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We-Go
Enhancing Western Balkan eGovernment Expertise

Work package 1 – We-Go Interoperability Framework
Deliverable D.1.1. EIF Compliance Analysis and Recommendations

Project acronym: ***"We-Go"***
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Acronyms

Acronym	Expansion
A2A	Administration to Administration
A2B	Administration to Business
A2C	Administration to Citizen
eID	Electronic Identity
EC	European Commission
EIF	European Interoperability Framework
eSignature	Electronic Signature
G2A	Government to Administration (see A2A)
G2B	Government to Business (see A2B)
G2C	Government to Citizen (see A2C)
IDABC	Interoperable Delivery of European eGovernment Services to public Administrations, Business and Citizens (EU programme)
I(C)T	Information (and Communication) Technology
IOP	Interoperability
IP(R)	Intellectual Property (Rights)
IS	Information Society
NIF	National Interoperability Framework
OS	Open Standard
OSS	Open Source Software
PA	Public Administration
PA2B	Public Administration to Business (see A2B)
PA2C	Public Administration to Citizen (see A2C)
PA2PA	Public Administration to Public Administration (see A2A)
PKI	Public Key Infrastructure
RDF	Resource Description Framework
SPOC	Single Point of Contact
SSO	Single-Sign-On
W3C	The World Wide Web Consortium (www.w3.org)
WAI	Web Accessibility Initiative
WCAG	Web Content Accessibility Guidelines (see WAI)
XML	eXtensible Markup Language

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Executive Summary

The We-Go project aims at identifying the most recent interoperability status in Western Balkan Countries compared to the European Interoperability Framework guidelines and at developing recommendations of practical use when eGovernment services will be developed and deployed locally in order to achieve pan-European compliance.

The deliverable describes in detail per Western Balkan Country – Bosnia and Herzegovina, Croatia, Former Yugoslavian Republic of Macedonia and Serbia - the status of interoperability for each relevant layer like technical, semantic and organisational as well as governance aspects. The compliance analysis provides the basis for concrete recommendations and for dissemination activities in order to address and to overcome the identified gaps and where actions are recommended to be taken.

Within the following chapter the reader will find more detailed descriptions of the methodology chosen by combining aspects of a "top-down" and "bottom-up" approach:
Surveys were conducted within each of the Western Balkan Countries addressing different stakeholders involved in that field. On the other hand the compliance analysis approach has been developed so that the outcome can be presented in very practical manner to interested parties in order to enable them to take actions in the respective fields and within their responsibility.

Recommendations have been developed so that concrete measures by each single Western Balkan Country could be initiated in order to address very specific topics within the field of interoperability for eGovernment services. We-Go provides in detail some interoperability details by application and by service level and will further focus on developing some more very specific “IOP application fiches” according to local priorities within the next period. The more interoperability is broken down to the specific service level the more value added and concrete actions could be derived from.

The main findings of the study are as follows:
Details with respect to organizational, semantic and technical aspects are almost very similar, because of common administrative legacy but the status varies meanwhile by country because of fast or slower moving progress of eGovernment developments. The outcome is specified as concrete as possible within the country parts of this deliverable.
A number of key success factors are along with governance, in terms of political, legal, managerial and economic aspects, whereby the most critical aspect is related with coordination, focus on and execution of appropriate action plans by country.

We-Go has built concise overviews and summaries by each country because of the specifics and the diversity. The deliverable concludes with a series of proposed dissemination activities, crucial for the execution of the developed recommendations.
Knowledge and capacity building measures are therefore of high priority involving different stakeholders coming from Public Administrations, Academic and Research institutions, IT software and service providers and selected regional, European and international players supporting the local developments.

1. Introduction

1.1 Objective and expected outcome

The overall aim is to support knowledge and capacity-building measures in the field of European Interoperability and what has to be considered and to be applied locally. The specific objectives of this deliverable are to provide concise and tangible information to be used for dissemination activities together with We-Go or individually. The document is classified as public.

The specific interoperability topics should be used and applied for practical work that means developing concrete action and project plans for applications and services, for quality and compliance review purposes where interoperability plays a role, at national and at pan-European level.

The interoperability guidance with the compliance analysis, country specific recommendations and the proposed roadmap and selected application fiches should serve the management and IT professionals inside and outside the public administrations as guidance and should facilitate the development of applications and services in compliance with the European Interoperability Framework guidelines.

The reason why we structured the content on interoperability per country and not subject wise across the countries is the following:

- ***Purpose of the document is to be used for dissemination activities.***
- ***Dissemination activities are primarily designed by country in order to meet the country specifics and to bring the targeted stakeholders for execution together.***
- ***Because of the common administrative legacy of the former Republic of Yugoslavia it may appear that parts of the content are redundant. But on a detailed level they may vary significantly depending on progress made.***
- ***The consistency of the approach and common methodology will allow comparative analysis among the Western Balkan Countries too, in order to identify lessons learnt.***

1.2 We-Go Methodology

The We-Go methodology, developed to recommend specific actions to raise interoperability awareness and to realise the "European Interoperability Framework" (EIF) in Western Balkan countries, is illustrated in Figure 1. Based on an analysis of the interoperability activities performed in Western Balkan countries towards the EIF, We-Go consequently provides recommendations to show the interoperability stakeholders in the Western Balkan countries concrete steps to narrow identified gaps. Impact in the Western Balkan countries is reached through a number dissemination activities described in the We-Go dissemination plan.

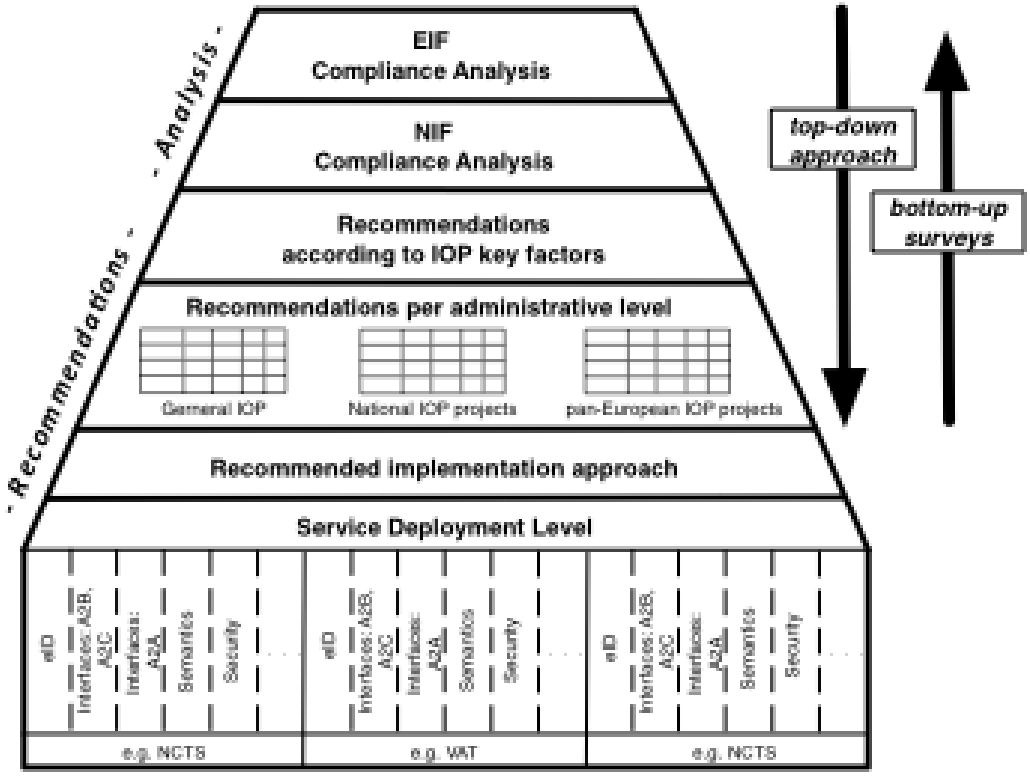

Figure 1: Overview of the We-Go Methodology illustrating the approach for the analysis and recommendation

1.2.1 Interoperability analysis

The picture of the current situation in Western Balkan countries is drawn through the following analyses:

- EIF compliance analysis: The practical implementation of interoperability key factors, arranged according to the four interoperability layers (governance, organisational, semantic and technical) is analysed. In addition, national strategies are examined towards applicability and implementation progress. The result is coverage of the gaps that the national strategies have regarding the realisation of the EIF.
- Relevant technical infrastructure elements and their availability and/or implementation grade.
- We-Go benchmark 2007: Sophistication level and full availability of online services, following the methodology of the official EU benchmark for public services, designed and performed each year by Capgemini on behalf of the European Commission.

1.2.2 Interoperability recommendations

Based on the interoperability analysis the recommendations are developed. They show the realisation of the EIF on different levels of detail:

- **Recommendations regarding interoperability key factors**: This level mirrors the EIF compliance analysis. Recommendations to overcome barriers are described for the interoperability key factors. This part is aimed at CIOs, enabling them to adjust and consolidate strategies and organisational structures.
- **Recommendations per administrative level:** On this level recommendations are presented in the form of a matrix using the methodology of the Modinis Lot II study that has been specifically adjusted to We-Go needs. The matrix outline is shown in Figure 2. The recommendations are organised according to two dimensions: area (following the interoperability layers) and administrative level. Such a matrix has been developed with recommendations for the national interoperability strategy, national interoperability projects and cross-border interoperability projects.
- **Recommended implementation approach:** Recommended set up, coordination and organisation of a national interoperability project.
- **Services – deployment level:** Addresses aspects and characteristics to be considered related to the interoperability layers for a specific interoperability project. The selected projects are NCTS for Bosnia and Herzegovina, Croatia and Serbia, and a VAT system in Macedonia. This document and We-Go as a project are not able and mandated to propose concrete implementation approach because of the high complexity, lack of resources, and lack of concrete information. The service deployment level recommendations document will be used in dissemination phase as information material that shows the concrete example for the deployment a pan-European service.

	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities				
National Authorities				
Western Balkan Regional Authorities & Actors (UNDP, Stability Pact, USAID)				
EU Authorities & Actors				

Figure 2: Outline of the recommendations in matrix form for national interoperability, national project and pan-European interoperability project recommendations

1.2.3 Dissemination plan

The dissemination plan, presented in tabularised form and illustrated in Figure 3, describes what knowledge needs to be disseminated, what stakeholders will be addressed, and proposes dissemination methods. The impact is reached through specific dissemination activities with every stakeholder group covering all four layers of interoperability and the corresponding recommendations. The dissemination activities share common objectives but vary in:

- Mission (objectives)
- Target stakeholder groups
- Dissemination methods used
- Content sophistication level (general, generic, detailed, concrete actions)
- Addressed domain

The target stakeholder groups can be identified horizontally in Figure 3 and the dissemination methods in the following list:

- Workshops with target stakeholders
- Participation in working groups (e.g. +eSEE) or national, regional and pan-European level
- Conferences: with local, regional, EU and International character
- Publications e.g. in journals and on conferences
- Participation in (online) communities e.g. We-Go Knowledge Net (We-Go Work Package 4) and epractice.eu

The content sophistication levels vary from general overviews and methods to concrete methodologies and techniques (e.g. public administration back office reengineering).
Not all dissemination actions included in the plan will be performed by We-Go. Some of the dissemination materials are already included in the deliverable D.1.1 Annex I, II and III (former D.1.1. submitted in January 2008), but more will be developed according to priorities and needs. For example, the full description of the analysis and recommendations for each of the WBC is intended for dissemination in the respective country.

D.1.1.		D.1.2 (Dissemination)			
		Public Administration	IT Industry	Academia	International Organisations
Research	(1) EIF				
	(2) NIF				
	(3) Roadmap to interoperability				
	(4) Recommended interoperability approach				
Practice	(4) Recommendations				
	(5) Service deployment level				

Figure 3: We-Go dissemination plan including topics and stakeholders

2. Management summary

2.1 Bosnia and Herzegovina

In Bosnia and Herzegovina progress is on the computerisation of governmental processes and services is visible, but in so-called „isolated projects“ that are mostly sealed off from each other. Thus, interoperability is not handled on a broad basis. There is no evidence of horizontal or vertical integration when services are taken online, new services are established or business processes are re-organised. For the overall ICT there is a strategy and action plan in place, but it is implemented at a very slow pace. Many of the scheduled tasks are already behind schedule. The gaps identified in the We-Go compliance analysis of the Bosnian approach to eGovernment in comparison to the best practices represented and published by the EU is confirmed by the We-Go benchmark results of 2007 that shows that most eGovernment services have virtually no online sophistication, thus reaching level zero (0). This is evidence that none of the monitored services are integrated. The overall online sophistication of all public services is 26,90%. The overall full online availability is 0%. This means that Bosnia and Herzegovina has not one single service, which is fully offered online to citizens or businesses. A missing state level agency that coordinates interoperability activities and a lack in collaboration are the main barriers identified and entail other problems. Based on the We-Go analyses a number of actions are recommended to make the move to an interoperability friendly environment that enables and supports the implementation of cross-transactional eGovernment services:

Establishment of a state level agency, the Agency for Bosnia and Herzegovina Information Society, that is responsible for the interoperability agendas and coordination. Immediate tasks of the agency upon its foundation:

- Development and promotion of an interoperability strategy and programme in collaboration with partners from different domains that introduce their expertise. The interoperability strategy can either be integrated into the current strategies or action plans, or can be a dedicated interoperability programme.
- Updating the existing IS action plans and giving realistic time frames for the fulfilment on the tasks.
- Introduction of means to monitor the progress in the implementation of programmes, strategies and services.
- Publishing clear standards for security and privacy.
- Identifying and documenting common service functionalities to prevent that several solutions for the same problem are developed, with a chance that these solutions are again not interoperable with each other.
- Developing of policies to guarantee the alignment of process within and across administration bodies in order to promote the horizontal and vertical integration, which is a key to sophisticated service provision.
- Developing and introducing of an eID and PKI system which requires a central register of citizenship data, semantics to describe data on citizens, technical infrastructure, access control procedures, authorised bodies to issue certificates, laws to ensure privacy and data protection, to enable digital signatures, etc.
- Promotion of the semantic layer and developing guidelines for the creation and documentation of global definitions for eGovernment semantics, and the provision of an administrative level of definitions development.

- Introduction of a project handbook as a guide in setting up and implementing transactional services that addresses the issued of service ownership, linkage of cross-organisational processes and services with the business strategies of the involved agencies, funding and implementation approach.
- Giving guidelines for the modelling of public administration business processes.
- Training staff in areas like project management, business process modelling, etc.
- Promotion to use of the government-owned technical infrastructure, especially the network backbone.
- Verification of the interoperability capabilities of registers (networking, interfaces, access control, etc.)
- Establishing a cooperation panel.

Establishment of a cooperation panel in order to overcome the barrier of collaboration and willingness and to get the best possible commitment. The panel is supposed to consist of all ministries, the council of ministries and other national bodies, regional and local administrations, bodies involved in the process of public administration reform (namely PARCO), private sector representatives and the national body entrusted with IT agendas. Each partner is expected to introduce his or her expertise. The cooperation panel gives the opportunity for the promotion of organisational federalism as a model for organising the diverged organisational space into a cooperative environment. Consequently involve the users in so-called communities of practice that are organised via the cooperation panel.

Move forward with the reform of the legal system and repair the haphazard and piecemeal legislation. Align it to the requirements that are imposed through cooperation and integration of public administrations a modern information society and to EU directives.

Establishment of structures for knowledge management in order to support the re-use of knowledge and solutions. We therefore strongly recommend the participation in the We-Go Knowledge Net and epractice.eu communities. Furthermore we excite to makes use of experiences made in the private sector and in administrations in other countries.

All public administration bodies are recommended to document and publish their taxonomies to ease reuse and mapping. The parties are furthermore recommended to collaboratively agree on new taxonomies, especially where processes are cross-organisational.
On the technical layer We-Go recommends to *introduce a policy for accessibility based on the Web Content Accessibility Guidelines of the W3C.* Furthermore it is recommended to make use of state-of-the-art technologies as recommended by the IDABC.

We-Go recommends training staff in fields like project management, financial management and process re-organisation and modelling in addition to the training for specific applications. Like done in the "Document Management System" project of the Ministry of Telecommunications and Information Society it is recommended to integrate staff training in the overall project plan.

The mentioned recommendations are described in more detail in Chapter 3.2. We-Go concludes with the definition of the dissemination plan for Bosnia and Herzegovina (as stated in the Chapter 3.3), which represents the dissemination activities by stakeholder audiences. The We-Go dissemination activities are a subset of the overall dissemination plan as illustrated in Figure 4.

Figure 4: The We-Go approach from compliance analysis and country recommendations to dissemination activities

We-Go will contribute and engage in selected fields of the overall landscape of possible dissemination activities that are crucial for WBC and are feasible according to the We-Go mandate, for example:

- For public administrations on national level
  - The meaning and importance of the four interoperability layers and their link, gaps between national interoperability approaches and EIF, We-Go recommendations to narrow the gaps.
  - The characteristics of organisational interoperability and the governance of interoperability.

- For Bosnian IT industry
  - The proposed implementation approach for Bosnia from a Bosnian IT Industry and Consultancy perspective.
  - Public-private partnerships and the opportunities for the IT industry.

- For Academia
  - Developing knowledge and capacity in the field of interoperability including the role of the Universities.

- For Regional, pan-European and other international actors
  - The status regarding the EIF compliance in Bosnia and what can be done within other projects, ongoing activities related to development of Bosnian interoperability agenda on national and regional level.

2.2 Croatia

Regarding the national IS agenda Croatia is on the right path to develop IS and to achieve interoperability on a national and pan-European level, based on a European *acquis communautaire* in the domain of IS.
The *Croatian government has established e-Croatia* as the state level agency, responsible for transforming Croatia into an Information Society.

For instance Croatia has reached a level of online sophistication for public services of around 50% on average, but in the terms of full online availability it is still lagging behind the levels already reached in the European Union countries (compare to page 79).
We-Go recommends enhancing the number of services with full online availability significantly and to further develop the existing efforts towards proactive citizen cantered services. All these activities are closely linked with interoperability issues to be understood and to be solved.
Furthermore, interoperability is one of the parts of Croatia's IS Agenda, which, although started, is still lagging behind the current solid overall achievements in this domain. In order to boost the introduction of IOP in Croatia, We-Go recommends that the current positive trends are additionally supported through concrete and urgent actions spread across the several domains of the Croatian National IS Agenda, as presented in more detail in Chapter 4.1.4.1.

The current national Agenda has to be extended with the dimension of a National IOP Strategy. Within the existing IS Agenda IOP as a process has been initiated, but has to be additionally supported in order to assure the momentum needed for a sustainable impact. *There is a need for institutionalising the IOP Agenda for operational purposes and to enable an aligned execution.* We-Go recommends the creation of a state-level body, which will take over the leadership, ownership, and coordination of a National IOP Agenda, in order to assure compliance with Croatian NIF principles.
The most concrete examples for an IOP introduction as an ongoing process have been introduced through the implementation of new services:

1) State and local level services – e.g. services from the eBusiness pillar of eCroatia.
2) Pan-European services – e.g. NCTS, VIES, EBR etc…. - as an accession prerequisites and adoption of different *acquis communautaire* in the domain of IS and other departmental specific domains.

We-Go recognises the "one-stop-shop" and eBusiness pillar as the strongest consistent, coordinated, and organised effort devoted towards achieving interoperability in Croatia in the domain of public administration services. Furthermore, We-Go strongly recommends to support the eBusiness pillar of eCroatia with all resources as defined in the Strategy and Action plan of development of eCommerce in Croatia (see more details in Chapter 4.2.1).
Furthermore, if this approach will be successful and feasible, it should be extended to the other pillars of eCroatia and furthermore even to the entire Croatian IS Agenda. Isolated islands solutions have to be avoided in the future by introducing the dimension of interoperability and organisational change among the newly created services of the public administration.

In the context of implementation of pan-European services, current twinning projects have shown feasibility and sustainable impact.
As recommended within Chapter 4.2.1, We-Go recommends supporting projects of similar nature:

- At national level by helping the Croatian authorities to express their needs more explicitly and to establish and to ensure an appropriate execution in compliance with IOP standards.
- At European level by participating in European projects and initiatives and taking advantage from accessible resources and knowledge of any kind.

The missing parts of an ICT state level infrastructure have to be developed and are crucial for the establishment of IOP:

- Registers – deployment of missing registers and removal of barriers toward broader usage across the organisational boundaries.
- eID – usage has to be offered on a large scale on national level for all participants of the Croatian IS.
- Back-Office integration – has to be started as a process on state and local public administration level.
- Acceptance of missing standards of technical and semantic IOP.

Supporting the modernisation programme of service delivery, the semantic layer of interoperability has to be included into the national IS/IOP agenda. As stated in detail in Chapter 4.1.4 We-Go recommends focusing on common definitions and data harmonisation for the development of registers and catalogues to be used as standardised business elements within the national service and IT architecture.

The fundamental laws regulating the domain of IS in Croatia are enacted and aligned with basic EU laws in this domain. However, the implementation of new services based on new organisational, technical, and semantic principles are requiring additional so called sub-laws or sub-acts. Desk research has recognised the need to invest additional efforts in order to overcome the legal barriers related to sub-legislation and to establish IT enabled processes in order to make them operational. In this context We-Go recommends (further details in Chapter 4.2.1.4):

- Additional regulations needed to facilitate usability and to attract end users.
- Training programmes for Judiciary and for the domains of IS and eCommerce particularly.

We-Go concludes with the definition of the following dissemination plan for Croatia (as stated in Chapter 4.3), which represents the dissemination activities by stakeholder audiences.

Figure 5: The We-Go approach from compliance analysis and country recommendations to dissemination activities

We-GO will contribute and engage in selected fields of the overall landscape of possible dissemination activities, which are crucial for WBC and are feasible according to the We-Go mandate, for example:

- For public administration on national level
  - The meaning and importance of NIF and the gap between the current Croatian (nonexistent) NIF and EIF. Actions have to be taken in order to close the gap and to integrate them in the IS agenda.
  - The proposed implementation approach for Croatia and what does it mean for public administration at national and local level.

- For Croatian IT industry
  - The proposed implementation approach for Croatia from a Croatian IT industry and consultancy perspective.
  - Building knowledge and capacity in the IOP field

- For Academia
  - Key success factors and recommendations for a successful execution of IOP related services/applications/projects with national and pan-European character and recommendations for a successful IOP agenda.
  - Developing knowledge and capacity in the IOP field including the role of Universities.

- For Regional, pan-European and other international actors
  - The status regarding the EIF compliance in Croatia and what can be done within other projects and ongoing activities related to the development of a Croatian IS agenda on national and regional level has to be identified.
  - Possibilities for improvements of WBC regarding the IS development, particularly IOP based on EIF postulates and their possible role to support those activities have to be defined.

2.3 FYR of Macedonia

The Government of FYR of Macedonia is actively involved in the global transition towards a know-ledge-based economy, where the development of an Information Society plays a unique and important role.

As stated in Chapter 5.1.6 the FYR of Macedonia has reached an online sophistication level of 49,95% at the moment and a full online availability of 10% of public service. The FYR of Macedonia's level of development is at a stage where almost no exchange of information between different service providers is possible.
Consequently, We-Go recommends investing significantly more efforts towards improving the full online sophistication of services.

The objectives and goals defined by each pillar of the IS agenda (both strategy and action plan) are sufficient to boost the development of IS in the FYR of Macedonia in general, but have to be further extended to achieve the same effect for interoperability among the services offered by public administration to citizens and enterprises.
Therefore, We-Go desk research has focused itself to help the FYR of Macedonian IS agenda actors to extend existing and ongoing IS efforts and recommends the Government of the FYR of Macedonia first to clearly entrust the fulfilment of the IS Agenda to some state level body, e.g. Ministry or Agency, and provide the assigned body with political commitment on all state levels and sustainable funding resources sufficient for development of the entire spectrum of IS. Furthermore We-Go recommends that this body is taking responsibility for delivering and executing of interoperability on state level. In particular this will be a coordinated action of parallel executed activities currently fragmented among the domains of the seven ongoing IS agenda pillars; Infrastructure, eBusiness, eGovernment, eEducation, eHealth, eCitizens, and Legislation.

We-Go recognises and suggests the FYR of Macedonian government to use as much as possible the excellent domestic intellectual potential regarding the information society.
Different donors (e.g. USAID, UNDP, EU etc.) are playing an important role in the development of IS in FYR of Macedonia. We-Go recommends keeping this approach, but observing the integration aspects to satisfy country needs, by defining the skeleton for interoperability. As consequence of donor projects, IOP aspects have not been considered seriously enough and therefore additional island solutions have been implemented.

Once when IOP is defined within the IS Agenda of the FYR of Macedonia, the missing technical and semantic standards have to be accepted in order to address the needs of technical and semantic layer of interoperability as it was recommended in Chapter 5.2.1.
Start with pilot programmes in order to introduce the process of establishing the IOP on a national and local level used only within the country, and later to become the member of IDABC and all their activities (e.g. e-Public Administration programme and EIF itself etc.).

As presented in more detail in Chapter 5.1.5 the current ICT infrastructure is not sufficient to support the interoperability technically; therefore We-Go recommends its modernisation and development of missing basic and central registers and as well the infrastructure for e-Signature, record management, and eID.

In order to support the changes of service delivery, the semantic layer of IOP has to be integrated into one of the pillars of the current FYR of Macedonian IS/IOP national Agenda and accompanied with its counterparts addressing the same issues within the technical layer of IOP, as presented in details within chapter 5.2.1.

Currently there are no pan-European services implemented,
but as a candidate country FYR of Macedonia is obligated to satisfy several *acquis communautaire criteria* from the IS domain.

We-Go recommends:

- FYR of Macedonian IS actors to join the twinning initiative to implement services like NCTS or VIES are.
- EC to support this kind of project by allocating the sufficient resources and supporting the FYR of Macedonian to prepare the projects and administer their pre-accession obligations.

Fundamental laws which regulate the domain of IS/NIOP agenda in FYR of Macedonia are partly enacted and aligned with the basic EU laws in this domain, but this was not recognised by desk research as a sufficient legal framework to successfully support the changes mentioned above within the public administration which will arise with IOP being promoted on a state level in organised manner. Therefore, in order to enable the shift of IOP/IS Legal Framework from a current barrier toward enabler/facilitator position,

We-Go recommends:

- Introduce and accelerate the process of FYR of Macedonian Legal adjustment to the EU Laws where missing,
- Make the IS/IOP domain laws more applicable by training the Judiciary staff which will be then further be able to disseminate the application of laws, acts etc. related to this Domain.
- EU to support this process through the projects/programmes of pan-European cooperation (e.g. Twinning, IPA etc.)

We-Go concludes with the definition of the dissemination Plan for FYR of Macedonia (as stated in Chapter □), which represents the dissemination activities by stakeholder audiences.

Figure 6: The We-Go approach from compliance analysis and country recommendations to dissemination activities

We-GO will contribute and engage in selected fields of the overall landscape of possible dissemination activities, which are crucial for WBC and are feasible according to the We-Go mandate, for example:

- For PA on national level
  - The meaning and importance of NIF, gap between FYR of Macedonian current (nonexistent) NIF and EIF.
  - Proposed measures for further developments and changes which have to be introduced into the FYR of Macedonian IS Agenda by adding the NIF dimension
  - Building capacity to establish the key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character from FYR of Macedonian national perspective.
  - The proposed implementation approach for FYR of Macedonia and what does it mean for public administration at national and local level.
  - Overall presentation of steps to be performed from a national public administration perspective in order to implement the VIES in the FYR of Macedonia.

- For FYR of Macedonian IT industry
  - Presenting the proposed implementation approach for FYR of Macedonia and what are the concrete tasks and activities, which could be undertaken on a concrete operational level from their perspective.
  - Presenting the importance of NIF from operational level projected on possible concrete role of Computing Centres in FYR of Macedonia.
  - Building Knowledge and capacity in the IOP field

- For Academia
  - Presenting the importance of NIF and possible involvement of universities in the process of creation of NIF. Presentation of the gap between EIF and NIF in FYR of Macedonia
  - Developing further knowledge and capacity in the IOP field including the role of Universities.

- For Regional, pan-European and other international actors
  - Possibilities for the improvement of FYR of Macedonia regarding the IS development, particularly IOP based on EIF postulates and their possible role in this activities.
  - Creating awareness regarding the status of EIF compliance in FYR of Macedonia and what can be done within other projects, ongoing activities related to development of FYR of Macedonian IS agenda on national and regional level. Overview of changes which have to be introduced in FYR of Macedonian IS Agenda for a dimension of national IOP Agenda
  - Overview of trends in FYR of Macedonia related to implementation of services/projects with pan-European dimension, to find possibility to support the FYR of Macedonian eGovernment actors in the process of introduction of concrete IOP applications/services/projects (e.g. VIES) in FYR of Macedonia.

2.4 Serbia

In Serbia the computerisation of eGovernment services and processes shows some progress. But no activities regarding interoperability could have been identified according to EU best practices like the EIF. Interoperability is not handled on a broad basis. There is no evidence of horizontal or vertical integration when services are taken online, new services are established or business processes are re-organised. The lack of awareness for the link between ICT and public administration reform is mirrored in the implementation approach of interoperability projects. Projects are carried out isolated and not coordinated at all. eGovernment actors do not collaborate enough. For the overall ICT there is a strategy and action plan in place, but it is implemented at a very slow pace. It is not clear which of the bodies at the state level is the leader and coordinator regarding both IS and interoperability agendas. The gaps identified in the We-Go compliance analysis of the Serbian approach to eGovernment are confirmed by the We-Go benchmark results of 2007. The overall online sophistication of all public services is 46,55% which is well behind the European average. The overall full online availability is 0%. This means that Serbia has not one single service, which is fully offered online to citizens or businesses. A missing central leader in interoperability activities and a lack in collaboration are the main barriers identified and entail other problems.
Based on the We-Go analyses a number of actions are recommended to make the move to an interoperability friendly environment that enables and supports the implementation of cross-transactional eGovernment services:

We-Go recommends nominating a central body responsible for the leadership and coordination of interoperability agendas. In addition We-Go recommends that other players on the national level give broad support to the coordinator. Immediate tasks to handle upon its nomination that are currently not addressed:

- Development and promotion of an interoperability strategy and programme in collaboration with partners from different domains that introduce their expertise. The interoperability strategy can either be integrated into the current strategies or action plans, or can be a dedicated interoperability programme.
- Updating the existing IS action plans and giving realistic time frames for the fulfilment on the tasks.
- Introduction of means to monitor the progress in the implementation of programmes, strategies and services.
- Publishing clear standards for security and privacy.
- Identifying and documenting common service functionalities to prevent that several solutions for the same problem are developed, with a chance that these solutions are again not interoperable with each other.
- Developing of policies to guarantee the alignment of process within and across administration bodies in order to promote the horizontal and vertical integration, which is a key to sophisticated service provision.
- Developing and introducing of an eID and PKI system which requires a central register of citizenship data, semantics to describe data on citizens, technical infrastructure, access control procedures, authorised bodies to issue certificates, laws to ensure privacy and data protection, to enable digital signatures, etc.
- Promotion of the semantic layer and developing guidelines for the creation and documentation of global definitions for eGovernment semantics, and the provision of an administrative level of definitions development.

- Introduction of a project handbook as a guide in setting up and implementing transactional services that addresses the issued of service ownership, linkage of cross-organisational processes and services with the business strategies of the involved agencies, funding and implementation approach.
- Giving guidelines for the modelling of public administration business processes.
- Training staff in areas like project management, business process modelling, etc.
- Promotion of the implementation of government-owned technical infrastructure, e.g. a national backbone
- Verification of the interoperability capabilities of registers (networking, interfaces, access control, etc.)
- Establishing a cooperation panel.

Establishment of a cooperation panel in order to overcome the barrier of collaboration and willingness and to get the best possible commitment. The panel is supposed to consist of all ministries, the council of ministries and other national bodies (e.g. National Information and Internet Agency and Office for Common Operations of Governmental Institutions), regional and local administrations, bodies involved in the process of public administration reform, private sector representatives and the national body entrusted with IT agendas. Each partner is expected to introduce his or her expertise. The cooperation panel gives the opportunity for the promotion of organisational federalism as a model for organising the diverged organisational space into a cooperative environment. Consequently involve the users in so-called communities of practice that are organised via the cooperation panel.

We-Go recommends including bodies that are in touch with public administration reform activities. Those bodies can give valuable input of process and process re-organisations and can link public administration to the ongoing efforts on the national level.

We-Go recommends adopting the laws that are not yet aligned to the needs of a modern information society. This especially concerns data protection and privacy, eProcurement, eCommerce and digital signatures. Consider alignment with EU directives where available.

Establishment of structures for knowledge management in order to support the re-use of knowledge and solutions. We therefore strongly recommend the participation in the We-Go Knowledge Net, epractice.eu and semic.eu communities. Furthermore we excite to makes use of experiences made in the private sector and in administrations in other countries.

All public administration bodies are recommended to document and publish their taxonomies to ease reuse and mapping. The parties are furthermore recommended to collaboratively agree on new taxonomies, especially where processes are cross-organisational.
On the technical layer We-Go recommends to *introduce a policy for accessibility based on the Web Content Accessibility Guidelines of the W3C and guidelines for multilingualism.* Furthermore it is recommended to make use of state-of-the-art technologies as recommended by the IDABC.

The mentioned recommendations are described in more detail in Chapter 6.2. We-Go concludes with the definition of the dissemination plan for Serbia (as stated in Chapter 6.3), which represents the dissemination activities by stakeholder audiences. The We-Go dissemination activities are a subset of the dissemination plan as illustrated in Figure 7.

Figure 7: The We-Go approach from compliance analysis and country recommendations to dissemination activities

We-Go will contribute and engage in selected fields of the overall landscape of possible dissemination activities that are crucial for WBC and are feasible according to the We-Go mandate, for example:

- For public administrations on national level
  - The meaning and importance of interoperability, gaps between national interoperability approaches and EIF, We-Go recommendations to narrow the gaps.
  - The characteristics of organisational interoperability and the governance of interoperability.

- For Serbian IT industry
  - The proposed implementation approach for Serbia from a Croatian IT Industry and Consultancy perspective.
  - Public-private partnerships and the opportunities for the IT industry.

- For Academia
  - Developing knowledge and capacity in the field of interoperability including the role of the Universities.

- For Regional, pan-European and other international actors
  - The status regarding the EIF compliance in Serbia and what can be done within other projects, ongoing activities related to development of Serbian interoperability agenda on national and regional level.

3. Interoperability in Bosnia and Herzegovina

3.1 Compliance Analysis

Bosnia and Herzegovina has to undertake several actions before reaching full compliance with the European Interoperability Framework (EIF). Cross-border interoperability is not a strong topic at the moment, as officials in Bosnia and Herzegovina are still struggling with interoperability on a national level. There are some policy, strategy, and action plan documents, but they only cover certain areas and most of them are not implemented yet. However, national interoperability is a prerequisite for the adoption of the European Interoperability Framework as they are most likely sharing the same principles. Thus, the principles of the EIF are also valid for an NIF. There are actually quite some activities planned, but the overall performance is quite slow.

3.1.1 Technical Layer of Interoperability

Technical interoperability is generally not addressed in a coordinated or continuous way, but on case-by-case basis. Not many front office level tasks are addressed; the same is applies for the back office area. Although Bosnia and Herzegovina has a sophisticated network, it is hardly used to connect offices across the country. The service provision is mostly limited to the presentation of information. Furthermore, there are no strategies for content update or accessibility. In the back office there is no sign of horizontal and vertical integration. Instead, many "isolated islands" exist. Most of the basic registers are implemented, but interoperability is not guaranteed.

3.1.1.1 Core Technical Interoperability

Use of suitable technologies to handle structure of information such as XML, data models.
No evidence

Use of suitable technologies to handle structure of services, such as Web Services, SOA, WSDL, UDDI, Workflows.
No evidence

Use of suitable technologies to handle semantics of information, such as RDF, OWL.
No evidence

Use of suitable technologies to handle semantics of service, such as OWL-S and WSMO, Semantic Web Services.
No evidence.

Although XML is being used in some projects, there is no evidence that any of the technologies mentioned above is used at all or at least in a coordinated and strategic manner. The future "Agency for Bosnia and Herzegovina Information Systems" (AIS) (see section 3.1.4.3 "Managerial") is the body responsible to choose common open standards for the data exchange and technical interoperability in coordination with centres of IT competence from other levels.

3.1.1.2 Supportive Technical Interoperability

Accessibility
Most of the public administration services have already introduced their own web pages, but until now no guidelines have been prepared to enable a common look and feel (CLF) for these sites. Activities for standardization have yet to be done. The current public administration institutions' web pages have a variety of visual and conceptual identities. There is no policy or regulation in order to adhere to international accessibility standards like the "Web Content Accessibility Guidelines[1] (WCAG)".

There is no central portal available like in the most EU and Western Balkan countries. Plans for a portal exist, but they are not implemented yet.

Multilingualism and multiplatform devices
There are a couple of web sites from public administrations, which publish their content in different languages. However, there is no evidence for a coordinated action. Multilingual support of a web site seems to be decided on a case-to-case basis.
Mostly translations were offered in the following languages: Bosnian, Serbian, Croatian, and English. However, in most cases the entire web pages weren't available for all of the different languages. This means that, for example, the content for some or in the worst case for all pages is not available in every offered language. In such cases the web pages console with a message that the content is under construction. Mostly this leads to confused and disappointed users. A better solution would be not to offer additional languages if the content is not fully available in multiple languages.

Security and Privacy
Every system that has been developed has some kind of security and privacy mechanisms implemented, but there are no common and clear standards for security and privacy.

Subsidiary
There is evidence that subsidiary is taken under consideration and that it is regard as a crucial issue.

Open Source Software and Open Standards
Several open standards are advocated in Bosnia and Herzegovina. However, the issue of a clear responsibility for software products in this variant remains open, although strategy plans consider the use of standards and the proposal of new standards.

3.1.2 Semantic Layer of Interoperability

Common and global definitions/representations for eGovernment semantics
No evidence.

Modelling perspective and formalism for documenting the common definitions
No evidence.

[1] Web Content Accessibility Guidelines 1.0, W3C-WAI Recommendation, http://www.w3.org/TR/WCAG10/

Administrative level of definitions development
No evidence.

Promotion/dissemination and maturity of common definitions
No evidence.

Trust, reliability, and the supportive technical interoperability layer
No evidence.

Maintenance and evolution of common definitions
No evidence.

There is no evidence that any of the processes and actions recommended on the semantic layer of interoperability are taking place or are performed continuously by EU standards. There is a very limited number of projects where semantics are agreed upon and are being documented (e.g. HJCP). However, this is not sufficient in order to achieve true semantic interoperability.

3.1.3 Organisational Layer of Interoperability

Clear link between cross-organisational processes/services and the business strategies of the broader agencies.
Most actors do not see the importance behind this recommendation. Most of the implemented IT projects have addressed "burning" issues, and are therefore isolated; these projects are viewed as the solution to a single problem, and not as a tool for an overall government reform. It is a positive new trend, that the introduction of IT in government businesses has been recently addressed through detailed policy documents. Some individual institutions are trying to automate horizontal functions, causing duplication of efforts, wasted funds, and possible future interoperability problems. Some substantial back-office reorganisation of services enabling access to 'any data, anywhere, anytime' has been achieved (e.g. personal documents and change of address).

Modelling and visualisation of public administration services/processes
Not taking place.

Involvement of the users by setting up communities of practice in the process of new service design
Involvement of local communities will be encouraged in the development of broadband data transfer through private and public partnerships.

Reuse of knowledge and experience related to the execution of internal and cross-agency business processes/services from the private sector
By signing the Stabilization and Association Agreement (SAA) Bosnia and Herzegovina will be obligated to adopt European Union standards, including the preparation of the entire society for a digital age and interoperability of networks and services. Knowledge and experience of the private sector is being used to achieve this goal. Under the term "*The Information Society builds the IT sector and the IT sector the Information Society*", decision makers have an understanding that the Information Society has to rely on the experience and knowledge of the private sector, while at the same time stimulating the private sector with the

ongoing development of the Information Society. We-Go project partner "BAIT" is a good example for this partnership. However, no ongoing activities could be identified. There is also no central body that is responsible for the coordination.

The IT Sector is taking part in almost all of the ITA (Indirect Taxation) activities: traders and companies registrations, introduction of the VAT, everyday functioning of the customs system, and development of specialized software for the whole organization.

Identification and documentation of common service functionality and features across public administration agencies
No evidence.

Support of multi-channel service delivery
No evidence. Only basic services that have sophistication level 0 to 1.

Consensus on and visibility of the ownership, management, and responsibility for cross-organisational processes / services
Proof has only been found on a very limited number of projects. It was mostly obvious what body is responsible and owns the processes and services. The United Nations eGovernment Survey 2008 draws the same conclusion. There is no body or agency that is coordinating these efforts.

3.1.4 Governance Layer of Interoperability

3.1.4.1 Political

Development of national eGovernment interoperability strategy and programmes
There is no dedicated programme, policy or strategy regarding interoperability. A programme is being planned, but currently there is no momentum. There are three reasons for this: the absence of a legal framework, the absence of standards (which is connected to the first reason), and the absence of an agency that would be in charge of information and communication technologies and automatically responsible for solving those problems. There is no unit in place to design eGovernment policies and coordinate ministries, regional, and local governments. The third reason again connects to the first one: The law or act for the establishment of such an agency is already written, but not enacted (see section 3.1.4.2 "Legal"). However, the need for an interoperability framework and the adherence to EU standards has been realized. The work on the eGovernment interoperability framework for the public sector in Bosnia and Herzegovina, harmonized with the European Interoperability Framework (EIF), is stated to become a long-term priority. However, there is no evidence that any actions have already been started.

In general, the importance of interoperability in the ICT systems of public administrations is recognized, but it is still not understood as a must. This contributes to the establishment of even more "island solutions". Finally this results in more actions that have to be performed to unify them into a common information space.

The most relevant ongoing project "e-Government at Council of Ministers BiH" is being developed and implemented at the moment. It seeks to build a secure infrastructure that interconnects all governmental structures and to implement concrete eGovernment services. These services shall then pave the way for a substantial organizational change within the

public sector structures. Thus, interoperability is an important key factor. The project also intends to produce e-Government policies, guidelines, standards, and administrative regulations. It is unclear, whether the issue of interoperability is going to be a part of these efforts.

Interoperability is one of the principles in the so-called **"Software Policy"**. It states that "… *all institutions will assure interoperability and portability between eGovernment software solutions on all levels…*". However, the policy is only valid on the state level. The document also names the "Ministry of Communication and Transportation" as the responsible body for the creation of an interoperability framework document.

Promotion of organisational federalism as a model for organising the diverged administrative space into a cooperative environment

The promotion is mentioned in the strategy paper for eGovernment and in the context of the public administration reform. The idea is to provide a coordination of different local and higher-level activities whilst respecting the authorization and autonomy of the local level governance institutions. A working group, consisting of members from different state-level institutions, the entities, the Brcko District, non-governmental organisations, and the private sector under the head of the "Ministry of Communication and Transportation", collaboratively agreed on the document.

Significance of international interoperability aspects

As a consequence of the missing national interoperability programme the adherence to international interoperability aspects is not established. As mentioned before, international aspects of interoperability are regarded when talking about interoperability in general.

3.1.4.2 Legal

Legal alignment to address the new requirements posed by intensive cooperation of public administration agencies

The existing IT legislation remains haphazard and piecemeal, leaving Bosnia and Herzegovina a long way from *acquis communautaire* requirements, and the needs of a modern information society. The legal framework in Bosnia and Herzegovina is currently not developed and sufficient enough to assure the employment of the ICT on a large scale. Only the inadequate legal framework prevents the basic public services to reach a higher online sophistication.

There is no evidence for legal alignment, except for some rare areas like for registers. The complex legal structure is an inhibitor. There are different legislations and rules at the level of cantons, entities, state level, and roof level. New laws or amendments need to be adopted by 14 parliaments, sometimes conflicting each other. The system as such slows down the establishment of a legal environment that is needed for an efficient realisation of the development strategy.

A good example for legislative problems is the **"Act on the Agency for Bosnia and Herzegovina Information Society"**, which is awaiting its final approve since already more than three years.

Several more specific operational problems regarding the legal framework have been recognized and addressed by the We-Go project participants from Bosnia and Herzegovina during the We-Go country desk research:

- The process of enacting rules and regulations is very slow.
- Some of the acts are not harmonized between each other.
- The enforcement of the different acts is postponed very often because it is lacking the prerequisites for a successful enforcement.

eLegislation is wanted but not existent: The legal framework for eLegislation currently doesn't exist at any level of state in Bosnia and Herzegovina. The existing parts are present in the form of isolated acts and regulations only valid for some specific areas and can therefore be considered as insufficient. The eLegislation scope is not defined or regulated by legislation.

Protection of intellectual properties in multi-partner projects and developments
No information available.

Diffusion of digital signature and electronic identity (eID)
The "Law on E-Business and Electronic Signature" has been enacted, but still all sub-acts needed for passing the law are missing. According to the draft, the law should regulate the usage of e-Format data, documents, and messages, as well as the usage of electronic signature in legal purposes, judicial, administrative, arbitrary, and other procedures. Therefore the digital signatures and electronic identity cannot be diffused.

Citizen privacy and data protection
A Data Protection Commission has been established in November 2002 in order to ensure a high level of protection of individual rights and privacy with respect of governmental use of personal data of citizens.

3.1.4.3 Managerial

Clear IOP leadership/ownership/sponsorship/management
Today Bosnia and Herzegovina does not have government-wide planning, guidelines, and standards for the deployment and maintenance of ICT equipment, training, licensing, usage, applications, etc.

There is no evidence that any of these functions are performed by an included actor. Until now there is no institutional support in the form of a committee or secretary concerned with IT and there is no cabinet or equivalent body entrusted with strategic planning, standardization, and coordination of the development of the information society. The establishment of the **Agency for the Bosnia and Herzegovina Information Society**, that is planned to be responsible for those tasks, has been delayed due to current shortcomings in the legal system. The agency is supposed to lead the organisation of an environment, capable to employ the policy, strategy, and action plans for the Bosnia and Herzegovina information society during the period of 2004 to 2010. The results are obvious: principles and practices differ on different levels and different municipalities/cantons. There is a poor tendency to unify and connect databases (except for some exceptions, mostly on the state level: e.g. CIPS, DGS, and Customs). The horizontal and vertical integration of electronic communication is missing. Furthermore, there is no global plan for the introduction of information technologies in the state administration. Unfortunately there are a lot of so-called "island solutions".

Within Bosnia and Herzegovina there are several parties in both entities, as well as some country level parties, which manage several projects similar or related to e-Government. The basic problem with these projects is the fact, that there is no central guiding or coordination agency or office.

With the AIS still not established, the following actors are the main players in eGovernment and interoperability:

- The **Ministry of Communications and Transport** is leading the process of developing Bosnia and Herzegovina towards an information society on the state level. It has strong support from international community organisations such as the United Development Programme (UNDP), the United States Agency for International Development (USAID), the European Commission, and the Stability Pact for South Eastern Europe (eSEE), the World Economic Forum, and others.

- The **Public Administration Reform Coordinator's Office[2] (PARCO)** is a major player and a driving force in the context of eGovernment related administration reforms. The most important role of this body is to coordinate the reform activities between the Council of Ministers, government entities, and the government of the Brcko District[3]. Furthermore, it is closely cooperating with the Delegation of the European Commission in Bosnia and Herzegovina. The office coordinates, directs, and follows the public administration reform. It employs best practices from the EU countries in order to comply with EU standards and to facilitate the integration of Bosnia and Herzegovina into the European administrative space. PARCO initiated the National Strategy of Public Administration Reform and Action Plan 1 with measures for its implementation.

- **Other actors** relevant for the establishment of an information society in Bosnia and Herzegovina beside the ones mentioned above are:

    - Governmental institutions at entity and cantonal levels in Bosnia and Herzegovina
    - Governmental institutions at the level of self-government in Bosnia and Herzegovina
    - Educational Institutions
    - IT industry - Association for Information technologies in Bosnia and Herzegovina – BAIT
    - Telecom operators in Bosnia and Herzegovina

- **Ministry of Civil Affairs and Communications– CIPS Directorate -** The CIPS Directorate intends to become a more important player in the area of strategic planning and development of e-Government systems in the "Council of Ministries" and other governmental bodies. It has already cooperated with the UNDP expert team, that developed the State Policy, Strategy and Action Plan for IS development. The CIPS Directorate has explicitly expressed its full support to this UNDP e-Government reform project in the Council of Ministers of Bosnia and Herzegovina and implied its role as one of the serious players in its implementation.

[2] http://parco.gov.ba/eng/?page=8
[3] Brčko District was established after an arbitration process undertaken by Holland the High Representative for Bosnia and Herzegovina.

- **Indirect Taxation Authority of Bosnia and Herzegovina** – The IT Sector-organizational unit of the Indirect Taxation Authority (ITA) is responsible for: maintenance, planning, and development of information technology, and as such support the everyday functioning of all ITA units. The ITA is heavily dependent on information technology and the IT Sector is taking part in almost all of the ITA activities: traders and companies registrations, introduction of the VAT, everyday functioning of the customs system, and development of specialized software for the whole organization.

- **B@IT – Association for Information Technologies in Bosnia and Herzegovina** – Its mission is the constant promotion of information society development, at all levels and in all sectors, assistance in expert specialization, and transfer of modern ICT knowledge, creation of basis for connecting people, organizations and institutions and informatics experience exchange between them, and constant striving to achieve improvements in education as well as raising the overall level of information awareness.

Flexibility/transferability/reconfigurability of IOP solutions
No evidence.

Adoption of any relevant available standard and proposal of new standards in areas where standardisation is missing
No evidence for the creation of new standards. Although, strategy plans considered the use of standards and the proposal of new standards they are not implemented yet (See also 3.1.1.2 "Supportive Technical Interoperability"). One example is the standard for information systems protection, ISO 17799 (2006), which is being implemented. To a great extent donors provide the software and therefore standards cannot always be adopted or chosen.

Broad commitment, participation and communication
No evidence.

Willingness for cultural change at all partners
Lack of willingness for cultural changes is a great inhibitor for interoperability.

Staff training related to IOP projects
Activities are planned in the action plans within the national IS strategies to improve the level of IT skills for people employed in public administration. They are still not performed and already delayed according to the deadlines set in the action plans. The "Civil Servant Agency" is offering seminars to raise ICT literacy. But there is nothing said on interoperability topics.

3.1.4.4 Economic

Adoption/switching costs inherent to IOP solutions
These costs prevent projects, because cost savings in the mid- and long-term is not enough motivation to carry out projects now.

Public procurement policies and financing for IOP projects
There are no official policies or systems related to public procurement.

Interoperability projects are financed through normal budgets or by donors. Donors include organisations like the UNDP and USAID as well as the EU and companies like Microsoft. The dependence on donors makes it more difficult to follow a demand-driven approach and brings other issues such as the use of open standards and interoperability between systems that are donations with it. (e.g.: In the IT environment of the "Indirect Taxation" 5 different systems were in use. This made the access to the information difficult and unproductive. Most of the systems have been donations).

Partnering with the private sector in IOP projects
Public-private partnership has the overall goal to integrate all non-state resources into the process of establishing information security, to the benefit of all stakeholders of information society. BAIT (Association for Information Technologies of Bosnia and Herzegovina) represents a network of more than 50 ICT companies, and is an active participant in relevant e-Government projects.

3.1.5 Infrastructure, Back Office and Services

The previous sections have addressed areas of interoperability according to the EU understanding of interoperability. Besides the aforementioned layers, a basic IT infrastructure as well as certain back office systems is a prerequisite for eGovernment as well. The current status in Bosnia and Herzegovina regarding the implementation of those "basic building blocks" is illustrated in the following paragraphs.
Bosnia and Herzegovina has a very modern and sophisticated network. But still most of the offices are not connected to it. Thus, cross-institutional networking is very limited. Nevertheless, most employees across Bosnia and Herzegovina's public administrations have access to a personal computer. Some ministries have broadband Internet access. However, Internet access is mostly used for Internet browsing, and often each ministry buys ISP services separately, with huge monthly costs for the government, rather than benefiting from an integrated, government-wide Internet network. Quantitatively, the number of computers in the Ministries is relatively adequate. However, most of the equipment is several years old and would not comply with the technical requirements of planned infrastructure and systems development. Moreover, ministries do not have technical procurement specifications at the hardware and software level, and offices often use different applications that do not integrate with each other, making data exchange difficult if not impossible.

The level of ***ICT infrastructure*** is quite different. It is in particular interesting that lot of ministries and agencies have independent ICT solutions and information systems. They are isolated because of missing interoperability between organisational institutions and within the government.

So far, only the **advanced computer networking (physical infrastructure)** is already implemented. The infrastructure can be described as state-of-the-art and has large capacities. Vice versa the exploitation is not on an adequate level of usage compared to the available capacity.

Building a logical infrastructure among the state institutions is in the planning phase and already partly implemented. At the moment the implementation for many parts of local public administration takes place.

The infrastructure for **e-Signature** is also currently in the planning phase. The necessary law is enacted, but still all sub-acts needed for passing the law are missing.

Record management is in planning. In some parts of municipalities and institutions document management systems are implemented.

Internet at local government units is in planning while **equipping the municipalities with at least three computers and continuous Internet connection** for public access is implemented. In the majority of municipalities Internet is available and community web sites are online.

Availability of ICT infrastructure and deadline as indicated in the action plan of the national IS strategy	
Advanced computer networking (physical infrastructure)	Implemented
Building a logical infrastructure among the state institutions	Partly implemented, remaining parts in planning
eSignature	In planning, law enacted
Record management	In planning
Equipping the municipalities with at least three computers and continuous Internet connection for public access	Implemented
Internet at local government units	In planning

Figure 8: Availability of ICT infrastructure in Bosnia I

Availability of ICT infrastructure	
Electronic Citizen Registry	Implemented
Public Expenditures (Treasury/Finance)	Implemented
Taxation Authorities	No
Customs Administration	Implemented
Network/communication infrastructure, dedicated to eGovernance systems	No
Judicial systems	Mostly implemented
Electric Registration of Companies	Being implemented

Figure 9: Availability of ICT infrastructure in Bosnia II

The situation of the ***governmental information systems and eGovernance systems*** has improved lately, but still not all systems are fully operational.

The system for the **Taxation Authorities** is in implementation as well as the system for the **Custom Administration**.

A **network and communication infrastructure, dedicated to e-Governance** systems is in planning / implementation.

Fully operational registers and deadline as indicated in the action plan of the national IS strategy	
Companies and associations	Being implemented
Persons	Implemented (CIPS)
Addresses	Implemented
Personal properties	In planning
Citizenship	In planning -2008
Cadastre	In planning -2008
Agricultural	In planning
Tourism	In planning
Central registrar of all databases	In planning

Figure 10: Registers in Bosnia and their availability/implementation deadline

The **Judicial system** and the **Electronic Registration of Companies** are already being implemented.

The situation of the implementation of ***fully operational registrars,*** offering availability to be used in eGovernment environment is as follows:

- The register for **companies and associations** is in the test phase.
- The register for **persons** is implemented. The system is called CIPS and is made for personal documents, which at the same time indicates the creation of databases of private persons.
- The **addresses** register is implemented.
- A register for **private property** is in planning. However, the according project has to be started. A project with the goal to create a unified database has been started.
- The register for **citizenship** is in planning. Administration books containing the lists of citizens are administered and kept in the local offices of municipalities. The majority of municipalities have databases of citizens. A project with the aim to create a unified database containing a list of all citizens of Bosnia and Herzegovina should be enforced and started.
- The **cadastre** register is in planning. Currently the cadastre is kept and administered on the municipality's level. A project with the aim to create the unified database containing the cadastre information of Bosnia and Herzegovina should be enforced and started soon.
- An **agricultural** register is in planning – project and implementation have to be started.
- A **tourism** register is in planning – project and implementation have to be started.
- A **central registrar of all databases** is in planning. With the aim to protect the privacy, several central registries that will be in the competence (responsibility) of several different institutions have to be formed.

3.1.6 We-Go Benchmark

The *We-Go benchmark 2007 for Bosnia and Herzegovina*, conducted based on the same measurement framework as used by Capgemini for the study "*Online availability of online services 2006*", has helped to understand the situation in the eGovernment domain in Bosnia and Herzegovina. The current trend is shown in comparison to the achievements in the WBC region and the EU. The benchmark has not been officially performed. Nevertheless it has provided useful results on the state level. The We-Go Benchmark has shown that most eGovernment services have virtually no online sophistication, thus reaching level zero (0). The maximum level reached is level 1. ***The overall online sophistication of all public services is 26,90%.***

A closer look on the clusters of the benchmark reveals that all of them are underdeveloped. They range between 23 and roughly 30%. The difference between the sophistication of services offered to citizens and business is marginal. Through the EU, services for businesses reach higher numbers than those for citizens. The European average of online sophistication is much higher, between 61 and 94%. Thus the difference is 100 percent and more. The negative discrepancy between Bosnia and Herzegovina and the remaining We-Go WBC participants is around 50 percent.

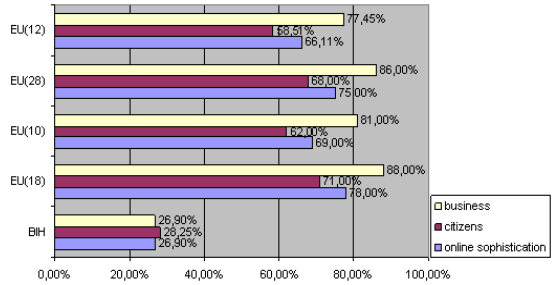

Figure 11: Online sophistication of services for businesses and citizens measured by BiH We-Go country participant team - Comparison of EU (12), EU (28), EU (10), EU (18) and BiH

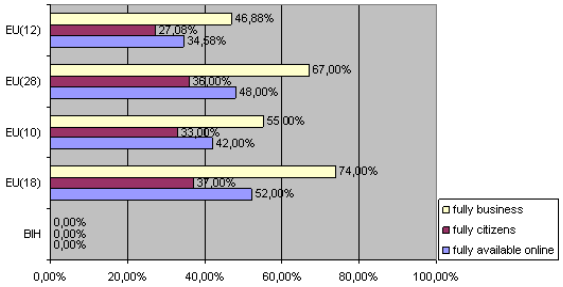

Figure 12: Full online availability of services for businesses and citizens measured by BiH We-Go country participant team -Comparison EU (12), EU (28), EU (10), EU (18) and BiH

The online sophistication is significantly lagging behind the 12 "new member states" that have joined the EU in the last enlargement. Among this twelve countries are Estonia, Slovenia, and Malta; they are eGovernment champions and from the historical perspective with nearest experiences to the countries from Western Balkan.
The EU (28) average for the fully online sophistication is 75% (86% for business and 68% for citizen services).
Regarding the full online availability the most significant gap in comparison to the European countries can be identified. Bosnia and Herzegovina has not one single service, which is fully offered online to citizens or businesses. ***The overall full online availability is 0%.***

Other studies as well identify a large gap regarding the services being offered by the government, which support the administration processes for citizens and businesses. According to the *World Economic Forum classification of the government online services*[4], Bosnia and Herzegovina got a 2,12 point mark (maximum is 7, Singapore) ranking it as 71st of 104 countries. The *UNDP eSEE sector status report from 2004*[5] has concluded that only 61% of the government institutions have access to the Internet. With the support of international organizations a set of portals offering more than just static information has been developed over the last several years. An example for such a portal is for instance the register of vehicles. The *United Nations eGovernment Survey 2008* draws the same conclusions.

3.1.7 IOP Projects

3.1.7.1 CIPS

As an integral part of the Citizens Identification Protection System (CIPS), authorities of Bosnia and Herzegovina introduced the new identity card in January 2003. For the first time since the war, all citizens have a single, uniform ID card, which meets highest international and EU standards in terms of quality, security and appearance. Moreover, this new card is backed up by a central database of all citizens and one of the most powerful computer systems in the Balkan region.

4 The Global Information Technology Report, World Economic Forum, 04/05. Issue 9.02 Government on-line services.
5 eSEEurope Regional Information and Communication Technologies Sector, Status and Usage Report: Building an Information Society for All, UNDP and Stability Pact for South Eastern Europe, October 2004.

Document security is an essential aspect of the CIPS project whose aim is to, among other things, rectify the dubious reputation documents from Bosnia and Herzegovina have abroad. The CIPS system uses live digital data capture (photo, digital signature, and finger prints), which requires a person to be present at the time of ID issuance. This greatly reduces - virtually eliminates - the possibility of a person having more than one identity document or multiple residencies, which were major contributors under the previous system to organized crime, illegal migration, and international terrorism in Bosnia and Herzegovina. The security and privacy of the citizens' data is ensured through the "Data Protection Commission".
The project involves the public service of "Personal documents (Id Card)" and is situated on the national level. The system is run by the "Directorate for CIPS" and funded by the public service provision.

