

EUROPEAN INTEROPERABILITY FRAMEWORK FOR PAN-EUROPEAN eGOVERNMENT SERVICES



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1. INTRODUCTION

1.1. What is the European Interoperability Framework?

1.1.1. Goals

In June 2002, European heads of state adopted the eEurope Action Plan 2005 at the Seville summit. It calls on the European Commission “to issue an agreed interoperability framework to support the delivery of pan-European eGovernment services to citizens and enterprises”. This framework would address information content and recommend technical policies and specifications to help connect public administration information systems across the EU. The Action Plan also stipulated that the Framework would “be based on open standards and encourage the use of open source software”¹.

The present document establishes the European Interoperability Framework (EIF) to support the pan-European delivery of electronic government services. In particular, it will be the reference document on interoperability for the IDABC programme². The document represents the highest-ranking module of a comprehensive methodological tool kit for implementing pan-European eGovernment services. It will be further developed parallel to the progress and the emerging requirements of pan-European infrastructures and services.

1.1.2. Definitions and objectives

Interoperability means the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge.

An interoperability framework can be defined as a set of standards and guidelines that describes the way in which organisations have agreed, or should agree, to interact 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.

The European Interoperability Framework defines a set of recommendations and guidelines for

eGovernment³ services so that public administrations, enterprises and citizens can interact across borders, in a pan-European context.

The objectives of the European Interoperability Framework are:

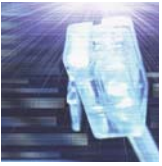
- To support the European Union's strategy of providing user-centred eServices by facilitating the interoperability of services and systems between public administrations, as well as between administrations and the public (citizens and enterprises), at a pan-European level.
- To supplement national interoperability frameworks in areas that cannot be adequately addressed by a purely national approach.
- To help achieve interoperability both within and across different policy areas, notably in the context of the IDABC programme and any other relevant Community programmes and initiatives.

The European Interoperability Framework 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 eGovernment services. To achieve this, it needs to complement national interoperability frameworks by providing a

¹ http://europa.eu.int/information_society/eeurope/2005/all_about/action_plan/index_en.htm

² 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://europa.eu.int/idabc/>)

³ In the Communication “The role of Government for Europe's future”, COM (2003) 567 final of 26 September 2003, eGovernment is defined as the use of information and communication technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes and strengthen support to public policies.



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.

In particular, the European Interoperability Framework should:

- Address the pan-European dimension of interoperability and provide an answer for the following questions: What is interoperability? Why is interoperability needed at the pan-European level? What are the implications of interoperability from the pan-European and national perspectives?
- Provide a description of the elements that have to be addressed for the interoperability of pan-European eGovernment services.
- Identify reference information that provides additional guidance on interoperability issues.
- Support the pan-European eGovernment projects and the related activities to be launched, notably in the context of the IDABC programme.

In so doing it will:

- Lead to the identification of a number of actions to be carried out by the Member States and the EU Institutions and Agencies in order to achieve interoperability.

1.1.3. Target groups

The target audience of the EIF are the managers of eGovernment projects in Member State administrations and EU bodies. Member State administrations should use the guidance provided by the EIF to add a pan-European dimension to their national eGovernment interoperability frameworks, thus enabling pan-European interoperability. European Institutions and Agencies⁴ should use the European Interoperability Framework for their operations with each other and with citizens, enterprises and administrations in the EU Member States.

1.1.4. Area of validity

The EIF focuses on supplementing, rather than replacing, national interoperability guidance by adding the pan-European dimension. In order to operate at pan-European level, a Member State administration must therefore already have a national interoperability framework or equivalent technical strategy for the delivery of eGovernment services in place⁵. The EIF can then provide the pan-European layer to the national framework (See also Section 3: Recommendations for National Interoperability Frameworks).

However, the recommendations and guidelines of the Framework and related documents, such as the IDABC Architecture Guidelines, are mandatory for pan-European projects carried out in the context of the IDABC programme.

RECOMMENDATION 1:

Member State administrations and EU Institutions and Agencies should use the guidance provided by this European Framework to introduce a **pan-European dimension** into their own interoperability frameworks and administrative infrastructures to enable interoperable pan-European eGovernment services. Adherence to the EIF should also be mentioned in the national interoperability frameworks.

For IDABC projects, the guidance provided by the EIF and related documents should be considered mandatory.

⁴ Proper account should nevertheless be taken of the sometimes “*sui generis*” nature of the European Institutions with regard to the Member State Administrations: The principle of “*extra-territoriality*” applies to many areas of the Institutions’ dealings with national administrations, which might require particular attention in such issues as handling data exchanges.

⁵ The institutions are governed by explicit and separate regulations concerning such matters as personal data protection and public access to information, rather than being covered by the provisions in law of a particular Member State.

1.2. Background information

There is a growing awareness that the interoperability of national public ICT infrastructures is a precondition for a more service-oriented and competitive public sector. Ever since the adoption of the Interoperability Decision⁶ of the European Council and the European Parliament in July 1999, the European Commission has focused on the pan-European dimension of eGovernment and on the interoperability requirements for its implementation.

One of the conclusions of the conference on pan-European eGovernment services at Sandhamn, Sweden⁷, was that:

“... to implement eGovernment services an agreed interoperability framework for Europe is a prerequisite. This is required to underpin the fast and efficient development of eServices. In addition to technology, this framework must also address both procedures and content”.

Similarly, the Ministerial Declaration issued at the European eGovernment conference in Como⁸, Italy in July 2003, co-organised by the Italian Presidency of the European Council and the European Commission, recognised that interoperability is central to the development of pan-European eGovernment services. It also stated that an agreed European Interoperability Framework was a necessary pre-requisite⁹. The Ministers also welcomed the Commission staff working paper on interoperability in support of eGovernment and restated their desire to see the Commission, in close cooperation with the Member States, deliver the interoperability framework for pan-European services by the end of 2003, as announced in eEurope 2005 Action Plan.

On the 26th of September 2003, the Commission issued a Communication to Council and Parliament on “The role of eGovernment for Europe's Future”¹⁰, which supports interoperability and the importance of an agreed European Interoperability Framework. In its meeting on the 20th of November 2003¹¹, the Council invited the Commission, the Member States and the Acceding States

“... to ensure that the creation, development and implementation of these [eGovernment] services

should be accompanied by joint actions to build up experience and validate advanced solutions concerning common approaches to key aspects of seamless pan-European eGovernment service provision such as accessibility, user identification, security, interoperability, including data definitions and procedures. As far as appropriate, pan-European eGovernment services should be integrated and interactive.”

The proposal from the Commission for a Decision on Interoperable Delivery of pan-European eGovernment Services to Public Administrations, Businesses and Citizens (IDABC) has been adopted by the Council and by the European Parliament on 21 April 2004¹². Following on from the IDA Programme, IDABC will continue to work on improving cooperation between public administrations and on supporting the delivery of pan-European eGovernment services to citizens and businesses, thus contributing to greater efficiency in both the public and the private sectors. Interoperability, and in particular the European Interoperability Framework, are key elements of the new programme to support the development of pan-European eGovernment services.

The present document therefore aims to meet the demands of the Council conclusions, of the new IDABC Decision and of the eEurope Action Plans for an interoperability framework for Europe's public administrations.

⁶ 1720/1999/EC: Decision of the European Parliament and of the Council of 12 July 1999 to adopt a series of actions and measures in order to ensure interoperability of, and access to, trans-European networks for the electronic interchange of data between administrations (IDA).

