Macedonian Interoperability Framework (**MIF**)

for Macedonian public services

Peter Reichstädter,
Igor Crvenov, Filip Manevski, Nadica Josifovski

Date: 2016
Version: 2.0

This project is funded by the European Union

TABLE OF CONTENTS

This project is funded by the European Union

1 Introduction to the Macedonian Interoperability Framework

1.1 Purpose and legal framework

The purpose of the Macedonian Interoperability Framework (MIF) is:

- to promote and support the delivery of Macedonian public services by fostering cross-border, cross-organisation and cross-sector[1] interoperability;
- to guide public administrations in their work to provide Macedonian public services to businesses[2] and citizens;
- to complement and tie together the various Organisational Interoperability Frameworks (OIFs) at Macedonian level.

This non-technical document addresses all those involved in defining, designing and implementing Macedonian public services.

The MIF should be taken into account when making decisions on Macedonian public services that support the implementation of Macedonian policy initiatives. The MIF should also be considered when establishing public services that in the future may be reused as part of Macedonian public services.

The MIF was done within the framework of Component 3.2 of the twinning project "Support to Public Administration reform" and needs to be maintained further on at a (central) level assigned for policy coordination mentioned in the document IOP-O.

The MIF contributes to the better functioning of the internal market by increasing interoperability among Macedonian public administrations.

1.2 Definitions

1.2.1 Macedonian public service

In this document, Macedonian public service means *'a (cross-organisation/-border) public sector service supplied by public administrations*[3]*, either to one another or to Macedonian businesses and citizens'.*

Although not all Macedonian public services are supported by information and communication technologies (ICT), most will rely on the interlinking of software systems which are mainly custom-made[4] and developed by public administrations.

1.2.2 Interoperability

The MIF addresses interoperability in the very specific context of providing Macedonian public services.

Although the provision of Macedonian public services almost always involves exchanging data between ICT systems, interoperability is a wider concept and encompasses the ability of organisations to work together towards mutually beneficial and commonly agreed goals.

---

1 Sector is to be understood as a policy area, e.g. customs, police, eHealth, environment, agriculture, etc.

2 In the context of the MIF, the concept of businesses includes non governmental organisations, not-for-profit organisations, etc.

3 Refers to either national public administrations or bodies acting on their behalf.

4 Public administrations need custom-made software meeting their specific requirements (tax administration, police cooperation) to complement commercial 'off the shelf' software (operating systems, database systems, text processors, spreadsheets, etc.) in order to cover all their needs.

Therefore, the following definition is used in the MIF[5]:

'Interoperability, within the context of Macedonian public service delivery, is the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems.'

Interoperability is multilateral by nature and is best understood as a *shared value* of a community.

1.2.3 Interoperability framework

'An interoperability framework is an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices.'

1.3 The needs and benefits of interoperability

Interoperability is both a prerequisite for and a facilitator of efficient delivery of Macedonian public services. Interoperability addresses the need for:

- ***cooperation*** among public administrations with the aim to establish public services;
- ***exchanging information*** among public administrations to fulfil legal requirements or political commitments;
- ***sharing and reusing information*** among public administrations to increase administrative efficiency and cut red tape for citizens and businesses.

The result is:

- ***improved public service delivery*** to citizens and businesses by facilitating the one-stop-shop delivery of public services;
- ***lower costs*** for public administrations, businesses and citizens due to the efficient delivery of public services.

1.4 The MIF's recommendations

The MIF provides recommendations that address specific interoperability requirements. Implementing the recommendations will create an environment conducive to public administrations establishing new Macedonian public services. This will help cultivate a Macedonian public service ecosystem[6] with people familiar with interoperability, organisations ready to collaborate, and common frameworks, tools and services facilitating the establishment of Macedonian public services.

1.5 Context

The MIF is one of a series of interoperability initiatives and documents that aim to support the establishment of Macedonian public services.

The table below shows the relationship between these initiatives and documents: the Macedonian Interoperability Strategy (MIS) as mentioned in the document, the MIF, the Macedonian Interoperability Guidelines, Macedonian interoperability services and tools and activities to establish Macedonian public services.

---

5 compare: Article 2 of Decision No 922/2009/EC of the European Parliament and of the Council of 16 September 2009 on interoperability solutions for European public administrations (ISA) OJ L 260, 03.10.2009, p. 20.

6 An ecosystem is a system whose members benefit from each other's participation via symbiotic relationships (positive-sum relationships).

Strategy	MIS	Governance
Frameworks	MIF	Design
Guidelines	MIAG	Implementation
Services & Tools	MIIS	Operation

Interoperability initiatives supporting activities to establish Macedonian public services

Table 1-1

There should be a systematic approach to governing interoperability at Macedonian level, with specific goals set. To this end, the 'MIS'[7] provides a basis for an organisational, financial and operational framework to support cross-border, cross-organisation and/or cross-sector interoperability. The MIS steers the MIF and all other associated efforts by setting strategic priorities and objectives.

The purpose of the MIF is to help design Macedonian public services.

The Macedonian Interoperability Guidelines help establish Macedonian interoperability services and tools that underpin the delivery of Macedonian public services.

1.5.1 The political and historical context of interoperability in Macedonia (and the EU)

To implement Macedonian public services, the public sector must address many challenges. Cross-organisation and cross-sector interoperability is seen as a key factor in overcoming these challenges.

Achieving cross-organisation interoperability is a political priority in Macedonian public service initiatives. The provision of seamless cross-organisation/cross-border public services (for which interoperability is a prerequisite) has the potential to have a high impact on businesses and citizens.

1.5.2 Interoperability frameworks

Many public administrations already have, or are in the process of developing, frameworks addressing interoperability issues at their level. The scope of these frameworks is restricted to the jurisdictions within which they have been developed. However, Macedonian public administrations must be ready to work together to deliver Macedonian public services to meet the needs of businesses and citizens.

It is important that interoperability frameworks used by public administrations, both organisational (OIFs) and Macedonian (MIF), are aligned as regards how to achieve interoperability so that Organisations can agree on the concrete implementation of the MIF recommendations when establishing Macedonian public services.

By their nature, OIFs are, in general, more detailed and often prescriptive than the MIF, which operates at a higher level of abstraction, as a 'meta framework'.

Recommendation 1. Public administrations should align their interoperability frameworks with the Macedonian Interoperability Framework (MIF) to take into account the Macedonian dimension of public service delivery.

As the MIF and the OIFs are complementary, the 'MIS' supports an Organisational Interoperability Framework Observatory (OIFO) – '*Clearing organisation*', whose main objective is to provide information about organisational interoperability frameworks to allow public administrations to share experiences and knowledge. This Framework Observatory may even be starting point for harmonisation / information exchange f.e. with the European Interoperability Framework Observatory.

[7] The strategy defines a common vision for Macedonian public service delivery, and a set of focused actions at both local and national level to improve interoperability for public services in Macedonia.

1.6 Macedonian public service scenarios

Interoperability as covered by the MIF comes into play in a number of interaction scenarios. Macedonian public services covered by the MIF can be subdivided into interaction types, as described below.

The first type is direct interaction between businesses or citizens and public administrations/government (G2B and G2C) that deliver the public service to those businesses or citizens.

The second type is interaction between governmental organisations. This may support administrations in serving businesses or citizens.

1.6.1 Examples of Macedonian public services

A non-exhaustive list of examples[8] illustrates generic scenarios for the Macedonian public services outlined above:

Sector/Area	Service
Business development (G2B, G2G)	Start-up of a company Public Procurement Registration of patents, trademarks, designs Consumer protection, labelling, packaging
Certificates and licenses (G2C)	Birth and marriage certificates Driving licenses, Passports, visas Residence working permits Car registration
Education (G2C)	Enrolment in schools and university Study grants
Taxes for citizens (G2C)	Online tax

Sector/Area	Service
Social security (G2C)	Information service for social security systems Unemployment benefits Child allowances Pensions Public health insurance
Supply of statistical data (G2B, G2G)	Tax for businesses VAT refunding Information on tax incentives Declaration of excise goods
Work (G2C)	Recognition of qualifications and diplomas Job search
Customs (G2C, G2B, G2G)	Information on Customs duties Customs declaration

1.7 Structure of the document

In the following chapters, the MIF addresses a number of key issues for the efficient and effective delivery of Macedonian public services.

[8] Compare: Study on stakeholder requirements for pan-European eGovernment Services, Final Report v1.3, providing a ranking and description of various pan-European eGovernment services (see: http://ec.europa.eu/idabc/servlets/Docc7f6.pdf?id=19649).

Chapter 2, dealing with the 'underlying principles', sets out general principles underpinning Macedonian public services. They reflect the expectations of citizens, businesses and public administrations with regard to public service delivery.

Chapter 3 presents the 'conceptual model for public services'. It suggests an organising principle for designing Macedonian public services, focusing on basic services that can be aggregated to form aggregated services and help establish other Macedonian public services in the future.

Chapter 4 on 'interoperability levels' covers the different interoperability aspects to be addressed when designing a Macedonian public service and provides a common vocabulary for discussing issues that arise.

Chapter 5 presents an approach to facilitate cooperation among public administrations to provide a given Macedonian public service by introducing concepts of 'interoperability agreements', formalised specifications and open specifications.

Chapter 6 on 'interoperability governance' sets out what is needed to ensure interoperability over time when delivering a Macedonian public service and to coordinate interoperability activities across administrative levels to support the establishment of Macedonian public services.

2 Underlying principles of Macedonian public services

2.1 Introduction

This chapter sets out general principles of good administration that are relevant to the process of establishing Macedonian public services. They describe the context in which Macedonian public services are decided and implemented. They complement one another regardless of their different natures, e.g. political, legal or technical.

The eleven underlying principles of the MIF can be broken down into two categories:

- The first group of underlying principles reflect generic user needs and expectations (1-7);
- The next group provides a foundation for cooperation among public administrations (8-11).

2.2 Underlying principle 1: User-centricity

Public services are intended to serve the needs of citizens and businesses. More precisely, those needs should determine what public services are provided and how public services are delivered.

Generally speaking, citizens and businesses will expect:

- to access user-friendly services in a secure and flexible manner allowing personalisation; multichannel delivery, allowing access to services anyhow, anywhere, anytime;
- to access a single contact point, even when multiple administrations have to work together to provide the service;
- to provide only the information necessary to obtain the public service and to provide any given piece of information only once to administrations;
- administrations to respect privacy.

2.3 Underlying principle 2: Inclusion and accessibility[9]

The use of ICT should create equal opportunities for all citizens and businesses through inclusive services that are publicly accessible without discrimination.

Inclusion means allowing everyone to take full advantage of the opportunities offered by new technologies to overcome social and economic disadvantages and exclusion. Accessibility ensures that people with disabilities and the elderly can use public services with the same service levels as all other citizens.

Inclusion and accessibility must be part of the whole development lifecycle of a Macedonian public service in terms of design, information content and delivery, according to e-accessibility specifications widely recognised at Macedonian or international level.[10]

Inclusion and accessibility usually involve multichannel delivery. Traditional paper-based or face-to-face service delivery may need to co-exist with electronic delivery, giving citizens a choice of access.

Inclusion and accessibility can also be improved by the ability of a system to allow third parties to act on behalf of citizens who are unable, either permanently or temporarily, to make direct use of public services.

---

9 Compare: http://ec.europa.eu/information_society/activities/einclusion/policy/accessibility/index_en.htm .

10 See also EC standardisation mandate No376 on the development of European standards for public procurement of accessible ICT products and services (http://ec.europa.eu/information_society/activities/einclusion/archive/deploy/pubproc/eso-m376/a_documents/m376_en.pdf).

Recommendation 2. Public administrations should ensure that public services are accessible to all citizens, including persons with disabilities and the elderly, according to e-accessibility specifications widely recognised at Macedonian or international level.