In order to implement the project several issues on different layers of interoperability had to be solved:

- Communication between a central unit/server and a number of remote locations where the ID cards are issued. Thus, shared access to a common set of data.
- The involved services partly use the same auxiliary services. But there are as well services involved that use different auxiliary services, which however are interoperable.
- Changes in the legal framework had to be done e.g. the law on the ID card.
- The organisation had to be changed and new processes had to be introduced.
- Installation of new hardware and software.

The advantages of the new system, in addition to the ones mentioned in the beginning of this text are higher user potential and faster service delivery.

3.1.7.2 ICT project of the High Judicial and Prosecutorial Council (HJPC)

Being part of the eJustice efforts this project of the "High Judicial and Prosecutorial Council (HJPC)" has the following objectives:

- The development of a database for the enforcement of minor offence fines.
- The establishment of the case management system and judicial documentation centre.
- The set up of a distance learning module for judges and other staff.
- Electronic communication between all courts and prosecution offices.
- Introduction of a monitoring tool.

Prosecution offices and courts will share the same single information and communication space. All new cases are registered electronically in the case management system, which allows for a new workflow that is managed by the system as well. Objectives that haven't been achieved yet include the development and installation of the judicial portal and the linkage of the HJCP system and database with the CIPS database.

The project involves the following of the 20 basic public services defined by the EU: "personal documents (passport and driver's licence)", "declaration to the police (e.g. in case of theft)", and "other education and training related services". The project has been executed by the HJCP with financial support from the European Commission (under CARDS 2006), the Embassy of Norway, and the Government of Spain. The funding for the services comes from the public service provision, a government program, and third parties. It is run by the HJCP. The project spans over several levels of administration, namely the local, sub-national,

and national level. The services are performed on different stages by distinct organisations that therefore cooperate. This requires direct bi-directional communication between those organisations. The addressed interoperability challenges span three layers of inoperability: organisational, semantic, and technical. The issues resolved were:

- It was necessary to build a network infrastructure and to define protocols that are being used in the communication. The communication is set up according to standardised interfaces and procedures.
- Data is shared via the network with specified protocols.
- A set of common data is accessible by all involved organisations, whereas some data that belongs to another organisation may only be accessed by some organisations.
- Standards for the presentation and encoding of the documents have been adopted.
- New practices or ways of doing business have been created. Thus, organizational change has taken place.

The new system has several advantages compared to the “old way” of how the services were handled:

- Cost and time savings per case
- Improved collaboration
- Higher user potential

3.2 Interoperability Recommendations

3.2.1 Recommendations regarding interoperability key factors

This part of the recommendation deals with strategic and thus generic issues and deficiencies in the Bosnian procedure to reach interoperability. Some of the superior goals, namely better service delivery to citizens and businesses and automation supported by ICT, have been well understood. But it is apparent, that very few actors are aware of the link between ICT and the public administration reform, despite the fact that it is a central, yet secondary part of the public administration reform strategy.

In order to diffuse interoperability and to develop and implement interoperability projects it is necessary to create an environment that supports those efforts. This is achieved by central coordination and the collaborative discussion and determination of procedures and rules that are valid on all levels and between actors on all levels. Collaboration between all levels and end users is important to get broad commitment. Furthermore, it is also required to take the needs of administrations on different levels and regions and their possibilities into account. Moreover, the central approach should not trim local governance authority. One must consider that lots of administration does not take place at federal/state level. In this context public-private partnerships are a good example since both sides can support each other very much. The business sector has shown the most significant improvement in eReadiness and has the potential and capacity to accelerate the progress towards an information society by offering services and products for citizens and businesses.

The described environment is defined through principles and practices. This is not necessarily a single document as long as interoperability "is being lived" and covered in all actions on all different levels.
The EIF and NIF analysis for Bosnia and Herzegovina revealed five basic deficiencies on the way to interoperability. They are generic and general and need to be addressed first hand before going into more specific areas and before performing more specific tasks. The main barriers to interoperability in eGovernment in Bosnia and Herzegovina are:

- No central agency and governance structures are in place
- Strategy and action plans are not being implemented properly and in a timely manner
- IOP is not a very specific issue in any documents that are strategically oriented
- Too many crucial areas lack policies
- Not much collaboration, whether horizontal nor vertical

In regards to cross borders and pan-European interoperability any awareness and pursue of this is missing. These afore mentioned barriers prohibit the development of a supportive interoperability friendly environment. Hence the preliminary remark is already the first recommendation by We-Go on the way to interoperability: **Creation of a supportive environment arranged by rules and boundaries that are defined in collaboration of all involved stakeholders.**

The following topics are required to be understood, promoted, and covered in order to guarantee interoperability on all levels:

- Collaborative environment: working groups and cooperation panel to encourage dialogue and discussion between stakeholders, governed by a central body: The analysis revealed the existence of many isolated islands solutions. Problems are approached, but in a solo run without regarding collaboration with other administration bodies. Interoperability, although recognized, is not an issue, whether on the local, regional or national level. A platform needs to be set up and working groups need to be created to encourage dialog and discussion among the different stakeholders.
- Strong leadership and coordination
- Training and support of civil servants as well as of the top management to break barriers that are only natural
- Knowledge management: Documentation and distribution of semantics and best practices and reusable solutions
- Fully legislation designed to enable modern public services in an electronic environment
- Technical infrastructure and central services
- Change management in cooperation with public reform body PARCO

The before mentioned principles are recommended to be handled immediately to create an environment, that is encouraging interoperability and interoperability projects. In regards to the EIF and NIF compliance analysis the We-Go team concludes the following recommendations.

The following paragraphs describe more concrete steps, based on the special situation in Bosnia and Herzegovina and consequently as an answer to the analysis presented in the previous chapter. Building an interoperability architecture is an evolutionary task that cannot be performed completely at once. Instead it grows continuously over time. This is why there is no more time to loose because drawbacks are more difficult to catch up at a later time, given that more and more isolated solutions are implemented in the mean time.

3.2.1.1 Technical Layer of Interoperability

The technical layer addresses connections that enable the data exchange within and between administration bodies. Rules for the interconnection of technical systems are required to be defined through the definition and implementation of standards, norms, and best practices. A central state level body is needed to coordinate efforts in these areas.
The government has to move forward by putting the existing ICT infrastructure in better use in order to enable communication and service delivery. The existing physical national backbone needs to be promoted to intensify the cross-institutional networking. The impact is cost saving and better cooperation.
The implementation and maintenance of registers requires central guidance, ownership, and maintenance including the infrastructure, data, and access management.
We-Go encourages the use of web technologies to overcome potential interoperability problems due to the different sets of installed hardware and software. Consequently it is

recommended to pursue transactional models with a centralised system where individual users access data and applications remotely by means of web interfaces.
Efforts for the inclusion of citizens have to be strengthened. In regard to interoperability this means to enhance the accessibility of the provided information and services on the Internet. As claimed in the "Software Policy" a policy for web pages to be made by the Ministry of Communication is still missing. The delivery of services over multiple channels needs to be regulated as well. Some portals offer multilingualism but they are mostly poorly implemented. Appropriate policies are required as well.
The potential impact is, that users will more likely be willing to make use of electronic public services, thus transposing the cost savings. The recommendations are also countermeasures against the digital divide.

Burning issues to be addressed from a We-Go perspective are:

- Enable Internet access via the government-owned physical network
- Collect expertise on core technical interoperability technologies and distributed the results
- Analyse the existing and planned registers regarding interoperability capabilities and update them if necessary
- Create a policy for the accessibility of web portals based on the "Web Content Accessibility Guidelines (WCAG)" of the W3 Consortium
- Create a central portal that links to all offered services
- Create principles and policies for the implementation of multilingualism and monitor the implementation
- Analyse existing standards in the context of future use and share the results
- Create a policy for the use of (open) standards in administration
- Plan and implement a pilot "Document Management and Workflow" system that is scalable and flexible enough to be rolled out over all state level entities.

There is no sense in recommending a certain technology because the use of a set of technologies strongly depends on the system design and the installation basis (current installed systems). The Architectural Guidelines by IDABC cover different technologies and their uses as well as different system designs. The choice has to be made per project. The following paragraphs give an overview of technologies recommended by the EU and the IDABC for different domains.

Front Office:

- Data presentation and exchange
  - Interfaces
    - Interfaces design principles -
      - WCAG[6] (IDA mandatory)– Web Content Accessibility Guidelines – We-Go recommends the creation of a policy based on the WCAG for any web-based services or information platforms. It is crucial to include the training of public administration staff.

[6] http://www.w3.org/TR/WCAG10

- Web browsers have to support almost all file format specified in this recommendation, most notably HTML v 3.2.[7](IDA mandatory), and HTML 4.0.1[8], XHTML v1.0
- Mobile Phones – SMS[9](IDABC mandatory), or Short Message Service has to be used as an standard when implementing SMS services for GSM Mobile devices. WAP[10] v. 2.0 has to accept as a standard for services interfaced over WAP browsers.

- Characters sets – ISO/IEC 10646-1:2000 (IDA mandatory) - have to be accepted in order to support alphabets from different worldwide used alphabets. UTF-16 will be needed for some non Western European Languages and for documents in Greek language.
- Collective authoring – WebDAV- Web Distributed Authoring and Versioning- is recommended to be used.
- File type formats
  - Hypertext file format - HTML v 3.2. (IDA mandatory), and HTML 4.0.1, XHTML v1.0
  - Style sheets – CSS2 – Cascading Style Sheet Language for the display of HTML sites has to be used. XSL (Extensible StyleSheet Language v1.0 should be used.
  - Active contents / extended programming – Passive HTML (IDA Mandatory) should be used for the exchange of information on client-side passive HTML sites. For support of general communication, interaction and more complex solutions Java applications are recommended to be used.
  - Text Documents, spreadsheets and presentations – TXT (IDA Mandatory) for simple, editable text documents should be used. RTF (Rich Text Format) for documents, which have to be edited by several parties who don't use the same editors. PDF – Portable Document Format (IDA Mandatory) for unchangeable documents. HTML (IDA Mandatory) for documents exchanged in HTML format. XML can be used as format for documents. MIME (IDA mandatory) - Multipurpose Internet Mail Extensions – as a standardised method to indicate the format of file or part of a file. CSV (IDA Mandatory) – Delimited comma separated tables can be exchanged as CSV files.
- Document management – MOREQ is recommended for management of electronic records.
- Database Files – ANSI X3.135-1992/ISO 9075-1992 (IDA Mandatory) – standard in relational databases to assure conformity to accepted international standards.
- Graphics – here are few very well known and accepted standards not mandatory but IDA recommended forms – GIF - Graphics Interchange Format and JPG - Joint Photographic Experts should be used for the exchange of graphs and pictures, CGM - International Standard for storage and exchange of 2D graphical data., PNG - portable network graphics , TIF - Tagged Image

[7] http://www.w3.org/TR/REC-html32
[8] http://www.w3.org/TR/html401
[9] http://www.smsforum.net
[10] http://www.wapforum.org

File, ECW – Enhanced Compressed Wavelet, EPS – Encapsulated Postscript, VML – Vector Markup Language , SVG - Scalable Vector Graphic etc….
- Video – MPEG (IDA Mandatory) Motion Picture Experts Group , MP3 (IDA Mandatory) MPEG 1 layer 3, MPEG 4/ISO/IEC 14496 for multi-media content/services, Animated GIF (IDA Mandatory), Real Quick time
- File compression – ZIP v.2.0 and GZIP[11](alternative to ZIP) are mandatory to be used.

Desk research has found the presence of usage of some of these standards but very often their usage was not the result of centrally coordinated efforts from some sate level body but a result of expressed needs of some single public administration organisational units. So even if the same standards are used in the different organisations, it is not assured that they are used according to the same principles (e.g. versions etc…)

According to IDA: „*XML is the reference technology for most IT industry sectors (e.g. web publishing, document, and knowledge management, software design, system and network management, directory interoperability, etc.) as an ideal language for defining contents to be handled, shared, and exchanged.*" Therefore we recommend putting an accent and additional effort on the usage of XML based standards in public administration as well. XML technology has several features important for EIF postulates:

- End-to-end content control – allowing users and/or applications to supervise content production;
- Configuration management – the capability to maintain the correct, current baseline version of a document/document set, while making it possible to track and trace back requirements and to access previous versions of the information;
- Content exchange – an XML document can be designed to carry all the business information that local user applications need to know when processing that document.
- Multilingualism – XML offers designers means for establishing the requisite level of data granularity for the contents to be handled, with ultimate capacity to set up automated translation
- Processes, or the run-time rendering of itemised data stored in a language-independent manner.

Back Office level:

- XML based standards
  - For data description – XML (IDA Mandatory) XML should be used to standardise documents and to format data and message files., XSD (IDA mandatory) should be used to structurally describe data of XML schemas
  - For data presentation and user interfaces - data description – CSS (IDA mandatory) is a W3C standard that defines a style sheet language that allows authors and users to attach style (e.g., fonts, spacing, and aural cues) to XML applications., XUL is an XML-based language that is used to define elements of a user interfaces (e.g. menus of a menu bar or pop up menus etc…)
  - For data modelling – UML[12] (IDA mandatory) standard notation for the modelling of real-world objects as a first step in developing an object-oriented

[11] http://www.ietf.org/rfc/rfc1952.txt
[12] http://www.omg.org/technology/documents/formal/uml.htm

program, XSD (IDA Mandatory) should be used to structurally describe data of XML schemas, RDF[13] (IDA Mandatory)

- For data transformation – XSL[14] and XLST[15] (both IDA Mandatory) if applications use different XML schemas, an exchange of data can mean a conversion from one format to another. XSLT is a language that performs this transformation and is a part of XSL.
- Metadata Interchange – XMI[16] is a format which standardises how any set of metadata is described., MOREQ - Model Requirements for the Management of Electronic Documents
- Document object modelling – DOM[17] - provides a platform and language-neutral interface that is implemented in browsers, allowing scripts to dynamically access and update the content, structure, and style of documents.
- Geographical data – GML[18] - Geospatial Mark-up Language defined by the Open Geographic Council is used to make structured descriptions of geographical chart information.
- Security aspects – XML Signature[19] is a product of a joint effort of the IETF and W3C
- EDI-based standards - EDI Formats: EN 29735: 1992 (Syntax) D93.A (directory services) are basically replaced by XML-based standards. Keep in mind that one day maybe another technology will arise, one which will offer a better solution than XML based technologies currently are. There is a need to establish the process of maintenance of accepted and monitoring of new technologies covering this domain.

EIF under the middleware assume the technology/infrastructure which will enable sharing of enterprise data across multiple, heterogeneous platforms, operating systems, servers, and applications. The domains which will have to be standardized and according to EIF nomenclature called ***Middleware*** will be:

- Web services
  - Web Services Description – WSDL is a language used for the service definitions.
  - Web Service Publication and Discovery – UDDI[20] – Universal Description, Discovery and Integration specification is used to publish a Web Services to a central UDDI Repository.
  - Web Services Invocation – SOAP[21] v1.2. - This is a W3C standard that defines a distributed application model, which uses XML for enabling applications to communicate with each other over network.

[13] http://www.w3.org/TR/REC-rdfsyntax
[14] http://www.w3.org/TR/xslt
[15] http://www.w3.org/TR/xsl/
[16] http://www.omg.org/technology/documents/formal/xmi.htm
[17] http://www.w3.org/DOM/
[18] http://www.opengis.org
[19] http://www.w3.org/TR/xmldsig-core/
[20] http://www.uddi.org/
[21] http://www.w3.org/TR/SOAP/

Distributed Application Architecture required by EIF can be established through the use of Java 2 Platform Enterprise Edition (J2EE) or for example by using the Common Object Request Broker Architecture CORBA.
There are a several standards that will have to be enacted covering the usage of J2EE:

- Enterprise JavaBeans Technology – EJB v. 2.0 (IDA Recommendation) – used to build the business logic component in the IDA three-tiered model.
- JDBC 3.0 API (IDA Recommendation) – this is an API specification for connecting Java applications to the data in RDBMS platforms.
- Java Servlet Technology – Servlet v. 2.4. Servlets are used to write Web server extensions that perform Java code in response to HTTP requests.
- Java Server Pages – JSP 2.0 (IDA Recommendation). This is a text document that combines static template data expressed in any web text format like for example HTML, WML or XML are.
- Java Message Service – JMS v. 1.1. (IDA Recommendation). It provides standard Java-based interfaces to multi-vendor message services.
- Java Transaction API – JTA v. 1.0. (IDA Recommendation). It provides transaction services to the parties involved in distributed transactions.
- JavaMail Technology – JavaMail API v. 1.3.1. - (IDA Recommendation).
- Java API for XML – JAXP 1.2.4. – It enables the reading, manipulating, and generating of XML documents through Java API's.
- J2EE Connector API v. 1.5. (IDA Recommendation). -
- Java Authentication and Authorisation Service – JAAS v. 1.0 - (IDA Recommendation).
- Remote Procedure Call – (IDA Recommendation). This is a protocol that one service/application/programme can use to request a service from another service/application/programme located on another computer. We-Go proposes to use Open Software Foundations Distributed Computing Environment.
- CORBA[22] IIOP v. 2.0 - (IDA Recommendation) – This is an architecture and specification for creating, distributing, and managing distributed program objects in a network.

The following standardised APIs are relevant and it is recommended accepting them:

- Message Transfer Service: IEEE P1224.1 IEEE
- Directory Services: IEEE P1224.2 IEEE
- File Transfer: IEEE P1238.2 IEEE
- Distributed Transaction Processing XATMI, TxRPC, CPI-C, XA, XA+, TX, XATP, X/Open
- Transport Service: XTI X/Open

ebXML is a global electronic business standard that is sponsored by UN/CEFACT and OASIS and defines a framework for businesses to conduct transactions based on well-defined XML messages within the context of standard business processes, which are governed by standard agreements. The following standards are recommended to be accepted:

- Messaging Service Specification v.2.0[23] – used to exchange the XML business messages between organisations.

[22] http://www.omg.org
[23] http://www.ebxml.org/specs/ebMS2.pdf

- Registry Services Specification v.2.0[24] – these services handle information on XML schemas of business documents.
- Partner profiling services[25] – Collaboration-Protocol Profile and Agreement Specification v2.0 -
- Process definition[26] - Business Process Specification Schema v.1.01

Interconnection services are provided on different levels and should be standardised as well:

- File and message transfer protocols – FTP – File Transfer Protocol (IDA mandatory). HTTP v.1.1 and HTTP v. 1.0 - Hypertext Transfer Protocol – used between client and web server. Both are IDA mandatory.
- Message transport and security - SMTP/MIME (IDA Mandatory)
- Message store services – IMAP4 (IDA Mandatory)
- Mailbox access - POP3 (IDA Mandatory)
- Directory and domain name services – LDAP v3 X.500 (IDA Mandatory), DSML v2 and DNS.
- Network services – IP v4 and IP v6 are both IDA Mandatory.

Security:

- IP-SEC – IDA recommended - allows authenticated and encrypted communication, between routers, between firewalls, and between routers and firewalls.
- IDA PKICUG services - The IDA PKI for Closed User Groups project (PKICUG) it provides a pan-European PKI to secure the information exchanged between the trans-European network partner organisations. It is IDA mandatory standard.
- SSL / TLS – SSL v3/TLS (IDA Mandatory)
- S/MIME (IDA Mandatory) - is a specification for secure electronic mail and was designed to add security to e-mail massages. There are three symmetric algorithms: DES, Triple-Des and RCA and the format used for digital certificates.
- SSH v.2. Secure Shell (IDA Mandatory) – it provides strong authentication and secure communications over insecure channels.
-

Java security related standards are:

- Java GSS is used for securely exchanging messages between communicating applications.

Web service security standards to be recommended and implemented:

- SAML - Security Assertion Markup Language – used to enable interoperability between different systems that provide security services.
- XML Signature – it is a XML compliant syntax used for representing the signature of Web resources and parts of protocols. It provides the procedures for verification of such signatures as well.
- XML Encryption is a process for encrypting/decrypting digital content.
- XML Key management

The usage of Firewalls has to be standardised as well by covering the following domains:

- Packet filtering (IDA mandatory) - should be standardised in order to assure whether the data transmitted through the network is based on agreed transfer protocols.

[24] http://www.ebxml.org/specs/ebrs2.pdf
[25] http://www.ebxml.org/specs/ebcpp-2.0.pdf
[26] http://www.ebxml.org/specs/ebBPSS.pdf

- NAT – Network Address Translation - (IDA mandatory) to enable local domains the usage of two different IP sets for internal and external traffic.
- Application-level gateway – Proxy – should be enforced in order to apply special purpose rules for every application.
- Demilitarised zone network - DMZ – the firewalls making possible to provide security for both, applications, and network layer. DMZ is a small isolated network between these two layers.
- Stateful inspection – analyses multiple layers of the protocol stack.

You have to standardise the prevention from malicious or unauthorised code as well:

- A *virus*, which is a self-replicating program that can infect other programs, either modifying them directly or by modifying the environment in which they operate.
- A *worm* is a program that attacks computers that are connected by a network and spreads by sending a copy of itself through the network to infect other machines.
- A *Trojan horse* is a program that pretends to be something it is not.
- An *e-mail bomb*, which is a program equivalent to a letter bomb.

Workflow management:
There is a need to standardise the usage of technologies upon which ***Workflow management*** is based. Here are few specifications, papers, and standards that have to be taken into consideration:

- Interoperability, WF-XML Binding (WFMC-TC-1023) - This specification is intended to be used by software vendors, system integrators, consultants, and any other individual or organisation concerned with interoperability among workflow systems.
- Workflow Standard Interoperability, XML-HTTP Binding (WFMC-0208) - This document represents a workflow protocol that aims for interoperable, reliable, and practical interactions between services using the HTTP protocol.
- Workflow Security Considerations, White Paper (WFMC-TC-1019) - The document summarises a number of security services that may be important within a workflow system and relates them to a generalised model identifying different security domains within a heterogeneous workflow environment.

3.2.1.2 Semantic Layer of Interoperability

The future central body in charge of the further development of interoperability is required to give guidelines and principles for the definition, documentation and distribution of common vocabularies and data definitions, and common and global definitions/representations of eGovernment semantics. The potential impact is the elimination of ambiguity and content interoperability.
Project leaders are encouraged to participate in the EU's "semic.eu" portal.

Here is a brief overview of themes that are still missing and have to be covered by a national level semantic strategy and included within the broader IOP National Agenda:

- The process of drafting/agreeing on ***common and global definitions/representations for eGovernment definition/vocabularies/metadata*** has first to be defined by IOP

semantic strategy and afterwards entrusted to be executed, coordinated, and monitored to some state level organisation

The semantic interoperability strategy should especially cover the following domains:

- ***Common and global definitions/representations for eGovernment semantics***
- ***Modelling perspective and formalism for documenting the common definitions***
- ***Administrative level of definitions development***
- ***Promotion/dissemination and maturity of common definitions***
- ***Trust, reliability and the supportive technical IOP layer***

3.2.1.3 Organisational Layer of Interoperability

Clear link between cross-organisational processes/services and the business strategies of the broader agencies – and – **modelling and visualisation of public administration services/processes**

Therefore a general approach in the national interoperability strategy has to be done. While reforming the public administration, the business strategies and the cross-organisational services have to be defined and developed. During the development process the link should already be known and be agreed upon between the involved parties. The process can be modelled with techniques already utilised in the economy. The modelling and visualisation has, to take place on a large scale, governed by a central body. The overall goal of these recommendations is that all involved parties understand the services, the processes involved and their role. Service provision is more effective if the processes are aligned to and therefore support the business strategy.

The process of **involvement of users by setting up communities of practice in the process of new service design** can be included in the training agendas. Anyway this has to be pursued with more courage and should be defined in the national IOP agenda. Inclusion of future users can beforehand reduce barriers and can raise commitment and support from user side. In addition users should be included in the development process of any project, be considered in the requirements specification, and they should have a voice on the cooperation panel.

Reuse of knowledge and experience related to the execution of internal and cross-agency business processes/services from the private sector – and – **identification and documentation of common service functionality and features across public administration agencies**

Availability of information about interoperability is strongly demanded as the stakeholder's questionnaire from the Bosnian We-Go team revealed. According to the survey in Bosnia stakeholders prefer to get information during workshops or by getting them off a portal.

Knowledge management is required to be coordinated by a central body. Under that umbrella knowledge needs to be collected locally and be orderly distributed to interested parties. The potential impact is the elimination of duplicated efforts. In addition it becomes more likely to get interoperable solutions. A collection of possible solutions to given problems that have already proven their applicability will also allow identifying potential cooperation. A knowledge database should include best practices from other countries as well and in return best practices from Bosnia and Herzegovina shall be published. But beware that solutions from one country might not always provide a good example for another country. That makes it even more important to share local and regional solutions and experiences since they might

fit a given problem better than a solution from a country with a totally different public administration environment.
But knowledge management is also required to be handled in-house in different bodies on the state, entity, and local level. It is recommended by the central body governing knowledge management on the state level to issue principles, procedures, and policies for knowledge management.

Here are a few typical service functionalities that are recognised by IDABC as a part of any public service scheme:

- Registration/Authentication/Authorisation
- Payment processing or issuing of funds
- Cross-division/agency workflow
- Request for additional information from other public administration organisational units or even private sector
- Status notification
- Support handling etc…

We-Go encourages the participation in the "epractice.eu" online community. It is the EC's latest effort to build a pan-European best practice community and a social platform for discussion and exchange. The web site provides descriptive information including contact details for dozens of best practice cases from all over Europe. Since not all kind of information can be shared on that portal we encourage the participation in the We-Go Knowledge Net (Work Package 4 of the We-Go Project) that can be regarded as complementary to the EC efforts by implementing a local WBC exchange platform that covers cases from the WBC in more depth. The We-Go Knowledge Net for Bosnia is aligned to the portal approach demanded by many stakeholders. Information should be available centrally to interested parties in Bosnia and beyond. Based on the efforts of the We-Go team this platform can be extended to be used by administrations from all over the country to share experiences and solutions.
A strategic planning to bring knowledge on interoperability to stakeholders is provided by We-Go Work Package 3 (We-Go Academies). Work Package 2 of the We-Go Project deals with specific applications.

Support of multi-channel service delivery is another piece in the national interoperability agenda and needs to be addressed there. The technological progress enables new ways to bring the services to the people. Thus, this area should continuously be monitored. The service delivery always has to be seen as a piece in an overall "One Stop Shop" strategy.

Consensus on and visibility of the ownership, management and responsibility for cross-organisational processes / services. Consensus on that topic is needed to be achieved as every service/project is required to have clear understanding of responsibilities. This should be included in the same strategic framework and coordinated by the same teams like the process of identification and documentation of common services and features.

Issues to be addressed firsthand:

- Within the coordination panel consider the local governance authorities
- Create policies for the modelling of administration services and processes
- Via the cooperation panel create clear cross-organisational links

- Set up a strategy and policy for knowledge management and get stakeholders involved in the epractice.eu portal and the We-Go Knowledge Net.
- Analyse common functionalities and features
- Raise the interaction level by pushing further the horizontal and vertical integration of public services
- Via the cooperation panel, get consensus of the ownership, management and maintenance of cross-organisational services

3.2.1.4 Governance Layer of Interoperability

- Political -

Development of national eGovernment IOP strategy and programmes – and – **promotion of organisational federalism as a model for organising the diverged administrative space into a cooperative environment** – and – **significance of international IOP aspects**

The existing strategies and action plans are not implemented fast enough. This is because they are insensible for the political and economical complexity of Bosnia and Herzegovina. Consequently implementation progress is behind the planned dates. Thus, the documents need to be aligned to the real situation and the priorities need to be reconsidered. Prioritisation must be achieved according to most impact/cost savings/maximum return of investment and fastest realisation of the eGovernance concept and according the EU basic services as benchmark. Furthermore, indicators and planned achievements need to be verifiable. A good example for the measurement of efforts is the PARCO "Annual Progress Report"[27]. A similar tool is required for the area of interoperability.

In addition the strategies and action plans need to be updated, in order to include the area of interoperability more properly. An interoperability framework, stated and being planned in the "Software Policy", is still missing. But, if interoperability is properly addressed in the existing documents, a special framework document is not needed. Interoperability is a very complex topic that affects many areas and many levels of eGovernment. Consequently many stakeholders are affected. To solve all issues experts from different areas and with complementary expertise are required. Therefore We-Go does not see the necessity for one single actor to coordinate interoperability as a whole. Rather We-Go recommends that, with the current structure in place and the upcoming "Agency for Information Society", actors cover their area of expertise regarding interoperability and work closely together via the recommended "Cooperation Panel". More precisely it is recommended to split responsibilities according to the four layers of interoperability as defined by the EC and Modinis. But note that there can be an overlapping. With PARCO already dealing with the public administration reform and already having a strategy and action plan at hand, it is predestined to play a strong role in the organisational layer. The "Agency for Information Society" could be a main actor in the governance of interoperability, and govern the technical and semantic layer. A body responsible for the coordination of IT still needs to be defined or to be set up. It is recommended that the "Ministry of Telecommunication and Transport" plays a strong role in future developments due to its previous responsibilities, its experience, and its connections to and strong support by international organisations.

The awareness of and the advantages of the involvement in international interoperability projects need to be raised. This can be done via the cooperation panel. The importance of international interoperability fitness must be broadly understood.

[27] Reference missing

- Legal -

Legal alignment to address the new requirements posed by intensive cooperation of public administration agencies

The planned reform of the legal system, which should bring simplification of the adoption of laws, is a prerequisite before laws can be harmonized in an efficient way. In the next step, as anticipated, laws need to be harmonized between all administration levels. The legal framework is not completely supporting modern electronic public services. Furthermore, the legislation is required to be monitored continuously in order to be able to identify and resolve issues immediately.

Diffusion of digital signature and electronic identity (eID)

This topic is strongly pursued by the EC and many EU member states both national and pan-European. The future central body is encouraged to move forward in this area and build an eID system based on the CIPS register. Because of the huge number of potential applications the system shall be built scalable and flexible. The impact is to have an auxiliary universal service in place for access control, identification, and authentication.

- Managerial -

Clear IOP leadership/ownership/ sponsorship/management – and – **broad commitment, participation and communication** – and – **willingness for cultural change at all partners**

The creation of a central body that coordinates the settlement of rules and their adherence between the different stakeholders is an essential step. The creation of the central "Agency for the Bosnia and Herzegovina Information Society" is delayed and thus delays other interoperability and eGovernment efforts. The agency is required to be set up and operational as soon as possible in order to take the role of the leader, coordinator, and promoter of interoperability. In addition we recommend developing procedures to benchmark and monitor the efforts taken and the goals that are reached. The agency can then intervene if any deviations from defined tasks take place. As a coordinator the agency is as well responsible to raise awareness and to make sure that the involved actors have a clear understanding of the same issues. In other words, different views and ways of thinking are required to be harmonised. In the same way, principles and practices that differ from region to region need to be aligned. However, thought patterns cannot be change over night. Given, in addition, the complex political structure of Bosnia and Herzegovina We-Go recommends a more cautious approach that puts soft pressure on the involved parties.

Rules and policies to be developed are already stated in the "Software Policy" document.

A strong collaboration with the Public Administrations Reform Office is recommended since the transformation of public services with the help of ICT goes hand in hand with the reform and transformation of public administration procedures. Public services should be aligned to so-called life situations that can span horizontally and vertically. We-Go recommends the analysis of life situations regarding their potential impact, potential cost savings, and best practices that can de drawn from their implementation and commonalities of life situations. The latter can conclude in auxiliary services that are implemented once and used by different services, like service delivery or electronic identification. Thus, it is required to model public administration services and processes. By doing this it is easier to reveal any duplication of efforts.

In addition the tasks of the central agency shall include the representation to the outside, especially parties outside of Bosnia and Herzegovina like other WBC countries EU member states, the European Commission, and organisations like the UNDP and the Stability Pact for South-Eastern Europe.

Besides the central agency a body is needed to coordinate the IT.
As long as the central agency is not established We-Go recommends the creation of a coordination panel similar to the PAR task force. It shall be situated on the political coordination level and consist of expert representatives from ministries and entities, from PARCO as well as businesses (BAIT), citizens representatives, and the Civil Servant Agency. The platform may continue its work even after the establishment of the central agency that would then govern the platform. Since this platform is the forum for discussion and collaboration it should allow the identification of cooperation potentials. Within the platform working groups consisting of experts from the stakeholders can work on solutions for specific areas of expertise.
Regarding the funding it is recommended that efforts in the field of interoperability are jointly funded by the state, local authorities, and partly international. It is recommended to regard donor projects and solutions with great care in order not to end up in vendor lock-ins. In addition projects should be carried out according to their priority and potential impact. Projects only considering a single problem should be avoided. Consequently it is recommended to analyse planned projects regarding their impact.
A best practice example of how close collaboration brings concrete results is the development of the "Software Policy" has already been mentioned in the We-Go compliance analysis. Different state-level institutions, the entities, the Brcko District, non-governmental organisations, and the private sector formed a working group under the head of the "Ministry of Communication and Transportation" and collaboratively agreed on the document.

Staff training related to IOP projects
Users require support and the structures that need to be set up. Without support users might loose their trust in the new services. Staff training is crucial to get a broad commitment and to raise awareness on all levels, from state level to local administrations, and all actors, from top management to civil servants. It is a tool to raise awareness for the diverse variety of issues. Consequently it is required to bring this to the agenda of the future central body governing eGovernment and interoperability in Bosnia and Herzegovina. Interoperability in all its flavours needs to be on the training agendas. Thus, not only ICT but also organisational topics like process modelling or project management, semantic topics, and expert areas of IT, e.g. security management and data protection.
The potential impact is more awareness, decreased support costs, and increased productivity. In addition more independence from third parties should be achieved.
Workshops with interoperability topics are covered by Work Package 3 (We-Go Academies) of the We-Go Project.

- Economic -
Stable funding and the possibility to plan activities in the future are fundamental for the establishment of an interoperability friendly environment. The execution of the Action Plan can then be put on a stable basis. Current activities related to assuring the economic prerequisites for the implementation of the Information Society Agenda in general have to be additionally supported by funds determinate only to the issues arising out of the national interoperability strategy. Especially these issues need to be addressed:

- **Adoption/switching costs inherent to IOP solutions**
- **Public procurement policies and financing for IOP projects**

- **Partnering with the private sector in IOP projects:** Can be handled via the proposed cooperation panel. As outlined earlier, the private sector cannot only assist with funding but also with expertise in certain technological areas and in the implementation of projects.

Burning issues summarised:

- Establish a national interoperability programme under the lead of the "Agency for Bosnia and Herzegovina Information Society", the before mentioned cooperation panel or the Ministry of Telecommunication and Transportation (latter as stated in the "Software Policy" document).
- Develop the interoperability programme in close cooperation with the PARCO, especially in the areas of organisation and governance.
- The interoperability programme aims at cross-border interoperability in the first place. National, regional and local interoperability (summarised under the term "National Interoperability Framework") are thus a pre-requisite for the implementation of the "European Interoperability Framework".
- Development of interoperability framework under the backdrop of current directives of the European Commission and best practice cases transposed to the very special Bosnian situation.
- Work together with experts from different administration levels, the IT industry (incl. BAIT) and foreign partners in order to have broad basis and in order to cover as many situations and realities as possible.
- Shape the programme development approach as a flexible process. Since this an evolutionary process, parts might change over time or might become deprecated due to new understanding of the area.
- Create the remaining policy documents stated in the "Software Policy" as each of them covers specific topic areas that are too special to be covered in the general interoperability agenda.
- Give realistic time frames to the action plans connected to the interoperability programme for the completion of tasks to reflect the real situations. Furthermore goals must be defined in a way that makes it possible to verify the results.
- Synchronize interoperability tasks and goals with and add them to the exiting strategies, policies, and action plans.
- Resolve the issue regarding the legal layer: Continue and accelerate the process of simplifying the adoption laws.
- Approve the "Act on the Agency of Bosnia and Herzegovina" so that the agency can be established quickly to fill the gap inherent in terms of leadership and coordination.
- Establish the "Agency for Bosnia and Herzegovina Information Society" put it the place as the interoperability leader and coordinator.
- More actively participate in the creation of new standards, whether national or international.
- Actively promote the advantages of interoperable solutions.
- Address the weak willingness for change, since a reform and change cannot be executed without the support and commitment of the employees. Address their fear and discomfort by actively integrating them into the transformation process and by giving best possible training and support. Stress the advantages of any change for them.
- Add interoperability topics to the training activities.

- Financial planning needs to be set into a longer time frame. Only immediate cost savings seem to be able to motivate the implementation of projects. The cost savings in the mid- and long-term are required to be more important than now.
- It is unrealistic to speculate that donor driven projects will stop to be a crucial funding method for projects. Thus, instead of demonising those projects it is more appropriate to find an approach that allows the implementation of donor driven projects aligned with the prioritised targets. Beforehand that issue requires discussion with donors.
- Promote use of the government-owned physical network backbone.

3.2.1.5 Auxiliary services

- A final recommendation, whether to install central registries or not, cannot be given. This decision is depending on many factors, including the implementation scenario. In general transactional solutions, consisting of a central server and remote users have advantages in terms of maintenance costs, data consistency, and usage as an auxiliary system in many different scenarios and services.
- We recommend putting more emphasis on the interoperability capabilities of installed and future registers. A solution that is not interoperable is another "isolated island" and thus an issue instead of a solution.
- The creation of registers and the system design should not be decided and implemented in a rapid move. Instead registers shall be created upon demand and the system design should be consistent, scalable, and flexible.

3.2.2 Recommendations per administrative level

Issues to consider, potential risks, and required steps for stakeholders of interoperability projects are illustrated for different policy areas and in two ways:

- As an on-hand example for the implementation of an eID system in Bosnia and Herzegovina (Figure 13), against the backdrop of the newly implemented Citizens Identification Protection System (CIPS) (Chapter 3.1.7.1 on page 29) this is regarded as apriority in the EU and by the European Commission. The recommendations are based on the current eGovernment situation and on best practices from EU member states (namely Austria[28] [29], Estonia[30] [31], and Italy[32]).

- Generic blue prints with recommendations for the national interoperability agenda (Figure 14), national interoperability projects (Figure 15), and pan-European interoperability projects (Figure 16). The blue prints are based on the analysis of the EIF and NIF compliance, strategic recommendations, project analysis, and EU best practices.

[28] http://www.a-sit.at/pdfs/rp_eid_in_austria.pdf
[29] http://ec.europa.eu/idabc/en/document/4486/5584
[30] http://ec.europa.eu/idabc/en/document/4487/5584
[31] http://www.epractice.eu/files/upload/gpc/document/191-1170255573.pdf
[32] http://dgrc.org/dgo2004/disc/posters/tuesposters/rp_arcieri.pdf

eID interoperability recommendations	Legislation	Funding-Financial	Policy- Management	Technical / Semantic
Local Authorities	(1) Consideration of legal requirements and EU directives ("digital signature" and "data privacy and protection") relevant for the local level (2) Consider time for laws and acts to pass all parliaments in planning (3) Document and communicate all encountered problems and obstacles created by legislation to national authorities	(4) Consider necessary investments for equipment in local authorities offices (e.g. card readers, network connection, computers) (5) Promote Private-Public Partnerships on a local level	(6) Go through a collaborative testing of the system before going live (7) Accept and follow the central lead in this project (8) Participate in the discussion on the eID project, make yourself heard	(9) Specify requirements based on the working place realities (equipment available versus required for the use of eID) (10) Analyse and document semantic requirements on the local level (11) Ensure the existence of basic technical infrastructure (network, computers, card readers, etc.)
National Authorities	(12) Consideration of national legal requirements and EU directives ("digital signature" and "data privacy and protection") relevant for the local level	(13) Allocate money for marketing and advertisement the eID auxiliary service (14) Fee relief for eID medium (e.g. card) and certificates for fast and wide market penetration (15) Fund pilot projects and reference applications/services (16) Consider future cost savings in your calculations (17) Promote Private-Public partnerships (18) Make use of Open Source software and Open Standards to lower cost (19) Subsidy of investments for businesses and citizens	(20) Realise visible project lead and coordination (21) Create a common organisational infrastructure (22) Create working groups that brings necessary stakeholders together (23) Seek possible interoperable solutions and commonalities with other implemented, planned or ongoing projects (24) Organise lectures for staff (public administration civil servants) (25) Learn from best practices from other countries (26) Go through a collaborative testing of the system before going live (27) Use of open source software and open standards raises trust since anyone examine the project and document internals (28) Guarantee liability of the certificate authority (29) Develop registration procedures (30) Nominated publishers of certificates (31) Partnership with businesses for use in ecommerce (e.g. online banking) (32) Consider of how to integrate foreign eIDs in national model (organisational procedures and process management) (33) Consider the national population register (requires IOP) as basis (34) Make use of a medium for the eID certificates that is already in circulation – or – consider this in the future: bank cards, mobile phones, etc. (35) Organisational and physical security measures (36) Awareness and marketing (37) Provide sample or reference applications (38) Data protection: limit the amount of data saved on the card to a minimum → card as a key to services (39) Create a policy for the disabling the card (40) Design it to be used for other uses and promote those: electronic banking, electronic ticketing, secure Email (41) Clear understanding of information to be stored and its context and access (42) Become involved in current pan-European eID activities and monitor them closely regarding interoperability among different countries	(43) Ensure the availability of basic technical infrastructure: network, registers (44) Analyse and document semantic requirements on national level and pan-European level (45) Clear understanding of information to be stored and its context and access (46) Reuse centrally or locally available definitions/ taxonomies/ ontologies (e.g. from passport register) (47) Document and publish ontologies and taxonomies developed for use in other local, national projects and for IOP with WBC and European partners (48) Ensure service modularity (49) Establish a PKI infrastructure (50) Consider different forms of eID "card": bank cards, mobile phones etc. in the system design (51) Technical infrastructure to be based on standards to guarantee interoperation with a broad range of complementary technologies (52) Consider internationalisation aspects (53) Technical security measures (54) Build a scalable and flexible infrastructure (55) Design the card to be universal and only the key to services (56) Support multiple platforms (not only MS Windows) (57) Ensure technical handling of foreign certificates/cards (58) Participate in the EU "semic.eu"portal (59) Share results, semantics, technical solutions via the We-Go Knowledge Net and epractice.eu

Western Balkan Regional Authorities & Actors (UNDP, Stability Pact, USAID)	(60) Promote harmonization in the administrative practice amongst WBC (61) Support Bosnia by sharing experience in the elimination of legal barriers	(62) Fund/support pilot projects and reference applications/services (63) Seek cooperation potential within the WBC region	(64) Organise exchange of best practices and experiences in the implementation of eID among WBC (65) Seek cooperation and convergence with other projects (probably from other donors)	(66) Support the exchange of available definitions/ taxonomies/ ontologies between WBC
EU Authorities & Actors	(67) Promote harmonization in the administrative practice amongst Member States (68) Support Bosnia by sharing experience in the elimination of legal barriers	(69) Fund/support pilot projects and reference applications/services	(70) Provision of best practices (71) Define and publish basic requirements for pan-European eID exchange	(72) Support the exchange of available definitions/ taxonomies/ ontologies

Figure 13: Recommendations for the implementation of eID in Bosnia per administrative level and domain

General interoperability recommendations	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Consider the time needed for a law to pass all parliaments in the planning (2) Support the efforts regarding the simplification of the legal system (3) Analyse and document encountered legal problems and obstacles on the local level (4) Train public administration civil servants in legal interoperability issues	(5) Consider necessary investments in the technical infrastructure on the local level and allocate adequate resources (6) Promote Public-Private partnerships on the local level (7) Utilise Open Standards software and open source software	(8) Take an active role in the development of the national interoperability agenda (9) Support the national Information society and interoperability strategy (10) Training of public administration servants (legal issues, organisational change etc.) (11) Create the Knowledge Communities/Portals on local level (12) Participate in national, regional and pan-European knowledge communities and portals (e.g. We-Go Knowledge Net and epractice.eu, semic.eu) (13) Support creation of new cross organisational services/ business processes (14) Support collaborative testing of pilot services/projects.	(15) Take an active role in the development of common definitions/ taxonomies/ ontologies (16) Adopt technical and semantic standards (17) Introduce the usage of Service oriented Architecture (modularity of services) (18) Support national IOP strategy regarding the adoption and usage of semantic and technical standards (19) Document the specific requirements based on the local working place realities (available equipment) (20) Participate in the EU's semic.eu portal
National Authorities	(21) Implement the EU directives, especially those regarding interoperability, IT legislation (data protection and security, etc.) (22) Train public administration civil servants in legal interoperability issues (23) Constantly analyse and monitor if the legal system meets all requirements	(24) Allocate resources and funding for the promotion and marketing of the national interoperability agenda (25) Promote Public-Private partnerships on the national level (26) Fund pilot projects and reference implementation/services/applications (27) Promote and utilise Open Standards software and open source software (28) Support local administrations in investments in technical infrastructure (29) Fund the development and deployment of common service functionalities (30) Concentrate on projects with the best return on investment (31) Consider long term cost savings in the calculation (32) Allocate money for the training of public administration civil servants (33) Financial planning needs to be set into a longer time frame. Only immediate cost savings seem to be able to motivate the implementation of projects. The cost savings in the mid- and long-term are required to be more important than now	(34) Establish the Agency for Bosnia and Herzegovina Information Society (35) Create a cooperation panel and invite all relevant national, local, business players (36) Develop a national interoperability Strategy and Action Plan (37) Develop the interoperability programme in close cooperation with the PARCO, especially in the areas of organisation and governance (38) Work together with experts from different administration levels, the IT industry (incl. BAIT) and foreign partners in order to have broad basis and in order to cover as many situations and realities as possible (39) Give realistic time frames to the action plans connected to the interoperability programme for the completion of tasks to reflect the real situations. Furthermore goals must be defined in a way that makes it possible to verify the results (40) Create the remaining policy documents stated in the "Software Policy" as each of them covers specific topic areas that are to special to be covered in the general interoperability agenda. (41) Assure clear leadership, management and sponsorship of national and Pan-European interoperability projects (42) Create policies for the modelling of administrative services and processes (43) Prioritise services according to their impact and best return on investment (44) Support creation of Knowledge Communities / Portals on national level (45) Participate in national, regional and pan-European knowledge communities and portals (e.g. We-Go Knowledge Net and	(53) Define national semantic (common definitions/ taxonomies/ ontologies) and technical standards (54) Consider internationalisation aspects in (45) (55) Develop support and promote usage of PKI (56) Hosting of common service functionalities (57) Develop support and promote usage of eID (58) Participate in the EU's semic.eu portal (59) Guarantee that the technical infrastructure is based on standards to ensure interoperation with a broad range on complementary technologies (60) Provide the infrastructure on the national level (network, Internet access, registers, …) (61) Promote use of the governments-own physical network backbone (62) The creation of registers and the system design should not be decided and implemented in a rapid move. Instead registers shall be created upon demand and the system design should be consistent, scalable and flexible (63) Support multiple platforms (not only MS Windows) (64) Create a policy for the accessibility of web portals based on the "Web Content Accessibility Guidelines (WCAG)" of the W3 Consortium (65) Plan and implement a pilot "Document Management and Workflow" system that is scalable and flexible enough to be rolled out over all state level entities

			epractice.eu, semic.eu) (46) Support and coordinate training activities (47) Analyse and develop common service functionalities (48) Assure the common organisational structure. (49) Support the internationalisation of the Bosnian eID (50) Support collaborative testing of pilot services/projects (51) Introduce monitoring and benchmarking (52) Create policies for project and process management	
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(66) Promote the harmonisation of the administrative practice (67) Support Bosnia in removing legal obstacles (68) Support the training efforts	(69) Support pilot projects (70) Fund projects according to local priorities (71) Financially support regional cooperation projects	(72) Provide regional best practices (73) Promote regional benchmarking of interoperability solutions (74) Give advice on policy/management issues and how to assure creation of successful IS/IOP National Strategies	(75) Support the creation of PKI through programmes (76) Support creation of commonly agreed semantics
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(77) Give support in the development of a national interoperability strategy by helping to remove the legal barriers	(78) Support pilot projects (79) Fund projects according to local priorities (80) Financially support regional and pan-European cooperation projects (81) Support management of financial management	(82) Provide regional best practices (83) Give advice in managerial issues, project and process management	(84) Provide mediating services for data mapping (85) Support creation of commonly agreed semantics (86) Support the creation of PKI, through dissemination of IDABC expertise in that field

Figure 14: Recommendations regarding the interoperability strategy in Bosnia per administrative level and domain

Generic recommendations for projects on the national level	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Analyse local legal requirements and check if they are met (2) Analyse national legal requirements and check if they are met on the local level (3) Support the removal of legal barriers (4) Consider the time needed for laws to pass all parliaments in the project plan	(5) Support the Public private partnership on local level, which can fund the implementation of national IOP projects/services. (6) Utilise Open Source software and standards to minimise costs (7) Consider necessary investments in the technical infrastructure on the local level and allocate adequate resources (8) Consider those investments from (7) in the financial planning	(9) Follow central lead in the project implementation, be cooperative and actively participate (10) Assure that everyone in the implementation team on the local level understands their roll (11) Coordinate related training activities on the local level	(12) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete IOP project. (13) Analyse usage of "new" standards and report comments/improvement recommendations to the governing body. (14) Specify requirements based on the working place realities (equipment available)
National Authorities	(15) Take in consideration all national legal requirements relevant on national level (16) Consider the time needed for laws to pass all parliaments in the project plan (17) Analyse/monitor legal barriers related to the development/implementation of services/projects, document and remove them (18) Cooperate with local public administration, give them space to express and address their needs (19) Make use of the regional and EU support programmes and documents for removing the legal barriers	(20) Choose a project with good return on investment (21) Allocate resources and funding for the promotion and marketing of the implemented service (22) Promote Public-Private partnerships on the national level (23) First fund pilot project for testing (24) Fund reference implementation/services/applications (25) Promote and utilise Open Standards software and open source software (26) Support local administrations in investments in technical infrastructure (27) Consider training and dissemination activities in the project's financial planning	(28) Assure the clear ownership/leadership of the national project/service being implemented (29) Choose the execution partners on local and national level (30) Create working groups that brings necessary stakeholders together (31) Deliver the good business case for a service/project being implemented. (32) Define the clear set of deliverables of the project/service being implemented (33) Go through a collaborative testing of the system before going live (34) Use of open source software and open standards raises trust since anyone examine the project and document internals (35) Publish and share project results	(36) Leave the space for local initiatives which will cover their needs (37) Propose the introduction missing semantic and technical standards that can be used by concrete application/service. (38) Propose the modelling standards, framework and methodologies to be followed in the concrete project. (39) Ensure service modularity (40) Reuse components where possible (41) Implement interfaces to become interoperable with other services (42) Document and publish interfaces, system modules, documentation and "complete solutions" (43) Document and publish ontologies and taxonomies (44) Support multiple platforms
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(45) Support the implementation of projects on national level, by providing them with experience in removing of legal barriers	(46) Financially support the implementation of national IOP services/projects and research in the area of semantic and organisational IOP	(47) Support the national level IOP projects/services being implemented in Bosnia with the consultancy in the domain of management of the public administration projects on national level. As well enrich them with international experiences.	(48) Donate needed infrastructure for concrete national IOP projects/service (49) Support (financially) introduction of important technical and semantic standards/service
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(50) Support the implementation of projects on national level, by providing them with experience in removing of legal obstacles.	(51) Support pilots (52) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (53) Financially support the implementation of national IOP services/projects	(54) Provide best practices	(55) Donate needed infrastructure for concrete national IOP projects (56) Support (financially) introduction of important of technical and semantic standards

Figure 15: Generic recommendations for national interoperability projects in Bosnia per administrative level and domain

Generic recommendations for pan-European interoperability projects	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Take in to the consideration all concrete legal EU interoperability requirements related to the implemented Pan-European service relevant on a local level. (2) Support national authorities in removing the concrete legal barriers related to the implemented services.	(3) Support the Public private partnerships, which can fund the implementation of pan-European IOP projects/services on local level. (4) Try to decrease the price of implementation by usage of open standards and open software instead of proprietary solutions.	(5) Follow the coordination efforts lead by national body and be cooperative. (6) Assure that everyone in the implementation team on the local level understands his or her roll.	(7) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete Pan-European IOP project/service. (8) Analyse usage of "new" technical and semantic standards and report the problems/improvement proposals to the governing body.
National Authorities	(9) Take in consideration all legal national and EU interoperability requirements relevant on national level for concretely implemented service/project. (10) Analyse Pan-European legal barriers related to implemented project/service and remove them. (11) Cooperate with local public administration; leave them space to address their needs. (12) Use the Regional and EU support programmes and documents for removing the concrete legal barriers related to the implemented service/project.	(13) Support the Public private partnership on national level, which can fund the implementation of Pan-European IOP projects/services. (14) Assure timely the sufficient funding resources for the Pan-European IOP projects/services being implemented.	(15) Assure the clear ownership/leadership of the Pan-European project/service being implemented. (16) Choose the execution partners on local and national level (17) Deliver the good business case for a Pan-European service/project (e.g. VIES, NCTS) being implemented. (18) Define the clear set of deliverables of the Pan-European project/service being implemented.	(19) Leave the space for the local initiatives that will cover their needs related to the implemented Pan-European service/project. (20) Propose the introduction of missing semantic and technical standards, which can be used by concrete Pan-European application service. (21) Propose the modelling standards, framework and methodologies to be followed in the concrete Pan-European project/service being implemented.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(22) Support the implementation of similar or identical projects/services on a regional and Pan-European level, by providing them with experience in removing of legal barriers related to the concrete service/project.	(23) Support financially the implementation of Pan-European IOP services/projects (e.g. CARDS, PHARE) and research in the area of semantic and organisational IOP.	(24) Support the Pan-European IOP projects/services being implemented in Bosnia with the consultancy in the domain of management of the public administration projects. As well enrich them with international experiences.	(25) Donate needed infrastructure for concrete Pan-European IOP project/service being implemented. (26) Support (financially) introduction of important technical and semantic standards needed for concrete Pan-European service/project.
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(27) Support the implementation of similar or identical projects/services on a Pan-European level, by providing them with: (28) Experience in removing of legal obstacles related to the concrete service/project. (29) Consultancy on concrete implementation of EU legal requirements for concrete service/project	(30) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (31) Support financially the implementation of Pan-European IOP services/projects (e.g. CARDS, PHARE)	(32) Support the Pan-European IOP projects/services being implemented in Bosnia with the consultancy in the domain of management of the public administration same or similar projects in EU.	(33) Donate needed infrastructure for concrete Pan-European IOP projects (34) Support (financially) introduction of important technical and semantic standards needed for concrete Pan-European Project.

Figure 16: Generic recommendations for pan-European interoperability projects per interoperability projects

3.2.3 Recommended implementation approach

We recommend that projects be approached in way that limits risk and capital employed. A bottom-up approach is a strategy, where a small and limited pilot is created and run in parallel with the current systems to proof the concept and to collect valuable experience. Based on the experiences the organizational structures can be created, following the principles and policies of the interoperability strategy. The successful pilot provides the foundations of an infrastructure that could be expanded. Such pilots would preferably be governed by a central agency but not necessarily operated by it.

First, choose a service that requires modernization and that delivers a good return on investment. Check for any inter-organisational links that can be treated and resolved during the implementation for progression in the horizontal integration. As well watch out for any commonalities with other services, being planned, implemented or already implemented.

Second, the project needs to be coordinated and lead by a single body. In projects that affect the workflow of more than one body, either one of the bodies can take that role or a central body can govern the process.

Third, integrate the service vertically to further simplify the organizational structures. Thereby identify organizational development opportunities.

Fourth, document semantics for future interoperability projects and for re-use. This information is valuable also if upcoming projects may interoperate. (Also see WP3 Lecture on Interoperability)

Fifth, develop staff trainings, prepare material (hand books, etc.), and develop a support structure to minimize resistance and problems and to maximize satisfaction, usage and impact.

Sixth, develop indicators and benchmarks to monitor and measure the impact of the service.

Seventh, run the pilot in parallel with the existing system for testing, accuracy, timing, and usage acceptance benchmarking before going live.

Governance of Interoperability

The leadership and governance can be given to the Agency for Bosnia and Herzegovina Information Society which has yet to be defined a central IT body. Until the agency is finally established and operational and even later on, the "Ministry of Communications and Transport" can take the lead as well. This especially concerns technical and semantic standards. The agency or ministry as the central body with expertise on interoperability issues and cooperation with other partners that have expertise in their area (through the cooperation panel) can assist the implementation team and the body that operates the service with knowledge on specific interoperability issues.

We-Go recommends implementing a pilot first to limit costs and risks and gain experience during test run in parallel to the existing system.

This pilot project can be executed by some non-departmental organisation (e.g. APIS IT) or with some departmental organisation (e.g. Ministry of Interior). Consider the cooperation with the private sector for the technical implementation.

Prerequisites for this pilot project/service:

- Development of a pilot infrastructure
- Definition and publishing of technical and semantic standards needed
- Messaging Hub – based on the usage of XML technologies.
- Define the standards for business artefacts/elements
- Define the business artefacts/elements itself
- Definition of registers/catalogues of standardised business artefacts/elements. They have to be described and published. The usage of XML based technologies is recommended. Concrete instructions about recommended versions of specific standards can be found in the first part of the recommendations.

These are typical tasks that are common for all services regarding the organisational interoperability and best to be performed by the involved departmental unit:

- Analysis of forms and delivery channels in order to find better ways of service delivery
- Analysis of legislative regulations in order to first define and together with (for example) IOP team within the Ministry of Justice to remove the legal obstacles towards offering the new services.
- Analysis of business processes in order to define the common ones, to improve the current business processes or especially important for IOP to aggregate processes from different public administration organisational units and to offer them as a "totally new services" for the benefit of all participants of the Bosnian IS or one day maybe even EU IS space.
- Definition of common functionalities in order to enable their reuse.
- Definition of common legal and organisational obstacles towards aggregate service provision.

Ideally common functionalities are governed and operated centrally by either the Agency, the Ministry or the central IT body.
The following typical common functionalities are considered by IDABC as the most important ones:

- Identity management process
- Customer registration process
- Electronic forms production and management
- Case tracking and status reporting
- Electronic payment system

Organisational Layer of Interoperability

The reengineering of processes should be lead by one involved body if there are two or more bodies involved. The unit(s) currently responsible for the service takes an active part as well. The agency and PARCO can assist in the modelling and modernization of administration processes.
Operational execution and implementation of pilot project(s) can be entrusted to the department that is currently responsible for this service (e.g. a Ministry, department, etc.).

3.2.4 Services: Deployment level - NCTS

The following paragraph will describe concrete steps which have to be taken in order to deploy one pan-European service; the New Computerised Transport Service (NCTS). In terms of level and direction of data being exchanged, interoperability and services on concrete service deployment level have two dimensions:

- National (e.g. inscription at a university)
- pan-European (e.g. NCTS, VIES, EBR)
- National and pan-European (e.g. eID)

This document and We-Go as a project are not able and mandated to propose concrete implementation approaches or even more to become part of NCTS implementation team in Bosnia because of the high complexity and too many concrete missing information and much higher resources which are needed to successfully implement this service in Bosnia. This document will be used in the dissemination phase as a main information material for a concrete example of deployment of one pan-European service.

Community Transit is a customs procedure that allows customs to excise duties and VAT on imported goods to be suspended until the goods either reach their point of destination in the European Community or are exported out of it. The procedure can also be used for movements to and from the EFTA countries (Switzerland, Liechtenstein, Norway, and Iceland) and is then known as Common Transit. The New Computerised Transit System (NCTS) is a European wide system, based upon electronic declarations and processing. It is designed to provide better management and control of Community and Common Transit. In July 2005 European Union law made it mandatory to submit all transit declarations using NCTS, except for private travellers (with goods in excess of their allowances) and for some authorised simplifications.

All companies that use, or wish to use, Community/Common Transit can use NCTS. It will be necessary to have the facilities to send and receive electronic messages to and from NCTS. The aim is, that all traders will eventually input all transit declarations and any other necessary messages such as arrival of the goods, to NCTS electronically. Connected traders will receive electronic responses advising of key decisions during the procedure such as acceptance of declaration, release of goods, notification of discharge of liability etc. at both departure and destination.

There are two types of procedures available under NCTS:

- Normal Procedures,
- Simplified Procedures.

Using the *Normal Procedures* any company connected to NCTS will be able to lodge declarations at any Office of Departure. They will also have the facility to 'pre-lodge', i.e. to input a declaration prior to the physical presentation of the goods.
Under the *Simplified Procedures* authorised consignors/consignees will, as at present, be able to carry out community transit operations without presenting the goods and corresponding documents at the Customs Office. They must, however, become connected to the NCTS system and make their declarations electronically.

