JEEADiS Policy Proposal 2026

Redesigning the Infrastructure of Digital Democracy

A Policy Proposal for Realizing Internet Voting in Japan

— A Phased, State-Responsibility Digital Election Infrastructure Starting with Overseas Voters —

Japan & Estonia EU Association for Digital Society (JEEADiS)
February 15, 2026

This proposal aims to initiate legislative design during the 2027 Ordinary Session of the National Diet.

Why Now?

Japan's electoral system has long prioritized fairness and accuracy. However, it has not sufficiently adapted to changes in social structure and technological environments. Institutional fatigue is becoming evident.

Key challenges include:

- Structural decline in youth voter turnout
- De facto restrictions on voting rights for Japanese citizens overseas
- Insufficient voting mechanisms during disasters and pandemics
- Operational and fiscal limits of a paper-based system
- Inefficiencies caused by fragmented voter registry management across 1,700 municipalities
- Inconsistent voter identification standards at polling stations

These challenges affect not only administrative efficiency but the legitimacy and sustainability of democracy itself.

Internet voting is not merely a convenience measure. It is institutional reform to modernize democratic infrastructure.

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1. Purpose and Positioning

This proposal draws lessons from Estonia's i-Voting system but does not seek direct transplantation.

Instead, it proposes a:

- **Phased**
- **Limited**
- **State-responsibility-based**

Japanese model of Internet voting, adapted to Japan's legal framework, administrative structure, and societal trust conditions.

The entry point shall be overseas voting, where legitimacy and necessity are strongest.

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2. Foundational Design Principles

(1) Gradual and Limited Introduction

No nationwide immediate deployment.

Three stages:

1. Overseas voting
2. Early voting in selected domestic municipalities
3. National expansion

(2) Clear State Responsibility

- Internet voting shall be administered by the national government.
- Municipalities retain responsibility for paper voting.

- Municipal burden must decrease as digital voting expands.

(3) Technological Neutrality and Transparency

- Avoid dependence on specific vendors, cloud providers, or technologies (e.g., blockchain).
- System architecture must not become a black box.
- Specifications and mechanisms shall be publicly disclosed.

(4) Institutionalized Verifiability

Trust must not rely on “trust us.”

The system shall incorporate mathematical verifiability from the design stage.

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3. Structural Diagnosis of Japan’s Challenges

Issue	Structural Nature
Youth disengagement	High voting and information access cost
Overseas voting difficulty	Geographic and time constraints
Delayed digitalization	Paper-centric institutional design
Obsolete campaign practices	Misalignment with modern information flow
Municipal burden	Labor-intensive, unsustainable
Weak voter ID consistency	Inconsistent verification standards

A structural understanding enables effective reform.

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4. Core Institutional Design

(1) Digitalization and Future Abolition of Polling Station Admission Tickets

Japan currently uses physical polling station admission tickets mailed to voters.

Proposal:

- Introduce digital notices via the MyNumber Portal (MynaPortal).
- Gradually abolish paper admission tickets (optional upon request).

Expected effects:

- Reduced mailing costs
- Reduced administrative burden
- Increased accessibility and immediacy

This approach mirrors Estonia's digital notification system.

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(2) Establishment of the National Electronic Electoral Roll Database (E-ERDB)

Japan's voter rolls are currently managed separately by municipalities.

We propose:

- Logical integration at national level
- Municipalities retain actual resident data
- The state holds reference and verification authority necessary for elections

Indirect Reference Model

E-ERDB will not directly merge with the MyNumber database.
An indirect reference mechanism ensures:

- Protection of personal data
- Electoral accuracy
- Institutional separation of powers

Dual-Track Structure

① Fail-Safe E-ERDB (Minimum Viable Infrastructure)

- Operable even if municipal standardization is delayed
- Enables overseas Internet voting
- Supports snap elections
- Built early under national leadership
- Non-invasive integration with existing systems

② Ideal E-ERDB (Progressive Enhancement)

As municipal system standardization advances:

- Daily or near-real-time updates
- Automated overseas voter extraction
- Improved interoperability

This ensures early deployment and long-term optimization simultaneously.

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(3) Legalization of Internet Voting for Overseas Elections (Phase 1)

Amend the Public Offices Election Act to allow Internet voting for overseas voters only.

