



Registers as the Single Source of Truth (SSOT)

Unlocking Efficiency, Trust, and Innovation.

Authors



John Murray

Foster Moore VP European Operations & Special Projects



Bill Clarke

Teranet VP Business Development and Partnerships



Justin Hygate

Foster Moore Vice President of Registry Solutions



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1. Introduction

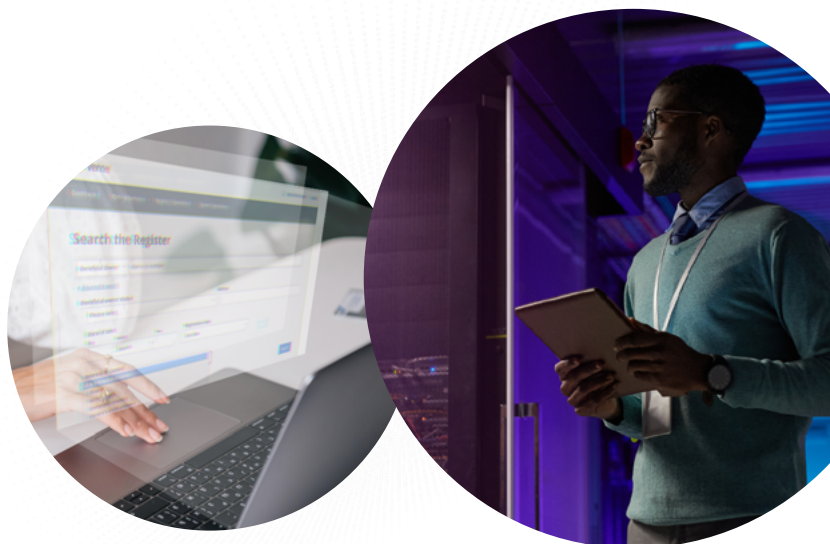
Registers are the custodians of the primary information relating to citizens, legal entities, property and nearly all forms of assets within most societies. In its basic form, a register creates a relationship between an entity, or what can be described as an asset, and a natural person. These registers persist the events, changes, and the transactions pursuant and with respect to their existing legislation. These registers contain the records of facts relied upon by an economy to transact with certainty, and for which the scrutiny of these registers, is the basis both for their accuracy, and the derived value of their data.

Registers are not the end in themselves, but the means to ensure compliance with the law. Their real value lies in enabling governments, businesses, and citizens to operate with confidence that rights, obligations, and entitlements are respected. Registers transform abstract regulations into practical reality.

The transparency of registers is an oft discussed topic, in terms of cost of access, legitimate interest, and numerous other factors. But transparency is rarely discussed in terms of it being a function of the very accuracy of this same register. Nor is there discussion on how many physical locations the register's data exists partially or in some form (potentially contravening most privacy and data copyright regulations), in a jurisdiction. How can the accuracy of the data be assured, when the register data is consumed from multiple sources? There is wholesale duplication of register data facilitated by the custodians of registers, to related government bodies, and in some cases under license/contract to third parties and intermediaries. It is the opinion of the authors that this fundamentally acts against the register evolving to a Single Source of Truth (SSOT). Furthermore, providing register data to intermediaries, does nothing to help improve the quality of the register data and equally does nothing to assist the register authority to perform its functions.

Despite the importance of registers in a modern economy, and indeed the proliferation of registers as a construct to support increased regulation, most of these registers do not become the SSOT within their jurisdictions. And again, surprisingly these registers do very little to even aspire to become an SSOT. A single source definitively means that there is one, and one only place, where the data is persisted. Thus, all consumption of this register data takes place from there.

The authors will explore what we mean by SSOT, its implication for a jurisdiction, the explicit demand for interoperability by the register, and what it effectively means operationally for a register. The authors contend that the efficiencies that can be derived from implementing the Target Operating Model (TOM) of your register to an SSOT are exponential, for all stakeholders of the register.



2. Background

An SSOT is in essence a data management philosophy or as some researchers call 'Data-ism'.¹ A data management philosophy is an important operational principle of all registers. It is also a key principle in data management and enterprise architecture. It ensures that all stakeholders rely on a single, authoritative data source for accurate, consistent, and up-to-date information. This approach eliminates discrepancies, reduces redundancy, and enhances compliance and decision-making.

With respect to a register it takes on an even greater importance in the context of a jurisdiction/economy/society. In simple terms it means that the register data is accurate and is correctly used consistently by all consumers of this register data. To that end, it seems logical for this data to be then persisted in a single repository, in a single location, from where all data is as accurate as regulations or legislation provide for.

However as obvious as this may seem, it is unfortunately not the case in the operation of registers. The wholesale duplication of register data in government is quite remarkable. Consider the duplication of legal entity names, and numbers across government agencies and departments. It is common to see third-party intermediaries use and retain statutory register information in unauthorized databases, producing extracts of this data for consumers, where the provenance of the information is never certified. The primary reason for this is the lack of available interfaces that enables interoperability to the register data, and that the custodians of registers do not demand the rigour of being an SSOT for their legal entity types, within their jurisdiction.

Consider a register that does not natively provide such access, and instead, as a workaround, supplies offline extracts to third parties, and other government agencies. This practice leads to a proliferation of copies of register data that should be protected and remain sacrosanct under their custodianship. It could be argued that supporting such duplication of register data undermines the very legislation that established the register in the first place. Consider, too, how many registers today openly sell or otherwise make their data available to third parties. Does a natural person whose information appears on these registers provide consent for their data to be passed to a third party? These are fundamental questions not only about the operation of the register but, more importantly, about the data management philosophies underpinning these registers.