⁷ “eGovernment in the service of European citizens and enterprises - what is required at the European level”, Sandhamn, Sweden, 13 to 14 June 2001.

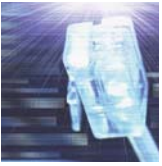
⁸ eGovernment Conference 2003, 7-8 July 2003, Villa Erba, Como (Italy) (http://europa.eu.int/information_society/eeurope/egovconf/index_en.htm).

⁹ Ministerial Declaration, European eGovernment Conference 2003 (http://europa.eu.int/information_society/eeurope/egovconf/doc/ministerial_declaration.pdf).

¹⁰ COM(2003) 567

¹¹ 14671/03 (Presse 327), 2543th Council meeting - Transport, Telecommunications and Energy - Brussels, 20 November 2003

¹² 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)



1.3. Underlying principles

The eEurope Action Plan 2005 as well as the Decisions of the European Parliament, the Council and the Commission quoted above have adopted and promote a set of general principles which should be respected for any eGovernment services set up at a pan-European level.

Accordingly, the considerations and recommendations of the European Interoperability Framework are based on the following principles:

- **ACCESSIBILITY**

There is a need to ensure that eGovernment creates equal opportunities for all through open, inclusive electronic services that are publicly accessible without discrimination. Generally accepted design principles for interfaces should be applied in order to ensure access for disabled persons and offer support in a language understood by the user. The Web Accessibility Guidelines established by the Web Access Initiative of the World Wide Web Consortium should be taken into account.

Issues such as socio-economic disparities between regions and groups of citizens should also be addressed. In terms of eInclusion, a multi-channel approach should be considered in order to render the services available to citizens and enterprises through several different communication means (kiosks, web-TV, mobile connectivity, etc.).

- **MULTILINGUALISM**

In Europe, a vast variety of languages are used extensively in services today. At the presentation level (front office and web pages on the Internet - the level at which citizens and enterprises are to interact with administrations), language is clearly a major factor in the effective delivery of trans-European eGovernment services.

At back-office level, the underlying information architectures should be linguistically neutral, so that multilingualism does not become

an obstacle to the delivery of eGovernment services. If neutrality is not feasible (i.e. in XML-schemes), provisions should be made in order to facilitate translation mechanisms.

- **SECURITY**

Overall, the reliable exchange of information takes place in conformity with an established security policy. This is achieved by conducting appropriate risk assessment activities prior to the set-up of the services and the appropriate security measures.

This principle applies equally well to the information exchange at pan-European level. In this case, the administrations concerned will need to consider their own security policy and come to an agreement on a common security policy at pan-European level. In particular, for document classification at EU level and related security measures, the Council's security regulation¹³ applies.

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

- **PRIVACY (PERSONAL DATA PROTECTION)**

Pan-European eGovernment services need to ensure uniform levels of personal data protection, including measures in which individuals have the right to choose whether their data may be used for purposes other than those for which they originally supplied the data in question¹⁴. Appropriate information regarding the data

¹³ OJ L 101/1 - COUNCIL DECISION of 19 March 2001 adopting the Council's security regulations (2001/264/EC), see also OJ L 137/1 COMMISSION DECISION of 29 November 2001 amending its internal Rules of Procedure (notified under document number C(2001) 3031) (2001/844/EC, ECSC, Euratom)

¹⁴ The European Court of Justice has emphasised in its recent judgement of 20 May 2003 in the *Rechnungshof* case the importance of the cumulative application of articles 6 and 7 of Directive 95/46/EC

processing activities should be made available to the concerned individuals. Full compliance with the existing European and national data protection legislation should be ensured¹⁵.

In particular, work on interoperability should be coordinated with the mechanisms already in place following the Directive 95/46/EC¹⁶ (in particular article 29). When available, technologies that are privacy-compliant and privacy-enhancing should be used.

- **SUBSIDIARITY**

The guidance provided by the European Interoperability Framework is concerned with the pan-European level of the services. In line with the principle of subsidiarity, the guidance does not interfere with the internal workings of administrations and EU Institutions. It will be up to each Member State and EU Institution to take the necessary steps to ensure interoperability at a pan-European level.

- **USE OF OPEN STANDARDS**

To attain interoperability in the context of pan-European eGovernment services, guidance needs to focus on open standards¹⁷. The following are the minimal characteristics that a specification and its attendant documents must have in order to be considered an open standard:

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

- There are no constraints on the re-use of the standard.

RECOMMENDATION 2:

The following **principles**, of a general nature, should be considered for any eGovernment services to be set up at a pan-European level:

- Accessibility
- Multilingualism
- Security
- Privacy
- Subsidiarity
- Use of Open Standards
- Assess the benefits of Open Source Software
- Use of Multilateral Solutions

15 Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)

16 Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data

17 The term 'standard' is here used in its broadest sense: it includes all specifications, having gone through a standardisation process, which is compliant with the principles outlined above.

The Directive 98/34/EC, which lays down a procedure for the provision of information in the field of technical standards and regulations, defines a standard as a technical specification approved by a recognised international, European, or national standardisation body. All standard-related definitions will be analysed in 2005 in the framework of the review of the Directive 98/34/EC.

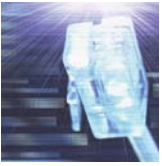
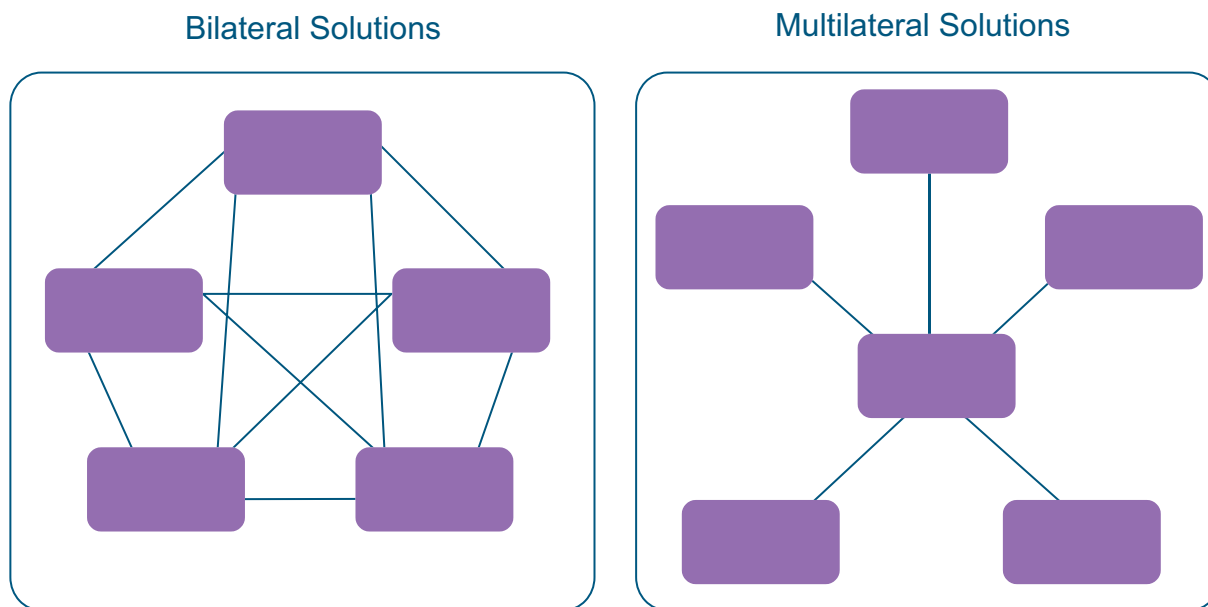


FIGURE 1: USE OF MULTILATERAL SOLUTIONS



- **ASSESS THE BENEFITS OF OPEN SOURCE SOFTWARE**

Open Source Software (OSS) tends to use and help define open standards and publicly available specifications. OSS products are, by their nature, publicly available specifications, and the availability of their source code promotes open, democratic debate around the specifications, making them both more robust and interoperable. As such, OSS corresponds to the objectives of this Framework and should be assessed and considered favourably alongside proprietary alternatives.