2.4 Underlying principle 3: Security and privacy

Citizens and businesses must be assured that they interact with public administrations in an environment of trust and in full compliance with the relevant regulations, e.g. on information security, privacy and data protection. This means that public administrations must guarantee the privacy of citizens and the confidentiality of information provided by businesses.

Subject to security constraints, citizens and businesses should have the right to verify the information that administrations have collected about them and to be consulted whether this information may be used for purposes other than those for which it was originally supplied and/or the usage is in accordance with the relevant legislation.

Recommendation 3. Public administrations should consider the specific needs of each Macedonian public service, within the context of a common security and privacy policy.

2.5 Underlying principle 4: Multilingualism

Multilingualism needs to be carefully considered when designing Macedonian public services.

A balance needs to be found between the expectations of citizens and businesses to be served in the national language(s) and public administrations' ability to offer services in other languages.

Multilingualism comes into play not just at the level of the user interface, but at all levels in the design of Macedonian public services. For example, choices on data representation may limit the ability to support different languages.

The multilingual aspect to interoperability again becomes apparent when Macedonian public services require exchanges between ICT systems across linguistic boundaries, as the meaning of the information exchanged must be preserved. Whenever possible, information should be transferred in a language-independent format, agreed among all parties involved.

Recommendation 4. Public administrations should use information systems and technical architectures that cater for multilingualism when establishing a Macedonian public service.

2.6 Underlying principle 5: Administrative simplification

Businesses compile large amounts of information, often solely due to legal obligations, which is of no direct benefit to them and not necessary for achieving the objectives of the legislation imposing the obligations. This creates a considerable administrative burden[11], which can be expressed as a cost incurred by businesses. To achieve this target, public authorities across sectors (if applicable) will have to act together when establishing Macedonian public services.

This principle is closely linked to underlying principle 2, user-centricity.

2.7 Underlying principle 6: Transparency

Citizens and businesses should be able to understand administrative processes. They should have the right to track administrative procedures that involve them, and have insight into the rationale behind decisions that could affect them.

Transparency also allows citizens and businesses to give feedback about the quality of the public services provided, to contribute to their improvement and to the implementation of new services.

[11] Compare: http://ec.europa.eu/enterprise/admin-burdens-reduction/faq_en.htm.

2.8 Underlying principle 7: Preservation of information

Records[12] and information in electronic form held by administrations for the purpose of documenting procedures and decisions must be preserved. The goal is to ensure that records and other forms of information retain their legibility, reliability and integrity and can be accessed as long as needed, taking into account security and privacy.

In order to guarantee the long-term preservation of electronic records and other kinds of information, formats should be selected to ensure long-term accessibility, including preservation of associated electronic signatures and other electronic certifications, such as mandates.

For information sources owned and managed by national administrations, preservation is a purely national matter. For Macedonian public services and for information that is not purely national, preservation becomes a Macedonian issue, requiring an appropriate 'preservation policy'.

Recommendation 5. Public administrations should formulate together a long-term preservation policy for electronic records relating to Macedonian public services.

2.9 Underlying principle 8: Openness

In the context of the MIF, openness is the willingness of persons, organisations or other members of a community of interest to share knowledge and stimulate debate within that community, the ultimate goal being to advance knowledge and the use of this knowledge to solve problems.

While respecting data protection and privacy, interoperability involves sharing information among interacting organisations, and hence implies openness.

Applying the principle of openness when jointly developing custom-made software systems, Macedonian public administrations generate results that can be interconnected, reused and shared, which also improves efficiency.

Therefore, Macedonian public administrations should aim for openness, taking into account needs, priorities, legacy, budget, market situation and a number of other factors.

Recommendation 6. Public administrations should aim for openness when working together to establish Macedonian public services, while taking into account their priorities and constraints.

2.10 Underlying principle 9: Reusability

Reuse means that public administrations confronted with a specific problem seek to benefit from the work of others by looking at what is available, assessing its usefulness or relevance to the problem at hand, and deciding to use solutions that have proven their value elsewhere.

This implies that public administrations must be willing to share with others their solutions, concepts, frameworks, specifications, tools and components. This can be facilitated by applying the principle of openness, as described above.

Reuse and sharing naturally lead to cooperation using collaborative platforms[13], towards mutually beneficial and agreed common goals.

Reuse is consequently key to the efficient development of Macedonian public services.

---

[12] Compare: As defined by the model requirements for the management of electronic records (MOREQ): a record is (a) document(s) produced or received by a person or organisation in the course of business, and retained by that person or organisation.

[13] Compare: At EU level, various platforms (e.g. https://joinup.ec.europa.eu …) have been set up to share - f.e. open source software components (http://www.osor.eu/), semantic assets (http://www.semic.eu/) and best practices (http://www.epracice.eu/). The European Commission has also created EUPL (http://www.osor.eu/eupl) in order to facilitate the sharing of software components.

Recommendation 7. **Public administrations are encouraged to reuse and share solutions and to cooperate on the development of joint solutions when implementing Macedonian public services.**

2.11 Underlying principle 10: Technological neutrality and adaptability

When establishing Macedonian public services, public administrations should focus on functional needs and defer decisions on technology as long as possible in order to avoid imposing specific technologies or products on their partners and to be able to adapt to the rapidly evolving technological environment.

Public administrations should render access to public services independent of any specific technology or product.

Recommendation 8. **Public administrations should not impose any specific technological solution on citizens, businesses and other administrations when establishing Macedonian public services.**

2.12 Underlying principle 11: Effectiveness and efficiency

Public administrations should ensure that solutions serve businesses and citizens in the most effective and efficient way and provide the best value for taxpayer money.

There are many ways to take stock of the value brought by public service solutions, including considerations such as return on investment, total cost of ownership, increased flexibility and adaptability, reduced administrative burden, increased efficiency, reduced risk, transparency, simplification, improved working methods, and recognition of public administration achievements and competencies.

3 The conceptual model for public services

3.1 Introduction

This chapter proposes a conceptual model for public services to suggest ways to organise the creation and operation of these services.

The model brings together the common aspects and best practices observed. As a blueprint for future implementations of Macedonian public services, the model helps develop a common vocabulary and understanding across sectors / organisations about the main elements of a public service and how they come together.

The model emphasises a building-block approach to setting up Macedonian public services, allowing for the interconnection and reusability of service components when building new services.

The model is generic by nature, so not every existing or future public service will exactly fit into it. However, it is generic enough to be applicable at any level of government providing public services, from local level all the way up to the national level, and it illustrates the fact that any level of government can be a provider of both basic and aggregate public services. In this sense, the model clarifies and rationalises the relationships among entities that work together to deliver public services.

The aim of the model is to bring practical benefits to establishing Macedonian public services. For example, splitting functionalities into basic public services with well-defined interfaces, designed to be reused, will simplify and streamline the implementation of aggregate services and the reuse of service components, avoiding duplication of work.

3.2 The key concepts of the conceptual model

The model promotes the reuse of information, concepts, patterns, solutions, and specifications in organisations and at Macedonian level, recognising that Macedonian public services:

- are based on information from various sources located at different levels of administration, in different organisations, and
- combine basic public services constructed independently by public administrations in different organisations.

Therefore, the model highlights the need for modular, loosely coupled service components [14] interconnected through infrastructure and for working together to deliver Macedonian public services.

It explicitly calls for Macedonian-wide adoption of a service orientation to designing and developing systems, and an ICT ecosystem comprising consistent, and in some cases jointly developed, service components. Its particular service orientation is a specific way of creating and using business processes, packaged as services, throughout their lifecycle.

Recommendation 9. Public administrations should develop a component-based service model, allowing the establishment of Macedonian public services by reusing, as much as possible, existing service components.

[14] Service Oriented Architecture (SOA) is an implementation of that concept.

Public administrations will need to agree a common scheme on how to interconnect service components – compare therefor IOP-T/S/O/L.

There are well-known and widely used technical solutions, e.g. web services, to do this, but implementing them at Macedonian level will require concerted efforts by public administrations, including investment in common infrastructure.

Recommendation 10. **Public administrations should agree on a common scheme to interconnect loosely coupled service components and put in place the necessary infrastructure when establishing Macedonian public services.**

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

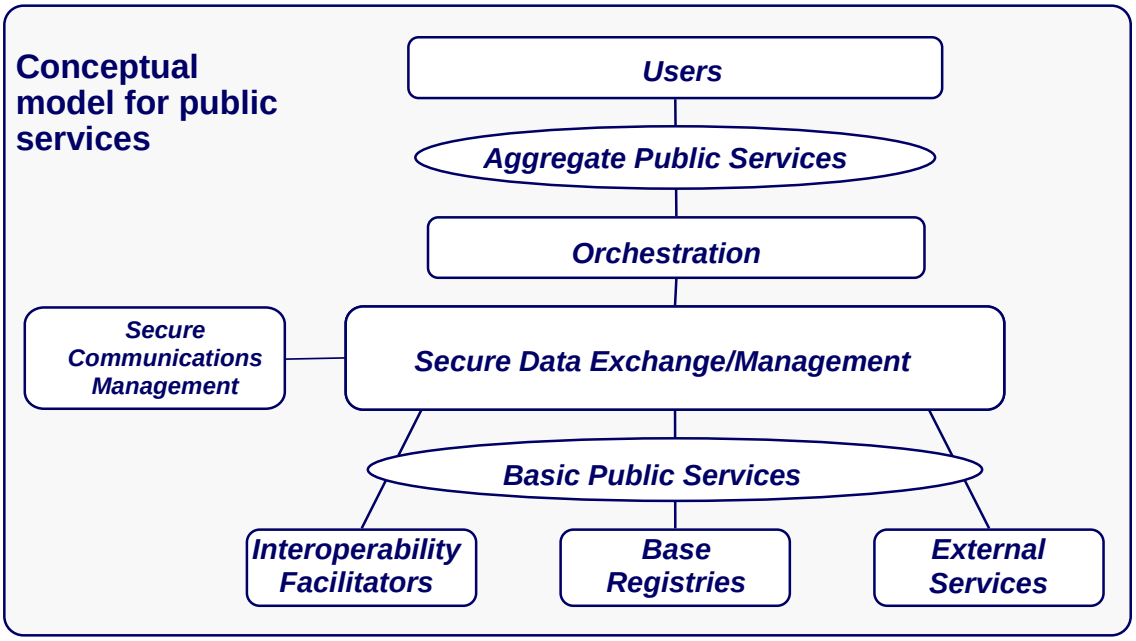


Figure 3-1

In order to understand this model, it is useful to subdivide it into three layers: basic public services, secure data exchange and aggregate public services, which are detailed in the following sections.

3.2.1 Basic public services

The lowest layer of the model deals with the most basic service components from which Macedonian public services can be built. It groups three types of components, namely interoperability facilitators, services based on base registries, and external services, together called basic public services.

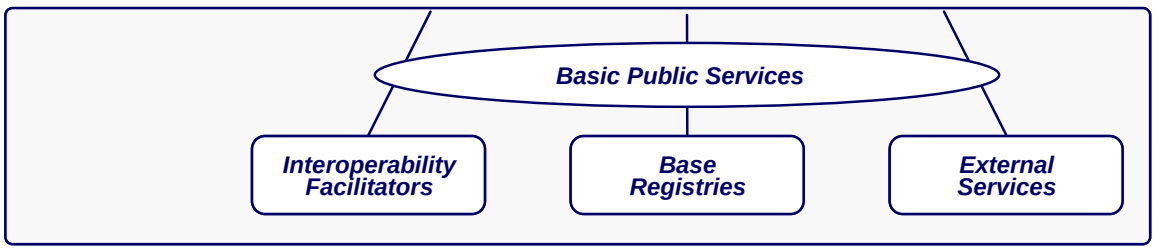


Figure 3-2

Some basic public services have been developed primarily for direct use by the public administration that created them, or by their direct customers, i.e. businesses and citizens, but are made available for reuse elsewhere with a view to providing aggregate public services. Others are generic and/or

infrastructural by nature, while the remainder represent external services, i.e. services provided by third parties. The following sections describe in more detail each type of basic public service.