The authors contend that a register being an SSOT demands that all consumers of its data, only interrogate it as an authority and as the sole custodian of the truth, as related to the function of their custodianship. In effect, SSOT and interoperability are two sides of the same coin.²

In our published Paper, "Enabling Digital Government – Interoperability and Data Exchange Across Registers"³ we position SSOT and Interoperability as foundational pillars for modernizing government registers, arguing that these concepts are non-negotiable for overcoming systemic inefficiencies in legacy systems.



1. Soo, C., Devinney, T., Midgley, D. and Deering, A., 2002. Knowledge management: philosophy, processes, and pitfalls. California management review, 44(4), pp.129-150.

2. Park, Jinsoo, and Sudha Ram. "Information systems interoperability: What lies beneath?" ACM Transactions on Information Systems (TOIS) 22.4 (2004): 595-632.

3. <https://www.fostermoore.com/news/enabling-digital-government-interoperability-and-data-exchange-between-registries>

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Across the paper, we structured an analysis of their importance, with a focus on the EU's leadership and implications for global benchmarking:

1. SSOT and the “Once-Only Principle”: Core Drivers of Efficiency - We emphasize that SSOT eliminates data duplication and ensures authoritative, version-controlled records (e.g., land titles, corporate registries). By adhering to the “once-only principle”, where data is collected once and reused across systems, governments reduce redundancy costs and errors.

For example:

- Land registries acting as SSOTs can feed verified ownership data to tax, planning, and environmental agencies, avoiding contradictory records.
- Business and Corporate registries as SSOTs streamline registrations, compliance processes, as well as licensing & permitting by sharing canonical entity data.

This approach directly addresses our critique of “siloe systems” that force citizens to submit identical data to multiple agencies, eroding trust and wasting resources.

2. Interoperability as a Technical and Governance Imperative – Our paper identifies interoperability as the “connective tissue” enabling SSOTs to function. Key requirements include:

- Standardized APIs for real-time data exchange between registers (e.g., Estonia's X-Road system).
- Legal frameworks mandating cross-agency data sharing, such as the EU's Single Digital Gateway Regulation, which enforces the “once-only” rule for citizen-facing services.
- Cryptographic verification (e.g., blockchain-based hashing) to ensure data integrity during exchanges.

Without these, legacy systems perpetuate fragmentation. For instance, Canada's federal-provincial registries often lack interoperable standards, leading to duplicated efforts in business incorporation and property transactions.

3. EU Leadership, a model for digital transformation. The EU has emerged as a global benchmark by institutionalizing SSOT and interoperability through:

- Regulatory frameworks: The eIDAS Regulation (electronic identification) and INSPIRE Directive (spatial data interoperability) enforce cross-border data harmonization.
- Base registries: National SSOTs for core datasets (e.g., population, companies, property) are interlinked via the Once-Only Technical System, enabling seamless data reuse across 27 member states.
- Procurement reforms: Public tenders now prioritize interoperable solutions over bespoke systems, accelerating modernization.

These efforts have reduced administrative burdens by ~30% in member states like Denmark and Estonia, where citizens no longer manually submit data across agencies.⁴

4. Global Benchmarking and Challenges - While the EU sets a high bar, other jurisdictions lag due to:

- Legacy system inertia: Older registries (e.g., U.S. property records) often lack APIs or standardized data models.
- Policy gaps: Few countries legally mandate interoperability, unlike the EU's binding regulations.
- Cultural resistance: Agencies may resist ceding control of “their” data to SSOT frameworks.

However, drivers like cost pressures (e.g., Canada spends ~\$2.6B annually reconciling duplicate datasets⁵) and citizen demand for streamlined services are pushing reforms in Australia, Singapore, New Zealand, and Latin America.

4. <https://ec.europa.eu/futurium/en/system/files/ged/finalreportstudyonegovernmentandthereductionofadministrativeburden.pdf>

5. https://cca-reports.ca/wp-content/uploads/2022/02/ISTP-EN_final_digital.pdf

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Across the paper the authors underscore that SSOT and Interoperability are not optional—they are prerequisites for functional and efficient digital government, within a connected landscape. The EU’s progress demonstrates that success requires legal mandates, technical standardization, and cultural shifts toward data sharing⁶. As jurisdictions worldwide face rising expectations for efficiency, the EU’s model provides a replicable blueprint, though legacy challenges remain significant.

The principle of SSOT is consistently emphasized across our published works, serving as a critical benchmark for the future direction of registry systems. In “Registers: The New Frontier”, SSOT is positioned as the bedrock for data integrity, transparency, and operational efficiency within the proposed Target Operating Model (TOM). We assert that registers must embody canonical status—legally recognized as the authoritative record—thereby eliminating data silos, enabling accurate validation, and facilitating seamless interoperability across jurisdictions and domains. We also advocate that government transformation initiatives should prioritize SSOT in both technological design and legislative reform to unlock higher trust, improved service delivery, and broader economic value for citizens, businesses, and the public sector.⁷

Complementing this, “Architecting Innovative Registers of the Future” distills SSOT into a series of architectural guiding principles that underpin resilient, scalable, and interoperable register systems. The paper stresses the necessity for register platforms to embed SSOT as a strategic imperative, ensuring all transactions and records are consolidated, validated, and universally referenced from a singular authoritative source. By aligning system architecture, data governance, and process automation with SSOT, we strive to show how registries can more effectively support digital government, prevent fraud, and foster trust across an increasingly interconnected global registry landscape.⁸



6. Kalogirou, Victoria, and Yannis Charalabidis. “The European union landscape on interoperability standardization: status of European and national interoperability frameworks.” Enterprise Interoperability VIII: Smart Services and Business Impact of Enterprise Interoperability. Cham: Springer International Publishing, 2019. 359-368.

