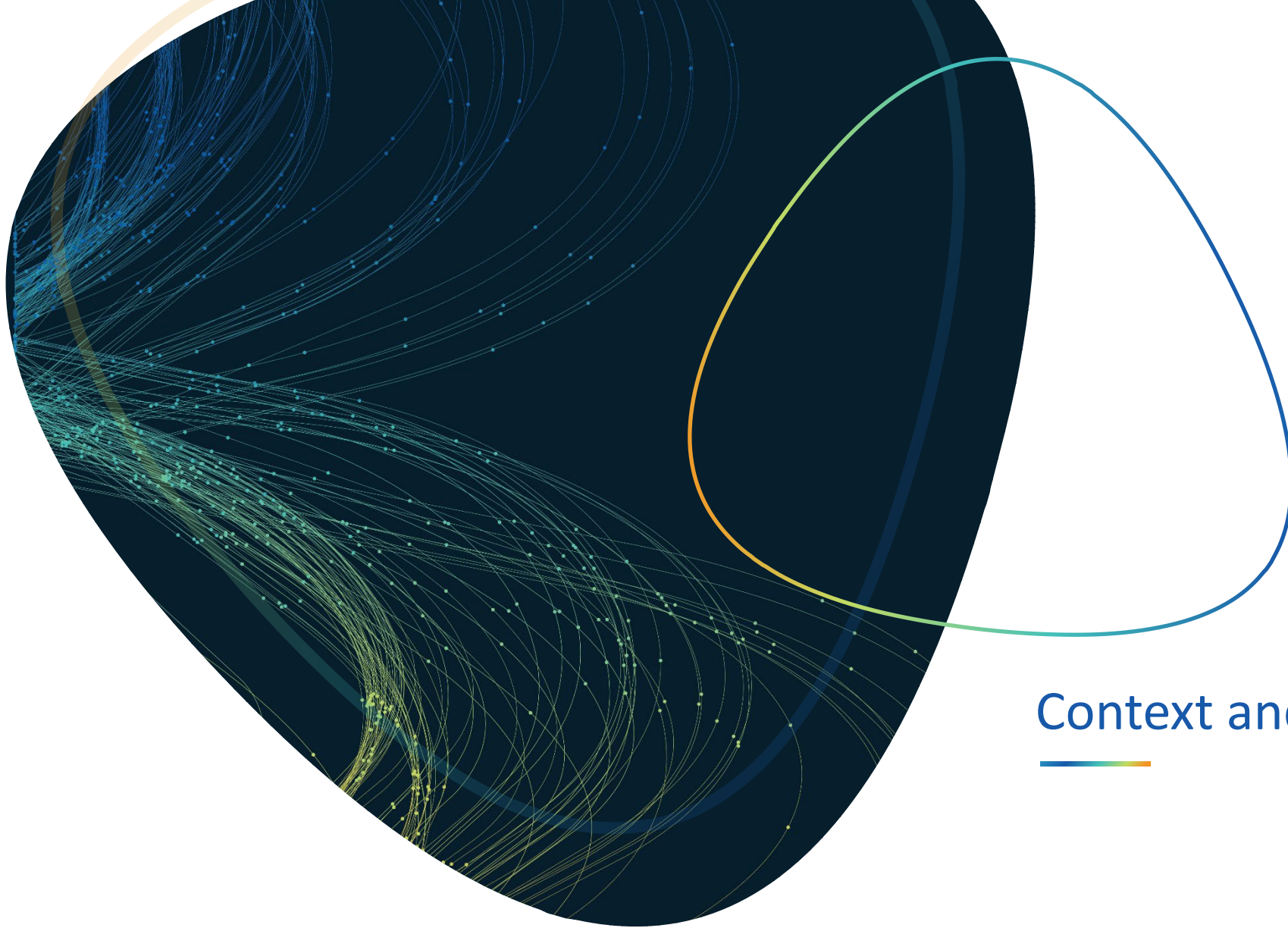




Interoperability training and supporting material package

April 2023

interoperable
europe



Context and background



National Interoperability Framework Observatory – NIFO



NIFO publishes the most up-to-date information on the state-of-play of digital public administration and interoperability.



NIFO provides support and guidance to European national administrations to facilitate the alignment of their National Interoperability Framework (NIF) with the European one (EIF).



NIFO fosters engagement activities with European public administrations such as workshops and webinars, so as to create a community of practice.



*The main mission of NIFO is to monitor the implementation of the revised version of the **European Interoperability Framework (EIF)** and to help foster the capacity building policy and **modernisation of public administrations**. By doing so, it aims at becoming an online community of practice and the prime source of information regarding digital public administration and interoperability matters within Europe.*

Objectives of the training material

1

Good practices

Create a repository of solutions and good practices to foster European countries' interoperability.

2

NIFs

Support European countries in aligning their National Interoperability Framework (NIF) with the European one (EIF).

Interoperable Europe Act

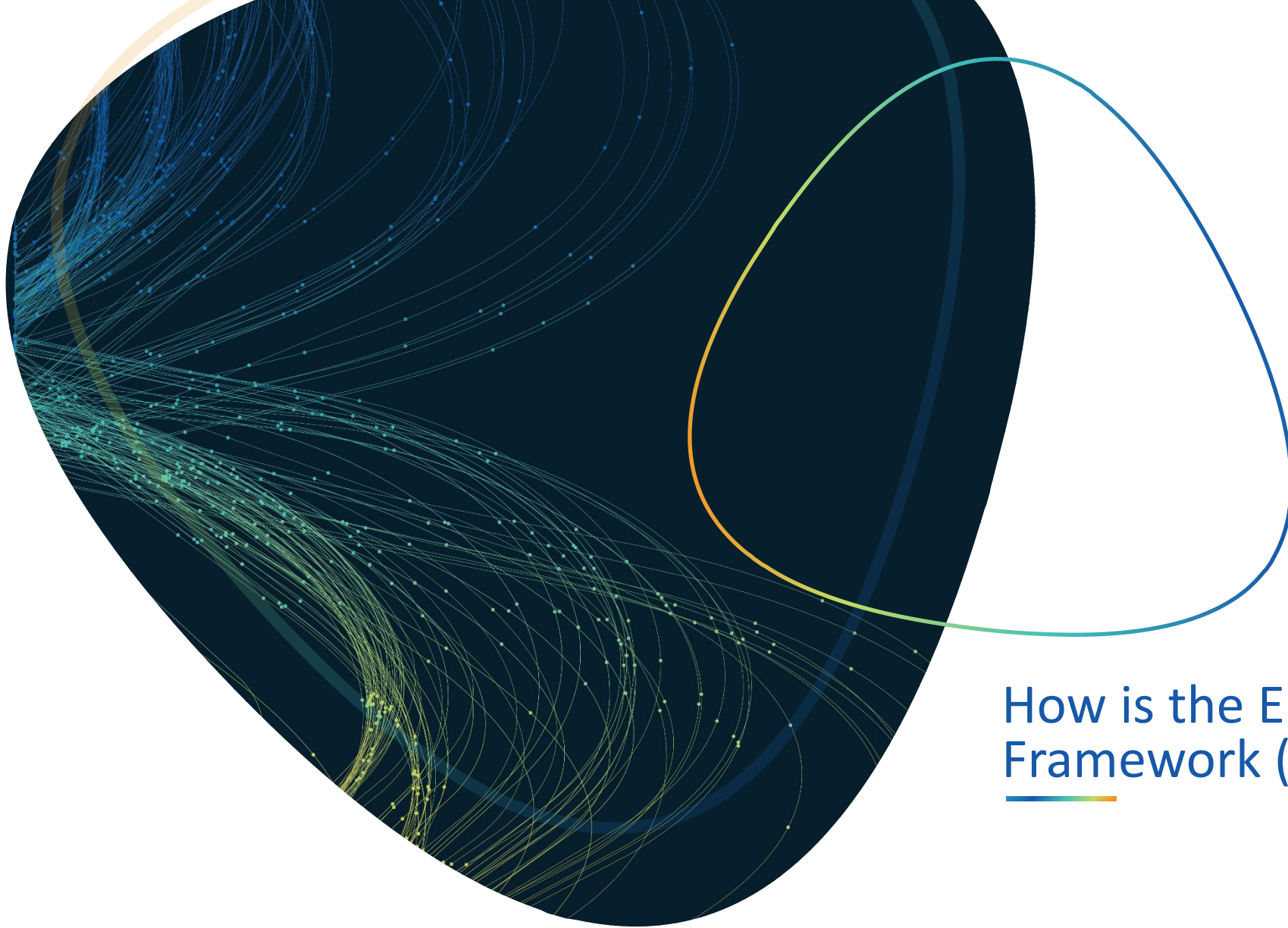
Support countries in the implementation of the upcoming Interoperability Policy and the Interoperable Europe Act.