3.2.1.1 Base registries

The most important components are base registries that provide reliable sources of basic information on items such as persons, companies, vehicles, licences, buildings, locations and roads. Such registries are under the legal control of public administrations and are maintained by them, but the information should be made available for wider reuse with the appropriate security and privacy measures.

The common feature of all implementations of basic registries is the fact that they are authentic and authoritative and form, separately or in combination, the cornerstone of public services. Generally speaking, their content is not static: they also reflect the information lifecycle.

Recommendation 11. **Public administrations should make their authentic sources of information available to others while implementing access and control mechanisms to ensure security and privacy in accordance with the relevant legislation.**

One of the obstacles to adopting the conceptual model for Macedonian public services could be legacy systems. These systems, and their underlying data repositories, have specific characteristics limiting the possibilities for reuse (e.g. lack of published interfaces), and they may require extensive re-engineering in order to make their information available for Macedonian public services.

Access to authentic data sources across borders will be facilitated if the interfaces to these sources are published and harmonised, at both semantic and technical level.

Recommendation 12. **Public administrations, when working to establish Macedonian public services, should develop interfaces to authentic sources and align them at semantic and technical level.**

3.2.1.2 Interoperability facilitators

Interoperability facilitators provide services such as translation between protocols, formats and languages or act as information brokers.

3.2.1.3 External services

These include services provided by external parties such as — at business level — payment services provided by financial institutions or — at infrastructure level — connectivity services provided by telecommunications providers.

3.2.2 Secure data exchange layer

This layer is central to the conceptual model since all access to basic public services passes through it.

Figure 3-3

3.2.2.1 Secure data exchange

From a business point of view, administrations and other entities exchange official information that may involve access to base registries. This should go through a secure, harmonised, managed and controlled layer allowing information exchanges between administrations, businesses and citizens that are:

signed and certified — both sender and receiver have been identified and authenticated through agreed mechanisms,

encrypted — the confidentiality of the exchanged data is ensured,

logged – the electronic records are logged and archived to ensure a legal audit trail.

In the proposed conceptual model, these functions are grouped in the 'secure data exchange' layer.

This layer should allow the secure exchange of certified messages, records, forms and other kinds of information between the different systems. In addition to transporting data, this layer should also handle specific security requirements such as electronic signatures, certification, encryption and time stamping.

Security is potentially one of the main barriers to interoperability if it is not applied in a harmonised and agreed way among organisations.

The conceptual model highlights this and calls on all service providers to:

- consider the security issues head-on;
- cooperate on a common framework to meet their respective security needs via compatible mechanisms and commonly agreed specifications;
- reach a common understanding on essential characteristics such as protective marking levels, authorisation levels and authentication strength.

Therefore, public administrations should agree on a common security framework when establishing a Macedonian public service (see Recommendation No 3).

One of the key prerequisites for implementing the functionality expected in secure data exchange involves leveraging national identification and authentication infrastructures in the organisations to reach a working cross-organisations/sectors scheme. This scheme should establish which ICT architectures and data are needed in a cross-sector context to make existing organisation electronic identity infrastructures interoperable.

3.2.2.2 Secure communications management

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

- *service management*, to oversee all communications on identification, authentication, authorisation, data transport, etc., including access authorisations, revocation, and audit;
- *service registration*, to provide (subject to proper authorisation) access to available services through prior localisation and verification that the service is trustworthy;
- *service logging*, to ensure that all data exchanges are logged for future evidence, and archived when necessary.

3.2.3 Aggregate services layer

Aggregate public services are constructed by grouping a number of basic public services that can be accessed in a secure and controlled way. They can be provided by several administrations at any level, i.e. local, regional, national or even other level.

A typical aggregate service should appear to its users (administrations, businesses or citizens) as a single service. Behind the scenes, transactions may be implemented across borders, sectors and administrative levels.

Aggregation is accomplished via mechanisms tailored to specific business requirements. In the most general case, some business logic is required to implement the requirements, and the implementation mechanism could take several forms, such as orchestration or workflow engines, all included in portal-like access infrastructures.

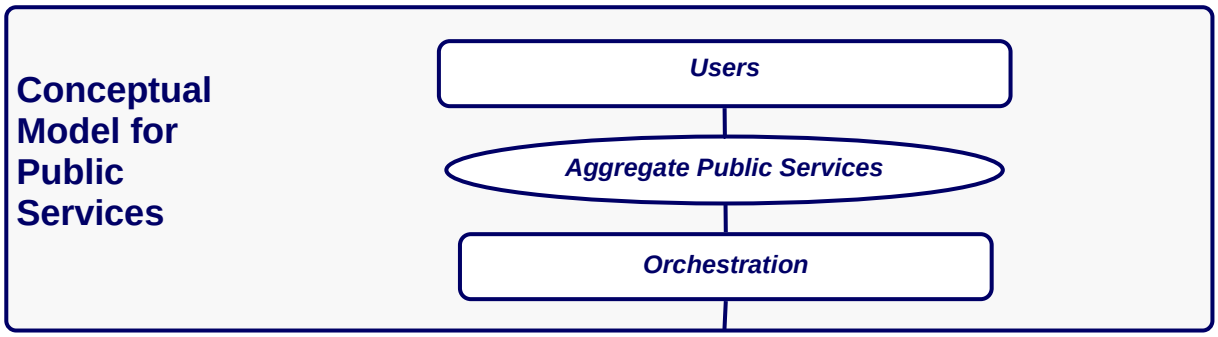


Figure 3-4

Nowadays, users expect to access public services not solely through government portals or websites but also via intermediaries with whom they are in contact on a regular basis. Therefore, public services should be developed in such a way that they can easily be integrated in intermediaries' websites through mechanisms such as mash-ups and widgets, without government losing responsibility for the service itself and with clear indications enabling users to tell the difference between private and public services.

If aggregate public services are provided by intermediaries, public administrations should establish:

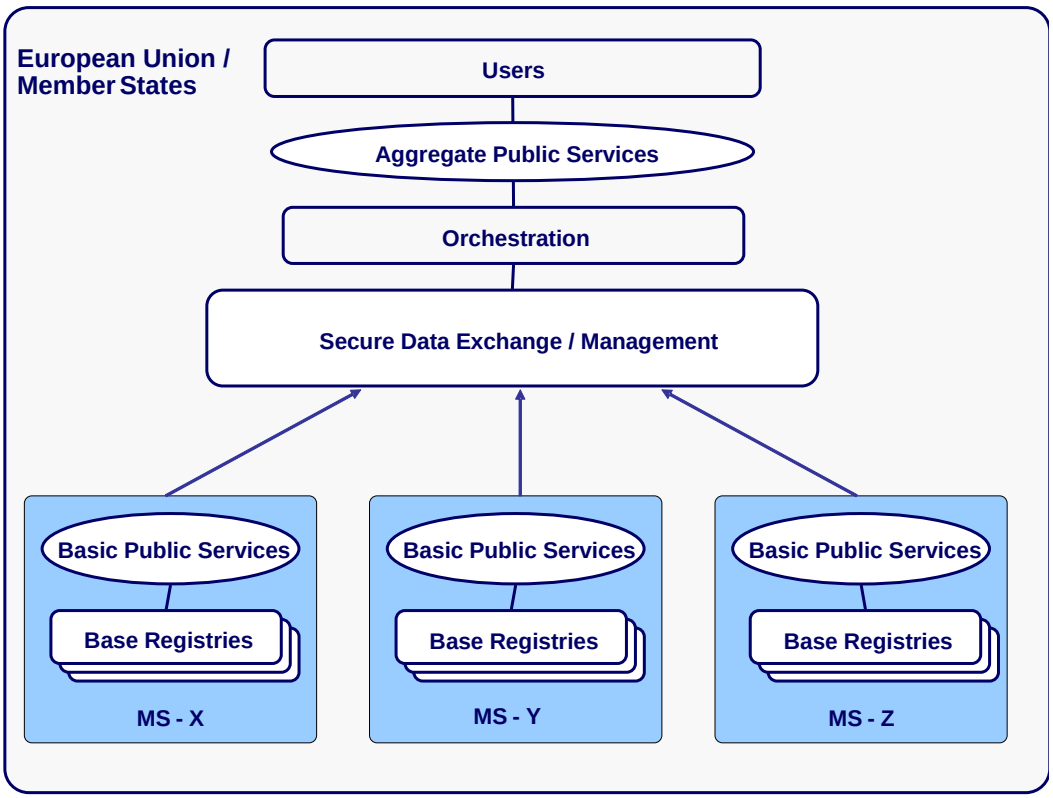
- a process for authorisation to determine which basic public services may be disclosed to which intermediary, and
- a process for certifying intermediaries to establish trust between users and service providers.

3.3 Applications of the conceptual model

What makes the model powerful is its flexibility in allowing different aggregate services to be created by combining basic public services from multiple providers. The model unlocks the potential for further aggregating and combining the different services available. The sections below describe two cases, all with a high added value in the Macedonian context: the cross-organisation/sector example and the cross-administrative boundary example.

3.3.1 Cross-border example

This illustrates a Macedonian public service implemented by combining basic public services, in this case access to national base registries, implemented in different Member States.



The model has been simplified for the sake of clarity.

Figure 3-5

The situation depicted in the diagram is a variation on the original conceptual model to illustrate its cross-border application by adding national boundaries to indicate where individual sets of basic public services are located.

This raises a number of issues:

Trust: The cross-border application of the model involves allowing external access to national base registries, which requires a high degree of security and trust.

Dependence of Macedonian public services and service levels on lower-level services: The aggregated service depends on basic public services provided by different entities.

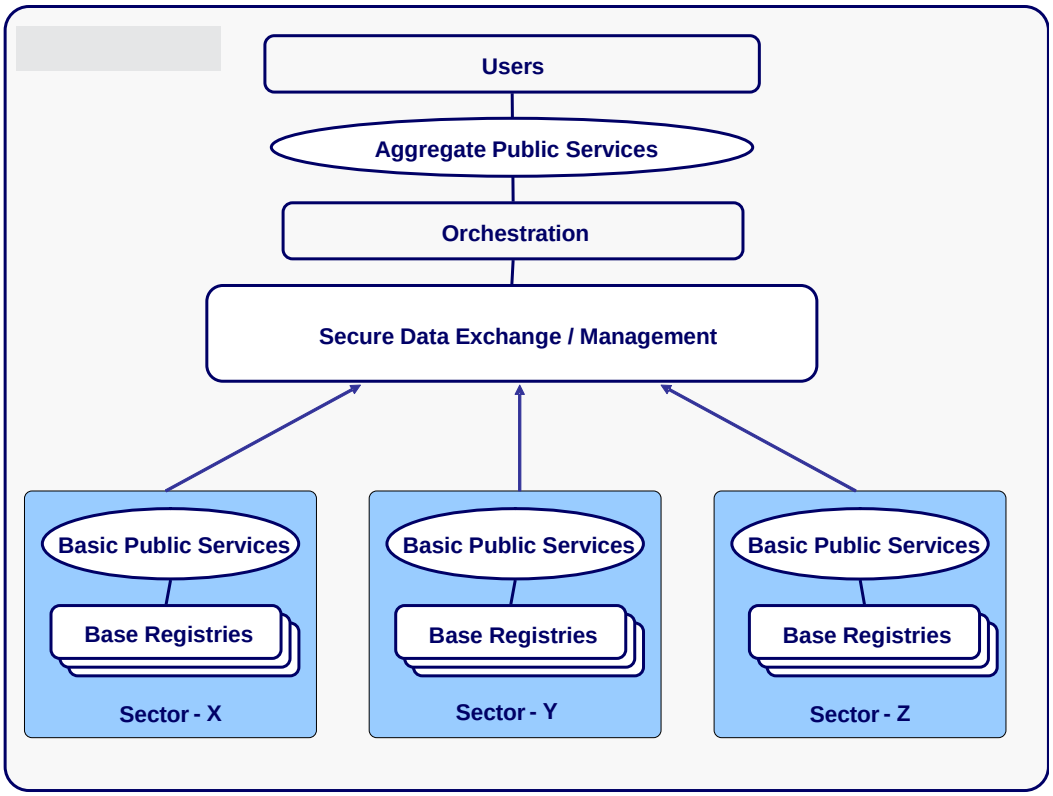
Common specifications for basic public services: The fact that the basic public services on which the aggregated services are based are developed by different public administrations highlights the need for common interface specifications, at technical and semantic level.