Scope:

- House of Representatives elections
- House of Councillors elections
- Potential future referenda

Internet voting will complement postal voting.

Overseas voting provides the strongest normative justification for introduction.

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(4) State-Led System Construction and Operation

The national government shall build and operate:

- Voting application
- E-ERDB
- Vote reception and storage systems
- Tallying and audit systems

Source code shall, in principle, be publicly disclosed and subject to third-party verification.

However:

- Official production implementation
- Distribution control
- Change management

shall remain under strict state responsibility to ensure integrity and continuity.

Dedicated electronic voting machines (polling-station-based) will not be adopted due to excessive municipal burden.

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(5) Clear Role Allocation

Actor	Responsibility

National Government	Internet voting, authentication, cybersecurity, audit
Municipalities	Paper voting and result certification
Voters	Voting and individual verification

As Internet voting expands, municipal burden decreases.

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(6) Early Voting Only & Revoting Design

- Internet voting limited to early voting period
- Election day: paper voting only

Revoting:

- Mandatory when expanding to domestic Internet voting
- Not required in Phase 1 (overseas), aligning with postal voting risk levels

Revoting (only final vote counts) increases resistance against:

- Coercion
- Vote-buying
- Device compromise

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(7) End-to-End Verifiability (Core Requirement)

The system shall satisfy:

- **Cast as intended**
- **Stored as cast**
- **Counted as cast**

Without compromising ballot secrecy.

Cryptographic tools:

- Zero-knowledge proofs
- Mixnets
- Threshold cryptography
- Modern elliptic curve cryptography

Voters can verify their vote was counted but cannot prove to others how they voted.

This aligns with international standards reflected in Estonia's system (Cybernetica) and later improvements such as TIVI.

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5. Complementary Modernization Reforms

(A) Strengthened Voter Identification at Polling Stations

- Mandatory MyNumber Card or official photo ID
- Unified verification standards nationwide

Effects:

- Reduced fraud risk
- Harmonization between paper and Internet voting
- Reduced reliance on admission tickets

(B) Independent Electronic Election Audit Commission

A permanent body independent from administrative authorities.

Responsibilities:

- Pre-election audits
- Operational audits
- Post-election audits
- Source code audits
- Incident review
- KPI validation

(C) Machine-Readable Election Information

Mandatory open data for:

- Candidate information
- Policy platforms
- Official bulletins

Formats:

- JSON
- XML
- CSV
- API access

Digital notice shall become the legally authoritative version.

Candidate identifiers (Candidate ID) shall be introduced to:

- Eliminate ambiguity from name variations
- Improve transparency and verifiability
- Maintain traditional ballot culture while modernizing backend governance

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(D) Business Continuity (BCP)

Internet voting functions as:

- Disaster contingency
- Pandemic response
- Legitimacy safeguard during overseas voter growth

(E) International Cooperation

- Continued workshops with Estonia
- Ongoing technical exchange
- Incorporation of mobile authentication lessons
- Participation in international best practice sharing

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6. Smartphone-First Design (Critical Principle)

Estonia’s system was designed PC-first and later faced smartphone integration challenges.

Japan’s context differs:

- High smartphone penetration
- Strong MyNumber authentication infrastructure
- Secure mobile digital signatures

Therefore:

Japan’s Internet voting must be smartphone-ready from inception.

Browser-Based Principle

- No OS lock-in
- No app-store dependency
- Web browser-based system
- Accessible via smartphone and PC

Access shall be routed through the MyNumber Portal to reduce phishing and fake app risks.

Accessibility by Design

From the outset:

- Screen reader compatibility
- High contrast mode
- Simplified interface mode
- Evaluation with disability advocacy groups

Internet voting shall be a universal system, not a special accommodation.

