

Interoperability Data for Greece, 2012

1. Interoperability as a strategic goal	
1.1. Strategic Priority on Interoperability	Yes
<p>Strategic priority on interoperability for Greece is demonstrated in the Greek eGovernment Interoperability Framework, which is part of the overall design of the Greek Public Administration aiming to provide eGovernment services to enterprises and citizens. Being one of the projects that have been prioritized as critical for the development of eGovernment within the Digital Strategy for the period 2006-2013, it is moreover the cornerstone of the latter, while it is also directly related to the objectives and guidelines of EU Policy 2010, European Information Society 2010 [1].</p> <p>Strategic priority on interoperability is additionally reflected in the “Digital Convergence” Operational Programme, in which it is mentioned as one of the factors affecting the programme’s success, and where is also stated that IT projects under the specific programme are obliged to comply to the Greek e-GIF to enable shorter time-to-market and develop high quality services [2]. On 24 May 2011, the Greek Parliament adopted the Law on e-Government which constitutes the institutional framework for the organization and simplification of the relationship between the government and citizens/businesses through ICT. The law creates a general framework for e-Government in public administration by, among others, examining issues related to the authentication of user services [1].</p> <p style="text-align: right;">[1, 2]</p>	
1.2. National Interoperability Strategy Status	Not planned (2011)
2. National Interoperability Frameworks	
2.1. National Interoperability Framework Status	
2.1.1. Title	Greek e-Government Interoperability Framework (eGIF) http://www.e-gif.gov.gr/ [1, 2, 3]
2.1.2. Version	Version 3.0 (4th version is under development) [2]
2.1.3. Release Date	January 2009 [3]
2.1.4. Focus / Scope	Conception, Implementation, Operation
<p>The Framework defines standards, specifications and rules for the development and deployment of web-based front and back office systems for the Greek Public Administration at national and local level [1]. Although it refers to vision and strategy it is not a systematic approach. The conception, the implementation and the operation are analyzed adequately [3]. The Greek eGIF consists of the following five building blocks [1, 2]:</p> <ul style="list-style-type: none"> - Certification Framework for Public Administration Sites and Portals - Interoperability and Electronic Services Provisioning Framework - Digital Authentication Framework - Documentation Model for Public Administration Processes and Data - Interoperability Registry prototype <p style="text-align: right;">[1, 2, 3]</p>	
2.1.5. Audience	Government sector (2011)
2.1.6. Status	Published

<p>The Greek eGovernment Interoperability Framework is mature (it has been updated to version 3, with version 4 under development), and is regulated by law (3882/2010), which applies to both the framework itself as well as the maintenance processes that surround it. It is however not mandated or enforced by law. Nor is the maintenance process described by law. Still, IT projects under the “Digital Convergence” operational programme are obliged to comply to the Greek e-GIF to enable shorter time-to-market and develop high quality services.</p>	
[2]	
2.1.7. Responsible Agency	Greek Ministry of Interior, General Secretariat of Public Administration and Electronic Government, Information Development Service (http://www.gspa.gr/) [1, 3]
2.2. Compatibility of National Interoperability Framework with the European Interoperability Framework	Yes
<p>The Greek Interoperability Framework is in conformance with the European Interoperability Framework (EIF).</p>	
[1]	

3. Interoperability Projects and Activities

3.1. Number of interoperability-related projects of local or national scope	Moderate
<p>National-Public Administration Portal:</p> <ul style="list-style-type: none"> - SYZEFXIS, the National Public Administration Network (launched in 2001, and entering its full production state in Nov 2005), the largest and most modern broadband administration network across Europe, linking approx. 6 000 bodies in 2010 and covering thereby the entire Greek territory, and ensuring communication by telephone, data and video among the latter, as well as the infrastructure required to link the information systems, in order to develop and provide electronic services to citizens and businesses (http://www.syzefxis.gov.gr/). Since 2007, ‘SYZEFXIS’ is connected to the modern European public administration network ‘s-TESTA’, enabling Greek public authorities to access advanced ‘s-TESTA’ services [1]. - ERMIS, the National Portal of Public Administration (May 2009), encompassing the most modern technological infrastructure for ensuring interoperability between the computer systems of public services as well as secure transaction of public information through digital certificates, and providing 100 online services - organized in various ways to facilitate the navigation for the citizens - and 11 complete transactions (http://www.ermis.gov.gr/). ERMIS Interoperability Infrastructure and Portal is linked to all Citizen Service Centres, and offers one-stop, automated, interoperable digital services delivery for citizens and businesses [1, 4]. <p>E-Government Backbone:</p> <ul style="list-style-type: none"> - The National Authentication System, a large-scale project, aiming to enable interoperable, digital transactions of all types, and encompassing as its main components i. the SYZEFXIS Network, and more specifically the PKI (Public Key Infrastructure) service offered by the latter, ii. ERMIS, the national portal, providing integrated and secure eGovernment services at all levels from a central point, and aiming thus to become the backbone of the National Authentication System, and iii. the management of public sector certificates by the Hellenic Public Administration Root Certification Authority (HPARCA) [1]. <p>Research & Education Network:</p>	

- **GRNET**, the Greek Research and Technology Network, a project supporting the electronic interconnection of academic and research institutions among themselves as well as with relevant academic networks world-wide through research and education networks (<http://www.grnet.gr/>) [1].

