Preparation for Update European Interoperability Framework 2.0 - FINAL REPORT

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Gartner

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DISCLAIMER

Preliminary remark

IDABC (Interoperable Delivery of Pan-European eGovernment services to Administrations, Business and Citizens) is an European Union programme with as objective to "identify, support and promote the development and establishment of pan-European eGovernment services and the underlying interoperable telematic networks supporting the Member States and the Community in the implementation, within their respective area of competence, of Community policies and activities, achieving substantial benefits for public administrations, business and citizens".

Promoting the concept of interoperable systems is at the heart of the IDABC strategy. In this context, in November 2004, the first version of the "European Interoperability Framework" (EIF) was published. This document is extremely well received in the world of public administrations in Europe (and elsewhere) and is often referenced as one of the basis documents when interoperability is discussed. Many Member States of the European Union has used the document as the basis for the definition of their national interoperability frameworks and to provide guidance to project managers and procurement officers.

Taking into account the progress made in this area, the rapid evolution of the technology and the wish to come to a document that will no longer be limited to the IDABC context, the process to prepare a second version of the EIF document has started. This second version will be written in close collaboration with the relevant Commission services and with the Member States. Other, indirect stakeholders will be given the opportunity to provide their input. This second version is expected to be ready in 2008.

The second version of the European Interoperability Framework will take into account the national interoperability frameworks and related activities that today either already exist in the Member States or are being prepared.

At the start of the European Interoperability Framework revision process, the Commission asked Gartner inc. to make a study, situating the European Interoperability Framework in relation to the current practices in the Member States and elsewhere and to give an independent view on the revision process and on its desired outcome.

This document is the final result of this study. Although the people from Gartner spoke with many stakeholders, the views expressed in the document are their own.

The content of the document is discussed within the Commission and with the Member States but it has not been endorsed, neither by the Commission nor by the Member States. This study is not the second version of the European Interoperability Framework but will be one of the many inputs for the revision work.

Everyone who sees interoperability as an effective means to come to better pan-European eGovernment services is invited to read the document and reflect on its content. IDABC is interested in your reactions. A summary of reactions (that reach us before September 15, 2007) will be published on the IDABC web-site (http://ec.europa.eu/idabc) and will constitute another input into the revision process.

IDABC Team

Karel De Vriendt
Head of Unit

Management Summary

Introduction

Cross-border public sector information and interactive services, also known as *pan-European public services*, are necessary to enable the realization of political aims of many EU Ministerial Conferences: to provide better support for growth and jobs, for participation and transparency, for social impact and cohesion and for effective and efficient administration. Already successful examples of pan-European public services can be seen: the Schengen Information System, the Customs Union and the Eucaris system for the exchange of vehicle information.

This report describes the enhancement of the European Interoperability Framework in order to faster deploy pan-European Public Services. The new framework integrates and complements existing national e-government frameworks and is respectful of their differences as well as of the common issues -.such as data-protection – that need to be resolved. It identifies barriers and ways to overcome them in order to make cross-border interoperability and the ensuing pan-European public services an effective contributor to growing prosperity in the European Union.

The primary objective of this report is to provide advises for the new European Interoperability Framework by the IDABC Program. This report is meant to contribute to accelerating the implementation of the e-government Strategy of the Commission by leveraging and complementing the e-government infrastructures of the Member States. The report highlights the roles of the EC, the MSs and the private sector to collaborate effectively together to further the e-government Strategy of the EU.

Summary

The new European Interoperability Framework has been designed as a vehicle for pan-European public services. It builds on existing albeit different national infrastructures respecting subsidiarity, national autonomy and citizen privacy. The basic idea is to make national public information and interactive services available in a European context to certified intermediaries and users. In more technical terms, this can be achieved by adopting global best practices and making information and interactive services available as “web-services” over the Internet across the European Union.

The new framework also shows what measures are needed to create the governance, legal, organizational, semantic and technical foundation to provide quick wins and rapidly increase the availability of effective electronic public services across the Union.

The role of the European Commission is to invite Member States to open up basic public services and to coordinate national legislation and standardization efforts necessary to enable sharing of public services across national borders. The most effective instrument to do so (either a regulation, or a directive or a set of recommendations) remains to be determined.

The role of the Member States is to implement such legislation and take the necessary measures to effectively open-up their base registries to be used as components in pan-European public services.

Pan-European public services could be piloted today, with Member States that are more ready in legal, organizational and technical terms. Potential candidates could be found in the Nordic countries where legislation supports the public use of base registries.

Interoperability

Interoperability means the ability of different organizations to effectively communicate in order to enable service provision: this implies that their respective processes, information assets and technologies are able to communicate.

Although differences exist in national legislation, information structure and language, standardization bodies have been active for many years to resolve semantic differences and to reach harmonization and interoperability across Member States. Successful domains include Customs and Police. Today, eID, eHealth, eProcurement are actively working towards better interoperability across Member States in specific domains.

The principal value of interoperability is that it helps to develop and deploy agreed interfaces between organizations. Agreed interfaces provide for relative independence, which in turn allows organizations to develop and deploy new (public) services, with the guarantee that they can use, and be used by, existing services of other organizations. The net result is that myriads of organizations can re-use existing services to provide new services only limited by their own creativity. This is part of the so-called “Web 2.0” phenomenon, which is already transforming business models in the private sector and yields a great potential in the public sector as well

Public Services

Basic public information and services concerning individuals, locations, buildings, vehicles and other entities are under the responsibility of national Governments. They have to guarantee or certify the protection, correctness and integrity of that basic information. Several cross-border interoperability services exist already today, including e.g. Schengen (security), Eucaris (vehicles and drivers licenses) and Customs. To enable cross-border public services, national governments should make their basic public services available as web-services, hence taking all the legal, organizational, process, semantic and technical measures necessary to do so.. The role of the European Commission is to facilitate further standardization of basic public services by building on the many efforts of standardization bodies that already operate in various domains.

The availability of Member State basic public services allows cross-border aggregate public services to be created. There are several examples. Re-location between member-states traditionally requires multiple administration visits in the originating country and again, multiple visits in the new country. Should a cross-border public service be available, citizens could rely on a one-stop shop in either country, dealing with transfers of address, phone-numbers, health certificates, insurance, permits, etc when re-locating. Medical treatment could be much more efficient if a doctor, wherever in the EU, could open medical records to give a safe and effective treatment if needed. Not to mention retiring workers who have their pension rights scattered across various MS countries and may obtain their pension rights online by just typing in their social security number.

Aggregate cross-border services provide great value to businesses and citizens in terms of time saving, spared lives or increased speed of doing business in the EU. This makes the design and delivery of aggregate public services also attractive to private intermediaries, which could create totally new and enticing value propositions for citizens and businesses alike.. Therefore, an option would be to allow private intermediaries to deliver aggregate public services, although only if certified in terms of data-protection and other criteria that guide the implementation of public services.

The role of the Commission and National Governments would be to provide certified basic public services and to coordinate and monitor the delivery of aggregate public services

The Momentum is here…

Today, base registries of persons, businesses, locations, vehicles, buildings, etc. plus one or more identification and authentication mechanisms exist in most Member States. Web-service technology enables technical interoperability to seamlessly connect between systems and exchange valuable information.

Now is the time to resolve the final barriers e.g. to provide a legal basis (as e.g. in the Nordic countries), organizational and process alignment and the semantic standards to interoperate and deliver pan-European public services where needed, albeit with all due respect for privacy and data-protection.

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MAIN REPORT

1.0 Introduction

1.1 History

The support of interoperability for pan-European e-Government services is a core task of the IDABC (Interoperable Delivery of pan European Services to Public Administrations, Businesses and Citizens) program, explicitly requested in the Decision to implement the program[1]. Interoperability was already a key issue for the IDABC predecessors IDA[2] I and IDA II, under which a series of measures were initiated under the work program entry "Interoperability Guidelines"[3].

As announced in the e-Europe 2005 Action Plan[4] and foreseen in its own legal basis, the IDA II program developed the European Interoperability Framework for pan-European e-Government services (EIF v1.0) in a close consultation process with the Member States. As a result, a draft version of EIF was published on the IDA(BC) website[5] in January 2004. The public request for comment was met by about 20 different contributions from Member States, EU institutions and industry representatives.

The IDABC Management Committee TAC approved the official version of EIF v1.0 on October 19, 2004 and published it in early November 2004. The document models the organizational framework for the exchange of information between Member States and recommends technical policies and specifications for participating public administration information systems across the EU. Decision makers in e-Government are its main target group. It is the highest-ranking reference document for interoperability within the IDABC program.

The 'old' IDA Architecture Guidelines (AG) are directed to supplement EIF at an operational level that is essential for the implementation of cross-border services. First published in 1999, the AG are available on the IDA website in the 7th edition[6] dating from 2004. The guidelines describe concepts and provide recommendations for the organizational and technical prerequisites of data exchange between public administrations, citizens and enterprises. They also contain detailed information on the parameters of IDA infrastructures and tools already in place. Furthermore they address those responsible for planning, design and procurement tasks for pan-European horizontal actions and measures, in particular generic services and common tools. The AG are also aimed at those who develop specific sector projects for exchanging data between administrations.

EIF v1.0 and the AG both share common principles and goals: they are based on the principle of subsidiarity specifying only the pan-European aspects of e-Government technologies. Their recommendations rely on the use of open standards, and there is the common understanding that the future architecture of pan-European e-Government services will be based on XML-technologies. Furthermore, both documents will have to adapt continuously to the requirements of emerging trans-border-services in the future, in order to become useful reference documents for the IDABC community.

However, due to their different history and date of origin (the concept of the AG dates back in the 90s!), there is an obvious gap between the content of the two papers. Whereas the generic

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1 Decision 2004/387/EC "Decision of the European Parliament and of the Council on Interoperable Delivery of pan European Services to Public Administrations, Businesses and Citizens (IDABC)"; http://ec.europa.eu/idabc/en/document/2319/5644

2 IDA — Interchange of Data between Administrations

3 For the IDA work programs see http://ec.europa.eu/idabc/en/document/2548/3.

4 See http://europa.eu.int/information_society/eeurope/2005/index_en.htm

5 See http://ec.europa.eu/idabc/en/document/3473/5887

6 See http://ec.europa.eu/idabc/en/document/2317/5890

outlines of EIF already depict adequate policies for a state-of-the-art architecture, the AG 7.1 do not yet provide the adequate technical concepts and operational guidance towards an architecture for cross-border services. (An available more advanced version 8.1 was not published, because the work on the harmonization of EIF and the AG had already been started).

There is also some doubt on whether the architecture guidelines should be continued as one document or rather be split up in several documents. E.g. security and authentication might deserve their own guidelines. Member States have volunteered to contribute their experience in terms of architecture and standards. Also, consideration should be given to the possibility to manage the future AG as an online service.

In 2005, IDABC published already a study on infrastructures for e-Government services[1] as well as two papers related to semantic interoperability[2]. All three studies use terminology and concepts of EIF. The "Stakeholder Study"[3] provides information on stakeholders' priorities.

First attempts in 2005 to harmonize EIF and AG by adapting the AG to the new environment did not lead to the expected results. EIF itself obviously did not provide enough conceptual guidance for the content of the other documents. The project did not succeed in integrating stakeholder requirements and technology options into a coherent framework that would touch on the most important interoperability questions.

In the meantime, the high visibility of EIF v1.0 and the international reactions it has caused, have led to the decision to convert its next version into an official Commission document. The action was first announced in the Communication on Interoperability[4] that was published in early 2006. It is also mentioned in the 2010 e-Government Action Plan that sets policy goals for the coming years[5] and generally states the importance of guidance on interoperability: "(…) interoperability is a generic key enabler. Interoperable essential infrastructure services (e.g. for secure communications between administrations or cross-border access to registers), common specifications, interoperability guidelines and re-usable software are all building blocks of high impact on e-Government."

In this context, IDABC decided to initiate a preparatory study for the revision of both, EIF v1.0 and the AG.

1.2 Objectives of this Study

The objectives of this study are as follows:

1. **Assessment of the situation**
   This includes the assessments of the following aspects:
   - State of IDABC activities on interoperability;
   - Existing IDABC interoperability guidelines/activities compared to measures taken nationally/internationally by public administrations and businesses in this area;
   - Stakeholder requirements (Member States, Commission, costumers of pan-European e-Government services in general);
   - Member State proposal to contribute through the national e-government interoperability frameworks;

[1] See http://ec.europa.eu/idabc/en/document/3759/556

[2] See http://ec.europa.eu/idabc/en/document/3875/556

[3] See http://ec.europa.eu/idabc/en/document/3880/556

[4] See http://ec.europa.eu/idabc/en/document/5316

[5] http://europa.eu.int/information_society/eeurope/i2010/i2010/index_en.htm

- Technology options.

2. **Definition of IDABC's role**

   Define IDABC's role in providing guidance for pan-European interoperability by answering the following questions:

   - What are the benefits versus the risks in doing or not doing something to improve interoperability cross-border services? How can IDABC provide an added value in this area?
   - Which areas should be covered? How deep, how broad should the coverage be?
   - What could be the barriers in building interoperability and how can they be removed?
   - Which constraints must be respected during these activities?
   - What should be the impacts of IDABC interoperability recommendations?
   - What should the relationship between the IDABC and the Member States be regarding these activities?
   - Which technology preferences should be proposed? — approach for pan-European e-Gov Services.

3. **Proposals and estimations**
   - Propose outline for EIF and AG (respectively for documents replacing the AG);
   - Propose work packages for EIF, AG and possibly other activities, set priorities;
   - Give rough estimations for timeframe and resources (internal and external) to be invested (short and long term).

4. **Dissemination of results**
   - Propose basics for communication strategy;
   - Help to communicate the findings;
   - Support for Commissions internal and public presentation of objectives and results during the foreseen workshops as well as in the context of the IDABC Management Committee PEGSCO.

1.3 Methodology of this Study

The methodology of this study applied by Gartner has been derived from the 'scientific paradigm' and consists of the following iterative phases:

- *Problem Inventory* — of specific problems is captured through document study, interviews, workshops and Member State visits
- *Requirements and Assumptions* — As a fundamental output of the architecture process, this part describes the linkage between the EC business strategy (delivering PEGS) and the overarching requirements that the Architecture must meet to satisfy that strategy. It also defines the EC business strategic context on which the future-state Architecture is built. In other words: the Requirements and Assumption process and the resulting artefact captures and links environmental trends, business strategies and requirements for the future-state enterprise architecture.
- *Generic Solution Framework* — is designed to resolve all (clusters of) problems
- *Review* — review and tests are performed to assess whether and how the generic solution framework satisfies all specific problems
- *Repeat* — until all problems are solved

These phases are shown in the next diagram:

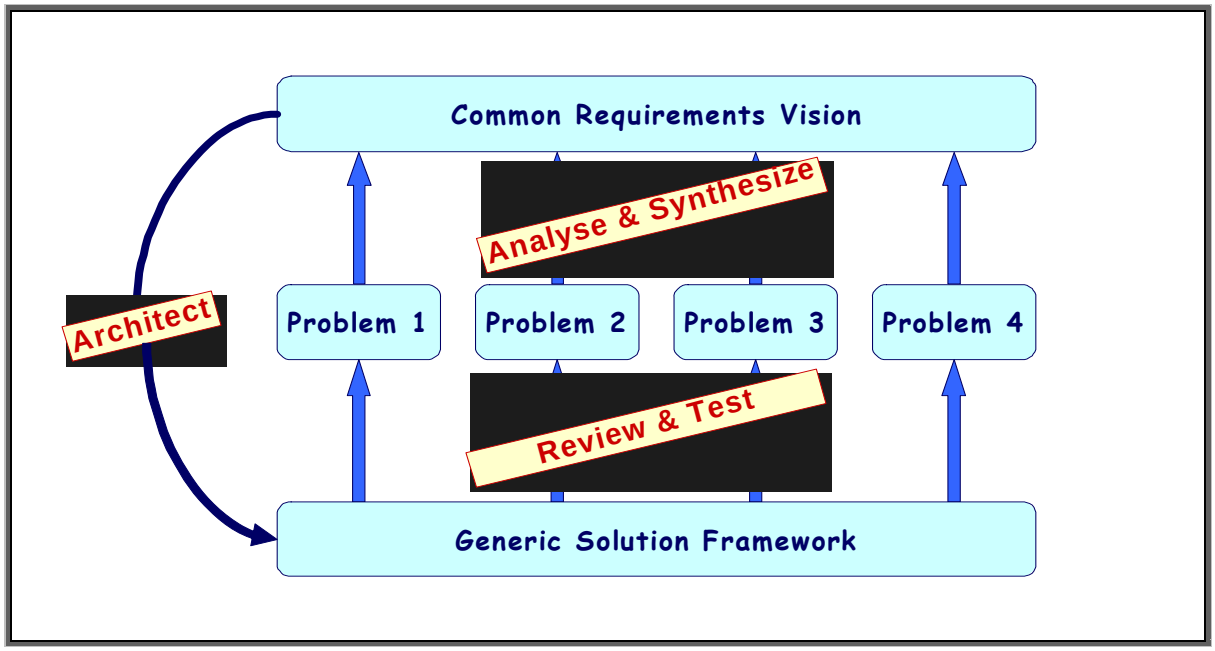


Figure 1 The Applied Study Methodology (the Scientific Paradigm)

In this study, an inventory of problems was collected from Member State visits, from stakeholder workshops with experts from Member States, the Commission and the industry, from the EIF v1.0 and many other reports and documents. The summary of all this input information is called the 'Input Model', as shown in the next figure.

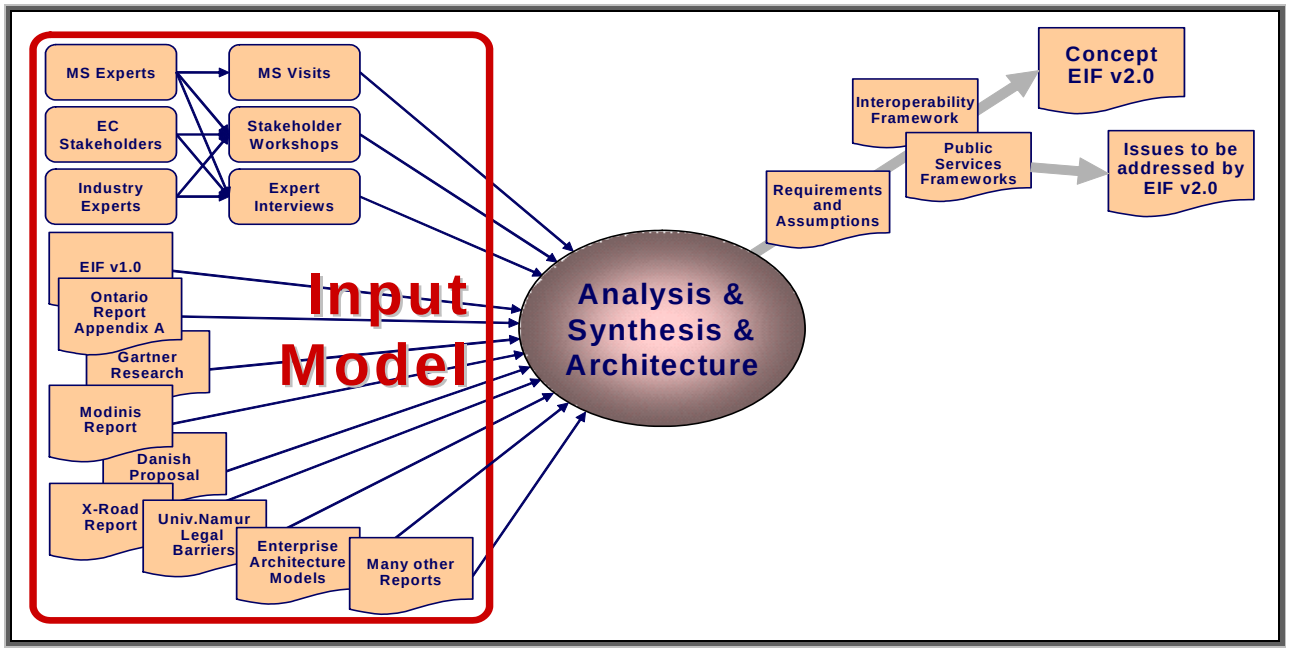


Figure 2 How did Gartner achieve its results?

The analysis and synthesis resulted in a set of requirements and assumptions to provide a high-level overview of the objectives of the new framework. From this, the new framework perspectives have been created: the 'Interoperability Model' and the 'Public Services Frameworks' that are to provide a Generic Solution. These perspectives together form the foundation of the concept EIF v2.0. Furthermore the Public Services Frameworks have been

used to identify multiple issues needing resolve before pan-European public services can be developed, deployed and used at increasing scales.

It should be noted here that the activities analysis – synthesis - architecture have not been executed as a sequential or linear process. Instead, the design of the framework concept for EIF v2.0 has been an iterative, incremental and creative process.

As may have been duly noted by many stakeholders, the requirements and assumptions and the ensuing frameworks have evolved during the study, based on stakeholder discussions in many review workshops and interviews.

In fact, the review workshops and interviews constituted the review and test activity as indicated in the applied methodology. During this study, the iterative cycle of review, test, analyse, synthesize and architect has been executed several times and have lead to the results presented in this report.

1.4 Structure of this report

The report answers questions asked by the Commission through the Technical Annex[1] and it structures the information, analysis and conclusions and results.

Chapter 2 presents the input Gartner obtained and used during the execution of this study. Chapter 3 assesses EIF v1.0 and proposes enhancements based on the input presented in the preceding chapter. Chapter 4 elaborates on the contents of EIF v2.0 and introduces the main issues to be addressed. Chapter 5 takes these issues as an input for the definition of the work packages for IDABC and the European Commission.

Appendix A gives the definitions of the specific terminology used throughout this report. Appendix B explains Gartner's hype cycle methodology. Appendix C elaborates on the interoperability reference model used for this study. Appendix D elaborates on effective communication strategies. Appendices E, F and G list the documents, interviews and Member State visits respectively that served as key input for this study.

[1] See Technical Annex for Specific Contract no 2 based on framework contract no DI/5370-00 "Preparing the Revision of IDABC Interoperability Guidelines"

2.0 Input

This chapter presents an overview of the input materials Gartner used for this study. Chapter 3.0 presents our analysis of this material.

The first section of this chapter elaborates on the activities and products of IDABC. The subsequent sections deal with the general barriers to interoperability, Member State visits, interviews, workshops and other inputs Gartner obtained.

2.1 State of IDABC activities on interoperability

2.1.1 Activities of IDABC

European Interoperability Framework

Definition

Interoperability means working together — collaboration of systems, services and people. When people work together, they need to communicate and make agreements. They need to agree on the tasks they will perform and how they will exchange results. If their nationality is different, they also need to agree on the language in which they will communicate. Moreover, they need to overcome cultural and legal differences.

An Interoperability Framework can be defined as the overarching set of policies, standards and guidelines which describe the way in which organisations have agreed, or should agree, to do business with each other. An Interoperability Framework is, therefore, not a static document and may have to be adapted over time as technologies, standards and administrative requirements change.

Administrations that provide electronic services (e-services) are faced with the same situation they need to elaborate a set of agreements on a large number of issues, considering organisational, semantic and technical aspects. For example, when administrations exchange data, they must ensure that each party shares the same meaning of the data (semantic interoperability) when referring to 'price', do we mean the actual price or the price per item? EIF addresses these issues in order to facilitate the interoperability of e-Government services at pan-European level.

Objectives

EIF supports the European Union's strategy of providing user-centred e-Government services by facilitating, at a pan-European level, the interoperability of services and systems between public administrations, as well as between administrations and the public (citizens, businesses). It is an action of the e-Europe 2005 Action Plan, under the e-Government heading.

Infrastructure for cross-border e-Government services

Definition

When IDA became IDABC in 2005, the delivery of European e-Government services to administrations, citizens and businesses moved to the centre of its activities. Apart from the identification of these services, this requires the definition of the infrastructure that will enable their delivery and accessibility.

Such an infrastructure will need to handle all the complexities of communication between different national and European administrations. It will have to ensure basic transmission of information, the translation of information content and meaning and finally it will have to link up

internal administrative processes of various organisations. In the terminology of EIF, it will have to ensure technical, semantic and organisational interoperability.

To determine the required capabilities and the implementation choices, a project was launched with the purpose of establishing a high-level architecture description for the infrastructure for cross-border services to be implemented by IDABC. This resulted in three documents: a requirements analysis, an architectural description and an assessment of market and technology trends that could have impact on the implementation of the infrastructure.

Objectives

The main objective of this action is to define the architecture for the delivery of cross-border e-Government services and the concrete implementation steps this requires.

Architecture Guidelines

Definition

The Architecture Guidelines are an IDABC document offering a framework for the establishment of other IDA services, namely s-TESTA, CIRCA and PKI, and for users who wish to use IDA and IDABC infrastructures.

It also offers general advice on issues related to interoperability between these services and with national applications of the Member States. The Guidelines supplement the generic rules and specifications of the EIF on a technical level.

Objectives

The primary aim is to contribute to technical convergence of European network infrastructures for administrations and achieve interoperability through harmonisation of design.

Content Interoperability Strategy

Definition

E-Government services are built upon the exchange of information and in the future they will be technically based on state-of-the art XML-technologies. Semantic or content interoperability is about ensuring that the meaning of the information exchanged is not lost in the process that it is readable and understood by the involved people, applications, and institutions. The worldwide acknowledged standard of the postal address is an evident example for the necessity of content interoperability: only through this standard, which identifies country, city, street/house as required elements, letters are guaranteed to reach the recipients regardless of the country they live in.

In order to deliver cross-border services, the European institutions and the Member States will have to agree on a multitude of semantic specifications, such as descriptions of people, products, processes, forms, etc. They will also have to agree on how to formulate these descriptions and where to store them for public use.

Such standards require extensive and long-term coordination efforts with many partners. In the European context, this not only implies the coordination of data and information formatting, the implementation of transformation processes, and the systematic publication of related information. It also requires the provision of multilingual solutions for the Member States.

The EIF defines a set of general recommendations and guidelines for trans-European coordination and collaboration in implementing e-government services The Content Interoperability Strategy provides a more specific concept and implementation plans. In particular it defines the specific areas, where semantic standards and related specifications have to be created. This in order to support pan-European e-Government services, to deliver a concept on how to organise and implement semantic interoperability (including infrastructures

such as central registries and repositories for the material), to estimate the resources needed for institutionalised coordination processes and to sustained maintenance of semantic standards.

The Content Interoperability Strategy is supposed to ensure a harmonised and consistent approach to semantic interoperability for IDABC services and projects.

Objectives

The objective of this initiative is to establish a Content Interoperability Strategy for the IDABC program in order to ensure a concerted and congruent approach to the content and semantic management of future cross-border e-Government services. This strategy will provide a sound foundation for the achievement of the IDABC objective to support and promote the development and establishment of pan-European e-Government services and their underlying telematic networks by defining and implementing European interoperability.

Promotion of Open Document Exchange Format

Definition

Most of today's electronic office documents have been created by a few commercial software programs and more often than not each one has its own format. To allow users to process a document they need in many instances to have the same program (and corresponding versions) or a filter that allows the document to be opened and modified.

Open document exchange formats would do away with this need. They remove dependency on products and technologies by using standardized formats that promise interoperability of document processing. Information exchange via documents being at the hearth of any public sector activity, document interoperability becomes a central issue in any e-Government strategy.

