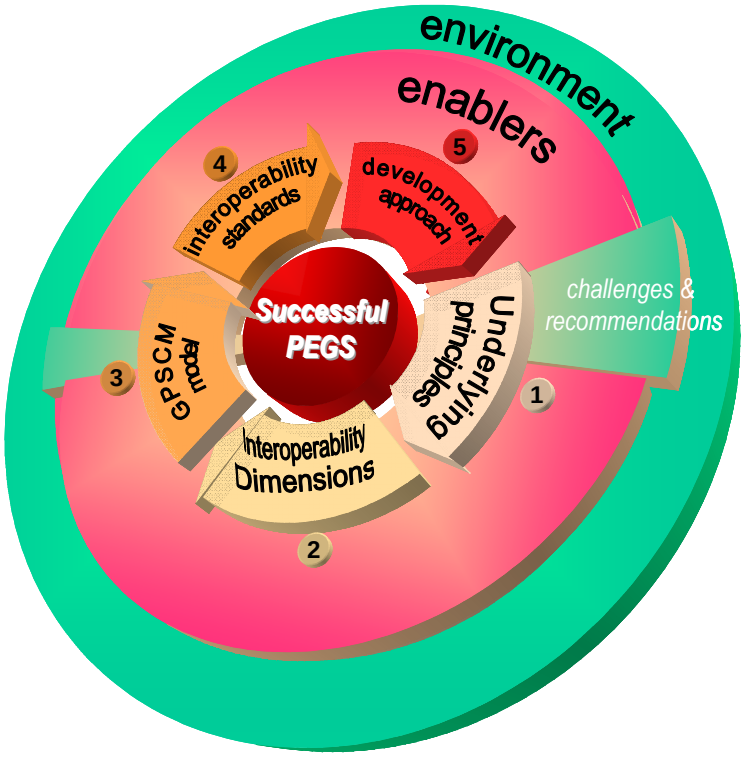

Draft document as basis for EIF 2.0

Notice

This document is an unabridged, preliminary work paper on which the final EIF will be based. It is only a work in progress; it has not been extensively polished, and ***is published to collect external comments***.

The EIF that is finally published will be substantially condensed from this document, and formatted extensively prior to publication, at which time extensive consistency, continuity and redundancy checks, as well as other checks on abbreviations, references, structure, grammar, logic, etc., will be performed.

The final document will also include a glossary of terms to aid the reader's comprehension. Finally, all of the figures appearing in the final document will be properly cleaned and formatted for clarity and simplicity, based on the sketches included in this version.

EIF V2 - Planning

The main milestones of the EIF project are depicted below:

Mid July	Publication on the IDABC website for external comments to be received up to mid September
Mid September	Substantial compression and polishing exercise to produce the EIF and preparation of the related Communication
September/October	Finalisation of the EIF with the Member States and EC services
October/November	Inter Service Consultation
End of 2008	Publication of the Communication together with the EIF

How to submit comments

Everyone who sees interoperability as an effective means to provide better pan-European eGovernment services is invited to read the draft document and to provide feedback on its content by sending comments to eifv2@ec.europa.eu by the 22nd of September 2008 at the latest.

IDABC is interested in your reactions and contributions. A summary of reactions will be published on the IDABC web-site (http://ec.europa.eu/idabc) and will constitute another input into the EIF elaboration.

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BRIEF TABLE OF CONTENTS

FULL TABLE OF CONTENTS

1 EIF Overview

This will provide an overview of the EIF at a length of 4-5 pages, as well as the mission statement for the document
It will be produced once the main elements of the EIF have been completed

2 Presentation

2.1 Structure of this document

This document is structured as follows:

- Section 2 lays out the rationale and context of this particular revision of the European Interoperability Framework (EIF).
- Section 3 introduces the EIF and provides the general background and context of the EIF. It begins with some basic definitions, and then lays out the general context of the EIF, including the social and economic environment in the EU and the world, which has resulted in the need for interoperability, the political environment and policy decisions and initiatives which produced and sustain the EIF, and finally the legal framework which underpins the EIF. Some other approaches to interoperability taken elsewhere are also presented to round out the picture.
- Section 4 presents the roadmap that leads to the EIF through a set scenarios and positions the Pan-European eGovernment Services (PEGS) with respect to the EIF.
- The next five sections represent the core of the EIF:
    - the general policy guidelines to be kept in mind in implementing PEGS under EIF (Section 5 - "The EIF Underlying Principles"),
    - the various levels of interoperability that should be taken into account (Section 6 - "The EIF interoperability levels dimension"),
    - a generic model to be used as basis for PEGS (Section 7 - "The Generic Public Services Conceptual Model"),
    - an orientation towards open standards (Section 8 - “Adopt Open Standards or Technical Specifications”) and
    - a positioning of the open source methods as part of the PEGS development model (Section 9 - “Be prepared to benefit from Open Source Methods”).

  Each of those sections also contains a variety of specific recommendations regarding PEGS interspersed throughout the text and highlighted in grey (these are regrouped into one of the annexes).
- Finally, in the annexes are included a number of specific recommendations for the Member States building their own National Interoperability Frameworks, as well as suggestions for external stakeholders such as IT suppliers, IT service providers and standardization bodies to achieve interoperability.

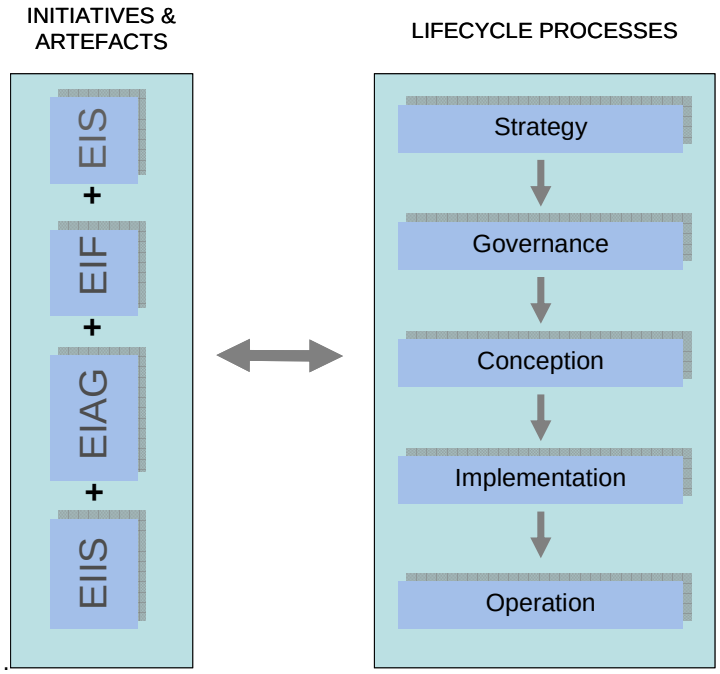
2.2 The organisational context of the EIF

In this section is described the organisational context of the EIF: how it is situated with respect to other related documents and other planned initiatives. The previous EIF was conducted in the context of a de-facto, but non-formalized strategic framework. The revised EIF will be part of a much more structured approach to interoperability in this context.

The EIF is intended to be part of the set of interoperability guidelines documents and initiatives conducted under the auspices of the IDABC Programme which aims at providing guidance and offering infrastructure services to PEGS stakeholders and developers.

The figure below shows the relationships between the various IDABC documents/initiatives and related processes: the European Interoperability Strategy (EIS), the European Interoperability Framework (EIF), the European Interoperability Architecture Guidelines (EIAG) and the European

Interoperability Infrastructure Services (EIIS), and their relation to the PEGS process development. These artefacts collectively provide the basic technical requirements of consumers of eGovernment services, cover the lifecycle from strategy through to operations, and provide IT vendors and suppliers with reliable information on their costumers' needs in this area.



A systematic approach to the governance of Interoperability at EU-level must be taken in the future, and concrete goals specified and reached. To this end, a "European Interoperability Strategy" (EIS) will be established in order to provide the basis for defining the organisational, financial and operational framework necessary to support cross-border and cross-sector interoperability as well as the exchange of information between European public administrations. This should ultimately enable the more efficient delivery of improved public services (PEGS). The EIS is currently under development, and is expected to be completed by the end of 2009.

The goal is to define and agree on a focused set of actions at EU level on what are the most effective and efficient means to rapidly deliver more and better PEGS to Citizens and Businesses, and also to improve collaboration between administrations in order to implement community legislation. The EIS will include long term planning information for prioritised and coordinated actions as well as the associated funding requirements. The EIS must contribute to meeting the new challenges, in particular government transformation. The EIS is intended to facilitate the achievement of such transformation at the European level. It must have the strong support of policy makers who are active in efforts aimed at transforming governments at national level in order to ensure that the necessary EU level transformations are also possible. The EIS will in effect make explicit several items which were implicit before. Some minor revisions to the EIF may be necessary once the EIS has been established.

Looking at cross-border interoperability as a layered model, the EIS will be at the highest level. The EIF defines the general rules and principles for governance and conception and will be complemented by a National Interoperability Framework Observatory (under development) and the definition of a Common Assessment Method for Standards and Specifications (under construction). The Architecture Guidelines (to be revised by the end of 2009) provides structured guidance for implementation. The lowest level concerns the operational infrastructure services (s-TESTA, PKI, SEMIC, etc.) provided at EU level to all Member States across all sectors. The EIS serves to steer the entire layered model and associated efforts by setting strategic priorities and principles.

3 Introduction to EIF v 2.0

3.1 Objectives of the EIF

The main objectives of the EIF are:

- To serve as the basis for European seamless interoperability in public services delivery, thereby providing better public services at EU level;
- To support the delivery of PEGS by furthering cross-border and cross-sector interoperability;
- To supplement the various National Interoperability Frameworks in the pan-European dimension.

3.2 Audience: to whom is the EIF directed

The main targets of the EIF are policy makers and PEGS project officers.

The intended audience includes:

- Policy analysts
- eGovernment public services managers and project officers in MS and EU bodies
- Government sector information and communication technology (ICT) strategists
- Technical analysts
- Industry stakeholders, particularly those active in eGovernment
- Anyone planning public services requiring interoperability.

3.3 Context

3.3.1 Definitions of Interoperability, PEGS and other key terms

3.3.1.1 Definition of Interoperability

The original EIF published in 2004 defined interoperability to mean "the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge"

Since that time, the appreciation of additional aspects of interoperability, encompassing more than just the ability of ICT systems to exchange data leads us to consider a more general view of interoperability as the ability of disparate and diverse organisations and systems to work together efficiently towards mutually beneficial common goals.

Of course, in the EU context and within the scope of the EIF, the domain of this "working together" encompasses the provision of eGovernment services with a cross-border dimension (PEGS).

In the most general case, in order for this "working together" to be effective and efficient, these diverse systems and organisations need to exchange data in mutually agreed forms and according to agreed protocols, automatically, meeting the business needs on both sides. This implies a certain degree of integration of business processes, or rather that business processes that span the cooperating systems and organizations are a necessary part of interoperability in the EU context.

With these points in mind, the definition adopted in this revision is as follows:

> *"Interoperability is the ability of disparate and diverse organisations[1] to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organizations via the business processes they support, by means of the exchange of data between their respective information and communication technology (ICT) systems."*

In fact, interoperability is often confused with other, related concepts. It can be therefore a useful exercise to observe explicitly what interoperability is NOT:

- Interoperability is not ***Integration,*** which is a means of changing loosely coupled systems to make them into more tightly coupled systems.
- Interoperability is not ***Compatibility***, which is more about the interchangeability of tools in a particular context
- Interoperability is not ***Adaptability***, which is a means of changing a tool, adding additional capabilities as needed even on an ad-hoc basis, whereas interoperability refers to inherent capabilities

It is also worth noting that interoperability is neither ad-hoc, nor unilateral (nor even bilateral) in nature. Rather, it is best understood as a ***shared value of a community***.

The final point to be made about interoperability from the definition standpoint, is that it is also a quality that could be broken down into a series of quantifiable characteristics (metrics) which could be assessed (measured) separately, as the need arises.

3.3.1.2 Definition of PEGS (Pan-European eGovernment Services)

The following is a good working definition of PEGS[2,3,4,5]:

> *"Cross-border public sector services supplied by either national public administrations or EU public administrations provided to one another and to European businesses and citizens, in order to implement community legislation, by means of interoperable networks between public administrations."*

3.3.1.3 Definition of Interoperability Framework

An Interoperability Framework describes the way in which organisations have agreed, or should agree, to interact with each other, and how standards should be used. In other words, it provides policies and guidelines that form the basis for selection of standards[6]. It may be contextualised (i.e., adapted) according to the socio-economic, political, cultural, linguistic, historical and geographical situation of its scope of applicability in a specific circumstance/situation (a constituency, a country, a set of countries, etc).

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[1] Principally administrations

[2] Taken from the CAP Gemini study on stakeholder requirements for pan-European eGovernment Services Final Report v1.3 PEGSCO 2005-02-11 DOC 6.1,which provided a Ranking and Descriptions of various PEGS

[3] A formal definition is provided in Article 3b of the Decision 2004/387/EC of the European Parliament and of the Council on 21st of April 2004: " *'Pan-European eGovernment Services' means cross-border public sector information and interactive services, either sectoral or horizontal, i.e. of cross-sectoral nature, provided by European public administrations to European public administrations, businesses, including their associations, and citizens, including their associations, by means of interoperable trans-European telematic networks.*"

[4] A lengthy list of some of the different types PEGS for citizens and businesses is given in section 4.1.6, "Examples of "high-impact" Pan-European eGovernment Services (PEGS)", page 5

[5] The Member states have also been solicited with regard to any national definitions they may use for PEGS

[6] The Architecture Guidelines which derive from the EIF, may actually identify specific standards to be used in specific circumstances

3.3.1.4 Interoperability in the PEGS context

Interoperability is a complex phenomenon, involving much more than the exchange of data between IT systems. Interoperability encompasses all the different ways that organisations, entities and processes have to work together in order to achieve common goals.

The EIF is concerned with interoperability in the very specific PEGS context. The view of interoperability presented here has several distinctive characteristics that will be examined in much more detail in later sections.

3.3.1.5 Enterprise Architecture[7]

Enterprise Architecture represents a concept which is related to but distinct from an Interoperability Framework, and it is therefore useful for the sake of clarity to reprise its definition.

Enterprise Architecture is the practice of applying a comprehensive and rigorous method for describing a current and/or future structure and behaviour for an organization's processes, information systems, personnel and organizational sub-units, so that they align with the organization's core goals and strategic direction

3.3.2 Societal, economical and technological drivers

A broad and powerful array of forces is driving innovation, transformation and modernisation in all spheres of life today, both public and private. The EIF focuses on their impact on the provision of eGovernment/Public services.

There is a complex interplay of these various forces in effect, and a full discussion of the socio-politico-technological context is out of scope of the EIF[8], but we can summarise some of the most important aspects of the phenomena which are distinguished by their relevance to interoperability and as motivators behind the objectives of the EIF.

Some of the most important of these forces are as follows:

- Rapid advances in ICT, including several paradigm shifts, have transformed the landscape in which administrations, businesses and citizens interact with one another to an unprecedented degree. For example, Citizens and businesses are demanding ever more and better services from their governments.
- At the political level, advancing EU integration has placed dramatically increased emphasis on the cross-border aspects of eGovernment service provision (PEGS)
- At the global level, the phenomena we collectively refer to as globalization is creating an ever more integrated and competitive environment for EU businesses and workers, resulting in increasing economic pressures which have been followed by major priority shifts in EU policies (e.g., the Lisbon agenda, etc.)
- Administrations are consequently under tremendous political pressure to streamline their activities, modernize their infrastructure, and integrate their activities all intended to provide better, faster, cheaper services to businesses and citizens; eGovernment programs have accelerated tremendously and moved to centre stage.

Collectively these forces have tremendously increased the importance of interoperability in all its aspects.

[7] Definition is taken from Wikipedia

[8] An in-depth analysis of these forces and the implication for eGovernment and related activities can be found in the report " New Trends in Technologies and Enablers for Applications for the Future Government in 2020", available at http://cordis.europa.eu/ist/ict-ent-net/ei-presentations.htm

3.3.3 Political initiatives at EU level

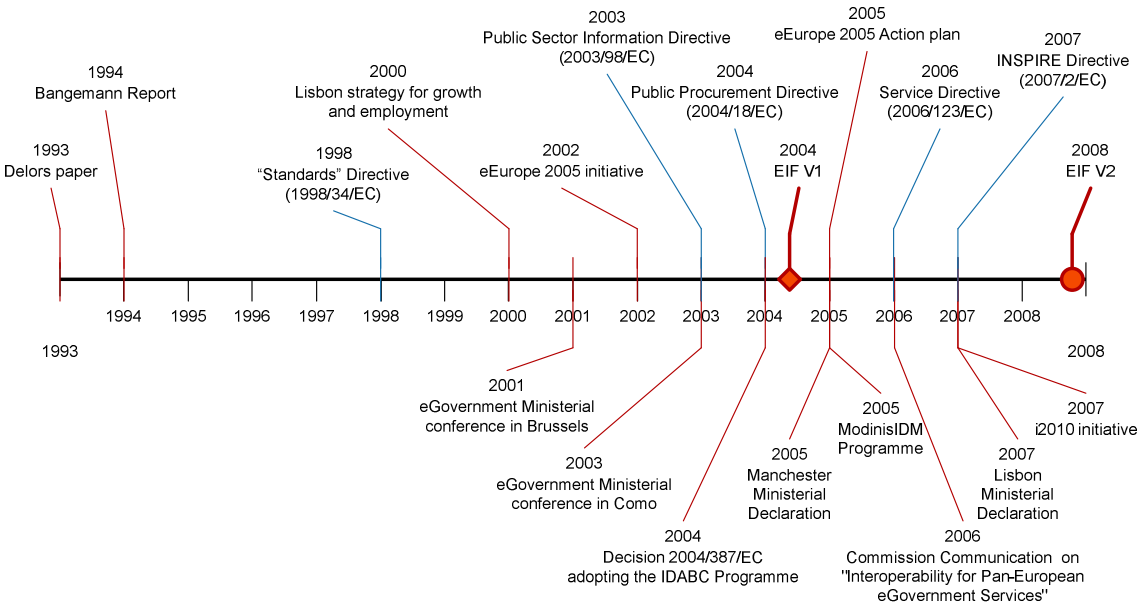
The achievement of pan-European, cross-border interoperability is a key element and prerequisite of all the EU's ambitious eGovernment initiatives.

The high-priority nature of achieving interoperability in the cross-border, cross-sector domain can be illustrated by a brief review of some of the different policy initiatives that have been announced at the highest levels of the EU over the past decade or so.

Many of the elements of the EU's main policy objectives in the coming years can be characterised as having a high degree of dependency on achieving interoperability, and of commanding high priority because of the high-profile nature of the work involved, the potential impact on citizens and businesses, and the extremely short timescales involved.

To implement pan-European eGovernment services (PEGS), the public sector must confront many challenges, some of which are quite daunting. The realisation of interoperability, especially of the cross-border and cross-sector type, is now recognised as being a key factor in securing these objectives.

The initiatives presented in the figure below and described in more details in annex of this report illustrate the priority and support provided at the political level for interoperability between MS and with European Institutions, which is strong and comes from the highest levels in the EU. The support is specifically manifested in a number of ambitious political objectives laid out by the top European Policy makers.



3.3.4 National Interoperability Frameworks (NIF's)

Within the EU, many Member States[9] already have or are in the process of developing their own National IF's, (NIF's) addressing interoperability issues arising within their own country, across internal borders, between national agencies, departments, government bodies, etc. These NIF's are complementary to the EIF yet should be compatible with it[10]. The EIF and the NIF's complement one

[9] Currently there are 12 with published NIF's. A list of countries, with links to their published NIF's can be found on the IDABC website at: http://ec.europa.eu/idabc/en/document/6227

[10] This compatibility between NIF's and the EIF is an important consideration. IDABC plans to set up a permanent "NIF Observatory" as a way to track developments on interoperability in the MS PA's, to facilitate the exchange of information relating to Interoperability between MS, and to promote the integration of EIF precepts into MS NIF governance and related activities with the aim of furthering compatibility between the EIF and the NIF's

another in the sense that the EIF is concerned with PEGS at EU level, whereas the NIF's are concerned with both PEGS and non-PEGS, but only at the national level.

The Commission recommends to all MS the alignment of their respective NIF's with the EIF in order to take into account the EIF dimension.

The Commission recommends to all MS to include their NIF's in their public calls-for-tender, and require compliance.

The Member States should prepare and publish national roadmaps (including deadlines) for interoperability, and a process to validate the alignment of these roadmaps as well as the respective NIF's with the EIF should be established.

The Commission recommends the creation of an observatory to follow this process.

3.3.5 Legal framework concerning the EIF

The European Interoperability Framework has been developed in the framework of the IDABC programme, in close collaboration with the Members States and the concerned Commission services with the final goal being to contribute to the internal market achievement.

Article 2 (d) of Decision 2004/387/EC adopting the IDABC Programme aims among others to achieving interoperability, both within and across different policy areas and, where appropriate, with businesses and citizens, notably on the basis of a European Interoperability Framework.

To this end, the IDABC programme develops infrastructure services as defined in article 3 (d) of the Decision as services provided to meet generic requirements, comprising technology and software solutions, including a European interoperability framework (EIF), security, middleware and network services. Infrastructure services underpin the delivery of pan-European eGovernment services.

The EIF is part of the list of horizontal measures mentioned in article 5.1 and identified in Annex 2 B(i) of the Decision that the Community, in cooperation with the Member States undertakings.

The implementation of the EIF should contribute to the improvement of the internal market and as such should be taken into consideration both by the sectors and by the Members States when developing and delivering Public Services to Citizens and Businesses.

Article 4 of the IDABC Decision states that the Projects of Common Interest (PCI) under the responsibilities of the sectors shall, whenever possible, make use of the horizontal pan-European eGovernment and infrastructure services and contribute to the further development of these services.

Furthermore as mentioned in article 6.9 of the IDABC Decision, Projects of Common Interest and horizontal measures shall, where appropriate, take due account of the European Interoperability Framework provided, maintained and promoted by the IDABC programme.

Consequently, EIF as a horizontal infrastructure service shall be used by the PCI and by the horizontal measures.

The EIF is not binding on the Member States. However, the Member States should self-enforce compliance with the principles and provisions of the EIF which has been developed collaboratively in the spirit of article 154 of the Treaty on which the whole IDABC programme is based. According to this article and with the aim to help achieve the objectives referred to in Article 14 (internal market) the Community shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructures and shall aim at promoting the interconnection and interoperability of national networks as well as access to such networks.

The EIF is a means to contribute to the establishment of the internal market. Following Article 14 of the EC Treaty, the Community shall adopt measures with the aim of progressively establishing the internal market which shall comprise an area without internal frontiers in which the free movement of goods, persons, services and capital is ensured in accordance with the provisions of this Treaty. In facilitating interoperability, the EIF will enable the provision of Public Services delivery at European level and thereby contribute to the internal market achievement.

A concrete example of specific market-related achievements furthered by interoperability can be found in the Services Directive (SD). The implementation of Points of Single Contact (PoSC's) for migrating service providers is mandated by the SD to place such providers on an equal footing with local providers. Setting up and operating these PoSC's will require significant cross-border interaction (involving the particular PEGS needed by such migrating service providers), which will be simplified considerably by increased interoperability.

Furthermore, in contrast with the first version of the EIF (November 2004) which was endorsed only in the framework of a programme (IDA 2 programme at that point of time), the new EIF will be an annex to a communication from the Commission to the European Council and the European Parliament and will therefore constitute an Commission position with respect to interoperability in the field of Public Services delivery.

3.4 The role of the EIFv2.0 for Pan-European e-Government Services

The efficient and effective delivery of Pan-European e-Government Services (PEGS) is not a simple or straightforward matter. In fact, a number of key issues need to be addressed:

- How are “Public Services” to be delivered at EU level and across borders?
- How can basic National (Member State) eGovernment components (functions, services, etc.) be aggregated at EU level to form PEGS?
- What are the Interoperability issues to be resolved?

The European Interoperability Framework (EIF) represents a common vision on these questions, specifically for the delivery of PEGS, and addresses the interoperability issues to be resolved. It provides a framework for achieving the common vision. The intention is to provide guidance the Member States in achieving this vision. More specifically,

- In order to provide improved public services which are more tailored to the needs of citizens and businesses, the seamless flow of information across governments and across sectors is required. Through its *promotion of interoperability*, the EIF facilitates these information flows, which in turn facilitates the cross-border delivery of public services where needed.
- By providing a Generic Public Services Conceptual Model (GPSCM), the EIF *provides a blueprint for the design of future Public services* with interoperability and the pan-European dimension built in from the very beginning (drawing board) phase, thereby addressing the issue of aggregation. The GPSCM is generic enough, being based on best-practices type information gathered from existing implementations in the Member States, that it respects subsidiarity and more specifically national e-government services frameworks.

3.5 The Benefits of Interoperability

The benefits of Interoperability in the domain of eGovernment, both direct and indirect, are numerous. Interoperability is a both a prerequisite/enabler for the efficient delivery of PEGS, and an enhancer of those eGovernment services, hence the benefits of all PEGS could be said to flow from Interoperability. However, the direct benefits are themselves numerous and substantial.

3.5.1 Classification of Benefits

As interoperability operates at several different levels, as well as involving an exceptionally broad set of stakeholders (essentially the same as stakeholders for eGovernment services) we should expect a wide variety of different types of benefits. Benefits can be classified by the interoperability level which provides them, the type of benefit obtained (cost, time, etc.) and by the beneficiary (Administrations, Businesses and Citizens). This approach to the cataloguing of benefits insures that we will be fully cognizant of what is to be gained.

3.5.2 Benefits by Interoperability Level

At the technical level, interoperability responds to the overall need of interaction among diverse ICT systems in order to share and exchange data, within and between different government agencies, and in the cross-border context (PEGS), between different (EU) administrations. The benefits at this level amount to dramatic savings in time and cost deriving from the avoidance of ad-hoc or point-to-point solutions[11]. Furthermore, the resulting exchanges are likely to be more reliable and require less maintenance.

