellability

A right is not only transferred; it is consumed. The ledger does not delete the entry — the evidence remains — but records indelibly its change of state.

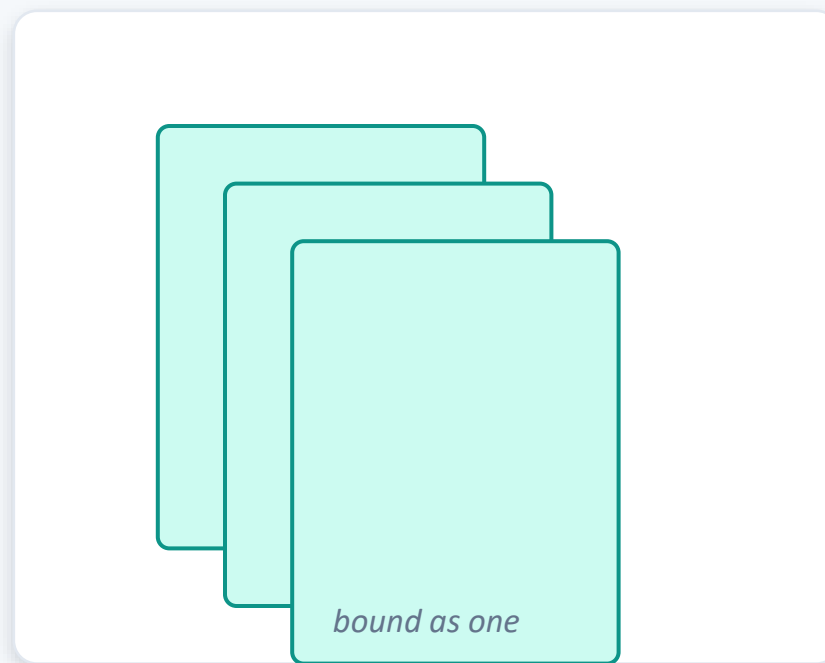
A cinema ticket, admission to a show, a postmark: mark it once used so it cannot be used twice.



Completeness — the electronic staple

A document rarely travels alone: a contract carries annexes, a deed carries endorsements, an agreement evolves through versions.

Think of contractual novations. Completeness keeps the document, its annexes and their versions verifiably bound as an indivisible, traceable unit — and records the order in which they were joined.



Book-entry securities → Cartulario

The same machinery as **book-entry securities** (anotaciones en cuenta): ownership, transfers, encumbrances and extinction constituted and proven by inscription — a reliable, ordered database.

EADTrust · Cartulario

Designed years ago as a register of ownership, state and relationships — endorsability, cancellability and completeness before the framework named them. Now with **millisecond-precision (1 ms) time stamps** on every archiving request, to guarantee chronological order with far greater fineness.

“Cartulario” is Spanish for a cartulary (or chartulary) — the medieval codex where monasteries kept their charters, roughly the great-grandfather of the notarial protocol. We only swapped the vellum for a server and the copyist monk for a 1 ms time stamp.

Trust anchors for European identity

The EUDI Wallet and **electronic attestations of attributes** need solid trust anchors — verifiable places to record who said what, about whom and when.

A qualified chronological ledger — centralised or as qDLT — is precisely one of those anchors, joining decentralised identity with eIDAS legal accountability.

“DLT and qDLT do not appear out of nowhere: they are the next rung on a ladder that began by preserving signatures, went on to archive documents, and is now learning to order facts.”

Try Cartulario

Today offered as a **non-qualified trust service**, **pending audit to be considered a qualified service** within the eIDAS framework.

Learn about it · propose a pilot · discuss use cases: endorsability, cancellability, completeness, 1 ms time-stamping.

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