European Interoperability Framework for European Public Services (EIF) Version 2.0

Notice

This document is a work in progress.

Executive summary, annexes as well as glossary of abbreviations and terms will be added.

The EIF that is finally published will be formatted prior to publication, at which time extensive consistency checks, as well as other checks on abbreviations, references in footnotes, grammar, etc. will be performed.

All figures will be properly cleaned and formatted for clarity and simplicity, based on the sketches included in this version.

The document will be checked by DG Translation before the interservice consultation.

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1 Introduction to the European Interoperability Framework

1.1 Purpose and Legal framework

The purpose of the European Interoperability Framework (EIF) is:

- to promote and support the delivery of European Public Services by fostering cross-border and cross-sectoral[1] interoperability;
- to guide public administrations' efforts in providing European Public Services to businesses and citizens;
- to complement and tie together the various National Interoperability Frameworks (NIF's) in a European dimension.

This document, non-technical by nature, is targeting all those involved in the definition, design and implementation of European Public Services.

The EIF should be taken into account when making decisions about the implementation of European Public Services and more particularly during the development of services and systems to support the implementation of EU policy initiatives. Furthermore, the EIF should be considered when implementing public services that in the future might become part of European Public Services.

The EIF is developed and maintained in the framework of the IDABC[2] and ISA[3] programmes, in close collaboration with the Members States and the concerned Commission services. They have worked together in the spirit of Article 154 of the EC Treaty. According to this article and with the aim to help in the achievement of the objectives referred to in Article 14 on the Internal Market, the Community shall contribute to the establishment and development of trans-European networks and shall aim at promoting the interconnection and interoperability of national networks as well as the access to such networks.

The EIF contributes to the better functioning of the Internal Market through increased interoperability among European public administrations.

1.2 Definitions

1.2.1 European Public Service

In this document, European Public Service means "*a cross-border public sector service supplied by public administrations[4], either to one another or to European businesses and citizens by means of cooperation between those administrations*."

While not all European Public Services are supported by information and communication technologies (ICT), most of them will rely on some form of ICT support.

1.2.2 Interoperability

The EIF is concerned with interoperability in the very specific context of the provision of European Public Services.

[1] Sector is to be understood as a policy area, e.g.: customs, police, eHealth, environment, agriculture etc.
[2] Interoperable delivery of pan-European eGovernment services to public administrations, businesses and citizens (IDABC), OJ L 181, 18.5.2004, p. 25
[3] Interoperability solutions for European public administrations (ISA), OJ *[To be completed when published]*
[4] Refers to either national public administrations (at any level), or bodies acting on their behalf, and/or EU public administrations.

Although in almost all cases, the provision of European Public Services will involve the exchange of data between ICT systems, interoperability is a wider concept and encompasses the ability of organisations to work together towards mutually beneficial and commonly agreed goals.

Therefore, the following definition is used in the EIF[5]:

"Interoperability, within the context of European Public Services delivery, is the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems."

It should be noted that interoperability is multilateral in nature and is best understood as a *shared value* of a community.

1.2.3 Interoperability Framework

Within the context of this document, "*an interoperability framework is an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements: vocabulary, concepts, principles, policies, guidelines, recommendations, and practices*".

1.3 The Needs and the Benefits of Interoperability

Interoperability is both a prerequisite for and a facilitator of the efficient delivery of European Public Services. Interoperability addresses the need for:

- ***cooperation*** between public administrations aiming at the establishment of public services;
- ***exchanging information*** between public administrations to fulfil legal requirements or political commitments;
- ***sharing and reusing information*** among public administrations to increase administrative efficiency and reduce administrative burden on citizens and businesses;

leading to:

- ***improving public service delivery*** to citizens and business by facilitating the one-stop shop delivery of public services;
- ***reducing costs*** for public administrations, businesses and citizens through efficient and effective delivery of public services.

1.4 The EIF's Recommendations

The EIF provides recommendations that address specific interoperability requirements. Implementing the recommendations will create an environment in which public administrations organise themselves in order to establish new European Public Services. This will help to grow a European Public Services ecosystem[6] with people familiar with interoperability, organisations ready to collaborate and common frameworks, tools and services facilitating the establishment of European Public Services.

1.5 Context

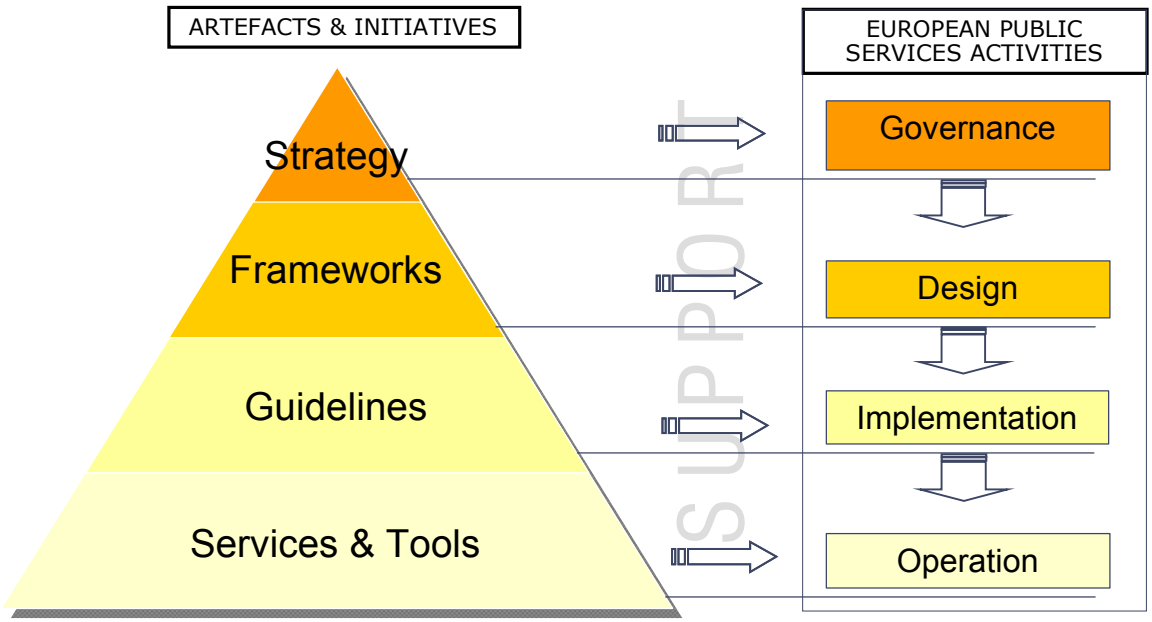
The EIF is part of a set of interoperability initiatives aiming at providing support to the establishment of European Public Services.

The figure below shows the relationships between those interoperability initiatives: the European Interoperability Strategy (EIS), the EIF, the European Interoperability Guidelines and the European

[5] Article 2 of the Decision of the European Parliament and of the Council on interoperability solutions for public administrations OJ *[To be completed when published]*

[6] An ecosystem is a system whose members benefit from each other's participation via symbiotic relationships (positive sum relationships).

Interoperability Services and Tools on the one hand, and the European Public Services establishment activities on the other.



Interoperability initiatives supporting European Public Services activities

Figure 1-1

A systematic approach to the governance of interoperability at EU-level should be followed, and concrete goals should be set. To this end, the European Interoperability Strategy (EIS)[7] provides the basis for defining the organisational, financial and operational framework necessary to support cross-border and/or cross-sectoral interoperability. The EIS steers the EIF and all other associated efforts by setting strategic priorities and objectives.

The scope of the EIF is to guide in the design of European Public Services.

The Guidelines contribute to the convergence of European interoperability services and tools.

The Interoperability Services and Tools provide a foundation for the delivery of European Public Services.