Environmental Geoportal: EU-Funded

Marine Data Management Infrastructure: EU-Funded

Legislation & e-Justice System:

- **E-Themis Online Legislation Portal** (Dec 2006 – Nov 2008), realized within the framework of a project regarding the “Design and Implementation of a System for Automating the Administration, Archiving and Dissemination of Legislation to the broader Public”, and aimed to provide online access to the complete Greek legislation, structured around a total of 40 thematic areas and interest, which are particularly tailored to meet the needs of different categories of users (<http://www.e-themis.gov.gr/>) [1].
- The **portal of the Supreme Court of Audit** the information system of the Council of State allowing online follow up of cases by the litigants or the attorney with the use of passwords, online application for certificates, etc [1].

e-Health System: EU-Funded

e-Tax Portal & Infrastructure:

- **TAXISnet** portal for online tax and customs services, including electronic submission of VAT forms with payment via banking system services, electronic submission of Income tax forms, personalized online notification of the results of the tax return clearance process and e-delivery of tax certificates (<https://www.taxisnet.gr/>) [1].
- **LGAF**, the Local Government Application Framework for the development of an open source platform of Greek Municipalities that will allow citizens and SMEs to access useful information as well as pay taxes and fines, modify their public administration records and purchase permits and licenses [1].

Other projects:

- Project on the implementation of the **National Electronic Procurement System (NEPPS)**, expected to cover and support an automated manner the whole lifecycle of the public procurement process [6].
- The **National Cadastre** project and portal aiming at the simplification of the real estate property transactions, enabling online submission of applications, electronic secure payments and transferring of all required documents to the database of Ktimatologio S.A. [1].
- The **Management Information System of the Hellenic Selective Service** offering information services, citizen guide, online submission of military service redemption applications and numerous other forms [1].
- Issuance of **biometric passports** (Aug 2006), carrying a digital version of the holder's image as well as identity details incorporated on a microchip, and enabling Greece to comply with EC Regulation on standards for security features and biometrics in passports and travel documents issued by Member States [1].
- **National Citizens' Base Registry** [7].
- The **Greek eGovernment Interoperability Framework (eGIF)**, aiming to support eGovernance at central, regional and local level, and to achieve interoperability at the information systems level, processes and data by defining the standards, specifications and rules for the development and deployment of web-based front and back-office systems [1, 2].
- The **Hellenic Police Network** (Police Online) connecting more than 1100 police departments and offering new electronic services to citizens [1].

- The network of multi-channel **Citizen Service Centres** (CSCs or “KEP”, operational since 2002) - currently comprising 1036 CSCs, as the administrative one-stop public service delivery centres, where citizens can have access to public service information and to over 1000 standardised administrative procedures, also supported by “**eKEP**”, an online platform, allowing to manage citizens’ requests and monitor their progress, and supporting the use of certified digital signatures, to enable real time on-line transactions between Public Administrations (<http://www.kep.gov.gr/>). The Citizen Service Centres are to be gradually upgraded and renamed to **Integrated Transaction Centres**. The case of the Citizen Service Centres was among the finalists in the European eGovernment Awards 2007 organisation [1, 5].
- **Online issuing of criminal records** in six major cities [7].

[1, 2, 4, 5, 6, 7]

3.2. Number of EU-funded interoperability-related projects

High

3.2.1. Indicative projects

- **G.I.C.** (The Greek interoperability centre: enabling research in the interoperability domain, Feb 2008 – Jan 2012), aiming to establish a research centre targeting eGovernment and eBusiness Interoperability Research within the National Technical University of Athens, the leading technological research institute in Greece (<http://www.iocenter.eu/>) [8].
- **ENSEMBLE** (Envisioning, Supporting and Promoting Future Internet Enterprise Systems Research through Scientific Collaboration, Sep 2010 – Aug 2012), a coordination and support action (CSA), aiming at enlarging and supporting the FInES (Future Internet Enterprise Systems) research community, increasing thereby the impact of the future internet enterprise systems domain, and at establishing a scientific base for Enterprise Interoperability, a grand challenge of the FInES research (link) [9].
- **SPOCS** (“Simple Procedures Online for Cross-border Services”) project to build the next generation of online portals (Point of Single Contact or PSC), which every European country now has in place, through the availability of high impact cross- border electronic procedures, in order to remove the administrative barriers that European businesses face before offering their services abroad, and ensure service and system interoperability (<http://www.eu-spocs.eu/>) [10].
- **GENESIS** (“Enterprise Application Interoperability via Internet-Integration for SMEs, Governmental Organisations and Intermediaries in the New European Union”) addressing the interoperability issues that hinder electronic transactions among enterprises and organizations today and focusing on the research, development and pilot application of the needed methodologies, infrastructure and software components that will allow the typical, usually small and medium European enterprise to conduct business transactions over the internet (<http://www.genesis-ist.eu/>) [11].
- **PEPPOL** (Pan-European Public Procurement On-Line, May 2008 – Oct 2011), aiming to implement common standards and a pan-European interoperational environment, built upon national systems and infrastructures, to enable EU-wide public eProcurement, so that any company and in particular SMEs can communicate electronically with any European governmental institution for the entire procurement process (<http://www.peppol.eu/>) [12].
- **FUSION** (Business process fusion based on Semantically-enabled Service-oriented Business Applications, Feb 2006 – July 2008) project aiming to promote efficient business collaboration and interconnection between enterprises (including SMEs) by developing a framework and innovative technologies for the semantic fusion of heterogeneous service-oriented business applications (<http://www.fusionweb.org/>) [13].
- **INTEROP-NoE** (Interoperability Research for Networked Enterprises Applications and Software - Network of Excellence) project focusing on the integration of main thematic components of interoperability research roadmaps, the development of new knowledge and the promotion of interoperability research on enterprise applications at a European level [14].

