European
Commission

State of Play of Interoperability in Europe – Report 2014

ISA

European Commission

"State of Play of Interoperability – Report 2014"

A study prepared for the European Commission by:

KPMG
cutting through complexity

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1 Introduction

Today, European public administrations are expected to provide efficient public services to businesses and citizens across Europe. The European Commission under the **2010-15 ISA programme** with a global budget of some EUR 160 million facilitates cross-border and cross-sector transactions among public administrations, making administrative procedures quicker, simpler and cheaper for all parties concerned.

The ISA programme coverage extends beyond all EU public administrations to European Economic Area (EEA) countries and Candidate countries with whom a Memorandum of Understanding regarding their participation in the ISA programme has been signed.

Actions under the ISA programme are coordinated and aligned with the Commission's Digital Agenda for Europe (DAE), the Commission's Internal ICT strategy, and the 2011-15 European e-Government Action Plan. The ISA programme supports these and other similar initiatives whenever they contribute to interoperability between EU public administrations.

ISA is aligned with the CEF programme, the Union's funding instrument for trans-European networks in the fields of transport, energy and telecommunications.

In December 2010, the European Commission adopted the Communication "Towards interoperability for European public services" to promote interoperability and establish a common approach among public administrations, to help citizens and businesses to fully benefit from the EU Single Market. The Communication included two annexes: the European Interoperability Strategy (EIS) and the European Interoperability Framework (EIF) as foreseen in the Digital Agenda for Europe Action Plan.

European Interoperability Framework (EIF) provides guidance to European public administrations as regards the definition, design and implementation of European public services

The European Interoperability Framework (EIF) provides guidance to European public administrations when designing European public services.

Furthermore, the EIF complements and ties together National Interoperability Frameworks at European level.

Indeed, the majority of countries have taken into account the European Interoperability Framework (EIF) in their National Interoperability Frameworks (NIFs) thus recognising the importance of the alignment of the NIFs with the EIF for the interoperability among public administrations.

The **National Interoperability Framework Observatory (NIFO)** monitors interoperability activities in Member States (MSs). It leverages on the analyses of the National Interoperability Frameworks in the countries covered, based on a comparative model (also called Analytical Model – AM).

Supported by the ISA programme, the NIFO exchanges and promotes good practices and interoperability solutions among Member States as well as the re-use of infrastructures, digital services and software solutions. It collects public administrations' interoperability requirements that are then translated into specifications and standards for digital services.

isa
Interoperability Solutions for European Public Administrations

ISA funds the National Interoperability Framework Observatory that monitors interoperability activities within Europe. It analyses the latest interoperability activities and keeps the Observatory constantly up to date while helping public administrations to align their NIFs with the EIF.

The **main activities undertaken by NIFO** in 2014 are summarised below:

- Ensuring the update of the information concerning the interoperability activities in the Member States.

- Carrying out a **comparative analysis** of the NIFs in order to gain a structural snapshot of the various NIFs in Europe.

- Analysing the current national interoperability activities for each MS, and sharing, with all MSs, the **NIFO factsheets** with the results.

- Helping EU public administrations to **align their NIFs** with the European Interoperability Framework (the EIF).

- Managing the online space for the **NIFO Community** on the **Joinup.eu platform** containing information and comparative analysis between different countries as well as **best practices and practical examples.**

- Identifying the needs of the public sector in what concerns interoperability.

- Recommending **new interoperable and reusable solutions** that can feed the **EICart**.

The State of Play Report summarises **the main findings emerging from the analysis of the NIFs across Europe with regard to the current State of Play of Interoperability within the EU.** This is an updated overview of the main developments in the alignment of NIFs with the European Interoperability Framework (the EIF).

The Report is based on the direct input from **19 Member States and on the 31 NIFO factsheets updated in 2014** (through 19 validated Analytical Models and/or desk research) and published on Joinup.

The European Interoperability Cartography (EICart) of solutions will be used for discovering existing solutions which can be reused by public administrations at any level.

The annual State of Play of Interoperability presents the main findings emerging from the analysis of the NIFs across Europe.

1.1 Main contents of the Report

Within the context outlined above, this Report aims to address the following business questions (BQs):

BQ1: What is the alignment of each MS with the EIF?

This first question focuses on the **analysis of the NIFO analytical models**, in order to evaluate the level of alignment of each NIF of the Member States with EIF recommendations. This analysis includes qualitative evaluation of current interoperability initiatives and actions taken by Member States, to closely align their respective NIFs with EIF recommendations.

BQ2: How is each MS implementing and monitoring its NIF?

The analysis of implementation and monitoring of each NIF is organised around the five dimensions of the EIF: Principles, Conceptual Model, Interoperability Levels, Interoperability Agreements and Interoperability Governance. Each dimension contains a number of specific elements allowing measurement of the "NIF implementation and monitoring". A graphical representation is also available and highlights the "NIF implementation and monitoring" for each MS.

NIF IMPLEMENTATION AND MONITORING
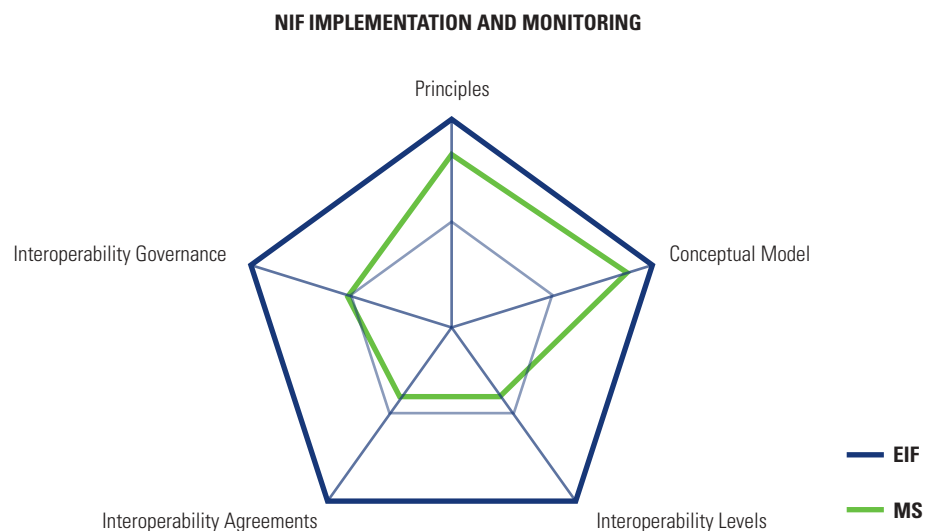
▌ BQ3: What are the main changes compared to the State of Play of Interoperability in Europe (2013)?

This business question aims to verify the main changes in the State of Play of Interoperability with respect to the previous State of Play Report. It helps understand the trends across Member States in terms of development of their NIFs and in terms of alignment over time of their NIFs with EIF recommendations.

▌ BQ4: What are the main best practices that can be shared with other MSs?

The analysis of NIFs allows for identifying best practices to be shared between the MSs.

