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DG Information Society and Media

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Study on Interoperability at Local and Regional Level

Interoperability Study version 5

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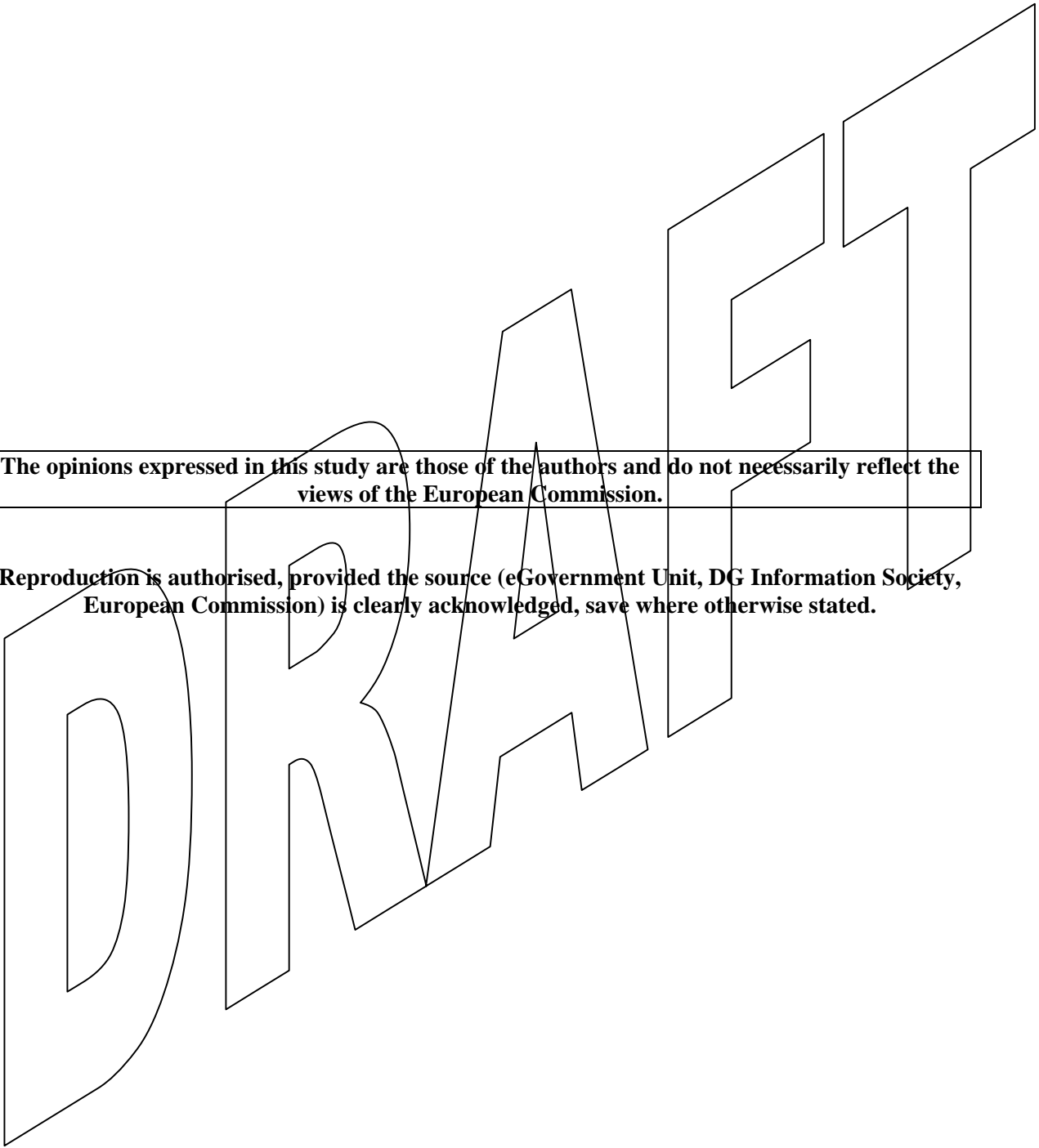
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Table of contents

Preface	7
Executive Summary	10
1. Introduction	11
2. eGovernment and Interoperability	12
2.1 Rationale	12
2.2 Scope of Study	12
2.3 eGovernment Interoperability	13
2.4 Interoperability Types	13
2.4.1 Governance of Interoperability	14
2.4.2 Organisational Interoperability	15
2.4.3 Semantic Interoperability	16
2.4.4 Technical Interoperability	17
2.5 Summary	18
3. Status of Local and Regional Interoperability in Member States	20
3.1 Introduction	20
3.2 Status Report 1 (enhanced): Austria	21
3.2.1 Overview	21
3.2.2 WHY – eGovernment, Local Government and Interoperability Strategies	22
3.2.3 WHO - Main Actors in eGovernment, Local Government and Interoperability	22
3.2.4 HOW - IOP Strategy Implementation Through Broad Programmes	23
3.2.5 WHAT - Examples of Projects that Promote IOP at the Local Level	24
3.2.6 References and Links	26
3.3 Status Report 2 (enhanced): Estonia	27
3.3.1 Overview	27
3.3.2 WHY – eGovernment, Local Government and Interoperability Strategies	27
Key principles of the state IT interoperability	28
3.3.3 WHO - Main Actors in eGovernment, Local Government and Interoperability	29
Sectoral information systems	30
3.3.4 HOW - IOP Strategy Implementation Through Broad Programmes	30
3.3.5 WHAT - Examples of Projects that Promote IOP at the Local Level	32
3.3.6 References for the Status Report	35

3.4	Status Report 3 (enhanced): Germany	36
3.4.1	Overview	36
3.4.2	WHY – eGovernment, Local Government and Interoperability Strategies	37
3.4.3	WHO - Main Actors in eGovernment, Local Government and Interoperability	39
3.4.4	HOW - IOP Strategy Implementation Through Broad Programmes	42
3.4.5	WHAT - Examples of Projects that Promote IOP at the Local Level	46
3.4.6	References and Links	51
3.5	Status Report 4 (enhanced): The United Kingdom	53
3.5.1	Overview	53
3.5.2	WHY – eGovernment, Local Government and Interoperability Strategies	53
3.5.3	WHO - Main Actors in eGovernment, Local Government and Interoperability	55
3.5.4	HOW - IOP Strategy Implementation Through Broad Programmes	56
3.5.5	WHAT - Examples of Projects that Promote IOP at the Local Level	57
3.5.6	References and Links	63
3.6	Status Report 5 (short): Belgium	64
3.7	Status Report 6 (short): Cyprus	67
3.8	Status Report 7 (short): Czech Republic	69
3.9	Status Report 8 (short): Denmark	70
3.10	Status Report 9 (short): Finland	72
3.11	Status Report 10 (short): France	74
3.12	Status Report 11 (short): Greece	76
3.13	Status Report 12 (short): Hungary	78
3.14	Status Report 13 (short): Ireland	80
3.15	Status Report 14 (short): Italy	84
3.16	Status Report 15 (short): Latvia	86
3.17	Status Report 16 (short): Lithuania	88
3.18	Status Report 17 (short): Luxembourg	89
3.19	Status Report 18 (short): Malta	90
3.20	Status Report 19 (short): Poland	92
3.21	Status Report 20 (short): Portugal	94
3.22	Status Report 21 (short): Slovakia	96
3.23	Status Report 22 (short): Slovenia	98
3.24	Status Report 23 (short): Spain	100
3.25	Status Report 24 (short): Sweden	102
3.26	Status Report 25 (short): The Netherlands	104

4.	Important findings so far	105
4.1	Introduction	105
4.2	Findings from Surveying the Technical Literature	105
4.3	Findings from an Analysis of Stakeholders' Information Needs	109
4.4	Findings from an Analysis of eGovernment IOP Good Practice Cases	114
4.5	Findings from Consultations with Stakeholders	118
5.	Results So Far: Key Success Factors and Barriers	120
5.1	Introduction	120
5.2	Technical Interoperability	121
5.2.1	Key Success Factors for Core Technical IOP	121
5.2.2	Key Success Factors for Supportive Technical IOP	123
5.3	Semantic Interoperability Key Success Factors	124
5.3.1	Drafting/Agreeing on the Common Definitions/Vocabularies/Metadata etc	125
5.3.2	Using/Exploiting these Common Definitions	127
5.3.3	Maintaining/Evolving Common Definitions	127
5.4	Organizational IOP Aspects	128
5.4.1	Linking Services to the Broader Agency Strategy	128
5.4.2	Service Modelling and Visualisation	128
5.4.3	User Involvement and Communities of Practice in New Process Design	129
5.4.4	(Re-)Using Knowledge Related to Business Processes from the Private Sector	129
5.4.5	Identification of Common Service Functionality and Features (Shared Service Layer)	129
5.4.6	Multi-channel Service Delivery	130
5.4.7	Ownership and Responsibility for Cross-Organisational Processes	130
5.5	Interoperability Governance	131
5.5.1	Political Factors	132
5.5.2	Legal factors	135
5.5.3	Managerial factors	136
5.5.4	Economic Issues	140
5.6	Summary of All Interoperability Key Success Factors	142
6.	Recommendations	144
6.1	Recommendations Related to Legislation	146
6.1.1	Recommendations to Local Authorities	146
6.1.2	Recommendations to National Authorities	146
6.2	Recommendations Related to Funding/Financial Issues	146
6.2.1	Local Authorities	146

6.2.2	National Authorities	147
6.3	Recommendations Related to Policy – Management Issues	147
6.3.1	Local Authorities	147
6.3.2	National Authorities	148
6.4	Recommendations Related to Technical Issues	149
6.4.1	Local Authorities	149
6.4.2	National Authorities	150
7.	Consultation: Your Comments, Recommendations and Contributions	152
8.	Conclusions and Future Steps	153
	Appendix A: Methodology	154
A.1	Introduction	154
A.2	Study Objectives and Methodologies	154
A.2.1	Methodology for Reporting Status of IOP in Selected MS	154
A.2.2	Methodology for Identifying Key Success Factors/Barriers and for Issuing Recommendations	157
A.3	Methods Employed for Input Streams	158
A.3.1	Method for Gathering and Using Bibliography	158
A.3.2	Method for the Analysis of IOP Good Practice Case	158
A.3.3	Method for the Analysis of Stakeholders' Needs	159
A.3.4	Methods for Gathering and Assessing Stakeholders' Feedback	161
	Appendix B: Short Profiles of 16 Good Practice Cases	162
B.1	Introduction	162
B.2	Case 1: IOP in e-Enabled Child Benefit in Ireland	162
B.3	Case 2: Civil Registration in Austria	163
B.4	Case 3: Civil Registration in German Regions	164
B.5	Case 4: Social Security Benefits For Citizens in Belgium	165
B.6	Case 5: Standardised e-Form Exchange via EDIAKT II in Austria	166
B.7	Case 6: The Road Traffic Accident Automation Project in UK	166
B.8	Case 7: Regional Integrated Health Services for the Continuity in the Medical Treatment in Friuli Venezia Giulia	167
B.9	Case 8: Company Registration eService in Sweden	168
B.10	Case 9: Kadaster-on-line: Direct Access to Land-Registry Products via Internet in the Netherlands	168
B.11	Case 10: The Danish XML Project	169
B.12.	Case 11: ICAR: a System for e-Enabled Cooperation among Public Administrations in Italy	170

B13.	Case 12: e-Bourgogne – Regional Shared eGovernment in the Region of Burgundy / France. The Example of the Regional Shared eProcurement Platform	171
B13.	Case 13: eID in Estonia	173
B14.	Case 14: eInvoicing in Finland – The Example of the Region of South Karelia	174
B15.	Case 15: eInvoicing in Denmark	175
B16.	Case 16: The Finnish Address System	176

Appendix C: List of National Documents on eGovernment and Interoperability

178

Preface

Deliverable D2.6 presents the fifth version of the Study on Interoperability (IOP) at Local and Regional Level.

In this version we use the same structure that was introduced in the previous version and adheres to the initially foreseen final structure. In the first three versions, the emphasis was on providing information about the methodology to be used for conducting the Study. This enabled stakeholders to provide feedback on the methodology itself. From the previous version the focus was more on providing the results of the Study, which constitute the real value to readers.

The elements that appear for the first time in this fifth version (i.e. Deliverable 2.6) of the study are the following:

- A more extensive section on technical interoperability
- Key success factors in regard to technical interoperability
- Recommendations on interoperability at national and local level
- Reports on the Status on Interoperability at Local and Regional Level for all Member States, as follows:
 - Short Status Reports for 21 Member States.
 - Enhanced Status Report for Estonia in addition to Austria, Germany and the UK's Reports that were provided in the previous version of the Study

Deliverable D2.6 takes into consideration the European Commission's recommendations for the previous versions of the study as follows:

Ver.	#	Recommendation	Action
D2.2	1	In future versions we expect concrete findings with references to cases, feedback of stakeholders and to bibliography.	Findings with references to cases, feedback of stakeholders and bibliography have been used for all versions of the study from then on. A special report with statistical analysis of the stakeholders' feedback is also available in the present version.
D2.2	2	The index is to be reviewed in terms of giving a more visible structure to the key elements of the contents and should be kept flexible regarding the stakeholders feedback	<p>The contents of the Study have been re-organised in the second version of the study to improve clarity. The contents included:</p> <ul style="list-style-type: none"> • An introduction on eGovernment and IOP • The Methodology and Analysis framework • The key findings so far • A call for stakeholders to provide their feedback • Brief descriptions of four good practice cases (in Appendix) <p>This structure was reviewed in the fourth version to ensure that the focus</p>

			is more related to the results of the study.
D2.2	3	It should be discussed, that the decision factors, the advantages and disadvantages of the different models should be clearly outlined.	A preliminary discussion had been started in the third version of the study when presenting key findings. This discussion has evolved in subsequent versions of the study since a substantial number of good practice IOP cases has been identified and analysed.
D2.3	1	Please use the abbreviation CIP instead of CIF	This has been corrected.
D2.3	2	Chapter 4.3.1.8 Ownership Are there any "good practices" how to deal with fragmented responsibility and ownership having the citizen in view?	A number of good practices had to deal with fragmented responsibility and ownership. The lessons learnt from them have been considered when formulating key success factors, barriers and recommendations.
D2.4	1	Please include a paragraph discussing the outcomes of the Public Consultation in IOP. (http://europa.eu.int/information_society/activities/egovernment_research/doc/highlights/your_voice_egov_2010_report.pdf) (p. 13)	Since the study has been restructured, this addition can be found in section 4.5 under Stakeholders' feedback. It was added in the fourth version and can also be found in the present one (D2.6)
D2.4	2	In p. 15 you state the different interoperability aspects, in the Methodology chapter you start describing, which aspect will be covered by which version of the study. Process and connectivity aspects are not very clear in this context, because these aspects did not show up before and could therefore be misunderstood. Please explain how they relate to the above mentioned IOP aspects. How about coverage of technical IOP?	In order not to confuse the reader with different terminology, the reference to process and connectivity aspects of IOP has been discarded and has been replaced with a reference to technical aspects. Due to the change in structure from the previous version of the Study, this modification can be found in Annex A: A.2 Study Objective and Methodologies.
D2.4	3	Spelling error in the image (upper left): Bibliography	This is now corrected.
D2.4	4	Information modelling on reality but not on legal concepts might not always be applicable. Discuss the restrictions and possible work-around (including legal changes as stated later in mentioning good practice cases) (p. 31)	This comment has been considered.
D2.4	5	Given a citizen centric service, the process and back-office organisation should be transparent to the citizen. Therefore it is crucial to have one responsible department for the citizen, regardless if the procedure is split between different governmental services and/or private service providers. Can you refer to cases with good practices, where such a citizen centric solution was possible? (refer to a Good Practice case) (p. 34)	There are a number of cases where this citizen centric approach was selected. The lessons learnt from them have been considered when formulating key success factors, barriers and recommendations.

D2.4	6	Are there any recommendations, good practices how to enhance the diffusion and take-up of the smart-cards? (e.g. make it also usable in private sector) Are there any ideas why the diffusion is so weak? (e.g. technical interoperability?) (p. 38)	The Estonian eID card is a good example of the use of smartcards. The lessons learnt from that case have been considered when formulating key success factors, barriers and recommendations.
D2.4	7	<p>Please think about the usability of the study in interoperability projects and discuss with your stakeholders. The focus on usability seems still a little blur. The chapter of key success factors, barriers and recommendations is in principle ok.</p> <p>A stakeholder who wants to implement an IOP project wants to see what is recommended in which situation, what is to consider and what is to avoid (not only a listing of different possibilities) (general comment)</p>	In the present version of the study, a concrete section (section 6) is dedicated to recommendations on national and local semantic interoperability. This section will be extended to include more recommendations in the next and final version of the study. We have tried to comply with this suggestion in the current (fifth) version of the Study.
D2.5	1	General Comment: As mentioned in the last project board meeting, it would be more readable from the stakeholders, if there was a condensed part of the study (max. 30 pages) focusing on the findings as well as an extended part with details	An executive summary of the report has been prepared focusing as suggested on the findings. This will be provided as a separate document.
D2.5	2	p. 11: Figure 1 – Please check the figure IOP typology	The figure has now been inserted as a jpg file in order to avoid printing errors.
D2.5	3	p. 12: 4 th line: "Is there..." replace with "Are there..."	This has been corrected.
D2.5	4	p. 66ff: please be clear when talking about "key success factors" and when about "key factors" – if you don't mean the same please explain the latter term	All references to "key factors" have been substituted with "key success factors" since there is no difference in meaning between the two.
D2.5	5	p. 71 2 nd paragraph, fourth line: "coved" replace with "covered"... In general check the spelling for the whole report	The spelling mistake has been corrected. The whole report has been checked for spelling mistakes.

Executive Summary

This document was produced within Work Package 2 "Local and Regional Interoperability Study" of the "Study on Interoperability at Local and Regional Level" project. This is a 26-month project funded by the European Commission (Information Society and Media Directorate – General, eGovernment Unit) under the MODINIS Programme.

The Interoperability (IOP) Study aims at covering the following aspects:

- Status of local and regional interoperability in member states
- Key success factors of local and regional interoperability
- Key barriers of local and regional interoperability
- Recommendations to different stakeholders

The IOP Study report is based on the analysis of stakeholders' needs, IOP good practice cases in Europe as well as relevant material collected for this purpose. The Study is undertaken in an incremental and iterative manner, where each iteration considers new information, feedback from stakeholders and corrective actions.

In this fifth version of the Study, we present an introduction to eGovernment IOP. We also present the status of local and regional IOP in all member states. In particular, a short status report is provided for the 21 Member States while an enhanced status report is provided for four Member States (Austria, Estonia, Germany and the United Kingdom). We also present an overview of findings so far from surveying the technical literature, analysing the stakeholders' needs, studying more than 100 good practices that were documented in the context of this work, and from consultations with stakeholders. We provide a categorisation of IOP key success factors and barriers. A section on recommendations is also available in the present version of the study. Finally, we present our methodology and analysis framework as well as short profiles of sixteen good practice cases that were examined in-depth.

The Study results have been presented and discussed with stakeholders in a number of workshops that have been organised so far.

It should be noted that the opinion of stakeholders is considered of paramount importance. You are therefore invited to contact us in order to provide your view and opinion on any aspect of this report you would like to comment upon. Details are provided in section 7.

Changes from previous version: In this version of the Study we present a more extensive section on technical interoperability and introduce key success factors regarding technical interoperability. Recommendations pertaining to interoperability at national and local level are also presented. Finally, the short Status Report Profiles for 21 Member States and the enhanced Status Report of Estonia are also included for the first time.

1. Introduction

The overall objective of the study on local and regional interoperability (IOP) is to cover the following:

- Status of local and regional interoperability in member states
- Key success factors of local and regional interoperability
- Key barriers of local and regional interoperability
- Recommendations to different stakeholders

To achieve this objective, the work programme defines three Tasks, as follows:

- Task 2.1: Prepare for study
- Task 2.2: Acquire and organise material
- Task 2.3: Perform analysis

Task 2.1 has culminated in Deliverable D2.1 which presents relevant bibliography, such as interoperability frameworks, projects etc.

Tasks 2.2 and 2.3 are running in an iterative manner starting from the third month of the project.

The current version of the Study (Deliverable D2.6) reports on the results of the fifth iteration and is the fifth of six deliverables.

The Interoperability Study report is based on the analysis of stakeholders' needs, good practices in Europe as well as relevant material collected for this purpose along with stakeholders' feedback.

The main text of this report commences with an introduction on eGovernment and IOP (section 2) and continues with an overview of the Status of local and regional IOP in all Member States (section 3). In particular, an enhanced Status Report is presented for four member states, while a shorter profile is presented for the remaining 21 Member States. Section 4 presents significant findings on which the results of the Study are based, while section 5 presents the results so far in terms of key success factors and barriers. Section 6 lists some preliminary recommendations. Section 7 provides details on how the reader could provide feedback to this document.

Appendix A provides the methodology that has been used for conducting the Study, while Appendix B provides short profiles of the sixteen good practice cases that were analysed in-depth. Finally, Appendix C provides references and links to strategic eGovernment and IOP documents identified through our desktop research in all Member States.

2. eGovernment and Interoperability

2.1 Rationale

In Europe, eGovernment is now well embedded in the policies and plans of administrations at all levels: local, regional, national and pan-European. At the European level, the eEurope 2005 and now the i2010 action plans emphasise the importance of eGovernment and call for rapid advances. At the national level, eGovernment action plans ask for online public services provided according to citizen needs. The concepts of one-stop government and joined-up government have been reinforced with the use of Information and Communication Technologies (ICT) and particularly the Internet.

However, the realization of one-stop government and joined-up government is easier said than implemented. Providing citizens with services according to their needs calls for collaboration within and across public authorities and hence, essentially requires changing the *modus operandi* of the public sector. Indeed, citizens have needs that in many cases can be fulfilled only by aggregating information and/or services traditionally provided by different public authorities. Furthermore, putting citizens at the center of service provision suggests providing them with multiple communication channels for the same service.

In this huge modernization effort, it was soon realized that interoperability (IOP) would play a significant role. At a first glance, it seems that resolving all interoperability obstacles would be a non-trivial task. For example, in some cases public authorities do not exchange data due to legal constraints: in some cases there may be no laws to enforce public authorities to collaborate; or laws on data protection and privacy may prevent authorities from exchanging data. Even when the legal framework is in place, determining appropriate inter- and intra-organization workflows is not trivial. Even when this is resolved, it should be ensured that all collaborating authorities share the same understanding on the data that are exchanged. And finally, the automatic exchange of data should be technically feasible, even if the participating public authorities have different information systems in place.

eGovernment projects often have to be designed, implemented and delivered in short time frames in order to meet political urgencies. This has often resulted in a number of similar projects and programmes being reinvented across Europe and incurring considerable development costs. This is particularly true for regional and local initiatives that often did not take into consideration exemplars of good practice already in place elsewhere, which could be adopted and adapted to suit local circumstances.

It is therefore essential that a better understanding be achieved in the domain of IOP at the local and regional level that would be based on good practice. The aim of this Study is to assist in achieving exactly this objective, i.e. to improve our understanding and knowledge of eGovernment IOP at local and regional level by capitalizing on relevant good practice in Europe.

2.2 Scope of Study

As already suggested, the aim of the Study is to improve stakeholders' understanding on IOP at the local and regional level by capitalizing on good practices in Europe. In particular:

- *Stakeholders* include public authorities at the local and regional level with an interest to collaborate with other authorities in providing aggregated information and/or services; national and European authorities interested to learn about IOP developments at the local and regional level; and more generally anyone interested to learn from good practice in this area.

- In this context, we consider *good practice* to be eGovernment services at the local and regional level where IOP has a central role.

We acknowledge that the focus of this study is on **eGovernment services** where there is **collaboration** between authorities to provide aggregated information or services. We identify two important characteristics of these services:

- They are eGovernment services: thus, all knowledge that exists for eGovernment services is relevant to this study.
- There is collaboration amongst two or more authorities, where at least one is public: thus, all knowledge that exists in the domain of collaboration, integration, intra- and inter-organisation processes etc is relevant to this study.

However, one important consideration is to focus the contents of the study, wherever possible, to those issues that are related to IOP. Therefore, we avoid focusing on areas that may be important to eGovernment services in general, but where IOP does not play a central role. For example, adequate funding is an important factor for the success of any eGovernment project. We will refrain from mentioning this factor in barriers, not because it is unimportant, but because we focus on barriers that are closely related to Interoperability.

2.3 eGovernment Interoperability

In this study we employ the European Commission's definitions of eGovernment and Interoperability. Thus:

- eGovernment is defined as¹:

"the use of ICT 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".

Although, in the literature some prefer to use the term "eGovernance" for this broad definition, we remain compatible with the EU nomenclature and use "eGovernment" instead.

- Interoperability is defined as²

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

More definitions and relevant background material is presented in Deliverable D2.1.

2.4 Interoperability Types

In order to analyse eGovernment IOP the use of an appropriate typology is essential. Currently, several IOP typologies have been proposed³ (an overview of such typologies is presented in section 4.2). For the purposes of this study, the adoption of an IOP typology was based on two

¹ European Commission, 2003, 'The role of eGovernment for Europe's future' Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Brussels, 26.9.2003, COM(2003) 567 Final.

² IDABC 2004. European Interoperability Framework for pan-European eGovernment Services. Luxembourg, European Communities.

³ Peristeras V. and Tarabanis K., 2006, *The C4IF Interoperability Typology Framework*. International Journal of Interoperability in Business Information Systems (IBIS), 1(1), pp 61-72

main criteria: (a) compliance with existing EC work, and (b) suitability for the purposes of the study (e.g. the need to organise key success factors/ barriers and recommendations) using this typology.

Based on these criteria, we endorse the IOP typology introduced by the European Interoperability Framework (EIF) ⁴. Thus we consider:

- Technical IOP aspects. Technical interoperability "...covers the technical issues of linking computer systems and services".
- Semantic IOP aspects. Semantic interoperability ensures 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".
- Organisational IOP aspects. Organisational interoperability is concerned with "...defining business processes and bringing about the collaboration of administrations that wish to exchange information and may have different internal structures and processes, as well as aspects related to requirements of the user community."

In addition, we identify:

- Governance of IOP, as introduced by the European Public Administration Network (EPAN) eGovernment Working Group⁵, as another important consideration to be investigated. Governance of IOP is concerned with political, legal and structural conditions, which are relevant for developing and using interoperable applications.

The IOP typology that we use is depicted in figure 1.

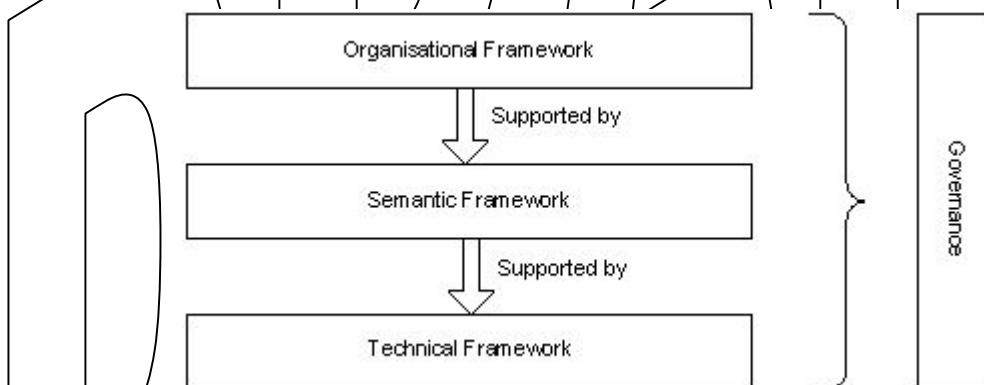


Figure 1 – IOP typology

Each term is briefly presented in the following sections.

2.4.1 Governance of Interoperability

According to the EPAN, governance of interoperability is concerned with the coordination and alignment of business processes and information architectures that span both intra- and inter-organisational boundaries. The purpose here is to identify and address/remove any possible

⁴ IDABC 2004. European Interoperability Framework for pan-European eGovernment Services. Luxembourg, European Communities.

⁵ European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

barriers, including legislative, cultural and others, in order to aggregate services and share information.

A typical scenario of interest suggests that there is a number of public authorities that want to collaborate in order to aggregate their eGovernment services to better match the needs of citizens (e.g. by implementing a life-event). The type of questions addressed at this layer includes:

- Are there any legal constraints and how can these be overcome?
- Which authority is responsible for setting and maintaining the relevant IOP standards?
- Are the necessary skills in place?
- How can a "collaboration culture" be developed?
- How will change be managed?
- Who decides on the way of collaboration?

For example, referring to the good practice cases that were developed and which are briefly presented in Appendix B, the Irish good practice case emphasises the need not only to identify any new legislation required, but also to enact this legislation early in order to avoid serious legislation versus practice conflicts. The Swedish good practice case documents exactly the same fear of serious delays when it presents that their project lost more than one year due to slow-moving legislation.

2.4.2 Organisational Interoperability

Organisational IOP is actually about the collaboration of organisations that wish to exchange information and may have different internal structures and processes. The aim of achieving organisational IOP is to overcome all organisational obstacles, thus being able to set up the relevant intra- and inter-organisation workflows.

Coordination in virtual enterprises could conform to a number of models; these include⁶:

- *Hierarchical model*, in which one of the organizations initiates the process and decides how any workflow, will be carried out. This model could be further sub-categorised into the following, depending on how the process initiator's workflow pattern might be agreed:
 - *Centralised*, where one dominant or delegated agency arbitrarily decides the whole pattern.
 - *Participative*, where all organisations involved in the process are consulted as the workflow pattern is being decided.
 - *Decentralised*, where different organisations decide their part of the total workflow independently.
- *Market model*, in which there is no formal agreement, but the organisation initiating the workflow can choose a service provider, including the interface they offer for data interchange and workflow.
- *Ad-hoc model*, in which no predefined workflow pattern is set, and the process is performed according to the will of the organisations at that time.

With respect to organisational solutions addressing interoperability, the EIF examines and rejects the use of bi-lateral arrangements in favour of the use of multilateral arrangements. Here, each of the interoperating partners adopts the same set of agreements for IOP solutions. As a result, this single solution is implemented only once and fits the needs of all. In addition, the EIF also suggests that the subsidiarity principle prescribes decentralised responsibility. Furthermore, the EIF proposes the introduction of the so-called "business interoperability interfaces" (BII) through

⁶ R. Tagg: Workflow in Different Styles of Virtual Enterprise. Australian Computer Science Communications. 23 (2001), 21-28.

which the administrations of different Member States will be able to interoperate at a pan-European level for a given eGovernment service.

Again with respect to organisational solutions addressing interoperability, the EPAN suggests identifying a broker service to provide common functionality to back-end fulfilling agencies on a shared-basis in accordance with negotiated Service Level Agreements and usage guidelines.

For example, in Sweden the establishment of a new business required entrepreneurs to visit two authorities: one for company registration and one for company taxation. In the Swedish good practice case, the relevant workflows have been redesigned and a joint eService is provided as a result by Bolagsverket (responsible for company registration issues) and Skatteverket (responsible for company taxation issues). As a result, foretagsregistrering.se is now a single place for the whole procedure regarding registration matters of companies; it saves time and money for clients as well as for the involved authorities.

2.4.3 Semantic Interoperability

Semantics is perceived as the meaning and the use of data⁷. Thus, semantic interoperability becomes particularly important when public authorities need to exchange information. The main semantic conflicts are related to the structure of data and the meaning of data.

Another categorisation suggests semantic conflicts may occur at the data-level and at the schema level⁸.

Data-level conflicts are differences in data domains caused by the multiple representations and interpretations of similar data. The following data-level conflicts are possible:

- *Data-value conflicts*, e.g. the value "foreigner" in one database may mean that the person is not a citizen of the country, while in another database it may mean that the person is not a citizen of the European Union.
- *Data representation conflicts*, e.g. a date can be represented as 06-30-2005 in one database, as 30-06-2005 in another and as 30-Jun-2005 in a third.
- *Data unit conflicts*, e.g. buildings heights can be measured in centimetres in one database and in inches in another.
- *Data precision conflicts*, e.g. buildings heights can be graded as "high", "medium", "low" in one database and as scale A, B, C or D in another.
- *Data language conflicts*, e.g. when information is retained in different languages.

Schema-level conflicts are characterised by differences in logical structures and/or inconsistencies in metadata. The following schema-level conflicts are possible:

- *Naming conflicts*, e.g. the name "Citizen" in one database is used to capture the exact same information as the name "Beneficiary" in another database.
- *Generalisation conflicts*, e.g. when one database has a representation for "Citizens", while a second database has two separate representations for "Males" and "Females".

Other schema-level conflicts are also possible, e.g. entity-identifier conflicts, schema-isomorphism conflicts, aggregation conflicts, schematic discrepancies etc.

Semantic IOP solutions and other related research is often categorised into three broad areas⁶: mapping-based, intermediary-based and query-oriented approaches.

⁷ W.A. Woods "What's in a link: Foundations for semantic networks", in Representation and Understanding: Studies in Cognitive Science, D.G. Bobrow and A. Colling, Eds. Academic Press, Inc., New York, NY, 35-82, 1975

⁸ Park, J. and S. Ram (2004). "Information Systems Interoperability: What Lies Beneath?" ACM Transactions on Information Systems 22(4): 595-632.

The *mapping-based* approach is usually accomplished by constructing a federated (or global) schema and by establishing mappings between the federated (or global) schema and the participating local schemas.

The *intermediary-based* approach suggests the use of an intermediary that has domain-specific knowledge, mapping knowledge, or rules specifically developed for coordinating various autonomous information sources. This is close to the multilateral solution pattern proposed by the European Interoperability Framework to ensure IOP at the European level.

The *query-oriented* approach suggests the use of interoperable languages capable of formulating queries spanning several databases. This is probably the less appropriate approach for the case of eGovernment as it may contradict the principle of subsidiarity.

The ultimate objective of current research in semantic IOP is to manage all semantic conflicts among different systems in a fully automated manner. Furthermore, it is accepted that the overall environment is changing, thus new systems may be added or removed at any time. It should be noted however that unlike other domains (e.g. eCommerce) in the domain of eGovernment the list of semantic IOP requirements is found to be smaller as there is normally no competition between authorities providing the same services.

In the Belgian good practice case, the agreement on data content of XML schemes and the data interpretation across different institutions and different services played a key role. Each institution developed its own scheme and data structure based on historical use in order to provide public services. The institutions had to come to an agreement, which means that they had to come to a compromise even if they had to accept changes in their basic databases. So negotiations, e.g. about the interpretation of what is a name, what is an address etc. took place and was commonly agreed. These agreed governmental representations should be common across governmental boundaries.

Similarly in the Austrian good practice case, the agreement on commonly used grammar and standards has been identified to be one of the four main challenges for providing standardised electronic file exchange.

It is important to mention that in practice this process of standards definition may have proved problematic in various respects. The Danish OIOXML good practice case reports an interesting experience of tedious development cycle of data standards, language problems (in this case with regards to the choice between Danish and English), unwillingness to standardize and lack of understanding and commitment.

2.4.4 Technical Interoperability

Technical IOP is concerned with all technical issues (technologies, standards, policies) to guarantee that the technical components of the information systems of the collaborating authorities will be able to work together. It should be noted that technical IOP is concerned not only with technologies at the physical connection layer (such as network protocols), but also with technologies that support the organisational and the semantic layers.

There are many different ways to categorise technical IOP. For example, the UK eGovernment Interoperability Framework (e-GIF), issues technical policies and specifications related to interconnection, data integration, content management metadata and e-services access. As another example, the German Interoperability Framework (SAGA ver. 2.1) proposes technical standards to support a proposed architecture in the areas of: process modelling, data modelling, application architecture, client, presentation, communication, connection to the back end, and security.

Technical developments are rapid particularly those related to the Internet. Consequently, it is common for technical IOP guidelines to suggest the use of Internet in all eGovernment services.

The Internet has made technical interoperability easily achievable⁹. The use of Internet standards is a common recommendation to achieve technical IOP. As an example, at the network layer, TCP/IP is recommended as a widespread networking standard for basic connections over the internet; at the presentation layer HTML is recommended; at the data connectivity layer XML is the most frequently used etc.

We have already mentioned that in this Study, we will report on technologies to support semantic and organisational IOP in the technical IOP layer.

In the case of semantic IOP, we should note the importance of XML, the de-facto standard for the representation of information. XML is often perceived as an answer to a number of interoperability issues. However, XML by itself is only able to establish a common framework for representing hierarchies of data. Thus, supplemental specifications are required to define and validate more complex logical data structures and types¹⁰ particularly in cases where needs go beyond representing hierarchies or simple taxonomies. Technologies that can be employed in such cases include topic maps that can be used to represent topics, their occurrences in documents, and the associations between topics. They also include the Resource Description Framework (RDF) that defines a model and XML syntax to represent and transport metadata. The RDF specifications provide a lightweight ontology system to support the exchange of knowledge on the Web. It is used to describe any Internet resource such as a website and its content. Moreover, OWL is a semantic mark-up language for Web resources¹¹ that enables ontology sharing via the web. In the context of web services, OWL led to the definition of another important standard to deal with the web services requirements, namely OWL-S. OWL-S is an ontology for describing web services with semantic information. OWL-S enables declarative advertisements of service properties and capabilities that can be used for automatic service discovery, invocation and description¹².

In the case of organisational IOP, a number of standards exist in many relevant areas such as process modelling and process reorganisation. For example, in the case of inter-organisational workflows, relevant workflow specification standards include BPEL4WS (for Web Service orchestration, workflow and composition). The Business Process Execution Language for Web Services (BPEL4WS or BPEL) is specified in an interchange format via an XML schema. Furthermore, other relevant specification workflow standards include BPML (Business Process Modelling Language), BPMN (Business Process Modelling Notation), BPSS (Business Process Specification Schema is part of OASIS and based on ebXML for XML based eBusiness), WSCI (W3C Web Services Choreography Interface), WSCL (Web Service Choreography Language), XPD (XML Process Definition Language) etc¹³.

2.5 Summary

Interoperability is important in all cases where different public authorities or units have to collaborate in order to provide aggregated services and/or information to citizens (e.g. around a life event or a business episode). Thus, IOP is particularly important to realise the benefits of eGovernment as it is a prerequisite for achieving joined-up government and one-stop government.

⁹ Kubicek, H. and Cimander, R. (2005), "Interoperability in eGovernment: A Survey on Information Needs of Different EU Stakeholders", European Review of Political technologies, December 2005.

¹⁰ Chase, E. and Straat, M. (2005), "information Interoperability and Intelligent Documents", eGov-Interop'05 Conference, 23-24 February 2005.

¹¹ TopQuadrant Technology Briefing, Semantic Technology, Version 1.2, March 2004

¹² Vicente, S., Perez, M., Garcia, X., Gimeno, A. and Javier, N. (2005), "eGovernment Interoperability on a semantically driven world", eGov-Interop'05 Conference, 23-24 February 2005.

¹³ Punia D. K and Saxena K. B. C., "Managing Inter-organisational Workflows in eGovernment Services", ICEC 2004, pp. 500-505.

In this Study we will examine IOP by capitalising on good practice cases identified for this purpose all over Europe. We will analyse the governance of IOP as well as organisational, semantic and technical aspects of IOP.

DRAFT

3. Status of Local and Regional Interoperability in Member States

3.1 Introduction

This section presents an overview of the Status of local and regional IOP in all 25 Member States. In order to assemble this information, we performed the following steps:

1. Preparation: In this step, we conducted the methodology that would be employed. Furthermore, we constructed the two main templates that would be used for reporting the Status: one template for a *short profile* of each Member States and one template for an *enhanced report*.
2. Collection of data and Preparation of short profiles: In this step, we performed desktop research via the Internet for each Member State. This resulted in constructing a short profile (about one page) with main information about each Member State. The short profile includes general information about eGovernment and IOP in the country as well as key actors and stakeholders at local and regional level.
3. Validation of data and Preparation of enhanced reports: In this step, we contacted national experts in each Member State and asked them to validate and enhance the short Status report of their country. The enhanced profile includes information such as policies and frameworks, actors and stakeholders, initiatives and programmes, as well as concrete guidelines, services and products.

More details on the methodology employed and the templates constructed are presented in section A.2.1.

Currently, we have constructed the short profile of all Member States and the enhanced profile of four Member States. Furthermore, we have the commitment of 14 more Member States (plus Romania) that they will validate and enhance their respective Status profile. Finally, we are continuing our efforts to obtain also commitment from the remaining 7 Member States in order to be able to provide enhanced Status profiles for all Member States in the next, final, version of the Study.

In the rest of this section, we present the enhanced profiles of Austria, Estonia, Germany and the UK followed by short profiles of all remaining Member States (in alphabetical order).

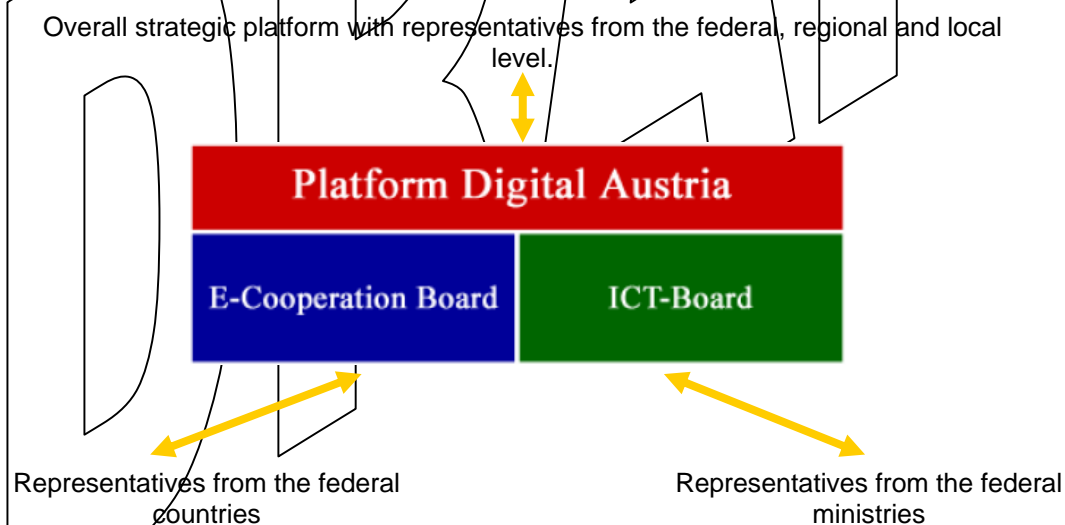
It should be noted that although every attempt is made for the content of the Status reports to be correct and accurate, it is not possible for the consortium to guarantee neither the correctness nor the comprehensiveness of the information provided. Furthermore, if you have spotted errors or omissions please contact us (see contact details in section 7 of this report).

3.2 Status Report 1 (enhanced): Austria

3.2.1 Overview

Interoperability is a key characteristic of the Austrian e-government strategy, a separate, explicit strategy for interoperability does not exist. The strategy is based, among others, on the principles of cooperation and interoperability. These principles are considered especially important because of the federal structure of the Austrian state. The provision of services by many regional and local authorities on one hand and the provision of basic services for administrations on the local and regional level by the central administration require the use of interoperable solutions. These solutions need to be planned and developed in a cooperative fashion taking the requirements and use cases of stakeholders from different administrative levels into consideration. The discussion and specification of solutions takes place in thematic working groups with participation mostly from the central administration, the provinces and larger cities.

The e-government strategy requires authorities to implement the building blocks and use the basic services put in place. Conformance to the strategy ensures higher interoperability since all the components are specified and coordinated by operational working groups on the basis of common agreement. Multiple decentralised developments do not only impair interoperability but also lead to redundant efforts and a waste of resources. The results of the operational working groups are discussed and approved in the ICT Board and E-Cooperation Board. Together with the Platform Digital Austria they are the strategic umbrella for E-Government in Austria. The national working groups report to these bodies on a regular basis.



The most important working group concerned with interoperability issues is the communication architecture group. It has the task of defining XML standards for the communication between all kinds of administrative applications. Other projects of national working groups are to define technical and organisational standards for the negotiation of access rights between portals and back office applications (Portal Group) or to build a common data model for a central directory service that is interoperable with the local directories of the regional governments. Another working group concerned with the interoperability of national registers has only recently taken up work.

3.2.2 WHY – eGovernment, Local Government and Interoperability Strategies

National strategy for e-government

In Austria the cooperation of the different actors in the field of eGovernment and the interoperability of applications are closely related and both are inherent principles of the national e-government strategy. Because of the highly federal structure of the Austrian state (more than 2300 local authorities), great importance has been placed on cooperation between the Federal Government, the provinces, municipalities and local authorities. Since administrative tasks are mostly performed by the provinces, municipalities and local authorities, eServices need to be developed for these administrative levels. Without basic coordination, the federal nature of the Austrian state would lead to diverging approaches in electronic public services. Efficient and effective development of seamless e-government can therefore only be achieved by interoperable systems and comprehensive cooperation between all levels of the administration.

For this purpose e-government conventions designed to govern implementation are being drawn up on the basis of internationally accepted standards and open interfaces. The e-government activities at the different levels are coordinated in various working groups and priorities as well as standards are set jointly. Working groups focus on specific needs and work in concert with the ICT board. Therefore, concepts and projects are agreed before becoming recommendations for administrations at all levels.

The e-government reference server¹⁴ set up by the provinces is the main reference point for administrative bodies from different levels and a communication platform for the working groups. It is used for the publication of working papers, draft and final documents of specifications and conventions. By this the reference server has become a repository for interoperability standards and solutions relevant to local and regional administrations.

3.2.3 WHO - Main Actors in eGovernment, Local Government and Interoperability

The Federal Chancellery, the provinces and the associations of local authorities and municipalities are the main actors in Austrian e-government on local level. The provinces exercise legislative and executive powers as sub-national units and there are very few legally binding obligations for co-operation between the Federal government, the provinces and local authorities. For this reason, voluntary cooperating bodies have been established in which provinces and local authorities participate:

Platform 'Digital Austria'

Senior representatives of the regional and local governments participate in the Platform 'Digital Austria', which is responsible for devising integrated e-government strategies headed by the Federal Chief Information Officer. The objectives and roadmaps adopted by the Platform are thus also valid for regional and local governments. These orientations are then translated or included into regional and local strategies, for which regional States and Municipal Governments are responsible.

The Platform 'Digital Austria', set up in 2005, supports the elaboration, monitoring and implementation of horizontal e-government projects involving all layers of government (federal, regional, local). Its tasks include allocating responsibility for the preparation of implementation projects, and monitoring current work and implementation projects of participating organisations.

E-Government Working Group of the federal, regional and local authorities

Responsibility for the implementation of eGovernment lies with individual state and municipal governments. In order to create synergies, working groups open for representatives of the federal, regional and local authorities have been set up. The open participation enables the federal administration, regions, the Austrian Association of Cities and Towns and the Austrian Association

¹⁴ <http://www.ref.gv.at>

of Municipalities to address interoperability issues and develop joint solutions. The required transparency is ensured by a common information and communication platform.

Austrian Association of Cities and Towns

The Austrian Association of Cities and Towns (Österreichischer Städtebund) represent the interests of large municipalities in Austria. It has 248 members among the total of 2,359 local authorities in Austria, representing approximately 55% of the total population of the country. It has set up some 30 technical committees to explore innovative measures and programmes adopted by the towns and communities, develop statements regarding new legislation and discuss the implementation of new policies. E-government is currently one of its main areas of focus.

Austrian Association of Municipalities

The Austrian Association of Municipalities (Österreichischer Gemeindebund) is the legal representation of the interests of smaller and medium-sized municipalities in Austria. 2,346 municipalities are members of the association.

3.2.4 HOW - IOP Strategy Implementation Through Broad Programmes

Communication Architecture Working Group

According to the Austrian e-government strategy, e-government applications have to be developed with interoperable communication in mind. The main objective is to avoid incompatible solutions and divergent parallel developments. The implementation of different interfaces in e-government applications will result in enormous effort and bad quality if sub-functions are integrated. Therefore several sub-working groups are cooperating in the Communication Architecture group with the task of adapting the different interface components between the Federal Administration, Federal States and municipalities.

The working group Communication Architecture is developing specifications for the interoperability of Austrian e-government based on existing and international standards (XML, web services, SOAP, etc.). These standards operate system-independent interfaces that are used by e-government applications on all levels of the administration.

The results of the various working groups are published at the mentioned reference server. Target groups of these specifications are primarily the corresponding project managers of the regional authorities and communal IT service providers. The following specifications have already been developed:

- MOA-ID (online identification and authentication)
- MOA-SS/SP (electronic signature)
- MOA-ZS (secure electronic delivery of official notifications)
- Internet Policies (domains, e-mail, signatures, certificates, etc.)
- Closing dialog for online requests
- XML specifications for
 - Searching with Web services (XML-sw)
 - Entry protocol (XML entry protocol)
 - Consistent schema for the electronic exchange of records (EDI AKT)
 - Consistent schema for personal data and organizational data (XML-persondata)
 - Electronic notification (XML notification)
- Consistent description of errors and standardized error messages during SOAP transmissions (SOAP faults)
- Form style guide for the consistent design of online forms

- EPS2 standard for electronic online payment

3.2.5 WHAT - Examples of Projects that Promote IOP at the Local Level

Portal Group

The portal group is a link-up of administrative web portals for the purpose of joint use of the existing administrative back office resources and applications like for example official registers. The interconnected system enables participating organisations to use their own user administration for accessing applications of other administrative bodies. The operators of these applications do not need to administrate user accounts for external users who want to use the applications. Instead providers of portals and applications sign the so-called Portal Group Agreement (PVV), which specifies that the application provider delegate authentication and authorisation of access to external portals (Base Portals). This portal operator assigns these rights to his own users. The portal operator has the duty to administrate the access rights to external resources with appropriate care and in accordance with data protection regulations. Still, which application is made available via which other portals is determined by the operator of the application.

The portal group is one result of the good cooperation between the federal, regional and local public administrations. The advantages are reduced expenditure for the user administration and simpler management of access rights as a result of single sign-on. The maintenance of many parallel directories is no longer necessary.

The application and base portals are web applications communicating over HTTP or SOAP protocols. The so-called Portal Group Protocol is a standardised set of data fields for the communication between the portals. The protocol is maintained and reviewed by a working group consisting of representatives from all levels of the administration. The technical specification of the protocol is available for all interested parties. Participation in the Portal Group on the other hand is limited by the legal provisions of the Portal Group Agreement.

LDAP.gv.at directory service

LDAP.gv.at is a central directory service that in its final stage is planned to hold data objects of the entire Austrian public administration (local authorities, regions, Federal Ministries, self-governing bodies, etc.).

The specification LDAP.gv.at describes the data model of the administrative system (organisation, organisational unit, personnel, user rights). It was developed by a working group consisting of participants from the federal ministries and the provinces. Beside the central directory, the data model is also used for local directories (e.g. of the federal provinces) to ensure interoperability between local and central directories and allow the replication of data to and from the central directory service. By this local directories can use LDAP.gv.at as a central hub for the distribution of data.

The directory service is an infrastructure service that can be used by a number of systems and applications, e.g. it can be used for single sign-on to administrative applications in the Portal Group. In the near future it will contain the information on users, applications and rights that has to be exchanged online between the portals e.g. when an application owner delegates access rights to a base portal operator who can then grant these rights to his users.

Although the LDAP directory has been devised for the Austrian administration, denominators and list values are defined in English to facilitate interoperability at the European level.