7. <https://www.fostermore.com/news/the-target-operating-model-pioneering-changes-in-registry-practices>

8. <https://www.fostermore.com/white-papers/architecting-innovative-registers-of-the-future-white-paper>

3. Key Concepts and Practice Areas

3.1. Data Reuse and ‘The Once Only Principle’ (TOOP)

Data reuse is the practice of leveraging existing data across multiple applications, processes, or departments to avoid redundancy and improve efficiency. An SSOT plays a crucial role in enabling effective data reuse by ensuring that all systems and users rely on a single, authoritative dataset.

Why does data reuse matter in a register, because it simply cannot be effective if it does not. For a registry authority, effective data reuse can:

- Reduce Administrative Burden – Avoid repetitive data collection and verification processes.
- Improve Compliance & Auditability – Ensure consistent records across all regulatory and reporting requirements.
- Enhance Customer Experience – Enable seamless interactions by reusing verified customer data (e.g., KYC records).
- Drive Efficiency – Minimize duplication, ensuring departments and systems use the same validated data.

It seems at odds with the custodianship of a statutory register that basic data management practices are not employed even within the jurisdictions in which it exists.

The TOOP Directive is an initiative under the European Union’s Single Digital Gateway (SDG) Regulation that aims to simplify administrative processes by ensuring that individuals and businesses provide their data only once to public authorities⁹. This means that different government agencies and entities can securely reuse existing data, reducing duplication and administrative burden.

TOOP goes to the heart of the poor practice by member states in implementing interoperability and management of their underlying registers. It demands that government agencies effectively share information, which at the extremely basic level means that it is only stored in a single location. TOOP calls out the poor practice of registers and in effect demands that these registers become an SSOT.

It is the authors’ opinion that TOOP, while concerned with the benefits of cross border exchanges, misses entirely the larger benefit of requiring effective interoperability at a national jurisdictional level.¹⁰ It is conceded though, and it is discussed below where the EU designates a base register within a jurisdiction.

Norway has implemented legal and policy frameworks requiring government agencies to avoid asking citizens for information that is already held by another public authority, following the “once-only” or “one-stop” principle in public administration, particularly as part of its digitalization strategy.

9. Prentza, Andriana, et al. “TOOP pilot experiences: challenges and achievements in implementing once-only in different domains and member states.” *The once-only principle: the TOOP project* (2021): 191-207.

10. Krimmer, Robert, et al. “The Once-Only Principle: A Matter of Trust.” *The Once-Only Principle: The TOOP Project*. Cham: Springer International Publishing, 2021. 1-8.

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Norway's main digital government policy, known as the "One Digital Public Sector" initiative, explicitly addresses the "once-only" principle, aiming to ensure that citizens and businesses do not have to provide the same information repeatedly to different government entities. This principle is integrated into administrative processes and reflected in government modernization efforts aimed at eliminating redundant data collection. The key Acts and Laws cover:

- **Freedom of Information Act:** While it primarily concerns access to government documents for the public, it encourages transparency and promotes the re-use of information collected by public authorities.
- **Public Administration Act:** Sets out how public bodies manage cases and information. Although it does not directly prohibit repeated requests, the act's provisions and supporting administrative practices promote efficiency and sound case management, supporting the minimization of redundant requests.
- **Data Protection Laws:** Norwegian data protection rules, aligned with the EU GDPR, reinforce that personal data should only be collected when necessary and for specified purposes, indirectly supporting the "once-only" principle by discouraging unnecessary repeated collection.

Practical Application

In practice, Norway's administration actively implements shared registers and electronic services to facilitate the re-use of previously supplied data. Government guidance and policy documents emphasize that agencies should obtain information from internal sources before requesting it again from the individual. The "one-stop shop" model for digital services is fundamental to this approach, reducing burdens on citizens and improving service delivery.

3.2. Base Register Designation across the EU

A Base Register is an SSOT as defined by the European Commission.¹¹ In the EU a Base Register is a fundamental, authoritative source of data that is legally recognized and maintained by a public authority. These registers serve as the SSOT for specific domains, ensuring data integrity, interoperability, and reusability across government services.

The Base Register designation exists within a framework of regulation to support a greater level of interoperability. Across the EU these premised around:

- **Single Digital Gateway (SDG) Regulation**
Enables cross-border access to base registers.
- **Once-Only Principle (TOOP)**
Ensures that citizens and businesses provide data only once, and authorities retrieve it from base registers.
- **eIDAS Regulation**
Standardizes electronic identification across EU borders.
- **GDPR & Data Governance Act**
Ensures secure, lawful data usage.



11. <https://interoperable-europe.ec.europa.eu/collection/semic-support-centre/base-registries>

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EU member states designate different base registers depending on their national implementation, but typical examples include:

Base Register Type	Example Data	Use Case
Business Register	Legal status, ownership, tax ID	KYC/AML, company verification
Civil Register	Birth, marriage, death records	Identity verification, social benefits
Land Register	Property ownership, boundaries	Taxation, real estate transactions
Vehicle Register	Registration, ownership, insurance	Law enforcement, road safety
National ID Register	Citizen identity, digital identity	Authentication, eIDAS, e-Gov services

3.3. Open Data Directives and Key Principles

The SSOT approach aligns closely with the goals of open data frameworks and directives, particularly in driving improved data interoperability. SSOT is a methodology where all stakeholders rely on a single, authoritative source for data, ensuring consistency, accuracy, and reliability. The SSOT approach fits into open data directives and frameworks across key areas:

• **Alignment with Open Data Principles –**

Open data frameworks, such as the International Open Data Charter and the EU Open Data Directive, emphasize principles like data quality, interoperability, and openness by default¹². The SSOT approach directly supports these principles by:

- Ensuring that datasets are consistent and free from duplication or conflicting versions.
- Providing a centralized, authoritative source for data that can be accessed and reused by multiple stakeholders.
- Enhancing trust in the data by maintaining its integrity and accuracy.