2 State of Play of Interoperability 2014

This section presents a summary of the analysis of the level of NIF-EIF alignment and NIF implementation for **all countries covered in this NIFO exercise.**

The number of countries that provided updated information for the Analytical Model is **nineteen (19) in total**, out of which 6 did it for the first time.

At the time of writing this Report (December 2014), some of the countries were still working on updating the Analytical Model and their NIF documents.

Addendum

At the time of the publishing process of this report, the data collection was received from Austria and could not be included in the whole analysis. Nevertheless, to take it into account, this addendum is added to attempt to highlight the main results observed. The next edition of the report will take these results into account in a more detailed way.

The Austrian NIF (AIF) adopted in January 2015 is fully aligned with the EIF on the conceptual model, interoperability agreements and governance dimensions and is fully aligned with all the principles except multilingualism. The AIF has a strong alignment on the interoperability levels.

The Austrian EIF/NIF alignment score is 94%, a strong level of maturity.

The monitoring of the implementation of interoperability recommendations is performed by the BLSG (Bund-Länder-Städte-Gemeinden) Coordination group which gathers representatives from the federal, regional, city and community levels (FRCC).

2.1 NIF-EIF Alignment

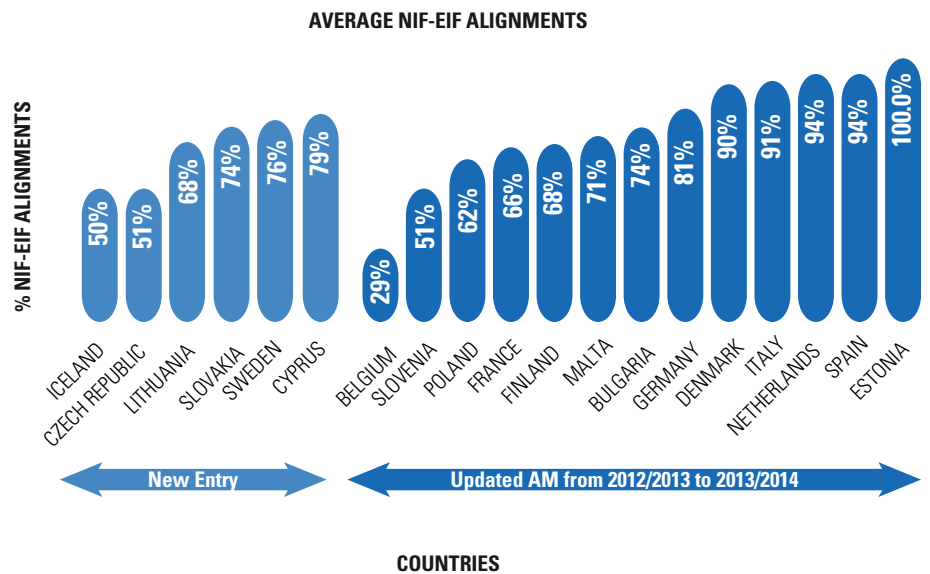The Figure below summarises the average overall alignment of the NIFs with the EIF.

AVERAGE NIF-EIF ALIGNMENTS

Figure 1 - NIF-EIF alignment overview for each country assessed

72%
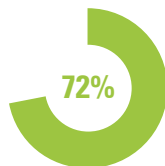
> **There is an overall very good NIF-EIF alignment across countries for 2014**

- The **newcomer** countries are **Cyprus, Czech Republic, Sweden, Iceland, Lithuania and Slovakia**. The average NIF-EIF alignment of the newcomers is 66%, a very good overall total alignment, but slightly lower than the average of the countries that provided updated information from 2012/2013 to date (75%).

- The newcomer **Cyprus** has a **strong maturity level** in the NIF-EIF alignment, thanks to its newly prepared National e-Government Interoperability Framework (NGIF) that is currently under review (publication foreseen at the end of 2014).

- **Iceland** (alignment score of 50%) has a **draft interoperability framework** that has been published for public consultation, and started the process of setting up the NIF with a clear **focus on the technical level of interoperability, and semantic and organisational interoperability**.

eGIF Cyprus' perspective on the User Centricity principle.

The Government should be at the disposal of the people and not the other way around. The target for future services should be the **provision of personalised e-services** at the maximum possible sophistication level, which will allow service users, i.e. citizens and businesses, to be able to **interact with public administrations at any time**, **as easily as possible**. In order to gain acceptance and approval from end users, **electronic environments** shall have a **consistent design and be user-friendly and understandable**, which means they shall be readable, predictable and interactive.

Sweden's Inclusion and Accessibility point of view

The Swedish Government's principle for digital cooperation mentions: "Fitting the needs of different groups and individuals."

The digital experience must be designed so that

citizens can control their processes based on their own preferences and their own needs. This includes the perspectives of information, services, processes, etc.

An important aspect is that e-services need to be designed in a user-friendly way, with a smooth login, good help functions and uniform interfaces, regardless of the agency or their provider.

The public sector should take advantage of technologies to support, inform and educate in order to reduce the "digital exclusion".

Help functions and explanations should be available in the five official minority languages, and the most common immigrant languages.

Italy's perspective on Interoperability Governance

In Italy, the entire governance of SPC (Public Connectivity System) is under the control of the SPC Commission (or SPC Board). The Commission is formed by members appointed by Ministers (50%) and members appointed by the Assembly of Local Administrations (50%); who are the political representatives of local public administrations (PAs).

AgID has the presidency of the SPC Commission. This Commission is responsible for approving all guidelines and procedures concerning the activities carried out within the context of SPC.

Compliance rules are approved by the Prime Minister and updated by decree by the Minister of Public Administration and Innovation. AgID, and the Italian Regions with regard to local administrations, are responsible for the governance of both the SPC Interoperability infrastructures and framework contracts defining the e-Government services used by PAs.

Malta – Interoperability Agreements

In Malta, two approaches are taken towards interoperability agreements:
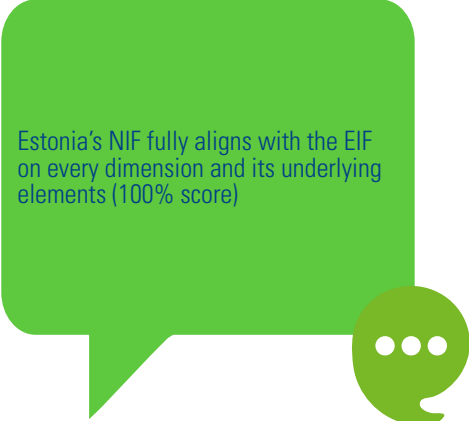
- Agreement on a common set of formalised specifications for technical connectivity. Formalised specifications which can impact the way public services interoperate are endorsed by a central body and contextualised for effective use in the public sector. Adopted specifications are also used in acquisition scenarios as technical requirements.

- Building Block: Adopted Specifications Catalogue Interoperability Profiles; Adopted Standards and Services.