Objectives

Interoperability between office application programs is currently at an insufficient level for efficient e-government. The Open Document Exchange Format initiative will prepare an IDABC policy on formats that will allow electronic documents to be exchanged among authorities, and between authorities, citizens and business in a way that does not enforce the use of specific software products and ensures universal readability of the documents.

At its meeting of 6 December 2006, the PEGSCO (Pan-European eGovernment Services Committee) endorsed recommendations supported by the IDABC Expert Group on Interoperability and by the PEGSCO Technical Working Group (TWG). PEGSCO conclusions and recommendations on Open Document Exchange Formats (6 December 2006) can be found at: http://ec.europa.eu/idabc/servlets/Doc?id=26971

2.1.2 Products of IDABC

On 14 August 2006, the European Commission adopted the third revision which constitutes a major revision of the IDABC Rolling Work Programme. The Programme can be found at: http://ec.europa.eu/idabc/en/document/5101/3.

In sum, 41 actions are included in the work programme, totalling around € 25 million in 2005. Each follows the structure proscribed by Article 8 of the IDABC decision.

The actions are grouped by sector (for the projects of common interest) or by objective (for the horizontal measures), and each such section is preceded by an introduction describing the cohesion of individual actions in this section and their overall alignment with the broader objectives of the programme.

Sectors defined are:

- Agriculture
- Competition
- Education and Training
- Employment and Social Affairs
- Enterprise
- Environment
- Health and Consumer Protection
- Internal Market
- Statistics
- Transport

Objectives defined are:

- Horizontal PEGS
- Basic Infrastructures
- Security Measures
- Interoperability Measures
- Dissemination and spread of good practice
- Strategic and support activities

Often, the actions are described in greater detail in other documents, such as the associated global implementation plan. In addition, information on the individual projects will be made available through the IDABC programme's website http://europa.eu.int/idabc.

2.2 General barriers to interoperability

This section discusses the general barriers to interoperability from the perspective of the responsible parties.

Policy makers

One of the biggest challenges for policy makers is the relatively high autonomy of the various agencies. Making a decision at the highest level and issuing a directive does not work in commercial enterprises. Government agencies, each with its policy objectives and related accountability, form a complex network rather than a straight hierarchy.

Administrations

Although most agencies are willing to implement interoperability according to the architecture presented above, two major challenges are holding them back. First of all: a certain operational scale helps when it comes to implementing the best practices which this essay will present. Only a few agencies have the required IT skills and budgets at their disposal.

The second challenge concerns a lack of serious incentives. Although governments are working hard on performance contracts with their agencies, in practice agencies are not really held accountable for the way they deliver services to the public.

IT departments

IT departments (both public and private) face the challenge of leveraging mission-critical legacy applications rather than treating them as liabilities that prevent interoperability objectives from being met. Legacy applications challenge interoperability in three ways. The first obstacle to overcome is the traditional stovepipe architecture as this hinders real-time functionality re-use. The proposed interoperability architecture implies that various business units across administrations should be able to invoke the same elementary business function. However this implies a degree of cooperation and coordination among administrations that is usually beyond their intentions and capability.

The second challenge is that business processes are hard coded in the legacy applications. This means that the implementation of each business process change requires IT specialists that are expensive and in short supply. Easy and fast changes in business processes are nowhere near.

The high cost of a big bang approach is a final hurdle. The commonly high investments in current business processes and applications makes a big bang transition an unviable option. An approach is needed which supports a gradual migration from the stovepipe applications to an interoperability friendly architecture.

A last challenge worth mentioning here is the IT maturity level of public IT departments. Often there is no clear governance model defined and there is no clear distinction between business and IT responsibilities. In most situations this results in an overburdened IT department and a fragmented collection of information systems delivering bad service and demanding high operational costs.

Accessibility

Another important barrier to interoperability is accessibility. With accessibility we mean the possibility for everyone to enjoy the higher service levels of e-government, including disabled persons and the digitally agnostic part of the population. By offering similar service levels through different channels (e.g. Internet, phone, mail, front desk, personal intermediary and mobile devices) a person can choose the channel that suits him best. Therefore, the true barrier of accessibility is not so much attaining to accessibility guidelines for websites (although important) but far more the provisioning of a well-balanced multi-channel service offering (as is also concluded in the IDABC study "Multi-channel delivery of eGovernment services" of June 2004). This requires the implementation of e-government to the full extend. A nice facade on the Internet will not suffice. Front-offices and back-offices need to be seamlessly integrated.

An example worth mentioning here is the Dutch Tax and Customs Administration. This agency started with electronic forms for income tax back in 1997. Because of the huge success the tax administration decided to promote usage of electronic forms heavily since 1999. To be able to provide the digitally agnostic a similar ease of use experience the tax administration set-up temporarily offices in places like elderly homes with clerks providing a helping hand to fill-in the electronic forms. I.e. they applied a multi-channel approach.

2.3 Workshops

This section discusses the workshops Gartner organized for this study.

2.3.1 Member State Workshop (27-9-2006)

Discussions were lively and divers. Lead by the questions, crucial items on the current EIF and its application and value for Member States were discussed.

The Plenary feedback showed the following:

- There is appreciation for an Architectural model as a basis for the upgraded framework.
- Many viewpoints were contributed, many coherent, some diverse.

During the Member State workshop it became clear that all participants agree upon the ultimate goal of EIF: to support the delivery of pan-European e-government services (PEGS). Furthermore the Member States expressed that they would appreciate an architectural model extending the current EIF to provide more practical guidelines on how to proceed.

The Member States like to keep their autonomy on various levels and prefer a federated approach. This includes the autonomy of having an independent national reference architecture for implementing interoperability.

It appeared that the Member States have different opinions on how to proceed with EIF regarding the amount of guidelines. On one side are the Member States who advocated exhaustive and detailed guidelines. On the other side are the Member States who want to limit the guidelines to the minimum set necessary to realize interoperability. These Member States foster the idea that EIF v2.0 and the AG should give just enough guidelines for Member States to develop in the same direction and work towards the same goal.

2.3.2 EC Organization Workshop (16-10-2006)

The EC stakeholders discussed crucial items on the current EIF, its application and value for the stakeholders.

The Plenary feedback showed the following raw material on remarks:

- Interoperability
  - "Act together";
  - Federation not Integration;
  - Semantics, services;
  - Autonomy in systems is preserved → loosely coupled systems.
- Value
  - Eg. e-Procurement, Eurostat;
  - Process of fund granting.

The EC stakeholders acknowledged the finding of the Member State workshop that true executable guidelines are missing in EIF. The current version is not practical enough. The focus should be on semantics and services. The EC stakeholders also stated that cost reduction and transparency are the two most important drivers for EIF.

The important drivers for interoperability are cost reduction, faster delivery, transparency. At the same time there is political demand to stay autonomous.

One of the most important issues EIF v2.0 should address, is the issue of pan-European user identification, authentication and security. The stakeholders also expect more practical guidance from EIF v2.0.

The EC stakeholders expect IDABC's role to be that of a knowledge hub disclosing best practices when implementing EIF:

- Recommend standards (EU standardization expert groups);
- Promote (two way mechanism), select and monitor the use of standards;
- Guidance to construct a service registry;
- Vocabularies, definitions belong to the business — not IDABC;

- Provide scenarios, patterns, best practices;
- Compliance tooling.

2.3.3 Industry Representatives Workshop (27-11-2006)

The industry stakeholders are very much interested in helping to contribute to the delivery of PEGS. This includes the provision of technical solutions but also the provision of aggregate services as a third party.

The representatives of the industry mentioned cost reduction as an important driver for implementing EIF. According to the representatives the focus of EIF should be on semantic interoperability first and then on technical issues.

True leadership is important when it comes to actually implement EIF. What is missing is a central mechanism guiding the local (Member State and EC directorate) initiatives.

The issue of open standards is a controversial topic among the industry representatives. Their opinion is that the framework should allow competition among standards, open and non-open.

2.3.4 Review workshops

Initial versions of the framework were presented to Member State representatives and EC stakeholders to comment on.

The most important aspects mentioned during the review workshops were:

- The financial aspect. E.g. who is going to charge whom for the usage of services?
- Secure message exchange and the inclusion of B2B and C2C and B2C in the scope of the framework.

2.4 Member State visits

Gartner conducted seven Member State visits. During these visits it appeared that pan-European e-government is not a key priority on the management agenda of the Member States. All visited states focus on delivering e-government services locally. The e-government infrastructures developed by Member States are all aiming for the provision of national public services.

Each visited Member State has developed a national reference architecture. Member states agree that EIF v2.0 should respect the national architectures. When it comes to delivering e-government services to businesses and citizens the Internet plays an important role in each Member State visited. Gartner also witnessed several successful examples of public-private partnerships.

The Member States had the liberty to set the agenda of the visit. Therefore the following sub-sections on the visits are formatted differently.

2.4.1 United Kingdom

The Cabinet Office plays a central role in providing guidance and setting standards for the use of information technology in government and the delivery of government services. Delivery and Transformation Group (DTG) within the Cabinet Office takes forward key themes of delivery, performance, capability and transformation.

The ‘Transformational Government – Enabled by Technology’ strategy set out the Government's vision for a long–term transformation of public services to provide efficient, effective services that citizens want. It is about transforming public services as citizens receive them and demonstrating how technology can improve the corporate services of government,

supported by professionalism throughout the delivery chain. The scale of the change is enormous and will not be completed overnight. The Transformational Government implementation plan focuses on the immediate priorities to mid 2007.

Taking **Transformational Government** forward on a day to day basis remains the responsibility of the Chief Information Officer Council, the Chief Technical Offier Council and the Delivery Council – bodies representing both the technology and business sides of government and the wider public sector.

Directgov is the UK government's website providing public service information and services to citizens. There is also a separate business oriented site called Businesslink.gov.uk which similarly provides small and medium-sized businesses with access to UK business e-services and transactions through this one primary site. Future government information will be delivered through either Directgov and Business Link – this will make access to information much easier.

e-Identification and e-Authentication is performed by a central platform called Government Gateway. The Government Gateway is a central registration and authentication engine enabling secure authenticated e-government transactions to take place over the Internet.

Similar clear, transparent strategies and supporting governance structures should be cornerstones and critical success factors of pan-European e-government services.

On the longer term, the National Identity Scheme is likely to become the preferred identification method for e-government services.

The following comments are Gartner impressions from the discussion during the visit and not a formal statement from DTG about UK policy matters.

- As seen in similar situations in other Member States, the UK show many local initiatives. Orchestration of these initiatives appears to be difficult and many solutions for e-Services are point solutions;
- Experiences in the UK demonstrate that a clear, transparent and operational Governance structure is the cornerstone and a critical success factor of pan-European e-government services;
- Like in many other e-Government activities over Europe, Gartner sensed the impression that the start of the e-Government activities first focused more on technical matters, less at governance and semantic and organizational matters. In fact, this is a growth path that is seen in many organizations. The work done in the UK today is now focused on these second set of issues (governance, organization, semantics). Taking these experiences into account, this report will help and support on how to develop governance, organization and semantics on the EU level;
- A real business owner of the e-Government Services is important. This experience calls for a solid and strong Governance structure needed for EIF v2.0;
- e-Identification and e-Authentication strategies and schemas are important elements to be taken into account for EIF v2.0.

2.4.2 Netherlands

In the Netherlands e-government is a multi-department issue. Key players are the Ministry of Interior and Kingdom Relations (BZK) and the Ministry of Economic Affairs (EZ). The overarching name for the e-government program is e-Overheid. In this visit it became clear that BZK is more oriented towards providing services for the citizen while EC is more oriented towards the business.

There is a distinction between the Dutch national policy in e-gov architecture and interoperability and the Dutch international policy (that is not matured as of yet).

The Dutch Government Reference Architecture is called NORA and first was published in 2006. NORA contributed to the notion of structuring and priority setting in developing e-Services. Co-operation is facilitated and is also expanding. In this architecture the words Front Office and Back Office lost a bit their classical meaning because citizens do not know how they are served. There is just one product catalogue. In Back Office related aspects there is still a long way to go on the semantic and organizational issues. The executive organizations - Agencies - also look at NORA for adoption. In fact there is some structuring effect pushing from its organizational principles. This effect is based on the mutual dependency to provide e-Services. Although the first results are encouraging, there's a long way to go yet. It may take up to ten years to create a more service oriented public service.

The development of services is seen as a bottom-up approach. For the development of concrete propositions for pan-European e-government services a strong cooperation is expected with other Member States. Interoperability and Standardization are treated from a thematic approach.

The Netherlands are said to be at the dawn of a large scale implementation of e-Services. The number of participating institutions is rapidly increasing. The aim is to have 65% of the transactions on the e-Services handled over the common Internet. Today the counter is at 50%.

To make e-government services really happen it needs front runners. Front runners in the Netherlands are: Rijksdienst voor het Wegverkeer, Customs, Port Authority of Rotterdam. The ambition to cooperate is generated from these enterprises themselves. One of the strategies is to work with front-runners (Champions) and demonstrate possibilities. The immediate conclusion however is that the strategy has to take bridge builders into account, building bridges between the front-runner enterprises and the more conservative enterprises.

The anticipated mode in an European perspective is a federative principle. The roadmap looks for an increase of the e-Services in professional level until they are mature enough to bring it to a political discussion. As in the Netherlands examples, it is believed that champions are needed on an European level to lead the way and function as early developers for pan-European e-government services. It will be clear that many will follow.

This MS visit also revealed the issues of the legal aspect. In The Netherlands many legal aspects inhibit the disclosure of information and dissemination of information for which one does not have the right or ownership. This subject is indicated to be one of the most difficult, but yet essential to build aggregated services. It is clear to the Netherlands Government that these issues can only be solved in cooperation and participation with the private sector. Certification, auditing, logging are the issues that have to be researched and developed. Harmonization of legislation on a European level is indicated as necessary.

2.4.3 France

The French e-government strategy is set in the ADELE program. Many initiatives implement the strategic program on a National level as well as on a Local level. The -Government Services are separated in different networks and access for citizens, business and administrations.

The following key items were discussed in this visit:

- How can quality of information be provided. It was discussed that cross-certification may be the solution here.
- In the area of public and private initiatives the project team learned that in France a couple of such relations exist, working well and showing the examples in this.
- France uses one system for User Identification. While each Administration has its own user administration, they are linked for Interoperability.

The important issue missing is legislation to move forward in this area. Addressing the subsidiarity principle, this visit also discussed the fit of the (early stages) Public Services Framework in EIF v2.0 and the French model. Apart from further thorough analysis, a first review shows that the subsidiarity principle is respected and there is a clear demand for the EIF v2.0 model on interfacing with the national model.

On the cost and private partnership issue the following observations are made. In France only the cost of the publication of services can be charged, to administrations at low cost, to private enterprises at higher cost. Commercial activities on these portals are allowed.

In general, pricing is an important issue for France, as constituencies pay each other to use services.

2.4.4 Estonia

The Estonian e-government efforts are characterized by the X-Road project. The goal of this project is to build an infrastructure that allows effortless access to the data in state registries without compromising the security of the data and with minimal impact to the existing systems.

The Estonian administrations host many diverse registries, most of them very small organizations without security knowledge and with a very small IT budget. The security requirements are high. Registries contain mostly personal data that is in some cases used to make high value decisions and in some cases needed in real-time.

The initial analysis shows that the priority of the security properties is following:

- *Evidentiary value, authenticity, integrity*. For identification the national ID-Card is used (in March 2007 95% of residents have ID card). Regular bank cards can be used as an alternative identification method.
- *Availability*. This is realized through the use of the public Internet with central network management components. Secure bi-lateral communications can continue even when central components are failing.
- *Confidentiality (restricted data, sensitive personal data)*. Two level access rights control mechanism is used as a defence mechanism against internal attackers. The two access control levels are inter-organisational level and intra-organizational level. This two level access control mechanisms that isolates the details of the authentication and access control mechanisms used internally by the organizations was biggest success factor of the X-Road because the impact to the existing systems was minimized.

X-Road is currently used by the government of Estonia and private companies and citizens. X-Road is the preferred way for connecting governmental agencies and is also used by private companies to exchange data with government and with the other organizations. X-Road is real working infrastructure: all public sector registers offer services over X-road, all central government and most local government authorities use everyday services over X-Road. X-road is supported by existing law.

2.4.5 Sweden

E-government implementation is the responsibility of each government agency, under the supervision of the Ministry of Finance. While practical work is carried out in the agencies, the Swedish Administrative Development Agency (VERVA) has the expert role to support and promote the e-government development. Guidelines and ordinances are issued, and another important coordination tool for VERVA is the responsibility for public procurement of IT resources and services, representing ca 1/3 of the public sector IT spending in Sweden. Initiatives to establish an architecture framework and common requirement specifications are in progress.

A cornerstone of the Swedish e-government strategy is the secure identification of citizens. This matches the general requirements for citizen's electronic identification and electronic signature, used in the specifications for public framework agreements to make PKI solutions widely available. The usage of the most common electronic identification method, a soft certificate issued mainly via the Internet banks and used for both public and private services, is increasing at the rate of 25,000 new users and approximately 60,000 more transactions a month. At the end of 2005 there were some 800,000 users and 1,800,000 transactions a month.

Another e-cornerstone is the Swedish Government e-link (SHS), which is used for the secure and reliable transport of data via the open Internet. SHS, e-Id and other generic basic functions are also available through framework agreements with two major IT service providers as"Infra Services" . The open information infrastructure is further improved by an initiative to develop XML Schemas that define frequently used standard messages.

The most important project at the moment is the e-procurement project which aims to realize electronic procurement for the entire government by 2010.

2.4.6 Austria

Austria has a CIO on the central government level. E-government is his responsibility. The CIO resides under the Bundeskanzleramt. The CIO works in close cooperation with the local authorities and the industry. Austria is the only country visited that has adopted a specific e-government law which is an important base for all e-government initiatives.

Important projects in Austria are:

- CitizenCard for identification of citizens. With the enrolments of new bank-cards and eCards for Social-Security every Austrian has a CitizenCard since 2005;
- E-billing for small and medium enterprises. The necessary ebInterface is implemented by various ERP vendors;
- Eudin message broker for the exchange of information on the transport of waste;
- The government-wide electronic record system (ELAK) – the back office workflow system. The benefits for citizens and enterprises are faster administrative procedures and the widespread delivery of electronic documents;

2.4.7 Denmark

The National ITT agency has several initiatives in the field of e-government and interoperability. With projects, that span high/low, theories/pragmatics and local/international, the agency supports the Danish ambition to increase competition and openness in pan-European services generally and in Danish services specifically.

Some projects of specific interest are:

- Enterprise architecture framework project - this project defines a methodology to do architecture and defines the documents to be produced during the execution of the methodology. The documents map on the TOGAF framework.
- Government directive to use open standards - in order to enable cross platform and cross vendor interoperability Denmark pursues the use of open competitive standards. Denmark maintains a directory, OIO Kataloget, of prescribed standards. Mainly three concerns are important when certifying standards: conformance (public value), influence (private/public partnership) and performance (private value). See also section 2.7, introducing the 'Danish proposal'.

- OIOISI, Service Oriented Infrastructure - This is a national web-service based infrastructure, enabling a secure and reliable exchange of business documents. Electronic invoicing is the key driver for this initiative.

2.5 Interviews

Gartner executed 26 interviews with persons involved in e-government/interoperability initiatives. The interviews confirmed that there is currently no explicit sense of urgency to deliver PEGS.

Interoperability knowledge is scattered across many projects, people and DGs. Several DGs have the same objectives but are not cooperating. Although we identified a number of centrally directed/facilitated approaches, the majority of projects is neither guided nor monitored from a higher level within the EC. This fragmentation leads to suboptimal solutions and does not contribute to the ultimate goal of EIF: "Public Services Where Needed".

The interviews showed that the EC projects tend to focus on technical solutions first instead of aligning business processes and semantics. Although some limited services exist (e.g. vehicle registration, drivers licenses, criminal information), operational PEGS are still in its infancy state.

The list of interviewees is presented in appendix D.

2.6 Gartner Research

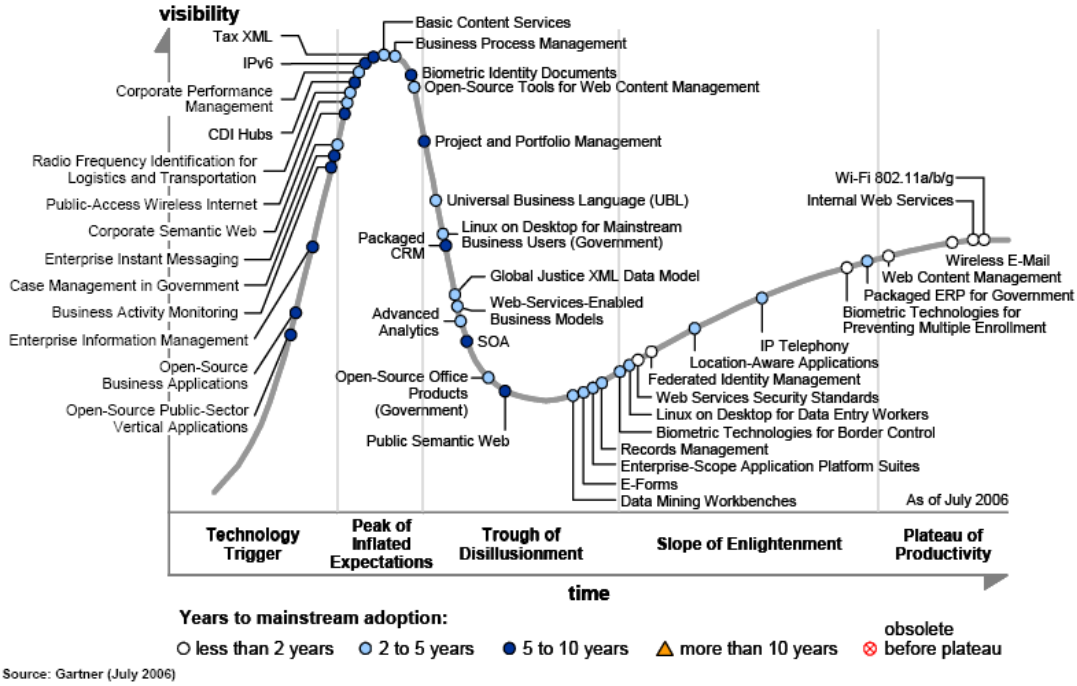


Figure 3 Gartner Hype Cycle for Government (July 2006)

Figure 3 shows the most recent Gartner Hype Cycle for Government to date. The Gartner Hype Cycle methodology is explained in appendix B. The most important trends with respect to EIF are:

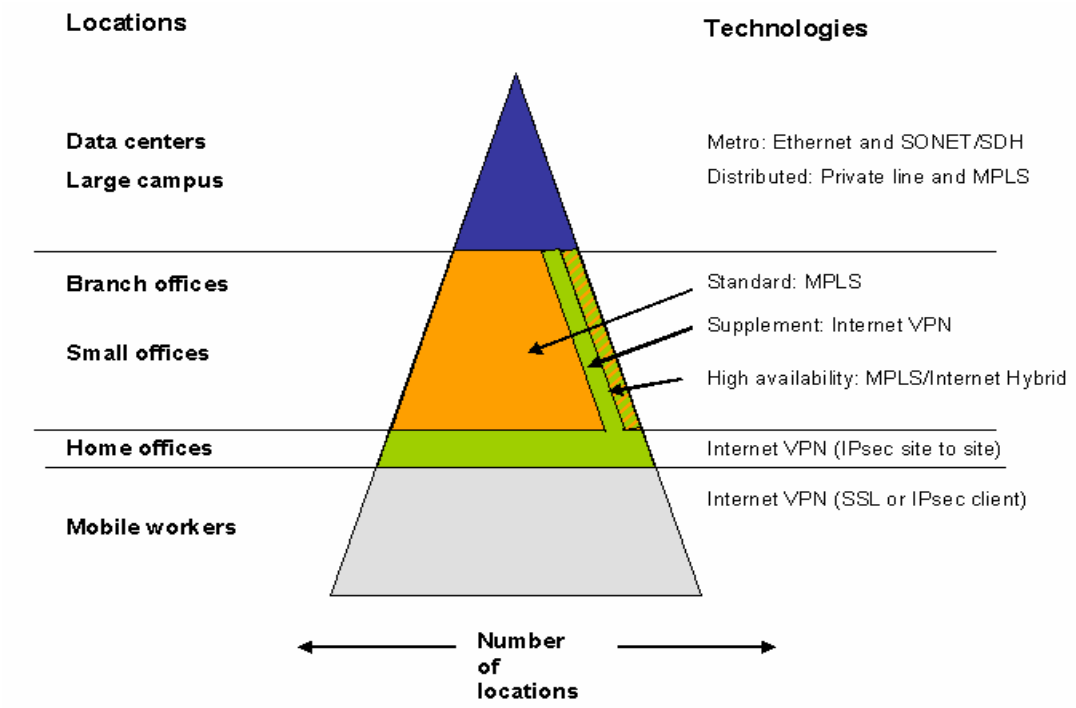
- *Web-service security standards* — Strong support comes from major web-services vendors and World Wide Web Consortium/Organization for the Advancement of Structured Information Standards/Web Services Interoperability Organization (W3C/OASIS/WS-I) for almost all elements. Major products include some compatibility

with standards such as WS-Security, SAML, XACML and XML encryption, and developing specifications such as Web Services Federation (WS-Federation), Liberty Alliance protocols, WS-SX and Service Provisioning Markup Language (SPML).

- *Internal web-services* — Customer relationship management and internal portals are just two examples of internally facing applications that benefit from web-services. The ease of interoperability of web-services will allow faster integration of internal applications.
- *Federated identity management* — Federated identity management allows sharing of identification credentials among several entities and across domains. Tools and standards allow identity and authentication information to be transferred from one trusted identifying and authenticating entity to another. Security Assertion Markup Language (SAML)-based solutions remain underutilized, yet interest is growing.
- *Web-services-enabled business models* — Web-services-enabled business models represent new approaches to conducting business among enterprises and consumers that would not be possible without the benefits of web-services. Business-to-business interaction was limited to electronic data interchange or structured XML-based services. Because of web-services, new methods of interoperability are possible. This also opens up the competitive landscape to additional software and service providers.

The Gartner Research Note, "Recent E-Government Strategies Highlight Key Focus Areas" of 15 December 2006, states that a successful transformation towards delivering e-government services requires far more than technology alone. Best practices from around the world show that successful transformations are based on four pillars: 1) an understanding of real customer demand, 2) a management and maintenance framework to support cross-department transformation, 3) an enterprise architecture (EA) process, and 4) a robust investment planning and portfolio management process.

When it comes to network infrastructures Gartner observes an emerging world-wide trend among organizations to use the Internet in combination with VPN technology as a robust and low cost alternative next to expensive dedicated private networks (mostly based on MPLS). Figure 4 visualizes the global usage of the various WAN technologies for 2007.



IPsec	IP Security	**SONET**	Synchronous Optical Network
MPLS	Multiprotocol Label Switching	**SSL**	Secure Sockets Layer
SDH	Synchronous Digital Hierarchy	**VPN**	virtual private network

Figure 4 Common WAN Technology Mix, Global 2007 (Source: Gartner)

The Internet already is the de facto standard to connect home offices and mobile workers to the enterprise. The coming years we expect more and more enterprises to invest in a hybrid model for their WANs, meaning they use dedicated private networks and the public Internet at the same time. Enterprises that have implemented this hybrid model experience decreased costs and increased network reliability and performance.

2.7 Danish Proposal

The Danish interoperability framework currently comprises of an overview of standards and specifications for use in planning and development of public IT-projects. In the future, the Danish framework will also include tools for help on choosing between alternatives, evaluating solutions and specifying requirements.