- **USE OF MULTILATERAL SOLUTIONS**

In a multi-actor environment, one way to achieve interoperability is to consider different solutions according to the exchange partner one has to communicate with, leading to bi-lateral solutions and agreement. The net effect (and disadvantage) of such an approach is that it requires as many communications as there are external partners, resulting in less efficiency and higher costs. On the

other hand, if each of the interoperating partners adopts the same set of agreements for interoperability solutions, each of them can reap the benefits of a single solution that is developed once and fits the needs of all.

1.4 Context and governance

The following figure provides an overview of the main aspects, actors and the working context of the European Interoperability Framework.

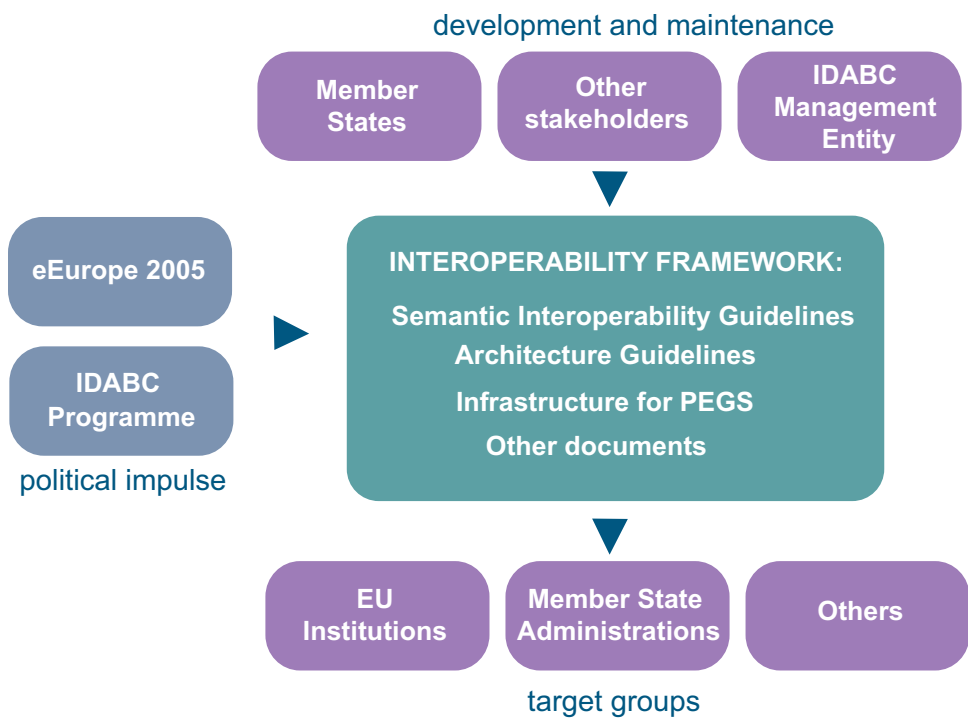
- The context: The Interoperability Framework forms part of a set of documents and studies destined to support the implementation of pan-European eGovernment services. Whereas the EIF is intended to give an outline and set general principles for pan-European cooperation, the IDA(BC) Architecture Guidelines - and other documents foreseen in the IDA(BC) Work Programme - aim at practical guidance and the building of common standards and infrastructures needed for the implementation of interoperability.
- Actors and partners: IDABC, Member States, EU Institutions and other stakeholders (such as citizen organizations) have been actively involved in the development of the Framework and Guidelines and will continue to be in the future.
- Target groups: IT-community members working

in the public institutions as well as the business sector delivering eGovernment services.

The Interoperability Framework remains a work-in-progress for the time being. It will be improved and developed along with the building of pan-European eGovernment services and in response to the challenges of the evolving of new technologies. The Framework will be subject to a continuous consultation process with Member States and other stakeholders, which will produce an update at least once a year.

The maintenance of the EIF and related papers is going to be a long-term task. Institutional support and well-defined workflows are needed in order to guarantee the consistent development of the Framework. In recognition of this need the IDABC Programme intends to implement the organisational infrastructure ("management entity"). This infrastructure will be the subject of a pilot study and discussed in a separate document. In the meantime, maintenance of the EIF will be conducted by the IDABC Programme.

FIGURE 2: CONTEXT AND ACTORS



2. THE FRAMEWORK: THE BASICS OF PAN-EUROPEAN INTEROPERABILITY

2.1. Scope

2.1.1. Interaction types

In the most general form of interoperability, the following three interaction types that cover most of the current trans-border eGovernment services can be defined (see figure 3):

- Direct interaction between citizens or enterprises of one particular Member State with administrations of other Member States and/or European institutions.
- The exchange of data between administrations of different Member States in order to resolve cases that citizens or enterprises may raise with the administration of their own country.
- The exchange of data between various EU Institutions/Agencies or between an EU

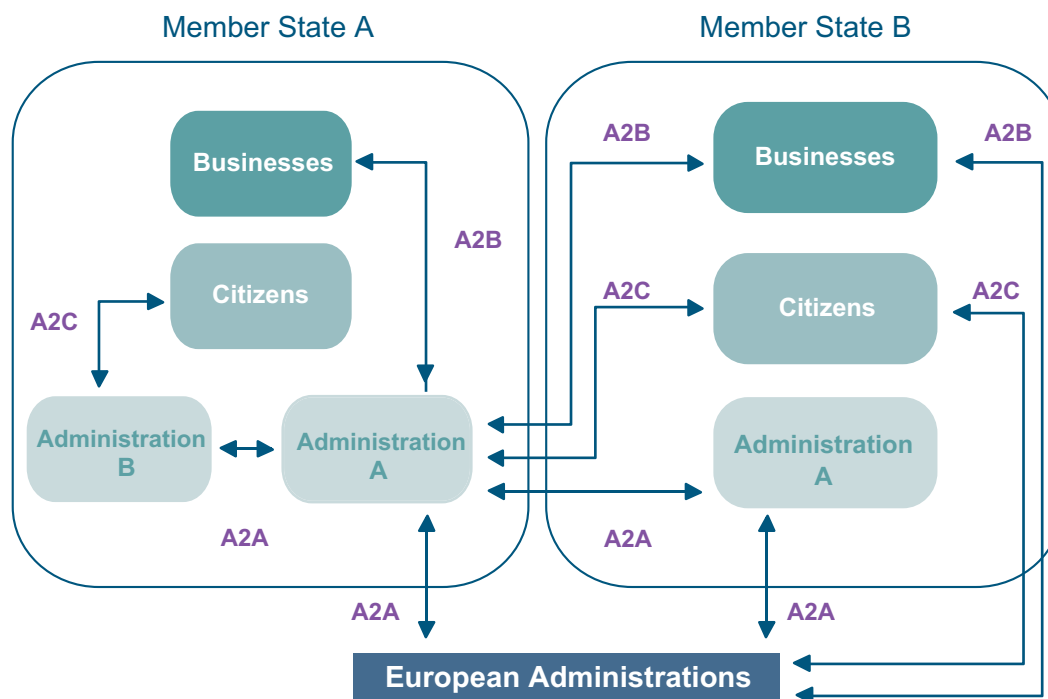
Institution/Agency and one or more administrations of Member States.