France – Vision of "Technological neutrality and adaptability" principle

In France, the General Interoperability Repository (RGI) mentions that vendor neutrality has to be assured and that the ability to integrate with other information systems contributes to greater adaptability of the network.

- No NIF 'per se' has been developed yet for **Slovakia**; however, a number of interoperability initiatives and policies exist in a **series of separate documents** with an alignment score of 74%.

- **Lithuania has a good alignment** (68%) thanks to its current framework for interoperability structured around the Public Governance Development Programme 2012-2020 (PGDP) and the Law of Management of Government Information Resources.

- **Germany, Denmark, Italy, The Netherlands, Spain and Estonia** are at a high level of maturity in their NIF.

- **Bulgaria and Malta** have a good alignment score. In particular, **Bulgaria** has put forward **legislative provisions to support interoperability**, and the project to update the NIF is ongoing: it aims at reviewing the NIF taking into account the European Interoperability Framework and experience from the implementation of the current NIF and practices from other countries. The **Malta Information Technology Agency (MITA)** published the National ICT Interoperability Framework in May 2013 and there are a number of **ongoing initiatives** regarding interoperability, like the dissemination of the culture of Open Standards within government and the local ICT industry.

- **Finland, France and Poland** have a NIF-EIF alignment score slightly under the overall alignment. **Finland** has taken an **Enterprise Architecture (EA) approach** to interoperability, and embeds all interoperability initiatives within an overall EA for public administrations. This approach resulted in a good NIF-EIF alignment (68%).

- **Belgium** has an alignment score of 29%. **Budget cuts are mentioned as the main challenge for the development of interoperability in this country.**
  For this reason, few people are working on interoperability and even these individuals are not fully dedicated to the topic (people are involved on a project basis, on demand and there is no focal point). This is one of the reasons why there is little documentation related to NIF and interoperability initiatives. On the other hand, Belgium states that an **opportunity could come from political developments: Belgium is moving towards a new, more decentralised model** (more power to the regions) and there are official "integrators" that have been appointed to focus on interoperability issues and on re-use of components and common standards.

- **Slovenia** is moderately aligned with the EIF (51%). The Slovenian interoperability portal (NIO – Nacionalni Interoperabilnostni Okvir), launched on 23 October 2010, is the cornerstone of the National Interoperability Framework (NIF) in Slovenia. The portal allows different stakeholders to publish standards and guidelines on interoperability, interoperability information, and interoperability assets.

Estonia's NIF fully aligns with the EIF on every dimension and its underlying elements (100% score)

The following chart shows the **average alignment for each NIF dimension**. The blue bar shows the average alignment (calculated as the average of the scores for all countries for each of the five dimensions). The green spot shows the highest level of alignment for each dimension (measured as the highest score reached by a country) and the yellow spot the lowest level of alignment per dimension (measured as the lowest score reached by a country).

NIF-EIF Alignment for each dimension
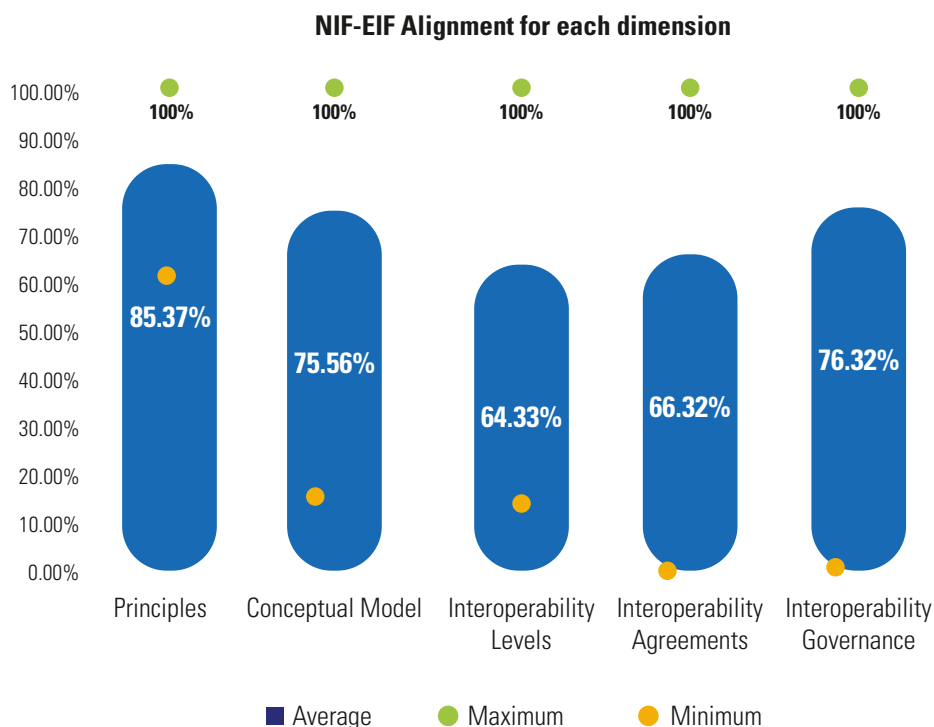
The average alignment of the countries measured varies depending on the dimensions considered, with the highest alignment on the Principles (85.3%) and the lowest alignment with the Interoperability Levels (64.3%).

Looking at the lowest levels of alignment, the chart shows particular gaps for the dimensions of Interoperability Agreements and Interoperability Governance; with respect to the average alignment of 66.3% and 76.3% respectively, some countries do not align at all (the lowest score is 0%). The gap is less in the case of Principles and Conceptual Model.

The difference between lowest and highest scores reflects the different levels of maturity of the NIFs in the countries assessed here.

2.2 NIF Implementation and Monitoring

As described in the Introduction, it is also important to point out how each country is currently implementing its NIF and the related level of implementation monitoring.

Indeed, there is a need to establish effective monitoring activities to ensure the implementation of the NIFs at each administrative level by the countries.

As for the "EIF/NIF alignment" analysis, the implementation and monitoring analysis is structured around the same five dimensions of the EIF: Principles, Conceptual Model, Interoperability Levels, Interoperability Agreements and Interoperability Governance.