The Danish framework has an emphasis on the technical dimension of the EIF interoperability definition and focuses on the following standards:

- User Interfaces;
- Document- or data exchange;
- Web based services;
- Content Management and Metadata Definition;
- Data integration;
- Identity Management;
- Technical interoperability;

- Operations.

It is administered by a coordinating board of information comprising of the Digital Taskforce, Ministry of Science, Technology and development, Ministry of the Interior and Health, Ministry of Economic and Business Affairs, Local Government Denmark (organisation of Danish municipalities), Danish Regions and the National IT and Telecom Agency.

The new entry for the revision of the IDABC work programme on the Danish proposal is the Common Assessment Method for standards and specifications. The objectives of this work are to initiate, support and coordinate the collaboration between volunteer Member States in the definition of common assessment method for standards and specifications and sharing of the assessment study results for the development of e-Government services. The rationale behind this work is that Member States are currently organising the assessment of standards and specifications, e.g. within the context of their National interoperability frameworks. Sharing information and knowledge about this process, aligning the national processes and re-use of best practices could speed up the assessment processes and reduce their costs throughout European Administrations.

Section 5.4 will describe how the Danish proposal can be positioned within the future IDABC working program.

2.8 MODINIS Study

Aim of this study funded by DG INFSO is to improve stakeholders' understanding of IOP at the local and regional level by capitalizing on good practices in Europe. For purposes of the study, the following definitions are used:

E-government is defined as:

"the use of IT in public administrations combined with organizational change and new skills in order to improve public services and democratic processes, and strengthen support to public policies".

Interoperability is defined as:

"the ability of IT systems and of the business processes they support to exchange data and to enable sharing information and knowledge".

Within the project, the information needs of stakeholders with regards to IOP were gathered using a questionnaire. The stakeholders were identified to be:

- Local and Regional Government
- National Government
- IT-business or
- Academia

The study identified e-Government IOP key success factors related to:

- Technical IOP aspects
- Semantic IOP aspects
- Organisational IOP aspects
- Governance of IOP

Section 5.4 will describe how the Modinis study can be positioned within the future IDABC working program.

3.0 Analysis and Synthesis

This chapter provides the analysis and synthesis leading to the recommendations for EIF v2.0. The main input for this chapter is the data collection (workshops, interviews, Member State visits and document study) presented in the previous chapter. This chapter forms the bridge between the findings of chapter 2 and the recommendations of chapter 4 and 5.

Section 3.1 concludes the position of IDABC based on the input material. Section 3.2 assesses the current versions of EIF and AG. It follows the structure of the current EIF v1.0 policy document. The subsequent sections discuss the key topics identified in section 3.2. Section 3.3 discusses standards, section 3.4 private intermediaries, section 3.5 governance and section 3.6 the interoperability backbone.

3.1 The position of IDABC

Looking at individual Member States, one can identify three major categories. Those who do not have any established interoperability framework, those whose frameworks cover almost exclusively technical interoperability (such as e-GIF in the UK or BELGIF in Belgium), and those that contain elements for semantic and organization interoperability (such as SAGA in Germany and NORA in the Netherlands). EIF v1 is positioned between the second and the third category: it states principles but does not articulate an actual framework not a process to use the framework. At the same time, it is by no means as prescriptive or detailed as those in the second category when it comes to listing technical interoperability standards.

In comparison to foreign experiences, it is fair to say that initiatives such as the US, FEA (Federal Enterprise Architecture) or the Canadian BTEP (Business Technology Enablement Program) remain definitely ahead of what is happening in Europe, although there is no evidence that Europe lags behind when it comes to the availability of electronic public services. The main challenge is how to use the interoperability framework to enable truly seamless service aggregation across agency (let alone national) boundaries. This is what makes EIF v2.0 (and similar efforts at a national level) so essential to drive the next wave of government transformation. However experience shows that the framework is a necessary but not a sufficient condition to make service aggregation and cooperation happen: what is also needed is a clear process (including governance) to adopt the interoperability framework. Once more, US and Canada clearly lead in this space.

3.2 Assessment of EIF and AG

The guiding principles in the first pages of EIF v1.0 show particular strength and pragmatism. These principles actually form a logical and meaningful sequence. Therefore, Gartner recommends maintaining these statements for EIF v2.0 in the logical sequence of EIF v1.0 which can be summarized as 'pan-European e-Government Services, through a multilateral framework, respecting Member State autonomy' (italics by Gartner):

- ***Pan-European*** — "The present document establishes the EIF to support the *pan-European delivery of electronic government services.*"
- ***e-government Services*** — "The EIF shows how services and systems of administrations throughout Europe should interrelate in order to serve, supplement and enrich each other with a view to providing pan-European e-government Services."
- ***Multilateral Framework*** — "To achieve this, it needs to complement national interoperability frameworks by providing a multilateral framework with a pan-European dimension."

- ***Respecting Member State Autonomy*** — "In doing so, it also creates benefits such as economies of scale and the re-use of knowledge and resources, whilst *ensuring that each Member State is given the maximum level of independence."*

Together, these guiding principles enable the realization of the mission: "Public Services where Needed".

According to Gartner full acceptance and implementation of EIF v1.0 and the AG was sub-optimal due to some challenges, the most important being:

- ***Incomplete interoperability model*** — containing only 'organization', 'semantic' and 'technical' dimensions leading to incomplete and sometimes confusing discussions (see section 3.2.3).
- ***Neglecting the legacy and evolution of standards*** — EIF v1.0 has a strong focus on the proliferation of open standards. This is quite understandable given open standards legislation and from a long term perspective. However, this focus ignores the fact that existing standards may represent an operational legacy and migrating to open standards may require significant investments and time without delivering new value. Besides EIF v1.0 does not mention the world-wide best-practice to support multiple standards simultaneously in order to prevent vendor lock-in and sustain innovation (see section 3.3).
- ***Unclear responsibilities*** — for governments to provide basic public services and to certify constituencies, transactions and services and for industries to provide aggregate (public) services in a competitive setting to enable service improvement (see section 3.5).
- ***Ignoring legal barriers*** — on 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 that impede the full deployment of public services.

The following sub-sections discuss the elements of EIF v1.0 that need to be enhanced. The associated paragraph numbers referring to the EIF v1.0 policy document are mentioned in the title of the sub-section.

3.2.1 Underlying principles (EIF v1.0 paragraph 1.3)

The use of multilateral solutions is to be preferred. However, the Internet has been deployed to enable bi-lateral point-to-point communications, albeit under central management. A short comparison of the communication principles:

- *A Hub* — implements *central management* and *central data transport*. This implementation is not preferred as the centralized data transport presents a performance and availability bottleneck.
- *A Bus* — implements *central management* and *de-central data transport* (bi-lateral). This adheres to the basic principles of the Internet and is the preferred implementation option.

Brokers may be deployed profitably for language translation or search distribution. To avoid performance and management bottlenecks brokers should never be deployed as transport hubs only.

Gartner uses the Interoperability Reference Model depicted in Figure 5 to position the concept of interoperability and to discover the "white spots" in the current "dimensions of interoperability" presented in EIF v1.0.

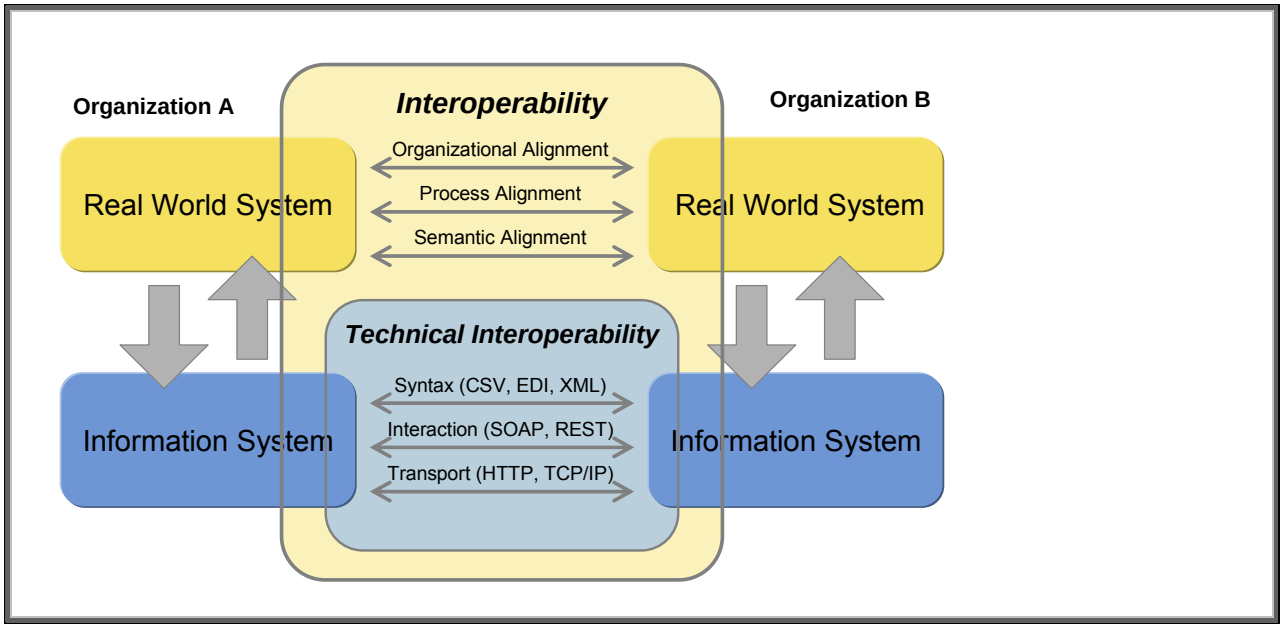


Figure 5 Interoperability Reference Model

The reference model shown in Figure 5 consists of two layers:

- *Real World System* — This system represents the business organization as part of the real world. This is where people do their work. They execute processes and take decisions based on information. The primary actor in the real world system is a person. Within this system we distinguish three layers:
  - *Organization* — the entire hierarchy of staff in an enterprise. A contract or similar agreement needs to be established between the parties, in order to initiate technical interoperability. Organizations can be A (administrations), B (businesses) and/or C (citizens).
  - *Process* — business processes must be aligned to interconnect. I.e. organizations agree on initiation of a business transaction and the ensuing procedural steps. Processes may be standardized according to industry specific global practice. Examples: procurement, logistics, tax returns.
  - *Information* — information drives the business process. Aligned business processes require information to be exchanged between parties. This is called semantic alignment.
- Information System — This system represents the collection of information systems which present data to end users in the real world system. This system consists of three layers.
  - *Data presentation (syntax)* — data is stored in a structured (relational), semi-structured (XML) or unstructured (Full Text) databases. Data is presented in reports, screens and messages.
  - *Application (interaction)* — processing of data-to-information (output) or information-to-data (input). If interconnecting with other systems, messages are exchanged between applications. Examples: SOAP, REST (gaining market attraction)
  - *Hardware (transport)* — this sub-layer consists of computer systems, storage and computer networks. Also included is the generic software (operating systems, middleware) with no direct business use.

Gartner discerns interoperability and technical interoperability as follows:

- *Interoperability* — operationally connecting constituencies, to provide value.
- *Technical interoperability* — part of interoperability focusing on physically connecting the enabling systems of constituencies.

This distinction is necessary the parties responsible for the realization are different. By definition the business organization is responsible for all elements of the Real World System (people, processes and information). The IT department is responsible for the Information System (applications, data and hardware). Too often we see interoperability initiatives fail because IT departments start defining semantics and processes without proper involvement of the business organization. To prevent failures we should adhere to the following distribution of responsibilities:

- The IT department is responsible for technical interoperability.
- The business organization is responsible for interoperability as a whole.

An elaborate discussion on this interoperability reference model and how it is part of the architecture methodology used throughout this study can be found in appendix C.

Other interoperability models as for instance the C4IF model of the Greek National Center for Public Administration can be easily mapped onto the Interoperability Reference Model as shown in the next diagram.

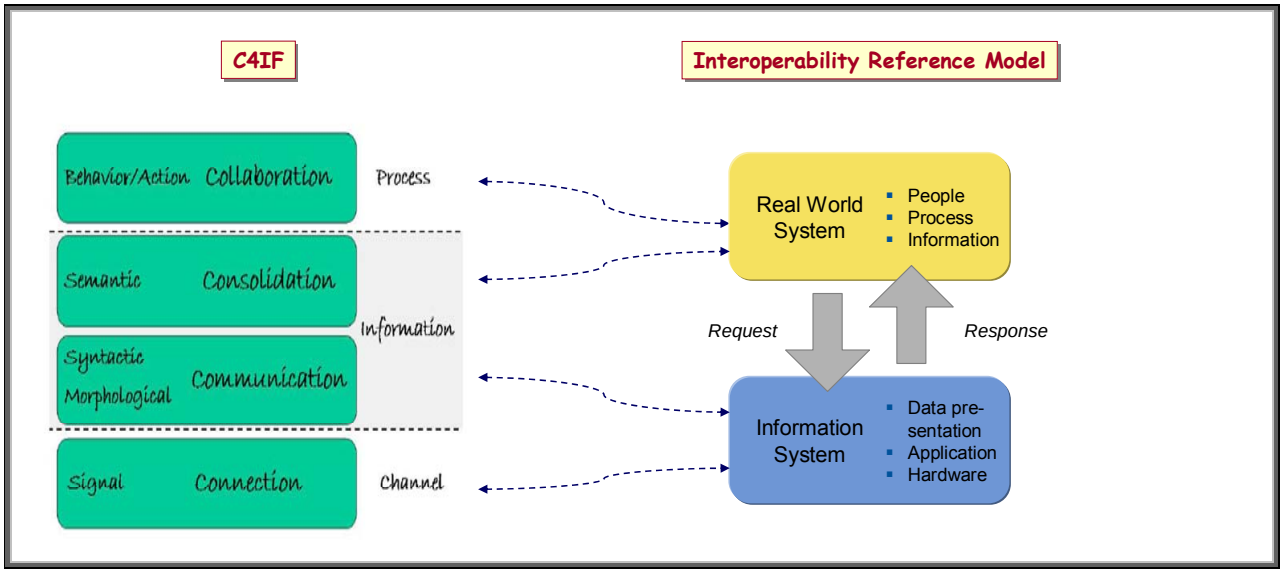


Figure 6 The layers of the C4IF model mapped onto the Interoperability Reference Model

3.2.2 Context and governance (EIF v1.0 paragraph 1.4)

Gartner recommends the EC to apply federation to pan-European public services. This includes the exchange of EC direction for EC facilitation. With EIF v2.0, the EC should further the development and growth of pan-European public services through the activities of the individual Member States.

This also includes the facilitation of public-private-partnerships (PPPs) to act as intermediaries to provide public services. Gartner believes that the acceptance of competition in the delivery of aggregate public services will lead to growth in service quality and service quantity.

Administrations remain responsible of course, for the provision, integrity and confidentiality (where applicable) of basic public services from base registries.

3.2.3 Scope (EIF v1.0 paragraph 2.1)

Many examples of interaction types have been displayed in 2.1.1. However, Gartner believes that there is no limit to the number of aggregate services if left to the creativity of intermediaries with viable (however certified) business models. The scope of the EIF v2.0, which will be introduced in Figure 8, allows for every permutation of interoperability and may be used as a generic scope model for EIF v2.0.

Figure 7 visualizes the mapping of the EIF v1.0 'dimensions' of interoperability (2.1.2) onto the Interoperability Reference Model.

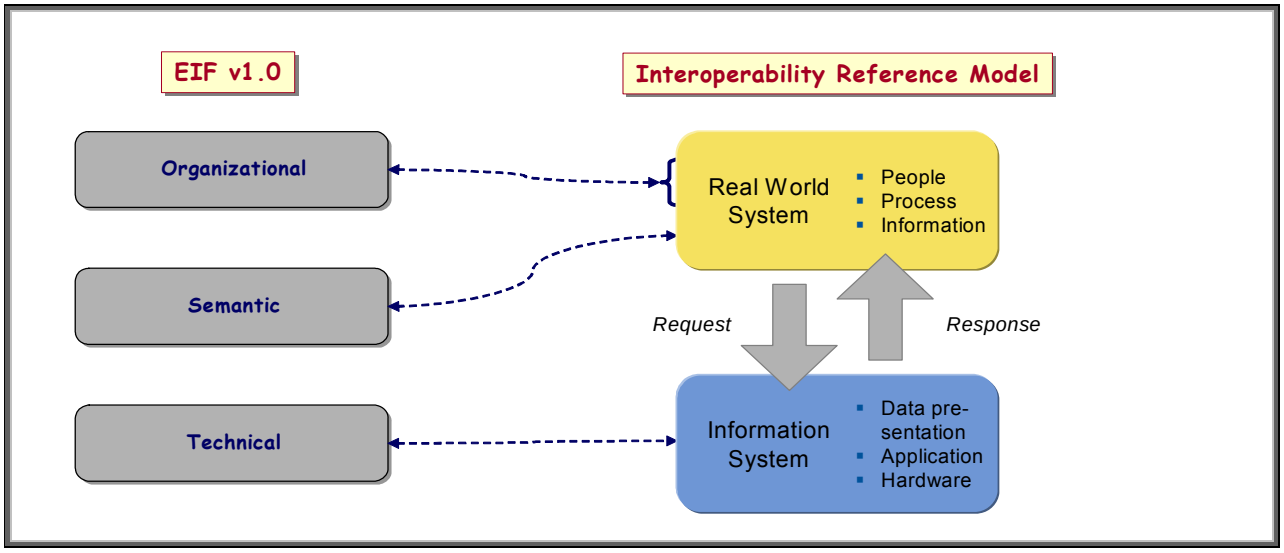


Figure 7 Mapping of the EIF v1.0 dimensions of interoperability onto the Interoperability Reference Model

Gartner observes the following deficiencies regarding the mentioned dimensions of interoperability in EIF v1.0:

- On the 'Organizational' dimension — the notion of 'processes' is absent. Although the term is mentioned several times, the fact that processes have not been made explicit in the model is a serious weakness. Processes support the linkage of basic services into comprehensive aggregate services to provide one-stop-shopping services to administrations, businesses and citizens.
- The 'Technical' dimension — does not show sufficient detail to show the necessary technical interoperability sub-layers and the pertaining standards. This detail is necessary to provide articulate guidelines for pan-European technical interoperability.

Gartner proposes to enhance the current EIF v1.0 dimensions of interoperability as follows:

- Extend the 'Organizational' dimension explicitly with the processes sub-layer of the Real World System layer of the Interoperability Reference Model.
- Extend the 'Technical' dimension with the sub-layers defined the Information System layer of the Interoperability Reference Model.

The value of this enhanced interoperability model, with clearly defined layers, is that it enhances discussion, understanding and communication to ensure faster time-to-connect of constituencies.

3.2.4 Key interoperability areas (EIF v1.0 paragraph 2.2)

The public service examples are non-exhaustive. Gartner believes that central determination (either at Member State or Commission level) of aggregate public services will be sub-optimal (see recommendation 4 in EIF v1.0).

Recommendation 5 on related (aligned) business processes has been visualized with the Interoperability Reference Model (Figure 7). Business process alignment is to be left to the stakeholders within a domain and should not be centralized, except in very simple cases (e.g. basic tax returns).

Gartner fully supports Recommendation 6 on the establishment of pan-European public services. However, it is believed that political, organizational and legal measures (legislation, directives and guidelines) are necessary to further the development thereof.

Recommendation 7 may be enhanced by stating that the development of aggregate public services should start with simple data models allowing evolution into more complex services as needed over time. Trying to be perfect and complete first-time is to be avoided as this does not allow learning over time.

Recommendations 10-13 can be based on the Interoperability Reference Model. Some recommendation topics may be dropped if these are not essential for interoperability per se, but may be provided as independent services (e.g. multi-channel, middleware, mailbox). Others are essential for the deployment of technical interoperability (e.g. directory services, security services).

Recommendation 14 may be enhanced by including "other recognized standards" as well. The next paragraph discusses this recommendation in more detail.

Recommendations 15-17 on multilingualism may be offered as independent services by contracting intermediaries.

3.2.5 High-level policy issues (EIF v1.0 paragraph 3.1)

The main issue here is that Member State basic public services are to be made available to certified intermediaries. The central direction of the development of aggregate public services will slow down the evolution. Facilitation of aggregate public services will further the development thereof.

3.2.6 Business requirements for e-government services (EIF v1.0 paragraph 3.3)

Gartner fully supports the concept of publicized public services, albeit to certified intermediaries, and under proper authorization.

3.3 Standards

Directive 98/34 plays an important role in EU standardization. The Directive is intended to help avoid the creation of new technical barriers to trade within the Community. Directive 98/34 regulates that only standards published by CEN, CENELEC and ETSI can be associated with EU legal frameworks and policies. Therefore, standards from organizations as W3C, IETF and OASIS can not be associated with EU legal frameworks and policies. At the same time EU stakeholders embrace exactly the standards published by these non recognized organizations.

Since 2005 Directorate General Enterprises and Industry (ICT unit) is conducting a study with the objective to “Identify policy recommendations for an effective EU ICT standardization policy”. The final report of this study is expected to be delivered in 2007.

As pointed out in section 3.1 Gartner has two main reservations regarding the policy stated in EIF v1.0:

- Prescribing detailed technical standards;
- Dogmatic focus on open standards.

Facilitate evolution and avoid vendor lock-in by supporting multiple standards

As new technologies emerge standards are evolving. There are, and always will be, multiple standards available on every sub-layer of the Interoperability Reference Model presented in Figure 5. A major problem emerges if communicating parties use different standards. To facilitate evolution over time and to support the migration from one standard to another and to avoid vendor lock-in it is therefore paramount to design for support of multiple standards.

- *Real World System standards* — These standards are grouped per domain (public, industry, banking, etc.) or discipline (financial, healthcare, etc.). Domains were Gartner already notices fruitful standardization efforts include: customs, police, eID, eHealth, and eProcurement. The information sub-layer shows standards that often involve both message types (reason to include on this information sub-layer) and message syntax (repeated on the syntax sub-layer). The guideline for constituencies is to join one (or more) of the standardization expert groups or efforts that best represent the requirements for interoperability.
- *Information System standards* — These are slowly evolving and have a huge legacy (many messages/files are still exchanged in CSV or EDI formats). This means that there will be multiple standards on any layer. The guideline is to always design for co-existence of multiple standards (e.g. Google has both a SOAP and a REST interface on Google Earth). When it comes to the lower layers the standards are more or less globally accepted and need little further consideration. Gartner's guideline is to use those standards that are globally accepted and evolve with them.

Allow open standards and other recognized standards to coexist

Gartner acknowledges the importance of open standards. IT vendors and system integrators should also recognize that open standards are the way to go. The era where proprietary standards lead to a sure base of loyal customers is fading away. IT is becoming just like any other industry where true added value and competitive pricing determine the winners.

Yet, Gartner recommends not to focus on the use of open standards per se. Whether open or not, standards are to further the deployment of public services. EIF v2.0 should facilitate the most profitable business model(s) of cost versus public value, under proper recognition of intellectual property rights, if any. The support for multiple standards allows a migration towards open standards when appropriate in the long run.

The use of 'open source' software may further the deployment of public services. However again, whether open source or not, it is the most viable software that should be allowed to survive in the infrastructure. So again, EIF v2.0 should facilitate multiple options to co-exist, and to compete.

3.4 Private intermediaries

Today it is not uncommon for groups of similar local administrations to form an alliance in order to reach the scale necessary to outsource shared activities effectively. There are already examples of local administrations cooperating to select an external service provider for the provisioning of portal and business process management services. Although this type of initiatives is a step in the right direction, it leads to suboptimal solutions. The resulting

intermediaries are dedicated to the members of the alliance only. Besides, it is difficult for an alliance member to switch to another external service provider.

A solution is to stimulate the advent of competitive private intermediaries. Competition implies that agencies can choose the private intermediary whom they think would service them best. Competition will stimulate private intermediaries to watch their pricing and service levels. The use of standardized interfaces is a guarantee that agencies will not be confronted with high costs when switching from one intermediary to another.

For call center services it is already more or less common to use an external service provider. The accomplishment of a similar situation for portal and business process management services will likely stimulate local agencies to make a step forwards with their e-government programs.

EIF v2.0 should also allow and stimulate private intermediaries to develop mash-ups (aggregate services). Gartner already found several successful examples of public-private partnerships in implementing e-government. E.g. in Austria the vehicle registration is run by the insurance industry.

3.5 Governance

From the industry workshop it became clear that strong leadership is necessary to establish an accepted framework. The findings from the interviews show that strong leadership has not been established. There are many fruitful initiatives within the EC but central guidance leading to synergy and accelerating developments is missing.

Gartner research (see section 2.6) shows that the central guidance providing robust investment planning and portfolio management is one of the four pillars to successfully deliver (pan-European) e-government services. Here lies an important task for the Commission.

Where central guidance is necessary to accelerate the development of PEGS it must be noted that this shouldn't surpass the subsidiarity principle. This implies that EIF v2.0 should be based on the principle of federation to enable each Member States to join the development of PEGS in its own pace and fashion.

3.6 Interoperability backbone

As presented in section 2.6 Gartner research shows that today it is a world-wide best practice to use the Internet (with VPN for security) to connect home and mobile users. We also notice that all Member States visited use the Internet as the primary transport mechanism to deliver e-government services to citizens and businesses. So for A2B and A2C EIF v2.0 should promote the Internet as the primary backbone.

When it comes to the backbone for A2A communications it is relevant to observe the world-wide trend of enterprises moving towards hybrid backbones, meaning that they choose for a combination of dedicated private networks (mostly based on MPLS technology) and low cost Internet connections (with VPN technology for security). This combination gives them a more reliable and performing network at a lower cost than a single dedicated private network would. Gartner advices to choose from the three alternatives depending on the specific requirements regarding performance and reliability of the A2A domain at hand. The alternatives are: the Internet (with VPN), a hybrid solution or a closed network like s-TESTA.

4.0 Proposed EIF v2.0

This chapter introduces the proposed EIF v2.0. The chapter presents the mission statement for EIF v2.0 followed by the stakeholders and scope. Then the requirements and assumptions are discussed. Based on the input from the interviews and Member State visits the commonalities of the national public services frameworks are presented. These lead to the pan-European public services framework which is discussed in the final section of this chapter.

4.1 Mission Statement

A mission statement is one of the most powerful management instruments to guide decisions and actions of (groups of) organizations. A good mission statement provides direction and focus and contains 5 words or less.

Interoperability is a means to an end: delivery of public services to reach the goals of the European Union e.g. improving the internal market, enhancing the four freedoms, etc. Therefore, the mission statement of interoperability can be formulated as:

"Public Services where Needed"

This mission statement not only holds for pan-European public services, but also for national public services in any Member State. To emphasis the customer perspective Gartner advocates the use of the term 'public services' instead of 'e-government services'. We deliberately did not use the term 'electronic public services'. This would focus too much on the electronic delivery of services while the true benefits of e-government lie in an integrated multi-channel approach.

We adhere to the use of the additive "where needed". This implies that only public services are development and provision that are truly beneficial for both the user society and the administrations. The additive "where needed" ensures a service-pull by citizens, businesses and administrations and provides focus to the service providers. To use an additive like "where requested" would emphasize only the user society and their vision of e-government.

We discourage proposed additive verbs like 'facilitate', 'promote', 'support' as they induce service-push that may not be needed at all.