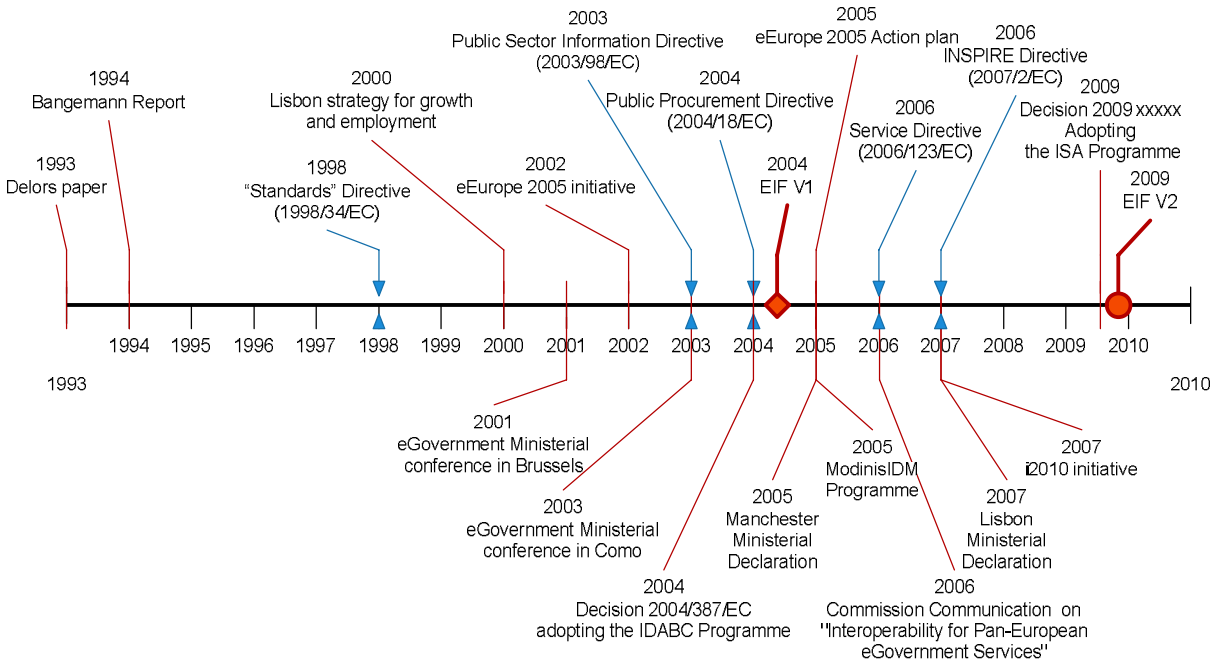
1.5.1 The Political and Historical Context of Interoperability in the EU

To implement European Public Services, the public sector must confront many challenges. The realisation of cross border and cross-sectoral interoperability is recognised as being a key factor in overcoming these challenges.

The achievement of cross-border interoperability is a political priority in European Public Service initiatives. The provision of seamless cross-border public services – for which interoperability is a prerequisite – is considered to have a potential high impact on businesses and citizens.

The EU initiatives presented in the figure below illustrate, from a historical perspective, the support provided at the political level for interoperability between public administrations.

[7] The strategy defines a common vision on public service delivery, and a focused set of concrete actions both at national and EU level that will improve interoperability of public services in Europe.



Timeline on EU initiatives related to Interoperability

Figure 1-2

1.5.2 Interoperability Frameworks

Many public administrations already have or are in the process of developing frameworks addressing interoperability issues within their national, regional or local domains. The scope of these frameworks is restricted to the jurisdictions within which they have been developed. However, European public administrations must be ready to work together in order to deliver European Public Services to meet the needs of businesses and citizens.

It is important that interoperability frameworks used by public administrations, both national (NIF's) and European (EIF), are aligned when addressing the various aspects of achieving interoperability within the context of European Public Service delivery.

By their nature, NIF's are, in general, more detailed and often prescriptive, whereas the EIF which operates at a higher level of abstraction, as a "meta framework", is less detailed and, in application of the subsidiarity principle, does not impose any specific choices or obligations on the Member States[8].

Recommendation 1. Public Administrations should align their interoperability frameworks with the European Interoperability Framework in order to take into account the European dimension of public service delivery.

As the EIF and the NIF's are complementary, the European Commission supports a National Interoperability Framework Observatory (NIFO) whose objective is to provide information about national interoperability frameworks allowing public administrations to share experiences with and knowledge about such frameworks.

[8] The principle of subsidiarity applies not just from EU to Member States, but in some cases within Member States, at the Federal/National level or at other levels (e.g. regional, provincial, county and local municipalities).

1.6 European Public Services Scenarios

The interoperability covered in the EIF comes into play in a number of interaction scenarios. The European Public Services covered by the EIF can be subdivided into various interaction types illustrated in the following diagram.

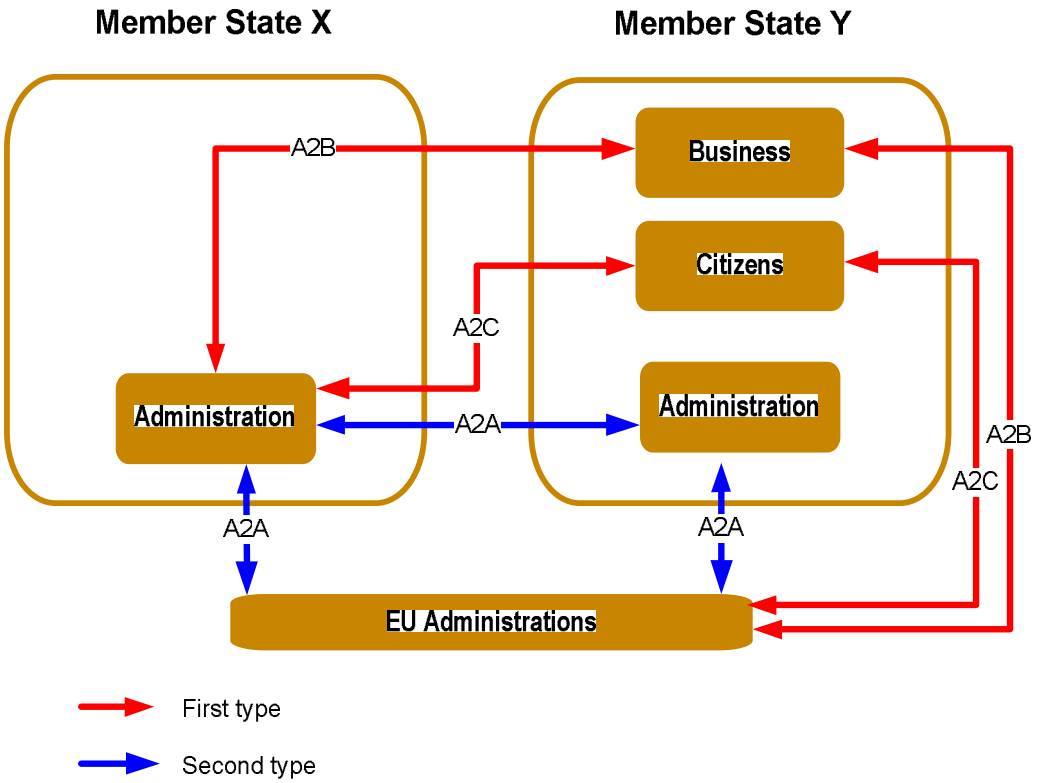


Figure 1-3

The first type is a direct interaction between businesses or citizens of one particular Member State and public administrations within another Member State and/or an EU Administration (A2B and A2C).

The second type is an interaction between administrations of different Member States or EU administrations (A2A). This second type of interaction may support administrations in serving businesses or citizens (A2B and A2C).

1.6.1 Scenario 1: Direct Interaction between Businesses/Citizens and Foreign Administration

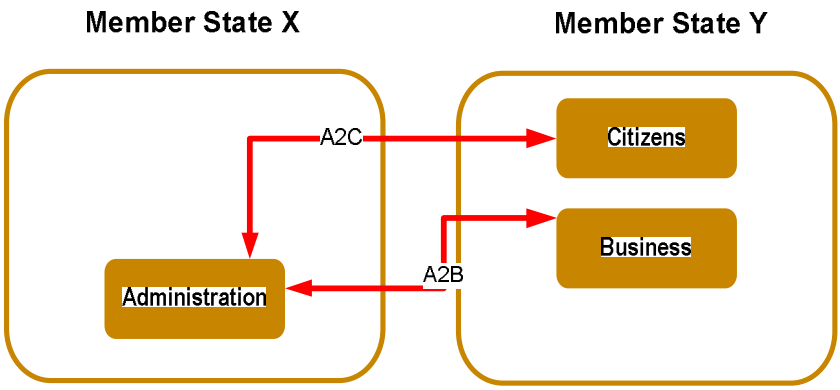


Figure 1-4

Example: a citizen of Member State Y taking a job in destination Member State X has to complete a number of formalities in Member State X in order to establish himself.