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7. Implementation Plan & KPIs (2026–2035)

Phase 1 (2026–2028)

- Legal amendments
- E-ERDB construction
- Smartphone pilot tests

- Third-party audits

KPIs:

- Legal reform passed
- Audit completion
- Zero polling-station fraud cases (baseline: 24 in 2025 Upper House election)
- 20%+ digital notice view rate

Phase 2 (2029–2031)

- Full overseas Internet voting operation
- System refinement

KPIs:

- Increased overseas turnout
- Zero major security incidents
- Improved voter satisfaction

Phase 3 (2032–2035)

- Expansion to domestic early voting
- Accessibility improvements
- Municipal burden reduction

KPIs:

- Youth turnout improvement
- Accessibility index increase
- Administrative workload reduction

8. Budget Estimate (Reference)

Short Term (2026–2028)

JPY 20–30 billion
(E-ERDB, pilot, audits, development)

Medium Term (2029–2031)

JPY 10–15 billion annually
(Operation, security, overseas voting)

Long Term (2032–2035)

JPY 50–70 billion initial expansion

Long-term savings expected through:

- Reduced mailing
- Reduced staffing
- Reduced polling infrastructure

9. Risks and Mitigation

Risk	Mitigation
Public distrust	Phased introduction, transparency
Political opposition	Overseas-only initial scope
Bureaucratic resistance	Visible workload reduction
Technical failure	Open source + multi-layer audit
Vendor lock-in	Technology neutrality
Digital divide	Browser-based access + alternatives

10. Conclusion

Internet voting is not primarily a technological challenge.

It is a matter of institutional design and trust architecture.

By beginning with overseas voters — the most normatively justified entry point — and implementing a state-responsibility, verifiable model grounded in transparency and modern cryptography, Japan can modernize its democratic infrastructure while preserving legitimacy.

The question is not whether technology permits Internet voting.

The question is whether institutions are designed to sustain trust in the digital age.

Appendix

Appendix 1: Architecture of Internet Voting in Japan (Overall Diagram)

Appendix 1-2: Overview of the Layered Architecture

Appendix 2: User Flow for Internet Voting (Overseas Voting / Domestic Voting)

Appendix 3: Overall Structure of the National Electoral Roll Database (E-ERDB) — Dual-Track Model

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Appendix 5: Visual Comparison of Electoral Roll Management (Estonia / Current Japan / Proposed Model)

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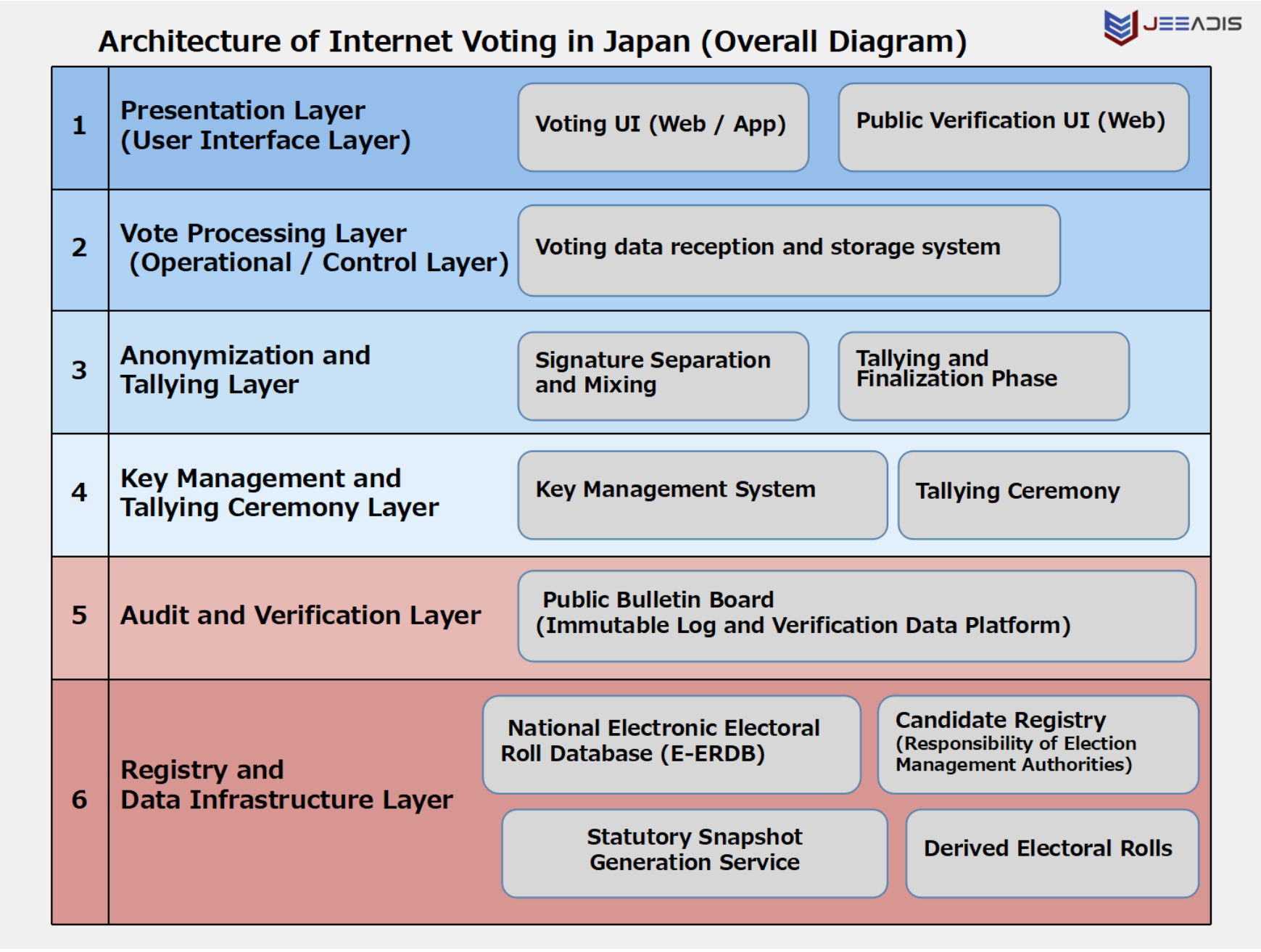
Appendix 7: Comparative Table of Structural Advantages of Internet Voting