Interoperability at the semantic level responds to the need for disparate systems to understand and be able to reuse the data they are exchanging/receiving. The benefits at this level will be even more dramatic, as in the worst case, when data exchanged is not directly usable due to semantic mismatch, very labour-intensive and time-intensive actions are needed to process data for reuse at the receiving end.

Interoperability at the organisational level responds to the need for different entities to be able to cooperate efficiently by working together based on some commonalities and/or understandings about how they must conduct their own business and how they must interact. Integration of disparate Business Processes, even within a single organisation is a very complex endeavour, whose success is not always complete or even possible. The benefits at this level are highly significant in that they enable certain processes and activities to take place, and certain objectives to be met, that often or normally would not be possible.

Interoperability at the political and legal level responds to the need for administrations to be aligned in terms of the priority and resources assigned to the projects requiring interoperability, and the need for data exchanged between administrations to have the same meaning and weight in both country of origin and country of destination. Also, legal alignment is needed to achieve mutual cooperation and recognition. At the political level, the benefits of interoperability are that it enables policy makers to set and achieve their priorities. At the legal level, the benefits are about enabling all stakeholders to meet their legal obligations.

3.5.3 Catalogue of Benefits by Beneficiary

3.5.3.1 Benefits to Administrations

- Helps them to do their jobs better: more efficiently, fulfil their obligations faster at lower cost;
- Facilitate reuse of data and functionality which can lead to reduction of overall department, agency and total government IS development costs;
- Improve management decisions by facilitating aggregation of data;
- Speeds up the development of public services and supporting systems;
- Interoperability leads to better decision making: allowing data collected by different agencies to be aggregated, and serve as inputs to better, more informed decisions;
- Allows for better coordination of government services resulting in higher added value to citizens and businesses;
- Speed up public services development;
- Reduce ICT costs and enhance ICT affordability;
- Promoting international cooperation: Providing additional tools that can be brought to bear against certain cross-border problems such as fraud and other crimes (trafficking, pollution, illegal arms trade, etc).

[11] In the cases where a global approach would be more beneficial to all member states

3.5.3.2 Benefits to Businesses and Industry

- Reduction of Administrative Burden;
- Enables the service aggregation that is required to implement one-stop-shop interface to government services;
- Allows for better coordination of government services resulting in higher added value;
- Increased and fairer competition, levelling the playing field through the migration towards and use of open standards; this opens the market, especially to smaller companies that might not be able to otherwise participate or compete and add their creativity to the marketplace;
- Unleashes growth of new markets.

3.5.3.3 Benefits to Citizens

- Reduction of Administrative Burden;
- By increasing the flow of information between administrations, agencies, entities, etc., citizens get more accurate and complete information in their dealings with governments, and are therefore better informed;
- Interoperability is the foundation/cornerstone of citizen-centric delivery of one-stop-shop services through a variety of channels;
- Enabling the streamlining and simplification of eGovernment services offered to them (e.g., via integrated/single window-type applications), including significant reductions in administrative burden;
- Facilitating access to eGovernment services using eID and eDoc;
- Increased mobility afforded by the seamless availability of eGovernment services in the cross-border context;
- Increases citizen participation and use of public services via reaching for inclusion of all citizens, thereby enhancing democracy;
- Reduce ICT costs and enhance ICT affordability used to provide eGovernment services meaning a more efficient use of citizens' taxes;
- The seamless flow of information across government and between government and citizens/businesses increases transparency and accountability.

3.5.3.4 Benefits to All

- Avoidance of vendor lock-in results in lower costs, to administrations to develop services, plus more freedom of choice is available to citizens and businesses as a result;
- Increasing the number of suppliers of standards-based products should lead to increased competition;
- Increased competition deriving from the lowering or elimination of barriers (resulting from the migration towards open standards) Unleashing creativity of more persons leading to better solutions, and generally accelerating the technology evolution cycle;
- Ability to easily fulfil various legal obligations that otherwise would be difficult or impossible;
- Creates jobs and growth;
- Leads to more equality within the EU and with external trade partners;
- Enables the provision of cross-border eGovernment services in the EU (PEGS).

3.5.4 Benefits of Interoperability with respect to Privacy and Security

The enumerated benefits however also entail increased risks to privacy and security; the more things are interconnected, the broader and more serious is the potential impact that malevolent actions can have. It is therefore imperative that interoperability be implemented with data protection and security requirements taken into account from the beginning, and that appropriate mechanisms be put in place.

Due to the thoroughness and exceptional transparency of the process of evaluating the impact and risks posed by interoperability for privacy and security, and the necessarily systematic approach to respecting these constraints, the achievement of interoperability could result in *enhanced* privacy and security through uniform and rigorous respect of the constraints. This could be classified as an intended side effect of achieving interoperability.

3.6 Subsidiarity at political level

The principle of subsidiarity applies to both the construction and the use of the EIF. For example, the process by which the EIF has been elaborated has been executed with the complete cooperation and agreement of the member states, culminating with a document drafted and agreed by expert groups comprised of delegates from the EU Member States.

The EIF imposes no specific choices or obligations on the Member States. Rather it presents the results of the consultation process reached by common agreement, on such issues as the definition and application of open standards, a common and generic model for public services, and the various principles underlying the continuing implementation of PEGS.

- With respect to standards, it does not impose any specific selections on Member States, but rather specifies processes and criteria all have agreed should be applied in selecting those standards. This approach is designed to meet the specific needs of each member state administration entity or agency in the specific circumstances and environment they are currently working in. This allows for the "best fit" of selected standard to circumstance.
- With respect to the common model, Member States are not constrained to apply the model precisely, but rather are encouraged to use it as a general blueprint to be referred to when new or updated services are planned or implemented. This approach is intended to facilitate future integration of services.
- With respect to the underlying principles, these are for the most part a distillation of (already adopted) recent and older policy and technical agreements relevant to the implementation of interoperability to support PEGS. Their inclusion here serves as a general reminder of things to be “kept in mind” during PEGS implementation.

It also means that any enforcement mechanisms designed as part of the governance process have to be self-imposed; the result is that the MS have to self-police their own adherence to the principles and provisions of the EIF.

The principle of subsidiarity, which is inherently hierarchical in nature, applies not just from EU to MS, but in some cases within MS’s, at the Federal/National level or at other levels (e.g., provincial, county and local municipalities, depending on the MS). For example, in some Member States, there are sub-federal levels of government that enjoy significant degrees of autonomy in the decision making process.

In practice, this means for such cases that:

- The NIF may have to take into account the application of National subsidiarity; in some cases there may not even be a single NIF for the Member State in question.
- The target audience of the NIF must be aware that in some cases, interconnections between Member States will not be simple one-to-one, but possibly one-to-many or even many-to-many.

- Within such Member States, interoperability is not just a cross-border exercise but also comes into play between levels of national governments and therefore becomes a far more important internal matter on par with technical systems integration and/or enterprise architecture.

3.7 Governance of the EIF

3.7.1 What is Governance?

Governance of the EIF is concerned with the ownership, definition, development, maintenance, monitoring and communication of the various elements of the EIF (policies, standards, requirements, etc).

IT governance implies mastery of the technology, systems and organisations in question, ensuring that their combined activities serve the strategic goals and objectives set out by the organisation, in a continuous manner, and not the other way around. Governance of the EIF is focused on ensuring that the EIF supports and furthers the objectives of the policy makers as expressed in the various political initiatives put forward by those policy makers.

3.7.2 Why are we concerned with governance?

Since the publication of the EIF, and especially with the publication of this revised version, it has become the responsibility of the European Commission in collaboration with the Member States to ensure the relevance and durability of the EIF. The intended consequences of the publication of the EIF require a set of supporting activities (which we can also collectively call governance) to ensure its sustainability. Without a matching governance program, the EIF would lose relevance and import within a year or two and become a dead letter, still formally in effect but no longer valid or enforced.

3.7.3 What are the key aspects of governance that we are concerned with?

A sustainability study[12] focusing on funding key aspects of the IDABC program that need to be sustained has completed. The importance of governance in successfully implementing Interoperability has already been highlighted elsewhere, particularly in the UNDP programs related to interoperability. The need for systematic and formalised governance of the EIF and PEGS has already been established in the act which created IDABC. The sustainability study shows a way forward[13] for sustained governance of the EIF and associated artefacts & processes, plus sustained governance[14] of many of the core services on which PEGS will be built, such as eIDM (Identity Management services) and s-TESTA (secure networking services). While globally speaking, the governance of PEGS is outside the competence of the Commission, IDABC is nonetheless able to make some specific recommendations and suggestions with regard to PEGS governance[15], based on related best practices and member states' accumulated knowledge and experience with PEGS implementation to date. These include such elements and characteristics as governance structures[16], governance activities, governance metrics, governance planning/reviews, etc.

In the first instance, a Governance structure/model has to be defined, encompassing involvement of the stakeholders in the governance activities. This model should focus on the following:

[12] An Internal Commission document that was not published
[13] Especially the programming/funding aspects of it.
[14] Suggested responsibility of EC-DIGIT
[15] One suggestion involves the establishment of a separate agency tasked with governance and other related activities.
[16] We can observe that governance of PEGS will be done on a sector-by-sector basis, but recommend that there be some global coordination of these governance activities, and that sector-specific governance follows to some degree or other a common (or similar) approach in terms of those elements of structure, activities , metrics, planning and reviews. For example, most if not all PEGS would benefit from the existence of an expert group of MS delegates to aid in the governance tasks.

1. *Specifying decision rights* - making clear what decisions need to be made and who can make them regarding the EIF;
2. *Managing the life-cycle* – including periodic reviews, top-down re-assessments, and taking into account paradigm shifts when they occur;
3. *Measuring effectiveness* - defining metrics of success as well as using said metrics to evaluate progress on interoperability, and take appropriate actions when necessary.

Secondly, governance organisation, procedures and processes have to be defined and put in place. Aside from those aspects mentioned above (decision-making, life-cycle management, monitoring), processes and procedures would have to be established to deal with the application of the metrics, to ensure compliance and provide effective enforcement of the precepts of the EIF. It must be stressed that compliance cannot be coercively enforced in this context. Nevertheless, some enforcement mechanisms will likely be needed. Any such mechanisms will necessarily be voluntary ones. Nevertheless, there are a number of possible self-policing approaches that can be proposed/discussed and eventually employed.

3.7.4 What are the concrete and definite statements with regard to governance that we are able to state at this time?

There is work currently underway on the European Interoperability Strategy which already deals with these issues (especially the organisational ones) from a long-term strategic perspective.

A significant amount of discussion remains to define the governance model, and to work out the details of what will be done to support and sustain the EIF; These are planned to be conducted in short order after its publication. In particular, there remains a significant amount of organisation-related actions to be taken.

4 Roadmap to the EIF

4.1 Scope and PEGS scenarios

4.1.1 To whom does the EIF apply

The EIF will be of interest to all of the stakeholders who have been previously identified: Administrations, Businesses and Citizens. More precisely, the EIF is of interest to all providers and users of eGovernment services, especially those offered in the cross-border and cross-sector context.

The specific provisions of the EIF are however designed to provide practical guidance to two main classes of stakeholders:

- administration policy makers responsible for eGovernment service development and operation, and
- administration officials responsible for ICT systems implementation (and by extension any contractors working on their behalf)

In more concrete terms, the EIF is intended to apply when decisions are made about implementation of eGovernment services, especially during the development and application of:

- EU and national policy objectives
- national interoperability frameworks
- EU and national and departmental IT strategies
- national (and EU) ICT systems

The document may be used by EU agencies and institutions and national authorities during procurement exercises involving ICT systems.

4.1.2 Interaction Scenarios: A2A, A2B, A2C

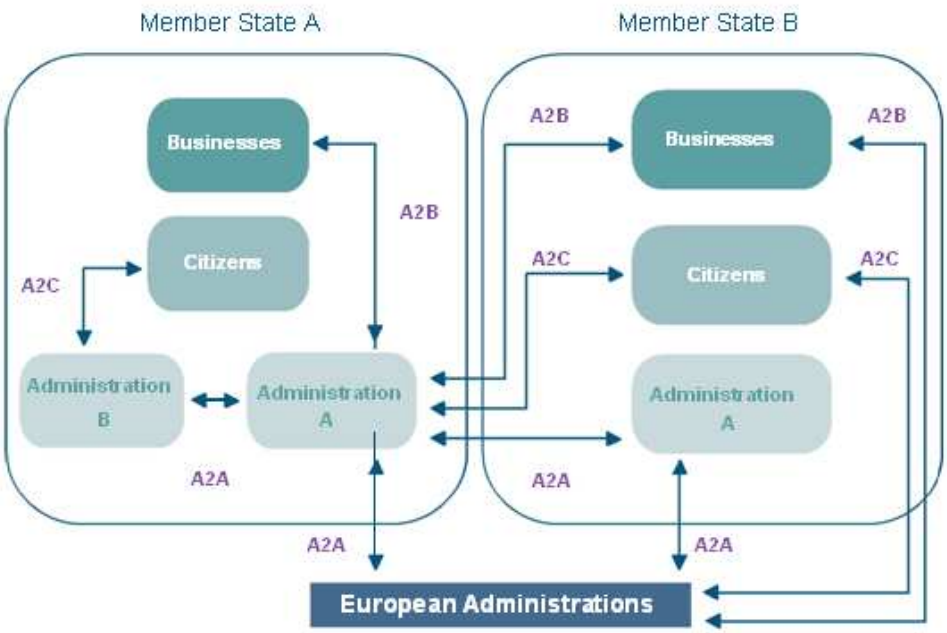
The interoperability covered in the EIF comes into play during a number of specific circumstances or interaction scenarios. The pan-European eGovernment Services (PEGS) that are covered by the EIF[17] can be subdivided into a number of interaction types involving trans-border operations:

- Direct interaction between citizens or enterprises of one particular Member State with administrations of other Member States and/or European institutions. (these are Administration to Citizen and Administration to Business type interactions, or A2C and A2B)
- The exchange of data between administrations of different Member States in order to resolve cases that citizens or enterprises may raise with the administration of their own country. (These are bilateral Administration to Administration type interactions, or A2A)
- The exchange of data between various EU Institutions/Agencies or between an EU Institution/Agency and one or more administrations of Member States. (These are also classified as Administration to Administration type interactions, or A2A)

These scenarios collectively define the scope of applicability of the EIF.

Each of these interaction scenarios are illustrated in the following diagram.

[17] A semi-comprehensive list of PEGS for citizens and businesses is given below in section)



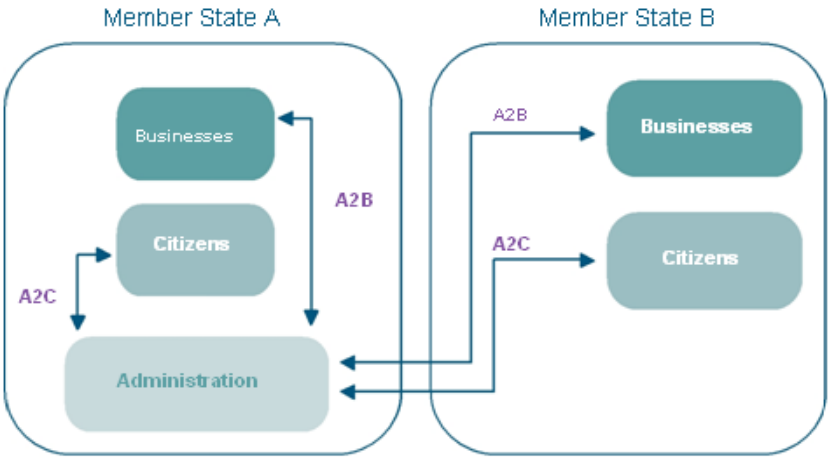
A2A: administration to administration - A2B: administration to business - A2C: administration to citizen

The first interaction type comprises those eGovernment services that are provided to citizens or enterprises at national level, but that may also be of interest to citizens or enterprises located in other countries - on account of requirements such as freedom of movement of people and goods, such as might be mandated by the implementation of the Service Directive.

The second interaction type is a fundamental part of all cross-border eGovernment services, in that they involve automated cooperation between separate, disparate administrations (and their systems; processes, and organisations) to achieve a common goal or result.

The third interaction type is of high interest to administrations in that it involves their legal obligations to share and provide certain types of information in a form suitable for reuse.

4.1.3 Scenario 1: Direct interaction between Citizens/Businesses and Foreign Administration



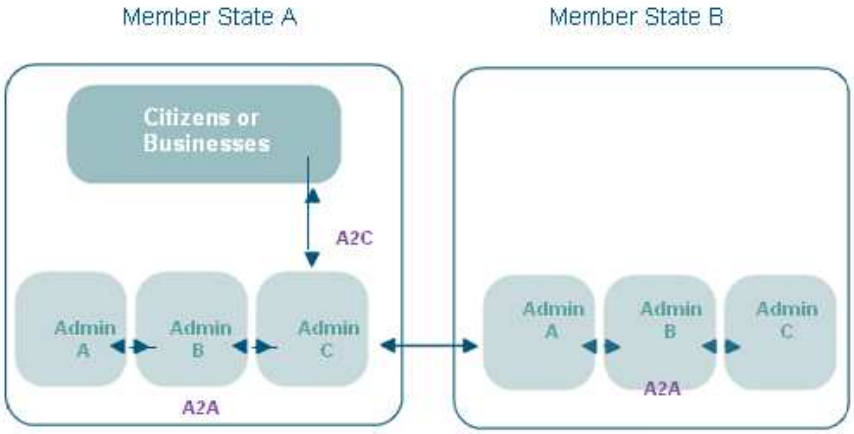
As an example of such a scenario consider a worker/citizen who is a national of one MS (MS B) and has taken a job in another MS (MS A). There will be a number of formalities in the destination MS he

will have to complete in order to establish himself in the destination Member State. He would therefore like to avail himself of the different eGovernment services necessary to complete this task.

Interoperability comes into play in a number of possible ways, including:

- In providing a one-stop-shop interface to the eGovernment services being offered to the Citizen or Business
- In providing a means for the Citizen or Business to identify himself to the destination Member State's administration
- In providing a means for the Citizen or Business to obtain documents from or provide documents to the destination Member State's administration in electronic form

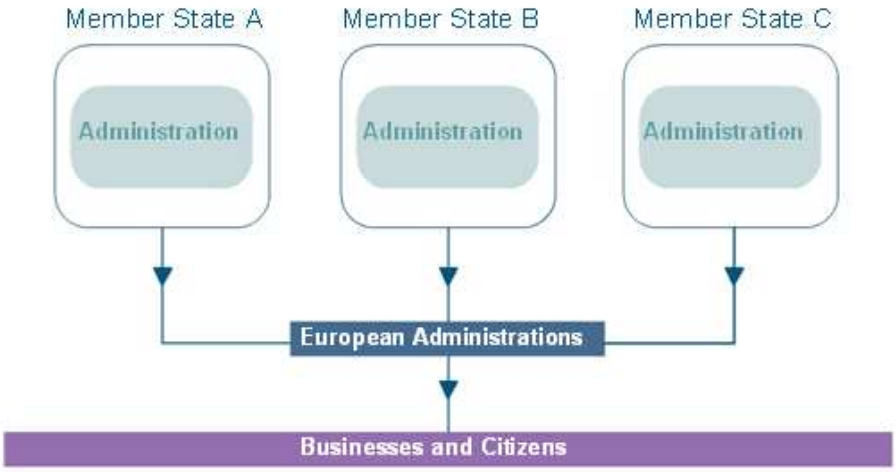
4.1.4 Scenario 2: Exchange of data between administrations on behalf of citizen/business requests



As an example of such a scenario consider a service provider established in one Member State who wishes to offer his services in another Member State. He will have a number of formalities to complete with this target Member State, and will therefore have to avail himself of their services. It is likely however that a number of administrative bodies and agencies, in both of the MSA's, of origin and of destination, will have to interchange information and data about the particular service provider in order to complete his request for establishment. It is here that the interoperability between Administrations comes into play.

As another example, consider a Citizen of MS A who has worked previously in MS B and is now retiring and wishes to transfer his accumulated pension benefits from the MS where they were earned to the MS where he will spend his retirement.

4.1.5 Scenario 3: Exchange of data between National Administrations and EU institutions in order to provide public services to citizen and businesses



This is a very common scenario, often involving the aggregation of data from national sources for the ultimate use of citizens and businesses that is much in use today. There are already a variety of circumstances under which National Administrations already provide information to and exchange information with European administrations, including the European Commission. Many of those exchanges are however ad-hoc in nature, and involve legacy systems for which the possibilities of reuse are limited.

Typically the exchanges involve sectoral networks of administrations (such as those dealt with by the IDABC Programme), where a legal basis requires that the Member State administrations collect, exchange, and share data together and with EU Institutions and Agencies.

Examples of such scenarios include the Member States providing data and statistics on environmental conditions in the Member State to a competent European authority who then proceeds to disseminate the aggregate data to the public (INSPIRE directive).

Another example is TARIC in the Customs domain, wherein the MS receive updates from the Commission to their Tariff databases, and they in turn supply translations of the descriptions in their national language(s), etc. The aggregate data received from all MS is made available to the general public via the Europa website (TARIC DDS – Data Dissemination System).

4.1.6 Examples of "high-impact" Pan-European eGovernment Services (PEGS)

The preceding generic descriptions of Pan-European eGovernment Services within the scope of the EIF can be complemented by a review of some specific examples of the types services covered by the different interaction scenarios presented above.

While the following is not intended to be a comprehensive list of services (which would become outdated quickly), we can list a number of the most important or “high impact” types of PEGS under consideration at this time, for illustrative purposes.

From the users’ perspective, some of the most significant PEGS[18] can be grouped into clusters as follows:

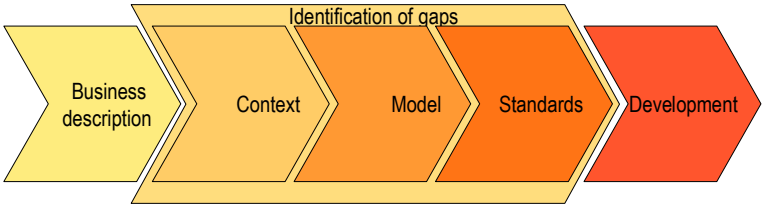
[18] Taken from the CAP Gemini study on stakeholder requirements for pan-European eGovernment Services Final Report v1.3 PEGSCO 2005-02-11 DOC 6.1,which provided a Ranking and Descriptions of various PEGS

Sector/Area	Service	Sector/Area	Service
Business development (A2B, A2A)	• *Start-up of a company*	*Social security (A2C)*	• *Informational service for social security systems*
	• *Public procurement*		• *Unemployment benefits*
	• *Registration of patents, trademarks, designs*		• *Child allowances*
	• *Consumer protection, labelling, packaging*		• *Pensions*
			• *Public health insurance*
Certificates and licenses (A2C)	• *Birth and marriage certificates*		
	• *Driving licenses*	*Supply of statistical data (A2B, A2A)*	• *Tax for businesses*
			• *VAT refunding*
	• *Passports, visa*		• *Information on tax incentives*
	• *Residence and working permits*		
			• *Declaration of excise goods*
	• *Car registration*		
Education (A2C)	• *Enrolment in high schools and universities*	*Work (A2C)*	• *Recognition of qualification and diplomas*
	• *Study grants*		• *Job search*
Tax for citizens (A2C)	• *Online Tax returns* • *Online Tax payments*	*Customs (A2C, A2A)*	• *Information on Customs duties* • *Customs declarations*

4.2 Context

As stated previously, the expressed **goal** of the European Interoperability Framework is to support the development and deployment of PEGS at the conceptual level.

In order to meet this goal, the EIF has opted for a structure mapped to the main steps[19] necessary to put a PEGS in place. This allows for a clear and direct demonstration of how the interoperability framework provides support for and/or important **guidance to the PEGS provider** at each of these steps.



In order to achieve this goal however, we also have to take into account the gaps between the current situation and the target situation. An analysis to identify the set of interoperability challenges in a systematic and comprehensive manner has been performed for each step of the PEGS development lifecycle and has resulted in a set of **recommendations aimed at a large variety of stakeholders**.

A) PEGS are built to fulfil needs of the internal market. In order to do so, they have to be aligned with a set of underlying principles, commonly agreed and acting as universal

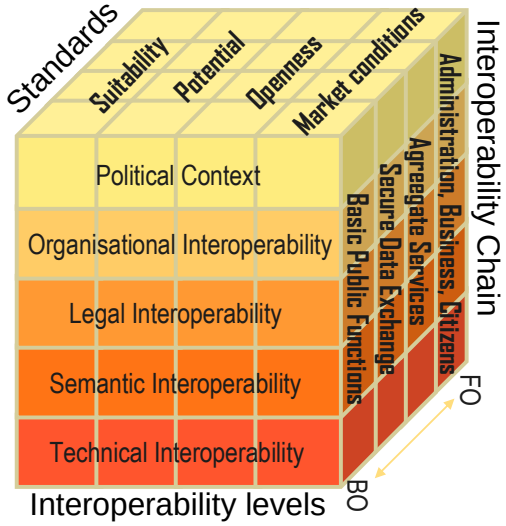
[19] the objective is not to present any specific development roadmap for implementing a PEGS, but to use this pragmatic sequencing to cover the main activities that should be part of a PEGS conception and illustrate the links with the EIF

foundations reflecting the expectations of the society at large. A clear appropriation of those principles is critical as it directly affects the very nature of the PEGS.

The PEGS development lifecycle perspective: Pan-European e-Government Services support the objectives of the internal market. Some underlying principles are the foundations on which the PEGS are built; they provide additional guidance by describing important aspects that every stakeholder needs to keep in mind when implementing any Public Services with a pan-European dimension. This aspect is addressed very early i.e. when a business description of the PEGS is prepared; this includes the typical services of the PEGS and corresponding expectations.