3

Digital public services

Enable the smooth, interoperable implementation and delivery of digital public services in Europe.

4



How is the European Interoperability Framework (EIF) useful to you?

What is Interoperability?

“ *Interoperability is a key factor in making a digital transformation possible. It allows administrative entities to electronically exchange meaningful information in ways that are understood by all parties. It addresses all layers that impact the delivery of digital public services in the EU, including legal, organisational, semantic and technical aspects.* ”

European Interoperability Framework – Implementation Strategy

Introduction to the European Interoperability Framework (EIF)

Published in 2017, the EIF is a commonly agreed approach for the delivery of European public services in an interoperable manner. It defines basic interoperability guidelines in the form of common principles, models and recommendations.



The EIF is principally promoted and maintained by the [Interoperable Europe programme](#) in close cooperation between the Member States and the Commission in the spirit of Articles 26, 170 and 171 of the Treaty on the Functioning of the European Union calling for the establishment of interoperable trans-European networks that will enable citizens to derive full benefit from a European internal market.



- Inspire European public administrations in their efforts to design and deliver seamless European public services which are to the degree possible, digital-by-default, cross-border by-default and open-by-default;
- Provide guidance to public administrations on the design and update of their national interoperability frameworks (NIFs), policies, strategies and guidelines;
- Contribute to the establishment of the digital single market by fostering cross-border and cross-sectoral interoperability.



The EIF is meant to be a generic framework applicable to all public administrations in the EU. It lays out the basic conditions for achieving interoperability, acting as the common denominator for relevant initiatives at all levels including European, national, regional and local, embracing public administrations, citizens and businesses.

Introduction to the EIF Monitoring Mechanism

THE EIF MONITORING MECHANISM (EIF MM)

Has for goal to provide each MS with its level of implementation of the EIF based on a recommendation-by-recommendation measurement as defined by the Article 1.2 of the ISA² Decision.

Input



Primary indicators

A survey of national contact points will be conducted to obtain responses needed to measure primary indicators.



Secondary indicators

Secondary research will use existing data sources, such as the Open Data Portal, DESI, and eGovernment Benchmark Report, Eurostat, etc.

Monitoring Mechanism



Member States **gain intelligence** on which operation areas they can improve in.



Member States obtain **granular information** on their level of **EIF implementation**.



Simplified **evaluation process** through existing indicators.



Useful input for mid-term and final **evaluations**.






Identification of **synergies across EC** facilitating interoperability.

Benefits

Introduction to the EIF Scoreboards

The EIF MM has been revised with the inclusion of a new cross-border transversal scoreboard, encompassing the Interoperability Principles, the Interoperability layers and the Conceptual model.

The new scoreboard mirrors the thematic areas and recommendations described by the EIF framework thematic areas and recommendations described by the EIF framework.

 Scoreboard 1 Interoperability Principles		 Scoreboard 2 Interoperability Layers		 Scoreboard 3 Conceptual Model	
	Recommendation(s) n°		Recommendation(s) n°		Recommendation(s) n°
Principle 1 - Subsidiarity and Proportionality	1	Interoperability Governance	20-24	Conceptual Model	34-35
Principle 2 - Openness	2-4	Integrated Public Service Governance	25-26	Internal information sources and services	36
Principle 3 - Transparency	5	Legal Interoperability	27	Basic Registries	37-40
Principle 4 - Reusability	6-7	Organisational Interoperability	28-29	Open Data	41-43
Principle 5 - Technological neutrality and data portability	8-9	Semantic Interoperability	30-32	Catalogues	44
Principle 6 - User-centricity	10-13	Technical Interoperability	33	External information sources and services	45
Principle 7 - Inclusion and accessibility	14			Security and Privacy	46-47
Principle 8 - Security and privacy	15				
Principle 9 - Multilingualism	16				
Principle 10 - Administrative simplification	17				
Principle 11 - Preservation of information	18				
Principle 12 - Assessment of Effectiveness and Efficiency	19				

Scoreboard 4 Cross-border Interoperability

The thematic areas and recommendations affected by the addition of the cross-border dimension are the ones highlighted in dark blue.



Recommendations to set up the EIF's underlying principles

Principle 1 – Subsidiarity and proportionality

*Please note that this is only a selection of solutions. The full list is available [here](#).

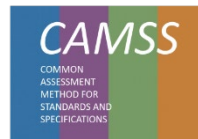
The **subsidiarity** principle requires EU decisions to be taken as closely as possible to the citizen. This entails that the EU does not take action unless this is more effective than the same action taken at national level.

The **proportionality** principle limits EU actions to what is necessary to achieve the objective of the EU Treaties.

Recommendation 1

- ✓ Ensure that national interoperability frameworks and interoperability strategies are aligned with the EIF and, if needed, tailor and extend them to address the national context and needs.

Solutions*



CAMSSaaS allows to assess the compliance of specifications with the EIF and thus, it supports public administrations in taking decisions regarding ICT specification.



ELIS contains the specifications defining the interoperability requirements of the architectural building blocks contained in the EIRA, which is designed in line with the EIF.

Good practices

- ✓ In Spain, cooperation among public administrations, citizens and businesses is considered as a key pre-requisite for interoperability. In the country, interoperability is implemented through the National Interoperability Framework of Spain (ENI), which has been developed in line with the EIF. The compliance of the ENI with the EIF is ensured by the implementation of a gap analysis based on a traffic light system. The system shows the principles and recommendations that are aligned between the two frameworks in green, and the missing aspects, such as actions to be implemented and/or topics that deserve special attention in yellow or red. It thus helps to define the overall state-of play of the country and provides policy makers with detailed information when defining the way forward for the country.