• **Supporting Interoperability –**

Interoperability is a cornerstone of open data frameworks, enabling different systems, organizations, and jurisdictions to seamlessly exchange and use data. The SSOT approach facilitates interoperability by:

- Creating a unified framework for data management where all systems reference the same dataset.
- Standardizing formats, definitions, and structures to ensure compatibility across platforms.
- Reducing fragmentation caused by multiple versions of the same dataset being used in different systems.

• **Enhancing Data Discoverability and Accessibility –**

Open data frameworks stress the importance of making data easily discoverable and accessible. SSOT contributes by:

- Providing a clear point of access to authoritative datasets (e.g., through centralized portals like New Zealand’s data.govt.nz or the EU’s European Data Portal).

12. Arisi, Marta. “Open knowledge. Access and re-use of research data in the European Union open data directive and the implementation in Italy.” Italian LJ 8 (2022): 33.

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- Simplifying metadata management so users can easily find relevant datasets.
- Reducing confusion caused by multiple conflicting sources of the same information.

• Enabling High-Value Datasets –

Open data frameworks often prioritize releasing high-value datasets (e.g., transport, health, companies, property/geospatial, etc). SSOT ensures these datasets are:

- Accurate and up to date when shared publicly.
- Easily integrated into applications or combined with other datasets due to their standardized nature.

For instance, in the EU's Open Data Directive, high-value datasets must be machine-readable and interoperable. SSOT helps meet these requirements by ensuring consistency at the source.

• Addressing Privacy and Security Concerns -

Both open data frameworks and SSOT approaches emphasize protecting sensitive information while maximizing openness. SSOT supports this balance by:

- Centralizing governance over sensitive datasets to prevent unauthorized modifications or breaches.
- Embedding privacy-preserving mechanisms (e.g., anonymization) at the source before sharing publicly.

• Cross-Government Coordination -

Open data initiatives often face challenges in coordinating across multiple government agencies or jurisdictions. The SSOT approach helps overcome this by:

- Establishing a single authoritative source that all agencies can reference for consistency.
- Reducing silos between departments or regions by creating shared standards for data management.

While SSOT offers significant benefits, there are some challenges in integrating it into open data directives, these include:

- **Implementation Complexity:** Establishing an authoritative source requires significant investment in infrastructure, governance, and stakeholder coordination.
- **Legacy Systems:** Many government organizations rely on outdated systems that may not integrate easily with an SSOT approach.
- **Cultural Resistance:** Agencies and departments are typically reluctant to relinquish control over their own versions of datasets.
- **Scalability:** Maintaining a single source of truth becomes more complex as the volume of data grows.

The Single Source of Truth (SSOT) approach complements open data frameworks by enhancing interoperability, standardization, and trust in shared datasets. It aligns well with principles outlined in global directives like the EU's Open Data Directive or other jurisdictional alignment (e.g. Canada and New Zealand) and adoption of the International Open Data Charter. However, successful implementation requires addressing technical, organizational, and cultural challenges to ensure that SSOT becomes a foundational element of an effective open data ecosystem.

3.4. Data Sharing/Data Registry Legislation – The EU Approach

- **EU Data Governance Act¹³**

The EU Data Governance Act establishes a comprehensive legal framework to enable the secure exchange and availability of data across the European Union, explicitly supporting the creation of sectoral and cross-sectoral EU Data Spaces. By mandating that public sector bodies facilitate access to non-personal data held in registers, the Act directly reinforces the transition of base registers to SSOTs: public authorities are required to establish governance structures and technical mechanisms to ensure data is shared accurately, consistently, and under regulated conditions. The Act also sets out conditions for re-use, supports data altruism initiatives, and demands clear responsibilities for custodianship, providing a strong legal basis for data held in registers to serve as the sole authoritative source not only within national borders, but across the EU digital single market. Enforcement actions taken in 2024 against non-complying Member States exemplify the critical importance of designated authorities and harmonized practices to realizing the SSOT vision at the European scale.

- **Supports the Setting Up of EU Data Spaces**

EU Data Spaces are collaborative environments where public and private sector participants can pool, share, and leverage data based on clear rules, standards, and governance processes.¹⁴ Each data space is anchored in the principle that its core registers (such as those for business, property, or vehicle data) function as SSOTs—serving as the foundation for trustworthy data flows, regulatory compliance, and digital innovation. The Data Governance Act catalyses this by mandating interoperability, standardized APIs for cross-border data exchange, and the alignment of national registers around EU-wide frameworks (eIDAS, Once-Only Technical System). As the regulation matures, more sectors; healthcare, transportation, and energy will be required to harmonize their principal registers as federated SSOTs, fostering a pan-European data ecosystem that maximizes both data integrity and accessibility.