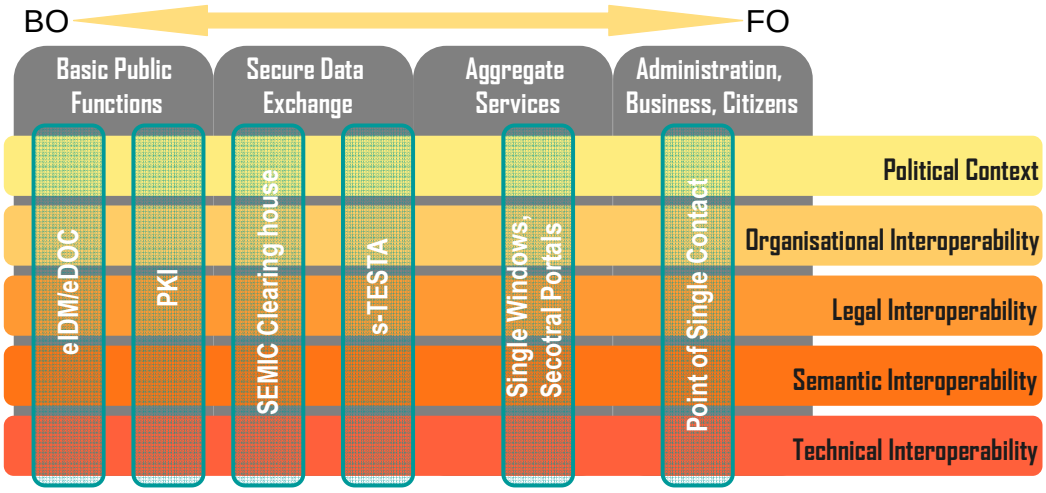
B) PEGS are not standalone. They are part of a much larger environment, the Public Administration ICT ecosystem. In this context, they have to interact with a large set of components and are often built on top of pre-existing components. This entails a number of integration and interoperability challenges.

Interoperability is itself a foundation of PEGS implementation. Therefore, in order to obtain the best and most complete understanding of the general requirements of PEGS implementation, a proper appreciation of the different dimensions of interoperability is necessary.



Three dimensions have to be taken into account to collectively address all the issues necessary to achieve interoperability in the EIF (PEGS) context.

- The first dimension is the "interoperability levels" (horizontal) which classifies interoperability concerns by who/what is concerned
- The second dimension is the "interoperability chain" (vertical) which is concerned with interoperability as a phenomenon, as something progressively built up over time via the construction and assembly of essential "building blocks". These can range from such generic items as infrastructure elements like the Internet (public), or the sTESTA network (private), to core services such as eIDM and eDOC, up to permanent collaboration structures such as the SEMIC XML clearinghouse, or the NIF observatory. The presence of an underlying skeletal interoperability infrastructure and the associated services offers an integrating solution that isolates PEGS implementations from the details of the different possible specifications and/or underlying protocols via the presence of a commonly aligned and adopted set of interfaces. Thus, for a PEGS implementation to make full use of these underlying infrastructures it is only necessary to be aware of and to use appropriately the specifications of the corresponding interfaces.



- The third dimension is "interoperability standards" (or "interoperability agreements") which is concerned with the specifications and/or decisions governing in detail how the interoperability is implemented, a "contractual" view if you will. The assessment and selection of these standards facilitates the information exchanges and the integration of components. The important thing to note is that these interoperability arrangements at all the levels need to be subject to an appropriately standardized approach that is systematic, formal, detailed and clear. Member States can all benefit from each of the others' work and experience in the different areas by sharing of information via the appropriate forums. Where none exists, the appropriate ones should be setup to facilitate the exchanges, and concurrent efforts at standardisation. Currently, the most intense interest focuses on those at the technical level, where technical interoperability is implemented, as this is a focal point for interaction with external suppliers, and therefore involves well-established and detailed sets of requirements and procedures such as all the rules in force for public procurement exercises.

The PEGS development lifecycle perspective:

Once identified as a valuable cross-border service to be built, a more in-depth analysis is usually performed in order to assess the context in which the PEGS will be built (AS-IS, TO-BE, readiness, etc.). This includes the production of a roadmap (or planning) for implementation. This roadmap should comprehensively cover the various interoperability levels (political, legal, business, semantic and technical) in order to identify gaps and preconditions necessary to ensure successful implementation (and operation) of the PEGS.

In order to start the actual development, a breakdown of the PEGS into basic constituent sub-components ("Building Blocks") can be initiated. It should be based on the guidance provided by the Generic Public Services Conceptual Model (GPSCM, see section 7) with a specific emphasis put on well-conceived / reusable building blocks.

Once the building blocks have been identified, adequate standards must be selected enabling reuse, as well as ensuring long-term usability while minimizing constraints. This covers the inter-block interfaces.

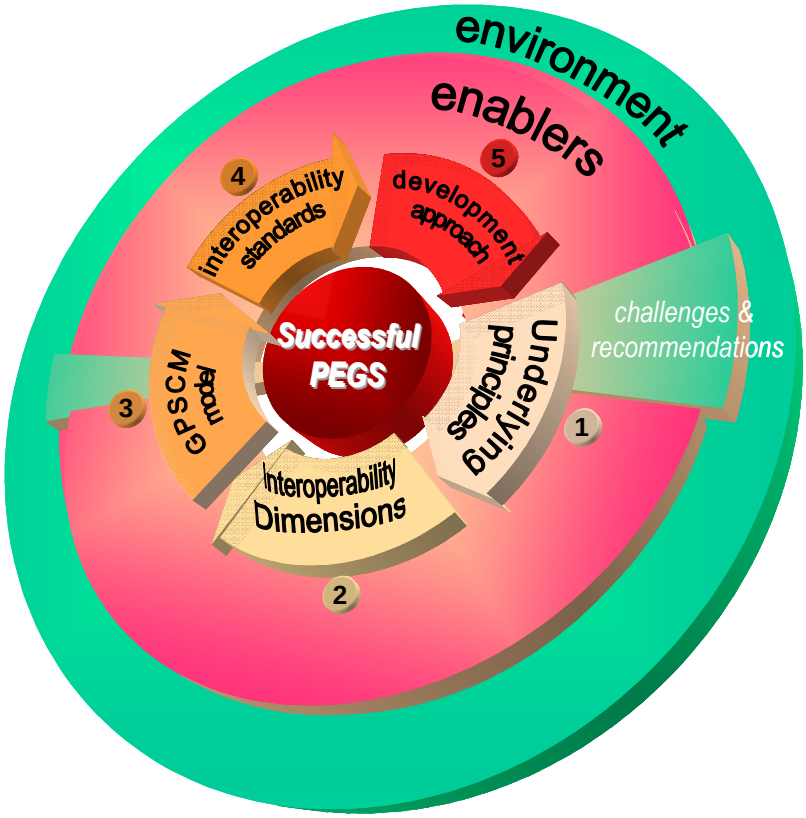
C) PEGS are tangible infrastructure components.

They have to be progressively built and integrated as an essential part of the PA ICT ecosystem. In order to do so, PEGS need to be progressively developed based on sound development methods.

The PEGS development lifecycle perspective:

Based on the expected uses of the building blocks, an adequate development methodology must be selected enabling future reuse, as well as ensuring long-term usability while minimizing constraints

4.3 Using the EIF to achieve successful PEGS



The EIF Roadmap depicts the relationship of the EIF to the generic PEGS development lifecycle, and the relationship of the EIF fundamentals to the achievement of PEGS, bridging the gaps between what is provided/available in the current environment, and that which is necessary for the successful implementation of PEGS[20].

The diagram can be read as follows: start from the environment, depicted as the outer circle, put the enablers in place, allowing the efficient execution of the PEGS lifecycle, resulting in Successful PEGS implementation (the central circle/target).

It should also be noted that this generic PEGS development cycle, as seen from the point of view of EIF-related concerns, is a ***self-reinforcing lifecycle***, in which the conception and construction of PEGS starting from a modular approach results in more Building Blocks which can in turn lead to more PEGS implementations; the cycle continues indefinitely.

In the following sections, we discuss each element of the EIF in detail, as they relate to PEGS development, and the corresponding challenges, enablers and recommendations:

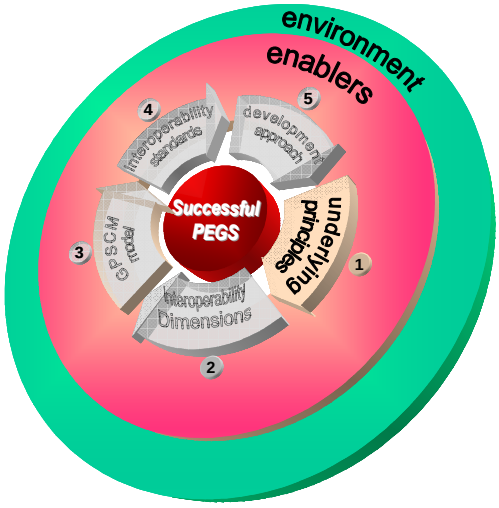
- Section 5, "EIF Underlying Principles", presents the 10 Underlying principles of European Interoperability;
- Section 6, "Interoperability Levels Dimension", presents the technical, semantic, organisational and legal interoperability levels, as well as the political context;
- Section 7, "The Generic Public Services Conceptual Model (GPSCM)", describes a generic model for public services;

[20] When the PEGS implementer is a national public administration, they will obviously also take into account their own NIF's requirements (should they an NIF), but this deals only with national issues, and is therefore outside the scope of this discussion. As long as the NIF in question is consistent with and compatible with the EIF, it has no impact on the discussion that follows.

- Section 8, "Adopt Open Standards or Technical Specifications", presents a standardisation approach;
- Section 9, "Be prepared to benefit from Open Source Methods", discusses the development models;

5 EIF Underlying Principles

5.1 Introduction



The purpose of this section is to outline the general policy guidelines and the associated underlying principles to be observed in implementing the PEGS-related systems, processes and organisations that are intended to be compliant with and benefit from the EIF.

Pan-European e-Government Services are intended to support and contribute to the free flow of goods, persons, capital and services within the internal market. All the political inputs quoted in the previous sections have adopted and promote a set of general principles which should be respected by any Public Services with a pan-European dimension. These underlying principles are the foundations on which the EIF is built; they provide additional guidance by describing important aspects that every stakeholder needs to keep in mind when implementing any Public Services with a pan-European dimension. Taken together, they outline the overall intent of the EIF, and provide guidelines for decisions that must be taken concerning details related to implementation of PEGS.

Nearly any public service offered by the Member States could potentially have a European dimension, and therefore be a PEGS candidate. In fact, most potential PEGS will not be directly traceable to a specific EU Directive, and therefore the European dimension will not necessarily be explicit or clear. The Underlying Principles represent things that need to be kept in mind throughout the PEGS lifecycle, starting at the beginning. Even at the proposal stage, a "good" PEGS candidate is one that, at a minimum, is aligned with these principles.

This is of interest to the EIF because it concerns effective application of the EIF. Specifically, the various interoperability enablers, including those related to the Underlying Principles, will only be phased in gradually. The relevant National and EU PEGS authorities need to take this into account in their roadmaps and plans.

The European Commission and the Member States should set up a campaign promoting awareness of these fundamental strategic concepts in order to lead to better PEGS proposals more likely to succeed.

The 10 Underlying Principles of the EIF fall into a few different categories. The first Principle deals with fundamental constraints of Policy making in the EU environment. A number of the Underlying Principles express basic and inescapable user needs (2 through 6). Some key EU policy objectives also find expression in the principles (7, 8). Finally, the remaining Underlying Principles could be characterised as representing a high standard of professionalism in the approach to the implementation of PEGS in the EU (9, 10).

5.2 Underlying Principle 1: Adhere to the subsidiarity and proportionality principles

The European Interoperability Framework is concerned with Public Services offered at the pan-European level. In line with the principle of subsidiarity, the Community is not competent to act in the IT area, on issues of administration or of eGovernment. The guidelines and direction offered here do not intrude on the prerogatives of the Member State Administrations (at all levels from Local up to National) or of the EU institutions.

The subsidiarity principle applies such that the Community only intervenes if the challenges can be better met at Community level. The proportionality principle also applies in that it limits Community intervention to only what is necessary for meeting the challenges.

Governance and operational autonomy shall be implemented at the most decentralised level that is appropriate for each service.

It will be up to each Member State and EU Institution to take the necessary steps to ensure, in line with the European Interoperability Framework, interoperability where needed at a pan-European level.

Member States and the European Commission should establish and then crosscheck their PEGS development roadmaps in order to ensure interoperability at the EU level and validate that the challenges are addressed effectively.

5.3 Underlying Principle 2: Focus on the needs and rights of Citizens and Businesses

Public services are provided to serve the needs of citizens and businesses. Those needs should determine how government functions are defined and government services delivered.

The citizens and businesses expect:

- Access to customized services, such as personalised information and personal virtual dossiers,
- To be asked to provide information only once, which requires sharing of information between administrations but recognizing the limits that privacy and data protection require,
- "Points of Single contact" (PoSC) that let the data do the “walking”, not the citizen or business customer. The idea is to implement something like a "No wrong door" principle - regardless of where a citizen or business customer begins his search/request for assistance or a service, he will be provided with the direct access and the assistance he/she/it seeks
- Access to, and availability & reliability of Public Services anytime, anyhow, anywhere (within the legally applicable delays).

The trend in Public Services should be towards increasing integration of location-specific information into the service offerings, including personalisation of contents according to the location of the service customer, as well as benefiting from geo-referenced data and map services.

This aspect should be integrated into eGovernment service offerings when appropriate from the citizen or business customer's point of view.

- All official EU languages should be supported, as appropriate to the context (see section 5.6, "Underlying Principle 5: Design for multilingual use", page 28, below).

5.4 Underlying Principle 3: Build in e-Inclusion and accessibility for all

It is still unfortunately the case that public services are often designed under the assumption that the user does not suffer from any disabilities or limitations, and has as a matter of course ready access to IT equipment and the internet. It is of course a desirable and worthy goal to advance the possibilities for disabled and digitally agnostic persons to experience the same (or as nearly as possible the same) service levels as other people. Public Administrations should ensure that eGovernment creates equal opportunities for all citizens and businesses through open, inclusive services that are publicly accessible without discrimination.

Accessibility should be tackled in the early ages of all eGovernment public services projects as a common requirement and also when multimedia content is created for use within eGovernment Public Services.

Some principles should be adhered to:

- No citizen should be left behind: citizens of differing abilities (or "disabilities") will be accommodated, according to their needs
- Design Web interfaces according to standardised web accessibility guidelines ensuring access for disabled persons.
- Prepare multimedia (audio, video, etc.) data to be understood in alternative ways (such as via the use of alternate text, etc.).
- Use a language and vocabulary that can be understood by the average/typical user.

Issues such as socio-economic disparities between regions and groups of citizens should also be addressed. Traditional service delivery channels should continue to exist, enhanced by the use of technology. People should have a choice of channels to government information and services that are convenient and easy to use. Fulfilment of services must be consistent, regardless of the different access channels used.

A process-oriented approach in which accessibility concerns are properly taken into consideration throughout the development lifecycle of a PEGS is likely to be the most effective. Within this approach a certification schema could then be set up not only on the result (website compliance with relevant guidelines) but on the full process of implementing accessibility like the "quality insurance process" has been set up through normative approach during the last past years.

The Member States and the European Commission should support the set up of a certification scheme supported by a process addressing public services accessibility.

The most viable way to achieve this (besides the evident guidelines for accessible websites) is to follow "design for all approaches" that takes accessibility considerations into account since the beginning of the technology and service development process. It is also important to consider a multi-channel strategy in order to render the services available to citizens and enterprises through different communication means.

The European Commission should make sure that administrations understand the needs to create portals, to stimulate administrations to think beyond the mere provision of user-friendly web interfaces and to invite industries and administrations creating portals to support a multi-channel strategy.

Adherence to accessibility guidelines can also be facilitated by the use of accessibility-friendly development tools, that are "accessibility aware/capable", and/or make appropriate use of "assistive technologies" (e.g., content management systems, etc.).

The Commission must support the development of such accessibility-friendly tools, via EU sponsored initiatives.

Interoperability of e-government platforms and services with "assistive technologies" used by people with disabilities (e.g. Braille readers, text-to-speech conversion software, etc) must also be taken into consideration.

Another aspect of accessibility concerns scenarios where the citizen is simply unable to directly make use of the public services, for whatever reason. In this case, accessibility is furthered by the capability of a system to accommodate the actions of a third party acting on behalf of such citizens. More specifically, the concept of eID and mandates/delegation should be built into service provision. This may even be relevant for services not requiring authentication, but which do require recourse to external services (service provider), which may have their own requirements, such as banking/payments, etc.

The Commission should encourage schemes where online actions can be performed by one identified person or entity on behalf of another person or entity and therefore stimulate the inclusion of mandates and delegation into eID related development efforts.

The Member States should also include such provisions in their NIF's: in order to make this truly cross-border, it should even be possible to delegate or to assign mandates between entities in different MS's.

5.5 Underlying Principle 4: Ensure Security and Privacy

Security and privacy are transversal concerns that affect all PEGS, and for which a common approach at the EU level is needed. Security, privacy and data protection are major obligations of governments and institutions that are entrusted with the administration of public services and the exchange of public information. An environment of trust must be established. The first step for the MS's is to establish a roadmap covering such items as implementation of common models.

Citizens and businesses must have the guarantee that their fundamental rights are preserved. They must be assured that all interactions with their government are properly secured.

From the user perspective, functions associated with security (identification, authentication, authorisation, integrity, non-repudiation, confidentiality, etc.) should have a maximum level of transparency, involve a minimum of effort and provide the proper level of security.

Overall, the reliable exchange of information requires conformity with an established security policy. This is achieved by conducting risk assessments and applying the appropriate security measures prior to the set-up of new services.

The public administrations concerned will need to consider their own security policy and come to an agreement on a common security policy at pan-European level.

Pan-European eGovernment services need to ensure uniform levels of personal data protection, including measures in which individuals have the right to choose whether their data may be used for purposes other than those for which they were originally supplied, as well as uniform application of security levels in order to eliminate (where possible) weak links in the security chain.

Appropriate information regarding the use of personal data should be made available to the individuals concerned. Full compliance with the existing European and national data protection legislation should be ensured.

Public Administrations should organize themselves internally so that inappropriate aggregation of citizen and business data is not possible, and that the principle of separation of concerns should be employed, whereby access to citizen and business data is only possible by authorised staff, on a need-to-know basis which is strictly enforced.

Introduction into the standard approach to analysis of requirements for all public procurement in the MS the addition of specific set of requirements catering to the European dimension of PEGS, specifically security interoperability requirements (the question of specific requirements such as common authentication levels, transmission of secure assertions, etc., will be treated in the Architecture Guidelines). The outputs of the collaborative activities should then be included into the procurement dossier for each PEGS-related procurement.

The Member States shall collaborate substantially on this topic to build a common set of requirements.

The Member States should also integrate the results of the eID Large Scale Pilot (the outputs as well as the lessons learned) into their national infrastructure and their National Interoperability Frameworks, as these will likely also include significant security and privacy related results.

Businesses and Citizens require a sufficient level of guarantees regarding their privacy, an appropriate collaboration structure involving data protection authorities from the MS and at the EU level should be considered, taking into account the necessary subsidiarity.

Privacy as relates to the usage of PEGS is also a Data Protection issue. The confidentiality of this information also has to be respected. A hypothetical PEGS where such issues would come into play is one providing a cross-border Job Search service open to users in any MS.

The PEGS operator has to have a clear view of his legal obligations with regard to Data Protection, which underlines the need for cross-border collaboration and coordination.

The European Commission and the Member States should establish the appropriate collaboration and coordination structure(s) between the different data protection authorities concerned.

5.6 Underlying Principle 5: Design for multilingual use

In Europe, a variety of languages is used and pan-European eGovernment services should meet the linguistic and other cultural requirements of their users.

At the presentation level (front office, web pages – the level at which citizens and enterprises interact with administrations), the delivery of pan-European eGovernment services in the local language(s) is a major factor in their effectiveness,

Service implementers face architectural and design choices in implementing these services (centralised vs. distributed, integrated vs. layered at the presentation level, etc.) with respect to multilingualism; Regardless of the implementation details however, pan-European eGovernment services which are intended for all European citizens or businesses users must be made available to them in all of the official EU languages.

For those public services which are not initially intended or expected to be used by a wider, non-local audience (i.e., services not formally defined as PEGS), it is still considered a best practice to offer such services in at least one or two additional languages, with an eye towards eventual language independence of implementation of all eGovernment services.

At the back-office level, the underlying information system and technical architectures should be linguistically neutral where possible, so that multilingualism does not become an obstacle to the delivery of eGovernment services. If neutrality is not feasible, provisions should be made in order to facilitate translation mechanisms.

Furthermore, the achievement of semantic interoperability in a multilingual context is also a common goal and a priority.

5.7 Underlying Principle 6: Support public participation and transparency

People that are better informed are better able to contribute and participate in government processes, thus furthering democracy, and adding another dimension of collaborative intelligence and creativity.

Transparency implies that citizens and businesses have a right to understand and to follow the Pan-European eGovernment administrative procedures, and to have an insight into the basis for decisions.

Active participation in democratic processes can be encouraged and facilitated using modern information technology. This outcome will be achieved when:

- the results of government actions and decisions, such as legislative acts, government gathered statistics, etc., are made publicly available as provided for in the Public Service Information (PSI) directive
- online participation becomes an increasingly important part of policy development and service delivery;
- democratic processes may be electronically enabled (e.g. e-voting in local body elections);
- Information on the status of pending eGovernment service requests and on personal data used for decisions by administrations is easily available.

- Citizens and businesses are fully cognizant of the delays expected when they avail themselves of the various eGovernment services.

The MS's should encourage, measure & monitor the support of public participation and transparency within their own public administrations.

5.8 Underlying Principle 7: Support Standardisation and Innovation and ensure administration neutrality

Standards are key to interoperability. In the EU strategy for Growth and Jobs, strong and dynamic standardisation has been identified as one of the key instruments to foster innovation. Standardisation has a dimension of public interest, in particular whenever issues of safety, health, environment and performance are at stake.

Administrations should ensure that solutions and/or products are chosen via a process in which competition between vendors is fair. This is important so as to preserve the ability of the beneficiaries to make the best choice between competing products that fit their particular needs (at that particular point in time) and that do not lock them in as regards future choices.

The role of national administrations in this process is to choose the appropriate standard for various types of interactions, so as to ensure that proper solutions and products are available to Citizens and Businesses.

Public administrations and European Institutions such as the European Commission should actively support efforts at eliminating the use of proprietary standards and solutions within public administrations by actively supporting and participating in standardization efforts, particularly by formulating and communicating needs and requirements, according to the new approach[21].

When exchanging data and documents with other administrations, business or citizens, it is important that no particular hardware or software products should be mandated, aside from the minimal connectivity requirements which depend on the channel of exchange.

In line with the goal of maximizing citizen and business access to eGovernment services, administrations should endeavour to make access to public services as affordable as possible. Fees to be paid should not be prohibitively expensive so as to render it impossible for disadvantaged members of the public to avail themselves of the public services in question.

5.9 Underlying Principle 8: Reduce Administrative Burden

"Administrative Burden" refers to costs incurred by citizens and businesses in fulfilling legal "Information Obligations" to an administration (assembly of data, formatting, etc.), specifically data that they normally would not gather or use, and which is not necessary to achieve the objectives of the legislation imposing the Information Obligations. It is widely recognised that there is also a large amount of redundancy involved in the global set of Information Obligations of a given citizen or business.

The European Commission has proposed[22] a specific target for Administrative Burden reduction of citizens and businesses (25%) and a specific time frame (by 2012). To achieve these targets, public authorities across Europe will have to co-operate so as to minimise the Information Obligations of citizens and businesses by eliminating or reducing as much as possible the solicitation of unnecessary or redundant information.

[21] see the COUNCIL RESOLUTION of 7 May 1985 on a new approach to technical harmonization and standards (85/C 136/01) at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31985Y0604(01):EN:HTML

[22] Commission Communication - "Action programme for reducing administrative burdens in the EU" - COM(2007)23 final, available at:
http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0023en01.pdf

Repeated requests for the same information (besides data required to establish identity via authentication) by different administrations should be avoided. This will require reorganisation and reengineering efforts aimed at the establishment of "authentic sources" for all data sets gathered by the administrations, which must be done in a manner so as to respect all relevant privacy and data protection requirements.

Member States should encourage the establishment of “authentic sources”

By sharing some aspects of Citizen and Business usage in using Public Services (while still respecting their privacy rights and data protection regulations), other Citizens and Businesses can be helped with their own interactions with administrations.

Member States should encourage the sharing between Public Administrations of the Citizen and Business usage in using Public Services.

5.10 Underlying Principle 9: Ensure the best value for money

eGovernment Services that are integrated, customer-centric and minimise cost will bring concrete benefits to people, businesses and providers. Governments should ensure that Public Service solutions serve Citizens and Businesses in the most effective way, providing the best value for taxpayer money.

Public Administrations should evaluate the value that their Public service offerings provide using innovative evaluation methods.

The calculation of "value for money" should not only be considered from the perspective of the return on investment, total cost of ownership, flexibility and the degree of reduction of administrative burden, but also the global value provided to Citizens and Businesses in terms of cost & time savings, reduced risk, increased transparency, simplified administrative procedures, and the increased control over information afforded by interoperability.

The benefits to civil servants in improving their working methods and environment, as well as increased recognition of their achievements and competencies, etc., should be taken into account as well.

The effectiveness and efficiency of Public Services can also have additional political and social value at European level as well as at national, regional and local levels.

Member States should develop evaluation methods for Public Services which include the above criteria.

5.11 Underlying Principle 10: Preserve information over time

The long-term availability of records that document procedures and decisions must be secured for legal, democratic and cultural reasons. The long-term preservation of information held by administrations in electronic form is a horizontal concern which stretches beyond any particular set of applications or any particular sector, some aspects of which are regulated by EU law[23]. Furthermore, it is likely that there are some PEGS which will have specific requirements relating to such capabilities.