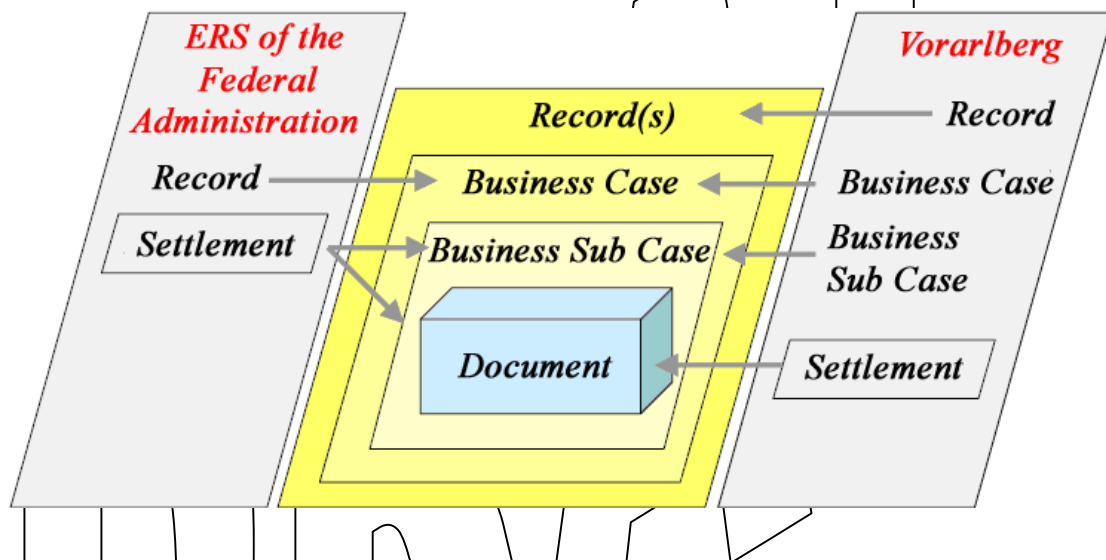
EDI AKT II

Ediakt defines a format for the communication between two partners e.g. authorities, court of law, companies, citizens, etc. using records, business cases and sub-cases including documents. This standard for electronic file exchange will be usable on all governmental levels (local, regional,

national) as well as by business and citizens. EDIAKT II is an XML-Scheme that describes electronic files, their internal structure and attributes. It allows the exchange of electronic files, business cases and business processes among all Austrian office information systems (KIS) and the electronic filing system (ELAK). It will also be the standard for long-term archiving.

The federal structure has led to differences among the various authorities on the different levels in terms of the implementation of business rules, applications providing electronic data exchange, services and workflows as well as technical equipment. The EDIAKT standard ensures interoperability between the different electronic filing systems. By this for example, files from the ELAK filing system of the federal administration can be transferred to the office information system of a province.

To allow all administrative bodies to use the EDIAKTII format, a viewer was developed to read EDIAKTII files. The software is part of the free EDIAKTII package. By this, even administrations without workflow or office information system can open and read electronic files.



Help.gv.at

The federal structure of the Austrian state also has had great influence on the concept of the national portal Help.gv.at. Besides being an information portal for citizens and businesses, Help has also become the main transaction portal for local authorities. The rationale behind that strategy is that the more than 2000 local authorities should have a common one-stop-shop platform for e-government services. Without a central portal the implementation of local level e-government services is practically impossible.

Within the administration, Help.gv.at supports the transfer of electronic forms to electronic record systems and to automated procedures. Each Help Partner receives the form data in a standardised XML format suitable for printout and manual processing or for automated processing in office information systems. From the view point of the local communities Help is a central forms server and distribution hub for official applications.

One of the next steps in the development of Help.gv.at will be the exchange of information about local administrations and service. The organisational information and descriptions of the services available will be aggregated at the Help portal. This requires standardised descriptions of services and organisations. Help is planned to receive data about local organisations from the federal countries and store this data in the LDAP directory service.

Service Catalogue of the Austrian Administration

The E-Government Working Group of the federal, regional and local authorities is currently working on a catalogue of products and services of the Austrian administration. Due to the federal

structure of the Austrian state the services of local administrations despite being similar at the core, differ broadly from each other e.g. in terms of terminology used, information required on application forms or online availability. The aim of this catalogue is to have a formal model for standardised descriptions of all administrative products and services of the nine federal countries. Each service entry will be associated with meta-information (e.g. group of services), the corresponding life situation, a textual description and the required online forms. The entries in this service directory are not only eServices but also offline services. To have standardised descriptions paves the way for defining standardised and semantically interoperable processes. Published process models of reference or best practice processes can help local authorities with the modernisation and digitisation of their services.

Form Style Guide

The Form Style Guide contributes to a standardised layout for web forms. No particular form is prescribed by statute but the authorities should design their Web forms in keeping with the requirements of the Style Guide. The consistent use of standardised forms offers the entire public administration an opportunity to present a uniform image to the outside world. At the same time, synergies can be produced when drawing up forms. The present diversity of layouts will be replaced by a standardised form and old forms will gradually be adapted to the new standards.

Public administration has declared its intention to provide non-discriminatory access to its electronic services. Web forms are often the key to such open access. The Form Style Guide lays down minimum requirements to be met by the public authorities with respect to the graphic design of their Web forms. One of the minimum standards imposed is conformity with Level A of the internationally established WAI Guidelines and the W3C HTML/XHTML standard.

The Style Guide is continuously updated by a working group composed of representatives of the Federal Government, the provinces, municipalities and local authorities. Together with a description and provision of standard data to be contained in e-government forms, the Style Guide serves as a basis for a uniform layout of electronic forms for Austrian public administration.

3.2.6 References and Links

<http://www.ref.gv.at/>

<http://www.ref.gv.at/Kommunikationsarchitektur.265.0.html>

<http://www.ref.gv.at/Verfahrensvernetzung.200.0.html>

http://www.ref.gv.at/EDIAKT_II.599.0.html

<http://reference.e-government.gv.at/Styleguide.299.0.html>

3.3 Status Report 2 (enhanced): Estonia

3.3.1 Overview

One of the main objectives of the Estonian information and communication technology (ICT) policy in the coming years is to make state information systems citizen-oriented and service-based. Information systems have to be integrated into a single logical whole serving the population and different organisations. To this end, it was found necessary to agree – on the state level – upon clear rules and agreements, and to use common middleware.

During the last couple of years, a public key infrastructure (PKI) has been built and several user-oriented portals, such as <http://www.riik.ee>, <http://www.eesti.ee>, <https://www.eesti.ee>, have been developed in Estonia. In addition, a data exchange layer called X-Road has been created. The present <which framework, the interoperability framework or e-government framework ???> framework generalizes and gives a systematic overview of the positive developments of state information systems.

In order to implement the interoperability framework, the state has to be citizen-centred and its information systems must be service-based. Besides, as a member state of the European Union (EU), Estonia has to ensure interoperability of its information systems with those of other member states. Though the functioning of state information systems is targeted at achieving the same rationality as applied to private sector information systems, sharp differences between the state and the private sector remain. It is not the state's aim to "sell" services, but to ensure their expediency. It is presumed that in the nearest future, information systems will enable to perform several operations from one and the same place, e.g. service users will no longer have to visit officials and search for websites. The efficiency of public sector information systems cannot be measured by the same indicators as those of the private sector (e.g. return on investment). In terms of integrated service provision, public sector information systems have to serve as pathfinders for private sector information systems. Participation in the development of state information systems through public procurement and meeting the needs of the state as a whole poses a considerable challenge for the Estonian IT sector.

Institutions are autonomous as to the IT architecture and interoperability principles within their internal information systems, but when launching new IT projects, central and local government institutions have to follow the principles of the interoperability framework.

The second and third versions of the framework have been elaborated by IT experts of central and local government agencies and private sector organisations. The work of the expert group was led by the Department of State Information Systems of the Ministry of Economic Affairs and Communications.

3.3.2 WHY – eGovernment, Local Government and Interoperability Strategies

Interoperability denotes the ability of information systems and of the business processes they support to exchange data and share information and knowledge.

The Estonian IT interoperability framework is a set of standards and guidelines aimed at ensuring the provision of services for public administration institutions, enterprises and citizens both in the national and the European context.

The IT interoperability framework and the related documents are obligatory in order to ensure mutual communication between the information systems of central and local government agencies. The framework documents cannot, however, be regarded as legislation. The obligatory nature of the framework is expressed through the following aspects:

- The framework and the related documents go through a consultation period during which central and local government agencies, the private sector, third sector organisations, as well as private persons can submit their proposals. Thus, the obligatory nature of the

framework derives from the fact that the document serves as an agreement between different stakeholders.

- Pursuant to the Government of the Republic Act, the Act on the Databases of the State Information System (draft), and "The Principles of the Estonian Information Policy", co-ordination of the development of state information systems is assigned to the Ministry of Economic Affairs and Communications. The interoperability framework and the related documents are the basic documents of the state information system.

The following documents have been taken into account when drafting the Estonian IT framework:

- political decisions and legislation of the Republic of Estonia;
- "The Principles of the Estonian Information Policy 2004-2006", approved by the Government of Estonia;
- the EU Interoperability Framework and the related documents.

The Estonian IT interoperability framework serves as:

- guidance for those elaborating concepts for country-wide information systems;
- guidance for IT project managers in the public administration for elaborating concepts for the information systems of their institutions;
- an aid for organising public procurements.

The aim of the IT interoperability framework is to increase public sector efficiency in Estonia by improving the quality of services provided to citizens and enterprises both at national and the EU level. The specific objectives of the framework are the following:

- to facilitate and, consequently, implement the transformation of institution-based public administration into a service-centred one, where all citizens can communicate with the state without knowing anything about its hierarchical structure and division of roles;
- to reduce public sector IT expenses through a wide use of centrally developed solutions;
- to improve the interoperability of new IT projects through co-ordinated use of centrally developed infrastructure, middleware (public key infrastructure (PKI), data exchange layer X-Road, citizen's environment etc.) and open standards;
- to improve the co-ordination and management of state information systems and to accelerate the development of IT solutions;
- to contribute to the co-development of the state information system;
- to allow autonomous development for all systems within the principles of organisational, semantic and technical interoperability;
- to ensure free competition in the area of public procurement.

The state of the IT interoperability framework is examined from three aspects: organisational, technical and semantic interoperability.

The framework does not attempt to provide clear solutions to all IT-related problems in the state. The transformation from the institution-based world to a service-centred and citizen-oriented one is a longer process, necessitating changes in the legislation and in the organisation of public administration activities. Activities that do not require creative intellectual work by human beings should be detached from the typical activities of the public sector. The current version of the framework does not aim at describing new ways of governance that the development of information society brings along, but seeks to determine the rules, trends and principles necessary for the development of such a society from the viewpoint of information systems.

The first version of the framework was published in 2004, while the second in 2005.

Key principles of the state IT interoperability

- The institution-based approach should be replaced by service-centred one;
- public services (including nested services) are provided free of charge for public sector institutions;
- the development of information systems is based on internet-centred approach;
- XML-based technologies are used for the integration of information systems and the presentation of data;

- information systems provide and use services via a data exchange layer based on multilateral agreements;
- course will be taken towards wider use of open standards;
- in developing information systems, open source based solutions are considered alongside proprietary ones;
- access to public services should preferably be ensured via a web browser by different channels and devices;
- all services requiring user authentication and authorization exploit the secure middleware X-Road for data transport;
- the authentication and authorization procedures of civil servants are based on the use of the Estonian ID card;
- as a temporary alternative, authentication mechanisms of internet banks can be used for citizen authentication;
- central and local government agencies co-operate in order to ensure the provision of information and services for citizens, officials or entrepreneurs from one place, without need to know anything about the subordinating system of the executive power or the division of roles therein.

3.3.3 WHO - Main Actors in eGovernment, Local Government and Interoperability

In the context of information systems, organisational interoperability means the ability of organisations to provide, by using information systems, services to each other as well as to the general public.

Organisational interoperability is based on the following principles:

- All interoperable institutions are autonomous organisations with a specific technological architecture.
- All connections between institutions are based on multilateral agreements; if possible, bilateral agreements are avoided.
- Private sector bodies and non-governmental organisations participating in the state interoperability framework own the information and/or data they create or obtain. Data in the state information system is owned by the state. Responsibility for the structure and content of data lies with an organisation administering the respective data either as a chief or an authorised processor of data.
- In data exchange, legal restrictions as well as organisational capacities are taken into account.
- Interoperable institutions exchange information by user authorisation.
- Each institution determines access restrictions within its own information system. The use of nested services is agreed on between institutions.

The non-hierarchic co-ordination system in Estonia ensures that necessary decisions can be made as close to the level where they occur as possible.

Pursuant to the Government of the Republic Act, co-ordination of information systems as well as elaboration and implementation of economic policy in the field of informatics are assigned to the Ministry of Economic Affairs and Communications. The implementation of the information policy is based on annual information policy action plans, which state responsible authorities, measurable performance indicators, and evaluation of finances.

The responsibility for the implementation of the information policy lies with the **Department of State Information Systems (RISO)** of the **Ministry of Economic Affairs and Communications** together with the implementing agency under its jurisdiction – the **Estonian Informatics Centre (RIA)**. RISO is responsible for the policy formulation, while it is RIA's task to ensure the implementation of the policy. In order to determine the responsibilities of different institutions for various initiatives, an overview is given below about concrete fields of responsibility of different organisational units.

Sectoral information systems

In accordance with the principle of subsidiarity, sectoral information systems are developed and administered independently by ministries and agencies in their field of administration. Responsibility for different fields of actions is divided between various state institutions:

Education, research and development (Ministry of Education and Research, Ministry of Economic Affairs and Communications): extensive training for the population will be increased so as to ensure their coping in the information society and guarantee readiness for making use of IT solutions.

Enterprise development (Ministry of Economic Affairs and Communications): promotion of pre-conditions necessary for the development of eBusiness.

Culture (Ministry of Culture, State Chancellery): development of a national database (eCulture) that would allow the integration of national information resources and the development of information services; development of digital archives; collecting digital information of archival value; digitisation of records as cultural heritage.

Health care (Ministry of Social Affairs): development of the eHealth project; modernisation of the health care system by implementing modern IT solutions.

Environment and spatial data (Ministry of Environment): aggregation of environmental data into a general national register; processing information related to land and geographic location, issuing guidance for the performance of public sector activities in the field of geoinformatics.

State and local government administration

- **State Chancellery** is responsible for the modernisation of electronic document management and development of digital archiving in the public sector;
- **National Electoral Committee** is responsible for the development of e-voting and eDemocracy;
- **Ministry of Interior** is responsible for increasing administrative capacity as well as for the development of Police and Border Guard information systems;
- **Ministry of Finance** is responsible for the readiness of IT systems for the administration of the EU structural funds, and for the development of the eTax and eCustoms Board;
- **Ministry of Foreign Affairs** is responsible for promoting Estonia in the world by using modern IT solutions.

In ministries, the development of information systems is co-ordinated by ministries' IT councils, which make proposals to their IT development strategies and, proceeding from the information policy and respective action plans, drafts measures for their implementation. IT councils are established by directives of ministers, while the council's work format (its members, frequency of its meetings etc.) are left to its own discretion.

At regional level, ICT development is co-ordinated by IT councils established at county governors' offices. County IT councils organise the elaboration of county IT strategies and, proceeding from the information policy and respective action plans, draft measures for their implementation.

3.3.4 HOW - IOP Strategy Implementation Through Broad Programmes

The basic policy document in the field of information society in Estonia is the „Principles of the Estonian Information Policy“, the current version of which is coming to an end in 2006. Thus, a new strategy that also takes into account the objectives and priorities of the EU information strategy i2010 is currently being elaborated by the Ministry of Economic Affairs and Communications.

The implementation of the Estonian information policy is based on annual information policy action plans, which set out concrete activities, responsible authorities, expected outputs, and evaluation of finances.

The priority fields of the information policy action plan 2006 are the following:

1. **Geoinformation systems:** development of geoinformation services so as to ensure their ease-of-use and to make digital cards available for all authorised users and other information systems.

Responsible authority: Ministry of Environment

2. **Document management and digital archiving:** increasing the share of electronic document management and launching digital archiving in order to ensure faster, easier and more convenient management of public business.

Responsible authority: State Chancellery

3. **Reorganisation of the population information system:** Pursuant to the Population Register Act, the register has to ensure the collection of main personal data of Estonian citizens and aliens, who have obtained residence permits in Estonia for the performance of functions of the state and local governments.

Responsible authority: Ministry of Interior

4. **Administration system for the state information system (RIHA):** development of a new administration system for the state information system. RIHA will be an integral system covering all components of the state information system, administrating their metadata, providing services, and performing, to the extent provided by legislation, the administrative function of support systems.

Responsible authority: Ministry of Economic Affairs and Communications

5. **Development of social welfare information systems:** consolidating the performance of social welfare functions into an integral service-based system and improving, in co-operation with state agencies dealing with employment and health matters, the quality of service provision to citizens.

Responsible authority: Ministry of Social Affairs

6. **ICT in education and research:** supporting the follow-up to the TigerLeap programme and the Tiger University+ programme, the Estonian Grid project, the Estonian Research Information System project and the Estonian School Information System project.

Responsible authority: Ministry of Education and Research

7. **eInclusion and broadband strategy:** ensuring for all Estonian citizens benefits related to the use of computers and the internet, and increasing, thereby, Estonia's competitiveness and the creation of new jobs. This priority field mainly includes activities aimed at increasing the supply and availability of fast internet connections, while matters related to the demand-side are dealt with in other fields of the current action plan.

Responsible authority: Ministry of Economic Affairs and Communications

8. **eProcurement:** digitising the whole public procurement process, beginning from tender notifications to signing of contracts.

Responsible authority: Ministry of Finance

9. **Presentation layer for the state information system:** creation of a single point of entry that would ensure standardised access to e-services provided by the public, the private and the third sector, and would lead to:

- improved quality of service provision by uniform and centrally provided e-services;
- increased efficiency in the public sector as a result of the re-use of similar functions and the elaboration of a framework suitable for the standardised presentation of e-services.

Responsible authority: Ministry of Economic Affairs and Communications

10. **eSecurity:** development of a co-ordination mechanism for the management of IT security matters and organisation of respective co-operation. This priority field also includes awareness-raising activities in the field of IT security both for the public sector and for the whole society.

Responsible authority: Ministry of Economic Affairs and Communications

11. **eBorder:** joining the Estonian border control information system with respective EU systems.

Responsible authority: Ministry of Interior

12. **Co-ordination of the state IT policy and the respective EU co-operation:** ensuring that the co-ordination, implementation and monitoring of the priority fields set out in the action plan would be carried out in accordance with common principles.

Responsible authority: Ministry of Economic Affairs and Communications

13. **Electronic legal protection** is a set of projects aimed at the development of e-services for citizens and the creation of an ICT working environment for law-enforcement authorities in the jurisdiction of the Ministry of Justice and the Ministry of Interior.

Responsible authorities: Ministry of Justice, Ministry of Interior, Police Board

14. **Digitalisation of cultural heritage** is a project integrating several sub-projects that aim at the protection and preservation of the Estonia cultural heritage and rendering it accessible for all by means of modern IT solutions.

Responsible authority: Ministry of Culture

15. **eHealthcare:** development of an intelligent patient-centred environment and creation of e-services that would enable the collection, processing and preserving of health-related information irrespectively of an individual's location, time etc.

Responsible authority: Ministry of Social Affairs

16. **Environmental Register:** integration of environmental data into the register to an extent provided by legislation, updating the Environmental Register Act and ensuring the functioning of databases necessary for data exchange.

Responsible authority: Ministry of Environment

3.3.5 WHAT - Examples of Projects that Promote IOP at the Local Level

3.3.5.1 *X-road as the Main Backbone of Estonian State Information System*

The project was initially launched for linking Estonian state databases to the common data resource accessible over the internet. After the successful start of sending database queries and answers over the internet, the X-Road environment was expanded to send all kinds of electronic documents in XML-format securely over the internet. Furthermore, X-Road became the skeleton for all eGovernment services. The main backbone of the eGovernment environment is the X-Road network of distributed and central servers. The eGovernment project itself started in parallel to the X-Road infrastructure project and the ID card and PKI projects were launched in parallel to the development of some back-office information systems. Of course, there was a set of information systems already developed before.

The essence of the eGovernment is that different information systems communicate with each other via security servers (SS), which are built up as special firewalls storing all the messages (queries, services) in logs. This means that after a long period of time it would still be possible to restore past situations, e.g. who has used the service and when, as well as what kind of decisions have been made in a particular context.

In the eGovernment environment, information systems provide and also consume services. Estonian commercial banks (more precisely Hansapank, SEB Eesti Ühispank, Sampo Pank, Krediidipank and Nordea Pank) are playing three different roles in the eGovernment schema. First, they provide portals (connected to the eGovernment environment) with the authentication service for citizens. This is because all Estonian citizens do not possess the ID card yet, but more than half of the population already has contracts with commercial banks for using internet bank facilities. The authentication mechanism provided by banks is considered as trustworthy as that based on the ID card and valid for using eGovernment services. Second, some of the services are

charged for and, therefore, a solution has been developed for paying these charges. At first, the citizen transfers money to the bank and right after the transfer the e-service will start automatically. Third, the banks themselves are users of data and e-services and they are using this environment just like any other information system.

The X-Road centre is actually the heart of the eGovernment environment as all central servers (central monitoring server, certification server, etc.) of the whole network are connected and located in that centre. The centre employs special staff for managing eGovernment hardware, software, internet connections, agreements, etc. A new central register of databases was added to the X-Road centre at the beginning of 2005. On one hand, this register includes the description of all Estonian public sector registers and databases. On the other hand, the register gathers all descriptions of e-services in WSDL (Web Service Description Language) format, which enables to develop different automatic tools by using the library of e-services for automatic generation of new services on the basis of these descriptions. This provides a new opportunity for doing research and development projects in the near future.

The Estonian Certification Agency (CA) is responsible for the developments related to the ID card, digital signature, and other PKI infrastructure elements in Estonia.

Direct communication between citizens and the eGovernment environment works over a set of communication portals: the Citizen Portal, the Entrepreneur Portal, and the Civil Servant Portal.

3.3.5.2 eVoting in Estonia

Though small-scale pilots on internet-based voting have been carried out in several countries, the number of those having been able to confirm the valid internet-based votes is still small. In Estonia, internet-based voting was used during the local government elections in October 2005. For the first time, the new kind of voting was applied countrywide.

The development of the Estonian eVoting system was started in 2003 with an objective to provide voters with an additional opportunity to cast their votes, raising thereby voting activity and voting convenience. eVoting does not replace the traditional methods of voting: each voter can decide himself, whether he votes electronically or in a traditional way.

Legislative framework for of eVoting was put in place in 2002 and, thereafter, the National Electoral Committee decided to launch a project targeted at the development of an eVoting system. The objective of the project was to enable eVoting during the local government elections of 2005.

By the end of 2001, ID card enabling secure personal authentication and digital signing as well as the public key infrastructure (PKI) necessary for that had been developed in Estonia. ID cards had been issued since January 2002, and by October 2005, the respective figure was about 850.000. Thus, most of eligible voters (1.06 million) had the national ID card.

eVoting took place during advance polls and ID cards were used for voter authentication. Only authenticated people with the right to vote were able to cast their vote, meaning that a database of citizens with the right to vote was developed prior to elections.

eVoting followed all principles characteristic of traditional voting. In order to avoid the influencing of voters there was a possibility of electronic re-vote – e-voter could cast his/her vote again electronically. Only the last vote was counted. Additionally priority was given to traditional means of voting (with paper ballot) – if the voter went to polling station during advance polls and cast a vote, his or her e-vote was deleted.

More information about the principles of the Estonia's eVoting system as well as its technological solutions can be found at the web site of the National Electoral Committee: <http://www.vvk.ee/engindex.html> .

3.3.5.3 Reorganisation of Geoinformation Systems

For the reorganisation of public sector geoinformation systems (GIS), the Public Sector Infrastructure for Spatial Information based on OpenGIS standards is under elaboration. This comprises the network of related spatial data servers and provides the technological (software) base for integrating various spatial data into a whole. This way, the public sector geoinformation resources will be created, which will utilise interoperable datasets' network and ensuing synergy. It will facilitate co-operation between state agencies and enable to enhance the quality of citizen-oriented public sector services. For citizens, it will take very little effort and time to get answers to their queries or communicate with state agencies. Civil servants processing spatial data also spend considerable amount of time on preparing, gathering, approving, controlling and entering information and drafting responses. Automated data processing tools would simplify the work of civil servants, e.g. perform complex queries on different databases; compare data and check upon their quality; ensure compliance with data security requirements (confidentiality, integrity, availability, time-criticality); draft data exchange documents, etc. This way a lot of workforce could be saved and the quality of public and online services provided by the public sector agencies would increase.

Various procedures (e.g. public disclosure and adoption of plans, registering of cadastral units, issuing building permits, identifying environmental pollution, formation of new address units, etc.) produce a lot of (spatial) data about the same geographical location. The availability of such location-based information allows for better understanding and assessment of the region's value and thus enables to make respective public processes more transparent, i.e. civil servants can better administer and citizens and entrepreneurs can better monitor these processes and this way also participate in the administration process. One and the same region might often be involved in various plans. The question is how these different plans take account of each other and whether the outcomes are mutually consistent? Therefore, it is important that data (incl. the status of other registers) necessary for decision-making is always available and after the registration new data is accessible for other user groups. Consequently, when the amount of spatial data grows, the use and administration of such data becomes more complicated. Spatial data processing (incl. analysis, control, and updating) entails the simultaneous and immediate use of data from different data sources (different institutions and various servers). That is why spatial data have to be interoperable, semantically comprehensible and highly available. A large amount of data resulting from procedures or observations is entered in registers on a daily basis. This includes location data on the event or object(s). Generally, the normal user cannot control such data acquisition, i.e. the user is not aware of whether and what kind of information has been gathered. Therefore, it is ever more complicated to obtain an overview of the availability, quality, status, sources and conditions of use of (spatial) data. The solution is to make metadata (data about data) accessible for users. All in all, the implementation of rules for co-operation between spatial data administrators and the use of automation equipment ensuring the interoperability of databases is inevitable. The reorganisation of public sector geoinformation systems and the development of the Land Board's data services provide a solution for the above-mentioned problems. Other registers and state information systems should take advantage of the new spatial data infrastructure as well by taking into use available services and also by providing their own services.

3.3.5.4 ePolice

The objectives of the Police Board's project „Re-organisation of the general information system of the Estonian police and development of e-services“ are the following:

- to develop new services for citizens and organisations in order to facilitate the communication with the Estonian police (submitting applications, making enquiries, etc.);
- to increase the efficiency of police officers' work;
- to ensure better integration of the general information system with other information systems of the police;

- to improve the quality of data in police information systems.

The project is divided into six themes:

- development of e-services for individuals and organisations;
- development of the operational management information system;
- development of the information system for offence proceedings;
- development of the map server;
- development of the punishment register;
- development of a new architecture for the POLIS information system.

3.3.5.5 Motor Vehicle Registration Centre

The Estonian Motor Vehicle Registration Centre has launched several projects that aim to make the agency more customer-oriented and convenient both in the virtual and the physical world. Increasing the efficiency of ARK's internal processes is also of great significance in order to reduce irrelevant bureaucracy and leave more time for the performance of the organisation's core activities.

Information System For the Verification of State Fee Payments - TASU

The objective of TASU, to be completed by the end of 2005, is to ensure better handling of information about state fee payments. So far, clients have presented their payment orders on paper in ARK bureaus, after which the orders have been entered in a database. Such a system is time-consuming both for the front-line staff entering tax-related information in databases and for customers themselves, who must ensure that they have paper-based payment orders on them.

Paperless ARK

The objective of the „Paperless ARK” project is to digitalise a number of time-consuming and paper-based processes between ARK and its co-operation partners. For instance, the agency intends to allow scrap yards to digitally notify ARK about the classification of a vehicle as dismantled. Besides, the agency plans to make it easier for driving schools to send their student lists to ARK.

3.3.6 References for the Status Report

Abridgement of Estonian IT Interoperability Framework, version 2.0:

http://www.riso.ee/en/files/framework_2005.pdf

IT in Public Administration of Estonia 2005:

http://www.riso.ee/en/pub/yearbook_2005.pdf

Principles of the Estonian Information Policy 2004–2006:

<http://www.riso.ee/en/files/Policy.pdf>

Uuno Vallner E-Government Architecture and the Interoperability of Information Systems – Estonia's Example:

<http://www.ebaltics.com/QuickPlace/ebaltics/PageLibraryC2256A4D002A0ADF.nsf/18709652284132BAC2256A4E002DC32C/98A3EEF6A8CDE76DC2256F2C00269D72>

Uuno Vallner The Estonian IT Interoperability Framework

<http://www.ebaltics.com/QuickPlace/ebaltics/PageLibraryC2256A4D002A0ADF.nsf/18709652284132BAC2256A4E002DC32C/E003B13A1059C212C22571B7003ABD44Status>

3.4 Status Report 3 (enhanced): Germany

3.4.1 Overview

With the strong federal system in Germany with its 16 Federal States and its more than 14,000 municipalities and hence the power of the local and regional government level concerning the organization and provision of public services has lead to a dispersed structure with many actors. The general status by law is that individual Federal States (the German "Länder") and Municipalities are responsible for their own eGovernment strategies/policies. Most often, the public service provision is characterized by this federal structure. I.e. the Federal Government provides the guidelines, the Federal States act as legislators and convert these guidelines/framework conditions in federal-state acts, and the local authorities are then responsible for the service provision itself.

This has led to many differences in the procedures, processes and the technologies used among the public authorities in the past even if they have the same duties and responsibilities and provide the same services.

Of course, valuable achievements in interoperability on the local level require a minimum of cross-local organization. Some remarkable results are achieved within specific sectors and local networks based on local initiatives¹⁵; some are widely known to the public, some are not. However, main achievements enabling cross-local and cross-regional (incl. Federal States) outreach of interoperable services and structures in Germany are envisaged mainly by joint efforts of all government levels and their central associations in certain initiatives and projects, like e.g. Deutschland-Online¹⁶. So far, interoperability on the technical layer on each government level has been achieved by introduction and linkage of public authorities to a technical network (Behördennetze). A main objective in Germany is to network the municipalities to a German wide authority network technically based on TESTA-D, the German extension to the European authority network.

Due to the strong federal structure in Germany, emphasis has especially to be given to the cross government level co-operations. To come to results, i.e. interoperable structures valuable for all Germany, all actors respectively their associations representing their interests have jointly to coordinate and cooperate. This has been recognized and can especially be seen in the most relevant initiatives and projects like Deutschland-Online in particular OSCI-XÖV (XML in Public Administration) where representatives of all relevant actors work together. In this framework standards and products are developed following a 'some for all' principle, i.e. some do the developments and provide them to others without bureaucracy or all parties make their contribution to a certain development. With the Committee for Automatic Data Processing at the Federal, Federal-State, and Local Level (KoopA ADV) an important actor exists which combines the interests and knowledge of all administrative government levels. Even if the KoopA ADV has been founded in 1970, in terms of eGovernment interoperability it can now also be seen as an answer to the federal structure and the dispersed and inherent interests of its actors in this regard. It is the only body where joint principles of the use of information and communication technologies (ICT)¹⁷ and important ICT projects of the public service are discussed. Therefore, KoopA ADV can be seen as the most important actor in terms of interoperability in the public administration when all government levels are concerned. Various initiatives and programs have been started and/or coordinated by this body and important results achieved.

The analysis of Germany will also focus on four key Questions:

¹⁵ e.g. the Civil Registration Project MOIN! in Lower Saxony or the Regional Network of Bremen and Lower-Saxony and many more; see also the WHAT chapter

¹⁶ see the projects and strategies in the 'HOW' chapter

¹⁷ like the architectural model for interoperability in eGovernment applications (see below)

(Why?) Its starting point are important initiatives and project that form the German eGovernment strategy, (How?) delivered via ambitious cross government level projects and programs, (What?) which have spawned a number of projects, initiatives, standards and final products that are currently in its development or implementation phase or are already available at no cost for local authorities to take up and exploit.

3.4.2 WHY – eGovernment, Local Government and Interoperability Strategies

Due to the federal structure there is no settled common eGovernment or Interoperability strategy in Germany. With its "Modern State – Modern Administration" programme of reforms initiated in 1999, the Federal Government embarked on a comprehensive modernization of the federal administration. The programme brings together the three most important fields of action under one roof: modern administrative management, bureaucracy reduction and eGovernment. Together they constitute a firm foundation for reforms and innovation in public administration.

With **BundOnline 2005**¹⁸, the Federal Government set up its eGovernment strategy, which actually has been the largest eGovernment programme in Europe. BundOnline 2005 was launched at the Hanover EXPO in September 2000 with an ambitious goal: to make all Internet-compatible services of the federal administration available online by the end of 2005. In summer 2001, the Federal Cabinet assigned the Federal Ministry of the Interior (BMI) the responsibility for coordinating this initiative and providing support to the other federal ministries. In particular, the coordination of this initiative was assigned to the Coordination and Advisory Agency for IT in the Federal Administration (KBSt).

BundOnline 2005 has been a major element of the Federal Government's policy for the development of the Information Society of Germany. It was designed to ensure that citizens, industry, academia, as well as other administrations can use the services of the federal administration more simply, rapidly and cost-efficiently. At the end of the initiative, BundOnline 2005 has greatly advanced central, task sharing, networked IT infrastructures and services within the federal administration. As an inter-ministerial project, the initiative has made a major contribution to modernizing federal IT and demonstrated how this modernization effort can be carried on in the coming years. Central was that the need for the determination for interoperability policies, technical standards and organisational requirements for online federal services was recognised and settled as well as the definition of the central components that need to be developed to be used by the whole federal administration. For this reason, technical standards and principles of integration were drafted in the "Standards and Architectures for eGovernment Applications" (**SAGA**) from the start of the BundOnline 2005 initiative, and model processes and architectures for specific types of services were added over time. SAGA played a key role in the development of the basic components and most of the BundOnline service projects and prepared the way for a uniform IT landscape at federal level (and beyond) on the basis of open standards. The "X" standards developed as part of the Deutschland-Online strategy (**XÖV**)¹⁹ constitute a necessary addition to SAGA in terms of standardizing data formats and with the aim of enabling interoperable eGovernment in Germany. The goal set in the initial implementation plan to make available all online capable services of the federal administration by the end of 2005 was successfully achieved. By the time the initiative concluded on 31 December 2005, 440 services were available online. Many of these services significantly reduce bureaucracy and represent a modernization of public administration.

The successful completion of the BundOnline 2005 initiative lays the groundwork for modern, IT-assisted federal administration. E-government has helped provide new channels of access to administrative services, reduce media discontinuities, speed up processing and increase transparency, allowing the state to offer services for individuals and businesses in a more efficient and client-oriented way.

¹⁸ www.bundonline2005.de

¹⁹ see also below in this chapter

Beside the organisational and technical achievements of the BundOnline initiative, another major element which promotes and - at the same time - is the basis of the implementation of the BundOnline objectives are the **technical networks** of the federal authorities (Informationsverbund der Bundesverwaltung (IVBV)). The IVBV builds the technical backbone enabling the realisation of independent and closed data networks for federal authorities. Hence, the IVBV aims at linking the existing technical networks of the federal authorities among themselves and in addition, in the framework of TESTA (Trans-European Services for Telematics between Administrations), also with other authorities on the European level and with authorities of the German Länder (TESTA-D). I.e. from a technical perspective there is the strategy in Germany to connect all federal authorities via a common gateway and to open this gateway also for the authorities of the "Länder" that, so far, mainly run their own authority network. As the BundOnline initiative, the maintenance and enhancement of the IVBV is coordinated by the KBSt²⁰, the main actor on the federal level in terms of eGovernment on the federal level. Assisted and consulted is the KBSt by the federal authority responsible for IT-security (Bundesamt für Sicherheit in der Informationstechnik (BSI)) and by external service providers.

Beside their technical network generally linking their authorities on the federal-state level ("Länder") and with the local authorities, the **Federal States generally set up their own eGovernment strategies**, master plans, roadmaps or similar containing their individual objectives and implementation schedules. Some give more attention to eGovernment issues with more challenging objectives to be achieved with detailed schedules, some less. However, the more cities and municipalities a Federal State has, the more diversified are the inherent interests and technical equipment as well as the organization of service provision and the more complex is it to harmonize processes and technologies and come to benign compromises within this Federal State. Much easier therefore is it for the city-states, i.e. where a Federal State consists only of one or two cities with closer communication structures. However, in order to start to overcome this diversified structure in Germany towards common developments and commonly used standards, a main initiative in Germany is to be mentioned. This initiative will allow for the savings of resources mainly concerning the development of eServices as not every municipality or Federal State has newly to 'invent the wheel'; i.e. developments will be shared among the various actors. And moreover, in a joint process, standards are to be defined that specifically shall support and warrant the syntactic and semantic interoperability of eServices and their authorities behind. This initiative is 'Deutschland-Online' and has started in June 2003, which, in comparison to BundOnline or other eGovernment initiatives on European level, is to be seen as rather late:

Deutschland-Online²¹

The assumption behind Deutschland-Online is that good eGovernment requires the comprehensive integration and optimisation of administrative processes – on and across all administrative levels. As outlined above, the obstacle in Germany is to be seen in the heterogeneous IT landscape of the Federal Government, 16 Federated States, over 323 counties and more than 14,000 municipalities. Different authorities have developed different IT applications for the same purposes; the authorities on the different government levels operate thousands of websites that are hardly integrated; consistent electronic processes among them are still the exception rather than the rule; and the fragmented public investment in IT hence can't be seen as being used optimally. Such fragmentation, if not addressed, could lead to the development and implementation of expensive, isolated and redundant technology solutions and processes. In order to avoid these risks and foster proper coordination and cooperation between the Federal Government, the "Länder" and the local authorities, the Deutschland-Online joint strategy for integrated eGovernment was devised in June 2003. The Deutschland-Online initiative defines a view for a fully integrated eGovernment landscape in Germany and hence provides the framework

²⁰ see above and under the WHO chapter

²¹ www.deutschland-online.de/

for cooperation between all administration layers and to be created gradually and finalized by 2010. Thereby, the local authorities take part in the agreement through their representative associations. Deutschland-Online emphasizes that transferable best-of-breed solutions for the most significant services should be developed by leading state and local governments and then rolled out across the country. I.e. other partners benefit from this in that they will use these developments without central bureaucracy. With this decentralized concept and the principle of "Einige für alle" (Some for All), Deutschland-Online also aims at becoming a role model for cooperation on a European level. This approach stresses the importance of synergies for eGovernment in a highly federated state and is a challenging "bottom-up" approach developing cross-government service interactions. A more detailed overview on which elements Deutschland-Online is composed of, is outlined in the HOW chapter below.

3.4.3 WHO - Main Actors in eGovernment, Local Government and Interoperability

The main actors participating directly or indirectly in drafting and implementing IOP at the local and regional level in Germany are identified as:

Federal Ministry of Economics and Technology (BMWi)

The Federal Ministry of Economics and Labour²² launched in 1998 one of the most ambiguous eGovernment competitions in Germany - **MEDIA@Komm**. This competition aimed at gathering concepts concerned with the useful and efficient cooperation between "new media" and digital signatures in eGovernment on the local and regional level (incl. the federal-states level). After the successful completion of this project, the **MEDIA@Komm-Transfer** succession project has been initiated aiming at the transfer of the best of breed solutions to interested public authorities and their interoperable cross-linking. In this sense, the BMWi can be seen as promoter of eGovernment and interoperability whereby the responsibility formally is in the hands of the Federal Ministry of the Interior.

Federal Ministry of the Interior²³

The responsibility for Germany's eGovernment strategy/policy lies with the Federal Ministry of the Interior. The Ministry has set up in 2002 an office of the IT Director, which pools the tasks of the Federal Ministry of the Interior relating to IT policy and strategy, IT Management and IT security. It brings together the Coordination and Advisory Agency for IT in the Federal Administration (KBSt)²⁴, the Federal Information Security Agency (BSI)²⁵, the team in charge of the biometry projects for identification and travel documents, and the BundOnline 2005 Project Group. The BundOnline 2005/Project Group in the Federal Ministry of the Interior supports the Federal Ministries and authorities in the strategic planning, coordination and implementation of the BundOnline 2005 initiative.

In particular it's the **KBSt** which as an inter-ministerial agency of the Federal Government intends to ensure that the federal administration optimizes its use of information technology for specific fields and in organizational, economic and technical terms. The KBSt's current work rests on the

²² Since the launch of MEDIA@Komm, the structure of the Ministry changed and now the Ministry of Economics and Technology (BMWi) is in charge of MEDIA@Komm

²³ <http://www.bmi.bund.de/>

²⁴ see below

²⁵ The Federal Office for Information Security is the central IT security service provider for the German government. One of its key tasks is to provide support to federal authorities on IT security. In this regard, the BSI has defined interoperability specifications for the implementation and use of digital signatures.

"Guidelines for IT Use in the Federal Administration" adopted by the Cabinet in 1988. The KBSt advises federal authorities on their IT strategies and publishes recommendations on IT strategy and methodological guidelines for implementing such strategy. The KBSt also deals with issues of software architecture and its standardization and with the definition of interfaces. To perform its mission, the KBSt develops framework rules for the use of IT within the federal administration. Upon approval by the ministries in the Inter-ministerial Co-ordination Committee for Information Technology in the Federal Administration (IMKA), the KBSt publishes such rules as general recommendations. The central document on software strategy, Standards and Architectures for e-Government Applications (SAGA)²⁶, contains the standards for the federal administration and constitutes an essential compendium of knowledge for IT decision-makers. With its XML-strategy, the KBSt provides a "XML-infopoint" serving the exchange of experience among Federal and Federal-State authorities and to strengthen their knowledge and networking. Based on this aim, the XML infopoint provides access to information on running XML-projects in authorities of the State and the Federal States on its website.

Beside these and other tasks, the KBSt represents the federal administration in national and international bodies concerned with developing norms or standards or with representing the interests of IT users.

Federal-State Ministries responsible for eGovernment²⁷

The responsibility for eGovernment strategies/policies is differently organised within the Federal States. Most often the Federal-State Ministry of the Interior but also the Federal-State Ministry of Finance or others are concerned with this task. In order to allow for combined efforts in various topics across the Federal States, the 'Innenministerkonferenz' (IMK), a constant conference of the Ministers of the Interior, has been formed. There, a special working group (AK 1) deals with issues relating to eGovernment and interoperability. At one of its constitutional meetings, a project emerged which dealt with the reduction of red-tape in civil registration (Bürokratieabbau im Meldewesen) and which benefited the most advanced and successful standardisation project in public administration in Germany, XMeld, which is a standard by law for the interoperable exchange of civil registration data among registration offices²⁸.

The Committee for Automatic Data Processing at the Federal, State, and Local Level (KoopA ADV)²⁹

The Kooperationsausschuss ADV (KoopA ADV, ADV Cooperation Committee) - including the federal administration, the federal-state administrations and the communal lead organisations - is the only body where joint principles of the use of information and communication technologies (ICT) and important ICT projects of the public service are discussed. It is a platform where the States and the communal lead organisations can articulate their interests concerning questions of ICT applications in the public service and (with increasing importance) in EU projects.

Today, the KoopA ADV mainly deals with questions of the ICT infrastructure of the public service. Besides the observance of economic efficiency, the aim is to guarantee the interoperability of public services and to create uniform foundations for future applications areas of ICT in the public administration. A main concept is the architectural model for interoperability of eGovernment applications in the Federation, Federal States and on the local level in Germany³⁰. The main working areas are:

²⁶ see elsewhere

²⁷ http://www.bundesrat.de/Site/Inhalt/DE/3_20Konferenzen/3.2_20Innenminister-Konferenz/index,templateId=renderUnterseiteKomplett.html

²⁸ see also below in the WHAT chapter

²⁹ <http://www.koopa.de/>

³⁰ KoopA ADV 2003: Architekturmodell für Interoperabilität von e-Government-Anwendungen in Bund, Ländern und im Kommunalen Bereich in Deutschland. Ergebnis der vierten Sitzung der AG

- Development of the cross-border TESTA communication network of the public administration with links to the EU network
- Development of services for the exchange of electronic mail across state borders ('Verzeichnisdienste nach X.500', directory services according to X.500)
- Development of the data exchange standard OSCI for eGovernment applications. The KoopA is the contractor of the XML-based standard OSCI-Transport and issues the respective libraries in the JAVA and .net versions. The OSCI head office is engaged to develop further and coordinate the OSCI-XÖV (X Öffentliche Verwaltung, public administration), the KoopA being its decision-making body.
- Development of standards as a basis for electronic processing (encryption, electronic signature)
- In the framework of Deutschland.Online, the KoopA working group on eGovernment prepares the eGovernment meeting of the state secretaries.

Members of the KoopA are also the main actors participating directly or indirectly in drafting and implementing IOP at the local and regional level in Germany. These are

- the Federal Ministry of the Interior,
- the respective responsible Ministries in the Federal States,

and for the local level

- the KGSt - Kommunale Gemeinschaftsstelle für Verwaltungsmanagement (largest local government association in Germany to support them in all questions regarding local management),
- Deutscher Landkreistag (German County Association),
- the Deutsche Städtetag (German Association of Cities),
- Deutscher Städte- und Gemeindebund (German Association of Towns and Municipalities).

KGSt³¹

KGSt is the largest local government association in Germany, comprising approximately 1,600 municipalities, cities and countries including the four city-states of Berlin, Bremen, Hamburg and Vienna in Germany and Austria. Politically independent, the many activities include advising their members on all aspects of leadership, management, organisation and governance of local government. They initiate and promote the process of reform now ongoing in many municipalities. They support their members in developing progressive concepts of administration. This includes the New Public Management and progress in terms of interoperability among authorities.

The German County Association³², the German Association of Cities³³, and the German Association of Towns and Municipalities³⁴

There are three local government central associations in Germany: the "Deutscher Landkreistag" which includes all the 323 "Landkreise" (counties) with more than 55M inhabitants, the "Deutscher Städtetag" (German Association of Cities and Towns) representing 4,700 towns and municipalities with about 51M inhabitants and the "Deutscher Städte- und Gemeindebund" (German association of towns and municipalities) representing 12,500 towns and municipalities with about 47M inhabitants.

They represent matters of public interest. They differ from other association organizations, particularly from vocational and subject-related bodies and interest groups, in that their direct and

am 21./22.7.2003 in Hamburg. Downloaded at:
<http://www.koopA.de/beschluesse/dokumente/Architekturmodell.pdf>. Last visit: 1.6.2006.

³¹ <http://www.kgst.de/>

³² <http://www.kreise.de/landkreistag/>

³³ <http://www.staedtetag.de/>

³⁴ <http://www.dstgb.de>

indirect members, just as with the federation and Federal States ("Länder"), are territorial administrative entities, the organs of which bear general political responsibility for their territory.

In Germany's federally arranged State structure, the municipalities, towns, cities and counties (Kreise) form the third tier of public administrations. With the Federal Government and the Federal States they have in common the fact that their objectives are formulated within representative bodies of the people resulting from general, direct, free, equal and secret elections. This state of affairs also characterizes the work of the local government central associations.

The central task of the local government central associations lies in promoting local government self-administration guaranteed by the Basic Law to the counties, cities and municipalities, in encouraging the exchange of useful experiences and in presenting, before the State and the public, the common interest of all local government bodies to their best advantage. In this sense, the transformation of public service provision into eGovernment and hence the interoperability of public services and between public authorities on all government levels is a main interest.

In order to simplify and coordinate collaboration between the associations, the local government central associations have come together, at federal level, to form a joint working party: the Federal Union of Local Government Central Associations.

Beside these, the **Data Protection Commissioners** of the State as well as of the Federal States are also relevant in questions relating to interoperability. This, particularly since interoperability in the public service domain could conflict with the right for privacy of user data. Data Protection Commissioners are responsible for the audits/controls of all (federal) state agencies as regard to the observance of the (federal) state data protection legislation. They are independent organizations.

3.4.4 HOW - IOP Strategy Implementation Through Broad Programmes

As presented above, there is no common strategy for interoperability in Germany. There are various initiatives, programmes, and projects for eGovernment in general out of which some are striving for interoperability. Having this and the WHY chapter above in mind, the so-called "IOP strategies" and the technical networks so far are characterized by the federated system of Germany; i.e. the existence of differently formed strategies and technical networks. However there is the ambiguous aim to overcome this situation in the not too distant future.

If we consider the level of the Federation, there is from the technical point of view - as described in the WHY chapter above - the approach to realize independent and closed data networks for the federal authorities (IVBV). However, the integration of this network into the European TESTA network is permanently expanded as well as the integration into the authority network of Germany (TESTA-D; Deutsches Verwaltungsnetz) is forced.

With regard to the national BundOnline strategy, of course, the focus there is also laid on the networking of the federal administrations and hence won't be further discussed here (even if it shows outreach in terms of basic infrastructures and standards also to the local and regional level).

Seen from the level of the Federal States and the local authorities, beside initiatives under their own responsibility (e.g. Roadmaps, Master plans), two broader programmes are of specific importance for the development and implementation of interoperable applications which have been main vehicles for promoting IOP at the regional and local level in Germany. On the one hand, there is the

MEDIA@Komm project including its succession project **MEDIA@Komm-Transfer** of the Federal Ministry of Economics and Technology (BMWi)³⁵ and on the other hand the

³⁵ for further explanation for BMWi see the respective entry in the WHO section above

Deutschland-Online Initiative with its standardization activities i.e. **OSCI-XÖV** (XML in Public Administration), both, strategy and projects and. SAGA coordinated by the Committee for Automatic Data Processing at the Federal, State, and Local Level (KoopA ADV).

MEDIA@Komm³⁶

MEDIA@Komm was a competition of the Federal Government launched in 1998 aiming at gathering concepts concerned with the useful and efficient cooperation between 'new media' and electronic signatures in eGovernment on the local and regional level in Germany.

In the course of MEDIA@Komm, more than 300 solutions for local authority electronic business and legal communication systems were developed and tested in three model regions (Bremen, Esslingen, and Nuremberg). Examples include the virtual planning department, online reminder procedures, electronic registration information service, electronic awarding of contracts or online libraries and evening classes. The electronic storing of knowledge and e-learning systems as well as guides on how to establish virtual town halls were also created in the course of a concomitant research programme led by the German Institute of Urban Affairs (Deutsches Institut für Urbanistik: difu). Alongside the online processes and eGovernment teaching tools, considerable success was also achieved in the field of standardization. For example, the **OSCI standard (Online Services Computer Interface)**³⁷ was developed for the secure and legally recognized exchange of data. On this basis, initial standardized special electronic procedures in the fields of registration, construction and social services are currently being developed for use throughout Germany³⁸. In conjunction with this, the interoperability specification **ISIS-MTT** for electronic signatures has been conceived. OSCI and ISIS-MTT are obligatory standards used in German government. Work is currently in process to introduce them into the EU.

The basic idea behind the MEDIA@Komm competition was first to promote the development of best practice eGovernment applications and infrastructures by awarding the three model regions with high financial federal government aids and second to transfer these solutions afterwards to other public authorities all over Germany. However the concept didn't fully pay off mainly due to the lack of a sound transfer concept throughout Germany. This has been recognized by the BMWA and together with consideration of the successful activities of BundOnline and Deutschland-Online, the BMWA initiated the **MEDIA@Komm-Transfer**³⁹ succession project in order to use this as a basis for accelerating the widespread expansion and integration of eGovernment in all regions of Germany. This project, launched in 2004, in particular aims at identifying and developing transferable eGovernment solutions to be tested in pilot "transfer-municipalities" and finally to distribute the best of breed solutions throughout Germany with the particular focus on services of and infrastructures for the municipalities. As part of the standardisation measures, the transfer municipalities will be supported with the technical and organisational know-how of the transfer agency and help with government-specific legal issues. However, the MEDIA@Komm-Transfer project offers only low or no support in terms of financial aids for the transfer municipalities and is based on their voluntary participation. I.e. the transfer process of good practice to the pilot municipalities and in particular as it is aimed throughout Germany is lugging. A rather engaging programme which is more binding to the public authorities in terms of development and implementation of interoperable services or infrastructures is to be seen in the Deutschland-Online initiative.

Deutschland-Online

³⁶ For more information on MEDIA@Komm and MEDIA@Komm-Transfer please consult: <http://www.mediakomm-transfer.de>.

³⁷ see the WHAT chapter

³⁸ These procedures have become part of Deutschland-Online and are explained below

³⁹ see <http://www.mediakomm-transfer.de>

Deutschland-Online, as already introduced above, is the initiative for the co-operation between the federal government, federal-state governments and municipalities in eGovernment. The initiative currently encompasses 23 individual groups, each of which addresses a specific project and is broken down into five pillars and is based on three principles.