Privacy and data protection: Even when personal information is exchanged across borders, national data protection legislations apply. The secure data exchange layer implements and enforces the security requirements for the aggregate service. As data originating from different Member States may be subject to different data protection requirements, a set of common requirements for data protection should be agreed in order to implement the aggregate service.

Recommendation 13. **Public administrations, when working together to establish Macedonian public services, should use a common taxonomy of basic public services and agree on minimum service requirements for secure data exchange.**

3.3.2 Cross-organisation/sector example

This application of the conceptual model combines basic public services from different organisations/sectors to provide new aggregate public services.



The model has been simplified for the sake of clarity

Figure 3-6

This application of the model channels interaction between users and aggregated public services provided through cooperation between different sectors via a single point of contact.

To make this approach successful, it is essential that sectors adopt a common approach to service definition.

3.3.3 Cross-administrative boundary example

This case illustrates the aggregation of services originating in different layers of government at local, regional, national (and other level).

The challenge for implementing this application is to master the complexity resulting from multiple service providers. Cooperation among public administrations at each level is essential.

4 Interoperability levels

4.1 Introduction

This chapter describes four levels of interoperability. Each deserves special attention when a new Macedonian public service is established. The practical implementation of the conceptual model for cross-border/cross-organisation/cross-sector services requires each of these levels to be taken into account.

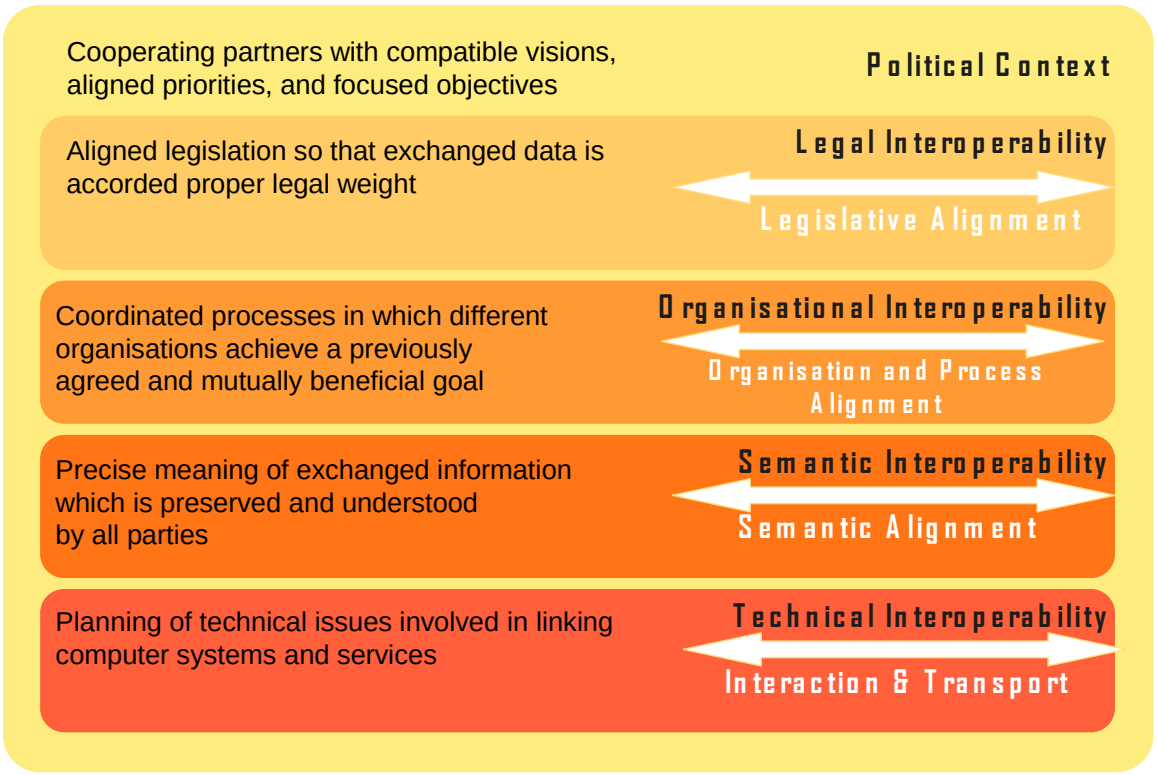


Figure 4-1

4.2 Political context

The establishment of a new Macedonian public service is the result of direct or indirect action at political level, i.e. new bilateral, multilateral or Macedonian agreements.

If the establishment of a new service is the direct consequence of new Macedonian legislation, the scope, priorities and resources needed to establish and operate the service should be defined when the legislation is adopted.

However, political support and sponsorship is also needed in cases where new services are not directly linked to new legislation but are created to provide better, more user-focused public services.

Likewise, political support is also necessary for cross-organisation/sector interoperability efforts to facilitate cooperation among public administrations. For effective cooperation, all stakeholders involved must share visions, agree on objectives and align priorities. Action at cross-organisation/sector level can only be successful if all organisations involved give sufficient priority and resources to their respective interoperability efforts towards agreed goals within agreed timeframes.

4.3 Legal interoperability

Each public administration contributing to the provision of a Macedonian public service works within its own (organisational) legal framework.

Sometimes, incompatibilities between legislation in different organisations make working together more complex or even impossible, even where such legislation is the result of transposing international directives into national law.

When information is exchanged between organisations to provide Macedonian public services, the legal validity of such information must be maintained across organisations/sectors and data protection legislation must be respected.

Recommendation 14. **Public administrations should carefully consider all relevant legislation relating to data exchange (especially IOP-L), including data protection legislation, when seeking to establish a Macedonian public service.**

4.4 Organisational interoperability

This aspect of interoperability is concerned with how organisations, such as public administrations in different organisations, cooperate to achieve their mutually agreed goals. In practice, organisational interoperability implies integrating business processes and related data exchange. Organisational interoperability also aims to meet the requirements of the user community by making services available, easily identifiable, accessible and user-focused – compare also with IOP-O.

4.4.1 Business process alignment

In order for different administrative entities to be able to work together efficiently and effectively to provide Macedonian public services, they may need to align their existing business processes or even to define and establish new business processes.

Aligning business processes implies documenting them, in an agreed way, so that all public administrations contributing to the delivery of Macedonian public services can understand the overall business process and their role in it.

Recommendation 15. **Public administrations should document their business processes and agree on how these processes will interact to deliver a Macedonian public service.**

4.4.2 Organisational relationships

Service orientation, on which the conceptual model for public services is built, means that the relationship between service providers and service consumers must be clearly structured.

This involves finding instruments to formalise mutual assistance, joint action and interconnected business processes in connection with cross-organisation/sector service provision. Examples of such instruments are Memoranda of Understanding (MoUs) on joint actions and cooperation and/or Service Level Agreements (SLAs) signed between participating public administrations. For cross-organisation/sector action, they should preferably be multilateral agreements.

Recommendation 16. **Public administrations should clarify their organisational relationships as part of the establishment of a Macedonian public service.**

4.4.3 Change management

Since delivering a Macedonian public service is the result of collective work parties that produce or consume parts of the service, change management processes are critical to ensure the accuracy, reliability and continuity of the service delivered to other public administrations, businesses and citizens – compare also with IOP-O.

Recommendation 17. **Public administrations working together to provide Macedonian public services should agree on change management processes to ensure continuous service delivery.**

4.5 Semantic interoperability

Semantic interoperability enables organisations to process information from external sources in a meaningful manner. It ensures that the precise meaning of exchanged information is understood and preserved throughout exchanges between parties.

A starting point is to create sector-specific sets of data structures and data elements that can be referred to as semantic interoperability assets (compare also with IOP-S). Once these are created, the cooperating organisations will need to agree on the meaning of the information to be exchanged. Given the different linguistic, cultural, legal, and administrative environments in the organisations, this poses significant challenges. Multilingualism may add further complexity to the problem.

In the context of the MIF, semantic interoperability encompasses the following aspects:

- *Semantic interoperability* is about the meaning of data elements and the relationship between them (including MetaData). It includes developing vocabulary to describe data exchanges, and ensures that data elements are understood in the same way by communicating parties.
- *Syntactic interoperability* is about describing the exact format of the information to be exchanged in terms of grammar, format and schemas.

Achieving semantic interoperability at Macedonian level requires at least:

- agreed processes and methodologies (IOP-O) for developing semantic interoperability assets;
- agreement (IOP-L) by sector-specific and cross-sector communities on the use of semantic interoperability assets at Macedonian level.

Due to the complexity of the task and the large number of interested parties, it will take a concerted effort to harmonise processes and methodologies.

4.5.1 Excurse: The EU Semantic Interoperability Initiative[15]

Several initiatives aim to achieve semantic interoperability, at both national and EU level. The EU semantic interoperability initiative aims to lay the foundations of semantic interoperability for European public services, across all sectors and in close cooperation with national initiatives. It provides coaching services for the design and implementation stages, and a web-based platform for cooperating and sharing solutions to semantic interoperability challenges.

Public administrations establishing public services should verify at an early phase of any given project whether existing semantic interoperability assets can be reused.

Recommendation 18. **Public administrations should support the establishment of sector-specific and cross-sector communities that aim to facilitate semantic interoperability and should encourage the communities to share results on Macedonian and international platforms.**

4.6 Technical interoperability

This covers the technical aspects of linking information systems – compare also with IOP-T. It includes aspects such as interface specifications, interconnection services, data integration services, data presentation and exchange, etc.

While public administrations have specific characteristics at political, legal, organisational and, partly, semantic level, interoperability at the technical level is not specific to public administrations. Therefore, technical interoperability should be ensured, whenever possible, via the use of formalised specifications, either standards pursuant to Macedonian legislation or specifications issued by ICT industry fora and consortia.

[15] SEMIC.EU: Semantic Interoperability Centre Europe.

Recommendation 19. **Public administrations should agree on the formalised specifications to ensure technical interoperability when establishing Macedonian public services.**

5 Interoperability agreements

5.1 Introduction

This chapter proposes an approach to facilitate cooperation among public administrations to provide a given Macedonian public service.

As stated throughout this document, providing Macedonian public services requires cooperation among different public administrations at the different interoperability levels described in the previous chapter. For each level, the organisations involved should formalise cooperation arrangements in **interoperability agreements** – compare also with IOP-L.

Agreements should be drafted with sufficient detail to achieve their aim — to provide a Macedonian public service — while leaving each organisation maximum internal autonomy.

At legal level, interoperability agreements are rendered specific and binding via legislation, including Macedonian directives and their transposition into organisational legislation, or bilateral and multilateral agreements, which are outside the scope of the MIF.

At organisational level, interoperability agreements can, for example, take the form of MoUs or SLAs that specify the obligations of each party participating in cross-organisation/sector business processes. Interoperability agreements at organisational level will define expected levels of service, support/escalation procedures, contact details, etc., referring, when necessary, to underlying agreements at semantic and technical levels – compare also with IOP-O.

At semantic level, interoperability agreements can take the form of reference taxonomies, schemes, code lists, data dictionaries, sector-based libraries and so forth – compare also with IOP-S.

At technical level, interoperability agreements include interface specifications, communication protocols, messaging specifications, data formats, security specifications or dynamic registration and service discovery specifications– compare also with IOP-T.