The enshrinement of the Data Governance Act in September 2023 marked a foundational shift in how Europe approaches public sector data curation and stewardship. By legally obligating Member States to recognize and designate authorities charged with data governance, the Act ensures base registers achieve and maintain the level of trust, security, and legal certainty required for SSOT status. Provisions against inaction, as seen in the 2024 warnings and proceedings, provide accountability mechanisms, making this legislative framework central to elevating EU registers from fragmented data holders to internationally recognized SSOTs. Ultimately, this legal architecture shapes both operational standards for digital public services and the broader culture of data sharing across the continent.¹⁵

- **EU Countries now being Formally Instructed to Comply**

Recent enforcement measures by the European Union highlight the growing importance of compliance with the Data Governance Act for the realization of SSOT in public sector registers. As of December 2024, several member states including Czechia, Germany, Estonia, Greece, Luxembourg, Poland, Austria, Portugal, and Slovenia—have been formally advised that insufficient action has been taken to enable their relevant authorities to implement the Act's mandates. Similarly, in July 2024, the EU initiated proceedings against Ireland for failing to designate a responsible authority to enact the legislation. These decisive steps reinforce the necessity for robust national governance frameworks and demonstrate the EU's commitment to ensuring that all countries converge on best practices for data stewardship cornerstones in the establishment of interoperable, authoritative registers as SSOTs across the single market

13. <https://www.european-data-governance-act.com/>

14. <https://interoperable-europe.ec.europa.eu/collection/semic-support-centre/data-spaces>

15. <https://digital-strategy.ec.europa.eu/en/library/new-practical-guide-data-governance-act>

3.5. Non-Governmental Data Spaces

Automotive Industry

Concept/Application:

- Manufacturers and suppliers implement centralized data platforms (SSOT) to unify production data, supply chain status, compliance records, and design documentation across all departments and plants.
- Adhering to SSOT supports regulatory reporting, safety recalls, and industry standards adherence, benefiting government oversight and public safety.

Example:

- A global automotive machinery company unified all departmental data using an SSOT platform, enabling consistent and real-time tracking of production, engineering, and compliance, dramatically improving efficiency and transparency.¹⁶

Real Estate Market

Concept/Application:

- Integration of property records, transaction histories, ownership data, valuation data and regulatory compliance in a centralized SSOT improves transparency and streamlines public asset management as well as application “single source” for external market.
- Governments and industry work in collaboration using SSOT principles to create dedicated, professionalized real estate management entities/data solutions organized around digital land/property registries for efficient asset utilization, market evaluation tools and to support fraud reduction.

Example:

- Teranet’s REALM solution, adopted across the province of Ontario, unifies government land title and assessment data with real-time transaction updates, enabling a seamless MLS platform for realtors, providing reliable due diligence, and automated compliance checks.¹⁷



16. <https://inductiveautomation.com/resources/customerproject/global-automotive-machinery-company-gets-single-source-of-truth-in-every-department>

17. <https://thenewrealm.ca/>

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Healthcare

Concept/Application:

- Hospitals and clinics utilize SSOT frameworks to centralize patient information (EHRs), lab results, billing, and compliance records, reducing errors, improving care continuity, and supporting regulatory mandates (such as HIPAA).
- SSOT enables government health authorities to monitor outcomes, patient safety, and compliance across providers more effectively, and to better manage public health emergencies.

Example:

- Government healthcare networks adopting SSOT for master health records have optimized care, enhanced predictive analytics for resource allocation, and streamlined compliance with federal interoperability requirements.

Aviation and travel

Concept/Application:

- The aviation industry relies on centralized data platforms and SSOT principles to unify and manage passenger, ticketing, and operational data across multiple airlines, travel agencies, and regulatory authorities. By leveraging interoperable APIs and digital solutions, the industry consolidates data such as Passenger Name Records (PNRs), e-tickets, schedules, and compliance information into authoritative repositories. This centralized approach ensures accuracy, consistency, and transparency in booking, ticketing, and border control processes. SSOT frameworks enable real-time data sharing, reduce manual reconciliation, and improve compliance and security—all while supporting seamless end-to-end travel experiences for customers and partners.

Example:

- IATA's ONE Order initiative exemplifies SSOT and interoperability in practice by consolidating all records of a passenger's journey—including PNRs, e-tickets, and ancillary documents—into a single, authoritative "order" reference. Through interoperable APIs, airlines, travel agencies, and global distribution systems (GDS) access and update the same dataset, streamlining ticket issuance, settlement, and passenger management.

3.6. Pan Jurisdictional Data Sharing

The evolution of pan-jurisdiction data sharing agreements marks a critical step forward for SSOT (Single Source of Truth) frameworks in registries, strengthening both global digital governance and the interoperability of regulatory datasets across borders. A notable example is the landmark data flows agreement between the European Union and Japan, which entered into force on July 1, 2024.^{18 19}

This agreement, embedded in the EU-Japan Economic Partnership Agreement, eliminates restrictive data localization requirements and establishes a predictable legal environment for cross-border, non-personal data flows. By mutually recognizing the data governance standards and fostering the "Data Free Flow with Trust" principle, the EU and Japan have created a foundation of trust that is essential for successful SSOT implementation at a global scale.

For governments and entities operating critical registers—whether in commerce, land, corporate, or beneficial ownership domains—this agreement delivers several tangible benefits:

18. https://policy.trade.ec.europa.eu/news/eu-japan-deal-data-flows-enters-force-2024-07-01_en

19. <https://www.hunton.com/privacy-and-information-security-law/new-data-flow-agreement-between-the-eu-and-japan-enters-into-force>

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- **Unified Regulatory Oversight:** Reliable, real-time cross-border data exchange supports efforts to maintain an SSOT, as authoritative records can be sourced, verified, and reconciled across legal jurisdictions.
- **Operational Efficiency:** Abolishing forced in-country data storage reduces duplicate recordkeeping and complexity, minimizing data silos and manual reconciliation—key to maintaining the integrity of an SSOT.
- **Business and Innovation Enablement:** Companies and government agencies in financial services, e-commerce, and public sector administration gain efficiency and compliance advantages as they leverage consistent, up-to-date register data for onboarding, compliance checks, and seamless client experiences.
- **Alignment on Data Governance:** The agreement preserves regulatory autonomy (particularly for personal data, which remains protected under mutual adequacy decisions), while simplifying the sharing of non-personal register data for regulatory or service purposes.²⁰