Every recommendation by Gartner in the course of this EIF Upgrade Study has been tested against this mission statement: does the recommendation further the development, deployment and use of "Public Services Where Needed"?

As an example, the test of the guiding principles of EIF v1.0 versus the mission statement shows that they provide favourable conditions to realize the stated mission:

- ***pan-European*** — across the European Union
- ***e-government services*** — aggregate public services, building on basic public services
- ***through a multi-lateral framework*** — using existing infrastructures and investments, enabling local albeit co-ordinated development, deployment and use of services to satisfy customer needs
- ***respecting Member State autonomy*** — an important condition to preserve existing investments, intelligence and creativity

4.2 Stakeholders

The EC discerns three types of interoperability stakeholders that are potential recipients and / or providers of pan-European e-government Services:

- *Administrations (A)* — the Commission and its Member States, with their respective departments and agencies
- *Businesses (B)* — all local, regional or globally dispersed enterprises
- *Citizens (C)* — all citizens of the respective Member States, i.e. the European Union.

4.3 Scope

The primary scope of EIF v2.0 will be to enable and further Pan-European Government Services between:

- *Administration-to-Administration (A2A)* — public sector constituencies relating to each other
- *Administration-to-Business (A2B or B2A)* — administration constituencies relating with businesses
- *Administration-to-Citizen (A2C or C2A)* — administration constituencies relating with citizens.

In the generic interoperability diagram below, the interoperability-modes have been clearly indicated:

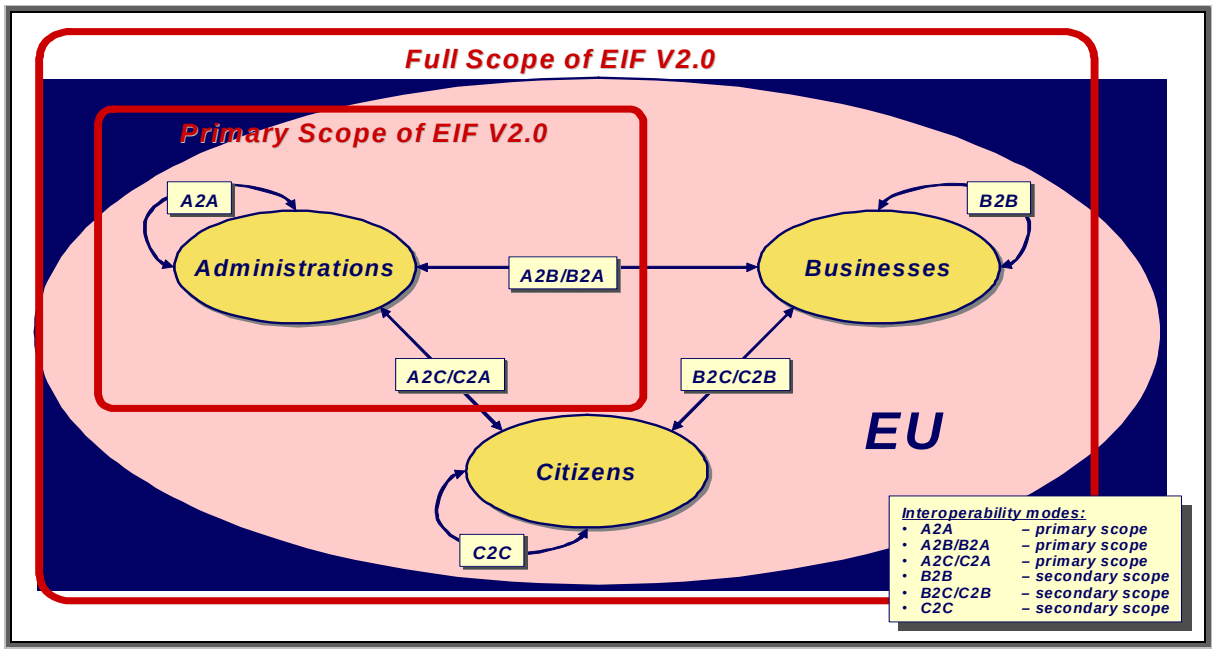


Figure 8 Scope of the European Interoperability Framework

Please note that, based on the interoperability model introduced in section 3.2.1, constituencies are shown as the aggregate of business (organization), systems and technology, as explained in the legend of the preceding diagram.

As a secondary scope, and because it can be achieved as a co-product of the primary interoperability infrastructure, EIF v2.0 may also facilitate the following interoperability modes:

- *Business-to-Business (B2B)* — formal interoperability between businesses

- *Business-to-Citizen (B2C)* — formal interoperability between businesses and citizens
- *Citizen-to-Citizen (C2C)* — formal interoperability between citizens

The secondary scope is a consequence of the primary scope but is not a volunteer action from IDABC and the Commission in general as it doesn't fit the legal bases. Of course informal interoperability in the secondary scope is already extensively deployed worldwide, e.g. SWIFT (B2B), Amazon (B2C) and MSN (C2C).

4.4 Requirements and Assumptions

The analysis and synthesis resulted in requirements and assumptions for EIF v2.0. This section defines HOW the mission is to be accomplished. EIF v1.0 provided some very strong identifiers that must be re-iterated in EIF v2.0:

- The EIF shows how services and systems of administrations throughout Europe should interrelate in order to serve, supplement and enrich each other with a view to **providing pan-European e-government services.**
- To achieve this, it needs to complement national interoperability frameworks by **providing a multilateral framework** with a pan-European dimension.
- In doing so, it also creates benefits such as economies of scale and the re-use of knowledge and resources, whilst **ensuring that each Member State is given the maximum level of independence.**

NB From EIF v1.0, page 5 (bold by Gartner)

Based on the analysis, synthesis and recommendations in the previous section, Gartner identified the following main requirements:

- Pan-European e-government Services must include:
  - *Secure Communications* — there may be differentiated security levels – signed and/or certified and/or encrypted and/or logged message and document exchange, depending on the outcome of a risk assessment. The certification applies to the security services providing signing, encryption and logging functions.
  - *Basic Public Services* — operated and maintained by the respective Member States and the EC
  - *Aggregate Public Services* — operated and maintained by certified parties
- Pan-European e-government Services require:
  - *Governance* — of all initiatives required to deploy Pan-*European e-government Services*
  - *Re-use* — of accessible, available and evolving information and services of the Member States, the Commission and third parties
  - *Interoperability* — alignment of organizations, business processes and information between constituencies
  - *Technical interoperability* — reliable and secure data transport
  - *Networks* — Public and private networks for physical data transport
- Member States do:
  - *Operate* — their own e-government infrastructures, in different states of evolution
  - *Retain autonomy* — over their own e-government architecture and infrastructure
  - *Allow access* — to their basic public services, under certain conditions and trust

- The Commission does:
  - *Facilitates development* — of PEGS, with a strong central guidance in a federated fashion. The central guidance is necessary to leverage existing solutions and stimulate synergy between projects. The federated fashion means that the Commission adheres to the subsidiarity principle and allows Member States to develop their own e-government architectures as long as they are capable of interconnecting at the interface points indicated in the pan European Public Service Framework presented in section 4.6. This may involve political, legal, organizational and technical issues.
  - *Facilitates certification* — of transactions, basic public services, intermediaries providing aggregate services, on a pan-European level; this may be based on Member State certification (the different types of certification are explained in section 4.6.2).
- Third Parties do:
  - *Provide services* — to Member States and the Commission.
  - *Act as intermediaries* — if certified, to provide aggregate public services.

In the following section, a framework is proposed to realize this set of requirements, on a pan-European level, based on a leverage of the autonomous national public services frameworks.

4.5 Generic Public Services Framework

The Generic Public Services Framework shows how Member States, in general, implement the requirements identified in the previous section. Through document study, interviews, workshops and Member State visits, Gartner has observed that all national e-government architectures share common characteristics. These characteristics have been summarized into a 'Generic National Public Services Framework', based on best-practices observed, and as shown below.

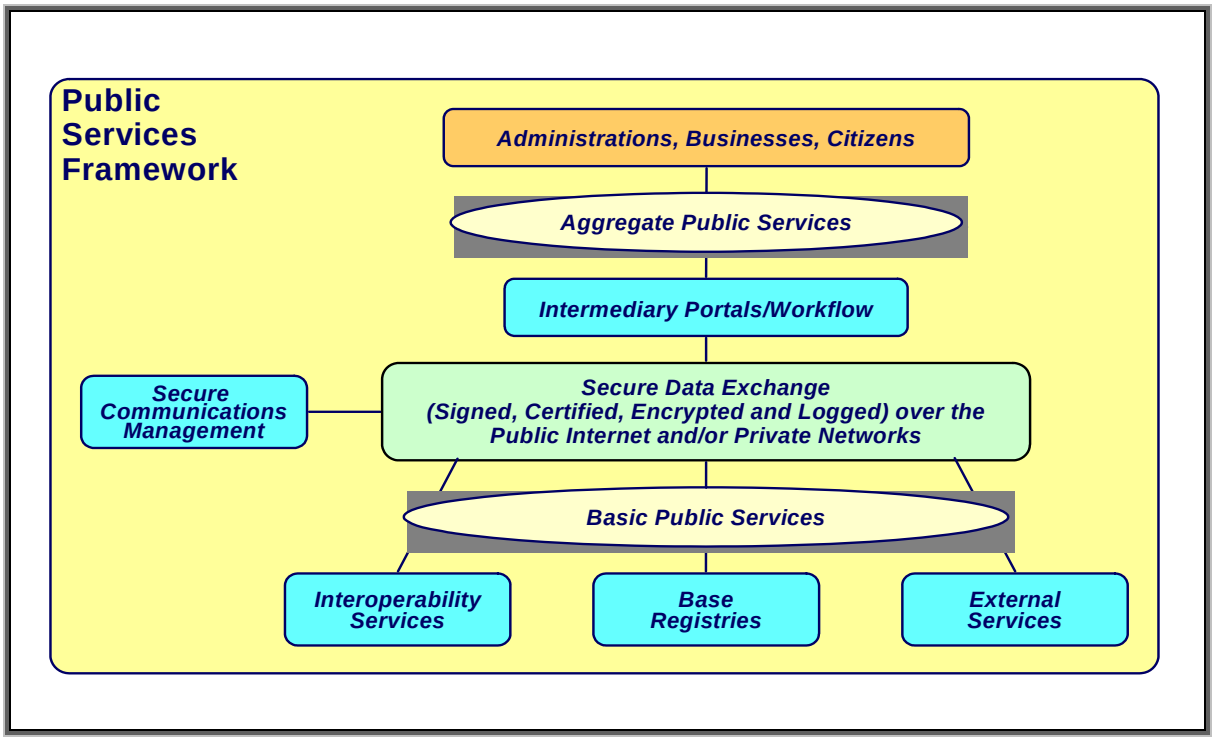


Figure 9 Generic National Public Services Framework

The reason why Gartner prefers to use the term "public services" over the term "e-government" is explained in section 4.1.

Most National Public Services Frameworks (have been designed to) provide the following capabilities:

- *Secure Data Exchange* — for data-transport over (a combination of) private (e.g. s-TESTA) and/or public networks that is:
  - *Signed* – both sender and receiver have applied their signatures to the logged data exchange for legal and evidentiary purposes
  - *Certified* – at least one authority certifies the authenticity of the signatures
  - *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.

  NB secure communications management may include other important network functions e.g. service registry, authentication services, etc. although these may also be provided by base registries.
- *Basic Public Services* — to deliver public services in electronic formats from:
  - *Base Registries* – that are maintained by any local, regional or national government on e.g. persons, vehicles, licences, buildings, locations, roads, etc. These services may also reflect the customer life cycle.
  - *Interoperability Services* – providing e.g. language translation services, information broker services, standards conversion services, etc.
  - *External Services* – provided by enterprises or agencies that may be included in the aggregate public services, e.g. financial services, geographical services, etc.
- *Aggregate Public Services* — to provide public services, across multiple public (e.g. a Ministry) and private (e.g. a Bank) constituencies, as one composite transaction, through multiple channels. The personal versus communal aspect of service delivery can be solved with aggregate public services. In this report, the focus is on pan-European aggregate public services.

4.5.1 Secure document exchange and Communications Management

Constituencies (administrations, businesses and citizens) require the exchange of certified messages, email and documents between their respective systems (for a citizen this may be a PC, in most cases).

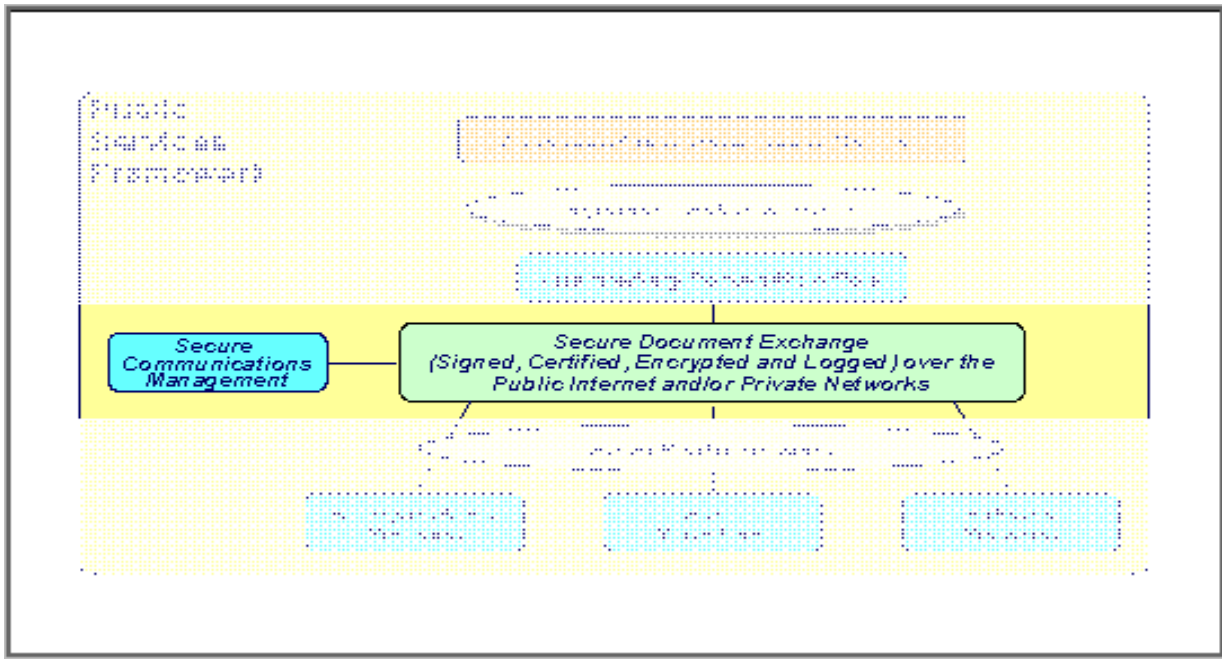


Figure 10 Secure Document Exchange and Communications Management

Administrations must be able to interoperate with other Administrations (whether Member State or Commission), whether internal or external to that Administration.

Most administration systems will be legacy systems. However, every system or package can be adapted to interoperate with other systems following EIF v2.0.

Administrations of Member States and the Commission, as well as Businesses and Citizens of the European Union need Signed, Certified, Encrypted and Logged exchange of messages, emails and documents.

For most situations, EIF v2.0 must ensure that data transport (files, messages, services) uses data protection, rather than transport protection. This means that the public Internet in combination with VPN technology can be used as the prime transport facility, because it is a robust and low cost network. Private closed networks can be used additionally when high reliability and performance are needed.

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

- *Communications Management* — to ensure parties can identify, authenticate, authorize and reach each other
- *Service Registry* — to ensure, given proper authorization, access to available services
- *Service Logging* — to ensure logging of all data transports (a hash, not the message body itself) for future evidence

The central management functions must be set-up in such a manner that communications facilities remain available should one of these functions be unavailable for a certain period. Several Member States have been observed to be working along these lines. An easily readable document on this communications facility has been produced in Estonia. This document also touches on the facilities needed for inter-member-state interoperability.

The EIF v2.0 Guidelines will focus on data protection instead of transport protection, as this allows communication with every Internet user on the globe instead of the limited number of connections available on a private network. The Guidelines will also stress the need to abstain from a centralized approach and focus on a federated (i.e. agree upon standardized interfaces

among all participating constituencies) or bi-lateral approach, using cross-certification (i.e. verifying and accepting each others solutions) between independent infrastructures.

4.5.2 Basic public services

Administrations of Member States and the Commission, as well as Businesses and Citizens of the European Union require the availability and re-use of basic public services, similar to the public services that can be obtained today via other channels (phone, mail, front desk, personal intermediary and mobile devices, etc.).

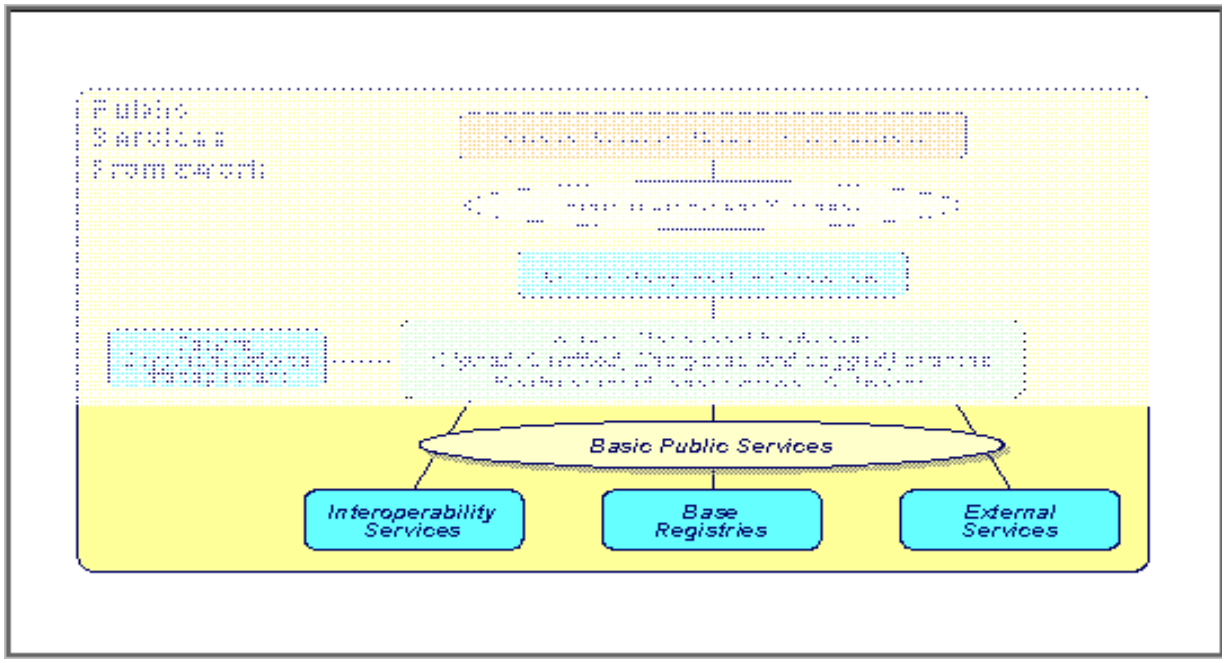


Figure 11 Basic Public Services

EIF v2.0 require the availability of basic public services to everyone authorized (this may be dependent on local legislation). Basic public services, and other external services, may be used in aggregate public services provided by service intermediaries if certified.

The provision of basic public services will rely on technical interfaces. The semantic definition of services may pose some problems, but these are assumed to resolve and evolve over time, through the efforts of domain specific standardization organizations.

The main problem identified is the legislation and/or directives to make basic public services available to authorized intermediaries in other Member States. This will be a prime focus in EIF v2.0.

Best practice in the service mash-up and workflow business shows that, when technical interoperability is available, aggregate services quickly evolve from simple to complex. EIF v2.0 should state that this principle be applied in all cases: start simple!

4.5.3 Aggregate Public Services

Administrations of Member States and the Commission, as well as Businesses and Citizens of the European Union require Aggregate Public Services from other organizations through Intermediary Portals:

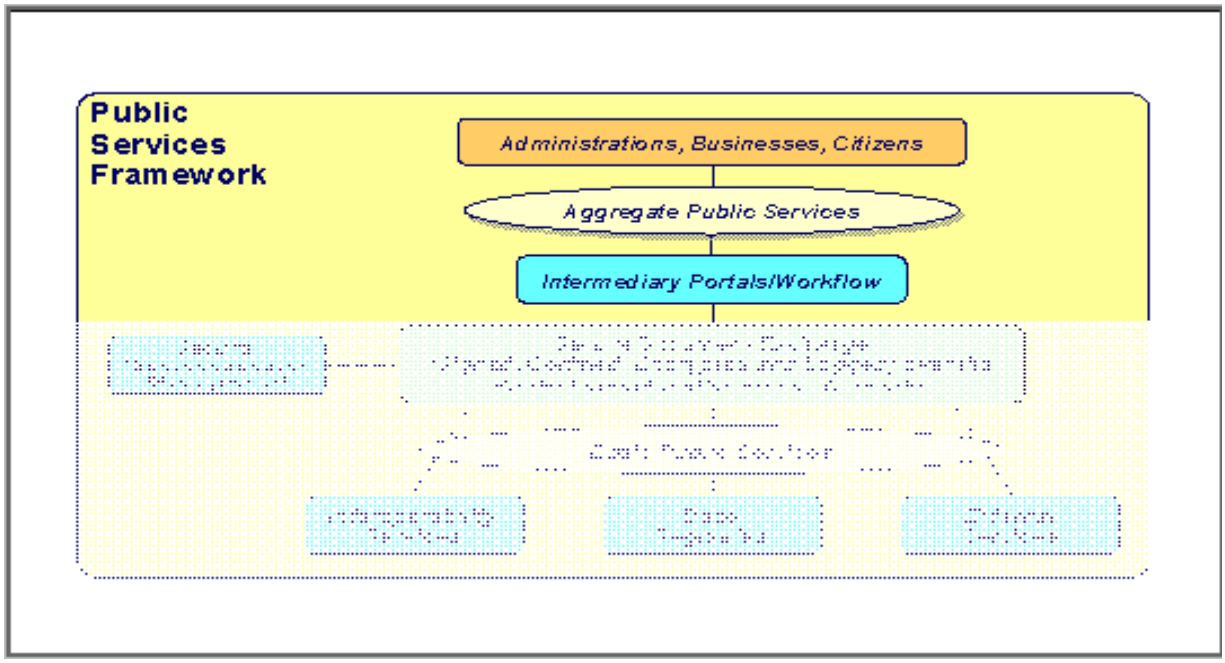


Figure 12 Aggregate Public Services

Aggregate Public Services are created by mashing-up basic public services and External Services, or providing basic services in a workflow. Basic public services may be provided by any Member State or the Commission.

The users, whether from administrations, businesses or private citizens, may need (some services are anonymous, see the mash-up example below) to authenticate to the portal. Users will then have access to those services they are authorized to use. A Portal provides authentication, personalization and a unified interface to (groups of) users.

Portals may be operated by any intermediary that is trusted by its users, and by the basic service providers (notably Member States and the EC). In practice, providers of basic services will require certification of intermediaries because its services may contain confidential or personal information. An example of a certification rule could be that an intermediary is not allowed to retain information flowing through the portal. EIF v2.0 must include the certification of intermediaries.

It is envisioned that aggregate public services may be delivered by multiple intermediaries. Also, aggregate public services may be free of charge or incur a transaction fee, depending on their value to the user. Competition between intermediaries is believed to ensure increasing value to service users.

An aggregate public service could be: all steps to re-locate a citizen from one Member State to another. Or all steps to arrange a transport of dangerous goods through multiple Member States, including the licenses to export, transport and import and including the necessary payments in those Member States. Or the re-registration of a car from one Member State to another.

Although many administrations are currently developing and providing aggregate services to other administrations, businesses and citizens, Gartner believes that the emergence of certification intermediaries will speed-up the deployment and value of aggregate public services.

Aggregate services have been around for quite a while in the private sector. The following two diagrams provide examples of a mash-up and a workflow service.

Figure 13 Mash-up of multiple services (Example: traffic jams and rain showers)

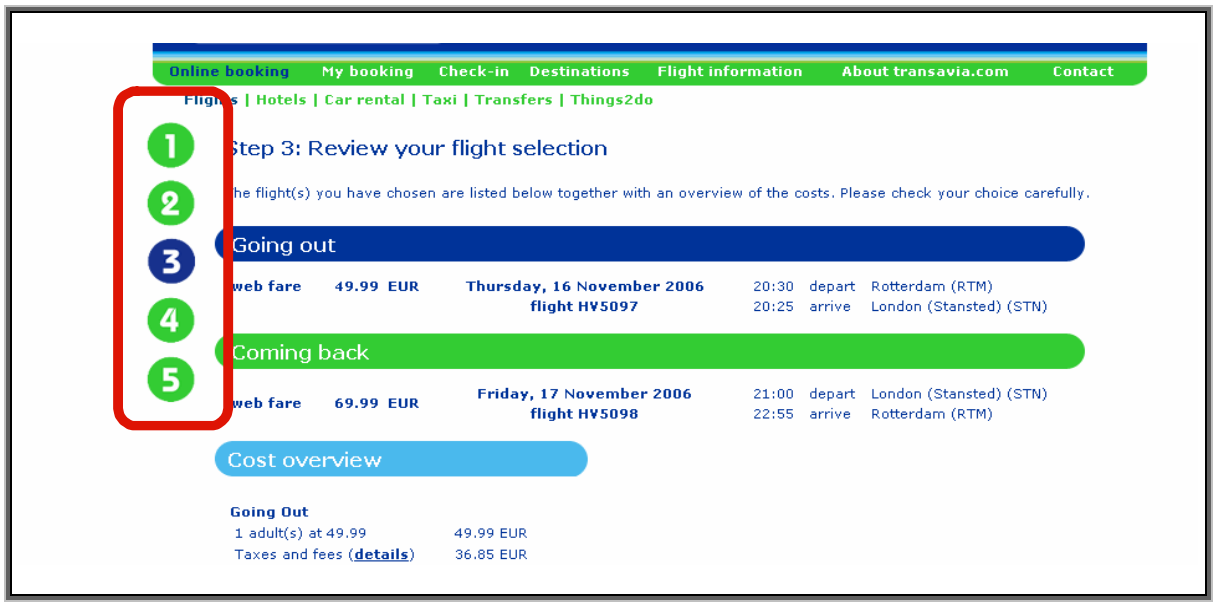


Figure 14 Workflow services (Example: Airline Reservation)

To increase the accessibility of aggregate services it is important that the actual service becomes accessible through multiple channels (e.g. Internet, phone, mail, front desk, personal intermediary and mobile devices).