Figure 2 below shows the **Level of NIF Implementation and Monitoring in each country assessed in 2014.**

AVERAGE NIF-EIF IMPLEMENTATION / MONITORING

SCORE (%)

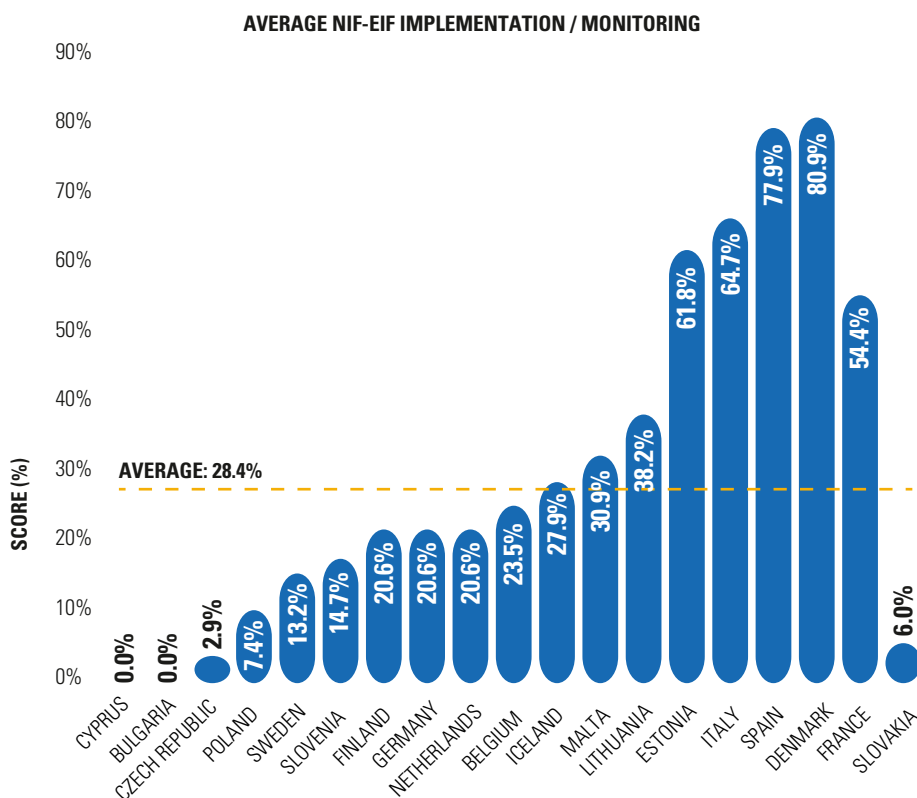| Country	Score
CYPRUS	0.0%
BULGARIA	0.0%
CZECH REPUBLIC	2.9%
POLAND	7.4%
SWEDEN	13.2%
SLOVENIA	14.7%
FINLAND	20.6%
GERMANY	20.6%
NETHERLANDS	20.6%
BELGIUM	23.5%
ICELAND	27.9%
MALTA	30.9%
LITHUANIA	38.2%
ESTONIA	61.8%
ITALY	64.7%
SPAIN	77.9%
DENMARK	80.9%
FRANCE	54.4%
SLOVAKIA	6.0%

AVERAGE: 28.4%

Figure 2 - Overview of the level of NIF Implementation and Monitoring for each country assessed

28%

The overall average of NIF Implementation and Monitoring for 2014 is significantly lower than the overall average of NIF-EIF Alignment (72%)

The Danish Steering Committee for Cross-Governmental Cooperation (STS) is the organ with overall responsibility for coordinating and preparing common framework decisions on the development of public sector digitisation.
Many of the EIF principles are monitored through the STS.

The wide divergence in scores reflects the different levels of maturity of the NIFs in the analysed countries: the less the maturity, the more time is needed by the country to implement its NIF in real life among public administrations. Indeed, some countries have started to work on interoperability and on establishing a NIF only recently, while in other cases those activities date back several years (e.g. Spain, Italy, Estonia, etc.).

- **Estonia, Italy, Spain, Denmark and France** are at a high maturity level in the NIF implementation, mainly thanks to their strong commitment to the interoperability strategy and the presence of a **Governance Framework** for the monitoring of interoperability initiatives.

- **The Czech Republic** has a NIF implementation score of 2.9% namely because only a few examples of practical application of principles were identified. The User-centricity principle is practically applied through the different portals that are offered by the Government such as CzechPOINT, the government portal and data boxes.

- **Iceland, Malta and Lithuania** have good levels of NIF implementation, but still have considerable opportunities to improve the implementation of their NIFs, especially at local level.

In December 2014, the Spanish Government launched the first Transparency Portal: it is extensively used by citizens. This is a strong example of implementation of the EIF Transparency principle.

Denmark – Steering Committee for the monitoring of interoperability initiatives

Denmark is one of the six countries that has fully implemented and monitors the Governance Framework. There is a Steering Committee for Cross-Governmental Cooperation (STS) which is the organ with overall responsibility for coordinating and preparing common framework decisions on the development of public sector digitisation. The STS consists of high-level officials of key ministries, a representative of Local Government Denmark, and a representative of Danish Regions. Their main objective is to coordinate e-Government initiatives throughout the public sector.

The STS also monitors the interoperability initiatives, and reports on the situation every six months to the Government, municipalities and regions.

In December 2014, the Spanish Government launched the first transparency website

With respect to the Transparency principle, Spain has implemented a **Transparency Portal** which has an **electronic mechanism that enables citizens to exercise their right of access to information, refer to the state of process of their requests, and receive responses timely and accurately**.

The Transparency Portal contains information on matters related to Spanish Law and public administration related information, and is used extensively by citizens. Examples include the governments of Asturias, Castilla y Leon, Extremadura and Navarra that have a portal on open government and transparency, which allows citizens to obtain detailed information regarding the management of the regional administration. A **centralised application has been designed which allows use by every organisation involved in the transparency website**. This application permits management of all citizens' requests for information.

Netherlands DigiD system to obtain access to hundreds of Dutch e-Gov websites

The Government of the Netherlands is working with industry on a new system of electronic identification. Part of this eID system is a DigiD in the form of a smart card to get access to hundreds of Dutch e-Gov websites. The eID system enters into force in 2015.

Entrepreneurs log in with eRecognition on government websites just as citizens do with their DigiD. eRecognition guarantees that the person who logs in is in fact authorised to do so.

The following chart shows the **average NIF Implementation for each NIF dimension.**

The blue bar shows the average NIF implementation (calculated as the average of the scores for all countries for each of the five dimensions). The green spot shows the highest level of NIF implementation for each dimension (measured as the highest average score reached by a country) and the yellow spot the lowest level of NIF implementation per dimension (measured as the lowest average score reached by a country).

NIF Implementation for each dimension

	Principles	Conceptual Model	Interoperability Levels	Interoperability Agreements	Interoperability Governance
Maximum	95.8%	85.7%	72.2%	70%	100%
Average	37.94%	30.08%	20.76%	26.84%	26.32%