1.6.2 Scenario 2: Exchange of Information between Administrations on Business/Citizen Requests

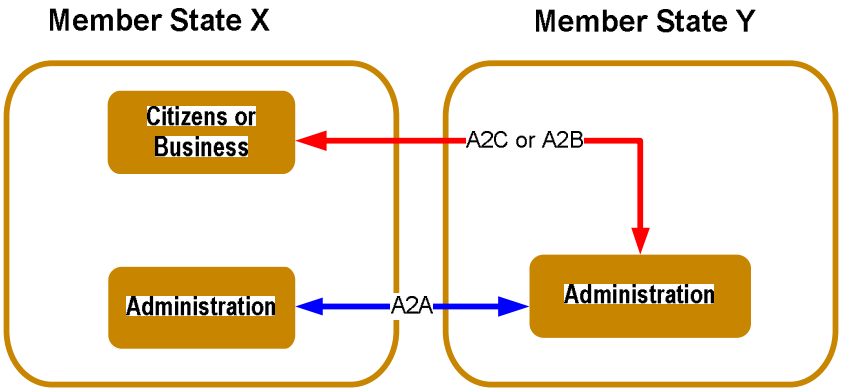


Figure 1-5

Example: a service provider established in Member State X wishing to offer services in Member State Y submits a request for establishment in Member State Y. In order to process his request for establishment, a number of administrative bodies and agencies in both Member State X and Y have to interchange information about the service provider. To that end, interoperability between administrations is needed.

1.6.3 Scenario 3: Exchange of Information between National Administrations and EU Institutions

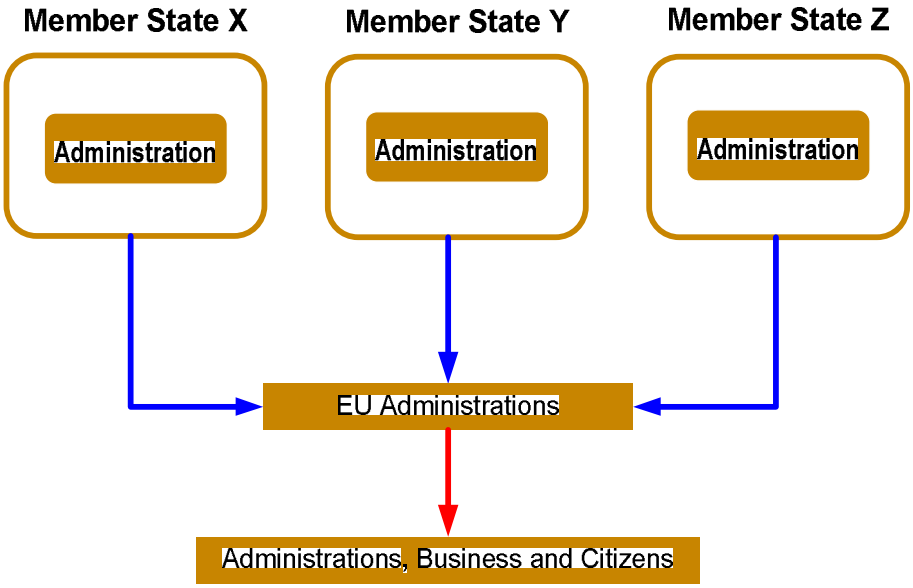


Figure 1-6

This scenario often involves the aggregation of information from national sources.

Typically, the exchanges involve sectoral networks of administrations, where an EU legal basis requires Member State administrations to collect, exchange, and share information with each other as well as with EU institutions and agencies.

Examples of such scenarios include the Member States providing information and statistics to a competent European authority, which then disseminates the aggregated information to the concerned public.

1.6.4 Examples of European Public Services

A number of specific examples of services[9] can serve the purpose of illustrating the generic scenarios of European Public Services mentioned above:

Sector/Area	Service
Business development (A2B, A2A)	Start-up of a company Public procurement Registration of patents, trademarks, designs Consumer protection, labelling, packaging
Certificates and licenses (A2C)	Birth and marriage certificates Driving licenses Passports, visa Residence and working permits Car registration
Education (A2C)	Enrolment in high schools and universities Study grants
Taxes for citizens (A2C)	Online Tax returns Online Tax payments

Sector/Area	Service
Social security (A2C)	Information service for social security systems Unemployment benefits Child allowances Pensions Public health insurance
Supply of statistical data (A2B, A2A)	Tax for businesses VAT refunding Information on tax incentives Declaration of excise goods
Work (A2C)	Recognition of qualification and diplomas Job search
Customs (A2C, A2B, A2A)	Information on Customs duties Customs declarations

1.7 Structure of the document

In the following chapters, the EIF addresses a number of key issues for the efficient and effective delivery of European Public Services:

Chapter 2, dealing with the "underlying principles", presents a number of general principles on which European Public Services are based. They reflect the expectations of public administrations, business and citizens with regard to public services delivery.

Chapter 3 presents the "Public service conceptual model". It introduces an organising principle for the design of public services focusing on how service components can be aggregated to form a European Public Service and contribute to the establishment of other European Public Services in the future.

Chapter 4 on 'Interoperability levels" covers the different interoperability aspects to be addressed when designing a European Public Service and provides a common vocabulary for discussing issues encountered when establishing such a service.

Chapter 5 presents the approach proposed to facilitate the cooperation of public administrations working together to provide a given European Public Service by introducing the concepts of interoperability agreements, formalised specifications and open specifications.

[9] Study on stakeholder requirements for pan-European eGovernment Services, Final Report v1.3, providing a ranking and description of various pan-European eGovernment services (see http://ec.europa.eu/idabc/servlets/Doc?id=19649)

2 Underlying Principles of European Public Services

2.1 Introduction

This chapter sets out a number of general principles of good administration that are relevant to the process of establishing European Public Services. Taken together, the underlying principles describe the context in which European Public Services are being decided and implemented. They complement one another regardless of their different natures, e.g. political, legal or technical.

The 12 underlying principles of the EIF fall into different categories:

- The first principle sets the frame for community action in the area of European Public Services;
- The next group of underlying principles reflect generic user needs and expectations (2, 3, 4, 5, 6, 7 and 8);
- The last group of underlying principles provides a foundation for collaboration between public administrations (9, 10, 11 and 12).

2.2 Underlying Principle 1: Subsidiarity and Proportionality

The first underlying principle comprises subsidiarity and proportionality as enshrined in the EU Treaty.

The subsidiarity principle implies that EU decisions are taken as closely as possible to the citizen. In other words, the Union does not take action unless EU action is more effective than action taken at national, regional or local level.

The proportionality principle limits EU actions to what is necessary to achieve agreed policy objectives. This implies that the EU opts for solutions that leave the greatest possible freedom for implementation to Member States.

Subsidiarity and proportionality also apply to the delivery of European Public Services and therefore to the exchange of information necessary for the delivery of such services. The exchange of information and the joint delivery of European Public Services will occur either as a consequence of EU legislation or when public authorities willingly and proactively participate in coordinated initiatives.

2.3 Underlying Principle 2: User Centricity

Public services are provided to serve the needs of citizens and businesses. More precisely, those needs should determine what public services are provided and how public services are delivered.

Generally speaking, citizens and businesses will expect:

- Access to user friendly services in a secure and flexible manner allowing personalization and with full respect of privacy;
- To provide any given piece of information only once to the government;
- To access a single contact point even when multiple administrations have to work together in order to provide the service;
- Multichannel delivery allowing access to services anyhow, anywhere, anytime.

2.4 Underlying Principle 3: Inclusion and Accessibility[10]

The use of ICT should create equal opportunities for all citizens and businesses due to open, inclusive services that are publicly accessible without discrimination.

Inclusion aims to take full advantage of opportunities offered by new technologies to overcome social and economic disadvantages and exclusion. Accessibility aims at ensuring people with disabilities and the elderly access to public services so they can experience the same service levels as all other citizens.

Inclusion and accessibility have to be considered throughout the whole development lifecycle of a European Public Service regarding design, information content and delivery.

Inclusion and accessibility usually encompass multichannel delivery. Traditional service delivery channels may need to co-exist with new channels established using technology, giving citizens a choice of access.

Inclusion and accessibility can also be furthered by the capability of a system to allow a third party to act on behalf of citizens who are unable, either permanently or temporarily, to directly make use of public services.

2.5 Underlying Principle 4: Security and Privacy

Citizens and businesses must be assured that they interact with public administrations in an environment of trust and in full compliance with the relevant regulations, e.g. on privacy and data protection. This means that public administrations must guarantee that the privacy of citizens and the confidentiality of information provided by businesses are respected.

Within the necessary security constrains, citizens and businesses should have the right to verify the information administrations have collected about them and to decide whether this information may be used for purposes other than those for which it was originally supplied.