The first interaction type (see figure 4) comprises those government eServices that are provided to citizens or enterprises at national level, but that may also be of interest to citizens or enterprises located in other countries - on account of requirements such as freedom of movement of people and goods.

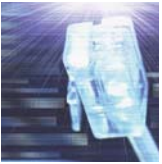
Case 1

A web-based job search service provided by a labour agency based in a European region can be used by job seekers to find job vacancies and to submit a CV summary or by employers to post a job vacancy or search for suitable CVs.

FIGURE 3: COMPLEX INTERACTIONS



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



The supporting system features a service to alert an applicant via e-mail when opportunities arise, or an employer when a suitable CV is available. Designed to serve a national community, this service is in fact of interest to the wider EU community, i.e. to any enterprise or any individual wishing to settle in that region.

To reach its potential EU-wide audience, this sample service needs to fulfil a wider set of requirements than a service that is designed for national requirements only. This implies that:

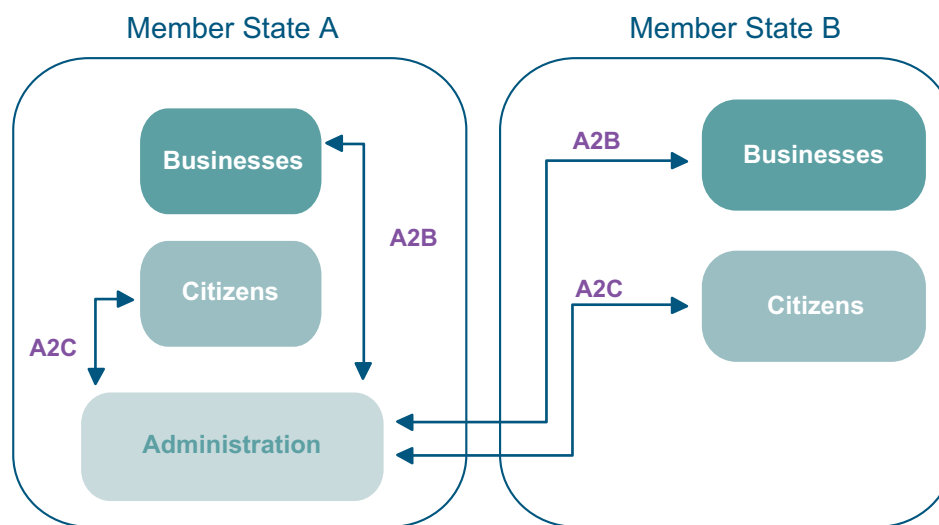
- The service needs to be available in a language that can be understood by potential users who may be residing in any one of the Member States.

At a pan-European level, this interaction type requires interoperability and the exchange of information between administrations in different Member States.

Case 2

An employee with a long record of working in different Member States is retiring and needs to apply for a pension. To do so, the employee uses a web service provided by the local social security agency. In order to address the request submitted by the employee, the local social security agency needs to connect with all agencies (in each of the countries in which the employee has paid pension funds) to collect the data needed for the calculation of the employee's pension scheme.

FIGURE 4: INTERACTION WITHIN AND ACROSS BORDERS



- Rules for defining a CV or job vacancy record should be formulated in a manner that is equally acceptable for all Member States.

The second interaction type (see figure 5) takes the simple interaction scenario a step further because it involves processes in which multiple organisations play a role. In a typical example, a citizen or an enterprise accesses a government eService to receive information, to submit information (e.g. an application) or to perform a fully-fledged administrative transaction that triggers a complex process involving multiple authorities.

The requirements imposed by this case include:

- The user needs to be identified and their identification then needs to be accepted/recognised by all administrations involved.
- To allow the matching of data, a high degree of standardisation is required in terms of the relevant data structures and the semantic components.
- Agreements must be made between the different administrations regarding the authen-

THE FRAMEWORK: THE BASICS OF PAN-EUROPEAN INTEROPERABILITY

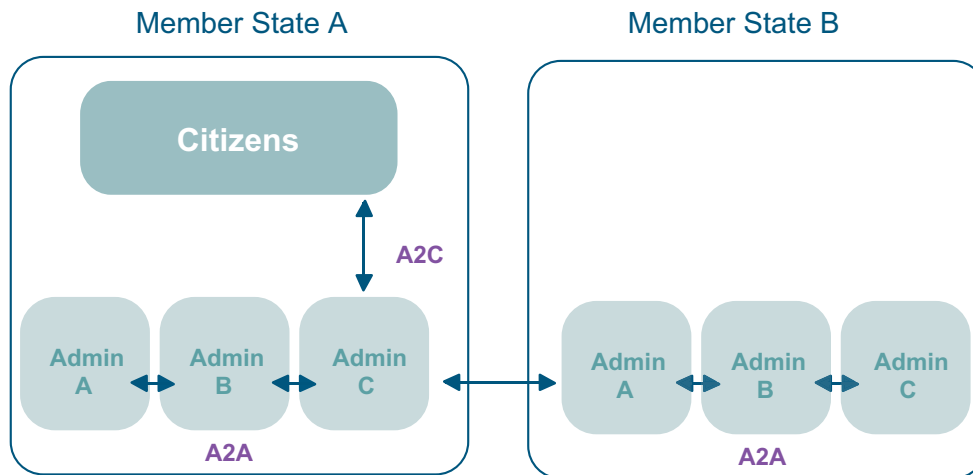
tication of the sending and the receiving party, the accountability of the data transmitted and received, the appropriate security levels and the procedures and mechanisms to be used in this respect.

- Agreements for data exchange with administrations other than the social security agencies (e.g. tax departments) must also be made.

This case involves the regular collection, processing and delivery of large amounts of data from and to administrations located anywhere in the European Union. In addition to the pan-European dimension, high levels of reliability and security are of crucial importance. The requirements imposed by this case therefore include:

- To allow the matching of data, a high degree of

FIGURE 5: CROSS-BORDER INTERACTION BETWEEN ADMINISTRATIONS



The third interaction type (see figure 6) concerns the case of the sectoral networks of administrations (such as the ones dealt with by the IDA(BC) Programme), where a legal basis requires that the Member State administrations collect, exchange, and share data together and with EU Institutions and Agencies.

Case 3

National statistical agencies in each of the Member States must submit statistical data to Eurostat on a regular basis. Eurostat processes the data and then makes it available to its customers, which include a large number of Member State administrations.

standardisation is required in terms of different national statistical data dictionaries.

- Agreements must be made between the Member States and Eurostat regarding the authentication for the sending and the receiving party, the accountability of the data transmitted and received, the appropriate security levels, and the procedures and mechanisms to be used in this respect.
- The service needs to be available in a language that can be understood by potential users, who may be residing in any one of the Member States.