For most data sources owned and managed by national administrations, the implementation is a purely national matter. Preservation services will operate in much the same way as paper-based national archives operate: as a controlled, efficient and secure check-in, consultation and storage service.

For some PEGS for which the data sources are not owned by purely national authorities, such as sectoral PEGS, or PEGS offered by non-governmental agencies or the private sector, (or even EU institutions such as the commission) the question of preservation (and implementation thereof) of the related data sources becomes a European question. This is why we handle it in the EIF. In such a case, we can conceive of specifically EU/PEGS archives. This includes the use of standards for metadata,

[23] See Directive 2006/24/Ec Of The European Parliament And Of The Council of 15 March 2006 on the retention of data generated or processed in connection with the provision of publicly available electronic communications services or of public communications networks and amending Directive 2002/58/EC

document formats, storage media and maintenance procedures that are adequate for long-term preservation purposes. This also encompasses the transfer of digital records between (to and from) operational sources and archives.

Public Administration implementing Pan-European eGovernment Services need to account for records management and archiving procedures according to international standards and good practices.

Just as in a physical archive service, a user expects that any item that is checked-in is "well taken care of", so that upon consultation, the same item in the same condition is returned. The analogous function for electronic based preservation services could be termed maintenance of the archived information. For electronic documents to be maintained, the formats[24] need to be selected in a way so as so assure the long-term accessibility of the information stored in the documents. Furthermore, for documents which are electronically signed or electronically certified in some way, this aspect of the documents has specific maintenance needs that must be also met by the preservation services.

Member States should formulate recommendations regarding Format and Maintenance procedures aimed at long-term information preservation.

The broad nature of the interest points towards the establishment of a common model for preservation activities whereas ultimately there will be many different PEGS that have legal and functional requirements in the area of long-term preservation. By off-loading implementation of these specific requirements to common mechanisms with standardized interfaces, the development of many impacted PEGS will be facilitated.

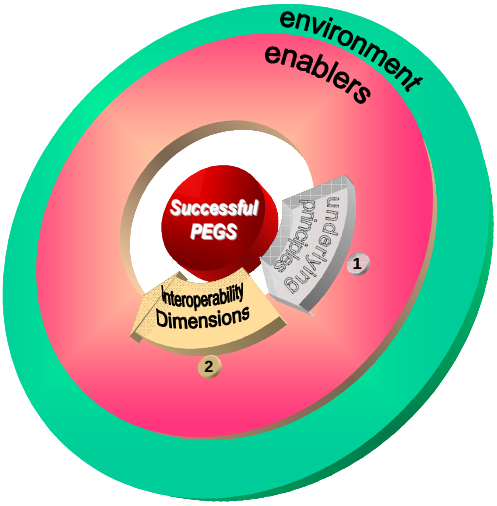
The European Commission, in coordination with the Member States shall evaluate the utility of an EU policy on these items that could be shared with the Member States, thereby facilitating their efforts in the area.

[24] Guidelines for the migration to authentic sources from legacy systems, employing data formats and mechanisms which will ensure long-term (20+ years) accessibility and availability of the data in question through PEGS mechanisms is also a part of the format issue.

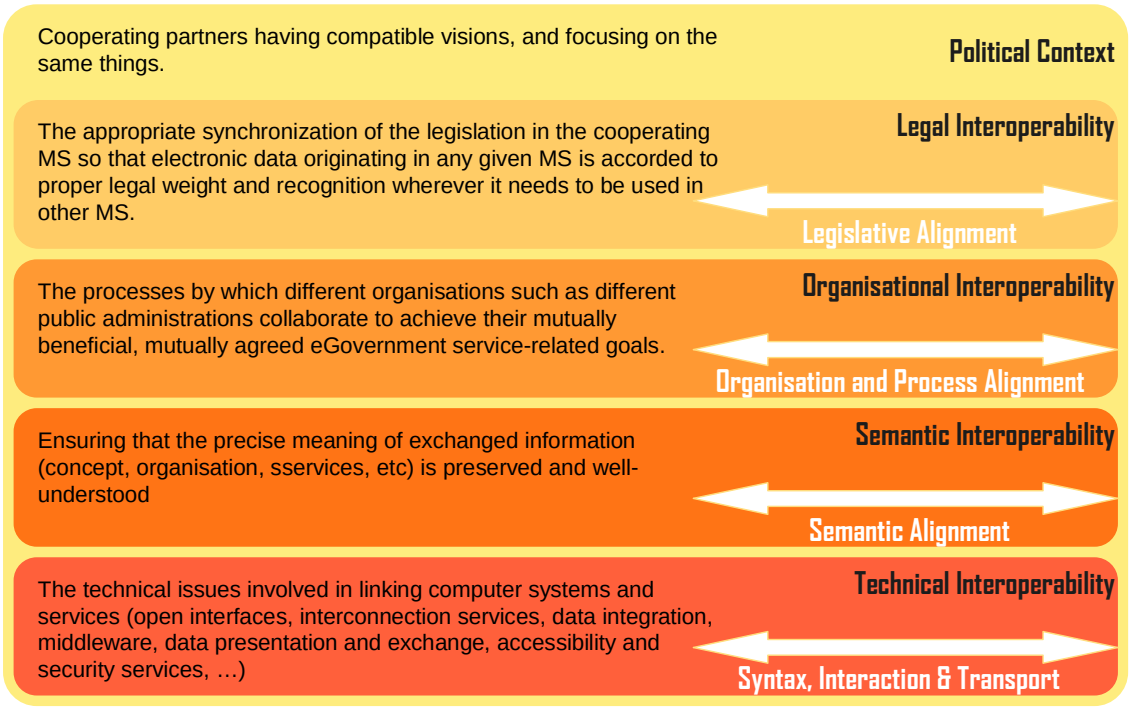
6 Interoperability Levels Dimension

6.1 Introduction

A model of the Dimensions of European Interoperability was established with the first version of the EIF. That model described three levels: Technical, Semantic, and Organisational.



As Interoperability advanced and the priority accorded to Interoperability by policy makers rose, it became clear that two additional aspects should be considered. In order to maximize the possibilities for success, the efficiency of implementation and the benefits to be obtained, it is important that before launching any public services with a cross border dimension both the political field and the legal framework should be in place to provide the necessary support in these two areas (Political and Legal). They are depicted in the diagram below.



6.2 Political Context

Political support for interoperability efforts is an absolute necessity. In order that cooperation be effective with respect to achieving the intended goals, it is necessary that the cooperating partners have compatible visions, and are focusing on the same things. In practical terms it means that the cooperating partners accord sufficient priority and resources to their respective efforts, on an ongoing basis, that they are moving in the same direction, and are using the same timeframes, and finally that any changes to these are mutually agreed or at least coordinated and synchronised appropriately.

In the context of the EU, the political context relating to interoperability efforts could be seen to be reflected in such specific political instruments as EU Directives, Ministerial Declarations and Multi-

year programs. These instruments (among others) collectively express (at least in part) the vision and priorities of EU policy makers[25]. The level of funding and other budgetary aspects and measures as well as possible timescales imposed can provide additional details about the political priorities and can be used to understand and gauge the political context.

Governance is yet another reflection of the political context; The processes and actions carried out under its guise are the direct expression of the mutually agreed strategy laid out in the planned EIS (European Interoperability Strategy), which therefore implements directly the specific and detailed priorities and objectives of the policy makers with respect to interoperability.

Owing to the sensitive nature of policy making at this high level, it is difficult for the EIF to provide any relevant details, especially with regard to process or other means by which future policy directions and developments related to interoperability would be decided, mechanisms for coordination of political goals, frequency of reassessments, dealing with real or perceived deviations from previous agreements, etc.

Nevertheless, managing the PEGS development within a changing political context across the EU so as to ensure the continuing development of and support for efforts aimed at interoperability, is of course a major challenge. More specifically, the challenges are:

- Avoiding and/or preventing Divergences in vision of interoperability
- Insufficient levels of support (resources, priority) in the MS

There are existing political structures where issues related to agreements and common endeavours are regularly raised and it can be hoped that interoperability goals and follow-up on achievement/progress will remain an active item on their agenda. Aside from this, the best way to ensure continued support for interoperability is via the ongoing activities of the various coordination and consultation bodies and activities as outlined at various points in the EIF v2, especially any permanent structures dealing specifically with interoperability issues, and common priorities.

In line with the preceding, the Commission has an important role to play in PEGS selection by encouraging/pushing forward the most promising ideas, and supporting them with appropriate funding instruments, such as the sponsoring and involvement with pilot projects across the EU.

The construction of a PEGS roadmap would be also very useful in this context, as it will link in a clear and realistic manner the objective of ensuring operability with the benefits to citizens and businesses provided by PEGS.

6.3 Legal Interoperability

Legal interoperability involves the appropriate synchronization of the legislation in the cooperating MS so that electronic data originating in any given MS is accorded the proper legal weight and recognition wherever it needs to be used in other MS.

Legal Interoperability is necessary for a variety of reasons, including:

- To provide for mutual recognition of electronic data originating in other EU MS
- To enable a MSA to perform mutual assistance aspects of integrated/cross-border business processes, e.g., supplying national data of various types to other EU MS

As EU legislation generally is driven by the goals decided at the highest political levels, legal interoperability is closely related to, yet distinct from the political context, due to its much more technical nature.

[25] The Political context may vary considerably from sector to sector, as the degree and manner in which MS must cooperate to achieve their common goals can be very different for each relevant sector.

In fact, a number of important barriers and challenges have been identified at this level, deriving from a number of factors. Chief among these is the fact that the kind of legal interoperability under consideration here is typically implemented at national level by transposition of EU directives into national legislation. This process is repeated independently in each Member State, with slightly different results each time owing the different legal traditions and framework in place[26], the different political environments in which such legislation is drafted and is voted upon, and even how it is implemented and enforced in the Member State in question.

6.3.1 Legal jeopardy

Every PEGS implementer faces a myriad of legal risks deriving from the need to be compliant with both EU legislation and potentially 27 sets of national legislation.

PEGS implementations should keep as an objective compliance with a framework composed of the set of each of the strictest legal provisions applicable in a given domain or sector, across all member states.

This however does not mean that PEGS implementation should be postponed or suspended pending the definition of such a framework.

Where necessitated by lack of sufficient legal clarity or protection, a pragmatic approach starting with the implementation of PILOT systems ('Mini-PEGS') having a scope of deployment limited to a small number of countries should be followed.

This has the benefit of dramatically reducing the barriers to entry (obviating the need to resolve conflicts and any other issues arising from having to comply with potentially 27 sets of constraints). It furthermore represents a lower risk approach to resolving issues and obtaining more experience on which to build future PEGS.

6.3.2 Data protection

Data Protection in the cross-border context is one of the key legal issues: the question is whether there sufficient legal and operational support covering the entities and mechanisms responsible for ensuring Data Protection.

A Data Protection strategy to provide this support for cross-border PEGS is needed at EU level. This Data Protection strategy would include such elements as designation of one or more Data Protection authorities, a roadmap for the establishment of appropriate collaborative structures, and associated mechanisms.

6.3.3 Public Service Legislation

The challenges at the legal level are numerous. Interoperability can be affected by differences in legislation in areas such as administrative law, identification and authentication, intellectual property rights, liability, privacy and data protection, public administration transparency relationships between public administrations, citizens, businesses and other IT actors and the re-use of public sector information in base registries.

During the drafting stage, the Commission and the Member States should assess the impact on ICT of proposed legislative acts.

Once EU Directives have issued they are transposed into national legislation, which is conducted independently is each MS. EU Directives themselves are open to interpretation, a fact which in some cases can be the source of differences in the transposed law. The resulting sets of 27 laws can potentially have some unintended side effects owing to the subtle differences in implementation.

[26] For example, different Member States have different traditions and approaches to the question of Data Protection. Ensuring that all National rules on Data Protection are observed during cross-border exchanges and interactions can be a challenge.

The impact on ICT should be once again assessed at this level by each respective Member State.

These are many, often very specialist, and also controversial areas that require the involvement of multiple expert organizations, universities and national governments. Ultimately, EC directives and Member State legislation will need to be ratified in the national and European Parliaments leading to the cross-Member State availability of Basic Public Functions of individual Member States.

Legal support for sectoral harmonisation should be provided (guided by EC directives, if necessary), which will serve to minimise the undesired side effects of transposition of EU directives into national legislation.

New directives related to non-sectoral ICT themes (such as on eSignatures) have to be well coordinated with sectoral efforts at harmonization

An alignment check should be introduced into the national legislation process as part of the adoption procedure; this it is related not just to verifying that each country matches the directive, but to suggest that each and every MS really takes into account the follow-up and regular reporting on the adoption of the relevant EU directives.

As alignment of transposed EU directives is in itself not always sufficient to ensure interoperability, it is suggested that the MS, on voluntary basis take the initiative to continually work together and to align all legislation potentially affecting interoperability with each other rather than depending on the Commission to intercede.

6.3.4 Procurement process, standards and specifications

Procurement drives behaviour, both of government agencies and industry partners. As a key force in open ICT environments, procurement deserves close attention.

For the moment, open standards are not referenced or mandated in any current EU directives; only in some MS national legislation are they mentioned. In fact, current legislation does not even adequately reflect the realities of the ICT market place (e.g., the widespread use of TCP/IP despite its provenance).

Interoperability should be embedded as standard criteria (among others) within public procurement processes, giving preference to open standards and open specifications where possible.

6.4 Organisational Level

Organisational interoperability concerns a broad set of elements of interaction, including business processes, business interfaces such as email, web portals, etc., business events within and between administrations, and "life" events, involving the external parties: businesses and citizens. This aspect of interoperability is concerned with how different organisations such as different Member State Administrations collaborate to achieve their mutually beneficial, mutually agreed eGovernment service-related goals.

The partners need to reach detailed agreeements on how their processes will interact (synchronize and cooperate) in order to deliver “public services where needed”.

Organisational Interoperability in practice means the seamless integration of business processes and the exchange of information that they manage between the organisations. (from EIF v1) Organisational Interoperability aims at addressing the requirements of the user community by making services available, easily identifiable, accessible and user-oriented. Organisational interoperability occurs when actors agree on the why and the when of exchanging information, on common rules to ensure it occurs safely, with minimal overhead, on an ongoing basis, and then draw up plans to do all these things, and carry them out.

6.4.1 Alignment of Business Processes

In order for different administrative entities to collaborate efficiently and effectively, the different interacting business processes on different sides of these borders and information exchanges must be properly aligned or at least well understood by all stakeholders.

The interacting entities (PA, MS) participating in the alignment of business processes should achieve an alignment on the standard to be used to describe business processes.

A repository[27] of Business Process and best practices where the stakeholders can exchange information should then be established. This will also facilitate reuse of best practices among the MS.

6.4.2 Business Process Reengineering (BPR)

The reengineering of business processes in this context, necessitated by the goal of achieving organisational interoperability, is a two steps process. The ultimate goal is of course to achieve the following:

- Cross-border integration of business processes involved in providing PEGS
- Redesign of Business processes as necessitated by the introduction of "authentic sources" as the key principle in the design of the "Base Registers"

This is however a long term goal that will be achieved only after a significant investment of time and resources.

An interim solution to achieving the organisational interoperability required for successful PEGS implementation begins with a broad (meaning cross-border) effort at analysing the equivalent/peer business processes currently in use, with an eye to establishing a common understanding of the business processes (a taxonomy of the business processes), identifying common elements, and decomposing the processes into process components in such a way as to enable cross-border interconnection.

Member State Administrations should work together to achieve cross-border integration of Business Processes by means of coordinated efforts at BPR

MS and more generally Public Administrations should adapt their business processes as required by the introduction of authentic sources.

Such an effort entails a considerable amount of cross-border information exchange and concerted standardisation and harmonisation activities. The Commission ultimately has a very important role to play in facilitating and coordinating these cross-border efforts.

6.4.3 Establishment of Service Level Agreements (SLA)

This involves the introduction of SLA-like instruments to formalize specific aspects of mutual assistance, joint activities, and merged/coupled business processes in the scope of cross-border services provision; one means foreseen is via so-called "Memoranda of Understanding" (MoU's) between governments detailing bilateral agreements on joint actions and cooperation.

This can be considered as a cross-border standardisation activity, in which the "standards" to be defined and put in force are these instruments. When seen from this point of view, the question of bilateral vs. multilateral interactions is raised. While SLA's and MOU's are in theory instruments governing relationships and interactions between two entities, nothing prevents following a common approach among the MS, which in any case will be the case when the agreements involve one or more of the EU institutions and the set of MS's in some joint activities.

MS's should systematise the definition of SLA's for all services that might be used to support PEGS.

[27] Along with associated mechanisms for versioning and synchronisation between MS

6.4.4 Assess and confront the gaps

The Common Assessment Framework (CAF) provides a Quality self-assessment methodology and in this context provides a framework for encouraging the necessary business process engineering efforts on the part of the Member States. As a first step, sectoral application of the CAF (i.e., across Member State boundaries) will highlight, in the most effective manner, the actual business-related (more specifically, PEGS-related) gaps related to cross-border and cross-sector activities. Member States can then proceed with the necessary BPR efforts.

CAF (Common Assessment Framework) assessments should be performed on sectoral bases, in order to identify real deficiencies in the business processes so that needed improvements as well as alignments can be identified and implemented.

The results of, these business process reengineering efforts should be applied within each member state to fill the sector gaps, the goal being to support efficient and harmonized PEGS.

This forms the nexus of internal MS and sector improvement, in mutually supportive efforts. Applying CAF in both ways would support the corresponding monitoring activities.

6.4.5 Manage the changes

This is the operational aspect of both introducing and then maintaining Organisational interoperability once the approach has been defined. Business Process Reengineering (BPR) is inherently a highly disruptive undertaking, with significant associated risks. A careful and deliberate approach to implementing the necessary changes will be required.

These efforts at improvement should be continuous and subject to regular supervision and review.

The Member States should establish a change management strategy at national level, integrated into the PEGS-specific roadmaps, and possibly at higher (national) planning levels as well. The specific aspect of interest here is the cross-border coordination of these various change management activities in order for the Member States to remain in sync.

6.4.6 Reinforced collaboration

As hinted at in the previous section on Change management, effective implementation on these BPR efforts depends on effective cooperation. At some level, this cooperation can be greatly facilitated via some harmonisation at organisational level.

The Member States should designate delegates to cooperative and/or consultative structures dealing with specific issues, such as security, data protection, mutual assistance, etc.

Furthermore, at some point, it may be necessary to introduce specific interoperability services, platforms and/or other elements designed to orchestrate the cross-border interaction of business processes. Such mechanisms would be associated with some specific architectural requirements, defined/selected by common agreement. While implementation of such mechanisms is an activity at the level of technical interoperability, an important aspect remains at this level concerning the consultation on (and ultimately definition of) the mechanisms to be employed, as well as on how those mechanisms would be supervised and maintained.

As is readily apparent after the preceding, achievement of Organisational Interoperability requires a substantial amount of consultation and collaboration between the Member States, on an intensive and sustained basis.

The MS must collectively engage in:

- Cross-border information exchange on business processes
- Cross-border consultations on taxonomy of business processes and their components

- Cross-border coordination of change management activities
- Cross-border sectoral and functional coordination (security, data protection, etc.)
- Cross-border assessments of sectoral deficiencies affecting PEGS-related activities, or ameliorated/eliminated by introduction of specific PEGS.
- Cross-border consultation on mechanisms and architecture to orchestrate integrated cross-border business processes

All of which should ultimately result in cross-border operation and maintenance of PEGS.

It is clear that consultative structures must be put in place in order for these activities to take place in a reasonably efficient and effective manner. As already pointed out, the Commission ultimately has a very important role to play, in facilitating and coordinating these extensive cross-border efforts, and by extension the definition and establishment of the needed structures and mechanisms

6.5 Semantic Level

Semantic Interoperability enables organisations to process information from external/secondary sources in a meaningful manner. In practice, it will involve the establishment of common sector-specific sets of data structures, data elements and protocols. The partners need to agree on meaning and format of the information to be exchanged.

In practice, the MS and the EC should support the establishment of:

- Global and Sector-specific tools to aid in the sharing of information, e.g., listing sectors in which information will be shared, and for which base schema are to be established, etc
- Well understood and agreed basic principles for the management of government-held information
- common sector-specific sets of data structures, data elements and protocols
- Protocols for sharing/re-use of information across public and private sectors
- Information lifecycle management in the participating organizations

Achieving semantic interoperability in this context is challenging, as it is essentially an uncharted activity, which has not been achieved before elsewhere on the scale envisioned herein. Efforts at developing the necessary tools and methods are ongoing in different contexts and in different parts of the world, some of which have highlighted the importance of information management lifecycles[28].

Both vertical (sector-oriented) and horizontal (common-services and infrastructure-oriented) efforts are required in order to build effective interoperability at this level. The EU and IDABC have a number of initiatives underway towards achieving the goal of semantic interoperability. Among these, the IDABC project SEMIC.EU[29] aims at establishing the foundations of semantic interoperability for PEGS, across all sectors and at both conceptual and implementation sub-levels.

The establishment of Semantic interoperability will require the founding of sector-specific communities who are well positioned and possess enough practical and diverse knowledge of the

[28] The Australian IIOP takes a comprehensive approach including the information management lifecycle as an integral part of achieving Semantic Interoperability. It also recognizes the key role played by migration to the use of authentic data sources in achieving Semantic Interoperability.

[29] In September 2005 IDABC published the "IDABC Content Interoperability Strategy Working paper". This document recommends setting up a European Interoperability Clearinghouse organising the publication of "Interoperability Assets" at the European level, as central instrument for the implementation of the semantic interoperability strategy. In this context, a Clearinghouse is defined as a pan-European online information and collaboration platform, setting up a European Interoperability Clearinghouse; In December 2005 IDABC published the "IDABC Semantic Interoperability Strategy: The European XML Clearinghouse Feasibility Study".

sector so as to be able to define the common elements necessary to construct the semantic interoperability assets called for in the strategy paper cited above.

Due to the complexity of the task and the large number of interested parties active in any given sector[30], an organised effort at standardisation for each sector is needed. Specific expert groups may be selected or installed to further pan-European semantic standardization. Both the Commission and the Member State governments have key roles to play in fostering, facilitating and monitoring the developments.

The Commission and the Member States should identify and support development of sectoral communities aimed at facilitating semantic interoperability

Owing to its position, the Commission is ideally suited to playing a major role in the organisation of these communities. These sectoral communities encompass more than one business process, supply chain, institution or closed system. Members of these sectoral communities are the most knowledgeable parties with regard to the reference models and/or services they use/provide as well as the problems they face. This knowledge and expertise must be leveraged in the standardisation efforts.

The Commission and the Member States should support and extend the work of these sectoral communities, playing a formal role in a consultative and mutually supportive/collaborative process. In particular, the Commission should promote active involvement in the activities derived from the SEMIC project/study[31].

The NIF's should take into account the cross-border nature of semantic interoperability when developing data dictionaries

A further issue relates to the version of business data exchanged between entities. Various common data can be continuously modified after they have been created.

The exchange of information between one business partner using new data and the other business partner using existing data needs to be managed via a standard approach to versioning[32].

6.6 Technical Level

This aspect of interoperability covers the technical aspects of linking computer systems and services. It includes key aspects such as open interfaces, interconnection services, data integration and middleware, data presentation and exchange, accessibility and security services.

The Members States, Public Administrations and PEGS sponsors need to agree on the stack of technical standards to be used:

Area subject to technical standardisation	*Description/Detailed Recommendations (if any)*
Presentation	Interoperability at the presentation layer in the EU context is basically concerned with issues such as accessibility, multilingualism and language neutrality. The question of cultural neutrality (via the use of language-independent symbols for such items as common operations, universal services, types of information, etc.) as an objective has also been raised, but should be the focus of further study.
Data Representation/	Data interoperability concerns the selection of standards for data formats, such as character sets, etc. For example, in the case where textual data originating in one

[30] E.g.: customs, police, eID, eHealth, eProcurement, etc.
[31] SEMIC includes the production of data dictionaries and/or taxonomies of entities, services, data, etc.; and will facilitate and support alignment of sector players at MS level
[32] UN/EDIFACT (in operation for several decades) has now been generalised for any exchange of business data, based on the UN/CEFACT library of semantic building blocks, called the Core Component Library (CCL).

Area subject to technical standardisation	*Description/Detailed Recommendations (if any)*
Encoding	IT system must be understandable by another IT systems, this implies the selection and use of the appropriate[33] multi-language supporting character set for the representation of such data to ensure that meaning and usability of the data is preserved.
Middleware	In the case where loosely coupled IT systems (or some subset of components and/or functionality therein) must collaborate, the question of middleware may arise as one possible solution. In the cross-border context, the requirement can often be expressed as the need to provide certain services to IT systems in other Member States, implying the exposure of certain interfaces of particular National IT systems data and/or functionality to a closed community of systems comprised of all the member states. A standardized approach to selection and use of middleware at community level proving this type of loose integration[34] is recommended and will help to avoid the occurrence of new ad-hoc, bi-lateral and/or non-reusable solutions.
Platforms	The selection of platforms is generally of great interest to individual EU MS administrations. Their national or departmental IT strategies will properly be concerned with issues such as portability as well as the maintenance implications of their selections. Interoperability aspects of such platforms are addressed in relevant standards and technical specifications such as POSIX, or IETF-produced specifications.
Databases and Data Models	Also largely a national matter, excepting that efficient, effective interoperability will depend to some degree on across-the-board use of the relational model for modelling data. There are hardly any systems being planned or developed (or even on the horizon) in EU MS that do not conform to this model. This aspect of technical interoperability is closely related to semantic interoperability, as there may be sector-specific formats for exchange of such structured data sets (such as ebXML) that depend on the selection of specific lower level standards (such as XML).
Networks	The ability to transmit and receive data reliably and intelligibly is fundamental to interoperability. The EU MS will need to agree on common standards in this area.
Programming languages	The portability of source code has an interoperability aspect. There exist relevant technical specifications governing such interoperability such as the ANSI specifications for the C Language, etc. or the Java Community Process defining the Java Programming language, and its various extensions.