The July 2024 EU-Japan milestone demonstrates the growing maturity of transnational data sharing arrangements and their centrality to advancing SSOT principles in registries. As more economies adopt similar protocols, they will enable more robust international verification, improved cross-border transparency, and innovation around digital government and regulatory systems—making the vision of truly interoperable, global SSOT environments increasingly realistic and actionable.²¹



20. <https://2b-advice.com/en/2024/07/03/eu-japan-agreement-on-data-flows-in-force/>

21. <https://www.rplt.it/eu-japan-deal-on-data-flows-enters-into-force-a-new-era-of-digital-economic-cooperation/>

The Value and Impact of Operating as an SSOT

4.1. Characteristics of an SSOT

The defining characteristic of an SSOT register is in setting the foundation for its role as the authoritative, reliable, and trusted point of reference for critical data within its domain. These core attributes distinguish an SSOT from traditional registers ensuring that all stakeholders can confidently rely on a single, validated source for accurate information and seamless data exchange, and can be outlined such that they are:

Authoritative & Legally Recognized -

The register is the official, legally recognized source for specific data (e.g., business, citizen, or land records). Other systems and stakeholders must rely on this register for accurate, up-to-date information.

Example:

- A business registry that is the official source for company legal status.

Maintain Data Integrity & Accuracy -

The register is continuously updated with validated and verified information.

Any changes to records are logged, traceable, and auditable.

Example:

- A real estate register ensuring only validated property transactions are recorded.

Eliminate Data Duplication & Conflicts -

All relevant stakeholders (government agencies, banks, compliance bodies) refer to this register instead of maintaining duplicate datasets. Data updates occur in one place and are propagated to other systems as needed.

Example:

- A national identity register serving as the primary source for personal identity verification.

Enable Secure & Controlled Data Access -

Other systems access the register via APIs, data-sharing agreements, or federated access. Access is role-based, secure, and compliant with data protection regulations (e.g., GDPR, AML directives).

Example:

- A KYC register allowing banks to retrieve verified customer data securely.

Support Interoperability & Data Reuse -

The register integrates with national and international systems, ensuring consistency across borders. Uses standardized formats (eIDAS, TOOP, X-Road, or blockchain-based ledgers) for seamless data exchange.

Example:

- A cross-border business register enabling EU-wide company validation under TOOP.

4.2. Transitioning Base Registers

Transitioning a base register to an SSOT is a structured process that involves both technical upgrades and organizational alignment. The key steps and requirements include:

- **Identify and Create an Inventory of Data Sources:** Map all data flows, dependencies, and understand which systems or databases contain relevant data. Document what data is currently held, in what formats, its quality, and its ownership.
- **Standardize Data and Data Models:** Align varied data formats, definitions, and models into a unified schema. This often means setting common data types, naming conventions, keys, and relationships, ensuring data normalization and eliminating duplication.
- **Select Appropriate Technology and Integration Tools:** Choose systems and platforms capable of collecting, storing, and integrating all necessary data into a single repository. Data integration and ETL (Extract, Transform, Load) tools are typically required for smooth consolidation.
- **Design and Implement Data Governance:** Establish clear policies for access control, user roles, validation, updates, audit trails, and data stewardship. Make sure the data is accurate, secure, and interactions are traceable.
- **Integrate and Synchronize:** Develop or adopt workflows to regularly synchronize incoming data, validating it against quality standards and resolving conflicts. Ensure ongoing integration to keep the register current and authoritative.
- **Establish Consistent Access:** Open access to all relevant systems and stakeholders, ensuring everyone references the same register for up-to-date data.
- **Change Management and Training:** Communicate the transition to all users and stakeholders, provide clear documentation, and deliver targeted training so that everyone adopts the new SSOT approach and does not revert to old data silos or manual tracking.
- **Monitor and Improve:** Continuously audit, monitor for data quality, and refine integration, governance, and user practices to preserve the SSOT status as business or regulatory needs evolve.

Some recent examples of base registers transitioning to SSOTs are in the corporate or business registry domain:

European Union:

- **Belgium – Ultimate Beneficial Owner (UBO/BO) Register:** Since 2017, Belgium expanded its BO register to cover ownership chains and worked with stakeholders and automatic data-matching tools to clarify rules and identify discrepancies, making it an increasingly authoritative SSOT for ownership data. Over 15,000 discrepancy reports were addressed in 2023 alone, leveraging reconciliation tech to maintain integrity and reliability.
- **EU-wide Business Registers Interconnection System (BRIS):** The EU's BRIS enables linkage of national business registers, offering cross-border company data lookup and moving toward a pan-European SSOT model. The Single Digital Gateway Regulation ("once-only" principle) seeks to ensure that businesses do not need to resubmit the same data across different EU countries, building a more unified and trusted registry environment. **Broader Trends:** EU directives now require registers be interoperable, to verify adequacy, accuracy, and timeliness of business and beneficial ownership data, with powers to reconcile discrepancies and sanction non-compliance. This elevates business registers into official SSOTs, supported by tighter access and data quality requirements.

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United Kingdom

UK Companies House: Companies House acts as the official SSOT for company registration in the UK, including the register of members, directors, secretaries, and people with significant control (PSC). Since 2016, the PSC Register has been mandatory, bolstering the transparency and completeness of UK company ownership information. Statutory registers must be kept up to date as per the Companies Act 2006, and digital storage options have improved accessibility and compliance, centralizing a single authoritative source for corporate legal data. These examples illustrate the EU's active legislative and technical modernization of business registries into trusted, comprehensive SSOTs, and show how the UK's Companies House is a mature example of statutory and digital SSOT for business entity information.