■ Average   ● Maximum   ● Minimum
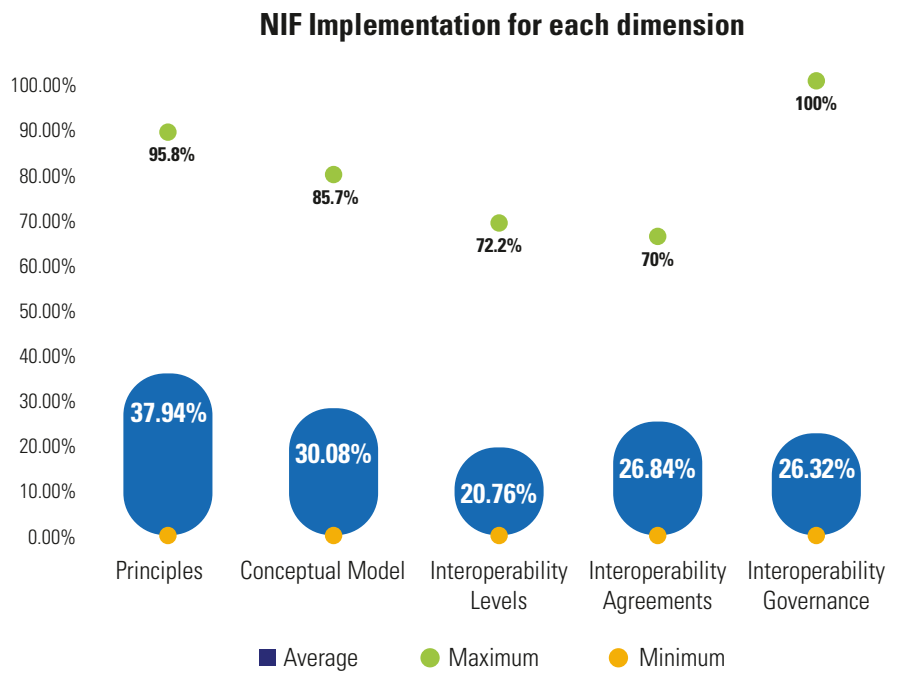
There is a general homogeneity in the score for each dimension, with the best value being for the Principles dimension (37.94%) and lowest value being for Interoperability Levels (20.76%).

Lithuanian SIRIP Platform for the delivery of e-services.

Lithuania implemented the "State Information Resources Interoperability Platform – SIRIP" as one of the tools for subsidiarity and proportionality.

The technological interoperability platform offers an easy way for all public local authorities to design, deliver and manage e-services. This platform is the reason why Lithuania reached a score of 92.86% for the Conceptual Model. The platform permits the development of e-services on a flexible service-oriented architecture (SOA).

3 Trend Analysis

3.1 NIF-EIF alignment over the years

This chapter gives the trends in NIF-EIF alignment by comparing the information provided by thirteen (13) Member States since 2013.

Figure 3 – Countries considered for the trend analysis

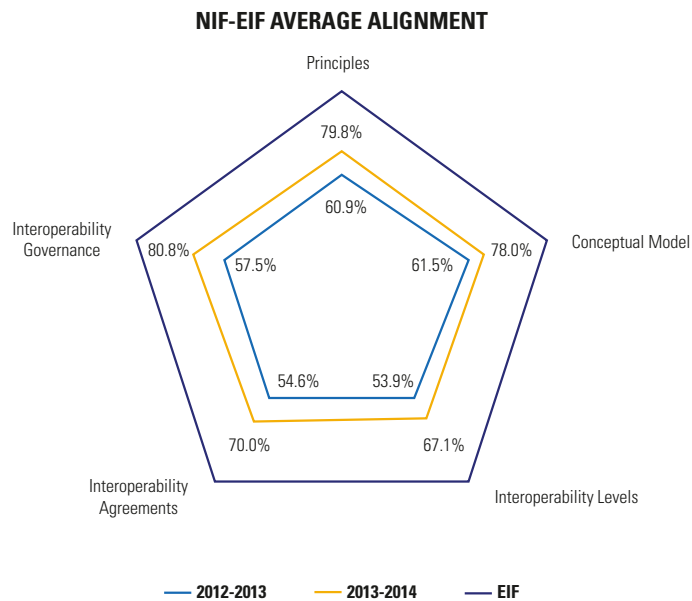Figure 4 below presents the main trends in NIF-EIF alignment:

NIF-EIF AVERAGE ALIGNMENT

Figure 4 – Trends in NIF-EIF alignment for each EIF dimension

The overall average NIF-EIF alignment of the Member States assessed increased by 17.5% from the previous exercise to the current exercise. This is a very good increase in the overall level of alignment of the NIFs with the EIF.

At the level of EIF dimensions, the average of the NIF-EIF alignment increased in all 5 dimensions, with a marked increase particularly in the "Interoperability Governance" dimension (+23%), thanks to Bulgaria, Denmark, France and Malta which achieved a 100% alignment. This dimension is the one with the best alignment and improvement, followed by Principles (+19.2%), Conceptual Model (+16.5%), Interoperability Agreements (+15.4%) and Interoperability Levels (+13.2%).

Going in-depth with the analysis, the following **bar chart represents an overview of all countries assessed and their respective overall average alignment** of the NIF with the EIF obtained in 2012/2013 and the increase of the alignment to date.
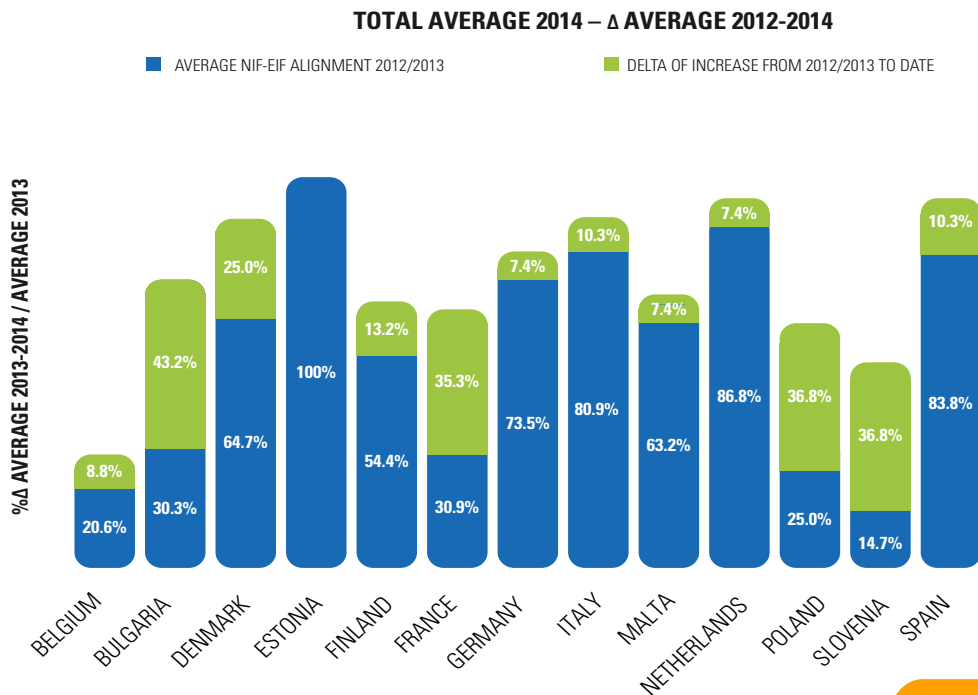
TOTAL AVERAGE 2014 – Δ AVERAGE 2012-2014

■ AVERAGE NIF-EIF ALIGNMENT 2012/2013   ■ DELTA OF INCREASE FROM 2012/2013 TO DATE

Figure 5 – Trends in NIF-EIF alignment for each country assessed

As can be seen in Figure 5, the following are the main changes that can be observed in the trends of NIF-EIF alignment from the previous exercise to the current exercise:

- **Estonia** maintains a **complete NIF-EIF alignment (100%)** over the 2012-2014 period;

- **All Member States, with the exception of Estonia, increased their NIF-EIF alignment since the previous NIFO exercise;**

- **Bulgaria (+43.2%), Poland (+36.8%), Slovenia (+36.8%) and France (+35.3%) are the countries seeing substantial development and that increased their NIF-EIF alignment the most.**

Improvements in the Bulgarian NIF-EIF alignment can be observed in all dimensions and has reached a 100% alignment level for Conceptual Model and Interoperability Governance. Looking at the Conceptual Model, there is now a Register of e-Services that organises an environment of complex e-services. This Register includes standardised nomenclature, classification of the primary and the complex services, and directives for joining the services. Interoperability Governance (as a part of e-Governance) is explained in the "e-Governance Development

Large increase in NIF alignment in all assessed countries

Strategy – 2014-20 in the Republic of Bulgaria". A project for updating the national framework for interoperability of information systems is currently underway.