The interconnectivity to the NCTS systems, operational in the European Union and the other Contracting Parties of the Common Transit Convention, is an accession pre-requisite in the customs sector.

In Bosnia and Herzegovina NCTS is not included in any strategy or action plans. But it will be considered after the demonstration of the WP2 team for the following reasons:

- It offers advantages to customs and companies.
- It has to be implemented anyway in Bosnia and Herzegovina sooner or later, the latest one year before Bosnia and Herzegovina joins the European Union

NCTS has been chosen for the service deployment level of Bosnia because it is the most advanced cross-border application that has the widest spread, driven by the European Commission and the importance of the EU as a common economic area.

Governance aspects

The best approach for the realisation of a national NCTS system is the establishment of a new project team that focuses on the NCTS project. A pre-condition is the motivation of the involved persons and a good coordination between the IT team and the customs body.
The implementation should be based on a comprehensive plan for the change management. This plan includes all required steps for the implementation of NCTS. To be more exact it is the basis for the planning of human resources and other resources. Furthermore, it defines the necessary roles and definition of responsibilities. Moreover it sets milestones, which are the basis for progression measurement.

The project team should reflect the variety of interoperability topics:

- Team leader, team manager
- Analysts
- Programmers
- Organisational people with links to the customs body, customs officers, and IT sector

As already recommended in a previous statement, it is recommended to test and pilot the system extensively before "going live". The procedure therefore provides that there is an

- Internal test, followed by the
- Pre-Conformance test and the
- Conformance test

The internal test is conducted by people from business and IT with a "Standard Transit Test Application (STTA)". The tool provided by the European Commission that supports all basic functionalities (messaging).
During the pre-conformance tests the system is remotely connected to a server in Brussels. Another tool, called "Transit Test Application" (TTA) is used. The national NCTS system is tested against 300 pre-defined scenarios. In addition to the pre-conformance test the system is tested with implementations from other member states in the conformance test.
Generally NCTS installations run 24 hours per day and during the whole year. The availability of the system is regulated in a Service Level Agreement between the national NCTS and the European Commission. It allows a maximum downtime.
When planning the funding of the NCTS project, budgets for the development and implementation of the IT infrastructure have to be considered. As for the customs offices there are costs for hardware and software as well as operation and maintenance expenses.

Legislative Aspects

In order to fulfil the conditions for the introduction of a common European transit procedure, legal relations among all participants of transit procedure have to be regulated in details. This means that by that time, all the legal provisions concerning the transit (primary, secondary, and tertiary legislations) should be in force. Also, the preconditions for an alignment of the guarantee system for payment of customs debt that might occur have to be regulated and conditions have to be created in order to enable customs service to implement computerised transit procedures (NCTS).

From a legal point of view there are two kinds of regulations that need to be considered.

Firstly, the so-called "community transit" is a procedure used for customs transit operations between the EU Member States and is in general applicable to the movement of non-community goods for which customs duties and other important charges are at stake. Furthermore it is applicable for the movement of community goods, which, between their point of departure and point of destination in the EU, have to pass through the territory of a third country.

Moreover, there are regulations with respect to transit procedures which are in line with the transit convention. These regulations cover the common transit procedure used for the movement of goods between the 27 EU Member States and the EFTA countries (Iceland, Norway, Liechtenstein, and Switzerland). The rules are effectively identical to those of community transit.

The processes and procedure that need to be implemented are described and determined by the two-mentioned regulations. They are available from the NCTS webpage of the EU in short form and extensive description. This is why they will not be covered in detail in this document.

- Transit Convention
- Railroad and specific procedures
- Simplified procedures
- Guarantee Management
- Elaboration of national regulations

Organisational Aspects

The following organisational aspects should be addressed:

- EC NCTS project management aspects
- EC business aspects
- NCTS business team job profiles
- NCTS IT team job profiles
- Helpdesk job profiles
- Helpdesk strategy aspects
- Client administration – basic aspects
- Trader solution - basic aspects
- Trader awareness meeting

Business Aspects

European Community Business Aspects

The Business Change Management Plan will consist of:

- Business Change Management Plan - basic aspects
- Business Change Management Plan - business requirements
- Business Change Management Plan - IT requirements

- Business Change Management Plan - training requirements

IT Aspects

The development of national IT systems (TARIC[33], NCTS, EMCS, AEO, CCN/CSI, QUOTA, Surveillance, etc) is required to connect the CCA with the EU IT systems, in order to enable the exchange of information with the EC and EU Member States immediately upon accession to the EU. In order to comply with the EU Customs Legislation and IT system requirements, the following systems require interoperability by the date of accession:

- **CCN/CSI**[34]: this gateway is mandatory for the communication between the DG TAXUD IT systems and the member states' counterparts. The CCN/CSI must be operational at least three months prior to the beginning of any remote tests.
- **ITMS:** this integrated tariff management system is a business concept grouping most of the computerised systems dealing with the tariff exchange of information between the Commission and the EU member states. Two of the applications under this concept are complex. Being mandatory for the accession date, their development and interconnection should therefore be prepared in advance. These are TARIC (Tariff Integre Communautaire) and TQS (Tariff Quotas and Surveillance). ITMS also covers some other systems dealing with the exchange of information. For following ITMS sub-systems the Commission has developed web-light client solutions that do not require substantial national adaptations and that can be used instead of national system-to-system solutions:
  - **EBTI** (European Binding Tariff Information)
  - **ISPP** (Information System for Processing Procedures)
  - **SMS** (Specimen Management System)

The following ITMS subsystems do not require any particular IT development:

- **ECICS** (European Customs Inventory of Chemical Substances)
- **BOI** (Binding Origin Information)
- Suspensions

However, all **ITMS** systems (**TARIC, TQS, EBTI, ISPP, SMS, ECICS, BOI** and suspensions) are accession-mandatory.

- **NCTS:** by the date of the accession, the National Transit application, fully compatible with the NCTS, must be available. Moreover, the IT system should pass all the required conformance tests in national and international modes and that at least all traders with the status of an authorised consignor/consignee should be connected to the NCTS national external domain.
- **EMCS:** This system will modernise and significantly increase the grade of automatisation for the group of three applications that are presently operational and mandatory for Member States (EWSE[35], MVS and SEED[36]).

33 TARIC (Integrated Tariff of the European Communities) is designed to show the various rules applying to specific products when imported into the EU. This includes the provisions of the harmonised system and the combined nomenclature but also additional provisions specified in Community legislation such as tariff suspensions, tariff quotas and tariff preferences, which exist for the majority of the Community's trading partners. In trade with third countries, the 10-digit TARIC code must be used in customs and statistical declarations.

34 Common Communications Network / Common Systems Interface

35 Early Warning System for Excise (under the joined responsibility of DG TAXUD and OLAF)

36 System for Exchange of Excise Data

- Finally, new interoperability systems will be developed under the electronic customs' DG TAXUD project (within the security and modernisation reform of the EC Customs Act). Currently, the most defined applications being the following[37]:
  - **AEO** (Authorised Economic Operator)
  - **ECS** (Export Control System)
  - **ICS** (Import Control System)
- **MCC** Implementation
- Hardware specifications – will have to be delivered.
- Functional specifications of the trader module will have to be delivered
- Users perspective – From user's (companies) perspective adequate interfaces will have to be offered:
  - Web Interface - This enables companies to use the customs portal to send and receive NCTS messages. It is suited for small businesses that only have a low level of transit declarations. A web solution has several advantages:
    - Independent from customs office (warehouse)
    - Independent from System (PC, Mac)
    - Useable from wherever internet is available
    - Thin client (only browser is needed)
    - Easy to deploy
    - Centrally serviced packages
  - **EDIFACT** – This system sends and receives messages as email attachments, or in the body of the email, via Simple Mail Transfer Protocol (SMTP) or the ISO standard for electronic mail (X.400). If an EDIFACT message is sent to NCTS, a converter in the ERP software of the company will need to translate it into an EDIFACT coded message that NCTS can read. NCTS will then accept or reject the declaration in EDIFACT, which again a converter must be able to translate back.
  - **XML** - Another way of integrating a business' system into the New Computerised Transit systems (NCTS) is via the eXtensible Markup Language (XML) Channel. Using the XML route to NCTS means sending and receiving Electronic Data Interchange For Administration, Commerce and Transport (EDIFACT) messages "wrapped" within an XML envelope. EDIFACT declarations are transmitted via HTTPS (Hyper Text Transfer Protocol Secure sockets) to an NCTS XML Channel Application. The response is returned back to the NCTS XML Channel Application via EDCS (Electronic Document Control System), which "re-wraps" the message in XML. The user's system polls the XML Application and the trader receives the message.
  - A combination of the web interfaces and web services seems to be ideal, allowing creating web based clients (GUI) and Web Services. Customs officers can access the system via a web browser from anywhere, which gives them flexibility in the best possible way. Import and export companies are linked to the system via Web Services that are easy to

[37] The generic eCustoms term includes the following systems: AEO, ECS, ICS, RIF and other systems involved in Interoperability between MS Customs Administrations. In this context, it needs to be underlined that the "vision statement" on eCustoms is currently under discussion with the EU Member States. Therefore, all eCustoms systems specifications may change

program and easy to use for software companies of traders. In this scenario traders are collecting the messages and the system never sends messages.

- Different implementation ways implicate different message formats that need to be converted before being processed. Messages in the EDIFACT message format or the XML version of it need to be converted to the in-house XML format before the data can be accessed via Web.

Client Administration Aspects

- Helpdesk – description according to the existing EC NHD specifications
- Client Administration – business requirements
- Trader Solution
- Trader Awareness

Training Aspects

Any implementation of NCTS is required to be accompanied by an extensive training and information package for staff in custom offices and helpdesk and end users (traders). There are several training strategies that can be followed, e.g. train the trainers or workshops. Among the provided materials the most important are technical equipment to learn with, manuals for the system, its user interface and procedures as well as working guidelines.

- Training of the national helpdesk staff including the usage of CS/MIS (Central Services / Management Information System)
- Client administration - business requirements
- Guarantee management - business requirements
- Training on inquiry procedure
- Training on authorisation management of the simplified procedures
- Risk management in transit procedure
- Training on fallback procedure
- Training FTSS
- Training on CS/RD (Central Services/Reference Data) maintenance
- COL (Customs Office List) management
- Curricula development for the future national NCTS training programme

3.3 Dissemination with focus on interoperability stakeholder groups

3.3.1 We-Go dissemination plan

D.1.1.		D.1.2 (Dissemination)			
		Public Administration	IT Industry	Academia	International Organisations
Research	(1) EIF				
	(2) NIF				
	(3) Roadmap to interoperability				
	(4) Recommended interoperability approach				
Practice	(4) Recommendations				
	(5) Service deployment level				

Figure 17: We-Go dissemination plan for Bosnia covering all interoperability stakeholder groups and domains

The dissemination, presents the facts related to interoperability in Bosnia. The impact is reached through specific dissemination activities with every stakeholder group, covering all five layers of interoperability and the corresponding recommendations. The dissemination activities will share the common objectives but will vary in:

a) Mission (objectives)
b) Content sophistication level (general, generic, detailed, concrete actions)
c) Dissemination methods used.

Of course another variation is due to the recommendations domain and the stakeholder group. The content sophistication level will vary from general overviews and methods to concrete methodologies and techniques (e.g. public administration back office reengineering).

Dissemination methods are:

a) Workshops with target stakeholders groups
b) Conference participation (especially in working tables), research papers, and articles,
c) Working groups participation (e.g. +eSEE) on national, regional and pan-European level.
d) Participation and creation of (new) knowledge network communities within We-Go's Work Package 4 (e.g. We-Go Knowledge Net, epractice.eu)

The dissemination activities are presented in more detail in the figures below, per:

a) Practical or research domain,
b) Per stakeholder group,
c) Mission,
d) Dissemination methods used.

The dissemination plans for the different stakeholders are given in Figure 18 for public administrations, in Figure 19 for the IT industry, in Figure 20 for academia and **Figure 21** for regional in international actors.

D.1.1.		D.1.2 (Dissemination) Public Administration		
		Local Level	**National Level**	**Others (e.g. IS decision makers, Project Managers, IT Architects, Software Developers)**
RESEARCH	(1) EIF	**Mission:** Introduce and press importance of the principles of the various aspects of interoperability, the EIF, Lisbon Agenda, i2010 in Bosnia and Herzegovina and the impact on and advantages for the local level, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working groups c) Knowledge Net communities	**Mission:** Introducing ALL layers of interoperability, EU activities (EIF, i2010, Lisbon Agenda), best practices and the link to the current national eGovernment strategy. Press the importance and advantages of an integrated interoperability approach, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, round table, working group c) Knowledge Net communities	**Mission:** Introducing interoperability and the EIF recommendations on the service deployment level: technical layer of interoperability, opportunities and barriers, requirements for the IT architectures, security, accessibility, service availability, system integration, interfaces and data mapping, compliance analysis results. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities
	(2) NIF	**Mission:** EIF and NIF: interoperability on different administrative levels with focus on the local level. The role of local administrations in the NIF, compliance analysis results. Organisational and governance aspects of interoperability. Local level interoperability in the EU. **Content sophistication level:** general overview, more specific on the role of the local level administrations and impact, more specific on organisational and governance aspects. **Dissemination methods used:** a) Workshop	**Mission:** EIF and NIF: interoperability on different administrative levels with focus on the national level, compliance analysis results. Leadership and coordination of the interoperability strategy organisational structures **Content sophistication level**: concrete, detailed on organisational and governance aspects **Dissemination methods used:** a) Workshop	**Mission:** Requirements that arise of the NIF implementation for IT and IT implementation, technical layer of interoperability, compliance analysis results. **Content sophistication level:** concrete, Detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table, working group c) Knowledge Net communities
	(3) Roadmap to interoperability	**Mission:** Introducing the roadmap to interoperability and the role of the local level administrations, opportunities and dangers, impact. Knowledge sharing and semantics. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Introducing the roadmap to interoperability and the role of national level bodies in the planning and implementation. Cooperation and collaboration, pilot projects. Knowledge sharing and semantics. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** IT and operational aspects of the roadmap to interoperability. Requirements for the implementation. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities
	(4) Recommended implementation approach	**Mission:** Presenting the recommended implementation approach and the requirements to and impact for local level administrations. Role of the national level. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and the requirements to and the role of national level bodies. Public-private partnerships. Pilot projects. Change management and project management. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and the tasks and responsibilities on the operational level, public-private partnerships, and pilot projects. IT projects management of interoperability projects. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper c) Knowledge Net communities
PRACTICAL	(5) Recommendations	**Mission:** Key success activities, responsibilities of local level administrations in the overall interoperability strategy and in interoperability projects (national, pan-European). Focus on: organisational and governance aspects, legal system. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, round table, working group c) Conference	**Mission:** Key success activities and responsibilities of the national level bodies in the interoperability strategy an in the implementation of interoperability projects. Focus on: organisational and governance aspects, legal system. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities	**Mission:** Key success activities and barriers on the technical layer of interoperability. **Content sophistication level:** concrete and detailed **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities
	(6) Service deployment level	**Mission:** Local level administrations in the NCTS. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Aspects and characteristics of NCTS in Bosnia /w focus on legal and organisational aspects (process modelling, services re-engineering, etc.), EU best practices. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Technical aspects of introducing NCTS in Bosnia (e.g. networking, security, data mapping), EU best practices. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities

Figure 18: We-Go dissemination plan for public administrations in Bosnia

D. 1.1		D.1.2 (Dissemination)		
		IT Industry		
		SW Development	**IT Industry Association / Consultancy**	**Computing Centres**
RESEARCH	(1) EIF	**Mission:** Introducing interoperability and EU best practices (EIF, IDABC documents, i2010, Lisbon agenda). Technical layer of interoperability. **Content sophistication level:** very general **Dissemination methods used:** a) Workshop b) Round table	**Mission:** Introducing interoperability and EU best practices (EIF, IDABC documents, i2010, Lisbon agenda). Technical layer of interoperability, compliance analysis results. **Content sophistication level:** very general. **Dissemination methods used:** a) Workshop b) Round table	**Mission:** Introducing interoperability and the EIF and the impact on the operational level for Bosnian Computing Centres. Requirements and opportunities for Bosnian Computing Centres. **Content sophistication level:** very general **Dissemination methods used:** a) Workshop b) Conference, paper
	(2) NIF	**Mission:** The opportunities for the software industry in the implementation of national interoperability. Public-private partnerships. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** The opportunities for the IT industry in the implementation of national interoperability. Public-private partnerships, compliance analysis results. **Content sophistication level**: general **Dissemination methods used:** a) Workshop c) Knowledge Net Communities	**Mission:** Operational requirements to support national interoperability with IT services. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference c) Knowledge Net communities
	(3) Roadmap to interoperabilit	**Mission:** Introducing the roadmap to interoperability and opportunities for the software industry. Public-private partnerships. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table c) Knowledge Net communities	**Mission:** Introducing the roadmap to interoperability and opportunities for the software industry. Public-private partnerships. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference	**Mission:** Role of the computing centres in the roadmap of interoperability, **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop b) Conference, round table c) Knowledge Net communities
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for Bosnia and what does it mean for Bosnian SW Industry. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop	**Mission:** Presenting the proposed implementation approach for Bosnia from the Bosnian IT Industry and Consultancy perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop	**Mission:** Presenting the proposed implementation approach for Bosnia and what are the concrete tasks, activities which could be undertaken on concrete operational level from their perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshop
PRACTICAL	(5) Recommendatio ns	**Mission:** Recommendations for successful execution of interoperable services with national and pan-European character from Bosnian SW developer perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Recommendations for successful execution of interoperable related services/applications/projects with national and Pan-European character from Bosnian IT Industry and Consultancy perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Recommendations for successful execution of interoperable services with national and pan-European character from their perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshop b) Conference, paper, round table, working group c) Knowledge Net communities
	(6) Service deployment level	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS and their possible role in that project. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS and their possible role in that project. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Overall presentation of steps to be performed in order to implement NCT and their possible role in that project. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, round table

Figure 19: We-Go dissemination plan for IT industry in Bosnia

D.1.1.		D.1.2 (Dissemination)			
		Academia			
		Universities	**Research Institutions**	**IT Institutes**	**Others (e.g. independent researchers)**
RESEARCH	**(1) EIF**	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, paper	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, conference, round table	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, round table	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group
	(2) NIF	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions, and compliance analysis results. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions, and compliance analysis results. **Content sophistication level**: detailed **Dissemination methods used:** a) Workshop	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions on the operational level, compliance analysis results. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table c) Knowledge Net Communities	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions, and compliance analysis results. **Content sophistication level**: General overview + concrete details about in some areas **Dissemination methods used:** a) Workshop
	(3) Roadmap to interoperability	**Mission:** Introducing the roadmap to interoperability and associated research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper	**Mission:** Introducing the roadmap to interoperability and associated research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper	**Mission:** Introducing the roadmap to interoperability on the operational level and associated research opportunities. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table	**Mission:** Introducing the roadmap to interoperability and associated research opportunities. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table
	(4) Recommended implementation approach	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop
PRACTICAL	**(5) Recommendations**	**Mission:** Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** P Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table
	(6) Service deployment level	**Mission:** Characteristics of NCTS. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference			

Figure 20: We-Go dissemination plan for academia in Bosnia

D.1.1.		D.1.2 (Dissemination)			
		Regional, pan-European and World Level			
		Stability Pact	**UNDP**	**USAID (e.g.)**	**EC (IS Directorate)**
RESEARCH	**(1) EIF - and – (2) NIF**	**Mission:** Presentation of the compliance analysis and recommendations and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities			
	(3) Roadmap to interoperability - and - (4) Recommended implementation approach	**Mission:** Introducing the roadmap to interoperability and the recommended implementation approach and showing opportunities where the stakeholders can get active to support Bosnia. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities			
PRACTICAL	**(5) Recommendations**	**Mission:** Presenting We-Go recommendations and key activities to regional and EU stakeholders. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table, working group c) Knowledge Net communities			
	(6) Service deployment level	**Mission:** Characteristics of NCTS, role of stakeholders in implementation. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table			

Figure 21: We-Go dissemination plan for regional and European stakeholders in Bosnia

3.3.2 We-Go dissemination activities

Figure 40 shows the topics and stakeholders that We-Go is going to address.

Bosnia	We-Go Contributions to Dissemination Plan for 2nd period			
	Bosnian IOP Stakeholder Groups			
	Public Administration	IT Industry	Academia	Regional, pan-European and World Level
(1) EIF	1/2 day workshop	1/2 day workshop	1/2 day workshop	1/2 day workshop
(2) NIF				
(3) Roadmap to interoperability				
(4) Recommended implementation approach				
(5) Recommendations	1 1/2 day workshop	1 1/2 day workshop	1 1/2 day workshop	
(6) Service Deployment Level				

Figure 22: We-Go dissemination plan for Bosnia with a marked cell where We-Go is planning activities

Event planning for 2nd period and expected participants from the different stakeholders

	Bosnian IOP activities 2008/2009	Date	PA Hi Level	PA Mid Level	Private NGO Academia	Total No. Participants	Student Days	Total Person Days
	Event							
1	**1st IOP Workshop Mgmt**	**Nov/Dec 2008**	3	10	7	20	½	10
2	**1st IOP Workshop for Professionals / Experts**	**Nov/Dec 2008**		10	10	20	1 1/2	30
3	**2nd IOP Workshop Mgmt**	**Jan/Feb 2009**	3	10	7	20	½	10
4	**2nd IOP Workshop for Professionals / Experts**	**Jan/Feb 2009**		10	10	20	1 1/2	30
	Overall Sum		**6**	**40**	**34**	**80**		**80**
			8%	**50%**	**42%**			

Figure 23: Planned We-Go activities in the 2nd period in Bosnia

Additional and complementary Activities

1. **Participation in WP3 TTT events (see WP3)**
2. **Participation in WBC Conferences to be announced**

4. Interoperability in Croatia

The usage of Information Technology systems in the public administration plays a key role in shifting towards knowledge and information based society. Croatian government has recognized this fact by establishing e-Croatia, the state agency responsible for transforming the Croatian society into an information society. Currently Croatia has reached a level of online sophistication for public services of around 50% on average, but in the term of fully online availability it is still lagging behind the levels already reached in the European Union countries. Considering the way of introducing electronic public administration services in Croatia by a central state agency, and the achieved results on state level, Croatia is on a promising way to reach the level of EU country members. At the moment Croatia is positioned on the same level of e-Government sophistication as for instance Slovakia. Nevertheless, on the same level of sophistication were current EU eGovernment champions (Austria, Slovenia, and Estonia) several years ago. After recognizing interoperability as a central necessity, appropriate actions have been taken in these countries, and they moved forward very fast into the top rankings.

Although several standards, policies, and documents have been developed and accepted covering the eGovernment domain, a National Interoperability Framework (NIF) is still missing. The National Council for Information Society was established in 2007 through a government resolution with the aim of exploring, raising, and promoting all relevant issues regarding the development of an Information Society. Among the other important roles the development of guidelines for the development and use of open standards and the National Interoperability Framework will be the most important tasks for this agency. The process of establishing interoperability among the public administration's services has already started in the form of establishing services which are able to exchange data across the Croatian borders and by adopting national and international norms and standards. In order to establish the prerequisites for interoperability between information systems of The Customs Administration[38] and The Tax Administration[39] with the information systems of EU countries, the implementation of a joint gateway has been started. Therefore national standards for spatial data representations and interoperability support need to be set up and aligned with current EU and world standards. The State Geodetic Administration[40] has presented a study of a template for a national spatial data infrastructure to support the National Infrastructure for Spatial Data in Croatia[41]. The main goal is to develop standards aligned with *the Proposal of a Directive on establishing an Infrastructure for Spatial INfoRmation in Europe* (INSPIRE).

By broadening the integration processes in the EU, where Croatia is participating in the status of a candidate country, there arises the need for implementing Pan European public administration services of member countries. The objective of the EU **IDABC programme**[42] is to establish a framework which will enable a harmonious delivery of Pan European e-public services among public administrations of member states. By participating in this program, Croatia is getting involved in the process of developing the **e-Public Administration programme** in the European Union and the **European Interoperability Framework**. Within

[38] Carinska uprava
[39] Porezna uprava
[40] Državna geodetska uprava
[41] Nacionalna infrastruktura prostornih podataka Republike Hrvatske (NIPP RH)
[42] http://www.europa.eu.int/idabc

the framework of implementing the European Commission Action Plan for electronic acquisition, activities in the development of open technical specifications as well as technical and functional requirements for information systems for electronic public tenders have begun in 2006.

The Croatian Standards Institute[43] (HZN), which is responsible for standardization in the Republic of Croatia, began operating in July 2005, after Croatian legislature complied with European regulations in the area of standardization, accreditation and metrology. Organizations such as the European Committee for Standardization (CEN), European Committee for Electrotechnical Standardization (CENELEC), and the European Telecommunications Standards Institute (ETSI) are responsible for standardization in the European Union. HZN is an official member of these organisations and has established close cooperation. Moreover HZN is also a member of world standardization organizations such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) and aligns its working programme with the norms introduced by these organisations.

In addition to national and international organizations for standardization, many other international professional associations develop and maintain so called open standards. While standards accepted in organizations for standardization are protected by copyright and their unauthorized multiplication and distribution is prohibited, open standards are accessible to the public without a fee. Some of the most important open standards are the following:

- Standards for the creation of Internet pages and establishment of Internet services which are developed and maintained by the World Wide Web Consortium[44],
- Technical Internet standards which are developed and maintained by the Internet Engineering Task Force[45]
- Standards for eBusiness which are developed and maintained by the Organization for Advancement of Structured Information Standards[46]
- Standards for interoperable distribution of digital contents developed and maintained by the Open Archives Initiative[47], etc.

The Croatian Standards Institute (HZN) is working closely with these organisations as well. For example, the process of harmonisation of Internet pages of the public administration with the open standard WCAG 1.0 – Web Content Accessibility Guidelines 1.0 started in 2007. Its goal is to make the information, issued by bodies of government administration on their Internet pages, accessible to all citizens and legal entities under equal conditions, regardless of the platform used in their work.

Based on the conclusion of the government of the Republic of Croatia from 2005, bodies of government administration posted on their web pages all the official forms in an electronic format, which citizens and other parties must use in a prescribed manner. In accordance with the principle of openness of the strategy programme HITRO.HR, users of public sector services must be able to download an e-form to their own PC, fill it in electronically, save it on their own PC, print it out and submit it to the authorized administration office either in person or by post.

[43] HZN – Hrvatski zavod za norme, http://www.hzn.hr
[44] W3C, http://www.w3.org
[45] IETF, http://www.ietf.org
[46] OASIS, http://www.oasis-open.org
[47] OAI, www.openarchives.org

If an office in authority within public administration system acknowledges eBusiness operational mode based on the Law on Electronic Identification, it must accept the completed and electronically signed form in electronic format. The electronic form must be accessible in a format, which is legible by open-standard supporting freeware applications. These open standards include ISO 19005-1:2005 PDF 1.4, OASIS - OpenDocument v1.0, W3C HTML 3.2 etc. Moreover the government administrations must provide the electronic forms in a platform-independent manner.

4.1 Compliance Analysis

As mentioned above, the National Interoperability Framework in Croatia is still missing. However, the process of introduction of interoperability in Croatia has started and is an ongoing process. In this report the gap between current Croatian achievements regarding the Interoperability and the European Interoperability Framework will be presented in a very concrete, practical, and operational manner. However, with or without the NIF, the synonym for interoperability is an agreement of all participating stakeholder groups on the usage of all needed common issues of interaction that have to be aligned mutually to the benefit of all participants. Therefore the analysis presents all key interoperability aspects, which should be incorporated in the Croatian Information Society Agenda.

4.1.1 Technical Layer of Interoperability

At the ***front office level*** some issues like ***multi-channel access, character sets, and file type as well as document formats*** are addressed so far through different activities.

Although several different bodies are involved in defining the technical layer of interoperability, the We-Go Desk Research didn't found evidence of activities, which are taking care of issues such as ***data presentation and exchange or collective authoring***. eGovernment services in Croatia reached around 50% of online sophistication on the average, but this is merely a result of digitalisation of old services offered by public administration then the process of their reengineering and redeployment. EIF concretely addresses itself strongly on technical interoperability on the ***back office level***. We-Go desk research has shown, that the ***reengineering of back-office*** is one of the most crucial activities that have to be achieved in the near future. The Croatian public administration information space must connect "isolated island" solutions into one aggregated and common information space. Moreover, there are no clearly appointed organisations which have taken the initiative of considering and coordinating all these important issues of technical interoperability on the front- and on the back- office level as well on a state level.

4.1.1.1 Core Technical IOP

- The presence of suitable ***technologies to handle structure of information such as XML and data models*** were found during the desk research. Depending on the platform which is used, individual information resources are implemented. The communication between the different resources may be established using a separate "adapter " application which uses standard XML schemes.

The inter-layer for modelling business processes permits describing and executing business processes that require an integration of information resources from several various sources. The presentation layer ensures, that the information viewed by the user is presented in an aggregated manner, regardless of the number of data sources used. The presented data must be adjusted to the communication channel chosen by the user e.g. telephone conversation, SMS message, online computer access or access at the Internet kiosk, WAP.

- Use of suitable technologies to handle structure of services, such as Web Services[48], SOA[49], WSDL[50], UDDI[51], and workflows is already taking place. In the public administration services are currently developed by APIS IT[52]. The developed services are mainly for customs, taxes, and elections. Thereby desk research has shown evidence of a coordinated usage and development of these services on a state level.

- Use of suitable technologies to handle Semantics of Information, such as RDF[53], OWL[54] is still not actually taking place.

- Use of suitable ***technologies to handle Semantics of Service, such as OWL-S[55], WSMO[56], and Semantic Web Services[57]*** is still missing.

4.1.1.2 Supportive Technical IOP

- Regarding the ***accessibility*** all public administration Internet pages are still not harmonized with the open standard WCAG 1.0 - Web Content Accessibility Guidelines 1.0 like was previously planned until 2006. According to the eCroatia's annual report for 2007[58], the process of harmonisation will additionally be extended

[48] The W3C defines a Web service (many sources also capitalize the second word, as in Web **S**ervices) as "a software system designed to support interoperable Machine to Machine interaction over a network."
[49] Service-oriented architecture, software architecture that defines the use of services to support the requirements of software users
[50] The Web Services Description Language is an XML-based language that provides a model for describing Web services.
[51] Universal Description, Discovery and Integration (UDDI) is a platform-independent, XML-based registry for businesses worldwide to list themselves on the Internet.
[52] Information Systems and Information Technology Support Agency
[53] Resource Description Framework (RDF) is a family of W3 Consortium specifications originally designed as a metadata model but which has come to be used as a general method of modelling information, through a variety of syntax formats.
[54] Web Ontology Language is a markup language for publishing and sharing data using ontologies on the World Wide Web.
[55] OWL-S is ontology, within the OWL-based framework of the Semantic Web, for describing Semantic Web Services.
[56] Web Service Modelling Ontology is an ontology currently developed to support the deployment and interoperability of Semantic Web Services.
[57] Semantic Web Services are self-contained, self-describing, semantically marked-up software resources that can be published, discovered, composed and executed across the Web in a task driven semi-automatic way. Semantic Web Services can be defined as the dynamic part of the semantic web.
[58] http://www.ehrvatska.hr/sdu/hr/Dokumenti/StrategijeIProgrami/categoryParagraph/01112/document/OP2007_godisnji_izvjestaj.pdf - Available only in Croatian.

and supported through planned courses for targeted public administration servants who are responsible for implementation tasks.

- ***Multilingualism and multiplatform devices*** **–** Some public administration Internet pages are offered in English as well. Services offered by the public administration are still not bi- or multi- lingual.

- The ***security and privacy*** of information resources and communications is critical for establishing a trustful relationship with citizens and enterprises. In 2005, the Government of the Republic of Croatia adopted the *National Programme for Information Security in the Republic of Croatia* as well as the *Plan for the Implementation of the National Programme for Information Security in the Republic of Croatia for* the year 2005**.** The National Programme for Information Security in the Republic of Croatia defines goals for information security at the national level, the jurisdiction and duties of particular institutions in the area of information security, as well as the necessary mutual coordination of all factors of information security. These include the requirements necessary for a systematic development of laws, regulations, methods, procedures and technical systems. The strategic task of this national programme is to gradually expand the process of information security to the entire country by introducing appropriate, minimal safety criteria into the government and public sector, as well as the development of the awareness for security among the wider public. Since its beginnings, the Central Administrative State Office for eCroatia has encouraged the activities related to adopting norms and open standards, which led to adoption of several ISO norms and standards.

- The presence of principles of ***subsidiary***[59] could not be proved by the analysis of available resources by the We-Go desk research.

- Use of ***open source software.*** There is an open source software policy, which provides the guidelines for developing and using open source software in the government institutions.

- Use of ***open standards.*** It is required from the state administration bodies to apply open standards for the recording of electronic documents, which is included in the operational plan of implementation of the eCroatia 2007 programme. Open standards are thus creating the foundations for the operation and development of the HITRO.HR system. HITRO.HR will contain the procedures for integrating the information and public services with the overall goal to reduce the total public expenses of providing services to citizens and companies.

4.1.2 Semantic Layer of Interoperability

The process of drafting and agreeing on ***common and global definitions and representations for eGovernment definition/vocabularies/metadata*** still didn't take place. Moreover, Croatian eGovernment actors didn't realise the importance of this field. From this perspective We-Go desk research team has concluded:

[59] The subsidiarity principle is intended to ensure that decisions are taken as closely as possible to the citizen and that constant checks are made as to whether action at Community level is justified in the light of the possibilities available at national, regional or local level.

- ***Common and global definitions/representations for eGovernment semantics*** are missing, and there are on ongoing activities covering this domain.

- The ***modelling perspective and formalisms for documenting the common definitions*** are still missing. Moreover, there is no state level body taking care for this subject.

- The ***administrative level of definitions development*** is still not present and there are no ongoing actions and activities, which are covering this domain.

- ***Promotion and dissemination as well as mature common definitions*** are not present at the moment and there are no ongoing activities or institutions covering this domain.

- ***Trust, reliability and the supportive technical inter-operability layer*** are still missing. Furthermore, it is not mentioned in any of the analysed reference documents, that there are any state level bodies covering and coordinating this domain.

- ***Maintenance and evolution of common definitions*** are not present since the Croatian eGovernment actors did not realise its importance.

4.1.3 Organisational Layer of Interoperability

At the moment the involved public administration organisations are jointly determining the organisational inter-operability aspects. Moreover, there are initiatives for the identification and prioritisation of services in the public administration domain. A good example for the successful implementation are services like NCTS or INSPIRE, providing the first cross-border services with pan-European character in the country.

- Evidence of a ***clear link between cross-organisational processes/services and the business strategies*** were found during the We-Go desk research.

- The process of ***modelling and visualisation of public administration services/processes*** still didn't take place in a large and systematic scale.

- The process of user involvement in the public administration domain is supported by setting up communities of practice. These communities aim at the integration of local communities through the construction and setup of broadband data transfer possibilities. The overall goal is a high availability of broadband access for Croatian citizens.

- There are neither ongoing activities nor responsible organisations coordinating the issue of ***knowledge reuse. There is a significant lack of experience related to the execution of internal and cross-agency business processes and services in the private sector***.

- ***Identification and documentation of common service functionality and features across public administration agencies*** are missing or not realised.

- There are some isolated examples of ***support for multi-channel service delivery*** but they are neither standardised nor centrally managed by an organisation with a clear responsibility for the issue. All the services offered by the state's administrative bodies to legal and natural persons at a central and local level are integrated horizontally by establishing an integral information system. The system unites all information and communication resources of all bodies through a unique communications network by applying technological, semantic, and process interoperability features. In order to apply security constraints the systems uses advanced electronic signature for authorization and authentication. Moreover international standards of information security and data protection are used, thus enabling an "end-to-end" service through all available communication channels e.g. personal contact, telephone, SMS, Internet etc.

- ***Consensus on and visibility of the ownership, management and responsibility for cross-organisational processes / services***, is still not achieved and there is currently no responsible state level body taking care of this issue.

4.1.4 Governance Layer of Interoperability

4.1.4.1 Political

- ***Development of national eGovernment IOP strategy and programmes.*** Croatia is currently getting involved in the process of developing the ePublic administration programme in the European Union and the European Interoperability Framework. The process of establishing an interoperability framework has already started in several parts of public administrations e.g customs administration and tax administration. The state geodetic administration (Državna geodetska uprava) has presented a study of a national spatial data infrastructure as a template for the national infrastructure for spatial data in Croatia - HITRO.HR.

- We-Go Desk research didn't find any evidence for ongoing activities of ***promotion of organisational federalism as a model for organising the diverged administrative space into a cooperative environment.***

- The presence of ***international inter-operability aspects*** was found during the research. Croatian authorities have realized the significance of interoperability. The implementation of cross-border pan-European services like NCTS or INSIPIRE shows, that interoperability efforts now play a very important role in Croatia's eGovernment initiatives.

4.1.4.2 Legal

- The need for ***a legal alignment in order to address the new requirements posed by the intensive cooperation of public administration*** agencies is recognised and addressed in the strategy and action plan of the reform of public administrations. The alignment process is currently ongoing in Croatia.

- ***Protection of intellectual properties in multi-partner projects and developments*** has been identified as an important issue.

- ***Diffusion of digital signature and electronic identity.*** By enacting the law on electronic identification, a basis for creating a wider use of the system of e-business and services on the network, where the key category is the electronic signature, was set.

- ***Citizen privacy and data protection.*** Data on citizens' personal status is entered into local databases and replicated into the central registry at the Central State Administrative Office for Public Administration (SDUU[60]).

4.1.4.3 Managerial

- Although there is a state level body responsible for ***clear interoperability leadership/ownership/ sponsorship/management on the national level,*** its role is not clearly perceivable in the large scale.

- ***Flexibility/transferability/reconfigurability of interoperability solutions*** can be seen through the strategic goal of the eEducation project. The Croatian national library system includes the communication, personal computers, organization, information, and people. Furthermore the network will provide a linkage and data transparency between the libraries.

- Evidence of ***adoption of available and relevant standards and the proposal of new standards in areas where standardisation is missing*** were found during the desk research. Examples of standards that have been adopted so far are: Croatian National Educational Standard (HNOS), ECDL (European Computer Driving Licence), XML standards (2006), and standards for information systems protection ISO 17799 (2006).

- A much needed ***broad commitment, participation and communication*** can be seen in the common programmes like e-Registries, e-Justice, e-Education, e-Health, and e-Business.

- Parts of the involved public administration organisations have shown interest in a **cultural change of interoperability with all participating partners**. However, a commitment to organisational and cultural changes is still not a common phenomenon, which is happening on a large scale.

- The process of ***training the staff related to inter-operability projects*** has been started. We-Go desk research has found several examples and the consolidated plan according to deadlines is:
  - Design programmes and measures as well as special projects for training state administrative bodies from: Office for eCroatia, Central State Administration Office for public administration, and the Ministry of Justice in 2005/2006.

[25] SDUU - Središnji državni ured za upravu – Central State office for Public Administration

- Initiate programmes and measures and as well as special projects for training state administrative bodies from: Office for eCroatia, Central State Administration Office for public administration, and the Ministry of Justice, in 2005/2006.
- There are also additional training activities, which are performed in order to support ongoing projects related to interoperability. An example project is the harmonisation of all state web sites in order to be WCAG 1.0 – Web Content Accessibility Guidelines 1.0 compliant.

4.1.4.4 Economic

- ***Adoption/switching costs inherent to interoperability solutions.*** Involvement of local communities will be encouraged in the development of broadband data transfer through private and public partnership, and by financing the construction of infrastructure for high-speed Internet.

- ***Public procurement policies and financing for interoperability projects***. In January 2007 Croatia has brought its legislation in line with the eProcurement provisions of the EU Directives on Public Procurement[61].

- ***Partnering with the private sector in interoperability projects***. The main goal of public-private partnership is to activate all non-state resources into the process of establishing an information security. The overall goal is that all stakeholders can benefit of an information society.

4.1.5 Infrastructure, Back Office and Services

The following text will cover two important issues, addressed by EIF; interoperability key infrastructure and benchmarking of the 20 most important public administration's services offered to the citizens and business. In order to reach interoperability there is a need to include the NIF and EIF postulates in the public administration ICT infrastructure. Moreover it is important to measure the progress of online sophistication of public administration services. The benchmarking was introduced for a first time in Croatia in 2004 on a state level by e-Croatia based on the same principles as CapGemini in the EU did it. Since then it was performed continually on an annual basis. However, We-Go desk research didn't find evidence of a state level body taking care of the issue of interoperability in particular in regard to ICT infrastructure decisions. Furthermore there are no common guidelines and principles that should be obeyed by all levels of public administration included in the process of creating the important central registers and other key ICT interoperability infrastructure. The general impression of the desk research team is, that in the last few years Croatia has made great progress in the implementation of new services and in the deployment of new ICT infrastructure. However, the back office integration as a process didn't take place. There is neither a state body nor a specific strategy addressing and coordinating this process needed to move from isolated islands solutions towards interoperable services.

[61] Directives *2004/17/EC* and *2004/18/EC*

Basically, the key infrastructure for interoperability is already implemented to some extent or will be implemented in the approaching period. The Internet connections on state level have reached a solid level of sophistication. The majority of state institutions on local, regional and national level as well as educational institutions have Internet or broadband Internet connection. The e-Signature as a service and infrastructure on a large scale, offered both to citizens and businesses, is still missing. Nevertheless, the legislative part has already been enacted as mentioned before. At the moment the only usage of electronic signature issued by FINA is within the ePDV[62] service context. The record management is still missing and has to be introduced. All state bodies are connected through the HITRONet, an ICT network providing the basic system of computer-based communication between state administration bodies.

Availability of ICT infrastructure and deadline as indicated in the action plan of the national IS strategy	
Advanced computer networking (physical infrastructure)	Yes/No
Building a logical infrastructure among the state institutions	2008
e-Signature	Yes
Record management	Yes
Equipping the municipalities with at least three computers and continuous Internet connection for public access	Yes
Broadband connectivity	Yes
Internet connectivity at schools	Yes
Internet at Local and government units	Yes

Figure 24: Key interoperability ICT infrastructure in Croatia in 2007

The central database registry on personal data consists of a main registry, subsidiary databases, and the different records. There are neither common guidelines, nor is there a state level body which is covering and coordinating the issue of data description in all registries on a national and local level. The Ministry of Justice is the major coordination body regarding the implementation of information systems in the judicial domain.

Availability of Information Systems in Croatia	
Electronic Citizen Registry	Yes
Public Expenditures (Treasury/Finance)	Yes
Taxation Authorities	Yes
Customs Administration	Yes
Network/communication infrastructure, dedicated to e-Governance systems	Yes[63]
Judicial systems	Some
Electronic Registration of Companies	No

Figure 25: Availability of information systems in Croatia in 2007.

The judges and other judiciaries are using legal databases and registers. At the moment there are two large projects going on: the implementation of ICMS[64] and the single Intranet and Internet network for judicial bodies. ICMS aims at covering all business operations and needs of the judicial system, and the single Intranet is a prerequisite for the exchange of documents and information within the judiciary. While deployment of information systems progresses well, desk research has found a lack of central coordination between the interoperability activities in different public administration sectors. Taxation and customs authorities are successfully modernising of their services and ICT equipments. They are the first public administration institutions to introduce cross-border Pan-European services – NCTS and VIES.

The implementation of fully operational registers to be used in an eGovernment environment is crucial for the achievement of interoperability among services, processes, and peoples in public administration.

[62] eVAT – Electronic Value Added Tax system.
[63] HITRONet
[64] Integrated Communication Management System

Although the majority of registers is already fully functional and available online, desk research still didn't find a state level body taking care of a coordinated approach in designing and implementing these registers. Moreover, there are no guidelines based on a common agreement of all included participants in eGovernment in order to assure the same level of interoperability among these registers. At the moment the Croatian IS Agenda includes and addresses interoperability on a national and Pan-European level as a key issue, but only on high policy level.

Figure 26 provides us with an insight into the current situation in Croatia regarding registries. At the moment registries covering companies and associations as well as agricultural and tourism are missing. Not all currently fully implemented registers are available online for all citizens. The central register of all registers/databases is still in the implementation phase.

Fully operational registers and deadline as indicated in the action plan of the national IS strategy	
Companies and associations	Yes/no
Persons	Yes
Addresses	Yes
Personal properties	Yes
Citizenship	Yes
Cadastre	Yes
Agricultural	No
Tourism	No
Central registrar of all databases	Yes/No

Figure 26: Availability of fully operational registers in Croatia in 2007

4.1.6 We-Go Benchmark – availability of Online Services

Croatia has introduced the benchmarking of online service availability based on the CapGemini method used in all EU member states for a first time in 2004. The benchmarking on a state level performed by CapGemini and coordinated by eCroatia in 2006, has shown that most eGovernment services have reached modest level of online sophistication. Currently only one service is fully online available.

The overall online sophistication of all public services is 51,34%.

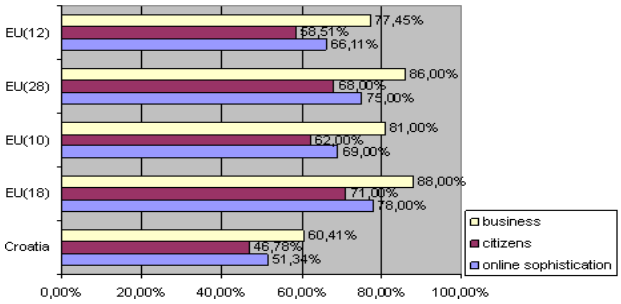

Figure 27: Online Sophistication of services for businesses and citizens measured by CapGemini for e-Croatia in 2006- Comparison of EU (12), EU (28), EU (10), EU (18) and Croatia

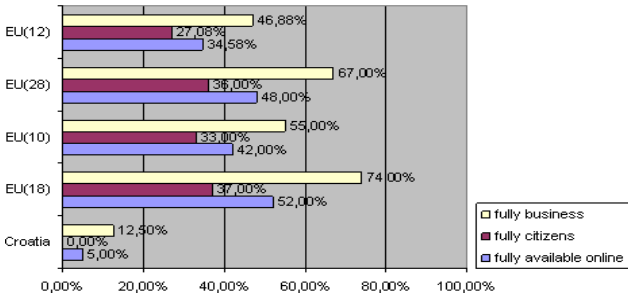

Figure 28: Fully Online availability of services for businesses and citizens measured by CapGemini for e-Croatia in 2006-Comparison EU (12), EU (28), EU (10), EU (18) and Croatia

Online sophistication according to clusters has shown that the average percentage of online availability of public services is higher in the European Union than in the Republic of Croatia for some 20 to 30%. Throughout the EU, services for businesses reach a higher sophistication level than those for citizens; desk research has identified the existence of the same trend in

Croatia as well. The European average of online sophistication is much higher than in Croatia (51,34%); currently it lies between 61% and 94%. Compared to the rest of the WBC region and the countries included in the We-Go project, Croatia is on a similar level of sophistication than the EU. The online sophistication is not significantly lagging behind (EU (12) 66,11%). The 12 "new member states" have joined the EU in the last enlargement phase. Regarding the full online availability the most significant gap in comparison to the European countries can be identified. It is likely, that a number of interoperability issues, which are currently not yet addressed on a practical and deployment level, may have an impact on a faster improvement as well. Having in mind the i2010 Agenda, the EU Services Directive and most recent Lisbon Agenda Services are the key drivers at local, regional, and pan-European level in order to increase the competitiveness. Croatia is now on the crossroad where more importance has to be given to the incensement of full online sophistication of public administration services, offered to the citizens, businesses, and other public administration in Europe.

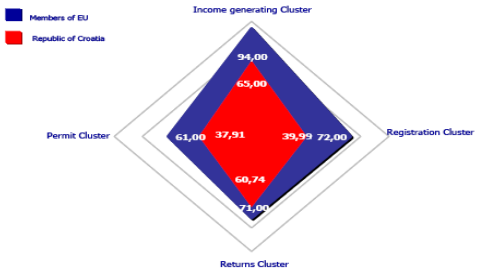

Figure 29: Clustered public services in Croatia measured by CapGemini for e-Croatia in 2006 – Comparison of EU and Croatia

4.2 Interoperability Recommendations

4.2.1 Recommendations regarding interoperability key factors

The outcome of the EIF compliance analysis and current trends of information society developments in Croatia are the basis for the proposed roadmap towards interoperability in Croatia. The main objective will be to assure the conformity of the Croatian IS development agenda with the EIF postulates. Furthermore, We-Go will emphasize the need to institutionalize the EIF postulates within the Croatian IS development agenda. The aim of the roadmap is to summarize actions that need to be carried out in order to get Croatia in line with the EIF principles and to provide a recommended approach applicable from the perspective of the current IS developments in Croatia. However, it does not recommend an implementation way that is to be decided by decision makers in Croatia. This recommendation will provide a general, high level introduction of necessary adaptations within the current national IS agenda, by stating weaknesses in the overall strategy and especially in its implementation. This paragraph will give general remarks that put decision makers in the position for an overall adjustment of the pursued route towards pan-European interoperability.

Regarding the national IS agenda Croatia is on the right path to develop IS and to achieve interoperability on a national and pan-European level based on a European *acquis communautaire*. However, there are some changes which need to be introduced in the current IS Agenda, in order that stated goals and changes can take place. The Croatian IS agenda is one of the five domains addressed by the broader Public Administration Reform Agenda. Furthermore, there is an e-Croatia programme which represents the concepts of the IS agenda. The national IS development agenda of e-Croatia is constituted out of nine pillars, where some of them are devoted partly or directly to interoperability. Interoperability as a strategic goal is present in all pillars, but most concrete it is addressed by strategies and accompanied by action plans within the programme areas ”one-stop-shop” and e-Business. Therefore, We-Go desk research has focused on the deepening of these two programmes in order to provide them with recommendations for improvement. The recommendations cover the current actions and proposals for additional steps in order to reach the interoperability on a local, national, and pan-European level.

e-Croatia should enact a state-level body for example **National Council for Information Society,** which will lead the interoperability agenda on a national level, and become a synonym for interoperability in Croatia. Furthermore, this agency should deliver state-level interoperability strategies and include all relevant national institutions in the process of fulfilment. Furthermore, it should assure the adequate funding resources from the state budget, human resources for implementation, leadership and control of execution of the interoperability strategy plan. Since NIF is still missing, it will be advisable but not mandatory to define or agree on common principles of interoperability valid on a national and on a pan-European level. If NIF is not based on agreement the successful implementation is unlikely to take place. Since the introduction of interoperability will be a long and for many years a fruitless process (neither one project nor even one programme) it is very important that every participant of the national interoperability agenda has a clear postulate of NIF in front. Postulates have to be clear, simple, non-metaphysic, applicable, and implementable within the given timeframe and available resources. We-Go desk research follows the four-layer interoperability model; technical, organisational, semantic, and governance. When defining the national interoperability strategy and action plan it is recommended to take in

consideration the concrete recommendations stated below. They define how to first recognise and then to remove barriers towards achieving interoperability among electronic transaction interaction for:

- Citizens to Government - C2G
- Citizens to Business - C2B
- Business to Business -B2B
- Business to Government - B2G
- Government to Government – G2G.

It is never too late to start the process of the implementation of interoperability on a national level, by starting later than the rest of European Countries. There is the chance to use the experiences from other EU members who have already successfully implemented interoperability or through the supportive EU programmes for candidate countries. Another option is through the cooperation and participation in EU programmes devoted to interoperability like IDABC and CIP ICT. The implementation process of interoperability is about learning, sharing, implementing, and maintaining. The whole process of achieving the interoperability will be long and organisationally, technically, and legally very complex. Behind NIF lies the simple idea of high level EU policy and the long term strategic goal of four single markets as defined in the Initiative i2010.

4.2.1.1 Technical Layer of Interoperability

When defining the strategy and action plan for interoperability regarding the technical layer it is important to consider the barriers of so-called technical nature which have to be solved in order to establish connections and data exchange among systems and services. They can be implemented through the definition and implementation of standards, norms, and internationally accepted best practice's norms, which are already recognized, by all or at least a majority of EU member states. There is a also a strong need for a one state-level body which will coordinate the process of:

- Analysis of missing standards and norms of existing technical barriers – where We-Go desk research can significantly help to develop the analysis methodology or can be used as an input for needed standards and norms to be applied.
- Input in the form of comments and suggestion followed by an announcement of valid technical norms and standards. We-Go desk research can be used as an input or as a reference model.
- Maintenance of standards and norms after they have been accepted and announced as official standards to be used in certain domain.

This can be done by an office or state-level body which is currently involved in e-Croatia or by some ministry already very well involved and experienced in the domain of eGovernemnt in Croatia. The decision about the final responsibility has to be made based on a best cost benefit ratio. The shortest and maybe far most cost-effective way of implementing the standards in the technical domain is to proclaim already well accepted and established standards in this domain from the EU (IDABC) and world wide best practice cases.

The domains, which will have to be standardized and according to EIF nomenclature called ***Front Office*** are:

- Data representation and exchange
  - *Interfaces*
    - Interfaces design principles
      - WCAG[65] (IDA mandatory) – Web Content Accessibility Guidelines – since e-Croatia has started with the introduction of this standard We-Go recommends investing additional efforts in the education of public administration's servants, responsible for the implementation of this norm. These norms are helping to make content accessible to a variety of web-enabled devices like mobile phones, handhelds etc. as well.
      - Web browsers have to support almost all file formats specified in this text, most notably HTML v 3.2.[66](IDA mandatory), and HTML 4.0.1[67] as well as XHTML v1.0
      - Mobile Phones – SMS[68] (IDABC mandatory), or Short Message Service has to be used as a standard when implementing SMS services for GSM Mobile devices. WAP[69] v. 2.0 has to be accepted as a standard for service interfaces over WAP browsers.
  - *Character sets.* ISO/IEC 10646-1:2000 (IDA mandatory) - has to be accepted in order to support alphabets from different worldwide used alphabets. UTF-16 will be needed for some non-western European languages and for documents in Greek language.
  - *Collective authoring.* WebDAV- Web Distributed Authoring and Versioning- is recommended to be used.
  - *File type formats.*
    - Hypertext file format - HTML v 3.2. (IDA mandatory), and HTML 4.0.1 as well as XHTML v1.0
    - *Style sheets*. CSS2 – Cascading Style Sheet Language for the display of HTML sites has to be used. XSL (Extensible Style Sheet Language) v1.0 should be used.
    - *Active contents / extended programming.* Passive HTML (IDA Mandatory) should be used for the exchange of information on client-side passive HTML sites. For the support of general communication, interaction, and more complex solutions Java as the programming language of choice is recommended.
    - *Text Documents, spreadsheets and presentations.* TXT (IDA Mandatory) for simple, editable text documents should be used. RTF (Rich Text Format) is recommended for documents, which have to be edited by several parties who don't use the same editors. PDF – Portable Document Format (IDA Mandatory) is the format of choice for unchangeable documents. HTML (IDA Mandatory) should be used for documents exchanged in a hypertext environment (e.g. World Wide Web). XML can be used as mark-up format for documents. MIME

[65] http://www.w3.org/TR/WCAG10
[66] http://www.w3.org/TR/REC-html32
[67] http://www.w3.org/TR/html401
[68] http://www.smsforum.net
[69] http://www.wapforum.org

(IDA mandatory) - Multipurpose Internet Mail Extensions – as a standardised method to indicate the format of a file or part of a file. CSV (IDA Mandatory) – Delimited comma separated tables can be exchanged as CSV files.

- *Document management*. MOREQ as a model is recommended for management of electronic records.
- *Database Files.* – ANSI X3.135-1992/ISO 9075-1992 (IDA Mandatory) – this standard is used in relational databases to assure conformity to accepted international standards.
- *Graphics*. These are few very well known and accepted standards not mandatory but IDA recommended formats. GIF - Graphics Interchange Format and JPG - Joint Photographic Experts should be used for the exchange of graphics and pictures, CGM - International Standard for the storage and exchange of 2D graphical data., PNG - Portable Network Graphics , TIFF - Tagged Image File, ECW – Enhanced Compressed Wavelet, EPS – Encapsulated Postscript, VML – Vector Markup Language , SVG - Scalable Vector Graphic etc.
- *Video*. – MPEG (IDA Mandatory) Motion Picture Experts Group , MP3 (IDA Mandatory) MPEG 1 layer 3, MPEG 4/ISO/IEC 14496 for multi-media content/services, Animated GIF (IDA Mandatory), Real Quick time etc.
- *File compression.* The following standards should be used: ZIP v.2.0 and GZIP[70](alternative to ZIP).

Desk research has identified the presence of usage of some of these standards but very often their usage was not result of centrally coordinated efforts from some sate level body but as a result of expressed needs of single public administration organisational units. Even if the same standards are used in the different organisations, it is not assured that they are used according to the same principles (e.g. versions etc.).

According to IDA: „*XML is the reference technology for most IT industry sectors (e.g. web publishing, document and knowledge management, software design, system and network management, directory interoperability, etc.) as an ideal language for defining contents to be handled, shared and exchanged.*" Therefore we recommend putting an accent and additional efforts on the usage of XML based standards in public administration as well. XML technology has several features important for EIF postulates:

- End-to-end content control – allowing users and/or applications to supervise content production.
- Configuration management – the capability to maintain the correct and current baseline version of a document or document set, while making it possible to track and trace back requirements and to access previous versions of the information.
- Content exchange – an XML document can be designed to carry all the business information that local user applications need to know when processing that document.
- Multilingualism – XML offers designers a means of establishing the requisite level of data granularity for the contents to be handled, with the ultimate capacity to set up automated translation
- Processes, or the run-time rendering of itemised data stored in a language-independent manner.

[70] http://www.ietf.org/rfc/rfc1952.txt

The domains which will have to be standardized and according to EIF nomenclature called ***Back Office level*** are:

- XML based standards
  - For data description – XML (IDA Mandatory) XML should be used to standardise documents and to format data and message files., XSD (IDA Mandatory) should be used to structurally describe data of XML schemas.
  - For data presentation and user interfaces - Data description – CSS (IDA Mandatory) is a W3C standard that defines a style sheet language that allows authors and users to attach style information (e.g., fonts, spacing, and aural cues) to XML applications., XUL is an XML-based language, that is used to define elements of a user interface (e.g. menus of a menu bar or popup menus etc.).
  - For data modelling – UML[71] (IDA mandatory) standard notation for the modelling of real-world objects as a first step in developing an object-oriented programme, XSD (IDA Mandatory) should be used to structurally describe data of XML schemas, RDF[72] (IDA Mandatory).
  - For data transformation – XSL[73] and XLST[74] (both IDA Mandatory) if applications use different XML schemas since an exchange of data can mean a conversion from one format to another. XSLT is a language that performs this transformation and is a part of XSL.
  - Metadata Interchange – XMI[75] is a format which standardises how any set of metadata is described, MOREQ defines how to model requirements for the management of electronic documents.
  - Document object modelling – DOM[76] - provides a platform and language-neutral interface that is implemented in browsers, allowing scripts to dynamically access and update the content, structure and style of documents.
  - Geographical data – GML[77] - Geospatial Markup Language defined by the Open Geographic Council is used to make structured descriptions of geographical chart information.
  - Security aspects – XML Signature[78] is a product of a joint effort of the IETF and W3C.
  - EDI-based standards - EDI Formats: EN 29735: 1992 (Syntax) D93.A (directory services) are basically replaced by XML-based standards. One has to keep in mind that one day maybe another technology will arise, one which will offer better solutions than XML based technologies currently can provide. There is a need to establish the process of maintenance of accepted new technologies covering this domain.

[71] http://www.omg.org/technology/documents/formal/uml.htm
[72] http://www.w3.org/TR/REC-rdfsyntax
[73] http://www.w3.org/TR/xslt
[74] http://www.w3.org/TR/xsl/
[75] http://www.omg.org/technology/documents/formal/xmi.htm
[76] http://www.w3.org/DOM/
[77] http://www.opengis.org
[78] http://www.w3.org/TR/xmldsig-core/

EIF under the middleware assumes the technology and infrastructure which will enable sharing of enterprise data across multiple, heterogeneous platforms, operating systems, servers, and applications. The domains, which will have to be standardized and according to EIF nomenclature called ***Middleware***, will be:

- Web services
  - Web Services Description – WSDL is a language used for service definitions.
  - Web Service Publication and Discovery – UDDI[79] – Universal Description, Discovery and Integration specification is used to publish a Web Services to a central UDDI Registry.
  - Web Services Invocation – SOAP[80] v1.2. - SOAP is a W3C standard that defines a distributed application model, which uses XML for enabling applications to communicate with each other over a network.