Other Jurisdictional Examples:

Statistics Canada Business Register: The Business Register uses the Canada Revenue Agency (CRA) Business Number as the primary key. Multiple administrative data sources—including personal and corporate tax returns, GST, and payroll deduction accounts—are continuously consolidated and validated to create and update a central, authoritative view of all businesses operating in Canada. This evolution reflects a transition from a siloed, base register to a harmonized SSOT for national business data.

Australia's Modernizing Business Registers (MBR) Program: The MBR Program was cancelled in 2023, because an independent review found that massive cost overruns and timeline blowouts meant it could not deliver value for money. That said, the Program undertook a comprehensive transition with a vision of consolidating multiple outdated business registers into a unified, authoritative SSOT platform, the Australian Business Registry Services (ABRS). This multi-tranche program would have included the migration of the Companies Register, Business Names Register, and related professional registers to the new platform, which aimed to improve trust, data quality, and digital user experience. Old legacy systems were to be decommissioned as the new SSOT system became the master record for all business identity and compliance.

4.3. Realized Benefits for Government and Society

The benefits of operating a register as an SSOT means increased authoritativeness, increased funding, interoperability, and general influence within the register's jurisdiction. It strengthens the registry's role as a critical piece of digital infrastructure both nationally and internationally. More specifically this leads to benefits for the register in the form of:

(a) Legal and Institutional Recognition

An SSOT is recognized as the authoritative source of truth for a given type of legal entity (e.g., population, businesses, land, vehicles). It means increased recognition and importance for the register, as a custodian. It could also mean that the register is given additional registers to manage or at least is seen as the custodian of choice. Other public administrations are required to reuse data from base registers instead of duplicating it, strengthening the register's institutional role.

(b) Increased Trust and Credibility

Data held in a base register is considered authentic, reliable, and up to date. This credibility raises the register's profile at both national and international levels.

(c) Interoperability and Integration

SSOT registers deploy expansive set of self-service interfaces and APIs to make their data available. This promotes

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economic activity in the private sector where amalgamated data sets create new value-added products. It creates direct integration between registers in a jurisdiction, benefiting initiatives like TOOP and joined up government, within a connected landscape. It promotes and facilitates integration of cross-border services, such as company registration, land transactions, or citizen mobility, without requiring redundant data submissions.

(d) Efficiency and Cost Savings

SSOT reduces duplication of data collection and maintenance across government entities. Register authorities can leverage “once-only principle” compliance, where citizens and businesses only provide data once to the administration. Singular set of exposed services for all stakeholders, reduces the maintenance of a plethora of separate services for different stakeholders. It prevents duplication of data collection and storage across agencies. It saves time and money by reducing reconciliation, error correction, and disputes.

(e) Strategic Influence

Operators of SSOT gain recognition at a national level as the only source of this register data and the provenance of the data increases. Triangulation and shared services between register authorities at a national level, improves the quality of the underlying register data. An SSOT register typically gains a seat at the table in shaping national interoperability standards and digital policy.

(f) Improved Data Quality

An SSOT typically requires high standards of data governance, quality, and security. This leads to more reliable, standardized, and well-managed datasets, which can then be reused in innovative public service design. The register will allow other administrations (and in some cases private sector actors) to access and reuse data directly, instead of re-collecting it.

(g) Economic and Innovation Impact

SSOTs are often made available (at least partially) for open data initiatives, stimulating new digital services and economic activity.

(h) Transparency and Accountability

An SSOT provides clarity on who is responsible for data governance. It strengthens public trust in government information.

(i) Reduced Operational Risk

An SSOT ensures all stakeholders are working with the same, validated, up-to-date data. Thus, it improves decision-making and reduces operational risk.

In summary, the benefits of operating a register as an SSOT extend far beyond technical efficiency or cost savings—they underpin the very legitimacy, trustworthiness, and influence of the registry within its jurisdiction and beyond. The move toward SSOT elevates the registry’s role as critical digital infrastructure, ensuring that it can adapt to future demands, support cross-border collaboration, and deliver increased value for all stakeholders in a rapidly evolving digital landscape.

5. Conclusions

This paper delineates the critical path for base registers to move beyond traditional, siloed data management and become the authoritative, trusted custodians of digital truth in their domains. Through a detailed exploration of international benchmarks, particularly the EU's coordinated regulatory and technical approach, the paper not only underscores the necessity of legal mandates, interoperability, and data integrity, but also highlights the operational, strategic, and societal benefits realized by registers that have matured along the SSOT continuum.

The journey toward operating registers as the SSOT is foundational to the trusted, efficient, and innovative digital government of the future. This work provides practical insight into how register operators can adapt proven models, and align proven practices like the Registry Capability Maturity Model® (RCMM)²² to their unique environments by adopting a staged approach that aligns with global standards and local policy contexts. Articulating the five “Levels” framework for SSOT maturity, “Fragmented, Organized, Reliable, Interoperable, and Federated”, the paper enables organizations to pre-diagnose their current state, understand the developmental priorities at each stage. It allows them to envision the trajectory towards being recognized as a national and even global base register, and to frame the stages and dimensions registries must traverse to deliver on the SSOT promise at national and global scale.

5.1. Aligning the SSOT to a Maturity Model Framework

Just as the RCMM defines a progression from “Emerging” to “Aspirational” register operations, so too does achieving SSOT encompass a structured set of Levels:

Level 1 — Fragmented (Ad hoc):

- Data is siloed, often duplicated in multiple places.
- No legal recognition as authoritative.
- Quality is inconsistent; updates are manual and error prone.
- Limited or no interoperability (closed systems).
- Security and privacy handled reactively.