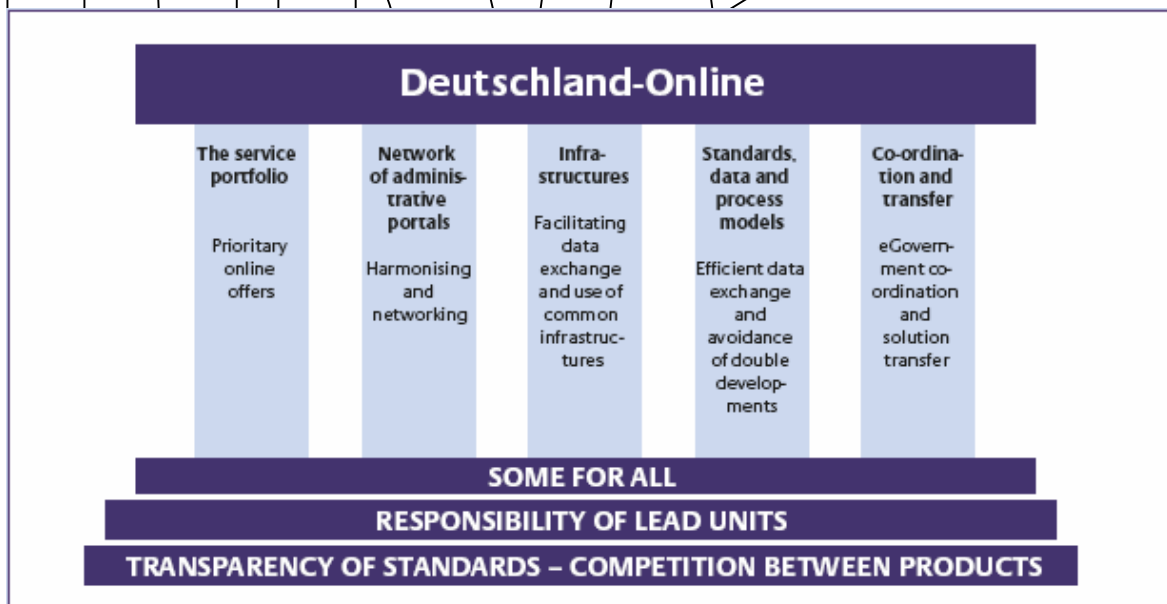
The ten project groups of the first pillar are focusing on proprietary eGovernment services. They represent the focus of Deutschland-Online's contents. Some of them, in particular the OSCI-XÖV projects are presented in the WHAT chapter below. The second pillar includes four project groups who are working on the interoperability of Internet portals. The four groups of the third pillar are developing technical infrastructures that are to be used jointly by various administrations (e.g. the TESTA-D network). Within the fourth pillar, two project groups are developing standards as well as data and process models for the various areas of administration. The XÖV strategy and hence the improvement of SAGA (see below) are parts of this pillar. The fifth pillar consists of three groups who co-ordinate the work by the other groups, ensure the transfer of knowledge and who are in charge of the political steering of Deutschland-Online (MEDIA@Komm-Transfer is part of this pillar).

When Deutschland-Online was launched, three principles were adopted as a basis for co-operation between the participants:

The »some for all« principle is implemented in the 23 project groups. The federal and federal-state governments as well as municipal administrations are equally represented in each of these groups. Involvement is voluntary. The participants are committed to the common goal of finding solutions, which will benefit all, including the federal states and municipal administrations who are not directly involved.

The second principle means that each project group has a lead unit. This lead unit is usually the unit that proposed the project for Deutschland-Online. Furthermore, the lead unit bears the main responsibility for the project and is also responsible for developing a sound finance plan.

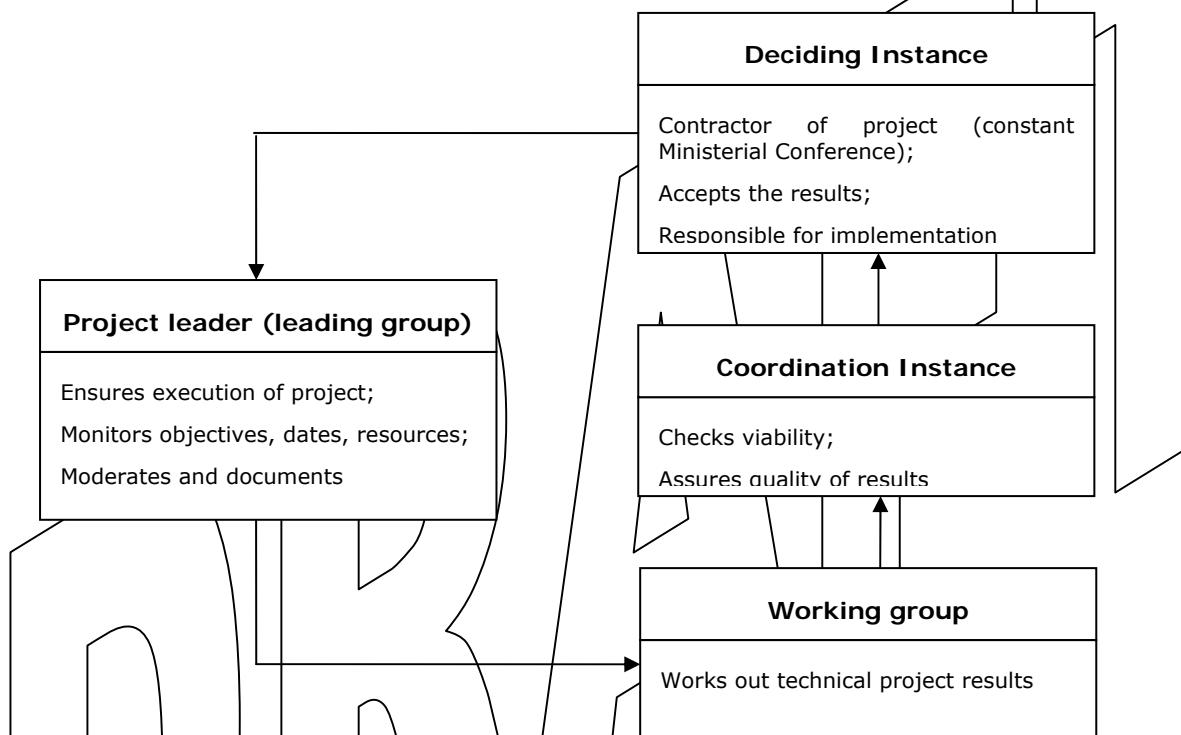
The third principle states: »Transparency of standards – competition between products«. Rather than recommending an application from a certain manufacturer, the project groups merely lay down a framework comprising transparent standards and process models within which different products can be offered. This ensures competition. The administration benefits from the most favourable bid and interoperable products.



The political coordination of the implementation of Deutschland-Online is carried out by a Working Group of State Secretaries for eGovernment in Federal and State governments, in which national associations of local authorities also take part and that reports annually to the heads of

government. Technical coordination is ensured by the Co-operation Committee for Automatic Data Processing at the Federal, State, and Local Level (KoopA ADV). This committee is supported by an eGovernment working group and an eGovernment project office.⁴⁰

For each Deutschland-Online project there is the same organizational framework, which already proved its value in several projects (e.g. XMeld, XJustiz). The contractor of each project is the constant Ministerial Conference in charge of the concerned resort. The organizational framework is as follows:



OSCI-XÖV (XML in Public Administration)⁴¹

The XML standardisation or OSCI-XÖV is a strategy located in the fourth pillar of Deutschland-Online whereby several projects are parts of the first pillar. OSCI-XÖV is the denomination of the continuous OSCI-XÖV coordination and the OSCI-XÖV framework, which describes the rules for the coordination as well as the methods and concepts for the execution of XÖV (XML in Public Administration) projects. OSCI stands for Online Services Computer Interface⁴² and is the standard by law for secure online transactions in eGovernment in Germany. XÖV basically stands for the standards for content related data descriptions, i.e. XML Schemas to be transmitted based on OSCI.

The OSCI-XÖV framework includes methods, concepts and rules for the OSCI-XÖV standardization thus providing the basis for the execution of XÖV projects and for their coordination by the OSCI head office.

The OSCI-XÖV coordination checks whether the methods and rules of the OSCI-XÖV framework are applied and provides for the coordination among the different professional XÖV projects, so that double work is avoided when preparing professional standards and developing methods and

⁴⁰ With the KoopA ADV the relevant actors in terms of IOP are involved in Deutschland-Online. These are stated in the WHO chapter.

⁴¹ <http://www1.osci.de/sixcms/detail.php?id=1161>

⁴² see also WHAT chapter

techniques of standardization. Therefore the OSCI-XÖV coordination is an important precondition for the interoperability of professional OSCI-XÖV standards; further it makes sure that existing knowledge can be used by all XÖV projects for standardization ('good practices') thus saving costs. The rules, methods and concepts required for this coordination work are described in the OSCI-XÖV framework.

XÖV standards are XML-based professional standards for public administration. XÖV standards are developed for certain professional sectors of eGovernment (such as registration) by means of XÖV projects; they are made available in the form of XML Schemas together with supplementing documentation.

Federal, state or local governments are in charge of XÖV projects; they are coordinated by the OSCI head office. Currently there are several XÖV projects in its development and implementation phase, e.g. XMeld (XML Schema for the civil registration domain)⁴³, XJustiz (XML Schema for electronic legal relation), XBau (XML Schema in the construction and housing domain) XSozial (XML Schema for the social security sector).

3.4.5 WHAT - Examples of Projects that Promote IOP at the Local Level

In this section some of the projects and initiatives that promote IOP issues at the local level are presented. These cases were selected from the broader initiatives/programmes presented in the previous sections but also presents cases emerged rather independently purely on the local/regional level. Presented are the results of the standardization activities in the framework of SAGA and cases from:

- MEDIA@Komm / Transfer
- Deutschland Online/OSCI-XÖV
- Local/regional (Federal States) initiatives

3.4.5.1 Standards and Architectures for eGovernment Applications – SAGA44

SAGA is an initiative of the Federal Government emerged in the framework of the BundOnline 2005 project (see above), which also is part of the Deutschland-Online Initiative.

The basic principle of SAGA is that information and communication systems in modern eGovernment should (ideally) interact smoothly. Simple and clear-cut standards and specifications help to achieve interoperability of information and communication systems. Besides the interoperability among the federal authorities, the basis for IOP among federal, federal-state, county and local authorities shall be supported SAGA identifies the necessary standards, formats and specifications; it sets forth conformity rules and updates these in line with technological progress.

Decision-makers in the fields of organization and information technology (eGovernment teams) in German administrations are the primary target group of SAGA. The document is a guideline that serves as an orientation aid when it comes to developing concepts for technical architectures and general technical concepts for individual IT applications.

The Co-ordinating and Advisory Agency of the Federal Government for Information Technology in the Federal Administration (KBSt)⁴⁵ has formulated the first set of standards. With participation by experts from industry and other specialists from federal, federal-state and municipal administrations, the agency first identified and evaluated existing standards. This stock-taking and evaluation then formed the basis for the first version of Standards and Architectures for

⁴³ see previous footnote

⁴⁴ <http://www.kbst.bund.de/saga>

⁴⁵ http://www.kbst.bund.de/cln_006/Content/Home/homepage.html__nnn=true

eGovernment Applications (SAGA). A public forum at: <http://foren.kbst.bund.de/saga> enables Internet users to register and discuss issues related to the application and further development of SAGA. The results of the discussions are evaluated and considered in the next version of the SAGA document. SAGA is updated at regular intervals, amended to reflect the latest developments and results, and published at: <http://www.kbst.bund.de/saga> and in the eGovernment manual at: <http://www.e-government-handbuch.de>.

Concerning the scope of validity and binding effect of SAGA, it describes the technical boundary conditions recommended for the development, communication and interaction of IT systems of federal administrations, agencies and authorities. Through the involvement of all government levels in the development, the scope is broadened to all government levels (but not obligatory).

3.4.5.2 Examples from MEDIA@Komm/-Transfer

Concept for transactions between citizens and the public administration / Bremen⁴⁶

MEDIA@Komm competition of the Federal Government in 1998 aimed at gathering concepts concerned with the useful and efficient cooperation between "new media" and electronic signatures in eGovernment on the local and regional level. In this competition, the Free Hanseatic City of Bremen was awarded a prize for a concept for transactions between citizens and the public administration based on a special, called **OSCI** (Online Services Computer Interface).

Based on this award, Bremen was assigned to develop OSCI for the public administration in Germany in coordination with responsible representatives of the Federal States.

The assumption behind this is that eGovernment targets can only be achieved when they are based on a strong IT network within the whole public administration. However, this IT network may not lead to dependencies to vendors or systems. Thus, a standard had to be developed that is to be defined and improved by the public administration and not by the IT-vendors. Today, on behalf of the public administration represented by the KoopA ADV (which is a special committee consisting of representatives of all three government levels in Germany concerned with IT in the public administration; see the WHO chapter), the "OSCI-Leitstelle" (OSCI control centre) is in charge of the development and coordination of the interoperable data exchange formats. The OSCI – Leitstelle originated from a public private partnership solution and is now part of the eGovernment and New Media Unit of the Senator for Finances of the City-state Bremen. By the way, starting from this local initiative in the public administration of Bremen, OSCI has meanwhile been standardized by law for eGovernment transactions.

3.4.5.3 Examples from Deutschland-Online/XÖV (XML in the Public Administration)

XMeld⁴⁷

The development of XMeld is closely linked to the aforementioned OSCI transport protocol, as it serves the first applications in the civil registration domain, which are provided based on OSCI (pilot application of OSCI). As mentioned above, XMeld as well as the other projects out of the XÖV strategy are part of the cross government level initiative Deutschland-Online.

The civil registration in Germany is characterised by its federal structure. I.e. the State provides the guidelines for civil registration, the Federal States are the legislators that convert these

⁴⁶ <http://www1.osci.de/sixcms/detail.php?id=1160>

⁴⁷ <http://www1.osci.de/sixcms/detail.php?id=1168>

framework conditions in federal acts, and the local registration offices are responsible for service provision. This has led to many differences in the proceedings and processes among the registration offices in the past. To overcome this structure, regional initiatives emerged using standardised formats to enable electronic data exchange among civil registration offices: first within the borders of the Federal States and then, under the influence of the two meanwhile legalised standards for data-exchange (OSCI) and civil registration messages (XMeld), across the regional borders. Although, much of these activities have started autonomously in the various Federal States due to different software systems, legislation and financial resources, these turned into a rather well coordinated project within Germany.

Basically, the content-related standards for messages and proceedings in the civil registration are defined by the standard called XMeld. To securely exchange these messages among citizen, businesses and administrations, a special transport mechanism is needed. This mechanism is described and standardised by the OSCI-Transport protocol (see the previous example).

While the Federal States can internally still use their own system for the electronic exchange of messages in the civil registration domain, the exchange across the Federal States based only on XMeld has to take place by the beginning of 2007. The regional project MOIN! located in Lower Saxony will serve as one example in Germany already employing XMeld within the regional borders. Interfaces to different registry software systems have already been tested there and are in practical use and will be offered also to other authorities responsible for civil registration.

The basic principle of the XMeld-project is the bi-lateral exchange of registry data between citizens and the public administration and among public administrations vendor and product independent via the OSCI-Transport protocol. To exchange digitally signed messages in accordance with the German Signature Act, this protocol has to be endowed with cryptographic mechanisms. In addition the messages have to be structured so that subsequent processing of the messages is possible without any cross-media conversion. This is enabled by OSCI-XMeld standard, which is the basis for the integration of registry data in different systems. What has started at regional level in the framework of the development of a pilot application in the civil registration domain for OSCI has finally led to a nation-wide standard. XMeld is seen as forerunner for the employment of standardised workflows for bi-and multi-lateral communication based on XML and OSCI in Germany.

XJustiz⁴⁸

In its basic approach and organisation, XJustiz can be considered similar to the XMeld project outlined before. However, the development of XJustiz is well behind the XMeld standard, which is already partly implemented.

An important precondition for fully implemented electronic legal relations is the development of a – at least nation-wide – uniform standard for the exchange of electronic information.

This is not only a matter of document exchange, for which market standards such as HTML (Hypertext Markup Language) or PDF (Portable Document Format) could possibly be used. It should also be possible to exchange single process-related data – for example, the addresses of parties to a case or information on hearing dates – so that the addressee can integrate them into his office software with a simple mouse click.

To make this possible, the "Bund-Länder-Kommission für Datenverarbeitung und Rationalisierung in der Justiz" (BLK, Federal-State Commission for Data Processing and Rationalisation in the Administration of Justice) developed the data set XJustiz. In this data set, data fields in the form of a data set description are defined facilitating the exchange of as many process-relevant data as possible. The XJustiz manual also describes the technical formats and procedures, which have to be followed in order to fulfil the requirements mentioned. Structured data are transmitted in the XML format using DTD resp. XML Schema files, which are determined by the BLK. The

⁴⁸ <http://www1.osci.de/sixcms/detail.php?id=1169>

organisational-technical guidelines for electronic legal relations, i.e. the exchange of structured data are included in the XJustiz data set.

3.4.5.4 Examples from Local/Regional Initiatives and the Federal States

Germany is subdivided in 16 Federal States, which in addition are subdivided in counties (Landkreise) and municipalities. In many areas of public administration, the Federal States are partly or fully independent in the organization of their public service provision, as well as the counties and municipalities have a strong position within the Federal States in questions concerning the fulfilment of their tasks and responsibilities. In terms of eGovernment, this has lead to a variety of different approaches in terms of eGovernment in the Federal States in the past. From an organizational perspective, we can say that every Federal State has its own eGovernment strategy or at least a paper where the objectives in terms of eGovernment have been determined. From a technical perspective, the possibilities to network the various authorities within each Federal State are to be seen differently. Yet, not every Federal State has its own administration network linking their authorities technically and not all Federal States who have such technical network have already all authorities integrated. Of course, for smaller Federal States, especially the small city-states it is easier to expand their technical network and in addition to come to integrated solutions and hence to achieve interoperability between the municipal and the federal-state level. There are already achievements under way in the cross federal-state cooperation between these city-states of Berlin, Hamburg and Bremen with the surrounding Federal States. However, in particular the big Federal States have to bear the big efforts on the one hand to encourage the strong municipalities for a combined approach within the Federal State and on the other hand to integrate its network into the network of the Federal Government (incl. TESTA on the European level). One of the most advanced Federal States in terms of eGovernment strategy incl. statements towards interoperability and in terms of the technical administration network is North Rhine Westphalia (NRW). NRW is the Federal State with the most big cities in Germany and the highest population (> 18 Mio.) and hence bigger than e.g. The Netherlands or Sweden and Finland together.

eGovernment in the Federal State of North Rhine Westphalia (NRW)

In the late 90ies the Federal State Government of NRW decided to force the implementation of an IT-concept aiming to support the administrative reform by the efficient use of ICT. One important aspect among others was the integration of the - at that time - three independent technical networks of the general Federal State, the finance authorities and the police. This now completed network, the "Landesverwaltungsnetz (LVN - NRW)" (Federal State network of public authorities in NRW) is the technical backbone for the secure electronic communication for the public authorities of the Federal State. For the communication between federal-state authorities and municipalities/counties based on a recommendation of a working group (AIV) of the KoopA⁴⁹ the Federal State Government NRW recommends the use of TESTA-D as technical basis for the administration network of German public authorities (Deutsches Verwaltungsnetz – DVN). By 1 September 2005 communication opportunities between the federal-state authorities and the municipalities by either the LVN-NRW or TESTA-D is already 97%⁵⁰. The strategy for networking has also gone into the eGovernment Masterplan of NRW⁵¹ in particular in the guidelines for the improvement of eGovernment in NRW⁵². Beside this strategy for networking the public authorities, there are several other technical measures to enable interoperable service delivery, in particular concerning the provision of networked and cross level internet-portals, secure payment solutions and electronic signature proceedings. In particular to entail the latter one, NRW will warrant that

⁴⁹for more information on the KoopA see above in the WHO chapter

⁵⁰ Brakmann 2005

⁵¹ Innenministerium NRW 2005

⁵² Land NRW 2004

online transactions are realized based on the use of OSCI⁵³. In addition, NRW adopts the architectural model for interoperability of eGovernment applications between the federal, federal-state and municipal level, set up by the KoopA ADV. As this architectural model contains the standards defined in the SAGA document⁵⁴ the basis for cross level interoperability in technical terms is laid.

NRW is project leader in two Deutschland-Online projects and of course represented in the KoopA ADV committee, i.e. an important partner in the interoperability activities in eGovernment in Germany. Based on this and with regard to the various guidelines, master plan, etc. for eGovernment mentioned above, beside the technical approaches, NRW is striving for organizational interoperability.

Beside such approaches/initiatives from Federal States, which at a first step are rather oriented on their duties and responsibilities within their administrative borders, there are also local and regional projects in Germany, which have emerged for other reasons. The MOIN! project mentioned above in the OSCI-XMeld project is such an example for cross municipality communication. The following two presented projects have been chosen arbitrarily; certainly, there would also be others, which were worthwhile to present.

Starter-Center Karlsruhe⁵⁵ and One-Stop-Shop Trier⁵⁶

The Starter-Center Karlsruhe and One-Stop-Shop Trier are streamlining their business registration procedures in a cross-regional partnership. All actions for a business registration can be taken care of at the Starter-Center of the Karlsruhe Chamber of crafts and trade and in the Trier One-Stop-Shop in one step.

All skilled crafts companies must register with their regional Chamber of Crafts (Handwerkskammer). Two regional chambers have therefore developed a tool to support not only the registration with the chamber but with all other relevant public authorities and social security institutions. The Chamber of Crafts has all the required paperwork for starting a new business. It assists the selection of forms and forwards them to the appropriate office. This eases registration not only for national starter but – even more so – for cross border business start ups. Both Chambers, Karlsruhe and Trier, are immediately adjacent to the borders and are thus the first point of advice for businesses from France or Luxemburg. The forms are naturally in German but advice in the Starter-Center is also offered in French.

The Starter-Center and the One-Stop-Shop use a unique software application (CT business start-up manager). With this tool the business can be registered easily from any home computer with Internet access. This reduces bureaucratic obstacles considerably.

The applicant who doesn't have his own computer with Internet access may also use personal computers made available at the Starter-Center Karlsruhe for this purpose. Competent employees are available to assist in filling out the forms and to answer the applicants' questions with the help of a Hotline. Be it registration of business or registration with the tax office, the job centres/labour offices, the employers' liability insurance associations or the social insurance institutions all formalities can be easily and quickly accomplished using the tools of the multi-media-strategy of the Starter-Center or the One-Stop-Shop. Services out of one hand – this is the contribution of the two Chambers of Karlsruhe and Trier to a tremendous simplification of administration

⁵³ see elsewhere

⁵⁴ see elsewhere

⁵⁵ www.starter-center-karlsruhe.de

⁵⁶ www.one-stop-shop-trier.de

Regionales Netzwerk eGovernment Bremen Niedersachsen (RegNet)⁵⁷

The "Regionale Netzwerk eGovernment Bremen/Niedersachsen" (RegNet, regional eGovernment network) is an informal ad hoc network, which can be expanded anytime. Counties (Landkreise), municipalities, local governments, but also corporations, associations etc. which agree with the aims of the RegNet, can join the network, informally and without obligations. The aim is to intensify the cooperation in the field of eGovernment so that the members are provided with the following benefits of electronic administrative services:

- no multiple costs of development
- uniform (compatible) technical standards for regional networking
- sharing know-how on short ways
- information exchange on current developments at federal, federal-state and local level
- synergies by joint qualification and further training of the employees
- existing co-operations are to be encouraged, new ones created
- joint project development
- mutual consulting on project execution

Several projects have been started and some of them are already implemented which show first results also in terms of interoperability. E.g. already implemented is an application enabling legally binding electronic communication across the Federal State borders between the registrar of civil status in Bremen and the civil registration offices of some municipalities of Lower-Saxony. Currently under development is a project, which shall enable citizens and businesses to apply for public services at every public administration in the region independent of the responsibility of the consulted public administration. E.g. a citizen from Delmenhorst but working in Bremen (a municipality near Bremen located in another Federal State (Lower Saxony)) shall be enabled to apply for public services also in Bremen. However, in general, a citizen has to apply for local public services at the public administration at his/her home municipality. By providing legally binding electronic communication and based on agreements between the public administrations this situation shall be overcome. Another project which is also already in its development is the creation of a directory of public services which aims at the standardisation of descriptions of public services. Same services are often differently named among public administrations though they serve the same target. A standardised description will overcome this situation and lead to more user friendliness.

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3.5 Status Report 4 (enhanced): The United Kingdom

3.5.1 Overview

The United Kingdom (UK) can be considered as a pioneering country in exploring and promoting interoperability issues both at the national and at local eGovernment level. It should be noted however, that referring to regions in the UK is a complex matter. In general the UK 'mainland' does not have local government and therefore public service delivery organized at the regional level. Instead the territory is arranged so that a number of local councils (public administrations), some large with wide ranging powers, some small with more restricted powers, deliver eGovernment at the local level. In addition a range of National Government led public services are delivered by National government agencies directly to citizens and businesses.

Our analysis of the UK focuses on the three key Questions resulting in brief with:

(Why?) Its starting point is a comprehensive eGovernment strategy, *(How?)* delivered via a package of broad based and ambitious programmes, *(What?)* which have spawned a large number of projects, initiatives and final products that are currently available at no cost for local authorities to take up and exploit.

Despite the fact that our review has not identified at either the local or regional level any single initiative termed in an upfront manner as 'interoperability', there was a striking number of programmes and projects dealing with interoperability related problems which had been implemented by local authorities: for example, addressing issues such as designing and implementing joined up e-service delivery, drafting and promoting e-service standards, creating one-stop-shops and web portals, investigating new ways of collaborating in service planning and delivery both within councils and in conjunction with other partners and councils. These have been common themes and objectives for almost all UK local authorities.

We have identified several important elements of this work, which could be transferable to other EU countries. In particular, the standardization experiences gained and schemas proposed among others under e-GIF, the controlled lists maintained by the esd-toolkit, the PARSOL and e-Service Delivery standards could prove to be valuable assets and act as roadmaps for other local, regional and national administrations across Europe.

3.5.2 WHY – eGovernment, Local Government and Interoperability Strategies

In this part, we briefly present the UK strategy for:

- the modernization of the public sector through the use of Information and Communication technologies (Transformational Government Enabled by Technology)
- the advancement of eGovernment interoperability (e-Government Interoperability Framework)
- eGovernment delivered at the local level. (National Strategy for Local e-Government)

National strategy for modernizing public services

The "Transformational Government Enabled by Technology" document⁵⁸ published by the Cabinet Office in Nov. 2005 sets out the UK Government's strategy for transforming public services using information and communication technology.

⁵⁸ http://www.cio.gov.uk/transformational_government/index.asp

The document elaborates three core themes: the need for a new generation of citizen-focused services, the importance of shared services and the need for greater professionalism in IT in the public sector.

The first and even more so the second item in the proposed agenda is directly linked to interoperability issues.

National strategy for eGovernment interoperability

The e-Government Interoperability Framework (e-GIF) sets out the UK government's policies for achieving interoperability and Information and Communication Technology (ICT) systems coherence across the public sector. E-GIF has already reached its 6.1 version, published in 18 March 2005.

An important aspect is the e-GIF policies and specifications are mandatory for all public agencies including local authorities.

The e-GIF architecture contains:

- the Framework, which covers high-level policy statements, technical policies and management, implementation and compliance regimes
- the e-GIF registry available through the GovTalk website⁵⁹, which covers the e-Government Metadata Standard (e-GMS) and Government Category List (GCL), the Government Data Standards Catalogue (GDSC), XML schemas and the Technical Standards Catalogue (TSC).

GovTalk provides the facility for generating and agreeing XML schemas for use throughout the public sector⁶⁰.

As the e-GMS is considered a 'superset' of metadata elements, it is unlikely that any single PA organization will require all of them. Therefore, organisations and particularly local authorities are encouraged to develop their own set of standards, using only a limited set of elements from the e-GMS superset and customizing them to the local needs.

National Local eGovernment Strategy

The National Strategy for Local eGovernment was launched in 2002 by the Office of the Deputy Prime Minister (ODPM)⁶¹. A portal website⁶² was also established to support the Local eGovernment Strategy programme.

The strategy was prepared jointly by the Office of the Deputy Prime Minister and the Local Government Association, in partnership with the Office of the e-Envoy, HM Treasury and government departments responsible for delivering national services at the local level. The Minister for Local Government, a Cabinet Sub-Committee and the Central Local Partnership oversees the strategy, which is managed by a Programme Board representing all the partner organisations and departments. The strategy sets three main objectives:

- Transforming services – making them more accessible, more convenient, more responsive and more cost-effective.
- Renewing local democracy – making councils more open, more accountable, more inclusive and better able to lead their communities.
- Promoting local economic vitality – to foster development and promote employment

⁵⁹ <http://www.govtalk.gov.uk/>

⁶⁰ <http://www.govtalk.gov.uk/schemasstandards/xmlschema.asp>

⁶¹ <http://www.localegov.gov.uk/en/1/strategy.html>

⁶² <http://www.localegov.gov.uk>

3.5.3 WHO - Main Actors in eGovernment, Local Government and Interoperability

The main actors participating directly or indirectly in drafting and implementing IOP at the local and regional level in UK are identified as:

The **Office of the Deputy Prime Minister (ODPM)**. The lead agency with overall responsibility for local authorities⁶³ reporting directly to the ODPM three ministers who have an active role in local authorities and eGovernment:

- The Minister for Local eGovernment
- The Minister for Communities and Local Government
- The Minister for Local Government - the minister in charge of local authorities.

The **Local Government Association (LGA)**. The LGA promotes the interests of English and Welsh local authorities and represents a total of just under 500 of them.⁶⁴ It has actively participated in the drafting and implementation of the local eGovernment strategy in co-operation with the ODPM and a number of other agencies.

The **eGovernment Unit (eGU)**. The eGU's mission is to ensure that Information technology (IT) supports the business transformation of Government itself so that it can provide better, more efficient, public services. The eGU is the largest unit in the Cabinet Office. It is responsible for formulating information technology strategy and policy, developing common IT components for use across government, promoting best practice across government and delivering citizen-centred online services⁶⁵.

IdeA (Improvement and Development Agency). IdeA is a company wholly owned by the Local Government Association and it covers local government in England and Wales. The mission of IdeA is capacity building for local authorities. The "IdeA Knowledge" web site acts as an information hub for local authorities, and provides access to reports, best practices, case studies, etc⁶⁶. IdeA is in line with the National Local eGovernment Strategy and supports the standardization work in local government.

Under the auspices of IdeA, two units provide additional support for implementing local eGovernment projects. Funded through the ODPM Support and Capacity initiative, the two IDEa-based units build on the existing help provided by IDEa, the Local Government Association and ODPM to help authorities meet the 2005 eGovernment target (100% of services provided by local authorities available as e-services). These units are:

The e-Government Strategic Support Unit (SSU). SSU provides advisory and research services on local eGovernment. A key objective is to assist local authorities with eGovernment projects and support them to transform their services.

Specifically for interoperability issues, SSU supports the development of partnerships in the areas of finance, human resources, legal services and information and communications technology, as well as advising on access channel strategy, customer relationship management, contact centres and portals. The target of "Integrating Technology Infrastructure" is among the Unit's nine key eGovernment issues and priority service outcomes, as defined by ODPM.

The e-Government Implementation Support Unit (ISU). ISU provides help to a number of Councils that have been identified by the ODPM as needing individual support to meet the 2005 eGovernment target. The unit provides onsite programme and project management assistance and is complementary to SSU.⁶⁷

⁶³ <http://www.odpm.gov.uk>

⁶⁴ <http://www.lga.gov.uk/>

⁶⁵ <http://www.cabinetoffice.gov.uk/e-government/>

⁶⁶ <http://www.idea-knowledge.gov.uk>

⁶⁷ <http://www.idea-knowledge.gov.uk/idk/core/page.do?pageId=1704057>

The **Local e-Government Standards Body (LeGSB)**. LeGSB has been established as a National Project under the ODPM's National Local eGovernment Strategy. It has been set up "...to ensure that the overall strategy is supported with standards and mechanisms that enable existing projects, products and services to be exploited so that duplication of investment and effort in local e-government can be avoided"⁶⁸. LeGSB is particularly active in local eGovernment development with a particular focus on interoperability issues mainly through its standardization work. It is the main actor for promoting local and regional standards in eGovernment at the local and regional level. Since April 2005, the UK eGovernment Unit has handed over the management of the local e-Gov XML schemas to LeGSB⁶⁹. The LeGSB web site, called Custodian⁷⁰, is a powerful tool that serves the standardization process and is presented below in more detail.

3.5.4 HOW - IOP Strategy Implementation Through Broad Programmes

The National Strategy for Local eGovernment has been the main vehicle for promoting IOP at the local level in the UK. Specifically, this strategy has mainly been implemented through five broad programmes:

- Pathfinders projects
- Partnership Programmes
- National Projects
- eGovernment Support and Capacity Programmes
- National eService Delivery Standards

Pathfinders Programme

During 2001-2002, Pathfinders projects were funded by ODPM, with the aim of exploring and developing new ways of implementing eGovernment. More than 100 local authorities, public and private sector partners were involved in these projects. Generic solutions for technical, policy and management issues were proposed. The programme put an emphasis on promoting interoperable and integrated solutions for similar types of problems across public agencies. The Pathfinder Product Catalogue has included over 60 products arising from the funded projects. Many of the Pathfinder findings have provided a valuable input in the drafting of the National Local eGovernment Strategy and have acted as the starting point for the National Projects.⁷¹

The Partnership Programme

The Partnership Programme began in late 2002, when groups of local authorities and other public sector agencies were invited by ODPM to propose projects – and receive funding – that support working together to deliver better electronic governmental services. As these partnerships provided joined up service delivery, their development and support has been considered as a key strand in the overall National Local eGovernment Strategy. Partnerships aimed at building capacity at a local level mainly by delivering interoperable solutions. Until 2005, ODPM funded 101 Local eGovernment Partnerships at a cost of £68m in funding. Through this programme, almost all (99%) local authorities in England participated in at least one eGovernment partnership.⁷²

Local eGovernment National Projects

The ODPM's 22 National Projects⁷³ aim has been to offer to local authorities, products, services and implementation roadmaps in order to design, implement and deliver local services. The motto of the National Projects has been 'build once, use often'. The information and experiences gained by these projects were gathered in the National Product Catalogue. The Catalogue enables public

⁶⁸ <http://www.localegov.gov.uk/en/1/strategy.html>

⁶⁹ <http://www.legsb.gov.uk/News>

⁷⁰ <http://www.legsb.gov.uk/custodian>

⁷¹ <http://www.lgolpathfinder.gov.uk/>

⁷² <http://www.localegovnp.org/>

⁷³ <http://www.localegov.gov.uk/nationalprojects>

employees to search and consult over 1000 outcomes and products that come out of the 22 National Projects⁷⁴. Most of these projects promote important IOP issues. Some illustrative cases are presented in the next part. It is worth mentioning that the estimated benefits from just six of these 22 projects are impressive: cost savings £320m, increased revenue £60m, service improvement £1,300m⁷⁵.

e-Government Support & Capacity Programme

The e-Government Support & Capacity Programme was established by ODPM in 2003⁷⁶. The Programme intended to help local authorities deliver eGovernment services in line with the National Local eGovernment Strategy. The Programme was organized in two axes:

- Providing direct support through the IDeA Implementation Support Unit (ISU) and the Strategic Support Unit (SSU) to local authorities who need assistance with achieving their eGovernment targets, or who require advice and guidance on areas of eGovernment delivery. To this end, a web portal, called esd-toolkit was established to support local authorities in implementing their eGovernment and wider modernisation agendas. As the esd-toolkit is of particular interest for interoperability, it is presented below in more detail.
- Implementation of an e-Capacity Building Programme that addresses the current difficulties experienced by Local Authorities in identifying, and developing the key skills and roles that are required to develop successful eGovernment projects. This Programme mainly supports the development of the culture and skills required for the successful implementation of eGovernment projects.

National eService Delivery Standards Project

The National e-Service Delivery Standards project (NeSDS) is an ODPM funded initiative which is being led by the London Borough of Havering and aims to deliver e-service delivery standards, best practice and guidance to help Local Authorities provide efficient and consistent levels of service to their customers.⁷⁷

The standards are developed as a collaborative effort with the participation of senior local authority professionals, professional bodies and practicing specialists. The intention is that standards are developed "by local authorities for local authorities". For each service area a Lead Local Authority and a Steering Group with representatives from several Local Authorities participate in the process of developing the standards. This process also involves the relevant service area Professional Bodies and Government Departments.

Specifically, the NeSDS programme continues and further elaborates on the standards developed by the Planning and Regulatory Services Online (PARSOL) national project in 2004. It is planned to deliver an initial eight service delivery standards across the following Local Authority service areas: Customer Services, Highways, Trees, ICT, Adult Services, Human Resources, Housing and Property. In addition to these, a further five sets of standards are to be developed in collaboration with the National Projects for Planning, Building Control, Environmental Health, Trading Standards and Economic Development.

3.5.5 WHAT - Examples of Projects that Promote IOP at the Local Level

In this section some of the projects and initiatives that promote IOP issues at the local level are presented. These cases were selected from the four currently⁷⁸ active broader programmes presented in the previous section, namely:

- the Partnerships Programme

⁷⁴ <http://catalogue.localegovnp.org.uk/default.asp>

⁷⁵ <http://www.localegovnp.org/default.asp?sID=1101309995531>

⁷⁶ <http://www.ecapacitybuilding.org/>

⁷⁷ www.nesds.gov.uk

⁷⁸ as in end 2005

- the 22 National Projects
- the e-Government Support and Capacity Programme
- the National eService Delivery Standards

3.5.5.1 Examples from the Partnership Programme

Blackburn with Darwen Local Strategic Partnership

The Blackburn with Darwen local strategic partnership is a joint effort of 25 local and other public and voluntary sector partners. One of their priorities is to enable joined-up public service delivery. As a step towards this, they implemented a common Content Management System for the partnership, and made the Blackburn with Darwen Council website a single portal for all partner agencies (www.bwdcomnet.org.uk). They collaboratively manage the website, which is used as an internal information management tool.

This gives citizens a more helpful, single view of the services and information relevant and available to them, regardless of which agency provides them, as well as enhancing understanding and knowledge within the partnership. Partners also benefit from the cost savings of having a single Content Management System and portal.

Cambridgeshire Partnership

This partnership includes the six county, unitary and district councils of Cambridgeshire. The partners have jointly purchased a portal technology that helps citizens by referring their queries to the relevant Local Authority (see www.cambridgeshire.net/). The experiences gained were presented as a detailed case study that would be of interest to any local authority undertaking a portal project. In addition, an integrated technical architecture was procured by the partnership, providing electronic service delivery tools such as website content management and electronic document management. The architecture also linked the partners to each other, so that information could be shared between front and back offices, and between partners. Moreover, and due to the scale of the partnership, partners managed to run a smartcard pilot for leisure, libraries and travel. Citizens could use a single card to access different Local Authority services quickly and easily. The partners used the management information from the cards to plan and prioritize future delivery of services.

Essex Online Partnership

This partnership of 14 District Councils in Essex has undertaken several eGovernment projects.

One of the most interesting is the Essex Online portal. This portal provides citizens with information at County and District level, in addition to local health and police information and national information from the National Health Service, and the Department of Work and Pensions. The partners also worked together to develop e-form and e-payment functionalities for the portal.

In their quest to improve levels of customer service, the partners have explored a number of options for facilitating the sharing of information. They have piloted a CRM integration system and also set up 'Essexnet': a secure extranet that allows the partners to share applications, secure information and data. These projects have greatly improved the effectiveness of information sharing between partners, and resulted in more consistent services to citizens.

Lincolnshire Networking Partnership

In this partnership, 8 Local Authorities in Lincolnshire together with other local organizations have focused upon systems integration in their effort to deliver joined-up services to citizens. To this end, the partners have linked up their separate telephone and CRM systems. This makes it easy for the partners to share customer's details e.g. when a citizen contacts the wrong authority with a query. This technology means that the citizen experiences a seamless and integrated service from all the partners. Moreover, through the introduced integrated telephone system the calls between partners are free-of-charge. This has cut down telephone expenses and at the same time encourages them to communicate more frequently by telephone. The partnership has also implemented LincUp (see www.lincup.net/). This is a portal that provides information on Local

Authority services (county and district) as well as police and health services. The citizen enters his/her postcode and then the query, and the portal automatically directs her/him to the right partner website and page.

3.5.5.2 Examples from the Local eGovernment National Projects

e-Planning and Regulatory Service Online (PARSOL)

PARSOL aims to assist councils in building effective and transparent online planning and regulatory services by providing a range of toolkits, standards, guidance materials, schemas, systems and software⁷⁹. According to PARSOL, planning systems include expert advice, fast-track applications, enforcement, data monitoring and electronic consultation, while regulatory systems include online licensing, business self-assessment and regulation information access.

PARSOL products and services refer to the areas of planning, environmental health, trading standards and building control. A wide range of toolkits is also available to provide guidance on service implementation issues. Local authority demonstrator sites have been developed to illustrate the software solutions produced by PARSOL and to answer further questions on implementation.

A key deliverable from PARSOL and particularly linked to the promotion of IOP between local authorities is a set of e-Planning Service Delivery Standards. In total, 28 Standards have been grouped in the following service related areas:

- Development control and enforcement – this section refers to standards related to development control and enforcement functions
- Local Development Framework (forward planning) – this section refers to forward planning functions
- Supporting e-Planning Services – this section refers to standards related to general indicators of a local authority current performance.

The above-presented standards have been also grouped into the following areas, based on the entity they affect:

- Customer focused. These standards have a direct and measurable impact on the customer.
- Organizational Standards. These are more general standards that should be followed by the whole organization of a local authority. Usually, there will be longer-term benefits from adherence to this type of standards and their impact is more difficult to measure and define in detail.
- Corporate Standards. These are standards to be followed by a large number (ideally all) of local authorities.

Framework for Multi-Agency Environments (FAME)

The goal of the FAME project is to improve the provision of services from local authorities through the sharing of information between these authorities, and other governmental agencies. The main drive for this work has been the identification of a severe lack of communication between agencies as the main reason to policy failures. For this purpose, in the FAME project different authorities try to share and integrate information across their separate organizations and systems. To this direction, FAME has developed the following:

- Readiness Assessment Tool - a checklist for local authorities to measure their multi-agency readiness;
- How-To-Guide - practical advice at three different user perspectives and a step-by-step guide as to where a local authority should start to implement multi-agency working;

⁷⁹ www.parsol.gov.uk

- The Generic Framework - nine areas that have to be addressed when faced with implementing a multi-agency partnership.

FAME has six pilot examples of multi-agency working in the areas of: Information Sharing and Assessment, Child Protection Systems, Promoting the Independence of Vulnerable Older People, Children with Disabilities, Virtual Integrated Mental Health Records and Housing Benefits.

The Project outcomes include:

- A nationally applicable, technologically independent framework for multi-agency information sharing.
- Nationally applicable standards and protocols that are adaptable and scalable and thus applicable to a range of different services.
- Exploitation of emerging technologies to increase efficiency and effective multi-agency working; at the same time driving down costs and increasing efficiency.
- Access for public service agencies to relevant and timely information.
- Improvement of information quality by reducing duplication and data errors.

e-Trading Standards National (e-TSN)

The objective of this project is to develop, test and provide a solution that enables statistical data to be shared across trading standards services as provided by different local authorities. Six local authority partners are involved in e-TSN. A community of other 14 additional partners helps to test the services provided by the project. e-TSN has already developed a set of trading standards, business self-assessment and licensing services. All relevant information is documented in special toolkits, which are freely available to the local authorities.

Valuebill (Council Tax/Business Rate Valuation)

Valuebill facilitates the exchange of information between local authority billing agencies, the Valuation Office Agency, and the National Land and Property Gazetteer - bringing together local and central government and improving the valuation services that reach the citizens and businesses. It also assists the exchange of information for wider land-related initiatives in local and central government. Valuebill has produced a starter kit as well as downloadable and ready-to-use data schemas.

Local e-Government Standards Body (e-Standards) - LeGSB

LeGSB is working to provide local authority councils, their partners and suppliers with one-stop access to the best and most current thinking, information, practice, standards and advice available for the development of eGovernment at local level.

The project has also prepared a standards catalogue, mapping existing standards and identifying gaps to be filled, publicizing local eGovernment projects and best practice and delivering practical support and advice to councils, their partners and suppliers on the interpretation and adoption of local eGovernment standards. It also supports efforts that lead to the agreement and certification of local eGovernment standards.

More generally, LeGSB aims to prevent duplication of effort and thus reduce the costs of local eGovernment.

One of the most important LeGSB products is Custodian. This is an online database of key projects and information to be used by councils in order to promote and further advance their eGovernment policies. Custodian is an information repository of eGovernment schemas. Moreover, the project evaluates how these schemas contribute to local eGovernment standards. As there are many projects active in local e-government in UK, the LeGSB through Custodian aims to provide access and disseminate comprehensive best practices and information on local service interoperability standards.

Custodian has a very clear focus and is very much related to the promotion of IOP between local authorities. Quoting from the site, "Local government has to agree with the national standards for interoperability. Standards are needed to ensure interoperability between National Projects

including links to strategic developments being led by central government departments. As standards develop they will reduce the cost of developing new projects, as the building blocks for ensuring interoperability will already be on place. For the same reason they will reduce the risk of failure. It will also provide the basis for improved interoperability across National Projects and with other national and local projects through early dissemination of new standards. "

In this line, the Custodian Blueprints are of particular importance to IOP. Blueprints provide a filter for a huge volume of relevant material to give local authority a tailored view on standards and related information. Taking into account, that the 22 National Projects alone have produced over 1000 documented outputs, all of which could benefit local government, it is easy to understand how valuable these Blueprints could be proved

The available Blueprints have been organized in the following thematic categories:

- The Social Care Blueprint brings together best practice, guidance and standards applicable to all areas of Social Care.
- The Planning Services Blueprint provides access to the range of standards relevant to Planning Services (in cooperation with the PARSOL National Project).
- The Trading Standards and Regulatory Services Blueprint refer to e-Trading Standards & Regulatory Services.
- The Smartcard Blueprint is a collection of information and emerging standards relating to Smartcards.

3.5.5.3 Examples from the e-Government Support & Capacity Programme

The esd-toolkit and its Standards Lists

The esd-toolkit is an initiative, which has evolved through the collaborative effort of different types of councils⁸⁰. The Support and Capacity Programme has funded the project with approximately £2 million for the years 2003-06.

The toolkit comprises:

- a) a repository of information on various topics, including business processes, best practices, projects, tools with which to tailor data, and a database to store research information
- b) a means of delivering statutory returns (Implementing eGovernment statements and Annual Efficiency Statements) to ODPM in an accurate and consistent way
- c) a means of communication within the local authority community through emails, forums and web pages
- d) a means to carry out interactive analyses such as web surveys.

Central to the esd-toolkit is a list of services against to be used as blueprints by local authorities in order to model their own service delivery and organisational structures. The lists provide different ways of grouping local authority's services. Amongst other things, these lists of services are used for defining local authority outputs and measuring electronic service delivery. The lists are built on a common XML framework and exist also in other formats to allow both manual and machine consultation. Mappings between lists are also published.

All lists are freely⁸¹ available and third parties (e.g. private sector) are encouraged to adopt them when dealing with local authorities.

The three main lists are the followings:

- Local Government Service List (LGSL)

⁸⁰ www.esd-toolkit.org

⁸¹ www.esd.org.uk/standards

- Local Government Directory List (LGDL)
- Government Classification Scheme (LGCS)

The first list is very important for the overall esd-toolkit. LGSL provides a full list of all citizen-centric services provided by a local authority. Users of esd-toolkit at any local authority can download this list, and then tailor it to their own local needs. This provides a common language gives also the necessary local flexibility. LGSL has been already approved as a standard by the Local e-Government Standards Body, which means that the LGSL can be used by councils as a roadmap for service delivery. Furthermore, it is possible to link to an LGSL service any kind of documents, web pages, etc - everything a council does and is visible to its citizens.

The Local Government Directory List (LGDL) defines the organisational structure of a typical council and interesting mappings to LGSL links this structure to the actual service provided to the citizens. Again, these generic descriptions can be tailored to the specific needs of a council. A local authority can create a modified version of LGDL to model its own structure.

The Local Government Classification Scheme (LGCS) is a record classification schema. It has been agreed between the Records Management Society of Great Britain and the Local Government Group to provide a structure appropriate and sound for classifying all council records.

All services are grouped in six different ways:

- by organisational structure (LGDL)
- by subject (LGCL)
- by function/activity (LGCS)
- by the types of interaction a council should support to deliver the service (LGIL)
- by audience, giving the profiles of service users (LGAL)
- by business sector (LGBCL)

3.5.5.4 Examples from the National e-Service Delivery Standards Initiative

The following draft standards, available through the National e-Service Delivery Standards project are accessible from the e-Service Delivery web site⁸²:

- Human Resources
- Property
- Highways
- ICT
- Customer Services
- Adult Services
- Housing
- Trees

All the above have been recently open for a Public Consultation period (10 Nov. - 15 Dec. 2005) to the local authority community.

The following notice appears in the Standards web site and deserves attention: "We are collaborating fully with the Local e-Government Standards Body (LeGSB) over the development of the standards to ensure consistency and avoid duplication and conflict. We will where considered appropriate use their Certification procedures."

⁸² <http://www.nesdsconsultation.org/>

3.5.6 References and Links

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- Cabinet Office, "Transformational Government Enabled by Technology", November 2005
- Esd-toolkit, "*What Are All These Lists?*", Issue 0.02 – Draft, 3 Sep. 2004
- eGovernment Unit, "*e-Government Interoperability Framework*", Ver. 6.1, 18 March 2005,
- Haig R., "Local e-Government Standards Body – Project Initiation Document", 1.0, 11 June 2003
- I&DeA, "IDeA Business Plan, summary 2005/6", 2004
- Gartner, "U.K. Government Sets Goals for Transformation With Technology", Research Report ID. G00135376, 4 Nov. 2005
- ODPM, "The National Strategy for Local eGovernment", Nov. 2002
- ODPM, "One Year On: The National Strategy for Local eGovernment", Dec. 2003
- ODPM, "Two Years On: realising the benefits from our investment in e-government", March 2005
- ODPM, "2 years on: support & capacity for local e-Government", 2005
- ODPM, "National Project: Benefits Guide Executive Summary", Dec. 2004
- ODPM, "National Project: Summary 2005", 2005
- ODPM, "Local e-Government Partnerships", Oct. 2005
- PARSOL, "e-Planning Service Delivery Standards", June 2004

3.6 Status Report 5 (short): Belgium

Belgium is considered one of the pioneer countries in implementing eGovernment initiatives. Its eGovernment interoperability framework **BELGIF** ('BELgian Government Interoperability Framework') was published on May 2, 2005, along with a first list of open standards to be used by public authorities. BELGIF is the result of a cooperative project bringing together the federal government and the federated entities (regions and communities). The aim of BELGIF is to promote interoperability both at national and European level, and to implement the federal government's decision, which was made in June 2004 to promote the use of open standards.

Prior to this, the Belgian Government published a white paper on the use of open standards by federal public bodies in October 2004. The paper presents a number of guidelines and recommendations regarding the use of open standards and open specifications by federal administrations, aiming at supporting a better integration of federal back-offices, promoting the interoperability of their information systems, and facilitating the electronic exchange of information with citizens and businesses.

According to Frank Robben, General manager of Crossroads Bank for Social Security and Strategic Advisor of the Federal Public Service for ICT, about 2,000 public and private institutions at several levels (federal, regional, local) are or must be highly interconnected and interoperable in order to provide high quality and low cost services to Belgian citizens. These public and private institutions are responsible for collecting social security contributions and delivering social security benefits⁸³. This mutual interaction requires a well-defined integrated interoperability framework. This IOP framework helps electronic information exchanges take place on the basis of functional and technical interoperability that evolves permanently but gradually according to open market standards, and is independent from the methods of information exchange.⁸⁴

An interesting example of local interoperability is the interoperability project in the municipalities and provinces of Wallonia⁸⁵. "Wall-On-Line" is the name given to the Walloon region electronic government project. Adopted in June 2001 by the Walloon government, this project is conducted under the authority of the Minister-President.

The overall objective of the Wall-on-Line project is to develop eGovernment and implement the concept of a one-stop shop with multiple accesses, common to all authorities.

In order to attain these objectives, the Walloon government has set up the "Wall-On-Line" unit, an ICT team reporting to the Ministry of the Walloon Region and involved in many projects in a cross-functional manner.