6.6.1 Closed Systems

EU and MS administrations need to have a clear and accurate view of the technologies in use, the technical expertise and capabilities of their staff which are available for leveraging, and how IT supports their main business activities expressed as documented business processes.

Many legacy systems have been designed to be tightly coupled internally, providing for very little or no interaction with external IT systems. Direct access to the services provided by or the data managed by these systems is difficult and in some cases impossible. These so-called "silo", “islands” or “closed” systems constitute one of the key barriers to interoperability as there are significant difficulties involved in repurposing the technology and data as building blocks.

[33] The appropriate character set in this context is one capable of supporting all the languages that would be used by the set of IT systems that might engaged in such implied data exchanges

[34] For illustrative purposes, there are of course well-known technical and open standards in existence that fulfil such needs.(e.g.,SOAP/Web Services, etc.); the selection of which standard, as in all similar cases, is deferred to the Architecture Guidelines, and to the Member States

The Public Administrations should engage in auditing, mapping, and selective benchmarking efforts that will help identify these closed systems as well as other barriers to technical interoperability.

6.6.2 Technical Standardization

A key factor in judging the viability of technologies is the availability of professionals, inside and outside the public sector, with the necessary ICT expertise.

Public Administrations need to assess the availability of professionals in the public/private sector and factor it into their strategic choices

Independently of the viability or utility of any specific technologies or standards, administrators need to cope with the existing set of standards and assets that are already in place / in use. Following the application of CAMSS, these will need to be identified, catalogued and ultimately assessed for their suitability, potential, degree of "open-ness", and the market conditions.

These efforts will also help in adapting legacy systems to interoperate and clarify surrounding issues.

The role extends beyond monitoring and facilitating the use and evolution of standards to catalyzing standards development and adoption, across all MS. The goal is to maintain a reasonable set of standards in any given domain, which respond sufficiently to the needs of Administrations, Businesses and Citizens.

It is recommended to compare what is in place in the various MS, and that collaboration between MS regarding convergence towards alignment with a limited set of standards[35] is encouraged and supported.

A significant part of this work is to be achieved via application of CAMSS, the results of which should be reflected in the forthcoming architecture guidelines (EIAG).

6.6.3 Common scheme and mechanisms to make systems connectable, including loosely-coupled systems

This particular aspect of technical interoperability bears specific mention and focus since it concerns some ways that Building Blocks on which PEGS are built can be connected, and because there are well-known technical solutions (e.g., Web Services) geared to exactly such situations the implementation of which will require a concerted and highly organized effort.

The European Commission and the MS shall establish a common scheme to connect loosely coupled systems (combining building blocks) and shall put in place the necessary infrastructure.

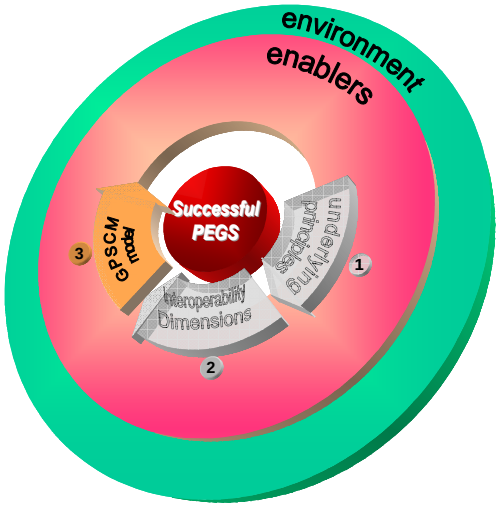
This particular technical interoperability problem is closely related[36] to the semantic interoperability efforts, as technical interoperability, among its other numerous aspects, is only part of the solution to make loosely coupled systems work together.

[35] Open standards is something else, further, discussed in section below.

[36] The analogy is communication using the telephone system: the telephone is only the mechanism (handset, interconnectivity, and numbering system) enabling communication, (as is Web Services in enabling the integration of loosely coupled systems); in order for two persons to communicate over the telephone they also need to speak the same language (semantic interoperability).

7 The Generic Public Services Conceptual Model (GPSCM)

7.1 Introduction to the Concepts



The Generic Public Services Conceptual Model (GPSCM) is the organizing principle underlying the construction and operation of the Interoperability chain mentioned earlier.

The Commission studied the implementation of public services/ eGovernment services in the Member States in 2007. After review of the information obtained, a Conceptual Model has been constructed, intending to embody the common elements observed and best practices recommend as a blueprint for future implementations.

It is important to note that the model is a conceptual model, and not a detailed specification, meaning that the basic purpose of the model is to develop a common vocabulary and understanding across the EU Member States about the main elements comprising a public service implementation, and their basic relationships to one another.

The GPSCM emphasizes a "building-block" approach to the construction of public services, allowing components to be compared and interconnected, and invites the possibility of service reuse to be taken into account when building new services. Systematic reuse of the GPSCM at all levels reinforces service reuse everywhere.

The model is strongly oriented towards the implementation of future services. Of course, not every existing service will exactly fit this model, nor is this the idea. Rather, with these principles in mind, it will be easier in the future to implement new PEGS efficiently and effectively with this model as the starting point.

The model is generic, in the sense that it is applicable at any level of government providing public services, from the local level all the way up to the EU-level. In more concrete terms, any level of government can be a provider of both Basic Public Functions (mainly meant for a local user base, but reusable) as well as of PEGS. The model also can be used to clarify and rationalise the relationships between entities (at the different levels of government or in different sectors, or both) that are collaborating to deliver better public services.

Application of the GPSCM will bring practical benefits in implementing PEGS. For example, the splitting of functionality into services with well-defined interfaces, conceived for reuse, will simplify and streamline considerably the implementation of specific PEGS, such as those required to implement the provisions of the Service Directive (Cross-sector service integration, single-windows related to implementation of Points of Single Contact, etc.). This splitting of functionality will also ease the integration of the various components comprising any given PEGS. Additional benefits of this service-orientation include avoiding duplication of efforts by encouraging recourse to existing services, as well as automating a variety of basic best practices that could find wider use than a single PEGS.

The final utility of the model is to aid in the identification of the key issues, challenges, and barriers to interoperability to be overcome.

7.2 The Key Concepts

The GPSCM promotes the reuse of Information, Concepts, Patterns, Solutions, and Standards in Member States and at European level:

- It takes into account the reality that information can exist at several levels of Government in the Member States, through its "genericity"
- The model also explicitly takes into account key aspects of the PEGS context: that significant cross-border data exchanges are involved which will have a fundamental impact on the design and implementation of IT systems across the EU, through its "interconnectivity"

In these two ways, the model highlights the need for modular, loosely coupled infrastructure components cooperating in the delivery of PEGS.

It explicitly posits the EU-wide adoption of a service orientation to system conception and development, as well as an application landscape which is broken down into consistent (and in some cases commonly defined) services components. **Service Orientation is an** architectural style for creating and using business processes, packaged as *services*, throughout their lifecycle.

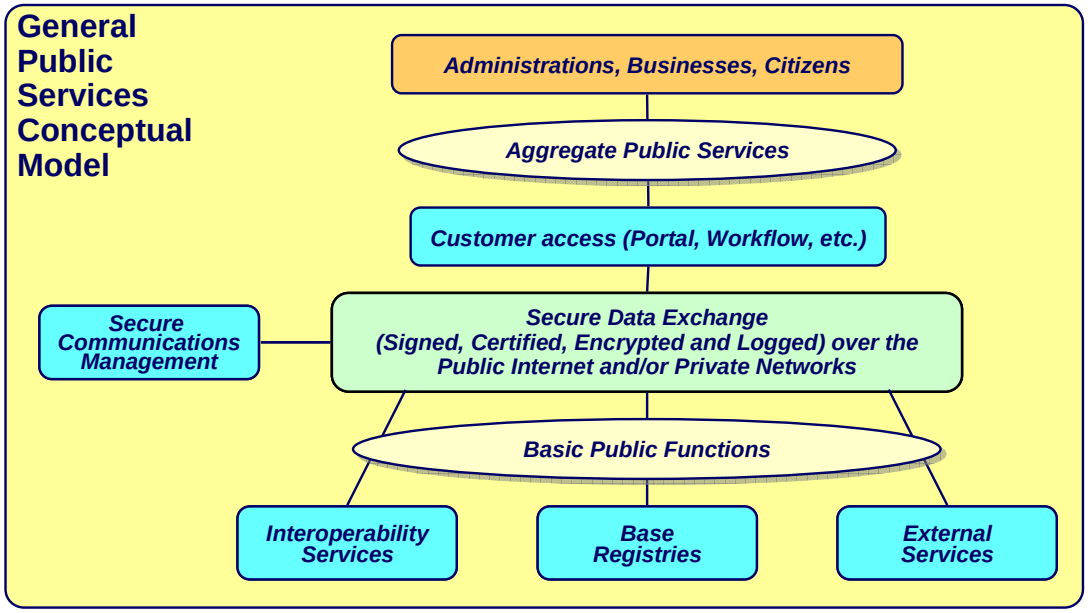
A common component model should be developed at National Level to align with the GPSCM

Public Administrations should reconfigure their systems and applications to increase reusability and meet new user requirements

Public Administrations should incorporate service-level agreements and operational policies at the component level

The implementation of PEGS in combination with other initiatives conducted in parallel such as implementing the Service Directive, reducing Administrative Burden, etc., will greatly exacerbate the need to share, reuse and exchange data within and between Member States administrations. A new collaborative approach to managing the data stores in question will be required.

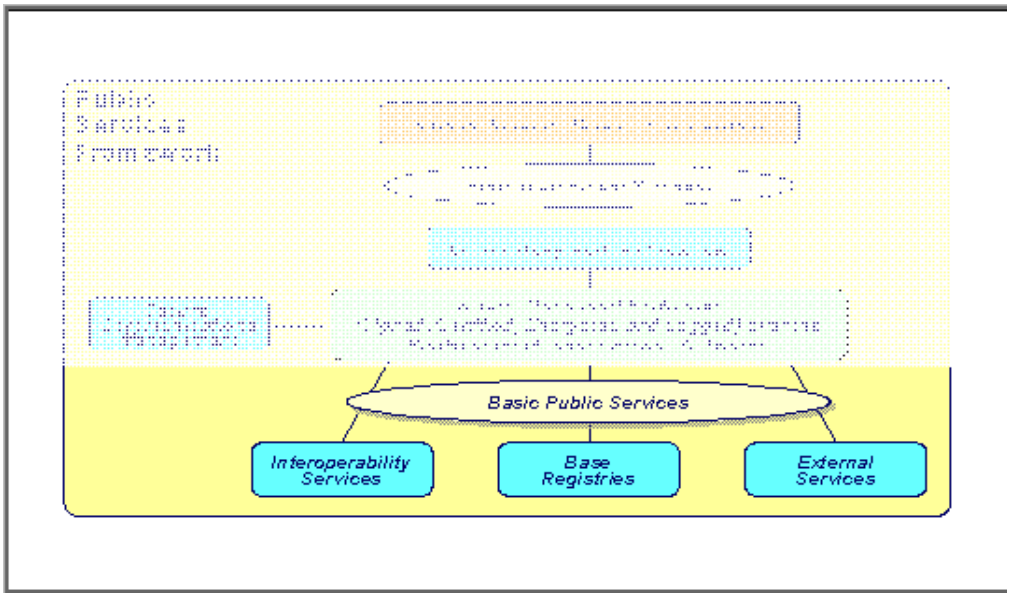
The basic elements of the model are depicted in the diagram below:



Each of the basic elements of the model will be explained in more detail in the following sections. In order to better understand this model, it is useful to subdivide the model into three layers and to take a look at each layer individually.

7.2.1 The Basic Public Functions layer

The lowest layer deals with the most basic building blocks used to construct PEGS.



There are broadly three types of such Building Blocks: Base Registers, Interoperability services and External Services, described in the next sections.

7.2.1.1 Base registers

The most important of these is the «Base Registers»: these represent data, under the legal control of MS or EU institution, but made available for wider reuse. These can be coming from legacy systems

These are sources of basic data that are maintained by any local, regional or national government on such items as persons, vehicles, licences, buildings, locations, roads, etc. These services may also reflect the customer life cycle. They also typically form the core (separately or in combination with others) of basic national eGovernment Services available to local citizens/users.

Base registers can take a variety of forms, but the common thread running through all possible implementations is the fact that they are authentic and authoritative in nature. This means that such data repositories contains relevant information, (not necessarily *all* information) about citizens, enterprises and organisations, etc., *that is believed to be correct*. The information is stored for a particular purpose and only that amount of information is stored that is needed to achieve that purpose.

Implementing cross-border access to data is of course a major challenge and several aspects need to be considered.

Migration to authentic sources

The basic concept behind the GPSCM is the building block approach to construction of PEGS. Implementing building blocks implies the establishment of certain levels of trust pertaining to specific interactions, accompanied by the introduction of negotiated agreements between member states, that could take the form of Memoranda of Understanding, and SLA's governing reliability across borders, associated with the idea of well-defined interfaces on which other components (service users) can rely; Achievement of these goals is problematic in the absence of base registers implemented as authentic sources of data.

The entire GPSCM is predicated on the eventual migration towards systematic and comprehensive use of authentic sources[37] by Public Administrations. This also mandates a well-defined ownership of each data source vetting how and by who the data can be accessed.

[37] Only for the relevant, and minimum required data sets of course

Implementation of Access and control mechanisms

To protect a person's privacy, measures have to be taken to avoid linking of personal information (profiling) when it is not allowed.

These measures include the Implementation of appropriate access and control mechanisms. As a starting point, the alignment of security policies is recommended, as well as coordination on all key decisions concerning the security model, or having significant impact on the established SLA's[38]. There also needs to be agreement on the possible uses of digital signatures and certificates in this context.

Alignment of interfaces to data sources

The implementation and maintenance of the abstraction layer will be considerably facilitated if there is a reasonable alignment of the interfaces to the authentic sources, at semantic level. Sharing of information to obtain this is necessary, and should follow on as part of the results of sectoral harmonisation activities mentioned elsewhere in this section.

EU level modelling activity

The purpose of this activity is to establish an abstraction layer providing a common, standardised interface mapping to national interfaces.

Legacy Systems

One of the greatest obstacles to the adoption of the GPSCM for PEGS implementation is the base of legacy systems from which Base Register services would have to be built, and all their attendant limitations. It is simply a fact that many if not most existing IT systems and data repositories will have widely differing characteristics[39] limiting the possibilities for immediate reuse to one degree or another.

To tackle this issue, the Member states need to obtain a thorough and detailed view of the readiness of their systems for repurposing as PEGS building blocks.

Public Administrations should audit their existing services (and associated business processes), in order to construct an accurate baseline, identify and document elements of existing services or business processes including business functions implemented by applications, data used by processes, services provided by systems and tasks done by people.

Public Administrations should then assess the reusability of the legacy systems to determine which systems are candidates for partial or complete reimplementation, and which system are sufficiently adaptable (or suitable for retrofitting) so that Building Blocks can be easily constructed or simulated, and PEGS can be built from them40.

7.2.1.2 Interoperability Services

These are the core services that provide the building blocks upon which the actual eGovernment services are built and depend, as well as any additional services that provide specific capabilities furthering specific interoperability concerns or needs, for example: protocol translators, format translators, language translators, standards translators, information brokers, etc.

[38] The SLA's ought to formulate their key provisions in the same manner across MS, using the same language where necessary (translated of course) to eliminate the possibilities for cross-border mismatches

[39] Legacy systems vary in their degree of "open-ness" with respect to reuse; at the extreme "closed" end are so-called "silo" systems, which are architecturally monolithic, i.e., the various elements of the ICT system such as data, business logic, and presentation processing, are tightly coupled or even completely intertwined, making re-use (requiring the exposure of service-based interfaces to other ICT systems) difficult or impossible to achieve without extensive re-engineering efforts. In some cases, reuse may not even be feasible and re-implementation could be required if reuse is sought.

[40] As an example, implementation of a single-window environment (such as could be envisioned as a particular implementation of the Service Directive) could be based on a set of such appropriate and relevant assessments.

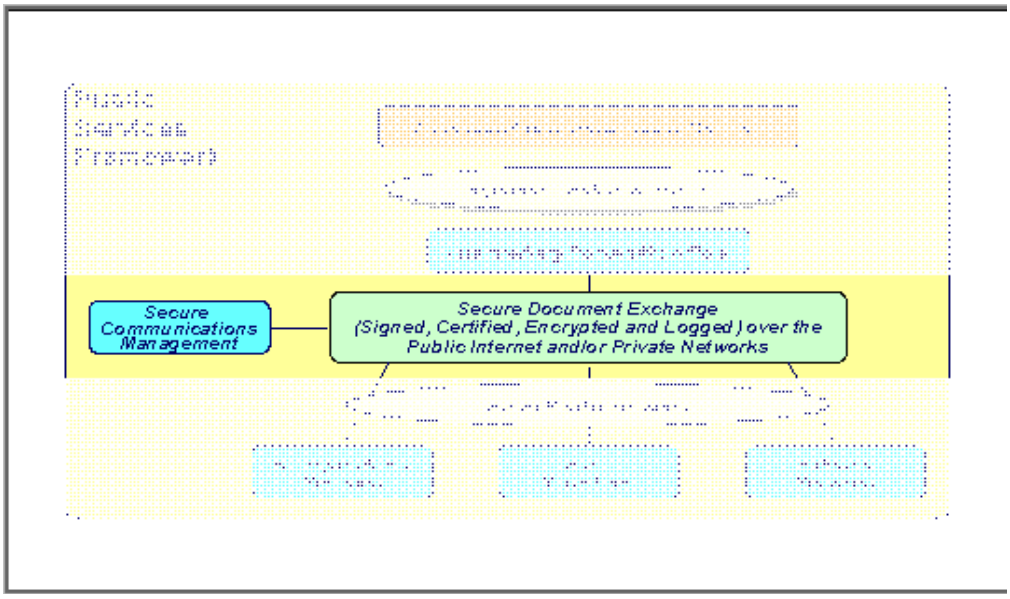
7.2.1.3 External Services

These include services provided by third parties such as enterprises or agencies that may be included in the scope of PEGS. Important examples of such services include:

- Connectivity services provided by the internet, or
- Financial services provided by financial institutions providing payment operations in the context of an eGovernment service transaction.

7.2.2 The Secure Data Exchange Layer

This layer is central to the GPSCM, figuratively and literally. All customer access passes through this layer.



From the business point of view, Administrations are moving official documents and (sometimes pre-filled) forms around, between entities, which in some cases actually results in direct access to "authentic sources". On those aspects, they must be able to interoperate with other Administrations (whether Member State or Commission), whether internal or external to that Administration as well as Businesses and Citizens of the European Union in a secure and controlled manner.

This induces specific requirements related to security on the exchange of certified messages, email and documents between their respective systems. This layer, in addition to the pure transmission of data, is intended to meet specific security requirements which include:

- *Secure Data Exchange* — for data-transport over (a combination of) private (e.g. s-TESTA) and/or public networks
- *Signed* – the sender has applied his signature to the data exchange for legal and evidentiary purposes
- *Certified* – that the data set delivered has been certified (via some acceptable means) as being authentic
- *Encrypted* – to ensure the confidentiality of the transported data
- *Logged* – by at least one authority, to maintain a legal audit trail of the exchanged data for evidentiary purposes.

Adoption of the GPSCM forces all service providers to confront the security issues head-on, and to collaborate on a common framework to meet their respective security needs at the same time via

compatible mechanisms and commonly agreed specifications, as well as reaching common understandings on essential characteristics such as authorisation levels, authentication strength, etc.

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

- *Communications Management* — to ensure parties can identify, authenticate, authorize and reach each other
- *Service Registry* — to ensure, given proper authorization, access to available services through prior localisation as well as verification that the service is authentic.
- *Service Logging* — to ensure logging of all data transports is adequately performed, including archiving when necessary.

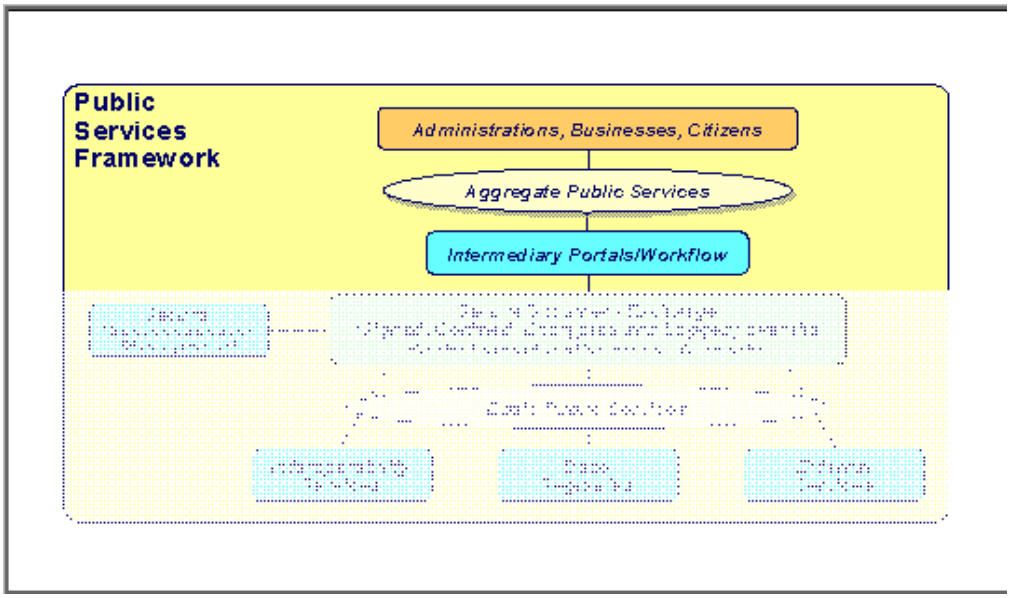
7.2.3 The Aggregate Services Layer

As implied by the GPSCM, Aggregate Public Services are constructed of appropriate groupings of Basic Public Functions: i.e., combinations of Base Register Services with Interoperability Services and External Services, accessed in a secure and controlled way. The functions in question can be supplied by administrations of any level, from any member state or set of member states.

When such aggregate services are implemented by Public Administrations and intended for citizens and/or businesses across the EU they correspond directly to PEGS.

The basic public functions are aggregated together via appropriate mechanisms according to the specific business requirements applicable for the given PEGS. In the most general case, business logic required to implement the requirements of the PEGS in question which can take several forms. They could for example be orchestrated via a workflow engine and/or access portal(s).

These aspects of the model are depicted in the diagram below:



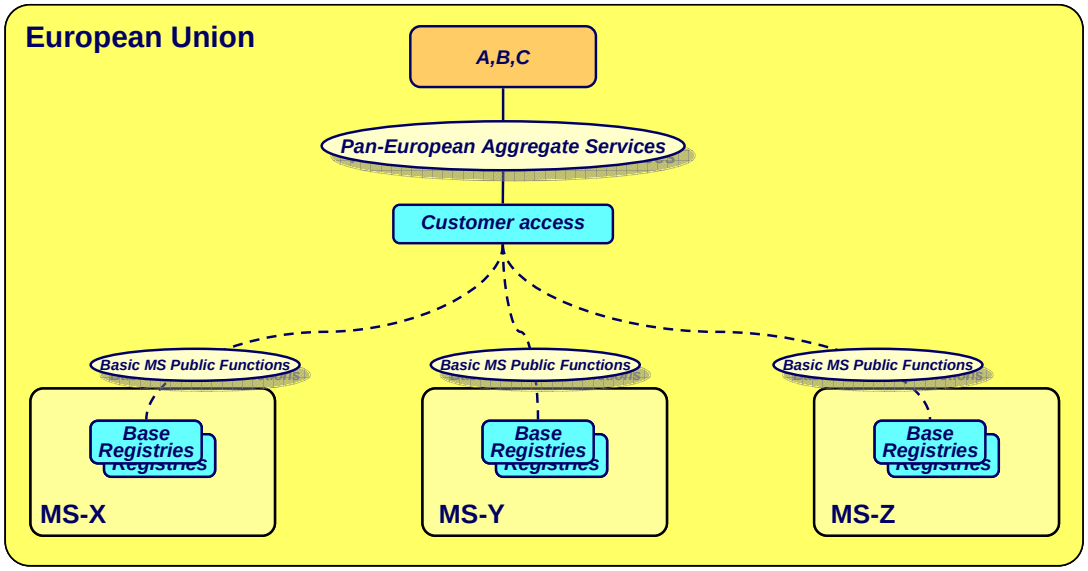
The typical aggregate service is intended to appear to its users as one (composite) service. Behind the scenes, transactions may be implemented that span borders and/or other administrative boundaries. In fact, the model does not include any representation of any national borders, nor does it recognize or acknowledge any intra-state borders such as between local and/or provincial governments and national governments.

7.3 Application of the GPSCM to National and European Public Services

The following two sections illustrate two specific and fundamentally interesting ways that the GPSCM can be applied and the benefits of doing so, including elucidating the issues that such application raises.

7.3.1 The Cross-Border Case

As an example of how the GPSCM can be applied, consider the case where a PEGS is implemented on the basis of a number of different Basic Public Functions implemented in different Member States, as depicted below:



We can see that the situation depicted in this diagram is merely an adaptation of the original GPSCM, adding national boundaries to indicate where individual sets of Basic Public Functions are implemented. This adaptation of the model therefore depicts the cross-border application of the model.

A number of issues arise from consideration of this application of the model:

TRUST: The cross-border application of the GPSCM involves allowing external access to national data. Establishing the kind of trust that is required is a significant challenge to be overcome.

Efforts by the MS guided by the Commission should be undertaken to produce a clear, detailed and systematic definition of the roles, rights and responsibilities of data "owners", data "custodians", and data "users", including the cross-border dimension in these definitions. It also requires technical, organisational, and legal support.

Service Levels and PEGS dependence on lower-level services: As the aggregated service depends on the Basic Public Functions, The *level* of service provided by the aggregated service depends on the *levels* of service provided by the Basic Public Functions. These are services that may be provided by other entities.

