



Enabling Digital Government: Interoperability and Data Exchange Between Registries

The benefits of a connected landscape

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Introduction

Globally, governments are increasingly working on digitalizing their administrations. This is an ongoing and continuous process driven by constantly evolving technologies and policy goals. For any digitalization initiative, interoperability is crucial towards enabling the provision of digital services. It allows data to be shared across repositories and registries, between governmental organizations and across jurisdictional boundaries, and enhances the flow of information. This level of connectivity improves the effectiveness of governance, elevates client services and allows government to operate in a more cost-effective manner.ⁱ

In the past two years of the global pandemic the need for better digital services, interoperability across government systems and data sharing has never been more apparent. Today public officials are increasingly making investments toward removing barriers across siloed data repositories and procuring new and adaptable technological solutions that can help to drive interoperability and whole of government digitalization.ⁱⁱ

Interoperability, even that focused directly on base registries, covers a wide area and it is not realistic to expect that a single methodology or set of specific steps can be used to solve registry interoperability problems in general. There are however, common elements, services and features across registries that will provide mechanisms to improve on and enable both technical and process interoperability to support intelligent data exchange and vastly improve on digital government directives and initiatives.

Statutory Registers Defined

All registers, irrespective of the legislative base from which they came into existence, share a common set of functions, that are agnostic indeed to the purpose of the register. These could be described in simple terms: to file, to store, and to publish the entries on the register. In computer terms this would translate to the operations of create, read, update, and delete (CRUD) that are the four basic operations of persistent storage. However, the complexity of a statutory register does go beyond the simple maintenance of such operations.

Statutory registers are the constructs that store the data of government. They are singularly the most important element or construct in the provision of Digital Public Services. Good practice in terms of data exchange across government inherently means interoperability between these registers. Registers can vary significantly in form and type.

In terms of understanding the modes of interoperability that can and do exist between registers, it is important to define the characteristics of registers that form the end points of this exchange. These characteristics exist in some registers, but they do apply to all types of registers.

^{i,ii} Cybernetica AS - Digital Government Interoperability Platform Reference Architecture Version 1.0 Taavi Toomere, Sujani Kamalanathan, Margus Freudenthal, Sandhra-Mirella Valdma, Keegan McBride (Hertie School)

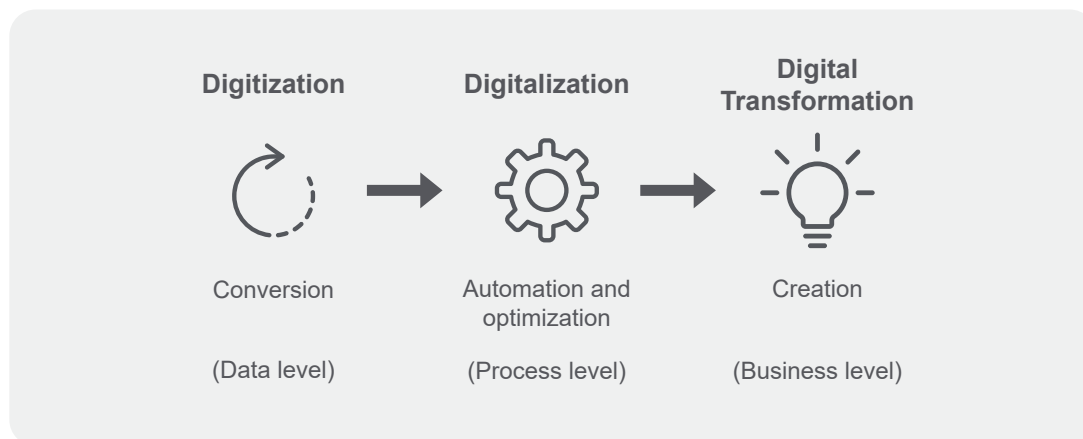
The general characteristics of a register, irrespective of the domain that it governs, are as followsⁱⁱⁱ:

- a** Registers are canonical and have a clear reason for their existence
- b** Registers represent a ‘minimum viable dataset’
- c** Registers are live lists, not simply published data
- d** Registers use standard names consistently with other registers
- e** Registers are able to prove integrity of record
- f** Registers are clearly categorized as open, shared or private
- g** Registers contain raw not derived data
- h** Registers must have a custodian

In describing the characteristics of the constructs that form the end points between which the interoperability exists, it is also equally important to determine what makes a register more complex than other forms of registers.

Evolution of Data Exchange between Registries

Registers have historically always communicated with other registers, other data sources and other regulatory organizations, to efficiently and effectively perform the functions of the register. The reasons they did so was to triangulate the data being filed on their register. Registers over the last three decades have moved through three distinct paradigms: **Digitization; Digitalization; and lately Transformation.**



ⁱⁱⁱ <https://gds.blog.gov.uk/2015/10/13/the-characteristics-of-a-register/>

Digitization occurred when registers, largely for business continuity reasons, digitized the paper that was filed. This meant that registers globally were the early adopters of Image Management Systems (IMS) and Document Management Systems (DMS).

Digitalization was the next paradigm that encompasses the efforts of the registers to automate and stream-line processes by implementing electronic filing and search services to their registers. Various techniques and technologies were employed by registers. But the fundamental and widespread mistake that was made is the registers simply replicated the filing of paper in an electronic medium. This was largely due to the fact that it is inherently more difficult and takes more time to modernize legislation for a digital economy. The past decades have been about the catch up of legislation to provide for a new operating model for registers.