4.5.4 Examples of Public Services

Four examples of public services have been displayed in the next diagram:

1. Secure Messaging — to provide secure data transport between two administrations, businesses or citizens. This service could be provided through a portal to those constituencies without a connection to the secure network facilities (e.g. citizens and small enterprises)

2. Aggregate services — where the portal (or other channels) connects the A, B or C user to the required basic public service(s) in an aggregate public service workflow using:
   a) Interoperability services — e.g. a broker service for pension-rights in multiple Member States
   b) Base registries — e.g. the personal data of the service requestor
   c) External services — e.g. the payment for an aggregate public service to the intermediary
3. Interoperability Services on Base Registries — for information brokerage, language translation and/or standards conversion.
4. Inter-system Services — e.g. to connect base-registries for verification purposes

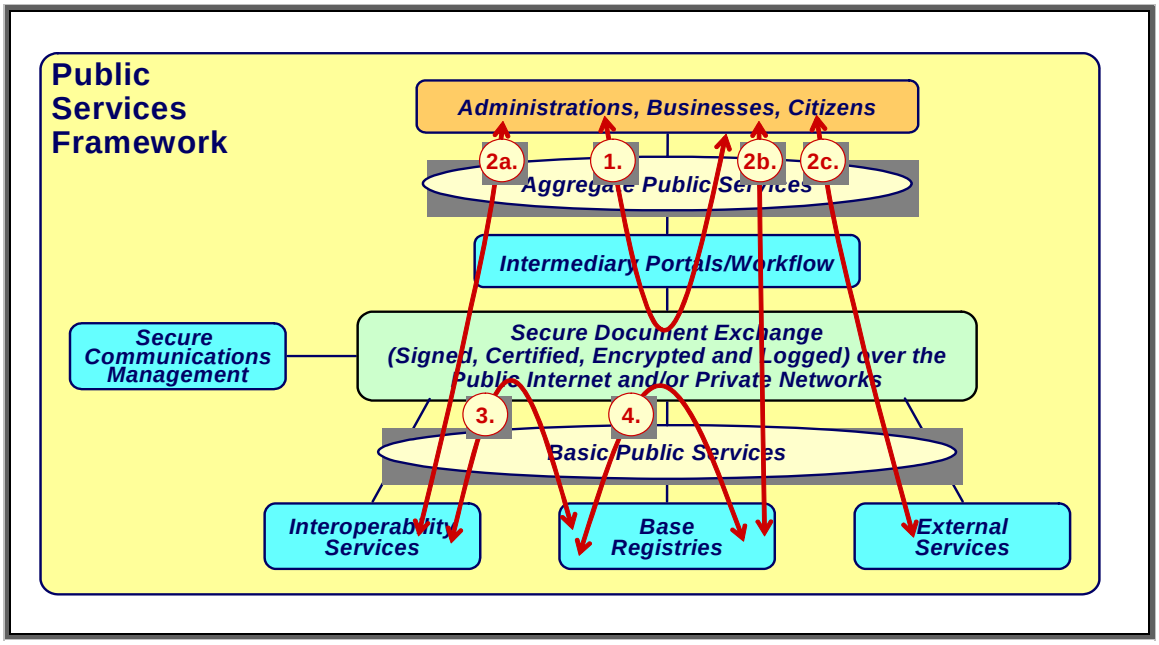


Figure 15 Examples of Public Services

Please note that one of the basic public services (re-)used by the aggregate service is an 'interoperability service'. This could be a broker that translates a simple question (e.g. a vehicle registration) into multiple requests to base registries in different Member States, to find the owner of the vehicle.

4.6 Pan-European Public Services Framework

Respecting the subsidiarity principle the pan-European Public Service Framework leads to a design that leverages the Generic Public Services Framework. The National (and Regional) Public Services Frameworks are re-used as independent components of the pan-European Public Services Framework, as shown in the next diagram:

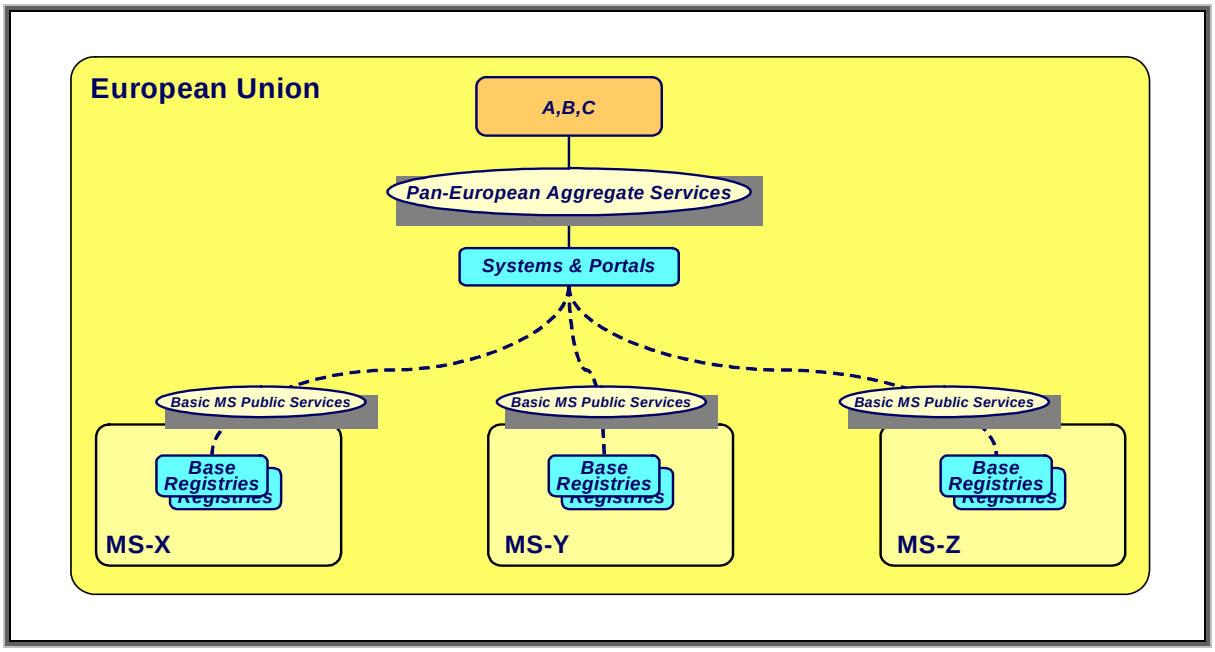


Figure 16 Pan-European Aggregate Public Services Framework (Simplified)

Each Member State will make a set of basic public services available. These services can be accessed by administrations, citizens and businesses through pan-European aggregate services provided by certified intermediary portals set-up by administrations or industries.

Member States determine how to implement its basic public services. Therefore, each Member State retains its investments and autonomy in its own internal e-government architecture.

The Pan-European Public Services Framework provides similar services as seen in the Generic Public Services Framework, but now on a pan-European level:

- *Secure networking* — over private (e.g. (s-TESTA, etc.) and public networks;
- *Message Logging* — to provide evidence of any message or service exchange;
- *Service Registry* — to provide an overview of available basic public services;
- *Federated Management* — to preserve independence of associated Member States, but at the same time providing synergy where needed;
- *Aggregate public services* — to provide public services, across multiple Member States and private (e.g. a Bank, or Google Earth) constituencies, as one aggregate transaction.

Today aggregate services would be realized by using recognized web-service standards such as SOAP and REST. EIF v2.0 could take these as a starting point. Still, we like to emphasize that EIF v2.0 should support multiple standards to facilitate the technical evolution.

Figure 16 focuses on the delivery of aggregate services. The proposed pan-European Public Services Framework of course also facilitates secure document exchange between systems, including back-office integration. This is realized exactly in the same way as the Generic National Public Services Framework does. The difference is that the Internet and European private networks are used to exchange the secure messages, files and emails from one Member State network to another Member State network, using cross-certification.

Cross-certification, i.e. Member States certifying each other, should be the basis for secure and reliable services as centralized certification would violate the federated character of the solutions. An existing real-world example of cross-certification is the way countries accept passports issued by other countries. This is based on a system of bi-lateral agreements. The

extent of a bi-lateral agreement determines how easy it is to travel with a passport issued in one country to another.

In practice, federation on a European level is preceded by federation on the national levels. Several Member States operate multiple regional (or even local) public services frameworks in federation, e.g. Germany, Spain, Switzerland (although no part of the EU), etc.

Federation hence applies at multiple levels. This leads to the following nested European Public Services Framework:

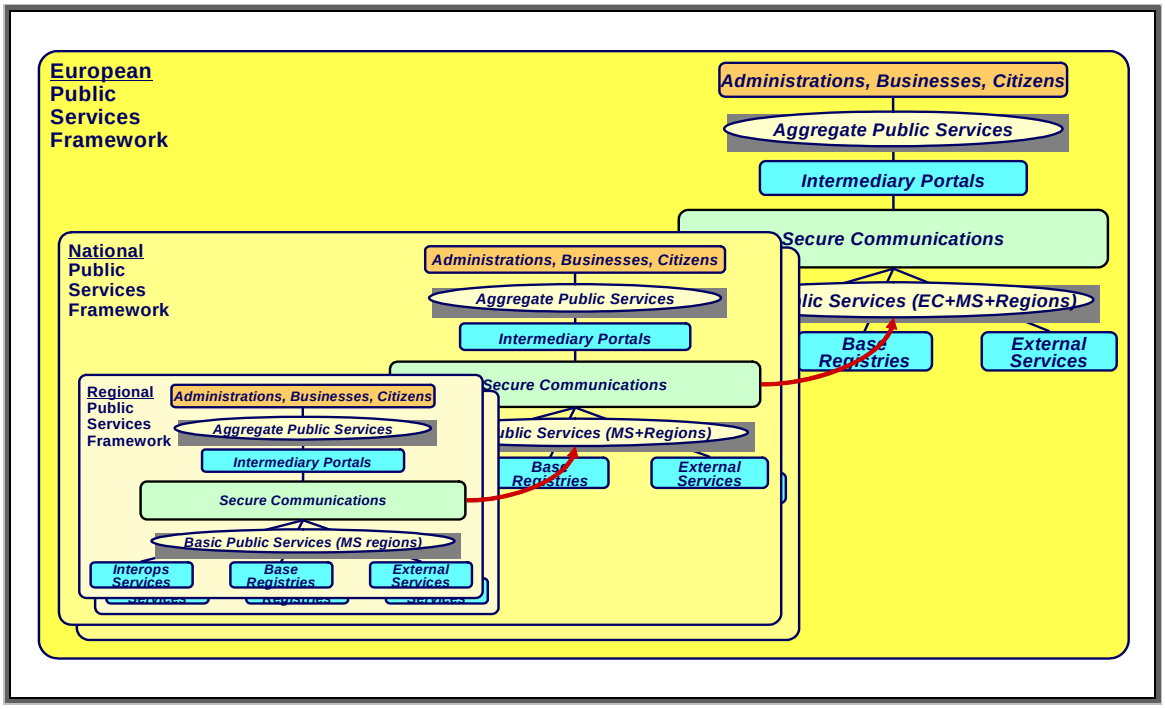


Figure 17 Pan-European Public Services Framework (a recursive model)

Regional frameworks operate in a federation as a national framework. National frameworks operate in federation in the European Public Services Framework. In this framework, national (or even regional) basic public services are re-used in national and European aggregate public services.

Of course, this can only be accomplished if standards are created on a European level. So, standardized interfaces to national base registries across all Member States is one of the principal conditions for pan-European Public Services.

4.6.1 Issues of the Public Services Framework

The proposed Public Services Framework, both on a national and pan-European level incur many issues that need a resolve before PEGS can be deployed successfully.

The issues have been identified in the next diagram of the Generic National Public Services Framework, but equally apply to the pan-European framework:

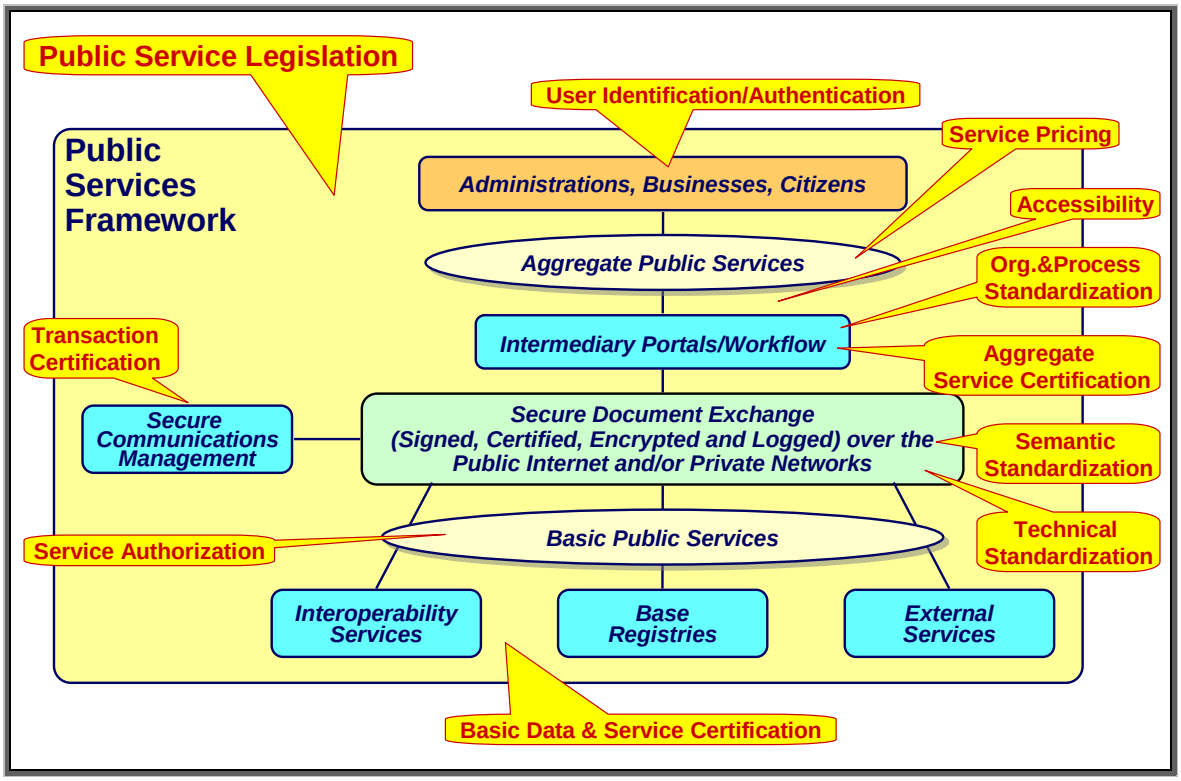


Figure 18 Issues to resolve for PEGS

These issues are further explained in the next sub-section.

4.6.2 Issues to be addressed by EIF v2.0

The combination of the Generic National and pan-European Public Services Framework in EIF v2.0 enables analysis of the conditions necessary to facilitate pan-European public services. The result of this analysis was the identification of multiple issues needing resolve before pan-European public services can be developed, deployed and used at increasing scales.

The issues identified include:

- ***Public Service Legislation*** — on 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. 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 services of individual Member States.
- ***Public Service Pricing*** — of basic and aggregate public services. Basic services are provided by national administrations and may or may not incur a fee. Basic service pricing is a matter of the national governments but harmonization is needed at a European level. Aggregate services may be delivered by intermediaries that may want to charge for the added value of the aggregate services. Aggregate service pricing also depends on the economic value. Some aggregate services may be delivered for free and this may well become a responsibility for the Commission or for assigned Member States. However, most aggregate services may be developed and exploited by private intermediaries and priced for competitiveness. Nevertheless, here is a definite role for

the Commission to maintain the competitiveness of aggregate service delivery and pricing.

- ***Accessibility*** — of aggregate public services. Disabled and digitally agnostic persons should be able to experience the same service levels as other people. The most viable way to achieve this (besides the evident guidelines for accessible websites) is to pursue a multi-channel strategy. Here is a role for the Commission to make sure industries and administrations creating portals support a multi-channel strategy and to stimulate administrations not only to provide a nice facade on the Internet but also to really integrate their front-office and back-office operations.
- ***User Identification and Authentication*** — in a multi-layered federation of the EU with Member States, Member States with businesses and citizens and business with their employees. To leverage autonomous national identification and authentication infrastructures, the role of the Commission is to take the lead in the certification of national infrastructures as a trust basis for cross-certification (see below). Also see i2010 e-Government action plan.
- ***Transaction Certification*** — to provide signed, certified, encrypted and logged document exchange between administrations, businesses and citizens. This includes the political consent of cross certification when documents are transferred across borders of autonomous Member States, each having their own certification infrastructures and authorities. Although Member States may certify cross-border transactions on their own behalf, there may be a need for transaction certification at a European or even global level. This would require a dedicated infrastructure that may be developed and exploited by the Commission or an assigned organization (e.g. an EC Agency, a Member State or one or more Banks). Also see i2010 e-Government action plan.
- ***Aggregate Service Certification*** — to create trust though certification of intermediaries to provide aggregate services using basic public services. On the back office side, this type of certification is needed to establish trust with the owners of base registries that their basic services are handled in a confidential and trustworthy manner. This also includes political consent that private intermediaries are allowed to develop and provide aggregate public services at their own initiative or in a public-private partnership. As pan-European public services are by definition aggregate services, it will be the role of the Commission to provide or facilitate certification legislation and execution and audit functions.
- ***Business Process and Semantic Standardization*** — to align business processes and information exchange between constituencies as a prime condition for interoperability. Political consent is needed to leave this to the many standardization expert groups in the public and private domains. Both the Commission and the Member State governments are to foster, facilitate and monitor the development and deployment of cross border transactions. For the public sector alone, specific standardization expert groups may be selected or installed to further pan-European business process and semantic standardization. Here is a facilitating role for the Commission. Existing examples are: customs, police, eID, eHealth, and eProcurement.
- ***Technical Standardization*** — to provide technical interoperability between disparate systems of constituencies, including citizens using browsers as their primary access point. Main standards and trends can be observed, albeit at a global scale. Gartner recommends to always adhering to two or more (versions of) recognized standards to accommodate standards evolution and transition. The role of the Commission is limited to monitoring and facilitating the use and evolution of standards.
- ***Basic Public Service Authorization*** — to determine which public services may be disclosed to which constituency and/or intermediary. Gartner recognizes the

differences in Member State legislation and advises to start aggregating easily accessible basic services wherever possible. Authorization policies are left to the Member States. However, the Commission may facilitate the harmonization of authorization and access rules, legislation and pricing at a pan-European scale.

- ***Basic Public Data and Service Certification*** — Intermediaries delivering aggregate services must be able to trust the basic services provided. This may include political consent and further legislation to open up base registries and interoperability services to intermediaries in (other) Member States. Businesses and Citizens, but also aggregate service intermediaries need trust to use basic public services. Basic Public Service certification is one of the options to foster trust. Certification establishes the integrity, confidentiality and availability of basic public services. This certification is done by or on behalf of the Member State governments. However, the role of the Commission is to certify the certification practice of the Member States on behalf of the other Member States and the aggregate service intermediaries.
- ***Cross-Certification*** — is needed for secure exchange of information (in documents and services) between constituencies in different Member States, each having their own (multiple) identification, authentication and certification infrastructures.
  It is recognized that eID interoperability and delivering on the Roadmap for a pan-European eIDM Framework is a "key enabler" for efficient European e-Government services. Given time restrictions, the priority of the Roadmap is primarily to realize the basic identification/authentication functionality.

Resolve of these issues requires a Program at Commission level. However, preparatory work packages for IDABC have been identified in the next section. The Commission-level Program is further explained in the ensuing section.

5.0 EIF Update Program

This study prepares the realization of the tremendous opportunities and promise to further the development, deployment and use of pan-European public services. Figure 19 visualizes the main purpose of EIF v2.0: achieve convergence in the interoperability related activities conducted by Member States, Directorates General and other stakeholders.

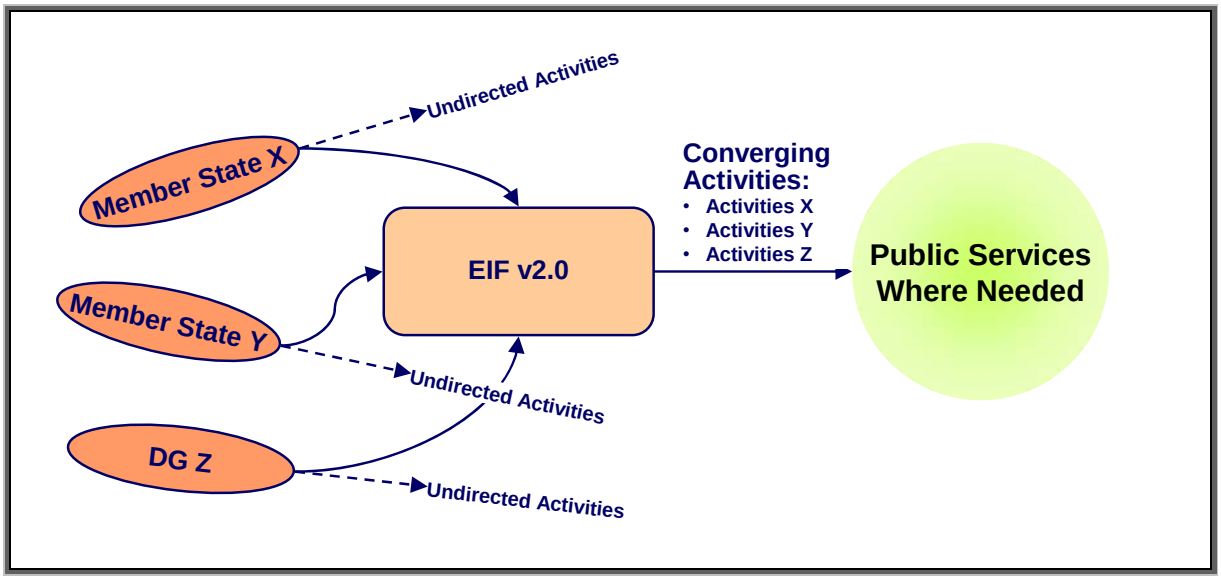


Figure 19 Purpose of EIF v2.0 — activity convergence

To achieve convergence will not be a trivial task. This will be a major endeavor, a program of programs, requiring involvement of a multitude of constituencies at many levels in the entire European Union, and over many years.

The identification of the issues in the proposed framework shows that, as anticipated by the IDABC program, many are to be resolved at the Commission level. Nevertheless, the IDABC program can perform several preparatory work packages over the coming years. In fact, the IDABC program can facilitate and coordinate technical interoperability as the technical basis for interoperability between Member States and intermediaries.

Other DGs, Member States and/or intermediaries may be involved to provide or facilitate the development of public services in specific domains.

The following sections present the definition and structure of EIF v2.0 followed by the added value of the proposed EIF v2.0 over the existing EIF v1.0. The subsequent sections present the work packages necessary to further the development of PEGS. These work packages are based on Gartner's best practices for a successful transformation towards delivering e-government services (as stated in section 2.6) and divided into three groups:

- IDABC activities to publish EIF v2.0 before the end of 2007
- Additional IDABC activities for the work program of 2008 and beyond
- Commission level activities

5.1 EIF v2.0 Definition and Structure

EIF v1.0 consisted of three documents: the EIF, the Architecture Guidelines and the Architecture Guidelines Annex.

For the new EIF v2.0, Gartner advises to produce three types of documents:

- A compact policy document
- General guidelines
- Procedures

5.1.1 EIF v2.0 Policy document

The proposed structure (Table of Content) of the policy document is as follows.

Summary

1 **Introduction**

- Definition of the EIFv2.0
- Objectives, audience and structure of this document
- The role of the EIFv2.0 and Pan-European e-Government Services
- Background Information (describes shortly why EIFv1.0 --> EIFv2.0)
- Context and Governance
- Key principles of EIFv2.0
- Documents in the Framework of the EIFv2.0

2 **Principles of the European Interoperability Framework v2.0**

- Dimensions of European Interoperability
- Architecture of Services
- National and European Public Services
- General structure of the European Public Services architecture
- Principles of organization of Information in Member States and on European level
- The role of open standards
- Subsidiarity and the role of the Member State autonomy

3 **Principles of Pan-European e-Government Services**

- General principles
- Interoperability
- Aggregated services
- Organizational coordination on European level
- Roles of the Commission, Member States, Industry, Private Sector

4 **Dimensions of European Interoperability**

- Organizational Interoperability
  - Definition and objectives of Organizational Interoperability
  - Aspects of Organization, Processes
  - Architectural requirements and organizational requirements
  - Coordination of Organizational Interoperability
- Semantic Interoperability
  - Definition and objectives of Semantic Interoperability

- — Aspects of Information
- — Architectural requirements and organizational requirements
- — Coordination of Semantic Interoperability

❑ Technical Interoperability

- — Definition and objectives of Technical Interoperability
- — Aspects of Presentation, Application, Data, Middleware, Platforms, Databases, Networks
- — Architectural requirements and organizational requirements
- — Coordination of Technical Interoperability

5 **Infrastructure requirements for European Interoperability**

❑ Basic principles

❑ Central versus decentral infrastructure

❑ Private versus open market infrastructure

6 **Interoperability with Member State Frameworks**

❑ European level policy issues

❑ High level policy issues

❑ Application of the subsidiarity principle

❑ Scope and structure

❑ General approach

Glossary

5.1.2 EIF v2.0 Underlying Principles

This section contains the collected list of underlying principles for the EIF v2.0 as identified in this report:

- The Mission Statement "Public Services where Needed" should be used to test all decisions to be made regarding EIF v2.0.
- The primary scope of EIF v2.0 should be A2A, A2B and A2C.
- EIF v2.0 should support multiple standards in order to facilitate evolution and avoid vendor lock-in.
- EIF v2.0 allows open standards and other recognized standards to coexist.
- EIF v2.0 ensures that data transport (files, messages, services) uses data protection, rather than transport protection.
- EIF v2.0 advocates the Internet for A2B and A2C communications.
- Depending on the specific requirements for the domain at hand EIF v2.0 advocates the use of closed networks, the Internet or a hybrid backbone for A2A communications.
- EIF v2.0 leaves business process alignment to the stakeholders within a domain.
- EIF v2.0 allows Member States to determine how to implement their basic public services.
- EIF v2.0 requires Member States to make agreed upon basic public services available to everyone authorized.

- EIF v2.0 allows the reuse of basic public services at regional, national and pan-European level.
- EIF v2.0 enables administrations, citizens and businesses to access basic public services through pan-European aggregate services.
- EIF v2.0 stimulates growth in service quality and quantity by allowing private intermediaries to develop aggregate public services.
- EIF v2.0 ensures service quality and reliability of services by an extensive certification program for security services, transactions, basic public services and intermediaries providing aggregate services.
- To encourage developments EIF v2.0 stimulates cross-certification of national certificates.

5.1.3 EIF v2.0 General guidelines

The objective of the guidelines is to help Administrations, Businesses (and Citizens) to apply the framework to realize the mission: “Public Services where Needed” on an intra- and Pan-European level.

Gartner proposes to exchange the set of architecture guidelines of EIF v1.0 for a more general, shorter and less technical set of guidelines in EIF v2.0.