The establishment of the appropriate SLA's, (negotiated between the cooperating parties) will be needed and is crucial to successful PEGS implementation.

As all PEGS providers face the same problems, a uniform/standardized/common approach to the provisions and other content of such SLA's is strongly recommended.

Common interface standards for Basic Public Functions. Basic Public functions developed by different Public Administrations, possibly in different Member States are bundled together to provide PEGS.

This highlights the need for a common taxonomy of such Basic Public Functions, at both technical and semantic levels..

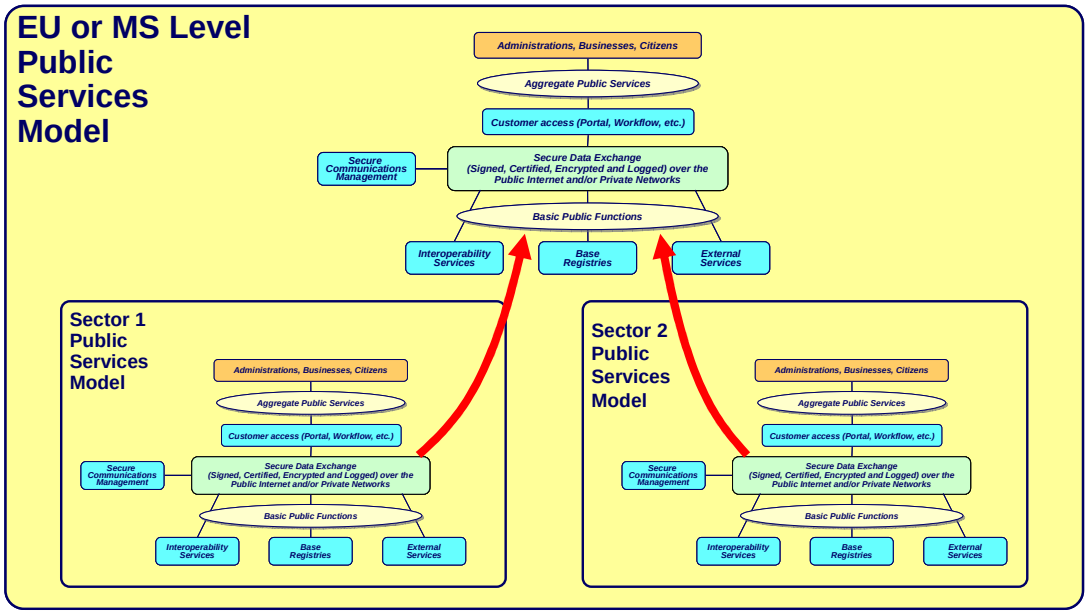
Data Protection As there is exchange of National Data across borders taking place, there will be national data protection requirements in force. The intermediary layers ("Customer Access", and "Secure Document Exchange") are intended to enforce these security requirements. The difficulty here is that data originating from different MS may have attached to them potentially different legal requirements with respect to data protection.

The challenge is two-fold: as differences will persist, the intermediary layers will have to continue to cope with a heterogeneous environment of persisting national data protection restrictions; however, conflicts in requirements affecting feasibility have to be eliminated via definition of minimum common requirements as codified in common agreements

Hidden Conceptual Mismatches. Each of the elements of the model contains many assumptions, that could in practice (in the worst case scenario) result in the situations where incompatible mismatches in conceptual framework and enterprise architecture elements such as "roles" lead to unworkable situations.

The challenge then is to define a common approach and conceptual framework at the next level of detail, so as to ensure interoperability of the resulting conforming systems.

7.3.2 The Cross-Sector Case



7.3.2.1 Description

Another important application of the GPSCM is the Cross-Sector case.

This particular application of the model reflects such real world PEGS as those involving the presentation of "single-window" environments to their users, which concentrate the interactions between users (citizens or businesses) into user-centric "Points of Single Contact". More specific examples of such environments could be foreseen in the implementation of the Service Directive, or for some types of transactions involving international trade (imports, exports, etc.).

The desirability of so-called single-window environments for businesses and citizens is long established. Unfortunately, the cross-sector integration of services necessary to achieve such environments has been a significant challenge, with only limited progress having been achieved across the EU despite the investment of significant time and effort in several Member States.

This topic has been the subject of much interest and study during the past several years; it is certainly not a simple matter to integrate data and activities of such disparate and different administrative agencies and bodies into a single set of coherent and straightforward transactions.

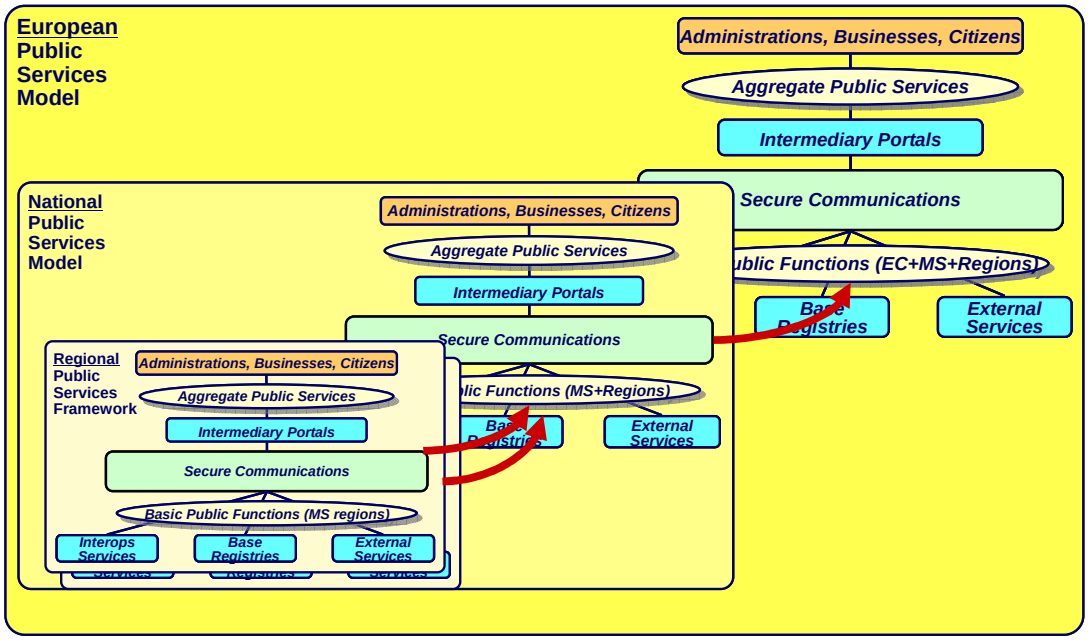
Among the most significant obstacles has been the lack of truly reusable and/or properly accessible interfaces to the key services, and a common approach to service definition. The application of the GPSCM in this case will go a long way towards eliminating these two specific obstacles thereby facilitating the introduction of these single-window environments, and thereby helping to achieve the expected benefits to citizens and businesses.

Public Administrations should adopt the GPSCM as an integral part of their efforts to implement single-window environments.

Another important issue highlighted in this application is the existence of significant weaknesses and deficiencies with and between sectors.

Public Administrations should evaluate performance on a cross-border sectoral basis applying the Common Assessment Framework (CAF), and track the corresponding improvements.

7.3.3 The Cross-Administrative Boundary Case



This diagram depicts (a particular set of) Aggregated Public Services being provided on the basis of Basic Public Functions provided at the European level, in combination with basic public service provided at National level from different sectors in a given member state (accessed in a secure and controlled way), some of which may be in turn offered based on the reuse of services provided by different regional or even local administrative entities (also accessed in a secure and controlled way).

Chief among the issues raised is the question of cooperation between and coordination of the different service providers involved in the aggregated service. As the proliferation of such relationships in PEGS provision is likely to be very large without an overarching strategy and control, an efficient and effective scheme of cooperation and coordination must be devised.

The MS should devise and implement an effective scheme of cooperation and coordination that limits the complexity and multiplicity of relationships between the providers of PEGS building blocks, and imposes some common, minimum set of operating principles and practices to make the resulting scheme manageable.

7.3.4 Other Issues related to application of the GPSCM

It is furthermore not surprising that in such a complex environment as the provision of cross-border public services, the closer we get to implementation in the real world the more thorny issues arise. Here are a few examples:

The autonomous national identification and authentication infrastructures in the MS must be leveraged into a working cross-border scheme.

The idea is to provide signed, certified, encrypted and logged document exchange between administrations, businesses and citizens.

This involves the certification of intermediaries to provide aggregate services using Basic Public Functions; it is about establishing trust between users and providers of the services

In order to determine which public services may be disclosed to which constituency and/or intermediary a process of authorization may be useful.

Intermediaries delivering aggregate services must be able to trust the basic services provided. Certification establishes the integrity, confidentiality and availability of Basic Public Functions.

Cross-Certification is one way in which the exchange of information (in documents and services) between constituencies in different Member States, (each having their own possibly multiple identification, authentication and certification infrastructures), can be secured.

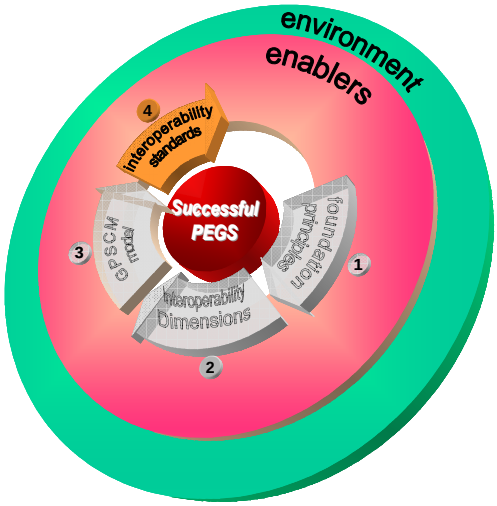
There is a definite public interest at stake: ensuring broad and continued access to needed services. The immediate goal is to maintain the competitiveness of aggregate service delivery and pricing.

In order to ensure this, a policy is needed, that will include harmonization at European level.

8 Adopt Open Standards or Technical Specifications

8.1 Introduction

This section advocates a systematic migration towards the use of open standards or technical specifications to cover the inter-block interfaces of the GPSCM, in order to guarantee interoperability, to facilitate future reuse and long-term sustainability while minimizing constraints. After contextualising the definition of open standards or technical specifications, this section addresses the assessment and selection of standards or technical specifications and finally presents a set of recommendations.



8.2 Definitions of standard and technical specification

It should be noticed that the way the term « standard » is used in the European legislation is not widely understood outside the standardisation and procurement communities. It is therefore worthwhile to explain it.

In this document, we refer to the definitions as present in Directive 2004/18/EC, which lays down procedures for public procurement.

- A 'technical specification', means *"a specification in a document defining the required characteristics of a product or a service, such as quality levels, environmental performance levels, design for all requirements (including accessibility for disabled persons) and conformity assessment, performance, use of the product, safety or dimensions, including requirements relevant to the product as regards the name under which the product is sold, terminology, symbols, testing and test methods, packaging, marking and labelling, user instructions, production processes and methods and conformity assessment procedures"*;
- A 'standard' means *"a technical specification approved by a recognised standardising body for repeated or continuous application …"*.

This distinction implies that we use the term "standard" to refer to a document, established and approved by a national, EU or International recognized body (CEN, CENELEC, ETSI, ISO,…) whereas the term "technical specification" covers also specifications issued by stakeholder fora or industry consortia such as W3C, IETF, … This approach is consistent with Directive 98/34/EC, which lays down a procedure for the provision of information in the field of technical standards and regulations.

In practice, many of the standardisation initiatives in the ICT field are producing technical specifications that are not standards (because not approved by recognised standardisation organisations; the ubiquitous TCP/IP (issued by the IETF) and HTML (issued by W3C) being good examples. We have therefore opted to systematically use « standard or technical specification » to cover all specifications that are relevant when specifying modern ICT architectures or systems.

Nevertheless, this distinction between "standards" and "technical specifications" is not always directly relevant for the purpose of the EIF where the emphasis is not put on who is producing the specification but is put on the adequacy of the specification to fulfil the public administration needs.

8.3 Openness and interoperability

Openness of standards or technical specifications is important for public administrations because of its relationship with interoperability, freedom and choice[41]:

- openness lowers barriers to market entry, thereby widening the field to competition - leading to more choice, better quality and lower prices;
- openness spurs innovation by allowing more talent to contribute ideas and advance the state-of-the-art;
- openness strengthens the position of consumers vis-à-vis their suppliers;
- openness enables consumers to combine off-the-shelf products with custom-built products and turn-key systems;
- openness facilitates interoperability through transparency;
- openness enhances security through transparency;
- openness ensure access to information and services, now and in the future, as it avoids lock-in situations, making such access dependent from specific products;

Any Public Administration must be independent of any particular supplier in terms of having permanent access to and control over its own data. This naturally leads to the identification of a number of specific needs and organisational imperatives related to standards or technical specifications:

- Public Administrations, especially in the PEGS context, need common standards or technical specifications to implement the interoperability of their processes, organisations and systems;
- The specifications being used have to be state-of-the-art, in order to be compatible with the rest of the world and to reduce risks ;
- Access to the standards or technical specifications has to inexpensive and easy and there should be no (cost) barriers related to their implementation so that a wide variety of products will be available on the market;
- Public administrations must maintain positive control over standards or technical specifications that have been developed by and for public organisations (metadata, schemas, taxonomies etc.).

For all of these reasons, the overwhelming desire of Public Administrations in Europe is for a clear migration towards *openness*.

In the context of PEGS, openness leads to easier pan-European information exchange and cross-border interoperability as it enables us to structure the GPSCM around services and components with well-managed interfaces. Furthermore, it adds the flexibility and reuse capabilities needed for a service-oriented approach and allows combining and mixing components, leading to increased effectiveness and efficiency. Standardisation of these interfaces therefore also provides interoperability over time between partners and do not impose hardware or software obligations on partners resulting from software choices. In particular, Open Standards allow easier pan-European information exchange and cross-border integration/interoperability[42].

[41] *"When open alternatives are available, no citizen or company should be forced or encouraged to use a particular company's technology to access government information … no citizen or company should be forced or encouraged to choose a closed technology over an open one, through a government having made that choice first"* European Commissioner for Competition Policy Neelie Kroes, OpenForum Europe – Breakfast Seminar, Brussels, 10th June 2008.

[42] i2010 Initiative: A single European Information Space - "The Commission intends to use all its instruments to foster technologies that communicate, ..., promotion of open standards."

8.4 The role of open standards or technical specifications

The rise of Internet ecosystem has shown that the openness of standards and technical specifications can lead to a high degree of interoperability and therefore can help to fulfil the needs and requirements expressed above.

There are a number of well-established standards-setting organizations including consortia like the Internet Engineering Task Force (IETF), World Wide Web Consortium (W3C), and the Organization for the Advancement of Structured Information Standards (OASIS), as well as formal standards bodies such as the European Committee for Standardization (CEN) or the International Organization for Standardization (ISO), whose outputs, in principle, can be considered as open to one degree or another.

As presented in the first version of the EIF, open standards or technical specifications have a key and central role to play in attaining interoperability in the context of PEGS. One of the difficulties is however that there is no universally accepted "open standards" definition that covers all openness aspects. In order to establish a baseline, the following are the four minimal characteristics that a specification and its attendant documents must have in order to be considered an open standard[43] under the EIF v1 definition:

1) The open standard is adopted and will be maintained by a not-for-profit organisation, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision etc.).
2) The open standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee.
3) The intellectual property - i.e. patents possibly present - of (parts of) the open standard is made irrevocably available on a royalty free basis.
4) There are no constraints on the re-use of the standard.

Each of those characteristics has been elected due to its unique potential to cover some of the needs presented in the previous section. Since the publication of version 1 of the EIF, several practical cases have however shown the necessity to clearly point out the extent of this definition and to clarify its applicability.

- The focus is on the interoperability within the context of complex, software based ICT systems.
- Open standards or technical specifications must allow all interested parties to implement the standards and to compete on quality and price. The goal is to have a competitive and innovative industry, not to protect market shares by raising obstacles to newcomers. Also, we want to be able to choose open source solutions or proprietary solutions on the basis of price/quality consideration (see the next chapter). The baseline is therefore that open standards or technical specifications can be implemented by both proprietary and open source software, with no limitations arising from IPR associated with the standard in question, especially in compliance with the open source licenses most used by EU public administrations.
- Practices distorting the definition of open standards or technical specifications should be addressed by protecting the integrity of the standardisation process.
- Practices distorting the evolution of open standards must also be addressed. In order to be considered an open standard, the candidate in question must be considered *in its entirety*, including any and all extensions. Products implementing non-standardised extensions to the standards should be considered as non-compliant. Exceptions are early implementations of

[43] In this definition, we used the term open standard in its broadest sense, including the open technical specifications, the objective being to focus on the "open" nature of this technical specification not specifically to focus on who is producing it.

extensions that are considered within the context of ongoing maintenance of the standard for as far that there is a (technical and commercial) guarantee that these extensions will be brought in line with the new version of the standard as soon that this new version is approved.

- This baseline definition reflects the needs of public administrations. If it is clearly assessed early in the PEGS development lifecycle that no potential benefit might result from using open source solutions, for any of the present or future stakeholders, then it might be relevant to limit the scope to the characteristics (1) and (2) noted above, otherwise, to goal is to fulfil all four criteria. There are also areas where no real open standard or technical specifications are available or there may be other considerations that make it necessary to drop one or more of the characteristics described above.
- This definition reflects a consumer's viewpoint, with his needs uppermost in mind. It does not however place any constraints on any market player. It is up to the creator of the standard or technical specification to decide which kind of IPR regime he would like to associate with the standard or technical specification and it is up to the owners of technologies to decide if they are willing to make their technology available under the proposed IPR regime.

8.5 Openness continuum

The difficulty in limiting the selection of standards or technical specifications only to the "most open"

The definition of open standards presented above should be considered as part of a broader approach, as openness touches upon many aspects of the definition, adoption and use of standards or technical specifications. First of all, openness might address additional process-related characteristics such as being subject to a non-discriminatory conformance process.

On the other hand, the characteristics of an open standard or technical specification, as presented in the previous section, might be fulfilled by some technical specifications only in part. It is useful to consider some specific "shadings" of openness such as technical specifications that are:

- "freely available" (meaning that their contents are not secret),
- "available for free" (without charge), or
- "free of use restrictions" (i.e., of legal restrictions on their use).

The interest in such additional categorisations is straightforward: Open standards or technical specifications are preferred (for all the reasons given above), but if there is no suitable, feasible open standard or technical specification, one can investigate some of the "less open" alternatives. Whereas the goal is to ensure real and fair competition through the selection of open standards or technical specification, it is however difficult at this time to limit the selection of standards or technical specifications only to the "most open" as prevailing conditions must be taken into account, including the current market conditions.

However, such choices must be revisited on a regular basis in order to ensure that a systematic migration towards the use of open standards or technical specifications takes place, as quickly as is practical.

98/34/EC directive: a very limited subset of IT-related specifications and standards

In addition to this division between specifications and standards, EU directive 98/34/EC[44] addresses some of the same issues. Among other things, it provides instructions for the use of technical standards and regulations in the domain of the information society. It does *not* mention open standards, or even take into account the previously discussed divisions; rather it views standards from an *institutional* perspective: the naming of "standards" *per se* is defined as the exclusive domain of a number of recognised standardisation organisations, with an order of precedence. The result of this is that the specifications and standards that fit the definition under the directive only comprise a limited subset of

[44] http://ec.europa.eu/enterprise/tris/98_34_ec/index_en.pdf

the complete set of specifications and standards available to choose from. These standards fulfil – by default – characteristics (1) and (2) specified above.

Restrictive use leads to less than optimum solutions in some cases.
The standards that fall within the directive do not provide a solution for every situation. Rigidly restricting the selection of standards only to those that fall within the definition given in the directive will therefore inevitably lead to less than optimum solutions in some cases.

A method is needed by which standards can be assessed and selected in a systematic and structured way
It is therefore clear that a process is needed by which standards or technical specifications appropriate for the context of any given Member State's environment and for any specific PEGS context can be assessed and selected in a systematic and structured way, taking into account the current environment and market conditions.

8.6 A systematic, structured assessment of standards and technical specifications

When defining interoperability frameworks, ICT architecture or individual ICT system, interfaces between building blocks or between the system and the "rest of the world" need to be defined. Depending on the case at hand, one may find no relevant standard or technical specification – in which case you will have to develop, together with all other stakeholders, your own specification – but often also one may find a number of equivalent, competing standards or technical specifications. Using multiple, equivalent standards or technical specifications may lead to lack of interoperability or the unnecessary introduction of "converter modules".

It is therefore advised to the Public Administrations to agree with all involved stakeholders on the use of a minimal set of standards or technical specifications.

The proper selection of standards and technical specifications relies first of all on a clear assessment process taking into account a set of objective criteria.

Such criteria can be grouped in several categories, addressing both Public & Private Value of the standard or technical specification in question:

- The "suitability" criteria reflect the ability to fulfil a public administration's "business" needs. Aside the direct business need to be covered, this includes aspects such as Accessibility, Security, Privacy, Multilingualism, Interoperability, etc.
- The "potential" criteria cover non-functional characteristics such as scalability, maturity, stability and maintenance.
- The "openness" criteria cover aspects such as:
    - the openness of the process used to produce and maintain the standard or specification and the neutrality of the party maintaining it;
    - the availability of the specification for reading and studying;
    - the ability for different market players to implement the standard, independent of their business model (see further the discussion on the impact of open standards and specifications on the open source business model);
    - the openness of the implementations – implementations implement the standard or technical specification, not a "proprietary" subset or superset of it that is not standardised;
    - the degree to which costs are limited at all steps in the process – from costs associated with the right to participate in the definition of the standard or specification, over costs associated with the implementation of the standard or specification all the way to costs related to verifying the conformance of an implementation.

- The "market conditions" criteria reflect the industrialization of a standard or specification, its alignment with best practices, its reusability, the number of competing implementations available, and the degree of market adoption and support available.

A specific initiative to harmonise such evaluations in the context of PEGS would be beneficial. It is expected that the CAMSS [45] project will deliver recommendations on just such an assessment methodology, covering the areas mentioned above. The applicable results of EU-wide assessments using CAMSS (i.e., across all EU Public Administrations, independent of any national borders or other administrative/sectoral boundaries) should be included in the EIAG.

Member states should use the CAMSS methodology and contribute to the assessment study as well as make use of the outputs of the CAMSS project.

8.7 Establishing a common framework for standards and technical specifications selection

It is important that the standards and technical specifications adopted by Governments support the wider-encompassing e-Government strategy. This is because the wider strategy usually sets out the values and principles for eGovernment. Tying in the standards and technical specifications selection with the more general policy directions of government itself ensures that the standards and technical specifications selected via the process are closely aligned with the overall strategy of the governments in question.

Determining what standards and technical specifications should apply across Public Administrations, independently of borders or sectors, is also a necessary foundation. Not all processes or information necessitate sharing; nevertheless, interoperability should be promoted and facilitated where most relevant. Conversely, the implementation of isolated, monolithic or otherwise non-interoperable information systems and the consequent duplication and/or redevelopment of similar business functions as well as the often needlessly complex interactions necessary to exchange information that are associated with such situations, must be discouraged.

One way to characterise this approach is that it entails applying an "urban planning"-style analysis to the use of IT standards throughout the IT ecosystem of public administrations in Europe. Interoperability in general (that is, globally speaking) is severely handicapped by the uncontrolled and ad-hoc proliferation of multiple standards or technical specifications applicable for any one given function, as well as by their varying characteristics. From this perspective, it is clear that a globally-oriented process of selecting standards and technical specifications has to be put in place to manage this situation properly.

A selection process shall be organised in a transparent, fair and balanced way with a major involvement of the MS as they have already taken several initiatives to select open standards or technical specification at national level. In this context, a hierarchy of areas that would (or do already) benefit from standardization should be identified with priority given to mature, widely used, open standards or technical specifications. In case open standards or technical specifications do not exist in certain areas, the selection should however take into account the context of use and based on CAMSS criteria should identify the best candidates.

Such orientation should be complemented active support for standardisation initiatives in the corresponding areas based on open processes. This will help balance the use of open standards with the dynamics of the market and emerging technologies.

Furthermore, obtaining the collaboration and support of the major industry players is a critical success factor. This aspect should be addressed through clear communication and the expression of a common position on the fact that the objective of the selection is to avoid competition between existing standards and technical specifications – which impedes interoperability – but that competition between products implementing a given standard or technical specification is healthy and encouraged. As this

[45] Objective: Sharing with volunteer Member States the ICT standards and specifications assessment workload in the context of the elaboration of the eGovernment Interoperability Frameworks

message is transmitted early in the standardisation process, the stakeholders involved are invited to de facto align their product offering with selected standards and specifications.

It is critical that the philosophy which animates the selection of the standards and specifications be clearly known and publicly communicated. The method should also be publicly available so that all stakeholders could understand how standards or technical specifications are assessed and then selected by Governments. When developing standards or technical specifications, stakeholders can also assess for themselves their own specifications and/or standards under development against the public list of criteria. This could save time and money.

Finally, a recurring dilemma is whether or not to adopt recently produced specifications. The situation to be avoided is one where the adoption of some promising "new" standard or technical specification is delayed or blocked by the limited practical experience with its use, making the standard or technical specification fail against certain assessment criteria such as maturity, stability, degree of market adoption, etc. It should be considered to give some recently produced technical specifications a temporary special classification during which time, their suitability and other characteristics can be assessed through pilot activities with the aim of adopting them after it has been verified that they really fit all criteria.

A mechanism for the incubation of standards and technical specifications should be put in place, allowing public administrations to identify the most promising ones in areas currently not well covered and actively promoting them.

8.8 Standard and technical specification coverage

Even if the emphasis is initially on standardisation at the technical level, all the levels of interoperability should eventually be covered by standards or technical specifications of the appropriate type, as this will tremendously advance and support interoperability. The results of such standardisation activities will be detailed in the EIAG where relevant.