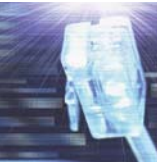
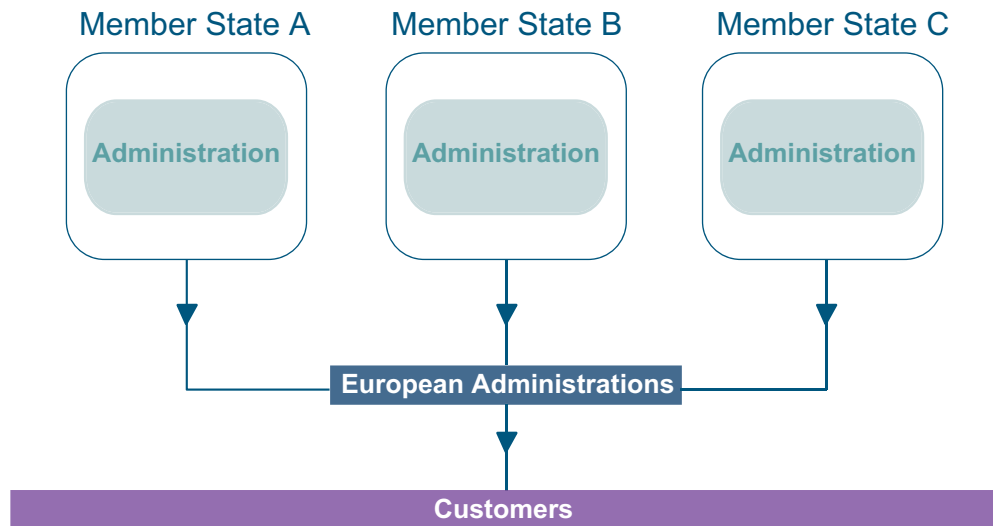


FIGURE 6: INTERACTION BETWEEN NATIONAL AND EUROPEAN ADMINISTRATIONS



2.1.2. Dimensions of Interoperability

Three aspects of interoperability need to be considered:

- **ORGANISATIONAL INTEROPERABILITY**

This aspect of interoperability is concerned with defining business goals, modelling business processes and bringing about the collaboration of administrations that wish to exchange information and may have different internal structures and processes. Moreover, organisational interoperability aims at addressing the requirements of the user community by making services available, easily identifiable, accessible and user-oriented.

- **SEMANTIC INTEROPERABILITY**

This aspect of interoperability is concerned with ensuring that the precise meaning of exchanged information is understandable by any other application that was not initially developed for this purpose. Semantic interoperability enables systems to combine received information with other information resources and to process it in a meaningful manner. Semantic interoperability is therefore a

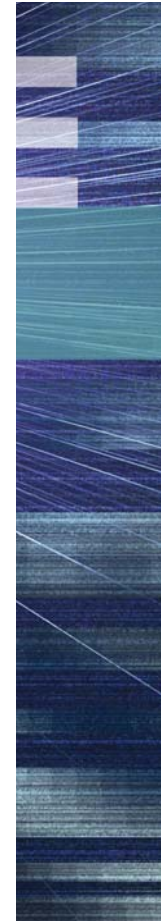
prerequisite for the front-end multilingual delivery of services to the user.

- **TECHNICAL INTEROPERABILITY**

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

RECOMMENDATION 3:

Setting-up eGovernment services at a pan-European level requires the consideration of interoperability issues with regard to organisational, semantic and technical viewpoints.



2.2. Key interoperability areas

2.2.1. Organisational interoperability

To bring public administrations closer to citizens and enterprises, Member States make use of “life events” for citizens (e.g. getting married) and “business episodes” (e.g. founding a company) for enterprises. In doing so, citizens and enterprises can remain focused on their needs instead of having to deal with the specific functional organisation of the public sector; the service delivery is customer-oriented, transparent, and it follows the so-called one-stop shop approach.

Each life event or business episode is then associated with the relevant actions and interactions with and between the public administrations. In the context of eEurope, this translates into defining eGovernment services available to citizens and enterprises and the subsequent business processes that have to be performed by the public administrations.

Member States have agreed on a common list of twenty public services (12 for citizens and 8 for enterprises) for which the online sophistication is being benchmarked at national level¹⁸. Such a list does not yet exist for eGovernment services to be provided at pan-European level, but comparable information on this topic is expected to result from of an ongoing IDA study¹⁹.

eGovernment services hide the level of complexity lying behind the service offered to the citizen and enterprises. Depending on the way public administrations are organised, a given eGovernment service may imply either a single process or several business processes to be performed in a given sequence between different administrations. This is true at both national level and pan-European level, which is the concern of the EIF. eGovernment services provided in a pan-European context will rely upon the interaction between public administrations from different Member States and EU Institutions.

PUBLIC SERVICES FOR CITIZENS (BENCHMARKED AT NATIONAL LEVEL)

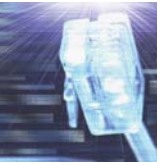
- 1 Income taxes: declaration, notification of assessment
- 2 Job search services by labour offices
- 3 Social security contributions (3 out of the following 4)
 - Unemployment benefits
 - Child allowances
 - Medical costs (reimbursement or direct settlement)
 - Student grants
- 4 Personal documents (passport and driving licence)
- 5 Car registration (new, used and imported cars)
- 6 Application for building permission
- 7 Declaration to the police (e.g. in case of theft)
- 8 Public libraries (availability of catalogues, search tools)
- 9 Certificates (birth, marriage): request and delivery
- 10 Enrolment in higher education / university
- 11 Announcement of moving (change of address)
- 12 Health related services (e.g. interactive advice on the availability of services in different hospitals; appointments for hospitals)

PUBLIC SERVICES FOR BUSINESSES (BENCHMARKED AT NATIONAL LEVEL)

- 1 Social contribution for employees
- 2 Corporation tax: declaration, notification
- 3 VAT: declaration, notification
- 4 Registration of a new company
- 5 Submission of data to statistical offices
- 6 Customs declarations
- 7 Environment-related permits (including reporting)
- 8 Public procurement

¹⁸ The European Commission has published it on(http://europa.eu.int/information_society/europe/2002/action_plan/pdf/basicpublicservices.pdf)

¹⁹ Survey of stakeholder requirements for pan-European eGovernment services.



For example, if a citizen of Member State A marries a citizen of Member State B, this should trigger an event 'marriage / change of civil status' in the Member State where the marriage occurs. Processing the event will result in the change of the citizens' civil status being recorded in various administrative systems of this Member State. For example, getting married may alter one's taxation status, entitlement to social welfare, etc.

While automatic modification of status would be achieved within a Member State if the participating administrative systems (e.g. taxation, social welfare) implement their national interoperability framework, change of its citizen's civil status would not be registered in another Member State's information systems unless the respective national administrative systems interoperate.

RECOMMENDATION 4 (ORGANISATIONAL):

The requirements for pan-European eGovernment services should be jointly determined by the participating administrations via a demand-driven approach²⁰. This should lead to the identification and prioritisation of services to be provided at pan-European level²¹.

The subsidiarity principle enforces decentralised responsibility. Decentralised responsibility involves the capability for each partner concerned to organise its business processes in a way best suited to its practices at national level. Consequently, it is unrealistic to believe that administrations from different Member States will be able to harmonise their business processes because of pan-European requirements. Indeed, steps and processes that are internal to a particular Member State can remain unchanged provided that "entry and exit points" to these processes are made transparent to and interoperable with the other Member States involved. The key to organisational interoperability is therefore to identify and document those "business interoperability interfaces" (BII) through which the administrations from different Member States will be able to interoperate at pan-European level for a given eGovernment service.

The following figure (see figure 7) provides an illustration of the concept of BII in the case of a request addressed to one administration (Member State A), which implies information to come from another Member State as well (Member State B). From an organisational point of view, such a request is allowed when the administrations involved have agreed in advance on

- Which pan-European eGovernment services they contribute to,
- Which business processes are involved, and
- Which administrations will provide the BII functionality to interconnect the 'national' business processes which might be completely different (from organisational, semantic and technical points of view).