The proposed structure (Table of Content) of the General Guidelines is as follows:

Summary

1 **Governance**

- ❑ Roles, responsibilities and organizational structure

2 **Strategy**

- ❑ Strategic perspectives
- ❑ Stakeholder perspectives

3 **User Requirements**

- ❑ Introduction
- ❑ Fundamental requirements
- ❑ Generic Business requirements
- ❑ Security requirements
- ❑ Implementation requirements
- ❑ Additional requirements

4 **The European Public Services architecture**

- ❑ Fundamentals of the European Public Services architecture
- ❑ Interoperability
- ❑ Aggregated services
- ❑ Implementation Principles

5 **Guidelines on the Organizational Viewpoint**

- ❑ Definition and objectives of Organizational Interoperability

- ❑ Aspects of Organization
- ❑ Architectural requirements and organizational requirements
- ❑ Coordination of Organizational Interoperability

6 **Guidelines on the Process Viewpoint**

- ❑ Definition and objectives of Process Interoperability
- ❑ Aspects of Processes
- ❑ Architectural requirements and organizational requirements
- ❑ Coordination of Process Interoperability

7 **Guidelines on the Semantic Viewpoint**

- ❑ Definition and objectives of Semantic Interoperability
- ❑ Aspects of Information
- ❑ Architectural requirements and organizational requirements
- ❑ Coordination of Semantic Interoperability

8 **Guidelines on the Technical Viewpoint**

- ❑ Definition and objectives of Technical Interoperability
- ❑ Aspects of Presentation, Application, Data, Middleware, Platforms, Databases, Networks
- ❑ Architectural requirements and organizational requirements
- ❑ Coordination of Technical Interoperability

9 **Guidelines for use of the European Public Services architecture**

- ❑ Step-by-Step Guidance
  - ─ Step 1 - Governance
  - ─ Step 2 – Architecture Analysis
  - ─ Step 3 – Architecture Definition
  - ─ Step 4 – Investment and Funding Strategy
  - ─ Step 5 – Program Management Plan and Execute Projects
- ❑ Transition Strategy Concepts
- ❑ Developing the Transition Strategy
- ❑ Using the Transition Strategy

10 **Roadmap from 2007 to 2012**

- ❑ Introduction
- ❑ Roadmap

Appendix A: Key Terms

Appendix B: Reference Information

The General Guidelines have been planned for in the 2008 IDABC work programme. A work package has been defined in the work programme to produce the General Guidelines.

5.1.4 EIF v2.0 Procedures

Next to the policy document and guidelines EIF v2.0 should include a reference to the organization and procedures to manage, evolve and communicate the framework.

5.2 Added value of the proposed EIF v2.0

When comparing the proposed EIF v2.0 with the existing EIF v1.0 the following aspects can be derived as being the added value of the proposed EIF v2.0.

- *Enhanced interoperability dimensions* — EIF v2.0 enhances the organizational dimension by explicitly defining a process sub-layer. Business process alignment is a prerequisite to realize interoperability. EIF v2.0 also enhances the technical dimension with sub-layers. These sub-layers are necessary to provide more articulate guidelines.
- *Future proof on standards* — EIF v2.0 will facilitate evolution and avoid vendor lock-in by supporting multiple standards as a design principle.
- *Decision guiding pan-European Public Services Framework* — EIF v2.0 goes beyond interoperability dimensions and provide a framework for guiding PEGS development. This framework is derived from the national frameworks of Member States and adheres to the subsidiarity principle.
- *Enabling public-private-partnerships* — Gartner believes that the admission of private and competing intermediaries will rapidly lead to new and enhanced aggregate public services.
- *A clear mission statement* — EIF v2.0 provides a clear mission statement to guide developments and ease decision making. For each intended activity the following question should lead to a positive answer: "Does the activity further the development, deployment and use of Public Services Where Needed?"
- *Identification of key issues to be resolved for PEGS to flourish* — The EIF v2.0 pan-European Public Services Framework allowed the identification of all major issues to be resolved for PEGS to boom. This helped to set a more concrete agenda.
- *Stronger governance* — EIF v2.0 implies a more guiding role for the Commission to bring more synergy to the current PEGS initiatives and accelerate developments while at the same time adhering to the subsidiarity principle.

5.3 IDABC activities to publish EIF v2.0

This section introduces the activities necessary to produce the EIF v2.0 document, similar to EIF v1.0 (no architecture guidelines, some general guidelines). The format of EIF v1.0 was compact and elegant. The EIF v2.0 format should be of similar or smaller size, including some initial guidelines to apply the framework (no need to be perfect here). EIF v2.0 is to be communicated to administration, business, and citizen (representative bodies) stakeholders within the EU and beyond. Gartner recommends IDABC, together with other DGs to install a small unit to provide permanent communication services and training on EIF v2.0. The result of this initial work package is the published EIF v2.0 document and a standing organization to manage and communicate EIF v2.0. Appendix D elaborates on effective communication strategies.

Work Package Project Management

This WP takes responsibility for successful delivery of the EIF v2.0 policy document. The WP sets out the direction and tasks.

The estimated elapsed time is 6 months – until the end of the project.

Work Package Principles of EIF v2.0 and PEGS

The goal of this WP is to deliver the principles of the new EIF v2.0 and Pan-European e-Government Services.

Since it is important that these principles are supported by all Member States and associated bodies, ample time has to be given to reaching consensus on the matter. For this reason an iterative process has to be installed, developing the principles and associated text in multiple rounds of conceptual wording and revision.

This WP analysis the principles of European Interoperability in terms of the dimensions and the way Pan-European e-Government Services are architected from basic services. It also describes the basic principles of aggregation of services and the role of Open Standards to achieve Interoperability. Interoperability is placed in the context of subsidiarity.

Based and building on the principles in the previous chapter, this WP analyses the principles and organization around the PEGS. Its main emphasis is on organizational coordination and roles.

The estimated elapsed time is 3 months + 1 for revision.

Work Package Dimensions of European Interoperability

This WP is the body of the IEF v2.0 and describes the dimension of the three architectural views in terms of definition, aspects, architectural requirements and coordination on European Interoperability.

The estimated elapsed time is 2 months.

Work Package Infrastructure requirements for European Interoperability

This chapter describes the infrastructural basic principles and needs analysed from a central versus decentral perspective and private versus open market infrastructure point of view.

The estimated elapsed time is 2 months.

Work Package Interoperability with Member State Frameworks

This WP analyses political and social issues and the effect of the subsidiarity principle of the EIF v2.0. Finally it spends words on Interoperability between Member State Frameworks and the EIF v2.0 and from this concludes a general approach for further work.

The estimated elapsed time is 2 months.

Work Package Consolidation

This WP consolidates all the issues that are included in the other work packages and as such is an overarching editorial workpackage. In fact it may be seen as a project management WP from a technical (content/ editorial) point of view.

The estimated elapsed time is 6 months.

Work Package Anchoring and Communication

The goal of this WP is to anchor the work in the various bodies and communicate the results to stakeholders.

The estimated elapsed time is 6 months.

Work package Transition

This WP formulates the workplan to transition from the EIF v1.0 to the EIF v2.0 including aspects like training, seminars, information and communication. It also formulates the preliminary future workplan after the EIF v2.0 has come into existence.

The estimated elapsed time is 3 months.

Effort and staffing

To be able to complete the work before the end of 2007 substantial effort and input from Member States as well as from EC is necessary. It is estimated that including anchoring, communication and transition, MS effort will be 28 months while EC effort will be 14 months. When expressed in FTE, the total MS effort would equal an average of 4,5 FTE per month while total EC effort would equal an average of 2,5 FTE per month. Most of the effort will be in the WP Principles.

5.4 Work Program for IDABC for 2008 and beyond

The following work packages are identified to be executed by the IDABC program in 2008 and beyond. For each work package a short description and a type are given. The type indicates whether a work package is a fixed project or an ongoing task for the duration of the IDABC work program.

- ***Inventory of Domain Expertise Groups*** — to identify and register constituencies that operate as bodies for a specific industry, banking or public domain through business processes alignment and message standardization (semantics). Domain Expertise Groups are commonly known by names such as standardization committee, standardization forum or standardization body have existed for many decades. There are many domain expertise groups to be found in the public sector (e.g. Customs), in industry (e.g. Transport) and the financial world (e.g. Banking). Domain experts of multiple organizations convene to discuss the alignment of their organizations and business processes and the pertaining message types to support the information flow. Gartner recommends the IDABC program (and specific domain DGs) to stimulate and facilitate these groups to exert their expertise to further interoperability services to the public sector as well. This work package is simply to identify and register the domain expertise groups that are involved (partly) with the public sector and to publish this registry to all stakeholders. The result of this work package is a managed public registry (website) of Domain Expertise Groups.
  - *Type* — Fixed project followed by ongoing task
- ***Inventory of Basic Public Services*** — to identify and register basic public services by Member States and to start harmonization. Every Member State has several base registries e.g. Persons, Businesses, Buildings, Roads, Vehicles, Drivers Licences, etc. and many special registries e.g. Social Security, Pensions, Traffic, etc. Gartner recommends the IDABC to identify and register these basic public services and to publish the registry. The registry must include business, systems and technology standards, authorization and security conditions. Hence this registry will disclose the differences between Member States. Analysis of the differences will provide a basis for further harmonization of the delivery of basic public services in the EU. The result of

this work package is a managed public registry (website) of basic public services. The IDABC XML Clearinghouse initiative can be regarded as a means of implementing this work package.

- ❑ *Type* — Fixed project followed by ongoing task

- ***Inventory of Public Services Initiatives*** — to identify and register public service initiatives by the EC, Member States and industry. In this work package IDABC can leverage the work of the MODINIS study. Every Member State has many managed base registries e.g. Persons, Businesses, Buildings, Roads, Vehicles, Drivers Licences, etc. and many special registries e.g. Social Security, Pensions, Traffic, etc. Gartner recommends the IDABC to identify and register these basic public services and to publish the registry. The registry must include standards of all interoperability dimensions, authorization and security conditions. Hence this registry will disclose the differences between Member States. Analysis of the differences will provide a basis for further harmonization of the delivery of basic public services in the EU. The result of this work package is a managed public registry (website) of Public Service Initiatives.

  - ❑ *Type* — Fixed project followed by ongoing task

- ***Guidelines for Standards (Danish Proposal)*** — to provide non-restrictive guidelines for standards at every level of the interoperability model. This work package implies the coordination of the agreed upon execution of the Danish Proposal.
  This work package must be executed with great caution and restriction. The Architecture Guidelines of EIF v1.0 were just too directive and therefore simply ignored. On the technology interoperability dimension, this work package will specify available standards with pertaining strengths, weaknesses and trends. On the business (organization, process and information semantics) layers, reference to Domain Expert Groups is to be made. Finally, the guidelines should stress the need to accommodate multiple standards per layer at any moment in time, to facilitate evolution and avoid vendor lock-in. The result of this work package is the standards guidelines section of EIF v2.0.

  - ❑ *Type* — Fixed project

- ***Management and Maintenance of EIF*** — create a (small) organization to govern the production, communication and lifecycle of EIF. The most important brief of this management and maintenance organization is to liaise with the higher levels of the Commission to prepare for resolve of the issues identified with EIF v2.0. This work package results in a standing organization to govern the lifecycle and communicate the latest versions of EIF to the EC and Member States.

  - ❑ *Type* — Fixed project followed by ongoing task

- ***Test EIF v2.0*** — to map (and stimulate mapping) and register existing public service initiatives in the EC and Member States and analyze for overlaps and omissions. This work package starts with the identification and registry of public service initiatives by the Commission, Member States and industry. These initiatives are then mapped to EIF v2.0 to identify overlaps and omissions. The final result of this work package is to publish the registry and the analysis to all stakeholders. This analysis of initiatives may be used as a basis for harmonization of public service initiatives. The result of this work package is an addition to the overlap/omission analysis of initiatives to the managed public registry (website) of Public Service Initiatives. Compliance tools should be developed to be instrumental in checking conformity.

  - ❑ *Type* — Fixed project followed by ongoing task

- ***Prepare Resolve of Legal Issues*** — take inventory of legal barriers, discuss with stakeholders and legal experts, document options

- *Type* — Fixed project

- ***Prepare for Cross-Certification*** — take inventory of constituencies, organizations, procedures and technologies to enable cross-certification of international services and secure document exchange. As central certification on a European scale is no option today, cross-certification is easier to accept by autonomous Member States. Cross certification requires autonomous Member States to certify their constituencies, document/service transactions and basic public services to other Member States. When Member States accepts the certificates of other Member States (a paper-based example is the passport), pan-European interoperability will be possible. The result of this work package is a blueprint for cross-certification based on the autonomous public service infrastructures of the respective Member States.

  - *Type* — Fixed project

- ***Operational Interoperability Services*** — ensure pan/intra-European interoperability communications management and transaction certification and logging. This requires leverage of existing infrastructures within the EC and Member States. As this includes businesses and citizens, the use of the s-TESTA network needs to be complemented with the secure use (deploy VPN technology) of the Internet. Gartner recommends considering the network management and logging solution of Estonia (X-Road) or a similar solution that is readily available. The result of this work package is an operational interoperability service that enable secure document and service communication between (at least two) Member States.

  - *Type* — Fixed project

- ***Produce initial list of Certification Criteria*** — to draw-up initial lists for certification of transactions, basic public services and aggregate service intermediaries. Certification is a condition for trust. Member states are required to certify their own basic public services, the identity of their constituencies. Member states will require the same from other Member States and intermediaries handling their sensitive data. Special attention is needed for accessibility criteria. Portal providers should be able to support multi-channel strategies. The result of this work package is a publication of the principles of trust and the ensuing certification principles, plus a set of draft certification criteria.

  - *Type* — Fixed project

- ***Facilitate Member State Basic Services*** — stimulate Member States to start delivering basic public services to intermediaries in other Member States

  - *Type* — Fixed project followed by ongoing task

- ***Facilitate Aggregate Services by Others*** — stimulate and facilitate service providers to develop and deploy aggregate public services. This is a challenge for the IDABC program as this requires facilitation of and collaboration with other DGs, Member States and intermediaries to pilot pan-European aggregate public services. As there is currently no full set of multi-lateral public services legislation, bi-lateral agreements and contracts need to be facilitated. The result of this work package is several operational pan-European aggregate public services, managed by other DGs, Member States and intermediaries.

  - *Type* — Fixed project followed by ongoing task

- ***Prepare Communication of Issues to Commission Level(s)*** — take inventory of issues and stakeholders, discuss with stakeholders, prepare for resolve at Commission-level

  - *Type* — Ongoing task

The main purpose of these work packages by IDABC is to facilitate quick-wins that leverage existing infrastructures in Member States and with intermediaries and to prepare for the required structured resolve of all the issues at Commission level over the coming years.

The cross-reference table as indicated in Table 1 provides a clear overview of the relation between issues and work packages in which these issues are to be resolved.

IDABC Work Packages / **Issues to be resolved in EIF v2.0**	Accessibility	User Identification and Authentication	Transaction Certification	Aggregate Service Certification	Business Process and Semantic Standardization	Technical Standardization	Basic Public Service Authorization	Basic Public Data and Service Certification	Cross-Certification
Produce EIF v2.0	●	●							
Inventory of Domain Expertise Groups					●				
Inventory of Basic Public Services					●	●	●	●	
Inventory of Public Services Initiatives	●	●			●	●			
Guidelines for Standards (Danish Proposal)	●	●			●	●			
Management and maintenance of EIF									
Test EIF v2.0	●	●							
Prepare Resolve of Legal Issues	●	●	●	●	●		●		
Prepare for Cross-Certification		●	●	●					●
Operational Interoperability Services		●	●	●		●		●	
Produce initial list of Certification Criteria	●	●	●	●					
Facilitate Member State Basic Services					●	●	●		
Facilitate Aggregate Services by Others	●			●	●	●			
Prepare Communication to Commission level			●	●	●		●	●	●

Table 1 Cross-reference table proposed IDABC work packages and issues to be resolved in EIF v2.0

5.5 Multi-Year Public Service Program for the EC

The new EIF and the resolve of the issues cannot be achieved by individual actions of the Member States. Further evolution pan-European public services require a concerted effort by Member States, EC directorates, industries and banks. This also means active involvement of the European Parliament, the Commission and the Directorates General for their specific roles.

Effective coordination of these activities requires a Public Service Program of many projects by many different constituencies and experts. The role of the Commission would be to facilitate the execution of such a Program.

In summary, Gartner proposes to execute the following activity clusters to facilitate the development and deployment of pan-European public services:

- ***Resolve the issues*** — to overcome the main barriers to interoperability and hence the further development and delivery of public services where needed. These issues (described in section 4.6.2) are to be resolved by multiple constituencies in Member States. The role of the Commission is to facilitate the resolve of these issues through the European Public Service Program.
- ***Test the framework*** — by continuously mapping current Commission, Member State and Industry initiatives to the concept EIF v2.0, with the objectives to see whether and where there are overlaps (hence potential synergies) of initiatives, and where there are any omissions.
  An important aspect of testing is conformity to the framework. For this reason this work package defines the compliance tooling necessary to test this conformity.
  In fact this is a project portfolio function as a permanent role of the European Public Service Program.
- ***Manage the Program*** — to coordinate the resolve of the issues and testing of the framework and to consolidate the results into the new EIF v2.0 and to further the development and deployment of new European Public Services.

The "European Public Service Program" (or any better name) is a program to be facilitated by the Commission. This program is to start in parallel with the public service program for IDABC in 2007.

5.6 Impact of the work packages

This section studies the impact of the recommendations for EIF v2.0.

- *Citizens* — EIF v2.0 will provide citizens easy access to pan-European public services. With a couple of clicks they can locate and invoke the service they need. Citizens will experience the same direct feedback on their actions they get from commercial websites. The multi-channel guidelines ensure that citizens receive similar service levels through other channels (e.g. phone, mail, front desk, personal intermediary and mobile devices) as well.
- *Businesses* — EIF v2.0 will bring speedier delivery and more predictable timelines of pan-European public services to businesses. Businesses need to supply data (e.g. turnover and employee data) only once.
- *Member States* — Member States continue their own e-government initiatives and maintain their autonomy. Meanwhile they also allow access to their basic public services under certain conditions and trust. Member States cross-certify each other to establish a secure environment.
- *European Commission* — The Commission should continue to focus on the dissemination of EIF and start providing central guidance on the development of PEGS. Besides the EC should start facilitating certification on a pan-European level.
- *Industries* — The mash-up concept allows industries to provide additional basic services. It also enables industries to provide aggregate public services delivering extra value to citizens, businesses and administrations.
- *IDABC* — Maintain EIF and establish a knowledge hub providing insight in best practices of PEGS and in this way connecting supply and demand.
- *Legislation, directives and guidelines* — These should be amended to make basic public services available to certified pan-European intermediaries.

- *National Public Service Frameworks* — Each Member State should continue with its own independent architecture. However, it is important that each Member State architecture is minimally aligned to the notion of basic public services in a way that these can be reused on a pan-European level.
- *Existing closed networks* — These networks will remain in place for specific closed communities that require a network reliability and performance that can be guaranteed by a single party. Gartner expects the majority of PEGS delivery including A2A will shift to the public Internet.

The EIF v2.0 upgrade is to further the mission “Public Services Where Needed”. This is a very important endeavor that not only requires centralized involvement of the Commission but also respects and optimizes the autonomies of Member States and the innovative potential of industries.

A pre-condition however is the resolve of the political, legal, organizational and technical barriers identified through EIF v2.0. This resolve will take many-years. The development of pan-European public services will develop through trial-and-error and learning by all constituencies requiring open and collaborative minds of all involved, at all levels in the Union.

The real potential will be realized because the new framework supports flexibility, evolution and innovation. It enables local and parallel development, deployment and use of pan-European public services by a multitude of central, regional and local constituencies. This releases the true innovative power of the European Union.

And, as pan-European public services support easier exchange of persons, services, goods and capital, it will prove a major factor in the further development and expansion of the European Union.

APPENDICES

Appendix A — Glossary of Terms

This study uses the following definitions:

Aggregate service — A public service that combines content from more than one source into an integrated experience.

Architecture — The process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key principles and models that describe the enterprise's future state and enable its evolution. The scope of the enterprise architecture includes the people, processes, information and technology of the enterprise, and their relationships to one another and to the external environment. Enterprise architects compose holistic solutions that address the business challenges of the enterprise and support the governance needed to implement them.

Basic public service — A web-service which provides an elementary function, usually an elementary business function.

Certification — A process by which a contractor provides evidence to the acquirer that a product or service meets certain predefined requirements.

Data — A collection of (raw) facts stored in a computer system.

De facto standard — A standard that is widely accepted and used but that lacks formal approval by a recognized standards organization.

E-government — The use of IT in public administrations combined with organizational change and new skills in order to improve public services and democratic processes, and strengthen support to public policies.

EIF — European Interoperability Framework. The object of this study.

Elementary business function — The largest possible step a civil servant performs within a single timeframe as part of a sequence of steps to deliver a specific public service. E.g. the service of issuing an electoral certificate may consist of the following elementary business functions: check citizenship, check age, check residence and check criminal record.

Framework — An extensible structure for describing a set of concepts, methods, technologies, and cultural changes necessary to achieve a certain goal.

Guideline — A recommended approach for conducting an activity.

Information — The result of processing, manipulating and organizing data in such a way that adds to the knowledge of the person receiving it.

Interoperability — The ability of two or more constituencies to exchange information, and to use the information that has been exchanged. Interoperability encompasses technical interoperability.

Interoperability Model — A model describing the various layers which can be distinguished when examining interoperability.

Interoperability service — A web-service providing functionality which enhances the interoperability.

Mash-up — See aggregate service.

MPLS — Multi-protocol Label Switching. A protocol that helps support quality of service in Internet Protocol (IP) computing networks. A router labels packets to assign different levels of service based on different priority levels. This helps ease congestion for high-priority network traffic, such as that needed for mission-critical applications.

Open Standard — A standard which adheres to the following criteria:

- ❑ There are no constraints on the re-use of the standard.
- ❑ The standard has been published and the specification is publicly available.
- ❑ The standard is adopted and maintained by a not-for-profit organization.
- ❑ The development of the standard occurs on the basis of an open decision-making procedure available to all interested parties.
- ❑ The intellectual property of the standard is irrevocably made available on a royalty-free basis.

pan-European service — A public service which involves actors from two or more EU Member States.

PEGS — pan-European e-Government Services. See pan-European service.

Portal — A website that serves as an entry point for a citizen or business to use a public service. In this study a portal consists of two components. The first component helps the user locate the service. The second component involves the orchestration of usage of underlying (basic) services necessary to deliver the public service used.

Principle — A fundamental rule serving as the basis for something else.

Proprietary standard — A standard which does not comply to the criteria of an open standard.

Public service — A coherent entity of work a citizen or business can obtain from an administration. A public service may result in a series of transactions. E.g. requesting a birth certificate, requesting a train time table, filing an income tax declaration, requesting a construction permit.

Recognized standard — A standard that has been approved by a recognized standards organization.

Semantic standard — A standard that defines information.

Service — Depending on the context in which this term is used a service may be an aggregate service, basic public service, interoperability service, pan-European service, public service, web-service.

Service Oriented Architecture (SOA) — An application topology in which the business logic of the application is organized in modules (web-services) with clear identity, purpose and programmatic-access interfaces. Web-services behave as "black boxes": Their internal design is independent of the nature and purpose of the requestor.

Standard — A definition or format. A standard is either a recognized standard or a de facto standard.

Technical interoperability — The ability of two or more computer systems to exchange data, and to use the data that have been exchanged. Technical interoperability is part of interoperability.

Transaction — A series of actions resulting in the addition, modification or deletion of data stored in a computer system.

VPN — Virtual Private Network. A set of technologies that makes it possible to create private connections over public infrastructures with the same level of security closed private networks offer.

WAN — Wide Area Network. A communications network that connects computing devices over geographically dispersed locations.

Web-service — A software component that can be accessed by another application (such as a client, a server or another Web service) through the use of generally available, ubiquitous protocols and transports, such as Hypertext Transport Protocol (HTTP).

Appendix B — Understanding Gartner's Hype Cycles

This appendix is an excerpt of Gartner research note G00138430 published in June 2006.

Gartner's Hype Cycles offer a snapshot of the relative maturity of technologies, IT methodologies and management disciplines. They highlight areas that are overhyped, estimate how long specific technologies and trends will take to reach maturity, and help organizations decide when to adopt.

B.1 What You Need to Know

Gartner's Hype Cycle characterizes the typical progression of an emerging technology, from overenthusiasm, through a period of disillusionment, to an eventual understanding of the technology's relevance and role in a market or domain.

Gartner analysts position technologies on the Hype Cycle based on a consensus assessment of hype and maturity. During the first part of the Hype Cycle, when there are many uncertainties regarding a technology, its position on the hype curve is guided more by its hype levels than its perceived maturity. At the later stages, as more information about maturity, performance and adoption becomes available, the hype plays a lesser role in determining the technology's position on the Hype Cycle.

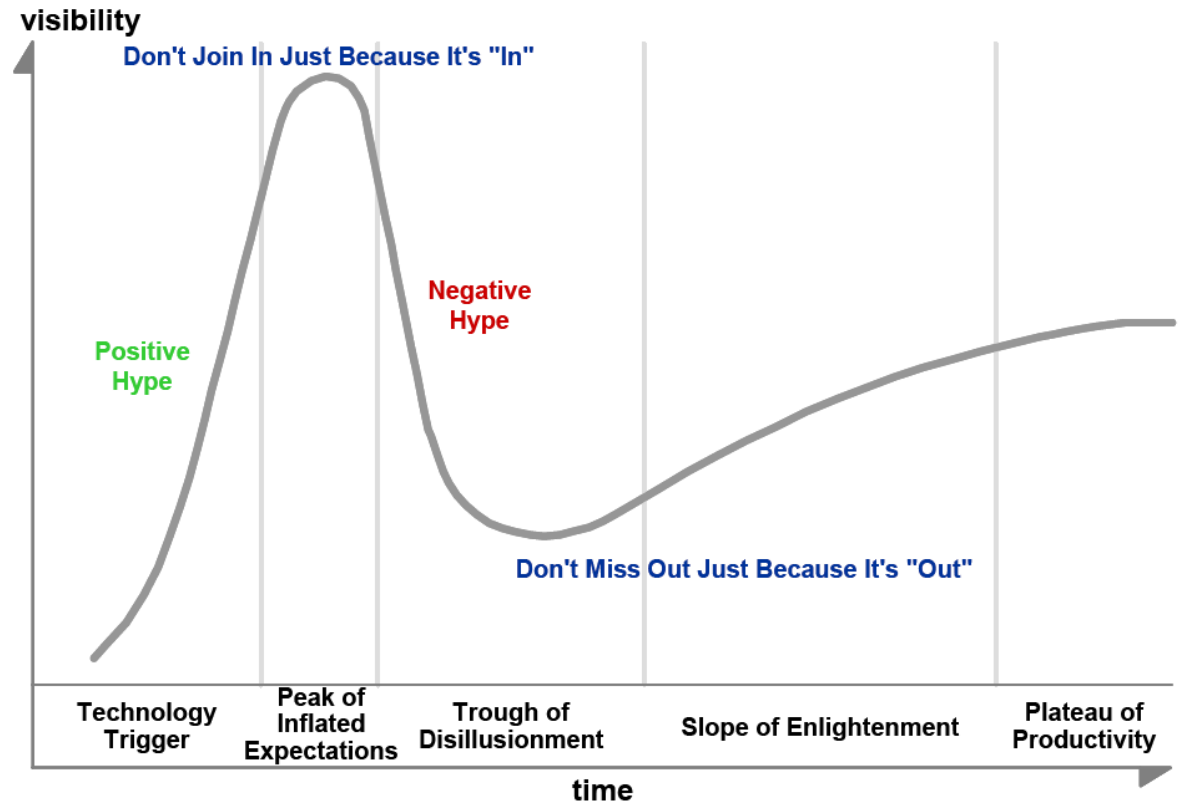
Technologies do not move at a uniform speed through the Hype Cycle. To represent the varying speeds, all technologies on the Hype Cycle are assigned to a category representing how long they will take to reach the Plateau of Productivity from their current position on the Hype Cycle — that is, how far they are from the start of mainstream adoption.

Hype Cycles enable technology planners to compare their understanding of technologies' evolution against Gartner's analysis of the technologies' maturity, to decide when to invest in a technology. If a company launches its efforts too soon, it will suffer unnecessarily through the painful and expensive lessons associated with deploying an immature technology. If it delays action for too long, it runs the even greater risk of being left behind by competitors that have succeeded in making the technology work to their advantage.