Recommendation 2. Public administrations should agree on an appropriate, common security and privacy policy for each European Public Service they establish.

2.6 Underlying Principle 5: Multilingualism

Multilingualism needs to be carefully considered when designing European Public Services.

A trade-off is to be made between the expectation of citizens and businesses to be served in their own language(s) and the possibility of Member State public administrations to offer services in all official EU languages.

However, European Public Services provided at EU level should ideally be available in all official EU languages.

Multilingualism and linguistic neutrality[11] comes into play not just at the level of the user interfaces, but at all levels of design of European Public Services as for example, certain choices at the level of data representation may limit the possibilities to support different languages.

The multilingual aspect to interoperability again becomes apparent when European Public Services require exchanges between ICT systems across linguistic boundaries as the meaning of the information exchanged must be preserved. Whenever possible, information should be transferred in a language independent format, agreed between all parties involved.

Recommendation 3. Public administrations should design information systems and technical architectures that are linguistically neutral in order to cater for multilingualism when establishing a European Public Service.

[10] http://ec.europa.eu/information_society/activities/einclusion/policy/accessibility/index_en.htm

[11] A system characteristic whereby implementing data or functionality in one EU language is no more difficult or different than doing the same in any other EU language.

2.7 Underlying Principle 6: Administrative Simplification

Businesses compile large amounts of information, often solely because of legal obligations, which is of no direct benefit for them and not necessary for achieving the objectives of the legislation imposing the obligations. This creates a considerable administrative burden[12] that can be expressed as a cost incurred by businesses.

For this reason, the European Commission has proposed in January 2007 to reduce the administrative burden on businesses by 25% by 2012. To achieve this target, public authorities across Europe will have to act together.

It is also widely recognised that there is a high redundancy in information to be provided by citizens to public administrations. Repeated requests by different administrations for the same information place a similar administrative burden on citizens who waste time compiling data and filling in forms with the same information over and over again.

When establishing European Public Services, eliminating the request for unnecessary or redundant information may require reorganisation and reengineering efforts in the public administration's back-offices.

2.8 Underlying Principle 7: Transparency

Citizens and businesses should be able to understand administrative processes. They should have the right to track administrative procedures that involve them, and have insight into the rationale behind decisions that could affect them.

Transparency also allows citizens and businesses to give feedback about the quality of the public services provided, to contribute to their improvement and to suggest the implementation of new services.

2.9 Underlying Principle 8: Preservation of Information

Records[13] and information in electronic form held by administrations for the purpose of documenting procedures and decisions must be preserved. The goal is to ensure that records and other forms of information keep their legibility, reliability and integrity over time and can be accessed taking into account security and privacy.

In order to guarantee long-term preservation of electronic records and other kinds of information, formats should be selected so as to ensure long-term accessibility, including preservation of associated electronic signatures and other electronic certifications, such as mandates.

For information sources owned and managed by national administrations, the preservation is a purely national matter. For European Public Services and for information that is not purely national preservation becomes a European issue and the necessary "preservation policy" has to be foreseen.

Recommendation 4. Public administrations should formulate together a long-term preservation policy for electronic records related to European Public Services.

2.10 Underlying Principle 9: Openness

Within the context of the EIF, openness is the willingness of persons, organisations or other members of a community of interest to share knowledge and to stimulate debate within that community of

[12] http://ec.europa.eu/enterprise/admin-burdens-reduction/faq_en.htm

[13] As defined by the MODEL REQUIREMENTS FOR THE MANAGEMENT OF ELECTRONIC RECORDS (MOREQ: http://ec.europa.eu/idabc/servlets/Doc?id=16847) a record is Document(s) produced or received by a person or organisation in the course of business, and retained by that person or organisation.
Note: a record may incorporate one or several documents (e.g. when one document has attachments), and may be on any medium in any format. In addition to the content of the document(s), it should include contextual information and, if applicable, structural information (i.e. information which describes the components of the record). A key feature of a record is that it cannot be changed.

interest, having as ultimate goal the advancement of knowledge and the use thereof to solve relevant problems. In that sense, openness leads to considerable gains in efficiency.

Interoperability involves the sharing of information and knowledge between organisations, hence implies a certain degree of openness. There are varying degrees of openness.

Specifications, software and software development methods that promote collaboration and the results of which can freely be accessed, reused and shared are considered open and lie at one end of the spectrum while non-documented, proprietary specifications, proprietary software and the reluctance or resistance to reuse solutions, i.e. the "not invented here" syndrome, lie at the other end.

The spectrum of approaches that lies between these two extremes can be called the openness continuum.

European public administrations need to decide where they wish to position themselves on this continuum with respect to the issues discussed in the EIF. The exact position may vary, on a case-by-case basis, depending on their needs, priorities, legacy, budget, market situation and a number of other factors. While there is a correlation between openness and interoperability, it is also true that interoperability can be obtained without openness, for example via homogeneity of the ICT systems, which implies that all partners use, or agree to use, the same solution to implement a European Public Service.

Recommendation 5. Public administrations should favour openness when working together to establish European Public Service while taking into account their priorities and constraints.

2.11 Underlying Principle 10: Reusability

Re-use is key to the efficient development of European Public Services.

Re-use 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 relevancy to the problem at hand, and decide to use solutions that have proven their value elsewhere.

This implies that public administrations must be willing to share with others their service components.

Re-use and sharing naturally lead to collaboration, i.e. working together towards mutually beneficial and agreed common goals.

For the specific case of Open Source Software, the European Commission has set up the Open Source Observatory and Repository (OSOR)[14] and developed the European Union Public Licence (EUPL)[15] to assist, among others, public administrations to share and re-use open source software components and/or to collaborate on their development and improvement.

Recommendation 6. Public administrations are encouraged to reuse and share solutions and to collaborate on the development of common solutions when implementing European Public Services.

2.12 Underlying Principle 11: Technological Neutrality and Adaptability

When establishing European Public Services, public administrations should focus on functional needs and defer decisions on technology as long as possible in order to avoid imposing specific technologies or products on their partners and to be able to adapt to the rapidly evolving technological environment.

Public administrations should render access to public services independent of any specific technology or product.

Recommendation 7. Public administration should not impose any specific technological solution on citizens, businesses and other administrations when establishing European Public Services.

[14] http://www.osor.eu/
[15] http://ec.europa.eu/idabc/eupl

2.13 Underlying Principle 12: Effectiveness and Efficiency

Public administration should ensure that solutions serve businesses and citizens in the most effective and efficient way and provide the best value for taxpayer money.

There are many ways to take stock of the value brought by public services solutions, including consideration such as return on investment, total cost of ownership, increased flexibility, reduction of administrative burden, increased efficiency, reduction of risk, transparency, simplification, improvement of working methods as well as recognition of public administration achievements and competencies.

3 The Public Services Conceptual Model

3.1 Introduction

This chapter proposes a Public Services conceptual model which describes an organizing principle underlying the construction and operation of European Public Services.

The conceptual model is derived from a survey on the implementation of European Public Services in the Member States, and embodies the common elements and best practices observed. As a blueprint for future implementations of European Public Services, the model aids in developing a common vocabulary and understanding across the Member States about the main elements comprising a public service and their basic relationships to one another.

The conceptual model emphasizes a building-block approach to the construction of European Public Services, allowing for the interconnection and reusability of components when building new services.

The conceptual model is generic by nature and therefore not every existing or future service will exactly fit into it. However, it is generic enough to be applicable at any level of government providing public services, from the local level all the way up to the EU-level and it illustrates the fact that any level of government can be a provider of both basic and aggregate public services. In this sense, the model clarifies and rationalises the relationships between entities that are collaborating to deliver public services.

Furthermore, the application of the conceptual model is intended to bring practical benefits in establishing European Public Services. For example, the splitting of functionality into basic services with well-defined interfaces, conceived for reuse, will simplify and streamline the implementation of services and the re-use of components avoiding duplication of efforts.

3.2 The key concepts of the conceptual model

The conceptual model promotes the reuse of information, concepts, patterns, solutions, and standards in Member States and at European level recognizing that European Public Services

- are based on information from various sources located at different levels of administration, in different Member States, and
- combine basic services constructed independently by public administrations in different Member States.

Therefore, the conceptual model highlights the need for modular, loosely coupled service components, interconnected through the necessary infrastructure, working together towards the delivery of European Public Services.

It explicitly puts forward the EU-wide adoption of a service orientation to system conception and development, as well as an ICT ecosystem that is broken down into consistent, and in some cases commonly developed, service components. Its particular service orientation is a specific style of creating and using business processes, packaged as services, throughout their lifecycle.