Principle 2 – Openness

*Please note that this is only a selection of solutions. The full list is available [here](#).

The concept of openness here mainly relates to **data, specifications and software**.

Open government data (here simply referred **‘open data’**) refers to the idea that all public data should be freely available for use by others, unless restrictions apply (e.g. for protection of personal data, confidentiality).

Recommendation 2

- ✓ Publish the data you own as open data unless certain restrictions apply.

Solutions*



EIRA Architecture Building Blocks support the EIF principle of openness and encourage the concept of publication of data as open data.



The Re3gistry is a source of common reference codes, hence it enables public administrations to use and reuse open specifications in relation to geospatial domain.

Recommendation 3

- ✓ Ensure a level playing field for open source software and demonstrate active and fair consideration of using open source software, taking into account the total cost of ownership of the solution.

Solutions*



CIRCABC is distributed as open source on the GitHub platform. When using this tool, Member States, businesses, citizens and European institutions ensure the use of open source and avoid vendor lock-in.



The EUPL is the first European Free/Open Source Software (F/OSS) license under which OSS can be developed and reused.

Principle 2 – Openness

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 4

- ✓ Give preference to open specifications, taking due account of the coverage of functional needs, maturity and market support and innovation.

Solutions*



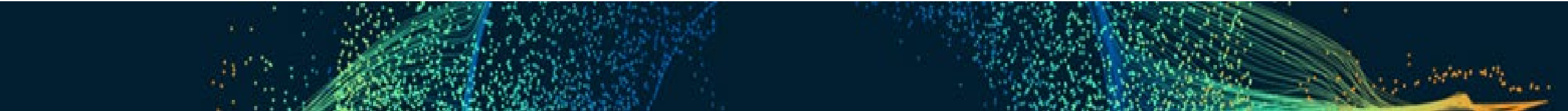
The CPSV-AP data model is based on open specifications. Hence, by reusing it, public administrations will in turn be giving preference to open specifications.



DCAT-AP is a solution that is based on open specifications, and it is actively maintained by a community of developers.

Good practices

- ✓ In Austria, open-source software and its respective Total Cost of Ownership (TCO) are considered as default when planning new public services. Besides the costs, additional perspectives are taken into consideration in software contracts, such as the confidentiality of secret algorithms, operational security, and legal aspects (e.g., compensation for damages). A number of e-Government applications make use of MOA (Modules for Online Applications) components, like MOA ID for identification, or MOA SP for signature verification.



Principle 3 – Transparency

*Please note that this is only a selection of solutions. The full list is available [here](#).

*Transparency refers to: a) enabling **visibility** inside the administrative environment of a public administration; b) ensuring **availability of interfaces** with internal information systems; and c) securing the right to **the protection of personal data**, by respecting the applicable legal framework for the large volumes of personal data of citizens, held and managed by public administrations.*

Recommendation 5

- ✓ Ensure internal visibility and provide external interfaces for European public services.

Solutions*



Question D11 of the Service Delivery section of the SIMAPS questionnaire assesses whether the public service makes its data, information and knowledge delivered clearly understood by its end users.



Context Broker provides a transparent interface (API) so that organisations can integrate data from multiple systems, creating a holistic view of information.

Good practices

- ✓ In Spain, all the procedures related to the Single Digital Gateway (SDG) are fully provided online except for the registration of address, which depends on more than 8.100 local authorities, the majority of which are of little or very little size. The support on foreign languages is still under development due to the high number of procedures linked to the numerous competent authorities at regional and local level. Currently, these online procedures exclude people or companies without an identity number issued in Spain and they do not support automatic evidence exchange with non-Spanish public bodies. According to Article 14 of Regulation 2018/1724 (SDG), Spain is working on the implementation of the technical system for the cross-border automated exchange of evidence and application of the 'once-only' principle and it is participating in working groups that have been set up for the development and implementation of the technical system.



Principle 4 – Reusability

*Please note that this is only a selection of solutions. The full list is available [here](#).

Reuse means that public administrations confronted with a specific problem seek to benefit from the work of others by looking at what is available, assessing its usefulness or relevance to the problem at hand, and where appropriate, adopting solutions that have proven their value elsewhere.

Reusability of IT solutions, information and data is an enabler of interoperability and improves quality as it extends operational use and helps saving money and time.

Recommendation 6

- ✓ Reuse and share solutions and cooperate in the development of joint solutions when implementing European public service.

Solutions*



This catalogue supports reusability of solutions for use in different phases of establishing and maintaining base registries.

VocBench

VocBench enables collaborative editing and management of common vocabularies and metadata that can be used by all public administrations, thus allowing them to participate in sharing and reuse of information.

Recommendation 7

- ✓ Reuse and share information and data when implementing European public services, unless certain privacy or confidentiality restrictions apply.

Solutions*



Crypto Tool enables data and information exchange between different parties in a secure manner. It helps enable public administrations to share information.

e-Certis

eCertis promotes the sharing and reuse of information and data by helping users identify and recognise the certificates and attestations that are most commonly requested.

Principle 4 – Reusability



Good practices

- ✓ The implementation of the Czech central interoperability governance mechanism illustrates how the Czech Republic complies with the EIF underlying Principle 4 on reusability at the national level. Such a good practice includes the implementation of a legislative framework in areas of public ICT systems and services where interoperability is a must. Moreover, the Czech Government foresaw the creation of a central governance body with a legally supported mandate, the Chief Architect of eGovernment Office, that ensures interoperability by focusing on the use of shared government ICT services, reuse of solutions, as well as compliance with the national architecture plan, eGovernment principles and public services ICT strategy.



Principle 5 – Technological neutrality and data portability

*Please note that this is only a selection of solutions. The full list is available [here](#).

Public administrations should provide for access and reuse of their public services and data **irrespective of specific technologies or products**.

The functioning of the digital single market requires data to be **easily transferable** among different systems to avoid lock-in, support the free movement of data. This requirement relates to **data portability** - the ability to move and reuse data easily among different applications and systems.

Recommendation 8

- ✓ Do not impose any technological solutions on citizens, businesses and other administrations that are technology-specific or disproportionate to their real needs.

Solutions*



Being an open-source software, eTrustEx does not impose any technology-specific solution. It also allows for further adaptations and improvements.



The INSPIRE reference validator allows public administrations to test their data sets, network services and other solutions to ensure that they are INSPIRE compliant. On its own, it does not impose any technological solution.

Recommendation 9

- ✓ Ensure data portability, namely that data is easily transferable between systems and applications supporting the implementation and evolution of European public services without unjustified restrictions, if legally possible.

Solutions*



By providing a model to ensure interoperability of the ESPD services developed at national level and their technical compliance with the ESPD form set out by the Regulation, the ESPD EDM ensures data portability.



The setting up of base registries helps to foster data portability by ensuring that all sets of data are described in the same way.