Mainly as a result of the "National Interoperability Framework" regulation, Poland NIF-EIF alignment improvements can be observed in the Principles, Conceptual Model, Interoperability Levels and Interoperability Agreements EIF dimensions.

Improvement in the Slovenian NIF-EIF alignment originates from a marked improvement in the Principles dimension (from 0% to 66%). All of the EIF principles, except "Multilingualism", are now referred to on the Slovenian Interoperability Portal (NIO) or in the Strategy on IT and electronic services development and connection of official records (SREP) strategy.

France improved its alignment in particular in "*Interoperability Governance*" (France in respect to the previous year now has a complete Governance Framework) and in the Conceptual Model (increased from 7% in 2012-2013 to 64% today). Regarding the Conceptual Model, France defined an Enterprise Architecture Framework based on service-oriented architecture. With respect to Interoperability Governance in France, DISIC (the Ministerial Department for ICT systems) is currently in charge of the governance of all the interoperability frameworks.

- **Italy, the Netherlands, Denmark and Spain have reached a high development level** on their NIFs (equal or more than 90%) and are thus moving towards an almost full NIF-EIF alignment;

- **Belgium increased its NIF-EIF alignment (+8.8%)** and has significant areas of improvement;

- The other Member States, namely **Finland, Germany** and **Malta,** improved their alignment, with an overall average alignment of around 70-80%.

> Regarding the implementation of the Conceptual Model, France defined an Enterprise Architecture Framework based on service-oriented architecture.

3.2 Technology trends

Some technology trends concerning interoperability initiatives have been identified from the analysis of the updated NIFO Analytical Model for the latest exercise.

Service Oriented Architectures or SOA

XML and open technologies

Open Data

Cloud

Big Data

Some technology trends concerning interoperability initiatives have been identified from the analysis of the updated NIFO Analytical Model for the latest exercise.

SOA

The OASIS group defines SOA as:

"*Service-oriented architecture is a paradigm for organising and utilising distributed capabilities that may be under the control of different ownership domains. It provides uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable preconditions and expectations.*"

The EIF explicitly recommends that "Public administrations should develop a component-based service model", and SOA is an excellent implementation of component-based services.

Many countries implemented a service-oriented architecture for their conceptual model:

- **Lithuania** implemented the "State information resources interoperability platform – SIRIP", a SOA based platform that offers an easy way for all public local authorities to design, deliver and manage e-services.

- **Italy** implemented the SPC (the Italian Public Application Cooperation System) to support Italian public bodies in application services. The architecture is currently modelled as a Service-Oriented Architecture (SOA), and is implemented using Web Service technologies.

- **Estonian** Interoperability architecture of services follows a Service-Oriented architecture approach. Authentic sources are accessible through the secure distributed service bus X-Road, which enables secure internet-based data exchange between the state's information systems.

SOA cases in Lithuania, Italy and Estonia

XML and open technologies

XML and open technologies in general are a technology trend among Member States. The term "open technology" typically includes open source, meaning computer software with its source code made available with a license, and open specifications, meaning accepted international standards.

Estonia, as an example, states in its NIF that: "*Information systems interfaces must be created in a technology neutral way, using open standards, prescribed in the interoperability framework (XML, WSDL, SOAP, etc.).*"

Germany 's orientations support the interconnection of loosely coupled service components and specify the use of XML in public administrations in order to standardise data exchange within and with the public administration. This will improve interoperability, and, consequently, electronic processes will be more uniform and efficient. Standard XML schemas are available in a repository and some of these schemas are mandatory by law.

Germany makes standard XML schemes available in a repository

Lithuania applied open standards to its SIRIP platform. In fact, the communication between SIRIP components is implemented using open standard technologies **– XML for data structures, WSS (Web Services Security) for data security, XML Signature for data integrity.**

In **Denmark**, there is a parliamentary decision as well as an **agreement** between the government and the regions and municipalities **to use open standards in order to secure interoperability**. (See: **http://www.digst.dk/ Servicemenu/English/IT-Architecture-and-Standards/Open-standards**)

Open Data

The term "Open data" refers to government data opened up for the public to use in their own applications, in order to increase government transparency, to improve services and to enable the delivery of new businesses.

Looking at the NIFO Analytical Model, many initiatives are in place in Europe for sharing e-Government information.

In **Denmark**, for example, the ODIS project is specifically targeted towards openness of data (PSI), and the **basic-data initiative** (Grunddata) is a large-scale initiative to increase the exchange and sharing of data between public organisations.

In **Italy**, the CAD (the Italian "Code for a Digital Administration") document states that public administrations will need to make their public data available in open formats that can be reprocessed by third parties. In addition, the openness principle is enforced by art. 68 of the CAD. AgID has released **technical guidelines** on this matter. Consequently, there is a public national portal ("dati.gov.it") where all public datasets of the public administrations are collected.

> The 'PSI Directive' on the re-use of public sector information entered into force on 31 December 2003. It focuses on the economic aspects of re-use of information rather than on the access of citizens to information. It encourages the Member States to make as much information available for re-use as possible.

[1]AgID is the Agency for Digital Italy, a Government agency responsible for the implementation of the Italian Digital Agenda under the surveillance of the Presidency of the Council of Ministers.

Cloud

The term "Cloud", according to NIST, refers to a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

In **Spain**, the Government is trying to provide public local entities with new e-services based on Cloud Computing technologies. In particular, software "as-a-service" fits very well with the needs of public local entities (e.g. no maintenance, no license management). Spain has published a national catalogue of interoperable and reusable solutions that offers many "as-a-service" solutions to its local entities. An example of Spanish software offered to local entities "as-a-service" is INSIDE, a software for documentation and expenses management.

> A best practice in Spain's government is sharing "software as-a-service" solutions with local administrations

[2] NIST (National Institute of Standards and Technology) is the federal technology agency that works with industry to develop and apply technology, measurements, and standards.

Big Data

The term "Big Data", according to the market analyst Gartner, is high volume, high velocity, and/or high variety information assets that require new forms of processing to enable enhanced decision-making, insight discovery and process optimisation.

