The CESARE IV Project as an input for the future interoperability in Europe

PROJECT'S HISTORY

CESARE Project started in 1998. After the first three phases which dealt with service definition, technical, operational and contractual interoperability, tenders and system implementation, the final fourth phase aims at defining a framework for establishing an interoperable EETS – European Electronic Toll Service, functioning in a coordinated way at European level.

GOALS

- Define a set of basic guidelines for providing EETS (technical, contractual, legal and procedural).
- Define and establish the Interoperability Management (IM) role.
- Solve open issues from previous Projects, as far as required for a functioning EETS.
- Define a migration path from the current status to EETS, utilizing the experience from regional Projects and RCI by working through five Work Packages.

PARTNERS

The CESARE IV Project is led by ASECAP and the Project partners are represented by 10 ASECAP members and 7 Public Administrations from Finland, France, Germany, The Netherlands, Sweden, Switzerland, United Kingdom.

Definition and Objectives

CESARE IV (Common Electronic Fee Collection System for a Road Tolling European Service) is a Project set up by **ASECAP** (*the European Association of Toll Motorways Operators*) in co-operation with **Stockholm Group** (*representing the Road Public Administrations from Finland, France, Germany, The Netherlands, Sweden, Switzerland, United Kingdom*) and co-financed by **European Commission**. The fourth and final CESARE IV phase started in December 2007 and ended in December 2009.

The objectives of CESARE IV were specifying, designing, developing, promoting and implementing a common interoperable Electronic Fee Collection System (EFC) on European toll roads. More specifically, the main goal of CESARE IV was to define, according to the European Directive 2004/52[1], a framework for establishing an interoperable EETS (European Electronic Toll Service), functioning in a coordinated way at the European level, while allowing the Member States to fasten the pace of their national implementation plans for EETS.

Given the importance of the EETS and of its definition and future application, CESARE IV Project partners decided also to involve in the Project potential EETS Providers, by establishing an Advisory Forum, composed by private companies from the financial domain, including both credit card issuers, petrol cards issuers and clearing houses.

1) Directive 2004/52/EC of the European Parliament and of the Council of 29 April 2004 on the interoperability of electronic road toll systems in the Community , OJ L 166 of 30.04.2004

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HISTORICAL EXCURSUS
and internal Organisation

The CESARE Project as a whole started in fact more than ten years ago and its development was structured into four Project phases:

Phase I: Service definition, technical and operational interoperability.

Phase II: Contractual interoperability and feasibility validation.

Phase III: Tenders and system implementation. With the third phase a new CESARE model has been introduced and 4 roles to be performed in the European Electronic Toll Service (EETS) have been identified and put in the following 4 groups:
• EETS Provision;
• Interoperability Management;
• Service usage;
• Toll charging.

Phase IV: Definition of a framework for establishing an interoperable EETS.

The CESARE IVth and final phase had more specific objectives compared to the previous CESARE phases, which were mainly focused on studying the technical aspects of the European interoperability. Since 2004, after the adoption of Directive 2004/52/EC the Project was in fact more oriented on EETS and on legal/fiscal/procedural interoperability and interoperability management.

In terms of **organisation**, the CESARE IV Project has been structured in the five following Work Packages: WP01 "EETS basic guidelines", WP02 "Interoperability Management (IM) role framework, functions and procedure", WP03 "IM preparation and implementation", WP04 "Communication", WP05 "Project Management". WP04 and WP05 worked all along the whole duration of the Project, by ensuring a coordination respectively in terms of communication, dissemination, contacts and Project's external relations (WP04) and management of the overall CESARE IV Project and coordination of the resources (WP05).

THE CESARE IV
Work Packages development in detail
WORK PACKAGE 01 "EETS BASIC GUIDELINES"

WP01 Major Findings

The starting point of CESARE IV is the organizational and operative Model of the European Electronic Tolling System (EETS) as described in the main outcomes of CESARE III and the experiences of the existing national and regional interoperable Electronic Tolling schemes, which have already partially applied the CESARE Model in several European countries.

CESARE organizational Model defined four main Roles: known as "Toll Charger" (TC), "EETS Provider" (EP), "Service User" (SU) and "Interoperability Manager" (IM).

The objective of CESARE IV was to establish the required framework for EETS, including a detailed definition of EETS IM Role. CESARE IV was intended to fill the gaps left by previous Projects. To this extent, a first suggested result of the Project is a set of EETS guidelines to be incorporated as inputs for the EETS Regulatory Committee and to the EC Decision, which was under preparation during the time WP01 was carried out.

The outcome of this Work Package is the compilation of the "EETS Conditions", a series of technical, operational and legal topics found "Necessary" or "Facilitative" for the development of EETS. Necessary Conditions are identified as "mandatory" rules as the Facilitative ones are seen as recommendations. Conditions are mainly structured in the form of "Rights" and "Duties" for the different Roles of EETS, although some of such conditions affect several Roles (e.g. a Right for TC Role was a Duty or Obligation for EP and vice-versa). Specific conditions for the IM role were also identified. This Work Package also analyzed technical and organizational aspects of six Electronic Tolling regional systems under the CESARE Model and validated EETS conditions with the outcomes of other Projects and EC initiatives, like RCI and the EC Expert Groups.

Open Issues and Next Steps

Discussions between Work team members arose on several aspects of the EETS Conditions, especially cross-conditions between TC and EP. The problems related to the "walk away" of a certain EETS actor from its role was also object of several discussions. Certain issues appeared when studying the Conditions for CESARE Roles under DSRC-based and GNSS/GPRS-based Electronic Tolling schemes and their compatibility under the common European interoperability scenario. However, a high level of consensus was reached after the deliberations of the plenary meetings. A number of EETS Conditions as defined in WP01 main deliverable D1.2 were included in the different chapters describing General Principles of the EC Decision issued in October 2009[2].

