



SEVENTH FRAMEWORK PROGRAMME



GREEK INTEROPERABILITY CENTER

Deliverable D2.1 - G.I.C. Interoperability Course M12 (2nd course)

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Table of Contents

1. INTRODUCTION	3
2. THE DELIVERABLE	4
3. THE COURSE “INFORMATION SYSTEMS INTEROPERABILITY”	5
4. STRUCTURE OF THE COURSE	6
5. BASIC BIBLIOGRAPHY AND RELATED SITES	7
5.1 BIBLIOGRAPHY	7
5.2 RELATED SITES.....	7
ANNEX I– COURSES MATERIAL (IN GREEK)	8

1. INTRODUCTION

Interoperability has been recognized as the key issue for achieving high productivity of Enterprises (especially SME's) and their information systems but also as the main driver for delivering effective pan-european electronic government services towards citizens and businesses. Promoted by the i2010 Strategy Framework, being a key area of the e-Government and e-Business European Commission research roadmaps, but also being a hot issue for all Governments of the 27 member states and the third countries, Interoperability is recognized as an inter-disciplinary research topic with high political and technological value.

Interoperability reaches all enterprises and governmental organizations at national and international level and constitutes a thriving research domain from all aspects – scientific, entrepreneurial, societal and political. Lack of interoperability appears as the most long lasting and challenging problem for enterprises and governmental organizations. It emerged from proprietary development or extensions, unavailability or oversupply of standards, and heterogeneous hardware and software platforms. Legacy enterprise applications, for example, often hinder cooperation endeavours, since they require complex system integration efforts, while international research estimates claim that around 40% of system implementation budgets are spent on system integration with other (legacy) systems within an enterprise. To meet their business objectives, enterprises and public organizations need to collaborate with other organizations: for many enterprises, doing business globally has become critical to their survival, while others (mainly governmental organizations and SMEs) discover new opportunities by focusing their business in a local setting. The situation has become more critical and important through new business paradigms like extended enterprises and networked organisations that require organizations to work together to achieve further benefits. Therefore, today an organization's competitiveness is to a large extent determined by its ability to seamlessly interoperate with others.

The main goals of GIC are as following:

- The creation of a national research pole of interoperability which will cooperate with enterprises, governmental organizations and research centres in Greece, in order to achieve high quality research results in the area of Interoperability.
- The active interaction with other relevant organisations and research centres, at Regional, European and International level, so as both to gain needed experience and know-how, but also to communicate results and assist neighbouring countries.
- The contribution of multi-disciplinary research on interoperability, tackling research challenges at organizational, semantic and technical level. Furthermore, as depicted in Figure 1, the scope of the G.I.C. in vertical thematic areas is not constrained to e-Business and e-Government, but has a long perspective of expanding to e-Learning, e-Health and Network of the Future - a multi-platform and multi-device approach to interoperability.
- The contribution to policy making and standardisation in Greece and the neighbouring region, thus assisting the implementation of European Policies and interoperability – related initiatives, such as the e-Government Interoperability Framework (eGIF).
- The creation of a new generation of young and more experienced researchers in the areas of Computer Science, Information Systems, Decision Support Systems and Electronic Business, able to tackle emerging interoperability issues in Businesses and Governments.
- The active dissemination of research results towards the scientific and business community in Greece, in the neighbouring countries and internationally.

2. The Deliverable

In accordance with the workplan of task 2.2 of WP2, G.I.C. aims to attract and train young researchers on interoperability related topics with a purpose of enhancing their insight on the importance and the technology aspects of interoperability in many application domains highlighting at the same time the relevant research perspectives. The wider objective is to raise awareness and strengthen the national research capacity on interoperability issues.

Through this process, GIC aims also to attract and engage qualified young researchers in the centre's operations.

The activities implemented towards this direction include

- Development of training material for seminars, courses, lectures
- Promotion for the introduction of interoperability related courses in master and postgraduate programmes of study, mainly in the National Technical University of Athens but also in other Greek Universities, where GIC may have an influence through the co-operation relationship that has been established.
- Producing a large number of topics for the implementation of diploma and master thesis
- Support and follow-up of all the above activities throughout their duration.

To this objective, GIC during the two years of the project duration has done considerable work.

The purpose of this deliverable is to present the outline and material of the courses developed by GIC that have or will be introduced in postgraduate/master programmes of study.

It is envisaged that in the next few semesters the undergraduate and the postgraduate programmes of NTUA and other Greek Universities, where the GIC members participate as trainers/professors, will be enriched by lectures and case studies on interoperability issues.

The first version of the deliverables referred to the course "Electronic Transactions" developed for and introduced in the master program "Technoeconomic Systems" (MBA) of NTUA. The course is being taught by the head team of the GIC, namely the Project Director and Quality Manager: Assist. Professor Dimitris Askounis, and the Project Manager of GIC: Dr. Yannis Charalabidis.

The second (parent) version of the deliverable addresses the course "Information Systems Interoperability" developed by GIC with the aim to be introduced as an elective course in a postgraduate program of NTUA or another Greek University.