Appendix 1: Architecture of Internet Voting in Japan (Overall Diagram)



Appendix 1-2: Overview of the Layered Architecture

Overview of the Layered Architecture for Internet Voting in Japan

This architecture is a multi-layered structure designed on the premise of Japan's electoral system, legal framework, and public trust environment. Its purpose is to simultaneously achieve **reliable voter authentication**, **ballot secrecy**, and **verifiable election results** by clearly separating **responsibility holders** and **processing stages** at each layer.

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① Presentation Layer (User Interface Layer)

This is the only layer directly accessed by voters and third parties.
The **voting interface** and the **public verification interface** are deliberately separated, clearly distinguishing the roles of *casting a vote* and *verifying election results*.

Voting UI (Web / App)

- Performs voter authentication, confirms ballot selections, and applies encryption and digital signatures
- Supports revoting, with only the final vote considered valid
- Enables voters to complete the voting process autonomously, based on their own intent

Public Verification UI (Web)

- Allows voters and third parties to independently verify results using publicly disclosed data
- Ensures that election outcomes can be confirmed **without requiring trust in the system operator**

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② Vote Processing Layer (Operational / Control Layer)

This is the final layer in which **personal identification information and ballot content coexist**, and therefore it is subject to the strictest controls and audits.

- Receives and stores signed and encrypted ballots (prior to anonymization)

- Manages revoting on a per-voter basis, validating only the final submission
- Applies logs and timestamps to all operations

This layer is responsible for preventing **duplicate voting and impersonation**, but it does **not** possess authority to determine vote tallies or final election results.

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③ Anonymization and Tallying Layer

This is the core layer where ballot secrecy is institutionally and technically finalized.

Signature Separation and Mixing

- Separates voter-identifying digital signatures from ballot data
- Mixes ballots to generate unlinkable, anonymous votes

Tallying and Finalization Phase

- Conducts tallying exclusively on anonymized ballots
- Operates in conjunction with the key management system to ensure that no single entity can process results independently

Role
By irreversibly severing the link between voters and their ballots, this layer definitively guarantees ballot secrecy. From this point onward, it becomes technically impossible to reconstruct who voted for whom.

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④ Key Management and Tallying Ceremony Layer

This layer introduces **human oversight** into digital processes.

Key Management System

- Distributes decryption keys using HSMs and threshold cryptography
- Keys are shared among multiple actors, such as administrative bodies, audit institutions, and third parties

Tallying Ceremony

- Decryption and aggregation of anonymized ballots are conducted under public or supervised observation
- Institutionally prevents fraud or arbitrary manipulation by any single entity

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⑤ Audit and Verification Layer

This layer ensures that **anyone can verify that the results are correct**.