In 2003 the Wall-On-Line unit (WOL), backed by the Minister-President, launched a pilot project on interoperability between a number of municipalities and the Walloon region. This project falls within the remit of the 2004-2009 regional policy declaration, which stipulates that "municipalities that so desire should be given active participatory roles in the Walloon eGovernment project".

The main Belgian actors in eGovernment, local government and interoperability are:

State Secretariat for the Computerisation of the State⁸⁶

In the new Belgian government resulting from the federal elections held in May 2003, a State Secretariat for eGovernment and the development of IT in the Federal government has been created. This position is directly linked to the Minister for the Budget and Public Enterprises and holds political responsibility for the eGovernment policy/strategy. The State Secretary oversees the Federal Public Service ICT (FEDICT), which is in charge of defining a common eGovernment strategy and of ensuring the consistency and homogeneity of this policy.

⁸³ <http://www.law.kuleuven.be/icri/frobber/presentations/20050914.ppt>

⁸⁴ <http://www.law.kuleuven.be/icri/frobber/presentations/20050914.ppt>

⁸⁵ <http://www.egovinterop.net/Res/5/Interop%20project%20wallonie%20Case%20study.pdf>

⁸⁶ <http://www.belgium.be/eportal/application?origin=navigationBanner.jsp&event=bea.portal.framework.internal.refresh&pageid=charterPodPage&navId=2726>

Federal Public Service ICT (FEDICT)⁸⁷

In addition to its role in defining the eGovernment strategy, FEDICT is also in charge of coordinating the implementation of this strategy within the federal administration. FEDICT helps government departments to elaborate and initiate their projects and supports them in the implementation phase. It is also in charge of developing, implementing and maintaining some elements of the national infrastructure itself, such as the federal portal Belgium.be, the network FedMAN (Federal Metropolitan Area Network) and the Universal Messaging Engine (UME) middleware.

Federal Departments and Agencies

Agency for Administrative Simplification⁸⁸

The Agency helps government departments and bodies in their efforts to simplify their administrative procedures, both internal and external.

Crossroads Bank for Social Security⁸⁹

This body initiates, coordinates and supports the implementation of eGovernment services in the social sector. In particular, it supports the implementation of integrated services across all public institutions of social security.

BELNET⁹⁰

The government agency BELNET, part of the Federal Science Policy Office, supplies secure Internet access with very high bandwidth (up to 2.5 gigabits per second) to more than 550,000 end users in Belgian education institutions, research centres and public administrations. Among other things, BELNET is in charge of the operation of the federal network FedMAN (Federal Metropolitan Area Network).

Federal Planning Bureau (FPB)⁹¹

The FPB is a public agency in charge of performing research and studies on issues of economic, socio-economic and environmental policy. For that purpose, the FPB collects and analyses data, explores plausible evolutions, identifies alternatives, evaluates the policy impact and formulates proposals. Its scientific expertise is available to the government, parliament, social partners and national and international institutions. One of its work areas is ICT policy, including eGovernment.

Internet Rights Observatory⁹²

The Internet Rights Observatory is a body created by the Minister for Economy and Scientific Research. It is in charge of advising the government on the economic, social and political impact of new technologies. It also enables all citizens and businesses to freely express their views on ICT-related issues and to receive information on their rights and duties in this respect.

REGIONAL & LOCAL eGOVERNMENT

Regional and Local Authorities

The political responsibility for eGovernment in Belgium's regions is held directly by the 'Minister-Presidents' (prime ministers) of the three regions: the Flemish Region, the Walloon Region and the Brussels Region.

Regional eGovernment efforts are coordinated by dedicated units or bodies set up by the regional executives: The eGovernment Coordination Cell in Flanders (CORVE), the E-

⁸⁷ <http://www.fedict.be/>

⁸⁸ <http://www.simplification.fgov.be/showpage.php?iPageID=3&sLangCode=FR>

⁸⁹ <http://www.ksz.fgov.be/>

⁹⁰ <http://www.belnet.be/en/>

⁹¹ <http://www.plan.be/en/welcome.stm>

⁹² <http://www.internet-observatory.be/>

Administration and Simplification Unit in Wallonia (EASI-WAL), and the Informatics Centre in the Brussels Region.

The coordination bodies mentioned above play a leading role in the implementation of regional eGovernment. Individual administrations in Flanders, Wallonia and Brussels are responsible for the implementation of their own ICT projects.

The coordination bodies mentioned above provide support and advice to individual administrations, as well as to municipalities in their regional area, for their eGovernment projects. The Walloon region has also set up a Walloon Agency of Telecommunications⁹³, which is in charge of promoting the development of ICT in the regions and that provides operational and expert support to Walloon administrations and communes.

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⁹³ <http://www.awt.be/index.aspx>

3.7 Status Report 6 (short): Cyprus

The Government of Cyprus has established an ad-hoc Ministerial Committee for the development of the Information Society, comprising of representatives from several Ministries as well as representatives from the Planning Bureau, the Telecommunication Authority and the Department of Computer Science at the University of Cyprus. Several pieces of legislation are in the pipeline, in particular regarding Personal Data Protection and Digital Signatures, which should facilitate and encourage the development of the information society and eGovernment.

While there is still progress to be made in building up an ICT infrastructure, the government is actively engaged in building a Government Data Network (GDN) interconnecting all government information systems. The core network has already been established. It connects a number of registries (civil, companies and land registries) whose data is used by different government bodies. A government portal has also been built⁹⁴ which acts both as an institutional website as well as an entry point to public information and services.

A number of back-end office automation projects are underway in government departments, which are also engaged in web-enabling their information systems in order to provide information and services to citizens and businesses over the Internet.⁹⁵

The eGovernment vision of the Government of Cyprus is to deliver one-stop services to the public via the web or through other electronic channels (kiosks, call centres, citizen support centres etc.).

However, there is a need for further design and implementation for Cyprus in order to achieve interoperability. The fact remains that there is no overall policy on IOP, neither on the national nor local level. Several barriers to supply and takeup of eGovernment and IOP services in the country are⁹⁶:

- Low level of digital literacy in the population.
- Lack of knowledge about eGovernment. Citizens do not know enough about the possibilities of eGovernment.
- eGovernment strategies are not detailed enough regarding the supply of services delaying thus their implementation.
- Lack of enough resources in the public sector for implementing eGovernment projects etc.

The main Cypriot actors in eGovernment, local government and interoperability are:

Cyprus Planning Bureau⁹⁷

The Planning Bureau is the responsible authority for the development of the Information Society in Cyprus.

Ministry of Finance - Directorate for the Co-Ordination of the Computerisation of the Public Service⁹⁸

The Ministry of Finance's Directorate for the Co-Ordination of the Computerisation of the Public Service is responsible for coordinating and monitoring the computerisation project of the entire Civil Service. The Directorate is mainly in charge of the coordination and monitoring of the progress recorded by the computerisation projects under construction or projects that are planned within the framework of the Strategic Computerisation Plan.

Ministry of Finance - Department of Information Technology Services (DITS)⁹⁹

⁹⁴ www.cyprus.gov.cy

⁹⁵ <http://ec.europa.eu/idabc/en/document/1601/593>

⁹⁶ <http://www.euser-eu.org/ShowCase.asp?CaseTitleID=538&CaseID=1251&MenuID=109>

⁹⁷ <http://www.planning.gov.cy/>

⁹⁸ <http://www.mof.gov.cy/mof/mof.nsf/Directorate8eng?OpenForm>

⁹⁹ <http://www.mof.gov.cy/mof/mof.nsf/Department4eng?OpenForm>

The Ministry of Finance's Department of Information Technology Services (DITS) is the Government Department responsible for ensuring that the full potential of information technology is harnessed to support the Government policies and objectives.

Government Ministries and Departments

Various government ministries and departments are responsible for their departmental systems.

Union of Cyprus Municipalities¹⁰⁰

The Union of Cyprus Municipalities was established in 1981. Even though membership is voluntary, at present all municipalities (33), accounting for 65 per cent of the population of Cyprus, are represented. The Union's main functions are to contribute to the development of local government autonomy, as well as to act as spokesman of local government interests vis-à-vis the central government and other national institutions.

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¹⁰⁰ <http://www.ekk.org.cy/index.shtm>

3.8 Status Report 7 (short): Czech Republic

As reflected in the data from an eEurope benchmarking exercise carried out¹⁰¹, the Czech Republic's performance is modest when it comes to the number and sophistication of public services available to citizens on the Internet. The country is roughly at the same level with the New Member States average. While it scores better than Hungary, Poland and Slovakia, there is still a long way to go in order to reach the level of eGovernment supply that has been achieved in the leading EU countries.

The Czech Government is undertaking considerable efforts to make progress in the Information Society area. This is happening in the context of the ongoing territorial public administration reform and modernisation of public administration, which are under the authority of the Ministry of Interior (MV). Main policy objectives and activities to be taken are laid out in "State Information and Communications Policy: e-Czech 2006", "State Information Policy" and "National Telecommunications Policy". They built on earlier policy frameworks such as the "Action Plan to Implement the State Information Policy by 2003" and the "National eEurope+ Action Plan", which was initiated for by the European Commission.¹⁰²

Lately, the Ministry of Informatics in collaboration with the Ministry of Finance of the Czech Republic has started forming the Czech Interoperability Framework in order to achieve interoperability and integration among the various Public Administration Information Systems.¹⁰³

The main Czech actors in eGovernment, local government and interoperability are:

Ministry of Informatics¹⁰⁴

Established in January 2003, the Ministry of Informatics (Ministerstvo Informatiky) has taken up responsibility for the Czech eGovernment policy/strategy from the Government Council for State Information Policy, a consultative body created in 1998 and disbanded in December 2002. The ministry is now in charge of devising the strategy and providing leadership across government for its implementation.

Furthermore, the Ministry of Informatics coordinates the development and implementation of eGovernment (putting the accent on the Public Administration Information Systems, the Portal of Public Administration etc.), telecommunications, postal services and promotion of the Information society in general (e.g. National Computer Literacy Program).

Other central government ministries and agencies¹⁰⁵

Other government ministries and agencies are responsible for several departmental projects.

REGIONAL & LOCAL eGOVERNMENT

Individual regions and communes

Individual regions and communes can be accessed through the government portal <http://portal.gov.cz>

Union of Towns and Municipalities of the Czech Republic¹⁰⁶

Association of Regions of the Czech Republic¹⁰⁷

¹⁰¹ http://europa.eu.int/information_society/eeurope/i2010/docs/benchmarking/online_availability_2006.pdf

¹⁰² http://www.euser-eu.org/eUSER_eGovernmentCountryBrief.asp?CaseID=2204&CaseTitleID=1045&MenuID=119#_edn4

¹⁰³ http://www.gsa.gov/gsa/cm_attachments/GSA_DOCUMENT/11-JRoudny-CRepublic_R2GXI-I_0Z5RDZ-i34K-pR.doc

¹⁰⁴ <http://www.micr.cz/>

¹⁰⁵ <http://wtd.vlada.cz/eng/adresar.htm>

¹⁰⁶ <http://www.smocr.cz/>

¹⁰⁷ <http://www.asociacekraju.cz/>

3.9 Status Report 8 (short): Denmark

Denmark is considered a leader in eGovernment with eGovernment in the country being well matured. In particular, according to an annual survey of global eGovernment leadership¹⁰⁸, Denmark leads the field in Europe, surpassed only by Canada, Singapore and the USA at a global level. Other surveys from the EU and the United Nations confirm Denmark's vanguard position. Denmark has a firm basis upon which to further develop eGovernment.¹⁰⁹

In order to fulfil the goal of an efficient and coherent public administration, the Danish Government has adopted an IT policy, which comprises of three main elements:

- The public sector – individual authorities and joint projects – should take active responsibility for its own enterprise architecture.
- A common enterprise architecture framework is being established for the planning of public IT systems in order to ensure interoperability.
- Considerable efforts must be made to propagate knowledge of and develop expertise in enterprise architecture and the joint public initiatives.

Hence, in October 2003, the Danish Government published the first draft version of its eGovernment Interoperability Framework. This framework is called the 'Reference Profile' and lists technical policies and specifications formally recognised by the government. It also guides IT decision-makers in their choices, which concern IT systems. The Reference Profile is aimed at harmonising the use of technologies throughout the Danish administration.

The Interoperability Framework has been compiled in collaboration with KIU, a committee which facilitates coordination of initiatives related to IT in the Danish public sector. Members of the KIU committee include the Digital Taskforce, the Ministry of Science, Technology and Innovation, the Ministry of the Interior and Health, the Ministry of Economics and Business Affairs, the Local Government of Denmark, Danish regions and the National IT & Telecom Agency.¹¹⁰

The main Danish actors in eGovernment, local government and interoperability are:

Joint Board of the eGovernment Project¹¹¹

The Joint Board of the eGovernment Project is the central decision-making body for eGovernment in Denmark. It is made up of the permanent secretaries from five ministries, the managing directors of the associations of County Councils and of Municipalities, and of a representative from the two largest municipalities (Copenhagen and Frederiksberg). The board is chaired by the Ministry of Finance and assumes joint responsibility for the country's eGovernment strategy/policy. The role of the Board includes formulating an overall eGovernment vision and strategy, identifying and seeking to remove central technical, legal, and organisational barriers, taking the necessary strategic decisions concerning joint solutions and conditions, driving progress in the digitisation of the public sector, among other things by making sure information and guidelines are worked out, and surveying the development and speed of the transition towards eGovernment.

The Digital Task Force

The Digital Task Force is a special task force that has been set up to act as a catalyst for co-ordination and co-operation in the digitisation process across all levels of the public sector. It assists the Joint Board of the eGovernment Project, prepares the basis for the decision-making on the background of cooperation with the involved parties, and drives the implementation of the adopted projects. The Digital Task Force initiates a number of cross-sector projects, but it remains focused on the business side of initiatives - identifying opportunities where business process re-

¹⁰⁸ <http://itst.dk/static/publikationer/AnnualReport2003/html/chapter03.htm>

¹⁰⁹ Architecture for eGovernment in Denmark, Challenges and Initiatives, Ministry of Science, Technology and Innovation, available at: <http://www.oio.dk/files/architecture.pdf>

¹¹⁰ More details and documents at: <http://standarder.oio.dk/English/Guidelines/>

¹¹¹ http://www.e.gov.dk/english/project_egovernment/the_joint_board/index.html

engineering and redeployment of resources can lead to a better and more efficient public service, value creation or cost reduction.

Ministry of Science, Technology and Innovation¹¹²

The Ministry of Science, Technology and Innovation leads the development of IT policy and infrastructure. It does so through its **IT-Policy Centre** and through the **National IT and Telecom Agency¹¹³**

Government departments and agencies¹¹⁴

Agency for Governmental Management¹¹⁵

Part of the Ministry of Finance, the Agency for Governmental Management aims to contribute ensuring efficient management in central government. In the field of eGovernment, the Agency for Governmental Management notably co-ordinates state interests in the public e-procurement platform DOIP¹¹⁶

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¹¹² <http://videnskabsministeriet.dk/site/forside>

¹¹³ <http://www.itst.dk/>

¹¹⁴ http://denmark.dk/portal/page?_pageid=374,477789&_dad=portal&_schema=PORTAL

¹¹⁵ <http://www.oes.dk/sw153.asp>

¹¹⁶ <http://www.doip.dk/>

3.10 Status Report 9 (short): Finland

Since the 1990s, Finland has been a leader in exploiting information and communication technologies (ICT) to renew its economy and to reform its public administration¹¹⁷. The Finnish eGovernment strategy is set in the paper **Public Services in the New Millennium**¹¹⁸ which was published in December 2001.

From a technology viewpoint, major critical requirements are multi-channel provision, seamlessness, interoperability of portals, device independence, information security, network coverage, ease of identification and standard interfaces.

In a local level, on October 12, 2005, the Prime Minister appointed a working group to prepare the creation of a new body (**KuntaIT**) that will strengthen the information management cooperation between Finnish municipalities.

The working group will draw up a proposal of the unit's tasks and organisation as well as propose funding models for joint data system purchases. In addition, the working group will propose a preliminary plan on moving towards a joint organisation for State information management. The working group will base its work on proposals made by the KuntaTIME project that examined developing the coherence of information management in public administration and cooperation related to Information Society. The KuntaIT organisation is to start operations at the beginning of 2007, at the latest.

The main Finnish actors in eGovernment, local government and interoperability are:

Ministry of Finance¹¹⁹

The Ministry of Finance has policy-making responsibilities in the areas of public management reform and information and communication technology (ICT) policy and guidance for the state administration. These functions are primarily carried out by the State IT Management Unit in the Ministry's Public Management Department. The Ministry of Finance also has responsibility for the Government Information Management Unit.

Information Society Council¹²⁰

The Information Society Council is a negotiation body for steering the development towards the information society and for coordinating cooperation between administrative branches and between administrations, organisations and business life. It is chaired by the Prime Minister and is composed of senior representatives of state and local administrations as well as IT industry leaders. It reports regularly to the Government on the state of Finland's Information Society development.

Public Management Department of the Ministry of Finance¹²¹

The Public Management Department is responsible for the management policy in central government and serves as the Government's expert on administrative development. Among other things, it is in charge of coordinating Government ICT policy.

Government Information Management Unit¹²²

The Government Information Management Unit was set up in 2002 to improve information management within and between the ministries. It operates the ministries' joint information

¹¹⁷ <http://www.oecd.org/dataoecd/20/50/13314420.pdf>

¹¹⁸ <http://ec.europa.eu/idabc/servlets/Doc?id=21913>

¹¹⁹ http://www.vm.fi/vm/fi/01_etusivu/

¹²⁰ http://www.tietoyhteiskuntaohjelma.fi/tietoyhteiskuntaneuvosto/en_GB/information_society_council/

¹²¹ http://www.vm.fi/vm/en/02_ministry/02_organisation_and_functions/06_public_management_department/index.jsp

¹²² http://www.vm.fi/vm/en/02_ministry/02_organisation_and_functions/11_government_information_management_unit/index.jsp

system and initiates, promotes and coordinates the further development of cross-sectoral and joint projects in the field of information management, information technology and data security in central government.

Government ministries and agencies¹²³

Government ministries and agencies have responsibility for the implementation of their own departmental eGovernment projects.

Finnish Institute of Public Management (HAUS)¹²⁴

HAUS was established in 1971 as an in service training centre for civil servants. It was transformed into a state-owned enterprise subordinate to the Ministry of Finance in 1995, and converted into a limited company at the beginning of September 2002. Its mission is to provide innovative training and consulting services and to promote latest knowledge in the field of administrative practices.

REGIONAL & LOCAL eGOVERNMENT

Regional Councils and Municipalities¹²⁵

Finland's Regional Councils are joint municipal authorities responsible for regional development. There are 19 Regional Councils, which group together the country's 446 municipalities. Even though many municipalities cover very small population catchments, most of them provide Internet services.

Ministry of the Interior¹²⁶

The Ministry of the Interior is responsible for information management in regional administration and local authorities and plays an important co-ordinating role at the local level.

Association of Finnish Local and Regional Authorities (AFLRA)¹²⁷

The Association of Finnish Local and Regional Authorities is made up of the towns and municipalities in Finland. The Association's goal is to promote the opportunities for local authorities to operate and co-operate and to promote their vitality for the benefit of the residents.

¹²³ <http://www.finland.fi/>

¹²⁴ <http://www.haus.fi/index~id~FA8435B786394D4AAFD2453E3C58B7FA.asp>

¹²⁵ <http://www.reg.fi/english/engindex.html>

¹²⁶ <http://www.intermin.fi/en>

¹²⁷ http://www.kunnat.net/k_etusivu.asp?path=1

3.11 Status Report 10 (short): France

The French eGovernment strategy is set in the **ADELE programme**, presented on 09 February 2004. ADELE (**AD**ministration **ELE**ctronique) provides a detailed roadmap for the coherent and coordinated development and implementation of electronic services that citizens, businesses and civil servants are entitled to expect. Covering the period 2004-2007, the programme comprises of a strategic plan¹²⁸ and an action plan¹²⁹.

On January 21, 2002, the first version of the **French eGovernment interoperability framework**¹³⁰ (Cadre Commun d'Interoperabilité) was published. The interoperability framework addresses the need for increased interoperability between information systems across the public sector and lays the foundations for enabling a greater joined-up work between public administrations.

Furthermore, on August 21, 2003, the French Government launched an open source content management system called **AGORA**¹³¹, providing a quick and easy tool for managing Internet, intranet or extranet sites at reduced cost. Its aim is to help rationalise content management and foster interoperability of web content and functionalities across government, while reducing websites costs and building times.

The main French actors in eGovernment, local government and interoperability are:

Minister in charge of Administrative Reform

In the new French Government appointed in June 2005, political responsibility for State Reform and eGovernment strategy/policy has been transferred from the Ministry for the Civil Service to the Minister Delegate for the Budget and Administrative Reform within the Ministry of Economy and Finance.

Agency for the Development of Electronic Administration (ADAE)¹³²

The ADAE eGovernment agency, created in early 2003, is in charge of preparing the French eGovernment policy/strategy and of steering and monitoring its implementation. The agency is placed under the authority of the Prime Minister but put at the disposal of the Ministry in charge of Administrative Reform (since June 2005, the Minister Delegate for the Budget and Administrative Reform in the Ministry of Economy and Finance).

Central government departments¹³³

All central government departments are responsible for projects in their field of competence.

The French Documentation¹³⁴

The French Documentation (Documentation Française) is responsible for Information Management

REGIONAL & LOCAL eGOVERNMENT

Regional and local administrations¹³⁵

Caisse des Dépôts et Consignations¹³⁶

The Caisse des Dépôts is a state-owned financial institution that performs public-interest missions on behalf of France's central, regional and local governments. It supports local

¹²⁸ http://www.adele.gouv.fr/spip/IMG/pdf/Le_plan_strategique-GB.pdf

¹²⁹ <http://ec.europa.eu/idabc/servlets/Doc?id=22154>

¹³⁰ http://www.adele.gouv.fr/spip/article.php3?id_article=219

¹³¹ <http://www.agora.gouv.fr/>

¹³² <http://www.adele.gouv.fr/>

¹³³ <http://lessites.service-public.fr/cgi-bin/annusite/annusite.fcgi/nat5?stheme=MIN&lang=fr>

¹³⁴ <http://www.ladocumentationfrancaise.fr/>

¹³⁵ <http://lessites.service-public.fr/cgi-bin/annusite/annusite.fcgi/loc1?lang=fr>

¹³⁶ <http://www.caissedesdepots.fr/>

eGovernment through projects like **FAST**¹³⁷ (a secure infrastructure for legally-binding interchange of electronic documents) or Local Public Service (a content syndication service, enabling local and regional councils to enrich their electronic information and services using the data produced for the national eGovernment portal <http://www.service-public.fr>). It also provides regional and local authorities with support for their ICT projects, in particular through its subsidiary **CDC-TIC**¹³⁸.

Association of French Mayors¹³⁹

Association of French Departments¹⁴⁰

Association of French Regions¹⁴¹

Observatory of Telecommunications in the City¹⁴²

Internet Cities Association¹⁴³

¹³⁷ <http://www.fast.caissedesdepots.fr/en/index.asp>

¹³⁸ <http://www.cap-tic.fr/new/>

¹³⁹ <http://www.amf.asso.fr/>

¹⁴⁰ <http://www.departement.org/jsp/index.jsp>

¹⁴¹ <http://www.arf.asso.fr/>

¹⁴² <http://www.oten.fr/>

¹⁴³ <http://www.villes-internet.net/>

3.12 Status Report 11 (short): Greece

In July 2005, the draft Greek **digital strategy for the period of 2006-2013** was presented¹⁴⁴, aiming at enabling a "digital leap" to improve productivity and quality of life by 2013. The proposed digital strategy includes more than 65 actions and is divided into two parts. The first part of the plan will be enacted by 2008, and the second one by 2013. The digital strategy will involve possible public-private co-operations in eGovernment projects, and will include three key government-wide projects: the development of a national e-services portal "Hermes," the implementation of a single authentication and transaction security system, and the development of a single interoperability system for public services. These projects will help reduce administrative burdens for businesses and improve people's quality of life.

As far as interoperability is concerned, in 2002, the Information Society Committee (directly linked to the Ministry of Economy and Finance) published the Greek eGovernment Interoperability Framework so that Greece will manage to conform to the European Interoperability Framework. The Greek eGIF is based on the outcomes of relevant European and international initiatives.

The main Greek actors in eGovernment, local government and interoperability are:

Ministry of Interior, Public Administration and Decentralisation¹⁴⁵

The Ministry of Interior, Public Administration and Decentralisation is responsible for implementing eGovernment in Greece. The ministry has a long experience in managing eGovernment projects within the 1st and 2nd European Community Support Framework and also manages national and European funds within the Operational Programme for the Information Society (OPIS). Within the Ministry, the General Secretariat for Public Administration and eGovernment is more particularly in charge of eGovernment issues. Beyond eGovernment, the overall Information Society strategy falls under the responsibility of the Secretariat for the Information Society in the Ministry of Economy and Finance.

General Secretariat for Public Administration and eGovernment¹⁴⁶

The General Secretariat for Public Administration and eGovernment is a division of the Ministry of Interior, Public Administration and Decentralisation.

Secretariat for the Information Society¹⁴⁷

As already stated above, this is a division of the Ministry of Economy and Finance.

Information Society S.A.¹⁴⁸

Created in 2001, Information Society S.A. is a state-owned company tasked with supporting the implementation of the Operational Programme for the Information Society (OPIS). To this end, the company implements and manages some components of the country's eGovernment infrastructure, such as the SYZEFXIS government-wide network.

All Government ministries and agencies¹⁴⁹

Individual government bodies are responsible for the implementation of departmental projects.

REGIONAL & LOCAL eGOVERNMENT

Regional Administrations¹⁵⁰, **Prefecture Administrations**¹⁵¹ and **Municipalities**¹⁵²

¹⁴⁴ <http://www.infosoc.gr/NR/rdonlyres/A13F889F-DE92-4DCF-B64A-37351BFC69B9/660/GreekDigitalStrategy20062013.pdf>

¹⁴⁵ <http://www.ypes.gr/>

¹⁴⁶ <http://www.qspa.gr/%289708599871378352%29/ecHome.asp?lang=1>

¹⁴⁷ <http://www.mnec.gr/ktp.aspx>

¹⁴⁸ <http://www.infosociety.gr/infosoc/el-GR/>

¹⁴⁹ <http://www.primeminister.gr/gr/ministries.asp>

¹⁵⁰ <http://www.ypes.gr/periferiakh.htm>

The administration of the Greek state is organised on the basis of the principle of decentralisation, with 13 administrative regions run by government-appointed representatives.

Greece also comprises of two tiers of local government: the municipalities, which are responsible for the administration of local matters, and the prefectures (54) headed by prefectural councils and prefects who, since 1994, are elected directly by the people.

Hellenic Agency for Local Development and Local Government¹⁵³

The Hellenic Agency for Local Development and Local Government (EETAA) was founded in 1985, with the aim of providing local government agencies, the public sector and social agencies with the professional and technical support they require.

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¹⁵¹ http://www.ypes.gr/nomarxiakh_aut.htm

¹⁵² <http://www.ypes.gr/topiki.htm>

¹⁵³ <http://www.eetaa.gr/>

3.13 Status Report 12 (short): Hungary

In November 2003 the Hungarian Government adopted a new **Hungarian Information Society Strategy (MITS)**¹⁵⁴. Creating a modern e-public administration is one of the top priorities of the Strategy. Efficient and useful e-public services can indeed demonstrate the benefits of the Information Society to the whole of the country and speed up its development in a manifold and effective way.

The implementation of this priority is based on the eGovernment Strategy and Programme (**eKormányzat Strategia 2005**)¹⁵⁵, prepared by the Electronic Government Centre of the Prime Minister's Office.

In the field of interoperability, the project of the MEKIK¹⁵⁶ (Hungarian Electronic Public Administration Interoperability Framework) has already been started. The first steps were the specification of the middleware and MEKIK portal as well as the pilot implementation of technical standards catalogue that would be accessible via this portal. These requirements affected the work relating to secure communication and the usage of electronic signature in the public administration. The project of the technical standards catalogue also covered the general conception of security framework, requirements of certification service providers, signature creation application and devices, cryptographic protocols, legal aspects and secure mobile communication¹⁵⁷.

The main Hungarian actors in eGovernment, local government and interoperability are:

Electronic Government Centre at the Prime Minister's Office¹⁵⁸

Inter-Departmental Conciliatory Committee for Government Information Technology (KIETB)¹⁵⁹

Ministry of Informatics and Communications¹⁶⁰

Inter-Departmental Coordination Committee for the Information Society¹⁶¹

An Inter-Departmental Coordination Committee for the Information Society has been formed to provide a forum for preparing the country's Information Society and eGovernment policies. Responsibility for implementing these policies lies within the Ministry of Informatics and Communications, except in central government where the 'Electronic Government Centre at the Prime Minister's Office' is in charge of providing leadership for eGovernment efforts.

REGIONAL & LOCAL eGOVERNMENT

Ministry of the Interior¹⁶²

E-administration Subcommittee of Inter-Departmental Coordination Committee for the Information Society

Hungarian National Association of Local Authorities (TÖÖSZ)¹⁶³

¹⁵⁴ <http://www.informatika.gkm.gov.hu/strategia>

¹⁵⁵ <http://www.meh.hu/szervezet/hivatalok/ekk/ekormanyzat/stratismeteto.html>

¹⁵⁶ http://www.itktb.hu/resource.aspx?ResourceID=IHM_IOP_Szabvt_v014_e_elka_2006_04_12_d oc_V1

¹⁵⁷ Zsolt Sikolya, Péter Risztics, Hungarian Electronic Public Administration Interoperability Framework (MEKIK) – Technical Standards Catalogue, available at: <http://interop-esa05.unige.ch/INTEROP/Proceedings/eGovScientific/papers/6b3.pdf>

¹⁵⁸ <http://www.meh.hu/szervezet/hivatalok/ekk>

¹⁵⁹ <http://www.meh.hu/szervezet/hivatalok/ekk/kietb>

¹⁶⁰ <http://www.ihm.hu/>

¹⁶¹ <http://www.itktb.hu/Engine.aspx>

¹⁶² <http://www.bm.hu/index.html>

¹⁶³ <http://toosz.webalap.hu/>

National Association of Intelligent Local Authorities (ITOSZ)¹⁶⁴

Association of Cities of County Rank (MJVSZ)¹⁶⁵

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¹⁶⁴ <http://www.itosz.hu/>

¹⁶⁵ <http://www.mjvsz.hu/portal/index.aspx?adat=53789&pf=21&lf=45&mf=1123&cmf=826>

3.14 Status Report 13 (short): Ireland

The Irish e-government strategy is laid down in **New Connections - A Strategy to realise the potential of the Information Society**¹⁶⁶, which was presented in March 2002. This objective is now a central focus for all Departments and Agencies through their **Statements of Strategy under the Public Services Management Act**, resulting in the e-government agenda being clearly integrated with mainstream business strategy and objectives. The Government is also committed to ensuring that the benefits of integrated services will not depend on having direct access to the electronic delivery channel. Intermediated access to the **Public Services Broker** will be a key feature and will be facilitated through both telephone contact centres and one-stop-shops.

In a EU benchmarking exercise carried out in November 2001 to measure progress with online delivery of public services¹⁶⁷, Ireland performed strongest of all Member States.

Reach¹⁶⁸ is an agency established by the Irish Government to develop a strategy for the integration of public services and to develop and implement a framework for e-government in Ireland.¹⁶⁹ The **Public Services Broker** (PSB), constructed by Reach, is an integrated set of electronic processes, systems and procedures based on a service-oriented architecture approach to e-government infrastructure.

In the context of progressing central components of the Public Services Broker, the **OASIS** (Online Access to State Information and Services) and **BASIS** (Business Access to State Information and Services) projects were initiated during 2000; the OASIS website was launched in April 2001, providing an integrated online resource of public service information based around citizen-centred life events, and available through a single point of contact (oasis.gov.ie); the BASIS website was launched in May 2001, providing an integrated online resource of public service information based around business-centred needs, and available through a single point of contact (basis.ie).

In order to define an interoperability framework, the PSB, collaboratively with other Government Departments and Agencies, has set the **Interoperability Standards and Guidelines**¹⁷⁰, a set of agreements among Departments and Agencies to work together and to subscribe to an agreed set of policies and guidelines. In the context of PSB and electronic delivery of standards, these agreements will concern subscription to policies concerning a relatively wide range of topics, including:

- Customer data – including protection, usage, capture and verification
- Security and access control policies – as set down by the PSB and other service providers
- Customer service policies and standards – including delivery of services to and for other agencies
- Use of Broker common services and subscription to technical requirements
- Authoring and supply of information about services

In the public sector, a huge variety of computer systems exist within Government Departments, their associated agencies, and throughout the health and local government sectors. Interoperability allows these different computer systems and networks to talk to each other and work together.

Currently, within the Irish public sector, there are a number of significant developments and work streams in the interoperability arena.¹⁷¹

¹⁶⁶ <http://europa.eu.int/idabc/en/document/4772/5683>

¹⁶⁷ http://europa.eu.int/information_society/eeurope/2002/documents/2nd%20Measurement%20FINALREPORT_ANNEX.pdf

¹⁶⁸ <http://www.reach.ie/>

¹⁶⁹ <http://www.idealliance.org/proceedings/xml04/papers/26/paper.html#S3.1>

¹⁷⁰ <http://www.reach.ie/publications/>

¹⁷¹ <http://www.reach.ie/interoperability/>

Inter-Agency Messaging Service (IAMS)¹⁷²

All agencies of the State can now be connected to each other via the Government Virtual Private Network (GVPN). The GVPN provides a single unified platform for agencies to access the Internet, send emails etc. securely.

Reach has developed a centralized reliable messaging service called the IAMS (Inter-Agency Messaging Service), which brokers the exchange of customer-related information between agencies on the GVPN. The first IAMS service launched mid-2003 centres on services surrounding the birth of a child. Using IAMS, the General Register Office (GRO) notifies Client Identity Services (CIS) in the Department of Social & Family Affairs about a birth. CIS then assigns the newborn baby with a Personal Public Service Number (PPS No). GRO also uses the IAMS to electronically send statistics on births, deaths and marriages to the Central Statistics Office (CSO).

Service Integration & Interoperability

Public services are often a shared responsibility between a number of public sector organisations. 'Joining-up' all the transactions and service information involved in delivering a service, and making them available to the public from one central access point, is a key aim of the Reach 'Public Services Broker' project.

The Services Index situated within the centre of the homepage of the Reach Services portal¹⁷³ offers customers a route to integrated public sector information and services, where services are grouped together based on service area/subject, not according to which agency is responsible for delivering the service. The **Services Index** also features a range of online services.

Interoperability between the systems, data and different ways of working of the organisations involved is crucial to successfully 'joining-up' the various back-end agency processes. The PSB service oriented architecture and data standards such as the Reach Interoperability Guidelines (RIGs) will assist Reach and public sector agencies in developing and delivering integrated online services.

Services and Data Exchange Catalogue (SDEC)¹⁷⁴

Information about each service or service component will be specified in a Services and Data Exchange Catalogue (SDEC). All services on the PSB will be registered and catalogued on the SDEC and will have their associated unique service identifiers and metadata created, stored and maintained in the SDEC.

As far as local interoperability is concerned, a good example of projects that promote interoperability at local and regional level is the Local Government Computer Services Board.

The main Irish actors in eGovernment, local government and interoperability are:

Department of the Taoiseach¹⁷⁵

The Department of the Taoiseach (Irish Prime Minister) is directly in charge of the Information Society and e-Government policy/strategy. Within the Department, a Minister of State has specific responsibility for advancing the Information Society and e-Government agenda across Government. The Minister for the Information Society is responsible for co-ordinating policy to ensure the continued development of the Information Society in Ireland, promoting and monitoring the implementation of national policies in this area, and representing the country at European and other international fora on Information Society issues. The Minister is assisted in this role by the **Cabinet Committee on the Information Society**, which defines, approves and monitors the Information Society strategy. The committee is convened by the Minister for the Information Society, chaired by the Taoiseach and comprises of several Ministers. The work of the Cabinet Committee on the Information Society is complemented by that of the **eStrategy Group of Secretaries General**, which addresses national e-Strategy issues. Secretariat for the Cabinet

¹⁷² <http://www.reach.ie/iams>

¹⁷³ <http://www.reachservices.ie/>

¹⁷⁴ <http://sdec.reach.ie/>

¹⁷⁵ <http://www.taoiseach.gov.ie/>

Committee on the Information Society and for the eStrategy Group of Secretaries General is provided by the **Information Society Policy Unit (ISPU)** in the Department of the Taoiseach.

Information Society Policy Unit (ISPU)

The Information Society Policy unit (ISPU), part of the Department of the Taoiseach, has overall responsibility for developing, co-ordinating and driving implementation of the Information Society agenda.

eStrategy Group of Secretaries General

The Group is in charge of the coordination at Department Secretaries General level.

Reach

The Reach Agency was established by Government decision in 1999 and, in May of 2000, was mandated by Government to build or procure the Public Services Broker. Since then, Reach has been defining the architectures and principles underlying the operation of the Broker and is now leading its development.

Government Departments and Agencies

Several government departments and agencies are responsible for individual departmental projects.

REGIONAL & LOCAL E-GOVERNMENT

Local Government Computer Services Board (LGCSB)¹⁷⁶

The LGCSB is a public sector organisation, closely aligned with local government in Ireland. Its job is to provide local authorities with the best possible solutions to meet all their Information and Communications Technologies needs, to help local authorities develop appropriate strategies to underpin their business needs and to help them implement appropriate solutions.

LGCSB's role is to provide vision, advice, guidance and support in the use of Information & Communications Technologies (ICT); and in doing so, to enhance the roles, processes, systems and service delivery of Local Government.

One of the challenges Local Government is facing is to become adaptive organisations in their use of IT. It is the job of the Architecture Office (AO) to introduce standards to ensure local government systems remain current, relevant, to guarantee interoperability with future systems and to readily incorporate appropriate future technologies. To make this happen, the Architecture Office creates a Software Applications Framework. This framework will incorporate all aspects of software standards, code standards, data integration, scalability and application security.

Regular inputs from external sources will ensure that work is not being carried out in isolation, and best practice models will be adopted where appropriate. Industry funding, research partnerships, early adoption packages, alpha and beta testing will be explored as methods of providing LGCSB and local authority personnel with regular updates in technologies and methodologies.

Another key function of the Architecture Office is to define the components and building blocks to integrate with the framework.

In addition, a proof of concept (POC) commenced in 2003 on a Data Interoperability Framework (DIF) in order to allow multiple disparate systems, which are managed in isolation, to represent their entity as one shared virtual entity across all systems and allows bi-directional updates on those entities.

The project chosen to implement the DIF was based upon an 'Employee Portal' that would allow the management of employee information through a web-based front end. Functionality would be provided via the portal to view, add, update and delete employees based on a virtual entity. This functionality was restricted subject to authorisation requirements. As well as providing

¹⁷⁶ <http://www.lgcsb.ie/>

a web-based interface, all source systems were still allowed to function as they have previously, potentially replicating any changes to the other systems based on a defined policy. Appropriate systems were chosen because they were deemed to be the critical systems that needed to be linked together to support an employee based portal.

Depending on how successful the completion of the proof of concept and follow-up on piloting of the application within the LGCSB is, the Data Interoperability Framework is intended to be integrated into the Generic Intranet for deployment to the local authorities¹⁷⁷.

DRAFT

177

http://www.taoiseach.gov.ie/attached_files/upload/publications/NewConnectionsMarch2002.pdf

3.15 Status Report 14 (short): Italy

The Italian Government intends to reform public administration to make it more responsive to the needs of users (individual citizens or businesses), provide modern services and create "public" value while ensuring ease of access and interaction. To implement this concept, a strategic reference model for eGovernment has been developed, composed of six key elements, one of which is the establishment of standards for interfaces between departments that permit efficient and transparent communication with the outside world and promote interoperability and cooperation.

According to the eGovernment Action Plan¹⁷⁸ published in 2000, the provision of integrated services by several different government units implies the achievement of full interoperability between the information systems of central and those of local government. These are increasingly assigned to the direct management of services to citizens and businesses and will thus be the front office of the country's public administration.

The main Italian actors in eGovernment, local government and interoperability are:

Department for Innovation and Technologies¹⁷⁹

A Minister for Innovation and Technologies was appointed in July 2001 to provide leadership and assume responsibility for the Italian Government's e-policies. A **Ministerial Committee for the Information Society**¹⁸⁰ has been set up to devise and/or endorse the strategic action lines, involving several senior ministers and chaired by the Minister for Innovation and Technologies.

National Centre for IT in Public Administration (CNIPA)¹⁸¹

The National Centre for Information Technology in Public Administration (Centro Nazionale per l'Informatica nella Pubblica Amministrazione - CNIPA) was created in July 2003. It is responsible for the implementation of policies in the field of information technology in the public sector devised by the Minister for Innovation and Technologies.

Government departments and agencies¹⁸²

Several government departments and agencies are responsible for departmental projects.

Civil Service Department¹⁸³

Formez¹⁸⁴

Formez is a non-profit association established by the State (through the Civil Service Department) and several local government associations, to develop and deliver training services to public sector staff, in particular training related to modernisation and ICT-related programmes.

REGIONAL & LOCAL eGOVERNMENT

All Regional and Local Authorities

Regional Competence Centers for eGovernment¹⁸⁵

The Regional Competence Centres were established following an agreement between the central government and the Presidents of all 19 Regional plus 2 Autonomous Provincial Authorities in March 2002. They form a network of expertise providing local public sector bodies in their areas with technical assistance, information and training activities. They support regional and local

¹⁷⁸ http://www.mininnovazione.it/eng/soc_info/politiche_governo/egovernment_00.pdf

¹⁷⁹ <http://www.innovazionepa.gov.it/>

¹⁸⁰ http://www.mininnovazione.it/ita/intervento/riunioni_comitato.shtml

¹⁸¹ <http://www.cnipa.gov.it/site/it-IT/>

¹⁸² <http://www.italia.gov.it/servlet/ContentServer?channel=HTTP&pagename=e-Italia/Structure&c=Page&cid=1019529802926&NumRic=5>

¹⁸³ <http://www.funzionepubblica.it/>

¹⁸⁴ <http://egov.formez.it/>

¹⁸⁵ <http://www.crcitalia.it/>

governments in their efforts to implement eGovernment, upgrade their IT systems and reorganise both their back-office processes and their service delivery channels.

Union of Italian Provinces (UPI)¹⁸⁶

National Association of Italian Municipalities (ANCI)¹⁸⁷

Ancitel¹⁸⁸

Ancitel is a company established in 1987 by the National Association of Italian Municipalities (ANCI) and dedicated to bringing innovation and modernisation to the Italian Municipalities and Local Authorities. It has become the main service provider of ANCI and supports and promotes the introduction of new information and communication technologies in municipalities.

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¹⁸⁶ <http://www.upinet.it/>

¹⁸⁷ <http://www.anci.it/anci.cfm>

¹⁸⁸ <http://www.ancitel.it/>

3.16 Status Report 15 (short): Latvia

Latvia's **eGovernment Action Programme 2005-2009**¹⁸⁹, adopted by the Government on 29 September 2005, is based on Latvia's eGovernment Conception and on the Public Administration Reform Strategy 2001-2006. The programme is closely aligned with the eEurope 2005 Action Plan and the new EU strategy "i2010". The basic action lines of the Programme are:

- to improve state and municipal information technology infrastructure and collaboration between State Registers
- to create new channels for government services based on the one-stop agency principle
- to develop new e-services – primarily those with the highest demand by citizens and businesses
- to improve the quality of public services using ICT solutions
- to create new state information systems and to develop municipalities' information systems.

The financing resources for the eGovernment Action Programme are State budget resources, co-funding of EU Structural Funds and others.

Apart from that, there is no defined Latvian interoperability framework and the internet-based research for such an interoperability framework has not given any results either in English or in Latvian.

The main Latvian actors in eGovernment, local government and interoperability are:

Minister for Special Assignments for eGovernment Affairs¹⁹⁰

The Minister holds political responsibility for the development and implementation of the state policy in the field of electronic government and Information Society. He is also in charge of organising the activities related to the implementation of information technologies in state administration to ensure the modernisation and effectiveness of state administration.

Secretariat of the Minister for Special Assignments for eGovernment Affairs¹⁹¹

The Secretariat of the Minister for Special Assignments for Electronic Government Affairs is responsible for eGovernment, information society and information technology policy development, implementation and coordination. The Secretariat is facilitating and coordinating the development of local governments electronic services and represents the country's interests in relevant international organisations and EU institutions.

Information Society National Council

The Information Society National Council, chaired by the Prime Minister, is established to provide high-level leadership on eGovernment and Information Society issues and to coordinate and promote all related development processes.

eGovernment Coordination Council

The aim of the eGovernment Coordination Council is to facilitate the implementation of eGovernment strategic guidelines and the realisation of eGovernment projects.

State Information Network Agency (VITA)¹⁹²

The State Information Network Agency was set up in 1997 to fulfil the need for improved data availability in national information systems. Since then, the Agency has been in charge of implementing and operating key components of the country's eGovernment infrastructure such as the 'State-Significant Data Transmission Network' (VNDPT), a nationwide network serving government and municipal institutions throughout Latvia. The Agency provides data networking and security services to government institutions, local governments, as well as private enterprises.

¹⁸⁹ <http://ec.europa.eu/idabc/servlets/Doc?id=23412>

¹⁹⁰ <http://www.eps.gov.lv/index.php?&12>

¹⁹¹ <http://www.eps.gov.lv/>

¹⁹² <http://www.vita.gov.lv/>

Central government and bodies¹⁹³

REGIONAL & LOCAL eGOVERNMENT

Ministry of Regional Development and Local Governments¹⁹⁴

The Ministry of Regional Development and Local Governments is responsible for the implementation of the Local Governments Unified Information System's project.

Latvian Association of Local and Regional Governments (LALRG)¹⁹⁵

The Latvian Association of Local and Regional Governments (LALRG) represents local and regional governments of the Republic of Latvia on a voluntary basis. Its members currently include: all 60 towns and cities of the country, all 26 districts (rajons), 391 out of 444 rural municipalities (pagasts), and 22 of 26 amalgamated municipalities (novads). The LALRG has the authority to represent local and regional governments in the negotiations with central government.

¹⁹³ <http://www.gov.lv/>

¹⁹⁴ <http://www.rapl.m.gov.lv/eng/>

¹⁹⁵ <http://www.lps.lv/jaunumi.php?lang=lv>

3.17 Status Report 16 (short): Lithuania

The Lithuanian eGovernment strategy is laid down in the **Position Paper on eGovernment**¹⁹⁶ adopted by the government on 31 December 2002.

The ultimate goal is to improve transparency of the decision making process of the executive bodies of the Republic of Lithuania in order to deliver high quality public services efficiently and provide information to the public, businesses and institutions. For this purpose possibilities offered by information technology are necessary.

In this context, the Information Society Development Committee established a working group on interoperability of the information systems of the State¹⁹⁷. One of the most important Lithuanian IT projects is the creation of system interaction capabilities through public administration institutions interoperability.

The Lithuanian Government has spent approximately 126.5 million Litas (36.6 million euro) during the period 2004-2006 under the measure "Electronic government and e-services" which aims to create possibilities for all citizens and businesses of Lithuania to use IT for communication with public institutions and to modernize services of public sector. One part of the measure is the implementation of interoperability in the public administration.

The main Lithuanian actors in eGovernment, local government and interoperability are:

The Ministry of the Interior¹⁹⁸

The Ministry of the Interior holds responsibility for formulating the state's information policy and information infrastructure strategy. It is also responsible for coordinating IT security in the state institutions, coordinating eGovernment projects and supervising electronic service delivery. The **Information Policy Department**¹⁹⁹ is the unit of the Ministry in charge of these different tasks.

Information Society Development Committee²⁰⁰

The Information Society Development Committee under the Government of the Republic of Lithuania designs, arranges and co-ordinates processes aimed at the development of the Information Society in Lithuania.

Infostruktūra²⁰¹

Infostruktūra is a State-owned company created in 1992, which provides IT infrastructure and services to central and local government. In particular, Infostruktūra has created and maintains the computer network of State institutions (VIKT).

REGIONAL & LOCAL eGOVERNMENT

Strategic responsibility for eGovernment at regional and local level lies with individual County and Municipal Authorities.

Association of Local Authorities in Lithuania (ALAL)²⁰²

The Association of Local Authorities in Lithuania (ALAL) is a non-profit organisation, having the rights of a legal entity, representing the common interests of its members - local authorities - in all institutions of state authorities and government, as well as foreign and international organisations of local authorities.

¹⁹⁶ http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=198184

¹⁹⁷ http://www.offentligarummet.se/pdf/Lithuanian%20eGovernment_spar_1_1.pdf

¹⁹⁸ <http://www.vrm.lt/>

¹⁹⁹ <http://www.vrm.lt/index.php?id=291&lang=2>

²⁰⁰ <http://www.ivpk.lt/>

²⁰¹ <http://www.is.lt/>

²⁰² <http://www.lsa.lt/>

3.18 Status Report 17 (short): Luxembourg

The Luxembourg eGovernment strategy was initially set in the **eLuxembourg Action Plan**²⁰³ presented in February 2001. In June 2005 the government presented a specific **eGovernment Action Plan**²⁰⁴, aimed at accelerating eGovernment progress in the country.

With the new Action Plan, the government intends to create a coherent framework for the different aspects of state computerisation. In this respect, the new strategy and action plan make a distinction between three main categories of projects, one of which consists of medium and long term strategic projects, such as infrastructure, interoperability, and service integration projects, as well as initiatives for the organisational reform of public administration.

According to the Action Plan, interoperability is one of the major challenges to realize. It constitutes one of the necessary conditions to guarantee the success of eGovernment as a whole. Coordination among the various initiatives and projects, centralization of the infrastructures and technical installations solutions, the definition of standards for data exchanges, the use of generally recognized standards and open technologies are the ways to reach this success.

The Action Plan recognizes 5 dimensions of interoperability:

- GI – Government Internal
- G2O – Government to Organization
- G2G – Government to Government
- G2C – Government to Citizen
- G2IG – Government to International Government

The Action Plan recognizes and defines several projects that will implement interoperability through the eLuxembourg service.

The main Luxembourg actors in eGovernment, local government and interoperability are:

Ministry of the Civil Service and Administrative Reform²⁰⁵

The Ministry of the Civil Service and Administrative Reform is responsible for eGovernment policy/strategy in Luxembourg.

eLuxembourg Task Force²⁰⁶

The eLuxembourg Service is in charge of the conceptual and administrative work supporting Luxembourg's eGovernment and Information Society drive.

Informatics Centre of the State²⁰⁷

The Informatics Centre of the State is in charge of developing and maintaining Luxembourg's national eGovernment infrastructure, such as the RACINE network connecting government entities.

Government ministries and administrations²⁰⁸

REGIONAL & LOCAL eGOVERNMENT

Municipalities²⁰⁹

Inter-Communal Informatics Management Centre²¹⁰

Association of Luxembourg cities and communes

²⁰³ <http://www.eluxembourg.lu/eLuxembourg/index.html>

²⁰⁴ http://www.eluxembourg.lu/Focus_content/plan_directeur1/plan_directeur.pdf

²⁰⁵ <http://www.mfpra.public.lu/>

²⁰⁶ http://www.eluxembourg.lu/eLuxembourg/task_force/index.html

²⁰⁷ <http://www.cie.public.lu/>

²⁰⁸ <http://www.etat.lu/>

²⁰⁹ <http://www.syvicol.lu/communes/>

²¹⁰ <http://www.syvicol.lu/>

3.19 Status Report 18 (short): Malta

The Maltese government's **White Paper on the Vision and Strategy for the attainment of eGovernment**²¹¹, presented in October 2000, sets the basis of a comprehensive programme aimed at acting as a catalyst for transforming Malta into an advanced Information Society. It establishes the principles that underpin eGovernment in Malta, creates a strategic framework and identifies the required changes and drivers for its implementation.

As far as interoperability is concerned, it is critical success factor in the implementation of integrated eGovernment services. In this respect, the Government ICT agency, Malta Information Technology and Training Services Ltd, has captured this skills shortage signal and is re-aligning its operations to transform itself into a centre of excellence in the integration of middleware applications²¹².

According to IDABC eGovernment Observatory, the Maltese government's Central Information Management Unit²¹³ (CIMU) has recently published two important documents aimed at enhancing the interoperability of e-services across the public sector.