While interoperability agreements at legal and organisational level will usually be very specific to the Macedonian public service concerned, interoperability agreements at technical level and, to a lesser extent, at semantic level can often be mapped onto existing formalised specifications.

Recommendation 20. **Public administrations, when establishing Macedonian public services, should base interoperability agreements on existing formalised specifications, or, if they do not exist, cooperate with communities working in the same areas.**

When trying to implement interoperability agreements, at technical or semantic level, there may be a choice between a number of equivalent, competing specifications, all of which may be able to provide a basis for such agreements.

Public administrations may decide to support multiple formalised specifications or technologies to communicate with citizens and businesses. However, for reasons of efficiency, they should reduce, as much as possible, the number of formalised specifications and technologies when working together to provide a Macedonian public service.

Similar decisions are often taken not just to provide a single Macedonian public service but within a wider context of cooperation within or among organisations. In this context, they should be aware that internal interfaces may become external in the future when new Macedonian public services are created.

Decisions on what formalised specifications and technologies to use to ensure interoperability for Macedonian public services should be based on transparency, fairness and non-discrimination. One way to do this is to agree on a common assessment methodology and selection process.

5.2 Assessing and selecting formalised specifications

When public administrations select the formalised specifications or technologies to ensure interoperability, they should assess relevant formalised specifications.

This assessment should be tailored to the specific interoperability needs of the public administrations in question, but based on objective criteria, primarily related to functional interoperability needs. When several formalised specifications meet functional interoperability needs, additional criteria on quality of implementation, market support, potential for reusability and openness can be used.

Recommendation 21. **Public administrations should use a structured, transparent and objective approach to assessing and selecting formalised specifications.**

5.2.1 Specifications, openness and reuse

The level of openness of a formalised specification is an important element in determining the possibility of sharing and reusing software components implementing that specification. This also applies when such components are used for the establishment of new Macedonian public services.

If the openness principle is applied in full:

- All stakeholders have the same possibility of contributing to the development of the specification and public review is part of the decision-making process;
- The specification is available for everybody to study;
- Intellectual property rights related to the specification are licensed on FRAND[16] terms or on a royalty-free basis in a way that allows implementation in both proprietary and open source software[17].

Due to their positive effect on interoperability, the use of such open specifications, characterised by the features mentioned above as well as the sharing and reuse of software implementing such open specifications, has been promoted in many policy statements and is encouraged for Macedonian public service delivery. The positive effect of open specifications is also demonstrated by the Internet ecosystem.

However, public administrations may decide to use less open specifications, if open specifications do not exist or do not meet functional interoperability needs.

In all cases, specifications should be mature and sufficiently supported by the market, except if used in the context of creating innovative solutions.

Recommendation 22. **When establishing Macedonian public services, public administrations should prefer open specifications, taking due account of the coverage of functional needs, maturity and market support.**

5.3 Contribution to the standardisation process

In some cases, public administrations may find that no suitable formalised specification is available for a specific need in a specific area – check first results on European Commission level as well as outcome of Large Scale Pilots & eSense. If new specifications have to be developed, public administrations may either develop the specifications themselves and put forward the result for standardisation, or request a new formalised specification to be developed by standards developing organisations. The resulting formalised specifications should comply with the characteristics set out in Section 5.2.1.

Even where existing formalised specifications are available, they evolve over time and experience shows that revisions often take a long time to be completed. Active government participation in the

[16] FRAND: Fair, reasonable and non discriminatory.

[17] This fosters competition since providers working under various business models may compete to deliver products, technologies and services based on such specifications.

standardisation process mitigates concerns about delays, improves alignment of the formalised specifications with public sector needs and can help governments keep pace with technology innovation.

Recommendation 23. **Public administrations should lead or actively participate in standardisation work relevant to their needs.**

6 Interoperability governance

Due to their cross-organisational and in some cases cross-sector characteristics, Macedonian public services operate in a complex and changing environment.

Ensuring interoperability between legal instruments, organisation business processes, information exchanges, services and components that support the delivery of a Macedonian public service is a continuous task, as interoperability is disrupted by changes to the environment, i.e. to legislation, the needs of businesses or citizens, the organisation of public administrations, business processes or technologies – compare also with IOP-O.

Recommendation 24. **Public administrations should ensure that interoperability is ensured over time when operating and delivering a Macedonian public service.**

Even if interoperability is maintained for a given Macedonian public service, its delivery often relies on components that are common to many Macedonian public services. These components, which are the results of interoperability agreements reached outside the scope of the Macedonian public service, should also be made available over time.

Moreover, as the common components and interoperability agreements are the results of work carried out by public administrations at different levels (local, regional, national and international), coordination and monitoring this work requires a holistic approach.

Recommendation 25. **Public administrations should establish a framework for the governance of their interoperability activities across administrative levels.**

7 Abbreviations and Glossary*

*under construction

7.1 Abbreviations

G2G	Government to Government
G2B	Government to Business
G2C	Government to Citizen
ABC	Administration, Business and Citizen
EC	European Commission
MIF	Macedonian Interoperability Framework
MIS	Macedonian Interoperability Strategy – 'A connected eMacedonia'
EU	European Union
EUPL	European Union Public Licence
IDABC	Interoperable delivery of European eGovernment services to public administrations, businesses and citizens
ICT	Information and Communication Technology
ISA	Interoperability solutions for European public administrations
MoU	Memorandum of Understanding
MS	Member State
NIF	National Interoperability Framework
NIFO	National Interoperability Framework Observatory
OIF	Organisational Interoperability Framework
OSOR	Open Source Observatory and Repository
SEMIC.EU	Semantic Interoperability Centre Europe
SLA	Service Level Agreement
SOA	Service Oriented Architecture

7.2 Glossary

Accessibility	To be understood here as Web accessibility, which means that everyone including people with disabilities can perceive, understand, navigate, and interact with the internet, and have the opportunity to contribute to society. While accessibility is a broad concept, eAccessibility aims to ensure that people with disabilities and the elderly can access ICTs on the same basis as others.
Administrative Burden	The cost of administrative work that businesses conduct solely in order to comply with legal obligations (http://ec.europa.eu/enterprise/policies/better-regulation/glossary/index_en.htm).
Aggregate Public Services	A generic term used in the MIF conceptual model for public services to refer to a set of basic public services accessed in a secure and controlled way before being combined and then delivered as a whole to end users.
Authentic Source	An authentic source is information that is stored only once and which is believed to be correct, so can serve as a basis for reuse.
Basic Public Services	Basic public services are the most fundamental service components from which Macedonian public services can be built. According to the MIF conceptual model, there are three fundamental types of basic public services: base registries, interoperability facilitators, and external services.
Base Registries	Authentic sources of information under the control of a public administration. Examples include registries of persons, vehicles, companies, licences, VAT numbers, locations, buildings, roads, etc.
Building-Block Approach	An approach to building information systems from architecture to implementation in which the information system is designed as an assembly or aggregation of components that encapsulate data and functionalities in groups that can also be reused as 'building blocks' to build other public services or information systems.
Business Process	A business process is a sequence of linked activities that creates value by turning inputs into a more valuable output. This can be performed by human participants or ICT systems, or both.
Collaborative Platform	A set of specific services and facilities for the use of a specific community and their interactions, the goal being to facilitate cooperation to achieve shared objectives. Typically, the services are communication-related, and incorporate a repository for exchanged objects, information, materials, etc. A notable example is the ePractice.eu platform, designed to enable members of public administrations involved in providing public services to benefit from each other's work, knowledge and experience. Other examples are OSOR.eu and SEMIC.eu.
Custom-made software	Specific software either developed internally within an organisation (for the MIF, a public administration) or developed for this organisation by a contractor to meet the specific requirements of that organisation. In most cases, the custom-made software is paid in full by the organisation which is consequently the owner of the software, holding all rights related to the further use of this software.
Data Repository	Any collection of data meant for use (processing, storage, querying, etc.) by an information system. Typically, a data repository contains additional structural and semantic information about the data in question, designed to aid the use of the data (data model, relationships between data elements, metadata, etc.). It may provide specific functionalities closely tied to the data stored in the repository (searching, indexing, etc.).

Data Representation	The manner in which data are expressed symbolically by binary digits in a computer.
Document	Recorded information or object that can be treated as a unit (see MOREQ specifications at http://ec.europa.eu/transparency/archival_policy/moreq/doc/moreq2_spec.pdf).
eInclusion	eInclusion ('e' standing for electronic) aims to prevent the risks of 'digital exclusion', i.e. to ensure that disadvantaged people are not left behind and to avoid new forms of exclusion due to lack of digital literacy or internet access.
eGovernment	eGovernment is about using the tools and systems made possible by information and communication technologies (ICTs) to provide better public services to citizens and businesses.
Electronic Signature	According to Directive 1999/93/EC, 'electronic signature' means data in electronic form which are attached to or logically associated with other electronic data and which serve as a method of authentication.
Electronic Certification	Electronic certification is the application of an electronic signature, by a specifically authorised person or entity, in a specific context for a specific purpose. It is mostly used to indicate that a certain validation process has been executed and that a given result is being attested by the signer. In the simplest case, it can merely represent the assertion of a given fact by an authorised person.
Electronic Records	A record in electronic form (see MOREQ specifications at http://ec.europa.eu/transparency/archival_policy/moreq/doc/moreq2_spec.pdf).
MPS establishment process	The activities needed to establish a Macedonian public service (MPS), making it available for use.
Macedonian Interoperability Strategy (MIS)	The Macedonian Interoperability Strategy (EIS) provides the basis for defining the organisational, financial and operational framework (including governance) needed to ensure ongoing support for cross-border and cross-sector interoperability, as well as the exchange of information among Macedonian public administrations – compare also: 'A connected eMacedonia'
Macedonian public service (MPS)	A cross-organisation public sector service supplied by public administrations, either to one another or to Macedonian businesses and citizens.
Formalised Specifications	Formalised specifications are either standards pursuant to EU Directive 98/34 or specifications established by ICT industry fora or consortia.
Information	Information is semantically enriched data, i.e. collections of data that have been given relevance and purpose.
Information and Communication Technology (ICT)	Technology, e.g. electronic computers, computer software and communications technology, used to convert, store, protect, process, transmit and retrieve information.
Interface	An interface is a conceptual or physical boundary where two (or more) independent legal systems, organisations, processes, communicators, IT systems, or any variation/combination thereof interact.
Interoperability	The ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems.
Interoperability Agreements	Written interoperability agreements are concrete and binding documents which set out the precise obligations of two parties cooperating across an 'interface' to

	achieve interoperability.
Interoperability Framework	An interoperability framework is an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices.
Interoperability Governance	Interoperability governance covers the ownership, definition, development, maintenance, monitoring, promoting and implementing of interoperability frameworks in the context of multiple organisations working together to provide (public) services. It is a high-level function providing leadership, organisational structures and processes to ensure that the interoperability frameworks sustain and extend the organisations' strategies and objectives.
Interoperability Levels	The interoperability levels classify interoperability concerns according to who/what is concerned and cover, within a given political context, legal, organisational, semantic and technical interoperability.
Legacy System	Generally refers to older systems that still perform essential functions or host/provide access to essential data, but which use older technology, pose difficulties for integrating with newer systems, and for which reimplementation is seen to be difficult or expensive. Strictly speaking, however, any IT system, of whatever vintage, including one that has recently been implemented, but which has not been designed with reuse or integration with other systems in mind, can also be classified as such.
Loose coupling	Loose coupling refers to communications between systems that operate more or less independently of one another (asynchronously) and whose internal states are not strongly interdependent. The coupling takes the form of messages passed between the systems in question, typically implemented using some type of middleware layer or queuing system, so that the target system deals with requests as and when it can. Thus, the target system may not even be available at the time of the request, which is simply queued for later action.
Memorandum of Understanding	A bilateral or multilateral written agreement between two organisations which sets out a number of areas and means by which they will cooperate, collaborate or otherwise assist one another. The exact nature of these activities depends on the nature of the two organisations, the domain of activity in question, and the scope of the cooperation envisaged.
Multichannel Delivery	A channel is a means used by an administration to interact with and deliver services to its users, and for users to contact public administrations with the aim of acquiring public services. The term 'user' includes citizens, businesses and organisations as consumers of public services. The set of different possible 'means' for electronic delivery constantly changes, and currently includes the use of web-based technologies, telephony, paper media, face-to-face contacts and many others, applications of these technologies such as the internet, e-mail, SMS, call centres or service counters, and devices to access these applications such as personal computers, mobile phones, kiosks or digital TV. Multichannel delivery refers to the provision of public services simultaneously and independently via two or more such channels, selectable by the user according to needs.
National Interoperability Framework (NIF)	NIFs are interoperability frameworks defined by individual Member States to govern national IT systems and infrastructure within their own countries.
Open Source or Open Source Software (OSS)	See the 10 criteria that define Open Source Software (OSS) at the Open Source Initiative web site: http://www.opensource.org/docs/osd. An alternative definition (of Free Software) can be found at:

	http://www.gnu.org/philosophy/free-sw.html.
Open Source Observatory and Repository (OSOR)	The Open Source Observatory and Repository for Macedonian public administrations (OSOR) is a platform for exchanging information, experiences and OSS-based code for use in public administrations (http://www.osor.eu/).
Orchestration	The aggregation and sequenced execution of sets of transactions involving use of other services and functionalities, according to business rules embodied in one or more documented business processes, with the ultimate goal of performing or providing some other value-added function or service. Orchestration is closely related to the concept of workflow. Usually orchestration involves executing a set of processes, described in a standard language, by an 'orchestration engine', which is configurable and capable of executing all the requisite service calls and routing the inputs and outputs of processes according to rules described in that language.
Point of Single Contact (PoSC)	Single institutional interlocutor for a given service provider through which the latter can collect all relevant information and easily complete at a distance and by electronic means all procedures and formalities to access a service activity and to the exercise thereof (see Article 8 of the Services Directive — OJ L376 of 27.12.2006).
Proprietary Software	Software that, generally for a fee, can be used on a limited number of computers and/or by a limited number of users. The internal working of the software (the source code) is not available for study and/or modification by the user.
Proprietary Specifications	Generally refers to specifications that are either partially or totally unpublished, or are only available from a single vendor for a substantial fee, and/or under restrictive terms, thus making the implementation and use by third parties of products that conform to the given specifications subject to control.
Protocol	A set of conventions that govern the interaction of processes, devices and other components within and across systems.
Record	Document(s) produced or received by a person or organisation in the course of business, and retained by that person or organisation (see MOREQ specifications at http://ec.europa.eu/transparency/archival_policy/moreq/doc/moreq2_spec.pdf). Note: a record may incorporate one or several documents (e.g. when one document has attachments), and may be on any medium in any format. In addition to the content of the document(s), it should include contextual information and, if applicable, structural information (i.e. information which describes the components of the record). A key feature of a record is that it cannot be changed.
Reusability	The degree to which a software module or other work product can be used in contexts other than its original, intended or main purpose.
Secure Data Exchange	This is a component of the conceptual model for Macedonian public services. Its aim is to ensure that all cross-organisation data exchanges are done in a secure and controlled way.
Semantic Interoperability Centre Europe (SEMIC.EU)	SEMIC.EU (Semantic Interoperability Centre Europe) is a collaborative platform and service offered by the Macedonian Commission to support the sharing of interoperability assets to be used in public administrations and eGovernment (http://www.semic.eu).
Semantic Interoperability Assets	Semantic interoperability assets are a subset of interoperability assets and include any element of the semantic layer, such as nomenclatures, thesauri, multilingual dictionaries, ontologies, mapping-tables, mapping-rules, service descriptions, categories, and web services.
Service	Service orientation means creating and using business processes packaged as

Orientation	services.
Service Level Agreement	A formalised agreement between two cooperating entities; typically, a service provider and a user. The agreement is expressed in the form of a written, negotiated contract. Typically, such agreements define specific metrics (Key Performance Indicators — KPIs) for measuring the performance of the service provider (which in total define the 'service level'), and document binding commitments defined as the attainment of specific targets for certain KPIs, plus associated actions such as corrective measures. SLAs can also cover commitments by the user, for example to meet certain notification deadlines, provide facilities or other resources needed by the service provider in the course of service provision, problem solving, or to process inputs given by the service provider to the user.
Service Oriented Architecture (SOA)	Service oriented architecture is a paradigm for organising and utilising distributed capabilities that may be under the control of different ownership domains. It provides a uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable preconditions and expectations (from OASIS Reference Model for SOA: http://www.oasis-open.org/committees/download.php/19679/soa-rm-cs.pdf).
Standard	As defined in European legislation (Article 1, paragraph 6, of Directive 98/34/EC), a standard is a technical specification approved by a recognised standardisation body for repeated or continuous application, with which compliance is not compulsory and which is one of the following: - international standard: a standard adopted by an international standardisation organisation and made available to the public, - Macedonian standard: a standard adopted by a Macedonian standardisation body and made available to the public, - national standard: a standard adopted by a national standardisation body and made available to the public.
Standards developing organisation	A chartered organisation tasked with producing standards and specifications, according to specific, strictly defined requirements, procedures and rules. Standards developing organisations include: - recognised standardisation bodies such as international standardisation committees such as the International Organisation for Standardisation (ISO), the three Macedonian Standard Organisations: the Macedonian Committee for Standardisation (CEN), the Macedonian Committee for Electrotechnical Standardisation (CENELEC) or the Macedonian Telecommunications Standards Institute (ETSI); - fora and consortia initiatives for standardisation such as the Organisation for the Advancement of Structured Information Standards (OASIS), the World Wide Web Consortium (W3C) or the Internet Engineering Task Force (IETF).
Taxonomy	A taxonomy represents a classification of the standardised terminology for all terms used within a knowledge domain. In a taxonomy, all elements are grouped and categorised in a strict hierarchical way, and are usually represented by a tree structure. In a taxonomy, the individual elements are required to reside in the same semantic scope, so all elements are semantically related with one another to one degree or another.
Vocabulary	A vocabulary is a set of terms (words or phrases) that describe information in a particular domain.
Workflow	The organisation of a process into a sequence of tasks that are performed by duly

designated sets of actors fulfilling given roles in order to complete the process.

Accessibility

To be understood here as Web accessibility, which means that everyone including people with disabilities can perceive, understand, navigate, and interact with the Internet, and have the opportunity to contribute to society. While accessibility is a broad concept, e-Accessibility aims to ensure that people with disabilities and the elderly can access ICTs on the same basis as others.

Accessibility is a term indicating full and simple access and usage of information and communication technology and service offers on the Internet. Accessibility aims at removing technical, visual and other access barriers to avoid the exclusion of persons or groups of people with special needs. With accessibility, people with such special needs should be encouraged to use ICT and Internet offers for exploiting related advantages and simplifications. An important guideline for the implementation of accessible Internet pages is developed and published by the Web Accessibility Initiative (WAI).

Administrative Burden

The cost of administrative work that businesses conduct solely in order to comply with legal obligations (http://ec.europa.eu/enterprise/policies/better-regulation/glossary/index_en.htm).

Aggregate Public Services

A generic term used in the MIF conceptual model for public services to refer to a set of basic public services accessed in a secure and controlled way before being combined and then delivered as a whole to end users.

Authentication

Authentication is the process of verifying and securing the identity of a user or a program when accessing electronically secured data and systems or when performing communication processes. In the authentication process, a certain attribute of a user or system certifies authorized access to such systems or data, for example, a key (see public key cryptography), a smart card, a password, the user name or even biometrical traits (fingerprint). A higher security level can be achieved by the combination of different traits used for authentication.

Authentic Source

An authentic source is information that is stored only once and which is believed to be correct, so can serve as a basis for reuse.

Back Office

The term Back Office includes processes and workflows of companies and public administrations which are, unlike the front office, running in the internal part of an organization and which are invisible for the customer or citizen. Examples are the processing of applications or the issuing of notifications as well as the general management and accounting. Middleware is used to link up (interoperate) the back office with the front office systems.

Basic Public Services

Basic public services are the most fundamental service components from which Macedonian public services can be built. According to the MIF conceptual model, there are three fundamental types of basic public services: base registries, interoperability facilitators, and external services.

Base Registries

Authentic sources of information under the control of a public administration. Examples include registries of persons, vehicles, companies, licences, VAT numbers, locations, buildings, roads, etc.

Best Practice

Best Practices are solutions, practices and products, which are already realized and successfully used in practice. The transfer of such approved practices should reduce costs and preclude mistakes

beforehand. Best Practices are determined by benchmarking assessments, in which products and solutions are compared by standardized quality characteristics. Best practice has recently been replaced by the term ‘good practice’.

Building-Block Approach

An approach to building information systems from architecture to implementation in which the information system is designed as an assembly or aggregation of components that encapsulate data and functionalities in groups that can also be reused as ‘building blocks’ to build other public services or information systems.

Business Process

A business process is a sequence of linked activities that creates value by turning inputs into a more valuable output. This can be performed by human participants or ICT systems, or both.

Business Process Reengineering (BPR)

Business Process Reengineering is an approach to modernize and restructure main business processes in companies or in public organizations based on a radical change. BPR requires a profound reconsideration of functions and a radical redesign of business processes. The aim is to react rapidly to market changes and to changing customer needs thereby saving costs and improving productivity while at the same time exploiting the potentials of modern ICT.

Business to Business (B2B)

In general, the term Business to Business stands for business relations between private companies. Yet, it is mostly used for the communication and the transaction of business processes between companies with the use of information and communication technology.

Business to Government (B2G)

Business to Government describes business processes between private companies and public administrations with the use of information and communication technology.

Certificate

In practical terms, a certificate is a digital identity card or a digital certification provided with a digital signature. A digital certificate from a certificate authority enables a person to prove his or her authenticity and to verify the belonging of a public key to its owner. Certificates are not only issued to identify and authenticate persons but also organizations, server, application programs etc. in a network. A certificate has a given validity and can be revoked or disabled by a certificate authority.

Chip Card

The term Chip Card describes different forms of plastic cards with an embedded microchip. Two types of chip cards can be distinguished: cards which simply store Information (memory card) and cards which are able to store and process data (smart card or integrated circuit card (ICC)). The latter are used e.g. for authentication (see signature card) or for electronic payment.

Client

A Client is a computer or a program that uses different services and resources in a network provided by a server. A browser, for example, is a client to access data (web sites) on a web server over the Internet.

Cloud Computing

Cloud computing, or the cloud, is a colloquial expression used to describe a variety of different types of computing concepts that involve a large number of computers connected through a real-time communication network such as the Internet. In science, cloud computing is a synonym for distributed computing over a network and means the ability to run a program on many connected computers at the same time. Cloud computing providers offer their services according to several fundamental models: infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service

(SaaS) where IaaS is the most basic and each higher model abstracts from the details of the lower models.

Collaborative Platform

A set of specific services and facilities for the use of a specific community and their interactions. The goal is to facilitate cooperation to achieve shared objectives. Typically, the services are communication-related, and incorporate a repository for exchanged objects, information, materials, etc. A notable example is the ePractice.eu platform, designed to enable members of public administrations involved in providing public services to benefit from each other's work, knowledge and experience. Other examples are OSOR.eu and SEMIC.eu (now merged to Joinup.eu).

Controlling

The term Controlling describes systems, concepts and instruments for the controlling and the coordination of the operative and strategic management in an organization. Controlling supports the management unit with delivering relevant management information to control and steer an organization. Consequently, it supports decision-making processes.