- **NEXES** (“Supporting Healthier and Independent Living for Chronic Patients and Elderly”) project, aiming to support the deployment of ICT-enabled integrated healthcare programs ensuring at the same time organizational interoperability among the actors involved (<http://www.nexeshealth.eu/egroupware/sitemgr/sitemgr-site/>) [15].
- **SAKE** (“Semantic-enabled Agile Knowledge-based eGovernment”, April 2006 – March 2009) project to facilitate knowledge management (knowledge personalization, proactivity and transferring as well as integration of structured and unstructured data) in the public sector (<http://www.sake-project.org/>) [16].
- **SWEB** (“Secure, interoperable cross-border m-services towards a trustful European cooperation with the non-EU member Western Balkan countries”) project to develop a secure, interoperable, open, affordable platform upon which secure cross border government services will be built (<http://www.sweb-project.org/>) [17].
- **CALLIOPE** (“CALL for InterOPERability”) project, aiming to promote an effective uptake of and advance eHealth interoperability (<http://www.calliope-network.eu/>) [18].
- **Access-eGov** (“Access to e-Government Services Employing Semantic Technologies”) project to develop and validate a platform for composition of government services into complex process definitions (covering life events/business episodes) enabling semantic interoperability of particular e-Government services (<http://www.access-egov.org/acegov/web/uk/index.jsp>) [19].
- **EPSOS** (“European Patients Smart Open Services”) project aiming to build and evaluate a service infrastructure demonstrating cross-border interoperability between Electronic Health Record Systems in Europe (<http://www.epsos.eu/>) [20].
- **VIDE** (“Visualize moDel drivEn programming”) project, focusing on the development of a Unified Modelling Language (UML)-compliant action language including visual notation, mainly suited to business applications (<http://www.vide-ist.eu/>) [21].
- **SemanticGov** (“Providing Integrated Public Services to Citizens at the National and Pan-European level with the use of Emerging Semantic Web Technologies”) project to build the infrastructure necessary for enabling the offering of semantic web services by public administration in order to achieve among others interoperability amongst PA agencies both within a country as well as amongst countries (<http://www.semantic-gov.org/>) [22].
- **COMMIUS** (“COMMunity-based Interoperability Utility for SMEs”, Feb 2008 – Jan 2011) to deliver an adaptable and customisable software prototype, providing SMEs with 'zero-cost of entry' into interoperability using the ideas behind the Interoperability Service Utility, and supporting thereby new business models (<http://www.commius.eu/>) [23, 24].
- **SELIS** (“SEcure ELectronic Invoicing Service”), a cross-border service for the secure exchange of eInvoices, based on an innovative architecture that adopts the most advanced standards for the secure provision of interoperable services (<http://selis.unipi.gr/selis/main/index.html>) [25].
- **NETC@RDS** project (June 2007 -) on the deployment of an online service for the “electronification” of the European Health Insurance Card (EHIC) in 16 EFTA/EU countries and a trans-European interoperable infrastructure (<http://www.netcards-project.com>) [26].
- **eMARKS** project (Sep 2007 – Feb 2009), to optimize the protection of trademarks through image-based searches of trademarks or industrial designs kept by Industrial Property offices to provide among others a new interoperability standard for the harmonization of Intellectual Property Office data collections (<http://emarks.iisa-innov.com/>) [27].
- **Plan4all** (Plan4all geoportal) focusing on the harmonization of spatial planning data and metadata according to the principles of the INSPIRE Directive (<http://www.plan4all.eu/>) [28].

- **SeaDataNet** (Pan-European Infrastructure for Ocean and Marine Data Management, April 2006 – March 2011), aiming to develop an efficient distributed Pan-European Marine Data Management Infrastructure for managing large and diverse marine research data sets, and to network the existing professional data centers of 35 countries, active in data collection, and provide integrated databases of standardized quality on-line (<http://www.seadatanet.org/>) [29].
- **SeaDataNet II** (Pan-European infrastructure for ocean and marine data management, Oct 2011- Sept 2015) aiming to upgrade the present SeaDataNet infrastructure into an operationally robust and state-of-the-art Pan-European infrastructure for providing up-to-date and high quality access to ocean and marine metadata, data and data products originating from data acquisition activities by all engaged coastal states, by setting, adopting and promoting common data management standards and by realising technical and semantic interoperability with other relevant data management systems and initiatives on behalf of science, environmental management, policy making, and economy. (<http://www.seadatanet.org/>) [30].
- **iCARDEA** (An Intelligent Platform for Personalized Remote Monitoring of the Cardiac Patients with Electronic Implant Devices, Feb 2010 – Jan 2013), aiming to expose CIED (Cardiac Implantable Electronic Devices) data through standard interfaces (based on the HL7, ISO/IEEE 11073 standards and the IHE IDCO Profile) to develop an intelligent platform to semi-automate the follow-up of CIED patients with context-aware, adaptable computer interpretable clinical guideline models (<http://www.icardea.eu/>) [31, 32].
- **CLARIN** (Common language resources and technology infrastructure, Jan 2008 – June 2011), with the goal to develop and operate a shared distributed infrastructure, making available language resources and technology to the humanities and social sciences research communities, based on data and interoperability standards (<http://www.clarin.eu/external/>) [33].
- **e-CODEX** (e-Justice Communication via Online Data Exchange, Dec 2010 – Nov 2013), to design a fully technically interoperable European e-Justice system (building on the national solutions to develop a pan-European interoperability layer) with the goal to improve the cross-border access of citizens and businesses to legal means in Europe as well as to improve communication, data exchange and interoperability between legal authorities within the EU (<http://www.ecodex.eu/>) [34].
- **SYNERGY** (Supporting highly adaptive Network enterprise collaboration through semantically enabled knowledge services, Feb 2008 – May 2011), envisaging the delivery of Collaboration Knowledge services through trusted third parties offering web-based, pay on demand services, exploitable through interoperability service utilities (ISUs) (<http://synergy-foss.org/>) [35].
- **EGEE-III** (Enabling grids for e-science III, May 2008 – April 2010), to expand, optimize and simplify the use of Europe's largest production Grid by continuous operation of the infrastructure, support for more user communities, and addition of further computational and data resources, and prepare the migration of the existing Grid from a project-based model to a sustainable federated infrastructure based on National Grid Initiatives. By strengthening interoperable, open source middleware, EGEE-III will actively contribute to Grid standards and will ensure that the European Grid does not fragment into incompatible infrastructures of varying maturity, but constitutes a world class, coherent and reliable infrastructure (<http://www.eu-egee.org/>) [36].
- **EMPOWER** (A semantic service-oriented private adaptation layer enabling the next generation, interoperable and easy-to-integrate software products of European software smes, May 2009- April 2011), proposing an innovative framework and the enabling technologies that will allow the European Software SMEs to create their next generation, loosely-coupled, interoperable and easy-to-integrate Commercial-off-the-Shelf software products (<http://empower-project.eu/>) [37].