Regarding the technical level, this comprises the elements used to deliver content across a community of interest. Elements include transport protocols, messaging specifications, security specifications, registry and discovery specifications, syntax libraries, and service and process description languages. In practice, those elements encompass all the GPSCM building blocks.

Technical interoperability should be considered in numerous fields, including:

- Interconnection (e.g. Internetworking between WAN's, Virtual Private Network)
- Security (e.g. Exchange of authentication and authorization, Signature of web resources, etc.)
- Data Exchange (e.g. Electronic Data Interchange, Markup Language, etc.)
- Discovery mechanisms (e.g. Domain Name System, Web Services Description)
- Presentation and document formats (e.g. Document distribution format, Graphic format)
- Metadata for Process and Data Descriptions (e.g. Specification of business processes and business interaction protocols, Structure of documents), and
- Naming (e.g. Identification of internet resources, Country code representations, etc.).

Regarding the semantic level, elements include reference taxonomies and workflows, code lists, data dictionaries and sectoral libraries.

Regarding the organisational level, elements comprise the business processes, policy elements that facilitate interactions between PAs, service level agreements.

At the legal and political level, harmonisation activities such as the Directive on electronic signatures progressively pave the way to a better interoperable legal environment.

8.9 Laying the groundwork for an open ICT environment

As mentioned previously, the current ICT environment is still largely dominated by closed systems and closed interfaces. An evolution towards a more open approach has to be supported by well-understood benefits. There is thus a clear necessity to build sound business cases for open ICT environments. Transparent and informed decision making processes will help generate credibility and therefore will facilitate political and financial support.

Public administration should identify at an early stage the benefits of interoperability for the administrations, businesses and citizens, resulting from quantitative as well as qualitative analysis. Public administration should focus not only on the intra-MS interoperability issues but should also cover the cross-border scenarios, taking into account the global costs, risks and feasibility of moving forward to specific standards, (or conversely not to align the standards selection processes along the MS).

8.10 Procurement aspects

Procurement is usually focused on obtaining coverage of the required functionality (often in an isolated and silo-style manner), without really taking into account the EU-wide interoperability aspects. In order to address this situation systematically, interoperability requirements for software solutions should be directly incorporated into the procurement process and should cover evaluation of interoperability characteristics/capabilities, functionality, support for open standards or technical specifications and future adaptability.

The EIF should be explicitly linked to procurement on the basis of compliance with a set of recommended standards and technical specifications. Publishing a set of open standards and specifications used by government enables suppliers to build applications that best fit government requirements. "General" interoperability requirements are manifested in procurement processes by preferring open standards and specifications when applicable. In the case where there are no viable open standards available, consensus-driven standards with the greatest degree of openness (based on rational and measurable criteria) should be favoured as an interim measure, but clearly in the context of a wider plan to migrate in the longer terms towards the use of open standards or technical specifications, as soon as practicable. In any case, technology and vendor neutrality should be included in the immediate targets in most if not all cases.

Public Administrations should embed the main EIF characteristics in the PEGS-related procurement process by mean of a set of measurable criteria. These includes the 5 main steps leading to successful PEGS implementation, addressing the underlying principles, the interoperability levels, the GPSCM model, the use of open standards or technical specifications, and the adoption of a sound development approach.

To support the interoperability objectives, the openness of the technical specifications is a primary concern and is an essential characteristic of such technical specifications when the context mandates it.

Public administrations should take into account the minimal level of openness required for each specific PEGS use in order to ensure interoperability. On that basis, the subsequent filters listed on the public procurement directive[46] (2004/18/EC) should be applied, in the appropriate order of precedence.

[46] 2004/18/EC, Art 23 / 3. *"Without prejudice to mandatory national technical rules, to the extent that they are compatible with Community law, the technical specifications shall be formulated: (a) either by reference to technical specifications defined in Annex VI and, in order of preference, to national standards transposing European standards, European technical approvals, common technical specifications, international standards, other technical reference systems established by the European standardisation bodies or — when these do not exist — to national standards, national technical approvals or national technical specifications relating to the design, calculation and execution of the works and use of the products. Each reference shall be accompanied by the words 'or equivalent'; …"*

As previously stated, open standards or technical specifications provide the ability to permanently secure access to and control over data, documents and other digital assets. This "assured control" can be accomplished independently of the particular systems and processes that use the data at any given point in time. As the long-term preservation of public data is one of its primary responsibilities, the public sector must take control of this data through the systematic use of open data formats.

Public administrations should consider support for open data formats as a prerequisite at the procurement stage.

The current ICT landscape is full of large-scale legacy systems working mostly in isolation whereas the objective should be to ensure that newly procured systems are open, interact easily with one another and are able to work with existing components (mainly legacy).

Public administrations should target procurement at standard-based sets of services, with re-use potential in an open standards or technical specification based environment.

Even if the procurement process calls for open standards or technical specifications, the end results, once implemented, do not always use or expose as interfaces the corresponding standards or technical specifications, or only through a compatibility layer with limited functionalities, often present only for formal compliance purposes. To avoid such undesirable situations, where systems with limited interoperability go into production (or "are introduced into the IT ecosystem") appropriate audit mechanisms should be put in place to verify compliance with interoperability requirements.

Public administrations shall link in their procurement terms final payments with a third party confirmation that the delivered solution complies with interoperability requirements (such as open standards or technical specifications or references to interoperability frameworks or architecture guidelines referenced in the tender, or related procurement terms) and entities mandated to conduct such audits shall receive the corresponding authority.

Bundling should be handled with caution, as the introduction of unwanted components or the disappearance of clearly defined interfaces in the ICT landscape could result in unintended or unforeseen consequences, such as the stealthy implantation of proprietary, undocumented specifications, without the proper assessments and reviews.

Public administrations should set up procurement procedures ensuring that optional or additional components coming along with a product should not affect the evaluation, especially if they induce the use of specifications or formats that have not been requested.

"When open alternatives are available, no citizen or company should be forced or encouraged to use a particular company's technology to access government information … no citizen or company should be forced or encouraged to choose a closed technology over an open one, through a government having made that choice first[47]*"*.

Public administrations should ensure that, whenever possible their procurement process does not result in an obligation to citizens, businesses or other partners to acquire for a fee specific product in order to be able to use the service offered by the public administrations.

8.11 Convergence mechanisms

Convergence mechanisms among MS are still relatively limited. The notification process resulting from 98/34 is currently triggered quite late.

The member states and the European Commission should put in place a proactive mechanism to know what others MS are doing.

Moreover, when new PEGS are introduced, the MS tend to select standards and specifications only gradually. In order to streamline the path towards interoperability, those MS implementing PEGS late

[47] European Commissioner for Competition Policy Neelie Kroes, OpenForum Europe – Breakfast Seminar, Brussels, 10th June 2008.

in the process (relative to the implementation plans of the other MS, that is) should whenever possible align their standardisation choices to those that the other MS have already assessed and chosen.

The member states and the European Commission should set up mechanisms for PEGS deployment to check with other MS before selecting interoperable solutions (not reinventing the wheel). This could be supported by an observatory having the mission to see what has been implemented.

8.12 Aspects of development of standards or technical specifications

Standards and technical specifications change over time and revisions can take years to complete. Informed government participation in the standardisation process mitigates concerns about delays, supports a better alignment of the standards or technical specifications with the public sector needs and can help governments keep pace with technology innovation.

International standards organizations welcome participation from all interested stakeholders but are however often perceived as closed communities. Moreover, a wide participation is an enabler for the large-scale adoption of standards and specifications and will strengthen the standard setting processes.

Member States should encourage the participation of local companies in standardisation activities and should improve their awareness on the value they could extract from such participation (such as improved competitiveness, early adoption of the standards and specifications, and alignment to their strategy).

As of today, many (unused) standards or technical specifications have been targeted at solving the wrong problem, at the wrong time, impeding the timely delivery of specifications really meeting user needs. Furthermore, up to now the public sector is mainly a bystander in the standard setting process providing only limited input regarding its needs.

To be able to reap the full range of benefits from the use of standards or technical specifications fitting its needs, a strong collaboration should be initiated very early in the process between all stakeholders in order to ensure that standards or technical specifications truly reflect real needs.

Government user groups shall actively share their business requirements with all other stakeholders.

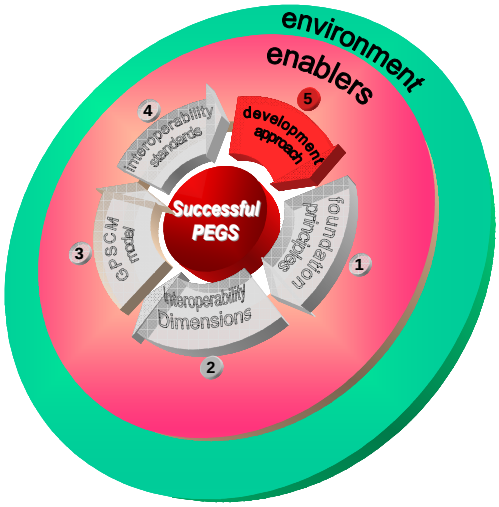
The public sector must develop the expertise necessary to contribute to the process and influence open standard or technical specification development.

Recognised international standards organizations are not yet fully focusing their effort on IT standards that can be considered as open based on the EIF definition.

The EC and the member states shall reaffirm their interest in seeing open standards adopted in the future and their support to standardisation bodies that support that goal.

9 Be prepared to benefit from Open Source Methods

9.1 Introduction



In this section, we will briefly address the following topics: first, we will position Open Standards, Open Source Software and the Open Source Development Model. We will then detail recommendations related to understanding the approach, using open source and reaping the full benefits of collaboration, reuse and sharing.

The rise of the open source movement has been a disruptive element yet provides a unique opportunity to favour interoperability.

It is clear that Open Source Software has had a profound influence on the ICT marketplace. This large amount of high-quality open source software has had a high impact on organizations that operate ICT systems and on their users. Large corporations have also committed structural and financial resources to support corresponding innovative business models. In fact, many organisations are surprised to discover the amount of open source components they already have in place. Moreover, the advent of open source software introduced a new method for producing software.

Whereas traditional procurement has mainly been focused on either out of the box solutions or ad-hoc custom software development, the Open Source approach of software development has gained much momentum recently. Concrete manifestation of the benefits of sharing can be found in the applications of the Open Source Development Model.

9.2 Open Source Software is a concept distinct from the use of Open Standards.

While Openness begins with Open Standards, enabling the interoperability of all software both proprietary and open source, Open Source Software is a concept distinct from the use of Open Standards. Open source software is software defined by its collaborative development, the accessibility of its source code and the distribution models employed.

Characteristics of the Open source software approach to software creation include (among others) freedoms *to study*, *to change*, *to (re-)distribute* and *to re-use* software solutions, which by themselves, have the potential to provide great value to public administrations.

9.3 Open Source Software vs. Open Source Development Model

The open source approach to software development relies on specific behaviours such as collaboration, reuse, and sharing. This approach also induces characteristics more directly linked to dynamics of the development model: vendor neutrality, reliance on open standards, availability - by their nature - of publicly available (over-)specifications, easy adaptation, easy sharing of resources from different companies and organisations, security trustworthiness due to the availability of the source code and the traceability of the development process.

In the context of PEGS, the characteristics listed above can prove to be advantageous. This development model might therefore also be worth studying and understanding, either to better interact with the corresponding communities or to adopt some of the underlying principles.

9.4 Understanding the Open Source Development Model

As a matter of fact, the open source wave is part of the overall ICT landscape, and various open source solutions and environments are already deployed in different public administrations. It should therefore be of interest to all MS to have a better understanding of the model.

The Open Source development model can provide significant benefits, but it must be noted that merely using open source software does not automatically guarantee that the full benefits will be delivered. Administrations need to adequately prepare in order to reap the maximum benefits from the approach. A set of key enablers has to be actively addressed in order to improve the readiness of the administration facing this new paradigm. First of all, a good understanding of this rapidly evolving area of the ICT landscape is necessary.

Open Source has proved to be disruptive in terms of business models as well as interactions between the main stakeholders of software development and production. Besides being a new software delivery mechanism, this movement also impacts the IT landscape in terms of economic, control and customisation. A detailed understanding of those effects is necessary in order to appropriately adapt procurement decisions.

Member States should evaluate the extent of their current use of open source software, the effects and availability of open source solutions in their domain, and adapt their procurement process where necessary.

Furthermore, there should be more proactive involvement in the evolution of the market towards more open source-based solutions. Reaping the full benefits of the evolution towards open standards mandates actively supporting the presence of several software choices implementing the corresponding standards, among which might be found open source components.

Public administrations should develop in-depth understanding of the inner working methods of the open source community.

Public administrations should also develop metrics that can be applied to both closed and open source.

Public administrations should adapt their internal processes to deal adequately with open source mechanisms (e.g. Bug report, testing / troubleshooting, contribution of changes, licensing, security accreditation, etc.).

The successes of Open Source projects in the past have been heavily reliant on the talent and dedication of a small number of individuals. The general way that this approach has unfolded has been not in a planned manner but rather by chance, and in ad-hoc manner, uniquely depending on and determined by the situation in which it has occurred.

It may be prudent that the use of OSS in other contexts, especially in the public sector, receive some guidance on collaboration techniques, and focusing on quality of results, scheduling of activities, marshalling of resources, releasing strategies, etc.

Finally, procurement rules currently in force have mostly been designed with the goal of obtaining proprietary software from commercial suppliers in mind, whereas the open models that have emerged during the last decade operate differently. One of the most important recent changes associated with these open models is that *communities* may now be able to provide substantial and sufficient resources for complimentary support and maintenance to such a degree that the risks associated with using smaller firms or newer standards could be offset.

Public administrations should integrate into the procurement criteria the availability of a community to support a component or a standard.

9.5 Using Open Source Software

Regarding the use of open source software itself, it is instructive to review its fundamental characteristics in making a decision for its use.

- Openness is a significant characteristic to recommend the model, among others such as cost efficiency, verifiable implementation of the standards, functional coverage, avoiding limits imposed by IPR and license constraints, the long-term durability of the solution, and the ease of adaptation to local needs.
- The objective is to not foreclose any software development model.

Public administrations should consider Open source solutions on an equal footing with proprietary solutions (which implement the open standard or standards in question) during public procurement procedures

Before actual implementation of a given PEGS begins, the following milestones in the PEGS development lifecycle can be assumed to have passed:

- a roadmap for implementation of the PEGS in question is elaborated, (which comprehensively covers activities at the various layers of the dimensions model - political, legal, business, semantic and technical),
- a compliance check with the EIF underlying principles has been performed,
- the building blocks supporting and being aggregated to provide PEGS in question have been defined and specified (using the GPSCM as starting point),
- an appropriate set of standards has been selected, applicable to the Building Blocks to be developed
- the gaps and preconditions necessary to ensure successful implementation (and operation) of the PEGS have been identified and documented.

The important thing to note is that these steps should have been carried out in a manner which is neutral with respect to the software development model to be followed, allowing the Public Administrations the option of choosing either the open source approach or a traditional software development model, according to their needs.

Public administrations should perform, during the conception of each PEGS project, the identification of the *criteria* leading to the selection of an appropriate specific software development method, as well as its effect on the selection of specific product(s) or solution for each given building block component of a GPSCM-modelled PEGS.

9.6 Adoption of Structures and Mechanisms for Collaboration, Reuse and Sharing

Public administrations produce many customised applications to support their activities but today the underlying pattern is more often rebuild than reuse. This induces a very limited capability to interoperate and put technological constraints on sectoral exchanges induced by the need to put in place lot of gateways - without any other added value other than allowing the exchange of information cross-border - , whereas the overall scheme might be largely simplified by a reuse approach. Furthermore, the eGovernment Action Plan i2010 strongly emphasises "sharing" eGovernment applications and experiences – and on the sharing of common, essential infrastructure services.

Member States should support reuse and sharing when building blocks supporting the GPSCM have to be built.

Public Administrations should be prepared to employ open source methods as well as traditional methods of software development.

Member states should assess in each instance whether the Open Source approach (collaboration, reuse, sharing) for any given PEGS implementation could provide any unique or specific benefits that should be taken into account when choosing the eventual development model.

Furthermore, the following support actions are recommended:

Public Administrations should set up infrastructures in support of working together.

Public Administrations should adapt their organisation to be able to use the open source development model (skills, change management…).

Public Administrations should provide guidance on collaboration (quality, professionalism …).

Public Administrations should provide a legal framework for using open source software and the open source development model.

Public Administrations should wherever appropriate actively contribute to projects building applications using an open source development model and foreseen to be publicly distributed under open source licences.

Public Administrations should be informed about and prepared to actively make use of the Open Source Repository (OSOR), as both contributors and beneficiaries[48].

9.7 Making open standards and technical specifications sustainable through innovation

IT environments based on open source components are developing their content mainly based on communities and entrepreneurship; they constitute a real vector of innovation, but are often only well known by a limited audience of technical specialists. Governments need to play a more active role in supporting the growth of the open environments covering issues relevant to the public sector, especially when there is an opportunity to promote the delivery of reference implementations that do support open formats, standards or technical specifications. The focus should be put on encouraging entrepreneurship and innovation. This goal can be achieved through several measures addressing all the stakeholders.

The European Commission and Member States should set up the necessary conditions such that when they sponsor R&D applicable to the public sector, for example in the context of FP7, the terms of the developed software shall support building up an interoperable ICT environment. Multiple options are possible in this area: supporting the use of tools compliant with open standards or technical specifications, recommending the creation of components matching standard interfaces, facilitating the reuse of components, etc.

In order to support development and innovation, it is central for governments to raise the knowledge of citizens regarding open technologies. Building this knowledge base, through education, training and R&D means committing the requisite resources. Securing this commitment is critical as it directly affects the ability to share innovation on a mid term basis.

Member states should support education, training and R&D related to open source technologies.

Currently, open communities are mainly built on an ad-hoc basis. Governments should play a proactive role in the formation and growth of such communities, and proactively expending efforts on building institutional relations between technology and science, by combining public and private expertise.

Member states should support the creation of clusters around open standards or technical specifications and open source components which hold the promise of establishing thriving collaborative communities and partnerships that can spread knowledge and sustain the flow of innovation.

[48] OSOR.EU is the operational arm of the Open Source Repository Project. Its centrepiece is a platform for the sharing and reuse of software by public administrations in Europe.

10 Glossary

This will provide a glossary.
It will be produced once the main elements of the EIF have been completed

11 Abbreviations

A2A	Administration to Administration
A2B	Administration to Business
A2C	Administration to Citizen
ABC	Administration, Business and Citizen
B2C	Business to Citizen
BPR	Business Process Reengineering
CAF[49]	Common Assessment Framework (www.eipa.eu)
CAMSS	Common Assessment Method for Standards and Specifications
CCL	Core Component Library (UN/CEFACT)
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
DRM	Digital Rights Management
eDoc	Electronic document
EA	Enterprise Architecture
EC	European Commission
EC-DIGIT	European Commission Directorate General For Informatics
EFQM	European Foundation for Quality Management
EIAG	European Interoperability Architecture Guidelines
EIF	European Interoperability Framework
EIIS	European Interoperability Infrastructure Services
EIS	European Interoperability Strategy
eID	Electronic identity
ETSI	European Telecommunications Standards Institute
EU	European Union
EUPL	European Union Public Licence
FP7	7th Framework programme
GPSCM	Generic Public Services Conceptual Model
HTML	Hypertext Markup Language
IDABC	Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens (ec.europa.eu/idabc)
ICT	Information and Communication Technology
IETF	Internet Engineering Task Force
IF	Interoperability Framework

[49] The Common Assessment Framework (CAF) is a total quality management tool inspired by the Excellence Model of the European Foundation for Quality Management (EFQM) and the model of the German University of Administrative Sciences in Speyer. It is based on the premise that excellent results in organisational performance, citizens / customers, people and society are achieved through leadership driving strategy and planning, people, partnerships and resources and processes. It looks at the organisation from different angles at the same time, the holistic approach of organisation performance analysis.

IPR	Intellectual Property Rights
ISO	International Organization for Standardization
ITU	International Telecommunication Union
MoU	Memorandum of Understanding
MS	Member State
MSA	Member State Administration
NGO	Non Governmental Organisation
NIF	National Interoperability Framework
OASIS	Organisation for the Advancement of Structured Information Standards
OECD	Organisation for Economic Co-operation and Development
OS	Open Source
OSOR[50]	Open Source Observatory Repository (www.osor.eu)
PA	Public Administration
PCI	Projects of Common Interest
PEGS	Pan-European eGovernment Services
PEGSCO	IDABC Management Committee
PKI	Public Key Infrastructure
PoSC	Points of Single Contact
PSI	Public Sector Information
R&D	Research and Development
SD	Services Directive
SEMIC.EU[51]	Semantic Interoperability Center Europe (www.semic.eu)
SLA	Service Level Agreement
s-TESTA	Secure Trans-European Services for Telematics between Administrations
TOGAF	The Open Group Architecture Framework
UN	United Nations
UN/CEFACT	United Nations Center for Trade Facilitation
UNDP	United Nations Development Program
W3C	World Wide Web Consortium
WAN	Wide Area Network
XML	Extensible Markup Language

[50] OSOR.EU supports the sharing of FLOSS-based eGovernment applications across Europe – connecting EU services and Member States. In order to do so, the following services are available: an information platform on OSS, a repository and registry which provide visibility to European OS projects, and a collaborative development environment.

[51] SEMIC.EU defines the platform, actors and supporting processes required to implement and operate a "clearing house" for data and information related to semantic interoperability (SEMIC). A number of other studies on aspects of Semantic Interoperability have been conducted in 2008 (some of which are still underway) under the auspices of the project, some of the most important being the Good Practices study, and the Multilingualism study. The outputs of these efforts provide important guidelines, recommendations and other inputs relevant to furthering semantic interoperability in this context.

12 Annex 1: Background Information

12.1 Context of the revision

A first version of the EIF was published in 2004 and received widespread acceptance by administrations in Europe. At the time, there were very few Member States who had established National Interoperability Frameworks (NIF's), and there were very few similar documents to be found elsewhere in the world. Since publication, a number of MS have been inspired by the EIF as the starting point for the development of their NIF's. The EIF was never intended to be a showcase for NIF's, despite its purpose of filling the gaps in NIF's at European level. This remains unchanged.

The EIF took a clear and firm position on the question of open standards, which resulted in some controversy. Since publication of the EIF, the need for a platform or forum for coordination and cooperation between the large number of parties and entities involved in standardization-related activities, and the need to centralize and moderate the discussions has been highlighted. The EIF also introduced a basic Interoperability model (as well as some other concepts) which has been widely reused around the world when Interoperability is discussed, e.g., the notion of "Interoperability levels" (Technical, Semantic, Organisational).

The originally intended scope of applicability of the EIF was limited to the implementation of Pan-European eGovernment Services (PEGS), which remains the case. Nevertheless, it is now clear that the actual impact of the EIF has extended far beyond this. The approach and concepts put forward by the EIF are driving industry and government thought and action throughout the world in a broadly constructive way.

One shortcoming of the published EIF was that the process by which it was created did not include an efficient means for external parties, such as industry groups and NGO's, to provide input: a substantive, constructive dialog was missing. As a result, some stakeholders, especially in the private sector, have not accepted all of the precepts of the EIF, particularly on the subject of open standards. Since publication of the original EIF, however, a great deal of useful and interesting input has been provided by different groups, including industry, and has now been taken into consideration during the revision process. In the future, the governance processes established via the European Interoperability Strategy (EIS) (see section 2.2, The organisational context of the EIF, page 2) will institutionalize such consultations into an ongoing activity that will improve the quality of the results, and reduce barriers to acceptance.

In retrospect, it has become clear that the EIF was a mixture of assets, but that there were shortcomings as well; in particular, the relationship between the EIF and the NIF's in the MS was not laid out clearly enough. The question of scope must also be explicitly noted, in that the intersection of these two types of instruments (EIF & NIF's) is PEGS. In other words, NIF's may cover non-PEGS services and administration activities, but these will not be of concern to or within the scope of the EIF. Finally, for historical reasons, the links between the EIF and the more technical detailed Architecture Guidelines (AG), which in theory derives from the EIF, were not as clearly or as explicitly laid out as possible. The revised EIF is more explicit about what points/subjects will be treated more explicitly or in more detail in the AG.

A number of other shortcomings in EIF v1 have also been pointed out, including:

- The original interoperability model could be more complete (only three levels)
- More attention to the question of legacy systems and the evolution of standards is needed (in addition to the long-term focus on open standards introduced in the original EIF)
- Unclear responsibilities (the cataloguing of which adds up to the absence of strong governance)

- Insufficient attention was paid to the question of legal barriers to interoperability, which are both numerous and serious.

We can also point out that the EIF did not provide any model or framework for understanding of PEGS or "Public Services", nominally the focal point for the interoperability efforts in this context.

Since the time of publication of the EIF, there have also been significant changes in the administrative, technological, business and legal environments. For example:

- The proliferation of national interoperability frameworks in EU MS, which have served to highlight issues requiring or deserving increased emphasis and/or attention, such as the relation between the EIF and the MS's NIF's, and the role played by Enterprise Architectures (EA's);
- The administrations have made progress in updating their systems and infrastructure, and in reengineering their business processes, in the process identifying new requirements; In particular, significant advances in eGovernment initiatives/key enablers in the Member States such as eID/eDOC have highlighted the issues and difficulties involved in implementing PEGS and elucidating new infrastructure and systems requirements giving new understanding to these elements;
- Advances coming from other national and international efforts, such as the Australian Government information interoperability framework as well as collected works on e-Government Interoperability developed by the United Nations Development Program (UNDP).and the UN e-Government Survey 2008 "From e-Government to Connected Governance";
- The appearance of new technologies and products in the ICT marketplace occurs frequently, inviting re-assessments of the general situation on a permanent, ongoing basis;
- As technical Interoperability, even if it is not solved today, was the first target of most past or current activities aiming at improving interoperability, emphasis should now be increasing refocused on semantic and organisational interoperability as presenting increasingly important challenges in the near term;
- Businesses have modernised and expanded across borders within the EU, and beyond, with consequent changes in the environment, their interactions with governments, and evolution in expectations thereof;
- New legislation such as the Service Directive has placed new objectives in front of the Member States along with ambitious timelines for their implementation.
- The deployment of PEGS has advanced significantly, and the Member State Administrations have learned some important lessons and gained some valuable experience from the efforts; In particular, they have been able to assess the relevance of requirements relating to common infrastructures, tools and services. The need to provide a global approach to provision of public services has been highlighted. Finally, some further understanding about interoperability issues at local/regional level has been gained.