RECOMMENDATION 5 (ORGANISATIONAL):

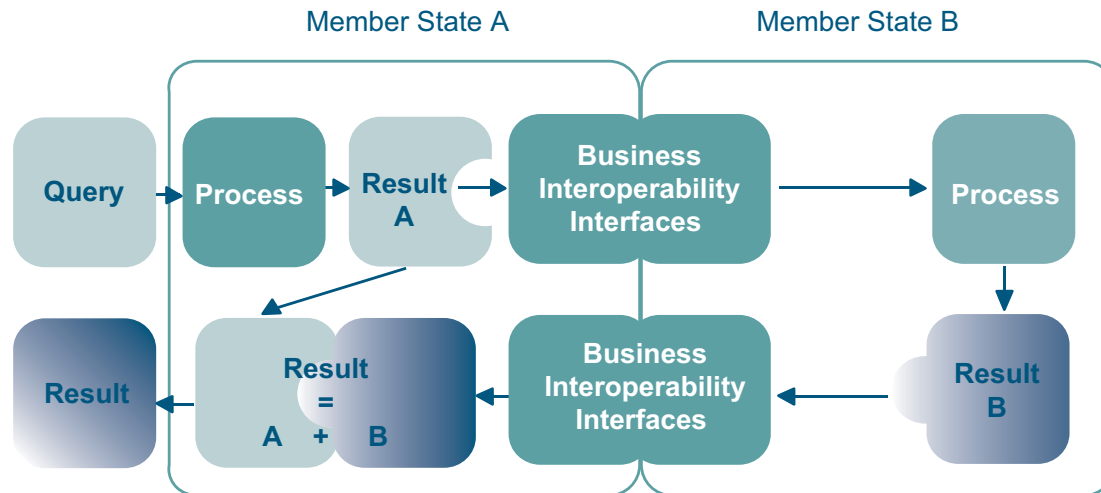
Public administrations that consider setting up eGovernment services with a pan-European dimension should analyse the related business processes and actors to be involved. They should agree on the necessary Business Interoperability Interfaces (BII) through which their business processes will be able to interoperate at pan-European level and the definition of common BII standards should be studied.

²⁰ The recent Communication "Public Services for Europe's Future: the Role of eGovernment" (SEC(2003) 1038) recognised the importance of a demand-driven approach. (http://europa.eu.int/information_society/europe/2005/all_about_e-government/index_en.htm)

²¹ Demand can be determined from the views of citizens and enterprises, e.g. in co-operation with Eurobarometer (http://europa.eu.int/comm/public_opinion), with Citizen Signpost Service (http://europa.eu.int/citizensrights/signpost/front_end/signpost_en.htm) et al., and also from the investigation of the practical problems that occur when citizens and enterprises try to relocate or trade across Europe's borders, e.g. in cooperation with SOLVIT (http://europa.eu.int/comm/internal_market/solvit/index_fr.htm) and the Euro Info Centres (<http://europa.eu.int/comm/enterprise/networks/eic/eic.html>).

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FIGURE 7: BUSINESS INTEROPERABILITY INTERFACES



In addition, the cooperating public administrations have to consider the contributions and commitment they require from each other in order to provide an acceptable level of quality and security to the customer. To address these requirements with confidence, public administrations will need to enter into some sort of agreement that gives assurance to all parties (e.g. service level agreements on timely delivery, on quality, on data protection, on security measures, etc.).

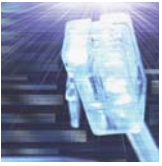
RECOMMENDATION 6 (ORGANISATIONAL):

Where the provision of a pan-European eGovernment service requires contribution from several public administrations across Europe, the respective expectations should be formalised, for example by means of service level agreements. Such agreements should at least be considered between the different business interoperability interfaces (BII) concerned (at pan-European level). In addition, a common security policy should be agreed upon.

2.2.2. Semantic interoperability

To move from simply presenting information to where computer programmes can exchange it, combine it with other information resources and subsequently process it in a meaningful manner, requires agreement on a wide variety of issues that relate to the context within which the information is created and used. This is the subject of semantic interoperability. It entails agreement on, for example, ways to discover, represent and give a context to information. This will allow automated tools to share and process information, even when they have been designed independently. The objective is not only to allow information resources to be linked up but also to allow information to be automatically understandable, and, consequently, reusable by computer applications that were not involved in its creation²².

²² In eGovernment this would, for example, allow a computer application in one Member State administration to access an information resource of another Member State administration to validate the taxation status of an enterprise from that Member State or to check the eligibility for social welfare of a citizen from another Member State. It could do this with the same ease as it could check the taxation status of nationally registered enterprises or the eligibility of its own citizens, without any foreknowledge of the way the information is created or used by the other national administration. Similarly, the technical and semantic interoperability of geographic information, for example, would enhance trans-border intra-agency cooperation, environmental monitoring and the coordination of disaster relief.



In the context of the 2005 target of eGovernment services, semantic interoperability concerns the need to agree on common definitions and understanding for the pieces of data that will need to be exchanged on a pan-European level.

Solving semantic interoperability is an activity to be done at the sectoral level, i.e. within a specific eGovernment service, taking into account the life event or business episode it serves. However, it is most likely that a common set of data items (the core eGovernment data elements such as basic national identifiers of enterprises, citizens and administrations) may need to be identified at a pan-European level. This will require the implementation of organisational as well as technical infrastructures.

RECOMMENDATION 7 (SEMANTIC):

For each eGovernment service considered at a pan-European level, the data elements to be exchanged should be made interoperable by requiring

- The responsible administrations to publish information on the corresponding data elements involved at national level.
- The responsible administrations to draft proposals for and agree on the data and the related data dictionaries required at pan-European level. This work should be performed on the basis of core eGovernment data elements common to all pan-European eGovernment services. The sector-specific eGovernment data elements should then be defined and agreed upon.
- The responsible administrations to draft proposals for and agree on multilateral mapping tables between the various national and pan-European data elements.

An essential requirement for the exchange of information is a single language that enables the description of the meaning and structure of the underlying data, i.e. a mark-up language. In the

context of current technologies and market developments this mark-up language is XML. However, XML does not, and cannot by itself, guarantee or deliver semantic interoperability. This is achieved through initiatives to develop common semantics on the basis of XML. The subsequent introduction of XML schemas and related artefacts (e.g. metadata, ontologies, etc.) then make it possible to integrate services that were developed with different vocabularies and with different perspectives on the data.

RECOMMENDATION 8 (SEMANTIC):

When considering semantic interoperability, due account should be taken of linguistic traces of the specific legal vocabularies used in delivering services. In the European Union's legal and social framework, there is a presumption of linguistic equivalence in directives and regulations that are approved as part of the legislative process. This implies that vocabulary used in European law subsequently finds itself used in the delivery of eGovernment services on the national level. This may require pan-European harmonisation.

RECOMMENDATION 9 (SEMANTIC):

Initiatives at pan-European level to develop common semantics on the basis of XML should be performed in a coordinated way and should consider cooperation with the existing standardisation bodies. In particular, the XML vocabularies should be developed whilst taking into account the agreed core/specific eGovernment data elements. Specific European schemas and definitions should be made available to all pan-European stakeholders through common infrastructures ²³.

²³ The IDA Work Programme includes a feasibility study to investigate the functionalities and resources needed.