Public Bulletin Board (Immutable Log and Verification Data Platform)

- Encrypted ballot data
- Revoting and processing logs
- Cryptographic proofs of anonymization and tallying processes
- Zero-knowledge proofs (ZKP), hashes, and timestamps published in an append-only structure

Note: This system is not limited to blockchain technology and is operated as a tamper-evident immutable log.

Role
This layer enables **universal verifiability**, allowing election results to be verified without trusting a specific operating authority.

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⑥ Registry and Data Infrastructure Layer

This foundational layer manages the authoritative data that underpins electoral legitimacy.

National Electronic Electoral Roll Database (E-ERDB)

- Continuously updated and operated under state responsibility
- Serves as the single authoritative source for voter eligibility, reflecting resident data managed by municipalities during normal periods

Candidate Registry (Responsibility of Election Management Authorities)

- Manages candidate information, policy platforms, and official election bulletins in machine-readable formats

- Finalized at the time of official announcement, hashed, and published as open data

Statutory Snapshot Generation Service

- Fixes the state of the E-ERDB and candidate registry at legally defined points (e.g., announcement date, election day)

- Preserved as immutable evidence for dispute resolution and judicial proceedings

Derived Electoral Rolls

- Operational voter lists generated for each election

- Preserved for evidentiary purposes after the election and subsequently discarded; regenerated for future elections

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Overall Characteristics

This layered architecture respects Japan's decentralized governance structure, municipal election practices, and public trust sensitivities, while simultaneously ensuring that:

- **Voter identity is strictly verified at the front end**

- **Ballot anonymity is irreversibly established mid-process**

- **Election results are verifiable by anyone**

By separating **technology**, **institutions**, and **operations**, this architecture provides a **realistic, robust, and trustworthy Internet voting model** tailored to Japan's electoral system.

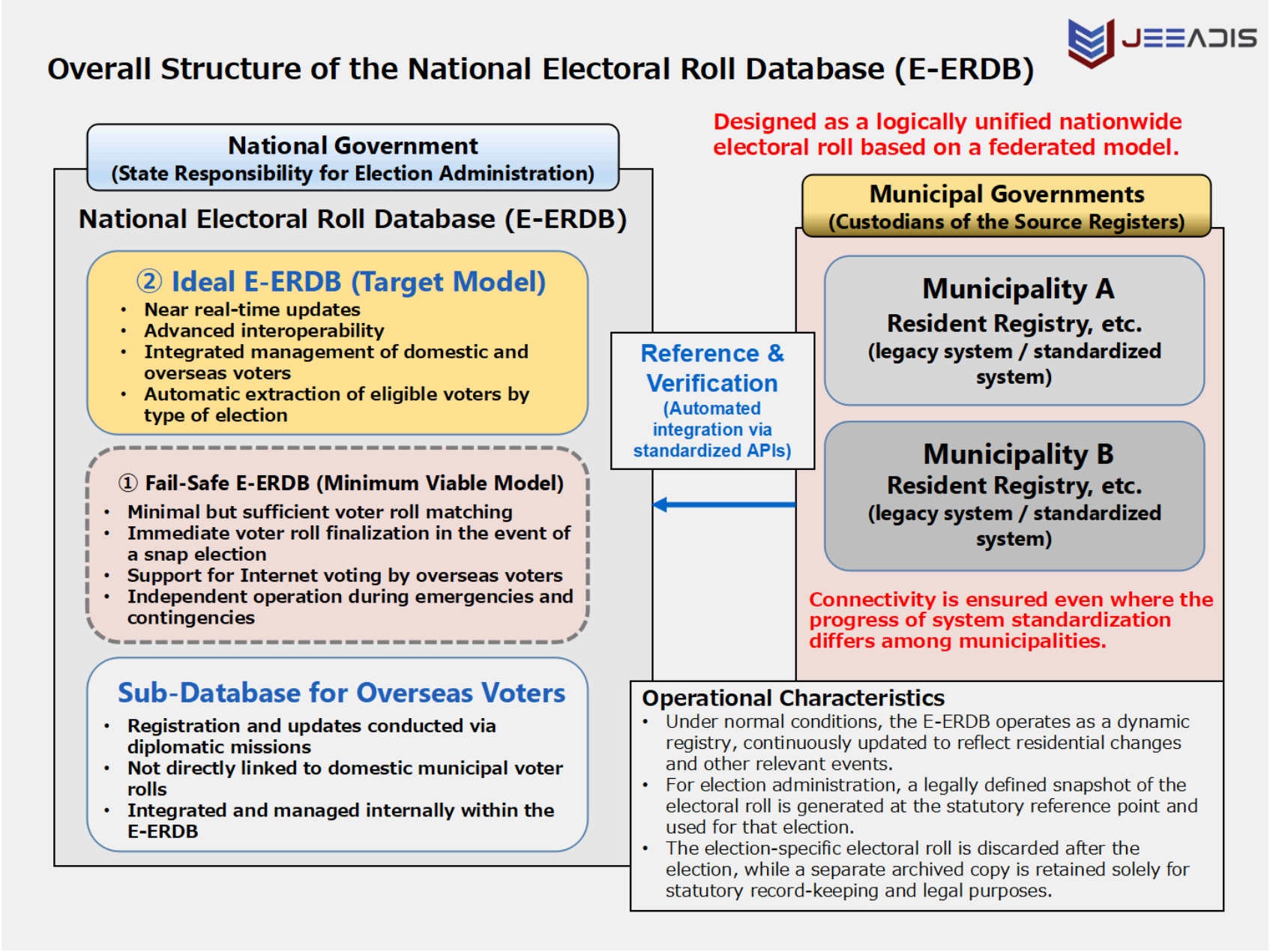
Appendix 2：User Flow for Internet Voting (Overseas Voting / Domestic Voting)