Risks: Conflicting data, low trust, inefficiency.

Level 2 — Organized (Foundational):

- Register has some legal basis but not universally recognized as the source of truth.
- Basic governance framework exists, but responsibilities unclear.
- Data accuracy improving but not systematically validated.
- Limited APIs or data sharing, mostly batch exchanges.
- Security measures exist but not aligned to standards.

Focus: Establish legal authority, clarify governance, improve data quality.

22. <https://www.fostermoore.com/news/registry-capability-maturity-model>

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Level 3 — Reliable (Trusted Source):

- Register is legally recognized as authoritative in its domain.
- Governance roles are defined (owner, steward, validator).
- Standard processes for data validation, error correction, audit trails in place.
- APIs or web services available for national stakeholders.
- GDPR compliance embedded; security and continuity policies documented.

Focus: Strengthen interoperability and accessibility; enhance user trust.

Level 4 — Interoperable (Single Source of Truth Nationally):

- Register is the mandatory reference for its dataset within the country.
- Provides real-time, machine-readable data access (APIs).
- Fully aligned with national interoperability frameworks.
- Supports the Once-Only Principle across government services.
- Tiered access models balance open data, restricted, confidential information.
- Proactive monitoring of data quality and usage.

Focus: Expand beyond national use; prepare for cross-border integration.

Level 5 — Federated (Single Source of Truth EU/Globally):

- Register is recognized as a base register under EU frameworks.
- Fully integrated with European Interoperability Framework (EIF) and cross-border networks (e.g., BRIS, Land Registers Interconnection, eIDAS).
- High standards of semantic interoperability (shared vocabularies, data models).
- Continuous quality assurance, real-time updates, cybersecurity resilience.
- Contributes to open data, innovation, and AI ecosystems.
- Seen as critical digital infrastructure nationally and at EU/global level.

Focus: Maintain leadership, continuous innovation, resilience.

5.2. Recommendations and Path Forward

To realize the SSOT vision, register custodians must:

- **Benchmark Current Position:** Conduct regular, honest self-assessments, mapping their operating state to the SSOT maturity levels above, using tools from the RCMM's multi-dimensional lens—People & Culture, Process/Operations, Technology & Innovation, Legislation & Compliance, Stakeholder Engagement, and Data Management/Governance.
- **Set and Align Ambitious Goals:** Establish a Target Operating Model (TOM) that sets the desired future state, ensures strategic alignment, clarifies roles, and defines precise metrics and milestones for progress—fostering accountability and continuous improvement.
- **Embed Legal and Regulatory Authority:** Ensure registers are underpinned by modern, enabling legal frameworks that recognize register data as authoritative and mandate reuse across government, mirroring EU best practices.
- **Drive Interoperability and Openness:** Prioritize real-time, standards-based connectivity (APIs, data models,

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authentication), enabling seamless data sharing nationally and internationally, and supporting open data initiatives while protecting privacy.

- **Invest in Data Quality and Security:** Advance rigorous, automated data validation, privacy-by-design practices, and frequent quality assurance—ensuring registers remain not just authoritative but trusted as the single source.
- **Foster Stakeholder Collaboration:** Engage users, partners, and peers in co-designing services and in assessing progress, ensuring solutions remain client-centric and responsive to an evolving landscape.
- **Strengthen Change Management:** Champion a culture of innovation and agility, prepared for rapid shifts in technology, regulatory frameworks, and user expectations.

Our SSOT Maturity Model offers a practical, actionable framework for jurisdictions and register operators. By honestly locating current practice on the maturity pathway, aligning efforts to the most advanced legal, operational, and technological standards (with the EU as a global benchmark), organizations can accelerate towards the goal of trusted, interoperable, and future-proof public infrastructure.

Pursuing excellence as an SSOT register is not a one-time project but a continuous journey. A commitment to adapting, benchmarking, and improving in step with innovation and societal need. The call to action is clear: registers must continuously invest in each dimension of maturity, adopt a holistic and benchmark-driven approach, and commit to innovation and transparency. By doing so, they will fulfil their mandates as the single, authoritative sources of truth, unlocking greater value, efficiency, and trust for all stakeholders in an increasingly digitized and interconnected world.



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Authors:



John Murray

Foster Moore VP European
Operations & Special Projects



Bill Clarke

Vice President of Business
Development and Partnerships
at Teranet



Justin Hygate

Vice President of
Registry Solutions
at Foster Moore



Foster Moore®, The registry people®, is a global leader and specialist registry software company focused on digital services for modernizing government. For two decades the team at Foster Moore has developed and maintained online business registry systems, and a host of other smaller electronic registries across the globe.



Teranet® is Canada's leader in the digital transformation, delivery, and operations of statutory registry services with extensive expertise in land and corporate and personal property registries. For more than three decades Teranet has been a trusted partner to governments and businesses in building stronger communities and economies. Teranet developed and currently operates Ontario's Electronic Land Registration System and Writs System, Manitoba's Land Titles and Personal Property Registries and Canada's largest integrated Collateral Management System.

At Foster Moore, our software solutions and experienced team are uniquely positioned to help you navigate the complexities of company name reservations and identification. Whether it's overcoming present challenges or preparing for the future with AI-driven automation and digital identity solutions, we offer the tools and expertise to ensure your business registry remains secure, efficient, and future-proof. If you're interested in learning more about how we can support your registry's name reservation processes, reach out to us today.

For questions, comments and further discussion please contact:

Justin Hygate, VP Registry Innovation

justin.hygate@fostermoore.com

Bill Clarke, VP Business Development & Partnerships.

bill.clarke@teranet.ca



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