2.2.3. Technical interoperability

Internet-based services, including government eServices are available in a myriad of forms and appearances and offer a variety of interaction types, ranging from simple websites to interactive ways of doing business. In the context of eGovernment services, a commonly used classification of these interaction types distinguishes the following sophistication levels:

- Stage 1: Online services only provide information. The consumer can read this information online or download it.
- Stage 2: Forms are available online. These can be downloaded and returned by post, fax or e-mail.
- Stage 3: Individual transactions between an administration and an enterprise or citizen are possible. Forms can be completed online and orders can be placed and paid for.
- Stage 4: Multiple transactions are possible, services are integrated and transactions between administrations and enterprises and citizens are fully automated.

Although each of these levels describes eServices, the most challenging requirements for electronic interoperability are at the fourth level. Stage 1 and Stage 2 mainly concern the interaction of the eGovernment service with the user (front-office) where there is no automated electronic processing of the forms performed, whilst Stage 3 and especially Stage 4 involve background electronic processing of the information provided and possibly electronic interactions with external systems from other administrations and/or from enterprises (back-office interoperability).

The main focus of Stage 1 / Stage 2 services is the provision of information to citizens and enterprises. Examples of such eGovernment services at EU level include EURES²⁴, PLOTEUS²⁵, COWEBS²⁶, SOLVIT²⁷, TRIS²⁸, SIMAP²⁹, and the Your Europe portal³⁰ that provides information on cross-border public services in Europe.

The most common way to delivering eServices to citizens is to set up a portal in front of the government applications, although mobile phones, PDAs etc. are also becoming increasingly important. The portal handles the communication with the users (user identification and authentication, presentation of a coherent view of the multitude of government services involved, provision/collection of data to/from the user, communication with the government applications, etc.).

Additional portal components include forms servers and distributed content management systems. The communication between the portal and the applications, or between the application themselves, is then provided by specific middleware components which ensure the interoperability between the diverse systems. See for example some middleware solutions considered in Sweden³¹ and Germany³², where Stage 3 / Stage 4 services are dealt with. In the context of pan-European eGovernment services, this means connecting applications which belong to different administrations and which are located in different Member States. The following figure considers the most complex interaction type (Stage 4) that encompasses the other models.

²⁴ EURES - European-wide job search portal: (<http://europa.eu.int/eures>)

²⁵ PLOTEUS, training opportunities database: (<http://europa.eu.int/ploteus>)

²⁶ COWEBS - the social security portal for migrant workers: (<http://europa.eu.int/idabc/en/document/1438>)

²⁷ SOLVIT solving administrative obstacles in cross-border procedures: (http://europa.eu.int/comm/internal_market/solvit)

²⁸ TRIS 98/34 information site concerning national technical regulations : (http://europa.eu.int/comm/enterprise/tris/index_en.htm)

²⁹ SIMAP - systeme d'information pour les marches publics : (<http://simap.eu.int/FR/pub/src/welcome.htm>)

³⁰ Your Europe: (<http://europa.eu.int/public-services/>)

³¹ SHS: (<http://www.statskontoret.se/shs/pdf/1-1documentation.pdf>)

³² OSCI: (<http://www.osci.de/>)

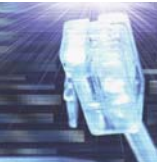
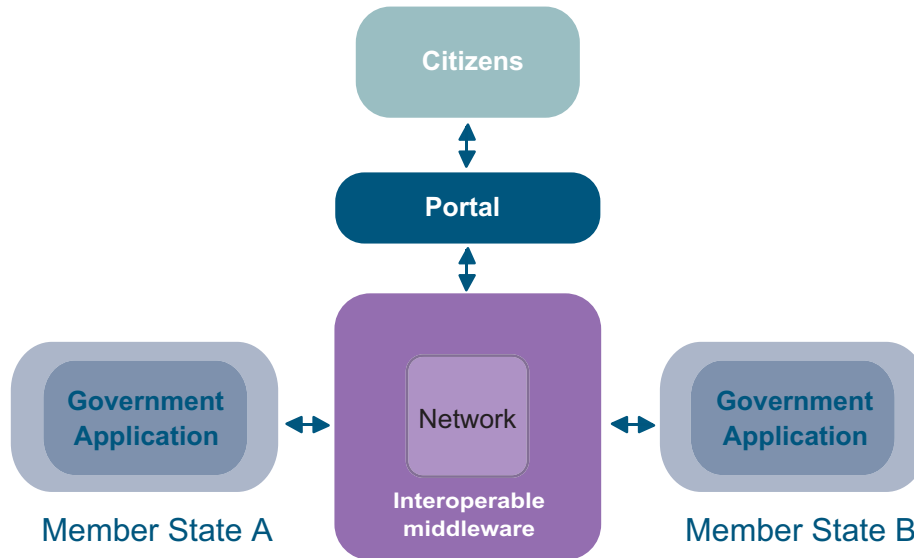


FIGURE 8: COMPLEX INTERACTION THROUGH A PORTAL



Another way to enable communication between enterprises and public administrations is to directly interconnect their respective applications with adequate middleware components. For example, a statistical application in an enterprise which automatically sends the required statistics to the National Statistics Institute, or an enterprise accounting system which sends tax declarations to the Finance Administration. Once again, this concerns back-office interoperability.

RECOMMENDATION 10 (TECHNICAL):

At front-office level, technical interoperability aspects should be considered for the following fields:

- Data presentation and exchange
- Accessibility - Interface design principles
- Multi-channel access
- Character sets
- Collective authoring
- File type and document formats
- File compression

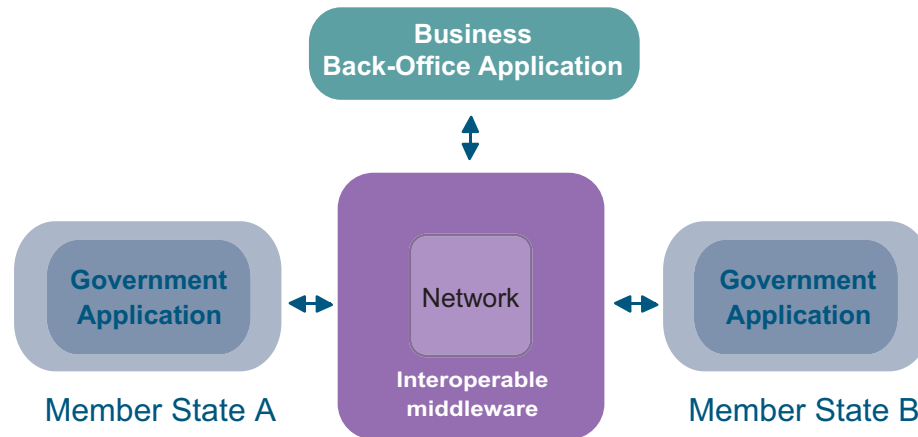
RECOMMENDATION 11 (TECHNICAL):

At back-office level, technical interoperability aspects should be considered for the following fields:

- Data integration and middleware
- XML-based standards
- EDI-based standards
- Web Services
- Distributed Application Architecture
- Interconnection services
- File and message transfer protocols
- Message transport and security
- Message store services
- Mailbox access
- Directory and domain name services
- Network services

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FIGURE 9 : INTERACTION FROM MIDDLEWARE TO MIDDLEWARE



RECOMMENDATION 12 (TECHNICAL):

Security aspects to be considered concern all layers:

- Security services
- General security services - PKI
- Web service security
- Firewalls
- Protection against viruses, worms, Trojan horses and e-mail bombs

Indeed, it is only with the recent development and ubiquity of 'Internet-type' technologies, based on universally agreed open standards and specifications, that it has been possible to achieve a high degree of technical interoperability. The Internet itself is a good example of this, where computers and information resources all over the world can link up, present data in a universally readable format and exchange e-mails by simply respecting protocols such as TCP/IP, HTTP and S/MIME.