Distributed Application Architecture required by EIF can be established through the use of Java 2 Platform Enterprise Edition (J2EE) or for example by using the Common Object Request Broker Architecture (CORBA).
There are several standards, which have to be enacted covering the usage of J2EE:

- Enterprise JavaBeans Technology – EJB v. 2.0 (IDA Recommendation) – used to build the business logic component in the IDA three-tiered model.
- JDBC 3.0 API (IDA Recommendation) – an API specification for connecting Java to the relational database management system (RDBMS) platforms.
- Java Servlet Technology – Servlet v. 2.4. Servlets are used to write Web server extensions that perform Java code in response to HTTP request.
- Java Server Pages – JSP 2.0 (IDA Recommendation). A JSP page is a text document that combines static template data expressed in any web text format like for example HTML with Java code.
- Java Message Service – JMS v. 1.1. (IDA Recommendation). JMS provides a standard Java-based interface to multi-vendor message services.
- Java Transaction API – JTA v. 1.0. (IDA Recommendation). JTA provides transaction services to the parties involved in distributed interactions.
- JavaMail Technology – JavaMail API v. 1.3.1. - (IDA Recommendation). This technology provides email features to Java programmers.
- Java API for XML – JAXP 1.2.4. – JAXP enables the reading, manipulating, and generating of XML documents through Java API's.
- J2EE Connector API v. 1.5. (IDA Recommendation). -
- Java Authentication and Authorisation Service – JAAS v. 1.0 - (IDA Recommendation).
- Remote Procedure Call – (IDA Recommendation). RPC is a protocol that one service/application/programme can use to request a service from another service/application/programme located on another computer. We-Go proposes to use Open Software Foundations Distributed Computing Environment.
- CORBA[81] IIOP v. 2.0 - (IDA Recommendation) – is an architecture and specification for creating, distributing, and managing distributed program objects in a network.

[79] http://www.uddi.org/
[80] http://www.w3.org/TR/SOAP/
[81] http://www.omg.org

The following standardised APIs are relevant and it is recommended accepting them:

- Message Transfer Service: IEEE P1224.1 IEEE
- Directory Services: IEEE P1224.2 IEEE
- File Transfer: IEEE P1238.2 IEEE
- Distributed Transaction Processing XATMI, TxRPC, CPI-C, XA, XA+, TX, XATP, X/Open
- Transport Service: XTI X/Open

ebXML is a global electronic business standard that is maintained by UN/CEFACT and OASIS and defines a framework for businesses in order to conduct transactions based on well-defined XML messages. The business processes involved are standardised and governed by standard agreements. The following recommended standards should be accepted:

- Messaging Service Specification v.2.0[82] – used to exchange the XML business messages between organisations.
- Registry Service Specification v.2.0[83] (ebRIM)– these services handle the storage and retrieval of partner profiles and partner agreements in a central registry.
- Partner profiling services[84] – Collaboration Protocol Profile (CPP) and Collaboration Protocol Agreement (CPA) Specification v2.0
- Process definition[85] - Business Process Specification Schema v.1.01 (BPSS)

Interconnection services are provided on different levels and should be standardised as well:

- File and message transfer protocols – FTP – File Transfer Protocol (IDA mandatory). HTTP v.1.1 and HTTP v. 1.0 - Hypertext Transfer Protocol – used between client and web server. Both are IDA mandatory.
- Message transport and security - SMTP/MIME (IDA mandatory)
- Message store services – IMAP4 (IDA mandatory)
- Mailbox access - POP3 (IDA mandatory)
- Directory and domain name services – LDAP v3 X.500 (IDA Mandatory), DSML v2 and DNS.
- Network services – IPv4 and IPv6 are both IDA Mandatory.

The domains which will have to be standardized and according to EIF nomenclature called ***Security*** are:

- IP-SEC – IDA recommended - allows authenticated and encrypted communication between different communication end nodes.
- IDA PKICUG services - The IDA PKI for Closed User Groups project (PKICUG) provides a pan-European PKI to secure the information exchanged between the trans-European network partner organisations. It is IDA mandatory standard.
- SSL / TLS – SSL v3/TLS (IDA Mandatory) provide a security protocol for online communication.
- S/MIME (IDA Mandatory) - is a specification for secure electronic mail and was designed to add security to e-mail messages. There are three symmetric algorithms: DES, Triple-Des and RCA and the format used for digital certificates.
- SSH v.2. Secure Shell (IDA Mandatory) – provides strong authentication and secure communication over insecure channels.

[82] http://www.ebxml.org/specs/ebMS2.pdf
[83] http://www.ebxml.org/specs/ebrs2.pdf
[84] http://www.ebxml.org/specs/ebcpp-2.0.pdf
[85] http://www.ebxml.org/specs/ebBPSS.pdf

Java security related standards are:

- Java GSS is used for securely exchanging messages between communicating applications.

Web service security standards to be recommended and implemented:

- SAML - Security Assertion Markup Language – used to enable interoperability between different systems that provide security services.
- XML Signature – is an XML compliant syntax, used for representing the signature of Web resources and parts of protocols. It poses the procedures for the verification of such signatures as well.
- XML encryption is a process for encrypting/decrypting digital content.
- XML Key management

Furthermore the usage of firewalls has to be standardised by covering the following domains:

- Packet filtering (IDA mandatory) - should be standardised in order to assure whether the data transmitted through the network is based on agreed transfer protocols.
- NAT – Network Address Translation - (IDA mandatory) to enable local subnets the usage of two different IP sets for internal and external traffic.
- Application-level gateway – PROXY – should be enforced in order to apply special purpose rules for every application.
- Demilitarised zone network - DMZ –is a small isolated network in the context of firewalls.
- Stateful inspection – analyses multiple layers of the protocol stack.

You have to standardise the prevention from malicious or unauthorised code as well:

- A *virus* is a self-replicating program that can infect other programs, either by modifying them directly or by modifying the environment in which they operate.
- A *worm* is a program that attacks computers that are connected to a network and spreads by sending a copy of itself through the network to infect other machines.
- A *trojan horse* is a program that pretends to be something it is not.
- An *e-mail bomb* is a program equivalent to a letter bomb which aims at bringing down email servers.

There is need to standardise the usage of technologies upon which ***Workflow management*** is based. The following specifications, papers, and standards have to be taken into consideration:

- Interoperability, WF-XML Binding (WFMC-TC-1023) - This specification is intended for the use by software vendors, system integrators, consultants, and any other individual or organisation concerned with interoperability among workflow systems.
- Workflow Standard Interoperability, XML-HTTP Binding (WFMC-0208) - This document represents a workflow protocol that aims for interoperable, reliable, and practical interactions between services using HTTP protocol.
- Workflow Security Considerations, White Paper (WFMC-TC-1019) - The document summarises a number of security services that may be important within a workflow system and relates them to a generalised model identifying different security domains within a heterogeneous workflow environment.

Once when the majority of the important standards is accepted, their usage, documentation, and dissemination must be supported by an organisation on state-level. Such an organisation must perform standard maintenance and adapt current specifications to future trends.

Nevertheless, it must not necessarily be one single organisation but the different task can be assigned to different state-level bodies as well.
There is a strong need to additionally support the usage of technologies which handle the semantics of information and semantics of services. Besides standardisation it is important to find a central organisation, which serves as a centre of excellence for the usage of these technologies. As the standardization carries on, and the different standards get more mature, the centre of excellence can be replaced by a more decentralised concept. At the moment APIS IT is the most suitable organisation which could serve as the centre of excellence for semantic issues in Croatia's IT.
The usage of open standards and open software is already defined and supported politically by the government and through their usage policies. However, additional efforts are needed in order to create the centre of excellence that will maintain, monitor, support and disseminate standard related issues.

4.2.1.2 Semantic Layer of Interoperability

The introduction of interoperability within the domain of public administration services implies organisational changes as well. In fact the interoperability introduction is a modernisation programme of service delivery.

In order to support these changes one has to integrate the semantic layer of interoperability into the national IS/IOP agenda by defining the development of registers and catalogues of standardised business elements within the national service and IT architecture. Besides the different standards, which have to be adopted, there is a need for organisational, managerial, and funding aspects to be covered. Organisationally there is a need to define the semantic layer of interoperability on the state-level e.g. integrating basic postulates within the NIF. Furthermore the different semantic issues must be reflected in the different strategy and action plans for public administration services (e.g. business elements in data bases). In regard to the management perspective there is a need to define one single state level body to start, prepare, execute, and monitor the execution of the IS strategy. Finally the necessary funding must be assigned in order to ensure the execution of the defined action plans.

The following brief overview covers the topics that are still missing and have to be included in the state-level semantic strategy. Furthermore they must also be reflected in the national interoperability agenda:

- The process of drafting/agreeing on ***common and global definitions/representations for eGovernment definition/vocabularies/metadata*** must first be defined in a central interoperability strategy. In the second step a state level organisation must be entrusted the execution, coordination, and monitoring.

The semantic interoperability strategy should especially cover the following domains:

- ***Common and global definitions/representations for eGovernment semantics***
- ***Modelling perspective and formalism for documenting the common definitions***
- ***Administrative level of definitions development***
- ***Promotion/dissemination and maturity of common definitions***
- ***Trust, reliability and the supportive technical interoperability layer***
- ***Maintenance and evolution of common definitions***

4.2.1.3 Organisational Layer of Interoperability

The organisational layer of interoperability addresses the need for aggregating the business processes, which can, but not necessary have to belong to the same organisational unit. The need for new services based on this principle is coming from the public administration's wish to offer better, more effective and "customer-centric" services for citizens, businesses and other public administrations. In regard to the organisational plan the national interoperability strategy and action plan will have to ensure a service delivery modernisation programme and the transition of services based on traditional vertical organisational structure towards services based on a new organisational public administration structure.

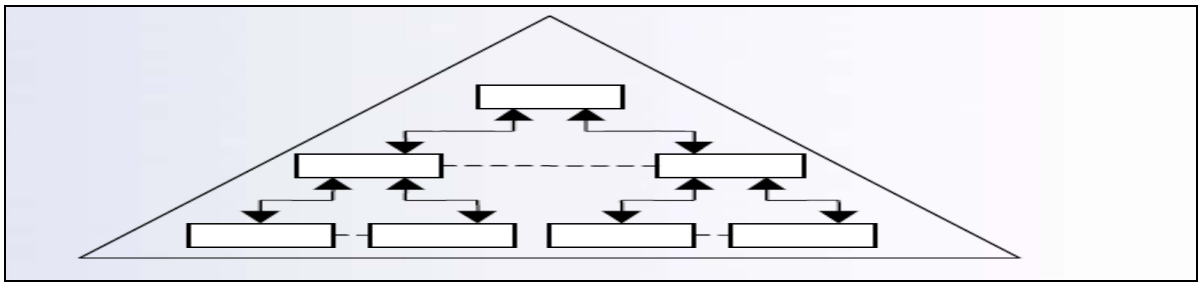

Figure 30: Traditional or vertical public administration organizational structure. Alberto Savoldelli, Politecnico di Milano, 2004

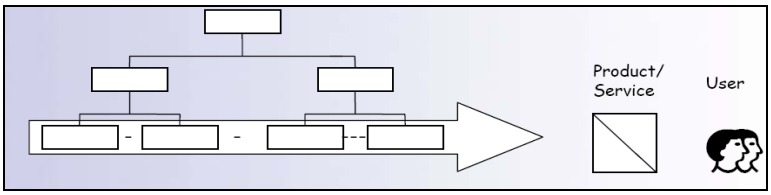

Figure 31: New organizational public administration structure. Alberto Savoldelli, Politecnico di Milano, 2004.

Evidence of a ***clear link between cross-organisational processes/services and the business strategies*** was found during the We-Go desk research within eCroatia's eBusiness programme. However, the same approach has to be adopted either on all pillars of eCroatia's programme (e.g. eHealth, eEducation etc.) or separated within the national interoperability strategy and action plan. Accordingly the process of ***modelling and visualisation of public administration services/processes*** has to take part on a large and systematic scale, performed by an organisation who is responsible for that. For example eCroatia can define such a process and APIS IT can take over the concrete execution of the process. The process of ***user involvement by setting up communities of practice in the process of new service design*** has to be more encouraged, supported, and concretely defined in the national interoperability agenda. The ***reuse of knowledge and experience related to the execution of internal and cross-agency business processes/services from the private sector*** is a crucial issue in order to make public administration services more efficient. Currently this issue is addressed on national level only by the eBusiness strategy programme. The national IS/IOP strategy should devote more attention to this domain and assure that all parts of public administration services from similar or different areas are included into one programme. The programmes should be focused on creating and collecting knowledge and experience about the public administration's processes, procedures, and structures.

If the eBusiness programme shows effectiveness, applicability, and feasibility the same methodology can be applied to all pillars included eCroatia's programme. The crucial question remains: ***"What are the obstacles towards better eBusiness services in Croatia!?*** The concrete execution can be performed by APIS IT or some organisational unit operating within eCroatia. Furthermore the ***identification and documentation of common service functionality and features across public administration agencies*** has to be defined within the IS or IOP national agenda. Moreover there is a need to define the state level body, for example the office within eCroatia, which will coordinate the teams who perform analysis and documentation of common service functionalities across the different public administration organisations. In the following typical service functionalities, which are recognised by IDABC as a part of any public service scheme, are listed:

- Registration/Authentication/Authorisation
- Payment processing or issuing of funds
- Cross-division/agency workflow
- Request for additional information from other public administrations or even form the private sector
- Status notification
- Support handling etc…

Once common functionalities have been examined and knowledge about them is collected, APIS IT can offer hosting services. These common functionalities can then be used and reused by all other organisations, which are offering the concrete services to citizens and businesses. The list of standard functionalities will be very basic at the beginning, but as time progresses the list will be extended by more and more services. Moreover, it is important to encourage people to use the different services. One good approach is to offer good service level agreements and 24 hours helpdesk support for all users and services hosted by this organisation.

In the same context there is a need to achieve ***consensus on the visibility of ownership, management, and responsibility for cross-organisational processes and services*** within the public administration domain. These issues should be included in the same strategic framework and coordinated by the same teams like the process of identification and documentation of common services and features. There are some isolated examples of ***support for multi-channel service delivery,*** but there is a need to standardise and centrally manage this domain by a central body with clear responsibilities for this issue. This can either be defined by a state level IS- or IOP-strategy. The recommendation is to keep this responsibility within the one-stop-shop programme, because of their experience within the domain of delivering new services based on a customer-centric approach, (e.g. HITOR.HR) where multi-channelling plays very important role.

4.2.1.4 Governance Layer of Interoperability

The execution of concrete steps defined by the national interoperability strategy can be done by different organisations. They can vary in regard to their background (IT industry, public administration units, public hold companies etc…) and in regard to size and scope. In terms of resources and knowledge they have to be the best suitable organisations for this task at the time of execution. However, in order to assure the deployment of the defined activities within the national interoperability strategy, there is a need for strong governance, performed by a central state level organisation. This organisation can for example be the ***National Council***

for Information Society or any other more operational state level body which will operate within the e-Croatia mandate. This organisational unit, responsible for governance of interoperability according to the national interoperability strategy, will have four focus areas:

- Political
- Legal
- Managerial and
- Economic

In the following paragraph an overview of currently missing issues regarding these four areas within the current Croatian IS/IOP Strategy is given.

- Political -

There is a need to additionally support and deepen several already existing strategies (e.g. one-stop-shop, eBusiness, eHealth) which partly or concretely address department specific interoperability issues. They can be further developed or have to become part of a broader interoperability strategy on a national level. Moreover, there is a strong need to start the process of promotion of organisational federalism as a model of a new modernised organisation structure which will arise from the planned changes. It is very important to support current and future international (e.g. IDABC etc…) activities of all participants included into the IS and IOP development agenda.

- Legal -

The fundamental laws which regulate the domain of IS in Croatia are enacted and aligned with basic EU Laws in this domain. However, the implementation of new services based on new organisational, technical, and semantic principles require additional so called sub-laws or sub-acts. These sub-laws or sub-acts will be needed in order to narrowly regulate and ease the interaction of applications, services, people, and organisations based on the interoperability postulates.

eCroatia has already started the process of enacting the new laws and sub-laws connected to the national IS Agenda. Thereby interoperability can be added as an additional activity to the ongoing activities in this domain as well. The issue of missing sub-acts was recognized by We-Go desk research as well. This process has to be institutionalised in the form of a small but highly profound state level office within the Croatian Ministry of Justice. The approach will first try to provide this kind of support for concrete services or applications. The second step will be the dissemination of the experiences across organisational boundaries. Both, the strategy and action plan, have to assure sufficient funding resources for legal issues within the governance layer.

The following tasks have to be executed:

- Analysis of current status of legal-related barriers which hinder the interoperability,
- Action plan for legal issues within the interoperability governance context,
- Determination of resources,
- Definition of coordination bodies, and
- Introduction of controlling instruments for quality of execution.

In the following the subjects are listed which desk research has identified as missing in the national Croatian IS/IOP strategy and which certainly have to be:

- Law on protection of intellectual properties in multi-partner projects and developments
- Law on diffusion of digital signature and electronic identity; the law exists, but one has to assure that these laws are used in the different organisational (departmental) organisations in a coordinated manner and based on the same principles.
- Law on citizen privacy and data protection
- Adaptation of laws and sub-laws (sub-acts) in order to remove obstacles which are hindering the execution of basic laws and the creation of services based on interoperability postulates.
- An organised and centrally coordinated education of judiciary servants in the domain of eBusiness regulations.
- Dissemination of experiences related to the reduction of legal obstacles among other department domain (other ministries)

- Managerial -

The National Council for Information Society or another appropriate state level body should coordinate the execution on the operative level. This specific state level body must be able to lead and coordinate the different task outlined in this study.

NCIS might operatively be a too "high-level policy" organisation for this task. However, since they have political support and commitment from the Croatian government, they can maybe authorise some other more execution level body for this task. This can be a working group within eCroatia or maybe within the NCIS itself. The most pragmatic approach, which offers the best cost/benefit ratio, should be used.

Leadership/ownership/sponsorship/management of the national interoperability agenda has to be clearly and operatively defined by the IS strategy. All tasks have to be assured through the accompanying resources and controlling execution mechanisms within the action plan. Flexibility, transferability and reconfigurability of interoperability solutions have to be further and more concretely defined in the national IS development agenda. In the current national IS agenda there is a strong need to include measures for gaining broader commitment, participation, and willingness for cultural change from all participating organisations.

Furthermore, there is a strong need to deepen the current activities related to the training of human resources in organisations involved in the process of implementation of interoperability projects. There are already ongoing activities focused on increasing the level of proficiency in the usage of ICT in public administration.

Interoperability project related trainings can be added to these activities. The following issues have been recognised by We-Go desk research as important tasks regarding the education of public servants:

- Education of judiciaries in the field of concrete application domain. The IS/IOP related laws are enacted but even the responsible civil servants for this domain are not familiar with their application.
- Process of standardisation of missing norms and standards
- Usage of new technologies (e.g. digital signature, eID, electronic payment etc…) is still an unknown term for the majority of public administration servants, industry and academia.

- Economic -

As mentioned at the beginning of this study, in order to execute planned activities on time, there is a strong need to assure stable funding for the execution of action plans. Current activities related to assuring the economic prerequisites for the IS agenda in general have to be additionally supported by funds. The following tasks have to be included:

- ***Adoption and switching costs inherent to interoperability solutions*** are still missing in existing action plans covering the IS Agenda. Since they are unavoidable and part of the process of implementation of new services they have to be covered and concretely defined within the pertaining action plans of the departmental units responsible for the introduction of certain services.

- ***Public procurement policies and financing for interoperability projects*** – can be defined by extending the current public procurement policies, currently defined within the national public administration reform strategy. The monitoring of execution, tendering etc. can be done by the involved public administration units. By opening the process of procurement and financing to the public Croatia will further improve the competitiveness of public procurement and assure as much as possible the best price benefit ratio of interoperability projects.

Partnering with the private sector in interoperability projects – has to be more concretely defined and deepened within the current national IS agenda and accompanied by concrete supporting measures for private-public partnerships in the domain of interoperability projects. The recommendation is to continue and support the measures within the eBusiness pillar devoted to this domain. If the concept for private and public partnership is feasible, practical, and successful one may apply the same or improved approach to the rest of the pillars included in to national IS development agenda.

4.2.2 Recommendations per administrative level

Operationally, the implementation of EIF recommendations on the national, regional, and pan-European level requires the inclusion of the EIF postulates in every project or activity related to the establishment of the information society in general. The same applies to the concrete deployment of new public administration services, processes, and procedures. Interoperability is not an isolated project. The recommendations will be outlined using a methodology from the Modinis Lot II study, specifically extended by We-Go to meet the needs of the WBC. The recommendations are structured in the form of a matrix and organized according to two dimensions: the suitable level of actions and the area where recommendations should be applied. Figure 32 presents the concise list of We-Go interoperability recommendations of general nature to Croatia. In order to support the implementation of interoperability services and projects in Croatia, We-Go states the recommendations in Figure 33 towards the generic services/projects on national and in the Figure 34 on the pan-European level.

General interoperability recommendations	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Education programme for public administration servants on legal issues related to IOP (2) Analysis of concrete legal obstacles on local level	(3) Support public private partnerships on the local level (4) Use as much as possible Open Standards software and open source software (5) Support SLA locally (6) Allocate adequate funding sources for necessary equipment on local level (e.g. card readers, broadband connection, three PC's pro local public administration office etc…)	(7) Follow the national IS and IOP development agenda (8) Training of public administration servants (legal issues, organisational change etc.) (9) Create the knowledge communities/portals on local level (10) Support creation of new cross organisational services/ business processes (11) Support multi-channel service delivery (12) Support collaborative testing of "new" services/projects.	(13) Work on definition of national semantic business processes (14) Support development of PKI (15) Adopt technical and semantic standards (16) Introduce the usage of service oriented architecture (modularity of services) (17) Support national IOP strategy regarding the adoption and usage of semantic and technical standards
National Authorities	(18) Education programme for public administration servants on legal issues related to IOP (19) Support the usage of eID (20) Remove the legislative obstacles towards IOP on a national level (21) Bring the data protection and security on the EU level. (22) Education programme of judiciary on eGovernment legal framework	(23) Support public private partnerships on national level (24) Fund analysis, creation and hosting of common service functionalities (25) Fund and promote the usage of open software and open standards (26) Support SLA on the national level (27) Assure the funds needed for centrally lead projects (e.g. eID etc…) (28) Fund the pilot projects on national and local level	(29) Define national IOP strategy and action plan (30) Assure clear leadership, management and sponsorship of national and pan-European IOP projects (31) Set implementation priorities of services that are more needed. (32) Support creation of knowledge communities / portals on national level (33) Promote analysis and creation of common typical functionalities (34) Assure the common organisational structure. (35) Include the internationalisation/ pan-Europeisation of Croatian eID solution.	(36) Define national semantic and technical standards (37) Develop support and promote usage of PKI (38) Hosting of common service functionalities (39) Develop support and promote usage of eID
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(40) Support projects for removing the legal barriers towards achieving the IOP in Croatia (41) Promote EU IOP best practice experiences relevant for Croatia (42) Create support programmes as concrete as possible (43) Provide the education of Croatian judiciary in the domain of eBusiness sub-laws	(44) Support creation of local funding programmes for IOP projects (45) Support education of public administration servants in financial management (46) Support financially the regional cooperation (47) Before you donate/support some IOP project assure that you support really something useful. (48) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(49) Promote regional benchmarking of IOP online sophistication (50) Support eCroatia with advices on policy/management issues and how to assure creation of successful IS/IOP National Strategies (51) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(52) Support the creation of PKI through programmes (e.g. twining projects) (53) Donate the needed technical infrastructure (54) Support creation of commonly agreed semantics
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(55) Bring EU level support programmes for bridging the IOP barriers relevant for Croatia (56) Dissemination of EU Best practices in the domain of legal IOP issues	(57) Disseminate the best EU practices from the domain of funding the IOP projects (58) Before you donate/support some IOP project assure that you support really something useful. (59) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(60) Support eCroatia and other state level eGovernment players with the advices how to build capacities in public administration management layer (61) Support eCroatia with advices on policy/management issues and how to assure creation of successful IS/IOP National strategies (62) Prepare the education programme, which will present Croatian eGovernment how to concretely use the allocated resources optimally.	(63) Support the creation of PKI, through dissemination of IDABC expertise in that field (64) Donate the needed technical infrastructure or support eCroatia with knowledge transfer in this domain (65) Support creation of commonly agreed semantics

Figure 32: Recommendations regarding the interoperability strategy in Croatia per administrative level and domain

Generic recommendations for projects on the national level	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Take into consideration all national legal requirements related to the implemented service/project relevant on local level. (2) Support national authorities in removing the legal obstacles related to the implemented service.	(3) Support the public private partnership on local level, which can fund the implementation of national IOP projects/services. (4) Try to decrease the price of implementation by usage of open standards and open software instead of proprietary solutions.	(5) Follow the coordination efforts lead by national body and be cooperative. (6) Assure that everyone in the implementation team on the local level understands their role.	(7) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete IOP project. (8) Analyse usage of "new" standards and report comments/improvement recommendations to the governing body.
National Authorities	(9) Take in consideration all national legal requirements relevant on national level. (10) Analyse legal obstacles related to implemented project/service and remove them. (11) Cooperate with local public administration, give them space to express and address their needs. (12) Use regional and EU support programmes for removing the legal obstacles.	(13) Support the public private partnership on national level, which can fund the implementation of national IOP projects/services. (14) Assure timely the sufficient funding resources for the national IOP projects/services implemented.	(15) Assure the clear ownership/leadership of the national project/service being implemented. (16) Choose the execution partners on local and national level (17) Deliver the good business case for a service/project being implemented. (18) Define the clear set of deliverables of the project/service being implemented.	(19) Leave the space for local initiatives which will cover their needs (20) Propose the introduction missing semantic and technical standards, which can be used by concrete application/service. (21) Propose the modelling standards, framework and methodologies to be followed in the concrete project.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(22) Support the implementation of projects on national level, by providing them with experience in removing of legal obstacles.	(23) Support financially the implementation of national IOP services/projects (e.g. CARDS, PHARE) and research in the area of semantic and organisational IOP. (24) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(25) Support the national level IOP projects/services being implemented in Croatia with the consultancy in the domain of management of the public administration projects on national level. As well enrich them with international experiences. (26) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(27) Donate needed infrastructure for concrete national IOP projects/service (28) Support (financially) introduction of important technical and semantic standards/service
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(29) Support the implementation of projects on national level, by providing them with experience in removing of legal obstacles.	(30) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (31) Support financially the implementation of national IOP services/projects (e.g. CARDS, PHARE) (32) Prepare the education programme that will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(33) Support the pan-European IOP projects/services being implemented in Croatia with the consultancy in the domain of management of same or similar projects in EU. (34) Prepare the education programme that will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(35) Donate needed infrastructure for concrete national IOP projects (36) Support (financially) introduction of important of technical and semantic standards

Figure 33: Generic recommendations for national interoperability projects in Croatia per administrative level and domain

Generic recommendations for pan-European interoperability projects	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Take into the consideration all concrete EU IOP legal requirements related to the implemented Pan-European service relevant on a local level. (2) Support national authorities in removing the concrete legal obstacles related to the implemented services.	(3) Support the public private partnerships, which can fund the implementation of pan-European IOP projects/services on local level. (4) Try to decrease the price of implementation by usage of open standards and open software instead of proprietary solutions.	(5) Follow the coordination efforts lead by national body and be cooperative. (6) Assure that everyone in the implementation team on the local level understands his or her roll.	(7) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete pan-European IOP project/service. (8) Analyse usage of "new" technical and semantic standards and report the problems/improvement proposals to the governing body.
National Authorities	(9) Take in consideration all national and EU IOP legal requirements relevant on national level for concretely implemented service/project. (10) Analyse pan-European legal obstacles related to implemented project/service and remove them. (11) Cooperate with local public administration; leave them space to address their needs. (12) Use the regional and EU support programmes for removing the concrete legal obstacles related to the implemented service/project.	(13) Support public private partnership on national level, which can fund the implementation of pan-European IOP projects/services. (14) Assure timely the sufficient funding resources for the pan-European IOP projects/services being implemented.	(15) Assure the clear ownership/leadership of the pan-European project/service being implemented. (16) Choose the execution partners on local and national level (17) Deliver the good business case for a pan-European service/project (e.g. VIES, NCTS) being implemented. (18) Define the clear set of deliverables of the pan-European project/service being implemented.	(19) Leave the space for the local initiatives, which will cover their needs, related to the implemented Pan-European service/project. (20) Propose the introduction of missing semantic and technical standards, which can be used by concrete pan-European application service. (21) Propose the modelling standards, framework and methodologies to be followed in the concrete pan-European project/service being implemented.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(22) Support the implementation of similar or identical projects/services on a pan-European level, by providing them with experience in removing of legal obstacles related to the concrete service/project.	(23) Support financially the implementation of pan-European IOP services/projects (e.g. CARDS, PHARE) and research in the area of semantic and organisational IOP. (24) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(25) Support the pan-European IOP projects/services being implemented in Croatia with the consultancy in the domain of management of the public administration projects. As well enrich them with international experiences. (26) Prepare the education programme, which will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(27) Donate needed infrastructure for concrete pan-European IOP project/service being implemented. (28) Support (financially) introduction of important technical and semantic standards needed for concrete pan-European service/project.
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(29) Support the implementation of similar or identical projects/services on a pan-European level, by providing them with: a. Experience in removing of legal obstacles related to the concrete service/project. b. Consultancy on concrete implementation of EU legal requirements for concrete service/project	(30) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (31) Support financially the implementation of pan-European IOP services/projects (e.g. CARDS, PHARE) (32) Prepare the education programme that will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(33) Support the pan-European IOP projects/services being implemented in Croatia with the consultancy in the domain of management of the public administration same or similar projects in EU. (34) Prepare the education programme that will present Croatian eGovernment actors existing support programmes and how to concretely use the allocated support resources optimally in implementation of pan-European services.	(35) Donate needed infrastructure for concrete pan-European IOP projects (36) Support (financially) introduction of important technical and semantic standards needed for concrete pan-European Project.

Figure 34: Generic recommendations for pan-European interoperability projects in Croatia per interoperability project

4.2.3 Recommended implementation approach

Technical & semantic interoperability

For the current level of development of the IS agenda in Croatia, the responsibility for the issues stated above and related to technical and semantic IOP is recommended to be located under the leadership and coordination of a small and highly professional IOP team. The team should have an eCroatia mandate. This approach will assure the independency while making decisions about semantic and technical standards to be used and accepted within the Croatian Public Administration. The overall goal is to make pragmatic decisions and to use best practice cases from other public administrations within the EU.

There are "good" but also "bad" best practice examples. It is important not to try to re-invent the wheel but to try to learn from the mistakes that others have made. We-Go recommends to start with the bottom-up approach by building small pilot projects, which will prove the concept of new services, based on the exchange of data and information of at least two different public administration organisational units.

It is important to provide the expendable infrastructure, which can be used in other pilot projects or maybe for an upgrade phase of the first pilot project if the pilot project has proven to be feasible. The pilot project can be executed by a non-departmental organisation (e.g. APIS IT) or together with other departmental organisations (e.g. Ministry of Interior). eCroatia and APIS IT team will have to provide the prerequisites for this pilot project/service in order to become operational (to offer service to the users):

- Development of a pilot infrastructure
- The definition and publishing of technical and semantic standards is needed
- Messaging hub – based on the usage of XML technologies.
- Define the standards for business artefacts/elements
- Define the business artefacts/elements
- Definition of registers/catalogues of standardised business artefacts/elements. They have to be described and published publicly. The usage of XML based technologies is recommended. Concrete instructions about recommended versions of specific standards can be found in the first part of this study.

With this approach the needed sense and experience for this kind of projects will gradually be gained. Since the pilot projects will rapidly be developed, early results can be presented in a relative short time frame. According to the Estonian We-Go partners the secret of success is to make a gradual development concept with achievable, measurable, and transparent goals at the end of every project year.

Organisational Interoperability

Organisational interoperability is all about the modernisation of current services, offered to businesses and citizens. We-Go recommends locating the coordination of this domain within the eCroatia hosted unit specialised on organisational IOP. The department currently responsible for the old paper-based service (e.g. Ministry of Interior) can be entrusted with the operational execution and implementation of pilot project(s). It is advisable to take a simple service for the first pilot project that is supported by two different public administration organisations. Nevertheless there can be more participating organisations, maybe one organisation from the private sector (e.g. issuing the driving licence for a first time) as well. The different services must have processes and data that are potentially reusable by other services from other public administrations. Moreover it must be possible to clearly prove the

cost effectiveness of new services e.g. potential reuse of standards, data, infrastructure, policies or better and more customer-centric services etc...

The following typical tasks, which are common for all services regarding the organisational interoperability, are of particular importance:

- Analysis of forms and delivery channels in order to find better ways of service delivery
- Analysis of legislative regulations in order to remove the legal obstacles towards the offering the new services.
- Analysis of business processes in order to define common processes and in order to improve the current business processes, which are of importance for interoperability. Moreover, it is necessary to aggregate processes from different public administration units and to offer them as "new services" for the benefit of all participants of Croatian IS.
- Definition of common functionalities in order to enable their reuse.
- Definition of common legal and organisational obstacles towards aggregate service provision.

Once common functionalities are defined, eCroatia can take responsibility and for example together with APIS IT offer hosting of these common functionalities for all public administration organisations which are offering services to citizens and businesses in Croatia. Typical common functionalities, which are abstracted by IDABC, are for example:

- Identity management process
- Customer registration process
- Electronic forms production and management
- Case tracking and status reporting
- Electronic payment system

This approach will assure the reduction of costs related to the development, deployment, and maintenance of newly deployed services as well.

Governance of Interoperability

The leadership for the technical and semantic IOP layer can be entrusted to eCroatia and to APIS IT. Furthermore, We-Go recommends assuring that this agency is a central point of excellence for IOP on a national level and has strong cooperative abilities with other less experienced public administration organisations, especially local ones. If a certain pilot project is in the process of implementation it will most practically be located within the concrete departmental unit currently responsible for the service being modernised. The departmental unit also takes care of the concrete organisational IOP layer issues.

4.2.4 Services: Deployment level - NCTS

The following paragraph describes concrete steps, which have to be undertaken in order to deploy the pan-European service "New Computerised Transport Service". In terms of level and direction of the data being exchanged, interoperability and services on a concrete service deployment level have two dimensions:

- National (e.g. inscription at a university etc…)
- Pan-European (e.g. NCTS, VIES, EBR)
- National and pan-European (e.g. eID etc...)

This document and We-Go as a project are not able and mandated to propose concrete implementation approaches or even more to become part of the NCTS implementation team in Croatia because of the high complexity. Furthermore there is too much concrete information missing and much higher resources are needed to successfully implement this service in Croatia. In the dissemination phase this document will be used as the main information material and concrete example for the deployment of pan-European services.

Overall Important Background Aspects for NCTS in Croatia

Community transit is a customs procedure that allows customs to excise duties and VAT on imported goods to be suspended until the goods either reach their point of destination in the European Community or are exported out of it. The procedure can also be used for movements to and from the EFTA countries (Switzerland, Liechtenstein, Norway, and Iceland) and is known as Common Transit. The New Computerised Transit System (NCTS) is a European wide system, based upon electronic declarations and processing. It is designed to provide better management and control of community and common transit.

In July 2005 a European Union law made it mandatory to submit all transit declarations using NCTS, except for private travellers (with goods in excess of their allowances) and for some authorised simplifications. NCTS has been introduced as a result of the report from the European Parliament's inquiry for transit fraud. It is seen to be an essential element of the reforms intended to make the transit systems more secure. The current paper based systems were found to be open to fraud and incapable of providing a reliable level of management and control for the movement of goods in transit. There is also a growing lack of clarity and consistency in the procedures and a lack of effective administrative communication and co-operation between custom authorities. This has led to expensive delays and confusion for companies along with an increased risk of fraud.

All companies that use, or wish to use, community/common transit can use NCTS. It is, however, necessary to have the facilities to send and receive electronic messages to and from NCTS. The main aim is that all traders will eventually input all transit declarations and any other necessary messages such as arrival of the goods etc., to NCTS electronically. Connected traders will receive electronic responses, advising of key decisions during the procedure such as acceptance of declaration, release of goods, notification of discharge of liability etc. at both departure and destination.

There are two types of available procedures under NCTS: normal procedures and simplified procedures.

Using the *normal procedures* any company connected to NCTS will be able to lodge declarations at any Office of Departure (OoDep). They also have the facility to 'pre-lodge', i.e. to input a declaration prior to the physical presentation of the goods.

Under the simplified procedures authorised consignors/consignees will, as at present, be able to carry out community transit operations without presenting the goods and corresponding

documents at the Customs office. They must, however, become connected to the NCTS system and make their declarations electronically.
The interconnectivity to the NCTS systems in the European Union and the other contracting parties of the common transit convention is an accession pre-requisite in the customs sector. Croatia as candidate country has to be fully NCTS compatible at the latest one year prior to accession to the European Union. Also, for Croatia to join the common transit convention before its accession to the EU, the same transit-related requirements (full and stable implementation of all common/community transit procedures and a fully operational NCTS system) apply.

Legislative Aspects
The basic act regulating customs procedures in the Republic of Croatia is the Customs Act that has to be harmonized with the Council Regulation (EEC) No 2913/1992. This regulation aims at establishing the Customs Act and its amendments, which will define the provisions on transit procedure.
In order to fulfil the conditions for the introduction of a common European transit procedure, legal relations among all participants of transit procedures have to be regulated in detail. This means, that by that time all the legal provisions concerning the transit (primary, secondary and tertiary legislations) should be in force. Also, the preconditions for the alignment of guarantee systems for the payment of customs debt that might be in place, have to be regulated. Furthermore, conditions have to be created in order to enable customs service to implement computerised transit procedures (NCTS). This includes:

- Transit convention
- Railroad and specific procedures
- Simplified procedures
- Guarantee management
- Elaboration of national regulations

Organisational Aspects
The following organisational aspects must be considered in order to allow Croatia to be in alignment with EU regulations:

- EC NCTS project management aspects
- EC business aspects
- NCTS business team job profiles
- NCTS IT team job profiles
- Helpdesk job profiles
- Helpdesk strategy aspects
- Client administration – basic aspects
- Trader solution - basic aspects
- Trader awareness meeting

Business Aspects
A possible business change management plan in Croatia will consist of the following aspects:

- Basic aspects
- Business requirements
- IT requirements
- Training requirements

IT Aspects

The development of national IT systems (TARIC[86], NCTS, EMCS, AEO, CCN/CSI, QUOTA, Surveillance, etc) required to connect the CCA with the EU IT systems, in order to enable exchange of information with the EC and EU member states immediately upon accession to the EU. In order to comply with the EU customs legislation and IT system requirements, the following systems require interoperability by the date of accession:

- **CCN/CSI**[87]: this gateway is mandatory for the communications between the DG TAXUD IT systems and their member state counterparts. The CCN/CSI must be operational at least three months prior to the beginning of any remote tests.
- **ITMS:** this integrated tariff management system is a business concept, grouping most of the computerised systems dealing with the tariff exchange of information between the European Commission and the member's states. Two of the applications under this concept are of a complex nature. Being mandatory for the accession date, their development and interconnection should therefore be prepared in advance. These are TARIC (Tariff Integre Communautaire) and TQS (Tariff Quotas and Surveillance). ITMS also covers some other systems dealing with the exchange of information. For following ITMS sub-systems, the European Commission has developed web-based client solutions that do not require substantial national adaptations and that can be used instead of national system-to-system solutions. These solutions are for instance:
  - **EBTI** (European Binding Tariff Information)
  - **ISPP** (Information System for Processing Procedures)
  - **SMS** (Specimen Management System).

The following ITMS subsystems do not require any particular IT development:

- **ECICS** (European Customs Inventory of Chemical Substances)
- **BOI** (Binding Origin Information)
- Suspensions

However, all **ITMS** systems (**TARIC, TQS, EBTI, ISPP, SMS, ECICS, BOI** and suspensions) are accession-mandatory.

- **NCTS:** By the date of the accession, the national transit application, being fully compatible with the NCTS, must be available. Furthermore the IT system should pass all the required conformance tests in national and international modes and at least all traders with the status of an authorised consignor/consignee should be connected to the NCTS national external domain.

86 TARIC (Integrated Tariff of the European Communities) is designed to show the various rules applying to specific products when imported into the EU. This includes the provisions of the harmonised system and the combined nomenclature but also additional provisions specified in Community legislation such as tariff suspensions, tariff quotas and tariff preferences, which exist for the majority of the Community's trading partners. In trade with third countries, the 10-digit TARIC code must be used in customs and statistical declarations.

87 Common Communications Network / Common Systems Interface

- **EMCS:** This system will modernise and significantly increase the grade of automatisation for the group of three applications that are presently operational and mandatory for Member States (EWSE[88], MVS and SEED[89]). Finally, new interoperability systems will be developed under the electronic customs' DG TAXUD project (within the security and modernisation reform of the EC Customs Act). Currently, the most defined applications are the following[90]:
  - **AEO** (Authorised Economic Operator)
  - **ECS** (Export Control System)
  - **ICS** (Import Control System)
  - **MCC Implementation**

Furthermore hardware specifications and the functional specifications of the trader module have to be delivered. From a user's perspective adequate interfaces have to be offered:

- Web Interface - This enables companies to use the customs portal to send and receive NCTS messages. It is suited for small businesses that only have a low level of transit declarations.
- **EDIFACT** – This system sends and receives messages as email attachments, or in the body of the email, via Simple Mail Transfer Protocol (SMTP) or the ISO standard for electronic mail (X.400). If an EDIFACT message is sent to NCTS, a converter in the ERP software of the company will need to translate it into an EDIFACT coded message that NCTS can read. NCTS will then accept or reject the declaration in EDIFACT, which again a converter must be able to translate back.
- **XML** - Another way of integrating a business' system into the New Computerised Transit systems (NCTS) is via the eXtensible Markup Language (XML) Channel. Using the XML route to NCTS means sending and receiving Electronic Data Interchange For Administration, Commerce and Transport (EDIFACT) messages "wrapped" within an XML envelope. EDIFACT declarations are transmitted via HTTPS (Hyper Text Transfer Protocol Secure Sockets) to an NCTS XML Channel Application. The response is returned back to the NCTS XML Channel Application via EDCS (Electronic Document Control System), which "re-wraps" the message in XML. The user's system polls the XML Application and the trader receives the message.

Client Administration Aspects

- Helpdesk – description according to the existing EC NHD specifications
- Client administration – business requirements
- Trader solution
- Trader awareness

[88] Early Warning System for Excise (under the joined responsibility of DG TAXUD and OLAF)
[89] System for Exchange of Excise Data
[90] The generic eCustoms term includes the following systems: AEO, ECS, ICS, RIF and other systems involved in Interoperability between MS Customs Administrations. In this context, it needs to be underlined that the "vision statement" on eCustoms is currently under discussion with the EU Member States. Therefore, all eCustoms systems specifications may change

Training Aspects

- Training of the National Helpdesk staff including the usage of CS/MIS (Central services / Management Information System)
- Client administration - business requirements
- Guarantee management - business requirements
- Training on inquiry procedure
- Training on authorisation management of the simplified procedures
- Risk management in transit procedure
- Training on fallback procedure
- Training FTSS
- Training on CS/RD (Central Services/Reference Data) maintenance
- COL (Customs Office List) management
- Curricula development for the future national NCTS training programme

4.3 Dissemination

4.3.1 We-Go dissemination plan

D.1.1.		D.1.2 (Dissemination)			
		Public Administration	IT Industry	Academia	International Organisations
Research	(1) EIF				
	(2) NIF				
	(3) Roadmap to interoperability				
	(4) Recommended interoperability approach				
Practice	(4) Recommendations				
	(5) Service deployment level				

Figure 35: We-Go dissemination plan for Croatia covering all interoperability stakeholder groups and domains

The dissemination, presents the facts related to interoperability in Bosnia. The impact is reached through specific dissemination activities with every stakeholder group, covering all five layers of interoperability and the corresponding recommendations. The dissemination activities will share the common objectives but will vary in:

a) Mission (objectives)
b) Content sophistication level (general, generic, detailed, concrete actions)
c) Dissemination methods used.

Of course another variation is due to the recommendations domain and the stakeholder group. The content sophistication level will vary from general overviews and methods to concrete methodologies and techniques (e.g. public administration back office reengineering).

Dissemination methods are:

a) Workshops with target stakeholders groups
b) Conference participation (especially in working tables), research papers, and articles,
c) Working groups participation (e.g. +eSEE) on national, regional and pan-European level.
d) Participation and creation of (new) knowledge network communities within We-Go's Work Package 4 (e.g. We-Go Knowledge Net, epractice.eu)

The dissemination activities are presented in more detail in the figures below, per:

a) Practical or research domain,
b) Per stakeholder group,
c) Mission,
d) Dissemination methods used.

The dissemination plans for the different stakeholders are given in Figure 18 for public administrations, in Figure 19 for the IT industry, in Figure 20 for academia and **Figure 21** for regional in international actors.

D.1.1.		D.1.2 (Dissemination)		
		Public Administration		
		Local Level	**National Level**	**Others (e.g. IS decision makers, Project Managers, IT Architects, Software Developers)**
RESEARCH	(1) EIF	**Mission:** Rising awareness & presenting the importance of IOP and EIF, Lisbon Agenda, i2010 in Croatia from a local perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshops covering mission statement for Local Level Croatian public administration's officials. b) Round tables, participation in working groups	**Mission:** Rising awareness & presenting the importance of IOP, EIF and Lisbon Agenda, i2010 from a Croatian national perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshops for highly ranked Croatian public administration's officials. b) Papers, round tables, working group's participation and contribution.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means concretely on operational level for Croatia. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related Technical and Semantic Standards, EU Best Practices from EU, PKI. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(2) NIF	**Mission:** Presenting the meaning and importance of NIF and GAP between Croatian current (nonexistent) NIF and EIF from Croatian local public administration's aspect. **Content sophistication level:** General overview **Dissemination methods used:** a) Workshop: NIF from a Croatian local public administration perspective, general aspect.	**Mission:** Presenting the meaning and importance of NIF and GAP between Croatian current (nonexistent) NIF and EIF from Croatian national public administration's aspect. **Content sophistication level**: Concrete, detailed **Dissemination methods used:** a) Workshop: NIF from a local public administration perspective, general aspect.	**Mission:** Presenting the Importance of NIF and GAP between Croatian current (nonexistent) NIF and EIF from operational (deployable) level. Presentation of concrete missing parts (to be deployed) of Organisational, Semantic, Technical and governance IOP Layer. **Content sophistication level:** Concrete, Detailed **Dissemination methods used:** a) Workshops: Aspect of NIF from an operational aspect. b) Conferences, papers, round tables, working groups. c) Knowledge Network Communities (e.g. epractice.eu)
	(3) Roadmap to interoperability	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level from Croatian local public administration perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level from Croatian National public administration perspective. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level, form operational perspective, covering the concrete tasks and subject related to all four layers of IOP. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc… b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for Croatia and what does it mean for local public administration level. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia and what does it means for national public administration level. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia and what are the concrete tasks, activities which will have to be undertaken on concrete operational level in accordance with proposed implementation approach. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc.
PRACTICAL	(5) Recommendations	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character. As well the recommendation for successful IOP agenda from Croatian local public administration perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character from Croatian national perspective. As well the recommendation for successful IOP agenda from Croatian national public administration perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character on concrete operational point of view. **Content sophistication level:** Very concrete and detailed **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables, working groups c) Knowledge Network Communities (e.g. epractice.eu)
	(6) Service deployment level	**Mission:** Rising awareness & presenting the importance of IOP and EIF, Lisbon Agenda, i2010 in Croatia from a local perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshops covering mission statement for Local Level Croatian public administration's officials. b) Round tables, participation in working groups	**Mission:** Rising awareness & presenting the importance of IOP, EIF and Lisbon Agenda, i2010 from a Croatian national perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshops for highly ranked Croatian public administration's officials. b) Papers, round tables, working group's participation and contribution.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means concretely on operational level for Croatia. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related Technical and Semantic Standards, EU Best Practices from EU, PKI. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)

Figure 36: We-Go dissemination plan for public administrations in Croatia

D. 1.1		D.1.2 (Dissemination)		
		IT Industry		
		SW Development	**IT Industry Association / Consultancy**	**Computing Centres**
RESEARCH	**(1) EIF**	**Mission:** Rising awareness & presenting the importance of IOP and EIF, Lisbon Agenda, i2010 in Croatia from a SW Development Industry perspective. **Content sophistication level:** general but with concrete technical and operational aspects **Dissemination methods used:** a) Workshops on IOP related Standards, Best Practices in EU, PKI etc. b) Round tables, participation in working group	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from Croatian IT industry perspective. **Content sophistication level:** general overview. **Dissemination methods used:** a) Workshops bringing the importance of EIF –> better public administration's services for businesses b) Papers, round tables, working groups.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means concretely on operational level for Croatian Computing Centres. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related Standards, Best Practices in EU, PKI etc…. b) Conferences, papers, round tables.
	(2) NIF	**Mission:** Presenting the Importance of NIF from Croatian SW industry perspective and their possible role in it. **Content sophistication level:** General overview **Dissemination methods used:** a) Workshop: NIF from a local public administration perspective, general aspect.	**Mission:** Presenting the Importance of NIF from Croatian IT industry and consultancy perspective and their possible role in it. **Content sophistication level**: General overview **Dissemination methods used:** a) Workshop: NIF from a local public administration perspective, general aspect.	**Mission: :** Presenting the Importance of NIF from operational level projected on possible concrete role of Computing Centres in Croatia. **Content sophistication level:** Concrete, Detailed **Dissemination methods used:** a) Workshops: Aspect of NIF from a operational level b) Conferences, papers, round tables, working groups. c) Knowledge Network Communities (e.g. epractice.eu)
	(3) Roadmap to interoperability	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level in Croatia with an emphasis on their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level in Croatia with emphasis on their role and interests in it. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops on the concrete measures which have to be undertaken to reach the interoperability and the possible role of IT industry and consultancy in it. b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level in Croatia, form operational perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for Croatia and what does it mean for Croatian SW Industry. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia from the Croatian IT Industry and Consultancy perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia and what are the concrete tasks, activities which could be undertaken on concrete operational level from their perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshops
PRACTICAL	**(5) Recommendations**	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from Croatian SW Industry perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from Croatian IT Industry and Consultancy perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from their perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops covering project management in public administration's b) Conferences, papers, round tables, working groups c) Knowledge Network Communities (e.g. epractice.eu)

	(6) Service deployment level	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS in Croatia and their possible role in that programme. **Content sophistication level:** general + concrete overview. **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS in Croatia and their possible role in that programme. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS in Croatia and their possible role in that programme. **Content sophistication level:** general + concrete overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.

Figure 37: We-Go dissemination plan for IT industry in Croatia

D.1.1.		D.1.2 (Dissemination)			
		Academia			
		Universities	**Research Institutions**	**IT Institutes**	**Others (e.g. independent researchers)**
RESEARCH	**(1) EIF**	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from a universities perspective and their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Round tables, participation in working groups	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from a Research Institution perspective. **Content sophistication level:** general overview. **Dissemination methods used:** a) Workshops bringing the importance of EIF b) Papers, round tables, working groups.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means on operational level for Croatia and their possible role in it. **Content sophistication level:** concrete **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related Standards, Best Practices in EU, PKI etc…. b) Conferences, papers, round tables.	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from their perspective and their possible role in it. **Content sophistication level:** general **Dissemination methods used:** a) Workshops b) Round tables, participation in working groups
	(2) NIF	**Mission:** Presenting the Importance of NIF and possible involvement of Universities in the process of creation of NIF. Presentation of GAP between EIF and NIF in Croatia. **Content sophistication level:** General overview + concrete details about in some areas **Dissemination methods used:** a) Workshop: NIF from an academic point of view.	**Mission:** Presenting the Importance of NIF and involvement of Res. Institutes in the process of creation of NIF. Presentation of GAP between EIF and NIF in Croatia. **Content sophistication level**: General overview **Dissemination methods used:** a) Workshop: NIF from a research / academic point of view.	**Mission:** Presenting the Importance of NIF from operational level. Presentation of GAP between EIF and NIF in Croatia. **Content sophistication level:** Concrete + concrete details about in some areas **Dissemination methods used:** a) Workshops: Aspect of NIF from a operational level b) Conferences, papers, round tables, working groups. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the Importance of NIF and involvement of Res. Institutes in the process of creation of NIF, especially as a consultants in some highly sophisticated domain. Presentation of GAP between EIF and NIF in Croatia. **Content sophistication level**: General overview + concrete details about in some areas **Dissemination methods used:** a) Workshop: NIF from a academic point of view.
	(3) Roadmap to interoperability	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level with emphasis on their role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national, and PAN EU level with emphasis on their role and interests in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc. b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level, form operational perspective. **Content sophistication level:** Concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level, form operational perspective and their role in it (eg. Consultants) **Content sophistication level:** Concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for Croatia and what does it mean for Universities and their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia and what does it mean for Research Institutions and their possible role in it **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia and what does it mean for IT Institutes and their possible role in it **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for Croatia and what does it mean for them and their possible role in it **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops

PRACTICAL	(5) Recommendations	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from Croatian Universities perspective. Proposal for their role in it. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from their perspective. Proposal for their role in it. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from their perspective. Proposal for their role in it. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from their perspective. Proposal for their role in it. **Content sophistication level:** concrete and technical **Dissemination methods used:** a) Workshops Reengineering of Services, Modelling of Processes, Procedures, Business Analysis b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu) Reengineering of Services, Modelling of Processes, Procedures, Business Analysis
	(6) Service deployment level	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from a universities perspective and their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Round tables, participation in working groups			

Figure 38: We-Go dissemination plan for academia in Croatia

D.1.1.		D.1.2 (Dissemination)			
		Regional, pan-European and World Level			
		Stability Pact	**UNDP**	**USAID (e.g.)**	**EC (IS Directorate)**
RESEARCH	**(1) EIF - and – (2) NIF**	**Mission:** To provide them with the status regarding the EIF compliance in Croatia and what can be done within other projects, ongoing activities related to development of Croatian IS agenda on national and regional level. **Content sophistication level:** general policy level **Dissemination methods used:** a) Workshops, participation in workshops b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu)			
	(3) Roadmap to interoperability	**Mission:** Present them possibilities for improvement of WBC regarding the IS development, particularly IOP based on EIF postulates and their possible role in this activities. **Content sophistication level:** general policy level in combination with concrete work package/activities for every organization separately. **Dissemination methods used:** a) Workshops, participation in workshops organized by other players in the IOP domain in the WBC region. b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu)			
	(4) Recommended implementation approach	**Mission:** Present the proposed implementation approach for Croatia from their perspective and their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops			
PRACTICAL	**(5) Recommendations**	**Mission:** To present general overview of trends in Croatia related to implementation of services/projects with Pan-European dimension, to find possibility to support the Croatian eGovernment actors in the process of introduction of concrete IOP applications/services/projects (e.g. NCTS) in Croatia. **Content sophistication level:** general trend overview with concrete work packages/activities which can be supported by specific organization in order to extend the effect of work done in We-Go and which are from time and resources perspective out of scope of We-Go. **Dissemination methods used:** a) Workshops, participation in workshops b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu) **Mission:** **Content sophistication level:** general policy level **Dissemination methods used:** a) Workshops, participation in workshops b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu)			
	(6) Service deployment level	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS in Croatia and their possible role in that programme. **Content sophistication level:** general + concrete overview. **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.			

Figure 39: We-Go dissemination plan for regional and European stakeholders in Croatia

4.3.2 We-Go dissemination activities

Figure 40 shows the topics and stakeholders that We-Go is going to address.

Croatia	We-Go Contributions to Dissemination Plan for 2nd period			
	Croatian IOP Stakeholder Groups			
	Public Administration	IT Industry	Academia	Regional, pan-European and World Level
(1) EIF	1/2 day workshop	1/2 day workshop	1/2 day workshop	1/2 day workshop
(2) NIF				
(3) Roadmap to interoperability				
(4) Recommended implementation approach				
(5) Recommendations	1 1/2 day workshop	1 1/2 day workshop	1 1/2 day workshop	
(6) Service Deployment Level				

Figure 40: We-Go dissemination plan for Croatia with a marked cell where We-Go is planning activities

Event planning for 2nd period and expected participants from the different stakeholders (Figure 41**)**

	Croatian IOP activities 2008/2009	Date	PA Hi Level	PA Mid Level	Private NGO Academia	Total No. Participants	Student Days	Total Person Days
	Event							
1	**1st IOP Workshop Mgmt**	**Nov/Dec 2008**	3	10	7	20	½	10
2	**1st IOP Workshop for Professionals / Experts**	**Nov/Dec 2008**		10	10	20	1 1/2	30
3	**2nd IOP Workshop Mgmt**	**Jan/Feb 2009**	3	10	7	20	½	10
4	**2nd IOP Workshop for Professionals / Experts**	**Jan/Feb 2009**		10	10	20	1 1/2	30
	Overall Sum		**6**	**40**	**34**	**80**		**80**
			8%	**50%**	**42%**			

Figure 41: Planned We-Go events during the 2nd period in Croatia

Additional and complementary Activities

1. **Participation in WP3 TTT events (see WP3)**
2. **Participation in WBC Conferences to be announced**

5. Interoperability in FYR of Macedonia

The Government of FYR of Macedonia is actively involved in the global transition towards a knowledge-based economy where the development of an Information Society plays a unique and important role. The *Commission for Information Technology*[91] and *Information Society Task Force*[92] has developed a "*National Information Society Policy"* and *"Strategy Plan"* in order to support the IS development agenda on a national level. FYR of Macedonia follows the regional initiatives, e.g. the *"eSEEurope Agenda for the Development of the Information Society"* adopted in October 2002 in Belgrade, which has been signed by the FYR of Macedonian Government. Since 2007 the government has constituted the Ministry for Information Society Development, which is the central coordinator of all eGovernment initiatives.
The study *Growth of eGovernment services in FYR of Macedonia* has shown a significant growth of eGovernment services in the FYR of Macedonia during the period of 2004 to 2007. At the moment FYR of Macedonia has reached an online sophistication level of 49,95% and a full online availability of 10% of public services. Although the progress of eGovernment service development in FYR of Macedonia is evident, according to the results of the We-Go country desk research, FYR of Macedonia is still at a level of development where there is almost no exchange of information between different service providers. Thus, interoperability is technically not possible on a large scale at the moment.

There are several projects that are about to be executed and which aim at achieving interoperability on certain level. The VIES and NCTS will be the first cross-border pan-European services to be implemented in FYR of Macedonia in the near future. The implementation projects have not been started yet, but the FYR of Macedonian Government has initiated the tenders for the implementation of these two services. There is still no state level body that has taken leadership and coordination of introducing interoperability as a sustainable activity. Furthermore interoperability should be incorporated in the national IS development agenda as well. The current situation is that FYR of Macedonia has a significant intellectual potential regarding Information Technology, coming from public administration bodies, IT industry, and academia. Since FYR of Macedonia is still going through complex transitions, the IS Agenda in general and interoperability issues are suffering from a lack of funds.

To a large extent the current IS achievements were gained through the cooperation of a variety of foreign Donation Programmes and FYR of Macedonian Know How, which can be taken as some kind of "Best Practice Experience" for the rest of WBC region. The Foundation Open Society Institute – Macedonia (FOSIM), Microsoft and others have donated many different projects which all have different directions but the same goal - to successfully transform the FYR of Macedonian Society towards an Information Society.

[91] http://www.kit.gov.mk/default-en.asp
[92] The Task Force is an ad-hoc expert body consisting of over 40 ICT and Information Society experts with varying backgrounds (government officers, business sector representatives, researchers etc.), led by the Commission for Information Technology.

5.1 Compliance Analysis

We-Go Desk Research has found signs of a starting process of introducing interoperability in FYR of Macedonia. However, a National Interoperability Framework (NIF) has still not been developed. EIF is very concretely mentioned as a reference model in both, the IS Development Strategy and in the accompanied Action Plan. The We-Go Desk Research couldn't find a concrete Roadmap or Action Plans consisting of different smaller projects/activities to be performed under the umbrella of interoperability. Yet a lot of rather simpler issues should be addressed in FYR of Macedonia such as usage of meta data, ontologies, and standards.
One of the donor organisations, namely METHAMORPHOSIS[93] has delivered recommendations on standards to be accepted in bodies of Public Administrations in FYR of Macedonia in order to achieve interoperability among services, applications, organisations, and peoples in public administration. Like in the case of Croatia, the We-Go team has compared EIF postulates which are currently missing or to some extent are included in the national IS Development agenda. The EIF compliance analysis recognized possibilities that interoperability achieved on EIF postulates doesn't have to be included in one document, one programme and especially not in one project. We-Go desk research has analysed the whole spectrum of facts, activities, documents, websites, and eGovernment services related to the development of IS in FYR of Macedonia in order to understand to what extend interoperability has been developed in FYR of Macedonia.