Recommendation 8. Public administrations should develop a component based service model, allowing the establishment of European Public Services by reusing, as much as possible, existing service components.

Public administrations will need to agree a common scheme on how to interconnect such components.

There are well-known and widely-used technical solutions, e.g. web services, geared to ensure such connectability, but their implementation in an EU context will require concerted efforts by the concerned public administrations, including investments in the corresponding common infrastructure.

Recommendation 9. **Public administrations should agree on a common scheme to interconnect loosely-coupled components and put in place the necessary infrastructure when establishing European Public Services.**

The basic elements of the conceptual model are depicted in the diagram below:

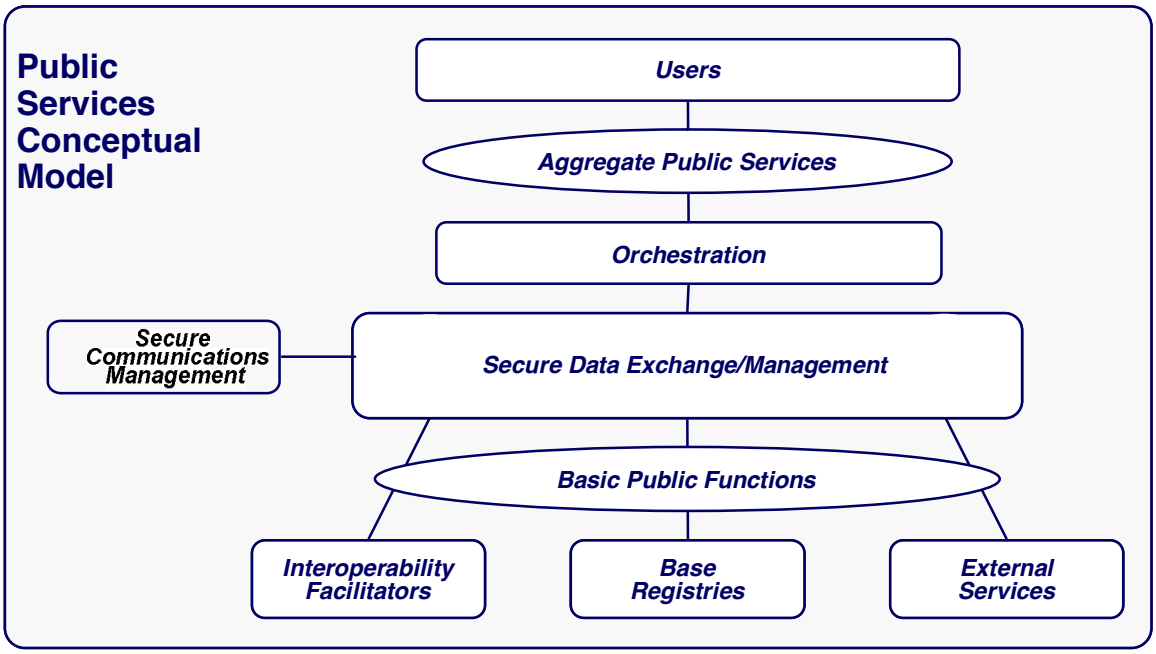


Figure 3-1

In order to understand this model, it is useful to subdivide it into three layers: basic public functions, secure data exchange and aggregate public services, detailed in the following sections.

3.2.1 The Basic Public Functions

The lowest layer of the Conceptual Model deals with the most basic components from which European Public Services can be built. It groups three types of such basic components, namely interoperability facilitators, base registries, and external services, together calling them basic public functions.

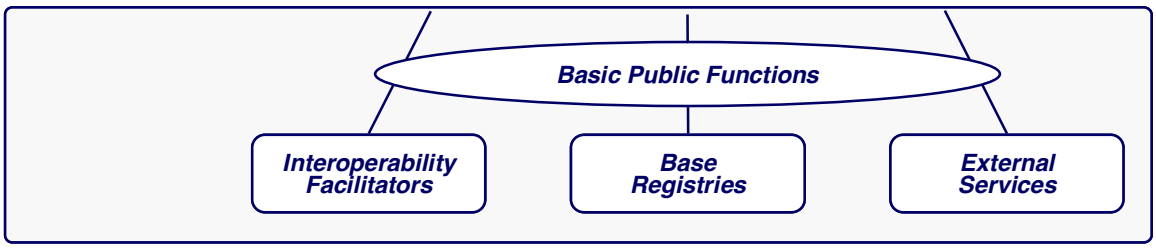


Figure 3-2

Some of these basic functions have been developed primarily for the direct use by the public administration which has created them, or by their direct customers, i.e. the businesses and citizens, but are made available for reuse elsewhere with a view to being combined to provide aggregate public services. Others are generic and/or infrastructural in nature, while the remaining ones represent external services, i.e. services provided by third parties. The following sections describe in more detail each type of basic public functions.

3.2.1.1 Base Registries

The most important components are the **base registries** which are reliable sources of basic information on items such as persons, companies, vehicles, licences, buildings, locations, roads, etc. Such registries are under the legal control of and maintained by a given public administration, but the information should be made available for wider reuse with the appropriate security and privacy measures.

The common thread running through all implementations of basic registries is the fact that they are authentic and authoritative in nature and are, separately or in combination the cornerstone of public services. Their content is, in general, not static; they also reflect the information lifecycle.

Recommendation 10. **Public administrations should make their authentic sources of information available to others while implementing the appropriate access and control mechanism to ensure security and privacy as foreseen in the relevant legislation.**

One of the obstacles to the adoption of the conceptual model for European Public Services implementation might be the existence of legacy systems. Such legacy systems, and their underlying data repositories, have specific characteristics limiting the possibilities for reuse (e.g. lack of published interfaces) and they might require extensive re-engineering efforts in order to make the information available for European Public Services.

Access to authentic data sources across borders will be facilitated if the interfaces to these sources are published and harmonised, at both the semantic and technical level.

Recommendation 11. **Public administrations, when working towards the establishment of European Public Services, should develop the necessary interfaces to authentic sources and align them, at semantic and technical level.**

3.2.1.2 Interoperability Facilitators

Interoperability facilitators provide services such as translation between protocols, formats, languages or standards.

3.2.1.3 External Services

This includes services provided by external parties such as, at business level, payment services provided by financial institutions, or at infrastructure level, connectivity services provided by telecommunications providers.

3.2.2 The Secure Data Exchange Layer

This layer is central to the Conceptual Model since all access to basic public functions passes through it.

Figure 3-3

3.2.2.1 Secure Data Exchange

From the business point of view, administrations and other entities are exchanging official information, which might involve access to base registries. Such access should go through a secure, harmonized, managed and controlled layer providing information exchanges between administrations, businesses and citizens that are:

Signed and Certified – both sender and receiver have been identified and authenticated through agreed mechanism,

Encrypted – the confidentiality of the transported data is ensured,

Logged –the electronic records are logged and archived to ensure a legal audit trail.

In the proposed conceptual model, those functions are grouped in the Secure Data Exchange layer.

This layer should allow secure exchange of certified messages, records, forms and other kind of information among the different systems. In addition to the pure transport of data, specific security requirements such as handling of electronic signatures, certification, encryption, time-stamping, etc should also be managed in this layer.

Security is one the most important barriers for interoperability if not applied in a harmonised and agreed way among organisations. The conceptual model intends to highlight this fact and draw the attention of all service providers to consider the security issues head-on, and to collaborate on a common framework to meet their respective security needs via compatible mechanisms and commonly agreed specifications, as well as to reach common understanding on essential characteristics such as authorisation levels and authentication strength.

One of the key prerequisites for implementing the functionality expected in the secure data exchange layer involves leveraging the national identification and authentication infrastructures in the Member States into a working cross-border scheme. This scheme should establish which ICT architectures and data are needed in a cross-border context in order to make existing Member States' electronic identity infrastructures interoperable.

3.2.2.2 Secure Communications Management

The provision of secure, i.e. signed, certified, encrypted and logged, data exchange also requires several management functions, including:

- *Service Management* to ensure oversight of all communication activities relating to identification, authentication, and authorization, data transport, etc., including e.g. access granting, revocation, and audit.
- *Service Registry* to ensure, given proper authorization, access to available services through prior localisation as well as verification that the service is trustworthy.
- *Service Logging* to ensure that logging of all data exchanges for future evidence is adequately performed, including archiving when necessary.