- **CASPINFO** (Caspian environmental and industrial data & information service, Sep 2009 – Feb 2011), aiming at strengthening the regional capacity and performance of marine environmental data & information management, by building a Caspian Sea network of leading environmental and socio-economic research institutes, governmental departments, oil & gas industries, and international bodies, and establishing an Internet based Data & Information Service, serving as a repository for relevant, available marine environmental and industrial (meta-) data, while ensuring interoperability and harmonization with other European systems and international meta-data standards (<http://www.caspinfo.net/>) [38].
- **NATURE-SDIplus** (Best Practice Network for SDI in Nature, Oct 2008 - July 2011), aiming to improve harmonization of national datasets on nature conservation and make them more interoperable, accessible and exploitable, by developing the NATURE-SDIplus geoportal, to permit recovery of metadata, data and services, and involving stakeholders, data and best practices sharing (<http://www.nature-sdi.eu/>) [39].
- **ESDIN** (European Spatial Data Infrastructure with a Best Practice Network, Sep 2008 – Feb 2011), a collaboration network between mapping and cadastral agencies, academic institutions and technology providers, aiming to put into practice the INSPIRE Directive towards the implementation and usage of interoperable geographical data by Spatially-enabled Societies (<http://www.esdin.eu>) [40].
- **OASIS** (Open architecture for accessible services integration and standardization, Jan 2008 – Dec 2011), to introduce an innovative, Ontology-driven, Open Reference Architecture and Platform, which will enable and facilitate interoperability, seamless connectivity and sharing of content between different services and ontologies in all application domains relevant to applications for the elderly and beyond (<http://www.oasis-project.eu/>) [41].
- **EMI** (European Middleware Initiative, May 2010 – April 2013), to deliver a consolidated set of middleware components for deployment in EGI, PRACE and other DCIs, extend the interoperability between grids and other computing infrastructures, strengthen the reliability of the services, and establish a sustainable model to maintain and evolve the middleware, fulfilling the requirements of the user communities (<http://www.eu-emi.eu/>) [42].
- **CLOUD4SOA** (A Cloud Interoperability Framework And Platform For User-Centric, Semantically-Enhanced Service-Oriented Applications Design, Deployment And Distributed Execution, Sep 2010 – Aug 2013), to resolve the interoperability and portability issues that exist in current Cloud infrastructures, and introduce a user-centric approach for applications which are built upon and deployed using Cloud resources (<http://www.cloud4soa.eu/>) [43].
- **GEO-SEAS** (Pan-european infrastructure for management of marine and ocean geological and geophysical data, May 2009 – Oct 2012), to effect a major and significant improvement in the overview and access to marine geological and geophysical data and data-products from national geological surveys and research institutes in Europe by upgrading and interconnecting their present infrastructures, and adopting the SeaDataNet interoperability principles, architecture and components wherever possible to avoid duplicative effort (<http://www.geo-seas.eu/>) [44].
- **DL.ORG** (Coordination Action on Digital Library Interoperability, Best Practices, and Modelling Foundations, Dec 2008 – Feb 2011) targeting the creation of a framework where key representatives from major initiatives and on-going Digital Library related projects may collaborate, discuss experiences, exchange expertise, work on interoperability of their solutions, promote shared standards, and provide the DL community with a deeper understanding of key issues and new directions (<http://www.dlorg.eu/>) [45].
- **IDIRA** (Interoperability of data and procedures in large-scale multinational disaster response actions, May 2011 – April 2015), to design and develop a set of tools, interfaces and procedures that can be configured, deployed and operated in a flexible manner, to provide interoperable services for data integration, information exchange, resource planning and decision support to local and international disaster response units and decision makers (<http://www.idira.eu/>) [46].