5.1.1 Technical Layer of Interoperability

At the ***Front Office Level*** We-Go desk research has found:

- ***The issue of data presentation and exchange*** is missing and is still neither regulated nor coordinated by some state level body.
- The usage of ***character sets to be used in public administration*** has still not been regulated and defined.
- ***Collective authoring*** is not the common practice for public administration in FYR of Macedonia. Moreover, a regulation and coordination body is missing
- ***File type and document formats*** to be used by public administration bodies are not defined.
- ***File compression*** is missing and it is not regulated.

At the ***Back Office Level*** We-Go desk research has concluded:

- ***Data integration and*** middleware is either missing or not regulated and coordinated by some state level body.
- ***XML-based standards*** are missing.
- ***EDI-based standards*** are missing.
- ***Web Services*** are still missing.
- ***Distributed Application Architecture*** is missing.

[93] Metamorphosis is an independent, non-partisan and non-profit foundation based in Skopje, Macedonia. Its main goals are development of democracy and prosperity by promoting knowledge-based economy and information society. Metamorphosis started working in 1999 as part of the e-publishing program of the Foundation Open Society Institute – Macedonia, and became an independent foundation in 2004., http://www.metamorphosis.org.mk

- ***Interconnection services*** are missing.
- ***File and message transfer protocols*** have not been defined.
- ***Message transport and security*** are missing.
- ***Message store services*** are missing.
- ***Mailbox access*** is missing.
- ***Directory and domain name services*** are missing.
- ***Network service*** is supported on a modest level.

In the context of security organised on state level, coordinated usage of ***Web services, PKI, Web service security, firewalls, protection against viruses, worms, trojan horses, and e-mail bombs*** is still not taking place.

Major issues for ***Back Office and Front Office***, which hold back, IOP on the technical level are:

- Non existing so called ICT legal framework
- Accompanying technical infrastructure
- Lack of leadership and management on a state level
- Lack of resources needed for implementation and execution of projects with focus on enabling the technical IOP.

According to the IOP stakeholders' information needs analysis performed by We-Go desk research, aspects of technical interoperability are most needed among the public administration servants in FYR of Macedonia. A large part of the issues stated below have been addressed in a document, which has recently been released by METAMORPHOSIS.

5.1.1.1 Core Technical IOP

There is a large portion of laws missing which regulate and enable *core technical IOP*. Besides this discrepancy there is a managerial issue as well. The state level body responsible for coordination, support, and promotion of ***technologies to handle structure and semantics of information and services*** is missing. Desk research performed in FYR of Macedonia has concluded:

- The presence of use of suitable ***technologies to handle structure of information such as XML, and data models*** are missing.

- Use of suitable ***technologies to handle structure of services, such as Web Services[94], SOA[95], WSDL[96], UDDI[97], and Workflows*** are missing.

- Use of suitable ***technologies to handle semantics of information, such as RDF[98] and OWL[99]*** is still not taking place.

[94] The W3C defines a Web service (many sources also capitalize the second word, as in Web **S**ervices) as "a software system designed to support interoperable machine to machine interaction over a network."
[95] Service-oriented architecture is a software architecture that defines the use of services to support the requirements of software users.
[96] The Web Services Description Language is an XML-based language that provides a model for describing Web services.
[97] Universal Description, Discovery and Integration (UDDI) is a platform-independent, XML-based registry for businesses worldwide to list themselves on the Internet.

- Use of suitable ***technologies to handle semantics of service, such as OWL-S[100], WSMO[101], and Semantic Web Services[102]*** could not be found during the desk research.

5.1.1.2 Supportive Technical IOP

- The aspect of ***accessibility*** is missing, and it is still not addressed through the legal framework. Furthermore, there is no state level body taking care of this issue. Some important IS development stakeholders (e.g. METHAMORPHOSIS) have recognised the need for an alignment with relevant standards and best practice cases from the EU (e.g. SAGA etc…).

- ***Multilingualism and multiplatform devices*** – Some public administration Internet pages offer the possibility to be presented in English language as well. Services offered to the public administrations are still not multilingual or partly not even bilingual.

- The ***security and privacy*** of information resources and communications was addressed through the acceptance of the *law on personal data protection*, which is basically a harmonisation with the EU Directive 95/46/EC. However, the usage of for example Web Services through eID cards and PKI is not possible because of legal issues. The needed laws are about to be implemented, but they are missing at the moment. Additionally, there are no projects, funding resources or state level bodies taking care of coordination and implementation of these services.

- Principles of ***subsidiary***[103] were not present at the moment We-Go desk research was conducted in FYR of Macedonia.

- Use of ***Open Source Software*** - There is no legal framework or policy, which regulates the usage of OSS in public administration bodies in FYR of Macedonia. Accordingly, the state level body responsible for coordination, support and promotion of OSS usage in FYR of Macedonian public administration and information space is missing.

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[98] Resource Description Framework (RDF) is a family of W3 Consortium specifications originally designed as a metadata model but which has come to be used as a general method of modelling information, through a variety of syntax formats.

[99] Web Ontology Language is a markup language for publishing and sharing data, using ontologies on the World Wide Web.

[100] OWL-S is ontology, within the OWL-based framework of the Semantic Web, for describing Semantic Web Services.

[101] Web Service Modelling Ontology is an ontology currently developed to support the deployment and interoperability of Semantic Web Services.

[102] Semantic Web Services are self-contained, self-describing, semantically marked-up software resources that can be published, discovered, composed and executed across the Web in a task driven semi-automatic way. Semantic Web Services can be defined as the dynamic part of the semantic web.

[103] The subsidiarity principle is intended to ensure that decisions are taken as closely as possible to the citizen and that constant checks are made as to whether action at Community level is justified in the light of the possibilities available at national, regional or local level.

- The use of open ***standards*** is recognised by the FYR of Macedonian IS development agenda as an important issue. Surprisingly open standards based solutions are still not accepted and supported within the public administration on a large scale. A legal framework is still missing, as well as some coordination body which will promote and support the usage of open standards in public administration and in the whole FYR of Macedonian information space.

5.1.2 Semantic Layer of Interoperability

The process of drafting/agreeing on ***common and global definitions/representations for eGovernment definition/vocabularies/metadata*** is still missing. The issue of semantic interoperability in general was mentioned only as an important aspect in the recommendation document of METAMORPHOSIS; however there are no organisations or documents coordinating this issue on an operative and concrete deployment level. FYR of Macedonian We-Go desk research has concluded:

- ***Common and global definitions/representations for eGovernment semantics*** are missing, and there are no ongoing activities covering this domain.

- ***Modelling perspective and formalisms for documenting the common definitions*** are still missing. Furthermore, there is no state level body taking care of it.

- ***Administrative level of definitions development*** is still not present and there are no ongoing actions, which are covering this domain. There is no state level body coordinating this topic.

- ***Promotion/dissemination and maturity of common definitions*** is not present at the moment and there are neither any ongoing activity nor are there institutions covering this domain.

- ***Trust, reliability, and the supportive technical IOP layer*** are still missing, partly because of a missing legal framework and the absence of a state level body covering/coordinating this domain.

- ***Maintenance and evolution of common definitions***, is neither present as a continuous ongoing process nor is there any state-level body which realised the importance of this issue.

5.1.3 Organisational Layer of Interoperability

At the moment there are no involved public administration organisations which are jointly determining the organisational aspects of interoperability, like organisational change or cooperation of different public administration bodies. There are documents (e.g. strategy, recommendations to public administration bodies, legal framework etc…) which are missing. The demand driven approaches for eGovernment services were recognised by We-Go desk research. NCTS and VIES are the first cross-border pan-European services to be considered for implementation in FYR of Macedonia.

- Evidence of a ***clear link between cross-organisational processes/services and the business strategies*** were found still missing during the We-Go desk research. There are neither state level bodies which are taking care of coordination nor supportive documents needed to cover aspects of interoperability, for example a legal framework or instructions and directives for public administration, IT industry and academia.

- The process of ***modelling and visualisation of public administration services/processes*** still didn't take place on a large and systematic scale. Furthermore the accompanying supportive documents are missing.

- There are examples of cooperation between the public and private sector, like cooperation of Government and Microsoft or an eGovernment project, which has been sponsored by USAID. However, the process of ***involvement of the users by setting up communities of practice in the process of new service design*** is still not the activity/phenomenon that occurs on a large scale.

- Desk research has concluded that there are neither ongoing activities nor responsible organisations coordinating the issue of ***knowledge reuse. Furthermore experience related to the execution of internal and cross-agency business processes/services from the private sector are missing***. There exists a *law of free access to information of public character* enacted in 2006, which is covering the re-use of public sector information.

    - ***Identification and documentation of common service functionality and features across public administration agencies*** are missing and there is no public administration state level body performing this activity. Furthermore supportive documents such as a legal framework or instructions and directives for public administration units are missing.

- There are no examples of ***support of multi-channel service delivery.*** In the METHAMORPHOSIS recommendations to the bodies of public administration on standards to be accepted in FYR of Macedonia, there is a part devoted to this issue as well. However, state-level body supportive documents (e.g. laws, IT architecture etc…) covering this aspect are still missing.

- ***Consensus on and visibility of the ownership, management and responsibility for cross-organisational processes / services*** is still not achieved and there is currently no responsible state level body taking care of this issue.

5.1.4 Governance Layer of Interoperability

5.1.4.1 Political

- ***Development of national eGovernment IOP strategy and programmes*** – FYR of Macedonia has excellent foundation documents which are covering the national IS development agenda as such. These documents are regarding interoperability as an important part of IS development and EIF as a reference model which has to be followed. However, interoperability as strategy and programme is still missing.

Currently there is only one document developed by METAMORPHOSIS, which has IOP as its main subject. There is no political commitment supporting the development of interoperability strategy and programmes.

- We-Go Desk research couldn't find any evidence for ongoing activities of ***promotion of organisational federalism as a model for organising the diverged administrative space into a cooperative environment.***

- The presence of ***significance of international IOP aspects*** has been found during the desk research in FYR of Macedonia – however, only in the experts circles and mostly from the academic community. FYR of Macedonian public administration representatives, experts and servants are not included in the IDABC working programme or in a similar programme on regional, pan-European or international level.

5.1.4.2 Legal

- The need for ***a legal alignment to address the new requirements posed by intensive cooperation of public administration*** agencies is neither recognised nor addressed in both the information society development strategy and the action plan.

- ***Protection of intellectual properties in multi-partner projects and developments*** – is mentioned as one of the key issues, which have to be regulated in a so-called "ICT legislation framework". This framework is about to adopt all legislation, which is in conformity with international conventions and with the EU directives on the Information Society and knowledge-based economy.

- The law, which will enable diffusion of digital signature and electronic identity, is still missing, but it is part of the mentioned "ICT legislation framework".

- The issue of ***citizen privacy and data protection*** was addressed and aligned to the Directive 95/46/EC and to Article 28 in particular by adopting the new law on personal data protection in 2005. This law was amended to include EC recommendations. Accordingly a *Directorate for Personal Data Protection* was established as an independent state body, with the mission to implement data protection law with respect to the rights of citizens regarding the privacy.

5.1.4.3 Managerial

Although there is still no state level body responsible for ***clear IOP leadership/ownership/ sponsorship/management on the national level,*** teams covering IOP on the operational level in the IT organisational units of Public Administration were found during the desk research.

Flexibility/transferability/reconfigurability of IOP solutions were not found in FYR of Macedonia at this stage of development, because the IOP Agenda still didn't start with an execution on a national level.

- The evidence of ***adoption of any relevant available standard and proposal of new standards in areas where standardisation is missing*** were found during the We-Go desk

research in FYR of Macedonia. There is an excellent document made by METAMORPHOSIS that proposes the missing standards. As a non-profit organisation they are relatively independent in their proposals. On the other hand beginning an early adopter of eGovernment technology in FYR of Macedonia, they have excellent insights in all relevant trends in that domain. METAMORPHOSIS is definitely a good practice example to learn from for developing and disseminating high-level papers covering the development of IS in transitions countries.

- ***Broad commitment, participation, and communication*** can be perceived in all documents, projects and activities covering the IS development agenda as such. However, the same cannot be stated for interoperability. All interviewed stakeholders have expressed their interest in very concrete and specific IOP subjects. Readiness for participation exists, but broad commitment and communication is only possible with a strong central state level body. Such a state level body is currently missing in FYR of Macedonia.

- ***Willingness (and need) for cultural change involving all partners*** is expressed in all documents covering the development of an Information Society. There is a readiness at all stakeholder groups, namely public administration, academia, and industry to participate in the required change actions. We-Go desk research has found a lack of leadership and promotion of change processes that will have to be introduced in order to introduce interoperability.

- The coordination process of ***training the staff focused on IOP projects*** has still not started on the large state level. Exceptions are isolated activities, e.g. workshops held within the second We-Go work package, which have concretely covered issues related to the implementation of cross-border pan-European services like NCTS, VIES or eAdministration. Generally, the process of education related to ICT is included in several working programmes of all actors of IS development in FYR of Macedonia[104]. The need for continuous training of all IS stakeholders[105] regarding the usage of ICT generally and specifically on interoperability, is recognised and mentioned in the working papers of METAMORPHOSIS as well. This non-profit working group has assessed the needs of public administration and delivered recommendations for usage of ICT standards in the civil services.

5.1.4.4 Economic

- ***Adoption/switching costs inherent to IOP solutions*** – There are some activities regarding the IS development on the local level financed by USAID[106]. The project has indirect connection to IOP as well, where the project aims towards enabling better policy outcomes, higher service quality and to increase the citizen's participation through usage of ICT. In particular the project will upgrade the IT equipment, communication technology, office software and web-based municipal management information systems. This might be an example of how to solve the issue practice cases as well. Still, a state level body responsible for the coordination of funding issues is missing.

[104] Macedonian State, international donator organisations and Macedonian non-profit organisations, ICT industry and academia.
[105] All level Public Administration servants, politicians, citizens and business.
[106] http://www.metamorphosis.org.mk/content/view/634/30/1/1/lang,en/

- ***Public procurement policies and financing for IOP projects*** – The new law on public procurement was enacted at the beginning of 2008 with the aim to increase the transparency of the state's purchasing decisions and tendering procedures both for goods and services. The FYR of Macedonian government with the help of USAID has supported the development of the eGovernment project eProcurement[107]. eProcurement aims at providing a more transparent procurement procedure from bids submission to the selection of the most favourable one.

- ***Partnering with the private sector in IOP projects*** – There are public-private strategic partnership among the government and Microsoft with the goal to develop several eGovernment services, which will be gradually be developed first as a portal-oriented and in the future as interactive- and transaction- oriented services.

5.1.5 Infrastructure, Back Office and Services

The following paragraph will cover two important issues, addressed by EIF; IOP key infrastructure and benchmarking of the 20 most important public administration services offered to citizens and businesses in FYR of Macedonia. In order reach interoperability there is a need to include the NIF and EIF postulates in the public administration ICT infrastructure as well. Furthermore it is important to measure the progress of online sophistication of public administration services. The benchmarking is still not performed in on a state level in FYR of Macedonia. Because of its importance and in order to understand the status and the trends of service development in FYR of Macedonia, the We-Go country participant team has performed the benchmarking study.
The methodology is the same as used by CapGemini measuring the EU countries in 2006. The trends and results are evident; FYR of Macedonia has reached significant improvements in the last few years, but has to invest more efforts towards improving the full online sophistication of services. Furthermore more effort has to be put into the modernisation of the public administration's ICT infrastructure. Besides the missing key infrastructure and the missing NIF or some kind of agreement on common postulates of interoperability and eGovernment services in FYR of Macedonia, there is a one maybe more important issue which was recognised by We-Go desk research. There is no state level body taking care of the postulates of interoperability while making decisions on design or implementation of key ICT infrastructure, registers, services, and applications.
Current services, ICT infrastructure, and registers are representing digitalised versions of the "old" traditional organisation of public administration. Their design/deployment was not coordinated under one state level IS development agenda but under the leadership and according to funding possibilities and needs of certain public administration units. There is a significant intellectual potential in FYR of Macedonia needed for the shift towards more efficient public administration. The awareness, political commitment, and certainly state level body which is able to enact eGovernment decisions is missing. Such a state-level body must coordinate the joint effort of all eGovernment actors in FYR of Macedonia.
Accordingly there is no strategy or action plan of any nature covering this issue. The national IS agenda is mentioning interoperability more on the high-policy level.

[107] https://e-nabavki.gov.mk/

Availability of ICT infrastructure and deadline as indicated in the action plan of the national IS strategy	
Advanced computer networking (physical infrastructure)	Yes/No
Building a logical infrastructure among the state institutions	2008
e-Signature	No
Record management	No
Equipping the municipalities with at least three computers and continuous Internet connection for public access	Yes/No
Broadband connectivity	Yes/No
Internet connectivity at schools	Yes/No
Internet at Local and government units	Yes/No

Figure 42: Availability of Information Systems in FYR of Macedonia in 2007

Availability of Information Systems in FYR of Macedonia	
Electronic Citizen Registry	No
Public Expenditures (Treasury/Finance)	No
Taxation Authorities	Yes/No
Customs Administration	Yes/No
Network/communication infrastructure, dedicated to e-Governance systems	No
Judicial systems	Yes/No
Electronic Registration of Companies	Yes

Figure 43: Key interoperability ICT infrastructure in FYR of Macedonia in 2007

Basic key infrastructure for interoperability has still not been implemented. There is a state level action plan, which is taking care of this issue centrally, organised and coordinated, but the IOP postulates are not included in this process. In general, the achieved development level of ICT infrastructure varies among different institutions. It is interesting, that a lot of ministries and agencies have independent ICT solutions and information systems, but they are isolated among each other because of the insufficient network sophistication and the lack of interoperability between organisational institutions and also within the government itself. As indicated in 0a large part of the ICT infrastructure sophistication/implementation level can be described as partially implemented. Critical ICT infrastructure like e-Signature and Record Management is still missing.

There is no central database registry on personal data, which is typically constituted out of a main, subsidiary database and the records. There is neither common guideline nor is there a state level body which is covering/coordinating the issue of data description in all registries on national and local level. Information systems for public expenditures and network infrastructure dedicated to eGovernment systems are missing. Taxation, Customs, and Judicial Authorities have already partially implemented their information systems and several other projects are in the middle of their implementation process.

Fully operational registers and deadline as indicated in the action plan of the national IS strategy	
Companies and associations	Yes/No
Persons	Yes/No
Addresses	2009
Personal properties	No
Citizenship	2008
Cadastre	2008
Agricultural	No
Tourism	No
Central registrar of all databases	No

Figure 44: Availability of fully operational registers in FYR of Macedonia in 2007

In general the implementation of fully operational registrars available to be used in an eGovernment environment can be described as partial at the moment. The fully operational registrars indicated by Figure 44 are crucial for achieving interoperability among services, processes, and peoples in public administration. We-Go Desk research didn't find any state level body taking care of a coordinated approach in designing and implementing these registers.

Moreover, there are no guidelines based on a common agreement of all included eGovernment participants in order to assure the same interoperability among these registers in the future, once when they will be implemented. At the moment the FYR of Macedonian IS agenda recognises and addresses interoperability on a national and pan-European level as a key issue only on high policy level. There is no specific IOP action plan, or some kind of recommendations defined on a state level covering the interoperability postulates which should be respected when these register will be in the process of implementation in order to become interoperable with other parts of public administration ICT System.

At the moment registries covering the companies and associations, agricultural, personal properties, tourism, and central register are missing. There are several registers, which are in the process of implementation, like persons, citizenship, cadastre, etc.

5.1.6 We-Go Benchmark

FYR of Macedonia has still not introduced a benchmarking of availability of online services based on the CapGemini method used in the rest of all EU member and candidates states. In order to better understand the situation regarding the online sophistication of 20 public administration basic services offered to business and citizens, the FYR of Macedonian We-Go participant team has performed the benchmarking on a state level using the same CapGemini method like in the rest of the EU (28) states. The study has shown, that the average percentage of fully online availability of public services is higher in the European Union than in the FYR of Macedonia. Currently only two services are fully available online in Macedonia.

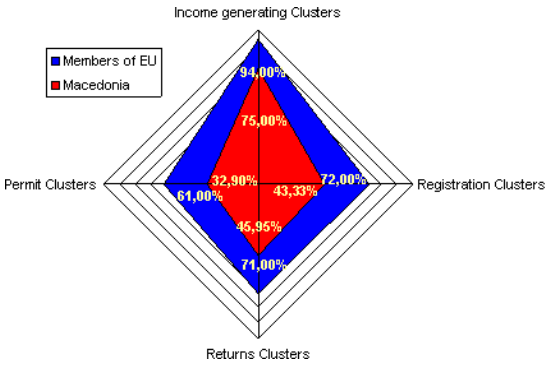

Figure 45: Clustered public services in FYR of Macedonia measured by FYR of Macedonian We-Go participant team in 2007 - Comparison EU (28) and FYR of Macedonia

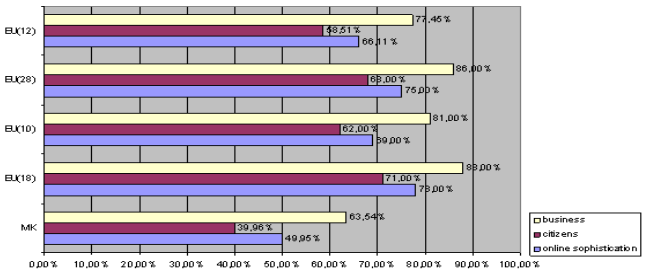

Figure 46: Online Sophistication of services for businesses and citizens measured by FYR of Macedonian We-Go participant team in 2007- Comparison of EU (12), EU (28), EU (10), EU (18) and FYR of Macedonia

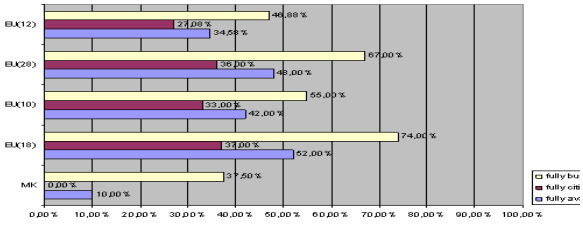

Figure 47: Fully Online availability of services for businesses and citizens measured FYR of Macedonian We-Go participant team in 2007-Comparison EU (12), EU (28), EU (10), EU (18) and FYR of Macedonia

The overall online sophistication of all public services is 49,95%.

Online sophistication according to clusters has shown similar trends like those in Croatia; the average percentage of online availability of public services is higher in the European Union

than in FYR of Macedonia for some 20 to 30%. In the EU countries the need for an interoperability framework became obvious around the year 2001/2002, when the online sophistication level was around 50% and the percentage of fully available services was around 25%.

The majority of eGovernment services in FYR of Macedonia that pertain to the citizens services are at level 1 or 2, hence for this sector it is too early to talk about level 4 interoperability. The online sophistication in FYR of Macedonia when compared on average is much lower than those in EU; MA 49,95% vs. EU (10) 59% - EU (18) 78%.

Desk research concludes: The most significant gap between FYR of Macedonia and EU can be recognised in the full online sophistication. We-Go believes, that this modest level of sophistication expresses the lack of a state level coordinated approach of inclusion of interoperability postulates in the designing and implementing of services. Since effective public administration services offered to citizens, businesses, and other public administration in Europe are recognised by EC (e.g. i2010, Service Directive, Lisbon Agenda) as key drivers in a shift towards a knowledge based economy and Information Society, FYR of Macedonia has to recognise their crucial role and invest more efforts towards:

(1) Development of new services
(2) Increase of online sophistication of existing services.

5.2 Interoperability Recommendations

5.2.1 Recommendations regarding interoperability key factors

The outcome of the EIF compliance analysis and current trends of information society developments in FYR of Macedonia are the basis for the proposed roadmap towards interoperability in FYR of Macedonia. The main objective will be to assure the conformity of the FYR of Macedonian IS development agenda with the EIF postulates. Furthermore, We-Go will emphasize the need to institutionalize the EIF postulates within the FYR of Macedonian IS development agenda. The aim of the roadmap is to summarize actions that need to be carried out in order to get FYR of Macedonia in line with the EIF principles and to provide a recommended approach applicable from the perspective of current IS developments in FYR of Macedonia. However, it does not recommend a specific implementation action plan that is to be decided by decision makers in FYR of Macedonia. This paragraph will provide a general, high level introduction for necessary adaptations within the current national IS agenda in FYR of Macedonia, by stating weaknesses in the overall strategy and especially in its implementation. This paragraph will give general remarks that put FYR of Macedonian decision makers in the position for an overall adjustment of the pursued route towards pan-European interoperability.

The FYR of Macedonian IS agenda is a part of the larger state-level agenda owned, lead, and coordinated by the FYR of Macedonian Government. As stated in the document **"Program of the Government of the Republic of Macedonia (2006-2010)"** delivered in 2006:

"Basic goals of the Program of the new Government of the Republic of Macedonia in 2006 - 2010 (hereinafter Program) are aimed at improving living standard of the population, increasing employment, fighting corruption, developing democracy, improving inter-ethnic relations, political stability of the country and its integration into the EU and NATO. Basic principles of the economic part of the Program are: economic freedom and equal working conditions for all subjects; dynamic implementation of structural reforms; partnership relation between the state and all relevant subjects, particularly in the private sector, aimed at speeding up its development and creating new working positions. Basic postulates for the new Government's work at the political and international plan include complete respect of the Constitution, implementation of the provisions of the Ohrid Framework Agreement and further realization of responsibilities resulting from the negotiations with the EU and NATO."

This program was recognised by the We-Go desk research team as a main document which defines the long term and sustainable policy for the development of an information society and eGovernment in FYR of Macedonia. The program recognises and devotes the crucial role to be played by the FYR of Macedonian IS agenda which will/can further support the other program goals and objectives from other domains of society which all basically having a common goal: to enable the shift of the FYR of Macedonian society towards a knowledge society. Furthermore, the FYR of Macedonian IS agenda, being constituted out of several pillars, has mentioning IOP as one of the goals to be reached but only on the "high-policy level". There are only a few concrete projects and activities defined in the pertaining action plan, covering partly this domain.
These projects are fragmented and separated from each other, with no central body responsible for coordination, and implementation among them regarding taking care for IOP postulates within.

The process of achieving an agreement among the IOP stakeholders on common technical and semantic standards to be used in public administration on state level have started, initiated by METAMORPHOSIS, a non-profit organisation. This example can be followed and recognised by other countries in the WBC region like a bridge between public and private sector, eligible to deliver the needed dialog among these two worlds and to help them to find the "common language on interests" needed for achieving interoperability. Objectives and goals defined by each pillar of the IS agenda (both strategy and action plan) are sufficient to boost the development of IS in FYR of Macedonia in general, but have to be further extended to achieve the same effect for interoperability among the services offered by public administration to citizens and enterprises. Therefore We-Go desk research has focused itself to help the FYR of Macedonian IS agenda actors to extend existing and ongoing IS efforts, by recommending to them what is missing concretely and what should be supplemented regarding interoperability in the existing IS agenda.

The FYR of Macedonian government should first clearly entrust the fulfilment of the IS Agenda to some state level body, e.g. Ministry or Agency, and provide the assigned body with political commitment on all state levels. Furthermore adequate state budget funding sources, human resources needed for implementation, leadership, and control of the execution of the IS agenda is needed. This body within the FYR of Macedonian IS agenda should then take responsibility for delivering and executing the interoperability state level agenda (both strategy and action plan), which will be constituted out of the supplement activities to the existing FYR of Macedonian IS agenda related processes. The goal is to extend them further by an IOP dimension among services, applications, processes, procedures, and people. This will be a coordinated action of parallel executed activities fragmented among the domains of the seven ongoing IS agenda pillars; Infrastructure, eBusiness, eGovernment, eEducation, eHealth, eCitizens, and Legislation. We-Go recommends operationally entrusting the mission of creating the NIF and accompanied IOP strategy and action plan to the proven team[108] of **Information Society Task Force.** The task force is an ad-hoc expert body consisting out of over 40 ICT and IS experts coming from public administration, IT industry, and academia. It is coordinated and led by the state's **Commission for Information Technology**.

The NIF should be based on the agreement of all IOP stakeholders and participants of the FYR of Macedonian IS (public administration, IT Industry, Academia, Citizens) and reached through their dialog. Otherwise NIF will have no effect, and will not be able to facilitate the introduction of interoperability in FYR of Macedonian IS. In terms of operational execution level of the NIOP Agenda, We-Go recommends the Commission for Information Technology (or any other state-level body responsible for IOP) to entrust the execution of agreed IOP related activities to the most suitable organisation. However, leadership, postulates, vision, and monitoring of the execution of NIOP should remain by the state body. FYR of Macedonia has an excellent intellectual potential regarding the information society, and this has to be used as much as possible. One must not forget, that human behaviour is one the most complicated patterns in nature and very often the best results accomplished by people were those where people had free choice of participation and contribution on a voluntary basis. METAMORPHOSIS Foundation is an excellent example for this.

We-Go desk research follows the four-layer interoperability model; technical, organisational, semantic, and governance. When defining the national IOP strategy and action plan it is recommended to take into consideration the recommendations stated below. It is important to

[108] This team have delivered National Information Society Policy Document and the National Strategy for Information and Communication Technologies.

recognise how to firstly identify and then to remove barriers towards achieving interoperability among electronic interactions for:

- Citizens to Government - C2G
- Citizens to Business - C2B
- Business to Business -B2B
- Business to Government - B2G
- Government to Government – G2G.

FYR of Macedonia can and should use the instruments of pre-accession assistance - IPA[109], in order to facilitate the acceptance of acquis *communautaire* related to the IS domain. Furthermore it should try to implement concrete pan-European services (e.g. VIES, NCTS, EBR etc…). Moreover, it should learn from other best practice experiences, especially from those countries which have achieved great success so far in their NIOP Agenda (e.g. Germany, Estonia, etc.), Nevertheless, one should not copy their NIOP Agenda related documents literally, but use the best practice examples in order to establish a own and self contained agenda. The whole process of achieving IOP will be long and organisationally, technically, financially, and legally very complex. NIF is the simple idea of a high level EU policy with the long-term strategic goal of creating four single markets, operatively currently mentioned in several EU Documents - most significantly in the Initiative i2010 and in the latest Lisbon Agenda.

5.2.1.1 Technical Layer of Interoperability

The purpose of strategy/action plan for IOP regarding the technical layer will be to first understand and then to remove the barriers of so-called technical nature, which have to be resolved in order to establish the connection and data exchange among systems and services. These can be done through definition and implementation of standards, norms, and internationally accepted best practices, which are already recognized by all or at least the majority of EU member states. There is a strong need for one state-level body which will coordinate the process of:

- **Analysis of missing standards**, norms and existing technical barriers – where We-Go desk research can significantly help FYR of Macedonia to develop an analysis methodology or can be used as an input for needed standards/norms to be applied.
- **Proposing comments/suggestions** and then announcement of valid technical norms/standards – We-Go desk research can be used as an input or as a reference model.
- **Maintenance of standards/norms** - once after being accepted and announced as official standards/norms to be used in certain domain.

We-Go recommends performing the analysis and suggestion of missing standards by working groups, which are active within the Information Society Task Force. Cooperation together with METAMORPHOSIS is also recommended, because these two organisations are very

[109] "The Instrument for Pre-Accession Assistance (IPA) offers rationalised assistance to countries aspiring to join the European Union for the period 2007-2013 on the basis of the lessons learnt from previous external assistance and pre-accession instruments. The aim of the IPA is therefore to enhance the efficiency and coherence of aid by means of a single framework. This framework incorporates the previous pre-accession and stabilisation and association assistance to candidate countries and potential candidate countries while respecting their specific features and the processes in which they are engaged.", http://europa.eu/scadplus/leg/en/lvb/e50020.htm , 2008

well involved and experienced in the domain of eGovernment in FYR of Macedonia. It is important to choose a solution, which will offer the best-cost benefit ratio.

The certainly shortest and maybe far most cost-benefit and effective way of implementing the standards important for the technical layer is to proclaim already well accepted and established standards in this domain from EU (IDABC) and international best practice cases.
In the following the recommendations regarding the technical layer are outlined. In particular it is mentioned, which standards should be taken into consideration and accepted as standards according to the EIF nomenclature called ***Front Office***:

- Data representation and exchange
  - Interfaces
    - Interfaces design principles -
      - WCAG[110] (IDA mandatory)– Web Content Accessibility Guidelines – have to be adopted. Experiences from Croatia have shown that the introduction of standard alone is not sufficient and must be supported with additional training of public administration servants who are responsible for the implementation of the standard. These norms are helping to make content accessible to a variety of web-enabled devices like mobile phones, handhelds etc.
      - Web browsers have to support almost all file formats specified in this text, most notably HTML v 3.2.[111] (IDA mandatory), and HTML 4.0.1[112], XHTML v1.0
      - Mobile Phones – SMS[113] (IDABC mandatory), or Short Message Service has to be used as an standard when implementing SMS services for GSM Mobile devices. WAP[114] v. 2.0 has to be accepted as a standard for services interfaced over WAP browsers.
  - Characters sets –
    - ISO/IEC 10646-1:2000 (IDA mandatory) - has to be accepted in order to support alphabets from different world - wide used alphabets. UTF-16 will be needed for some non Western European Languages and for documents in Greek language.
  - Collective authoring – WebDAV- Web Distributed Authoring and Versioning - is recommended to be used.
  - File type formats
    - Hypertext file format - ISO/IEC 15445:2000 - HTML v 3.2. (IDA mandatory), and HTML 4.0.1, XHTML v1.0
    - Style sheets – CSS2 – Cascading Style Sheet Language for the display of HTML sites has to be used. XSL (Extensible Style Sheet Language v1.0 should be used.
    - Active contents / extended programming – Passive HTML (IDA Mandatory) should be used for the exchange of information on client-side passive HTML sites. For support of general communication, interaction and more complex solutions Java applications are recommended to be used.

[110] http://www.w3.org/TR/WCAG10
[111] http://www.w3.org/TR/REC-html32
[112] http://www.w3.org/TR/html401
[113] http://www.smsforum.net
[114] http://www.wapforum.org

- Text Documents, spreadsheets and presentations – TXT - ISO 8859 - (IDA Mandatory) for simple, editable text documents should be used. RTF (Rich Text Format) for documents, which have to be edited by several parties who don't use the same editors. PDF – ISO19005-1: 2005 - Portable Document Format (IDA Mandatory) for unchangeable documents. HTML (IDA Mandatory) for documents exchanged in HTML format. XML can be used as format for documents. MIME (IDA mandatory) - Multipurpose Internet Mail Extensions – as a standardised method to indicate the format of a file or part of a file. CSV (IDA Mandatory) – Delimited comma separated tables can be exchanged as CSV files.

- Document management – MOREQ is recommended as the model for management of electronic records.
- ODF - ISO/IEC 26300 – the Open Document format for recording office applications
- Database Files – ANSI X3.135-1992/ISO 9075-1992 (IDA Mandatory) – use this standard in relational databases to assure conformity to accepted international standards.
- Graphics – here are few very well known and accepted standards not mandatory but IDA recommended forms – GIF - Graphics Interchange Format and JPG - Joint Photographic Experts should be used for the exchange of graphics and pictures, CGM - International Standard for storage and exchange of 2D graphical data., PNG - portable network graphics , TIFF - Tagged Image File, ECW – Enhanced Compressed Wavelet, EPS – Encapsulated Postscript, VML – Vector Markup Language , SVG - Scalable Vector Graphic etc….
- Video – MPEG (IDA Mandatory) Motion Picture Experts Group , MP3 (IDA Mandatory) MPEG 1 layer 3, MPEG 4/ISO/IEC 14496 for multi-media content/services, Animated GIF (IDA Mandatory), Real Quick time
- File compression – ZIP v.2.0 and GZIP[115](alternative to ZIP) are mandatory to be used.

The presence of usage of some of these standards was found during the We-Go desk research in FYR of Macedonia but not as result of multilateral agreements on common standards to be used but as a response to the needs of certain public administration organisation. So even if the same standards are used in the different organisations, it is not assured that they are used according to the same principles (e.g. versions etc…).

According to IDA: „*XML is the reference technology for most IT industry sectors (e.g. web publishing, document, and knowledge management, software design, system, and network management, directory interoperability, etc.) as an ideal language for defining contents to be handled, shared, and exchanged.*" Therefore we recommend putting an accent and additional effort on the usage of XML based standards in public administration as well. XML technology has several features important for EIF postulates:

- End-to-end content control – allowing users and/or applications to supervise content production;

[115] http://www.ietf.org/rfc/rfc1952.txt

- Configuration management – the capability to maintain the correct, current baseline version of a document/document set, while making it possible to track and trace back requirements and to access previous versions of the information;
- Content exchange – an XML document can be designed to carry all the business information that local user applications need to know when processing that document.
- Multilingualism – XML offers designers a means of establishing the requisite level of data granularity for the contents to be handled, with ultimate capacity to set up automated translation
- Processes, or the run-time rendering of itemised data stored in a language-independent manner.

The domains which will have to be standardized and according to EIF nomenclature called ***Back Office level*** are:

- XML based standards
  - For data description – XML (IDA Mandatory) XML should be used to standardise documents and to format data and message files., XSD (IDA Mandatory) should be used to structurally describe data of XML schemas
  - For data presentation and user interfaces - data description – CSS (IDA Mandatory) is a W3C standard that defines a style sheet language that allows authors and users to attach style (e.g., fonts, spacing, and aural cues) to XML applications., XUL is an XML-based language that is used to define elements of a user interfaces (e.g. menus of a menu bar or pop up menus etc…)
  - For data modelling – UML[116] (IDA mandatory) standard notation for the modelling of real-world objects as a first step in developing an object-oriented program, XSD (IDA Mandatory) should be used to structurally describe data of XML schemas, RDF[117] (IDA Mandatory)
  - For data transformation – XSL[118] and XLST[119] (both IDA Mandatory) if applications use different XML schemas, an exchange of data can mean a conversion from one format to another. XSLT is a language, which performs this transformation and is part of XSL.
  - Metadata Interchange – XMI[120] is a format which standardises how any set of metadata is described.,
  - MOREQ Model Requirements for the Management of Electronic Documents
  - Document object modelling – DOM[121] - provides a platform and language-neutral interface that is implemented in browsers, allowing scripts to dynamically access and update the content, structure, and style of documents.
  - Geographical data – GML[122] - Geospatial Markup Language defined by the Open Geographic Council is used to make structured descriptions of geographical chart information.
  - Security aspects – XML Signature[123] is the product of a joint effort of the IETF and W3C

[116] http://www.omg.org/technology/documents/formal/uml.htm
[117] http://www.w3.org/TR/REC-rdfsyntax
[118] http://www.w3.org/TR/xslt
[119] http://www.w3.org/TR/xsl/
[120] http://www.omg.org/technology/documents/formal/xmi.htm
[121] http://www.w3.org/DOM/
[122] http://www.opengis.org
[123] http://www.w3.org/TR/xmldsig-core/

- EDI-based standards - EDI Formats: EN 29735: 1992 (Syntax) D93.A (directory services) are basically replaced by XML-based standards. There is a need to establish the process of maintenance of accepted and monitoring of new technologies covering this domain.

Under the term middleware EIF assumes the technology/infrastructure which will enable sharing of enterprise data across multiple, heterogeneous platforms, operating systems, servers, and applications. The domains which will have to be standardized and according to EIF nomenclature are called ***Middleware*** are:

- Web Services
  - Web Services Description – WSDL is a language used for service definitions.
  - Web Service Publication and Discovery – UDDI[124] – Universal Description, Discovery, and Integration specification is used to publish a Web Service to a central UDDI Repository.
  - Web Services Invocation – SOAP[125] v1.2. - is a W3C standard that defines a distributed application model, which uses XML for enabling applications to communicate with each other over network.

Distributed Application Architecture required by EIF can be established through the use of Java 2 Platform Enterprise Edition (J2EE) or for example by using the Common Object Request Broker Architecture CORBA.
There are a several standards, which will have to be enacted covering the usage of J2EE:

- Enterprise JavaBeans Technology – EJB v. 2.0 (IDA Recommendation) – used to build the business logic component in the IDA three-tiered model.
- JDBC 3.0 API (IDA Recommendation) – an API specification for connecting Java applications to RDBMS platforms.
- Java Servlet Technology – Servlet v. 2.4. Servlets are used to write Web server extensions that perform Java code and return its response as HTML via HTTP.
- Java Server Pages – JSP 2.0 (IDA Recommendation) - is a text document that combines static template data expressed in any web text format like for example HTML, WML or XML are.
- Java Message Service – JMS v. 1.1. (IDA Recommendation) - provides standard Java-based interface to multi-vendor message services.
- Java Transaction API – JTA v. 1.0. (IDA Recommendation). It provides transaction services to the parties involved in distributed transactions.
- JavaMail Technology – JavaMail API v. 1.3.1. - (IDA Recommendation).
- Java API for XML – JAXP 1.2.4. – enables the reading, manipulating, and generating of XML documents through Java API's.
- J2EE Connector API v. 1.5. (IDA Recommendation). -
- Java Authentication and Authorisation Service – JAAS v. 1.0 - (IDA Recommendation).
- Remote Procedure Call – (IDA Recommendation). This is a protocol that one service/application/programme can use to request a service from another service/application/programme located on another computer. We-Go proposes to use Open Software Foundations Distributed Computing Environment.

[124] http://www.uddi.org/
[125] http://www.w3.org/TR/SOAP/

- CORBA[126] IIOP v. 2.0 - (IDA Recommendation) – This is an architecture and specification for creating, distributing and managing distributed program objects in a network.

The following standardised APIs are relevant and it is recommended accepting them:

- Message Transfer Service: IEEE P1224.1 IEEE
- Directory Services: IEEE P1224.2 IEEE
- File Transfer: IEEE P1238.2 IEEE
- Distributed Transaction Processing XATMI, TxRPC, CPI-C, XA, XA+, TX, XATP, X/Open
- Transport Service: XTI X/Open

ebXML is a global electronic business standard that is sponsored by UN/CEFACT and OASIS and defines a framework for businesses to conduct transactions based on well-defined XML messages within the context of standard business processes, which are governed by standard agreements. The following recommended standards should be accepted:

- Messaging Service Specification v.2.0[127] – used to exchange the XML business messages between organisations.
- Registry Services Specification v.2.0[128] – these services handle information on XML schemas of business documents.
- Partner profiling services[129] – Collaboration-Protocol Profile (CPP) and Agreement Specification v2.0 (CPA) -
- Process definition[130] - Business Process Specification Schema v.1.01(BPSS)

Interconnection services are provided on different levels and should be standardised as well:

- File and message transfer protocols – FTP – File Transfer Protocol (IDA mandatory). HTTP v.1.1 and HTTP v. 1.0 - Hypertext Transfer Protocol – used between client and web server. Both are IDA mandatory.
- Message transport and security - SMTP/MIME (IDA Mandatory)
- Message store services – IMAP4 (IDA Mandatory)
- Mailbox access - POP3 (IDA Mandatory)
- Directory and domain name services – LDAP v3 X.500 (IDA Mandatory), DSML v2 and DNS.
- Network services – IP v4 and IP v6 are both IDA Mandatory.

The domains which will have to be standardized and according to EIF nomenclature called ***Security*** are:

- IP-SEC – IDA recommended - allows authenticated and encrypted communication, between routers, between firewalls, and between routers and firewalls.
- IDA PKICUG services - The IDA PKI for Closed User Groups project (PKICUG) provides a pan-European PKI to secure the information exchanged between the trans-European network partner organisations. It is an IDA mandatory standard.

[126] http://www.omg.org
[127] http://www.ebxml.org/specs/ebMS2.pdf
[128] http://www.ebxml.org/specs/ebrs2.pdf
[129] http://www.ebxml.org/specs/ebcpp-2.0.pdf
[130] http://www.ebxml.org/specs/ebBPSS.pdf

- SSL / TLS – SSL v3/TLS (IDA Mandatory)
- S/MIME (IDA Mandatory) - is a specification for secure electronic mail and was designed to add security to e-mail massages. There are three symmetric algorithms: DES, Triple-Des and RCA and the format used for digital certificates.
- SSH v.2. Secure Shell (IDA Mandatory) – provides strong authentication and secure communications over insecure channels.

Java security related standards are:

- Java GSS is used for securely exchanging messages between communicating applications.

Web service security standards to be recommended and implemented:

- SAML - Security Assertion Markup Language – used to enable interoperability between different systems that provide security services.
- XML Signature – it is an XML compliant syntax used for representing the signature of XML based resources.
- XML Encryption is a process for encrypting/decrypting digital content.
- XML Key management

The usage of firewalls has to be standardised as well by covering the following domains:

- Packet filtering - (IDA mandatory) - should be standardised in order to assure whether the data transmitted through the network is based on agreed transfer protocols.
- NAT – Network Address Translation - (IDA mandatory) to enable a local domain the usage of two different IP sets for internal and external traffic.
- Application-level gateway – PROXY – should be enforced in order to apply special purpose rules for every application.
- Demilitarised zone network - DMZ – DMZ is a small isolated in the context of firewalls.
- Stateful inspection – analyses multiple layers of the protocol stack.

You have to standardise the prevention from malicious or unauthorised code as well:

- A *virus*, which is a self-replicating program that can infect other programs, either by modifying them directly or by modifying the environment in which they operate.
- A *worm*, which is a program that attacks computers that are connected to a network and spreads by sending a copy of itself through the network to infect other machines.
- A *Trojan horse* is a program that pretends to be something it is not.
- An *e-mail bomb*, which is a programme aiming at bringing down email servers.

There is need to standardise the usage of technologies upon which ***workflow management*** is based. Here are a few specifications, papers, and standards, which have to be taken in consideration:

- Interoperability, Wf-XML Binding (WFMC-TC-1023) - This specification is intended for use by software vendors, system integrators, consultants, and any other individual or organisation concerned with interoperability among workflow systems.
- Workflow Standard Interoperability, XML-HTTP Binding (WFMC-0208) - This document represents a workflow protocol that aims for interoperable, reliable, and practical interactions between services using HTTP protocol.

- Workflow Security Considerations, White Paper (WFMC-TC-1019) - The document summarises a number of security services that may be important within a workflow system and relates them to a generalised model identifying different security domains within a heterogeneous workflow environment.

Once the most important standards have been accepted, and their usage has been documented and supported by promotional and dissemination activities, there is a strong need on the state-level to establish an organisation to coordinate the maintenance and to follow the trends and development activities of covered and standardised domains. Operationally it doesn't have to be one single state level body; it can also be several of them, covering the domain that is best suitable to their experience and level of expertise in certain domain. We-Go recommends entrusting this task to the Information Society Task Force, METAMORPHOSIS and maybe to some representatives of Academia (e.g. Univ. Sts. Cyril and Methodius, Institute of Informatics). These bodies should create the "virtual" centre of excellence covering this domain.
Standardisation for itself, will be not sufficient to achieve tangible results. In addition the IS agenda must be updated and public administration staff (eEducation) must be trained in order to foster the usage and the deployment of the standardised technologies.
In particular this will be needed for technologies used to define the Semantics of Information and Semantics of Services. Later, when more experience will be present across the FYR of Macedonian public administration organisational units, it is of importance to decentralise the centre of excellence, where constituting organisations can serve as a facilitators and carriers of dissemination activities.
The usage of Open Standards and Open Software has to be defined and supported politically from the government side, through their usage policies (e.g. OS Policy, OS Policy). Furthermore there is a need to define within one of the IS agenda pillars additional efforts to create the centre of excellence which will maintain, monitor and support these two domains. All seven pillars of the FYR of Macedonian IS Agenda, e.g. eGovernment, eBusiness, eHealth and eCitizens etc. have to be further extended/updated/aligned to the NIF Agenda. This action is needed in order to support and assure the deployment of planed Technical NIF postulates. Moreover resources needed for deployment, coordination, execution, and maintenance of Technical NIF postulates are necessary.

5.2.1.2 Semantic Layer of Interoperability

Introduction of interoperability within the domain of public administrations services implies organisational changes as well; precisely it is a modernisation programme of service delivery. In order to support these changes the semantic layer of IOP has to be integrated into one of the pillars of the current FYR of Macedonian IS/IOP national Agenda. The integration can be achieved by defining and developing registers and catalogues of standardised business elements within the national service IT architecture. Beside the standards, which will have to be adopted and were provided above, there is a strong need for organisational aspect(s), managerial, and funding aspect to be covered. Organisationally there is a need to define the semantic layer of IOP on the state level; e.g. basic postulates within the FYR of Macedonian NIF and in more details within the strategy/action plan for semantic issues only within the concrete public administration services (e.g. data bases, business elements etc…). Managerial, there is a need to define a state level body to start, prepare, execute, and monitor the execution of this part of NIF Agenda. For the initial phase, We-Go recommends to create a small but

profound working group within the ISTF[131] start working in this domain. Moreover, there have to be allocated funding resources to assure the execution of this part of the NIF strategy and action plan. The usage of donation programmes (e.g. USAID, UNDP, EC etc.) in FYR of Macedonia in order to support the national IS agenda are certainly one of the best practice cases which can be disseminated along WBC region. However, it is advisable to try to avoid funding sources coming from donation programmes when delivering the basic postulates - no matter in which layer of interoperability. Instead they should be used for the deployment of concrete services or the procurement of an ICT infrastructure. Furthermore these activities have to be aligned with NIF postulates.

In the following a brief overview of themes that are still missing and have to be covered by FYR of Macedonian national level Semantic NIF Strategy and Action Plan is presented. The different themes and tasks should also be included in the broader national IOP agenda:

- The process of drafting/agreeing of ***common and global definitions/representations for eGovernment definition/vocabularies/metadata*** has first to be defined by an IOP semantic strategy and afterwards it has to be entrusted in order to be executed, coordinated, and monitored to some state level organisation.
-

The IOP Semantic Strategy should especially cover the following domains:

- ***Common and global definitions/representations for eGovernment semantics***
- ***Modelling perspective and formalism for documenting the common definitions***
- ***Administrative level of definitions development***
- ***Promotion/dissemination and maturity of common definitions***
- ***Trust, reliability and the supportive technical IOP layer***
- ***Maintenance and evolution of common definitions***

Common for all stated semantic IOP domains is, that the process has to be initiated, coordinated, and led by some state level body - for example the same or similar working group within the ISTF, responsible for the overall semantic part of NIF agenda in FYR of Macedonia.
Moreover the other pillars of the IS agenda must be extended/updated/aligned in order to support the planned deployment of semantic NIF postulates.

Good examples are:

- **eEducation,** assuring the needed support to train public administration's IT staff in the specific domain of semantic IOP.
- **Infrastructure** - assure that a state level body responsible for design, procurement, and maintenance of ICT infrastructure follows the national semantic IOP directions.
- **Legal** – assure that needed legal barriers will be recognised, analysed, and removed in order to support the achievement of semantic IOP postulates.

Furthermore other accompanied pillars of the FYR of Macedonian IS Agenda, e.g. eGovernment, eBusiness, eHealth, and eCitizens have to be taken in consideration on the same principles and updated in order to provide the resources needed for deployment, coordination of execution, and maintenance of the semantic NIF postulates.

[131] Information Society Task Forces

5.2.1.3 Organisational Layer of Interoperability

The organisational layer of interoperability addresses the need for a fusion of business processes, which can, but not necessary have to belong to the same organisational unit. The need for new services based on this principle is coming from the wish of public administrations to offer better, more effective and "customer-centric" service for citizens, business, and other public administrations. A national IOP strategy and action plan regarding the organisational perspective will have to assure a service delivery modernisation programme and a transition of services based on traditional vertical organisational structure towards services based on a new organisational public administration structure.

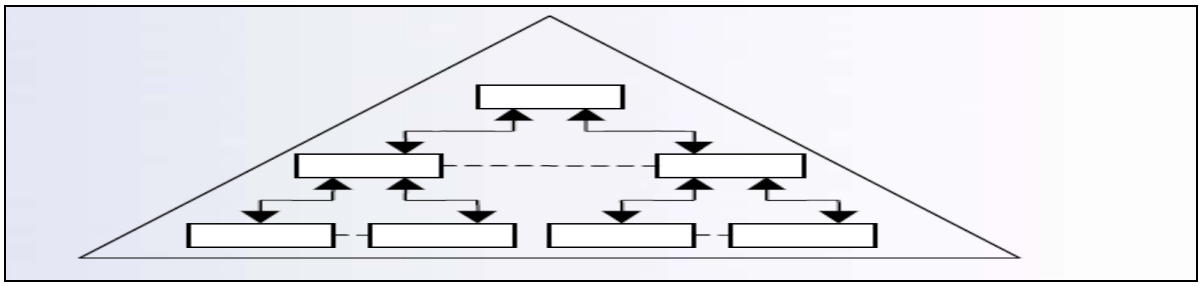

Figure 48: Traditional or vertical public administration organizational structure. Alberto Savoldelli, Politecnico di Milano, 2004

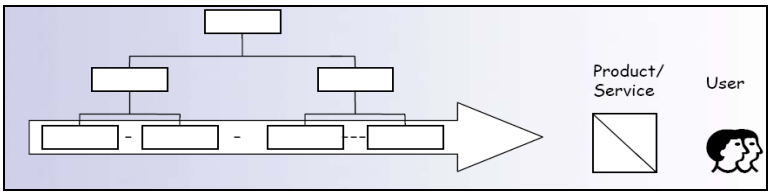

Figure 49: New organizational public administration structure. Alberto Savoldelli, Politecnico di Milano, 2004.

Since at the moment there are no public administration and organisational units involved which are jointly determining the organisational aspects of interoperability, there is a need to entrust this task first to a state level body. The state level body should be able to face this part of the FYR of Macedonian NIF Agenda. This can be some body, which certainly needs to have, or works within the mandate of ISTF, where activities within the body can be partly covered by non-public administration personal, e.g. academia or IT industry. Moreover, there is a need to devote one part of the FYR of Macedonian NIF strategy and action plan to the organisational layer of IOP. Since a "demand driven approach" for eGovernment services and the process of identification and prioritisation of services has been started, these trends have to be further supported and coordinated by a state level body. The state level body will mainly deal with the coordination of the organisational IOP layer in FYR of Macedonia. Furthermore there are several important areas which should be under the responsibility of this body and certainly be defined by the organisational layer of FYR of Macedonian NIOP agenda.

Since a ***clear link between cross-organisational processes/services and the business strategies*** is missing, there is a need to create the supportive documents needed to cover this aspect of interoperability: e.g. to remove legal barriers, instructions and directives to public administrations units, IT industry and academia. The process of ***modelling and visualisation of public administration services/processes*** has to be defined and enabled first by supportive documents (e.g. laws, NIF on organisational layer etc..) and then started and coordinated by

responsible state level body on systematic scale. The next issue, which has to be covered in a similar way, will be the ***involvement of users by setting up communities of practice in the process of new service design*** in order to assure, enable, and satisfy the principle of service user-centricity. The ***reuse of knowledge and experience related to the execution of internal and cross-agency business processes/services from the private sector*** has to be assured through an adequate organisational, legal, and strategic (within the NIF!) framework. Since there is a *law of free access to information of public character* enacted in 2006, which is covering the re-use of public sector information, FYR of Macedonia is on the right way to cover at least one of these crucial prerequisites. However, this existing law has to be concretely defined by the part of the FYR of Macedonian NIF covering the organisational layer, and then maybe included in the updated action plan of the seventh pillar of FYR of Macedonian IS agenda, legislation.

The process of ***identification and documentation of common service functionality and features across public administration agencies*** is missing and has to be started, coordinated, and lead by the same public administration organisation unit like the rest of the activities related to this domain. Before that it is necessary to enable this process on an operational level through supportive instruments (e.g. legal framework, building of needed capacities, FYR of Macedonian IOP strategy part devoted to this process etc...). The team who will perform the analysis and documentation of common service functionalities across the different public administration organisations has to be hosted within the same organisational units like the rest of the layer specific activities. In the following typical service functionalities which are recognised by IDABC as a necessary part of any public service scheme are listed:

- Registration/Authentication/Authorisation
- Payment processing or issuing of funds
- Cross-division/agency workflow
- Request for additional information from other public administration organisational units or even private sector
- Status notification
- Support handling etc…

Once common functionalities are examined and knowledge about them is collected, it is crucial to find the institution, which will be able to provide the hosting of these common functionalities. The whole process will be similar to the other parts like the rest of "basic slices[132]" of organisational IOP layer. This organisation should be based on the EIF proposed principles of private-public partnerships. These common functionalities can be used and reused by all other organisations who are offering concrete services to citizens and businesses. The list of standard functionalities will be very basic at the beginning but through time the list will be extended by more and more services. Moreover, it is important to get people to get used to it and to use the shared resources. Furthermore they have to gain trust in the quality of services. A good approach is to offer Service Level Agreement – SLA and 24 hours helpdesk support for all users and services/functionalities hosted by the organisation. In the process of creation of new services there is a strong need to ***support multi-channel service delivery*** as well. In the recommendations by METHAMORPHOSIS this urgent issue is mentioned as

[132] The term refers to the fact that NIF is constituted out of four layers; Technical, Semantic, Organisational and Governance Layer. Every Layer is further constituted out of "basic slices" which should be basically the same in all European Member States NIF's and reflects the EIF constituting postulates.

well. The document as such can partly be accepted and further developed and accommodated to the specific needs of FYR of Macedonian public administrations.
In the same context there is a need to achieve ***consensus on and visibility of the ownership, management, and responsibility for cross-organisational processes / services*** within the public administration domain. This should also be included in the same strategic framework and coordinated by the same teams like the process of identification and documentation of common services and features.

Once basic slices of the organisational IOP layer will be covered by the state level entrusted body in order to successfully execute the planned parts of IOP strategy and action plan covering the organisational layer, they have to be included into the pillars of the FYR of Macedonian IS agenda.

5.2.1.4 Governance Layer of Interoperability

The execution of concrete steps defined by the national IOP strategy can be done by different organisations. They can/will vary by background (IT industry, public administration units, public hold companies etc…) and by size or scope. In terms of resources and expertise they have to be the best suitable organisations for this task at the moment of execution. However, in order to assure the deployment of defined activities within the national IOP strategy, there is a need for strong governance, performed best by a central state level organisation. This organisation can be for example be the ***Commission for Information Technology*** or another more operational state level body which will operate under the FYR of Macedonian national IS agenda mandate. This organisational unit, responsible for governance of interoperability according to the National IOP Strategy will have four focus areas:

- Political
- Legal
- Managerial and
- Economic

In the paragraph below there is an overview of at the moment missing issues regarding these four areas within the current FYR of Macedonian IS/IOP strategy.

- Political-
There is a need to additionally update, deepen, and extend several already existing FYR of Macedonian IS agenda pillars (eBusiness, eHealth, eEducation, eCitizens etc...) which will then partly or concretely address IOP specific issues. Furthermore they have to be further developed in order to become part of a broader national level IOP/NIF strategy. Moreover, there is a need to start the process of promotion of organisational federalism as a model of a new modernised organisational model, which will arise from the planned changes. We-Go recommends to support current and future international activities of all participants included in the IS and IOP development agenda in FYR of Macedonia. Concretely FYR of Macedonia has to join the IDABC and similar EU level bodies/organisations, working on regional, national, and pan-European IOP as a main focus of work. Moreover, the participation of FYR of Macedonia in EU level dissemination level activities like for example epractice.eu is a great example to be followed by other WB countries.