Released in late March 2005, the first version of the **Register of Standard Data Elements** provides key information on standardised data elements in use in government databases and thus, it is an important building block in enabling semantic interoperability of information systems used across the Maltese public sector.

We would like to note here that during the research period, the CIMU web site was not accessible. Therefore, further information on interoperability could not be found.

The main Maltese actors in eGovernment, local government and interoperability are:

Ministry for Investment, Industry and Information Technology²¹⁴

Following the general elections in April 2003, the responsibility for eGovernment implementation has been transferred from the Ministry for Justice and Local Government to a new Ministry for Investment, Industry and Information Technology.

Central Information Management Unit (CIMU)

Based in the Office of the Prime Minister, the Central Information Management Unit (CIMU) coordinates the development and implementation of government information management standards and procedures. Information Management Units have been set up in each Ministry to relay the work of CIMU.

Government Ministries and departments for departmental projects²¹⁵

Malta Information Technology and Training Services Ltd (MITTS)²¹⁶

MITTS is a Government-owned company supplying IT systems and services to Government departments.

Management Efficiency Unit (MEU)²¹⁷

The Management Efficiency Unit is the in-house management consultancy organisation of the Government of Malta. It is constituted as a separate organisational entity within the Office of the Prime Minister and is primarily tasked with assisting Government Ministries and Departments in

²¹¹ <http://www.cimu.gov.mt/htdocs/content.asp?c=34>

²¹² New tools for an old job (The Hon Austin Gatt MP, Minister for Investment, Industry and Information Technology, assesses Malta's eGovernment strategy...), available at: <http://www.publicservice.co.uk/pdf/europe/autumn2004/EU8%20Austin%20Gatt%20ATL.pdf>

²¹³ <http://www.cimu.gov.mt/>

²¹⁴ <http://www.miti.gov.mt/>

²¹⁵ http://www.gov.mt/frame.asp?l=2&url=http://www.doi.gov.mt/en/ministries_and_departments/default.asp

²¹⁶ <http://www.mitts.gov.mt/>

²¹⁷ <http://www.meu.gov.mt/>

the development and implementation of effective change management strategies intended to lead to the improvement of Government Services. The MEU helped draft the eGovernment Vision and Strategy under the direction of the **Central Information Management Unit**. The MEU also helps various Government Departments to re-engineer their business processes in order to start providing their services online.

REGIONAL & LOCAL eGOVERNMENT

eMalta Commission²¹⁸

Department of Local Councils of the Ministry of Justice²¹⁹

Local Councils

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²¹⁸ <http://www.emalta.gov.mt/>

²¹⁹ <http://www.justice.gov.mt/deptlc.asp>

3.20 Status Report 19 (short): Poland

The Polish eGovernment strategy and action plan are laid down in the documents **Aims and directions of Information Society Development in Poland**²²⁰ of November 2000 and **ePoland - The Strategy on the Development of the Information Society in Poland for the years 2004-2006**²²¹, adopted in January 2004.

On October 26, 2004, the Council of Ministers adopted the **eGovernment Action Plan for 2005-2006**²²², which aims at implementing the eGovernment objectives of the 'ePoland' Information Society strategy approved in January 2004.

In addition, on February 18, 2005, the Sejm (lower chamber of Parliament) adopts the **Act on Computerisation of the Operations of Certain Entities Performing Public Tasks**. The Act sets up horizontal/infrastructure programmes for all sectors of public administration and establishes a common interoperability framework for IT systems in the Polish public sector.

Hence, by the end of 2006, the Polish Ministry of Scientific Research and Information Technology intends to establish the requirements which are to function as national interoperability framework following the Act on Computerisation of the Operations of Certain Entities Performing Public Tasks.

It is often noted that when providing public e-services it is crucial to ensure the integration, interoperability and complementarities between different access channels to services. This is particularly true because many Poles do not have easy and affordable Internet access and lack the necessary computer skills (computer literacy).

Examples of local interoperability are the following:

- INFOBIBNet, Computerisation of the network of libraries in the Province of Kujawsko, 2004 – 2006
- Computer System of Handling Cases and Documents (Province of Lubuskie Office), Implementation on the level of secretary offices, branch managers, division directors 2004 – 2006
- Register of Medical Rescue Units (Province of Małopolskie Office), complete computerisation of the registration process of medical rescue units, with the use of electronic signature technology - Under construction

A detailed index of current eGovernment and interoperability project can be found in the Action Plan.

The main Polish actors in eGovernment, local government and interoperability are:

Ministry of Scientific Research and Information Technology²²³

As part of its responsibility for public administration, the Ministry of Scientific Research and Information Technology is responsible for creating the Polish eGovernment policy/strategy and for overseeing its implementation. The Ministry's **Department for IT in Public Administration (DIA)** is responsible for the development and management of central ICT infrastructure, networks and systems in public administration, as well as for establishing of IT standards and supervising and supporting IT project in central and local government. **The Information Society Department (DSI)** is responsible for: the development of the central eGovernment platform ('Gateway to Poland' project) and the public administration portal; financial support for local eGovernment projects, preparation of documents and data flow standards for public administration; co-ordination with regards to implementation of the structural funds; programming of the structural funds; promotion of the Information Society and support for the creation of Polish educational resources on the Internet, including the Polish Internet Library.

²²⁰ http://www.kbn.gov.pl/en/cele_en.html

²²¹ http://www.mnii.gov.pl/_gALLERY/30/302.pdf

²²² http://www.mnii.gov.pl/_gALLERY/45/23/4523.pdf

²²³ <http://www.mnii.gov.pl/>

Ministries²²⁴ and Governmental Agencies²²⁵ for departmental projects.

Ministry of Internal Affairs and Administration²²⁶

The Ministry of Interior and Administration is responsible for the **Public Information Bulletin** (Biuletyn Informacji Publicznej – BIP), the official electronic journal providing access to public information. It operates on the basis of the Act on Access to Public Information.

Ministry of Infrastructure²²⁷

The Ministry of Infrastructure is responsible for the design and implementation of the state telecommunication policy. It covers a range of economic aspects, including the development of the market for needs of the Information Society, policy of standardisation associated with telecommunication technology and necessary legislation.

REGIONAL & LOCAL eGOVERNMENT

Regional and local authorities

Regional strategies regarding development of eGovernment services are designed at the regional level in accordance with the national strategy. In 2002 two regional projects were launched in Podlaskie and Malopolskie voivodships (provinces) as part of the 'Gateway to Poland' programme.

²²⁴ <http://www.kprm.gov.pl/english/112.htm>

²²⁵ <http://www.kprm.gov.pl/english/122.htm>

²²⁶ <http://www.mswia.gov.pl/>

²²⁷ <http://www.mi.gov.pl/>

3.21 Status Report 20 (short): Portugal

The Portuguese eGovernment strategy is presented in the **eGovernment Action Plan**²²⁸ presented in February 2003 and approved by the Government in June 2003. The eGovernment Action Plan is an integral part to the **Action Plan for the Information Society**²²⁹, which is the main instrument for the strategic and operational coordination of Information Society policies in Portugal.

According to the Portuguese eGovernment strategy, the development of eGovernment services is ultimately meant to generate positive impacts across the country.

The internet-based research has not given any results related to interoperability.

The main Portuguese actors in eGovernment and local government are:

Ministry of Finance and Public Administration²³⁰

In the new Portuguese Government appointed in February 2005, political responsibility for public administration matters – including public sector modernisation and eGovernment – has been transferred to the Ministry of Finance, renamed Ministry of Finance and Public Administration. The Ministry oversees the **Directorate General for Public Administration**.

Ministry of Science, Technology and Higher Education²³¹

In the new Portuguese Government appointed in February 2005, political responsibility for Information Society matters has been assigned to the Ministry of Science, Technology and Higher Education.

Agency for the Knowledge Society (UMIC)²³²

UMIC is tasked with coordinating and providing focus for the Government's activities in the field of Information Society, Electronic Government and Innovation. UMIC played a leading role in the preparation of the Portuguese Information Society and eGovernment Action Plans. UMIC is now overseen by the Ministry of Science, Technology and Higher Education.

Intersectoral Commission for IT in Public Administration (CITIAP)²³³

Commission responsible for the coordination of IT developments in central Government.

Government Network Management Centre²³⁴ (CEGER)

Institute for Informatics²³⁵

The Institute for Informatics is a service of the Ministry of Finance and Public Administration that has managerial autonomy and legal personality. It supports the Ministry and other government departments in the development and implementation of information systems.

REGIONAL & LOCAL eGOVERNMENT

Regions and Municipalities

Ministry for Internal Administration²³⁶

²²⁸ <http://www.unic.pcm.gov.pt/NR/rdonlyres/2EE26926-CC92-4FE4-AFCD-A9E2E1983E54/137/II Plano Accao eGov.pdf>

²²⁹ <http://www.unic.pcm.gov.pt/NR/rdonlyres/B3FDD123-98AF-4F47-A10B-AFBEE46E25E3/138/I Plano Accao SI.pdf>

²³⁰ <http://www.min-financas.pt/>

²³¹ <http://www.mctes.pt/>

²³² <http://www.unic.pcm.gov.pt/>

²³³ <http://www.citiap.gov.pt/>

²³⁴ <http://www.ceger.gov.pt/>

²³⁵ <http://www.inst-informatica.pt/>

²³⁶ <http://www.mai.gov.pt/>

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²³⁷ <http://www.anmp.pt/>

3.22 Status Report 21 (short): Slovakia

Overall eGovernment strategic objectives are set in the **Strategy and Action Plan for Development of Information Society**²³⁸ adopted in January 2004. According to this document, strategic objectives of public administration computerisation are:

- to ease and widen citizens' participation in public affairs through the computerisation of public services;
- to ease communication between businesses and public administration;
- to increase the effectiveness of public administration through digitisation;
- to prepare Slovak public administration for smooth integration into EU structures.

According to the **Roadmap for the Implementation of eGovernment Services in Slovakia**²³⁹, issued by the Ministry of Transport, Post and Telecommunications, the ten basic principles for the development of eGovernment are the following:

- services for citizens
- effectiveness
- security
- transparency
- availability
- privacy
- multi-level cooperation
- interoperability
- application of „Open Standards“
- technology and software neutrality

These should be respected prior to the implementation of any electronic service provided by public administration bodies and should help to achieve interoperability not only at the national but also at the European level!

Apart from the Roadmap, a draft version of the "National Policy for Electronic Communications (NPEC)"²⁴⁰ defines a strategy of development of electronic communication networks and services in Slovakia for the coming years. One of the objectives is to secure network integrity and interoperability of services in accordance with the principles of the EU regulatory bodies.

The main Slovak actors in eGovernment, local government and interoperability are:

Ministry of Transport, Posts and Telecommunications²⁴¹

In 2003 responsibility for Information Society policies was moved from the Ministry of Education to the Ministry of Transport, Posts and Telecommunications. Consequently, the Ministry of Transport, Posts and Telecommunications is responsible for the implementation the Action Plan adopted with the National Strategy for Information Society.

Ministry of Finance²⁴²

The Ministry of Finance holds responsibility for the National Lisbon Strategy²⁴³, including its eGovernment aspects.

Office of the Plenipotentiary for the Information Society

²³⁸ http://www.telecom.gov.sk/index/open_file.php?file=infospol/strategia.pdf

²³⁹ http://www.telecom.gov.sk/index/open_file.php?file=infospol/dokumenty/en/Roadmap_abstract.pdf&lang=en

²⁴⁰ http://www.telecom.gov.sk/index/open_file.php?file=telekom/Strategia/Politika/npec.pdf&lang=en

²⁴¹ <http://www.telecom.gov.sk/>

²⁴² <http://www.finance.gov.sk/>

²⁴³ <http://www.finance.gov.sk/mfsr/mfsr.nsf/0/3B514E74B6468BF2C1256F6B00499822?OpenDocument>

The Office of the Plenipotentiary of the Slovak Government for the Information Society, which is a division of the **Ministry of Transport, Posts and Telecommunications**, is in charge of coordinating activities in the field of information society and ICT.

The Slovak Government Office²⁴⁴

The Slovak Government Office is responsible for certain national infrastructure projects like the obcan.sk portal and the GovNet Network.

Government ministries and bodies²⁴⁵

These are responsible for various departmental projects.

The Social Insurance Agency²⁴⁶ for e-services within the pension system.

REGIONAL & LOCAL eGOVERNMENT

Ministry of the Interior, Section of Public Administration²⁴⁷

The Ministry of the Interior is responsible for decentralisation and re-organisation of the public administration (both central/regional state administration and administration of the self-governing regions).

Government Plenipotentiary for the Decentralisation of Public Administration²⁴⁸

Acts as an advisor to the government in a wide range of tasks concerning public administration reform, including eGovernment.

Self-governing regions: Banská Bystrica, Bratislava, Košice, Nitra, Prešov, Trenčín, Trnava and Žilina²⁴⁹

IVeS - Organisation for the Public Administration Informatics²⁵⁰

Provides software solutions to cover specific needs of the public administration bodies.

Association of Towns and Municipalities of Slovakia (ZMOS)²⁵¹

The Association initiated the creation and development of **SOMI**, an Internet information system for towns and municipalities. The project is designed to host and integrate municipal websites in order to support municipalities in providing citizens with information and e-services.

²⁴⁴ <http://www.vlada.gov.sk/>

²⁴⁵ http://www.government.gov.sk/english/others_sites.html

²⁴⁶ <http://www.socpoist.sk/>

²⁴⁷ <http://www.civil.gov.sk/>

²⁴⁸ <http://www.vlada.gov.sk/decentralizacia/splnomocnenec.php>

²⁴⁹ <http://www.vucbb.sk/> , <http://www.region-bsk.sk/> , <http://www.kosice-region.sk/> , <http://www.unsk.sk/> , <http://www.vucpo.sk/> , <http://www.tsk.sk/> , <http://www.trnava-vuc.sk/> , <http://www.zask.sk/>

²⁵⁰ <http://www.ives.sk/>

²⁵¹ <http://www.zmos.sk/default.aspx?id=8&lang=sk>

3.23 Status Report 22 (short): Slovenia

The strategic framework for the development of eGovernment in Slovenia is comprised of five key documents:

- The **Strategy of E-Commerce in Public Administration for the Period 2001-2004**²⁵², adopted by the Government on 7 February 2001.
- The **Action Plan for eGovernment up to 2004**²⁵³, adopted on 3 October 2002 and updated and reported to the Government on a monthly basis.
- The **Strategy of the Republic of Slovenia in the Information Society** (RSvID)²⁵⁴, adopted on 13 February 2003.
- The **Strategy of Electronic Commerce in the Local Communities** (SEP_S)²⁵⁵, adopted in February 2003.
- The **Action Plan of Electronic Commerce of the Local Communities** (draft version)²⁵⁶, which was presented on 25 November 2004.

The Slovenian Government conceives the development of the information society and of eGovernment as essential to enhance its position in Europe. Slovenia indeed aims at becoming one of the most competitive and dynamic knowledge-based economies in Europe.

In 2006 the Slovenian Government issued the **eGovernment Strategy of the Republic of Slovenia for the period 2006 to 2010**²⁵⁷. In the document, the lack of a uniform eGovernment architecture, interoperability framework and open standards for eGovernment projects is recognized. Therefore, major progress is planned to be made in 2007 and 2008 towards more efficient internal administration operations with the support of eGovernment.

The emphasis will be on upgrading, integration and informatisation of internal administration processes, introducing standardised horizontal and vertical solutions, implementation of standardised information technology platforms, interoperability of eGovernment solutions and services, new operational models, user training and establishing a uniform eGovernment architecture. Thus, linking of all elements (standards and recommendations, uniform architecture, open standards and solutions, guidelines) in a national interoperability framework for eGovernment services and solutions is considered of high priority. This national interoperability framework will provide organisational, semantic and technical interoperability and at the same time creative co-operation in the preparation of an interoperability framework for pan-European services.

The main Slovenian actors in eGovernment, local government and interoperability are:

Ministry of Public Administration²⁵⁸

The Ministry of Public Administration, established in December 2004, holds responsibility for the development and implementation of eGovernment in Slovenia.

Government Centre for Informatics²⁵⁹

The Government Centre for Informatics (GCI), under the supervision of the Ministry of Public Administration, is in charge of developing the country's eGovernment infrastructure at an operational level, and to support, control and coordinate departmental ICT projects.

²⁵² <http://e-uprava.gov.si/eud/e-uprava/en/sep2004-daljsa-angleska.pdf>

²⁵³ http://e-uprava.gov.si/eud/e-uprava/en/akcijski_nacrt_e-uprave_do_leta_2004_1_4.pdf

²⁵⁴ [http://www2.gov.si/mid/mid.nsf/V/KACF73A1447CF53FEC1256DE50042087A/\\$file/Strategy_RSIS_final_20030213.pdf](http://www2.gov.si/mid/mid.nsf/V/KACF73A1447CF53FEC1256DE50042087A/$file/Strategy_RSIS_final_20030213.pdf)

²⁵⁵ [http://mid.gov.si/mid/mid.nsf/V/K77E858374CF1C023C1256CE0002EE3EB/\\$file/LS_Strategy_of_the_e-Commerce_in_the_Local_Communities.pdf](http://mid.gov.si/mid/mid.nsf/V/K77E858374CF1C023C1256CE0002EE3EB/$file/LS_Strategy_of_the_e-Commerce_in_the_Local_Communities.pdf)

²⁵⁶ <http://www.mnz.si/si/upl/urloksam/info/strategija-ls/sepls-akcijski-nacrt251104.doc>

²⁵⁷ http://mju.gov.si/fileadmin/mju.gov.si/pageuploads/mju_dokumenti/english/SEP2010_english_final.doc

²⁵⁸ <http://www.mju.gov.si/>

²⁵⁹ <http://www.sigov.si/cvi/>

Government Ministries and bodies

Several government ministries and bodies are responsible for various departmental projects.

REGIONAL & LOCAL eGOVERNMENT

Government Office for Local Self-Government and Regional Policy²⁶⁰

Among other tasks, the Government Office for Local Self-Government and Regional Policy performs the following: preparing system regulations in the field of organisation, functioning and financing of municipalities; coordinating work with the ministries and other bodies in the preparation of system solutions and regulations in the field of organization, functioning and financing of municipalities, preparing system analyses of local self-government.

Local authorities

Association of Municipalities and Towns (SOS)²⁶¹

Comprising of 131 municipalities, SOS is the biggest representative association of local communities in Slovenia. The representative status allows it to be an official representative of municipalities' interests in relation to state institutions.

Association of Municipalities (ZOS)²⁶²

ZOS comprises 58 municipalities.

²⁶⁰ <http://www.gov.si/svrp/>

²⁶¹ <http://www.skupnostobcin.si/>

²⁶² <http://www.zdruzenjeobcin.si/>

3.24 Status Report 23 (short): Spain

The Spanish Government's current eGovernment strategy is laid down in the **Public Administration Technological Modernisation Plan 2004-2007**, otherwise known as **Plan Conecta**, which was presented in September 2004.

Plan Conecta is designed to improve the quality of services provided by Spain's central administration and to bring it closer to citizens and businesses by using new technologies, reducing bureaucracy, simplifying procedures and eliminating unjustified delays.

To achieve this mission, a set of specific, measurable, realistic, viable, and limited in time objectives have been defined, one of which is the improvement of interoperability within and among public administrations.

Spain faces a hiatus between the Central government and Regions (Comunidades Autonomas) in the implementation of local eGovernment, thus leading to high risks of incompatibility. It will be essential for any solution to be integrated to both approaches in order to later become a good candidate for ensuring interoperability among regions and with the State. At central level, solution providers should target the Federation of Municipalities and Provinces that collaborates with central government. They could propose the integration of interoperability centres in the regional infrastructures; PPPs should be considered as a possible way to support this approach towards Regions²⁶³.

The main Spanish actors in eGovernment, local government and interoperability are:

Ministry of Public Administrations²⁶⁴

The Ministry of Public Administrations is responsible for steering the development and implementation of eGovernment in Spain's central state administration. These tasks are carried out by the Directorate General for Administrative Modernisation in the Ministry's General Secretariat for Public Administrations.

Higher Council for Electronic Administration²⁶⁵

The Higher Council for Electronic Administration was created by the Royal Decree of 20 May 2005 restructuring the management framework for eGovernment. It is tasked with the preparation and development of the eGovernment strategy and policy for the Spain's central administration.

Ministry of the Interior²⁶⁶

The Ministry of the interior is responsible for the electronic ID card project.

Individual Government Ministries and Agencies²⁶⁷

Government ministries and agencies are responsible for various departmental projects

Directorate General for the Development of the Information Society²⁶⁸

Part of the State Secretariat for Telecommunications and the Information Society in the Ministry of Commerce, Industry and Tourism.

Red.es²⁶⁹

²⁶³ http://www.politech-institute.org/review/articles/BENAMOU_Norbert_volume_3.pdf

²⁶⁴ <http://www.map.es/>

²⁶⁵ <http://www.csi.map.es/>

²⁶⁶ <http://www.mir.es/>

²⁶⁷ http://www.administracion.es/portadas/perfiles/organizacion_publica/organizaciones_publicas/index.html

²⁶⁸ <http://www2.mityc.es/dgdsi/>

²⁶⁹ <http://www.red.es/>

Red.es is a state-owned company the role of which is to encourage, support and monitor the use of information and communication technologies in Spain, including their use in the public sector.

Red.es also maintains an **Observatory of Telecommunications and the Information Society** and provides consulting and supporting services to central and local administrations.

ASTIC²⁷⁰

ASTIC is the professional association of IT managers of the State Administration. It provides support and information services to its members for the development and implementation of their eGovernment projects.

REGIONAL & LOCAL eGOVERNMENT

Autonomous Communities²⁷¹ and Municipalities

FEMP- Spanish Federation of Municipalities and Provinces²⁷²

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²⁷⁰ <http://www.astic.es/>

²⁷¹ <http://www.la-moncloa.es/default.htm>

²⁷² <http://www.femp.es/>

3.25 Status Report 24 (short): Sweden

The goal of the Swedish Government Policy for developing a 24-hour Public Administration is that public information and services should, as far as possible, be available electronically 24 hours a day, seven days a week. A citizen-focused public administration must build on a close co-operation between the different government authorities and levels of government.

Therefore, in January 2004, the **Government Interoperability Board (GIB)**²⁷³ is established with the mandate to issue common standards and guidelines for electronic information exchange within government. The Board consists of directors general and deputy directors general of the main government agencies. The GIB can issue regulations that are mandatory for all agencies, as well as non-mandatory guidelines.

The GIB is an agency in its own right, but it is supported by the Agency for public management (*Statskontoret*). The GIB can issue regulations that are mandatory for all agencies, as well as non-mandatory guidelines. Regulations will not be binding for municipalities. Its regulations and guidelines will be prepared in joint projects, involving major agencies.

The GIB focus on the following areas:

- effective information use,
- e-identification and secure information exchange,
- information security and
- accessibility.

At a strategic level, the GIB has established a government interoperability framework, in the context of European Interoperability Framework, where the emphasis lies on interoperability rather than in the framework itself²⁷⁴. However, according to VERVA, the Swedish Administrative Development Agency, semantic interoperability improvements are needed and they will be implemented by continuing joint terminology analysis, information modelling and schema development to get a generic set of eGovernment "standard messages" as well as by producing controlled vocabularies for selected application areas.

The main Swedish actors in eGovernment, local government and interoperability are:

Ministry of Finance²⁷⁵

The Ministry of Finance holds political responsibility for eGovernment in Sweden.

24/7 Agency Delegation²⁷⁶

The 24/7 Agency Delegation, established in June 2003, is tasked with stimulating the development and use of electronic services in the public sector. Bringing together members from central and local government, industry and academia, the Delegation is tasked with providing innovative thinking, promoting and increasing cooperation between the state, county councils and local authorities, improving the flow of know-how between research activities and concrete implementation projects, and proposing funding arrangements for helping agencies and local authorities to implement the 24/7 Agency concept. It focuses particularly on e-services capable of generating major benefits for the public and businesses, and of making the public sector more efficient. The Delegation continuously reports to the Government on the progress of its work.

Government Interoperability Board

Established in January 2004, the Government Interoperability Board consists of general and deputy directors general of the main government agencies. Its task is to define common standards and guidelines for electronic information exchange within government. The Board can issue regulations that are mandatory for all agencies, as well as non-mandatory guidelines.

²⁷³ <http://www.e-namnden.se/>

²⁷⁴ http://www.statskontoret.se/statskontoret/templates/Page_2020.aspx

²⁷⁵ <http://www.sweden.gov.se/sb/d/2062>

²⁷⁶ <http://www.24sju.se/>

Swedish Agency for Public Management²⁷⁷

The Swedish Agency for Public Management provides support to the Government and to government bodies. Its task is to conduct studies and evaluations at the request of the government and to modernise public administration through the use of IT.

REGIONAL & LOCAL eGOVERNMENT

County Councils and Municipalities

The Platform for Co-operative Use²⁷⁸

The Platform for Co-operative Use is a cooperation platform for local authorities. Its purpose is to exchange best practices and speed up the development of eGovernment in the municipalities. Today there are 30 municipalities collaborating, and 5 pilot projects underway to identify, design and introduce common systems architecture, technical platform and basic functions for e-services in the municipalities.

Swedish Association of Local Authorities and Regions (SALAR)²⁷⁹

²⁷⁷ <http://www.statskontoret.se/>

²⁷⁸ <http://www.sambruk.se/>

²⁷⁹ <http://www.skl.se/>

3.26 Status Report 25 (short): The Netherlands

The current Dutch eGovernment vision and policy is a key component of the Government's wide-ranging '**Modernising Government**' programme²⁸⁰, launched in December 2003, and of the national ICT Agenda '**Better performance with ICT**', launched in February 2004.

The main eGovernment elements of the 'Modernising Government' programme are further detailed in the policy statement '**Towards the Electronic Government**'²⁸¹ published in September 2004. The statement provides an overview of the joint agenda for eGovernment over the coming few years.

The Ministry of the Interior and Kingdom Relations²⁸² created a website²⁸³ exclusively dedicated to eGovernment and interoperability issues. The site offers access to information about eGovernment and provides a vast amount of information and knowledge about how aspects of electronic government fit together. The website is managed and maintained by the **eGovernment Knowledge Centre** (Kenniscentrum e-overheid) at the Stichting ICTU²⁸⁴, the Dutch organisation for ICT in the public sector.

The eGovernment Knowledge Centre was established to facilitate the exchange of knowledge between government organisations and provide information and advice on eGovernment issues. The eGovernment Knowledge Centre plays a supporting role in the development and implementation of eGovernment and helps promote eGovernment both within government agencies and to interested external parties; however, communication activities are oriented primarily towards civil servants for whom the development of eGovernment is important. In the first instance, this means the decision makers (civil service managers, political leaders and members of parliament) of government. Directly, these are officials in government and other public institutions. Indirectly, they include experts in the fields of ICT, public officials in the sciences and media, and other civil servants who are also concerned with ICT and eGovernment.

Within the state, political-administrative co-ordination takes place in the eGovernment ministers' consultation (Government Reform and Kingdom Relations, Economic Affairs, Finance, Social Affairs and Employment). To ensure administrative harmonisation between the state and the municipalities, the ICT and government co-ordination group has been set up.

The e-Provinces steering group exists for the administrative harmonisation between the state and the provinces.

Two support programmes have been set up by the Ministry of the Interior and Kingdom Relations, together with the Association of Netherlands Municipalities and the provinces, to support the municipalities and provinces in realising their part in electronic government: EGEM (Electronic Municipalities) and e-Provinces (Electronic Provinces).

In order to increase government bodies' knowledge of the possibilities of ICT, a number of departments and implementing bodies have set up the academy for information management, which provides both basic courses in administration and customised courses for management. The Electronic Government Knowledge Centre will also provide information about electronic government in a systematic way.

²⁸⁰ <http://www.andereoverheid.nl/>

²⁸¹ http://www.elo.nl/elo/Images/towards-eGovernment_tcm70-49117.pdf

²⁸² <http://www.minbzk.nl/uk>

²⁸³ <http://www.e-overheid.nl/sites/english>

²⁸⁴ <http://www.ictu.nl/>

4. Important findings so far

4.1 Introduction

This section reports significant findings with regards to IOP. These include:

- Findings from surveying the technical literature
- Findings from an analysis of stakeholders' information needs
- Findings from an analysis of eGovernment IOP good practice cases
- Findings from consultations with stakeholders

4.2 Findings from Surveying the Technical Literature

Within the Study, a significant number of reports, papers, articles etc have been identified, gathered, analysed and evaluated for relevance. A significant amount of the relevant information is presented in Deliverable D2.1 of this project.

In this section, we only present the results of our survey in terms of IOP frameworks, as this was not covered in D2.1. These are particularly helpful and illuminate the existing different approaches and perceptions.

A common feature identified in all frameworks is an explicit or implicit evolutionary perspective. The various interoperability types follow a linear scale of advancement: the higher a type is placed in the scale, the more advanced the derived interoperability is considered. For this reason, the interoperability types are sometimes called "levels". Due to this evolutionary perspective, in the majority of these typologies an explicit or implicit linearity is introduced. To reach an upper level of interoperability advancement, all the previous levels have to be successfully addressed. There are cases though, where the linearity is looser. This means that certain features of an upper interoperability type may become available even without addressing fully all the lower interoperability levels.

A short presentation of these interoperability analysis frameworks follows.

1) DARPA presented the Levels of Information System Interoperability (LISI) capabilities model²⁸⁵ where a matrix structure was introduced with five interoperability maturity levels affecting four interoperability attributes. The levels introduced by LISI are the following:

- Isolated Systems: No physical connection exists (manual).
- Connected Systems: Electronically connected; separate data applications; homogeneous product exchange is possible (peer-to-peer).
- Distributed Systems: Minimal common functions; separate data & application; heterogeneous data exchange is possible (functional).
- Domain Systems: Shared applications but separate applications; sophisticated collaboration (integrated).
- Enterprise Systems: Enterprise wide shared systems; advanced collaboration; interactive manipulation of shared data & applications (universal).

The attributes defined in LISI and affected by the above-presented maturity level are: Procedures, Applications, Infrastructure and Data.

2) Within the context of the NATO C3 Technical Architecture (NC3TA)²⁸⁶, the NC3TA Reference Model for Interoperability (NMI) is used. NMI uses the following categories:

²⁸⁵ C4ISR Architectures Working Group (1998). Levels of Information Systems Interoperability (LISI)

- No Data Exchange: No physical connection exists.
- Unstructured Data Exchange: Exchange of human-interpretable, unstructured data (free text).
- Structured Data Exchange: Exchange of human-interpretable structured data intended for manual and/or automated handling, but requiring manual compilation, receipt and/or message dispatch.
- Seamless Sharing of Data: Automated data sharing within systems based on a common exchange model.
- Seamless Sharing of Information: Universal interpretation of information through cooperative data processing.

3) The Levels of Conceptual Interoperability Framework (LCIF)²⁸⁷ defines five levels focusing on the data to be interchanged and the interface documentation, which is available:

- 0-System Specific Data: No interoperability between two systems. Data are seen as a resource of the system, not meant to be shared with other systems.
- 1-Documented Data: Data is documented using a common protocol.
- 2-Aligned Static Data through metadata management: Data is documented using a common reference model based on a common ontology, common or shared reference models, and standardized data elements. However, the same object model can be used slightly or completely differently by different systems.
- 3-Aligned Dynamic Data: The use of the data within the federate/ component is well defined using standard software engineering methods such as UML.
- 4-Harmonized Data and Processes: Semantic connections between data that are not related concerning the execution code is made obvious by documenting the conceptual model underlying the component. The systems model the same part of the real world and the same relationships there.

4) J. Park and S. Ram²⁸⁸ identified interoperability conflicts at:

- (a) the data-level caused by multiple representations and interpretations of similar data (e.g. data-value, data representation) and
- (b) the schema-level characterized by differences in logical structures and/or inconsistencies in metadata (i.e., schemas) of the same application domain (e.g. conflicts in naming, entity-identifiers, schema isomorphism, generalisation).

5) Brutzman and Tolk²⁸⁹ presented five levels of system interoperability:

- technically connected (technical level);
- use the same protocols to exchange data (syntactical level);
- know the context of the data in the form of unambiguous definitions of the entities, attributes and relations (semantic level);
- know how the information will be used when being transferred to a component (pragmatic level); and
- know the functionality of the component within the common conceptual view of the world to ensure that assumptions and constraints are taken into account respectively (conceptual level).

6) MITRE^{290 291} has presented a matrix structure. In one dimension six levels of interoperability are presented: Data, Object, Application, System, Enterprise and Community. These levels are

²⁸⁶ NATO Allied Data Publication 34 (ADatP-34) (2003). NATO C3 Technical Architecture (NC3TA), Version 4.0

²⁸⁷ Tolk A. and J. A. Muguira (2003). "The Levels of Conceptual Interoperability Model". Simulation Interoperability Workshop, Orlando, Florida

²⁸⁸ Park, J. and S. Ram (2004). "Information Systems Interoperability: What Lies Beneath?" ACM Transactions on Information Systems 22(4): 595–632.

²⁸⁹ U.S Air Force and Don Brutzman and Tolk A. (2003). Report on JSB Composability and Web Services Interoperability via Extensible Modeling & Simulation Framework (XMSF), Model Driven Architecture (MDA), Component Repositories, and Web-based Visualization

²⁹⁰ Obrst, L. J. (2004). "Ontologies and Semantic Web for Semantic Interoperability". 2004 Semantic Technologies for e-Government Conference, USA.

²⁹¹ Obrst, L. J. (2005). Ontologies & the Semantic Web for Semantic Interoperability, presentation in the SICoP Workshop 2005.

then positively correlated to three kinds of Integration: Syntactic, Structural and Semantic. Taxonomies are provided as examples of syntactic integration, database schemas of structural integration and theory of logic for semantic interoperability. Interestingly, semantic explicitness is positively linked to looseness of coupling. Thus, historically we move from tightly coupled to loosely coupled systems.

7) The MITRE again²⁹² presented another framework for information interoperability, which defines four "problems levels":

- Level 1: Overcome geographic distribution (infrastructure heterogeneity).
- Level 2: Match semantically compatible attributes. Some independently developed information systems use the same terms for the same concepts, but many don't.
- Level 3: Mediate between diverse representations. Integrators must often reconcile different representations of the same concept.
- Level 4: Merge instances from multiple sources, through data correlation and data-value reconciliation (sometimes called fusion).

Two main types of information interoperability have been introduced:

- Exchange, in which a producer provides information to a consumer and the information is transformed to suit the consumer's needs (levels 1-3).
- Integration, in which in addition to being transformed, information from multiple sources is also correlated and fused. In general, the consumer sees a single, coherent view rather than all the different systems' views (level 4).

8) Clark and Jones²⁹³ proposed an Organisational Interoperability Maturity Model. The model defines the levels of organisational maturity that describe the ability of organisations to interoperate. Five levels were identified, closely aligned with the descriptions of the LISI model.

- Unified: a unified organisation is one in which the organisational goals, value systems, command structure/style and knowledge bases are shared across the system.
- Integrated: The integrated level of organisational interoperability is one where there are shared value systems and shared goals, a common understanding and a preparedness to interoperate, for example, detailed doctrine is in place and there is significant experience in using it.
- Collaborative: The collaborative organisational interoperability level is where recognised frameworks are in place to support interoperability. Shared goals are recognised and, roles and responsibilities are allocated as part of on-going responsibilities, however the organisations are still distinct.
- Ad hoc: At this level of interoperability only very limited organisational frameworks are in place, which could support ad hoc arrangements.
- Independent: This level describes the interaction between independent organisations.

9) Klischewski²⁹⁴ identifies and discusses two types of integration:

- information integration aims at facilitating information flow, i.e. providing access to structured informational resources across technical and organisational borders in order to enable new services based on a virtually shared information environment.
- process integration pertains to interrelating steps and stages of process performance across technical and organisational borders in order to enable new services based on an overarching monitoring and control of process flow.

10) The European Interoperability Framework (*ref EIF*) published by IDABC²⁹⁵ recognizes three interoperability levels:

- Technical, linking computer systems and services.

²⁹² Seligman, L. and A. Rosenthal (2004). "A Framework for Information Interoperability." The Edge Mitre's Advanced Technology Newsletter 8(1): 3-4.

²⁹³ Clark, T. and R. Jones (1999). Organisational Interoperability Maturity Model for C2

²⁹⁴ Klischewski, R. (2004). "Information integration or process integration: How to achieve interoperability in administration". EGOV04 at DEXA, Zaragoza, Spain.

²⁹⁵ IDABC (2004). European Interoperability Framework for pan-European eGovernment Services. Luxembourg, European Communities.

- Semantic, ensuring that the precise meaning of exchanged information is understandable by any other application that was not initially developed for this purpose.
- Organisational, defining business goals, modelling business processes and bringing about the collaboration of administrations.

11) Medjahed²⁹⁶ adopts a similar to the previous interaction model, which consists of three layers:

- Communication: Protocols for exchanging messages among remotely located partners.
- Content: Languages and models to describe and organize information in such a way that it can be understood and used.
- Business Process: Enable autonomous and heterogeneous partners to engage in peer-to-peer interactions with each other.

An additional set of parameters defines how applications interact on the Web. This set is applicable to enabling technologies and prototypes, and consists of the following parameters: coupling, autonomy, heterogeneity, external manageability, adaptability, security and scalability.

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²⁹⁶ Medjahed, B. (2004). Semantic Web Enabled Composition of Web Services. PhD Thesis, Virginia Polytechnic Institute. Falls Church

4.3 Findings from an Analysis of Stakeholders' Information Needs

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 and
- Academia

Interested parties filled in the questionnaire consisting of 10 questions. National eGovernment representatives identified the interested parties that belong to the first two categories. IT-business and academic interested parties were identified by other networks and at conferences. A total of 67 questionnaires were gathered from these stakeholders with a distribution that is shown in the next table.

Stakeholder Group	Percentage of total questionnaires
Local and Regional Government	30%
National Government	40%
IT-business	15%
Academia	15%

The results of this survey allow qualitative insights to be formulated and are summarised in the tables that follow.

Nine categories were presented in the questionnaire in order to identify the priorities of the stakeholders with regard to policy fields or service areas. The results of the priorities for the respondents are as follows:

Category	No. of questionnaires marked as most important
State and society (eParticipation, eDemocracy, civil society)	14
Social affairs (health, pensions, social security etc.)	11
General purpose	10
Police, security and justice	6
Education, science and research	4
Environment, agriculture and consumer protection	4
Economy and labour	2
Infrastructure (transportation, construction and housing)	1
Taxes and customs	0

The answers to this question show that stakeholders have an interest mainly for cases that involve eParticipation, eDemocracy and civil society in general. This is an important indicator as to understand where the current focus of stakeholders' interest is. It also signifies where the search for cases should be pointed (something that has been already taken into consideration by Work Package 1 which is responsible for selecting the cases).

To the question "Which aspect of interoperability (IOP) is the one you would like to know more about?" the following results were acquired:

	n	Overall
Organisational IOP	66	29
Semantic IOP	64	29
Technical IOP	61	16

It should be noted that the "n" column refers to answers received for each category, while the "overall" column displays the number of questionnaires that had this aspect of interoperability as its first priority. Knowledge about technical IOP is more widely available and more developed than the other two layers of interoperability. This may explain the fact that most respondents gave a lower priority to this aspect. This finding is in line with the present version of the study that presents the organisational and semantic layers of IOP. It is clear that cases giving a greater emphasis on the organisational and semantic IOP issues are more appropriate candidates for the selection of the long-case descriptions.

Another question in the questionnaire was "Regarding objectives, what kind of interoperability projects are you most interested in?" The results are shown in the following table.

	n	Overall
Projects where interoperability is achieved between different stages of a service that involve different authorities	61	24
Projects aiming to data sharing by different authorities	62	17
Projects where the aim is to build common repositories of services, meta data, directories etc.	60	15
Projects where auxiliary services (e.g. payment, authentication) are integrated that are common to many authorities	58	8
Projects aiming to data sharing by same authorities in different areas (or regions)	54	6

The highest priority that resulted for this question is learning from projects where IOP is achieved between different stages of service provision involving different authorities. Once again we come to see that organisational and semantic IOP are the most important factors for stakeholders, since projects that IOP is achieved between different stages of a service and involve different authorities have to do with the organisational layer of IOP while projects aiming at data sharing between different authorities and those aiming at building common repositories of services, meta data etc, have to do with semantic IOP. The results of this question are coherent with the previous one that marks directly these aspects of IOP as most important for stakeholders. It also leads us to give greater emphasis on organisational and semantic IOP issues in our study, as well as to make more recommendations that align with the aforementioned needs of the stakeholders.

Regarding type of integration, the following question was asked: "Regarding integration, what type of IOP projects are you most interested in?" The following results were compiled, shown from highest to lowest ranking:

	n	Overall
Mixed vertical and horizontal	63	34
Between authorities at the same level of government (horizontal)	56	15
Between authorities at different countries	54	15
Between authorities at different levels of government (vertical)	54	14
No integration, we are interested in projects within one authority	33	1

The needs of the stakeholders point to a direction that shows an interest in the more complex and multi-faceted cases. This is partly because cases that present both vertical and horizontal integration have the most barriers and the greater difficulties, while the ability to understand the cases and the approach that was used provides an all-around knowledge on IOP.

As far as organisational models are concerned, the question asked to stakeholders was "What basic organisational model are you interested in?". The results to this question follow:

	n	Overall
Direct bi-lateral or direct multi-lateral communication between authorities according to standardized interfaces and procedures	59	28
A central unit which defines the protocols and procedures for communication with many local units	64	21
A clearing house (or broker or intermediary) which transforms and adapts different formats and procedures between the units involved	57	21

Stakeholders show a greater interest for cases that present a direct bi-lateral or direct multi-lateral communication. This is not in accordance with current research, which suggests that these models face scalability problems. Although the other two organisational models (central unit and clearing house) are considered more appropriate for implementation especially when a large number of actors are involved, the need that has been identified will be taken into consideration. It should be noted that the three organisational models do not receive significantly different overall results.

The answer to this question may be explained by the fact that direct bi-lateral or direct multi-lateral communication between authorities is the easiest way to address IOP challenges.

Since several non-technical aspects have to be considered in the implementation of interoperability, the following question was asked: "Which other concerns for interoperability are of interest to you?" The answers were compiled as follows:

	n	Overall
Security, e.g. signatures, encryptions etc.	59	24

Legal, e.g. changes in laws, regulations etc.	64	19
Cultural, e.g. resistance from public servants etc.	57	15
Social, e.g. social inclusion etc.	55	8

This response is quite expected since ICT projects present security challenges. Legal barriers are also marked as important non-organisational issues that have to be taken into consideration.

It should be noted however, that during direct conversation with stakeholders, some of them suggested that these results can be attributed to a widely-held misunderstanding, since cultural and social issues may appear at a greater extent when security and legal issues have been properly handled.

With regards to partnerships, the following question was asked "Regarding partnership, what kind of interoperability project are you most interested in?" The answers are presented in the following table.

	Overall
Between authorities from all three sectors (public, private and third sector)	32
Between public authorities only	18
Between public authorities and the private sector	16
Between public authorities and the third sector, e.g. non-public and non-governmental organizations	9
Between the private sector and the third sector, e.g. non-public and non-profit including non-governmental organisations	0
No partnerships, we are interested in projects within one authority	0

Once again, we come to see that stakeholders are interested in the more complex cases where the barriers that are confronted are greater. There is also an indication here that there is a shift of interest from the interconnection of public authorities or just the interconnection between public authorities and the private sector to the cases that also connect the non-governmental organizations with the public and the private sector.

The final question that is examined in the study had to do with the project management issues of IOP. In particular, the question was "Which phase of an interoperability project is the one you would like to learn more about?" The answers are:

	Overall
How to conceptualise an IOP project, e.g. what to consider, potential, objective, barriers	23
How to implement an IOP project, e.g. technologies, issues to consider, risks etc.	16
Strategic plan, e.g. benefits, policy etc.	15
How to disseminate and promote the results to politicians and decision makers	11

How to set up an IOP project, e.g. guidelines, resources, support, business plan etc.	8
How to create awareness of users and take-up	4

This table suggests that the most important information for stakeholders is the conceptualization phase. Stakeholders want more information on IOP, such as considerations, key success factors and barriers. Therefore, the basic structure of the Interoperability Study (i.e. key success factors, barriers, recommendations) is compatible with the stakeholders' information needs.

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4.4 Findings from an Analysis of eGovernment IOP Good Practice Cases

For the purposes of this study we analysed more than one hundred cases that were identified within the project as IOP good practice cases. These cases are classified in two main groups:

1. The first group includes a small number of cases that were identified as best IOP cases in terms of usefulness, learning potential etc. These were analysed in detail and long descriptions have been produced that include annotated text with IOP-related information. Short profiles of these cases are presented in Appendix B.
2. The second group includes a larger group of cases. Information on these cases is less detailed but can still be used to derive interesting results with regards to IOP organisational models etc.

In this section we present the results of analysing the above-mentioned cases.

The first element that is examined is whether the case refers to a cross-border eGovernment services or not. The following table presents the results.

	Percent
Not cross-border	90
Cross-border	10

According to public eServices involved, the cases that were selected involve eServices with the following distribution.

Public eServices Involved	
Social security contributions	24
Other education and training related services	24
Certificates	22
Transported related services	21
Disabled related services	21
Application for building permission	17
Elderly related services	17
Income taxes: declaration, notification of assessment	17
Announcement of moving	16
Personal documents	15
Services related to the policy development and decision-making process	15
Car registration	14
Public libraries	14
Services related to elections, plebiscites and referenda	10
Job search services by labour services	10
Enrolment in higher education/university	10

Health related services	8
Declaration to the police	8

The eServices that refer to businesses follow the distribution shown in the following table:

eServices for Business	
Submission of data to statistical offices	16
Registration of a new company	15
Public procurement	14
Customs declaration	11
Environment-related permits	10
Social contributions to employees	8
VAT: declaration, notification	8
Corporation tax, declaration, notification	7

The levels of organisations involved are shown below:

Levels of organisations involved	
local	86
national	72
regional	67
ministry	47
company	33
educational establishment	21
health care	12
pan-european	12
not-for-profit organizations	8
standardisation bodies	6
non-european actors	4

The main layers of IOP covered (organisational, technical, semantic and syntactic) in the cases follow the distribution presented in the following table.

Main layers of IOP covered		
organisational IOP	75	68,8%
technical IOP	65	59,6%
semantic IOP	63	57,8%

syntactic IOP	57	52,3%
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The organisational model that is most frequently used is standardized workflow, although the three models (centralisation, clearing house and standardised workflow) present in the cases almost the same distribution as shown in the following table.

Organisational Model		
Standardised workflow	34	31,2%
Centralisation	33	30,3%
Clearinghouse	33	30,3%
Not Clear	6	5,5%

The service provision model that is employed by each case can be seen below.

Service Provision Model		
Front-office / Back-office	72	66,1%
Back-office / Back-office	65	59,6%
Front-office / Front-office	29	26,6%

Finally, based on the categorization proposed for interoperability, the following distribution can be compiled for the 109 cases.

Interoperability			
<i>Interoperability model</i>	<i>Cases</i>	<i>Cases for each main category of IOP</i>	<i>Percentage for each category</i>
1a - IOP between different services referring to the same customer and resorting to common data (within the same public administration)	10	63	57,8%
1b1 - IOP between different services referring to the same customer and resorting to common data (within different public administrations on same gov. level)	18		
1b2 - IOP between different services referring to the same customer and resorting to common data (within different public administrations on different gov. levels)	35		
2 - IOP between different stages of a supply chain producing one or more services	43	43	39,5%
3a - IOP between same agencies in different geographical areas providing the same service (between 2 agencies)	0	22	20,2%

3b - IOP between same agencies in different geographical areas providing the same service (between several agencies)	12			
3c - IOP between same agencies in different geographical areas providing the same service (between all agencies)	10			
4 - IOP between directories of services or documents	17	17		15,6%
5a - IOP supporting auxiliary services. One auxiliary service is applicable to different services or to one service provided by different agencies	26	38		34,9%
5b - IOP supporting auxiliary services. Different auxiliary services of different services or the same services of different agencies are interoperable	12			

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4.5 Findings from Consultations with Stakeholders

So far, six (out of a target of eight) workshops have been organised: three main (or formal) and three local. The first main workshop was held at Brussels on 14th September 2005, the second was held in Prague on 19th April 2006, while the third was held in Helsinki on 26th September 2006. The first local workshop was held in Vienna on 6th February 2006, the second in Bordeaux on 23rd-24th March 2006 and the third in Rome on 12th July 2006.

During all workshops organised by the consortium, plenary **discussions** took place. In these discussions the attendees had the opportunity to present their opinion or ask questions to the presenters (either consortium members or good practice case owners). In certain cases, a facilitator attempted to invite attendees to participate by presenting their opinion and experiences. The main issues that were discussed were related to: Detailed information about a good practice case, Main barriers to IOP, Key success factors, and Recommendations. Assessment of the cases and the presentations was also performed. The results of those assessments were documented and taken into account. Important IOP barriers that were identified during these discussions included sensitivity of data, cultural differences between different government departments, issues of trust, timing, collaboration between different agencies, organisational and technical problems, unsatisfactory workflows, convincing stakeholders of the importance of the system, legal issues, as well as the importance of political support and funding.

Key IOP factors that were identified during these discussions included wide use of digital IDs and digital signatures, commitment to IOP projects, wise use of budget, engaging all the stakeholders and taking into account time-constraints.

Finally, some of the recommendations that were discussed were: a gradual and systematic approach to IOP issues, an interest in becoming a good practice case and creating common understandings.

Basic issues that the stakeholders would like to know more about during workshops were first hand experiences and the layers of interoperability architecture. In addition, semantic IOP seems to be the main interest of stakeholders, while technical interoperability is not so important for stakeholders (this is something that is inline with the stakeholders information needs' as derived from the analysis presented earlier).

Online fora have been created in the GPF portal in order to give to participants of the workshops and to stakeholders who have read the study, the opportunity to discuss and comment on the Study so far. In particular, a forum was initiated after the 2nd Local Workshop in Bordeaux (<http://www.egov-goodpractice.org/forum.php?&threadid=14>), another one after the 2nd Formal Workshop in Prague (<http://www.egov-goodpractice.org/forum.php?&threadid=15>) and finally a discussion forum was opened for specific comments on the third version of the study (<http://www.egov-goodpractice.org/forum.php?&threadid=13>).

In some cases, additional information via **email** was requested from the consortium members. These were handled with priority to maintain momentum.

Finally, it should be noted that an **online public consultation** was held by the European Commission on eGovernment policy towards 2010 from October till December 2005²⁹⁷. 403 respondents answered questions in regard to inclusive eGovernment, to citizen involvement and participation, to high impact services, to efficient and effective eGovernment and finally to key

²⁹⁷ EC, "Your Voice on eGovernment 2010 – Online Public Consultation Report", January 2006, V1.0 Available at: http://ec.europa.eu/information_society/activities/egovement_research/doc/highlights/your_voice_egov_2010_report.pdf

enablers. Lack of interoperability was found to be the most significant barrier in nearly all the sections. In specific, inclusive eGovernment, the delivery of high impact services and efficient and effective eGovernment seem to face lack of interoperability, which is the most important barrier to progress towards eGovernment in 2010. In the delivery of high impact services, the 'lack of interoperability' barrier is second only to organisational barriers. In realising eParticipation, interoperability issues seem to be less significant than in the other sections already mentioned.

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5. Results So Far: Key Success Factors and Barriers

5.1 Introduction

In this part, we present the identified interoperability key success factors, which should be considered when designing and implementing relevant projects. Key success factors can be perceived either as critical success factors for reaching an advanced level of interoperable systems or as barriers (e.g. when identified as practically missing elements).

These key success factors have been derived in a two-way fashion:

- Top-down: Through an extended literature survey, we have found references to a significant number of critical interoperability aspects.
- Bottom-up: Through analysing the interoperability good practice cases that have been identified in this study (Appendix B). These cases have provided valuable input to the identification of real world problems and key success factors while drafting or implementing IOP projects and initiatives.