Big data uses inductive statistics and concepts from nonlinear system identification to infer laws (regressions, nonlinear relationships, and causal effects) from large sets of data with low information density to reveal relationships and dependencies and perform predictions of outcomes and behaviours.

The Italian Government has launched a public tender inside the SPC Framework on Cloud Computing (infrastructure as-a-Service, platform as-a-Service and software as-a-Service), Digital Identity and software security, **Big Data**, Open Data and software cooperation services for the Italian central and local public administrations.

4

In order to gather important insight directly from the MSs' NIFO representatives involved in the process, some targeted interviews were conducted with different MSs to expand on the following topics:

- **The challenges encountered when establishing and further developing a NIF;**

- **The challenges encountered when implementing a NIF.**

The guidelines for conducting the interviews were the four interoperability layers of the EIF, encircled by the political context: the legal, the organisational, the semantic and the technical one.

For each EIF layer, each country was asked what the main challenges were in establishing, developing or implementing a NIF.

The following section presents the results of in-depth interviews with some countries' representatives and outlines the main challenges identified for each EIF layer.

LEGISLATIVE ALIGNMENT

LEGAL INTEROPERABILITY

Aligned legislation so that exchanged data is accorded proper legal weight

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ORGANISATION AND PROCESS ALIGNMENT

ORGANISATIONAL INTEROPERABILITY

Coordinated processes in which different organisations achieve a previously agreed and mutually beneficial goal

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SEMANTIC ALIGNMENT

SEMANTIC INTEROPERABILITY

Precise meaning of exchanged information which is preserved and understood by all parties

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INTERACTION & TRANSPORT

TECHNICAL INTEROPERABILITY

Planning of technical issues involved in linking computer systems and services

POLITICAL CONTEXT AND LEGAL INTEROPERABILITY

> Technical aspects in legislation can hinder technological evolutions

Legislative context: technical aspects and rules specified in the regulations

The Italian NIF has experienced more difficulties with Legal interoperability than with the other EIF levels. This was due to the Italian legislative context where in some cases "technical aspects and rules" have been specified into the regulations, resulting in great difficulty in adapting/changing this aspect over the years (in line with technological innovations).

In this context, another important point highlighted by Italy relates to the need for coherence between Regional Laws and EU regulation. This coherence needs to be actively monitored.

Political context: lack of a central government Chief Information Officer (CIO)

The Italian representative states that the Italian NIF, from a regional perspective, has always been considered positively, since it enables Regions to be proactive. On the other hand, with regard to the "Central Government", the great variability (and volatility) of the Italian Government during the current period entails a moderate "political power" of the "actuator entity". The Italian contact point further emphasised the **lack of a central "Italian CIO"** for the Italian Government, a unique decision-maker with a unique vision: in fact over the latest period in Italy too many different decision-makers or Technical Committees with, sometimes, overlapping competencies/objectives have been appointed.

Political context: IT budget cuts in public administrations

One of the factors explored during the interviews with the country representatives, was the economic factor. The current economic crisis has led to IT budget cuts among public administrations and thus a need for increased efficiency. However, a reduction in IT costs can be an obstacle for the establishment and development of a NIF. Specifically, as stated by Malta, many interoperability activities are project-driven, but sometimes the budget is insufficient for rethinking the way systems are designed and implemented. Frequently, in fact, there is a **lack of "thinking out-of-the-box"** and introducing innovative technologies, focusing instead on the maintenance of the current service portfolio or concentrating on a standard approach in the development of new services.

On the other hand, a reduction in IT costs can offer a significant opportunity for interoperability, especially for software reuse among public administrations and for efficiency through common infrastructures and procedures. As an example, Spain introduced and published its solutions portfolio online for public reuse[3]. The solutions portfolio is published and maintained by the **Center of Technology Transfer (CTT)**

and encourages reuse of solutions for all Spanish public administrations. This portfolio offers many interesting solutions (projects, services, regulations, assets, open source, etc.) for the development of e-Government in Spain.

Belgium confirmed that they were also facing budget cuts, and for this reason there were few personnel working on interoperability and these people were not fully dedicated to the topic (staff are involved on a project basis, on demand, and there is no focal point). That is one of the reasons why there is also a lack of documentation related to NIF and to interoperability initiatives.

Legal interoperability: multiple laws for base registers

A challenge for Malta is the establishment of laws for national base registers: currently the Maltese NIF has multiple laws and multiple base registers for the identification of Maltese citizens in many business domains. As stated by Malta, in order to achieve a strong level of interoperability, it is fundamental to unify base registers. The current Maltese **overlap on base registers** is a challenge for the establishment and development of the NIF, but it also provides an opportunity to create one repository and simplify administrative processes and systems' maintenance.

The Swedish contact point highlighted that Swedish agencies have specific laws with respect to their own registers. There are also restrictions on the type of information that can be exchanged between agencies, causing difficulty in the exchange of information.

ORGANISATIONAL INTEROPERABILITY

Lack of a monitoring process for interoperability projects and related expenses

The Italian contact point highlighted a challenge at the organisational level: the lack of a "monitoring process" for projects and expenses related to interoperability. With regard to this point, the Spending Review programme can be considered as a driver rather than an obstacle for the government and promotes the sustained improvement of the NIF and its technical initiatives.

Public consultation procedure for the establishment of a NIF

Remarks coming from MSs having recently established a NIF pertaining to the early stage of the NIF development, such as the drafting of the document and the public consultation procedure. Member States that had introduced NIFs at an earlier stage had concerns and remarks with regard to maintenance and support issues, such as in finding the resources for this process.

At an early stage of development, with regard to the public consultation

IT budget constraints: a challenge but also an opportunity to give a boost to software and services reuse among public administrations

[3] The Spanish catalogue of reuse can be found on this website

The unification of base registers contributes to boosting interoperability by simplifying processes and systems

process involved in setting up a NIF document, Malta found it **difficult to obtain feedback from some businesses' chief executive officers**. Malta remarked that there could be some difficulties for businesses in understanding the benefits of the NIF.

Huge effort needed for NIF implementation and monitoring

e-Government services often have to be provided under a complex country scenario. Spain, for example, provides these services in a scenario that involves the interaction of the General State Administration, 17 regional governments, more than 8,000 public entities, universities and 2 autonomous cities. In order to **maintain a high degree of interoperability at all administrative levels**, there is the need to make considerable efforts in NIF implementation and monitoring. So far, Spain has been able to face this challenge thanks to a strong collaborative effort with the participation of all public administrations. The **cooperation effort** operates through a structure of committees dealing with e-Government that includes the General State Administration, regional governments and local entities and their working groups of experts.

In conclusion, a centralised regular monitoring of interoperability initiatives and a strong cooperation effort among public administrations are the basis for an effective NIF implementation.

