

**BULGARIAN NATIONAL INTEROPERABILITY
FRAMEWORK FOR
GOVERNMENTAL INFORMATION SYSTEMS**

**Adopted by the Council of Ministers
(Decision Nr. 482 of 28 June 2006)**

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1. Introduction

The present document is developed in compliance with the “European Interoperability Framework for pan-European e-Government Services” version 1.0 published in November 2004. The European framework has been created in pursuance of the initiative “eEurope 2005”, adopted at the Seville summit (June 2002). In accordance with its Recommendation Nr. 1, “Member State administrations should use the guidance provided by this European Framework to introduce a pan-European dimension into their own interoperability frameworks and administrative infrastructures”.

The high priority of the interoperability problem has been underlined in the Communication of the European Commission COM (2006) 45 dated 13 February 2006, entitled “Interoperability for pan-European e-Government services”. According to it, the interoperability is one of the four major challenges for the establishment of a Common European information space, as it is formulated in the Strategic initiative “i2010”.

The IDABC Programme (Interoperable Delivery of European e-Government Services to public Administrations, Businesses and Citizens) of the European Commission has proposed the following “road map” for the creation of a pan-European environment, ensuring system integration and interoperability of the information systems, passing through the following basic phases:

- development of an “Interoperability Framework for Information Systems”;
- development of Guidelines and specific rules for System Integration and Interoperability of applications related to the e-Government;
- development of “Architecture Guidelines and Reference Models”;
- setup of XML Clearinghouses - centralized storages of information resources, required for achieving Interoperability;
- development of a “pan-European Administration Orientation Map”.

In accordance with the definitions adopted in the European Union:

- ***interoperability means the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge;***
- ***the system integration is defined as a capability of the functional behaviours of the various systems as well as the data on which they are based to be integrated in new business processes;***
- ***an interoperability framework can be defined as a set of standards and guidelines that describe the way in which organizations have agreed to interact with each other.***

The interoperability framework cannot be a static document – it requires being permanently adapted to the changes in the technologies, the standards and the administrative infrastructures.

One of the most essential problems of the development of administrative information systems is the achievement of system integration and interoperability – both in the context of the information exchange between the systems of

administrative bodies, and in the realization of e-Services for citizens and organizations.

The integration of the information systems (the so called “System-to-System Integration - **S2Si**”) is facing a number of challenges:

- heterogeneity of the processes;
- heterogeneity of the system realizations;
- heterogeneity of the data structuring and presentation;
- requirements for security and reliability of the exchange.

Beside the discrepancies in software and technological aspect, the unregulated exchange between the partners also represents a problem.

While the heterogeneity is not having so serious consequences in the realization of e-services for natural persons, for the business information services where the problems of the different providers of e-services are transferred into the corporate systems of the companies-users, the situation is extremely serious. The problems become deeper also because of the requirements for integration of the national systems of the EU member states with the aim to organize cross-border e-services.

All this imposes the necessity for the development of the present National Interoperability Framework in conformity with the internationally adopted standards and the practices in the EU member states.

2. Guiding principles in the European Interoperability framework

2.1. In accordance with Recommendation Nr. 2 of the European Framework, in order to reach a pan-European level of the services of the authorities the following main principles have to be adopted:

- accessibility;
- multi-linguistic character;
- security;
- personal data protection;
- priority to the decentralized responsibility;
- use of open standards;
- benefiting from the advantages of the open code;
- multilateral relations.

2.2. In accordance with Recommendation Nr. 3 of the European Framework, the interoperability contains three aspects:

- technical - enabling exchange between the applied systems in various computers;
- semantic - providing one and the same meaningful content of the exchanged data;
- organizational - creating organization for the management of the processes for data exchange and processing between different organizational structures.

Besides that, the technical interoperability is distributed on:

- the methods for data presentation;
- the methods of access;
- the methods for data integration;
- the architectures for distributed applications;
- the protocols for exchange of messages and files;
- the network services;
- the services for the security of the exchange and the storage of the messages.

The semantic interoperability is based on specific information resources of two types:

- resources providing for morphological compatibility (nomenclatures, thesauruses, onthologies, etc.).
- resources providing for syntactical compatibility (XML-schemes, models and schemes of metadata, etc.).

2.3. The maintenance of the Interoperability Framework is a permanent task requiring institutional structure and well-defined rules.

