TECHNICAL ARCHITECTURE — CONFIDENTIAL

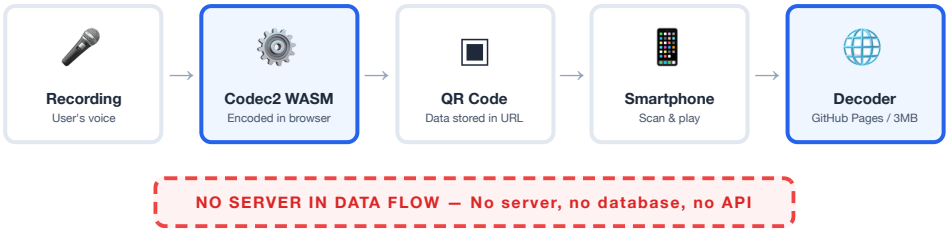
TokiStorage
Technical Architecture

No server. No subscription.

Three-layer distributed storage carrying voice and memory **a thousand years** forward.

Zero servers in the data flow — an architecture with no dependencies

ARCHITECTURE OVERVIEW



Design Principle

To eliminate service shutdown risk, servers are completely removed from the data flow. The QR code's paper surface itself is the storage, and the decoder is just a 3 MB static site.

Three independent layers — physical, national, and private — geographically and institutionally distributed

THREE-LAYER DEPLOYMENT

Physical Layer

Quartz glass engraving (300M+ year durability)

UV laminate film (10-year outdoor durability)

Sado Island | Maui Island

National Layer

National Diet Library deposit (Legal Deposit Law)

Voice QR converted to PDF newsletters and deposited periodically

Tokyo, Nagatacho

Private Layer

GitHub Pages decoder (3 MB)

Data lives inside QR paper's URLs

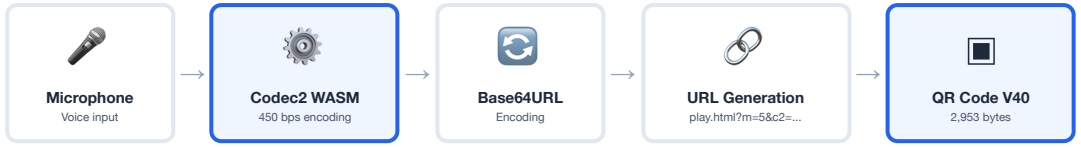
O(1) — storage independent of record count

Worldwide

Each layer is fully independent. Physical distance, managing authority, and legal basis all differ — no single point of failure.

Voice is processed entirely in the browser — never sent to a server — and becomes a QR code

DATA FLOW: VOICE → QR

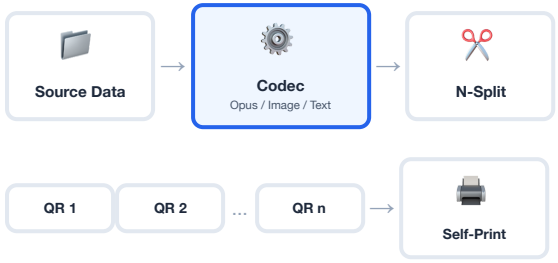


Parameter	Value
Codec	**Codec2 (Mode 5: 450 bps)**
Max Recording	**~29 seconds**
QR Version	Version 40, Error Correction L
Max Capacity	2,953 bytes
URL Format	`play.html?m=<mode>&c2=<base64url>`
Supported Modes	6 modes (3200 / 2400 / 1600 / 1200 / 700C / 450 bps)

Bulk Mode — split into N QR codes, credit managed via IndexedDB. No server required

BULK MODE ARCHITECTURE

Supports long audio, high-res images, and long text beyond the single QR's 30-second limit



The server cannot see balances, revoke credits, or recover lost ones. This asymmetry is intentional by design.

Prepaid Credits

- ¥150 / 1 code ($1)
- IndexedDB (browser storage)
- No account required
- No personal info required
- No expiry
- Purchase via Wise transfer

If any layer is lost, the remaining layers can recover all data — no single point of failure

REDUNDANCY & RECOVERY

Physical

Quartz glass + laminate

National

National Diet Library legal deposit

Private

GitHub Pages decoder

Scenario	Physical	National	Private	Recovery
Physical layer lost	✕	○	○	Yes
National layer lost	○	✕	○	Yes
Private layer lost	○	○	✕	Yes
Two layers lost simultaneously	○	✕	✕	Yes

> A single surviving layer is sufficient to recover all data. This is not coincidence — it is a design principle of three-layer distributed preservation.

Inspired by Ise Grand Shrine's Shikinen Sengu — renewing technology every 20 years to outlast a millennium

20-YEAR RENEWAL CYCLE

Preservation for 1,000 years is not a "build once and forget" design. Technology is renewed every 20 years and handed off to the next cycle.

Comparison with Shikinen Sengu

Ise Grand Shrine has rebuilt its halls every 20 years since 690 AD, transmitting craftsmanship and culture for over 1,300 years. TokiStorage applies this philosophy to digital preservation, renewing recording media, encoding technology, and storage sites on a 20-year cycle.