Principle 5 – Technological neutrality and data portability



Good practices

- ✓ Bulgaria's Ministry of e-Governance has developed and implemented a unified model for centralised requests, payments and delivery of electronic administrative services and related information. The access and use of electronic administrative services by citizens and businesses is ensured through the application of widely available and popular technological solutions. The provision of the electronic administrative services is also provided through the Unified Portal for Access to Electronic Administrative Services (UPAEAS), a software designed on the Service-oriented Architecture (SOA). In this way, applying the basic principles of service-oriented architecture, an independence and avoidance of the imposition of some technologies, products and suppliers are achieved.
- ✓ In the content of the Web Accessibility Act, Denmark has created a cross-governmental guide for the development of good self-service solutions. The guide includes recommendations on safety, design, user-friendliness, language, availability and re-use of data. It is mandatory in relation to digital services, which are compulsory by law. Authorities can use a common design system, which ensures conformity to the design guidelines for the two major portals for citizens' and businesses, respectively. Similarly, authorities are required to use the common public user test. There is no requirement for the use of a particular technology, but requirements are set for the re-use of common public infrastructure, such as ID, signature and SSO solutions. The use of API's based on standards and open specifications for accessing base registers, and services designed for machine interaction also is promoted.



Principle 6 – User centricity

*Please note that this is only a selection of solutions. The full list is available [here](#).

*User needs and requirements should guide the design and development of public services, in accordance with the following expectations: a) a **multi-channel** service delivery approach; b) a **single point of contact** to hide internal administrative complexity and facilitate access to public services; c) **users' feedback** should be systematically used to design new public services; d) users should be able to provide data **once only**; and e) only information that is **absolutely necessary**.*

Recommendation 10

- ✓ Use multiple channels to provide the European public service, to ensure that users can select the channel that best suits their needs.

Solutions*



Ref2link offers multiple environments allowing the user or integrator to pick up the detection rules that fit its need.



The IQAT assesses whether the solution being deployed is available through multiple channels.

Recommendation 11

- ✓ Provide a single point of contact in order to hide internal administrative complexity and facilitate users' access to European public services.

Solutions*

Re³gistry

The Re3gistry allows public administrations to set up a central access point that allows labels and descriptions for reference codes to be easily looked up by humans or retrieved by machines.



Member States in need can rely on the single point of contact at CEF digital for support on the implementation of their Big Data Test Infrastructure.

Principle 6 – User centricity

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 12

- ✓ Put in place mechanisms to involve users in analysis, design, assessment and further development of European public services.

Solutions*



EUSurvey can be used to involve users in the design, assessment and further development of public services. Indeed, it can be used for public consultations on different EU and non-EU initiatives.



Question B5 D11 of the Service Delivery section of the IMAPS questionnaire assesses whether citizens and businesses can help to design and enhance public service delivery by providing feedback on received services.

Recommendation 13

- ✓ As far as possible under the legislation in force, ask users of European public services once-only and relevant-only information.

Solutions*



The creation of a Catalogue of Public Services by public administrations helps to ensure the implementation of once-only principle, by gathering all services in one place.



By being able to share citizens' information across borders through the e-IDAS nodes, eID promote the once-only principle.

Principle 6 – User centricity



Good practices

- ✓ In Luxembourg, web accessibility can be considered as being a domain that is part of general user centricity. Renow.lu contains many guidelines regarding the involvement of users via UX techniques, such as user testing, card sorting, personas, etc. For over a decade, Luxembourg has had a dedicated UX Unit focusing on user centricity and assisting systematically project owners. The UX Unit takes care of checking and quality assuring each governmental website before it goes online. A Service Design Unit providing help and assistance regarding service design also is active within the Ministry for Digitalisation.
- ✓ Malta invites citizens, business and public administrations to get involved in the development of services throughout their lifecycle, as co-creation efforts. For instance, a number of selected representatives of the target audience are invited to use early versions of services, in order to ensure they function effectively and meet user needs. Training sessions also are offered to public officers (both with and without a technical background) to obtain feedback on mobile government services which is then used to update the services in question. Moreover, feedback on existing services is taken into consideration when new ones are being developed.



Principle 7 – Inclusion and accessibility

*Please note that this is only a selection of solutions. The full list is available [here](#).

Whereas **inclusion** is about enabling everyone to take full advantage of the opportunities offered by new technologies to access and make use of European public services, overcoming social and economic divides and exclusion, **accessibility** ensures that people with disabilities, the elderly and other disadvantaged groups can use public services at service levels comparable to those provided to other citizens.

Recommendation 14

- ✓ Ensure that all European public services are accessible to all citizens, including persons with disabilities, the elderly and other disadvantaged groups. For digital public services, public administrations should comply with e-accessibility specifications that are widely recognised at European or international level.

Solutions*



Question D12 of the Service Delivery section of the IMAPS questionnaire assesses the extent to which public services are accessible to all parties.



eSignature can be seen as enabling the access to public services to all citizens, like for instance those with limited mobility.

Good practices

- ✓ In December 2020, public Icelandic websites were scanned and assessed on their level of compliance with the new accessibility provisions. Results showed that the sites meet on average 80% of the requirements of the standard, according to the measurements of Siteimprove, the tool used to scan and evaluate websites.



Principle 8 – Security and privacy

*Please note that this is only a selection of solutions. The full list is available [here](#).

*Citizens and businesses must be confident that when they interact with public authorities they are doing so in a **secure and trustworthy environment** and in full compliance with relevant regulations.*

*Public administrations must guarantee the **privacy**, confidentiality, authenticity, integrity and non-repudiation of information provided by citizens and businesses.*

Recommendation 15

- ✓ Define a common security and privacy framework and establish processes for public services to ensure secure and trustworthy data exchange between public administrations and in interactions with citizens and businesses.

Solutions*



CISE has been designed to handle sensitive data and personal data. A study has been launched to use the solution for the exchange of classified information.



OpenPM² is a project management methodology and it supports the establishment of processes. Thus, it can be used to guide the definition of a common security and privacy framework.

Good practices

- ✓ Law 58/2019, of August 8, ensures the execution of the GDPR in the Portuguese legal order, including the availability of a list of processing operations which are subject to the requirement for a data protection impact assessment. In this context, some areas of governance have created guidelines to assist the bodies under their tutelage in the implementation of the GDPR. In terms of national legislation, it's also noteworthy to mention the Council of Ministers Resolution 41/2018, of 22 March, which defines the technical guidelines for Public Administration in terms of security architecture of networks and information systems related to personal data. By using the national interoperability platform entity federation service, it's possible to interchange information ensuring privacy principles – namely by anonymising citizens' IDs when consulting other registries.



Principle 9 – Multilingualism

*Please note that this is only a selection of solutions. The full list is available [here](#).

*A balance needs to be found between the expectations of citizens and businesses to be served in their **own language(s)** or their preferred language(s) and the ability of Member States' public administrations to offer services in all official EU languages. A suitable balance could be that European public services are available in the languages of the expected end-users.*

Recommendation 16

- ✓ Use information systems and technical architectures that cater for multilingualism when establishing a European public service. Decide on the level of multilingualism support based on the needs of the expected users.

Solutions*



eTranslation can be integrated into your information systems to make digital public services and content multilingual.