2.4. In accordance with the “Strategy of IDABC for interoperability of the content” the following conditions have to be observed for the successful application of the Interoperability Framework”:

- continuous stability of the basic parameters of the Framework;
- feedback from the users;
- open and transparent process of changes of the basic documents;
- policy and mechanisms for quality management;
- adaptation to the expected new applications;
- focus of the changes on the processes and not on the standards;
- publication and allocation of the resources, oriented to the provision of the interoperability (definitions, terminologies, vocabularies, rules, etc.) in suitable formats;
- identification, enlargement and multiple use of the existing resources, oriented to the provision of the interoperability;
- key role of the registers with meta data.

3. Objectives of the National Interoperability Framework

A. The general objectives of the unification and rationalization of the Information infrastructure of the governmental information systems can be formulated as follows:

- Social efficiency, minimization of the capital investments and the exploitations costs;
- Equal treatment of the participants in the exchange;
- Security, confidential exchange, personal data protection, intellectual property protection;
- Homogeneity and interoperability of the information structures – basis for macro-management of the cybernetic principles;
- Integration in the global and regional information structures.

B. From practical point of view the pointed out overall objectives can be achieved through:

- Invariance of the access to the systems and their exchange with the environment;
- Compatibility of the processes and the data flows;
- Integration of the applications;
- Automation of the processes of information exchange;
- Multiple use of single input of data (data blocks);
- Multiple use of already developed or bought software components and products;
- Use of already built information systems;
- Scaling of the decisions;
- Transferability and independence from the platforms;
- Possibility for flexible readjustment of the procedures after changes in the environment and the requirements.

4. Subject area

4.1. The interaction of the information systems in the governmental information systems in the Republic of Bulgaria is defined in the following documents:

- Strategy for the modernization of the State Administration – from accession to negotiation, adopted with a Decision of the Council of Ministers Nr. 465 dated 2003;
- e-Government Strategy of the Republic of Bulgaria, adopted with a Decision of the Council of Ministers Nr. 866 dated 28 December 2002;
- Plan for the implementation of the e-Government Strategy of the Republic of Bulgaria for the period 2003 - 2005, adopted with a Protocol Decision of the Council of Ministers dated 11 March 2004;

4.2. In essence these information systems (not depending on the common technical and telecommunication environment) perform comparatively autonomous functions – three basic and one auxiliary:

A. Function “Macro-management of the country” where analytic-synthetic procedures are predominating, related to the processing of unstructured information, with non-formalized preliminary exits and continuous time periods for generation of the decisions.

B. Function “Electronic services for the citizens and the business” where predominating are the formalized procedures for processing of structured information in a regime close to the real time.

C. Function “Exchange of information between the units of the administration” – data exchange predominantly connected to the technological processes in the administration itself. This covers:

- exchange of structured data;
- exchange of unstructured data (including graphically organized data and multimedia);
- exchange of meta-data.

D. Auxiliary function “Adaptation and upgrading” which on the basis of the information from the functioning of the three basic systems enables that analysis will be prepared for the effectiveness of the actions of the units of the administration branch and recommendations for their improvement.

4.2.1. The applications related to the e-services are first and foremost critical for the integration between the information systems. This is stemming from the circumstance that the latter are most dynamic, they act in the most heterogeneous environment and include in themselves procedures with different degree of automation.

4.3. The functions of the information systems in the governmental information systems develop in the hierarchical environment of the public and the local administration, which from a system point of view represents a non-canonic hierarchy (because of some autonomy of some of the levels and the functional relations, leaping across several levels). Irrespective of this, the principles for obtaining integration and interoperability are invariant in respect to the levels of functioning of the information systems.

4.4. The modern infrastructure for complex e-services supposes:

- realization of the services as a complex value added chains;
- centralized management of the process of provision of services in its whole “life cycle”;
- requesting and receiving the services from “one-stop shop” (including territorially distributed ones).

However the exchange of data between the information systems (the applications respectively) is realized at four levels:

- transport (between the systems);
- transactions;
- syntactic (between the applications);
- semantic.

4.5. The choice of fundamental standardization platform is of crucial importance, because of the exceptional diversity of the standards and the specifications related to the system integration and the interoperability. The evolution of the standardization process in respect to the system integration and the interoperability directs this choice towards the integration oriented to services. The latter allows not only for transfer of information from one application to another application in different information systems, but also the creation of complex application through services, maintained in remote systems through the distribution of common business logics between the applications.

4.5.1. The basic approach to the creation of the National Framework is a combination of:

- the classical Reference model for open distributed processing (international standard ISO/IEC 1076 : 1998), which defines the infrastructure for distributed

processing of information between heterogeneous technological resources and multiple organizational domains;

- the last level in the evolution of the standards for system integration – the so-called “Service oriented architecture (SOA)” where “loose coupled” modules of applications are distributed, combined and used for the creation of new applications in the network.