Interoperability key success factors come in many guises: Privacy, ambiguity about statutory authority, openness to public scrutiny, trust, lack of experience, hardware/software incompatibility, data sharing standards, a lack of awareness of opportunities to share, or even unwillingness to share information or integrate processes.²⁹⁸

Following the Study's Analysis Framework presented in section 2, the eGovernment IOP key success factors are organised as related to:

- technical IOP aspects
- semantic IOP aspects
- organisational IOP aspects
- governance of IOP

²⁹⁸ Minitrack Report: "E-Government Infrastructure and Interoperability", Proceedings of the 38th Hawaii International Conference on System Sciences, Hawaii, 2005

5.2 Technical Interoperability

Technical interoperability is concerned with all the technological key instruments for offering cross-organisational, cross-level, transparent, integrated, secure, decentralised public services.

Key success factors related to technical interoperability are currently considered the easiest to be addressed. This is due to the fact that there are several ready to be used and off-the-shelf standard solutions that allow the interconnection and exchange of data and information amongst information systems that have been built under different architectural and/or technological implementation paradigms.

In order to better organize such a broad field of technical issues and evaluate the maturity (strengths) or the unavailability (weaknesses) of certain IOP related technologies and at the same time provide a sound organization of the field to be used for recommendations, we distinguish between two technical IOP fields:

Core technical IOP aspects: this covers all technical issues that lie at the core of information interchange and/or distributed process seamless execution (e.g. understanding the data syntax and/or semantics).

Supportive technical IOP aspects: this covers broader technical issues that although are common in almost all information systems implementations, they become more challenging and difficult to handle in environments where interoperation is required (e.g. availability).

It is important to clarify that "core" here in no way means "more important". We perceive as *core* the technical issues that are related to and support the very notion of interoperability, that is, data, information and meaning exchange as well as process coordination and collaboration amongst different information systems and organizations. By *supportive* here we mean all the other technical aspects that do not directly affect this central IOP function. Some supportive aspects may acquire a critical importance when applied in IOP projects and may become critical success (or failure) factors (e.g. security).

In the following, we present how we perceive these two categories of technical IOP aspects.

5.2.1 Key Success Factors for Core Technical IOP

For presenting key success factors related to core technical IOP aspects, we adopt a model that organises Information Systems technologies in a matrix structure. This defines four cells as presented below.

<i>Semantic</i>	Semantic information (e.g. Semantic Web, ontologies)	Semantic Workflows (e.g. Semantic Web Services)
<i>Structure</i>	Data schemas and structures (e.g. XML, Databases, OO)	Workflows (e.g. Web Services, BPL, Workflows)
	<i>Static/Information</i>	<i>Dynamic/Process-Service</i>

The vertical axis presents the type of integration problem based on focus: structural refers to issues related mostly to data definitions, format, properties, etc, while semantic to the meaning of data. Along the horizontal axis, a very common differentiation between Information and

Process/Service is presented. Thus, four cells are defined and each cell represents for our analysis a field of relevant technologies.

Currently, the Structure/Information cell can be considered mature, in the sense that stable, commercial applications and solutions by various vendors can be found. A number of standards exist related to this category such as XML and databases. XML was designed to describe data and to focus on what data is. It was created to structure, store and to send information²⁹⁹. A database is a collection of structured data designed to meet information needs.

The Structure/Service and Semantic/Information cells are currently evolving rapidly with major vendors presenting a growing number of off-the-shelf solutions to support technology problems in these areas.

For the Structure/Service cell, there has been an interest of vendors in implementing Service Oriented Architectures - SOA (e.g. *Software AG*³⁰⁰, *IBM*³⁰¹). In this case, interoperability is achieved by the use of standards, such as the Web Services standard for remote invocation using SOAP and Web Service interfaces expressed in WSDL and service discovery using UDDI. Furthermore, there is the *workflow* approach that has been prominent in the 90-ies, focusing on and addressing problems in distributed environments with multiple service providers and intensive needs for inter-organization collaboration. Workflows have become a middleware technology for process automation and application integration³⁰². In recent years, workflow systems have gained importance as an effective infrastructure for automating the business process within and across government agencies³⁰³. Workflows are able to handle dynamic changes in delivering eGovernment services³⁰⁴.

For the Semantic/Information cell, we currently experience an emerging interest mainly related to Semantic Web applications. Although the advancement in this field appears lagging behind when compared with the workflow area, it is interesting to see today the advancements and progress in this totally new area, introduced just some years ago by Tim-Berners Lee the inventor of the WWW, URI's, HTTP, and HTML. There is a team of people at the W3C consortium working, to improve, extend and standardise the system. The vision of this next-generation internet has inspired many people to work on technologies and standards such as RDF, DAML+OIL and OWL³⁰⁵. The Semantic Web can offer answers and solutions to a set of problems the classical Web cannot face regarding information extraction, interpretation and processing. Ideally, by using Semantic Web Technologies, a large amount of data, semantically-described and machine-processable can be made available to intelligent search engines or applications that can use it in various application scenarios. Semantic Web has proved the advantages of having the static data semantically described. However, the Web is not only static data that has to be retrieved and processed. It has dynamic content that continuously changes depending on the user or application that consumes it. According to³⁰⁶, the static content of the Web is insufficient for the requirements of the so-called Business Web. In such an environment, almost everything is dynamic. In the next paragraph we describe the last Semantic/Service cell appropriate for dealing with dynamic changes.

The Semantic/Service cell is currently considered the least mature – but at the same time the most promising for heavy service industries like public administration – as it (should) combines

²⁹⁹ http://www.w3schools.com/xml/xml_what.asp

³⁰⁰ <http://www.softwareag.com/Corporate/products/cv/default.asp>

³⁰¹ <http://www-306.ibm.com/software/solutions/soa/>

³⁰² M.-T. Schmidt, "Evolution of Workflow Standards," IEEE Concurrency, vol. 7, no. 3, July-Sept. 1999.

³⁰³ Holowczak, R., D. and Chun, S., A. (2001), "Customized Geospatial Workflows for E-Government Services", GIS '01, pp. 64-69.

³⁰⁴ Chun, S., A. and Atluri, V. (2003), "Ontology-Based Workflow Change Management for Flexible eGovernment Service Delivery", Proceedings of the 2003 annual national conference on Digital government research, vol. 130, pp. 1-4.

³⁰⁵ Klischewski, R. (2003), "Semantic Web for E-Government" EGOV 2003, pp. 288-295.

³⁰⁶ Hepp M., "Semantic Web and Semantic Web Services: Father and Son or Indivisible Twins?" IEEE Internet Computing, 2006. Vol. 10(2): p. 85-88

technologies from the two former areas. Nevertheless, the vivid interest for efforts like OWL-S and WSMO and the engagement of the major vendors (e.g. SAP, HP) in relevant R&D projects (e.g. the DIP IST project³⁰⁷ and the SemanticGov IST project³⁰⁸) promises that soon more stable solutions will become available covering this demanding field. Semantic Web Services are trying to prove the advantages of having Web Services semantically described. As a consequence, various frameworks have been developed to describe semantically what goal a Web Service can achieve, how this state is changed after the execution of this service (i.e. the capability of the Web Service) and how the functionality of the Web Service can be consumed (i.e. the interface of the Web Service). Automatic discovery and selection, mediation and dynamic invocation are only some of the advantages gained by bringing semantics into the descriptions of Web Services and creating the new generation of intelligent Web applications under the name of Semantic Web Services.

5.2.2 Key Success Factors for Supportive Technical IOP

For presenting key success factors related to supportive technical IOP aspects, we intend to use the EIF, as well as other national interoperability frameworks (e.g. the UK e-GIF). In a nutshell, these frameworks suggest eGovernment services should follow amongst other and respect principles like:

- *Accessibility*: the front-end of an eGovernment portal must satisfy user needs regarding usability and accessibility (easily access to information and services).
- The eGovernment portal should be *multilingual* and should *support multiplatform devices*
- *Security, Privacy*: Data confidentiality and security mechanisms are considered as important aspects that need to be addressed in a technical interoperability dimension. For example, the use of SSL encryption is one solution for securing and authenticating personal data.
- *Subsidiarity*: the front-end should be able to provide different functionalities, modules and options according to user rights belonging to different user categories.
- *Use of Open Standards*: Standards play a key role in enabling technical interoperability. Government policies that support the implementation or adoption of open standards will improve technical interoperability and benefit governments on the whole³⁰⁹.
- EIF also encourages the use of opens source software (OSS) i.e. software that its source code is available to the general public for use and/or for modification. The use of OSS does not denote that this kind of applications is open standard. Two open source software applications can interoperate when both adhere to the same open standard³¹⁰.

³⁰⁷ <http://dip.semanticweb.org/>

³⁰⁸ <http://www.semantic-gov.org/>

³⁰⁹ Muller, B. (2005), "eGovernment, Interoperability and Innovation", eGov-Interop'05 Conference, 23-24 February 2005.

³¹⁰ Lueders, H. (2005), "Interoperability and Open Standards for eGovernment Services", eGov-Interop'05 Conference, 23-24 February 2005.

5.3 Semantic Interoperability Key Success Factors

In this section, we present the most important semantic IOP key success factors identified so far. As already mentioned, key success factors related to technology that supports semantic IOP are not presented here, as these are included in the category of technical IOP.

From the analysis conducted, we conclude that semantic IOP (excluding technology) is directly or indirectly related to the development of commonly agreed descriptions (e.g. meta-models, common definitions and vocabularies, content standards, ontologies) for public administration related information. Taking into account this interesting finding, we group the identified key success factors, in three categories with regards to the lifecycle of the common definitions development, that is:

1. Drafting/Agreeing on the common definitions/vocabularies/metadata etc
2. Using/Exploiting these common definitions
3. Maintaining/Evolving common definitions

We also plan to follow the same structure for organizing the recommendations section in the next version of the study.

Following the lifecycle of these common definitions, we noticed that there are no large scale real-world implementations with documented experience for all the three above presented stages, apparently due to the novelty of the overall semantic IOP field and the limited experience PA organizations have in setting up applications that support semantic IOP. Thus, the experiences we found were mainly related to the process of agreeing/drafting, less on using and scarcely for maintaining and updating common definitions and standards.

For the first case (agreeing/drafting on definitions), the Danish QIOXML initiative is an interesting case that fuels our analysis. Our intention is to further try to identify cases with advanced semantic IOP features in order to enrich the factors that should be taken into account. As real world examples are rather limited, we will further review the literature.

The following semantic IOP key success factors have been identified so far:

- Drafting/Agreeing on the common definitions/vocabularies/metadata etc
 - Develop common and global definitions/representations for eGovernment semantics
 - Choosing a modelling perspective and formalism for documenting the common definitions
 - Balance centralized/decentralized definitions development
 - Use citizen-friendly metadata
 - Information modelling based on reality and not on legal concepts
- Using/Exploiting these common definitions
 - Promoting the use of common definitions
 - Definitions maturity
 - The role of the supportive technical IOP layer
- Maintaining/Evolving common definitions
 - Maintain the semantic definitions
 - Evolving the semantic definitions

5.3.1 Drafting/Agreeing on the Common Definitions/Vocabularies/Metadata etc

5.3.1.1 *Develop common and Global Definitions/Representations for eGovernment Semantics (e.g. ontology)*

In the absence of specific efforts to address eGovernment specific and widely adopted data definitions and vocabularies, government entities at all levels are being left to adopt the semantics and vocabularies developed for private industry for cross-industry applications or creating local, non-standard vocabularies. Governments therefore need to examine and analyse the various data vocabularies being standardised and decide which one of these vocabulary efforts could form the basis for a solution that specifically addresses the requirements of eGovernment³¹¹.

Although this approach promises a quick start in semantic IOP work, it has certain limitations. Sooner or later, work must be done to define and agree upon Government sector-specific semantics. The vocabulary for expressing governmental business contains a number of elements unique to government. Agreement is required on the context and precise meaning of the exchanged data³¹².

This agreement should be more effectively reached by communities of practice that define requirements and develop the necessary standards and policies for semantic interoperability in their own domain. These communities of practice should be promoted and encouraged to develop their own consensus on the basis of which they will standardise their domains³¹³. Special consideration should be taken to ensure that the proposed data representation is simple, extensible³¹⁴ and in line with a centrally defined modelling perspective.

In USA, the Semantic Interoperability Community of Practice (SICoP)³¹⁵ is a relevant initiative that brings together a broad community with an interest in the field.

In the Belgian case, the agreement of data content of XML schemes and the data interpretation across different institutions and different services played a key role. Each institution developed its own scheme and data structure based on historical use in order to provide public services. The institutions had to come to an agreement, which means that they had to come to a compromise even if they had to accept changes in their basic databases. So negotiations, e.g. about the interpretation of what is a name, what is an address etc. took place and commonly agreed. These agreed governmental representations should be common across governmental boundaries.

Similarly in the Austrian case, the agreement on commonly used grammar and standards has been identified to be one of the four main challenges of providing standardised electronic file exchange. The Swedish case also stresses on the need for collaboration in order to define common semantics.

This process of the definition of standards may prove problematic in various aspects. The Danish OIOXML case reports an interesting experience of the tedious development cycle of data standards, language problems (in this case with regards to the choice between Danish and English), unwillingness to standardize and lack of understanding and commitment.

³¹¹ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³¹² European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

³¹³ Munindar P. Singh, The Pragmatic Web: Preliminary Thoughts, proceedings of NSF-EU Workshop on SemWeb, 2004

³¹⁴ Stefan Decker, Semantic Web and Databases: Relationships and some Open Problems, Proceedings of NSF-EU Workshop on SemWeb, 2004

³¹⁵ <http://web-services.gov/>

5.3.1.2 Choosing a Modelling Perspective and Formalism for Documenting the Common Definitions

The issue of the modelling perspective is critical and is inevitably linked with the modelling formalism and languages to be used for creating the needed representations.

Currently, XML is the most commonly used language for defining data elements. But as the Danish OIOXML case reports the data standard should not be documented exclusively on XML schemas, as different levels of data representation should be covered in the data standard, i.e. conceptual, logical, physical levels, in order to communicate and share data standards between non-technical persons.

All public administration personnel need to understand the data standards before consensus can be reached and, a complete data model with information on all levels of understanding both technical and business-related provides this foundation.

The same case concludes that semantic standardization (conceptual and logical models) is equally important as syntactic standardization (XML schemas).

Another issue related to the modelling perspective is commented in the Belgian case. Information should be modelled through government levels and government bodies in such a way that the model reflects the real world as closely as possible. This means the definitions of items of information, their attributes and interrelations is based on an abstraction from reality and not on legal concepts. However, we have to mention that this perspective may not be applicable in all cases as there may be cases with serious conflict between legal and real world descriptions. Interestingly, this is an alarming situation that indicates a need for legal alignment, something that is discussed below in the key success factors related to the governance of IOP.

5.3.1.3 Balance Centralized/Decentralized Definitions Development

In theory, there are two approaches for developing eGovernment IOP standards:

- Top-down: standards imposed by a central mechanism to all PA sector organizations
- Bottom-up: standards are evolved from the collaboration of agencies first at sectoral and then at national/federal level

From the cases analyzed so far, the Danish OIOXML initiative follows a top-down approach trying to provide a national infrastructure to be used and exploited by the overall Danish public administration. The other cases are examples of agencies agreeing on definitions in order to address specific sectoral or even bilateral problems.

In practice, both the top-down and the bottom-up approaches are needed in agreeing on these definitions.

As discussed in the Danish case, in order to speed up the data standardization process covering the whole public sector, it is necessary to involve all sectors in the work. The chosen approach (which is being tried out now) is to delegate the mandate and responsibility of standardization to each sector while still maintaining a centralized control of the process. This decentralized solution encourages the feeling of ownership and responsibility of ones own concepts, data and processes. This approach needs to be handled with care, however, so as to not compromise the quality of data standards. It is very important that domain concepts for each sector are standardized and harmonized also between sectors.

5.3.1.4 Use Citizen-friendly Metadata

An interesting experience was reported in a case where "citizen-friendly metadata", specific to the communities and organisations involved, was used. This friendly metadata allowed users to accurately search the site for information in a way that has meaning and is accessible to them.³¹⁶

5.3.2 Using/Exploiting these Common Definitions

5.3.2.1 Promoting the Use of Common Definitions

As documented by the Danish OIOXML case, despite the fact that the project has already provided a strong set of data schemas available via a public available (on the Internet) and free-to-use XML schema repository (<http://isb.oio.dk>), PA agencies still scarcely use them and fewer web services than expected have been implemented by governmental organizations.

To address this problem, data standard must be made visible in order to facilitate the standardization process. Moreover, standards maturity is also discussed as a significant factor in a long-term national standardization initiative like the OIOXML project. Actually, there can be many more causes to this limited usage, of which not all have been identified by the project owners yet.

5.3.2.2 The Importance of the Supportive Technical IOP Layer

The Danish case again reports another important factor that sometimes is underestimated in semantic IOP projects. In order for services to thrive and grow in an IOP enabling infrastructure, trust on each service is essential. To recognise this fact and also to chart the details and characteristics of such a trust is an important step in the whole process. Mere syntactic and semantic standardization is not enough; the level of quality, documentation, security, reliability offered by a service counts a lot.

In other words, what has been identified in the previous part as supportive technical IOP aspects with this observation becomes of critical importance and should be perceived as the basic infrastructure upon which advanced IOP solutions can be developed.

5.3.3 Maintaining/Evolving Common Definitions

5.3.3.1 Maintaining/Evolving the Semantic Definitions

As we have seen, the data semantics definitions/representations are usually the result of agreement processes, which take a lot of effort and time. Maintaining these definitions within a government-wide distributed group of people is a challenging task – even more as currently almost no tools are mature enough and readily available to support this maintenance process. Several threats exist. For example, (a) data, applications and definitions that conform to an agreed schema might become inaccessible, unusable, or inconsistent after certain changes occur, and (b) managing different versions and branches of such schemas is a laborious and knowledge-intensive task³¹⁷.

³¹⁶ Jeff Hume, David Field, The One-Ipswich Community, eGov-Interop'05 Conference 23 -24 February 2005 – Geneva

³¹⁷ Stefan Decke, Semantic Web and Databases: Relationships and some Open Problems, Proceedings of NSF-EU Workshop on SemWeb, 2004

5.4 Organizational IOP Aspects

The following key success factors related to *organisational IOP* have been identified, in the way presented in section 5.1:

- Linking services to the broader agency strategy
- Service modelling and visualisation
- User involvement and Communities of Practice in new process design
- (Re-)Using knowledge related to business processes from the private sector
- Identification of common service functionality and features
- Multi-channel service delivery
- Ownership and responsibility for cross-organisational processes

These service-related aspects will be further enriched in the next version of the study and will provide the basis for drafting relevant recommendations towards recipients at three different levels: EU, National and Agency.

5.4.1 Linking Services to the Broader Agency Strategy

Processes and services should be based on the underlying business models. Only then, will the new collaborative processes and the services they produce be properly grounded on the business goals and organisational mission³¹⁸.

In a PA environment, this means that the design and execution of the full set of public services by each separate agency and even more importantly the set of the new services that will derive from collaboration and interoperation among PA agencies should be based on and be compliant with the general strategy and policy of the agencies and linked to their broader strategic mission and vision.

5.4.2 Service Modelling and Visualisation

The modelling of the different processes involved in the workflow of the administration is being perceived as crucial and it should be the first step prior to the design of new electronic services³¹⁹.

Furthermore, appropriate modelling of services and processes may support the service/process visualisation. Process diagrams visualizing the integration of systems should be structured through a series of views. These series of views should start with a customer oriented view, or some other actor's view, presenting the business level and add more and more details moving from a business perspective to a more technical perspective.³²⁰

Among other things, process modelling and visualisation serve as vital preconditions to service monitoring. Both the explicit description of an electronic service (modelling), and the ability to

³¹⁸ Paul Johannesson, Erik Perjons, Benkt Wangler, Rose-Mharie Åhlfeldt, Design Solutions for Interoperability using a Process Manager, 1st International Conference on Interoperability of Enterprise Software and Applications INTEROP-ESA'2005, Geneva, Switzerland, February 23 - 25, 2005

³¹⁹ EU, eGovernment Interoperability Workshop Report, Brussels 18th March 2003

³²⁰ Paul Johannesson, Erik Perjons, Benkt Wangler, Rose-Mharie Åhlfeldt, Design Solutions for Interoperability using a Process Manager, 1st International Conference on Interoperability of Enterprise Software and Applications INTEROP-ESA'2005, Geneva, Switzerland, February 23 - 25, 2005

monitor its current execution state bring very valuable *visibility* and *transparency* to the entire system. This is especially important for the citizen in the case of PA services³²¹.

5.4.3 User Involvement and Communities of Practice in New Process Design

The importance of the communities of practice has already been discussed with regard to the process of agreeing on data definitions and semantics. Similarly, organizational IOP is "user-centric" in nature and requires the active involvement of the users in question (in this case, governments, PA agencies and citizens/businesses)³²². To ensure this customer-centric approach to service provision and to improve the efficacy of the public service, public organisations need to use their constituent to evaluate their internal processes, procedures and structures³²³.

This is especially true, when the focus should be switched from autonomous and simple services as provided by separate (and isolated) public administration agencies to complex cross-organizational processes that produce services of high value that address complex customer requests. As an example, the concept of life events clearly provides a direction to this end³²⁴. In all these cases, the creation of communities of practice and their involvement in the process of process design is perceived as critical.

5.4.4 (Re-)Using Knowledge Related to Business Processes from the Private Sector

Government entities could gain significant benefits from working together to develop extensions and modifications to existing standardised private industry business processes that meet governmental business requirements³²⁵.

It is important to stress that a great number of processes are executed more or less in a similar way for private and public organizations, especially almost all the supportive processes (e.g. logistics, HR management, infrastructure maintenance). Instead of re-inventing the wheel, PA agencies can easily reuse the experiences and models that have been successfully implemented in the private sector. To this direction, e-business models developed in the enterprise sector should be assessed and, where appropriate, their use by public administration be encouraged³²⁶.

5.4.5 Identification of Common Service Functionality and Features (Shared Service Layer)

An organisational IOP programme needs to address possible common functionality across services and develop means for providing this identified common functionality³²⁷. This common service

³²¹ Alain Busso & Alain Keravel, Interoperable government providing services: key questions and solutions analysed through 40 case studies collected in Europe, eGov-Interop'05 Conference 23 - 24 February 2005 – Geneva, Switzerland

³²² CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³²³ European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

³²⁴ Alain Busso & Alain Keravel, Interoperable government providing services: key questions and solutions analysed through 40 case studies collected in Europe, eGov-Interop'05 Conference 23 - 24 February 2005 – Geneva, Switzerland

³²⁵ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³²⁶ Commission Staff Working Document, Linking up Europe: the importance of interoperability for e-government services, 2003

³²⁷ European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

layer is usually called Shared Service Layer and/or Auxiliary Services and includes infrastructure services such as authentication, e-payment, security, digital signature, electronic IDs etc.

Instead of having each PA organization developing its own infrastructure to support this type of functionalities, a centralized approach seems to be highly preferable as it creates economies of scale, provides common solutions for overall public administration and releases resources to be used effectively at the local level.

5.4.6 Multi-channel Service Delivery

There is a profound citizen requirement for multi-channel service delivery. At the architectural level, this requirement calls for a loosely coupled back vis-à-vis front office systems to allow the delivery of services through different and alternative channels.

5.4.7 Ownership and Responsibility for Cross-Organisational Processes

At any time, all actors participating in an electronic service (e.g. a civil servant, a citizen) should be able to know what is the status of the electronic service, in other words, who is responsible for its prior, present and next step(s)³²⁸.

Also, it seems that in most cases a central ownership of the overall service execution should be maintained by a single organisation, most probably the actual service provider. Nevertheless, as many public administration processes cut across departmental boundaries, the ownership and responsibility of the service execution is usually fragmented and a reference point for the citizen enquiries may not be available. This is especially true for e.g. portal services where a new layer is added at the front-end on top of existing back-end systems and processes.

³²⁸ Emmanuel ORAIN, Role of Control Flow in Interoperable Services, eGov-Interop'05 Conference 23 -24 February 2005 – Geneva (Switzerland)

5.5 Interoperability Governance

In this category we group IOP key success factors in a broader political, legal, managerial and financial sense. For analysis and presentation purposes, we present a matrix structure that organises key success factors into more focused areas. The matrix was drafted trying to identify the different mandate types needed to deal with the specific IOP governance issues.

Along the first dimension, we introduce four types of key success factors for IOP governance:

- (A) Political: factors that are related to broader policy and institutional issues and should be addressed by political personnel.
- (B) Legal: factors that need legal action.
- (C) Managerial: factors that are related to organizational, managerial and technology related (e.g. decisions on technologies to be used) issues and should be dealt with by public administration and domain professionals and managers.
- (D) Economic: factors related to financing and budgeting.

Along the second dimension, we identify three levels where action should be taken:

- 1. EU Level: aspects that should be addressed at the EU level.
- 2. National Level: aspects that should be addressed at the national level.
- 3. Agency Level: aspects that should be addresses at the agency level.

Each of the factors to be presented here is linked to one or more of the cells defined in the table shown below. This relationship will be further used for the recommendation section of the study, as each cell will accommodate recommendations towards specific groups, as indicated in the cells of the table.

Table 1 - Organization of aspects related to the Governance of eGovernment IOP

	A - Political	B - Legal	C - Managerial	D - Economic
1 – EU	e.g. EU Council, EU Parliament	e.g. for EU Directives	e.g. European Commission	e.g. EU Programmes
2 - National	e.g. Ministers	e.g. for National Legislation	e.g. central eGov units	e.g. to national IOP frameworks and programmes
3 - Agency	e.g. political appointees	Not applicable	e.g. PA professionals	e.g. agency funding, PPP

In the next table, we present the factors that have been identified so far and a rough categorisation according to the four types introduced above, that is political, legal, managerial and economic. By "rough" here we mean that there may be cases where a factor may be categorized in more than one type. In these cases, we choose the more prevailing characteristics of the key success factors to include it in one category for presentation purposes. In the recommendations section, the factors that affect more than one category will be dealt with and discussed separately for each target group.

Table 2 - Aspects related to the Governance of eGovernment IOP

Key success factors related to the Governance of eGovernment Interoperability	
Political	<ul style="list-style-type: none"> ▪ National eGovernment strategy and programmes ▪ International aspects ▪ Organisational federalism
Legal	<ul style="list-style-type: none"> ▪ Legal alignment ▪ Intellectual properties ▪ Diffusion of digital signature ▪ Citizen Privacy and Data Protection
Managerial	<ul style="list-style-type: none"> ▪ Clear IOP leadership/ ownership/sponsorship/management ▪ Flexibility-transferability of the solutions ▪ Adoption of Standards ▪ Broad commitment, participation and communication ▪ Staff Training ▪ Willingness for cultural change at all partners
Economic	<ul style="list-style-type: none"> ▪ Lower adoption costs ▪ Public procurement and financing ▪ Risks for early adopters ▪ Partnering with the private sector

A short description of the above-presented factors follows. Moreover, we place each identified factors in one or more cells of table 2.

5.5.1 Political Factors

These are issues that should be dealt with basically at the political level. This means that recommendations linked to these key success factors are to be addressed mainly to political

appointees. We have identified three IOP key success factors grouped under the *Political* category. These are:

- National eGovernment strategy and programmes
- International aspects
- Organisational federalism

It should be mentioned that the first factor is broad enough to involve a broader community as it reveals important organizational and financial aspects.

5.5.1.1 National eGovernment IOP Strategy

eGovernment IOP is very difficult to take off unless supported by a central strategy, plan and support at a national/federal level. We have found the following important issues related to this strategy:

Providing a clear long-term vision. Through such a strategy a clear long-term vision and direction for the overall public sector is provided.

The Austrian case stresses the need for a clear vision for eGovernment interoperability across the country. By setting a clear vision for IOP on top of further plans and steps as well as with legalising these in binding acts, uncoordinated and disperse developments will be avoided. Moreover, a clear vision of what should be achieved is essential as a starting point in defining objectives at the agency level and ways to materialise these objectives. In this way the measures that are taken become more comprehensible by people involved in the IOP initiatives/projects.

In the same line, the Belgium case discusses the need for a combination of a long term vision, profound re-engineering and quick wins: political leaders have to be convinced that eGovernment IOP has to be based on a long term vision and a profound re-engineering of service delivery to the customers; quick wins are useful to prove the efficiency and importance of eGovernment IOP and to motivate civil servants to change, but they have to fit with the long term vision.

Creating the common infrastructure. The Austrian and Belgium cases emphasise the need for coherent national eGovernment strategy and programmes. These programmes among others are expected to provide the necessary infrastructure for promoting IOP. Basic infrastructure should be provided at the national level and be used and maintained at the local and regional level. For example in Austria, the provision of the registry information service via Internet is based on the introduction of the Central Register of Residence which is one of the main pillars of the Austrian eGovernment IOP vision.

Re-focusing national IOP frameworks on business issues. Another important issue that should be taken into account when drafting or updating a national IOP strategy is the need to (re-)focus national IOP frameworks on business issues. The national interoperability frameworks as currently available in the Member States generally limit their scope to what the European Interoperability Framework refers to as *technical interoperability* and do not try to address semantic and organizational issues to the same degree³²⁹. Cultural, legal, organisational issues are generally perceived as key ones but are still to be defined and addressed in national IOP frameworks³³⁰. While a sound technical architecture for achieving national eGovernment IOP is indispensable, the overwhelming focus on the technical side of information sharing and system interoperability drastically increases the risk of shortcutting the organisational and social processes³³¹. The socio-

³²⁹ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³³⁰ EU, eGovernment Interoperability Workshop Report, Brussels 18th March 2003

³³¹ Hans J. (Jochen) Scholl, Interoperability in e-Government: More than Just Smart Middleware, *Proceedings of the 38th Hawaii International Conference on System Sciences, Hawaii, 2005*

economic aspects of integration and the impact analysis on these aspects must be based on a critical mass of empirical data, which is not always readily available or easily shared³³².

The importance of these business integration aspects and requirements is reported in all cases presented in the Appendix. Furthermore, taking all the above into account, there is an indispensable need for broader than technology-focused, interdisciplinary research for supporting eGovernment integration and IOP.

Re-inventing public administration rather than simply re-engineering it.

It is widely accepted that intergovernmental collaboration may require business process re-engineering on the part of one or more participants³³³. But it is of critical importance to draft a general strategy that avoids taking the set of existing public services for granted. This perspective allows considering both new (and innovative) services, as well as the potential abolishment of established services³³⁴. This means that the focus should exceed simple process improvement and equal attention should be given towards structural issues i.e. overcoming organisational and political divisions within public administrations³³⁵. The Austrian EDIAKT case reports that a broad eGovernment project that promotes IOP issues should be perceived as a complex organisational development project, which requires a fundamental change in the way the public administration works internally. Even, the shift from vertical, internal and command-based communication to horizontal, external and collaboration-based patterns of communication is a factor that results in a new landscape and potential for governmental organizations.

(Cells A-2, C-2, D-2)

5.5.1.2 Organisational Federalism

The organisation of administrative space is highly fragmented and vertical. The example of Italy exhibits the distribution and fragmentation (100 Central – 20,000 Local Authorities) as well as complexity (50,000 Laws and 200,000 norms and regulations) that is inherited in contemporary public administration systems. Federalism is a structural and organisational model by which basically independent, autonomous entities join forces to form a higher-level whole in order to combine a required level of uniformity with the kind of diversity that is indispensable if the organization wants to be successful³³⁶. In federations, the specific integration requirements should emerge through the representation of the inter-networked organisation and not on the basis of the individual participant³³⁷.

Unfortunately, for public administration agencies such a cooperative environment could be mistakenly perceived as a loss of control by agencies over decisions relating to their business³³⁸.

Operating in a federated environment poses specific requirements for all participating actors. The following two are of particular interest in the eGovernment domain³³⁹:

³³² Man-Sze Li, Business models for interoperable products and services European Commission, DG INFSO Cluster Enterprise Interoperability, ATHENA, 2005

³³³ Gartner, Achieving Intergovernmental Collaboration: Child Support, 2003

³³⁴ EU, Working Paper on eGovernment Beyond 2005 - An overview of policy issues, v.1.0, 2004

³³⁵ Fountain, Jane (2001) Building The Virtual State, Brookings Institution Press, http://www.brook.edu/press/books/virtual_state.htm

³³⁶ Kurt Schwarzenbacher, Johann Wagner, The Federative Principle in Business Architecture, 1st International Conference on Interoperability of Enterprise Software and Applications INTEROP-ESA'2005, pp. 567-579, Geneva, Switzerland, February 23 - 25, 2005

³³⁷ Chen, Doumeingts, (2003), European initiatives to develop interoperability of enterprise applications—basic concepts, framework and roadmap, Annual Reviews in Control 27, pp 153–162

³³⁸ European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

³³⁹ Silvana Castano, Alfio Ferrara, Stefano Montanelli, Ontology-based Interoperability Services for Semantic Collaboration in Open Networked Systems, 1st International Conference on Interoperability of Enterprise Software and Applications INTEROP-ESA'2005, pp. 137-149, Geneva, Switzerland, February 23 - 25, 2005

- Dynamism of the system, regarding the fact that parties are allowed to join and leave the networked organization (federation) at any moment.
- Organisational autonomy, in that each organisation is responsible for its own information resource management and representation.

Emphasising on the latter the “CoBra recommendations for eGovernment beyond 2005” wisely comments that “There is a need to define a roadmap that spells out where the choice is either harmonisation or mediation to achieve interoperability (i.e. harmonisation where possible and reasonable and mediation to respect diversity)”.

(Cells A-2, C-2)

5.5.1.3 International Aspects of eGovernment IOP

eGovernment IOP is not just a country-specific or national issue, but it is global in scope. The international aspects become of particular importance in the case of European Union countries. To this direction, the Pan-European eGovernment Services (PEGS) attract the interest of the EU, with projects promoted by IDABC (e.g. the European Interoperability Framework, PEGS Architecture, etc). The notion of the European Administrative Space (e.g. ³⁴⁰) fuels an interesting theoretical discussion for the convergence of European public administration systems. In this setting, the IOP discussion should be organized and accommodated at a European level, as it requires an enhanced cooperation between EU and Member States with respect to national and regional initiatives.

Moreover, it requires the cooperation of European public administrations with international standardisation initiatives and research activities^{341 342}.

(Cells A-1, A-2)

5.5.2 Legal factors

There are important restrictions related to the legislation that should be taken into account when drafting, promoting or implementing eGovernment IOP projects. The following aspects deserve particular attention:

- Legal alignment
- Intellectual properties
- Diffusion of digital signature
- Citizen privacy and data protection

In all these cases legal action is needed and should be timely scheduled to avoid delays later.

5.5.2.1 Legal Amendments and Alignment

In general, public entities face a unique decision-making environment of distributed control and divided powers³⁴³. In this fragmented environment, information sharing and particularly

³⁴⁰ Johan P. Olsen, Towards a European Administrative Space?, ARENA Working Papers WP 02/26, http://www.arena.uio.no/publications/wp02_26.htm

³⁴¹ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³⁴² Commission Staff Working Document, Linking up Europe: the importance of interoperability for e-government services, 2003

³⁴³ Hans J. (Jochen) Scholl, Interoperability in e-Government: More than Just Smart Middleware, *Proceedings of the 38th Hawaii International Conference on System Sciences, Hawaii, 2005*

organisational IOP as practiced and promoted in eGovernment may pose fundamental legal issues by undermining basic design principles such as the deliberate division of powers³⁴⁴.

Even at a lower scale, quite often for promoting eGovernment IOP an alignment of laws, regulations, etc. is required³⁴⁵. The Irish case emphasises not only on the need to identify any new legislation required, but furthermore, on the early enactment of this legislation to avoid serious legislation versus practice conflicts. The Swedish case documents exactly the same fear for serious delays when it presents that the project missed more than one year due to slow moving legislation.

(Cells B-1, B-2)

5.5.2.2 Intellectual Properties

Government should leverage and be protective of the intellectual property that the ICT industry develops³⁴⁶. Interoperability poses several new requirements and problems in this field and governments should act proactively to avoid conflicts in the near future.

(Cells B-1, B-2)

5.5.2.3 Diffusion of Digital Signature and Electronic Identity

As reported by the Austrian case, the currently low diffusion of signature smartcards has to be taken into account and support strategies or alternatives should be discussed. This low diffusion is conceived as a critical factor for the development of advanced eGovernment interoperable services. Moreover the electronic ID is perceived as key factor for the implementation of the Swedish case. It is identified to be the main factor that allowed the usage of the system to grow.

(Cells B-1, B-2)

5.5.2.4 Citizen Privacy and Data Protection

The sharing and exchange of information raise important data protection and privacy issues. These must be suitably addressed if eGovernment services based on information sharing, aggregation and IOP are to gain wide acceptance and usage³⁴⁷.

The challenges eGovernment IOP introduces to citizens' privacy are discussed in the Austrian EDIAKT case, where the protection of sensible data is considered to be among the main challenges of providing standardised electronic file exchange.

(Cells B-2, C-2, C-3)

5.5.3 Managerial factors

In this category, we have grouped the following key success factors:

- Clear IOP leadership/ ownership/sponsorship/management

³⁴⁴ P. T. Jaeger, "Constitutional principles and eGovernment: An opinion about possible effects of federalism and the separation of powers on e-government policies," *Government Information Quarterly*, vol. 19, pp. 357-368, 2002.

³⁴⁵ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³⁴⁶ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³⁴⁷ Commission Staff Working Document, Linking up Europe: the importance of interoperability for e-government services, 2003

- Flexibility/transferability/reconfigurability of the solutions
- Adoption of Standards
- Broad commitment, participation and communication
- Staff Training
- Willingness for cultural change at all partners

5.5.3.1 Clear IOP Leadership/Ownership/Sponsorship/Management

The influence of technical, semantic and organisational aspects in eGovernment IOP, urges public administrations to develop a structured organizational model for IOP management. Within this model, agencies need to be identified to take responsibility for the different facets of IOP. For example, technical and semantic interoperability standards could be the responsibility of a single agency³⁴⁸ while the responsibility for organisational IOP standards may need to reside in other organisations depending on the different organisational structures in place throughout the public administrations of the Member States. Therefore, each Member State will need to individually identify which of its agencies is the most appropriate governing authority for each element of the IOP strategy and architecture³⁴⁹.

In a lower per project base, project sponsorship at a high level and clear ownership of the developments are considered a warrantor for the success. For example, this was presented in the Irish project where the following critical success factors were identified:

- Need for strong project governance with regular project meetings to solve issues on a timely basis
- Set up of issue-specific teams ensuring co-ordinated progress
- Set up of a structure to resolve cross-departmental issues
- Common agreement about developments

In the same line, the German case proposes the above coupled by an organisational structure to provide professional project management.

The Belgian case stresses on the need for strong political leadership and central project sponsorship to avoid delays. For the first, access to and support of policymakers at the highest level is needed: strong political leadership is crucial to make the necessary changes possible and to guarantee cooperation between all government levels and government bodies. For the second, in the case of umbrella projects with the participation of multiple agencies, a split up of budgets over a large number of partners involved can lead to delays, for instance because of the necessity for all partners to receive administrative approval. That is why the required financial resources should be shifted to the organisation that provides the project manager.

In the same direction, the Swedish case argues that due to unexpected complications that even a small change in the chain might trigger, there is a need for strong support for the development and the objectives of IOP projects by all management levels of the involved parties.

Nevertheless, it is worth mentioning that from the cases analyzed so far, it was only in the UK traffic case that a rigid project management methodology (PRINCE2) was adopted and used during the phase of project implementation.

(Cells A-2, A-3, C-3, D-3)

³⁴⁸ Gartner, Achieving Intergovernmental Collaboration: Child Support, 2003

³⁴⁹ European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

5.5.3.2 Flexibility/Transferability/Reconfigurability of the Solutions

IOP solutions should be as transferable as possible to avoid overspending of resources for solving local problems or solving the same problem more than once.

Interestingly, in the Italian health case the most important lesson learnt during the implementation of the project was reported to be the fact that the system that interlinked a large number of organizations and actors in the health field had to be flexible in order to adapt itself to the specific needs of the territory.

In the Swedish case, the use of transferability is discussed in a slightly different perspective. The owners of the case conclude that an agency should start with solutions to local IOP problems, easy to be managed and maintained by the agencies alone; nevertheless these local solutions should remain compatible with a broader vision, or in other words to be used "for wider purposes".

More generally, we may say that the need for flexibility of IOP solutions has at least two aspects:

- (a) As IOP always concerns a group of organizations, a flexible system is needed both to accommodate the particular unique characteristics of each separate organization of the group and ensure that new organizations could easily enter the system with minimum additional effort.
- (b) As transferability is highly desirable in IOP solutions, the system should be easy to be reconfigured to different needs e.g. in different municipalities and regions, at the national level and ideally, even across countries.

5.5.3.3 Adoption of Standards

Government, through its procurement, research and policies, should support and encourage the efforts to develop, adopt and promote open standards³⁵⁰. An important aspect of an open standards policy is the fact that it can successfully provide results only when discussed, adopted and promoted on a pan-European basis³⁵¹.

For a standard to become successful and achieve benefits the following aspects should be considered³⁵²:

- Hide the heterogeneity of the underlying infrastructure (e.g. programming languages, operating systems, network, and hardware).
- The consortium that drives and defines a technical standard requires broad industry support. Not only vendors and solution providers but also user organisations have to be involved early on.
- Definitions have to be reasonably easy to understand and implement, but they still have to be unambiguous.
- Validation of specifications and standards must complement the definition process.
- The uptake of recommendations and standards should be considered from the beginning.

In the EIF-ICT recommendations report³⁵³ certain recommendations are provided for the adoption and use of open standards by governments.

Open standards compatibility should become a major software selection criterion for governments to ensure its interoperability. Standardisation and frameworks within governments, such as the

³⁵⁰ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

³⁵¹ EU, Working Paper on eGovernment Beyond 2005 - An overview of policy issues, v.1.0, 2004

³⁵² Man-Sze Li, Business models for interoperable products and services European Commission, DG INFSO Cluster Enterprise Interoperability, ATHENA, 2005

³⁵³ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

EIF, the UK e-GIF, etc., plus direct involvement in international standardisation efforts, such as those of the W3C, OASIS, and others, and working with regional intermediaries such as CEN/ISSS, are considered essential to eGovernment IOP. Moreover, governmental officials responsible for implementing eGovernment should participate in the standards-setting process as technology end-users stating business requirements, ensuring that government-specific requirements and national viewpoints are embodied in technical standards such as privacy requirements and security standards.

The importance of standards for promoting eGovernment IOP has been also reported in the cases analysed so far:

- The Irish and Belgian cases stress on the need for early setting and agreement on standards as well as the necessity to have one organisation responsible for the management of standards. One organisation should be mandated to "own" the standards and ensure that they are adhered to. The Reach agency in Ireland and the Crossroads Bank for Social Security in Belgium were mandated to agree, set and own the data, envelope and XML message standards and this proved very successful in the development and implementation of the various strands/projects involved.
- The Austrian case concludes that the use of public key cryptography with smartcards and international open standards for the communication between administrations and citizens entails commonalities across countries within the development of eGovernment in Europe.
- The German case recommends governments to proceed towards the legalisation of the standard. With the legalisation of the standard in the German "Melderechtsrahmengesetz" and then the subsequent amendment of the regional laws, the basic principles of service development and processing within a certain time frame were established.
- Furthermore, the Austrian EDIAKT case advocates the use of international open standards as a means to ease and support further eGovernment development across countries in Europe.

(Cells A-1, A-2)

5.5.3.4 Broad Commitment, Participation and Communication

The identification and involvement of the stakeholders in drafting and implementing an IOP strategy is critical³⁵⁴. This holds particularly true in the eGovernment domain, where the environment is characterized by little inter-agency information exchange and practically no intra-agency knowledge management³⁵⁵.

Stakeholder communication and involvement — even beyond government — in understanding how each stakeholder benefits is key to intergovernmental collaboration. This type of collaboration may require for example each participant to review, and possibly amend or ignore, their own technology standards something that may cause serious conflicts³⁵⁶.

As documented by an UK eGovernment interoperability case³⁵⁷: "For many years the partner organisations involved had maintained their own data, building complex repositories for everything, ranging from personnel details to the holdings of a large museum. Access to this information had generally been restricted, with a wall of paperwork and bureaucracy separating the information from those who might wish to use it. The website of the project needed to be able to access information from a wide variety of partners, many of whom had never interacted significantly before. It was critical to work in consultation with these organisations, to explain the

³⁵⁴ Hans J. (Jochen) Scholl, Interoperability in e-Government: More than Just Smart Middleware, *Proceedings of the 38th Hawaii International Conference on System Sciences, Hawaii, 2005*

³⁵⁵ Reinhard Riedl, IT-Solutions for International E-Government, Invited talk, 1st IFIP I3E Conference, Zurich 2001 (presentation)

³⁵⁶ Gartner, Achieving Intergovernmental Collaboration: Child Support, 2003

³⁵⁷ Jeff Hume, David Field, The One-Ipswich Community, eGov-Interop'05 Conference 23 -24 February 2005 – Geneva (Switzerland)

value of sharing this information between them.” Moreover, as reported in the Austrian EDIAKT case, co-operation in the planning and development phase with all relevant authorities on all levels as well as with the respective IT-and software suppliers enable high level of project awareness.

Last, in an even more “market-oriented” approach, in Sweden the electronic ID has been promoted through a TV-commercial campaign, during spring 2005. The same project - basically aiming at electronic registration of new companies through the cooperation of two independent agencies – also identified intermediaries that could benefit from the eServices provided by the system by using it as a tool when dealing with their clients. This group has been an important and separate target group for communication throughout the project.

(Cells A-2, A-3)

5.5.3.5 Staff Training

Staff training is usually perceived as a prerequisite for the actual use of the new interoperable systems. In the Irish case for example, the necessary skills development has been part of a broader Organisational Change programme.

(Cells C-2, C-3)

5.5.3.6 Willingness for cultural change at all partners

There must be the explicit will of all actors to change the system and procedures even if the own organisation has to accept some disadvantages on the way to the overall objective. As in the German case, the adherence to commonly decided plans is a pre-condition for success.

Generally for the overall government structure, the Belgian case reports a straightforward need for radical cultural change within government if eGovernment integration is to be achieved, e.g. moving from hierarchy to participation and team work; meeting the needs of the customer, not the government; empowering rather than serving; rewarding entrepreneurship within government; ex post evaluation on output, not ex ante control of every input.

(Cells A-2, A-3, C-2, C-3)

5.5.4 Economic Issues

There is a certain set of IOP aspects related to financial barriers and/or critical success factors. In the next part, we present the following:

- Lower adoption costs
- Public procurement and financing
- Risks for early adopters
- Partnering with the private sector

5.5.4.1 Lower Adoption Cost

An important issue that should be taken into account is related to the high adoption costs that sometimes may result from adopting cutting edge IOP technological solutions and systems. The danger is to create in a way a special type of *digital divide* inside and among public administration agencies, separating agencies that can pay for state-of-the-art IOP infrastructures and others that remain isolated due to budget restrictions.

As the Austrian case stresses there should be a provision of low-cost facilities in order to enable also small municipalities and customers with low budgets to take part in the Austrian EDIAKT national electronic archiving and electronic file exchange system.

(Cell D2)

5.5.4.2 Public Procurement and Financing

Public procurement policies that promote IOP should be developed as these are currently not generally in place³⁵⁸. A central policy of support for initiatives could ensure that financial priority is given to those initiatives that comply with and adhere to the principles of eGovernment IOP. To this end, a central funding programme to allow agencies to develop the necessary infrastructure required to support IOP could be made available³⁵⁹ and financial incentives to encourage intergovernmental collaboration and sharing of information should be put in place³⁶⁰.

While this is important at the national level, at the agency level and as the Italian health system case indicates it is important to diversify to the greatest extent possible the resources for the funds required by the projects, as to guarantee the success of the projects, in any circumstances.

(Cells D-2, D-3)

5.5.4.3 Risks for Early Adopters

As documented in the Irish case, early adopters of the new systems perceive themselves to be at greater risk in terms of initial investment versus likely returns, as they would bear the burden of the development costs.

It is an issue for the central IOP strategy to take some measures to relax the extra costs (and resistance) pioneers in the field of eGovernment IOP may have to deal with.

(Cells A-3, C-3, D-3)

5.5.4.4 Partnering with the Private Sector

The public sector partnering with the private sector, in particular the ICT industry is considered also a crucial success factor both in the literature and in the study cases.

Without partnering with the private sector, eGovernment IOP runs several risks such as³⁶¹:

- Adopting technologies and standards that become outdated and unsupported over time.
- Not being able to rapidly take advantage of technology advances and business process improvements that private industry develops.

The Austrian EDIAKT case indicatively discusses how big vendors like Fabasoft, SER, SAP, HP, Intercom and ÖKOM were contacted during the project implementation and support the government effort by preparing interfaces to link their platforms to EDIAKT in due time.

(Cells D-2, D-3)

³⁵⁸ EICTA, EICTA Interoperability White Paper, 2004

³⁵⁹ European Public Administration Network eGovernment Working Group, Key Principles of an Interoperability Architecture, 2004

³⁶⁰ Gartner, Achieving Intergovernmental Collaboration: Child Support, 2003

³⁶¹ CompTIA, European Interoperability Framework - ICT Industry Recommendations, 2004

5.6 Summary of All Interoperability Key Success Factors

Concluding this part, we present an overview of all the interoperability key success factors identified so far, in the following table.

Table 3 - Interoperability key success factors

<p style="text-align: center;">Technical Interoperability</p> <ul style="list-style-type: none"> • Core Technical IOP <ul style="list-style-type: none"> ▪ Structure/Information technologies: XML, Databases ▪ Structure/Service Technologies: Web Services, SOA, WSDL, UDDI, Workflows. ▪ Semantic/Information Technologies: RDF, DAML + OIL, OWL ▪ Semantic/Service Technologies: OWL-S and WSMO, Semantic Web Services • Supportive Technical IOP <ul style="list-style-type: none"> ▪ Accessibility ▪ Multilingual portal supporting multiplatform devices ▪ Security and Privacy ▪ Subsidiarity ▪ Use of Open Standards ▪ Open Source Software
<p style="text-align: center;">Semantic Interoperability</p> <ul style="list-style-type: none"> • Drafting/Agreeing on the common definitions/vocabularies/metadata <ul style="list-style-type: none"> ▪ Develop common and global definitions/representations for eGovernment semantics ▪ Choosing a modelling perspective and formalism for documenting the common definitions ▪ Balance centralized/decentralized definitions development ▪ Use citizen-friendly metadata ▪ Information modelling based on reality and not on legal concepts • Using/Exploiting these common definitions <ul style="list-style-type: none"> ▪ Promoting the use of common definitions ▪ Definitions maturity ▪ The role of the supportive technical IOP layer • Maintaining/Evolving common definitions <ul style="list-style-type: none"> ▪ Maintain the semantic definitions ▪ Evolving the semantic definitions
<p style="text-align: center;">Organizational Interoperability</p> <ul style="list-style-type: none"> ▪ Linking services to the broader agency strategy ▪ Service Modelling and Visualisation ▪ User involvement ▪ Managing the message order ▪ (Re-)Using knowledge from the private sector domain ▪ Identification of common service functionality and features ▪ Multi-channel service delivery ▪ Ownership and responsibility for cross-organisational processes ▪ Discovering, matchmaking, composing, invoking and monitoring web services ▪ Providing user friendly functionalities and services

Interoperability Governance

- Political
 - National eGovernment strategy and programmes
 - International aspects
 - Organisational federalism
- Legal
 - Legal alignment
 - Intellectual properties
 - Diffusion of digital signature
 - Citizen Privacy and Data Protection
- Managerial
 - Clear IOP leadership/ ownership/sponsorship/management
 - Flexibility-transferability of the solutions
 - Adoption of Standards
 - Broad commitment, participation and communication
 - Staff Training
 - Willingness for cultural change at all partners
- Economic
 - Lower adoption costs
 - Public procurement and financing
 - Risks for early adopters
 - Partnering with the private sector

6. Recommendations

In this version of the Study we provide a first set of recommendations to local and national authorities with regards to interoperability.

To better organise this set, we introduce a matrix structure that groups recommendations in two dimensions:

The level of suitable action, that is:

- Local
- National

The area where a recommendation should be applied, that is:

- Legislation
- Funding/Financial
- Policy/Management
- Technical

These recommendations will be presented and discussed with stakeholders in the forthcoming workshops. It is expected that the next version of the study will include an updated (final) set of recommendations supported by some illustrative examples.