PMKI datasets will support localisation of digital services (for example the reuse of PMKI product taxonomies for the implementation of an eCommerce solution).

Good practices

- ✓ The use of law and the provision of multilingualism to foster the EIF implementation in Finland demonstrates that legislation is the most effective tool to foster interoperability at the national and sectorial levels. It also provides an overview of the challenges linked to the provision, by central government authorities and large cities, of services in English as well as, less frequently, in additional languages. These challenges, which concern in particular small municipalities, include the cost of maintaining websites in different languages, in terms of capacity, skills and time, and the direct translations of the public information displayed on these websites appear not to be as useful as expected for foreigners and would require some broader tailoring or explanation.



Principle 10 – Administrative simplification

*Please note that this is only a selection of solutions. The full list is available [here](#).

Digitalisation of public services should take place in accordance with the following concepts: **digital-by-default**, whenever appropriate, so that there is at least one digital channel available for accessing and using a given European public service; and **digital-first** which means that priority is given to using public services via digital channels while applying the multi-channel delivery concept and the no-wrong-door policy, i.e. physical and digital channels co-exist.

Recommendation 17

- ✓ Simplify processes and use digital channels whenever appropriate for the delivery of European public services, to respond promptly and with high quality to users' requests and reduce the administrative burden on public administrations, businesses and citizens.

Solutions*



Question D10 of the Service Delivery section of the IMAPS questionnaire assesses whether the administrative rules and processes underlying a digital public service are explained in a simple and clear way.



The eArchiving building block can be coupled with services and processes to support administrative burden reduction.

Good practices

- ✓ Two main initiatives characterize Norway's efforts to foster cooperation and coordination among public administrations. The first one is the revision (in 2019 and 2020) of the architecture principles for public sector digitalisation whose goal is to foster the public sector's interoperability and interactions with businesses. The implementation of the architecture principles is mandatory for public administrations at the national level and recommended for those at the sub-national level (e.g. municipalities). The second initiative is the publication of the Norwegian Interoperability Framework (NIF) in 2018 which aims to help public administrations in defining, developing and managing digital public services, including cross-sectorial ones. Norway's experience highlights the importance of stakeholder involvement and participation, and thus of collaboration, to improve interoperability.



Principle 11 – Preservation of information

*Please note that this is only a selection of solutions. The full list is available [here](#).

Legislation requires that decisions and data are stored and can be accessed for a specified time. This means that records and information in **electronic form** held by public administrations for the purpose of documenting procedures and decisions must **be preserved and be converted**, where necessary, to new media.

To guarantee the long-term preservation of electronic records and other kinds of information, formats should be chosen to ensure **long-term accessibility**.

Recommendation 18

- ✓ Formulate a long-term preservation policy for information related to European public services and especially for information that is exchanged across borders.

Solutions*



The Reference Architecture contains several building blocks that help to ensure long term preservation policy of eDocuments.



By using CISE specifications and data models, public administrations are contributing to the preservation policy of their data.

Good practices

- ✓ In Finland, preserving digital information of organisations that store cultural heritage and operate within the administrative branch of the Ministry of Education and Culture will be covered by the centralised Digital Preservation Service. The Service is scalable as the volume and types of data, and number of partner organisations increase; it also has been utilised by the National Library and the National Archives of Finland. Contracts about preservation have been signed with the National Board of Antiquities, the National Audio-visual Institute and the Finnish Social Science Data Archive. National preservation specifications have been published, which describe in detail how materials shall be submitted to the preservation service, and also how these shall be described, and which file formats are supported. Specifications are updated annually. Moreover, the Archives Act is currently under reform and should enter into force in late 2023.



Principle 12 – Assessment of effectiveness and efficiency

*Please note that this is only a selection of solutions. The full list is available [here](#).

Various technological solutions should be evaluated when striving to ensure **the effectiveness and efficiency** of a European public service.

There are many ways to take stock of the value of interoperable European public services, including considerations such as return on investment, total cost of ownership, level of flexibility and adaptability, reduced administrative burden, efficiency, reduced risk, transparency, simplification, and level of user satisfaction.

Recommendation 19

- ✓ Evaluate the effectiveness and efficiency of different interoperability solutions and technological options considering user needs, proportionality and balance between costs and benefits.

Solutions*



CAMSSaaS ensures that public administrations can assess and select in a transparent and trusted manner the most relevant interoperability standards for their needs.



The test bed allows solution owners to test their level of interoperability and to perform conformance testing to ensure that they fit their purpose.

Good practices

- ✓ In Ireland, the adoption of the eGovernment Strategy 2017-2020 underpinning the Government's commitment to being open, flexible and collaborative with people and businesses, using digitalisation and technology has helped increase efficiency and effectiveness, and continuously improve public services. The strategy contains ten key actions, among which the development of a Digital Service Gateway, the improvement of existing eID and data-sharing capabilities.





Recommendations to set up the EIF's interoperability layers

Interoperability governance

*Please note that this is only a selection of solutions. The full list is available [here](#).

Interoperability governance refers to decisions on interoperability frameworks, institutional arrangements, organisational structures, roles and responsibilities, policies, agreements and other aspects of ensuring and monitoring interoperability at national and EU levels.

Recommendation 20

- ✓ Ensure holistic governance of interoperability activities across administrative levels and sectors.

Solutions*



Recommendation 17 of the EULF Blueprint recommends the establishment of an integrated governance of location information processes at all levels of government. This is fully in line with the EIF.

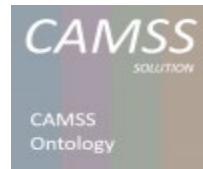
joinup

Joinup provides a common technical platform offering a set of services supporting public administrations exchange interoperability solutions and good practices so this can help to foster better governance.

Recommendation 21

- ✓ Put in place processes to select relevant standards and specifications, evaluate them, monitor their implementation, check compliance and test their interoperability.

Solutions*



The CAMSS Ontology is a formal description of knowledge as a set of concepts within the CAMSS domain and the axioms connecting its concepts and allowing for logic inferences.



The use of CAMSS tools allows public administrations to select relevant standards and specifications for their solution or digital public service.

Interoperability governance

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 22

- ✓ Use a structured, transparent, objective and common approach to assessing and selecting standards and specifications. Take into account relevant EU recommendations and seek to make the approach consistent across borders.

Solutions*



CAMSS List of Standards is a structured, transparent, objective and common approach to select standards.

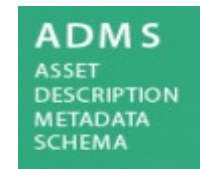


CAMSSaaS provides a structured, transparent, objective and common approach to assessing and selecting standards and specifications.

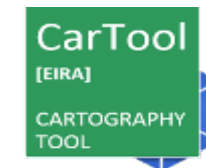
Recommendation 23

- ✓ Consult relevant catalogues of standards, specifications and guidelines at national and EU level, in accordance with your NIF and relevant DIFs, when procuring and developing ICT solutions.

Solutions*



The ADMS data standard can be used by public administrations with the need for a structure approach to metadata management.



CarTool aids its users in the selection process of standards by giving them access to the list of proposed interoperability standards and specifications.