A comparative analysis of the standards and specifications mentioned in the national interoperability frameworks (eGIF) of France³³, Germany³⁴ and the United Kingdom³⁵ was performed before this framework was drafted. The comparison considered

the key technical aspects and showed a large degree of conformity in the technical choices that the countries have made at national level.

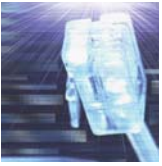
There is a commonality of standards for transport (e.g. networking LAN/WAN) and for presentation (e.g. file / hypertext / message transfer / character sets) of information. There is also a high degree of commonality in standards for domain naming, web browsers and viewers. This is because the national eGIFs, in effect, implement Internet standards at these levels. The use of the XML family of standards is recommended in national eGIFs for data integration. This is usually supplemented with recommendations for supporting standards such as UML or RDF for data modelling, XSLT for data transformation, Dublin Core (possibly with national extensions) for metadata, etc. Some Member States also make reference to the interoperability of Web Services.

These results provide for a very positive and favourable technical ground to the establishment of interoperable pan-European eGovernment services. The technical solutions adopted for such services will need to respect the capability of each partner concerned to organise their data processing systems and networks in the way that is best suited to their practices (i.e. technological approach, legal frame-

³³ (<http://www.adae.pm.gouv.fr>)

³⁴ (<http://www.kbst.bund.de>)

³⁵ (<http://www.govtalk.gov.uk>)



work, principles of management, etc.). Technical interoperability should then be achieved on the basis of common guidelines that will enable the adoption of technical solutions that work on a multilateral basis.

Multilingualism is a well-known characteristic of Europe and a demanding aspect to be taken into account when designing technical solutions for pan-European eGovernment services.

RECOMMENDATION 13 (TECHNICAL):

Member State administrations and EU Institutions and Agencies should develop and use common guidelines for the technical interoperability of pan-European networks, applications and services in the context of eGovernment. The IDA(BC) guidelines³⁶ should constitute the basis for such guidelines, and be updated accordingly, also taking into account relevant results and guidelines coming from the Community research and technological development programmes and other Community programmes such as IST, eTen, and eContent.

RECOMMENDATION 14 (TECHNICAL):

The common guidelines should be based on recognised open standards.

RECOMMENDATION 15 (TECHNICAL - MULTILINGUALISM):

As concerns the submission of requests via e-mail or front offices, there should be facilities for citizens and enterprises to submit requests in their own language when possible. An alternative is to submit requests only in a limited set of languages at EU level (e.g. 3 languages such as English, French and German).

When the open source software approach is followed, it is conceivable that a local administration translates particular components and makes them available again to the community at large. The coordination of efforts at a pan-European level should stimulate and support these activities.

RECOMMENDATION 16 (TECHNICAL - MULTILINGUALISM):

For the Pan-European services provided via portals, the top-level EU portal interface should be fully multilingual, the second-level pages (introductory texts and the descriptions of links) should be offered in the official languages and the external links and related pages on the national websites should be available in at least one other language (for example English) in addition to the national language(s).

RECOMMENDATION 17 (TECHNICAL - MULTILINGUALISM):

For other cases machine translation software may be offered to yield a rough translation of the contents of a website into the desired language³⁷.

³⁶ (<http://europa.eu.int/idabc/en/document/2317>)

³⁷ *Even though this translation would not be perfect and may contain logical and grammatical errors, its result would at least give some impression of the contents of the site and could thus offer support in the decision of whether or not to request or produce a professional translation.*

3. RECOMMENDATIONS FOR NATIONAL INTEROPERABILITY FRAMEWORKS

3.1. High-level policy issues

High-level policy issues can be stated in terms of objectives. These objectives are to be realised by making use of opportunities provided by technological developments. Objectives may focus on improving:

- Effectiveness: eGovernment will not be limited to the provision of standard administration services by electronic means; it will also allow the delivery of entirely new services.
 - Efficiency: Improved access to information and cost reduction by integrating local, regional and national administrations.
 - Flexibility: Multi-channel access to information and services for every citizen and enterprise, 24 hours a day, 7 days a week.
 - Transparency: Ease of finding and using services, thus allowing citizens and enterprises better access to and participation in administrative matters and political issues.
- The level of technology in the country;
 - Economic disparities between regions;
 - Socio-economic disparities between groups of citizens;
 - Cultural and language differences;
 - Different legal systems that may hinder integration.

If these obstacles are not addressed, they may even have a cumulative effect. If advances in technology are not matched by developments in other areas, the digital divide will widen, thereby excluding groups from accessing the services. On the other hand, seen from the perspective of the service provider, if an eService is based on technology choices that exceed the skills of the intended target groups, the potential benefits of the service may not be reaped. A clever solution that works well in one country may exceed the capabilities of citizens and enterprises in another country.

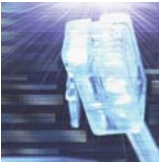
All these objectives may have a European dimension. National interoperability frameworks should pay attention to this dimension if there is a need for cross-border exchange of information. The results may influence how other issues are addressed. Entirely new services may be required that are primarily aimed at citizens and enterprises of other countries. These services may require different channels to provide them and they may need to be offered in different languages.

When stating the objectives, attention should be paid to the realities of the country. These realities provide information on the obstacles that have to be overcome in implementing the policy. Areas that must be considered are:

3.2. Scope

In order to define clear policies, it is important to have a clear view of:

- The target groups of the national interoperability framework (only government administrations or also enterprises from the private sector which provide public services).
- Whether the target groups must adhere to the interoperability framework of their country or they are merely “invited” to do so.



3.3. Business requirements for eGovernment services

If an eService is to contribute to the implementation of the high-level policy, it should adhere to generic business requirements for eGovernment services. In this context, the following priority requirements can be stated.

- eServices are made known to users and users are aware of the benefits of using the services.
- eServices can be located easily.
- eServices must be accessible to all members of the intended target groups. This may imply a differentiation between services that are used anonymously and services that require identification. Accessibility also includes awareness of the needs of disabled and elderly persons.
- eServices should be user-centred. They should be comprehensive, correct, readily available, and easy to understand in terms of language and structure.
- eServices should add value. A service that is merely “paper on glass” does not reap the full benefits of the available information technology. Where applicable a service should be integrated with other services.
- The provision of eServices should be safe, confidential and in no way harm the privacy of either party.
- The design of eGovernment applications should comply with the existing legal data protection requirements and, where available, make use of technologies that are privacy-compliant and privacy-enhancing.

3.4. General approach

When implementing a national interoperability framework the emphasis is obviously on “interoperability”. Standardisation in technology and harmonisation in legislation are just two ways to achieve this.

Other recommendations are:

- Use open standards.
- Incorporate existing standards in a larger context.
- Stimulate re-use of proven standards.
- Redesign administrative processes and make the best use of the available technology. This is also an opportunity to make services more user-centred.
- Keep administrative systems independent of proprietary technology.
- Coordinate and manage the eGovernment initiative.
- Centrally agreed XML schemas may be provided free of charge throughout the public sector. This form of re-use reduces cost and the need to develop separate mechanisms for interchanging data.
- Keep track of developments in the wider community. For instance, changes in privacy legislation may impose requirements to the provision of some eServices.
- Reduce the amount of data to be collected by using well-defined data dictionaries and data structures.
- Ensure information security by preventing unauthorised access to systems and, in the case of highly confidential information, securing each record (or even each component) individually.
- Enable wide access (user-friendly interfaces, access for the disabled, foreign language support, etc.).