The general scope of the course which is addressed to postgraduate students, is to attract and gather students of the highest academic background in information systems interoperability related fields (standards, frameworks, services offered, case studies, etc), and provide them with an initial set of concepts and knowledge that will enable them to become researchers in the G.I.C.

In this deliverable we provide:

- Information on the aim, structure and bibliography of the course "Information Systems Interoperability".
- Training material of the course

Indeed, it has already been proposed and is currently underway the introduction and use of this training material in the relevant course "Information Systems Interoperability" that has been recently introduced in the master programme "Management Information Systems" of the **Department of Information and Communication Systems** of the University of the Aegean.

The Department of Information and Communication Systems of the University of the Aegean has as its central goal the creation of scientists with high education, very creative and critical, able to take advantage of modern Information and Communication Technologies for the design, development and management of Information and Communication Systems. The educational work of the Department is combined with an extensive research activity, in order to acquire that way, new knowledge and disseminate it to the National, European and international arena.

Updated and additional relevant training material presented within postgraduate courses in NTUA or in the University of the Aegean will be included in the next version of the deliverable.

3. THE COURSE “INFORMATION SYSTEMS INTEROPERABILITY”

Scope and Objective of the Course

The great development of information systems in modern enterprises and organizations, together with the rapid expansion of intra-corporate and inter-corporate networks, has recently highlighted new challenges for ensuring the dynamic interplay between systems and organizational structures. Interoperability is recognized internationally as one of the most important issues for achieving efficient and effective operation of information systems in enterprises and organizations of all sizes and industries. Interoperability concerns not only the analysis and design, but also the development, operation and maintenance of information systems to organizational, semantic and technological level (organisational, semantic and technical interoperability), forming that way, a multi-level research field.

The aim of this course is the presentation and analysis of international standards, ICT tools, business models and general actions that are necessary in order to achieve interoperability in modern business and public administrations.

The course also includes various sections on methodologies and tools that aim to ensure interoperability between information systems under development or already in operation (interoperability by design / interoperability by retrofit), as well as the interoperability of business processes and data policies for interoperability in the European Union, USA and Greece.

The course also provides a detailed presentation of recent measurements on the interoperability of systems and services in Greece and abroad. Finally, it gives the current research directions in the Interoperability field, through the analysis of the European Roadmap for Research on Interoperability issues. Among all the above mentioned aspects of the course, a sufficient set of case studies is also included, for the application of theoretical knowledge to real examples

4. STRUCTURE OF THE COURSE

No	Lecture	Contents (Theory – Practice)
1.	Introduction	Definitions Purpose of the Course Course Structure Course Bibliography
2.	Interoperability Initiatives in EU and Greece – The Greek NIF	Historical Overview EU-EIF EU-Members' NIFs The Greek NIF
3.	Interoperability in Digital Public and Enterprise Services	Domains – Facets – Levels Standardization and Practices Recommendations
4.	Introduction to Enterprise Interoperability	Levels Issues Industry Sectors Main Initiatives
5.	Introduction to eGovernment	Introduction Key Factors Models Policies
6.	eGovernment – Information Systems and Services	Technological Infrastructures Current Situation Case Studies
7.	Organisational, Technical and Semantic Interoperability Standards for Digital Public Services	Introduction Definitions
8.	Organisational, Technical and Semantic Interoperability Standards for Digital Public Services (2)	Principles Frameworks Recommendations
9.	A Certification Framework for Public Services and Information Systems	
10.	Digital Identity and Authentication Framework	Introduction Levels Methods
11.	Digital Identity and Authentication Framework (2)	Recommendations Case Studies
12.	Cloud infrastructures for Interoperability	Models, tools, semantic metadata, xml
13.	Cloud infrastructures for Interoperability (2)	Base registries and federated systems

5. Basic Bibliography and Related Sites

5.1 Bibliography

- "Greek Information on eGovernment and interoperability standards - eGIF GR", Home Office, Greek Republic, 2008.
- Guy Doumeingts, Jörg Müller, Gérard Morel, and Bruno Vallespir: "Enterprise Interoperability: New Challenges and Approaches", Springer 2006
- Michael P. Papazoglou and Pieter Ribbers: "e-Business: Organizational and Technical Foundations", Wiley 2006
- Peter Bernus and Mark Fox: "Knowledge Sharing in the Integrated Enterprise: Interoperability Strategies for the Enterprise Architect", Springer 2005
- Ricardo J. Gonçalves, Jörg P. Müller, Kai Mertins, and Martin Zelm: "Enterprise Interoperability II: New Challenges and Approaches", Springer 2007
- Thomas Erl: "Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services", Prentice-Hall, 2007
- Y. Charalabidis et al (eds): "Enterprise Interoperability Research Roadmap", European Commission, DG Information Society and Media, 2008

5.2 Related Sites

- "European Interoperability Framework - EIF", IDABC, European Commission, 2005.
- European Commission, Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens - IDABC, [ec.europa.eu / idabc /](http://ec.europa.eu/idabc/)
- The European Network Interoperability Interop-Vlab, www.interop-vlab.eu
- Website of the Greek Interoperability Framework, www.e-gif.gov.gr

ANNEX I – COURSES MATERIAL (IN GREEK)