Interoperability governance

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 24

- ✓ Actively participate in standardisation work relevant to your needs to ensure your requirements are met..

Solutions*



By contributing to CISE forum, public officials working in the maritime domain are actively participating in standardisation work relevant to their needs.



The use of the ELI Annotation tool contributes to active participation in the standardisation work.

Good practices

- ✓ Greece's Law 4727/2020 and the Digital Transformation Bible define political and execution coordination committees for digital transformation. Moreover, the governance model of the National Interoperability Framework (NIF) of Public Services is addressed to the organisations responsible for planning and coordinating the actions of digital governance, to the bodies of the Greek public administration that design and provide public services, but also to members of a wider community of stakeholders outside the public sector. Under this logic, public participation, which has been included as a key building block in the NIF ecosystem, is expressed in the governance model through the introduction of the concept of the functioning of an Interoperability Community. This is strongly linked to the governance model of the NIF which defines the necessary functions and responsibilities for ensuring sustainability, coordination of interoperability, planning through horizontal and sectoral working groups, implementation of actions per body, and support of community interoperability action.



Integrated public service governance

*Please note that this is only a selection of solutions. The full list is available [here](#).

*Integrated public service governance should include the definition of **organisational structures, roles & responsibilities** and the **decision-making process** for the stakeholders involved; a **change management plan**, to define the procedures and processes needed to deal with and control changes; and a **business continuity/disaster recovery plan** to ensure that digital public services and their building blocks continue to work in a range of situations.*

Recommendation 25

- ✓ Ensure interoperability and coordination over time when operating and delivering integrated public services by putting in place the necessary governance structure.

Solutions*



EIRA framework can support the implementation of a governance structure to ensure smooth exchange of information and interoperability.



The Core Vocabularies can become the basis of a context-specific information exchange data model used to exchange data between information systems.

Recommendation 26

- ✓ Establish interoperability agreements in all layers, complemented by operational agreements and change management procedures.

Solutions*



Recommendation 18 of the EULF Blueprint provides guidance on partnering and recommendations on agreements to enable successful partnerships, including the exchange of interoperable data.

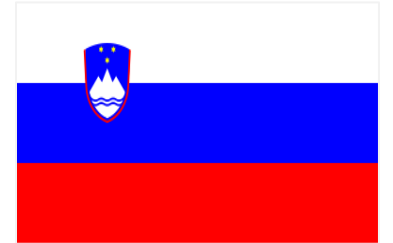


ISPG recommendations 3 and 5 ensure the establishment of interoperability agreements, complemented by operational agreements and change management procedures.

Integrated public service governance

Good practices

- ✓ According to Article 74 of Slovenia's State Administration Act, the Ministry of Public Administration is responsible for the management of information and communication infrastructure, development of common information solutions and their technological, process and organisational compliance with the central information and communication system as well as implementation of a unified information security policy. The Ministry of Public Administration also provides guidelines for the development of information solutions that cover all project phases, from specifications, best development practices, usage of reusable building blocks, to steps toward production. In addition, the definition of a business continuity and disaster recovery plan is agreed between solution management and central infrastructure management.



*The first step towards addressing legal interoperability, is to perform ‘interoperability checks’ by screening existing legislation to identify **interoperability barriers**.*

***Coherence** between legislation, in view of ensuring interoperability, should be assessed before adoption and through evaluating their performance regularly once they are put into application.*

Recommendation 27

- ✓ Ensure that legislation is screened by means of ‘interoperability checks’, to identify any barriers to interoperability. When drafting legislation to establish a European public service, seek to make it consistent with relevant legislation, perform a ‘digital check’ and consider data protection requirements.

Solutions*



CAMSS tools can be viewed as supporting public officials in performing 'digital checks' on new legislation.



The use of the EUPL license during the drafting process of the legislation, helps to make it consistent with other legislations using the license.

Good practices

- ✓ According to the Piano Triennale (3-year plan) 2021-2023, 16 base registries will be interconnected through fully interoperable APIs, semantically compliant with national and European ontologies and controlled vocabularies. To allow citizens to access their own personal information, a new “Anagrafi” platform is under construction: it will provide the first integration of at least 10 base registries.



Organisational interoperability

*Please note that this is only a selection of solutions. The full list is available [here](#).

*Organisation interoperability refers to the way in which public administrations align their business processes, responsibilities and expectations to achieve commonly agreed and mutually beneficial goals. In practice, it means **documenting and integrating** or aligning business processes and relevant information exchanged. It also aims to meet the requirements of the **user community** by making services available, easily identifiable, accessible and user-focused.*

Recommendation 28

- ✓ Document your business processes using commonly accepted modelling techniques and agree on how these processes should be aligned to deliver a European public service.

Solutions*



EIC presents and documents highly interoperable solutions using the EIRA framework.



Question B5 of the Service Management section of the IMAPS questionnaire assesses which procedures are in place to validate the consistency of the data and information exchanged by the public service.

Recommendation 29

- ✓ Clarify and formalise your organisational relationships for establishing and operating European public services.

Solutions*



The Organisational interoperability best practices aim to promote the clarification and formalisation of organisational relationships for the delivery of public services.



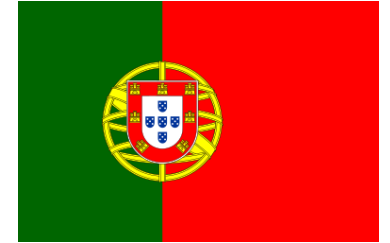
EIRA provides a framework that facilitates the formalisation of organisation relationships.

Organisational interoperability



Good practices

- ✓ In Portugal, the (re)design of services promoted by the Public Administration Digital Competencies Centre (TicAPP), an organic unit integrated into the Administrative Modernization Agency (AMA) with other public entities considers modelling techniques such as BPMN (Business process model and notation), UML (Unified Modeling Language) sequence diagrams and Entity Relations diagrams (modeling data). Furthermore, BPMN and UML are used in several areas of governance.



Semantic interoperability

*Please note that this is only a selection of solutions. The full list is available [here](#).

Semantic interoperability ensures that the precise format and meaning of exchanged data and information is preserved and understood throughout exchanges between parties, in other words 'what is sent is what is understood'.

It covers both semantic and syntactic aspects.

Recommendation 30

- ✓ Perceive data and information as a public asset that should be appropriately generated, collected, managed, shared, protected and preserved.

Solutions*

ADMS
ASSET
DESCRIPTION
METADATA
SCHEMA

ADMS contributes to the perception of data as public data by allowing its users to link semantic assets to one another in cross-border and cross-sector settings.



The Big Data Test infrastructure departs from the assumption that public data is an open data and identifies ways in which public administrations can reuse this data to deliver better public services.

Recommendation 31

- ✓ Put in place an information management strategy at the highest possible level to avoid fragmentation and duplication. Management of metadata, master data and reference data should be prioritised.

Solutions*

e-Certis

eCertis puts in place an information management strategy to avoid fragmentation and duplication of information.

DCAT-AP
FOR
DATA PORTALS
IN EUROPE

DCAT-AP provides a European standard for metadata publishing.