4.6. The standardization of the information systems in the governmental information systems in the field of the system integration and the interoperability covers wider area than that of the so-called “formal harmonized standards” approved by official intergovernmental standardization bodies (such as ISO, ITU at a global level or CEN, CENELEC, ETSI – at European level). It covers informal and hybrid standardization processes – the production of sectoral consortia, such as: OASIS, IETF, W3Consortium, UN/CEFACT, OMG, etc.

4.7. The above mentioned standards can be divided into two main groups related to the fields of application,:

- horizontal standards – with general application (in all areas);
- vertical standards – with application in the specific area (branch, etc.). As an example for the objectives of the governmental information systems these can be: medical information, banking, geographic information systems, industrial product systems, etc.

The present Framework is treating thoroughly only the horizontal standards, ensuring system integration and interoperability in the information systems within the administration. The vertical standards from areas concerned with these systems will be maintained by branch groups and an information relation with the Register of the standards, object of the present document, will be realized.

4.8. Relying on the definition perceived in the European Union, the National Interoperability Framework is built on the hierarchical principle:

- the main directions are formulated from several basic principles;
- the principles are realized by procedures, formulated in the respective methodologies and instructions;
- the technical aspect of the interoperability is guaranteed by a dynamic series of standards;
- the whole application of the National Framework is ensured with respective organizational and technological events.

5. Basic principles of the National Interoperability Framework

The present document specifies the scenarios and the technologies for obtaining system integration and interoperability. Here, the principles, the observation of which ensures them, are supplemented by rules, definitions and recommendations which make them more detailed.

Principle Nr.1: In accordance with Recommendation Nr. 14 of the European Interoperability Framework, the main factor ensuring system integration and interoperability is the application of open internationally adopted standards. This is

guaranteed through the support of a Register of the standards with “on-line” access, containing standards of different degree of compulsory character.

A. The basic criteria for choice of the standards are as follows:

- openness;
- level of accessibility and maintenance;
- maturity;
- potential;
- applicability to the national conditions;

B. The term “Maturity of the standards” has been introduced in compliance with the so-called “Model of maturity of the standards” considering five levels of effectiveness and applicability of the respective standard.

C. The Registers treated in the present National Framework (Register of the standards, Register of the information objects, Register of the electronic services) are specific information resources, intended for the developers of information systems and providers of software products for the e-Government. This predetermines the technology and the instruments for their support.

The name “**Register**” in the present National Framework means both **an information resource and the Registration body in the sense of BDS ISO/IEC 6523-2:2000.**

D. The Register of the standards is a dynamic structure, reflecting the current situation of the standardization processes and the possibilities for their application in the current moment. The register is supported and updated by a double-unit structure containing expert and executive part through procedures regulated in the respective Instruction Manuals.

Principle Nr. 2: The “Service oriented Architecture (SOA) is accepted as the basis for building of the information systems within the governmental information systems. In accordance with SOA all procedures related to exchange of information in the infrastructure of the governmental information systems (including: the information exchange between the systems of the different administration units; the information exchange between the administration and the citizens and the citizens and the companies when delivering e-services) can be represented, defined and parameterized as “services”.

On its part, every so presented “service” forms the following hierarchical structure:

- Complex (composite) service;
- Primary (elementary) services;
- Documents (information, official);
- Elements of data (segments, composite elements, simple elements).

A. In the present document “Electronic Service (e-Service)” is defined in accordance with the Directive of the European Parliament and the European Council

Nr. 98/48/EC dated 20.07.1998 as **“a public service, provided by the administration at a distance, in electronic way, called (activated), related to exactly defined transactions”**.

B. The primary services provided by different units of the governmental information systems, can be of different degree of automation (they also can contain manual operations) but for the customer they represent an unified process with one entry and exit and with a possibility for “on-line” tracing of the phase of execution.

C. In order to realizing complex services with a single interface, integrating primary services provided by different units of the governmental information systems, all services (primary and complex) have to be mandatory registered in the Register of the e-Services.

D. The Register of the e-Services organizes an environment of complex e-Services including: standardized nomenclature and classification of the primary and the complex services, rules for joining the services in Value Added Chains and their provision to the customers.

E. The entry into the Register of e-Services can be done with examination of the conformity with the mandatory and recommended standards registered in the Register of the standards. The Register will be supported and updated by a double-unit structure analogous to that for the Register of the standards.

Principle Nr. 3: All services are realized as transactions of formalized information objects – electronic documents.