- Legal -

Fundamental laws, which regulate the domain of IS/NIOP agenda in FYR of Macedonia, are partly enacted and aligned with the basic EU laws in this domain. However, implementation of services based on the new organisational, technical, and semantic principles will require additional so called sub-laws or sub-acts. These sub-laws or sub-acts will are needed to narrowly regulate and ease the interaction of applications, services, people, and organisations based on the interoperability postulates.
We-Go desk research has not found any evidence of an already started process of enacting the new laws and sub-laws connected to the FYR of Macedonian IOP agenda. The IOP has to be added as an additional activity to the ongoing activities in this domain as well. This process has to be institutionalised in the form of a small but highly profound state level office within for example the FYR of Macedonian Ministry of Justice. First, the approach will have to provide this kind of support for concrete services or applications. In the next step the experiences have to be disseminated across organisational boundaries. Both, the IOP strategy and the action plan have to ensure sufficient funding resources for legal issues within the governance layer. The following approach for the work to be done is recommended by We-Go:

- Analysis of current status of legal-related barriers which hinder the interoperability
- Action plan for legal issues within the IOP governance context has to be added in the FYR of Macedonian IS agenda, pillar for legalisation
- Determination of resources,
- Definition of coordination bodies, and
- Introduction of controlling instruments for quality of execution
- Introduction of maintenance instruments for enacted laws and sub-acts and sub-laws

The following subjects which desk research has found, are missing in the national FYR of Macedonian IS/IOP strategy and will have to be covered under this or a similar regime:

- Law on protection of intellectual properties in multi-partner projects and developments
- Law on diffusion of digital signature and electronic identity; the law does exist but it has to be ensured that the different laws are coordinately used in the different organisational and departmental organisations, based on the same principles.
- Law on citizen privacy and data protection
- Adaptation of laws, sub-laws, and sub-acts in order to remove obstacles which are hindering the execution of basic laws and the creation of services based on IOP postulates.
- Organised and centrally coordinated education of judiciary in the domain of eBusiness regulations.
- Dissemination of experiences related to the reduction of legal obstacles among other department domains
- At the moment several other laws are hindering the usage of the following infrastructure, critical for IOP:
    - Use of Web-Services through the eID and PKI
    - Introduction of a network for all governmental and public organisations
    - Use of central electronic register and databases
    - Establishment and implementation of standards and systems for electronic records

- Managerial -

There is a strong need for a state level body which must coordinate the NIOP agenda on the operative level. There must be an institution which is able to lead and coordinate the, in this chapter presented, parts of the FYR of Macedonian IOP Agenda. Such an institution could for instance be the ***Commission for Information Technology*** or the Ministry of Information Society or some other yet to be created body possessing the same stated attributes. CIT is maybe from an operative point of view a too "high-level policy" organisation for this, but since they have political support and commitment from the FYR of Macedonian government, they could authorise another, more execution level body for this task. The same is applies for the option with entrusting this task to the Ministry of Information Society or to a, at this moment, not yet existing body. In the latter case the FYR of Macedonian Government has to provide a Ministry with sufficient budget resources.
In general the most pragmatic approach, which offers the best cost/benefit ratio, should be used. Leadership/ownership/sponsorship/management of FYR of Macedonian IOP Agenda has to be clearly and operatively defined by the IS strategy. Furthermore, this has to be assured through the accompanying resources and controlling execution mechanisms within the accompanying NIOP action plan. Flexibility, transferability, and reconfigurability of IOP solutions have to be further and more concretely defined through the whole FYR of Macedonian IS and NIOP development agenda. Concretely, it has to be included in all seven pillars like the rest of the IOP layers. In the current IS national agenda there is a need to include the measures for gaining the broad commitment, participation, and willingness for cultural change at all participating organisations.
Moreover, there is a need to deepen the current activities related for the training of human resources in organisations involved in the process of implementation of IOP projects. There are already ongoing activities focused on increasing the level of proficiency in the usage of ICT in the public administration.
The IOP projects related trainings can be added to these activities, but with additional focus on the interoperability domain. The following tasks are recognised by We-Go desk research as important issues regarding the education of public servants:

- Education of judiciary in the field of concrete application domain of IS related laws and sub-laws.
- Education of participants in regard to the process of standardisation of missing norms and standards

- Economic -
In order to execute the planned activities there is a need to ensure the stable funding resources for execution of the entire IS and IOP strategy and action plan within the planed time frame. The issue of funding, besides the unclear leadership of FYR of Macedonian IS and analogically IOP Agenda, is one of the crucial problems, which have to be solved first in order to move forward in this domain in FYR of Macedonia. Financing of the FYR of Macedonian IS and IOP agenda has to be guaranteed from the state budget. One solid part of the IS and NIOP agenda related activities can be funded through donation programmes, e.g. UNDP, USAID, EC etc. FYR of Macedonian "donor effect[133]", is a certainly best practice case from FYR of Macedonia which can be disseminated in WBC' and other countries and regions going through a similar process of transition. We-Go desk research has the impression that the FYR of Macedonian IS actors didn't miss one single opportunity to finance IS Agenda related project from the donated resources. However, We-Go recommends the FYR of Macedonian Government to assure the funding resources for at least the most crucial parts of IS and IOP agenda in order to be independent from the donator's interests. Furthermore,

[133] Author refers to the positive development effect in IS related domain, created from the donations from many different sources (USAID, UNDP, SEE+, Microsoft, EC, etc…)

the deployed parts of the national IS or IOP agenda are really based on FYR of Macedonian states interests and needs. The alternative funding sources should be used for issues, which are not crucial for the interests of FYR of Macedonian citizens, business, and public administration.

The following issues should be included:

- ***Adoption/switching costs inherent to IOP solutions*** are still missing in existing action plans, covering the IS and IOP agenda in FYR of Macedonia. Since they are and unavoidable part of the process of implementation of new services, they have to be covered and concretely defined within the pertaining action plans within the departmental units responsible for introduction of certain services.
- ***Public procurement policies and financing for IOP projects*** – has to be defined by extending the current public procurement policies within the FYR of Macedonian IS agenda infrastructure pillar. Execution and monitoring of execution, tendering etc. can be done by involved public administration organisational units. By opening the process of procurement and financing to the public it is possible to further improve the competitiveness of public procurement and to ensure as much as possible the best price/benefit ratio of IOP projects.
- ***Partnering with the private sector in IOP projects*** – has to be more concretely defined and deepened within the current national IS agenda and accompanied by concrete supporting measures for private-public partnerships in the domain of IOP projects; e.g. legal framework, concrete operational level guidelines etc. The We-Go recommendation is to host this activity within the FYR of Macedonian IS agenda infrastructure pillar. If the concept of private/public partnership is feasible, practical and successful the same approach could be applied to the rest of the pillars included in to national IS development agenda.

5.2.2 Recommendations per administrative level

Operationally, the implementation of EIF recommendations on the national, regional, and pan-European level requires the inclusion of the EIF postulates in every project or activity related to the establishment of an information society. The same applies to the concrete deployment of new public administration services, processes, and procedures. Interoperability is not an isolated project. The recommendations will be outlined using the methodology from the Modinis Lot II study, specifically extended by We-Go to meet the needs of the WBC. The recommendations are structured in the form of a matrix and organized according to two dimensions: the suitable level of actions and the area where recommendations should be applied. Figure 50 presents the concise list of We-Go interoperability recommendations of general nature to FYR of Macedonia. In order to support the implementation of interoperability services and projects in FYR of Macedonia, We-Go states the recommendations in Figure 51 towards the generic services/projects on national and in the Figure 52 on the Pan-European level.

General interoperability recommendations	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Education Programme for public administration servants on legal issues related to IOP. (2) Analysis of concrete legal obstacles on local level.	(3) Support Public Private Partnerships on the local level. (4) Use as much as possible Open Standards software and open source software (5) Support SLA locally (6) Allocate the adequate funding sources for necessary equipment on local level (e.g. card readers, broad connection, three PC's pro local public administration office etc…) (7) Support the project, which will provide and connect all FYR of Macedonian local public administration offices in one network satisfying EU recommended standards.	(8) Follow the national IS and IOP Development Agenda (9) Training of public administration servants (legal issues, organisational change etc.) (10) Create the Knowledge Communities/Portals on local level (11) Support creation of new cross organisational services/ business processes (12) Support multi-channel service delivery (13) Support collaborative testing of "new" services/projects.	(14) Work on definition of national semantic business processes. (15) Support development of PKI (16) Adopt missing technical and semantic standards. (17) Introduce the usage of Service oriented Architecture (modularity of services) (18) Support national IOP strategy regarding the adoption and usage of semantic and technical standards (19) Support the projects, which will provide all FYR of Macedonian local level public administration offices with ICT equipment, which satisfies EU recommended standards.
National Authorities	(20) Education Programme for public administration servants on legal issues related to IOP (21) Support the usage of eID (22) Remove the Legislative obstacles toward IOP on a national level. (23) Bring the Data Protection and security on the EU level. (24) Education programme of Judiciary on eGovernment Legal Framework (25) Enact the missing IOP related legislative. (26) Update and extend the Legal Pillar of FYR of Macedonian IS Agenda for a dimension of NIOP Agenda.	(27) Support Public Private Partnerships on national level. (28) Fund analysis, creation and hosting of common service functionalities. (29) Fund and promote the usage of Open Software and Open Standards (30) Support SLA on the national level (31) Assure the funds needed for centrally lead projects (e.g. eID etc…) (32) Fund the pilot projects on national and local level (33) Support the project, which will provide and contact all FYR of Macedonian national level public administration offices in one network satisfying EU recommended standards. (34) Assure the budget for the Ministry of IS or whichever organisation (will) further carry in the planned period 2006-2010 FYR of Macedonian IS and NIOP Agenda.	(35) Define national IOP Strategy and Action Plan for FYR of Macedonia by extending the Pillars of current IS Agenda for a dimension national IOP Strategy/Agenda. (36) Assure clear leadership, management and sponsorship of national and Pan-European IOP projects (37) Set implementation priorities of services, which are more needed. (38) Support creation of Knowledge Communities / Portals on national level (39) Promote analysis and creation of common typical functionalities (40) Assure the common organisational structure. (41) Include the internationalised/ Pan-European of FYR of Macedonian eID solution. (42) Join to the IDABC and all other EU IOP initiatives and activities.	(43) Define national semantic and technical standards (44) Develop support and promote usage of PKI (45) Hosting of common service functionalities (46) Develop support and promote usage of eID (47) Support the projects, which will provide all FYR of Macedonian national and local level public administration offices with ICT equipment, which satisfies EU recommended standards.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(48) Support projects for removing the legal barriers towards achieving the IOP in FYR of Macedonia. (49) Promote EU IOP Best Practices experiences relevant for FYR of Macedonia. (50) Create support programmes as concrete as possible oriented on solving the problems. (51) Provide the education of FYR of Macedonian Judiciary in the domain of eBusiness Sub-Laws.	(52) Support creation of local funding programmes for IOP projects (53) Support education of public administration servants in financial management in public administration domain. (54) Support financially the regional cooperation (55) Before you donate/support some IOP project assure that you support really something useful	(57) Promote regional benchmarking of IOP online sophistication. (58) Support FYR of Macedonian government with advices on policy/management issues and how to assure creation of successful IS/IOP National Strategies (59) Prepare the education programme, which will present FYR of Macedonian	(60) Support the creation of PKI through programmes (e.g. Twining Projects) (61) Donate the needed Technical Infrastructure (62) Support creation of commonly agreed semantics on national and Pan-European level.

		and needed. (56) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing Support Programmes and how to concretely use the allocated resources optimally.	eGovernment actors existing Support Programmes (e.g. public administration) and how to concretely use the allocated resources optimally.	
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(63) Bring the EU level Support programmes for bridging the IOP legal barriers relevant for FYR of Macedonia. (64) Dissemination of EU Best Practices in the domain of legal IOP issues. (65) Help FYR of Macedonian IS Agenda actors to deliver the Legal Framework needed for FYR of Macedonian IOP Agenda.	(66) Disseminate the best EU practices from the domain of funding the IOP projects (67) Before you donate/support some IOP project assure that you support really something useful and needed. (68) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing Support Programmes and how to concretely use the allocated resources optimally. (69) Support education of public administration servants in financial management in public administration domain. (70) Help FYR of Macedonian government to develop optimal Financial Framework, which will further be able to sustainable support the FYR of Macedonian IS, and NIOP Agenda.	(71) Support FYR of Macedonian state level eGovernment players with the advices how to build capacities in public administration management layer (72) Support FYR of Macedonian government with advices on policy/management issues and how to assure creation of successful IS/IOP National Strategies (73) Prepare the education programme, which will present FYR of Macedonian eGovernment actors how to more concretely use the allocated resources optimally.	(74) Support the creation of PKI, through dissemination of IDABC expertise in that field (75) Donate the needed Technical Infrastructure or support FYR of Macedonian government with knowledge transfer in this domain (76) Support creation of commonly agreed semantics on national and Pan-European level.

Figure 50: Recommendations regarding the interoperability strategy in Serbia per administrative level and domain

Generic recommendations for projects on the national level	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Take into consideration all national legal requirements related to the implemented service/project relevant on local level. (2) Support national authorities in removing the legal obstacles related to the implemented service.	(3) Support public private partnership on a local level, which can fund the implementation of national IOP projects/services. (4) Try to decrease the price of implementation by usage of open standards and open software instead of proprietary solutions.	(5) Follow the coordination efforts lead by national body and be cooperative. (6) Assure that everyone in the implementation team on the local level understands their roll.	(7) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete IOP project. (8) Analyse usage of "new" standards and report comments/improvement recommendations to the governing body.
National Authorities	(9) Take into consideration all national legal requirements relevant on national level. (10) Analyse legal obstacles related to implemented project/service and remove them. (11) Cooperate with local public administration, give them space to express and address their needs. (12) Use the regional and EU support programmes for removing the legal obstacles.	(13) Support public private partnerships on a national level, which can fund the implementation of national IOP projects/services. (14) Assure timely the sufficient funding resources for the national IOP projects/services implemented.	(15) Assure the clear ownership/leadership of the national project/service being implemented. (16) Choose the execution partners on local and national level (17) Deliver the good business case for a service/project being implemented. (18) Define the clear set of deliverables of the project/service being implemented.	(19) Leave the space for local initiatives which will cover their needs (20) Propose the introduction of missing semantic and technical standards, which can be used by concrete application/service. (21) Propose the modelling standards, framework and methodologies to be followed in the concrete project.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(22) Support the implementation of projects on national level, by providing them with experience in removing of legal obstacles.	(23) Support financially the implementation of national IOP services/projects (e.g. CARDS, PHARE) and research in the area of semantic and organisational IOP. (24) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(25) Support the national level IOP projects/services being implemented in FYR of Macedonia with the consultancy in the domain of management of the public administration projects on national level. As well enrich them with international experiences. (26) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(27) Donate needed infrastructure for concrete national IOP projects/service (28) Support (financially) introduction of important technical and semantic standards/service
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(29) Support the implementation of projects on national level, by providing them with experience in removing of legal obstacles.	(30) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (31) Support financially the implementation of national IOP services/projects (e.g. CARDS, PHARE) (32) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(33) Support the Pan-European IOP projects/services being implemented in FYR of Macedonia with the consultancy in the domain of management of same or similar projects in EU. (34) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing Support Programmes and how to concretely use the allocated resources optimally.	(35) Donate needed infrastructure for concrete national IOP projects (36) Support the introduction of important technical and semantic standards

Figure 51: Generic recommendations for national interoperability projects in FYR of Macedonia per administrative level and domain

Generic recommendations for projects on the pan-European level	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Take into the consideration all concrete EU IOP legal requirements related to the implemented pan-European service relevant on a local level. (2) Support national authorities in removing the concrete legal obstacles related to the implemented services.	(3) Support public private partnerships, which can fund the implementation of pan-European IOP projects/services on local level. (4) Try to decrease the price of implementation by usage of open standards and open software instead of proprietary solutions.	(5) Follow the coordination efforts lead by national body and be cooperative. (6) Assure that everyone in the implementation team on the local level understands his or her roll.	(7) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete pan-European IOP project/service. (8) Analyse usage of "new" technical and semantic standards and report the problems/improvement proposals to the governing body.
National Authorities	(9) Take into consideration all national and EU IOP legal requirements relevant on national level for concretely implemented service/project. (10) Analyse pan-European legal obstacles related to implemented project/service and remove them. (11) Cooperate with local public administration; leave them space to address their needs. (12) Use regional and EU support programmes for removing the concrete legal obstacles related to the implemented service/project.	(13) Support the public private partnership on national level, which can fund the implementation of Pan-European IOP projects/services. (14) Assure timely the sufficient funding resources for the pan-European IOP projects/services being implemented.	(15) Assure the clear ownership/leadership of the pan-European project/service being implemented. (16) Choose the execution partners on local and national level (17) Deliver the good business case for a pan-European service/project (e.g. VIES, NCTS) being implemented. (18) Define the clear set of deliverables of the pan-European project/service being implemented.	(19) Leave space for local initiatives, which will cover their needs, related to the implemented pan-European service/project. (20) Propose the introduction of missing semantic and technical standards, which can be used by concrete pan-European application service. (21) Propose the modelling standards, framework and methodologies to be followed in the concrete pan-European project/service being implemented.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(22) Support the implementation of similar or identical projects/services on a pan-European level, by providing them with experience in removing of legal obstacles related to the concrete service/project.	(23) Support financially the implementation of pan-European IOP services/projects (e.g. CARDS, PHARE) and research in the area of semantic and organisational IOP. (24) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(25) Support the pan-European IOP projects/services being implemented in FYR of Macedonia with the consultancy in the domain of management of the public administration projects. As well enrich them with international experiences. (26) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(27) Donate needed infrastructure for concrete pan-European IOP project/service being implemented. (28) Support (financially) introduction of important technical and semantic standards needed for concrete pan-European service/project.
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(29) Support the implementation of similar or identical projects/services on a pan-European level, by providing them with: a. Experience in removing of legal obstacles related to the concrete service/project. b. Consultancy on concrete implementation of EU legal requirements for concrete service/project	(30) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (31) Support financially the implementation of pan-European IOP services/projects (e.g. CARDS, PHARE) (32) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(33) Support the pan-European IOP projects/services being implemented in FYR of Macedonia with the consultancy in the domain of management of the public administration same or similar projects in EU. (34) Prepare the education programme, which will present FYR of Macedonian eGovernment actors existing support programmes and how to concretely use the allocated support resources optimally in implementation of pan-European services.	(35) Donate needed infrastructure for concrete pan-European IOP projects (36) Support the introduction of important technical and semantic standards needed for concrete pan-European project.

Figure 52: Generic recommendations for pan-European interoperability projects in FYR of Macedonia per interoperability project

5.2.3 Recommended implementation approach

Technical & Semantic interoperability

For the current level of development of IS and IOP agenda in FYR of Macedonia, the responsibility for the issues stated above related to technical & semantic IOP, it is recommended to locate them under the leadership and coordination of a small and highly profound IOP team under the mandate of Commission of Information Technology or Ministry of Information Society. This team should be newly created; We-Go desk research didn't find the concrete existing team that is able to take over this mission at the current stage of development. In general for the whole IS and IOP agenda in FYR of Macedonia there is need to support the two organisations mentioned above with the governmental and political resources and commitments. By locating the team in one of the proposed state level public administration organisations, it will be assured, that the decisions made will be independent. Of particular importance is the acceptance of the decisions made within the FYR of Macedonian Public Administration. It is necessary to focus on pragmatic decisions and to reuse EU best practice cases from other EU public administrations

There are a "good", but also "bad" best practice examples. We-Go recommends to start with a bottom-up approach by building small pilot projects which will prove the concept of the new services based on the exchange of data and information of at least two different public administration organisational units. It is recommended to use extendable infrastructure, which can be used in other pilot projects as well. The pilot project should be executed by a non-departmental organisation or by another state organisation e.g. Ministries, State Agencies. A joint action between two organisations should be the preferred approach e.g. a public-private partnership. The two organisations will have to provide the prerequisites for the pilot projects/services to become operational in order to offer service to the users:

- Development of a pilot infrastructure
- Definition and publishing of technical and semantic standards needed
- Messaging hub – based on the usage of XML technologies.
- Definition of standards for business artefacts/elements
- Definition the business artefacts/elements itself
- Definition of registers/catalogues of standardised business artefacts/elements. They have to be described and published. The usage of XML based technologies is recommended. Concrete instructions about recommended versions of specific standards can be found in the first part of the recommendation paper.

Using this approach FYR of Macedonia will gradually gain the needed sense and experience for this kind of projects and since the pilot projects/services aren't of a large scale, it will be possible to present success within a relative short timeframe.

According to the Estonian We-Go partners the secret of success is to make a gradual development concept with achievable, measurable, and transparent goals at the end of every year of a specific project.

Organisational Interoperability

Organisational interoperability is all about the modernisation of current services offered to businesses and citizens. We-Go recommends locating the coordination of this domain within the FYR of Macedonian Ministry of Information Society hosted unit specialised for organisational IOP. Since this unit still doesn't exist it has to be introduced as soon as the execution of the FYR of Macedonian IP action plan starts.

The operational execution and implementation of concrete tasks related to the execution of pilot project(s) should be entrusted to the department, which is currently responsible for this old paper-based service. Very often this are the different Ministries. It is recommended for the first pilot service to take a simple service supported by two different public administration organisations. It can be even more, maybe one organisation from the private sector (e.g. issuing the driving licence for a first time) as well. The service has to possess processes and data, which are potentially reusable by services of other public administration organisations or services. There is also a cost/benefit issue which has to be able to clearly prove the cost effectiveness of a new service, e.g. potential reuse of standards, data, infrastructure, policies or better and more customer-centric services etc.

The following typical tasks, which are common for all services regarding the organisational interoperability, should be performed by the involved units:

- Analysis of forms and delivery channels in order to find better ways of service delivery
- Analysis of legislative regulations in order to first define and together with for example the IOP team within the Ministry of Justice to remove the legal obstacles towards the offering of new services.
- Analysis of business processes in order to define common ones, to improve the current business processes or especially important for IOP to aggregate processes from different public administration organisational units and to offer them as a new services for the benefit of all participants of the FYR of Macedonian IS.
- Definition of common functionalities in order to enable their reuse.
- Definition of common legal and organisational obstacles towards aggregate service provision.

Once common functionalities are defined, the organisational tandem (public administration, organisational unit, and public-private company) can take responsibility and offer the hosting of these common functionalities for all public administration organisations, which are offering services to citizens and businesses in FYR of Macedonia.
The following typical common functionalities, which are abstracted by IDABC, are considered as being the most important:

- Identity management process
- Customer registration process
- Electronic forms production and management
- Case tracking and status reporting
- Electronic payment system

This approach will assure the reduction of costs related to the development, deployment, and maintenance of newly deployed services as well.

Governance of Interoperability

The leadership for technical and semantic IOP layer can be entrusted to the Ministry of Information Society and to the company with the public-private background as was already mentioned above in order to be independent, and to really make the best possible decisions regarding the technical and semantic standards used. Furthermore, We-Go recommends assuring that this organisational unit is a central point of excellence for IOP on a national level and has strong cooperative abilities with other less experienced public administration organisations, especially local ones.

During the implementation phase of a certain pilot project, concrete organisational IOP layer issues, will be most practically located within the concrete departmental unit currently responsible for the service being modernised.

5.2.4 Services: Deployment level – VAT Exchange System

Following text will describe concrete steps which have to be undertaken in order to deploy one pan-European service; VIES. In terms of level and direction of data being exchanged, Interoperability and Services on concrete service deployment level have two dimensions:

- National (e.g. inscription in university)
- Pan-European (e.g. NCTS, VIES, EBR)
- National and pan-European (e.g. eID etc)

This document and We-Go as a project are not able and mandated to propose concrete implementation approach or even more to become the part of VIES implementation team in FYR of Macedonia because of the high complexity and too many concrete missing information and much higher resources which are needed to successfully implement this service in FYR of Macedonia. This document will be used in dissemination phase as of the main information materials for concrete example of deployment of one pan-European service.

Overall Important Background Aspects of/for VIES in FYR of Macedonia

"With the introduction of the single market on 1 January 1993, fiscal customs based controls at internal frontiers were abolished and a new VAT control system was put in place for intra-Community trade. The most significant benefit was the reduction of the administrative burden on companies; with the elimination of some 60 million customs documents per annum.

Under the new VAT system intra-Community supplies of goods are exempt from VAT in the Member State of despatch when they are made to a taxable person in another Member State who will account for the VAT on arrival. Therefore any taxable person making such supplies must be able to check quickly and easily that their customers in another Member State are taxable persons and do hold a valid VAT identification number. For that purpose, inter alia, each tax administration maintains an electronic database containing the VAT registration data of its traders.

Such information includes the VAT identification number, the date of issue, the trader's name, the trader's address and, where applicable, the date of cessation of validity of a VAT number.

A computerised VAT Information Exchange System (VIES.) was set up to allow for the flow of the data held across the internal frontiers which:

- *Enables companies to obtain rapidly confirmation of the VAT numbers of their trading partners.*
- *Enables VAT administrations to monitor and control the flow of intra-Community trade to detect all kinds of irregularities.*

The unit responsible for the control of intra-Community trade in each Member State, the Central Liaison Office (CLO), has a direct access through VIES to the VAT registration database of the other Member States.

Traders, making an enquiry as to whether a particular VAT number is valid or whether it is correctly associated with a specified trader name and/or address, gain access to the VAT registration verification system through their national CLO, which will give one of the following replies:

- *Yes, valid VAT number*
- *No, invalid VAT number*
- *Yes, the VAT number is associated with a given name/address*
- *No, the VAT number is not associated with a given name/address*

The methods used in the Member States to deal with trader enquiries differ significantly. Some have implemented on-line systems to automate traders' access to the information while others have administrative units that answer traders' inquiries made by phone, mail or fax."[134]

FYR of Macedonia as a candidate country is obligated in the process of fulfilling the EU pre-accession requirements, among the other things, to consider the requirements from Taxation (Chapter 16) of the *acquis communautaire* as well. Concretely, FYR of Macedonia has to adopt and integrate EU standards and practices for intra-community supplies and a service VIES according to EU requirements and in accordance with DG TAXUD specifications. The VIES has to be implemented in fully functional from a first day of FYR of Macedonian accession to European Union.

Legislative Aspects
FYR of Macedonia would have to make considerable and sustained efforts to align its tax legislation with the EU acquis in the taxation domain, and to effectively implement and enforce it before their accession to the EU.

List of EU relevant Laws and Regulations

- Value Added Tax Act (Official Gazette No 47/95, 106/96, 164/98, 105/99, 54/00, 73/00, 48/04, 82/04, 90/05)
- Regulation on Internal Organisation of the Ministry of Finance (Official Gazette No 43/05, 114/05, 14/06)
- Fiscalis 2003 – 2007 programme (Decision 2235/2002/EC)
- Mutual assistance for the recovery of claims (Directive 76/308/EC, Directive 2002/94/EC)
- Administrative cooperation in the area of VAT (Regulation 1798/2003 and Regulation 1925/2004)
- Council Directive 2006/112/EC

Organisational Aspects, which will have to be taken in consideration in order to enable FYR of Macedonian Public Administration to conform to DG TAXUD specifications and successfully deploy VIES:

- EC VIES project management aspects
- EC VIES business aspects
- VIES Business Team job profiles
- VIES IT Team job profiles
- Helpdesk job profiles description
- Helpdesk strategy aspects
- Client Administration – basic aspects

Business Aspects – there will be a VIES specific European Community Business Aspects which will have to be taken in consideration as well. One possible solution for this is to deliver the Business Change Management Plan for VIES will systematically covering several domains:

- Business Change Management Plan - basic aspects
- Business Change Management Plan - business requirements
- Business Change Management Plan - IT requirements

[134] http://ec.europa.eu/taxation_customs/taxation/vat/traders/vat_number/index_en.htm , 2008,

- Business Change Management Plan - training requirements

System Context

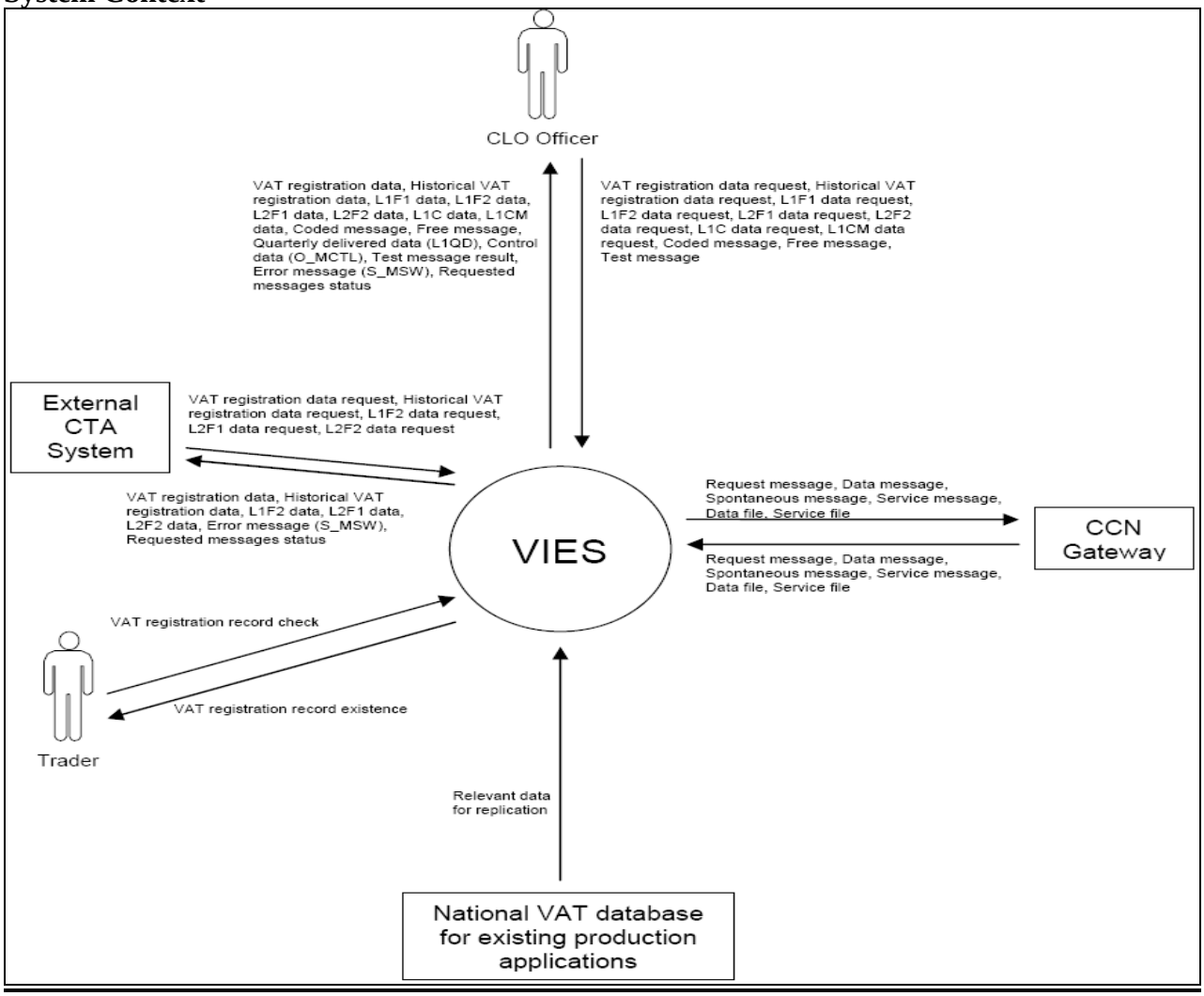

Figure 53: VIES – The entire system represented as a single object or process. The picture identifies VIES interfaces with external entities of the system as well.

- **External entities of the System** - characteristics of each external entity of the system:
  - Common Communication Network (CCN) Gateway – Communication platform for data exchange with common domain.
  - Central Liaison Office (CLO) Officer - Officer who works in central liaison office responsible for administrating data received from and sent to common domain. He also provides Tax offices with the results of data VIES analysis and issues Order for Verification Acquired good as the signal for possible audit activities. Officer participates in L3 data processing.
  - External Central Tax Administration System - System that tax officer uses in local office for data analysis and fraud detection.
  - National VAT database for existing production application - National central database (DB2) filled with national VAT data. Database supports applications in production.
  - Trader - Taxable person who is able only to check existence and validity of the VAT id number.

- **Information Flow –** characteristics of some of in total 33 information flows that cross the system boundary will be presented here:
  - **Coded Message** - Read or send notification on some special event sent between MS operators.
  - **Control Data (O_MCTL) -** Display sent and received O_MCTL messages (result of the check of the Purchaser VAT numbers included in received F_L1F1, F_L1QD, F_L1C and F_L1CM data files)
  - **Data File** - VIES data file containing ToD (F_L1C, F_L1CM, F_L1F1, F_ F1QD)
  - **Data Message** - VIES data message containing ToD, VAT registration
  - **Error Message (S_MSW) -** Display sent and received S_MSW messages

IT Aspects

- Software design, development and implementation
- Development and implementation of systems required for interconnectivity with the EU fiscal system (VIES) on the basis of the EU legal requirements and the CCN/CSI technical specifications.
- Implementation of CLO (Central Liaison Office for VIES)
- IT project management will be complex and crucial – it will have to support management of all business and functional aspects of system implementation
- Documentation of user requirements, software installation and system administration and user manual
- Procurement of equipment necessary to host VIES applications as specified by the DG TAXUD requirements:
  - Main server
  - Enterprise Storage Server
  - Band subsystem
  - UPS
  - Software
  - Storage System

Client Administration Aspects - This will have to be taken in consideration:

- Helpdesk – description according to the existing EC National Helpdesk specifications
- Client Administration – definition of business requirements

Training Aspects – in order to increase the institutional capacity of FYR of Macedonian PA in the domain of Taxation will be needed to comprehend following topics:

- VIES Training of the National Helpdesk staff
- VIES Client Administration - business requirements
- Guarantee management - business requirements
- Risk Management related to VIES
- Technical Assistance in the Project, Quality Management with knowledge on the above systems, as suggested by the DG TAXUD Tempo Methodology and Interconnectivity project.
- CLO (Central Liaison Office) management training
- Curricula development for the future national VIES training programme
- General Project management with specific focus on VIES specific topics
- General Change management issues with attention on VIES specific topics

5.3 Dissemination

5.3.1 We-Go dissemination plan

D.1.1.		D.1.2 (Dissemination)			
		Public Administration	IT Industry	Academia	International Organisations
Research	(1) EIF				
	(2) NIF				
	(3) Roadmap to interoperability				
	(4) Recommended interoperability approach				
Practice	(4) Recommendations				
	(5) Service deployment level				

Figure 54: We-Go dissemination plan for FYR of Macedonia covering all interoperability stakeholder groups and domains

The dissemination, presents the facts related to interoperability in Bosnia. The impact is reached through specific dissemination activities with every stakeholder group, covering all five layers of interoperability and the corresponding recommendations. The dissemination activities will share the common objectives but will vary in:

a) Mission (objectives)
b) Content sophistication level (general, generic, detailed, concrete actions)
c) Dissemination methods used.

Of course another variation is due to the recommendations domain and the stakeholder group. The content sophistication level will vary from general overviews and methods to concrete methodologies and techniques (e.g. public administration back office reengineering).

Dissemination methods are:

a) Workshops with target stakeholders groups
b) Conference participation (especially in working tables), research papers, and articles,
c) Working groups participation (e.g. +eSEE) on national, regional and pan-European level.
d) Participation and creation of (new) knowledge network communities within We-Go's Work Package 4 (e.g. We-Go Knowledge Net, epractice.eu)

The dissemination activities are presented in more detail in the figures below, per:

a) Practical or research domain,
b) Per stakeholder group,
c) Mission,
d) Dissemination methods used.

The dissemination plans for the different stakeholders are given in Figure 72 for public administrations, in Figure 73 for the IT industry, in Figure 74 for academia and **Figure 75** for regional in international actors.

D.1.1.		D.1.2 (Dissemination) Public Administration		
		Local Level	**National Level**	**Others (e.g. IS decision makers, Project Managers, IT Architects, Software Developers)**
RESEARCH	(1) EIF	**Mission:** Introduce and press importance of the principles of the various aspects of interoperability, the EIF, Lisbon Agenda, i2010 in Serbia and the impact on and advantages for the local level, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working groups c) Knowledge Net communities	**Mission:** Introducing ALL layers of interoperability, EU activities (EIF, i2010, Lisbon Agenda), best practices and the link to the current national eGovernment strategy. Press the importance and advantages of an integrated interoperability approach, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, round table, working group c) Knowledge Net communities	**Mission:** Introducing interoperability and the EIF recommendations on the service deployment level: technical layer of interoperability, opportunities and barriers, requirements for the IT architectures, security, accessibility, service availability, system integration, interfaces and data mapping, compliance analysis results. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities
	(2) NIF	**Mission:** Rising awareness & presenting the importance of IOP, EIF, Lisbon Agenda, and i2010 in FYR of Macedonia from a local perspective and relation to their government program 2006-2010. **Content sophistication level:** general **Dissemination methods used:** a) Workshops covering mission statement for local level FYR of Macedonian public administration's officials. b) Round tables, participation in working groups	**Mission:** Rising awareness & presenting the importance of IOP, EIF, Lisbon Agenda, and i2010 in FYR of Macedonia from a national perspective and relation to their government program 2006-2010. **Content sophistication level:** general **Dissemination methods used:** a) Workshops for highly ranked FYR of Macedonian public administration's officials. b) Papers, round tables, working group's participation and contribution.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means concretely on operational level for FYR of Macedonia. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related technical and semantic standards, EU best practices from EU, PKI. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(3) Roadmap to interoperability	**Mission:** Presenting the meaning and importance of NIF and gap between FYR of Macedonian current (nonexistent) NIF and EIF from FYR of Macedonian local public administration's perspective. Overview of changes, which have to be introduced in FYR of Macedonian IS Agenda for a dimension of national IOP Agenda. **Content sophistication level:** General overview **Dissemination methods used:** a) Workshop: NIF from a FYR of Macedonian local public administration perspective, general aspect.	**Mission:** Presenting the meaning and importance of NIF and GAP between FYR of Macedonian current (nonexistent) NIF and EIF from FYR of Macedonian national public administration's aspect. Overview of changes which have to be introduced in FYR of Macedonian IS Agenda for a dimension of national IOP Agenda **Content sophistication level**: Concrete, detailed **Dissemination methods used:** a) Workshop: NIF from a national public administration perspective, general aspect.	**Mission:** Presenting the importance of NIF and gap between FYR of Macedonian current (nonexistent) NIF and EIF from operational and deployable level. Presentation of concrete missing parts (to be deployed) of organisational, semantic, technical and governance IOP Layer. **Content sophistication level:** Concrete, detailed **Dissemination methods used:** a) Workshops: Aspect of NIF from an operational aspect. b) Conferences, papers, round tables, working groups. c) Knowledge Network Communities (e.g. epractice.eu)
	(4) Recommended implementation approach	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and pan-EU level from local FYR of Macedonian public administration perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and pan-EU level from FYR of Macedonian national public administration perspective. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and PAN EU level, form operational perspective, covering the concrete tasks and subject related to all four layers of IOP. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc… b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
PRACTICAL	(5) Recommendations	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it mean for local public administration level. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it means for national public administration level. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what are the concrete tasks, activities that will have to be undertaken on concrete operational level in accordance with proposed implementation approach. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…

Figure 55: We-Go dissemination plan for public administrations in FYR of Macedonia

D. 1.1		D.1.2 (Dissemination)		
		IT Industry		
		SW Development	**IT Industry Association / Consultancy**	**Computing Centres**
RESEARCH	(1) EIF	**Mission:** Rising awareness & presenting the importance of IOP, EIF, Lisbon Agenda, and i2010 in FYR of Macedonia from an IT industry perspective and relation to their Government Program 2006-2010. **Content sophistication level:** general but with concrete technical and operational aspects **Dissemination methods used:** a) Workshops on IOP related standards, best practices in EU, PKI etc…. b) Round tables, participation in working group	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from a FYR of Macedonian IT industry perspective and relation to their government program 2006-2010. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops bringing the importance of EIF –> better public administration's services for businesses b) Papers, round tables, working groups.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means concretely on operational level for FYR of Macedonian Computing Centres. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related standards, best practices in EU, PKI etc…. b) Conferences, papers, round tables.
	(2) NIF	**Mission:** Presenting the importance of NIF from FYR of Macedonian SW industry perspective and their possible role in it. **Content sophistication level:** General overview **Dissemination methods used:** a) Workshop: NIF from a local public administration perspective, general aspect.	**Mission:** Presenting the importance of NIF from FYR of Macedonian IT industry and consultancy perspective and their possible role in it. . Overview of changes which have to be introduced in FYR of Macedonian IS Agenda for a dimension of national IOP Agenda **Content sophistication level**: General overview **Dissemination methods used:** a) Workshop: NIF from a local public administration perspective, general aspect.	**Mission:** Presenting the importance of NIF from operational level projected on possible concrete role of Computing Centres in FYR of Macedonia. **Content sophistication level:** Concrete, detailed **Dissemination methods used:** a) Workshops: aspect of NIF from a operational level b) Conferences, papers, round tables, working groups. c) Knowledge Network Communities (e.g. epractice.eu)
	(3) Roadmap to interoperability	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and pan-EU level in FYR of Macedonia with an emphasis on their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and pan-EU level in FYR of Macedonia with emphasis on their role and interests in it. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops on the concrete measures which have to be undertaken to reach the interoperability and the possible role of IT industry and consultancy in it. b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and pan-EU level in FYR of Macedonia, form operational perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it mean for FYR of Macedonian SW Industry. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia from the FYR of Macedonian IT Industry and Consultancy perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what are the concrete tasks, activities which could be undertaken on concrete operational level from their perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshops
PRACTICAL	(5) Recommendations	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character and recommendation for successful IOP agenda from FYR of Macedonian SW Industry perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character and recommendation for successful IOP agenda from FYR of Macedonian IT industry and consultancy perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character in FYR of Macedonia and recommendation for successful IOP agenda from their perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshops covering project management in public administration's b) Conferences, papers, round tables, working groups c) Knowledge Network Communities (e.g. epractice.eu)

	(6) Service deployment level	**Mission:** Overall presentation of steps to be performed in order to implement the VIES in FYR of Macedonia and their possible role in that programme. **Content sophistication level:** general + concrete overview. **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS in FYR of Macedonia and their possible role in that programme. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.	**Mission:** Overall presentation of steps to be performed in order to implement the VIES in FYR of Macedonia and their possible role in that programme. **Content sophistication level:** general + concrete overview **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.

Figure 56: We-Go dissemination plan for IT industry in FYR of Macedonia

D.1.1.		D.1.2 (Dissemination)			
		Academia			
		Universities	**Research Institutions**	**IT Institutes**	**Others (e.g. independent researchers)**
RESEARCH	**(1) EIF**	**Mission:** Rising awareness & presenting the importance of IOP, EIF, Lisbon Agenda, and i2010 in FYR of Macedonia from an IT industry perspective and relation to their Government Program 2006-2010. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops b) Round tables, participation in working groups	**Mission:** Rising awareness about the importance of IOP and EIF, Lisbon Agenda, and i2010 from a research institution perspective and relation to their Government Program 2006-2010. **Content sophistication level:** general overview. **Dissemination methods used:** a) Workshops bringing the importance of EIF b) Papers, round tables, working groups.	**Mission:** Providing the concrete (deployment) level picture what does the IOP and EIF means on operational level for FYR of Macedonia and their possible role in it. **Content sophistication level:** concrete **Dissemination methods used:** a) Workshops (Detail Concrete) on IOP related standards, best practices in EU, PKI etc…. b) Conferences, papers, round tables.	**Mission:** Rising awareness about the importance of IOP and EIF. Lisbon Agenda, i2010 from their perspective and their possible role in it. **Content sophistication level:** general **Dissemination methods used:** a) Workshops b) Round tables, participation in working groups
	(2) NIF	**Mission:** Presenting the importance of NIF and possible involvement of universities in the process of creation of NIF. Presentation of gap between EIF and NIF in FYR of Macedonia. **Content sophistication level:** General overview + concrete details about in some areas **Dissemination methods used:** a) Workshop: NIF from an academic point of view.	**Mission:** Presenting the importance of NIF and involvement of Res. Institutes in the process of creation of NIF. Presentation of gap between EIF and NIF in FYR of Macedonia. **Content sophistication level**: General overview **Dissemination methods used:** a) Workshop: NIF from a research / academic point of view.	**Mission:** Presenting the importance of NIF from operational level. Presentation of gap between EIF and NIF in FYR of Macedonia. **Content sophistication level:** Concrete + concrete details about in some areas **Dissemination methods used:** a) Workshops: Aspect of NIF from a operational level b) Conferences, papers, round tables, working groups. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the importance of NIF and involvement of Res. Institutes in the process of creation of NIF, especially as consultants in some highly sophisticated domain. Presentation of gap between EIF and NIF in FYR of Macedonia. **Content sophistication level**: General overview + concrete details about in some areas **Dissemination methods used:** a) Workshop: NIF from an academic point of view.
	(3) Roadmap to interoperability	**Mission:** Presenting the concept of IOP roadmap in FYR of Macedonia, which could lead toward IOP on national and PAN EU level with emphasis on their role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the concept of IOP roadmap in FYR of Macedonia, which could lead toward IOP on national and PAN EU level with emphasis on their role, and interests in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables.	**Mission:** Presenting the concept of IOP roadmap, which could lead toward IOP on national and pan-EU level, form operational perspective. **Content sophistication level:** Concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)	**Mission:** Presenting the concept of IOP roadmap which could lead toward IOP on national and pan-EU level, form operational perspective and their role in it (e.g. consultants) **Content sophistication level:** Concrete, detailed **Dissemination methods used:** a) Workshops covering project management, change management, organizational change, standardization etc…. b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu)
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it mean for universities and their possible role in it. **Content sophistication level:** general overview	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it mean for research institutions and their possible role in it **Content sophistication level:** general	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it mean for IT Institutes and their possible role in it **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops	**Mission:** Presenting the proposed implementation approach for FYR of Macedonia and what does it mean for them and their possible role in it **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshops

		Dissemination methods used: a) Workshops	overview **Dissemination methods used:** a) Workshops		
PRACTICAL	**(5) Recommendations**	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character and recommendation for successful IOP agenda from a perspective of FYR of Macedonian universities. Proposal for their role in it. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character and recommendation for successful IOP agenda from their perspective. Proposal for their role in it. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and pan-European character and recommendation for successful IOP agenda from their perspective. Proposal for their role in it. **Content sophistication level:** General **Dissemination methods used:** a) Workshops b) Round tables, working groups	**Mission:** Presenting key success factors and recommendations for successful execution of IOP related services/applications/projects with national and Pan-European character and recommendation for successful IOP agenda from their perspective. Proposal for their role in it. **Content sophistication level:** concrete and technical **Dissemination methods used:** a) Workshops: Reengineering of Services, Modelling of Processes, Procedures, Business Analysis b) Conferences, papers, round tables. c) Knowledge Network Communities (e.g. epractice.eu) Reengineering of Services, Modelling of Processes, Procedures, Business Analysis
	(6) Service deployment level	**Mission:** Overall presentation of steps to be performed in order to implement the VIES in FYR of Macedonia and their possible role in that programme. **Content sophistication level:** general + concrete overview. **Dissemination methods used:** a) Workshops b) Conferences, papers, round tables.			

Figure 57: We-Go dissemination plan for academia in FYR of Macedonia

D.1.1.		D.1.2 (Dissemination)			
		Regional, pan-European and World Level			
		Stability Pact	**UNDP**	**USAID (e.g.)**	**EC (IS Directorate)**
RESEARCH	**(1) EIF - and – (2) NIF**	**Mission:** To provide them with the status regarding the EIF compliance in FYR of Macedonia and what can be done within other projects, ongoing activities related to development of FYR of Macedonian IS agenda on national and regional level. Overview of changes which have to be introduced in FYR of Macedonian IS Agenda for a dimension of national IOP Agenda **Content sophistication level:** general policy level **Dissemination methods used:** a) Workshops, participation in workshops b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu)			
	(3) Roadmap to interoperability - and - (4) Recommended implementation approach	**Mission:** To present them possibilities for improvement FYR of Macedonia regarding the IS development, particularly IOP based on EIF postulates and their possible role in this activities. **Content sophistication level:** general policy level in combination with concrete work package/activities for every organization separately. **Dissemination methods used:** a) Workshops, participation in workshops organized by other players in the IOP domain in the WBC region. b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu)			
PRACTICAL	**(5) Recommendations**	**Mission:** Present the proposed implementation approach for FYR of Macedonia from their perspective and their possible role in it. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshops			
	(6) Service deployment level	**Mission:** To present general overview of trends in FYR of Macedonia related to implementation of services/projects with Pan-European dimension, to find possibility to support the FYR of Macedonian eGovernment actors in the process of introduction of concrete IOP applications/services/projects (e.g. VIES) in FYR of Macedonia. **Content sophistication level:** general trend overview with concrete work packages/activities which can be supported by specific organization in order to extend the effect of work done in We-Go and which are from time and resources perspective out of scope of We-Go. **Dissemination methods used:** a) Workshops, participation in workshops b) Conferences, papers, round tables, participation in working groups c) Knowledge Network Communities (e.g. epractice.eu)			

Figure 58: We-Go dissemination plan for regional and European stakeholders in FYR of Macedonia

5.3.2 We-Go dissemination activities

Figure 40 shows the topics and stakeholders that We-Go is going to address.

FYR of Macedonia	We-Go Contributions to Dissemination Plan for 2nd period			
	FYR of Macedonian IOP Stakeholder Groups			
	Public Administration	IT Industry	Academia	Regional, pan-European and World Level
(1) EIF	1/2 day workshop	1/2 day workshop	1/2 day workshop	1/2 day workshop
(2) NIF				
(3) Roadmap to interoperability				
(4) Recommended implementation approach				
(5) Recommendations	1 1/2 day workshop	1 1/2 day workshop	1 1/2 day workshop	
(6) Service Deployment Level				

Figure 59: We-Go dissemination plan with a marked cell where We-Go is planning activities in FYR of Macedonia

Event planning for 2nd period and expected participants from the different stakeholders

	FYR of Macedonian IOP activities 2008/2009	Date	PA Hi Level	PA Mid Level	Private NGO Academia	Total No. Participants	Student Days	Total Person Days
	Event							
1	**1st IOP Workshop Mgmt**	**Nov/Dec 2008**	3	10	7	20	½	10
2	**1st IOP Workshop for Professionals / Experts**	**Nov/Dec 2008**		10	10	20	1 1/2	30
3	**2nd IOP Workshop Mgmt**	**Jan/Feb 2009**	3	10	7	20	½	10
4	**2nd IOP Workshop for Professionals / Experts**	**Jan/Feb 2009**		10	10	20	1 1/2	30
	Overall Sum		**6**	**40**	**34**	**80**		**80**
			8%	**50%**	**42%**			

Figure 60: Planned We-Go activities in the 2nd period in FYR of Macedonia

Additional and complementary Activities

1. **Participation in WP3 TTT events (see WP3)**
2. **Participation in WBC Conferences to be announced**

6. Interoperability in Serbia

6.1 Compliance Analysis

In the following sections we present an analysis of the efforts in the field of eGovernment and especially interoperability in eGovernment. Therefore, the current status in Serbia is checked against the postulates of the European Interoperability Framework (EIF) version 1 and the key success factors of the Modinis study on interoperability on the local and regional level, organized according to the four layers of interoperability.

6.1.1 Technical Layer of Interoperability

Technical interoperability is generally not addressed in a coordinated or continuous way, but on a case-by-case basis. Not many front office level tasks are addressed; the same is true for the back office area. Serbia does not have a sophisticated network, thus offices across the country are not connected. The service provision is mostly limited to the presentation of information, but there are no strategies for content update or accessibility. In the back office there is no sign of a horizontal and vertical integration. Instead, many "isolated island solutions" exist. Most of the basic registers are implemented, some are interoperable with EU initiatives (e.g. the Serbian Business Register), but interoperability is not guaranteed in general.

6.1.1.1 Core Technical Interoperability

Use of suitable technologies to handle structure of information such as XML, data models.
These technologies are used in some projects. But there is neither standardization nor coordination taking place, nor does a recommendation or policy exist on the national level.

Use of suitable technologies to handle structure of Services, such as Web Services, SOA, WSDL, UDDI, Workflows.
These technologies are used in some projects. For example: the Serbian Business Register has a web service to the Ministry of Finance. But neither standardization nor coordination is taking place. Furthermore, no recommendations or policies exist on the national level.

Use of suitable technologies to handle semantics of information, such as RDF, OWL.
These technologies are used in some projects (e.g. Serbian Business Registry Agency). But there is neither standardization nor coordination taking place, nor does a recommendation or policy exist on the national level.

Use of suitable technologies to handle semantics of service, such as OWL-S and WSMO, Semantic Web Services.
No evidence.

6.1.1.2 Supportive Technical Interoperability

Accessibility
Serbia has a central portal available (www.eUprava.gov.yu) like in the most EU and Western Balkan countries. But it lacks some basic characteristics. There is a strategy for the portal for the content management, but is has not been implemented yet. The public services all have their own web addresses and are not cumulated in the portal.

Some public administration services have already introduced their own web pages, but until now no guidelines have been prepared on the common look and feel standards (CLF) for these sites. Activities for standardization have yet to be done. The current public administration institutions' web pages have a variety of visual and conceptual identities.

There is no policy or regulation in order to adhere to international accessibility standards like the "Web Content Accessibility Guidelines[135] (WCAG)".

Multilingualism and multiplatform devices
There are a couple of web sites from public administrations that publish their content in different languages, like the "Ministry of Telecommunications and Information Society". However, there is no evidence that this is a coordinated action. It seems to be decided by who-ever is in charge of a web site on a case-to-case basis. There are plans for enabling multilingualism, especially for the central portal of eGovernment services. There is no evidence or example for multiplatform solutions.

Security and Privacy
There is a recommendation in the national strategy regarding this issue. But, due to a missing PKI, currently there is not any kind of authentication in place at the moment. There is no information about security in Custom Declaration and Online Procurement services, because in order to use these services a standalone application should be installed at client side.

Subsidiary
There is not any kind of different users. Basic effort in this direction is the special treatment for major taxpayers, but they are handled by a separate procedure, not with different rights.

Open Source Software and Open Standards
It is widely used and there is a recommendation in the national strategy for using open source software.

6.1.2 Semantic Layer of Interoperability

Common and global definitions/representations for eGovernment semantics
No evidence.

Modelling perspective and formalism for documenting the common definitions
No evidence.

[135] Web Content Accessibility Guidelines 1.0, W3C-WAI Recommendation, http://www.w3.org/TR/WCAG10/

Administrative level of definitions development
No evidence.

Promotion/dissemination and maturity of common definitions
No evidence.

Trust, reliability, and the supportive technical IOP layer
No evidence.

Maintenance and evolution of common definitions
No evidence.

There is no evidence that any of the processes and actions recommended on the semantic layer of interoperability is taking place or is performed continuously and/or by EU standards.

6.1.3 Organisational Layer of Interoperability

Clear link between cross-organisational processes/services and the business strategies of the broader agencies.
Most actors do not see the importance behind this recommendation. Most implemented IT projects have addressed "burning" issues, and are therefore isolated; these projects are viewed as the solution to a single problem, and not as a tool of overall government reform. Some substantial back-office reorganisation of services enabling access to 'any data, anywhere, anytime' has been started. Some bodies are better linked with EU institutions than institutions in the own country.

Modelling and visualisation of public administration services/processes
Not taking place.

Involvement of the users by setting up communities of practice in the process of new service design
No evidence.

Reuse of knowledge and experience related to the execution of internal and cross-agency business processes/services from the private sector
No evidence.

Identification and documentation of common service functionality and features across public administration agencies
No evidence.

Support of multi-channel service delivery
There is a special stress in the national strategy regarding this issue. Specification of the already approved eGovernment projects is partly related to the support of multi-channel service delivery (call centres, SMS, email…). But there is no evidence that this is approached in a broad and coordinated manner.

Consensus on and visibility of the ownership, management and responsibility for cross-organisational processes / services
Only exemplarily, but there is no evidence for coordination.

6.1.4 Governance Layer of Interoperability

6.1.4.1 Political

Development of national eGovernment IOP strategy and programmes
Currently there is no special document regarding either strategy for e-Government, or action plans for e-Government development. And in consequence there is no dedicated programme, document, policy or strategy regarding interoperability. The need for an interoperability framework and the adherence to EU standards has not been realized on a broad basis, only on an individual one. The importance of interoperability in the ICT systems of public administrations is recognized, but still not understood as a must. Interoperability on other layers has not been recognized widely.
In the Republic of Serbia, basic goals and directions of government strategy in the area of information society development and development of e-Government are defined in the document "Strategy of Public Administration Reform in the Republic of Serbia" (November 2004) and this strategy represents a framework for the Strategy for Information Society Development.
The Strategy for Information Society Development was adopted in October 2006. In this strategy, priorities and goals for information society development are set up and the necessary institutional and legislation framework for such development is defined. Furthermore a strategy for establishing an efficient national communication and information infrastructure is proposed.
In Serbia there is currently no institution on the national level, which holds jurisdiction over creating policy/strategy of e-Government development. The "National Information Technology and Internet Agency" is responsible for the improvement, development and maintenance of government institution information systems of local governments and public service offices.

Promotion of organisational federalism as a model for organising the diverged administrative space into a cooperative environment
No evidence could be found that this happening, although it is noticed in the national IS strategy.

Significance of international IOP aspects
International IOP is respected in some institutions in order to connect with relevant EU institutions. There is no example of usage or evidence of broad recognition of this topic on the national level.

6.1.4.2 Legal

Legal alignment to address the new requirements posed by intensive cooperation of public administration agencies
Many parts of the Serbian legal framework are already aligned. Examples are the Law on Information Systems and the regulations for its fulfilment for the realization of the significant infrastructural projects on the national level. Another example is the Law on Free Access to

Public Information by which paper and digital documents are made equivalent from the aspect of availability, and which offers email communication between citizens and public authorities. The Law on Business Entity Registration has also been enacted, based on which unique, centralized, public, electronic database on business entities is made available over the Internet.
In order to create a better legislation framework for more dynamic development of the information society and the eGovernment, it is necessary to adopt new laws from the related areas. This means adoption of:

- Law on Personal Data Protection
- Law on eGovernment,
- Law on eProcurement,
- Law on eCommerce,
- As well as other laws necessary for the normal process of EU integration and modern world trends.

Considering the legislation framework, We-Go identified that there is no significant lack in regard to the countries in the region. However, it should be pointed that the bigger problem is the appliance of the existing laws and regulations.

Protection of intellectual properties in multi-partner projects and developments
No evidence found.

Diffusion of digital signature and electronic identity (eID)
In the area of electronic signatures there has been a delay. Thus, diffusion has not been started yet. Until recently the legal framework for electronic signatures was not in place. The law has already been enacted in 2004, but not all sub-acts and regulations had been enforced. In March 2008 four regulations addressing the issuance of electronic signatures and the creation of certified bodies for the issue of electronic signatures have been enforced. The "Ministry of Telecommunications and Information Society" announced the registration of certified bodies for qualified electronic signatures, but stated no exact time frame.
However, an adequate law on personal data protection (adjusted to EU recommendations) is still missing. The "Post Serbia Certification Authority" is issuing (selling) digital certificates to interested users outside of Post Company since November 2004. At the moment it is the first and the only public certificate body in the Republic of Serbia.

Citizen privacy and data protection
The law on data protection exists, but it has not been applied and it is not up to date to reflect the requirements of today's Information Society. It is also not in line with the EC Data Protection Directive (95/46/EC) and the Council of Europe Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data. The necessary change of this law is recognized, but has not been done yet.

6.1.4.3 Managerial

Clear IOP leadership/ownership/ sponsorship/management
There is a noticeable lack of a single institution, which should have all necessary permissions for controlling efforts for building information society as well as for e-Government. Though it is formed with that goal, the "National Information Technology and Internet Agency" did not

achieve any significant results, foremost because of lacking funds and conflict of jurisdictions with other ministries. Unfortunately, until now, any wider consultancy mechanisms in order to create a forum for stakeholders for the discussion of applicability of the national strategy for information society have not been developed by the government.
Operations of government administration and tasks in the area of information society development are under jurisdiction of the "Ministry of Telecommunications and Information Society" (jurisdiction taken over from the Ministry of Science and Environment Protection in former government), the "National Information Technology and Internet Agency", and the "Office for Common Operations of Government Institutions". Although it is not an identical activity in comparison to e-Government, separation of responsibilities among institutions will be established. This fosters the establishment of an information society development – considering that there is no special structural responsibility regarding e-Government activities in place yet.

Responsibilities are divided such that:
Ministry of telecommunication and information society performs tasks of the government which are related to:

- Creation of policy and strategy for building information society
- Preparation of laws, other legal acts, standards, and measurement in area of electronic business
- Application of information technology and Internet
- Providing information services

National Information Technology and Internet Agency (formed in 2003) performs common and expertise tasks of the government related to:

- Improvement, development, and functioning of information systems of government institutions, local government, and public services
- Data protection
- Development and adaptation standards for involving information technologies in government institutions
- Other tasks regulated by law

Office for Common Operations of Governmental Institutions, performs tasks of automatic data processing which evolve:

- Creation and involvement of projects for automatisation of administrative and other operational tasks which are performed in office and other government institutions
- Design and organization of documents and other data bases in charge of government
- Other information technology tasks related for assurance of functioning and development of information systems
- Giving ICT support to various administration offices is the responsibility of the Office for Common Operations of Government Institutions, Department for Information Technology, Telecommunication, and Internet.

Flexibility/transferability/reconfigurability of IOP solutions
No evidence.

Adoption of any relevant available standard and proposal of new standards in areas where standardisation is missing
There are particular examples in some institutions, but not on a national level.
Broad commitment, participation and communication
No evidence.