The initial set of recommendations is presented in the figure of the next page.

A detailed description follows.

	Legislation	Funding-Financial	Policy - Management	Technical
National	<ul style="list-style-type: none"> • Monitor legislative incompatibilities and try to find ways to overcome them • Diffuse/promote the use of eID and digital signatures 	<ul style="list-style-type: none"> • Enhance the flexibility of IOP projects funding • Fund/promote partnership projects to create common systems/infrastructures • Support early adopters • Support/promote the use of open source software 	<ul style="list-style-type: none"> • Draft a visionary national eGovernment and IOP strategy • Create a Shared Service Layer and common infrastructures • Study local cases to identify transferability and document best cases • Monitor and document trends and developments in IOP "champion" countries 	<ul style="list-style-type: none"> • Document commonly agreed semantics (e.g. taxonomies, XML Schemas, ontologies) and encourage re-use • Promote (or even enforce) the use of metadata and technical standards in all IT projects • Propose a common standard modeling framework and methodology to be followed • Leave space to local initiatives to model in depth their domains • Create a IOP clearinghouse
Local	<ul style="list-style-type: none"> • Take into account well in advance all legislative barriers • Document and communicate all encountered problems and obstacles created by legislation to national authorities 	<ul style="list-style-type: none"> • Promote Private-Public-Partnerships • Preferably use open source solutions • Use Service Level Agreements 	<ul style="list-style-type: none"> • Keep compliance with national eGovernment and IOP strategies • Develop clear IOP project leadership/ownership/sponsorship/management • Create communities of interest/practice of all involved actors to ensure commitment and participation • Train all involved actors putting emphasis on cultural change • Invent new cross-organizational business processes • Provide multi-channel access to services 	<ul style="list-style-type: none"> • Try to agree on the semantics of the commonly used objects and processes with your peer organizations • Reuse centrally or locally available definitions/taxonomies/ontologies • Use XML, RDF, OWL and other standards for modeling business concepts • Set up maintaining and evolving processes for IOP assets (e.g. taxonomies, ontologies)

Figure 2 – Interoperability Recommendations

6.1 Recommendations Related to Legislation

In a large number of analyzed IOP cases legislation has been highlighted as a very important factor that can either speed up and facilitate IOP projects or seriously hamper and jeopardise their deployment and operation.

6.1.1 Recommendations to Local Authorities

- Take into account well in advance all legislative barriers

It is usually the case that local authorities should follow a legislation that has been set at the national level. They have to take into account all restrictions this legislation may pose. It is important that, even before starting, an IOP project clearly and explicitly identifies all these restrictions that set the general legislative background to avoid in later stages any conflicts with current legislation and regulations.

- Document and communicate all encountered problems and obstacles created by legislation to national authorities

Local authorities usually have limited access and influence to the national legislation process. Nevertheless, they should communicate to the competent national agencies all inconsistencies and difficulties they may experience due to incompatible legislation.

6.1.2 Recommendations to National Authorities

- Monitor legislative incompatibilities and try to find ways to overcome them

While local authorities should communicate upwards any problems identified in legislation, national agencies should develop the necessary infrastructures and processes to use this information for promoting legislative amendments as necessary.

- Diffuse/promote the use of eID and digital signatures

National legislation should promote and practically support the use of eID and digital signatures. In many cases, the use of these two has been considered critical success factors for IOP projects.

6.2 Recommendations Related to Funding/Financial Issues

In general, obtaining the necessary resources for large governmental IT projects has lately become a complex issue. This holds particularly true for IOP projects where the collaboration of more than one agency is usually needed. The vertical view on budget allocation that is commonly used seems not to be adequate to address this new type of funding needs.

6.2.1 Local Authorities

- Promote Private-Public-Partnerships

In general, PPP is considered a well promising funding schema for governmental IT projects. As IOP projects sometimes use state-of-the-art technologies the cost for fully implementing IOP solutions may be still higher than conventional stand-alone implementations. Thus the need for additional resources may become more apparent. Moreover, IOP provides the opportunity for new types of value-add services and products on top of traditional public administration services. This may be an interesting niche for private service providers.

- Preferably use open source solutions

There is a vivid discussion going on for open source solutions. Local authorities should be very careful when estimating IOP solutions, as the initial development and installment costs may be a small fragment of the overall expenditure that includes maintenance, support and upgrades. Being tight to a specific vendor rises up both the costs for initial development and the switching costs. IOP fits well with open source solutions as big vendors are rather reluctant to follow in fear of losing market shares and opening their systems architectures.

- Use Service Level Agreements

A Service Level Agreement (SLA) is an agreement between Service Providers or between Service Providers and Customers. SLA specifies what services the Service Provider is able to provide and what are the consequences when the Service Provider cannot meet the committed goals. The Service Level Specifications (SLS) represent the technical part of the SLA. SLS is a set of technical parameters and their associated semantics that describe the service. The SLS negotiation protocol allows cooperation between entities (i.e. a Service Provider and a customer of the service).

6.2.2 National Authorities

- Enhance the flexibility of IOP projects funding

Sometimes certain limitations exist for governmental IT systems funding. National authorities may have to revise their approach, following and promoting flexible funding schemas that allow the participation of private actors.

- Fund/promote partnership projects to create common systems/infrastructures

Usually IOP assets and infrastructures are not proprietary to a specific agency, but are rather shared among a number of agencies (e.g. a common terminology). Sometimes the cost for developing such an asset may be unaffordable to be covered by a single agency but benefits may apply to an extended set of other actors. These cases should be identified and addressed either at a central (e.g. national, state) level or by creating collaborative projects with the participation of multiple stakeholders to avoid duplication of effort and create economies of scales.

- Support early adopters

An IOP solution/asset may need substantial resources to be developed for the first time, and then it may be easy to be exploited and used with small add-on costs by various agencies. These early adopters should be generously supported, especially in the cases when their project is rated as highly reusable.

- Support/promote the use of open source software

For the reasons explained above for the local authorities, national authorities should also try to promote the use of open source software by any available means.

6.3 Recommendations Related to Policy – Management Issues

In this category, we have grouped recommendations that are related either to policy or to project management issues.

6.3.1 Local Authorities

- Keep compliance with national eGovernment and IOP strategies

At the majority of EU member states there are currently IOP eGovernment strategies that have been drafted at the national level. In most cases, central eGovernment units that are in charge of these strategies strongly recommend all public administration agencies at any level to follow them and adhere to the standards proposed. It is important for all agencies implementing IT projects to take into account the national IOP strategies so as to avoid creating isolated information islands that will face severe integration problems later.

- Develop clear IOP project leadership/ownership/sponsorship/management

IOP projects are usually collaborative efforts with multiple partners, complex allocation of tasks, and possibly fragment and volatile power distribution. For these reasons it is important to clearly define leadership for the projects. Project ownership is also important to be clearly defined and should be as distributed and inclusive as possible. Last, the support from the upper political level is essential to create the necessary enabling environment and to help overcome possible reluctance that may appear due to the extended changes the project may introduce to business processes, roles, etc.

- Create communities of interest/practice of all involved actors to ensure commitment and participation

Communication is of primary importance for multi-party IOP projects. All the involved actors should be identified from the beginning of the project and there should be a well organized effort to bring together all parties, to openly discuss problems, opportunities and threats of the new to-be situation. This ensures commitment and support at later stages, where several issues may come up and support may be needed.

- Train all involved actors putting emphasis on cultural change

Training is important not only on its technical dimension (e.g. to train people in new IT). More importantly, all actors should be educated with a focus on the cultural change IOP projects usually bring. One important training goal should be to make people feel comfortable with the revised processes and roles and become supporters of the project.

- Invent new cross-organizational business processes

As mentioned above, promoting information systems IOP usually also means redesigning existing business processes, or even obligating some of them. It is important for local leaders to perceive an IOP project as an organizational initiative and chance - ideally part of a more general organizational development program - and not simply as a technical effort led by computer experts. Through an IOP project new cross-organizational business processes and front-desk interfaces should be put in place. If not, then most probably the ability to provide technical IOP and interconnection has not been translated to clear business added value.

- Provide multi-channel access to services

One of the most apparent IOP benefits for the client of public administration services is the fact that at the front-desk multiple distribution channels may become available, e.g. cable TV, web, mobile phones, call centers. Although back-office integration is the more difficult and promising change that an IOP should pursue, it is important not to forget the front-office as it is the contact point with the client. Even for marketing purposes, it must become clear to the agencies' clientele that the IOP project offered substantial improvement on how they experience their interaction with public administration. Agencies should remember that clients' satisfaction usually brings together valuable political support.

6.3.2 National Authorities

- Draft a visionary national eGovernment and IOP strategy

IOP is to be exploited locally but it should be centrally coordinated. A central coordination is needed to ensure that common standards, procedures and compatible infrastructures are put in place. The first step towards this direction is drafting a national IOP strategy for eGovernment. This IOP strategy should be part of and support a more general eGovernment strategy. The IOP strategy should be a mixture of practical guidance and visionary insight. Moreover, it should balance between providing an overall plan to be followed and providing the necessary room-to-manoeuve and allowing the local authorities the flexibility to adopt/tailor the centrally set recommendations to local conditions and needs.

- Create a Shared Service Layer and common infrastructures

One important aspect of an IOP strategy, which deserves special attention, is the fact that it should clearly identify all the services and infrastructures that should be created once and then become available to all agencies as a shared infrastructure (e.g. eID, geospatial information). The Shared Service Layer should be centrally identified, at least to a certain extend of granularity, and a national plan should be developed to have them ready in due time. In many reported cases, ambitious IOP projects face insurmountable difficulties or even fail due to the absence of these basic services/infrastructures.

- Study local cases to identify transferability and document best cases

A national clearinghouse for monitoring local cases can serve as a documentation center for disseminating information and promoting good practices nationwide. The infrastructure that could play such a role is discussed in more details below, at the technical recommendation part.

- Monitor and document trends and developments in IOP "champion" countries

This is another important function of the above-mentioned clearinghouse that is also discussed in the next part.

6.4 Recommendations Related to Technical Issues

IOP is usually considered a simple technical issue. Although in this study IOP was perceived in a broad sense as an organizational issue, technical issues are still of critical importance thus they deserve particular attention.

6.4.1 Local Authorities

- Try to agree on the semantics of the commonly used objects and processes with your peer organizations

Semantic IOP is primarily on agreeing on a common vocabulary, definitions and nomenclature. Only a small part of an agency's data objects are usually shared with other organizations. These commonly used object as well as the other agencies that use them should be identified. Then, with the participation of all parties, a working group could be set to discuss and agree on common definitions. This group should be aware of and take into account any existing standards in the area. This awareness is so important that is discussed separately in the next recommendation.

- Reuse centrally or locally available definitions/taxonomies/ontologies

Any work on drafting semantic definitions and assets should build upon existing efforts when these later are available. These efforts may be the products of a national eGovernment or IOP strategy. They may be also products of private sector initiatives, recommendations from standardization bodies, or simply experience and assets created by other IOP projects at any administrative level.

- Use XML/schemas, RDF, OWL and other standards for modeling business concepts

Today XML, RDF and OWL are considered mature enough for enterprise modeling purposes. They can be used to cover different level of advancements in modelling expressiveness, and an agency can incrementally start creating XML schemas, then move to RDF schemas and finally create their own ontologies in OWL. Reusability of these different formalisms guarantees that a work done at any stage can be reused and feed more advanced efforts in the future.

- Set up maintaining and evolving processes for IOP assets (e.g. taxonomies, ontologies)

Although the main interest today is focused on creating semantic assets, it is also important to take care to set up maintaining and evolving processes of these assets. Agencies may find that maintaining for example an ontology may be a resource-demanding task that has to be well organized. There is a danger to have an outdated semantic infrastructure in short time after its initial creation, unless you have explicitly specified its update policy.

6.4.2 National Authorities

- Document commonly agreed semantics (e.g. taxonomies, XML Schemas, ontologies) and encourage re-use

Local agencies should reuse any existing semantic asset. To succeed in this, a central repository should be created at the national level, as an IOP clearinghouse. More details on the proposed structure for this clearinghouse can be found below in this part.

- Promote (or even enforce) the use of metadata and technical standards in all IT projects

IOP in governmental agencies needs the right mixture of centralized management/guidance and flexibility for implementation at the local level. It is where the "think globally and act locally" concept fits well. So, for the first part, national authorities should come up with a set of standards that should be followed by all public administration agencies. Standardization at this level should not be perceived (and communicated) as an attempt to force top-down solutions but rather as a prerequisite for creating an interoperable administrative space. To create synergies and distribute the feeling of ownership, these standardization initiatives should be based on an open collaborative process with ideally all involved actors participating in it.

- Leave space to local initiatives to model in depth their domains

On the other hand, national agencies should be careful with their standardization process. Certain freedom to move should be left to local authorities and standardization should only cover the necessary infrastructure that will enable independent agencies to freely develop their own systems to cope with their business on top of the standardized components.

- Propose a common standard modeling framework, architecture and general technological paradigm to be followed

All agencies should start working with a common language. Common language may mean for example, a common modeling formalism (e.g. UML), a common architecture to be followed (e.g. Service Oriented Architecture – SOA), and a common technological paradigm to be followed (e.g. Web Services). This common guidance may change from time to time as technology evolves, thus it is important to monitor current trends and revise the proposed specifications as appropriate.

- Create a IOP clearinghouse

Many of the above presented recommendations pose the need for the creation of a national IOP clearinghouse. Thus, we strongly recommend national authorities to seriously consider the creation of an infrastructure that could take care of the following tasks:

- Monitor IOP

IOP is a fast evolving field. Local agencies do not have the resources and the know-how to monitor and follow it. A central clearinghouse should monitor, document, categorize and communicate advancements that may come from at least three sources:

- Industry, e.g. new IOP enabling products
- Research, e.g. scientific papers, conferences, projects and prototypes
- Practice, e.g. good practice cases from national/local agencies, international experience from other countries, private sector initiatives.

- Create IOP Assets

The IOP clearinghouse will not only document and organize existing knowledge but it will produce new IOP assets and make them available to all national/local agencies. The following three items constitute a minimum set of assets that should be developed in due time:

- Reference Architecture, giving general architectural guidelines for a IOP enabling IT architecture (e.g. SOA)
- IOP Guidelines, e.g. providing a comprehensive toolkit to be used by system designers, local authorities and PA managers

- Repository of IOP assets, e.g. creating a central library where verified IOP assets regardless their initial source could be published and organized using several categorization criteria.

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7. Consultation: Your Comments, Recommendations and Contributions

This report presents the approach and results so far from studying eGovernment IOP at local and regional level in Europe. This is the fifth version of the Study.

The comments and recommendations of stakeholders on the contents of the first five versions of the Study are valuable.

Furthermore, we are looking for volunteering experts who can assist us in gathering information on the Status of IOP in Member States. Finally, if you identified any errors in the Status reports presented in Appendix C (or any other section of this report) please let us know.

The easiest way to provide your comments/ ideas/ recommendations/ experiences etc is via email.

Please use the email address: egov-iop@ifib.de

The Subject of your email should preferably be: IOP Study ver. 4

The next version of the Study is due end of December 2006.

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8. Conclusions and Future Steps

This fifth version of the IOP Study starts by introducing eGovernment Interoperability (IOP). This includes suggesting that IOP governance will be studied, together with the following three types of IOP: organisational, semantic and technical.

A profile report of the IOP status for all Member States is provided. An enhanced report of the status of IOP in local and regional level in four Member States (namely Austria, Estonia, Germany and the UK) is also presented.

The report proceeds by presenting key findings so far with regards to IOP frameworks, stakeholders' analysis information needs, analysis of case studies and stakeholders' consultation results.

The results obtained so far are thereafter reported. These include key success factors and barriers that were obtained from the literature and from studying in detail sixteen eGovernment cases that have been identified as good practices. Relevant recommendations to stakeholders and the national and local/regional level are also outlined.

Finally, the methodology used for conducting the Study as well as short profiles of sixteen good practice cases that were in-depth studied are presented as two Appendixes.

In the final version of the study we will finalise the categorisation of key success factors and barriers and finish reporting on recommendations. Furthermore, the enhanced status report of IOP in more Member States will be presented.

Appendix A: Methodology

A.1 Introduction

In the first annex of the Study, we give an overview of the methodology that is used in conducting the study. More specifically, in section A.2 we present the main objectives and the two relevant methodologies while in section A.3 we outline the different methods used for gathering input for the Study.

A.2 Study Objectives and Methodologies

The main objectives of the Study are:

1. To report on the Status of local and regional interoperability in selected Member States
2. To identify key success factors and barriers of local and regional interoperability
3. To issue recommendations to different stakeholders

To fulfil these objectives, we have prepared and followed two methodologies. These are:

1. Methodology for reporting Status of IOP in selected Member States
2. Methodology for identifying key success factors/barriers and for issuing recommendations

Each methodology is presented below.

A.2.1 Methodology for Reporting Status of IOP in Selected MS

The methodology conducted for preparing the reports on IOP Status in the different Member States included three Steps.

Step 1: Preparation

In this step, we constructed the methodology that would be employed. Furthermore, we constructed the templates that would be used for reporting the Status. More specifically, two templates were constructed: one for reporting a short profile of IOP and one for reporting an enhanced profile for IOP.

The short profile contains information about eGovernment strategies at the national and local/regional level including information about the nation eGovernment IOP Framework (if one exists). It further contains information about the main actors and decision makers for policies at the local and regional level.

The enhanced profile contains the following elements:

- *An Overview.* This is a summary of the overall country profile, highlighting and commenting on the core findings and the country's special characteristics.
- *Answering the WHY – eGovernment, Local Government and Interoperability Strategies.* The second part outlines the strategies that drive IOP initiatives for local government. These may be broad strategies for modernizing government using IT, national eGovernment strategies, national interoperability strategies or even local eGovernment strategies.
- *Answering the WHO – the main actors in eGovernment, Local Government and Interoperability.* This section presents the main actors who participate either directly or indirectly in drafting and implementing IOP at the local and regional level in the specific country.

- *Answering the HOW – IOP strategy implementation through broad programmes.* This section refers to broad national and local programmes and frameworks which promote interoperability and implement the general strategies discussed in the previous section.
- *Answering the WHAT – Examples of projects that promote IOP at the regional and local level.* In this section, specific projects with substantial outputs and products related to interoperability are presented. If a large number of relevant initiatives is identified, indicative and representative cases that are linked to more general programmes (presented in the HOW section) are selected. A number from 5 to 10 cases are presented.
- *References and links*

Step 2: Collection of data and Preparation of short profiles

The collection of information about the status of IOP in each Member State was performed by employing an Internet-based desktop method. The use of the Internet is now a well-established method for collecting data³⁶².

In the technical literature, two main approaches have been identified in searching the Internet and collecting data³⁶³:

- *Keyword Search:* In this approach, users enter a keyword or set of keywords that, in their opinions, best characterizes their information needs. The information system translates this request into a query and searches the information space for appropriate matches, which are returned. Advanced keyword searching allows users to enter more than one keyword and to relate multiple key words to each other via the use of Boolean operators ("AND," "OR," and "NOT").
- *Combined Keyword Search and Categorization:* Some searching engines allow the user to further refine keyword search by restricting it to a given directory or sub-division of the entire database. This is more efficient than searching the entire database but, as a consequence, user is unable to identify relevant information that may exist outside of the directory chosen.

In this work we used various search engines for keyword and combined keyword search. In order to gain access to information concerning eGovernment standards as well as interoperability frameworks, a wide range of web sites from miscellaneous institutions were accessed, such as IDABC eGovernment Observatory, European Commission and other European institutions, OECD, scientific journals, governmental portals and ministerial web sites, conferences, information society committees, local authorities, universities, projects, companies, research institutes etc.

The keyword search was performed on the Internet by using the terms *interoperability* and *eGovernment* in each of the 20 European languages of the 24 Member States in order to access national documents that were written in the national official language of a specific Member State. The terms interoperability and eGovernment in the 20 national languages can be seen in the following table while the documents that were found with this search on the internet can be found in Annex C. It should be noted that the search was performed between June and September 2006 during the fifth iteration of the project.

³⁶² L.J. Gurak and L. Kastman, Technical communication research via the Internet: a classroom perspective, the Journal of the Society for Technical Communication, available at <http://www.isc.umn.edu/research/papers/TC-Kastman-Gurak.pdf>

³⁶³ H. Chen, A. Houston, R. Sewell, B. Schatz, Internet Browsing and Searching: User Evaluations of Category Map and Concept Space Techniques, JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE. 49(7):582-603, 1998, available at: <http://ai.bpa.arizona.edu/go/intranet/papers/Internet-98.pdf>

Table 4 – The terms ‘interoperability’ and ‘eGovernment’ in the European languages

Language	Term: interoperability	Term: eGovernment
English (EN)	interoperability	eGovernment
Danish (DK)	interoperabilitet	digital forvaltning
Spanish (ES)	interoperabilidad	gobierno electrónico
Dutch (NL)	interoperabiliteit	eOverheid
Finnish (FIN)	yhteentoimivuutta	
French (FR)	Interopérabilité	gouvernement électronique
German (DE)	Interoperabilität	elektronische Regierung
Greek (EL)	διαλειτουργικότητα	ηλεκτρονική διακυβέρνηση
Czech (CZ)	Interoperační	e-governmentu
Estonian (EE)	koostalitlusvõime	e-valituse
Hungarian (HU)	interoperabilitási	ekormányzati
Italian (IT)	interoperabilità	eGovernment
Latvian (LV)	sadarbība	e-pārvalde(s)
Lithuanian (LT)	funkcinis suderinamumas	el. vyriausybės
Polish (PL)	interoperatywności	e-administracji
Portuguese (P)	interoperabilidade	administração em linha
Slovak (SK)	interoperability (-a)	elektronickej vlády
Slovenian (SL)	interoperabilni	eVlade
Swedish (SE)	driftskompatibilitet	e-förvaltningstjänster
Maltese (MT)	interoperabilità	Gvern elettroniku

Step 3: Validation of data and Preparation of enhanced reports

The process of validating the short profiles and preparing the enhanced Status reports for each Member States is performed:

- By volunteering public authorities responsible for local and regional IOP in each Member State
- By the consortium members via desktop research
- By volunteering experts in Member States (for this purpose several contacts with various eGovernment Working Groups might be required)

In the last two cases, a national expert is employed to verify the results for the relevant status report.

Up to now, contacts with experts and government officials in all Member States have been made e.g. EPAN national representatives. Contacts included email communications but also telephone calls.

As a result, this version of the Study includes enhanced IOP Status Reports of the following Member States:

Status Report 1: Austria –

prepared by Mr. Martin Spitzenberger, Federal Chancellery of Austria

Status Report 2: Estonia -

prepared by Mr. Uuno Vallner, leading specialist of the Estonian Ministry of Transport

Status Report 3: Germany -

prepared by IFIB

Status Report 4: The United Kingdom -

prepared by CERTH/ITI and validated by Antoinette Mousalini

In addition, we have the commitment of 14 more Member States that they will validate and enhance their respective Status profile. Finally, we are continuing our efforts to obtain also commitment from the remaining 7 Member States in order to be able to provide enhanced Status profiles for all Member States in the next, final, version of the Study

A.2.2 Methodology for Identifying Key Success Factors/Barriers and for Issuing Recommendations

The Study is being conducted in six iterations. In every iteration, we provide new information on the status of IOP as well as critical success factors, barriers and recommendations by improving and deepening our understanding of IOP (see figure 3).

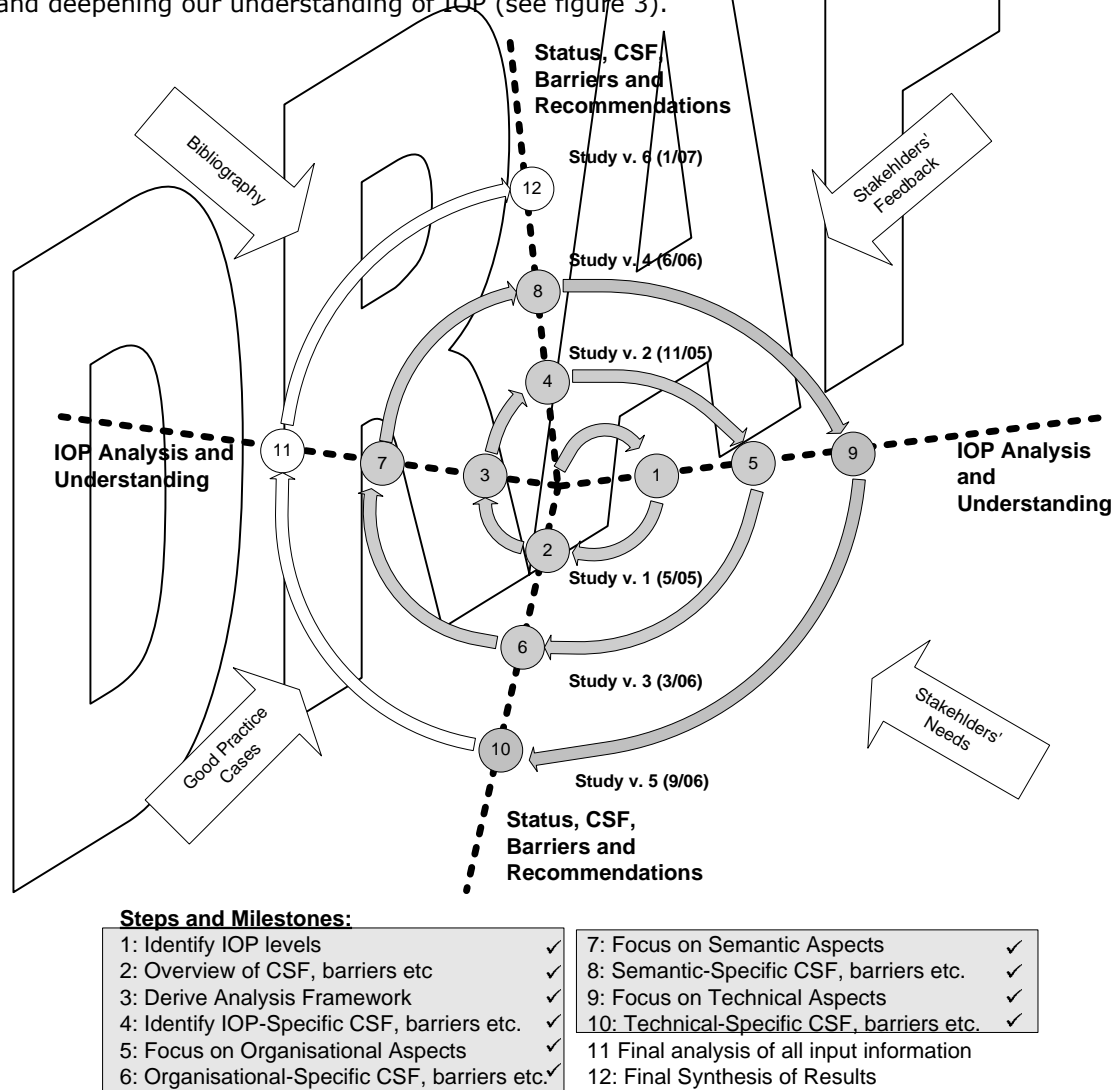


Figure 3 – Study Roadmap

Figure 3 suggests that each iteration of the Study contains two main steps and culminates in a new version of the Study report. The first step enables us to improve our understanding of IOP while the second step allows us to derive the status in Europe as well as identifying relevant key success factors and barriers and proposing recommendations. Furthermore, in figure 3, steps that have been performed so far are shown in grey.

Therefore, the contents of each of the six versions of the Study are:

- The first version contains a general understanding of IOP concepts and initial critical success factors and barriers
- The second version contains the methodology to be used in the Study and presents some preliminary results
- The third version finalised the methodology that was to be used and concentrated on organisational aspects of IOP
- The fourth version concentrates on semantic aspects of IOP
- The fifth version concentrates on technical of IOP
- The sixth and final version will provide the final synthesis of results.

There are four main streams of input to the study:

1. Bibliography.
2. Analysis of IOP good practice cases.
3. Stakeholders' needs.
4. Stakeholders' feedback to previous versions of the Study.

The methods used for each of the above-mentioned input streams are presented in the next section.

A.3 Methods Employed for Input Streams

A.3.1 Method for Gathering and Using Bibliography

The method for gathering and evaluating bibliography is based on desktop research. Desktop research of the related bibliography is an on-going task. As a result of this activity, a large number of relevant materials have been gathered, studied, analysed and evaluated for relevance. This includes policies, IOP frameworks, standards, research methods and results etc. A summary of early findings is presented in Deliverable D2.1 of this project. Findings related to IOP frameworks are presented in Appendix B, section B.2.

A.3.2 Method for the Analysis of IOP Good Practice Case

One of the most valuable inputs for conducting the Study is the material that will be gathered on eGovernment IOP good practice (in this project referred to as *case studies*). These are normally eGovernment projects where Interconnection / Integration / IOP have a central role. The requirements for eligibility of a case study are:

- The candidate projects should have initially aimed to become fully operational thus we exclude research projects and those aiming at building prototypes, demos etc.
- The candidate projects should have now finished, thus we exclude project ideas or those still in progress

The analysis of case studies will be based on information that will be gathered along four axes, as shown in figure 3. More information on each category can be found in the third version of the Study (Deliverable D2.4).

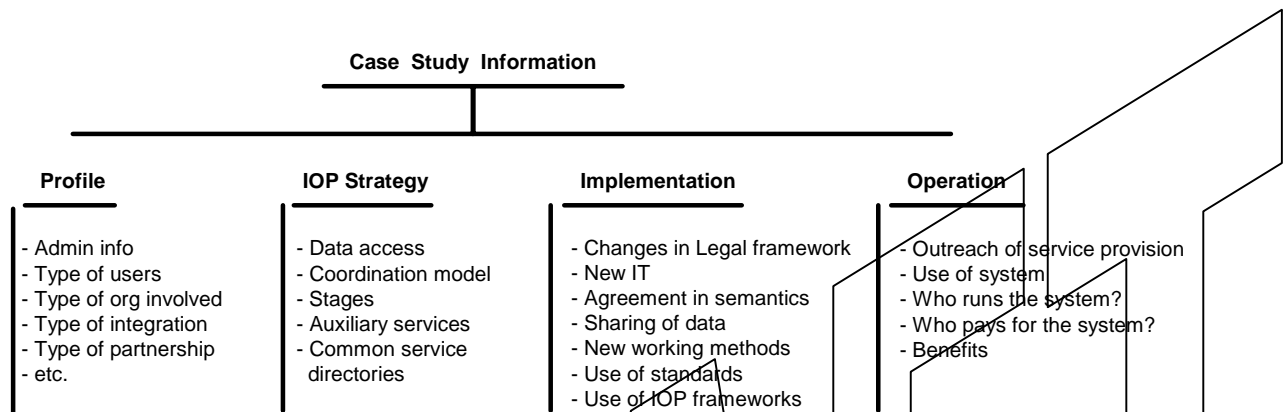


Figure 4 – The four axes of a case study

A.3.3 Method for the Analysis of Stakeholders' Needs

Another valuable input for conducting the IOP Study is the needs of stakeholders in terms of information regarding IOP.

The needs of stakeholders were identified and studied along seven views organised in three groups as shown in figure 4.

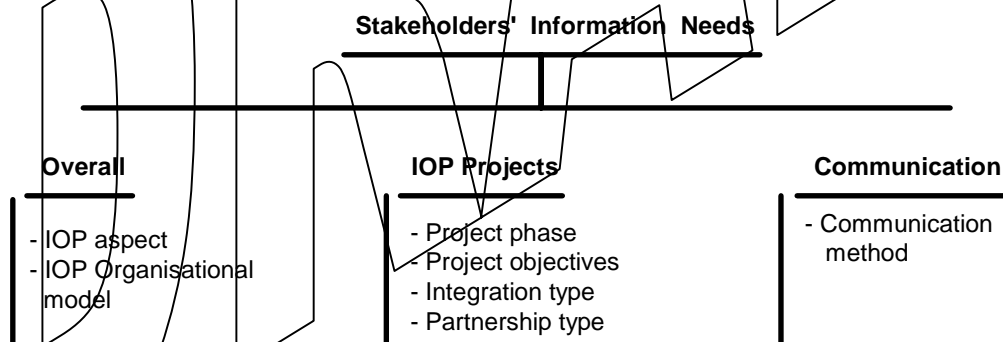


Figure 5 - The seven views of stakeholders' information needs

The first view refers to the *aspect of the IOP* that stakeholders perceive as most important. The following aspects have been provisionally identified:

- Organisational e.g. processes that should be changed, adapted or improved to enhance IOP
- Semantic e.g. agreement on common format on data exchanges etc.
- Technical e.g. technologies available, technical standards etc.
- Legal e.g. changes in laws, regulations etc.
- Cultural e.g. resistance from public servants etc.

The second view refers to the basic *organisational model* that stakeholders perceive as most suitable to solve IOP problems. The following models have been provisionally identified:

- models with direct bi-lateral or direct multi-lateral communication between authorities according to standardised interfaces and procedures
- models where a central unit exists or has been created which defines the protocols and procedures for communication with many local units
- models where communication is through a clearing house (or broker or intermediary) which transforms and adapts different formats and procedures between the units involved

The third view refers to the *phase of IOP projects* that stakeholders perceive as most important. The following phases have been provisionally identified:

- Strategic plan e.g. benefits, policy etc.
- How to conceptualise an IOP project e.g. what to consider, potential, objective, barriers
- How to set up an IOP project e.g. guidelines, resources, support, business plan etc.
- How to implement an IOP project e.g. technologies, issues to consider, risks etc.
- How to disseminate and promote the results to politicians and decision makers
- How to create awareness and take-up

The fourth view refers to the *objectives of IOP projects* that stakeholders perceive as most important. The following objectives have been provisionally identified:

- Projects aiming at data sharing by different authorities
- Projects aiming at data sharing by the same type of authority but in different areas (or regions)
- Projects where interoperability is achieved between different stages of a service that involve different authorities
- Projects where auxiliary services common to many authorities (e.g. payment, authentication) are integrated
- Projects where the aim is to build common repositories of services, meta-data, directories etc.

The fifth view refers to the type of IOP projects that stakeholders are most interested in with regards to *integration*. The following integration types have been provisionally identified:

- No integration; the interest is in IOP projects within one authority
- Between authorities at different levels of government (vertical)
- Between authorities at the same level of government (horizontal)
- Mixed vertical and horizontal
- Between authorities of different countries

The sixth view refers to the type of IOP projects that stakeholders are most interested in with regards to *partnerships*. The following partnership types have been provisionally identified:

- No partnerships, the interest is in IOP projects within one public authority
- Amongst public authorities only
- Between public authorities and the private sector
- Between public authorities and a third sector e.g. non-public and non-profit including non-governmental organisations
- Between the private sector and a third sector e.g. non-public and non-profit including non-governmental organisations
- Amongst authorities from all three sectors (public administration, private sector, third party)

Finally, the last view refers to the *method* that stakeholders perceive as most efficient for us to communicate IOP information to them. The following communication methods have been provisionally identified:

- Attendance at workshops about IOP in Brussels
- Attendance at workshops about IOP in their country
- Email communication e.g. newsletter about IOP
- An IOP Portal that can be visited when desired
- Online forum to make virtual discussions about IOP
- Printed material (brochure, white paper etc) about IOP
- A study of good practice solutions in IOP

A.3.4 Methods for Gathering and Assessing Stakeholders' Feedback

Stakeholders' feedback to each version of the Study is a significant input stream to the next version. This feedback can be realised through email or through face-to-face discussions, electronic discussion forums and during Workshops. It should be noted that during the lifetime of the project, the consortium has planned to organise four main workshops and four more local workshops (in different Member States that will show interest in the issue).

Discussions and expert panels with the participation of the audience during the workshops will be held in order to acquire feedback about the Study and important IOP issues like barriers, key success factors and recommendations.

On-line fora will help stakeholders to give feedback and discuss about workshops and the Study itself. These on-line fora will be opened in the GPF and participants will be informed about these. The Consortium will take into consideration relevant feedback and discussions that are made there.

Finally, at the end of each study, an e-mail address is given for relevant questions and feedback for the Study. Feedback is encouraged as stakeholders' view on IOP is of great importance for the success of the Study.

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Appendix B: Short Profiles of 16 Good Practice Cases

B.1 Introduction

The cases that were in-depth studied are:

- Case 1: IOP in e-enabled child benefit in Ireland
- Case 2: IOP in civil registration, Austria
- Case 3: IOP in civil registration in German regions – the example of Lower-Saxony
- Case 4: IOP in social security benefits for citizens in Belgium
- Case 5: IOP in the standardised e-Form exchange via EDIAKT II in Austria
- Case 6: IOP in the road traffic accident automation project in UK
- Case 7: IOP in the regional integrated health services for the continuity in the medical treatment in Friuli Venezia Giulia
- Case 8: IOP in company registration eService in Sweden
- Case 9: IOP in Kadaster-On-Line with direct access to land registry products via Internet in the Netherlands
- Case 10: IOP in the Danish XML project
- Case 11: ICAR: a System for e-Enabled Cooperation among Public Administrations in Italy
- Case 12: e-Bourgogne – Regional Shared eGovernment in the Region of Burgundy / France. The Example of the Regional Shared eProcurement Platform
- Case 13: eID in Estonia
- Case 14: eInvoicing in Finland – The Example of the Region of South Karelia
- Case 15: eInvoicing in Denmark
- Case 16: The Finnish Address System

Extensive descriptions these cases can be found at the eGovernment Good Practice Framework Web Site. Furthermore, long descriptions that are also annotated with useful IOP-related comments are reported in the report "D1.7/D1.8: Report with existing and additional case studies". Short profiles of these cases are now provided for comprehensiveness.

B.2 Case 1: IOP in e-Enabled Child Benefit in Ireland

The Irish child benefit service is the first eGovernment development in Ireland that e-enables life event data to the benefit of both, customers and the public service providers. Child benefit in Ireland is paid to children under the age of 16 or, if aged between 16 and 19 years, the child must be in full time education or training or be physically/mentally dependant on the parents. Child benefit is currently being paid for more than one million children, with more than 62,000 claims for new births and a variable number of claims by new residents every year.

The child benefit service is part of a wider Irish programme to e-enable life-event data more generally. The foundation of this programme is the development of the "Public Service Broker" (PSB) which is currently under way with the view to fully leveraging the potential of eGovernment concerning the use of life-event data.

The relevant developments made in the child benefit sector include a major re-organisation and development of the back-end child benefit system and, most significantly, developments in the civil registration process in Ireland that support automatic and proactive triggering of the initiation of the child benefit claim after the birth of a child.

The fundamental objectives in relation to the child benefit service and the PSB in general are:

- the introduction of a modern civil registration service,
- electronically sharing life event data between agencies via the Inter-Agency-Messaging Service (IAMS)
- automatic allocation, by the DSFA (the child benefit agency), of a Personal Public Service Number (PPSN) to a child on receipt of electronic notification of the birth,
- automated processing of child benefit claims following allocation of the PPSN,
- delivery of integrated and e-enabled services for customers,
- re-engineering of back-office and legacy systems.

From the perspective of child benefit services in Ireland, the combined goal of the three related initiatives - redesign of the child benefit (CB) system, modernisation of civil registration (GRO) and inter-agency linkage and messaging system (IAMS) - was to e-enable the process of initiation of child benefit claims. This required back-office and IT system developments in both the child benefit and civil registration services, as well as the development and implementation of a conduit for electronic notification of birth registrations from the civil registration service to the child benefit service. In relation to this overall goal, the specific objectives were to:

- automatically and proactively initiate the process of claiming for child benefit for all new births in Ireland,
- eliminate the need for customers to submit a physical birth certificate when making a claim for child benefit for a new baby.

Considering the overall goals, specific objectives and organisation of the service delivery, the service is characterised by several sequential interdependencies. This means that the output of former processes is used for the following processes. I.e. interoperability is required between several stages of the service provision (e.g. hospital, civil registration, child benefit section). This requirement is met in Ireland by the employment of a communication structure allowing involved agencies to communicate with each other usually via standardised workflows.

B.3 Case 2: Civil Registration in Austria

The duties and responsibilities of civil registration in Austria are basically sub-divided in services concerning the *change of address* incl. the application for the Austrian *certificate of residence* and the request or verification of *residence information* about Austrian residents as well as in processes related to the data exchange between the for civil registration responsible authorities. Online access to the for citizen and businesses relevant services is generally being provided, either by special agreements for business partners or via a Citizen Card function (e.g. in form of a smartcard).

Emphasis in this good practice case will be given to the two most relevant two services for citizens and business, the *certificate of residence* which is a proof of regular residence and required by many institutions like e.g. social insurances, schools, universities, insurance companies, and the *registry information service*. These services are only two services in the range of Austrian eGovernment services which rely on a central repository containing all personal and residence data of all Austrian residents – the Central Register of Residence (CRR). The CRR is the logical consequence of Austria's efforts to streamline the public service provision towards an organisation structure providing a rather centralised infrastructure for decentralised usage and creating synergies among services in eGovernment. In this sense, the CRR is the core of all public

services offered to citizens respectively of services where up-to-date residence information is needed.

The CRR was developed by a newly founded organisation, the Support Unit ZMR (Zentrales Melderegister). "ZMR" is the abbreviation for the Austrian name of this unit. This unit by law is responsible for the overall project organisation, the maintenance of the Central Register of Residence and serves as contact point for the enclosed public authorities. The local registration offices, responsible for registering and updating residence data and the Registrars' Offices for registering persons are connected to the CRR. I.e. the local authorities administer their local registries and feed the CRR in parallel. Since the municipalities record the residence data of persons living in Austria, thus all 2,359 municipalities are connected to the CRR. Thanks to this organisational structure, services and products can be provided speedily and in a user-oriented way on the basis of the legislation in force.

In this project Internet technology with XML interfaces was used for data exchange for the first time. In realising the CRR project, more than 40 different software providers of the public authorities, which had supplied local software solutions, had to be supported in implementing the XML interfaces. Now the connected public authorities have access to the CRR through a central server network via Internet. To guarantee security, a multilevel access and security concept has been implemented. Furthermore, every transaction is recorded in a protocol to allow tracing it at any time. The selected platform offers maximum scalability for future applications in the eGovernment sector. Currently, an average of about 120,000 and a maximum of 360,000 queries are conducted per day.

B.4 Case 3: Civil Registration in German Regions

The civil registration in Germany is characterised by its federal structure. I.e. the State provides the guidelines for civil registration, the Federal States are the legislators that convert these framework conditions in federal acts, and the local registration offices are responsible for service provision. This has led to many differences in the proceedings and processes among the registration offices in the past. To overcome this structure, regional initiatives emerged using standardised formats to enable electronic data exchange among civil registration offices; first within the borders of the Federal States and then, under the influence of two meanwhile legalised standards for data-exchange and civil registration messages, across the regional borders. What started differently in the various Federal States due to different software systems, legislation and financial resources, turned into a rather coordinated project within Germany, called XMeld.

Basically, the content-related standards for messages and proceedings in the civil registration are defined by the standard called OSCI-XMeld. To securely exchange these messages among citizen, businesses and administrations, a special transport mechanism is needed. This mechanism is described and standardised by the OSCI-Transport protocol. In the following, both standards together will be referred to as "XMeld".

While the Federal States can internally still use their own system for the electronic exchange of messages in the civil registration domain, the exchange across the Federal States based only on XMeld has to take place by the beginning of 2007. The regional project MOIN! located in Lower Saxony will serve as one example in Germany already employing XMeld within the regional borders. Interfaces to different registry software systems have already been tested there and are in practical use and will be offered also to other authorities responsible for civil registration.

XMeld aims at implementing vendor and product independent solutions in order to execute the amended German law providing guidelines for the civil registration (MRRG: Melderechtsrahmengesetz). The basic principle of the XMeld-project is the bi-lateral exchange of registry data between citizens and the public administration and among public administrations via the OSCI-Transport protocol. To exchange digitally signed messages in accordance with the German Signature Act, this protocol has to be endowed with cryptographic mechanisms. In addition the messages have to be structured so that subsequent processing of the messages is possible without any cross-media conversion. This is enabled by OSCI-XMeld standard, which is the basis for the integration of registry data in different systems.

The development of XMeld is subdivided into several steps resulting in ascending versions of the standard. Each version is a refinement of the previous one and extended by further proceedings. By end 2006, XMeld in the version 1.4, then covering all business processes within the civil registration, will be completed.

The standardisation approach of XMeld covers all Germany. However, due to the differing legal rules, strategies and used technologies within certain Federal States, only the common rules and processes in charge of the Federal Government will be implemented. I.e. Federal State specific rules and processes are not subject of the XMeld project, but the Federal States have to take care of the connectivity of their own civil registration system with the XMeld specifications.

Basically three category groups within the civil registration are concerned with the introduction of XMeld. Beside the registry information service online, this is the change of address (in case of relocation) via the internet and the automated exchange of data among the German registration offices.

What has started at regional level has finally led to a nation-wide standard. XMeld is seen as forerunner for the employment of standardised workflows for bi-and multi-lateral communication based on XML and OSCI in Germany. Extensions of the standards for other purposes like taxation features are already on the way. One of the biggest successes was the legalisation of OSCI-XMeld and OSCI-Transport as compulsory standards for data exchange in the civil registration. Other initiatives, combined under the umbrella of XÖV projects (XML in public administration), are already following this example. Besides, international registry information is also enabled via XMeld, since XMeld is a partner of the RISER project, a project of the European Commission enabling pan-European registry information by "connecting" national civil registration data.

B.5 Case 4: Social Security Benefits For Citizens in Belgium

In Belgium, a lot of federal, regional and local public or private institutions are entrusted with social missions and are responsible for granting social benefits. This concerns government bodies (e.g. public social welfare centres) as well as private organisations (e.g. health insurance funds, unemployment agencies). These institutions provide services (e.g. assistance relating to job search, health care) or grant financial support (e.g. benefits, tax deductions). Public social welfare centres (centres publics d'action sociale, "CPAS"), which are located in each municipality, must provide citizens with help in different life-events, therapeutic measures, the prevention of difficult life-situations, and substantial support measures.

Actually, the policy and funding of benefits in the social security domain is a duty of the Federal State, however, the service implementation is to be provided on the regional or local level. Besides the CPAS and the Federal State, the other government levels in Belgium and their institutions are also partners in the social sector. Altogether, there are about 2,000 offices on five government levels concerned with social services. The social services in Belgium are organised that way, that those services concern regularly several government levels. I.e. even if the service provision is local, other government level offices had to be consulted to carry out the service; this mainly concerns the verification of the applicant's data. This verification is to be laid back to one of the basic principles of administrative practice in Belgium, that citizens have to give information only once to the public administration. I.e. the public administration has to ask for the up-to-date data of this citizen at other public administrations that are also concerned with the respective citizen even if quite different purposes are pertained. However, since the responsibilities for services are shared among the various government levels this makes it especially difficult for the single CPAS to get up-to-date citizen data out of these various databases and, in addition, to get this data quickly.

This challenge has been faced by the interposition of an institution which interconnects the back-office applications of the various offices concerned with social services. I.e. the local CPAS use this network for the verification of applicants' data which is the basis for the entitlement and calculation of the social benefits.

Within this network, i.e. throughout the whole social system, basic legal concepts, information components and instructions have been harmonised, so that the information is collected in a standardised way and can be used in a multifunctional way by all social security offices.

By today, all the about 2,000 authorities and organisations concerned with social security, independent of their governmental level or affiliation, are networked. Between these offices, 380 million electronic messages were exchanged in 2004 with an average processing time of less than one second.

B.6 Case 5: Standardised e-Form Exchange via EDIAKT II in Austria

In order to be able to spread "communication without a media-break" to all administrative units in Austria, the structure of an electronic file called "EDIAKT II" has been developed and its first version released in June 2005. This standard for electronic file exchange will be usable on all governmental levels (local, regional, national) as well as on the customer side (business and citizen) and will regularly be refined. EDIAKT II is a XML-Scheme which describes electronic files incl. their internal structure and attributes in general. EDIAKT II serves for the exchange of electronic files, business cases and business processes among all Austrian office information systems (KIS) and electronic files systems (ELAK) and will be the standard for long-term archiving. Moreover, a standardised view on all electronic files on the level of the federation, states, municipalities and communities will be provided to all organisational units even without a KIS or ELAK system.

EDIAKT II is the follow-up model of EDIAKT I which is the standard for the exchange of electronic files among authorities on the federal level in Austria and to businesses for services on this level. This standard is already fully implemented and working together with an electronic file system called ELAK which serves as a document and workflow management tool which has been centralised for all federal authorities with about 8,500 users (which equals more or less the whole staff on this level). EDIAKT II will supplement these electronic workflows on the federal level with further definitions for the communication with local and regional authorities and its customers.

While the creation and the exchange of electronic files in the EDIAKT I format via the electronic files system ELAK requires a specific hardware and software infrastructure which is hardly affordable especially by small municipalities, electronic file exchange based on EDIAKT II follows a different approach. For local and regional authorities a specific "Creator" of EDIAKT II messages on open source basis is currently under development using Java technology.

Also in Java on open source basis, a specific "Viewer" enabling to display EDIAKT II messages to users in a structured and comfortable way and to check electronic signatures, is currently under development. With this viewer, businesses and citizens will be able to receive, select and extract the EDIAKT II messages and to process them with their locally available software tools (e.g. MS-Word, Acrobat Reader).

B.7 Case 6: The Road Traffic Accident Automation Project in UK

The Compensation Recovery Unit (CRU), part of the Department for Work and Pensions (DWP) in Great Britain, recovers from Insurance Compensators, on behalf of Dept of Health hospital costs for the treatment of injuries arising from road traffic accidents (RTA) under the Road Traffic Accident (NHS Charges) Act 1999. This was originally a high volume clerical processing operation, dealing annually with 350,000 forms (equating to 700,000 transactions) issued between DWP CRU and National Health Service (NHS) Hospitals. CRU, working with DoH partners and IT-service providers EDS, BT Syntegra, and Atos Origin initiated a project to automate the electronic transfer of data between the two government organisations including the enclosed Hospitals and the Insurance Companies.

Through a pioneering example of cross government working, utilising an innovative solution, the full process has been automated over the Government Secure Intranet (GSI). The data previously issued in paper format from the CRU system is transferred to NHS Hospitals as an eXtensible Mark-up Language (XML) schema and displayed on their web server. The required enquiry data is input by the Hospital administration staff via a web browser and the response is transferred back to CRU for automatic update of its system at a much-improved turn around time.

On receipt of the returned RTA forms, the CRU system automatically uploads the treatment information into the specific case held and issue an invoice automatically to the Insurance Company. This replaced the clerical process, which involved hundreds of CRU staff manually entering the data onto the CRU system.

Initiation of the project was in 2002 and first NHS Trusts went live on a pilot basis on April 29th of the same year. First pilots running in Scotland was in 2003. All NHS Hospitals were integrated in the system by 2004.

The project has been a resounding success within both operational environments. DWP and Department of Health secured joint annual efficiencies for Government of £1 million in return for initial DWP development costs of £320K.

The project has been a genuine partnership; between not only government departments, but also IT-service providers EDS, BT Syntegra, and Atos Origin working together to successfully deliver modernised business processes.

B.8 Case 7: Regional Integrated Health Services for the Continuity in the Medical Treatment in Friuli Venezia Giulia

The overall objective of the SISRCR (Regional integrated health services for the continuity in the medical treatment) in Friuli Venezia Giulia is creating an integrated system for the Regional Agency for Health and the Agencies for Health Services of the Region. Back-office and front-end systems allow for managing and distributing health services to the citizen and to specialised consumers (doctors, health operators) thanks to:

- a system of portals, one for each agency and a joint one
- a call centre service for a constant access to the services
- a smart card system to predispose and distribute the pharmaceutical prescriptions and the medical authorisations.

Hence the project aims at supplying the citizens with a complete services system, which is focused first of all on the de-localisation of the access and information points in order to avoid useless accesses for the gathering of medical reports and information. The objective is not reducing the expenses through the decrease of the offered resources, but rather the rationalisation of their use.

The project has already activated seven portals, one for each territorial medical authority and one operating as a single access point to the eGovernment services of the Regional Health system. The Call Centre guarantees a constant covering of the access to health services, even without any internet connection; whereas the smart card system uses the 'card of services'. That card has been created to allow regional citizens to buy discounted petrol, due to low price petrol in Slovenia. Now it is also used to access health services. More, there are two types of cards: for citizen (card of services) and for health operators. Each portal includes an Internet and an Intranet eGovernment area, whereby the latter is used by the Doctors of General medicine and Paediatric to prescribe medicines and health services.