3.2.3 The Aggregate Services Layer

Aggregate public services are constructed by grouping a number of basic public functions that are accessed in a secure and controlled way. Those functions can be provided by several administrations of any level, i.e. local, regional, national or even at the EU level.

The typical aggregate service is intended to appear to its users (administrations, businesses or citizens) as one single service. Behind the scenes, transactions may be implemented across borders, across sectors and administrative levels.

Aggregation is accomplished via appropriate mechanisms according to the specific business requirements. In the most general case, some business logic would be required to implement the requirements and the implementation mechanism could take several forms, such as orchestration or workflow engines, all of them included in portal-like access infrastructures.

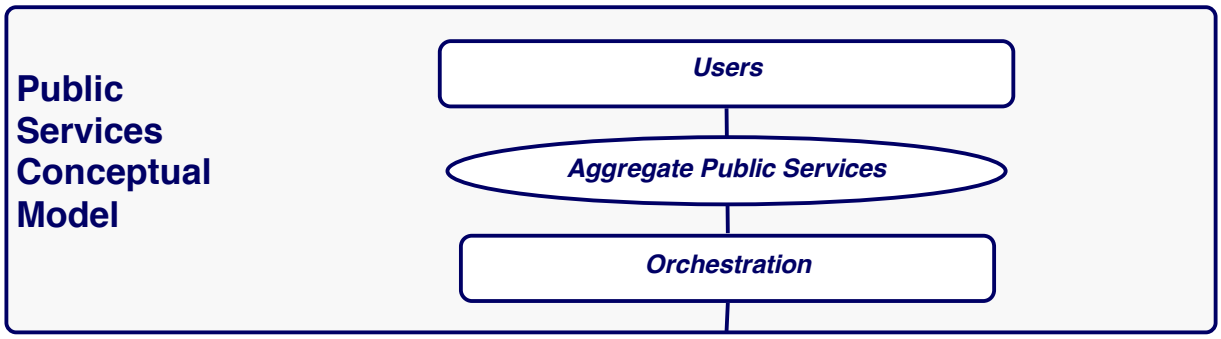


Figure 3-4

If aggregate public services are provided by intermediaries, public administrations should establish:

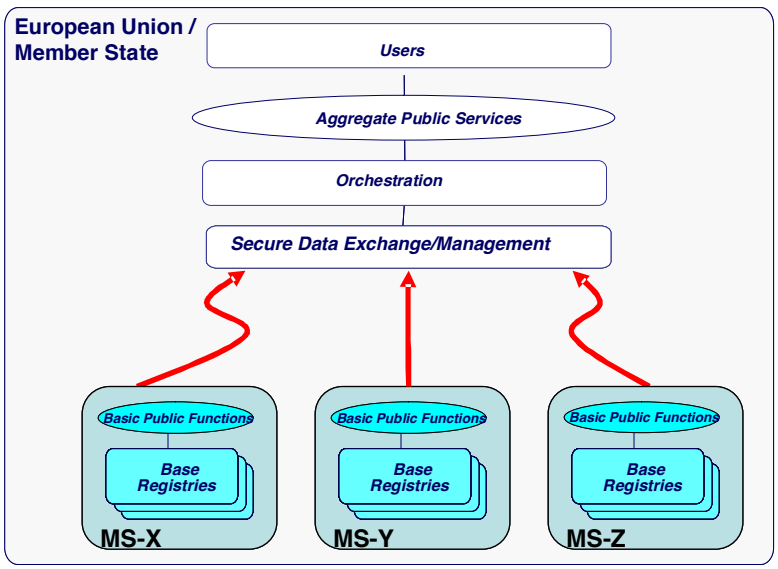
- a process of authorization in order to determine which basic public functions may be disclosed to which intermediary, and
- a certification of intermediaries in order to establish trust between users and providers of the services.

3.3 Applications of the Conceptual Model

What makes the Conceptual Model powerful is its flexibility to create different aggregate services by combining service components from a broad variety of providers. Using the Conceptual Model, the potential of further aggregating and combining the different services is unlocked. The sections below describe three cases, having high added valued in the EU context: the cross-border case, the cross-sectoral case and the cross-administrative boundary case.

3.3.1 The Cross-Border Case

This example illustrates a European Public Service implemented by combining basic public functions, in this case national base registries, implemented in different Member States.



For the purpose of clarity, the model has been simplified.

Figure 3-5

The situation depicted in the diagram is an application of the original conceptual model, to illustrate its cross-border application by adding national boundaries to indicate where individual sets of basic public functions are located.

A number of issues deserve highlighting:

Trust: The cross-border application of the conceptual model involves allowing external access to national base registers, hence requiring a high degree of security and trust.

Service levels and European Public Services dependence on lower-level services: As the aggregated service depends on the basic public functions provided by different entities. Appropriate SLA's must be put in place in order to guarantee a secure and reliable provision of the service.

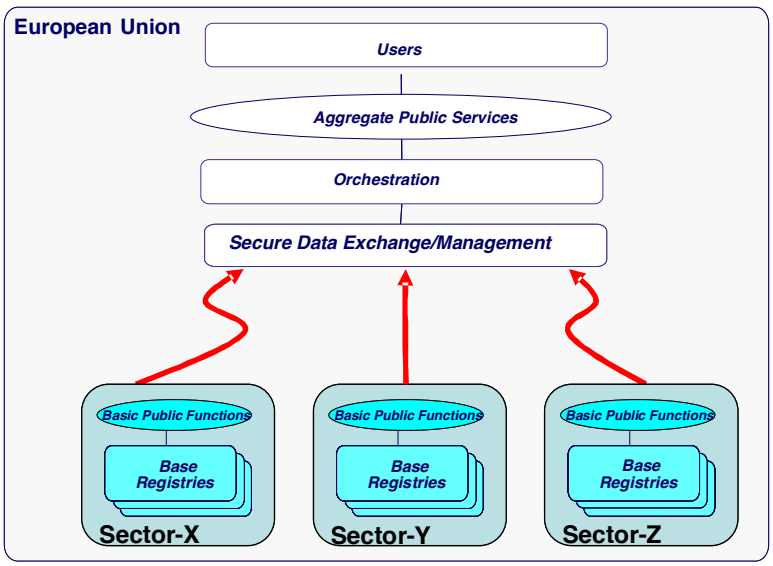
Common interface standards for basic public functions: The fact that basic public functions, on which aggregated services are based, are developed by different public administrations highlights the need for a common interface standards, at technical and semantic level.

Privacy and Data protection: Even when personal information is exchanged across borders, national data protection legislations apply. The Secure Data Exchange layer implements and enforces the security requirements for the aggregate service. As data originating from different Member States may have attached to them different data protection requirements, a set of common requirements for data protection should be agreed in order to implement the aggregate service.

Recommendation 12. **Public administrations, when working together towards the establishment of European Public Services, should collectively develop a common taxonomy of basic public functions and agree on minimum service requirements to the secure exchange of data.**

3.3.2 The Cross-sectoral Case

This application of the conceptual model presents the combination of different public services from different sectors in order to provide new aggregate public services.