Custom-made software

Specific software either developed internally within an organisation (for the MIF, a public administration) or developed for this organisation by a contractor to meet the specific requirements of that organisation. In most cases, the custom-made software is paid in full by the organisation which is consequently the owner of the software, holding all rights related to the further use of this software.

Data Center

A data centre is a facility used to house computer systems and associated components, such as telecommunications and storage systems. It generally includes redundant or backup power supplies, redundant data communications connections, environmental controls (e.g., air conditioning, fire suppression) and security devices.

Data Representation

The manner in which data are expressed symbolically by binary digits in a computer.

Data Protection

Data protection is imposed by law in order to protect personnel data against unauthorized access and abuse. Thereby, also the handling (analysis, processing, use) of data is regulated. Thus, data protection secures personal rights to self-determining the computation and sharing of personal data. This means that everyone can decide in person when, how and to whom his or her personnel data is accessible.

Data Repository

Any collection of data meant for use (processing, storage, querying, etc.) by an information system. Typically, a data repository contains additional structural and semantic information about the data in question, designed to aid the use of the data (data model, relationships between data elements, metadata, etc.). It may provide specific functionalities closely tied to the data stored in the repository (searching, indexing, etc.).

Database

A database is an electronic memory for saving and managing a big amount of data. It is concertedly used by different programs and users and provides a fast access to stored data.

Digital Divide

The term Digital Divide describes the increasing gap of the Have's and the Have-not's within the population due to the influence and the use of information and communication technology. There are people who are not able or not capable of using ICT because of their social background, because they

do not have access to it, etc. Thus these people are excluded and disadvantaged. Consequently, unequal social and economic chances and development potentials do exist for different people.

Digital Rights Management (DRM)

Digital Rights Management covers technologies and legal mechanisms to protect the copyrights of digital data (audio, video, documents, and software) and the access to it.

Digital Signature

The digital signature describes an asymmetric encryption process to warranty the authenticity and the integrity of electronic data and to check the identity of a user. In most cases, it confers to a handwritten signature or can be compared with the possibility to prove one's identity clearly (identity card). The legal effect of a digital signature in Macedonia is regulated by the Law on electronic signature.

Document Management System (DMS)

A document management system is a software system for storing, tracking, editing, managing and publishing electronic documents. Unlike traditional archival storage systems they provide additional functions for the handling of documents. Other terms for document management are enterprise document management or compound document management.

e-Business

e-Business (Electronic Business) deals with all forms of electronic transactions of business processes by the use of information and communication technology.

e-Commerce

e-Commerce (Electronic Commerce) as a part of e-Business deals with business transaction of goods, information and services over electronic systems in the commercial sector.

e-Democracy

e-Democracy includes different approaches of improving democratic communication and participation structures by the use of information and communication technology. E-Voting and e-Participation, for example, are part of e-Democracy.

.

e-Government

e-Government refers to the simplification and the transaction of business processes by the use of information and communication technology in the context of governance and public administration.

e-Government is about using the tools and systems made possible by information and communication technologies (ICTs) to provide better public services to citizens and businesses.

e-Inclusion

e-Inclusion aims to prevent the risks of ‘digital exclusion’, i.e. to ensure that disadvantaged people are not left behind and to avoid new forms of exclusion due to lack of digital literacy or Internet access.

e-Learning

The term Electronic Learning encompasses all forms of teaching and learning with the use of information and communication technology and thus it extends traditional methods of knowledge transfer. e-Learning allows interactive, multimedia-based, cooperative and individual learning without spatiotemporal restrictions.

e-Participation

By the use of information and communication technology, Electronic Participation develops and implements new forms of participation in decision and policy making processes for citizen. These processes are beyond providing just information; they should encourage the direct communication and

discussion between public authorities, elected representatives, politicians, citizens and governance. e-Participation is an offer to take part in the process of forming opinions up to the point of decision making with electronic systems. Aims of e-Participation are to improve public responsiveness and to reach citizen satisfaction.

e-Payment

Electronic Payment is the generic term for accepted systems and processes for the electronic transmission of required data for payment over a network (Internet, UMTS etc.). These processes ensure secure accounting and payment for users and provider.

e-Procurement

Electronic Procurement is the transaction of procurement processes of goods and services of an organization with the use of information and communication technology. Order processes are optimized, procurement costs are reduced and procurement quality is improved by the use of e-Procurement.

e-Tendering

Electronic Tendering, as a part of e-Procurement, describes the process of drawing up a tender till the contracting of a bidder. Thereby, the tendering steps are executed fully electronically using e-Tendering platforms in the Internet. The overall aim is to perform faster, cheaper and more transparent public tender processes.

e-Voting

The term Electronic Voting, as a part of e-Democracy, stands for electronic election as well as online elections. It describes different ways of electing and voting over networks (e.g. the Internet) by the use of information and communication technology independently of the location of a person. Beyond the democratic participation of the citizens the term e-Voting covers simple forms of electing, for example a common voting on a web page.

Electronic Certification

Electronic certification is the application of an electronic signature, by a specifically authorised person or entity, in a specific context for a specific purpose. It is mostly used to indicate that a certain validation process has been executed and that a given result is being attested by the signer. In the simplest case, it can merely represent the assertion of a given fact by an authorised person.

Electronic Records

A record in electronic form (see MOREQ specifications at http://ec.europa.eu/transparency/archival_policy/moreq/doc/moreq2_spec.pdf).

Electronic Signature

According to Directive 1999/93/EC, ‘electronic signature’ means data in electronic form which are attached to or logically associated with other electronic data and which serve as a method of authentication.

MPS establishment process

The activities needed to establish a Macedonian public service (MPS), making it available for use.

Macedonian Interoperability Strategy (MIS)

The Macedonian Interoperability Strategy (MIS) provides the basis for defining the organisational, financial and operational framework (including governance) needed to ensure ongoing support for cross-border and cross-sector interoperability, as well as the exchange of information among European public administrations.

Macedonian public service (MPS)

A cross-border public sector service supplied by public administrations, either to one another or to European businesses and citizens.

Formalised Specifications

Formalised specifications are either standards pursuant to EU Directive 98/34 or specifications established by ICT industry fora or consortia.

Front Office

Front office refers to a set of application programs und organizations that enable the direct contact to customers. These are, for example, web portals, offices for citizens and call centres, where customers (citizens) can inform themselves about services and make use of them directly.

MB – Macedonian BUS

Data Exchange infrastructure tier that enables e-ID management (registration, authentication and authorisation), security, applications interoperability and e-services integration, using web-based workflow for interconnection of back-office systems, providing a single integrated view of the Government by standardising the process for submitting transactions and documents and providing a single registration and single-sign on experience.

MIF - Macedonian Interoperability Framework

An interoperability framework based on open standards that promotes best practice for use of XML and scheme creation for interoperability purposes.

Good Governance

Good Governance is a concept that describes principles, approaches and guidelines for good governance and public administration to promote the interaction and formation of political will in regards to societal and technological changes. The European Commission has formulated five principles for "good governance": openness, participation, accountability, effectiveness and coherence.

Government to Citizen (G2C)

Government to Citizen describes business relationships between public administrations and citizens (as a customer) with the use of information and communication technology.

Government to Government (G2G)

Government to Government describes business relationships between public authorities with the use of information and communication technology.

GovernmentGateway – compare with above (MB)

The GovernmentGateway is a technical infrastructure (Middleware), which enables customers of public administration to enact electronic public information and transaction services via a centralized web based e-Government portal.

HTTPS

The Hypertext Transfer Protocol Secure (HTTPS) is a SSL encrypted HTTP Protocol. HTTPS is based on X.509 certificates and is used for the encryption and authentication during the communication between client and server over the Internet.

Identity Management

Identity Management is the management, supply and use of different user profiles and digital access data. It enables a user to use different identities and control the forwarding of required personnel data during electronic communication. The user decides which personal attributes are forwarded, for example, to protect his or her privacy or to identify him or herself clearly. Systems used for identity

management provide processes for the authentication, password management, access management and the management of rights and resources of single users.

Information

Information is semantically enriched data, i.e. collections of data that have been given relevance and purpose.

Information Society

The term Information Society describes an economic system and a form of society that is influenced by information and communication technologies and where attaining, storing, processing, spreading and use of information and knowledge plays an essential role in all areas of life.

Information and Communication Technology (ICT)

Information and Communication Technology is the collective term for all technical processes and devices for electronic data processing and for the support of communication over electronic media. ICT extends the term Information Technology (IT) with the aspect of electronic communication.
Technology, e.g. electronic computers, computer software and communications technology, used to convert, store, protect, process, transmit and retrieve information.

Information Technology (IT)

Information Technology is the collective term for all technical processes and devices for automatic electronic data processing. It was formerly termed as data processing or electronic data processing (EDP).

Interface

An interface is a conceptual or physical boundary where two (or more) independent legal systems, organisations, processes, communicators, IT systems, or any variation/combination thereof interact.

Interoperability

Interoperability The ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems.

Interoperability describes the ability and the instruments for the direct communication and cooperation between different systems and organizational units based upon common standards, technologies and concepts. Furthermore, interoperability needs a shared understanding of information and an adjustment of data structure. This means, for example, on a technical level that devices with different hardware can communicate in a network based on a common protocol. An example is the connection between a mobile phone and a computer over Bluetooth.

Interoperability Agreements

Written interoperability agreements are concrete and binding documents which set out the precise obligations of two parties cooperating across an ‘interface’ to achieve interoperability.
Interoperability Framework An interoperability framework is an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services. Within its scope of applicability, it specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices.

Interoperability Governance

Interoperability governance covers the ownership, definition, development, maintenance, monitoring, promoting and implementing of interoperability frameworks in the context of multiple organisations working together to provide (public) services. It is a high-level function providing leadership, organisational structures and processes to ensure that the interoperability frameworks sustain and extend the organisations’ strategies and objectives.

Interoperability Levels

The interoperability levels classify interoperability concerns according to who/what is concerned and cover, within a given political context, legal, organisational, semantic and technical interoperability.

Knowledge Management

Knowledge Management refers to a range of technical systems, of the organization and management of explicit and implicit knowledge in companies and public authorities with the aim of efficient identification, storage, processing, spreading and use of knowledge.

Knowledge Society

Knowledge society is a nowadays rather used name for the term and the characteristics of information society.

Legacy System

Generally refers to older systems that still perform essential functions or host/provide access to essential data, but which use older technology, pose difficulties for integrating with newer systems, and for which reimplementation is seen to be difficult or expensive. Strictly speaking, however, any IT system, of whatever vintage, including one that has recently been implemented, but which has not been designed with reuse or integration with other systems in mind, can also be classified as such.

Loose coupling

Loose coupling refers to communications between systems that operate more or less independently of one another (asynchronously) and whose internal states are not strongly interdependent. The coupling takes the form of messages passed between the systems in question, typically implemented using some type of middleware layer or queuing system, so that the target system deals with requests as and when it can. Thus, the target system may not even be available at the time of the request, which is simply queued for later action.

Memorandum of Understanding

A bilateral or multilateral written agreement between two organisations which sets out a number of areas and means by which they will cooperate, collaborate or otherwise assist one another. The exact nature of these activities depends on the nature of the two organisations, the domain of activity in question, and the scope of the cooperation envisaged.

Metadata

Metadata are structured data which contains information about other data and thereby describes data. For example, the attributes of electronic data are detailed by author, right of access, date of the last processing, format and keywords. This makes the retrieval, administration and management of electronic resources substantially easier.

m-Government

Mobile Government is the intensive use of mobile technologies and devices in connection with e-Government. The term also includes the transaction of business processes over wireless networks and mobile devices like Laptops, mobile phones or PDAs. The goal is to provide location-independent access to existing and new services, applications and information for the citizens, companies and public authorities. Thereby, a more flexible and faster service completion and new ways of communication shall be realised.

Middleware

Middleware is a technical infrastructure (software), which enables different applications to access resources on shared systems. Middleware solutions are e.g. required to interoperate front office and back office applications and systems.