1	Log in to the MyNumber Portal and check your voter registration status.
1-2	If you are not registered, apply for online registration (registration may be completed on the same day and typically within three business days).
2	Select “Elections” from the MyNumber Portal menu.
3	A list of candidates for the electoral district in which you are registered will be displayed.
4	Select the candidate you wish to vote for.
5	Confirm your selection on the screen and submit your vote (an electronic signature is applied and later separated and anonymized during the counting process).
6	After voting, you can confirm that your vote has been successfully received via the MyNumber Portal.
7	More advanced verification (cryptographic verification of vote receipt) is available through a separate verification application.
8	Individual verification of correct vote inclusion in the final tally is available via a public verification website separate from the MyNumber Portal.

Note:

- The “national UI for voting and voter authentication (the primary point of contact with voters)” and the “public verification interface” are institutionally separated.
- Ballot secrecy is guaranteed throughout the entire process, and accessibility features are provided as standard.
- For domestic voting, the system will allow revoting: only the final vote is counted, and any paper ballot will always override an Internet vote.

Appendix 3: Overall Structure of the National Electoral Roll Database (E-ERDB) — Dual-Track Model



Appendix 4: Timeline Scenario for Snap General Election × E-ERDB (Overseas Voting / Internet Voting / Early Voting Limited)

Time Axis	Political / Electoral Context	Fail-safe E-ERDB	Ideal E-ERDB
Normal Period	No election scheduled	• Logical integration of municipal voter registers • Periodic extraction of eligible overseas voters • Daily or weekly synchronization	• Daily or near real-time updates • Automatic reflection of address changes, relocation, death, etc. • Advanced record linkage and duplicate detection
T0: Dissolution Announcement	Dissolution of the House of Representatives	• Snapshot of the most recently synchronized registry state • Preparation for voter roll finalization	• Immediate finalization of the voter registry • Complete logging of the finalized state at the legal reference point
T0 + Several Hours	Official election announcement (start of election period)	• Extraction of overseas voters from E-ERDB • Generation of the eligible list for Internet voting	• Fully automated extraction and eligibility determination • Absorption of inter-municipal differences through standardization
Announcement → Early Voting Preparation	Preparation for early voting	• Issuance of voter IDs for Internet voting • Indirect linkage to identity verification data	• Integration with multi-factor authentication • Automatic detection and correction of inconsistencies
Early Voting Period	Internet voting (overseas voters)	• Vote reception • No re-voting allowed for overseas voters • Management of “voted” status flags	• Near real-time reflection of voting status • Anomaly and suspicious behavior detection
End of Early Voting	Voting deadline	• Finalization of voting records • Storage of tamper-evident hashes	• Automatic generation of audit trails • Facilitation of third-party verification
Election Day	In-person paper voting only	• Provision of reference data for double-voting prevention	• Nationwide real-time cross-checking