An effective NIF implementation requires central monitoring of IOP initiatives and strong cooperation among public administrations

Public local entities generally do not have sufficient IT resources

As stated by Spain, in general **public local entities do not have an adequate number of skilled IT staff and an IT budget sufficient to cover the development of local interoperable solutions**. A key challenge is to provide public local entities with new e-services based on Cloud Computing technologies. In particular, software "as-a-service" suits the needs of public local entities very well (e.g. no maintenance, no license management). Spain addressed this challenge through a national catalogue of interoperable and reusable solutions that offers many "as-a-service" solutions to its local entities. A Spanish example of software offered to local entities "as-a-service" is INSIDE, a software for documentation and expenses management.

In order to enhance the e-services offered to local entities, Spain suggests consolidating all national and regional Data Centers and enhancing public common infrastructure with Cloud Computing technologies.

No central Interoperability Governance

A main challenge from the point of view of the Swedish contact points is the **strong independence of the Swedish agencies and the absence of a central organisation for their coordination**. This high level of independence results in a lack of collaboration and difficulties in information exchange. Swedish agencies develop/publish services autonomously, there is no central national catalogue of e-services

offered by the agencies, and the visibility regarding the services offered by the agencies is very limited. But there is an initiative in place for setting up a national service catalogue in order to identify the services offered by each agency.

SEMANTIC INTEROPERABILITY

Need for skills/competencies improvement for the development of ontologies and taxonomies

Italy states that with regard to semantic interoperability there is a general **lack of specific competencies and skills for the development of ontologies and taxonomies** for specific business domains. Projects on ontologies and taxonomies normally require a substantial initial long-term investment.

In addition, Sweden stated that the main problem concerning semantic interoperability is the autonomy of agencies regarding the definition of taxonomies/vocabularies, so there are forms of collaboration and initiatives in place to develop single core vocabularies. Presently in Sweden there is a preliminary study under way to identify how to publish this information in catalogues (information models, taxonomies). Implementation will begin next year.

Multilingualism is a key challenge

Multilingualism is today a key challenge for both the establishment and development of a NIF. For example, the Maltese laws regarding interoperability are written in Maltese and English but some terms are still difficult to translate, due to a **different semantic meaning**.

Therefore, in certain countries where many regions have high autonomy (for example Spain) and a dedicated language, multilingualism may complicate things even more and provide a stimulus at the same time. Moreover, some e-services (e.g. services for immigration) require additional languages to the official national languages. Spain is considering solving this problem by using PLATA, a software for automatic translation of Castilian Spanish into English and the three other Spanish languages in the e-services offered by public administrations. The system translates 'on-the-run' the information from the public websites and is based on open source engines.

However, Malta expressed a different opinion and stated that **translation of e-services cannot be undertaken automatically** and that human language translation is too expensive. It is clear that an automatic translation system sometimes presents errors in translation, but, as Spain remarks, it is a good starting point for approaching multilingualism. Spain also states that **human translation of e-services would be too expensive.**

Opportunity offered by cloud computing as a means of sharing services

Semantic interoperability across domains and public entities remains a challenge

[4] More information on the Spanish PLATA system can be found on this website: **http://administracionelectronica.gob.es/ctt/plata**

The multilingualism challenge: translation is too expensive for budgetary constrained PAs

A recommendation on multilingualism: use of MT@EC platform

The Swedish contact point stated that guidelines are in place for e-services to support multilingualism, but each agency is autonomous and decides which language needs to be supported (or not) by each e-service.

However, for the Belgian contact point, multilingualism is not a challenge for cross-border e-services. It is more of a problem across sectors and across base registers that do not use the same definitions and terms.

In conclusion, **multilingualism remains one of the key challenges and debated topics** for cross-border interoperability in Europe.

A good recommendation for MSs on **multilingualism** is to use the **platform MT@EC** instead of developing their own custom solutions. The Machine Translation service was developed by the European Commission under the ISA programme and now it can also be accessed over a secure internet connection (https). The service was previously only accessible for institutions that were connected to the highly secured sTESTA network. At the moment the new web access also allows public administrations that are not connected to the sTESTA network to request access for their staff.

TECHNICAL INTEROPERABILITY

Legacy technology, silos and different ways of working among IT people

One factor strictly related to the economic issue is **legacy technology**, a challenge already present in the past year. Reduction in IT costs can cause difficulties in the renewal of already running old systems and applications and a NIF improvement may have a considerable impact on these systems and applications, especially on national base registers. Indeed, investments are needed in order to replace older systems with newer and interoperable systems.

Malta states that a greater challenge is the "**legacy way of thinking**" **about technology**. There is a need to transform the current mode of thinking of public administrations towards innovative technologies. Spain, moreover, is trying to overcome this challenge by introducing innovative technologies like Cloud Computing, in particular offering **as-a-service software to local public entities**.

An often-stated issue is the "**silo mentality**" and the fact that many of the national administrations or departments can function quite independently of one another. This hinders interoperability nationally (at municipality or regional level) and thus also the implementation at a higher level. Malta confirms this as an issue among public administrations. This organisational restructuring or breaking down of the silos is not an easy accomplishment since many public administrations feel that they are losing their autonomy and prefer to use their own solutions and databases.

Another technology challenge, as specified by Malta, is the level of technical knowledge among IT people and their different way of working: **IT developers have different approaches**; there is not a single and unified way of working, causing difficulties in the development of technology interoperability.

Extensive use of a common infrastructure

A technical challenge faced by countries when facilitating technical interoperability is the **enhancement of the extensive use of common infrastructures by all public administrations at all administrative levels**. Spain, for example, has more than 8,000 public entities, with approximately 4,000 entities already interconnected with Red SARA (the Spanish public platform for the interconnection of public administrations). A challenge for Spain is to continue the development of this common infrastructure in order to interconnect all the local entities to Red SARA.

Connecting all public administrations to a public common infrastructure facilitates the provision of many more services to citizens and businesses.

Low level of technical integration among local agencies

As stated by the Swedish contact point, there is a new common public IT infrastructure (using web services technologies) for Swedish agencies based on international standards.

The main challenge from the point of view of a contact point is the technical integration of these Swedish agencies. In fact, the agencies have considerable independence with regard to interoperability (there is no central organisation) and develop/publish services autonomously.

The silo mentality hinders the introduction of new technologies

Common platforms and infrastructure interconnecting public administrations is a remarkable paradigm enabling interoperability.

See the Spanish example of Red SARA.

5 NIF Best Practices

The complete list of best practices on **theoretical NIF-EIF alignment** and the list on **practical NIF implementation and monitoring** are available on the Joinup platform:

- **https://joinup.ec.europa.eu/community/nifo/document/nifo-alignment-examples**

- **https://joinup.ec.europa.eu/community/nifo/document/nifo-implementation-and-monitoring-examples**

The Joinup.eu platform, and more specifically the NIFO community, can be used to request clarifications and/or more detailed explanations on NIF-EIF alignment and NIF implementation, in order to enable a "collaborative-oriented" approach among countries in finding solutions and in sharing best practices and ideas.

IOP best practices, challenges and success stories on NIFO community on Joinup.eu

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