- **D4Science-II** (D4Science-II Data Infrastructures Ecosystem for Science, Oct 2009 – Sep 2011), being the continuation of the DILIGENT and D4Science-II projects, to develop technology for enabling interoperation of diverse data e-Infrastructures that are currently running autonomously, creating thereby the core of a pan-European e-Infrastructure research ecosystem (<http://www.d4science.eu/>) [47, 48].
- **SECRICOM** (Seamless communication for crisis management, Sep 2008 – April 2012), targeting the development of a reference security platform for EU crisis management operations with the ambition to solve or mitigate problems of contemporary crisis communication infrastructures, such as poor interoperability of specialized communication means, vulnerability against tapping and misuse, lack of possibilities to recover from failures, inability to use alternative data carrier and high deployment and operational costs, and to add new smart functions to existing services which will make the communication more effective and helpful for users, based four technological pillars, namely i. secure encrypted mobile communication on existing infrastructures, ii. Improved interoperability among various existing communicating systems, iii. introduction of distributed systems and the agent paradigm forming a smart negotiating system for parameterization and independent handling of requests suitable for rapid reaction use, and iv. security based on trusted hardware enhancing the confidentiality of data and the privacy of users (<http://www.secricom.eu/>) [49].
- **INFRA** (Innovative and novel first responders applications, April 2009 – March 2011), to research and develop novel technologies for personal support systems as part of an integral, secure emergency system for First Responders (FR) in crises, by creating an open, standards based interoperability layer, allowing communication interoperability between FR teams and their command posts, as well as useful novel applications for the FR teams, also integrated with the interoperability layer (<http://www.infra-fp7.com/>) [50].
- **VISION CLOUD** (Virtualized Storage Services Foundation for the Future Internet, Oct 2010 – Sep 2013), to introduce a powerful ICT cloud-based infrastructure, built on open standards and new technologies and capable of reliable and effective delivery of data-intensive storage services, facilitating the convergence of ICT, media and telecommunications and enabling among others data management, migration and interoperability (<http://www.visioncloud.eu/>) [51].
- **SMARTCM** (Smart container chain management, Aug 2008 – July 2011), to overhaul the complete container door-to-door transport chain so that it is more efficient, secure, market driven, and competitive, by stimulating interoperable B2B cooperation in door-to-door container transport security, developing B2B and B2A container security data solutions, compliant with international Customs operations, and introducing new e-managing business models in global container chain management and operation (<http://www.smart-cm.eu/>) [52].
- **E3** (End-to-end efficiency, Jan 2008 – Dec 2009), with the objective to design, develop, prototype and showcase solutions to guarantee interoperability, flexibility and scalability between existing legacy and future wireless systems, manage the overall system complexity, and ensure convergence across access technologies, business domains, regulatory domains and geographical regions, evolving thereby current heterogeneous wireless system infrastructures into an integrated, scalable and efficiently managed B3G cognitive system framework (<https://ict-e3.eu/>) [53].
- **JUMAS** (Judicial management by digital libraries semantics, Feb 2008 – Jan 2011), with the aim to automate the transcription process and provide effective information retrieval tools on multimedia libraries in the judicial sector, through the development of an advanced knowledge management system, enabling collection, enrichment and sharing of multimedia documents annotated with embedded semantics, and based on SOA to allow scalability, interoperability and modularity (<http://www.jumasproject.eu/>) [54].

- **SMARTSANTANDER** (Sep 2010 - Aug 2013), proposing a unique in the world city-scale experimental research facility, secure, open and flexible to enable horizontal and vertical federation with other experimental facilities, stimulate development of new applications, and enable better understanding and insight into the issues of Future Internet required capacity, scalability, interoperability and architectural design (<http://www.smartsantander.eu/>) [55].
- **CHRONIOUS** (Chronic disease management platform, Feb 2008 – Jan 2012), aimed at defining an open platform to manage and monitor patients with chronic diseases during their daily life with the help of wearable devices, simple, customized and adaptive interfaces and exploitation of HL7 standards to ensure interoperability with legacy healthcare systems (<http://www.chronious.eu/>) [56, 57].
- **DIEGO** (Digital Inclusive e-Government, April 2010 – March 2012), aiming to offer to any European Public Authority a full e-accessibility front-end for e-Government services, highly scalable and affordable, supported by i) a new "user-centric" and accessible service provision model for transforming pre-existing services, removing their ICT barriers (eExclusion), or creating new ones "from scratch" which will have an inclusive character from the beginning, and ii) a "highly scalable deployment model", based on a SaaS approach and widely accepted web services standards to guarantee interoperability with any back-office and affordability of the implementation (<http://www.diego-project.eu/>) [58].
- **BlogForever** (March 2011 - Aug 2013), to develop robust digital preservation, management and dissemination facilities for weblogs, capable of capturing the dynamic and continuously evolving nature of weblogs, their network and social structure, and the exchange of concepts and ideas that they foster; pieces of information omitted by current Web Archiving methods and solutions (<http://blogforever.eu/>) [59].
- **NET-EUCEN** (European Network for Enhanced User Centricity in eGovernment, April 2010 -) to create, animate and manage a working network of stakeholders in the Governance, User Centricity and Policy Modelling domains belonging to all European countries, and covering the whole range of Services for Users (S4U), and with the aim, among others, to identify opportunities for interoperability and standardization in the aforementioned domains, raise awareness, and provide guidelines and recommendations (<http://www.net-eucen.org/>) [60].
- **Organic.Edunet** (Oct 2007 – Sep 2010), a multilingual federation of learning repositories with quality content for promoting awareness and education of the European youth about Organic Agriculture and Agroecology. Organic.Edunet has focused on achieving interoperability between the digital collections of OA and Agroecology content that producers in various EU countries have developed, as well as on facilitating access, publication, search, retrieval and use of this content in multilingual learning contexts through a single European reference point (<http://www.organic-edunet.eu/>) [61].
- **JUDAICA Europeana** (Jewish Urban Digital European Integrated Cultural Archive, Jan 2010 – Dec 2011), a project and a growing network of heritage institutions, which will bring Jewish collections to Europeana - a portal of Europe's museums, archives and libraries, by identifying, digitizing and aggregating content documenting the Jewish presence and heritage in the cities of Europe, while ensuring conformance with the interoperability requirements of Europeana, and developing knowledge management tools to allow indexing, retrieval and re-use of the aggregated content (<http://www.judaica-europeana.eu/>) [62].
- **TUMOR** (Transatlantic TUmour MOdel Repositories, April 2010 – March 2013), to develop a European clinically oriented semantic-layered cancer digital model repository from existing EU projects that will be interoperable with the US grid enabled semantic-layered digital model repository platform at CViT.org, and to offer through this integrated environment a range of services to international cancer modelers, bio-researchers and clinicians (<http://tumor-project.eu/>) [63].