A. “Electronic document” in the context of the “interoperability” is: **“logically completed self-describing information structure, which can be visualized and at the same time processed by the information systems of the governmental information systems even without direct human intervention. Here, the electronic document contains mechanisms for undisputed authentication and protection against illegal access”**.

B. In order to ensure traceability of the transaction process and demonstrability of the participants in its individual steps, the storage of copies has to be provided both of the electronic document filed by the consumer of the e-service to the provider of the service, and of the documentary confirmation for its receipt on the part of the provider.

C. Definition – **The transaction realizes exchange of messages between two interacting processes, in such a way that they coordinate the performance of their functions. The transaction protocol guarantees either the complete performance of the functions or the recovery of the environment in the status in which it has been before the transaction in case of interruption or fatal error.**

D. In accordance with the general recommendations of the European Interoperability Framework to the national frameworks of the member states, the e-Services have to be consumer oriented: thoroughly described, correct, understandable, clearly differentiated into anonymous, requiring identification, etc.

E. In order to ensure electronic documents exchange management in the governmental information systems, every administrative unit has to maintain a system for effective management of electronic content, consistent with:

- The MoReg specification for management of electronic recordings, based on the European Regulation 94/C 235/03;
- The IDABC Strategy for interoperability of the electronic content (document ENTR/02/21-MIDDLEWARE-XML).

Principle Nr. 4: All data of the companies and the citizens, interacting with the governmental information systems, can be entered only once. The administration units are obliged to use the data already gathered on a multiple basis. The holders of the information resources are obliged to provide access thereto of all providers of e-Services using the respective information resource on the basis of regulated rights to access.

A. The single entry of the data and their multiple uses as well as the semantic interoperability between the various applied systems of the e-Government is realized through the Register of the information objects.

B. It is obligatory to enter in the Register of the information objects every electronic document foreseen to be used in newly developed information systems as well as the segments composing it, composite and simple elements of data. In case of presence of already registered elements and segments from the composition of the newly proposed document, they are used in it synonymously without repeated registration.

C. Every information resource, referred to the e-Government, has to have an exactly specified owner (holder). The latter is obliged to coordinate with the Register of the information objects every change in the structure of the information resource.

D. The entry of the information objects in the Register is realized with examination of the conformity with the standards adopted to be mandatory and recommended, registered in the Register of the standards. The Register will be supported and updated by a double-unit structure, analogous to the Register of the standards.

E. The Register of the information objects has to contain a comprehensive specification of the organizations having different rights of access to the information resources (including entry, reading, corrections, etc.).

F. The management of the life cycle of the information in the e-Government systems has to be consistent with the Recommendations of the so called "Data Management Forum (DMF)".

F1. "Management of the life cycle of the information" means the complex approach for management of the data flows and the metadata associated with them in the information systems from the formation and the initial storage to the moment of their falling into disuse.

Principle Nr. 5: In order to ensure a common interface in the information exchange between:

- a) the units of the governmental information systems;
- b) governmental information systems and consumers of complex e-services (physical persons and legal entities).

every exchange between the providers of information (units of the governmental information systems) and the consumers of information (units of the administration, citizens, companies) must be realized through “integration (intermediary) environment”.

A. Definition – according to the “IDABC architectural principles”: ***the intermediary environment organizes the communications between the applications and the objects (local and remote) by connecting different parts of the allocated IT-architecture and maintains the exchange between remote applications.***

B. The intermediary environment is built-up of “Basic components” performing specific functions. The basic components are ***“complex autonomous, self-controlled modules of applications having clearly defined interfaces and functions in the context of the general architecture of the information systems within the administration”.***

C. In accordance with recommendation Nr. 5 of the European Interoperability Framework the transactions between the “integration environment” and the consumers should be based on conventions for exchange, forming so called “interfaces for business interoperability”.

Principle Nr. 6: In accordance with Recommendation Nr. 12 of the European Interoperability Framework the security aspects of the intersystem exchange cover the following levels:

- analysis of the global and local environment;
- analysis of the type of information during the design or enlargement of the functional capabilities of the network;
- building of the public key infrastructure (PKI);
- monitoring, diagnosis and measures for protection in a situation of threat for the information security;
- controlled access to information;
- ensuring of authenticity and completeness of the information;
- measures for protection at the level of working stations, including at client’s level (including “firewalls”, antivirus protection; Trojan horses and other programmes bringing the computer systems into undesirable status or results).

A. The permanent analysis of the type of information has to be performed in accordance with the classification levels for information security, defined in the European Security Regulation, adopted with a Decision of the European council 2001/264/EC.