Beyond the registration system of the portal, the system adopts the smart card as a second level of security. The smart card access system: the patient card for patient identification and authorisation to access clinical information (folders); the health professionals card to operate in the portal system, retrieve information, make drug and treatment prescriptions and forward them digitally to the regional call-centre.

The pharmacies are entitled to manage the prescriptions drawn up by the doctors of general medicine and help the citizens to book the medical visit that will then be booked at the CUP (Italian centres for the reservation of the medical visits) by the doctors or by the pharmacies through the portal. During the booking the citizen will be given the information about all available structures and services.

B.9 Case 8: Company Registration eService in Sweden

The creative man, the one with ideas and vision is essential for the society. With the joint eService provided by Bolagsverket (responsible for company registration issues) and Skatteverket (responsible for company taxation issues) it is now easier for her or him to start a business and do the necessary register changes as the company grows or changes. Foretagsregistrering.se is a single place for the whole procedure around registration matters of companies; it saves time and money for the clients as well as for the concerned authorities.

The e-service foretagsregistrering.se provides a one-stop-shop for electronic registration at one place instead of filing paper form, in sequence, to two separate authorities.

To establish this e-service a work was done identifying fields and data in a number of forms used for company and tax registration. Next step was to trace back to the legislation and the need for each information part. Then efforts were made to combine and reduce the number of data needed.

The processes were identified and the information was structured into XML-Schemas and a common taxonomy decided. All this work was done in co-operation between the Swedish Company Registration Office (Bolagsverket) and the Swedish Tax Agency (Skatteverket).

An upcoming law in Sweden will make it possible for even more electronic signed applications and also electronic filing of annual accounts from the companies. At the moment work is in progress at Bolagsverket to extend the e-services to also include electronic filing of annual accounts from companies based on XBRL, eXtensible Business Reporting Language.

The cooperation between the two agencies started as a way to develop good service and creating greater value for the customer. A project was formed and alongside the project cooperation in the information and communication area also started. The idea was to meet the customer together with the relevant information and service, no matter which agency is responsible; a one-stop-shop perspective.

Interoperability is one key of the joint service, on a real down to earth way. By really looking at the forms and the legislations for the two agencies differences were brought up on the table. Is it necessary to register addresses in different way? And with different terminology?

The result is good. The numbers of users are constantly increasing and the effect is starting to show. It's easier for the customer, it's more cost efficient for the agencies and it is a kind of test-platform for creating joint e-services depending on interoperability.

B.10 Case 9: Kadaster-on-line: Direct Access to Land-Registry Products via Internet in the Netherlands

Kadaster promotes legal certainty in transactions involving registered properties. Kadaster compiles data about registered properties and records this in public registers and cadastral maps. By making this information available to the public, Kadaster provides clarity about the ownership of registered properties and related characteristics.

Kadaster is a professional and market-focussed organisation owned by the public, i.e. it is a self administering state body, and hence a legal entity under public law which performs its tasks as an

independent organisation. Starting from this position, Kadaster is keen to continue developing into a central organisation for real estate and geo-information. By law, Kadaster is the central organisation in The Netherlands obliged with cadastral issues, i.e. it performs all tasks in this regard for the whole country.

The spearhead of Kadaster is to increase the accessibility and availability of their information, which is why they developed Kadaster on-line. Some 45,000 users among 12,000 clients use Kadaster-on-line to consult up-to-date real estate information that is crucial for their own work processes. Kadaster-on-line offers clients (including notaries, real estate agencies, local councils and construction companies) greater convenience and accessibility to cadastral products all over Netherlands. Clients can access their information far quicker and cheaper. Every day more than 60,000 products are provided via Kadaster-on-line; equating 99.9% of all products provided by Kadaster (0.01% products provided offline).

Before the introduction of Kadaster-on-line, the Dutch Kadaster had an information system called 'Kadasternetwerk', established in 1996. The 'Kadasternetwerk' system turned out to be a problem, and made them start the case Kadaster-on-line. In 2001, 'Kadasternetwerk' was replaced by Kadaster-on-line and is only accessible via subscription.

In autumn 2003, a public version of Kadaster-on-line called 'Kadaster On-line-products' that can be accessed by anyone without the need for a subscription was introduced.

On-line products is intended primarily for private individuals and comprises of three basic products. These products can only be paid for electronically and are only provided on-line. In 2005 some 24,000 on-line products were provided on a monthly basis. On-line products realised high popularity among the users from the very beginning and reached already an online rate of 95% by end 2005.

Additions

Two important additions to Kadaster-on-line are:

- Automated Data Traffic - This enables clients to incorporate land-registry information into their own applications automatically, e.g. integration of a cadastral map in the website of a municipal online presence. Without human involvement, Kadaster-on-line is being accessed by computers of municipalities or other clients, to draft information or information elements from it.
- EULIS - Within a European context, several countries are working together to make land-registry information internationally accessible. First results will be available from summer 2006 on. For more information please visit: www.eulis.org.

B.11 Case 10: The Danish XML Project

The XML project in Denmark was initiated in 2001 in order to start a focused effort to create a common framework with a fully digitized public administration as the goal in the not too distant future. XML was clearly seen as the enabling technology to bring this goal around and has been a major driving factor ever since. This entire work also goes under the brand OIOXML where OIO stands for Open Information Online.

The vision for the XML project is, through a service-oriented architecture (SOA), to bring about a set of loosely coupled services used for exchanging all necessary information between authorities themselves, and also between authorities and citizens and private companies. Services, or more precisely their interfaces, are based on data standards that explicitly define what kind of messages is allowed in a service based on their type and structure. In OIOXML the data standards are expressed using XML schemas and services are implemented as Web services, all technologies defined by the W3C organisation.

The data standards in the form of XML schemas (also denoted OIOXML schemas) must be created and agreed upon on a national scale. Thus the Danish data standardization process is of the

greatest importance for the success of the XML project as the key to secure interoperability between future services.

For the last three years the primary focus in the public sectors in Denmark has been to create OIOXML schemas for the purpose of standardizing the web service interfaces used for exchanging data between the public authorities. A lot of work has been put into this effort, lots of XML schemas have been created both through various IT projects in Denmark and by the national core component working group whose responsibility is to create OIOXML core components for widespread reuse.

In spite of all this work, the overall project is still faced with many challenges:

- Tedious development cycle of data standards
- Language problems (English vs. Danish)
- Slow implementation and deployment of web services
- Lack of commitment
- Lack of understanding
- Difficult to establish business cases
- Communication problems
- Unwillingness to standardize
- Lack of competent resources
- Political obstacles

The data standardization effort has over the last 2 years provided Denmark with a strong set of OIOXML schemas all based on a nationally agreed set of Naming and Design Rules (NDR). All OIOXML schemas are stored in the InfoStructureBase (<http://lsb.oio.dk>), available to the public (on the Internet) and free-to-use XML schema repository, custom-built for the XML project and in production for 2 years now. The impact of this effort has clearly been an ever-growing operational base for creating both new XML schemas and web services.

Despite the many OIOXML schemas, however, fewer web services than expected have been implemented. There can be many causes to this, of which not all have been identified yet (a maturity aspect). Also an important issue of trust is in play here. What does it require from a service (with respect to quality, documentation, security, reliability, and other issues) in order for someone else to reuse it and base their whole business on it? What does it take to feel confident in a service?

B12. Case 11: ICAR: a System for e-Enabled Cooperation among Public Administrations in Italy

ICAR (Interoperabilità e Cooperazione Applicativa tra le Regioni e le Province Autonome) is setting up and testing the shared technical infrastructure for applications cooperation among Italian regional authorities, following the national standards defined for development of the so-called *Sistema Pubblico di Connettività e Cooperazione*, SPC (Public Connectivity and Cooperation System).

The SPC model is that of a "light SOA" based on three pillars:

- formalisation of service agreements, which makes it possible to define not only interfaces, but also behaviours, service level agreements (SLAs), security requirements and linkages with domain ontologies;
- definition of a federated identity and access management system;
- definition of metadata (the object of cooperation), semantics and domain ontologies.

The ICAR project (25 M€ budget) is co-funded with 9.5 M€ by *Centro Nazionale per l'Informatica nella Pubblica Amministrazione*, Cnipa (National Centre for IT in Public Administration), within line 1 of the second phase of the Italian e-government plan for regional and local authorities. ICAR's participants are 16 Italian regions (out of 19 altogether) and the autonomous province of Trento; the remaining regions and the autonomous province of Bolzano are constantly informed about the project's developments and are expected to re-use its results.

ICAR aims to overcome the current situation where administrations manage and exchange among them digital information organised and formatted in many different ways, leading to slow information transfer and huge needs for data control and corrections, hence additional costs for the public administration and (unnecessary) requests to citizens and companies to provide their data again and again to public offices.

ICAR's specific objectives are aimed to achieve through ten different sub-projects; three infrastructural projects and seven business application projects.

The infrastructural projects address

- the physical and logical infrastructure for IOP at interregional level,
- the management of SLAs; and
- the implementation of an interregional federated authentication system.

The business application projects aim to test the quality of the IOP services within specific domains where cooperation among regional authorities is crucial: compensations in health services, civil registration services, job and employment services, regional car taxation and others.

I.e. the specific requirement to achieve interoperability was to link the about 10,000 public administration offices concerned by ICAR; this means their directories of services and documents. ICAR is the organisational model to overcome this require by acting as a kind of clearinghouse, providing the infrastructure, standards and projects mentioned above.

B13. Case 12: e-Bourgogne – Regional Shared eGovernment in the Region of Burgundy / France. The Example of the Regional Shared eProcurement Platform

The regional council of Bourgogne (Burgundy - France) is currently leading a pilot eGovernment project, supported by the French government and part of the national Strategic plan ADELE. e-Bourgogne was developed in the "Adèle e-colloc" framework of Information society projects managed by the Direction Générale de la Modernisation de l'Etat (DGME-ADAE : Ministry of Finances).

A platform called "e-Bourgogne" (<http://www.e-bourgogne.fr>) developed since 2003, was launched as an operational service in January 2005, with two objectives:

- bringing together all public entities of Burgundy for their purchases
- giving companies, especially small ones, a single entry to all tenders.

Another service for companies is available online since January 2006 on:

- single entry for enterprises applying for public financial support,

By end of 2006:

- the secure transmission of documents from local entities to central government services will be provided.

In order to define a more concrete regional platform aligned with the real Burgundy user's needs and European comparisons, the e-Bourgogne project team has launched two key tasks: a benchmarking among similar regions or services and a survey on a representative sample of all regional public entities (more than 2000), Local Authorities (LA's) and Local Legal Entities (LLE's) such as schools, Hospitals, Chambers of Commerce, Social organisation. Results of these two studies were presented during the "European Regional eGovernment" Congress in Dijon (2006 June 22, 23). Focussing on various criteria, these benchmark and survey will be used for e-Bourgogne in order react to citizen, LA's and LLE's expectations and needs and to think about other ways to develop the portal and to build strategic orientations.

The "European Regional eGovernment" Congress brought together people from local and regional administrations mainly from France but also from Europe in order to exchange their experiences in local eGovernment projects.

Related to eProcurement, two *sharing* experience projects were presented during the Congress by key representatives of their regions:

- Brittany region in France which is launching "eBretagne" on the model of eBourgogne.
- Catalonia (Spain): the Procurement department of Bourgogne is exchanging know-how and good practices with this region since nearly ten years.

Within e-Bourgogne the PROCURE project has been launched with those two regions plus Uddevalla municipality (Sweden), Central Bohemia (Czech Republic) and Guadeloupe (France overseas Region).

PROCURE is an online platform providing a complete access to all regional public tenders to legal and private entities. The service is targeting specifically small and medium enterprises with enabling tools that simplify and reduce the cost of submitting and improve significantly the quality of procurement processes for public entities and private companies. The Burgundy region is running this platform since December 2004 with a very high satisfaction both in terms of adoption by users and of solution. By May 2006, the existing service is used by 6,000 companies, among which a large majority of SME's, to identify tenders, promote their offers and submit electronic tenders to 1,309 local legal entities (mainly local authorities). Since the beginning of 2005, 7,500 tenders were published on the e-Bourgogne platform and led to 63,000 downloads of RFP (Request for Proposals) documents.

The e-Bourgogne platform was developed and is hosted and maintained by a French service provider. To conduct the project, the Burgundy region was assisted by private consultancy services.

Target is to bring together more than 2,000 public entities in sharing a common platform to run the eProcurement processes and other eGovernment services. I.e. the specific interoperability requirement from an organisational point of view has been to convince these about 2,000 authorities to join e-Bourgogne with its first transactional service, the tendering platform. From the technical viewpoint, interoperability between the different stages of a procure procedure, also covering the complex organisation of this inter-local service provision, as well as between different services, provided by the platform, had to be achieved.

Key factors in implementing this shared platform and interoperability framework:

- Shared vision and values between all regional public entities.

- A strong commitment from key regional political entities, convinced that e-Bourgogne is one of the key factors to ensure attractiveness and competitiveness of the region.
- A significant support from national government entities.
- A comprehensive education plan (eCampus) and educational tools (e-Learning)
- A continuous communication plan and actions; broad involvement of regional council members.
- Procurement process optimisation.
- Open source software for reusability.

Open standards and alignment with European directives and DGME standards (existing and under process).

B13. Case 13: eID in Estonia

Estonia has implemented ID card as the primary document for identifying its citizens and alien residents living within the country. Before introduction of this card, no national personal identification document – neither physically nor electronically – did exist in Estonia. The card, besides being a physical identification document, has advanced electronic functions that facilitate secure authentication and legally binding digital signature, in connection with nationwide online services.

There is only one version of the national ID card – no optional features or variations exist. All cards are equipped with a chip containing electronic data and a pair of unique digital certificates relating to each individual. In emergency cases (e.g. loss of the card) the certificates can be suspended if required – disabling the ability to use the card for electronic authentication and transactions.

The Estonian ID card scheme is the overall responsibility of the Estonian Government's Citizen and Migration Board (CMB) and is regulated by the government's National Identity Act. The process itself is managed through a tight public and private partnership with two key private organizations, the AS Sertifitseerimiskeskus which is a joint venture between banks and telecommunications organizations in Finland and TRÜB Baltic AS which is the company that personalizes the card itself – both physically and electronically.

The overall aim of the CMB was the introduction of a reliable and trustworthy identification infrastructure in Estonia, receiving high acceptance by citizens and businesses and hence becoming a success in terms of effectiveness and efficiency of its use in everyday life. As an (e-)ID infrastructure is a very sensible area in public administration of a country, which need to be highly reliable and requires full-time technical support in case of problems, a solution had to found that is based on already proven technology and that is provided by inner country software and vendors. Besides, this infrastructure had to be scalable, flexible and standards-based for expansion to other services as well as forward-looking to enable also cross-border use.

Considering these overall goals, specific objectives and the organisation of service delivery, the interoperability requirement is that of different public services which have to use the same auxiliary services, i.e. digital signature, authentication, document encryption. Beside the use for application of public services or signing of documents, the approach is universal and is also applicable to private use and services. The interoperability requirement is met by employment of standardised workflows in form of a common document format applicable to each service independent of its provider. In addition, a centralised infrastructure of a national, unique

identification number for each Estonian resident has been employed serving their authentication (not only) in electronic processes. Each workflow where digitally signed data or documents are integrated in the legacy systems, IOP in the front-office to back-processes has been achieved, in the other cases front-office to front-office flows are concerned. Almost 70 per cent of Estonian residents own an ID card out of which 2.5 per cent use the electronic features of the card. Several applications are already working with eID, like e.g. e-voting pioneered at the local government elections in 2005 and with the e-ticketing of public transport tickets as one of the most massively used application.

B14. Case 14: eInvoicing in Finland – The Example of the Region of South Karelia

Electronic invoicing has been used in Finland over 30 years already. The first electronic invoices were sent between large corporations according to internal standards. At the end of the 80's, EDIFACT standard was established for the exchange of electronic invoicing starting between private sector companies and also few governmental units used it. EDIFACT is still quite widely used in Finland.

The eInvoice Consortium was initiated in 1999 by the providers of electronic invoicing services (consisting of both traditional data relaying operators and banks). A new electronic invoicing solution with its own "standard" (known by the name eInvoice format) was developed. That format is some kind of mixture between EDIFACT and XML; an early attempt to have a simpler version of EDIFACT. That format is widely used in Finland. The eInvoice Consortium wanted some neutral party to take the responsibility to promote and foster electronic invoicing further and TIEKE, the Finnish Information Society Development Centre was selected in 2003. TIEKE has a key networking role as a neutral and non-profit organisation. TIEKE is an association and its membership mirrors the key players in the Finnish Information Society, totalling about 100 organizations and companies.

After the European Committee for Banking Standards (ECBS) introduced the electronic Payment Initiator (ePI) standard in July 2003, the banks in Finland developed a new format called Finvoice. Finvoice makes use of, besides ePI, XML syntax and ebXML. The banks made a large effort to introduce the format and also to give rise to necessary software offerings. Lately many private companies and public authorities have implemented Finvoice.

Because there are many electronic invoicing standards in Finland, providers of electronic invoicing services excluding banks have implemented conversation services between those different formats.

The public administration wanted to further standardize its electronic invoicing. In 2003 a project under the Ministry of Finance was carried out to make an electronic invoicing recommendation for public authorities. It was decided that the public administration will not develop any new format or services for its purposes but utilize existing services and formats in private sector. In the recommendation two formats were accepted to be primary used by public authorities in electronic invoicing, either Finvoice or eInvoice (referring to the eInvoice Consortium format) -standard, which hence have become important standards in the overall business relations in Finland. The State Treasury operating under the Ministry of Finance and serving the state corporation as the financial administration expert is the key driver in promoting eInvoice in governmental units. The region of South Karelia has been one of the main drivers in the testing and implementation of electronic invoice in local administration from the early beginning and already achieved high impacts.

TIEKE has established the eInvoice Forum together with other players in this area. The Forum is the focal point for the different parties in the field (e.g. The State Treasury is a member in the Forum). Today there are in Finland approximately 15 providers of electronic invoicing services, which can be grouped into two main categories with slightly different services: traditional message operators and banks. The target is that a company or public authority can send an electronic invoice with its preferred format to any other company or public authority contacting only the service provider it has chosen. A recipient can correspondingly receive electronic invoices with its preferred format contacting only its service provider. A technical infrastructure among service providers allows for, besides necessary format conversions, roaming of the electronic invoices between service providers. Roaming is a service offered by the messaging (in this case eInvoicing) network, which allows a sender by contacting only his own service provider to seamlessly and reliably send a message to a recipient having a different service provider (and possibly a different message format). To enable conversion and roaming, the Forum has decided on the following common services (run by TIEKE):

- a common (electronic) address register for all parties,
- a common conversion table between different formats, and
- a common testing service.

This type of a Forum for electronic invoicing was first implemented in Finland, but later several other European countries have started similar activities.

The issues concerning technical/syntactic and semantic interoperability have been solved rather well, but the organizational issues (especially because of the two different service provider groups) have been the biggest challenge. However, as the government is a relative strong player in this field, this issue is not so relevant for them.

Today in the governmental units, out of 2,7 million purchase invoices, about 80 % are processed electronically and 20 % of them have been received electronically (most of the purchase invoices are still converted from paper format to electronic). The target by the end of 2007 is that 30 % of all invoices (purchase invoices and others) will be received electronically and that all governmental units are able to process them electronically. The government promotes the usage of electronic invoicing among its suppliers.

B15. Case 15: eInvoicing in Denmark

As of 1 February 2005, all public institutions in Denmark were required only to accept invoices from suppliers in electronic format. Thus, all public-sector entities have been required to convert all systems and administrative processes from physical to digital handling of invoices, credit notes and other transactions. This reform affects approximately 18 million invoices a year and applies to the entire public sector from government ministries to nursery schools. It is expected to save the public some EUR 120 million annually, in addition to savings in internal administrative processes.

Electronic invoicing requires a transportation system – which in the Danish case is based on an existing VANS network (Value Added Network Services). Routing of messages from the originator to the receiver requires an electronic postal address. Different identifiers of the address can be used i.e. tax registration number or as in the Danish case an EAN locations number (EAN Location numbers are also referred to as Global Location Numbers or GLN's - see <http://gs1.org>) that identifies each public-sector entity. Suppliers who cannot or do not wish to submit electronic invoices can still send them in paper format, with the EAN location number, to a so-called "Read-

In" bureau, which converts them to digital format and forwards them to the correct public institution in question.

By definition, an electronic invoice is a bill converted to a particular format, which can be read directly by the public sector's accounting systems. This particular format is called an "OIOXML electronic invoice" and is based on the OASIS (Organization for the Advancement of Structured Information Standards - see <http://www.oasis-open.org>) standard Universal Business Language.

The project is based on proven market solutions, including the VANS infrastructure and the systems that can receive and process electronic invoices.

The compulsory transition ensures a modernisation of the entire payment infrastructure so the old-fashion "paper channel" is closed for good. It provides security and convenience for the supplier, because all invoices to public-sector customers can be sent in a single, standard format, and it enables the individual public institution to immediately begin the digitalisation of all internal work processes and systems.

The initiative for electronic invoicing in Denmark came from the Danish Ministry of Finance. In cooperation with Local Government Denmark and Danish Regions, they developed the ideas, and parliament passed the necessary legislation behind eInvoicing in Denmark. eInvoicing supports the Danish national strategy for eGovernment which aims to create a more effective and coherent public sector. The Agency of Governmental Management, under the Ministry of Finance handles the implementation and ongoing administration of eInvoicing.

In terms of interoperability, the specific requirement was to achieve interoperability (IOP) between private companies doing business with public institutions and its customers from the public sector, i.e. all public entities. I.e. if we think of a workflow existent between them IOP between different stages of the supply chain in terms of invoicing procedures had to be achieved independently of the kind of service or product sold. The solution chosen to meet this requirement has been to standardise the format of the electronic invoice as an OIOXML electronic invoice and to securely transport and distribute them via a central infrastructure (VANS network). The adoption of the international EAN location numbering systems serves for the routing of the messages and warrants the correct delivery. Besides, centralised units overtaking clearing functions to guarantee that each company may convert and send electronic invoices independently of their technical equipment ("Read-In" bureaus, Invoicing portal). The legalisation of the standard (obligatory use) is to be seen as a main driver and supporter of the high benefits already gained on both sides, within the public administration as well as in the private sector.

B16. Case 16: The Finnish Address System

In everyday life we use addresses in different ways. It is a natural thing. We use names and addresses (postal address) to send a letter or a message to someone, and in the transport and rescue sector to find the right place (location). In Finland addresses are used more than 25 millions times every day. So one can understand that if public authorities (as well as any other user) do not have the right addresses or if the address is missing, the consequence will be ineffectiveness of different delivery systems. In modern society we have also new types of addresses and new ways of using them. We have special addresses, telefax numbers, e-mails, place names, etc. and we use addresses to identify persons or to differentiate between persons with the same name and so on. We can summarise this by saying that we use addresses in different ways in everyday life and that this use is growing and becoming more versatile. So the challenge is whether we can collect and update addresses in a systematic way and to use them in an effective way.

Collecting addresses is a local process – a long story

In Finland the municipalities have always been responsible for the address system of the municipality. The first instructions how to give names and streets numbers are from the middle of the nineteenth century for the former capital Turku. Nowadays these municipality address systems are the base for all national address databases in Finland. The Population Register Centre (PRC) maintains these databases in its Population Information System. The PRC together with the Police Organisation is responsible of the electronic identification both for citizens and civil servants. I.e. the Finnish EID-card is based on the Population Register System and relies on the validity and reliability of the stored data.

Implementation of the address code system started 1969

The population registration system was founded 1969. From the very beginning registered in the data base has been the permanent place of residence of a person containing the following data: street address with house number and an address code for every dwelling.

A unique address system for the whole country is today the base for many administrations and e-service processes. For instance the notifications of moves (changes of a persons permanent address) through Internet are nearly 30% of all notifications, 30% by phone and a little bit more than 40% are made by paper forms. Links to several databases like from the Finnish Post, National Land Survey and other state registers are already implemented and will be further integrated in the unique address system. This allows for qualitative address data also in terms of side residences, integration with topographic data, information on roads, and others.

In the near future










The address (-codes) are already and will be more and more the key and link in many web-services for the whole society: the public and business sector and also for citizens.












Co-operation between local and central organisations











The address system in Finland is a good example of co-operation between the local and central organisations. The development process is still going on and there are still a lot of common challenges.










In terms of interoperability this means that person data and their residence data available de-centrally (as the data are maintained by the municipalities) had to be provided in a commonly used address database on a central level. This in order to raise the effectiveness and efficiency in the high volume processes of using citizens' and businesses' address data in particular by public authorities for sending or exchanging messages of any purpose. In addition, these address data had to be amended and improved by further data coming from other administrations. As these databases and the address data are still held and maintained de-centrally in parallel to the national address database the organisational model in accordance to the IOP-Study methodology is centralisation of data-set components (clearing). The high quality of the data in the Population Information System with its various databases integrated and the integration with other public services, in particular the identification and authentication functions for eIDs can be seen as a major success of the Finnish solution.










Appendix C: List of National Documents on eGovernment and Interoperability









Country	Document	Author	URL
Austria 	The Austrian E-Government Act	Austrian Parliament	http://ris1.bka.gv.at/
Belgium 	E-government: the approach of the Belgian federal administration	Fedict	http://ksz-bcss.fgov.be/documentation/fr/documentation/Presse/2003%20-%20E-government%20paper%20v%201.0.pdf
Belgium 	Interoperability project in the municipalities and provinces of Wallonia	eGovernment Interoperability Observatory	http://www.egovinterop.net/Res/5/Interop%20project%20wallonie%20Case%20study.pdf
Belgium 	Interoperability and eGovernment: the ISO compliant Walloon region Metadata system	Ministère de la Région wallonne	http://www.ec-gis.org/Workshops/9ec-gis/papers/rsdi_kinnaert.pdf
Belgium 	The SEEMP project	OASIS Consortium	http://www.oasis-open.org/committees/download.php/15938/SEEMP%20-%20Case%20Study%20-%20e-government.pdf
Belgium 	Interoperability in the Belgian social sector	Crossroads Bank for Social Security	http://www.law.kuleuven.ac.be/icri/frobben
Cyprius 	eGovernment country report for CYPRUS	eUSER project	http://www.euser-eu.org/ShowCase.asp?CaseTitleID=538&CaseID=1251&MenuID=109
Czech Republic 	eGovernment in 2005, presentation	Ministry of Informatics of the Czech Republic	http://www.telecities-prague.cz/download/prezentace/2_Horejsi_MICR.pdf
Czech Republic 	Check Point Provides Security for eGovernment in the Czech Republic	Checkpoint company	http://www.checkpoint.com/corporate/success/docs/0404czech.pdf












 Czech Republic	Open ICT e-Government Architecture as an Interoperability Framework (presentation)	ITAPA	http://www.itapa.sk/index.php?ID=560
 Czech Republic	Interoperability Framework of eGovernment in Environmental Information Exchange of the Czech Republic (presentation)	European Projects & Management Agency	http://www.eprha.cz/Docs/EEGov%20Days/Hrebicek%20of%20eGovernment%20in%20Enviro.pdf
 Czech Republic	Interoperability of Information Systems	The Ministry of Finance of the Czech Republic	http://www.gsa.gov/gsa/cm_attachments/GSA_DOCUMENT/11-JRoadny-CRepublic_R2GXI-I_0Z5RDZ-i34K-pR.doc
 Denmark	UBL fits Danish e-Government strategy for e-procurement	IDEAlliance	http://www.idealliance.org/papers/dx_xmle04/papers/02-04-03/02-04-03.pdf
 Denmark	Architecture for e-Government in Denmark: Challenges and Initiatives	Ministry of Science, Technology and Innovation	http://www.oio.dk/files/architecture.pdf
 Denmark	Papers away in Danish government	National IT and Telecom Agency	http://www.statskontoret.se/upload/2629/bauer.pdf
 Denmark	OECD PEER REVIEW OF E-GOVERNMENT IN DENMARK	OECD	http://e.gov.dk/uploads/media/OECD_analyse_af_digital_forvaltning_i_Danmark_09-2005.pdf
 Denmark	ICA - Country Report from Denmark - ICA Conference 2005	Offentlig Information Online	http://www.oio.dk/files/ICA_Country_Report_-_Denmark_2005.doc
 Denmark	The Interoperability Framework	Offentlig Information Online	http://standarder.oio.dk/English/Guidelines/
 Denmark	Interoperability and open standards (presentation)	Ministerial eGovernment Conference 2005	http://www.egov2005conference.gov.uk/documents/ps_presentations/presentation_ps9a.pdf
Denmark (Sweden, Estonia incl.)	The Northern eDimension actionline eGovernment	BALTIC IT&T 2004 FORUM	http://www.statskontoret.se/upload/2625/Reportriga0404.pdf
 Estonia	E-Government Architecture and the Interoperability of Information Systems - Estonia's Example	RISO - State Information System	http://www.riso.ee/et/koosvoime/BalticITUV.pdf












	Estonian IT Interoperability Framework	Ministry of Economic Affairs and Communications	http://www.riso.ee/en/files/framework_2005.pdf
	Towards Interoperability of the Estonian Public Sector	State Chancellery of the Republic of Estonia	http://www.riigikantselei.ee/failid/Interoperability_ettekanne_ing.pdf
	eGovernment architecture and the interoperability of information systems in reality -Estonian example (presentation)	Ministry of Economic Affairs and Communications, Estonia	http://www.statskontoret.se/upload/2629/vallner-uuno.pdf
	INFORMATION TECHNOLOGY IN PUBLIC ADMINISTRATION OF ESTONIA, YEARBOOK 2005	Ministry of Economic Affairs and Communications, Estonia	http://www.riso.ee/en/pub/yearbook_2005.pdf
	eGovernment country report for ESTONIA	eUSER project	http://www.euser-eu.org/ShowCase.asp?CaseTitleID=541&CaseID=1254&MenuID=109
	E-Government in Finland: An Assessment	OECD	http://www.oecd.org/dataoecd/20/50/13314420.pdf
	INFORMATION SOCIETY PROGRAMME	Government Policy Programmes, Information Society, Finland	http://www.tietoyhteiskuntaohjelma.fi/en_GB/
	Towards a Networked Finland	Information Society	http://www.tietoyhteiskuntaohjelma.fi/tietoyhteiskuntaneuvosto/en_GB/information_society_council/files/11233297000012864/default/TietoYnRap-Eng-7-6-05.pdf
	THE E-GOVERNMENT ACTION PLAN (P2AE) 2004-2007	Ministry for the Civil Service, State Reform and Spatial Planning	http://ec.europa.eu/idabc/servelets/Doc?id=22154
	THE eGOVERNMENT STRATEGIC PLAN (PSAE) 2004-2007	Ministry for the Civil Service, State Reform and Spatial Planning	http://www.adele.gouv.fr/spip/IMG/pdf/Le_plan_strategique-GB.pdf










France 	Le cadre commun d'interopérabilité des systèmes d'information publics (Common Interoperability Framework of Public Information Systems)	ADAE (Agence pour le développement de l'administration électronique)	http://www.adele.gouv.fr/spip/article.php3?id_article=219
France 	Définition d'un Cadre Commun d'Interopérabilité entre les Systèmes d'Information des administrations - Etude d'impact	ADAE (Agence pour le développement de l'administration électronique)	http://www.adae.gouv.fr/upload/documents/etude_impact.pdf
France 	Rapport de mise à jour des standards et des référentiels proposé pour le Cadre Commun d'Interopérabilité	ADAE (Agence pour le développement de l'administration électronique)	http://www.adele.gouv.fr/IMG/pdf/cci_v21_Rapport_validation_Francais_vfinale.pdf
France 	How eGovernment are you? eGovernment in France: State of play and perspectives	IBM Business Consulting Services	http://www-03.ibm.com/industries/government/doc/content/bin/p510-3552-00-esr-eGovernment.pdf
France 	Ordonnance relative aux échanges électroniques entre les usagers et les autorités administratives et entre les autorités administratives	French government website dedicated to information systems security.	http://www.ssi.gouv.fr/fr/reglementation/ordonnance-20051208.pdf
Germany 	Bund Online 2005 portal	Federal Government Co-ordination and Advisory Agency	www.bundonline2005.de
Germany 	Umsetzungsplan für die BundOnline 2005 eGovernment-Initiative (Implementation plan for the BundOnline 2005 eGovernment initiative)	German Federal Government (Published by the Federal Ministry of the Interior, Sekretariat Modern State – Modern Administration)	http://www.staat-modern.de/Anlage/original_548984/BundOnline-2005-Umsetzungsplan-fuer-die-eGovernment-Initiative.pdf
Germany 	Deutschland-Online portal	German Federal Government	www.deutschland-online.de
Germany 	Deutschland-Online Brochure	German Federal Government	http://www.deutschland-online.de/Englisch/Dokumente/Broschure_english.pdf

Germany 	eGovernment Manual	Federal Information Security Agency	http://www.bsi.bund.de/fachthem/egov/
Germany 	Abschlussbericht Masterplan E-Government	Ministry of Interior	http://www.im.nrw.de/inn/doks/egov/schlussber_masterplan_egov.pdf
Germany 	Architekturmodell für Interoperabilität von e-Government-Anwendungen in Bund, Ländern und im Kommunalen Bereich in Deutschland	Co-operation Committee for Automatic Data Processing at the Federal, Land, and Local Level	http://www.kodpa.de/beschluesse/dokumente/Architekturmodell.pdf
Germany 	Rahmenempfehlung über die Weiterentwicklung des eGovernment in Nordrhein-Westfalen	Ministry of Interior (Nordrhein-Westfalen)	http://www.im.nrw.de/inn/doks/egov/rahmenempfehlung_nrw_egov_2005.pdf
Greece 	GREECE IN THE INFORMATION SOCIETY, Strategy and Actions, 2002	Office of the Greek Prime Minister	http://ec.europa.eu/idabc/servelets/Doc?id=22349
Greece 	Ελληνικό Πλαίσιο Διαλειτουργικότητας Ηλεκτρονικής Διακυβέρνησης (eGovernment Interoperability Framework)	Ministry of Finance, Information Society	http://www.infosoc.gr/NR/rdonlyres/52E7270A-2FB3-4E4E-93F9-3EC7F45B7E60/1066/GreeceGIFstudy_v_1_5.pdf
Greece 	Ελληνικό Πλαίσιο Διαλειτουργικότητας Ηλεκτρονικής Διακυβέρνησης (eGovernment Interoperability Framework) - Τεχνικές Προδιαγραφές	Ministry of Finance, Information Society	http://www.infosoc.gr/NR/rdonlyres/52E7270A-2FB3-4E4E-93F9-3EC7F45B7E60/1065/GreeceGIFTechSpecs_v_1_3.pdf
Greece 	Κείμενο Στρατηγικής για την Κοινωνία της Πληροφορίας - 2004	Ministry of Finance, Information Society	http://www.e-accessibility.gr/mydownloads/crypt.asp?wantedfilepath=../docs/&wantedfilename=WP_draft_9.12.03.doc
Greece 	Εγκύκλιος του ΥΠ.ΕΣ.Δ.Δ.Α. με θέμα την αξιοποίηση του Έργου «ΣΥΖΕΥΞΙΣ» - Δ.Τ. ΥΠ.ΕΣ.Δ.Δ.Α.	Ministry of Interior, Public Administration and Decentralization	http://www.northaegean.gr/site/page/1055%2C1%2C0.asp?mu=&cmu=&thID=









<p>Hungary</p> 	<p>Hungarian Electronic Public Administration Interoperability Framework (MEKIK) – Technical Standards Catalogue</p>	<p>Observatory on Interoperable eGovernment Services</p>	<p>http://egovinterop.eupm.net/cdrom/pages/presentations/6b3.ppt</p>
<p>Hungary</p> 	<p>Electronic Government and Public Administration in Hungary</p>	<p>Proceedings of the 38th Hawaii International Conference on System Sciences - 2005</p>	<p>http://csdl2.computer.org/comp/proceedings/hicss/2005/2268/05/22680122a.pdf</p>
<p>Hungary</p> 	<p>eGOVERNMENT IN HUNGARY - Efforts, results and opportunities, 2001–2007</p>	<p>Századvég Foundation (Századvég Politikai Elemzések Központja)</p>	<p>http://www.szazadveg.hu/image/gellen.pdf</p>
<p>Hungary</p> 	<p>Developing interoperable eGovernment solutions in Hungary</p>	<p>Personal homepage of Csaba Krasznay, Budapest University of Technology and Economics</p>	<p>http://www.krasznay.hu/prez_en.html</p>
<p>Hungary</p> 	<p>Interoperabilitási szabványtár a közigazgatás elektronikus rendszereinek fejlesztéséhez (Collection of Interoperability Standards for the Development of Electronic Systems of Administration)</p>	<p>Ministry of Informatics and Communication</p>	<p>http://www.itktb.hu/resource.aspx?ResourceID=IHM_IO_P_Szabvt_v014_e_elka_2006_04_12_doc_V1</p>
<p>Ireland</p> 	<p>New Connections - A Strategy to realise the potential of the Information Society</p>	<p>Department of the Taoiseach (Irish Prime Minister), Information Society Policy Unit</p>	<p>http://ec.europa.eu/idabc/en/document/4772/5683</p>
<p>Ireland</p> 	<p>Reach Interoperability Guidelines (RIGs)</p>	<p>REACH Agency</p>	<p>http://www.reach.ie/interoperability/</p>
<p>Ireland</p> 	<p>ICA Country Report: IRELAND</p>	<p>ICA 38th CONFERENCE Limassol, Cyprus, October 2004</p>	<p>http://www.ica-it.org/conf38/docs/Conf38_country_reports_ireland.pdf</p>












<p>Ireland</p> 	<p>Challenges of E-Government at the Local Level</p> <p>Some Experience from Ireland</p>	<p>Irish Information Society Commission</p>	<p>http://www.itu.int/itudoc/itu-t/workshop/e-gov/e-gov011.pdf</p>
<p>Ireland</p> 	<p>Offaly Local Authorities "Corporate Plan"</p>	<p>Offaly County Council</p>	<p>http://www.offaly.ie/Yourcouncil/offalycountycouncil/services/corporateservices/corporate%20plan%202005-2009/Corporate%20Plan%202005-2009final.pdf</p>
<p>Ireland</p> 	<p>E-Government Architecture in Ireland.</p>	<p>Searn McGrath Fergal Murray REACH services</p>	<p>http://www.idealliance.org/proceedings/xml04/papers/26/paper.pdf</p>
<p>Ireland</p> 	<p>REACH -- messaging infrastructure for intra-governmental cooperation (Ireland)</p>	<p>United Nations Online Network in Public Administration and Finance</p>	<p>http://unpan1.un.org/intradoc/groups/public/documents/other/unpan022024.pdf</p>
<p>Ireland</p> 	<p>A Partnership for the Future, Strategic Plan 2003–2007</p>	<p>Local Government Computer Services Board</p>	<p>http://www.lgcsb.ie/NR/rdonlyres/A853DA69-DC41-44DC-AC1D-838A0728EB8B/0/LGCSB_StrategicPlan.pdf</p>
<p>Italy</p> 	<p>eGovernment: challenges and opportunities</p>	<p>CMG Italy XIX Annual Conference</p>	<p>http://www.w3c.it/papers/cmng2005Italy.pdf</p>
<p>Italy</p> 	<p>IDA e.Procurement Workshop - Interoperability: The Italian Scenario (presentation)</p>	<p>Ministry of Economy and Finance</p>	<p>http://ec.europa.eu/idabc/servelets/Doc?id=1854</p>
<p>Italy</p> 	<p>The Government's guidelines for the development of the Information Society</p>	<p>Minister for Innovation and Technologies</p>	<p>http://www.innovazione.gov.it/eng/normativa/documenti/linee_guida_eng.pdf</p>
<p>Italy</p> 	<p>eGovernment Action Plan</p>	<p>Presidenza del Consiglio dei Ministri</p>	<p>http://www.mininnovazione.it/eng/soc_info/politiche_governo/egovernment_00.pdf</p>
<p>Italy</p> 	<p>Collaboration as the key for local eGovernment development: the Italian experience</p>	<p>LAC-EU Ministerial Forum on Information Society</p>	<p>http://www.forumsocinfo.gov.br/menu2/apresentacoes/GiuliodiPetra.ppt</p>
<p>Italy</p> 	<p>Reuse of SOA architecture results in Italian eGovernment projects.</p>	<p>Major Cities of Europe IT User's Group</p>	<p>http://www.majorcities.org/pics/medien/1_1145860595/slides-Bettini.pdf</p>



Latvia 	Elektroniskās parvaldes attīstības programma 2005. - 2009. gadam (eGovernment Action Plan 2005-2009)	Ministerial Council	http://ec.europa.eu/idabc/servlets/Doc?id=23412
Lithuania 	NUTARIMAS DEL ELEKTRONINES VALDŽIOS KONCEPCIJOS PATVIRTINIMO (eGovernment Concept of the Republic of Lithuania)	Lithuanian Government	http://www3.lrs.lt/pls/inter2/dokpaieska.showdoc_l?p_id=222092
Lithuania 	Elektroninio parašo įdiegimo viešajame administravime parengiamieji darbai	Information Society Development Committee	
Lithuania 	Lithuania's goals for implementation of eGovernment solutions	Information Society Development Committee	http://www.offentligarummet.se/pdf/Lithuanian%20eGovernment_spar_1_1.pdf
Lithuania 	ES Struktūrinių fondų valdymas	Information Society Development Committee	www.lpd.lt/reng/matulis.ppt
Lithuania 	The prospect of coordination of information society development process	Information Society Development Committee	http://www.ednes.org/ist4ba.lt/materials/presentations/seminarTradeFair/Matulis.ppt
Luxembourg 	Étude d'opportunité d'une Infrastructure à Clé Publique (PKI Public Key Infrastructure)	Centre de Recherche Public, Henri Tudor	http://www.eco.public.lu/documentation/etudes/2002/04/08_etude_PKI_crp-ht.pdf
Luxembourg 	LuxTrust GIE	Ministry of Economy and Commerce	http://www.eluxembourg.lu/dossiers/pki/luxtrust/index.html
Luxembourg 	eGovernment and Interoperability projects	eLuxembourg	http://www.eluxembourg.lu/eLuxembourg/plan_action_projects/index.html
Luxembourg 	PLAN DIRECTEUR DE LA GOUVERNANCE ÉLECTRONIQUE	Coordination Committee for the Modernization of the State	http://www.eluxembourg.lu/eLuxembourg/plan_directeur/plan_directeur.pdf
Luxembourg 	PLAN DIRECTEUR DE LA GOUVERNANCE ÉLECTRONIQUE (Extended version)	Coordination Committee for the Modernization of the State	http://www.eletzebuerg.lu/actualites/2005/06/plan_directeur/plan_directeur_pdf.pdf

	New tools for an old job (The Hon Austin Gatt MP, Minister for Investment, Industry and Information Technology, assesses Malta's eGovernment strategy...)	Minister for Investment, Industry and Information Technology	http://www.publicservice.co.uk/pdf/europe/autumn2004/EU8%20Austin%20Gatt%20ATL.pdf
	Maltese government advances semantic interoperability	IDABC eGovernment Observatory	http://europa.eu.int/idabc/en/document/4219/194
	IR-RABA SENA TA' HIDMA TAL-GVERN 1998-2003 (eGovernment Strategy 1998-2003)	Office of the Prime Minister	http://www.doi.gov.mt/EN/archive/gverninsahhupajz/minreports/opm.pdf
	INFORMATION SOCIETY IN POLAND: HOW FAR ARE WE?	Ministry of Science and Information Society Technologies	http://fiste.jrc.es/download/KrynicaPresentations2005/1.%20Kleiber%20-%20Information%20Society%20in%20Poland%20-%20M.%20Kleiber%20-%20Krynica.pdf
	eGovernment Action Plan for 2005 - 2006	Ministry of Science and Information Society Technologies	http://www.egov-goodpractice.org/download.php?PHPSESSID=eaa35835f42f849b6b85a7359e0d76da&fileid=415
	Wrota Wstepna Koncepcja projektu (Gateway to Poland Action Plan)	State Committee for Scientific Research	http://www.kbn.gov.pl/informatydzacja/wrota.pdf
	Interchange of Data Between Administrations	Ministry of Science and Higher Education	http://meinen.mnii.gov.pl/meinen/index.jsp?place=Lead0...cat_id=104&news_id=900&layout=2&forum_id=145&page=text
	Projects	Ministry of Science and Higher Education	http://meinen.mnii.gov.pl/
	The government IT initiatives and projects in Poland (presentation)	Ministry of Interior and Administration	http://www.malopolskie.pl/in dia/pliki/prezentacje/MSWiA.ppt

	Rolling out – Polish-German research for eGovernment	Fraunhofer Institute for Open Communications	http://www.egov-zentrum.fraunhofer.de/news_extern_detail.php3?sessionid=893d9cd08b34aed2f33a24987f344525&newsid=30
	Public Information Sector	Poland Development Gateway	http://old.pldg.pl/p/en/TarJ/21/12
	EPUBLIC SERVICES IN POLAND – THE STATE OF THE ART (Paper for Working Group on eGovernment NISPACEe Annual Conference)	University in Lublin, Poland	http://unpan1.un.org/intradoc/groups/public/documents/NISPACEe/UNPAN023450.pdf
	eGovernment Resolution	Council of Ministers	http://www.icp.pt/template20.jsp?categoryId=6041&contentId=121255
	eGovernment Action Plan	Ministry of Transport, Post and Telecommunication s	http://www.telecom.gov.sk/index/open_file.php?file=info_spol/dokumenty/en/Action_plan_miherva.pdf
	KONCEPT NA ULAHCENIE VÝMENY INFORMÁCIÍ V RÁMCI ISVS NA SLOVENSKU [Access to Slovak Interoperability Framework]	Ministry of Transport, Post and Telecommunication s	http://www.telecom.gov.sk/index/go.php?id=1733
	Roadmap for the Implementation of eGovernment Services in Slovakia	Ministry of Transport, Post and Telecommunication s	http://www.telecom.gov.sk/index/open_file.php?file=info_spol/dokumenty/en/Roadmap_abstract.pdf&lang=en
	Facts & Figures about eGovernment in Slovakia	Business Roundtable in ACTeN	http://www.elet.sk/brt/new/facts_figures.html
	Best Practices in the European Countries, Republic of Slovakia	Centre for Administrative Innovation in the EuroMediterranean Region	http://unpan1.un.org/intradoc/groups/public/documents/CAIMED/UNPAN019392.pdf
	Action Plan eGovernment Up to 2004	Government Centre for Informatics of the Republic of Slovenia	http://unpan1.un.org/intradoc/groups/public/documents/UNTC/UNPAN015721.pdf

<p>Slovenia</p> 	<p>eGovernment Strategy of the Republic of Slovenia for the period 2006 to 2010</p>	<p>Ministry of Public Administration</p>	<p>http://mju.gov.si/fileadmin/mju.gov.si/pageuploads/mju_dokumenti/english/SEP2010_english_final.doc</p>
<p>Spain</p> 	<p>BRINGING E GOVERNMENT INTEROPERABILITY</p>	<p>Business Flow Consulting</p>	<p>http://www.politech-institute.org/review/articles/BENAMOU_Norbert_volume_3.pdf</p>
<p>Spain</p> 	<p>A Review of Current e-Government Initiatives in Spain</p>	<p>Universidade de Vigo, Pontevedra, Spain</p>	<p>http://www.springerlink.com/index/PA80AG2DW9Y3GVH0.pdf</p>
<p>Spain (UK, Germany, Italy, France, Poland)</p>	<p>Impact of eGovernment on Territorial Government Services</p>	<p>TERREGOV</p>	<p>http://www.terregov.eupm.net/Documents/Deliverables/WorkPackage8:%20Dissemination%20AND%20Use%20Planning/Deliverable_D8.4%20-%20Market%20Study%20-%20v2/TGV-D8_4-Marget_Study_v2.pdf</p>
<p>Spain</p> 	<p>e-Government: Public Administration for a New Century</p>	<p>UPGRADE, The European Journal for the Informatics Professional, Vol. IV, No. 2, April 2003</p>	<p>http://www.upgrade-cepis.org/</p>
<p>Sweden</p> 	<p>ICA Country Report 2004</p>	<p>The Swedish Agency for Public Management (Statskontoret)</p>	<p>http://www.statskontoret.se/statskontoret/templates/Page_2020.aspx</p>
<p>Sweden</p> 	<p>Government Information Interoperability Workshop, Report from Sweden</p>	<p>The Swedish Agency for Public Management (Statskontoret)</p>	<p>http://www.cenorm.be/cenorm/businessdomains/businessdomains/iss/activity/22wessbrandt1.pdf</p>
<p>Sweden</p> 	<p>eGovernment Interoperability Seminar</p>	<p>The Swedish Agency for Public Management (Statskontoret)</p>	<p>http://www.riigikantselei.ee/failid/Interoperability_seminar_Estonia_jan_2006.ppt</p>
<p>Sweden</p> 	<p>Standard Messages for Interchange of Records – A Concept to Improve Interoperability</p>	<p>The Swedish Agency for Public Management (Statskontoret)</p>	<p>http://misc.magvarorszag.hu/mbinary/okt6%201430%202%20Karl%20Wessbrandt%2006Lehar.ppt</p>

<p>The Netherlands</p> 	E-government: For and by the Government (eOverheid)	Ministry of Interior and Kingdom Relations	http://www.e-overheid.nl/sites/english
<p>The Netherlands</p> 	Nederlandse Overheid Referentie Architectuur (Netherlands Government Reference Architecture)	eOverheid	http://www.e-overheid.nl/atlas/referentiearchitectuur
<p>The Netherlands</p> 	PROGRAMME FOR OPEN STANDARDS AND OPEN SOURCE SOFTWARE IN GOVERNMENT (OSSOS)	ICTU-foundation	http://www.ictu.nl/download/OSOSS_English.pdf
<p>The Netherlands</p> 	SOUTH HOLLAND DISTRICT COUNCIL (Case study)	Phoenix Software	http://www.phoenixs.co.uk/NR/Phoenix/attachments/PhoenixSoftwareCaseStudy-South_Holland_DC.pdf
<p>The Netherlands</p> 	ARCHITECTUUR ELEKTRONISCHE OVERHEID (eGovernment Architecture)	EGEM	http://www.egem.nl/kennisbank/organisatieinrichting/architectuurelektronischeoverheid.pdf
<p>United Kingdom</p> 	e-government: A STRATEGIC FRAMEWORK FOR PUBLIC SERVICES IN THE INFORMATION AGE	UK Cabinet Office	http://archive.cabinetoffice.gov.uk/e-envoy/resources-pdfs/\$file/Strategy.pdf
<p>United Kingdom</p> 	Connecting the UK: the Digital Strategy	Prime Minister's Strategy Unit and Department of Trade and Industry	http://www.strategy.gov.uk/downloads/work_areas/digital_strategy/digital_strategy.pdf
<p>United Kingdom</p> 	eGovernment Interoperability Framework	eGovernment Unit	http://www.govtalk.gov.uk/documents/e-GIF_part2_v5_1_2003-08-14.doc
<p>United Kingdom</p> 	The National Strategy for Local eGovernment	Office of the Deputy Prime Minister	http://www.cambridgeshire.gov.uk/NR/rdonlyres/86576B12-F01B-40CB-9546-6D359DD47411/0/NationalStrategy.pdf
<p>United Kingdom</p> 	Local e-Government Partnerships	Office of the Deputy Prime Minister	http://www.localegov.gov.uk/images/05081_Locale_Gov_348.pdf
<p>United Kingdom</p> 	National Project: Summary 2005	Office of the Deputy Prime Minister	http://www.localegovnp.org/webfiles/National%20Projects/NP%20Summary%20(final).pdf

United Kingdom 	e-Planning Service Delivery Standards	e-Planning and Regulatory Service Online (PARSOL)	http://www.planningportal.gov.uk/uploads/parsol/parsol_better-planning-services-standards.pdf
United Kingdom 	Transformational Government - Enabled by Technology	UK Cabinet Office	http://www.cio.gov.uk/transformational_government/index.asp

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