After Vote Counting	Finalization of results	• Aggregation of overseas Internet votes with domestic results	• End-to-end verifiability of the entire voting process
Post-Election	Audit and verification	• Provision of audit logs for institutional and operational review (including records of voter roll finalization processes, eligibility determination, and exception handling)	• Analysis of registry accuracy and update latency

Notes

Design Resilience to Snap Elections

This architecture is designed to withstand *sudden political events*, such as snap general elections.
The essence is **not continuous "always-on" registry operation**, but maintaining the ability to **finalize a legally valid voter registry at any moment**.

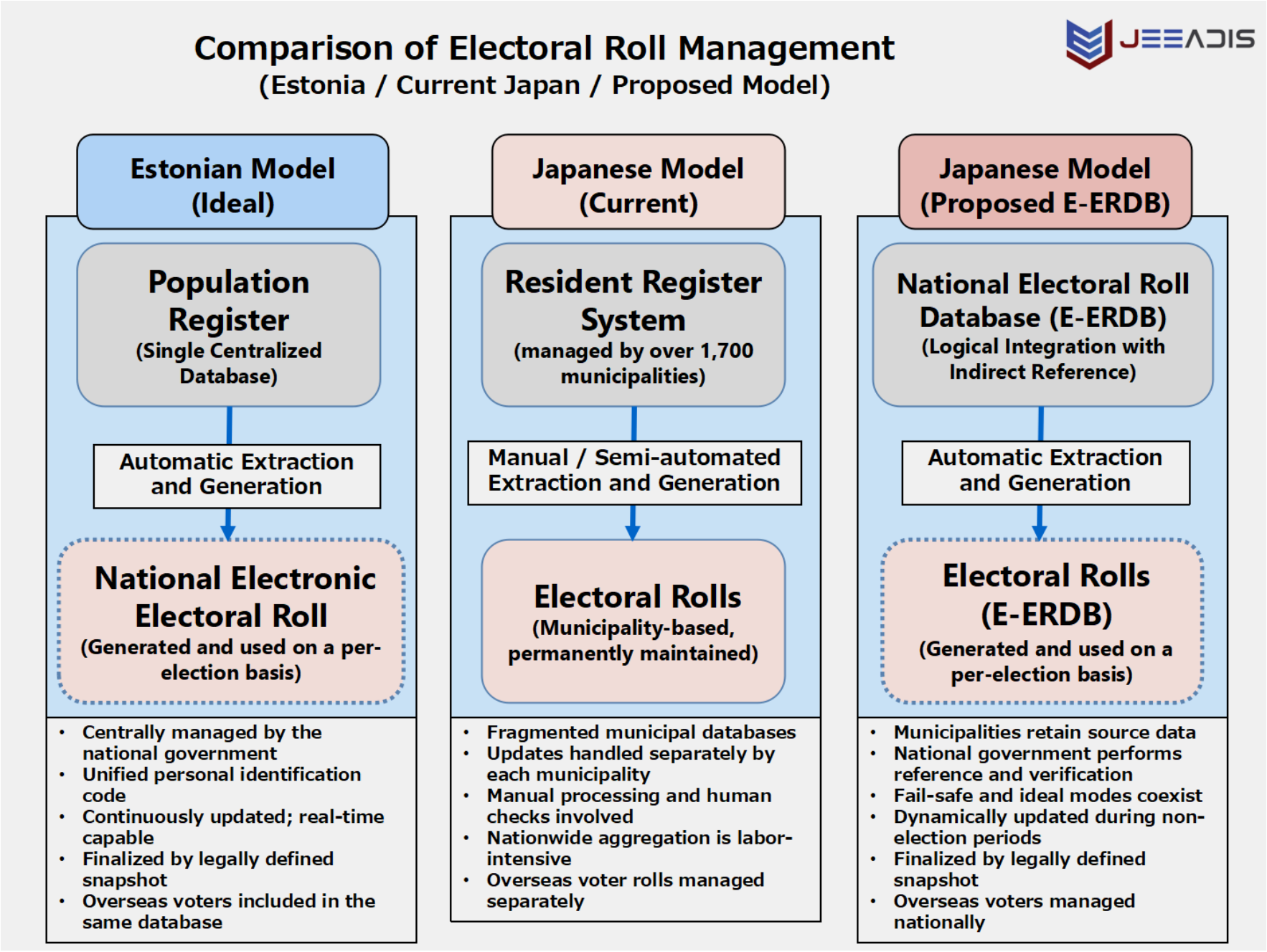
Why the Fail-safe Model Is Sufficient

- The population of overseas voters is limited
- Risk level is comparable to postal voting
- Operable even before full municipal system standardization
- Can coexist with postal voting during transition

The Ideal Model Improves "Automatically"

Once municipal standardization and government cloud initiatives succeed, the E-ERDB can be enhanced **without redesigning its core architecture**—allowing capabilities to improve incrementally and organically over time.

Appendix 5: Visual Comparison of Electoral Roll Management (Estonia / Current Japan / Proposed Model)



Appendix 6: Detailed Comparison of Electoral Roll Management (Estonia / Current Japan / Proposed Model)

Item	Estonian Model (Ideal)	Japanese Model (Current)	Japanese Model (This Proposal: E-ERDB)
Data Governance Authority	State (Ministry of the Interior) Operations: SMIT (IT agency under the Ministry of the Interior)	Independent management by each municipality Municipalities retain actual data (Resident Register, Family Register, supplementary family records, etc.)	Municipalities: retain source resident data National government: logical integration and reference
Authority Responsible for Electoral Rolls	National government	Municipal governments	National government: determination of voter eligibility and nationwide consistency Municipal governments: accuracy of resident data
Updates During Non-Election Periods	Continuously dynamic updates	Resident movement updates handled separately by each municipality	Dynamically updated with continuous synchronization even during non-election periods
Generation of Electoral Rolls	Automatically extracted from the population register and discarded after the election	Electoral rolls created and permanently maintained separately by each municipality	Automatically extracted from the E-ERDB (equivalent to a population register) and discarded after the election