The Hype Cycle has a simple and clear message: Enterprises should not invest in a technology just because it is being hyped, nor should they ignore a technology just because it is not living up to early overexpectations. Rather, enterprises should be selectively aggressive and move early with technologies that are potentially beneficial to their business. For technologies that are of lower impact, organizations can let others learn the hard lessons, putting off their own adoption until the technology is more mature.

B.2 What Is the Hype Cycle?

Gartner's Hype Cycle, introduced in 1995, characterizes the typical progression of an emerging technology, from overenthusiasm through a period of disillusionment to an eventual understanding of the technology's relevance and role in a market or domain (see Figure 20).



Source: Gartner (June 2006)

Figure 20 The Hype Curve

A technology passes through several stages on its path to productivity:

- **Technology Trigger:** A breakthrough, public demonstration, product launch or other event generates significant press and industry interest.
- **Peak of Inflated Expectations:** During this phase of overenthusiasm and unrealistic projections, a flurry of well-publicized activity by technology leaders results in some successes, but more failures, as the technology is pushed to its limits. The onlycompanies making money are conference organizers and magazine publishers.
- **Trough of Disillusionment:** Because the technology does not live up to its overinflated expectations, it rapidly becomes unfashionable. Media interest wanes, except for a few cautionary tales.
- **Slope of Enlightenment:** Focused experimentation and solid hard work by an increasingly diverse range of organizations lead to a true understanding of the technology's applicability, risks and benefits. Commercial off-the-shelf methodologies and tools ease the development process.
- **Plateau of Productivity:** The real-world benefits of the technology are demonstrated and accepted. Growing numbers of organizations feel comfortable with the reduced levels of risk, and the rapid growth phase of adoption begins.

The Hype Cycle:

- Establishes the expectation that most technologies will inevitably progress through the pattern of overenthusiasm and disillusionment.
- Provides a snapshot of the relative maturity of technologies within a certain segment of the IT world, such as a technology area, horizontal or vertical business market, or a certain demographic audience.

- Has a simple and clear message. Companies should not invest in a technology just because it is being hyped, nor should they ignore a technology just because it is not living up to early overexpectations

Note that, while many of Gartner's Hype Cycles are focused on specific technologies, the same pattern of hype and disillusionment applies to higher-level concepts such as IT methodologies and management disciplines. In this document, we will continue to refer to the individual elements mapped on the Hype Cycles as *technologies,* but in many cases, the Hype Cycles also position higher-level trends and ideas.

B.3 Behind the Hype Cycle

In looking at the rationale for the Hype Cycle, it becomes clear that the cycle is not so much about technology, as about human attitudes toward innovation. The same Hype Cycle applies to new business models and management approaches, and to consumer phenomena such as rising movie or music stars. Investors are intensely aware of the hype effect as a new company gains popularity and visibility.

As with other subjective metrics such as stock prices, part of the public's perception of the value of a technology comes from pure speculation or promise (that is, the benefit that people feel the technology might someday deliver), and part comes from the real engineering or business maturity as perceived in the form of real experiences. Both factors evolve over time (see Figure 21).

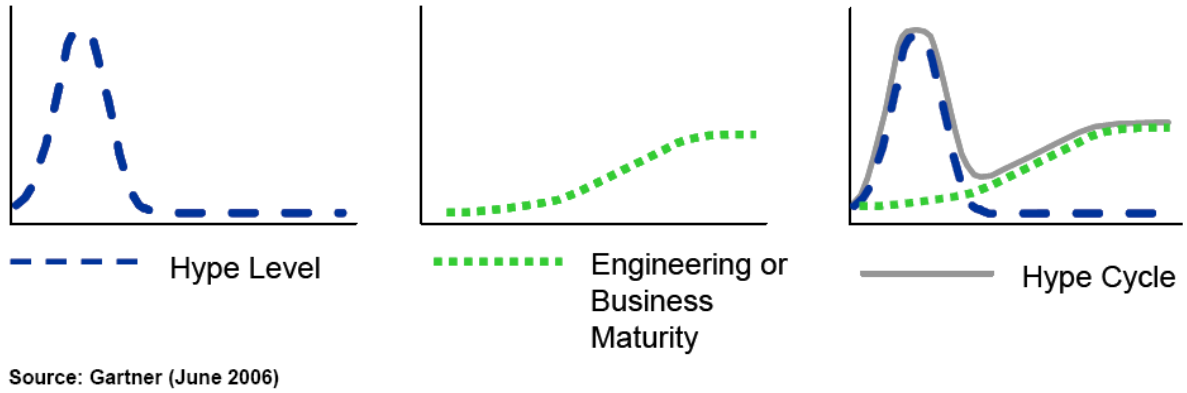
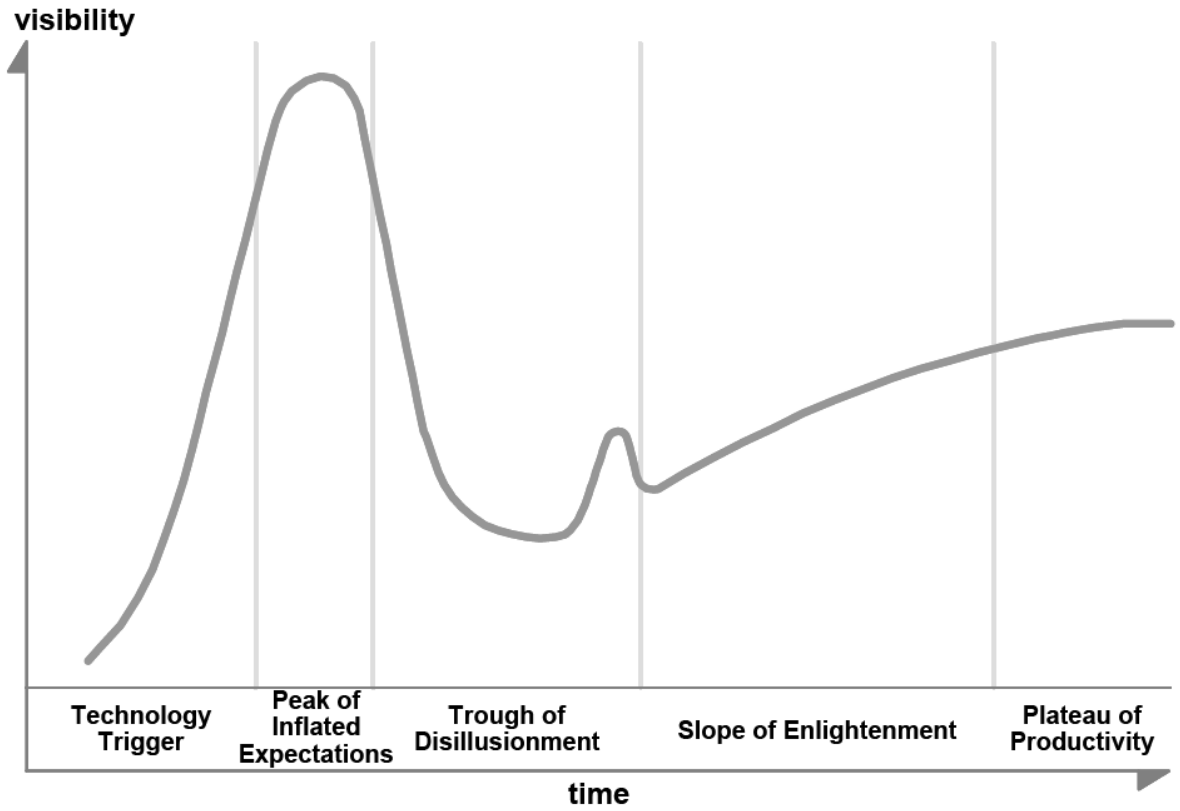


Figure 21 Components of the Hype Cycle

Excitement is a psychological factor that occurs in a rush, rises to a peak and eventually dies down, while real maturity (for example, of a product) builds slowly via development and use. Normally, there is a handoff from potential to maturity, as real experience takes the place of speculation as the primary determinant of the public mind-set. Combining the two curves yields the Hype Cycle, with the hype preceding real capability, resulting in the phases of expectation, disillusionment and maturation. (The observation that hype precedes maturity has been noted by Howard Fosdick and others.)

The Hype Cycle shows two stages of upward direction (that is, increasing hype) — the lead up to the Peak of Inflated Expectations and the rise up to the Slope of Enlightenment. The first rise in hype is the primarily insubstantial hype that occurs when a technology is first discussed in the media. Some technologies experience multiple rounds of vacuous hype before beginning a more serious growth path. The second stage of hype is associated with the beginning of real adoption growth. In many technology markets, another "mini-peak" of hype may occur, triggered by product vendors, that launches the technology up the Slope of Enlightenment (see Figure 22).

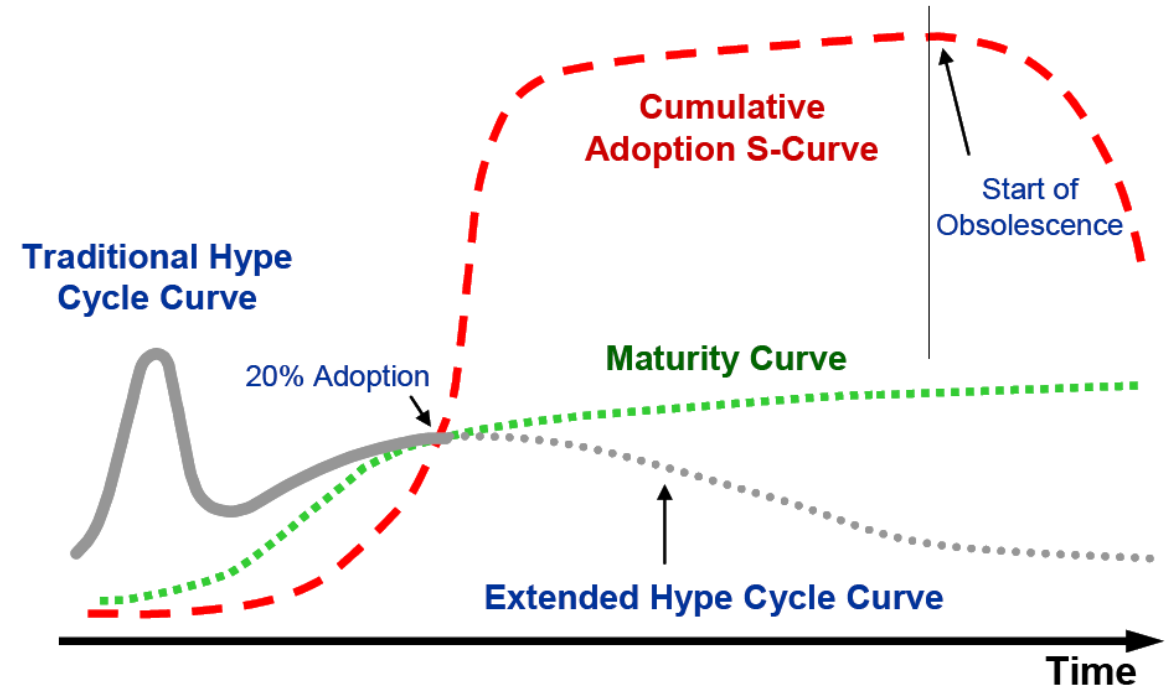


Source: Gartner (June 2006)

Figure 22 "Double Peak" of Hype Triggered by Meaningful Improvements and Adoption

The scale of each technology's hype curve typically varies, based on the technology's overall perceived importance to business and society. For visualization purposes, we have normalized these individual hype curves so they will all fit in one Hype Cycle graphic. For example, mesh networks are an interesting method of leveraging peer-to-peer wireless networking bandwidth, but they will be relevant primarily to wireless network service providers. Other technologies that will appeal to a large number of companies (for example, service-oriented architecture) or consumers (for example, smartphones) will attain much higher levels of exposure and hype. Therefore, even when mesh networking is at the peak of its hype curve, it may still receive less overall "hype volume" than smartphones or service-oriented architecture.

The Hype Cycle ends at the beginning of the Plateau of Productivity. Adoption of any innovation typically follows an S-curve representing cumulative adoption, with the steepest part of the adoption curve beginning at approximately 20 percent adoption by the technology's target audience (see Figure 23). Twenty percent adoption also represents the start of the Plateau of Productivity, so the traditional Hype Cycle ends at the point at which mainstream adoption of the technology surges. As with the height of the Peak of Inflated Expectations, the final height of the Plateau of Productivity varies according to whether the technology is broadly applicable and highly visible, or benefits only a niche market.



Source: Gartner (June 2006)

Figure 23 Technology Life Cycle Models

B.4 Positioning a Technology on the Hype Cycle

Gartner analysts position technologies on the Hype Cycle based on a consensus assessment of hype and maturity. During the first part of the Hype Cycle, when there are many uncertainties regarding a technology, its position on the hype curve is guided more by its hype levels than its perceived maturity. At the later stages, as more information about maturity, performance and adoption becomes available, the hype plays a lesser role in determining the technology's position on the Hype Cycle.

A technology may have radically different positions on different Hype Cycles. This occurs when there are different applications of a technology — for example, speech recognition in the call center may be more mature (approaching the Plateau of Productivity) than speech recognition on the desktop (pulling out of the Trough of Disillusionment). Application considerations may lead to different positions of the same technology on different horizontal (for example, customer relationship management) or vertical (for example, government) Hype Cycles.

In Hype Cycle reports, technologies are presented in five categories representing the various stages on the Hype Cycle. These stages are characterized by distinct investment, product and market patterns (see Figure 24).

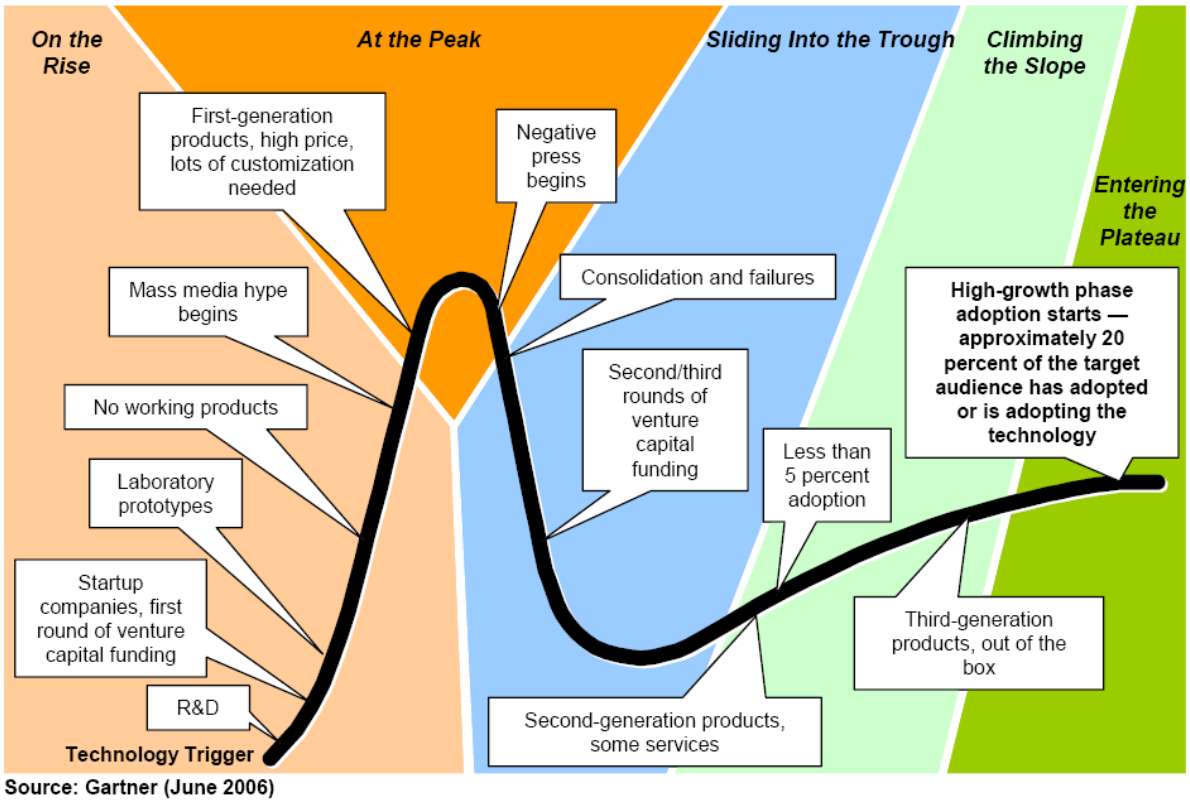


Figure 24 Phases of the Hype Cycle

B.4.1 On the Rise

At the Technology Trigger, typically no usable products exist, only research and laboratory prototypes. Venture capitalists may provide some early funding just after the Technology Trigger, if they expect the technology to be a fast runner.

On the rise to the Peak of Inflated Expectations, first-generation products emerge, but they usually are highly specialized or extremely difficult to use. Products are high margin because vendors are still trying to recover R&D costs, and the technology is expensive compared to its cost of production.

This is a good stage for venture capitalists to enter the market, before evaluations are at their apex. During this phase, some particularly aggressive companies may start to pilot the technology, particularly if it contributes to critical business issues. These companies work closely with the vendors to create customized solutions for their requirements.

B.4.2 At the Peak

As the Peak of Inflated Expectations crests, the number of vendors offering the technology increases. These vendors are primarily startup companies and small vendors that try to use the increasing amount of hype for their marketing benefit. A growing number of enterprises start to examine how the technology may fit within their business strategies, although most do not take action at this stage. Venture capitalists may be interested in selling some of the startups that they have equipped with early funding.

As problems with first-generation products become visible — often because the technology is pushed to its limits — negative publicity starts to push the technology into the Trough of Disillusionment.

B.4.3 Sliding Into the Trough

Because the technology does not live up to the overinflated expectations of enterprises and the media, it is rapidly discredited. Some of the early trials end in highly publicized failures. A significant amount of vendor consolidation and failure occurs. Later-stage investors may be interested in funding vendors during this phase because equity is fairly inexpensive after the "microbubble" at the Peak of Inflated Expectations has burst.

However, amid the disillusionment, trials are ongoing and vendors are improving products based on early feedback regarding problems and issues. Some early adopters find some benefit in adopting the technology. For some slow-moving technologies, workable and cost-effective solutions emerge and provide value in niche domains, even while the technology remains in the Trough of Disillusionment.

The Trough of Disillusionment coincides with the "chasm" in Geoffrey Moore's classic book on technology marketing, "Crossing the Chasm." During this stage, vendors need to increase product adoption from a few early adopters to a majority of enterprises to begin the climb up the Slope of Enlightenment.

B.4.4 Climbing the Slope

As second- and third-generation products are launched, and methodologies and tools are added to ease the development process, the technology begins its climb toward the early stages of maturity. The service component declines as a percentage of the sale. Vendors seek mezzanine or later-round funding for marketing and sales support to pull themselves up the Slope of Enlightenment. Technologically aggressive ("Type A") enterprises are relatively comfortable adopting the technology, and moderately aggressive ("Type B") enterprises start to investigate and pilot the technology. Conservative ("Type C") enterprises remain wary.

At the beginning of the Slope of Enlightenment, the penetration often is significantly less than 5 percent of the potential market segment. This will grow to approximately 20 percent as the technology enters the Plateau of Productivity.

B.4.5 Entering the Plateau

The Plateau of Productivity represents the beginning of mainstream adoption, when the real world benefits of the technology are demonstrated and accepted. Technologies become increasingly embedded in solutions that are "out of the box," with decreasing service elements as the technology matures. The majority of Type B enterprises adopt the technology, followed by Type C organizations.

As a high-profile technology matures, an "ecosystem" often evolves around it. The ecosystem supports multiple providers of products and services, and also a market for related products and services that extend or are based on the technology. This may in turn trigger a fresh Hype Cycle around the components of the ecosystem.

As a technology achieves full maturity and supports thousands of enterprises and millions of users, its hype typically disappears, as shown in the extended Hype Cycle graphic in Figure 4. Only a few specialist magazines continue coverage of new aspects of implementing and maintaining the technology.

B.5 The "Years to Mainstream Adoption" Assessment

Technologies do not move at a uniform speed through the Hype Cycle. To represent the varying speeds, each technology on the Hype Cycle is assigned to a category representing how long it will take to reach the Plateau of Productivity from the technology's current position on the Hype Cycle — that is, how far the technology is from the start of mainstream adoption:

- Less than two years
- Two to five years
- Five to 10 years
- More than 10 years
- Obsolete before Plateau

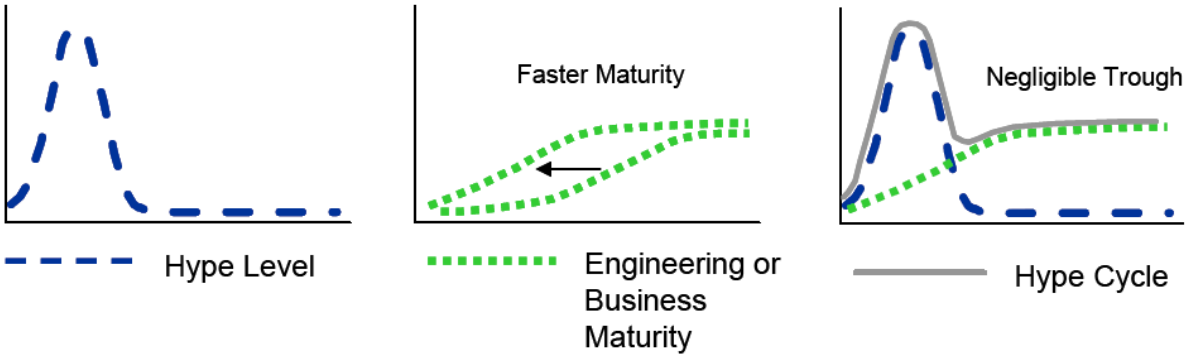
It usually takes years for a technology to traverse the Hype Cycle — some technologies may take decades. There are three adoption speeds: "normal," "fast track" and "long fuse."

B.5.1 Normal

Normal technologies with relatively few inhibitors usually traverse the Hype Cycle in five to eight years.

B.5.2 Fast Track

Fast-track technologies go through the Hype Cycle within two to four years. This occurs when the maturity curve inflects early in the life cycle of a technology (see Figure 25). These technologies find themselves adopted without much fanfare, bypassing the Peak of Inflated Expectations and Trough of Disillusionment. Many enterprises are unaware of their sudden maturity and applicability, as happened with instant messaging and Short Message Service.



Source: Gartner (June 2006)

Figure 25 Fast-Track Hype Cycle

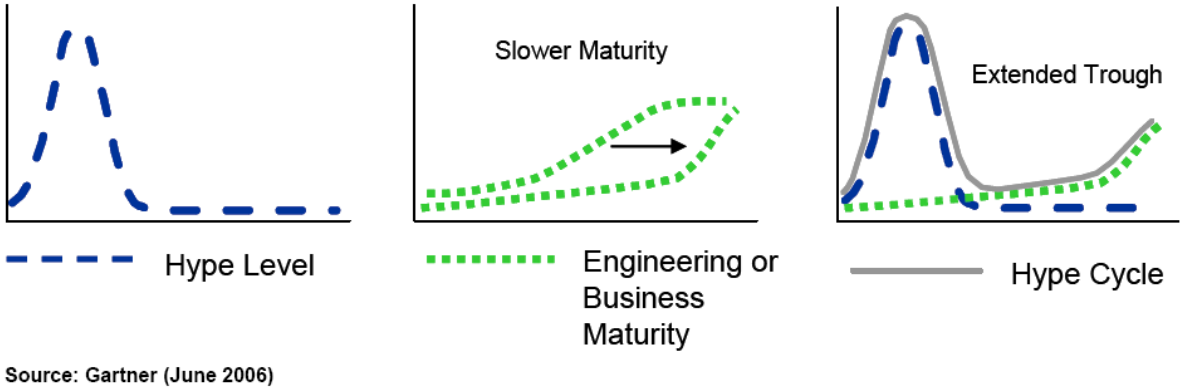
Fast-track technology indicators include:

- High value
- Simplicity of use by organizations and users
- Several strong vendors that support the technology
- Use of the current infrastructure
- Rapid transition from consumer to corporate use

B.5.3 Long Fuse

Long-fuse technologies spend a longer-than-average time in the Trough of Disillusionment, resulting in a slower overall traversal of the Hype Cycle — sometimes as long as one or two decades (see Figure 26). For example, PDAs were in the Trough of Disillusionment for several years after the Apple Newton, until the PalmPilot was launched and firmly established a viable new class of device. Another example is object orientation, which took 10 to 15 years to migrate from academia and other research organizations to become a

mainstream development technique; the delay was partly due to skills and development process barriers. Many long-fuse technologies seem to be perpetually emerging and cycling between the Peak and Trough in public attention (for example, biometrics and artificial intelligence).



Source: Gartner (June 2006)

Figure 26 Long-Fuse Hype Cycle

Long-fuse technology indicators include:

- A science-fiction-style fascination with the technology that is far ahead of its real capabilities (for example, artificial intelligence, nanocomputing and speech recognition)
- Inherent complexity that requires advances in basic science and engineering (for example, quantum computing and heads-up displays)
- User acceptance or regulatory issues (for example, biometrics and trusted computing)
- Reliance on a new infrastructure (ecosystem) that needs time to evolve (for example, public-key infrastructure and digital signatures require regulation and standardized business applications, smart cards need readers, and fuel cells require a distribution network)
- Dependence on professional skills that are unavailable or in short supply (for example, stand-alone data mining, text mining, knowledge management, standardization and data integration)
- Major changes to business processes or the creation of a new business model (for example, trusted computing, nanocomputing and public-key infrastructure)

Appendix C — Architecture Methodology

This appendix explains the architecture methodology used throughout this study.

C.1 Architecture Perspectives

The architecture methodology applied by Gartner in this study is explained by a series of diagrams.

Any private enterprise or public organization can be modelled as a 3-dimensional stack of domains, or layers, that constitute a value chain of technology, used to build (software) systems, that are used to provide information support to the business processes of the enterprise organization, as shown in the next diagram showing two interoperating businesses, A and B:

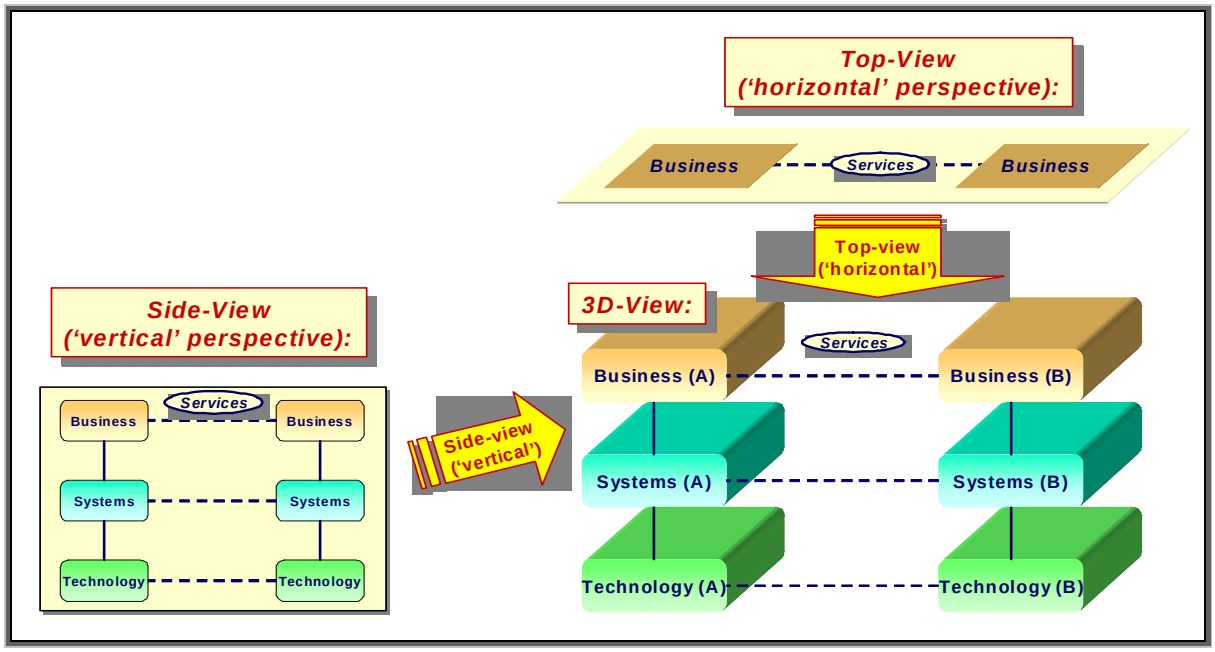


Figure 27 Perspectives o the Interoperability Framework

To design interoperability (of businesses) and interconnectivity (of systems and technologies), a side-view or 'vertical' perspective is used. Interoperability is a pre-condition for the delivery of (public) services.