Semantic interoperability

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 32

- ✓ Support the establishment of sector-specific and cross-sectoral communities that aim to create open information specifications and encourage relevant communities to share their results on national and European platforms.

Solutions*



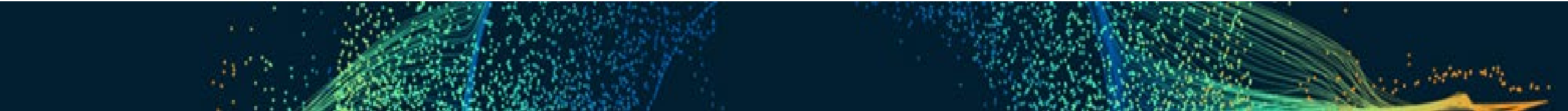
The CEF eDelivery building block encourages community driven development and updates of standards, hence involving a wide range of stakeholders in its development.



By extracting legal resources identifiers, Ref2link fosters use of semantic web standards (linked data, URIs..).

Good practices

- ✓ The Belgian Federal Government is using the EU Publication Office's controlled vocabularies and thesauri and started building its own national reference data. Besides, the Flemish Region has published, in a central catalogue of standards, commonly agreed descriptions of data (vocabularies, application profiles and implementation models), which are published in both human- and machine-readable formats. Data standards have been developed in over 40 domains and are managed as a knowledge graph using a fully automated open-source toolchain. Some of these standards have even been formalised in legislation.



Technical interoperability

*Please note that this is only a selection of solutions. The full list is available [here](#).

Technical interoperability covers the applications and infrastructures linking systems and services. Aspects of technical interoperability include interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols.

*Technical interoperability should be ensured, whenever possible, via the use of **formal technical specifications**.*

Recommendation 33

- ✓ Use open specifications, where available, to ensure technical interoperability when establishing European public services.

Solutions*



CPSV-AP is based on open specifications.



The library contains (open) specifications, hence encouraging the use of open specifications at national, sub-national and local levels.

Good practices

- ✓ The Netherlands has developed the Dutch Governmental Reference Architecture (NORA) to support the design of European cross-border services. NORA is a knowledge platform that was developed in 2005 and which gathers knowledge from several experts in the design of digital services. It supports the creation of domain specific architectures with information such as architecture principles for new developments, standards, specifications and useful building blocks. It ensures effective cooperation with other service providers and optimal reuse of existing solutions. The sharing of knowledge and information through the NORA platform has therefore been key in fostering interoperability in the country.



Recommendations to set up the EIF's basic components

Conceptual model

*Please note that this is only a selection of solutions. The full list is available [here](#).

The **conceptual model for integrated public services** aims to guide their planning, development, operation and maintenance by Member States. It is relevant to all governmental levels, from local to EU..

The model is **modular** and **comprises loosely coupled service components interconnected through shared infrastructure**.

Recommendation 34

- ✓ Use the conceptual model for European public services to design new services or reengineer existing ones and reuse, whenever possible, existing service and data components.

Solutions*



CarTool allows its users to model solutions using EIRA, and querying features to query an EIRA-based Cartography of solutions.



Online Collection Service stores and allows for export of data in a standardised xml format, generating benefits for public administrations by providing them reusable data components.

Recommendation 35

- ✓ Decide on a common scheme for interconnecting loosely coupled service components and put in place and maintain the necessary infrastructure for establishing and maintaining European public services.

Solutions*



Recommendation 10 of the EULF Blueprint contains recommendations and guidance on a common architectural approach for digital government solutions, facilitating the integration of geospatial components.



eID puts forward a common scheme for the sharing of data across border, thus allowing for service interconnection.

Conceptual model



Good practices

- ✓ Italy's latest National Interoperability Framework defines the interconnection layout which is based on direct connections between agencies providing and consuming interoperable APIs. Together with these direct connections, Italy is planning a set of common, centralised platforms to provide specific services, such as registries for common vocabularies and schemas, authorisation providers and an API marketplace supporting the signing of the interoperability agreements required to enable data exchanges.
- ✓ In order to boost the provision of centralised information circulation and public services, Latvia has developed the National Regional Development Agency (VRAA) Integrator of the State Information Systems (VISS). The VISS is a set of shared solutions that include data publishing and distribution solutions, web services and data distribution network. Shared services like the Payment Module and the Identity Integration Module are the most popular components of shared services platform operated by the VRAA agency. ERDF and RRF funds are used for further development of the VISS platform and shared services, including improving the performance and efficiency of data dissemination through a centralised data dissemination and aggregation solutions.



Internal Information Sources and Services

*Please note that this is only a selection of solutions. The full list is available [here](#).

*Public administrations produce and make available a large number of services, while they maintain and manage a variety of **information sources**. These include **internal information sources** that are often unknown outside the boundaries of a particular administration (and sometimes even inside those boundaries).*

The result is often a duplication of effort and under-exploitation of available resources and solutions.

Recommendation 36

- ✓ Develop a shared infrastructure of reusable services and information sources that can be used by all public administrations.

Solutions*



The test bed contributes to the development of shared infrastructure by testing whether the new building blocks are interoperable and can be connected to each other.



The use of the ESS Service Catalogue can help and enable to build an infrastructure for sharing and maintaining statistical data at national level.

Good practices

- ✓ The centrally provided Municipality ASP service and the Customisable State Administration Portal are example of good implementation of the recommendations set by the EIF in Hungary. They almost function as platforms for interoperable service provision. Both integrate several building blocks in order to ensure a ready-to-use integrated solution for all Hungarian public administrations to make their digital public services available on a single platform, therefore increasing interoperability. Such examples demonstrates how the country tackled the challenged linked to these services, which are their take-up by public bodies and the need to replace the traditional decision-making process with a data-driven approach.



Base registries

*Please note that this is only a selection of solutions. The full list is available [here](#).

A **base registry** is a trusted and authoritative source of information which can and should be **digitally reused** by others, where one organisation is responsible and accountable for the collection, use, updating and preservation of information.

A **base registry framework**, 'describes the agreements and infrastructure for operating base registries and the relationships with other entities'.

Recommendation 37

- ✓ Make authoritative sources of information available to others while implementing access and control mechanisms to ensure security and privacy in accordance with the relevant legislation.

Solutions*

Re³gistry

The Re3gistry helps to make authoritative sources of information available and easily exchanged by using reference codes.



The Reference Architecture contains provisions on how to make eDocuments available to others whilst complying with key legislation on privacy & security.

Recommendation 38

- ✓ Develop interfaces with base registries and authoritative sources of information, publish the semantic and technical means and documentation needed for others to connect and reuse available information.

Solutions*



The Cartography of Reusable Solutions can help policy makers identify relevant solutions for establishment of interfaces with base registries and authoritative sources of information.



The Registry of Registers allows public officials to publish the semantic and technical means and documentation needed for others to connect.

Base registries

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 39

- ✓ Match each base registry with appropriate metadata including the description of its content, service assurance and responsibilities, the type of master data it keeps, conditions of access and the relevant licences, terminology, a glossary, and information about any master data it uses from other base registries.

Solutions*



DCAPT-AP enables the sharing of metadata between different data portals by providing a specification to describe such data in a standardised way, hence ensuring interoperability.