For the purpose of clarity the model has been simplified

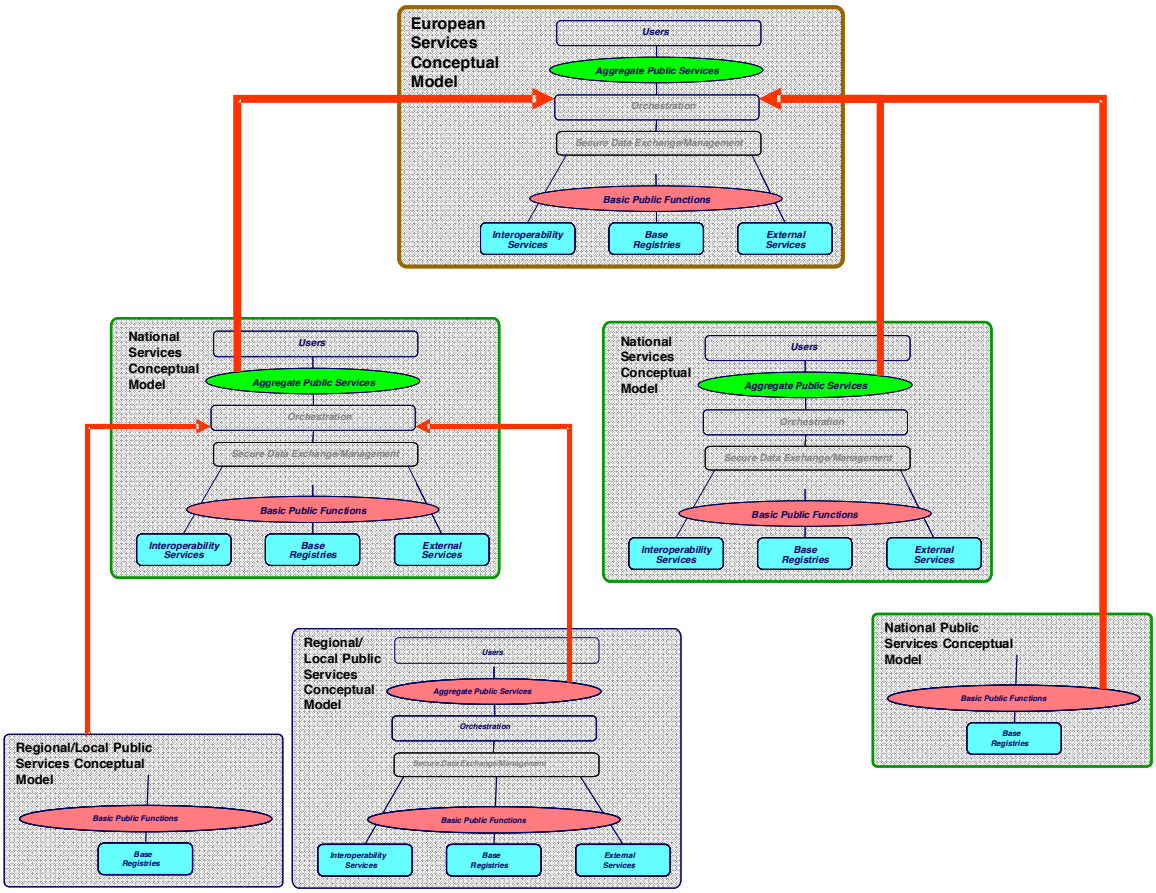
Figure 3-6

This application of the model channels the interactions between users and aggregated public services provided through collaboration between different sectors via a single point of contact.

In order to make this approach successful it is essential that sectors adopt a common approach to service definition and agree on standard interfaces.

3.3.3 The Cross-Administrative Boundary Case

This case illustrates the aggregation of services originating in different layers of government at local, regional, national and EU level.



For the purpose of clarity, the model has been simplified

Figure 3-7

The challenge for the implementation of this variation is to master the complexity resulting from the multiplicity of service providers. Organising the cooperation among the public administrations at each level by the immediate higher level is essential.

4 Interoperability Levels

4.1 Introduction

This chapter introduces four interoperability levels. Each of these levels deserves special attention when a new European Public Service is established.

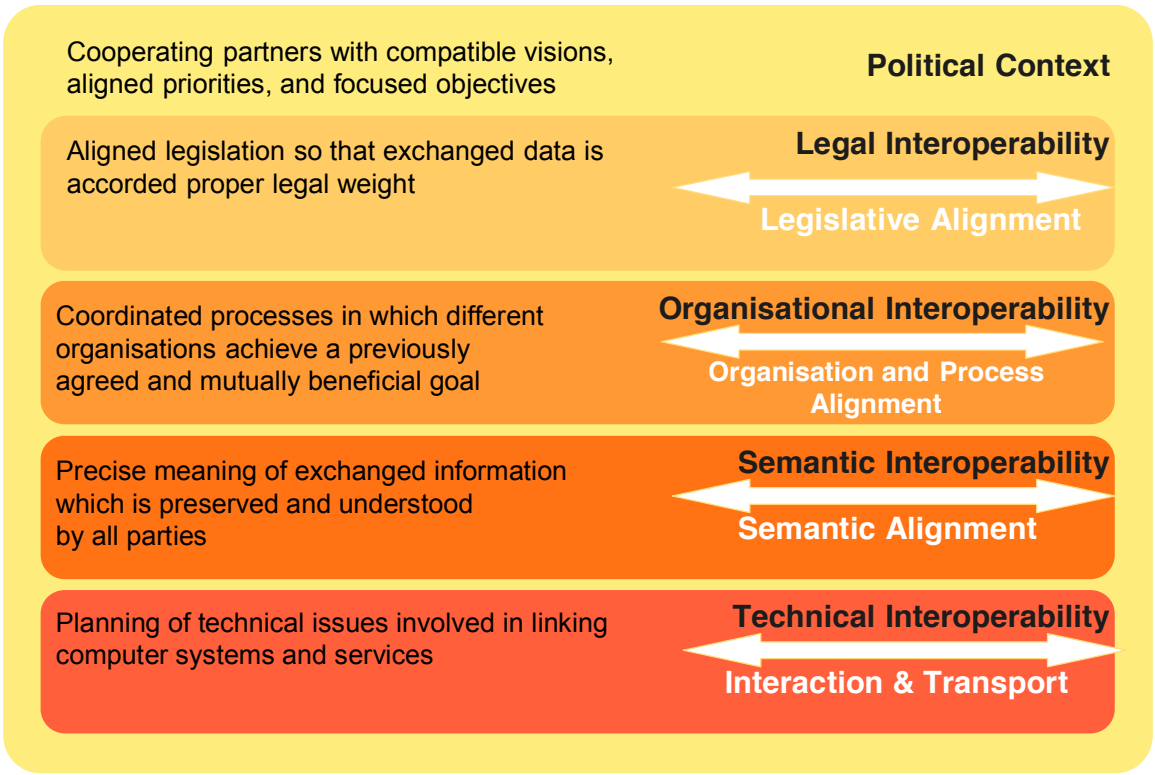


Figure 4-1

4.2 Political Context

The establishment of a new European Public Service is the result of a direct or indirect action at political level, i.e. of new bilateral, multilateral or European agreements.

If the establishment of a new service is the direct consequence of new EU legislation, the scope, priorities and resources necessary for the establishment and operation of the service should be foreseen when the legislation is adopted.

However, political support and sponsorship must also be ensured in cases where new services are not directly linked to new legislation but are decided upon in order to provide better, more user-oriented public services.

Likewise, it is necessary to ensure political support for cross border interoperability efforts facilitating cooperation between public administrations[16]. In order for such cooperation to be effective, all stakeholders involved must share visions, agree on objectives and align priorities. Actions at the cross-border level can only be successful if all Member States involved accord sufficient priority and resources to their respective interoperability efforts, progress towards agreed goals, within agreed timeframes.

[16] The ISA programme is an example of such political support.

Recommendation 13. **Public administrations should obtain political support for their interoperability efforts required for the establishment of European Public Services.**

4.3 Legal Interoperability

Each public administration contributing to the provision of a European Public Service works within its own national legal framework.

Sometimes, incompatibilities between legislation in different Member States make working together more complex or even impossible, even in cases where such legislation is the result of the transposition of European directives into national law. Legal initiatives may be needed to remedy such situations.

When exchanging information between Member States in the context of the provision of European Public Services, the legal validity of such information must be maintained across borders and the data protection legislation in both originating and receiving countries must be respected.

Recommendation 14. **Public administrations should carefully consider all relevant legislation linked to the information exchange, including data protection legislation, when envisaging the establishment of a European public service.**

4.4 Organisational Interoperability

This aspect of interoperability is concerned with how organisations, such as public administrations in different Member States, collaborate to achieve their mutually agreed goals. In practice, organisational interoperability is established through the integration of business processes and the related exchange of information.

4.4.1 Business Processes Alignment

In order for different administrative entities to be able to work together efficiently and effectively to provide European Public Services, they may need to align their existing business processes or even to define and establish new business processes.

Aligning business processes to contribute to European Public Services implies documenting them, in a commonly agreed way, so that all public administrations contributing to the delivery of European Public Services have a global view of the compounded business process and understand their role in it.

Recommendation 15. **Public administrations should document their business processes and agree on how these processes will interact to contribute to the delivery of a European Public Service.**

4.4.2 Establishment of Memoranda of Understanding and Service Level Agreements

Service orientation, on which the public service conceptual model is built, requires the rigorous structuring of the relationships between service providers and service consumers.

Among other things, this involves the introduction of instruments to formalize the mutual assistance, joint activities, and interconnected business processes in the scope of cross-border services provision. These instruments can either be Memoranda of Understanding (MoU's) between governments on joint actions and cooperation and/or Service Level Agreements (SLA's) signed between participating public administrations. Considered as a cross-border activity, such instruments should be preferably multi-lateral agreements.