- **SPITFIRE** (Semantic-Service Provisioning for the Internet of Things using Future Internet Research by Experimentation, July 2010 – June 2013), to investigate unified concepts, methods, and software infrastructures that lower the effort for the efficient development of robust, scalable and interoperable applications that span and integrate the Internet and the embedded world (Internet of Things) (<http://spitfire-project.eu/>) [64].
- **IMARINE** (Data e-Infrastructure Initiative for Fisheries Management and Conservation of Marine Living Resources, Nov 2011 – April 2014), to create the policy, organizational and technical framework for the establishment and operation of a sustainability-driven, data-centric e-infrastructure in the domain of marine life, offering user-level and application-level services, with the view to reuse and render interoperable existing policies, technologies and e-infrastructures in the specific domain (<http://www.i-marine.eu/Pages/Home.aspx>) [65].
- **IOT-A** (Internet of Things Architecture, Sep 2010 – Aug 2013), to provide an architectural reference model for interoperability of future Internet-of-Things (IOT) systems - outlining principles and guidelines for the technical design of its protocols, interfaces and algorithms - along with the corresponding mechanism for its efficient integration into the service layer of the Future Internet, and a novel resolution infrastructure allowing scalable lookup and discovery of IOT resources, entities of the real world and their associations (<http://www.iot-a.eu/>) [66].
- **TRANSFORM** (Translational research and patient safety in Europe, March 2010 – Feb 2015), targeting the development of rigorous, generic methods for the integration of Primary Care clinical and research activities, to support patient safety and clinical research, by enabling distributed interoperability, integration and reuse of clinical data, to be made available through dynamic interfaces, integrated with electronic health records (eHR) (<http://www.transformproject.eu>) [67].
- **EURIDICE** (European inter-disciplinary research on intelligent cargo for efficient, safe and environment-friendly logistics, Feb 2008 – Oct 2011), to improve the logistics, business processes and public policy aspects of freight transportation through the establishment of an information services platform that will support “on the fly” combination of services between user, context and cargo utilizing a number of advanced features and technologies, e.g. SOA architectures incorporating mobile technologies, interoperability between heterogeneous environments, advanced security features, semantic web and domain ontologies, advanced context technologies, distributed intelligent agencies etc. (<http://www.euridice-project.eu/>) [68].
- **FIBRE-EU** (Future Internet testbeds/experimentation between BRazil and Europe, June 2011 - Nov 2013), targeting among others the federation (interoperability) of Brazilian and European experimental facilities, both at the physical connectivity and control framework level, in order to provide a unified, intercontinental research facility for Future Internet (<http://www.fibre-ict.eu/>) [69].
- **INTEGRATE** (Driving Excellence in Integrative Cancer Research through Innovative Biomedical Infrastructures, Feb 2011 – Jan 2014), aiming to build solutions that support a large and multidisciplinary biomedical community to collaborate, share data and knowledge, and build and share predictive models for response to therapies, with the end goal of improving patient outcome, by delivering reconfigurable infrastructure components; tools for sharing and collaboration; standards-based data models; and repositories of data, models and knowledge, while also providing standards-based interoperability to existing research and clinical infrastructures to support efficient information reuse and integration [70].