The semantic view of EIRA contains a master data and descriptive metadata policy, focusing on metadata management.

Recommendation 40

- ✓ Create and follow data quality assurance plans for base registries and related master data.

Solutions*



The Guidelines for Base Registry Access and Interconnection offer instructions on how to create and follow data quality assurance plans in place for base registries.



The IQAT assesses whether data quality assurance plans were considered and applied during the operation of the solution.

Base registries



Good practices

- ✓ In France, several base registries are now available in different domains, going from population to tax and business data. For instance, the French Interministerial Digital Directorate (DINUM) and the National Institute of Geographic and Forest Information (IGN) developed and launched on 1 January 2020 the National Address Base Registry, an open-source database gathering information on all geographical addresses on the French national territory.



Open data should focus on releasing machine readable data for use by others to stimulate transparency, fair competition, innovation and a data-driven economy.

*To ensure a level playing field, the opening and reuse of data must be **non-discriminatory**, meaning that data must be interoperable so that can be found, discovered and processed.*

Recommendation 41

- ✓ Establish procedures and processes to integrate the opening of data in your common business processes, working routines, and in the development of new information systems.

Solutions*



ADMS allows for developing and keeping own systems for documenting and storing semantic assets.



OpenPM² can support the establishment of procedures and processes to integrate the opening of data in common business processes, working routines, and the development of new information systems.

Recommendation 42

- ✓ Publish open data in machine-readable, non-proprietary formats. Ensure that open data is accompanied by high quality, machine-readable metadata in nonproprietary formats, including a description of their content, the way data is collected and its level of quality and the licence terms under which it is made available. The use of common vocabularies for expressing metadata is recommended.

Solutions*



VocBench3 supports the publication of non-proprietary metadata by providing a common platform for its management.



The ELI Validator is adapted to verify the conformance of ELI metadata, hence ensuring that countries publish their data in a structured machine-readable format.

Open data

*Please note that this is only a selection of solutions. The full list is available [here](#).

Recommendation 43

- ✓ Communicate clearly the right to access and reuse open data. The legal regimes for facilitating access and reuse, such as licences, should be standardised as much as possible.

Solutions*



EIRA can support public administrations as a common model to describe interoperability solutions, including the rights to access and reuse open data.



Recommendation 2 of the EULF Blueprint contains provisions on the contribution of location data to wider open data policy and integration of national with European initiatives.

Good practices

- ✓ Since 2015, Decree No. 835 regulates open data in Ukraine. It provides a defined list of datasets that have to be published in open data format by state authorities. It also regulates the national open data portal. Different dashboards monitor which state authorities have published their datasets in compliance with this Decree. In 2018, the Government also adopted its Action Plan for the implementation of the International Open Data Charter Principles. It ensures the efficient development of open data in Ukraine, citizens' access to information rights, transparency and openness of state entities, and innovation fostering.



Catalogues help others to find reusable resources. Various types of catalogue exist, e.g. directories of services, libraries of software components, open data portals, registries of base registries, metadata catalogues, catalogues of standards, specifications and guidelines.

*Commonly agreed descriptions of the services, data and interoperable solutions published in catalogues are needed to enable **interoperability between catalogues**.*

Recommendation 44

- ✓ Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them.

Solutions*



The CAMSS Ontology defines the conceptual model that helps ensuring the common and standardised way for the assessment as well as identification of Interoperable Specifications.



PMKI will provide a publicly available infrastructure for public linguistic resources to facilitate the implementation of interoperability solutions and use common models for describing them.

Good practices

- ✓ Spain has implemented the Administrative Information System (SIA) which enables to have a single catalogue of information on administrative procedures and services for citizens. This system reinforces legal certainty in the administration's actions, as it incorporates the fundamental information on the different procedures. Spain, together with Portugal, is also piloting a project aiming at creating a federated catalogue of public services and a user-centric website to visualise the data. In this context, the two countries are notably using the Core Public Service Vocabulary Application Profile (CPSV-AP), a reusable and extensible data specification used for harmonising the way public services are described in a machine-readable format.



External information sources and services

*Please note that this is only a selection of solutions. The full list is available [here](#).

Public administrations need to exploit services delivered **outside their organisational boundaries by third parties**, such as payment services provided by financial institutions or connectivity services provided by telecommunications providers.

They need also to exploit **external information sources** such as open data and data from international organisations, chambers of commerce, etc.

Recommendation 45

- ✓ Where useful and feasible to do so, use external information sources and services while developing European public services.

Solutions*



TES Cartography is an external information source of reusable trans-European solutions.



Joinup can be considered as an external information source that can be consulted by public administrations while developing public services.

Good practices

- ✓ Spain has created building blocks such as cloud services to provide access to base registries, digital identification, digital signing and digital payment. It also implemented a shared service to provide connectivity services through a unified and consensual public contract at the central administration level. Moreover, most of the public organisations use social media channels such as Twitter and provide open data, and a building block is available to offer an open-source application to create open data portals. Finally, there are specific programmes to adopt IoT technologies in municipalities in Spain to provide better public services.



Public administrations should ensure that they follow the **privacy-by-design** and **security-by-design** approach to secure their complete infrastructure and building blocks; services are not **vulnerable to attacks** which may interrupt their operation and cause data theft or data damage; and they are **compliant with the legal requirements and obligations** regarding **data protection and privacy** acknowledging the risks to privacy from advanced data processing and analytics.

Recommendation 46

- ✓ Consider the specific security and privacy requirements and identify measures for the provision of each public service according to risk management plans.

Solutions*



Recommendation 3 of the EULF Blueprint on data protection includes guidance on privacy risk assessments.

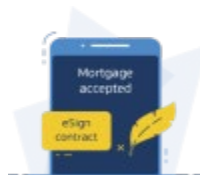


The IQAT assesses the extent to which security and privacy strategies and secure data exchange were considered during the operation of the solution.

Recommendation 47

- ✓ Use trust services according to the Regulation on eID and Trust Services as mechanisms that ensure secure and protected data exchange in public services.

Solutions*



eSignature complies with the Regulation on eID and Trust Services, thus ensuring secure and protected data exchange in public services.



Crypto Tool enables data exchange between different parties in a secure manner.

Security and privacy



Good practices

- ✓ Over the years, Sweden has adopted new initiatives such as trust services and eID, as well as data access and authorisation plans. Additionally, the Swedish Government is working on a project aimed at enabling the use of employees' digital identification in external services outside of their organisation, fulfilling the same requirements as the eID for citizens.

- ✓ Finland has adopted as national security framework for public services ISO 27001 standard for information security management. This entails that all Finnish public authorities are required to conduct risk analyses and preparation of risk management plans. They also have to determine the requirements for the continuity of information security management in adverse situations (Business Continuity Plan) and to make backups of information (Backup and/or Recovery Plans), as well as to prepare Data Access and/or Authorisation Plans.





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The background features a complex, symmetrical pattern of glowing green and blue lines and particles. The lines form a central, diamond-like shape that tapers towards the left and right edges. The particles are scattered throughout, creating a sense of depth and movement. The overall color palette is dominated by dark blue, with vibrant green and blue highlights.

Thank you