This leads us to the next and current paradigm of **Transformation**. The registers are changing fundamentally the way they operate and in their provision of more customer-centric public services. In their efforts to transform, registers have sought, and indeed been forced to seek interoperability with other registers and data sources, to fully automate their processes, leverage common information stored in base registers, to improve decision making through data analytics and to create innovative new business services for their stakeholders.

Towards Register Interoperability

The greatest effort and indeed investment in the implementation of interoperability between registers is by the registers themselves. That is, as weighed against the effort to implement the central orchestration/interoperable layer. The technical interoperability implementation must lower the cost and effort required for registers, as the participants, to integrate their internal systems. When looking to invest in or continue the journey towards fully enabling digital government, our recommendations are targeted across key principles at both the **Register and Interoperability Layers**.

Register Layer:

- a Canonical** – The register retains data only for the purpose that it was instantiated. It in turn consumes data held by other registers but does not retain it. This requires the register to seek interoperability between the register and other available data sources and relevant systems.
- b Application Programming Interface (API)** – The register platform itself is ‘API-first’ and can expose a set of easily consumed services to all stakeholders. The use of a COTS product in the technical implementation of the register will typically provide such capability and functionality.
- c Extensible and Configurable** – The register platform deployed is extensible (i.e., multiple registers can be deployed using the same architectural design and service modules) and easily configurable. Economies of scale are derived by deploying multiple registers on the same integrated platform with common shared services and a set of ubiquitous user interfaces.

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- d Cascading Data** – data elements (e.g., a natural person, corporate entity, and a unique address or property identifier) are common and can be shared across all registers. Allowing changes and updates to cascade across all registers (where permissible).
- e Shared Common Services** – these services only need to be implemented once and then can be used across all interconnected registers (e.g., security and authentication, data validation, payment services, identity validation, etc.). Interoperability of registers benefits from defining a common registry service layer.
- f Security Infrastructure** – modern registers are required to deploy significant security infrastructure to protect the delivery of services to stakeholders in a secure manner but also more importantly in order to protect the reputation of the custodian of the register. Compliance with cybersecurity protocols and infrastructure needs to be adhered to and directly aligned. Interoperability across registers should not afford bad actors an additional route for interference and manipulation.

Interoperability Layer:

- a Domain Agnostic** – the interoperability layer should be capable of transporting any message payload for any domain. Thus, the investment can deliver a benefit for several varied domains.
- b Centralized Architecture** – a central hub or point of presence is required to orchestrate the interactions between the register participants.
- c Provision of Technical Artefacts** – sample code, implementations to reduce the burden of integration for participants and widen the adoption of the interoperability platform.
- d Integration/ Compliance standards** – a minimum set of requirements need to be agreed upon to integrate to the technical interoperability layer. This must be published and enforced.
- e Governance** – the governance model employed must confer trust and reputation on all participants.
- f Semantics** – agreed semantic ontologies can take years to populate and become useful. They should never become a focus point in terms of minimization. Participants should agree on a structure, a means to populate such, and a repository to persist and share the ontology.

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We conclude that the most practical and in many regards the easiest starting point towards enabling technical interoperability and data exchange, is at the register level. By leveraging new digitally enabled technologies and registry aware platforms we will be better positioned towards achieving the outcomes and benefits of an efficient and effective digital government, these would include^{iv}:

- a Better Public Services** – connected government means better public services and more efficient public service.
- b Increased Administrative Efficiencies** – the corollary of better public services, means better administration by registration authorities, regulatory bodies, and across government as a whole.
- c Data-driven Policy Making** – the availability of connected government data, that is enabled by interoperability between registers, makes for better decisions by government, as the true reality for citizens of a jurisdiction is more accurately portrayed.
- d Enhance Security, Data Protection and Data Privacy** – connected government means the data within registers is triangulated, reviewed, and referenced more widely. Indeed, the principle of transparency of a register and thus the greater scrutiny of the register, increases the data integrity of the register itself.
- e Reduce Fraud, Waste and Abuse** – a connected ecosystem or landscape of government means that data from many sources is used for validating entries on a register, identifying relationships between entities on a register and between registers, reduces fraud. The current Corporate Transparency Bill routing through the UK House of Commons and the US Federal Government clearly identifies the benefits of data validation across government and internationally, to improve data integrity, reduce fraud and provide benefits to the nationally economy as a whole.

Achieving interoperability at a government wide level is difficult, but not impossible. It presents a significant challenge, demands substantial resources and can take many years. However, governments can lay the groundwork for a fundamentally more effective and efficient public sector by implementing interoperability within their statutory registers.

The full paper *Enabling Digital Government: Interoperability and Data Exchange Across Registries*, educates us on the foundational constructs of our public registers and outlines a clear and achievable path to begin to address this important challenge. Our registries hold valuable data that are developed under legislative frameworks and are duplicative across information silos. Interoperability, that concept that is required is achievable. Policy makers need to demand interoperability up front and include it in legislation, policy frameworks and procurement approaches.

The paper can be downloaded by visiting this link bit.ly/interoperabilitypaper or by scanning the QR code:



^{iv} <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/government-data-management-for-the-digital-age>