- **Health-e-Child** (Jan 2006 - Dec 2009), to build a Grid-enabled European network of leading clinical centres that will share and annotate biomedical data, validate systems clinically, and diffuse clinical excellence across Europe by setting up new technologies, clinical workflows, and standards, and more specifically by developing an integrated healthcare platform, providing seamless integration of traditional and emerging sources of biomedical information, and with the long-term goal to enable uninhibited access to universal biomedical knowledge repositories for personalised and preventive healthcare, large-scale information-based biomedical research and training, and informed policy making (<http://www.health-e-child.org/>) [71].
- **ALICANTE** (Media Ecosystem Deployment Through Ubiquitous Content-Aware Network Environments, March 2010 – Feb 2013), proposing a novel concept towards the deployment of a networked Media Ecosystem, and targeting the development of an interoperable middleware for the adaptation of advanced, distributed media resources to the user's preferences and heterogeneous contexts (<http://alicante.labri.fr/>) [72].
- **IMAGIC** (Worldwide interoperability microwave broadband access system for next generation wireless communications, Jan 2008 – Dec 2010), with the objective to develop novel and highly innovative technical solutions which will be backward compatible with the existing global broadband wireless access (BWA) standards (IEEE 802.16 and WiMAX) and linked to the specific end-user requirements to be incorporated into the emerging IEEE 802.16m standard (<http://www.wimagic.eu/>) [73].
- **GS Soil** (Assessment and strategic development of INSPIRE compliant Geodata-Services for European Soil Data) aiming, through state-of-the-art methodologies and best practice examples, to improve harmonization of national datasets and make them more accessible and exploitable within Europe. Therefore, the consortium contributes to the INSPIRE implementation with specific reference to a cluster of data themes on nature conservation (as per the INSPIRE Annexes) (<http://www.gssoil.eu/>) [74].
- **VENIS** (Virtual Enterprises by Networked Interoperability Services, Sep 2011 – Feb 2014), aimed at providing the a new level of interoperability between Large and Small Enterprises, according to Virtual Enterprise paradigm, including a distributed web-based repository which will be implemented in order to connect the existing information systems, a set of lightweight web services which will be developed for a smart exchange of the common data based on legacy email systems and the local business processes which will be modeled and linked by a distributed business engine mechanism, in order to assist the work in joint businesses and create novel synergies in marketing competition (<http://www.venis-project.eu/>) [75].
- **DITSEF** (Digital and innovative technologies for security and efficiency of first responders operation, Jan 2010 – Dec 2012) aiming to increase the effectiveness and safety of First Responders (fire fighters, police, etc.) by optimal information gathering and sharing with their higher command levels (<http://www.ditsef.eu/>) [76].
- **GERYON** (Next generation technology independent interoperability of emergency services, Dec 2011 – May 2014) proposing an innovative emergency inter-networking system capable of connecting existing first responder communication systems and enabling the integration of next generation mobile networks by defining technology independent standardized interfaces and autonomic configuration and adaptation techniques under the umbrella of IMS. Therefore, GERYON will unify common technical and operational logic of first responder communications networks in a technology independent manner. This unification will offload interconnection gateways from duplicated technology dependent details by providing a neutral interconnection interface. Proposed system will ensure seamless operation regardless the access technology and take advantage of coverage and responsiveness of existing PMRs and broadband data services of 4G networks (<http://www.sec-geryon.eu/UoP.html>) [77].

- **LINKED2SAFETY** (A Next-Generation, Secure Linked Data Medical Information Space For Semantically-Interconnecting Electronic Health Records and Clinical Trials Systems Advancing Patients Safety In Clinical Research, Oct 2011 – Sept 2014) to advance clinical practice and accelerate medical research, to improve the quality of healthcare, benefiting public health, and to enhance patients safety; by providing pharmaceutical companies, healthcare professionals and patients with an innovative semantic interoperability framework, a sustainable business model, and a scalable technical infrastructure & platform for the efficient, homogenized access to and the effective, viable utilization of the increasing wealth of medical information contained in the EHRs deployed and maintained at regional and/or national level across Europe, dynamically interconnecting distributed patients data to medical research efforts, respecting patients anonymity, as well as European and national legislation (<http://www.linked2safety-project.eu/>) [78].
 - **BEAMS** (Buildings Energy Advanced Management System, Oct 2011 – March 2014) aiming towards the development of an advanced, integrated management system which enables energy efficiency in buildings and special infrastructures from a holistic perspective (i.e. considering the indoors areas, the public spaces around the facility and the interaction of the overall compound with the grid and urban network outside it). The project will include an open interoperability gateway allowing the management of diverse, heterogeneous sources and loads, some of them typically present nowadays in spaces of public use (e.g. public lighting, ventilation, air conditioning), some others emergent and to be widespread over the next years (e.g. renewable sources, electric vehicles) (<http://ict-beams.eu/>) [79].
 - **OSR** – Open Science Resources (June 2009 – June 2012), this project proposes an innovative solution for metadata handling of digital science education objects that are available at the web repositories of science centres, museums and other organizations (<http://www.openscienceresources.eu/>) [80].
 - **ASSETS** (Advanced Service Search and Enhancing Technological Solutions for the European Digital Library), which aims to improve the usability of Europeana by developing, implementing and deploying software services focused on search, browsing and interfaces. ASSETS also strives to make more digital items available on Europeana by involving content providers across different cultural environments (<http://www.assets4europeana.eu>) [81].
- [8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81]

4. National Interoperability Practices

4.1. Number of Interoperability Cases with Good Practice Label

Low

- **ERMIS**, the National Portal of Public Administration (May 2009), encompassing the most modern technological infrastructure for ensuring interoperability between the computer systems of public services as well as secure transaction of public information through digital certificates, and providing 100 online services - organized in various ways to facilitate the navigation for the citizens - and 11 complete transactions (<http://www.ermis.gov.gr>). ERMIS Interoperability Infrastructure and Portal is linked to all Citizen Service Centres, and offers one-stop, automated, interoperable digital services delivery for citizens and businesses [1, 4].
(European eGovernment Awards Finalist 2009)

- The network of multi-channel **Citizen Service Centres** (CSCs or “KEP”, operational since 2002) - currently comprising 1036 CSCs, as the administrative one-stop public service delivery centres, where citizens can have access to public service information and to over 1000 standardised administrative procedures, also supported by “**eKEP**”, an online platform, allowing to manage citizens’ requests and monitor their progress, and supporting the use of certified digital signatures, to enable real time on-line transactions between Public Administrations (<http://www.kep.gov.gr/>). The Citizen Service Centres are to be gradually upgraded and renamed to **Integrated Transaction Centres**. The case of the Citizen Service Centres was among the finalists in the European eGovernment Awards 2007 organisation [1, 5].
(ePractice Good Practice Label 2007, European eGovernment Awards Finalist 2007)
 - The social security online services, offered by the Social Insurance Institute through ERMIS, the national portal of Public Administration, and allowing to completely treat online the declaration of social contributions for employees [1, 80]. (Capgemini Good Practice Label)
- [1, 4, 5, 82]