To design the service delivery between businesses, a top-view or 'horizontal' perspective is used. This perspective shows how one business (private enterprise or public organization) provides services to another.

As architecture is the art of showing what is needed for stakeholders to take informed and objective decisions. In practice, this means that many artifacts are left-out of any architecture diagram. This method is shown in the next series of diagrams.

C.2 Interoperability Reference Model

The interoperability reference model is generic for all businesses (private enterprises and public organizations) and articulates how businesses interoperate on the business levels and how they interconnect on the systems and technology levels.

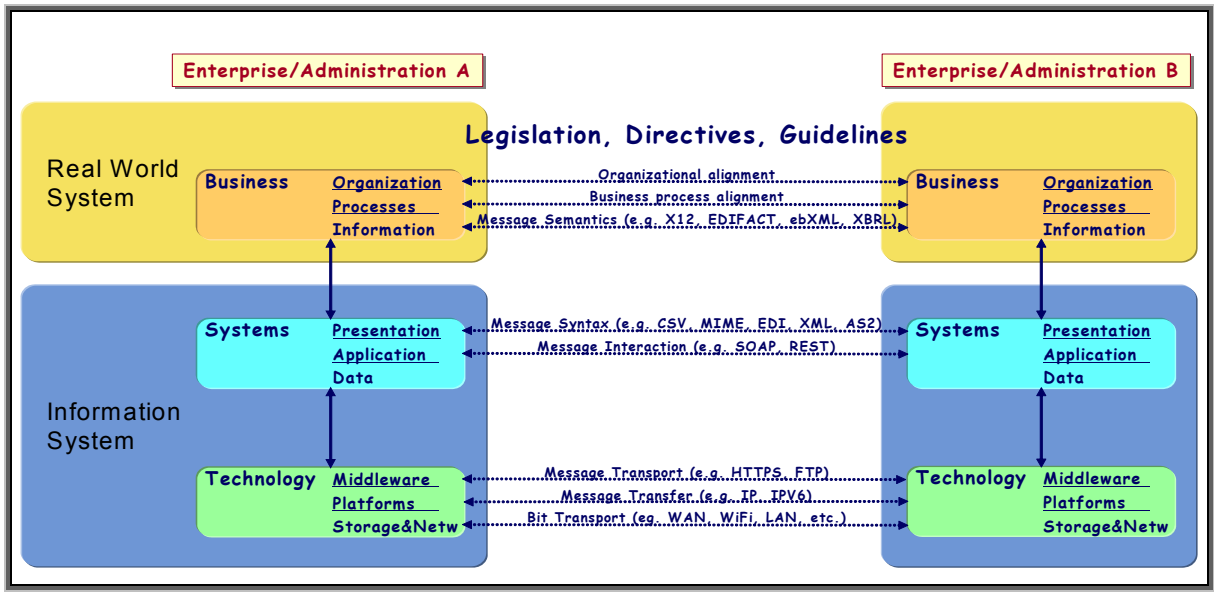


Figure 28 Elaborate version of the Interoperability Reference Model

The purpose of the interoperability reference model is to clearly distinguish all communications layers and the standards to be agreed per layer, as no communication is possible without these standards.

C.3 Public Services Model

The public services model for the delivery of pan-European public services is derived as follows. First, all components of all enterprise levels are shown in a 2D top-view (or 'horizontal') drawing:

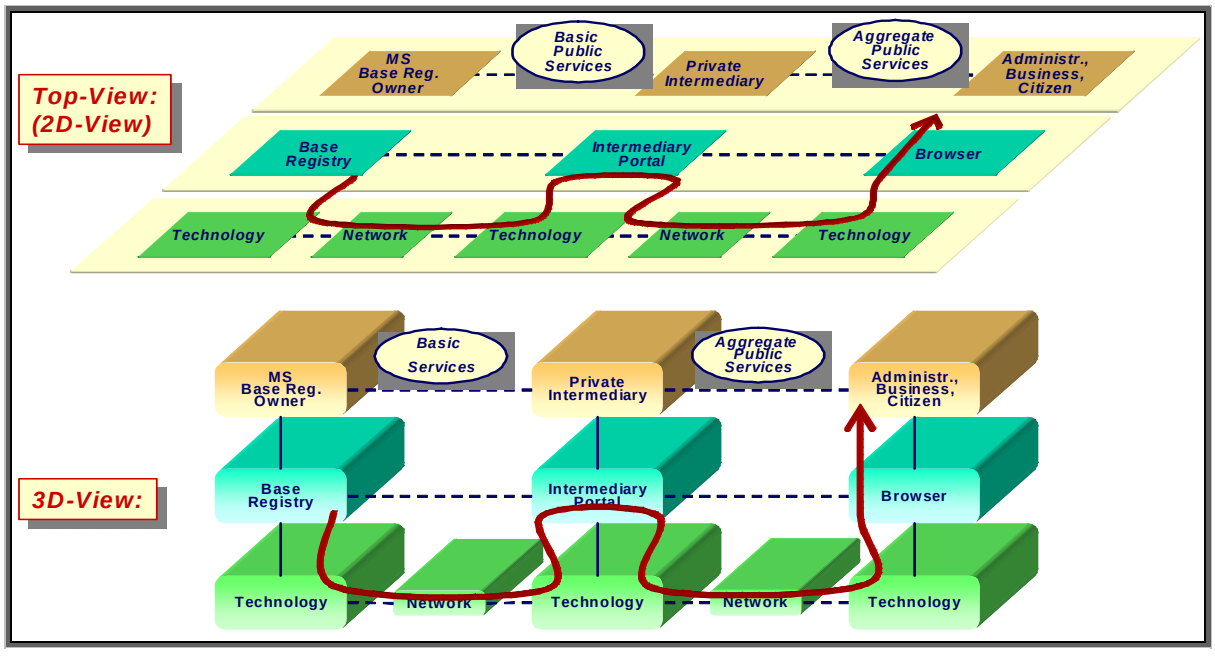


Figure 29 Horizontal perspective: the Public Services Framework

This 2D diagram shows how data from a base registry is transported as a service message through a network to the intermediary portal and subsequently to the browser of the client, which can be a public servant in an administration, an employee of a business or a private citizen.

However, this 2D diagram contains information that is superfluous because it is well known (the technology platforms) or ubiquitous (like browsers) and this results in the following perspective that is simplified because these trivial components have been left-out:

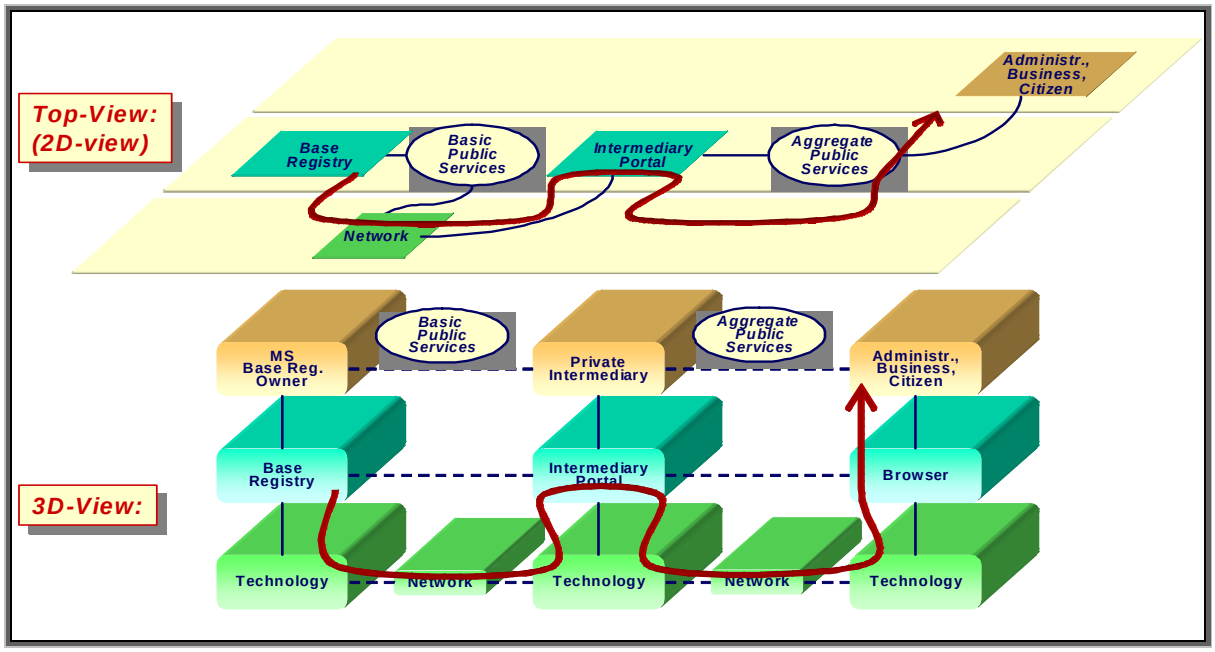


Figure 30 Horizontal perspective: simplified, trivial components left-out

Still, the diagram is a bit difficult to understand and further simplification is achieved by aligning the components from the different domains or layers, as shown in the next diagram:

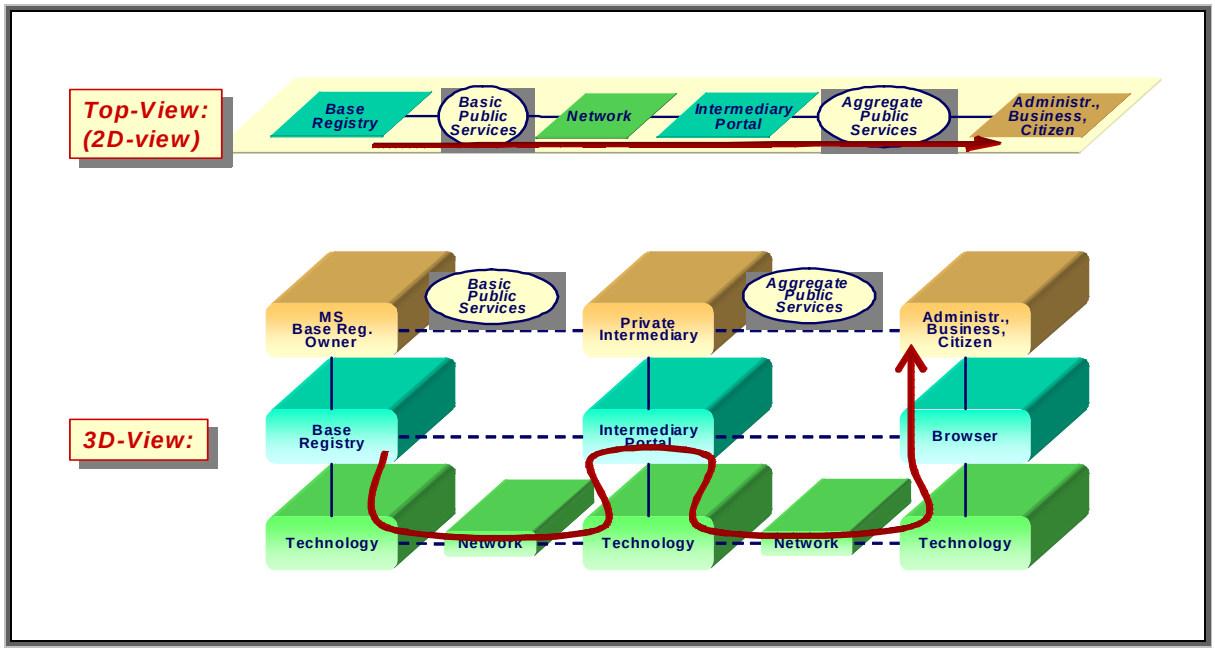


Figure 31 Horizontal perspective: layout straightened-out

In this straightened-out layout, only the essential components are shown: the base registry providing the government-guarded information, the basic public service provided, the secure network that logs the service transaction for evidentiary purposes, the intermediary portal that uses the transaction in a logical workflow providing aggregated public service and the administration, business or citizen consuming that service.

The final 2D-view is shown below as the basic public services model as the cornerstone of the new pan-European public services framework:

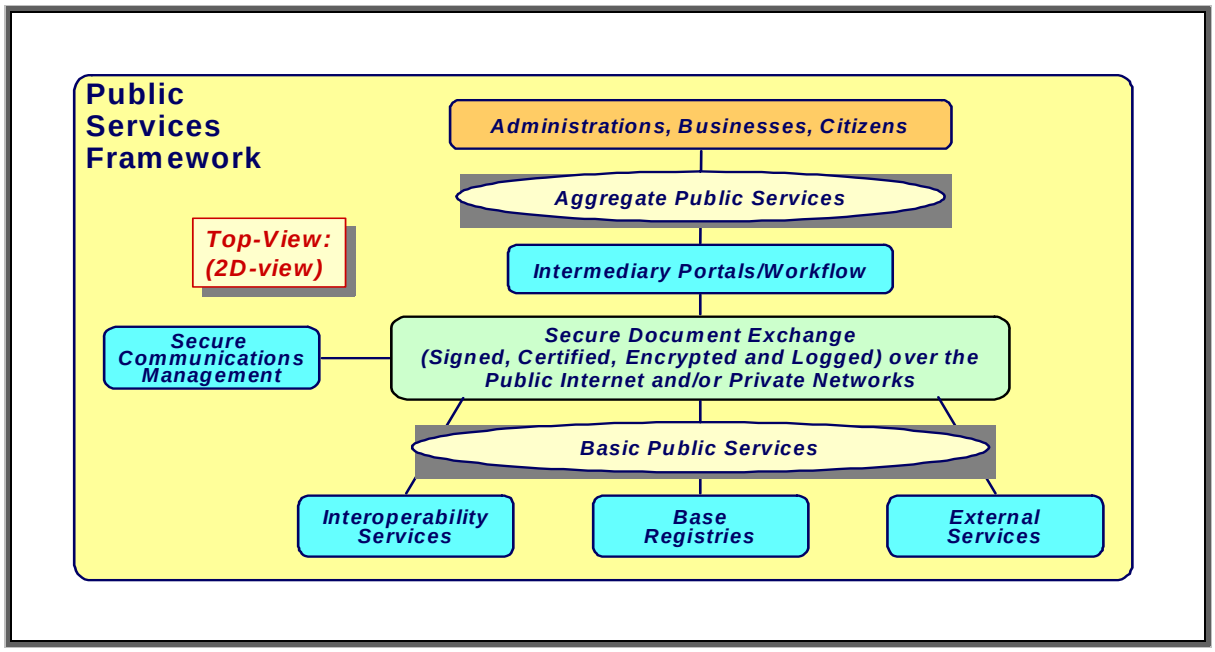


Figure 32 The Generic Public Services Framework

So, although this diagram is appears very simple, it implies all the details that have been indicated in the 3D-model of interoperable organizations. Yet, this diagram is sufficient to identify the main issues and barriers to interoperability and pan-European public services that need to be resolved in the near future by the Member States and industries, and facilitated by the European Commission.

Appendix D — Dissemination of Results

D.1 Basics for Communication

Why Effective Communication Is So Important

Interoperability is a dispersed subject throughout the European Union. There are various insights, believes and urges for priority. Besides this, it is currently not quite clear what entity is leading the interoperability subject in the EC. Furthermore, the discussion about the responsibilities and how to focus is an ongoing debate with mixed views which is not finished in short time.

This report is aiming at providing clarity, transparency and governance for interoperability.

The effectiveness of the communication of these results will have a significant impact on the decisions the EC will make about the role of EIF v2.0. For this reason it is of eminent importance to effectively communicate the vision for EIF v2.0 as expressed in this report.

Why Effective Communication Is So Complex

As the EC Directorate General offices and Stakeholder organizations are complex, relationships and communication are challenging. There are so many overloaded channels of communication that it becomes difficult to get people's attention.

These combined factors of complexity and importance mean that communicating with stakeholders requires more management consideration. It requires a higher priority and a different approach than has been applied up till now.

How to communicate

Gartner recommends the following:

- Apply a deliberate, structured and considered approach to communication.
  The basic principles of good communication are well-understood and have not changed. However, they are often not applied because they get forgotten or ignored. An Organization Communication Framework supporting credibility must lay out a deliberate and structured approach to communication that will substantially improve the quality, relevance and effectiveness of communication.
- Appoint a Communication Manager and apply best practices.
  It is important to assign the responsibility of building the communication strategy and executing it to a senior manager who comes from the IDABC Unit or the EC public relations team.
- Establish a Communication Framework for building shared interoperability priorities
  As we see, there are different mind-sets and approaches to establishing priorities and building the most appropriate program and portfolio of initiatives across Europe. This can result in ineffective communication, which can result in frequent priority changes and regrettably, no results. A Framework must be developed to provide to blend the analytical and intuitive approaches to setting priorities.
- Take Time to Understand Context
  One of the consequences of the complexity outlined earlier is greater contextual and cultural diversity. The emphasis, tone, style and channel of communication needs careful consideration based on a good understanding and analysis of the environment into which the communication is being targeted. For example, we look at

the different styles of communication in Europe and consider how they differ. There are important lessons here for identifying and dealing appropriately with cultural differences.

Understanding context also requires an understanding of the stakeholders. It should be clearly expressed what is important to them, what factors may influence their views or actions, what factors may influence their priorities and goals, who or what has greatest influence over them and where do they get their information?

D.2 Communication Framework

The Communication Framework is an integral part of EIF v2.0.

	Technical	EU administration	Business & Citizen
Strategic > 12 months	• Showcase demonstration	• Workshops • EU meetings	• Conferences • Member State workshops
Business cycle 3 to 12 months	• Planning meetings • Operational reviews	• Governance committees • Operational reviews	• External events • Negotiations
Operational < 3 months	• Service Quality reviews • Operational reviews	• Service Quality reviews • Operational reviews	• Monthly Service Quality reviews

Table 2 Communication Framework

Appendix E — List of Documents

Author	Title	Issued	Version
Enterprise DG	European Interoperability Framework for Pan-European e-government Services	2004	1.0
Enterprise DG	Architecture Guidelines, For Trans-European Telematics Networks for Administrations	September 2003	7.1
Enterprise DG	Architecture Guidelines, For Trans-European Telematics Networks for Administrations - Annexes	September 2004	7.1
EC	eEurope 2005: An Information Society for all - Action Plan	June 2004	FINAL
EC	eEurope 2005: An Information Society for all - Action Plan - Executive Summary	June 2004	FINAL
EC	Challenges for the European Information Society beyond 2005	November 2005	FINAL
EC	i2010 - A European Information Society for growth and employment	June 2005	FINAL
EC	IDABC Conference Papers and Proceedings	February 2005	FINAL
IDABC	IDABC Content Interoperability Strategy - Working Paper	September 2005	FINAL
IDABC	IDABC Semantic Interoperability Strategy - The European XML Clearinghouse	December 2005	FINAL
IDABC	Study on stakeholder requirements for pan-European e-government services (PEGSs)	February 2005	FINAL
IDABC	IDABC Work Program Third Revision - PCI Horizontal Measures	May 2006	FINAL
web	For the IDA work programs see http://ec.europa.eu/idabc/en/document/2548/3		
web	For the draft version of the EIF - See http://ec.europa.eu/idabc/en/document/3473/5887		
web	For the study on infrastructures for e-Government services - See http://ec.europa.eu/idabc/en/document/3759/556		
web	For 2005 February conference including The "Stakeholder Study" - See http://ec.europa.eu/idabc/en/document/3880/556		
web	For Communication on Interoperability - See http://ec.europa.eu/idabc/en/document/5316		
web	For i2010 e-Government Action Plan - http://europa.eu.int/information_society/eeurope/i2010/i2010/index_en.htm		

Author	Title	Issued	Version
	Related documents		
EC	IDABC Work Program	8-11-2005	Second Rev.
	Interoperability for Pan-European e-government Services,	13-2-2006	COM(2006) 45 final
	Proposal for Joint European effort of investigation on standards for national interoperability standards	-	-
	Technical Annex - Creating an XML-based Architecture for pan-European e-government Services: Harmonization of the IDA Architecture Guidelines (IDA-AG) with the European Interoperability Framework (EIF)		
Enterprise DG	From Interchange of Data between Administrations to Pan-European e-government Services: the way forward.	July 2003	
Enterprise DG	XML-AG, Harmonization of IDA-AG with EIF - Project Management and Quality Plan	18-2-2005	1.1
Enterprise DG	Preparing the Revision of IDABC Interoperability Guidelines: Work packages and Outline for a harmonised set of documents under the European Interoperability Framework for Pan-European e-government Services (EIF), including revised Architecture Guidelines (IDABC-AG)	2006	
	Contextual documents		
EU	Decision 2004/387/EC of the European Parliament and of the Council of 21 April 2004 on interoperable delivery of pan-European e-government services to public administrations, businesses and citizens (IDABC)		
EC	Council Decision 1995 95/468/EC of 6 November 1995 on IDA		
EC	Decision 1719/1999/EC of the European Parliament and of the Council of 12 July 1999 on		

Author	Title	Issued	Version
	IDA		
EC	Decision 2046/2002/EC of the European Parliament and of the Council of 21 October 2002 on IDA		
EC	The minutes and executive summaries of meetings of the IDABC management committee (dated 11/02/2004, 23/05/2005, 29/06/2005 and 08/12/2005)		
EC	Technical Working Group Summary of meetings (13 May 2005, 17 November 2005)		
EC	Multi-channel delivery of eGovernment services (June 2004) http://ec.europa.eu/idabc/servlets/Doc?id=16867		
Cap Gemini	Study on infrastructure for cross-border e-government services describing the necessary 'enabling' infrastructure services and the overarching architecture required to manage their development and interaction		
EC	Mid-term evaluation report of IDA II, Brussels, 07/03/2003, COM (2003) 100 final		
TietoEnator	IDA II Mid-term evaluation 2002, last printed 06/12/2003		
TEEC	End-term evaluation report of IDA II, 8 November 2005		
EU	Communication to the Spring European Council "Working together for growth and jobs, a new start for the Lisbon strategy" COM (2005)24 Final, 2 February 2005.		
EU	MODINIS - MODINIS Decision No 2256/2003/CE du Parlement européen et du Conseil du 17 novembre 2004 - Modinis Work program 2004, Work program 2005		
EU	eTen - Program based on the article 155, 156 and 157 of the EC Treaty whose objectives is to establish trans-European networks in the fields of transports, telecommunications and energy. - Work Program 2006, DG INFSO, 3 February 2006.		

Author	Title	Issued	Version
EU	IST (Information Society Technologies) FQ6 thematic priority − IST Work Program 2005-2006 fourth update 14 December 2000		
EU	eContentPlus - Decision N° 456/2005/EC of the European Parliament and of the Council of 9 March 2005 establishing a multinannual Community program to make digital content in Europe more accessible, usable and exploitable		
EU	- Competitiveness and Innovation framework Program (CIP 2007-2013)		
EU	- Proposal for a Decision of the European Parliament and of the Council establishing a Competitiveness and Innovation Framework Program (2007-2013) (presented by the Commission), Brussels, 6 April 2005 COM (2005) 121 final.C42		
EU	- eContent Final report for the Mid-Term evaluation of the eContent program, Technopolis Ltd. UK, IDATE France and PRISMA Greece, May 2003		
EU	- eTen program Intermediate evaluation, DG InfSo, IDATE France, Ramboll management, December 2004.		
Peristeras V., Tarabanis K.	The C4IF Interoperability Typology Framework, International Journal of Interoperability in Business Information Systems (IBIS), Vol. 1(1), pp. 61-72.		March 2006

Note 1	All documents are in the Gartner team library when indicated 'yes' in nSite
Note 2	All 'web' indicated documents can be found on EU IDABC or EU website

Appendix F — List of Interviewees

Name	Organisation	Date of interview
Peter REICHSTAEDTER	Member State expert for Austria	19-09-2006
Alexander SALOMON	Member State expert for Germany	19-06-2006
Miguel AMUTIO	Member State expert for Spain	22-09-2006
Michiel SCHOO	Member State expert for Netherlands	25-09-2006
Per-Olav GRAMSTAD Jeanette NIELSSON	Member State expert for Denmark	26-09-2006
Julia FERGER	DG Internal Market	12-10-2006
Giuseppe SINDONI	Eurostat, Head of Unit, ESTAT.B.3, Project officer	12-10-2006
Francois VERNADAT	DIGIT.B.2.IA, Chef de secteur - Interoperability and Architecture	13-10-2006
Colin FRASER	DIGIT B 3IT project leader	24-10-2006
Jenny THUNISSEN	Executive Director Dutch Tax and Customs Administration	04-09-2006
Harry VAN ZON	Head of eGovernment	23-11-2006
Dirk Jan VAN DE LINDEN	Coordinator Base Registries Netherlands	01-09-2006
Ineke SCHOP	Program Manager EGEM Netherlands	19-09-2006
Hans VAN DER BRUGGEN	Head of Eucaris, RDW	02-08-2006
Han DIEPERINK	InterAccess IT Service Provider	07-11-2006
Markku JUNKKARI	Administrative Director EASA	21-11-2006
Thierry BENIFLAH	Head of Unit EFSA	11-12-2006

Herman BRAND	Manager DG SANCO	10-01-2007
Isabel THOMAS	Head of Unit Cedefop	07-11-2006
Frans DE BRUINE	Director DG INFSO	19-12-2006
Francisco GARCIA MORAN	Director General DIGIT	24-01-2007 / 01-02-2007
Nico WESTPALM VAN HOORN	CIO Port of Rotterdam NV	13-03-2007
Gzim OCOKOGLU	IDABC member	05-04-2007
Christina MARTINEZ	DG INFSO	04-04-2007
Bent HAUSSCHILD	IDABC member	03-04-2007
Nicole KROON	NL Min.EZ, Directeur Strategie	06-04-2007

Appendix G — List of Member State visits

Member State	Member State Contact	Date of visit
Estonia	Uuno VALLNER	16/17-11-2006
Sweden	Karl WESSBRANDT	01-12-2006
United Kingdom	Geraldine LILLEY	20-11-2006
Austria	Peter REICHSTÄDTER	23-01-2007
Denmark	Per-Olav GRAMSTAD	13-12-2006
France	Pascal SOUHARD	24-01-2007
Netherlands	Michiel SCHOO	12-12-2006

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