Willingness for cultural change at all partners
Not at all partners. This is a great inhibitor and a problem.

Staff training related to IOP projects
Staff training is taking place in an isolated manner, for example as part of the "Document Management System (DMS)" project of the Ministry of Telecommunication and Information Society.
The National Strategy for an Information Society takes up the topic and recommends the assessment and training of staff in regard to ITC literacy. But no action plan or coordinating activity could be found.

6.1.4.4 Economic

Adoption/switching costs inherent to IOP solutions
There is awareness, depending on the actors. These costs prevent projects, because cost savings in the mid- and long-term do not motivate to carry out projects now.

Public procurement policies and financing for IOP projects
There is an ongoing project for eProcurement inside the National Investment Plan called "e-Public Procurement". In the first step a portal for publishing and monitoring tenders shall be installed. It is a common project of the Ministry of Finance and National Internet and the Information Technology Agency, with participation of the Public Procurement Office, and the Ministry of Telecommunication and Informatics Society. The project team itself stated that the Law on Public Procurement does not envisage e-Tenders in public procurement. Thus, also in this case the main barrier to the implementation of electronic public procurements is of legal nature, i.e. it is necessary to adapt (or to supplement) the Law on Public Procurements (adopted in 2002. with changes in 2004) with appropriate normative and organizational solutions for full online utilization. No evidence for any policies could be found.
Projects, from which some address IOP issues as well, are financed mostly through the National Investment Plan (NIP).

Partnering with the private sector in IOP projects
No evidence on a national level.

6.1.5 Infrastructure, back office and services

The previous sections have addressed areas of interoperability according to the EU understanding of interoperability. Besides the aforementioned layers a basic IT infrastructure as well as certain back office systems are a prerequisite for eGovernment as well. The current status in Serbia regarding the implementation of those "basic building blocks" is illustrated in the upcoming paragraphs.

At this moment there are several projects that address problems with infrastructure necessary for eGovernment services development. Those projects involve eSerbia and eCards. But the main barrier related to eGovernment infrastructure is the lack of applicability of the Law on Electronic Signature.

The level of ***ICT infrastructure*** is quite different. Implemented IT solutions and services are varying from municipality to municipality in terms of functionality, actuality of used technologies and equipment. In the most number of municipalities, there are information systems that partly implement most important business operations and which are relatively modern and non-integrated.

There are no examples of interoperability or any other attempts of process standardization, automation, etc.

Availability of ICT infrastructure and deadline as indicated in the action plan of the national IS strategy	
Advanced computer networking (physical infrastructure)	Being implemented – Part of eSerbia project
Building a logical infrastructure among the state institutions	Partly implemented, remaining parts in planning
eSignature	Not implemented
Record management	Not implemented
Equipping the municipalities with at least three computers and continuous Internet connection for public access	Partly implemented
Internet at local government units	Partly implemented

Figure 61: Figure 62: Availability of ICT infrastructure in Serbia I

The **advanced computer networking (physical infrastructure)** is part of the project eSerbia and is already partly implemented. The project is currently in the finalization phase. In the end it is planned to have a network as a secure and collaborative work environment for governmental institutions. The project started in 2006, and it is planned to last for 24 months.

Building a logical infrastructure among the state institutions is in planning and already partly implemented.

The infrastructure for **E-Signature** is not present.

Record management is not implemented. A "Document Management System (DMS)" is being developed in the Ministry of Telecommunication and Information Society. It is planned to roll out the system on a large scale after implementation and testing.

Internet at local government units and **equipping the municipalities with at least three computers and continuous Internet connection** for public access is partly implemented. Some international donation has improved the state regarding this issue, but there is no precise information available regarding the status in the whole country.

Regarding ***Governmental information systems and eGovernance systems*** the findings are mixed. Some systems are already fully implemented while others are not available at all. Although some of the information systems are very modern, most of them are closed systems. There is no example of a common solution in the information systems implemented in various institutions. There is no **Electronic Citizen Registry**. The system for the **Taxation Authorities** is partly implemented. The finalization of the current project "Fides" funded by the "National Investment Plan" is currently on its way. The project "Fides"

Availability of ICT infrastructure	
Electronic Citizen Registry	Not implemented
Public Expenditures (Treasury/Finance)	Partly implemented
Taxation Authorities	Partly implemented
Customs Administration	Implemented
Network/communication infrastructure, dedicated to eGovernance systems	Partly implemented
Judicial systems	Partly implemented
Electric Registration of Companies	Implemented - EBR

Figure 63: Availability of ICT infrastructure in Serbia II

addresses collaborations between Taxation Administration and local governments. The **Custom Administration** has been implemented with the finalization of the "Single Electronic Window" project.

The **network and communication infrastructure, dedicated to e-Governance** is partly implemented. The finalization of the current project eSerbia funded by National Investment Plan is currently going on. Project eSerbia will build a unique computer network of all government institutions that will serve as a backbone for e-Government services.

The **Judicial System** is partly implemented. The project "eJustice" has been proposed to the government for funding. The project is planned for the period between 2008 and 2011. Several projects are already done in the area of Justice (for example CCASA), but project "eJustice" should integrate all of them.

The **Electronic Registration of Companies** is already implemented with integration in the "European Business Register (EBR)".

The situation of the implementation of ***fully operational registrars*** offering availability to be used in eGovernment environment is as follows. The register for **companies and associations** is the only register that is fully implemented.

Fully operational registers and deadline as indicated in the action plan of the national IS strategy	
Companies and associations	Implemented
Persons	Partly implemented
Addresses	Partly implemented
Personal properties	Not implemented
Citizenship	Not implemented
Cadastre	Being implemented
Agricultural	Not implemented
Tourism	Not implemented
Central registrar of all databases	Not implemented

Figure 64: Registers in Serbia and their availability/implementation progress

The register for **persons** is partly implemented like the **address** register.

The **cadastre** register is being implemented. Although there is no full information available, it seems that the cadastre registry follows a modern solution approach. Finalization of the current project is planned for 2008.

6.1.6 We-Go Benchmark – availability of online services

The *We-Go benchmark 2007 for Serbia*, based on the same measurement framework as used by Capgemini for the study "*Online availability of online services 2006*", has helped to understand the situation in the eGovernment domain in Serbia. The current trend is shown in comparison to the achievements in the WBC region and the EU. The benchmark has not been officially performed. Nevertheless it has provided useful results for the state level.

The overall online sophistication of all public services is 46,55%.

A closer look on the clusters of the benchmark reveals that one is underdeveloped ranging at 27%, whereas the remaining three clusters range between 48% and 55%. The difference between the sophistication of services offered to citizens and business is 15 percentage points and thus within the EU average. Through the EU, services for businesses reach higher numbers than those for citizens. The European average of the online sophistication is much higher, between 61 and 94%. Thus, the difference is around 35 percent. The negative discrepancy between Serbia and the remaining We-Go WBC participants is around 10 percent.

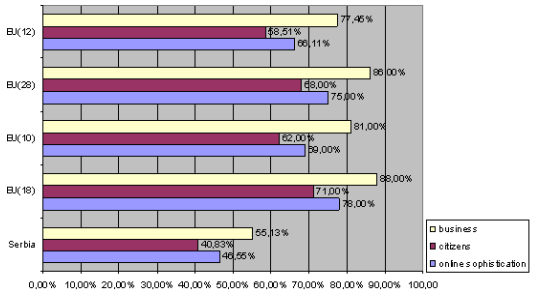

Figure 65: Online Sophistication of services for businesses and citizens measured by SR We-Go country participant team - Comparison of EU (12), EU (28), EU (10), EU (18) and SR

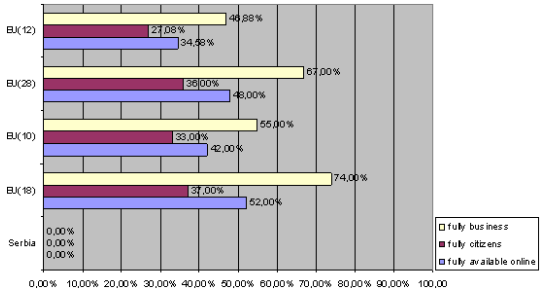

Figure 66: Fully Online availability of services for businesses and citizens measured by SR We-Go country participant team - Comparison EU (12), EU (28), EU (10), EU (18) and SR

The online sophistication is also significantly lagging behind the 12 "new member states" that have joined the EU in the last enlargement. Among this twelve countries are Estonia, Slovenia, and Malta; they are eGovernment champions and from the historical perspective with nearest experiences to the countries from Western Balkan.
The EU (28) average for the fully online sophistication is 75% (86% for business and 68% for citizen services).
Regarding the full online availability the most significant gap in comparison to the European countries can be identified. Serbia has not one single service, which is fully offered online to citizens or businesses. ***The overall full online availability is 0%.***

The *United Nations eGovernment Survey 2008* draws the same conclusions.
The results of the compliance analysis and the study of the infrastructure, back office and basic services are reflected in the outcome of the aforementioned benchmarks and reports respectively.

6.1.7 Examples of interoperability projects

6.1.7.1 Serbian Business Register

For the purpose of a reform of public administration the "Law on Registration of Business Entities" was adopted in May 2004. Based on this law, the "Serbian Business Registers Agency (SBRA)" was formed as the unique institution responsible for maintaining business registries, and a special "Law on Agency "regulates in detail its work for business registries.
Already in September 2004 the project "Reform of Business Subjects (REPS)" was started in collaboration with the World Bank. However, the official start of the agency was on 4.1.2005, when maintenance of Registry of Business Entities and Registry of Financial Leasing has started.
In August 2005 maintenance of Registry of Pledge Rights has started. The "Registry of Businesses" and Submitting Financial Reports of Business Entities became operational on January 1st 2006. It is expected that during the next years this list will be extended with new registries, whereby in shortest time it is expected to activate the "Registries of Foreign Investments", and the "Registry of Factoring".

Besides the Serbian government with its decision to make a reform of registration systems and a usable legislation framework, providing of financial facilities especially in the preparation phase was highly supported by: the Swedish Government, USAID, and Microsoft. The procurement procedure was designed according to the World Bank's International Competitive Bidding (ICB) rules. It was a „Turn-Key ICT Project", which involved the delivery of a complete solution for SBRA, including hardware, software, and all necessary services. In preparation of tender documentation, IT consultants played an important role from Ireland.
During the development, a good model from the EU was selected, whose experiences were used. The chosen model from Ireland was a very successful example of knowledge transfer from Companies Registration Office (CRO) Ireland, Dublin, with CRO as a real mentor for development in SBRA. Also, the methodologies of selected suppliers by tender were accepted for development.

Essential functions of software for Registration of Business Entities are:

(1) Electronic submission of requests
(2) Receiving electronic slips
(3) Scanned documents will be available in electronic format and opened for searching
(4) Possibility for making payments electronically (EUR, Dinars)
(5) There are various opportunities for connections based on industrial standards (e.g. Web Services)

Current State

Modern information system in the SBRA, throughout its internal part, user/partner connections, and Internet site, enables:

(1) Economy and data availability through the unique centralized database for every of needed registries
(2) Simplification and speeding up of registration process
(3) Decreasing of registration and business costs
(4) Harmonization with EU standards and directives
(5) Education of users and improvement of inter-communication
(6) Electronic data exchange with public and private sector

Before the reform, the registration system required the following procedure: registration of company was performed in one of 17 commercial courts, and registration of businesses in one of 161 municipalities. Automatisation of the process in the courts was on a low level, mostly on the level of very primitive information system, without inter-connection. Automatisation of the process in the municipalities varied, ranging from solid applications down to totally manual processes, without any standardization.
During the development of Registry of Business Entities in SBRA (the project REPS), the following modern concepts were used:

(1) Electronic register
- Centralized, unique database of business entities
- Usage of the most modern technologies (multi-tier Web applications, RDBMS – MS SQL server, LAN/WAN (Intranet)
- Full data availability (24/7) – Using of Internet for searching purposes
- Implementation of data exchange and business collaboration with other institutions

- Example of eGovernment services (G2C, G2B, G2G), done by all standards

(2) Ability for registration through Internet
- Ability of downloading all forms via Internet, and filling out Web forms
- As soon as it is possible, an offer of full electronic registration with the use of electronic signature will be established

(3) Respect of international standards
- Concept and legislation framework are aligned with "EU Best Practices"
- The modern standards of project management and software engineering methodologies (Agile Methods) were used
- Data formats and communication formats are such that can enable international collaboration

Implemented solutions are enabling data exchange with other institutions and offices. The final goal is the realization of "one-stop-shop" services for citizens, throughout several phases.
At present, there is a collaboration of SBRA with the following institutions:

1. National Agency for Statistics (from 2004).

1.1 Exchange of data set related to companies and businesses / statistical analysis

2. National Bank of Serbia

2.1 Exchange of data set related to companies and businesses / data on banking accounts

3. National fund for pension and invalid insurance

3.1 Forms of businesses application (electronic), confirmation of application (paper)

4. Ministry of Finance, Tax Administration

4.1 Data set of companies and businesses / Data of Tax IDs

5. Leasing companies

5.1 Data of leasing contracts / Reports from registries of financial leasing

6. The Serbian Business Registers Agency has recently joined the European Business Register (EBR) group. The work for the technical integration to the network will start soon.

Collaboration or extension of collaboration with following institutions was planned:

- Local Governments (Municipalities)
  - Data entry of businesses / summarized data of businesses
- National agency for health insurance, National agency for employment
  - Sending data of businesses
- Custom Administration, other Agencies and Ministries
  - As agreed

Collaborations with the private sector were also planned:

- Electronic delivery of data for legal entities and citizens will be offered
- Collaboration with banks (intensive collaboration already exists in some domain)
- Collaboration with Chamber of Business, Alliance of Banks (negotiations are active)
- Commercial registries, Enterprise clients (Telekom Company, Post Company, etc.) (Current negotiations)

- Full electronic registration – for partners and end-users (the full realization depends on the enforcement of Law on electronic signature)

The following activities are planned for the future:

- Finalization of the project "One Stop Shop for registration in SBRA"
- Participation in the BRITE project
- Continuity of quality improvement, standardization of data in the registries, initiative for changing necessary regulations
- Finishing of businesses databases
- Further opening to the public, through complete offer of deliverable electronic slips (complex reports from database)
- Participation on European Commerce Registers Forum (ECRF) in Riga, Latvia; Active international and especially regional collaboration, in the field of registration and more
- Realization of electronic requests (depending on availability of qualified electronic signatures)

6.2 Interoperability Recommendations

6.2.1 Recommendations regarding interoperability key factors

As a follow up to the analysis of the Serbian eGovernment approach in regard to the recommendations and guidelines of the EIF and the Modinis Study on Local and Regional Interoperability, this section of the recommendations deals with strategic and thus generic issues and deficiencies in the Serbian procedure to reach interoperability. The advantage of ICT introduction in governmental bodies is recognised: better service delivery to citizens and businesses and automation supported by ICT. But it is apparent that there is a lack of awareness of the existing link between ICT and public administration reform. Interoperability is not widely recognized. This is mirrored in the implementation approach of eGovernment projects. Projects are carried out isolated and not in a coordinated manner. Thus, the diffusion of computerisation is spreading, but only a small fracture of the potential impact is realised.
Serbia is lacking a central coordination, guidance, and advising in interoperability matters. Thus, the environment is not friendly towards the diffusion of interoperability and towards the development and implementation of interoperability projects. In addition, there is not much collaboration among the different players. Some institutions are well connected to EU bodies, but the connection of administrations within Serbia is not functioning properly. Bodies in charge of ICT matters and public administration reform are required to determine procedures and rules that are valid on all levels and between actors on all levels. Collaboration between all levels and end users is important in order to get broad commitment. It is also required in order to be able to take needs of administration on different levels and regions and their possibilities into account. Another reason is that a central approach should not trim local governance authorities. Consider that lots of administration does not take place at federal/state level. In this context public-private partnerships are a good example since both sides can support each other very much.

The described environment is defined through principles, practices, and boundaries that build a framework. This is not necessarily a single document as long as interoperability "is being lived" and covered in all actions on all different levels.
Concluding from the information acquired during the analysis, the following basic deficiencies can be summarized. They are generic and general. But they need to be addressed first hand before going into more specific areas and before performing more "specific" tasks. The main barriers to interoperability in eGovernment in Serbia are:

- No clear leadership, coordination and guidance
- Governance structures are in place
- Not enough collaboration and coordination even on the national level, whether horizontal or vertical.
- Strategy and Action Plans are not being implemented properly and in a timely manner
- IOP is not a very specific issue in any documents that are strategically oriented
- Central infrastructure components like a national backbone are still not implemented
- There does not seem to be a body close to the public administration reform to be involved in the strategy

In regards to cross borders and pan-European interoperability there is awareness within some bodies. But this is not followed strategically. These aforementioned barriers prohibit the development of a supportive interoperability friendly environment. Hence the preliminary remark is already the first recommendation on the way to interoperability: **Creation of a supportive environment arranged by rules and boundaries that are defined in collaboration of all involved stakeholders.**

The following topics are required to be understood, promoted, and covered in order to guarantee interoperability on all levels:

- Collaborative environment: working groups and a cooperation panel to encourage dialogue and discussion between stakeholders, governed by a central body: The analysis revealed the existence of many isolated islands and consequently isolated solutions. Problems are approached, but in a solo run without regarding collaboration with other administration bodies. Interoperability, although recognized, is not an issue, whether on the local, regional or national level. A platform needs to be set up and working groups need to be created to encourage dialog and discussion among different stakeholders.
- Strong leadership and coordination
- Training and support of civil servants as well as of the top management to break barriers that are only natural
- Knowledge management: Documentation and distribution of semantics and best practices and reusable solutions
- Fully legislation designed to enable modern public services in an electronic environment
- Technical infrastructure and central services
- Recognition that eGovernment is about more than technology and ICT introduction goes hand in hand with reforms to reach maximum impact

The before mentioned principles are recommended to be handled immediately to create an environment that is encouraging interoperability and interoperability projects. In regard to the EIF and NIF compliance analysis the We-Go team concludes the following recommendations.

The following paragraphs describe more concrete steps, based on the special situation in Serbia and consequently as an answer to the analysis presented in the previous chapter, that are required to be performed in order to be able to guarantee interoperability on all levels. Keep in mind, that building an interoperability architecture is an evolutionary task that cannot be performed completely at once. Instead it grows continuously over time. This is why there is no more time to lose because drawbacks are more difficult to catch up at a later time, given that more and more isolated solutions are implemented in the mean time.

6.2.1.1 Technical Layer of Interoperability

The technical layer addresses connections that enable the data exchange within and between administration bodies. Rules for the interconnection of technical systems are required to be defined through the definition and implementation of standards, norms, and best practices. A central state level body is needed to coordinate efforts in these areas.

Efforts for the inclusion of citizens have to be strengthened. In regard to interoperability this means to enhance the accessibility of the provided information and services on the Internet. We recommend the introduction of a policy related to the Web Content Accessibility Guidelines of the W3C Consortium. Web presences are required to deliver "true" multilingualism. This means that in contrast to the current situation the contents of web pages are really available in the languages communicated on the web page itself in order to reduce server messages of content that is not or soon available. To serve as a real portal the public services should be subsumed on the portal or linked by the portal.
The delivery of services over multiple channels needs to be regulated and policies have to be established as well.
We encourage the use of web technologies to overcome potential interoperability problems due to the different sets of installed hardware and software. Consequently we recommend to pursue transactional models with a centralised system where individual users access data and applications remotely by means of web interfaces.
The potential impact of these recommendations is that users will more likely be willing to make use of electronic public services, thus transposing the cost savings. The recommendations are also countermeasures against the digital divide.
Users require support. The structures therefore need to be set up and staff needs to be trained. Without support users might lose their trust in the new services.

Burning issues to be addressed from a We-Go perspective are:

- Establishment of a physical and logical network to connect administrations on the national and the local and regional level as (physical) basis for horizontal and vertical integration and inter-connection
- Define a policy/guideline/handbook for the use of technologies able to handle structured content and services in projects in order to get an aligned approach and to learn from successful implementations
- Define a policy/guideline/handbook for the use of technologies able to handle semantics and semantics of services in projects in order to get an aligned approach and to learn from successful implementations
- For the two points mentioned above: Collect expertise on core technical interoperability technologies, learn from already implemented projects (e.g. Serbian Business Register) and distribute the results
- Integration of the offered public services into the Serbian portal (both national and local)
- Creation of principles and policies for the implementation of multilingualism and to monitor the implementation
- Establishment of a policy for the accessibility of web portals based on the "Web Content Accessibility Guidelines (WCAG)" of the W3 Consortium
- Analyse existing and planned registers regarding interoperability capabilities and update them if necessary

- Analyse existing and already used standards and create a guideline based on the results of the analysis
- Create a policy for the use of (open) standards in administration
- Establish a PKI system in conjunction with an eID project to better handle security
- Use web technologies to make the installation of client software for services obsolete where possible. Then the use of services becomes more interoperable and less dependable from client platforms.

There is no sense in recommending a certain technology because the use of a set of technologies strongly depends on the system design and the installation basis (current installed systems). The Architectural Guidelines by IDABC cover different technologies and their uses as well as different system designs. The choice has to be made per project. The following paragraphs give an overview of technologies recommended by the EU and the IDABC for different domains.

Front Office:

- Data presentation and exchange
  - Interfaces
    - Interfaces design principles -
      - WCAG[136] (IDA mandatory) – Web Content Accessibility Guidelines – We recommend the creation of a policy based on the WCAG for any web-based services or information platforms. It is crucial to include the training of public administration staff.
      - Web browsers have to support almost all file format specified in this text, most notably HTML v 3.2.[137] (IDA mandatory), and HTML 4.0.1[138], XHTML v1.0
      - Mobile Phones – SMS[139] (IDABC mandatory), or Short Message Service has to be used as an standard when implementing SMS services for GSM Mobile devices. WAP[140] v. 2.0 has to accept as a standard for services interfaced over WAP browsers.
  - Characters sets – ISO/IEC 10646-1:2000(IDA mandatory) - has to be accepted in order to support alphabets from different world-wide used alphabets. UTF-16 will be needed for some non Western European Languages and for documents in Greek language.
  - Collective authoring – WebDAV- Web Distributed Authoring and Versioning - is recommended to be used.
  - File type formats
    - Hypertext file format - HTML v 3.2. (IDA mandatory), and HTML 4.0.1, XHTML v1.0
    - Style sheets – CSS2 – Cascading Style Sheets Language for the display of HTML sites has to be used. XSL (Extensible StyleSheet Language v1.0 should be used.

[136] http://www.w3.org/TR/WCAG10
[137] http://www.w3.org/TR/REC-html32
[138] http://www.w3.org/TR/html401
[139] http://www.smsforum.net
[140] http://www.wapforum.org

- Active contents / extended programming – Passive HTML (IDA Mandatory) should be used for the exchange of information on client-side passive HTML sites. For support of general communication, interaction and more complex solutions Java applications are recommended to be used.
- Text Documents, spreadsheets and presentations – TXT (IDA Mandatory) for simple, editable text documents should be used. RTF (Rich Text Format) for documents, which have to be edited by several parties who don't use the same editors. PDF – Portable Document Format (IDA Mandatory) for unchangeable documents. HTML (IDA Mandatory) for documents exchanged in HTML format. XML can be used as format for documents. MIME (IDA mandatory) - Multipurpose Internet Mail Extensions – as a standardised method to indicate the format of a file or part of a file. CSV (IDA Mandatory) – Delimited comma separated tables can be exchanged as CSV files.

- Document management – MOREQ is recommended for management of electronic records.
- Database Files – ANSI X3.135-1992/ISO 9075-1992 (IDA Mandatory) – use this standard in relational databases to assure conformity to accepted international standards.
- Graphics – here are few very well known and accepted standards not mandatory but IDA recommended forms – GIF - Graphics Interchange Format and JPG - Joint Photographic Experts should be used for the exchange of graphs and pictures, CGM - International Standard for storage and exchange of 2D graphical data., PNG - portable network graphics , TIF - Tagged Image File, ECW – Enhanced Compressed Wavelet, EPS – Encapsulated Postscript, VML – Vector Markup Language , SVG - Scalable Vector Graphic etc….
- Video – MPEG (IDA Mandatory) Motion Picture Experts Group , MP3(IDA Mandatory) MPEG 1 layer 3, MPEG 4/ISO/IEC 14496 for multi-media content/services, Animated GIF (IDA Mandatory), Real Quick time
- File compression – ZIP v.2.0 and GZIP[141](alternative to ZIP) are mandatory to be used.

According to IDA: „*XML is the reference technology for most IT industry sectors (e.g. web publishing, document and knowledge management, software design, system and network management, directory interoperability, etc.) as an ideal language for defining contents to be handled, shared and exchanged.*" Therefore we recommend putting an accent and additional effort on usage of XML based standards in public administration as well. XML technology has several features important for EIF postulates:

- End-to-end content control – allowing users and/or applications to supervise content production;
- Configuration management – the capability to maintain the correct, current baseline version of a document/document set, while making it possible to track and trace back requirements and to access previous versions of the information;
- Content exchange – an XML document can be designed to carry all the business information that local user applications need to know when processing that document.

[141] http://www.ietf.org/rfc/rfc1952.txt

- Multilingualism – XML offers designers means of establishing the requisite level of data granularity for the contents to be handled, with ultimate capacity to set up automated translation
- Processes, or the run-time rendering of itemised data stored in a language-independent manner.

Back Office level:

- XML Based standards
  - For Data Description – XML (IDA Mandatory) XML should be used to standardise documents and to format data and message files., XSD (IDA Mandatory) should be used to structurally describe data of XML schemas
  - For Data presentation and user interfaces - Data description – CSS (IDA Mandatory) is a W3C standard that defines a style sheet language that allows authors and users to attach style (e.g., fonts, spacing, and aural cues) to XML applications., XUL is an XML-based language that is used to define elements of a user interfaces (e.g. menus of a menu bar or pop up menus etc…)
  - For data modelling – UML[142] (IDA mandatory) standard notation for the modelling of real-world objects as a first step in developing an object-oriented program, XSD (IDA Mandatory) should be used to structurally describe data of XML schemas, RDF[143] (IDA Mandatory)
  - For data transformation – XSL[144] and XLST[145] (both IDA Mandatory) if applications use different XML schemas, an exchange of data can mean a conversion from one format to another. XSLT is a language, which performs this transformation and is a part of XSL.
  - Metadata Interchange – XMI[146] is a format which standardises how any set of metadata is described., MOREQ - Model Requirements for the Management of Electronic Documents
  - Document object modelling – DOM[147] - provides a platform and language-neutral interface that is implemented in browsers, allowing scripts to dynamically access and update the content, structure and style of documents.
  - Geographical data – GML[148] - Geospatial Markup Language defined by the Open Geographic Council is used to make structured descriptions of geographical chart information.
  - Security aspects – XML Signature[149] is the product of a joint effort of the IETF and W3C
  - EDI-based standards - EDI Formats: EN 29735: 1992 (Syntax) D93.A (directory services) are basically replaced by XML-based standards. Keep in mind that one day maybe other technology will arise, one which will offer better solution then XML based technologies currently are. There is a need to establish the process of maintenance of accepted and monitoring of new technologies covering this domain.

[142] http://www.omg.org/technology/documents/formal/uml.htm
[143] http://www.w3.org/TR/REC-rdfsyntax
[144] http://www.w3.org/TR/xslt
[145] http://www.w3.org/TR/xsl/
[146] http://www.omg.org/technology/documents/formal/xmi.htm
[147] http://www.w3.org/DOM/
[148] http://www.opengis.org
[149] http://www.w3.org/TR/xmldsig-core/

EIF under the middleware assume the technology/infrastructure which will enable sharing of enterprise data across multiple, heterogeneous platforms, operating systems, servers, and applications. The domains, which will have to be standardized and according to EIF nomenclature called Middleware, will be:

- Web services
  - Web Services Description – WSDL is a language used for the service definitions.
  - Web Service Publication and Discovery – UDDI[150] – Universal Description, Discovery and Integration specification is used to publish a Web Services to a central UDDI Repository.
  - Web Services Invocation – SOAP[151] v1.2. - This is a W3C standard that defines a distributed application model, which uses XML for enabling applications to communicate with each other over network.

Distributed Application Architecture required by EIF can be established through the use of Java 2 Platform Enterprise Edition (J2EE) or for example by using the Common Object Request Broker Architecture CORBA.
There are a several standards that will have to be enacted covering the usage of J2EE:

- Enterprise JavaBeans Technology – EJB v. 2.0 (IDA Recommendation) – used to build the business logic component in the IDA three-tiered model.
- JDBC 3.0 API (IDA Recommendation) – this is an API specification for connecting Java applications to the data in RDBMS platforms.
- Java Servlet Technology – Servlet v. 2.4. Servlets are used to write Web server extensions that perform Java code in response to HTTP requests.
- Java Server Pages – JSP 2.0 (IDA Recommendation). This is a text document that combines static template data expressed in any web text format like for example HTML, WML or XML are.
- Java Message Service – JMS v. 1.1. (IDA Recommendation). It provides standard Java-based interfaces to multi-vendor message services.
- Java Transaction API – JTA v. 1.0. (IDA Recommendation). It provides transaction services to the parties involved in distributed transactions.
- JavaMail Technology – JavaMail API v. 1.3.1. - (IDA Recommendation).
- Java API for XML – JAXP 1.2.4. – It enables the reading, manipulating, and generating of XML documents through Java API's.
- J2EE Connector API v. 1.5. (IDA Recommendation). -
- Java Authentication and Authorisation Service – JAAS v. 1.0 - (IDA Recommendation).
- Remote Procedure Call – (IDA Recommendation). This is a protocol that one service/application/programme can use to request a service from another service/application/programme located on another computer. We-Go proposes to use Open Software Foundations Distributed Computing Environment.
- CORBA[152] IIOP v. 2.0 - (IDA Recommendation) – This is an architecture and specification for creating, distributing, and managing distributed program objects in a network.

[150] http://www.uddi.org/
[151] http://www.w3.org/TR/SOAP/
[152] http://www.omg.org

The following standardised APIs are relevant and it is recommended accepting them:

- Message Transfer Service: IEEE P1224.1 IEEE
- Directory Services: IEEE P1224.2 IEEE
- File Transfer: IEEE P1238.2 IEEE
- Distributed Transaction Processing XATMI, TxRPC, CPI-C, XA, XA+, TX, XATP, X/Open
- Transport Service: XTI X/Open

ebXML is a global electronic business standard that is sponsored by UN/CEFACT and OASIS and defines a framework for businesses to conduct transactions based on well-defined XML messages within the context of standard business processes, which are governed by standard agreements. The following standards are recommended to be accepted:

- Messaging Service Specification v.2.0[153] – used to exchange the XML business messages between organisations.
- Registry Services Specification v.2.0[154] – these services handle information on XML schemas of business documents.
- Partner profiling services[155] – Collaboration-Protocol Profile and Agreement Specification v2.0 -
- Process definition[156] - Business Process Specification Schema v.1.01

Interconnection services are provided on different levels and should be standardised as well:

- File and message transfer protocols – FTP – File Transfer Protocol (IDA mandatory). HTTP v.1.1 and HTTP v. 1.0 - Hypertext Transfer Protocol – used between client and web server. Both are IDA mandatory.
- Message transport and security - SMTP/MIME (IDA Mandatory)
- Message store services – IMAP4 (IDA Mandatory)
- Mailbox access - POP3 (IDA Mandatory)
- Directory and domain name services – LDAP v3 X.500 (IDA Mandatory), DSML v2 and DNS.
- Network services – IP v4 and IP v6 are both IDA Mandatory.

Security:

- IP-SEC – IDA recommended - allows authenticated and encrypted communication, between routers, between firewalls, and between routers and firewalls.
- IDA PKICUG services - The IDA PKI for Closed User Groups project (PKICUG) it provides a pan-European PKI to secure the information exchanged between the trans-European network partner organisations. It is IDA mandatory standard.
- SSL / TLS – SSL v3/TLS (IDA Mandatory)
- S/MIME (IDA Mandatory) - is a specification for secure electronic mail and was designed to add security to e-mail massages. There are three symmetric algorithms: DES, Triple-Des and RCA and the format used for digital certificates.
- SSH v.2. Secure Shell (IDA Mandatory) – it provides strong authentication and secure communications over insecure channels.

[153] http://www.ebxml.org/specs/ebMS2.pdf
[154] http://www.ebxml.org/specs/ebrs2.pdf
[155] http://www.ebxml.org/specs/ebcpp-2.0.pdf
[156] http://www.ebxml.org/specs/ebBPSS.pdf

Java security related standards are:

- Java GSS is used for securely exchanging messages between communicating applications.

Web service security standards to be recommended and implemented:

- SAML - Security Assertion Markup Language – used to enable interoperability between different systems that provide security services.
- XML Signature – it is a XML compliant syntax used for representing the signature of Web resources and parts of protocols. It provides the procedures for verification of such signatures as well.
- XML Encryption is a process for encrypting/decrypting digital content.
- XML Key management

The usage of Firewalls has to be standardised as well by covering the following domains:

- Packet filtering (IDA mandatory) - should be standardised in order to assure whether the data transmitted through the network is based on agreed transfer protocols.
- NAT – Network Address Translation - (IDA mandatory) to enable local domains the usage of two different IP sets for internal and external traffic.
- Application-level gateway – Proxy – should be enforced in order to apply special purpose rules for every application.
- Demilitarised zone network - DMZ – the firewalls making possible to provide security for both, applications, and network layer. DMZ is a small isolated network between these two layers.
- Stateful inspection – analyses multiple layers of the protocol stack.

You have to standardise the prevention from malicious or unauthorised code as well:

- A *virus*, which is a self-replicating program that can infect other programs, either modifying them directly or by modifying the environment in which they operate.
- A *worm* is a program that attacks computers that are connected by a network and spreads by sending a copy of itself through the network to infect other machines.
- A *Trojan horse* is a program that pretends to be something it is not.
- An *e-mail bomb*, which is a program equivalent to a letter bomb.

Workflow management:

There is a need to standardise the usage of technologies upon which ***Workflow management*** is based. Here are few specifications, papers, and standards that have to be taken into consideration:

- Interoperability, Wf-XML Binding (WFMC-TC-1023) - This specification is intended to be used by software vendors, system integrators, consultants, and any other individual or organisation concerned with interoperability among workflow systems.
- Workflow Standard Interoperability, XML-HTTP Binding (WFMC-0208) - This document represents a workflow protocol that aims for interoperable, reliable, and practical interactions between services using the HTTP protocol.
- Workflow Security Considerations, White Paper (WFMC-TC-1019) - The document summarises a number of security services that may be important within a workflow system and relates them to a generalised model identifying different security domains within a heterogeneous workflow environment.

6.2.1.2 Semantic Layer of Interoperability

The future central body in charge of the further development of interoperability is required to give guidelines and principles for the definition, documentation, and distribution of common vocabularies and data definitions, and common and global definitions/representation of eGovernment semantics. The potential impact is the elimination of ambiguity and content interoperability.
Project leaders are encouraged to participate in the EU's "semic.eu" portal.

Here is a brief overview of themes that are still missing and have to be covered by a national level semantic strategy and included within the broader IOP National Agenda:

- The process of drafting/agreeing on ***common and global definitions/representations for eGovernment definition/vocabularies/metadata*** has to be firstly defined by IOP semantic strategy and afterwards entrusted to be executed, coordinated, and monitored to some state level organisation

The semantic interoperability strategy should especially cover the following domains:

- ***Common and global definitions/representations for eGovernment semantics***
- ***Modelling perspective and formalism for documenting the common definitions***
- ***Administrative level of definitions development***
- ***Promotion/dissemination and maturity of common definitions***
- ***Trust, reliability and the supportive technical IOP layer***

It is required to give guidelines and principles for the definition, documentation, and distribution of common vocabularies and data definitions, and common and global definitions/representation of eGovernment semantics. The potential impact is the elimination of ambiguity and content interoperability across different administration bodies.
Therefore we recommend the establishment of a local expert group to gather knowledge on and coordinate semantic interoperability and to define global definitions and schemas with domain experts, with the local semantic expert group serving as mediator.

6.2.1.3 Organisational Layer of Interoperability

Clear link between cross-organisational processes/services and the business strategies of the broader agencies – and – **Modelling and visualisation of public administration services/processes**
Therefore a general approach in the national interoperability strategy has to be done. While reforming the public administration the business strategies and the cross-organisational services have to be defined and developed. During the development process the link should already be known and agreed upon between the involved parties. The process can be modelled with techniques already utilised in the economy. The modelling and visualisation has, again, to take place on a large scale, governed by a central body. The overall goal of these recommendations is that all involved parties understand the services, the processes involved and their role. Service provision is more effective if the processes are aligned and therefore support the business strategy.

The process of **involvement of users by setting up communities of practice in the process of new service design** can be included in the training agendas. Anyway this has to be pursued with more courage and should be defined in the national IOP agenda. Inclusion of future users can beforehand reduce barriers and can raise commitment and support from user side. In addition users should be included in the development process of any project, be considered in the requirements specification, and they should have a voice on the cooperation panel.

Reuse of knowledge and experience related to the execution of internal and cross-agency business processes/services from the private sector – and – **Identification and documentation of common service functionality and features across public administration agencies**

Availability of information about interoperability is strongly demanded as the stakeholder's questionnaire from the Serbian We-Go team revealed. According to the survey conducted in Serbia, stakeholders prefer to get information during workshops or by getting them off a portal.

Knowledge management is required to be coordinated by a central body. Under that umbrella knowledge needs to be collected locally and be orderly distributed to interested parties. The potential impact is the elimination of duplicated efforts. In addition it becomes more likely to get interoperable solutions. A collection of possible solutions to given problems that have already proven their applicability will also allow identifying potential cooperation. A knowledge database should include best practices from other countries as well and in return best practices from Serbia shall be published. But beware that solutions from one country might not always provide a good example for another country. That makes it even more important to share local and regional solutions and experiences since they might fit a given problem better than a solution from a country with totally different public administration environment.

But of course knowledge management should be handled in-house in different bodies on the state, entity and local level. It is recommended, that a central body on national level governs knowledge management on the state level by issuing principles, procedures, and policies.

Here are few typical service functionalities that are recognised by IDABC as part of any public service scheme:

- Registration/Authentication/Authorisation
- Payment processing or issuing of funds
- Cross-division/agency workflow
- Request for additional information from other public administration organisational units or even private sector
- Status notification
- Support handling etc…

We encourage the participation in the "epractice.eu" online community. It is the EC's latest effort to build a pan-European best practice community and a social platform for discussion and exchange. The web site provides descriptive information including contact details for dozens of best practice cases from all over Europe. Since not all kind of information can be shared on that portal we encourage the participation in the We-Go Knowledge Net (Work Package 4 of the We-Go Project) that can be regarded as complementary to the EC efforts by implementing a local WBC exchange platform that covers cases from the WBC in more detail. The We-Go Knowledge Net for Serbia is aligned to the portal approach demanded by many stakeholders. Information should be available centrally to interested parties in Serbia

and beyond. Based on the efforts of the We-Go team, this platform can be extended to be used by administrations from all over the country to share experiences and solutions.
A strategic planning to bring knowledge on interoperability to stakeholders is provided by We-Go Work Package 3 (We-Go Academies). Work Package 2 of the We-Go Project deals with specific applications.

Support of multi-channel service delivery is another piece in the national interoperability agenda and needs to be addressed there. The technological progress enables new ways to bring services to the people. Thus, this area should continually be monitored. The service delivery always has to be seen as a piece in an overall "One Stop Shop" strategy.

Consensus on and visibility of the ownership, management and responsibility for cross-organisational processes / services Consensus on that topic is needed to be achieved as every service/project is required to have a clear understanding of its responsibilities. This should be included in the same strategic framework and coordinated by same teams like the process of identification and documentation of common services and features.

Burning issues identified by We-Go**:**

- Set up an coordination panel consisting all relevant players on the national level, representatives from the local and regional level, civil servant representatives, the IT-industry, businesses and citizens
- Within the coordination panel consider the local governance authorities while at the same time offering guidance and coordination agents
- Via the cooperation panel, get consensus of the ownership, management, and maintenance of cross-organisational services
- Create policies for the modelling of administration services and processes
- Via the cooperation panel create clear cross-organisational links
- Set up a strategy and policy for knowledge management
- Get stakeholders involved in the epractice.eu portal and the We-Go Knowledge Net.
- Raise the interaction level by pushing further the horizontal and vertical integration of public services

6.2.1.4 Governance Layer of Interoperability

- Political -

Development of national eGovernment IOP strategy and programmes

The creation of the National Interoperability Framework is an ongoing project. Thus, it is recommended to pursue the course and include all parties intended to collaborate in the cooperation panel.

To avoid future shortages of trained and qualified personnel, the human resource and training strategies should be included in a strategy or action plan documents and also be adopted to future needs (also see staff training and support paragraph).

- Legal -

Several laws need to be adopted to fit the needs of a modern information society, especially:

- Law on Personal Data Protection,
- Law on eGovernment,
- Law on eProcurement,
- Law on eCommerce,
- Electronic Signature Act,
- As well as other laws necessary for normal process of EU integration and modern world trends.

- Managerial -

Clear IOP leadership/ownership/ sponsorship/management – and – **broad commitment, participation and communication** – and – **willingness for cultural change at all partners**

Three bodies are mainly involved in the Information Society development with overlapping competencies: "Ministry of Telecommunications and Information Society", "Agency", and "Office". Nevertheless, none of the actors is pursuing the role of a central coordinator and guide. They cover many, but not all aspects of interoperability as defined by the EIF and the Modinis study. It is crucial, that one player is taking the role of a central body in charge of the different interoperability matters. The competencies on the national level should be well separated.

We-Go recommends for one of the aforementioned players to take the role in close cooperation with two partners. We-Go also recommends collaborating with a body that is closely related to public administration reform matters and thus has expertise on organisational topics and issues. The transformation of public services with the help of ICT goes hand in hand with a reform and transformation of public administration procedures. Therefore, public services should be aligned to so-called life situations that can span horizontally and vertically. We-Go recommends the analysis of life situations regarding their potential impact, potential cost savings, and best practices that can be drawn from their implementation and commonalities of life situations. The latter can conclude in auxiliary services that are implemented once and used by different services, like service delivery or electronic identification. Thus, it is required to model public administration services and processes. By doing this it is as well easier to reveal any duplication of efforts.

Moreover, a central IT coordinator could not be identified. Such a body should collect and process information on technical interoperability topics and technologies in order to provide support for interoperability projects.

In addition We-Go recommends the establishment of a cooperation panel that is constituted of members from national, regional, and local administration bodies and headed by a central body. This is to overcome the shortcomings of interconnection, discussion, and collaboration within Serbia. At the same time the head of the panel should oversee and govern cross-border activities. This especially includes the representation to the outside, especially parties outside of Serbia like other WBC countries, EU member states, the European Commission, and organisations like the UNDP and the Stability Pact for South-Eastern Europe. The cooperation panel may be situated on the political coordination level and consist of expert representatives from ministries and entities, businesses, citizens representatives, and the representatives of the civil servants. Since this platform is the forum for discussion and collaboration, it should allow the identification of cooperation potentials. Within the platform,

working groups consisting of experts from the different stakeholders, can work on solutions for specific areas of expertise.
All players can learn from the "Serbian Business Registers Agency", that showed an exemplary approach for the implementation of the "Serbian Business Register" regarding leadership, collaboration, and governance.

Staff training related to IOP projects
Staff training is crucial in order to get a broad commitment and to raise awareness and affects all levels, from state level to local administrations, and all actors, from top management to civil servants. It is a tool to raise awareness for a diverse variety of issues. Consequently it is required to bring the different training issues to the agenda of the future central body governing eGovernment and interoperability in Serbia. Interoperability in all its flavours needs to be on the different training agendas. Thus, not only ICT but also organisational topics like process modelling or project management, semantic topics, and expert areas of IT, e.g. security management and data protection have to be considered.
The potential impact is more awareness, decreased support costs, and increased productivity. In addition more independence from third parties is guaranteed, due to staff with specialised knowledge.
To bring the interoperability topics closer to the regional and local administration bodies, the establishment of structures for the promotion of those topics is encouraged.
Best practices, like the staff training and support in the ongoing "Document Management System" project of the "Ministry of Telecommunications and Information Society" should be followed and become a standard accompanying measure.
Workshops with interoperability topics are covered by work package 3 (We-Go Academies) of the We-Go Project.

- Economic -
Regarding the funding We-Go recommends that efforts in the field of interoperability are jointly funded by the state, local authorities, and partly by international partners. It is recommended to regard donor projects and solutions with great care in order not to end up in vendor lock-ins. In addition projects should be carried out according to their priority and potential impact. Projects only considering a single problem should be avoided. Consequently it is recommended to analyse planned projects in regard to their potential impact and be prioritised.

Stable funding and the possibility to plan activities in the future are fundamental for the establishment of an interoperability friendly environment. The execution of the Action Plan can then be put on a stable basis. Current activities related to assuring the economic prerequisites for the implementation of the information society agenda in general have to be additionally supported by funds determinated only to the issues arising out of the national interoperability strategy. In particular the following issues need to be addressed:

- **Adoption/switching costs inherent to IOP solutions**
- **Public procurement policies and financing for IOP projects**
- **Partnering with the private sector in IOP projects:** Can be handled via the proposed cooperation panel. As outlined earlier, the private sector cannot only assist

with funding but as well with expertise in certain technological areas and in the implementation of projects.

Burning issues identified by We-Go:

- Establishment, governance, and promotion of a national physical and logical network. Leadership and ownership must be clearly defined.
- Cooperation panel to deepen inter-administration connections and exchange.
- Raise awareness for linkage between cross-organisational processes and strategies of the administration bodies.
- Encourage and coordinate exchange with EU bodies and bodies from other countries at the same or different levels.
- Establish a national interoperability programme and document under the lead of the "National Information Technology and Internet Agency", the before mentioned cooperation panel or the "Ministry of Telecommunication and Information Society".
- The interoperability programme aims at cross-border interoperability in the first place. National, regional, and local interoperability (summarised under the term "National Interoperability Framework") are thus a pre-requisite for the implementation of the "European Interoperability Framework".
- Development of the interoperability framework under the backdrop of current directives of the European Commission and best practice cases must be transposed to the very special Serbian situation.
- Work together with experts from different administration levels, the IT industry, and foreign partners in order to have a broad basis and in order to cover as many situations and realities as possible.
- Shape the programme development approach as a flexible process. Since this an evolutionary process, parts might change over time or might become deprecated due to new understanding of the area.
- Give realistic time frames to any implementation plans connected to the interoperability programme for the completion of tasks to reflect the real situations. Furthermore, goals must be defined in a way that makes it possible to verify the results.
- Introduce the EU benchmark of 20 public services.
- Establish structures for the active promotion of interoperability key factors and interoperable solutions on the national, regional, and local level
- Synchronize interoperability tasks and goals with - and add them to - the existing strategies, policies, and action plans.
- More actively participate in the creation of new standards, whether national or international.
- Financial planning needs to be set on a longer time frame. Only immediate cost savings seem to be able to motivate the implementation of projects. However, the cost savings in the mid- and long-term are required to be more important than now.
- It is unrealistic to speculate that donor driven projects will stop to be a crucial funding method for projects. Thus, instead of demonising those projects it is more appropriate to find an approach that allows the implementation of donor driven projects aligned with the prioritised targets. Beforehand that issue requires discussion with donors.

6.2.1.5 Auxiliary services

It is strongly recommended that the government moves forward in the establishment of a national backbone as basis for any electronic and interconnected services. The potential impact is better interconnection of administrations, cost saving, and better cooperation among organisations.

The implementation and maintenance of registers requires central guidance, ownership, and maintenance including the infrastructure, data and access management.
We encourage the use of web technologies to overcome potential interoperability problems due to the different sets of installed hardware and software. Consequently, we recommend to pursue transactional models with a centralised system, where individual users access data and applications remotely by means of web interfaces.
There is no sense in recommending certain technologies because the use of a set of technologies strongly depends on the system design and the installation basis e.g. currently installed systems. The architectural guidelines by IDABC cover different technologies and their uses as well as different system designs. The choice has to be made per project.

This topic is strongly pursued by the EC and many EU member states both national and pan-European. Because of the huge number of potential applications, the system shall be built in a scalable and flexible manner. The impact is to have an auxiliary universal service in place for access control, identification, and authentication.
With the legal framework in place as of March 2008, the government should quickly move forward with the creation of certified bodies for the issuance of qualified certificates. As a next step, procedures for the identification and authentication using the certificates should be regulated.
As in other countries it is recommended to connect the eID system to a central database of citizenship as the core of the authentication systems. eID certificates need to be verified against a database containing all citizen information. The "Ministry of Telecommunications and Information Society" is encouraged to act quickly in regard to the implementation of the planned register of citizens.

- Enable Internet access for civil servants (over the national backbone)
- Continue the implementation of the pilot "Document Management and Workflow" system and plan it to be scalable and flexible enough to be rolled out over all state level entities.
- As a continuation of the "Document and Management Workflow" system on the state level, develop a project to bring paperless eGovernment to the regional and local level.
- A final recommendation, whether to install central registries or not cannot be given. This decision is depending on many factors, including the implementation scenario. In general transactional solutions, consisting of a central server and remote users have advantages in terms of maintenance costs, data consistency, and usage as an auxiliary system in many different scenarios and services.

- We-Go recommends putting more emphasis on the interoperability capabilities of installed and of future registers. A solution that is not interoperable is another "isolated island solution" and thus an issue rather than a solution.

The creation of registers and the system design should not be decided and implemented in a rapid move. Instead registers shall be created upon demand and the system design should be consistent, scalable, and flexible.

6.2.2 Recommendations per administrative level

Issues to consider, potential risks, and required steps for stakeholders of interoperability projects are illustrated for different policy areas and in two ways:

- As an on-hand example for the establishment of a document management and workflow system (DMWS) across all administration levels (Figure 67). A pilot is currently being implemented by and for the "Ministry of Telecommunication and Information Society". A roll-out across ministries on the national level makes perfect sense. Technical realities and organisational issues might prohibit a rollout on regional and local level. Thus, a solution to connect the different bodies to the workflow using their systems needs to be found. A common semantic and message format is currently being developed in Austria under the name "EDIAKT II" that builds upon the already implemented electronic document management system called "ELAK". This project being one of the best practices of Austria was included in the "Modinis Study on Local and Regional Interoperability".

- Generic blue prints with recommendations for the national interoperability agenda (Figure 68), national interoperability projects (Figure 69) and pan-European interoperability projects (Figure 70). The blue prints are based on the analysis of the EIF and NIF compliance, strategic recommendations, project analysis, and EU best practices. More general and generic so-called "key factors" are summarized in the "Study on local and regional interoperability" conducted by Modinis.

Recommendations for a document management and workflow system	Legislation	Funding-Financial	Policy- Management	Technical / Semantic
Local Authorities	(1) Consideration of legal requirements and EU directives ("digital signature", "digital originals") relevant for the local level (2) Consider time for laws and acts to pass all parliaments in planning (3) Document and communicate all encountered problems and obstacles created by legislation to national authorities	(4) Consider necessary investments for equipment in local authority offices (e.g. card readers, network connection, computers)	(5) Go through a collaborative testing of the system before going live (6) Accept and follow the central lead in this project (7) Actively participate in the development of new organisational processes, relevant on the local level	(8) Specify requirements based on the working place realities (equipment available) (9) Analyse and document semantic requirements on the local level (10) Actively participate in the discussion on data exchange formats
National Authorities	(11) Consideration of national legal requirements and EU directives ("digital signature", "digital originals") relevant for the local level	(12) Allocate money for marketing and advertisement of the eID auxiliary service (13) Fee relief for eID medium (e.g. card) and certificates for fast and wide market penetration (14) Fund pilot projects and reference applications/services (15) Consider future cost savings in your calculations (16) Promote private-public partnerships (17) Make use of Open Source Software and Open Standards to lower cost (18) Subsidy of investments for businesses and citizens	(19) Realise visible project lead and coordination (20) Create a common organisational infrastructure (21) Create working groups that bring necessary stakeholders together (22) Seek possible interoperable solutions and commonalities with other implemented, planned or ongoing projects (PKI/eID, central document management and workflow on national level, electronic delivery) (23) Organise lectures for staff (public administration civil servants) (24) Learn from best practices from other countries (25) Go through a collaborative testing of the system before going live (26) Use of open source software and open standards raises trust since anyone can examine the project and document internals (27) Guarantee liability of the certificate authority (28) Partnership with businesses for use in e-Commerce (exchange of data not only among public administration's, but as well businesses) (29) Organisational and physical security measures (30) Awareness and marketing (31) Provide sample or reference applications (32) Create a policy for the disabling the card (33) Clear understanding of information to be stored and its context and access (34) Become involved in current pan-European document management and workflow system activities and monitor them closely regarding interoperability among different countries (35) Integrate eID/PKI procedures for access control, encryption, and digital signature…	(36) Ensure the availability of basic technical infrastructure: network, central servers (37) Analyse and document semantic requirements on national level and pan-European level (38) Clear understanding of information to be stored and its context and access (39) Reuse centrally or locally available definitions/ taxonomies/ ontologies (40) Use web technologies to overcome heterogeneous IT (41) Document and publish ontologies and taxonomies developed for use in other local, national projects and for IOP with WBC and European partners (42) Ensure service modularity (43) Technical infrastructure to be based on standards to guarantee interoperation with a broad range of complementary technologies (44) Consider Open (Document) Standards (45) Consider internationalisation aspects (46) Technical security measures (47) Build a scalable and flexible infrastructure (48) Support multiple platforms (not only MS Windows) (49) Participate in the EU "semic.eu" Portal (50) Share results, semantics, technical solutions via the We-Go Knowledge Net and epractice.eu

Western Balkan Regional Authorities & Actors (UNDP, Stability Pact, USAID)	(51) Promote harmonization in the administrative practice amongst WBC (52) Support Serbia by sharing experience in the elimination of legal barriers	(53) Fund/support pilot projects and reference applications/services (54) Seek potential cooperation within the WBC region	(55) Organise exchange of best practices and experiences in the implementation of DMWS among WBC (56) Seek cooperation and convergence with other projects (probably from other donors)	(57) Support the exchange of available definitions/ taxonomies/ ontologies between WBC
EU Authorities & Actors	(58) Promote harmonization in the administrative practice amongst member states (59) Support Serbia by sharing experience in the elimination of legal barriers	(60) Fund/support pilot projects and reference applications/services	(61) Provision of best practices	(62) Support the exchange of available definitions/ taxonomies/ ontologies

Figure 67: Recommendations for the implementation of a document management and workflow system in Serbia per administrative level and domain

General interoperability recommendations	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Consider the time needed for a law to pass all parliaments in the planning phase (2) Support the efforts regarding the simplification of the legal system (3) Analyse and document encountered legal problems and obstacles on the local level (4) Train public administration civil servants in legal interoperability issues (5)	(6) Consider necessary investments in the technical infrastructure on the local level and allocate adequate resources (7) Promote public-private partnerships on the local level (8) Utilise Open Standards software and Open Source Software	(9) Take an active role in the development of the national interoperability agenda (10) Support the national information society and interoperability strategy (11) Training of public administration servants (legal issues, organisational change etc.) (12) Create the knowledge communities/portals on local level (13) Participate in national, regional and pan-European knowledge communities and portals (e.g. We-Go Knowledge Net and epractice.eu, semic.eu) (14) Support creation of new cross organisational services/ business processes (15) Support collaborative testing of pilot services/projects.	(16) Take an active role in the development of common definitions/ taxonomies/ ontologies (17) Adopt technical and semantic standards (18) Introduce the usage of service oriented architecture (modularity of services) (19) Support national IOP strategy regarding the adoption and usage of semantic and technical standards (20) Document the specific requirements based on the local working place realities (available equipment) (21) Participate in the EU's semic.eu portal
National Authorities	(22) Implement the EU directives, especially those regarding interoperability, IT legislation (data protection and security, etc.) (23) Law on Personal Data Protection, (24) Law on eGovernment, (25) Law on eProcurement, (26) Law on e-Commerce, (27) Electronic Signature Act (28) Train public administration civil servants in legal interoperability issues (29) Constantly analyse and monitor if the legal system meets all requirements	(30) Allocate resources and funding for the promotion and marketing of the national interoperability agenda (31) Promote public-private partnerships on the national level (32) Fund pilot projects and reference implementation/services/applications (33) Promote and utilise Open Standards Software and Open Source Software (34) Support local administrations in investments in technical infrastructure (35) Fund the development and deployment of common service functionalities (36) Concentrate on projects with the best return on investment (37) Consider long term cost savings in the calculation (38) Allocate money for the training of public administration civil servants (39) Financial planning needs to be set into a longer time frame. Only immediate cost savings seem to be able to motivate the implementation of projects. The cost savings in the mid- and long-term are required to be more important than now (40) It is unrealistic to speculate that donor driven projects will stop to be a crucial funding method for projects. Thus,	(41) Nominate or find a body that takes the responsibility and lead in the interoperability agenda (42) Create a cooperation panel and invite all relevant national, local, business players (43) Within the coordination panel consider the local governance authorities while at the same time offering guidance and coordination agents (44) Develop a national interoperability strategy and action plan (45) Develop the interoperability programme in close cooperation with a partner familiar/close to public administration reforms, especially in the areas of organisation and governance (46) Involve experts from different administration levels, the IT industry, and foreign partners in order to have broad basis and in order to cover as many situations and realities as possible (47) Shape the programme development approach as a flexible process. Since this an evolutionary process, parts might change over time or might become deprecated due to new understanding of the area (48) The interoperability programme aims at cross-border interoperability in the first place. National, regional, and local interoperability (summarised under the term "National Interoperability Framework") are thus a pre-requisite for the implementation of the "European Interoperability Framework". (49) Give realistic time frames to the action plans connected to the interoperability programme for the completion of tasks to reflect the real situations. Furthermore goals must be defined in a way that makes it possible to verify the results (50) Assure clear leadership, management, and sponsorship of national and pan-European interoperability projects	(62) Establish a national network that also enables Internet access (63) Enable Internet access for civil servants (over the national backbone) (64) Define national semantic (common definitions/ taxonomies/ ontologies) and technical standards (65) Consider internationalisation aspects in (58) (66) Develop support and promote usage of PKI (67) Hosting of common service functionalities (68) Develop support and promote usage of eID (69) Participate in the EU's semic.eu portal (70) Guarantee that the technical infrastructure is based on standards to ensure interoperation with a broad range on complementary technologies (71) Provide the infrastructure on the national level (network, Internet access, registers) (72) Promote use of the governments-own physical network backbone (73) The creation of registers and the system design should not be decided and implemented in a rapid move. Instead registers shall be created upon demand and the system design should be consistent, scalable and flexible (74) Support multiple platforms (not only MS Windows) (75) Create a policy for the accessibility of web portals based on the "Web Content Accessibility Guidelines (WCAG)" of the W3 Consortium (76) Continue the implementation of the pilot

		instead of demonising those projects it is more appropriate to find an approach that allows the implementation of donor driven projects aligned with the prioritised targets. Beforehand that issue requires discussion with donors.	(51) Create policies for the modelling of administrative services and processes (52) Prioritise services according to their impact and best return on investment (53) Support creation of knowledge communities / portals on national level (54) Participate in national, regional and pan-European knowledge communities and portals (e.g. We-Go Knowledge Net and epractice.eu, semic.eu) (55) Support and coordinate training activities (56) Analyse and develop common service functionalities (57) Support collaborative testing of pilot services/projects (58) Introduce monitoring and benchmarking (59) Create policies for project and process management (60) More actively participate in the creation of new standards, whether national or international. (61) Introduce the EU benchmark of 20 public services	"Document Management and Workflow" system and plan it to be scalable and flexible enough to be rolled out over all state level entities (77) We-Go recommends putting more emphasis on the interoperability capabilities of installed and of future registers. A solution that is not interoperable is another "isolated island" and thus rather an issue than a real solution. (78) As a continuation of the "Document and Management Workflow" system on the state level develop a project to bring paperless eGovernment to the regional and local level (79) The creation of registers and the system design should not be decided and implemented in a rapid move. Instead registers shall be created upon demand and the system design should be consistent, scalable and flexible.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(80) Promote the harmonisation of the administrative practice (81) Support Serbia in removing legal obstacles (82) Support training efforts	(83) Support pilot projects (84) Fund projects according to local priorities (85) Financially support regional cooperation projects	(86) Provide regional best practices (87) Promote regional benchmarking of interoperability solutions (88) Give advice on policy/management issues and how to assure creation of successful IS/IOP National Strategies	(89) Support the creation of PKI through programmes (90) Support creation of commonly agreed semantics
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(91) Give support in the development of a national interoperability strategy by helping to remove legal barriers	(92) Support pilot projects (93) Fund projects according to local priorities (94) Financially support regional and pan-European cooperation projects (95) Support management of financial management	(96) Provide regional best practices (97) Give advice in managerial issues, project and process management	(98) Provide mediating services for data mapping (99) Support creation of commonly agreed semantics (100) Support the creation of PKI, through dissemination of IDABC expertise in that field.