Monitoring

The generic term monitoring covers any form of monitoring and controlling of situations, activities, processes or systems. It is often implemented with the use of technical support. Monitoring is also used for managing processes that diverge.

Multichannel Delivery

A channel is a means used by an administration to interact with and deliver services to its users, and for users to contact public administrations with the aim of acquiring public services. The term 'user' includes citizens, businesses and organisations as consumers of public services. The set of different possible 'means' for electronic delivery constantly changes, and currently includes the use of web-based technologies, telephony, paper media, face-to-face contacts and many others, applications of these technologies such as the Internet, e-Mail, SMS, call centres or service counters, and devices to access these applications such as personal computers, mobile phones, kiosks or digital TV. Multichannel delivery refers to the provision of public services simultaneously and independently via two or more such channels, selectable by the user according to needs.

National Interoperability Framework (NIF)

NIFs are interoperability frameworks defined by individual Member States to govern national IT systems and infrastructure within their own countries.

New Public Management (NPM)

New Public management is the generic term for internationally discussed reform and modernization approaches for public authorities. The focus of these models is the adoption of management concepts, theories and instruments, which are used in the private sector, to increase the effectiveness, efficiency, profitability and orientation towards the citizen. The New Steering Model (NSM) is based on NPM and was developed in Germany for the implementation at regional level.

One-stop Government

One-stop Government provides information and services of public authorities on one shared platform with the access over a consistent user interface. This enables the customer to use a broad range of products and services of different authorities via a central access point independent from their location. It enables every citizen e.g. to find all relevant information for specific life events at one place, like contact details of the responsible authority, required forms or applications. This increases the service-orientation and saves time and costs for the customers in processing his or her transactions.

Online Application

Possibility to use a secure and legally compliant electronic application over the Internet.

Online Services

Online Services is the collective term for all kinds of service offers, which can be used over the Internet. It also includes basic (or trivial) services which only provide the access to the Internet and to the available content.

OpenGLAM

OpenGLAM (Galleries, Libraries, Archives and Museums) promotes free and open access to digital cultural heritage held by Galleries, Libraries, Archives and Museums. Main benefits for cultural institutions in Macedonia are greater public awareness of their collections via popular open content portals such as Wikimedia Commons and the Internet Archive, increased discoverability of their holdings through portals like Europeana and Google as well as improved opportunities for their audiences to participate in the curation and enrichment of their collections. See http://openglam.org

OpenAccess

OpenAccess is the practice of providing unrestricted access via the Internet to peer-reviewed scholarly journal articles. OpenAccess is also increasingly being provided to theses, scholarly monographs and book chapters. In an ICT-Hub Macedonia, Macedonian universities should be in the forefront of OpenAccess initiatives of the region.

Open Source

Open Source or Open Source Software (OSS) is software which is freely available. It is allowed to arbitrarily copy, use and pass on the software. Furthermore, the source code is freely accessible and visible for users and can be changed, passed on and published by other developers. See the 10 criteria that define Open Source Software (OSS) at the Open Source Initiative web site: http://www.opensource.org/docs/osd. An alternative definition (of Free Software) can be found at: http://www.gnu.org/philosophy/free-sw.html.

Open Source Observatory and Repository (OSOR)

The Open Source Observatory and Repository for European public administrations (OSOR) is a platform for exchanging information, experiences and OSS-based code for use in public administrations (see http://www.joinup.eu/).

Orchestration

The aggregation and sequenced execution of sets of transactions involving use of other services and functionalities, according to business rules embodied in one or more documented business processes, with the ultimate goal of performing or providing some other value-added function or service. Orchestration is closely related to the concept of workflow. Usually orchestration involves executing a set of processes, described in a standard language, by an 'orchestration engine', which is configurable and capable of executing all the requisite service calls and routing the inputs and outputs of processes according to rules described in that language.

Outsourcing

Outsourcing is a strategy for the delegation of fields of work and services of an organization to an external contractor. The motivators for outsourcing are to lower costs, to increase the effectiveness and to concentrate on the core business of an organization. Another driver for outsourcing is when the fulfilment of (non-core) operations is cheaper and effectuated more efficiently from a service provider.

Point of Single Contact (PoSC)

Single institutional interlocutor for a given service provider through which the latter can collect all relevant information and easily complete at a distance and by electronic means all procedures and formalities to access a service activity and to the exercise thereof (see Article 8 of the Services Directive — OJ L376 of 27.12.2006).

Project Management

Project Management refers to the planning, orchestration, organization and controlling of all activities relevant for a successful project implementation, including the coordination and leadership of the project team.

Proprietary Software

Software that, generally for a fee, can be used on a limited number of computers and/or by a limited number of users. The internal working of the software (the source code) is not available for study and/or modification by the user.

Proprietary Specifications

Generally refers to specifications that are either partially or totally unpublished, or are only available from a single vendor for a substantial fee, and/or under restrictive terms, thus making the implementation and use by third parties of products that conform to the given specifications subject to control.

Protocol

A set of conventions that govern the interaction of processes, devices and other components within and across systems.

Public Key

The Public Key Cryptography is an asymmetric encryption process for data which uses a pair of cryptographic keys to encrypt a message (one for the encryption and one for the decryption). The private key is only known by the owner. For example, it allows the encryption of an eMail with the public key of a person which only can be decrypted with the corresponding private key of this person.

Public Private Partnership

Public Private Partnership (PPP) is a sustainable way of cooperation between private and public Institutions to attain corporate objectives. With this form of collaboration, public duties are performed using synergies and balancing competencies among public and private bodies. This may result in partial or full privatization of public duties.

Qualified Electronic Signature

A qualified electronic signature fulfils certain security requirements of the Digital Signature Act and the Ordinance on Electronic Signatures. Actually, it represents the highest security level for electronic signatures. Thus it is also suitable for the use in communications among jurisdictions and in electronic legal relations.

Record

Document(s) produced or received by a person or organisation in the course of business, and retained by that person or organisation (see MOREQ specifications at http://ec.europa.eu/transparency/archival_policy/moreq/doc/moreq2_spec.pdf).
Note: a record may incorporate one or several documents (e.g. when one document has attachments), and may be on any medium in any format. In addition to the content of the document(s), it should include contextual information and, if applicable, structural information (i.e. information which describes the components of the record). A key feature of a record is that it cannot be changed.

Catalogue of Registers (CoR)

Unified State Registry of Information (Catalogue of Registers) - a single catalogue of registers, databases, services and information systems of the registry subjects, aiming at description of information resources available within the Macedonian public sector, establishment of uniform standards for information processing, facilitation of coordination and coherent development of information systems, promotion of uniform information policy and efficient use of public resources.

Reusability

The degree to which a software module or other work product can be used in contexts other than its original, intended or main purpose.

RSA

RSA is probably the best known asymmetric encryption algorithm for data. The RSA algorithm calculates the keys from two large prime numbers. The process was named after the initials of the inventors Rivest, Shamir and Adleman (RSA).

S/MIME

The Secure Multipurpose Internet Mail Extensions Standard (S/MIME) is a process for the encryption and digital signature of messages (e-Mails).

Secure Data Exchange

This is a component of the conceptual model for European public services. Its aim is to ensure that all cross-border data exchanges are done in a secure and controlled way.

Semantic Interoperability Centre Europe (SEMIC.EU)

Semantic Interoperability Centre Europe is a collaborative platform and service offered by the European Commission to support the sharing of interoperability assets to be used in public administrations and e-Government (http://www.joinup.eu).

Semantic Interoperability Assets

Semantic interoperability assets are a subset of interoperability assets and include any element of the semantic layer, such as nomenclatures, thesauri, multilingual dictionaries, ontologies, mapping-tables, mapping-rules, service descriptions, categories, and web services.

Service Level Agreement (SLA)

A Service Level Agreement is an agreement or rather a contract between a service provider and a customer. The agreement contains specifications about the purpose, the scale of operations and the quality of a service on defined conditions.
A formalised agreement between two cooperating entities; typically, a service provider and a user. The agreement is expressed in the form of a written, negotiated contract. Typically, such agreements define specific metrics (Key Performance Indicators — KPIs) for measuring the performance of the service provider (which in total define the 'service level'), and document binding commitments defined as the attainment of specific targets for certain KPIs, plus associated actions such as corrective measures. SLAs can also cover commitments by the user, for example to meet certain notification deadlines, provide facilities or other resources needed by the service provider in the course of service provision, problem solving, or to process inputs given by the service provider to the user.

Service Orientation

Service orientation means creating and using business processes packaged as services.

Service Oriented Architecture (SOA)

Service oriented architecture is a paradigm for organising and utilising distributed capabilities that may be under the control of different ownership domains. It provides a uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable preconditions and expectations (from OASIS Reference Model for SOA: http://www.oasis-open.org/committees/download.php/19679/soa-rm-cs.pdf).

Shared Service Centre (SSC)

A Shared Service centre is an independent organisational unit within an organization, which provides in-house services for several organisational units working almost independently. Thus shall allow the efficient use of shared resources, the bundling of services and the simultaneous support of different organisational units. The concept of Shared Service Centres has become of big interest in the e-Government sector as well.

Signature Card

The signature card is a chip card which includes, among other things, an electronic signature and required certificates for an easy and secure authentication process. Thereby a legally binding electronic signature is enabled. Such signatures are used for example for secure e-Mail communication, online transactions and for the encryption of documents and data.

Single Sign-on (SSO)

Single sign-on is the one-time authentication of a user at a system, which enables access to different services and systems outside the initial system without renewing authentication at each subsystem.

Secure Socket Layer (SSL)

A protocol for encrypting messages during the data transfer on the Internet. SSL enables encrypted connections and the authentication of certificates in real time by the X.509 standard. The public key cryptography is used to encrypt the messages.

Standard

The term standard is mostly used for common, well-known and generally approved rules for engineering approaches and solutions in specific contexts. When used as synonym for norms, the

expression refers to a set of legally approved rules, which have undergone an official evaluation procedure at an (international) standardizations organisation (ISO, ITU, W3C, etc.).

As defined in European legislation (Article 1, paragraph 6, of Directive 98/34/EC), a standard is a technical specification approved by a recognised standardisation body for repeated or continuous application, with which compliance is not compulsory and which is one of the following:

- international standard: a standard adopted by an international standardisation organisation and made available to the public,
- European standard: a standard adopted by a European standardisation body and made available to the public,
- national standard: a standard adopted by a national standardisation body and made available to the public.

Standards developing organisation

A chartered organisation tasked with producing standards and specifications, according to specific, strictly defined requirements, procedures and rules.
Standards developing organisations include:

- recognised standardisation bodies such as international standardisation committees such as the International Organisation for Standardisation (ISO), the three European Standard Organisations: the European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardisation (CENELEC) or the European Telecommunications Standards Institute (ETSI);
- fora and consortia initiatives for standardisation such as the Organisation for the Advancement of Structured Information Standards (OASIS), the World Wide Web Consortium (W3C) or the Internet Engineering Task Force (IETF).

Taxonomy

A taxonomy represents a classification of the standardised terminology for all terms used within a knowledge domain. In a taxonomy, all elements are grouped and categorised in a strict hierarchical way, and are usually represented by a tree structure. In a taxonomy, the individual elements are required to reside in the same semantic scope, so all elements are semantically related with one another to one degree or another.

Transaction

A transaction describes the exchange of services (goods and services) or data, and the transfer of rights of disposal.

Trust Centre

A trust centre is an independent institution for issuing certificates and assigning electronic signatures. The trust centre is responsible for the issuing, renewal, verification and management of certificates and it ensures authenticity and an efficient processing. Only trust centres accredited by the Federal Network Agency may issue qualified electronic signatures.

Vocabulary

A vocabulary is a set of terms (words or phrases) that describe information in a particular domain.

Workflow

The organisation of a process into a sequence of tasks that are performed by duly designated sets of actors fulfilling given roles in order to complete the process.