Recommendation 16. **Public administrations contributing to the provision of European Public Services should systematically define MoU's and SLA's for the part of the European Public Service they provide and/or consume.**

4.4.3 Change Management

Since the delivery of a European Public Service is the result of the collective effort of a number of collaborating parties that produce or consume parts of the service, setting appropriate change management process is critical to ensure the accuracy, reliability and continuity of the service delivered to other public administrations, business and citizens.

Recommendation 17. **Public administrations collaborating on the provision of European Public Services should define rigorous change management processes in order to ensure continuous delivery of such services.**

4.5 Semantic Interoperability

Semantic interoperability enables organisations to process information from external sources in a meaningful manner. It ensures that the precise meaning of exchanged information is understood and is preserved throughout the various exchanges between all communicating parties.

Achieving semantic interoperability in the EU context is a relatively new activity, not achieved before on this scale. However, a number of public administrations have lately gained experience in this field.

A starting point for achieving semantic interoperability is the establishment of sector-specific sets of data structures and data elements that can be referred to as **semantic interoperability assets**. Once these are established, the cooperating organisations will need to agree on the meaning of the information to be exchanged. Due to the differing linguistic, cultural, legal, and administrative environments in the Member States, reaching such agreements poses significant challenges. Multilingualism in the EU adds further complexity to the problem of achieving semantic interoperability.

In the context of the EIF, the semantic interoperability level encompasses both of the following aspects:

- *Semantic Interoperability* is about the meaning of information elements and the relationship between such elements. It includes the development of the vocabularies used to describe information exchanges, and ensures that information elements are understood in the same way by communicating parties.
- *Syntactic Interoperability* is about describing the exact format of the information to be exchanged via grammars, formats, and schemas.

Achieving semantic interoperability in the European context requires at least:

- Agreed processes and methodologies for developing semantic interoperability assets;
- Sector-specific and cross-sectoral communities to agree on the use of semantic interoperability assets at EU level i.e. sector-specific and cross-sectoral elements.

Due to the complexity of the task and the large number of interested parties, an organised effort towards harmonisation of both the processes and methodologies is needed.

4.5.1 The EU Semantic Interoperability Initiative[17]

Several initiatives are working towards achieving semantic interoperability, both at national and EU level. The EU semantic interoperability initiative aims at establishing the foundations of semantic interoperability for European Public Services, across all sectors and in close collaboration with national initiatives. It provides coaching services at both conceptual and implementation levels, and a web-based platform for collaboration and dissemination of solutions to semantic interoperability challenges.

Public administrations establishing public services should verify at an early phase of any given project if existing semantic interoperability assets can be re-used. If not, they can use the EU semantic

[17] SEMIC.EU: Semantic Interoperability Centre Europe

interoperability platform to advertise their goals and their approach to a wider European audience, seeking contact with other projects with similar needs.

Recommendation 18. **Public administrations should support the establishment of both sector-specific and cross-sectoral communities aimed at facilitating semantic interoperability and should encourage the sharing of results produced by such communities through national and European platforms.**

4.6 Technical Interoperability

This aspect of interoperability covers the technical aspects of linking information systems. It includes aspects such as interface specifications, interconnection services, data integration services, data presentation and exchange, etc.

While public administrations have specific characteristics at the political, legal, organisational and partly at the semantic levels, interoperability at the technical level is not specific to public administrations. Therefore, technical interoperability should be ensured, whenever possible, via the use of either standards endorsed by recognised standardisation organisations or technical specifications made available by industry consortia or other standardisation fora.

Recommendation 19. **Public administrations should agree on the standards and specifications to be used to ensure technical interoperability when establishing European Public Services.**

5 Interoperability Agreements

5.1 Introduction

This chapter presents the approach proposed to facilitate the cooperation of public administrations working together to provide a given European Public Service.

As stated throughout this document, the provision of European Public Services requires cooperation between different public administrations. Such cooperation takes place at the different interoperability levels described in the previous chapter. For each level, the organisations involved should formalise their cooperation in **interoperability agreements**.

They should be drafted with sufficient level of detail so that they achieve the intended result – the provision of the European Public Service in question – while leaving each organisation maximal internal autonomy.

At the legal level, interoperability agreements are expressed in concrete and binding terms via legislation, including European directives and their transposition into national legislation, whose details are outside the scope of the EIF.

At the organisational level, interoperability agreements can take the form of MoU's or SLA's that specify the obligations of each party participating in cross-border business processes. Interoperability agreements at the organisational level will define expected levels of services, support/escalation procedures, contact details, etc. referring, when necessary, to underlying agreements at the semantic and technical levels.

At the semantic level, interoperability agreements take the form of, inter alia, reference taxonomies, schemes, code lists, data dictionaries or sector-based libraries.

At the technical level, interoperability agreements will include items such as communication protocols, messaging specifications, data formats, security specifications or dynamic registration and service discovery specifications.

While interoperability agreements at the legal and organisation level will normally be very specific to the European Public Service to be provided, interoperability agreements at the technical level and, to a lesser extent, at the semantic can often be mapped onto already existing formalised specifications[18].

Recommendation 20. **Public administrations, when establishing European Public Services, should, as much as possible, base interoperability agreements on existing formalised specifications, or in case such specifications do not exist, collaborate with communities working in the same areas.**

However, there are many reasons why standards and specifications are produced, besides facilitating interoperability, e.g. efficiency, the creation of new markets or the extension of existing ones.

Furthermore, when trying to map interoperability agreements, at technical or semantic level, on formalised specifications, one may find that there are a number of equivalent, competing specifications from which to choose, all of which may be able to fulfil such agreements.

While public administrations may decide to support multiple formalised specifications or technologies to ease communication with their citizens and businesses, for reasons of efficiency, they may wish to reduce the number of formalised specifications and technologies to support when working together to provide a European Public Services.

Similar decisions are often taken not within the context of the provision of a single European Public Service but within a wider context of cooperation within or between organisations. In this context, it

[18] Within the context of this document, formalised specifications are either standards in the sense of EU directive 98/34 or specifications made available by industry consortia or other standardisation fora.

should be taken into account that internal interfaces may become external in the future when establishing new European Public Services.

Decisions on what formalised specifications and technologies to use to ensure interoperability within the context of European Public Services should be based on transparent, fair and non-discriminatory approach. One way to do so is by agreeing on a common assessment methodology and selection process.

5.2 Assessing and Selecting Formalised Specifications

When public administrations decide on what formalised specifications or technologies to select to ensure interoperability, they should assess relevant formalised specifications.

While being tailored to the specific interoperability needs of the public administrations in question, such assessment and selection should be based on objective criteria, primarily related to the functional interoperability needs. When several formalised specifications fulfil the functional interoperability needs, additional criteria related to quality of implementation, adoption by the market and the potential for reusability and openness can be used.

Recommendation 21. **Public administrations should use a structured, transparent and objective approach to the assessment and selection of formalised specifications.**

5.2.1 Specifications, openness and re-use

The possibility of sharing and re-using service components based on formalised specification depends on the openness of the specifications.

If the principle of openness is applied in full:

- All stakeholders can contribute to the elaboration of the specification and public review is organised;
- The specification document is freely available for everybody to study and to share with others;
- The specification can be implemented under the different software development approaches[19].

It is up to the creators of any particular specification to decide how open they want their specification to be.

Because of their positive effect on interoperability, the use of open specifications, characterised by the three features mentioned above, as well as sharing and re-use, have been promoted in many policy statements and are encouraged in the context of European Public Services delivery.

However, public administrations may decide to use less open specifications, especially in cases where open specifications do not meet the functional interoperability needs or the ones available are not mature and/or sufficiently supported by the market, or where all cooperating organisations already use or agree to use the same technologies.

Recommendation 22. **Other things being equal, public administrations should prefer open specifications when establishing European Public Services.**

5.3 Contribution to the Standardisation Process

In some cases, public administrations may find that no suitable formalised specification is available for a specific need in a specific area. If consequently new specifications have to be developed, they may either develop the specifications themselves and put forward the result for standardisation to

[19] For example using Open Source or proprietary software and technologies. This also allows providers under various business models to deliver products, technologies and services based on such kind of formalised specifications.

become a formalised specification, or request a new formalised specification to be developed by the relevant bodies.

Even where existing formalised specifications are available, they evolve over time and the experience shows that, in general, revisions may take long time to be completed. Active government participation in the standardisation process mitigates concerns about delays, supports a better alignment of the formalised specifications with the public sector needs and can help governments keep pace with technology innovation.

Recommendation 23. **Public administrations should actively participate in the standardisation activities that are relevant to their needs.**