Figure 68: Recommendations regarding the interoperability strategy in Serbia per administrative level and domain

Generic recommendations for projects on the national level	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Analyse local legal requirements and check if they are met (2) Analyse national legal requirements and check if they are met on the local level (3) Support the removal of legal barriers (4) Consider the time needed for laws to pass all parliaments in the project plan	(5) Support the public private partnership on local level, which can fund the implementation of national IOP projects/services. (6) Utilise Open Source Software and Standards to minimise costs (7) Consider necessary investments in the technical infrastructure on the local level and allocate adequate resources (8) Consider those investments from (7) in the financial planning	(9) Follow central lead in the project implementation, be cooperative and actively participate (10) Assure that everyone in the implementation team on the local level understands their role (11) Coordinate related training activities on the local level	(12) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete IOP project. (13) Analyse usage of "new" standards and report comments/improvement recommendations to the governing body. (14) Specify requirements based on the working place realities (equipment available)
National Authorities	(15) Take into consideration all national legal requirements relevant on national level (16) Consider the time needed for laws to pass all parliaments in the project plan (17) Analyse/monitor legal barriers related to the development/implementation of services/projects, document and remove them (18) Cooperate with local public administration, give them space to express and address their needs (19) Make use of the regional and EU support programmes and documents for removing the legal barriers	(20) Choose a project with good return on investment (21) Allocate resources and funding for the promotion and marketing of the implemented service (22) Promote public-private partnerships on the national level (23) First fund pilot project for testing (24) Fund reference implementation/services/applications (25) Promote and utilise Open Standards Software and Open Source Software (26) Support local administrations in investments in technical infrastructure (27) Consider training and dissemination activities in the project's financial planning	(28) Assure the clear ownership/leadership of the national project/service being implemented (29) Choose the execution partners on local and national level (30) Create working groups that bring necessary stakeholders together (31) Deliver a good business case for a service/project being implemented. (32) Define a clear set of deliverables of the project/service being implemented (33) Go through a collaborative testing of the system before going live (34) Use of open source software and open standards raises trust since anyone examine the project and document internals (35) Publish and share project results	(36) Leave the space for local initiatives which will cover their needs (37) Propose the introduction of missing semantic and technical standards that can be used by concrete applications/services. (38) Propose modelling standards, framework and methodologies to be followed in the concrete project. (39) Ensure service modularity (40) Reuse components where possible (41) Implement interfaces to become interoperable with other services (42) Document and publish interfaces, system modules, documentation and "complete solutions" (43) Document and publish ontologies and taxonomies (44) Support multiple platforms
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(45) Support the implementation of projects on a national level, by providing them with experience in removing of legal barriers	(46) Financially support the implementation of national IOP services/projects and research in the area of semantic and organisational IOP	(47) Support the national level IOP projects/services being implemented in Serbia with the consultancy in the domain of management of the public administration projects on national level. As well enrich them with international experiences.	(48) Donate needed infrastructure for concrete national IOP projects/service (49) Support (financially) introduction of important technical and semantic standards/service
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(50) Support the implementation of projects on a national level, by providing them with experience in removing of legal obstacles.	(51) Support pilots (52) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (53) Financially support the implementation of national IOP services/projects	(54) Provide best practices (55)	(56) Donate needed infrastructure for concrete national IOP projects (57) Support (financially) introduction of important of technical and semantic standards

Figure 69: Generic recommendations for national interoperability projects in Serbia per administrative level and domain

Generic recommendations for pan-European interoperability projects	Legislation	Funding-Financial	Policy- Management	Technical
Local Authorities	(1) Take into the consideration all concrete legal EU interoperability requirements related to the implemented pan-European services relevant on a local level. (2) Support national authorities in removing the concrete legal barriers related to the implemented services.	(3) Support public-private partnerships, which can fund the implementation of pan-European IOP projects/services on local level. (4) Try to decrease the price of implementation by usage of open standards and open software instead of proprietary solutions.	(5) Follow the coordination efforts lead by national body and be cooperative. (6) Assure that everyone in the implementation team on the local level understands his or her role.	(7) Support the efforts from national authorities to introduce the missing semantic and technical standards for concrete pan-European IOP project/service. (8) Analyse usage of "new" technical and semantic standards and report the problems/improvement proposals to the governing body.
National Authorities	(9) Take into consideration all legal national and EU interoperability requirements relevant on national level for concretely implemented service/project. (10) Analyse pan-European legal barriers related to implemented project/service and remove them. (11) Cooperate with local public administration; leave them space to address their needs. (12) Use the regional and EU support programmes and documents for removing the concrete legal barriers related to the implemented service/project.	(13) Support the public-private partnership on a national level, which can fund the implementation of pan-European IOP projects/services. (14) Timely assure the sufficient funding resources for the pan-European IOP projects/services being implemented.	(15) Assure the clear ownership/leadership of the pan-European project/service being implemented. (16) Choose the execution partners on local and national level (17) Deliver the good business case for a pan-European service/project (e.g. VIES, NCTS) being implemented. (18) Define the clear set of deliverables of the pan-European project/service being implemented.	(19) Leave space for the local initiatives that will cover their needs related to the implemented pan-European service/project. (20) Propose the introduction of missing semantic and technical standards that can be used by concrete pan-European application service. (21) Propose the modelling standards, framework and methodologies to be followed in the concrete pan-European project/service being implemented.
Western Balkan Regional Authorities / Actors (UNDP, Stability Pact, USAID)	(22) Support the implementation of similar or identical projects/services on a regional and pan-European level, by providing them with experience in removing of legal barriers related to the concrete service/project.	(23) Financially support the implementation of pan-European IOP services/projects (e.g. CARDS, PHARE) and research in the area of semantic and organisational IOP.	(24) Support the pan-European IOP projects/services being implemented in Serbia with the consultancy in the domain of management of the public administration projects. As well enrich them with international experiences. (25) Prepare the education programme, which will present Serbian eGovernment actors existing support programmes and how to concretely use the allocated resources optimally.	(26) Donate needed infrastructure for concrete pan-European IOP project/service being implemented. (27) Support (financially) introduction of important technical and semantic standards needed for concrete Pan-European service/project.
EU Authorities / Actors (e.g. IDABC, EIPA, epractice.eu)	(28) Support the implementation of similar or identical projects/services on a pan-European level, by providing them with: (29) Experience in removing of legal obstacles related to the concrete service/project. (30) Consultancy on concrete implementation of EU legal requirements for concrete service/project	(31) Support research in the area of semantic and organisational IOP (e.g. semic.eu.) (32) Financially support the implementation of pan-European IOP services/projects (e.g. CARDS, PHARE)	(33) Support the pan-European IOP projects/services being implemented in Serbia with the consultancy in the domain of management of the public administration same or similar projects in EU.	(34) Donate needed infrastructure for concrete pan-European IOP projects (35) Financially support the introduction of important technical and semantic standards needed for concrete pan-European Project.

Figure 70: Generic recommendations for pan-European interoperability projects in Serbia per interoperability projects

6.2.3 Recommended implementation approach

We-Go recommends that projects be approached in a way that limits risk and employed capital. A bottom-up approach is such a strategy where a small and limited pilot is created and run in parallel with the current systems to proof the concept and to collect valuable experience. Based on the experiences, the organizational structures can be created, following the principles and policies of the interoperability strategy. The successful pilot provides the foundations of an infrastructure that could be expanded. Such pilots would preferably be governed by a central agency but not necessarily be operated by it.

First, choose a service that requires modernization and that delivers a good return on investment. Check for any inter-organisational links that can be treated and resolved during the implementation for progression in the horizontal integration. As well watch out for any commonalities with other services, being planned, implemented or already implemented.

Second, the project needs to be coordinated and lead by a single body. In projects that affect the workflow of more than one body one of the bodies can take that role, or a central body can govern the process.

Third, integrate the service vertically to further simplify the organizational structures. Thereby, identify organizational development opportunities.

Fourth, document semantics for future interoperability projects and for re-use. This information is valuable as well if upcoming projects may interoperate. (also see WP3 lecture on interoperability)

Fifth, develop staff trainings, prepare material (hand books, etc.), and develop a support structure to minimize resistance and problems and to maximize satisfaction, usage and impact.

Sixth, develop indicators and benchmarks to monitor and measure the impact of the service.
Seventh, run the pilot in parallel with the existing system for testing, accuracy, timing, and usage acceptance benchmarking before going live.

Governance of Interoperability
The lead in the Serbian Information Society is still not clearly visible and needs to be resolved. The body that finally takes the lead and the responsibility can be given the lead in interoperability projects, like the “Ministry of Telecommunication and Information Society” already does. This especially concerns technical and semantic standards. The central body with expertise on interoperability issues and cooperation with other partners that have expertise in their area (through the cooperation panel) can assist the implementation team and body, that operates the service with knowledge on specific interoperability issues.
We-Go recommends implementing a pilot first in order to limit costs and risk and gain experience during test runs in parallel to the existing system.
This pilot project can be executed by some non-departmental organisation. In particular the cooperation with the private sector should be considered for the technical implementation.

Prerequisites for this pilot project/service:

- Development of pilot infrastructure
- Definition and publishing of technical and semantic standards needed
- Messaging Hub – based on the usage of XML technologies.
- Define the standards for business artefacts/elements.
- Define the business artefacts/elements.
- Definition of registers/catalogues of standardised business artefacts/elements. They have to be described and published. The usage of XML based technologies is recommended. Concrete instructions about recommended versions of specific standards can be found in the first part of the recommendations.

These are typical tasks that are common for all services regarding the organisational interoperability and best to be performed by the involved departmental unit:

- Analysis of forms and delivery channels in order to find better ways of service delivery
- Analysis of legislative regulations in order to firstly define and together with (for example) the IOP team within the Ministry of Justice to remove the legal obstacles towards offering new services.
- Analysis of business processes in order to define common ones, to improve the current business processes or especially important for IOP to aggregate processes from different public administration organisational units and to offer them as a "totally new services" for the benefit of all participants of Serbian IS or one day maybe even EU IS space.
- Definition of common functionalities in order to enable their reuse.
- Definition of common legal and organisational obstacles towards aggregate service provision.

Ideally the common functionalities are governed and operated centrally either by the Agency, the Ministry or the central IT body.
The following common functionalities are considered of particular importance:

- Identity management process
- Customer registration process
- Electronic forms production and management
- Case tracking and status reporting
- Electronic payment system

Organisational Layer of Interoperability

The reengineering of processes should be lead by one involved body in case there are two or more bodies involved. The unit(s) currently responsible for the service also takes an active part. The agency and a body familiar or close to public administration reforms can assist in the modelling and modernization of administration processes.
Operational execution and implementation of pilot project(s) can be entrusted to the department, that is currently responsible for the service (e.g. a ministry, department, etc.).

6.1.1 Services: Deployment level - NCTS

The following paragraph describes the concrete steps which have to be undertaken in order to deploy one pan-European service; the New Computerised Transport Service (NCTS). In terms of level and direction of data being exchanged, interoperability and services on concrete service deployment level have two dimensions:

- National (e.g. inscription at the university)
- pan-European (e.g. NCTS, VIES, EBR)
- National and pan-European (e.g. eID)

This recommendation document and We-Go as a project are not able and mandated to propose a concrete implementation approach or even more to become part of NCTS implementation team in Serbia because of the high complexity and too many concrete missing information and much higher resources which are needed to successfully implement this service in Serbia. This document will be used during the dissemination phase as a main information material for concrete examples of deployment of one pan-European service.

Community Transit is a customs procedure that allows customs to excise duties and VAT on imported goods to be suspended until the goods either reach their point of destination in the European Community or are exported out of it. The procedure can also be used for movements to and from the EFTA countries (Switzerland, Liechtenstein, Norway, and Iceland) and is then known as Common Transit. The New Computerised Transit System (NCTS) is a European wide system, based upon electronic declarations and processing. It is designed to provide better management and control of Community and Common Transit. In July 2005 a European Union law made it mandatory to submit all transit declarations using NCTS, except for private travellers (with goods in excess of their allowances) and for some authorised simplifications.

All companies that use, or wish to use, Community/Common Transit can use NCTS. It will be necessary to have the facilities to send and receive electronic messages to and from NCTS. The aim is, that all traders will eventually input all transit declarations and any other necessary messages such as arrival of the goods, to NCTS electronically. Connected traders will receive electronic responses advising of key decisions during the procedure such as acceptance of declaration, release of goods, notification of discharge of liability etc. at both departure and destination. There are two types of procedures available under NCTS:

- Normal Procedures
- Simplified Procedures

Using the *Normal Procedures* any company connected to NCTS will be able to lodge declarations at any Office of Departure (OoDep). They will also have the facility to 'pre-lodge', i.e. to input a declaration prior to the physical presentation of the goods.
Under the *Simplified Procedures* authorised consignors/consignees will, as at present, be able to carry out community transit operations without presenting the goods and corresponding documents at the Customs Office. They must, however, become connected to the NCTS system and submit their declarations electronically.
The interconnectivity to the NCTS systems operational in the European Union and the other Contracting Parties of the Common Transit Convention is an accession pre-requisite in the customs sector.
The responsible authority for customs is the “Serbian Customs Authority” (SCA). The current custom system consists of 13 custom offices with over 140 custom places. The system handles more than 100.000 transactions per day.

NCTS has been chosen for the Service Deployment Level for Serbia because it is the most advanced cross-border application that has the widest spread, driven by the European Commission and the importance of the EU as a common economic area.

Governance aspects

The best approach for the realisation of a national NCTS system is the establishment of a new project team that focuses on the NCTS project. A pre-condition is the motivation of the involved persons and a good coordination between the IT team and the customs body.
The implementation should be based on a comprehensive plan for the change management. This plan includes all required steps for the implementation of NCTS. To be more exact, it is the basis for the planning of human resources and other resources and it defines the necessary roles and definition of responsibilities. Furthermore it sets milestones, which are the basis for progression measurement.
The project team should reflect the variety of interoperability topics:

- Team leader, Team manager
- Analysts
- Programmers
- Organisational people with links to the customs body, customs officers and IT sector

As already outlined before, it is recommended to test and pilot the system extensively before "going live". The procedure therefore provides that there is an:

- Internal test, followed by the
- Pre-Conformance test and the
- Conformance test

The internal test is conducted by people from business and IT with a "Standard Transit Test Application (STTA)". This tool is provided by the European Commission and supports all basic functionalities (messaging).
During the pre-conformance tests, the system is remotely connected to a server in Brussels. Another tool, called "Transit Test Application" (TTA) is used. The national NCTS system is tested against 300 pre-defined scenarios. In addition to the pre-conformance test the system is tested with implementations from other Member States in the conformance test.
Generally, NCTS installations run 24 hours per day all year long. The availability of the system is regulated in a Service Level Agreement between the national NCTS and the European Commission. It allows a maximum downtime.
When planning the funding of the NCTS project, budgets for the development and implementation and the IT infrastructure have to be considered. As for the customs offices there are costs for hardware and software. Furthermore there are costs for the operation and maintenance of the different systems.

Legislative Aspects

In order to fulfil the conditions for the introduction of a common European transit procedure, legal relations among all participants of transit procedure have to be regulated in detail. This means that by that time, all the legal provisions concerning the transit (primary, secondary, and tertiary legislations) should be in force. Also, the pre-conditions for an alignment of the guarantee system for payment of customs debt that might occur have to be regulated and conditions have to be created in order to enable customs service to implement computerised transit procedures (NCTS).

From a legal point of view there are two kind of regulations that need to be considered.
The first in the connection of regulations in respect to transit procedures in line with EU-legislation. The so-called "community transit" is a procedure used for customs transit operations between the EU Member States and is in general applicable to the movement of non-Community goods for which customs duties and other important charges are at stake. Moreover, it is applicable for the movement of Community goods, which, between their point of departure and point of destination in the EU, have to pass through the territory of a third country.
And there are the regulations in respect to Transit procedures in line with transit convention. These regulations cover the common transit procedure used for the movement of goods between the 27 EU Member States and the EFTA countries (Iceland, Norway, Liechtenstein, and Switzerland). The rules are effectively identical to those of Community transit.
The processes and procedure that need to be implemented are described and determined by the two-mentioned regulations. They are available from the NCTS webpage of the EU in short form and extensive description. This is why they are not covered in detail in this document.

- Transit convention
- Railroad and specific procedures
- Simplified procedures
- Guarantee management
- Elaboration of national regulations

Organisational Aspects
Here the organisational aspects which have to be addressed:

- EC NCTS project management aspects
- EC business aspects
- NCTS business team job profiles
- NCTS IT team job profiles
- Helpdesk job profiles
- Helpdesk strategy aspects
- Client administration – basic aspects
- Trader solution - basic aspects
- Trader awareness meeting

Business Aspects
European Community business aspects
Business Change Management Plan will consist of:

- Business Change Management Plan - basic aspects
- Business Change Management Plan - business requirements
- Business Change Management Plan - IT requirements
- Business Change Management Plan - training requirements

IT Aspects

The development of national IT systems (TARIC[157], NCTS, EMCS, AEO, CCN/CSI, QUOTA, Surveillance, etc) is required to connect the CCA with the EU IT systems, in order to enable the exchange of information with the EC and EU Member States immediately upon accession to the EU. In order to comply with the EU Customs Legislation and IT system requirements, the following systems require interoperability by the date of accession:

- **CCN/CSI[158]**: this gateway is mandatory for the communication between the DG TAXUD IT systems and the member states' counterparts. The CCN/CSI must be operational at least three months prior to the beginning of any remote tests.
- **ITMS:** this integrated tariff management system is a business concept grouping most of the computerised systems dealing with the tariff exchange of information between the Commission and the EU member states. Two of the applications under this concept are complex. Being mandatory for the accession date, their development and interconnection should therefore be prepared in advance. These are TARIC (Tariff Integre Communautaire) and TQS (Tariff Quotas and Surveillance). ITMS also covers some other systems dealing with the exchange of information. For following ITMS sub-systems the Commission has developed web-light client solutions that do not require substantial national adaptations and that can be used instead of national system-to-system solutions:
  - **EBTI** (European Binding Tariff Information)
  - **ISPP** (Information System for Processing Procedures)
  - **SMS** (Specimen Management System)

The following ITMS subsystems do not require any particular IT development:

- **ECICS** (European Customs Inventory of Chemical Substances)
- **BOI** (Binding Origin Information)
- Suspensions

However, all **ITMS** systems (**TARIC, TQS, EBTI, ISPP, SMS, ECICS, BOI** and suspensions) are accession-mandatory.

- **NCTS:** by the date of the accession, the National Transit application, fully compatible with the NCTS, must be available. Moreover, the IT system should pass all the required conformance tests in national and international modes and that at least all traders with the status of an authorised consignor/consignee should be connected to the NCTS national external domain.
- **EMCS:** This system will modernise and significantly increase the grade of automatisation for the group of three applications that are presently operational and mandatory for Member States (EWSE[159], MVS and SEED[160]).

157 TARIC (Integrated Tariff of the European Communities) is designed to show the various rules applying to specific products when imported into the EU. This includes the provisions of the harmonised system and the combined nomenclature but also additional provisions specified in Community legislation such as tariff suspensions, tariff quotas and tariff preferences, which exist for the majority of the Community's trading partners. In trade with third countries, the 10-digit TARIC code must be used in customs and statistical declarations.

158 Common Communications Network / Common Systems Interface

159 Early Warning System for Excise (under the joined responsibility of DG TAXUD and OLAF)

160 System for Exchange of Excise Data

- Finally, new interoperability systems will be developed under the electronic customs' DG TAXUD project (within the security and modernisation reform of the EC Customs Act). Currently, the most defined applications being the following[161]:
  - **AEO** (Authorised Economic Operator)
  - **ECS** (Export Control System)
  - **ICS** (Import Control System)
- **MCC** Implementation
- Hardware specifications – will have to be delivered.
- Functional specifications of the trader module will have to be delivered
- Users perspective – From user's (companies) perspective adequate interfaces will have to be offered:
  - Web Interface - This enables companies to use the customs portal to send and receive NCTS messages. It is suited for small businesses that only have a low level of transit declarations. A web solution has several advantages:
    - Independent from customs office (warehouse)
    - Independent from System (PC, Mac)
    - Useable from wherever internet is available
    - Thin client (only browser is needed)
    - Easy to deploy
    - Centrally serviced packages
  - **EDIFACT** – This system sends and receives messages as email attachments, or in the body of the email, via Simple Mail Transfer Protocol (SMTP) or the ISO standard for electronic mail (X.400). If an EDIFACT message is sent to NCTS, a converter in the ERP software of the company will need to translate it into an EDIFACT coded message that NCTS can read. NCTS will then accept or reject the declaration in EDIFACT, which again a converter must be able to translate back.
  - **XML** - Another way of integrating a business' system into the New Computerised Transit systems (NCTS) is via the eXtensible Markup Language (XML) Channel. Using the XML route to NCTS means sending and receiving Electronic Data Interchange For Administration, Commerce and Transport (EDIFACT) messages "wrapped" within an XML envelope. EDIFACT declarations are transmitted via HTTPS (Hyper Text Transfer Protocol Secure sockets) to an NCTS XML Channel Application. The response is returned back to the NCTS XML Channel Application via EDCS (Electronic Document Control System), which "re-wraps" the message in XML. The user's system polls the XML Application and the trader receives the message.
  - A combination of the web interfaces and web services seems to be ideal, allowing creating web based clients (GUI) and Web Services. Customs officers can access the system via a web browser from anywhere, which gives them flexibility in the best possible way. Import and export companies are linked to the system via Web Services that are easy to program and easy to use for software companies of traders. In this scenario traders are collecting the messages and the system never sends messages.

[161] The generic eCustoms term includes the following systems: AEO, ECS, ICS, RIF and other systems involved in Interoperability between MS Customs Administrations. In this context, it needs to be underlined that the "vision statement" on eCustoms is currently under discussion with the EU Member States. Therefore, all eCustoms systems specifications may change

- Different implementation ways implicate different message formats that need to be converted before being processed. Messages in the EDIFACT message format or the XML version of it need to be converted to the in-house XML format before the data can be accessed via Web.

Client Administration Aspects

- Helpdesk – description according to the existing EC NHD specifications
- Client Administration – business requirements
- Trader Solution -
- Trader Awareness -

Training Aspects

Any implementation of NCTS is required to be accompanied by extensive training and information package for staff in custom offices and helpdesk as well as end users (traders). There are several training strategies that can be followed, e.g. train the trainers or workshops. Among the provided materials the most important ones are technical equipment to learn with, manuals for the system, user interfaces and procedures as well as working guidelines.

- Training of the National Helpdesk staff including the usage of CS/MIS (Central Services / Management Information System)
- Client Administration - business requirements
- Guarantee management - business requirements
- Training on inquiry procedure
- Training on Authorisation management of the simplified procedures
- Risk Management in Transit procedure
- Training on fallback procedure
- Training FTSS
- Training on CS/RD (Central Services/Reference Data) maintenance
- COL (Customs Office List) management
- Curricula development for the future national NCTS training programme

6.3 Dissemination

6.3.1 We-Go dissemination plan

D.1.1.		D.1.2 (Dissemination)			
		Public Administration	IT Industry	Academia	International Organisations
Research	(1) EIF				
	(2) NIF				
	(3) Roadmap to interoperability				
	(4) Recommended interoperability approach				
Practice	(4) Recommendations				
	(5) Service deployment level				

Figure 71: We-Go dissemination plan for Serbia covering all interoperability stakeholder groups and domains

The dissemination, presents the facts related to interoperability in Bosnia. The impact is reached through specific dissemination activities with every stakeholder group, covering all five layers of interoperability and the corresponding recommendations. The dissemination activities will share the common objectives but will vary in:

a) Mission (objectives)
b) Content sophistication level (general, generic, detailed, concrete actions)
c) Dissemination methods used.

Of course another variation is due to the recommendations domain and the stakeholder group. The content sophistication level will vary from general overviews and methods to concrete methodologies and techniques (e.g. public administration back office reengineering).

Dissemination methods are:

a) Workshops with target stakeholders groups
b) Conference participation (especially in working tables), research papers, and articles,
c) Working groups participation (e.g. +eSEE) on national, regional and pan-European level.
d) Participation and creation of (new) knowledge network communities within We-Go's Work Package 4 (e.g. We-Go Knowledge Net, epractice.eu)

The dissemination activities are presented in more detail in the figures below, per:

a) Practical or research domain,
b) Per stakeholder group,
c) Mission,
d) Dissemination methods used.

The dissemination plans for the different stakeholders are given in Figure 72 for public administrations, in Figure 73 for the IT industry, in Figure 74 for academia and **Figure 75** for regional in international actors.

D.1.1.		D.1.2 (Dissemination) Public Administration		
		Local Level	**National Level**	**Others (e.g. IS decision makers, Project Managers, IT Architects, Software Developers)**
RESEARCH	(1) EIF	**Mission:** Introduce and press importance of the principles of the various aspects of interoperability, the EIF, Lisbon Agenda, i2010 in Serbia and the impact on and advantages for the local level, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working groups c) Knowledge Net communities	**Mission:** Introducing ALL layers of interoperability, EU activities (EIF, i2010, Lisbon Agenda), best practices and the link to the current national eGovernment strategy. Press the importance and advantages of an integrated interoperability approach, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, round table, working group c) Knowledge Net communities	**Mission:** Introducing interoperability and the EIF recommendations on the service deployment level: technical layer of interoperability, opportunities and barriers, requirements for the IT architectures, security, accessibility, service availability, system integration, interfaces and data mapping, compliance analysis results. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities
	(2) NIF	**Mission:** EIF and NIF: interoperability on different administrative levels with focus on the local level. The role of local administrations in the NIF, compliance analysis results. Organisational and governance aspects of interoperability. Local level interoperability in the EU. **Content sophistication level:** general overview, more specific on the role of the local level administrations and impact, more specific on organisational and governance aspects. **Dissemination methods used:** a) Workshop	**Mission:** EIF and NIF: interoperability on different administrative levels with focus on the national level, compliance analysis results. Leadership and coordination of the interoperability strategy organisational structures **Content sophistication level**: concrete, detailed on organisational and governance aspects **Dissemination methods used:** a) Workshop	**Mission:** Requirements that arise of the NIF implementation for IT and IT implementation, technical layer of interoperability, compliance analysis results. **Content sophistication level:** concrete, Detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table, working group c) Knowledge Net communities
	(3) Roadmap to interoperability	**Mission:** Introducing the roadmap to interoperability and the role of the local level administrations, opportunities and dangers, impact. Knowledge sharing and semantics. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Introducing the roadmap to interoperability and the role of national level bodies in the planning and implementation. Cooperation and collaboration, pilot projects. Knowledge sharing and semantics. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** IT and operational aspects of the roadmap to interoperability. Requirements for the implementation. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities
	(4) Recommended implementation approach	**Mission:** Presenting the recommended implementation approach and the requirements to and impact for local level administrations. Role of the national level. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and the requirements to and the role of national level bodies. Public-private partnerships. Pilot projects. Change management and project management. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and the tasks and responsibilities on the operational level, public-private partnerships, pilot projects. IT project management of interoperability projects. **Content sophistication level:** concrete, detailed **Dissemination methods used:** a) Workshop b) Conference, paper c) Knowledge Net communities
PRACTICAL	(5) Recommendations	**Mission:** Key success activities, responsibilities of local level administrations in the overall interoperability strategy and in interoperability projects (national, pan-European). Focus on: organisational and governance aspects, legal system. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, round table, working group c) Conference	**Mission:** Key success activities and responsibilities of the national level bodies in the interoperability strategy an in the implementation of interoperability projects. Focus on: organisational and governance aspects, legal system. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table c) Knowledge Net communities	**Mission:** Key success activities and barriers on the technical layer of interoperability. **Content sophistication level:** concrete and detailed **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities
	(6) Service deployment level	**Mission:** Local level administrations in the NCTS. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Aspects and characteristics of NCTS in Serbia /w focus on legal and organisational aspects (process modelling, services re-engineering, etc.), EU best practices. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Technical aspects of introducing NCTS in Serbia (e.g. networking, security, data mapping), EU best practices. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities

Figure 72: We-Go dissemination plan for public administrations in Serbia

D. 1.1		D.1.2 (Dissemination)		
		IT Industry		
		SW Development	**IT Industry Association / Consultancy**	**Computing Centres**
RESEARCH	**(1) EIF**	**Mission:** Introducing interoperability and EU best practices (EIF, IDABC documents, i2010, Lisbon agenda). Technical layer of interoperability. **Content sophistication level:** very general **Dissemination methods used:** a) Workshop b) Round table	**Mission:** Introducing interoperability and EU best practices (EIF, IDABC documents, i2010, Lisbon agenda). Technical layer of interoperability, compliance analysis results. **Content sophistication level:** very general. **Dissemination methods used:** a) Workshop b) Round table	**Mission:** Introducing interoperability and the EIF and the impact on the operational level for Serbian Computing Centres. Requirements and opportunities for Serbian Computing Centres. **Content sophistication level:** very general **Dissemination methods used:** a) Workshop b) Conference, paper
	(2) NIF	**Mission:** The opportunities for the software industry in the implementation of national interoperability. Public-private partnerships. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** The opportunities for the IT industry in the implementation of national interoperability. Public-private partnerships, compliance analysis results. **Content sophistication level**: general **Dissemination methods used:** a) Workshop c) Knowledge Net Communities	**Mission:** Operational requirements to support national interoperability with IT services. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference c) Knowledge Net communities
	(3) Roadmap to interoperabilit	**Mission:** Introducing the roadmap to interoperability and opportunities for the software industry. Public-private partnerships. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table c) Knowledge Net communities	**Mission:** Introducing the roadmap to interoperability and opportunities for the software industry. Public-private partnerships. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference	**Mission:** Role of the computing centres in the roadmap of interoperability, **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop b) Conference, round table c) Knowledge Net communities
	(4) Recommended implementation approach	**Mission:** Presenting the proposed implementation approach for Serbia and what does it mean for Serbian SW Industry. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop	**Mission:** Presenting the proposed implementation approach for Serbia from the Serbian IT Industry and Consultancy perspective. **Content sophistication level:** general overview **Dissemination methods used:** a) Workshop	**Mission:** Presenting the proposed implementation approach for Serbia and what are the concrete tasks, activities that could be undertaken on concrete operational level from their perspective. **Content sophistication level:** general **Dissemination methods used:** a) Workshop
PRACTICAL	**(5) Recommendati ons**	**Mission:** Recommendations for successful execution of interoperable services with national and pan-European character from Serbian SW developer perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshop b) Round tables, working groups	**Mission:** Recommendations for successful execution of interoperable services with national and pan-European character from Serbian IT Industry and Consultancy perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshop b) Conferences, papers, round tables.	**Mission:** Recommendations for successful execution of interoperable services with national and pan-European character from their perspective. **Content sophistication level:** General **Dissemination methods used:** a) Workshop covering project management in public administration's b) Conferences, papers, round tables, working groups c) Knowledge Network communities
	(6) Service deployment level	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS and their possible role in that project. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Overall presentation of steps to be performed in order to implement the NCTS and their possible role in that project. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table	**Mission:** Overall presentation of steps to be performed in order to implement NCT and their possible role in that project. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, round table

Figure 73: We-Go dissemination plan for IT industry in Serbia

D.1.1.		D.1.2 (Dissemination)			
		Academia			
		Universities	**Research Institutions**	**IT Institutes**	**Others (e.g. independent researchers)**
RESEARCH	**(1) EIF**	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, paper	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, conference, round table	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Paper, round table	**Mission:** Introducing interoperability and EU best practices and possible research areas/topics, compliance analysis results. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group
	(2) NIF	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions, and compliance analysis results. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions, and compliance analysis results. **Content sophistication level**: detailed **Dissemination methods used:** a) Workshop	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions on the operational level, compliance analysis results. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table c) Knowledge Net Communities	**Mission:** Introducing the NIF next to the EIF, role in NIF development, research areas/topics/questions, and compliance analysis results. **Content sophistication level**: General overview + concrete details about in some areas **Dissemination methods used:** a) Workshop
	(3) Roadmap to interoperability	**Mission:** Introducing the roadmap to interoperability and associated research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper	**Mission:** Introducing the roadmap to interoperability and associated research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper	**Mission:** Introducing the roadmap to interoperability on the operational level and associated research opportunities. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table	**Mission:** Introducing the roadmap to interoperability and associated research opportunities. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table
	(4) Recommended implementation approach	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop	**Mission:** Introducing the recommended implementation approach and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop
PRACTICAL	**(5) Recommendations**	**Mission:** Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group	**Mission:** P Introducing key success activities and potential barriers, research opportunities. **Content sophistication level:** detailed **Dissemination methods used:** a) Workshop b) Conference, round table
	(6) Service deployment level	**Mission:** Characteristics of NCTS. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference			

Figure 74: We-Go dissemination plan for academia in Serbia

D.1.1.		D.1.2 (Dissemination)			
		Regional, pan-European and World Level			
		Stability Pact	**UNDP**	**USAID (e.g.)**	**EC (IS Directorate)**
RESEARCH	**(1) EIF - and – (2) NIF**	**Mission:** Presentation of the compliance analysis and recommendations and opportunities. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities			
	(3) Roadmap to interoperability - and - (4) Recommended implementation approach	**Mission:** Introducing the roadmap to interoperability and the recommended implementation approach and showing opportunities where the stakeholders can get active to support Serbia. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table, working group c) Knowledge Net communities			
PRACTICAL	**(5) Recommendations**	**Mission:** Presenting We-Go recommendations and key activities to regional and EU stakeholders. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Conference, paper, round table, working group c) Knowledge Net communities			
	(6) Service deployment level	**Mission:** Characteristics of NCTS, role of stakeholders in implementation. **Content sophistication level:** general **Dissemination methods used:** a) Workshop b) Round table			

Figure 75: We-Go dissemination plan for regional and European stakeholders in Serbia

6.3.2 We-Go dissemination activities

Figure 40 shows the topics and stakeholders that We-Go is going to address.

Serbia	We-Go Contributions to Dissemination Plan for 2nd period			
	Serbian IOP Stakeholder Groups			
	Public Administration	IT Industry	Academia	Regional, pan-European and World Level
(1) EIF	1/2 day workshop	1/2 day workshop	1/2 day workshop	1/2 day workshop
(2) NIF				
(3) Roadmap to interoperability				
(4) Recommended implementation approach				
(5) Recommendations	1 1/2 day workshop	1 1/2 day workshop	1 1/2 day workshop	
(6) Service Deployment Level				

Figure 76: We-Go dissemination plan for Serbia with a marked cell where We-Go is planning activities

Event planning for 2nd period and expected participants from the different stakeholders

	Serbian IOP activities 2008/2009	Date	PA Hi Level	PA Mid Level	Private NGO Academia	Total No. Participants	Student Days	Total Person Days
	Event							
1	**1st IOP Workshop Mgmt**	**Nov/Dec 2008**	3	10	7	20	½	10
2	**1st IOP Workshop for Professionals / Experts**	**Nov/Dec 2008**		10	10	20	1 1/2	30
3	**2nd IOP Workshop Mgmt**	**Jan/Feb 2009**	3	10	7	20	½	10
4	**2nd IOP Workshop for Professionals / Experts**	**Jan/Feb 2009**		10	10	20	1 1/2	30
	Overall Sum		**6**	**40**	**34**	**80**		**80**
			8%	**50%**	**42%**			

Figure 77: Planned We-Go events during the 2nd Period in Serbia

Additional and complementary Activities

1. **Participation in WP3 TTT events (see WP3)**
2. **Participation in WBC Conferences to be announced**

Bibliography

In addition to the inline-references positioned in the footnotes we like to refer to the Annexes I, II and III of deliverable D.1.1. and the references that can be found in these documents. The most relevant are listed here.

Remark: The former deliverable D.1.1., submitted in January 2008, has been reclassified and serves now as Annex III for the new D.1.1. submission in July 2008.

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Annex – Recommendations for ICT standards in the civil service in the Republic of Macedonia

RECOMMENDATIONS FOR ICT STANDARDS IN THE CIVIL SERVICE IN THE REPUBLIC OF MACEDONIA

General Secretariat of the
Government of the Republic of Macedonia

METAMORPHOSIS

Foundation Open Society Institute – Macedonia and the General Secretariat of the Government of the Republic of Macedonia in cooperation with Foundation Metamorphosis

Recommendations for ICT Standards in the Civil Service in the Republic of Macedonia

Assessment of Good Governance Potential in Macedonia
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Dear,

One of the main priorities of the 2006-2007 Program of the Foundation Open Society Institute – Macedonia is the good governance potential in Macedonia, implemented by the "Assessment of Good Governance Potential in Macedonia" Project.

The general aim of this cross-cutting initiative of FOSIM is to promote the concept of good governance as a public interest in Macedonia by intensive monitoring of the public institutions' operation, raising public awareness for the need of good governance, as well as encouraging the application of good governance principles by public institutions in compliance with the EU accession process.

The Project is comprised of three groups of activities:

- Cooperation Agreement with the General Secretariat (GS) of the Government of the Republic of Macedonia. The agreement contains five components: Citizens' Guide through the Institutions, ICT component, Code of Conduct for the Members of the Government of the Republic of Macedonia, transfer of general competencies in ministries and vertical analysis of a pilot ministry in terms of good governance principles;

- Analysis of the good governance potential in eight areas: economy, education, judicial reforms, local self-government, monitoring public funds management, health care, social issues, and human rights; and

- Promotion of the term "good governance" by a special portal (www.gg.org.mk), e-newsletter and award for central institutions applying the good governance principles.

The project pays special attention to the respect of internationally accepted standards in the application and development of information technology. An analysis of the five most used e-services on the governmental portal www.uslugi.gov.mk was made, as well as an IT training needs assessment for the public administration. Recommendations for ICT standards in the civil service have also been prepared. The project provides support for the IT Sector within the GS with human resources.

This publication presents the recommendations for ICT standards for inter and intra-communication in the civil service. On this occasion, we would like to pay our acknowledgement to the working group members (Miroslav Jovanovik, Zoran Janevski, Bardhyl Jasari, Karina Donevska, Aleksandar Ugrinoski, Kliment Kocovski, Andon Stefanovski and Georgi Tasevski), who prepared the analysis and formulated the ICT standards for the civil service. At the same time, we would like to extend our gratitude for the contribution made by the numerous participants in the consultation process, whose remarks and comments were incorporated in the final document.

Having in mind the fact that analyses were conducted in cooperation with the Government of the Republic of Macedonia and its bodies, as well as the fact that in the process of developing recommendations there was active participation by the professional and expert public in Macedonia, we honestly hope that the recommendations for ICT standards will be accepted and applied by the civil service. The acceptance and the coherent implementation will significantly increase the efficiency and the effectiveness of the civil service operation, hence strengthening the efforts for Macedonia to become a contemporary modern state, future member of EU and NATO.

Respectfully,

Project Team
Slavica Indzevska, Project Manager
Nevenka Rosomanova, Project Coordinator
Aleksandar Markovski, Project Administrator and Research Support
Igor Krstevski, Project IT Administrator

1. DEFINING STARTING PRINCIPLES AND STANDARDS

1.1. Starting principles

The starting principles for the adoption of Information and Communication Technologies standards that will be used in the civil service in the Republic of Macedonia stem from the need for interoperability.

Interoperability[1] means the ability of information and communication technology (ICT) systems, as well as, of the business processes they support in order to exchange data and enable the sharing of information and knowledge. Interoperability must be provided on technical (norms and standards for connecting computer systems and services), semantic (data meaning) and process level (defining business goals, modeling business processes and achieving cooperation between various administrative units).

Interoperability can be achieved by applying national and international technical norms. Having in mind the European agenda, the Republic of Macedonia must follow the guidelines provided in the European Interoperability Framework for Pan-European eGovernment Services v 1.0[2].

From the above cited document, we stress the following recommendations[3] relevant for Macedonia:

RECOMMENDATION 2:

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

- Accessibility
- Multilingualism
- Security
- Privacy
- Subsidiarity
- Use of Open Standards

[1] http://ec.europa.eu/idabc/en/chapter/5883
[2] http://europa.eu.int/idabc/en/document/3761
[3] European Interoperability Framework for Pan-European eGovernment Services http://ec.europa.eu/idabc/servlets/Doc?id=19528

- Assess the benefits of Open Source Software
- Use of Multilateral Solutions

RECOMMENDATION 10 (TECHNICAL):

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

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

RECOMMENDATION 11 (TECHNICAL):

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

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

RECOMMENDATION 12 (TECHNICAL):

Security aspects to be considered concern all layers:

- Security services
- General security services - PKI
- Web service security

- Firewalls
- Protection against viruses, worms, Trojan horses and e-mail bombs

RECOMMENDATION 13 (TECHNICAL):

Member State administrations and EU Institutions and Agencies should develop and use common guidelines for the technical interoperability of pan-European networks, applications and services in the context of eGovernment. The IDA(BC) guidelines[4] should constitute the basis for such guidelines, and be updated accordingly, also taking into account relevant results and guidelines coming from the Community research and technological development programmes and other Community programmes such as IST, eTen, and eContent.

RECOMMENDATION 14 (TECHNICAL):

The common guidelines should be based on recognised open standards.

IDABC[5] (Interoperable Delivery of European e-Government Services to public Administrations, Businesses and Citizens) is an EU department having major role in defining standards and cannot be omitted.

It takes advantage of the opportunities offered by information and communication technologies:
-to encourage and support the delivery of cross-border public sector services to citizens and enterprises in Europe,
-to improve efficiency and collaboration between European public administrations and,
-to contribute to making Europe an attractive place to live, work and invest.[6]

[4] (http://europa.eu.int/idabc/en/document/2317)
[5] http://ec.europa.eu/idabc/en/home
[6] http://ec.europa.eu/idabc/en/chapter/3

OPEN STANDARDS

Recommendations 2 and 14 particularly emphasize the importance of open standards[7]. The European Interoperability Framework for eGovernment Services defines the term open standard by means of the Directive 98/34/EC, which determines the procedure for provision of information in the field of technical standards and regulations. The Directive[8] provides definition of standard as technical specification approved by recognized international, European or national standardization body.

USE OF OPEN STANDARDS

Focusing on the use of open standards is necessary for the purpose of being able to achieve satisfactory level of interoperability in the context of pan European eGovernment services. The necessary minimum open standards according to the European Interoperability Framework, emphasizes the following features:

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

1.2. Fields where adoption of standards is recommended

Fields where standards should be stipulated are defined in the section on principles, and stem from the document and the above described rules. Having in mind the recommendations from the European Interoperability Framework and the conditions in Macedonia, we recommend the initial establishment of standards in the following fields:

[7] The term "standard" is used here in its broadest sense: it includes all specifications of the standardizations process in compliance with the abovementioned principle.

[8] All definitions on the standard were reviewed in 2005, as part of the review of the Directive 98/34/EC.

1. Basic group
2. Front office
3. Back office
4. Networks
5. Security
6. E-operations
7. Policies, forms and recommendations
8. Procurements
9. Web
10. Multimedia
11. Data compression
12. Distant learning contents
13. Miscellaneous

1.3. Identification of specific problems per field with recommended solutions

1.3.1. BASIC GROUP

- Code page - we recommend the use of UTF-8;
- Keyboard – the current standard supports the two options, QWERTY and QWERTZ. We suggest the use of QWERTY only. The problem with the use of various types of keyboards (US, UK, DE) should be solved by means of a decision for use of US keyboard.

1.3.2. FRONT OFFICE

- We recommend the use of ODF format for recording office applications according to the ISO/IEC 26300 standard[9];
- We recommend complete elimination of the use of fonts Mac C Times, Mac C Swiss, Macedonian Helvetic, Macedonian Tms and similar, and the exclusive use of the so called Macedonian support;
- For the final form of documents and forms, which are to be permanently stored, we recommend the use of PDF format according to ISO19005-1:2005;
- We recommend the use of HTML, ISO/IEC 15445:2000;
- We recommend the use of TXT, ISO 8859;

[9] At http://ec.europa.eu/idabc/en/document/6323/469, one can find the document where in the second last paragraph it is said that in meantime several administrations of EU member-states such as, for example, Belgium, Denmark, France, Italy and Spain have already announced the use of ISO 26300.

- We recommend the development and adoption of templates for documents used in the civil service
- The preparation and use of forms in the civil service must be accompanied with the existence of an equivalent form that can be filled-in electronically disregarding the platform. The PDF and ISO/IEC 26300 platforms should be mandatorily used. Other platforms can be used as well, provided the institution has them available. The civil service should accept and deem valid electronically filled-in forms.

1.3.3. BACK OFFICE

The following standards are recommended for use:

- Java 2 Platform, Enterprise Edition (J2EE) v1.4
- Java 2 Platform, Standard Edition (J2SE) v1.4
- Java Network Launching Protocol (JNLP) v1.5
- Java Platform, Enterprise Edition (Java EE) v5
- Java Platform, Standard Edition (Java SE) v5
- PHP: Hypertext Preprocessor (PHP) v5.x

1.3.4. NETWORKS

From the list of available networks, we recommend the use of the following:

- Internet Protocol (IP) v4 (mandatory use)
- Domain Name Services (DNS)
- File Transfer Protocol (FTP)
- Hypertext Transfer Protocol (HTTP) v1.1
- Simple Mail Transfer Protocol (SMTP) / Multipurpose Internet Mail Extensions (MIME) v1.0
- Post Office Protocol (POP) 3 / Internet Message Access Protocol (IMAP)
- Lightweight Directory Access Protocol (LDAP) v3

1.3.5. SECURITY

Security in the system use and management is of exceptional importance. For that purpose, we recommend the mandatory use of:

- Firewall and network segmentation in at least 3 segments (zones) as follows: public, demilitarized and private (Public, DMZ, Private)
- Antivirus protection[10] as follows:

[10] This particularly refers to any version of MS Windows, as it is not a problem for Unix / Linux, except for line 3.

a) workstation
b) server
c) e-mail server/antivirus and anti-spam e-mail gateway

- Spyware protection
- Root kits protection
- Spam protection
- Antivirus and anti-spam e-mail gateway. This solution is preferred in terms of special antivirus protection of the e-mail server and special spam protection. Use of already functional solutions from the so called grey lists for example is possible
- PTR record (Reverse DNS) on every legitimate e-mail server for the purpose of reducing spam
- Blocking the open relay on the e-mail server, as well as
- SPF record
- Secure Hash Algorithm (SHA)-1
- Secure Hash Algorithm (SHA)-256
- RIPE Message Digest (RIPEMD)-160
- RSA
- Digital Signature Algorithm (DSA)
- Advanced Encryption Standard (AES)
- Transport Layer Security (TLS) v1.0
- Secure Shell v2 (SSH-2)

1.3.6. E-OPERATIONS

In the field of e-operations we recommend:

- Defining and introducing the use of standards for electronic operations. It is particularly important to define e-order, e-invoice, e-delivery receipt, and all other electronic equivalents of paper documents in this field[11]
- Defining and introducing the use of e-procurement standards, although the standardization in this field is still in preparatory phase in the EU. It is exceptionally important for us to be compatible with the EU and hence we recommend following and accepting the benefits of the NES project[12] which use UBL 2.0 from OASIS.

[11] In the Republic of Slovenia, this issue was solved within the Chamber of Commerce; hence it would be useful to take the initial versions of documents available at http://www.gzs.si/Nivo3.asp?ID=28210&IDpm=2306 where one can see that documents are XML schemes, prepared also for electronic signature.

[12] http://www.nesubl.eu/, http://ec.europa.eu/idabc/en/document/6464/251, http://ec.europa.eu/idabc/en/document/5794/333

- The developed web contents must be compatible with the leading web browsers (Internet Explorer, Mozilla Firefox, Opera) and should be independent from the platform (operational system) used.

1.3.7. POLICIES

In terms of continuous development of civil service capacities for contemporary, high quality, efficient and effective management of state affairs, we recommend policy making and adoption on:

- Use of information resources in the civil service;
- Use of e-mail and Internet;
- Password policies;
- Use of open source software[13];
- Rigid intellectual property protection (using a licensed software and other aspects stemming from the applicable legislation in the Republic of Macedonia: Law on Copy Rights and Related Rights, Law on Intellectual Property and other relevant laws);
- Mandatory use of Help Desk software in the ICT sectors;
- Mandatory electronic record keeping on software and hardware inventories, as well as appropriate policies for its implementation;
- Introduction of ITIL (BS15000), as the best practice based on ISO 20000 IT Service Management

1.3.8. PROCUREMENTS

For the purpose of completing the process on e-procurement and upgrading the procurement practices, we recommend developing of:

- An act/policy on equal treatment in terms of software procurement[14];
- Templates for technical and functional specification of hardware and software;
- Templates for procurement contracts for hardware, software and maintenance.

[13] The policy can be downloaded here: http://www.e-hrvatska.hr/sdu/en/Dokumenti/StrategijeIPrograma/categoryParagraph/04/document/Open_Source_Software_Policy.pdf

[14] When developing the information systems and tender announcements, one must take into account the OSS based solutions in addition to the non open solutions. Decisions can be made in favor of OSS, commercial software or combination of both, but in case they equally meet other requirements, priority should be given to the open source software. Decisions should be made individually for every case.

1.3.9. WEB

Standardization of creation, management and use of web contents in the civil service will be enabled if the use of following protocols is standardized:

- Hypertext Markup Language (HTML) v4.01
- Extensible Hypertext Markup Language (XHTML) v1.0
- Cascading Style Sheets Language Level 2 (CSS2)
- Extensible Style sheet Language (XSL) v1.0
- Hypertext Transfer Protocol (HTTP) v1.1
- Simple Object Access Protocol (SOAP) v1.1

1.3.10. MULTIMEDIA

High quality, easy accessible and compatible contents will be provided if the use of the following formats is standardized:

- Quicktime (.qt, .mov)
- MPEG-4 Part 14 (MP4)
- Ogg
- Joint Photographic Experts Group (JPEG)
- Graphics Interchange Format (GIF)
- Portable Network Graphics (PNG)
- Tagged Image File Format (TIFF) v6.0

1.3.11. DATA COMPRESSION

In terms of standardization of the quality and the data compression process, we recommend the use of:

- ZIP v2.0
- GZIP v4.3
- 7ZIP

1.3.12. DISTANT LEARNING CONTENTS

Distant learning is becoming a reality and hence we recommend the mandatory use of:

- SCORM[15] compatible LMS (Learning Management System) for contents delivery and
- SCORM standard for developing distant learning contents (SCORM 1.2 Conformance Requirements).

[15] www.adlnet.gov

1.3.13. MISCELLANOUS

In the process of standardizing civil service work by means of ICT, it is necessary:

- to set up standards and standardize the state domains, with special attention on the use of Macedonian names of the institutions;
- to enable transliteration (writing Macedonian with English letters);
- to follow and respect standards in the EU defined by FORMEX[16] v4.0 in the preparation of the legal regulations (laws and by-laws), and in Macedonia these are developed by the public enterprise "Official Gazette of the Republic of Macedonia"
- to unify and cleanse state code books. There is a need for using single code books for every single area, as well as to define/authorize institutions competent for their maintenance and updating;
- to connect the existing knowledge bases at the public administration bodies, create conditions for developing new contents, exchange of contents and provide their unconditioned accessibility for the users in the public administration network;
- to adjust websites, particularly e-forms, to be available for use by disabled people. We recommend the use of W3C standards for people with special needs;[17]
- to provide training on ICT project cycle management for civil servants;
- to upgrade and harmonize websites of state institutions with the necessary standards;
- exclude the use of DRM technology for documents kept, stored or distributed by the civil service.

[16] http://formex.publications.eu.int/ - XML patterns for primary and secondary legislation
[17] http://www.w3.org/WAI/WCAG1AA-Conformance)

2. ICT STANDARDIZATION IN THE CIVIL SERVICE IN THE REPUBLIC OF MACEDONIA

2.1. On the process and need for ICT standards in the civil service in the Republic of Macedonia

Suggested standards in general are exclusively following the principles of openness and availability without limitations. We are striving towards possibilities for use/creation of resources that will not be limited and depend on the selected business model and software license for the selected model or the platform used by the selected model.

Accepting open standards means that offered ICT solutions for the civil service will meet the necessary minimum standards. This contributes to the development and upgrading of services offered by the civil service to the citizens and other entities.

Accepting open standards and ensuring their application will disable the market monopoly and dominant position of any technology. This will ensure independence and flexibility of the civil service and public administration in terms of providing ICT services, especially if one has in mind the specific function of the service for permanent archiving of documents and services, i.e., to develop and guard the national wealth.

The acceptance of this document, the basic principles and enabling the use of open standards will eliminate and disable the use of closed systems, non-standard solutions and platforms that are not interoperable with other platforms. Moreover, for example, this would overcome the problem of signing contracts with one supplier and the dependence on any platform or system, and would strengthen the position of the public administration in the Republic of Macedonia in procurements and negotiations with suppliers of ICT systems and solutions.

Finally, respecting basic principles and using open standards will increase the democratic capacity of the state and will provide solid basis for good governance that would contribute to the development and attainment of strategic goals.

Having in mind the determination of the Republic of Macedonia to become an EU member-state, it is quite expected and justified to accept the already implemented and internationally accepted standards in this field. We recommend the use of good practices from particular EU countries.

The use of final materials and already adopted and valid standards such as, for example, SAGA, is exceptionally important from practical point of view. Switzerland has completely accepted the SAGA document as binding document in terms of its implementation. The use of this document does not represent bypassing the standardization body, but setting foundation for upgrading and use of valid and relevant standards in the public administration in the Republic of Macedonia. Documents and practices of this type exist in almost all EU states.

We expect certain suggestions provided in this document, despite the harmonization process[18], to result in various interpretations. We understand this as part of a process that aims at providing high quality results. We are convinced that ICT systems in the civil service and public administration must be developed on generally accepted principles set on solid basis, to be compatible and interoperable, with the possibility to communicate in a "comprehending" way. Only in this manner, the service and the administration will be able to be efficient in providing services to citizens and businesses in the Republic of Macedonia.

For the members of the working group and for the project team, the collection of materials, the debate on the needs in Macedonia and the process of harmonizing expert public opinions, as well as the recommendations of this document, were a pleasant challenge. Standards proposed in this document are not unchangeable and should be revised and revisited with a predefined timetable and when needed.

[18] Prior to publishing this document, the same was distributed to all relevant organizations such as MASIT, The Chamber of Commerce, and Trade Unions, Organization Open Source Software Macedonia, Standardization Institute of the Republic of Macedonia and all affected state institutions, for the purpose of developing a document with recommendations whose implementation will be widely accepted.

Links have been provided for used materials available on Internet. Having in mind the fact that materials are already available in electronic form, the same will be available for downloading at the project website (www.gg.org.mk), where this document will be published as well.

2.2. Application of ICT standards in the civil service in the Republic of Macedonia

Adoption of new and atypical standards in the ICT sector is not recommendable and the practice in the developed countries avoids it. In the regulation of this filed we suggest the acceptance and use of already adopted relevant standards. In terms of stipulating, harmonizing and proposing new standards in the ICT sectors in the public administration, it is a usual practice for many countries to establish a special body with responsibilities in terms of standardizing the ICT sector in the civil service. The following sources can help the standardization process of ICT use in the civil service in the Republic of Macedonia:

- SAGA – Standards and Architectures for e-Government Applications, (English translation is provided with version 3.0) – Germany;
- NORA – Nederlandse Overheid Referentie Architectuur (at the moment there is only Dutch version) – Netherlands;
- TSC – Technical Standards Catalogue (available in English language, last version 6.2) – Great Britain.

Having in mind the fact that in Macedonia, the Standardization Institute of the Republic of Macedonia is responsible for adopting standards and having in mind the existence of the IT Commission, we recommend the existing Commission to be authorized by the Government of the Republic of Macedonia for accepting and revising the ICT standards for the civil service. In addition to the Commission members, we suggest for the authorized body to also include IT sector heads from the civil service bodies in full capacity.

Relevant standardization institutions throughout the world:

1. European Committee for Standardization, http://www.cenorm.be/cenorm/index.htm
2. European Committee for Electrotechnical Standardization, http://www.cenelec.org/
3. European Telecommunications Standard Institute, http://www.etsi.org/
4. International Organisation for Standardization, http://www.iso.org
5. International Electrotechnical Commission, http://www.iec.ch
6. World Wide Web Consortium (W3C), http://www.w3.org
7. OASIS, http://www.oasis-open.org
8. Open Archives Initiative, http://www.openarchives.org/
9. ECMA International, http://www.ecma-international.org/
10. Advanced Distributed Learning, http://www.adlnet.gov

3. RECOMMENDATIONS FOR CATEGORIZATION OF STANDARDS OF INTEREST

The working group believes that the concept that best reflects the classification needs can be found in SAGA[19]. Namely, it refers to 3 (three) categories and 3 (three) lists as follows:

Classification
- Mandatory
- Recommended
- Under observation

Expanded classification (lists)
- White
- Grey
- Black

3.1. Classification of standards and proposed extended classification of standards (lists) definitions

Classification of standards[20]

Mandatory

Standards are mandatory if they are tried-and-tested and represent the preferred so-lution. Such standards must be observed and applied with priority.

Competing standards can be mandatory parallel if they have clearly different core applications. The standard which is best suited for the given application must be adopted in such cases.

[19] URL http://www.kbst.bund.de/cln_012/nn_945224/SharedDocs/Anlagen-kbst/Saga/standards-and-Architectures-for-_20e-Government-applications-version-3__0-pdf.html

[20] Standards and Architectures for e-Government Applications Version 3.0: http://www.kbst.bund.de/cln_012/nn_945224/SharedDocs/Anlagen-kbst/Saga/standards-and-Architectures-for-_20e-Government-applications-version-3__0-pdf,templateId=raw,property=publicationFile.pdf/standards-and-Architectures-for-%20e-Government-applications-version-3_0-pdf.pdf

In the event that mandatory and recommended standards or standards under obser-vation exist parallel, the latter – i.e. standards under observation – should be adopted only in justified, exceptional cases.

A standard classified as mandatory does not necessarily have to be used in every e-government application. A mandatory standard only has to be adhered to if the use of the technology or functionality related to this standard is necessary or reasonable in view of the requirements of the specific application.

Recommended

Standards are recommended if they are tried-and-tested, but if they are not manda-tory and/or if they do not represent the preferred solution or if their classification as mandatory still requires further agreement. In the event that no competing mandatory standards exist besides recommended standards, deviations from the recommended standards are permitted in justified, exceptional cases only.

Competing standards can be recommended parallel if they have clearly different core applications. The standard which is best suited for the given application must be adopted in such cases.

In the event that recommended standards or standards under observation exist parallel, the latter – i.e. standards under observation – should only be adopted in justified, exceptional cases.

Under Observation

Standards are under observation if they are in line with the intended development trend, but if they have not yet achieved a mature level or if they have not yet sufficiently proven their value on the market. In the event that no competing mandatory or recommended standards exist in addition to standards under observation, such standards under observation can serve as an orientation aid.

Proposed Extended Classification of Standards (lists)[21]

White list

Standards are listed on the white list if proposals for their inclusion in SAGA were submitted to the SAGA team and if these standards were not yet classified further. Standards on the white list are evaluated by the SAGA team and the expert group who may also decide that a standard is to be left on the white list if further develop-ments are to be awaited and if a classification decision is to be made at a later stage.

Grey list

Standards are added to the grey list if they are no longer included in the current SAGA version, but if they had „recommended" or „mandatory" status in an earlier SAGA version and/or if they were widely used in the market in the past. When existing systems are upgraded, these standards are to be maintained in effect and can be used further.

Black list

Standards are added to the black list if they were examined and rejected by the SAGA team and the expert group.

[21] see reference to footnote 20

3.2. Conditions and justifiability for the assessment of the ICT standards applicability in the civil service in the Republic of Macedonia

Assessment of existing standards' applicability

The implementation of suggested standards in the public sector in the Republic of Macedonia is possible if the necessary realistic timetable is provided. Examples for successful implementation of standards can be found in part of EU countries, where they have provided particular but realistic deadline for standards' application. From that aspect, the working group believes that suggested standards are applicable, but is particularly important to also determine implementation deadlines that will be adopted in an integral form with the standards. In simple words, a stipulated standard without implementation deadline and application start is a "dead letter on paper" and the best way to never be put into operation.

On the other hand, the application of standards will enable "more vivid" ICT market in the Republic of Macedonia, hence encouraging greater competition, higher quality and thus higher level of professionalism in terms of offered services. The working group believes that the acceptance of standards will positively impact the small- and medium-sized ICT enterprises, as well as the new companies that are yet to be established.

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