Having taken stock of these and other changes, it has become manifestly clear that a revised version of the EIF is needed, to cope with the changes, and to advance certain other strategic objectives (e.g., via EU participation in the UNDP studies on interoperability), such as promotion of the EU-developed approaches to cross-border and cross-sector interoperability beyond the EU.

The revision process was designed to provide a close collaboration with the relevant Commission services and with the Member States. The resulting revised European Interoperability Framework takes into account the national interoperability frameworks (NIF's) and related activities in the Member States either planned or currently underway.

The revised EIF is published as an annex to a Communication from the Commission to the Council and to the Parliament. It is an invitation from the Commission to the Member States, having worked

together long and hard on the revision, to rally around the principles and precepts laid out in the EIF and apply them.

While not in itself a binding document, it has been designed for use as such in specific contexts, such as policy guidelines definition, projects set up, architecture design, and individual calls-for-tenders. Adherence to its precepts is necessary in order to achieve the stated interoperability goals.

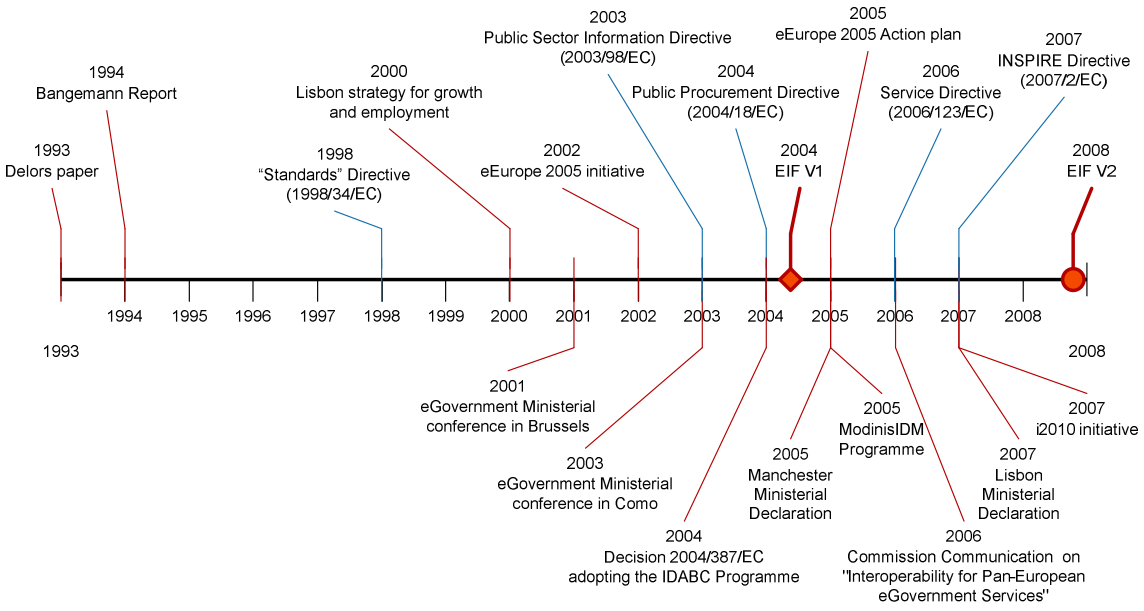
12.2 Key principles of EIF v2.0 vs. EIF v1.0

From its starting point, the revised EIF is distinguished from the original publication in the following ways:

- The revised EIF is to include a clear mission statement.
- The features of the EIF intended to guide developments and ease decision-making are to be enhanced and strengthened.
- Stronger governance of PEGS on the one hand and of Interoperability and the EIF itself on the other hand, must be planned and provided for.
- The guiding role of the Commission must be elaborated further.
- Constructive dialog with external stakeholders
- More synergy between pan-European and national initiatives (while respecting subsidiarity) is needed.
- The interoperability concept will be developed further via enhanced interoperability "dimensions"
- Clarification and further development of the situation vis-à-vis Standards & Specifications (especially open standards) is required[52]
- The key issues to be resolved for PEGS to flourish will be identified and described, via (among other things) the elaboration of the Generic Public Services Conceptual Model (see section 7, “The Generic Public Services Conceptual Model (GPSCM)”, page 42 below)
- Better links with the forthcoming Architectures Guidelines which will be elaborated from the new EIF
- Preparing the ground for a better Interoperability Governance through the planned European Interoperability Strategy (EIS)

[52] Especially as regards the criteria of "openness"

13 Annex 2: Related Initiatives



13.1 Political Initiative at EU level

13.1.1 Early initiatives

eGovernment has been on the EU policy agenda since 1993, and a high priority starting with the Lisbon strategy of 2000, when it has been recognised as key to realising a competitive and dynamic economy, economic growth and in creating and sustaining employment. eGovernment entered the agenda of EU policy starting with the 1993 Delors paper, was mentioned again in the 1994 Bangemann Report, and was then repeatedly mentioned, in increasing detail and with increasing urgency starting with the 2000 Lisbon strategy for growth and employment, the eEurope 2005 initiative launched in 2002[53], and in the eGovernment Ministerial conferences held in Brussels in 2001 and Como in 2003[54].

13.1.2 Recent initiatives

The recent initiatives have either implicitly or explicitly recognised the central importance of interoperability in the eGovernment and wider contexts.

13.1.2.1 The 2005 Manchester Ministerial declaration

The 2005 **Manchester Ministerial** declaration[55] set a number of ambitious targets for 2010[56]. It focused on delivering clear social and economic benefits to citizens, businesses and governments, through four key challenges to governments:

[53] Which gave the mandate for the creation of a European Interoperability Framework

[54] "Cooperation required to develop pan-European services depends in part on the interoperability of information and communication systems used at all levels of government"

[55] Available at: http://archive.cabinetoffice.gov.uk/egov2005conference/documents/proceedings/pdf/051124declaration.pdf

[56] By 2010, all citizens, including socially disadvantaged groups, should become major beneficiaries of eGovernment services, facilitated by means of innovative and imaginative use of ICT; By 2010 administrations should be 100% shifted to eProcurement; Between 2006-2010 the focus should be on delivery of high-impact

- No Citizen Left Behind
- Efficient and Effective Government
- Delivering High Impact services designed around customer's needs
- Simple and secure access to online public services (built around the use of electronic identity and authentication)

This declaration set out key objectives for eGovernment programs and defined the key enablers necessary to achieve those objectives. It explicitly recognised **eID** and **eDoc** (interoperable ***e****lectronic* ***ID****entity* and the cross-border recognition and long-term archiving of ***e****lectronic* ***Doc****uments*) as "key enablers" for the implementation and provision of eGovernment services. In particular, it specifically encouraged development of services facilitating cross-border mobility.

The role of interoperability in Manchester Declaration is indirect but quite important, as interoperability is a key building block in the achievement of **eID** and **eDoc**. The declaration itself does however explicitly mention the goal of achieving interoperability:

> *"As our eGovernment services become more transactional, the need for secure electronic means of identification for use by people accessing public services is essential for citizen and business trust and in ensuring the effectiveness and efficiency of our public administrations. Respect for, and recognition of, different forms of eID* ***to achieve interoperability*** *are therefore key principles for future eGovernment development.* ***Interoperable*** *eID's meeting recognised international standards and built on stable technologies would be a foundation for secure cross-border eGovernment services. As electronic identity technologies become proven in large-scale application, Member States should work together to pilot them with a view to adoption, by sharing expertise, good practices and the tools and building blocks they have developed."*
>
> *"… eIDs, issued and managed at the national, regional or local level, that are portable,* ***interoperable*** *and meet an agreed common minimum standard of technical security, have the potential to support citizen mobility and create a more flexible labour market."*

Furthermore, the Commission is called upon to play a central role in driving the progress in this area:

> *"Ministers call on the European Commission to drive forward progress on the actions set out in this Declaration, to mobilise the various EU programmes active in eGovernment to contribute effectively and coherently to the achievement of i2010 eGovernment objectives,"*

13.1.2.2 The 2007 Lisbon Ministerial Declaration

The **2007 Lisbon Ministerial Declaration**[57] was made during the fourth Ministerial eGovernment Conference under the title "Reaping the Benefits of eGovernment".

This Declaration outlined in more detail the benefits and impact of eGovernment on citizens and businesses It set out as a clear priority the establishment and furtherance of cross-border and cross-sector interoperability, reinforcement of cooperation between MS, notably through Large Scale Pilot (LSP), particularly cross-border recognition of eID and eProcurement. It specifically mentions the EIF as a key means of achieving interoperability. It places particular emphasis on the mission to continuously monitor the definition and openness of technical standards and publicly available specifications.

The declaration also invited the Commission to take an active/leading role in the process, notably:

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pan-European , cross-border electronic services to contribute to the Lisbon agenda, such as those facilitating mobility

[57] Available at: http://www.megovconf-lisbon.gov.pt/images/stories/ministerial_declaration_final_version_180907.pdf

- supporting/facilitating/reinforcing cooperation among Member States, including identifying the areas in which Member States could cooperate, notably through the high-impact large-scale ICTPSP Pilots on cross-border eProcurement and mutual recognition of national eID's
- to produce a revised version of the EIF (this document),
- by paying continuous attention to the definition and openness of technical standards and publicly available specifications
- Assist the MS to determine the appropriate modus operandi to define, develop, implement and monitor broad cross-border interoperability generally required for the implementation of the Services Directive

In support of these goals, the "eID for citizen and business" and eProcurement activities should be accelerated as building blocks contributing to the implementation of high impact services.

The declaration also introduces an ambitious deadline: by the end of 2008. Members States are to establish a list of new priority areas for high impact services, which can be further developed at the pan-European level with the support of EU programmes.

13.1.2.3 The i2010 (European Information Society 2010) initiative

The **i2010** (European Information Society 2010) initiative[58] is the first significant Interoperability-related initiative originating from the European Commission.

Digital convergence requires devices, platforms and services to interoperate. The Commission stated its intention to use all its instruments to foster technologies that communicate, including: research, promotion of open standards, support for stakeholder dialogue and, where needed, mandatory instruments.

The i2010 initiative identifies interoperability as one of the four main challenges posed by digital convergence (along with speed, content and security), and presents a concrete policy in the area. It calls for the identification and promotion of specific targeted actions on interoperability, particularly digital rights management (DRM).

The initiative also mentions the goal of "eInclusion", which is in line with the accessibility and multilingualism objectives of the multi-channel access part of the European Interoperability Framework and Strategy.

13.1.2.4 The Commission Communication [59] on "Interoperability for Pan-European eGovernment Services"

The communication refocused attention to the cross-border dimension of eGovernment, for which interoperability assumes even higher priority. It also specified more precisely several key characteristics of interoperability and of the EIF.

The communication recognised that:

- Interoperability of eGovernment services, based on standards, open specifications and open interfaces, has become a crucial, crosscutting task.
- Interoperability at European level, which is needed in order to implement common EU policies and priorities, requires cooperation and coordination at European level.
- Interoperability is a prerequisite for the delivery of eGovernment services across national and organisational boundaries.
- Interoperability facilitates communication, interaction and transactions between different entities or partners.

[58] http://ec.europa.eu/information_society/eeurope/i2010/index_en.htm
[59] http://europa.eu.int/idabc/en/document/5316

- Interoperability enables organisations to retain their independence while allowing information and transactions to pass across their boundaries.

The initiative identified three levels of eGovernment interoperability: Organisational interoperability, Technical interoperability and Semantic interoperability.

Other key points of the communication include:

- Achieving interoperability for given areas at European level has to be seen as a step-by-step process;
- EIF focuses on supplementing, rather than replacing, national eGovernment interoperability frameworks by adding a pan-European dimension.
- The EIF will have to evolve in line with policy requirements and technological changes.
- In the longer term, a stable governance organisation may need to be established.
- Due to its characteristics of openness and inclusiveness, ICT standardisation can provide a major support to the achievement of interoperability at the network, service and application levels.
- A Common infrastructure is needed to support eGovernment interoperability

13.1.2.5 Modinis^{IDM} Programme[60]

The MODINIS Study on Interoperability is a state of the art analysis of key success factors and barriers to interoperability, using good practice cases as a reference framework. Over the past few years, good practice cases have been identified, analysed and discussed. Achievements and results have been continuously disseminated and communicated to the public, thus creating a well-informed community of eGovernment experts interested in interoperability. Input received by the experts has been included in the study and subsequently recommendations have been drafted providing a manual for public administrations (at national, local and also European level) on how to successfully implement eGovernment solutions.

Modinis^{IDM} was a part of the eEurope2005 initiative. It produced a number of outputs of great importance to eID and Interoperability, especially with a study focusing on local and regional level[61].

13.1.2.6 The eEurope 2005 Action plan

The eEurope 2005 Action plan stressed that eGovernment identity management should be advanced by addressing interoperability issues as well as future needs, without ignoring differences in legal and cultural practices and the EU framework for data protection. It identified the strong relationship between identity management and interoperability.

13.1.2.7 The Service Directive (SD) (2006/123/EC)[62]

This initiative requires the Member States to set up the interoperability infrastructure necessary to provide mobile businesses with single points of contact for completing the administrative procedures related to mobility.

It represents a significant increase in priority/urgency at the political level: achieving the hard targets[63] imposed by the directive will require seriously stepped up efforts at interoperability, especially the foundations such as eID and eDOC, on which a great deal of other applications requiring interoperability will need to be built.

[60] http://ec.europa.eu/information_society/eeurope/2005/all_about/modinis/index_en.htm
[61] http://www.epractice.eu/document/3652
[62] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:376:0036:0068:EN:PDF
[63] The Service Directive will have to be transposed into national law by Member States by the end of 2009, etc.

13.1.2.8 Public Procurement (eProcurement) Directive (2004/18/EC)[64]

Doing public procurement by electronic means as it is required in the public procurement directive (also called **eProcurement)** is a perfect example of the necessity of interoperability to achieve important eGovernment goals. eProcurement involves administrations interacting directly with suppliers and potential suppliers to obtain goods and services ultimately used to provide their services to the public. eProcurement has to comply with a variety of requirements for transparency and fairness (as do the traditional procurement activities) while also being conducted in a totally automated and location-independent manner.

The CIP (Competitiveness and Innovation Framework Programme) mentions specifically a LSP (Large Scale Pilot) that will serve to elucidate additional interoperability requirements and challenges.

13.1.2.9 The INSPIRE Directive (2007/2/EC)[65]

The INSPIRE (Interoperability of Spatial Data Sets and Services) initiative refers to data with a direct or indirect reference to a specific location or geographical area, in this context data specifically related to the environment.

The INSPIRE Directive is mainly concerned with Semantic Interoperability of environment-related data sets (according to the EIF terminology and model), as well as defining and mandating a set of core services necessary to ensure the interoperability of the data sets at a practical level. As also foreseen in the directive, this approach can be generalised to other data sets besides the specific sector or business area foreseen in this particular directive.

The INSPIRE directive also has specific provisions calling for the establishment of a variety of basic network-related services intended to facilitate access to these spatial data sets and services, including discovery services, view services, download services, transformation services, and services allowing (specific) spatial data services to be invoked.

13.1.2.10 The Public Sector Information (PSI) Directive (2003/98/EC)[66]

In the context of perfecting the internal market, the goal of the **Public Sector Information (PSI) Directive** is to encourage the MS to make all PSI available for reuse, via electronic means where possible and appropriate, in any pre-existing format or language, existing documents held by public sector bodies, so as to create conditions conducive to the development of community-wide services. It is expected this will stimulate the creation of new aggregated information and products at pan-European level, as well as facilitating considerably the cross-border use of public sector documents.

13.1.2.11 The "Standards" Directive (1998/34/EC)[67]

Among other things, this directive provides instructions for the use of technical standards and regulations in the domain of the information society. It has important implications for the EIF, in the area of standards selection, which is discussed in section 8, page 52.

13.1.3 Other Related initiatives

13.1.3.1 eID management and eDOC interoperability

It has been recognised that the implementation of Interoperable Electronic Identities (eID) across the EU and cross-border recognition of Electronic Documents (eDoc) are key enablers for the implementation of PEGS.

As such, they both need each other, and are dependent upon each other to progress.

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[64] http://ec.europa.eu/internal_market/publicprocurement/legislation_en.htm
[65] http://www.ec-gis.org/inspire/directive/l_10820070425en00010014.pdf
[66] http://ec.europa.eu/information_society/policy/psi/docs/pdfs/directive/psi_directive_en.pdf
[67] http://ec.europa.eu/enterprise/tris/98_34_ec/index_en.pdf

The implementation of eID and eDOC is likely to be one of the first and most important cases in which EU-wide interoperability is used and demonstrated on a practical basis.

These initiatives are intimately related to the on interoperability represented by the EIF, as following the principles inherent in the EIF is essential to implementing EU-wide interoperable eID. Furthermore, being at the forefront of pan-European developments means that the eID/eDOC initiatives will be instrumental in identifying more details of the requirements of PEGS services, including those involving interoperability, especially at the technical level, but also at semantic and legal levels as well.

13.2 Other Approaches to Interoperability, including external to the EU

13.2.1 Trends

In just the few short years that have elapsed since the EIF was first published in 2004, awareness throughout the developed and developing world of the importance of interoperability in implementing eGovernment services has risen dramatically. Most governments have now quite a few years of experience under their belts of wrestling with the problems of building durable IT solutions for government functions, including the provision of eGovernment services. They have seen first hand the proliferation of solutions developed in relative isolation makes reuse difficult and leads to missed opportunities for simplifying procedures imposed on citizens and business in fulfilling their obligations or in obtaining eGovernment services.

These governments around the world increasingly appreciate the need for taking the long-term strategic view when it comes to automation, as well as the benefits of modernisation, standardization, harmonisation, and rationalisation of their activities.

They also recognise that there is an ever-increasing need (and benefit) to exchange data within their administrations but also with other countries, so they have to think about interoperability on a larger scale. In general, countries have recognized the hard way that true interoperability has several dimensions and something like a common model (lowest common denominator) could be described, in which there are several aspects to be considered, including technical, semantic, organisational, legal and political aspects of interoperability.

As a result, there is widespread agreement on a number of points relating to interoperability:

- The importance of standardization in procuring and building ICT systems;
- The importance of using open standards where possible to avoid vendor lock-in;
- The multi-dimensional nature of interoperability, and the need to consider all levels in building interoperability solutions, with increasing focus on achieving semantic interoperability;
- How expensive and difficult it is to retool ICT systems to work in ways that they are not originally intended to do;
- The complimentary nature of the respective roles played by Enterprise Architecture and Interoperability Frameworks in achieving interoperability;
- The importance of good governance of ICT and more generally of public services in achieving organisational goals.

What is unique about the EIF in relation to all these other efforts is its policy context:

- Interoperability is sought between sovereign entities (which comprise the EU), where all are equal and have an equal say in the construction of the framework.
- The EIF is focused on delivery of eGovernment services and specifically PEGS (the EU cross-border context)

- The unique context of the EU's support for multilingualism. The need to support the 23 official languages of the EU is an additional interoperability requirement;

13.2.2 Initiatives Elsewhere

There are specific efforts underway elsewhere, both within and without the EU, in different contexts, to address the issues arising in an increasingly connected and (persistently) heterogeneous world. These results of these efforts are of varying type depending on the intended scope of applicability, who is producing them[68] (industry consortia, standardisation bodies, researchers, administrations, etc.), and the level of technical detail they contain. In some cases, these take the form of interoperability frameworks similar in some ways to the EIF. In other cases, these other efforts focus on only some aspects of interoperability, or on related technical issues such as architecture, or within the context of some specific policy objectives, etc.

Due to the proliferation of such initiatives, positioning the EIF in relation to the others can be confusing. Furthermore, they can serve as sources of ideas, information and inspiration for the EIF. Because of the sheer number of such initiatives it is only feasible to mention a fraction of the most significant and relevant ones in the context of the EIF.

13.2.3 Enterprise Architectures

The establishment of Enterprise Architecture is an important area of activity of large organizations, and many efforts are underway at the EU Member State level. As pointed out above, Enterprise Architectures are distinct from yet complementary to Interoperability Frameworks, in both the scope of applicability and the level of technical detail.

Enterprise Architecture[69] is the description of the current and/or future structure and behavior of an organization's processes, information systems, personnel and organizational sub-units, aligned with the organization's core goals and strategic direction. While going into IT aspects in some detail, Enterprise architecture relates to the context of one specific organization or entity more broadly to the practice of business optimization in that it addresses business architecture, performance management, organizational structure and process architecture as well. As such, EA's must take into account interoperability requirements, and can hence provide the groundwork on which interoperability efforts can proceed.

TOGAF (The Open Group Architecture Framework) developed by the Open Group, attempts to provide organisations with a complete blueprint that can be adapted to their specific needs.

13.2.4 Some other specific Interoperability Frameworks of interest[70]

The **Australian Information Interoperability Framework**[71] (IIOP) is a highly developed framework for interoperability at the semantic level, focusing on a detailed model for Semantic Interoperability

New Zealand[72] has adopted an **Interoperability Framework** derived from the UK's eGIF.

The content of the **United Nations Development Program** (UNDP**)** Guidelines on eGovernment Interoperability[73] are similar in many ways to the EIF, but focuses more on the needs of developing

[68] Some important ones are the result of European Commission-sponsored research, including:
ATHENA (http://www.athena-ip.org/ & ftp://ftp.cordis.europa.eu/pub/ist/docs/directorate_d/ebusiness/athena.pdf),
IDEAS (ftp://ftp.cordis.europa.eu/pub/ist/docs/ka2/ideasebew20021017.pdf),
FUSION (ftp://ftp.cordis.europa.eu/pub/ist/docs/directorate_d/ebusiness/fusion.pdf), and
INTEROP (http://interop-vlab.eu/)

[69] Taken from Wikipedia

[70] An interesting list can be found at http://www.apdip.net/projects/gif/country/

[71] http://www.agimo.gov.au/__data/assets/pdf_file/0019/50725/Information_Interoperability_Framework.pdf

[72] http://www.e.govt.nz/standards/e-gif

[73] http://www.apdip.net/projects/gif/GIF-Overview.pdf, http://www.apdip.net/projects/gif/GIF-Guide.pdf, and http://www.apdip.net/projects/gif/GIF-Review.pdf

countries, and on the specific environment of the Asia-Pacific region. They also address governance issues in some detail.

DARPA (Defence Advance Research Projects Agency) of the US Department of Defence (DoD) first elaborated the **Levels of Information Systems model** [74] (LISI). Its successor, the Systems, Capabilities, Operations, Programs and Enterprises (SCOPE) Model for Interoperability Assessment is currently in the final stages of development.

DARPA has also developed NATO's Reference Model for Interoperability, which is included in the NATO C3 Technical Architecture (NC3TA).

Finally, within the EU, many Member States[75] already have or are in the process of developing their own National IF's, (NIF) addressing interoperability issues arising within their own country, across internal borders between national agencies, departments, government bodies, etc. These NIF's are complementary to the EIF yet should be compatible with it[76].

13.2.5 Other related initiatives

The multi-annual MODINIS program was launched in 2003 to provide financial support for the eEurope 2005 Action Plan. This effort focused on benchmarking, information gathering on national activities, and exchange of information. The initiative led to the Manchester declaration of 2005 raising the priority of implementation of PEGS and Interoperability. The later efforts which focused on issues related to eID highlighted a number of important requirements (or infrastructure elements) in terms of core services which will be prerequisites for achieving PEGS, including identification, authentication, authorizations, mandates, authentic sources and mutual recognition. The Modinis program also performed a study on Interoperability at local and regional level in the Member States[77].

The OECD has conducted a number of studies in this domain. Particularly of interest is their study on "Policy Principles For Enhanced Access And More Effective Use Of Public Sector Information[78]", and on policies that will help promote an enabling environment, enhance the necessary supporting infrastructure, and foster a business and regulatory climate conducive to the creation, access and preservation of digital content[79].

[74] The LISI model and associated process were developed by MITRE in the late 1990's as a means of assessing the interoperability readiness of a system or set of capabilities. It uses a matrix structure and defines five interoperability maturity levels affecting four interoperability attributes: Procedures, Applications, Infrastructure, and Data (PAID); it is no longer used. http://www.sei.cmu.edu/isis/pdfs/tolk.pdf ; see also http://www.enterprise-architecture.info/Images/Defence%20C4ISR/Enterprise%20Architecture%20Tools%20C4ISR.htm

[75] Currently there are 12 with published NIF's. A list of countries, with links to their published NIF's can b found on the IDABC website at: http://ec.europa.eu/idabc/en/document/6227

[76] This compatibility between NIF's and the EIF is an important consideration. IDABC plans to set up a permanent "NIF Observatory" as a way to track developments on interoperability in the MS PA's, to facilitate the exchange of information relating to Interoperability between MS, and to promote the integration of EIF precepts into MS NIF governance and related activities with the aim of furthering compatibility between the EIF and the NIF's

[77] http://ec.europa.eu/information_society/activities/egovernment_research/doc/pdf/interop_study.pdf

[78] OECD document DSTI/ICCP/IE(2007)11/REV1

[79] OECD document DSTI/ICCP/IE(2007)10/REV1

14 Annex 4: Recommendations for Member States

This will provide a consolidation of the recommendations for Member States.
It will be produced once the main elements of the EIF have been completed

15 Annex 5: Invitations to external stakeholders

This will provide a consolidation of the recommendations for External Stakeholders.
It will be produced once the main elements of the EIF have been completed