4.2. Best Interoperability Practice

4.2.1. Title

ERMIS – Interoperability Infrastructure and National Portal of Public Administration (2011)

4.2.2. Description

ERMIS – Interoperability Infrastructure and National Portal of Public Administration (<http://www.ermis.gov.gr/>), consisting of 4 main components:

The Service Registry, a web-based repository of services, documents, systems and organisations descriptions, containing currently 18,000 Public Sector Entities, 2066 Services, 3912 Documents, 1434 Unique Document Field Definitions, 614 BPMN Models for Services, 404 XML Schemas for Documents, 132 Core Components, 66 Data Types and several taxonomies for standardised information.

The Greek National Interoperability Framework, including a complete set of guidelines and standards.

The Service Delivery Platform, a multi-channel front-end, one-stop gateway for citizens, businesses and public organizations.

The Service Transformation Toolkit, containing guidelines and patterns for transforming public services.

[1, 4]

4.2.3. Status

Officially launched in May 2009. Operational since June 2008.

(2011)

4.2.4. Indicative interoperability aspects covered

- Business Process Management, Modelling, Simulation and Reengineering
- Service Registries
- Data Modelling
- Semantics
- Metadata Management
- Content Syndication
- Service Portals
- Interoperability Standardization, EIF, NIF
- Legal Framework

(2011)

4.2.5. Impact

Benefits - Reusable Components – Patterns:

ERMIS offers:

- A systematic, collaborative toolset to manage service transformation, from paper-based to electronic, already populated with a substantial set of information on services and documents.
- A set of guidelines and standards for managing portal creation and operation, back-office and front-office interoperability, eID management and service documentation – the main pillars of eGovernment.
- A centralised interoperability infrastructure that can be the delivery point of truly interoperable, one-stop, highly automated services while also federating on-line content from a variety of sources.
- An infrastructure for publishing available or needed Web Services on-line, so that service composition and mashing-up can be further promoted.
- Digital services that can be fulfilled in one stop, in one second and at no extra cost. This is extremely important especially for services that span several organisations and thus take a lot of time during manual fulfillment.
- Full on-line documentation of the whole spectrum of governmental services, the providing organisations and the legal framework, in four languages, with advanced semantic search mechanisms.
- A set of guidelines and standards for offering high-quality ICT services to the public sector, through the Greek NIF (for the ICT industry).
- The ERMIS Service Delivery Platform provides more than 100 highly sophisticated interoperable, cross-organisational digital services, in levels 3 and 4. More than 1,000 services currently exist at level 2. The most important services, provided at full-online availability, are the birth, citizenship, and family certificates.
- Compound financial gains, including both the administration and the citizens cost, amount to 30 EUR per certificate issued, generating an annual gain of more than 10 million EUR.

Lessons Learnt:

- Nation-wide initiatives for one-stop service provision have to combine content syndicating portals, service registries and relevant standardisation in a coordinated effort.
- Service digitization has to be coupled with transformation, in order to ensure service delivery to citizens but also long-term growth and sustainability.
- Interoperability standardisation has to be supported by collaborative platforms, than just be in paper format, in order to assist diffusion within the public sector.
- Service registries can greatly assist in managing service transformation, as they provide a consistent infrastructure for sharing information across the Public Sector.
- Training and dissemination has to get a significant amount of a large project effort and budget, as diffusion within the public sector and citizens is of key importance.
- Language issues are extremely important in an Interoperability Infrastructure: all relevant metadata descriptions should be in local language – for the government officials to understand, modify and approve - and at least in English - for easiness of communication with other governments and practitioners in anticipation of cross-border e-Government services.
- Adequate time and effort needs to be spent for communicating and working together with government officials at various levels, for the actual agreement on the standards and the e-Government service-related definitions and for the final adoption.
- Interoperability Infrastructures need to be supported by appropriate changes to the legal framework at national level.

- The follow-the-service approach, by means of structuring the majority of standardisation, development, transformation or management efforts around the provision of the key services towards citizens and businesses is a very valuable tool, greatly assisting focusing on actual and measurable goals.

(2011)

5. e-Government Interoperability

5.1. Interoperability Level of core e-Government services to citizens / businesses	48.0% (2010) [84]
5.2. Connected Government Status	0.8% (2008) [85]

6. e-Business Interoperability

6.1. Intra-organizational Integration Level	57.0% [83]
6.2. Cross-organization Integration Level	30.0% [83]
6.3. Cross-organization Application-to-Application Integration Level	26.0% [83]
6.4. e-Invoicing Status	17.0% [83]
6.5. B2B Data Standards Usage	
6.5.1. EDI-based standards	<i>Not available</i>
6.5.2. XML-based standards	<i>Not available</i>
6.5.3. Proprietary standards	<i>Not available</i>
6.5.4. other technical standards	<i>Not available</i>
6.6. Interoperability Awareness	
6.6.1. Within their sector	<i>Not available</i>
6.6.2. Between sectors	<i>Not available</i>
6.6.3. For producing or providing products and services	<i>Not available</i>

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