Handling of Overseas Voters	Automatically managed within the same population register	Separate overseas voter registers maintained independently	Centrally managed within the national E-ERDB
Finalization Timing	Snapshot generated at the legally defined reference point	Finalized separately by each municipality prior to the election announcement	Nationwide snapshot generated at the legally defined reference point
Nationwide Consistency	High (single centralized database)	Low (fragmented management)	High (logical nationwide integration)
Automation & Operational Efficiency	Very high	Low (manual processing and coordination required)	High (gradually improved through a two-layer architecture)
Compatibility with Internet Voting	High (assumed as a prerequisite)	Low	High (a realistic and implementable solution)

Appendix 7: Comparative Table of Structural Advantages of Internet Voting

Item	Conventional Model: Analog & Decentralized (Current)	Japanese Internet Voting Model: Centralized & Integrated (Proposal)
Cost Structure	Decentralized: 1,700+ municipalities operate with separate budgets and systems	Centralized: nationally developed and operated as a single system (economies of scale)
Voter Roll Updates	Manual: address changes and removals handled separately by each municipality	Automated: dynamically updated through linkage with E-ERDB and core registries
Prevention of Double Voting	Ex post verification relying on paper records and manual reconciliation	Immediate prevention via real-time control in a nationwide unified database
Quality of Voter Authentication	Varies by municipality; inconsistent standards and documented vulnerabilities	Uniform nationwide standard using MyNumber Card and smartphone-based authentication (aligned with polling-station verification standards)
Voting Security	Technology-dependent: individual devices pose isolated security risks	Institutionally reinforced: re-voting allowed, with paper ballots always overriding digital votes
Crisis & Continuity (BCP)	Fragile: dependence on physical polling stations; vulnerable to disasters and pandemics	Resilient: location-independent remote voting enables continuity
Accessibility	Physical constraints effectively exclude some voters	Location-independent access and optimized UI enhance inclusion for elderly and persons with disabilities
Auditability & Transparency	Closed: limited oversight centered on on-site observers at counting venues	Open: cryptographic proofs enable verification by all voters