B. The aspects pointed out cover the following areas of the definitions in the “Ordinance for the mandatory general conditions for security of the automated

information systems or networks wherein classified information is generated, processed, stored and transferred”:

- documentary security;
- communication security;
- cryptographic security;
- computer security.

B1. The exchange of electronic documents between the units of the administration should follow the policies of the European Union for authentication and authorization of the participants in the exchange of electronic documents and data, presented in the document “ENTR/01/67-CONSEC SA6/IDA_Auth_Pol”. This includes:

- coordinated authentication of the users;
- single public key infrastructure (PKI);
- unified services for the integration of the directories;
- unified services for secure exchange with external systems.

C. The provision of conditions for trust services is an essential element from the “Integration environment”. Here one has to follow the “European Trust Recommendations”.

Principle Nr. 7: The adequate application of the standards for interoperability (fixed in the dynamically supported register of the standards) in the information systems within the administration must be realized through conformity assessment procedures.

A. Every software product or information system being developed or bought with the aim to be applied in the administration has to be certified for conformity in accordance with a special Instructions Manual.

B. The certification for conformity is based on conformity tests, carried out by organizations authorized for this. The test methodics is based on the ETSI (European Telecommunication Standardization Institute) Recommendations and are adopted by the Authority, empowered to support the Register of the standards.

C. Besides the conformity with the entries in the three registers mentioned, the certification procedure should include a testing for the minimum requirements for security, corresponding to the European recommendations mentioned above.

6. Measures for practical application of the National Interoperability Framework for governmental information systems

The practical application of the National Interoperability Framework requires the resolution of the following immediate tasks:

6.1. The present document has to be an integral part of the e-Government strategy of Republic of Bulgaria adopted by Decision Nr. 866 of the Council of Ministers dated 28 December 2002 (Annex to p. 6 “Organization and Management”, Section “Methodology and Standards” of the Strategy).

6.1.1. The National Framework has to be obligatory for all newly introduced information systems in the units of the administration.

6.1.2. The documentation for participation and the technical specifications for all procedures for design, development or supply of departmental information systems in accordance with the Public Procurement Law should be consistent with the National framework.

6.1.3. “A Programme for bringing the existing information systems in conformity with the National Interoperability Framework” to be developed in coordination with the ministries.

6.2. It is necessary to establish and ensure the maintenance of the centralized registers.

6.2.1. The registers, defined in the National Framework (Register of the standards, Register of the information objects, Register of the e-services) give practical guidance of the contracting authorities, the developers and the providers of information systems and software products for the administration, as follows:

a) minimum amount of requirements, which the contracting authority has to set in his specification;

b) minimum amount of requirements, which the contacting authority should set for the technology of the exploitation and organization of the realization of the services provided by him;

c) direction for the Contractor what kind of means to select for development. A barrier is posed to the requirements which in essence draw the developments back in technological aspect.

6.2.2. The creation and the functioning of the registers will be provided through the adoption of regulating instructions on the basis of the following documents developed as annexes to the National Framework:

A. “Methodology for maintenance and management of the working processes for identification, adoption, application and development of the standards, providing system integration and interoperability of the information systems within the administration of the Republic of Bulgaria”.

B. “Methodology for the building and support of a Register of the information objects, ensuring system integration and interoperability of the information systems within the administration of the Republic of Bulgaria”.

C. “Methodology for the building and support of a Register of the e-services provided by the administration of the Republic of Bulgaria”.

6.3. It is necessary to adopt Instructions Manual for the order and the conditions for Certification of the departmental information systems in respect of their conformity with the present National Framework. In compliance with the European

practice the so called “voluntary certification” realized by bodies of professional associations has to be introduced.

6.4. It is necessary to define and ensure the creation and the exploitation of basic components performing specific functions in the environment of the information systems within the administration. In compliance with the basic formulations in the “e-Government Strategy of the Republic of Bulgaria” and the analysis of the best practices in the EU member states the following “basic components” can be pointed out as part of the “the integration environment” of the information systems within the administration:

- Information intermediaries (messaging brokers);
- Authorization and validation module;
- Module for electronic payments to the administration;
- Virtual post office;
- Central portal;
- Interfaces and adaptors to existing data basis;
- Server of application forms;
- Module for content management;
- Module of a public desk for e-services.

In this way the content of the Bulgarian National Interoperability Framework (Scheme – Annex 1) will completely cover the definition adopted by the European Union:

- the rules are defined in the basic document:
- the required series of standards will be maintained dynamically in the current type in the respective register;
- the instructions for building and support of the three registers as well as the Instructions Manual for certification of the information systems and products represent specific guidelines for action.

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