A significant set of EETS Conditions, especially those referred to Governance and Certification components, but also some other Conditions of the Service Usage, Enforcement and Promotion, are allocated to the IM Role. The relevance of this Role as a core element required for the EETS organization was highlighted in this Work Package. Detailed study of the features and structure of IM was left to further Work Packages of the Project.

The three reports prepared by WP01 were the following:

D1.1 - **Verification of the CESARE III Model**

D1.2 - **A compilation of European Electronic Tolling Service conditions for: Service User, Toll Charger, EETS Provider, Interoperability Manager**

D1.3 - **Verification of EETS Guidelines with the EG Reports and other EC documents**

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2) Commission Decision 2009/750/EC of 6 October 2009 on the definition of the European Electronic Toll Service and its technical elements (notified under document C(2009) 7547) (Text with EEA relevance), OJ L 268 of 13.10.2009

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WORK PACKAGE 02 "INTEROPERABILITY MANAGEMENT ROLE FRAMEWORK, FUNCTIONS AND PROCEDURE"

The second Work Package was finalised at the end of March 2009 and was focused on the Interoperability Management role framework, functions and procedure. The Interoperability Management role (IM) having to operate within a legal, operational, economical and administrative/organisational framework, WP02 was supposed to define this framework, as well as the functionality of the IM down to a detailed and operational level. The main objectives of WP02 were to define the IM framework concerning legal, administrative/organisational, economic and operational issues and to define the IM functions and procedures needed for the operation of EETS.

In fact, one of the main issues not solved in previous Projects was how to organise the Interoperability Management role in a real life world, i.e. transforming the responsibilities of the abstract role Interoperability Management into IM services provided and tasks/procedures performed by real organisations both on a European and national level giving the IM the required power to manage a pan-European interoperable EFC system. In order to identify essential requirements for Interoperability Management (including detailed certification requirements and procedures, regulation issues...), WP02 closely cooperate with the Advisory Forum of potential EETS Providers and carried out an internal benchmarking of existing interoperable (national or cross-border) electronic toll systems. This internal benchmarking study and the cooperation with potential EETS Providers resulted in a very concrete input and enabled WP02 to capitalize on experiences from existing electronic toll systems. WP02 also carried through an external benchmarking of similar interoperable systems in other sectors, e.g. telecommunication and railway. The result of this benchmarking was a valuable input to the work done by WP02. Moreover, WP02 took care of following up the development of the EETS Decision prepared by ETC Toll Committee chaired by EC - DG TREN and of giving input to the process both through CESARE IV presentations in ETC Toll Committee meetings, as well as concrete proposals to the draft text of the Decision, which has been voted and approved by the ETC Toll Committee on the 27th of March 2009 and published on the Official Journal on the 13th of October 2009.

The two reports prepared by WP02 were the following:

D2.1 - **Interoperability Management Framework**

D2.2 - **Interoperability Management functions and procedures**

Major Findings

For the first report of WP02, D2.1 IM Framework, a basic analysis has been performed in order to identify the essential requirements for Interoperability Management. The main findings based on this analysis were as follows:

- IM based on a two-level structure (EC Commission and Member States);
- Detailed steps and responsibilities for procedures leading to an EETS status.

Regarding the structure needed for IM, WP02 experts have come to the conclusion that the management of interoperability should be carried out at both national and European levels, involving existing structures/entities.

For each main task of IM, Report D2.1 describes this proposal and also details:

- internal interfaces between actors playing a role in the management of interoperability at both national and European level (for instance: interfaces between national authorities and EETS operators, between national authorities and European Commission and associated groups such as the Comité de télépéage, etc.);
- external interfaces between Interoperability Management and different EETS operators (i.e. toll chargers or EETS Providers may have interfaces with IM) or other entities/bodies (for instance, national Courts of justice or European court).

Regarding the procedures leading to an EETS status, WP02 experts have come to the conclusion that the common set of rules should include a clear and detailed common procedure for the certification of notified bodies, equipment (both road-sides equipment and on-board equipment), toll chargers (with respect to the basic distinction between DSRC and autonomous systems) and EETS providers.

With regards to the EETS providers, the focus on procedures leading to an EETS status shows that there is a need for two-step information that could lead to a two-step procedure leading to the status of EETS provider:

- 1st step: information given to the Provider's partners: compliance with EETS Standard;
- 2nd step: information given to both partners and users: compliance with ETS Standards + European scale of service provided.

Report D2.2 IM Functions and procedures aims at explaining how stakeholders play the roles introduced in the previous reports D2.1 IM Framework. It is consequently a high level description of the main procedures related with each IM function. It includes details on how IM should perform the daily operation of EETS as well as the interfaces between IM and other external entities linked to IM as sources or sinks for information flows (even more details will be further developed in WP03 reports IM preparation and implementation)

Report D2.2 focuses on:

- EETS regulation;
- Monitoring;
- Procedures leading to EETS status;
- Settlement of disputes.

THE CESARE IV
Work Packages development in detail
WORK PACKAGE 03 "IM PREPARATION AND IMPLEMENTATION"

The last technical Work Package was focused on IM preparation and implementation and analysed the establishment of the IM by preparing an Implementation plan.

Major findings

In order to fulfil their obligations under the Directive and the Decision, it will be necessary for Member States to be able to compel Toll Chargers to enter into agreements with approved EETS Providers and monitor the overall compliance with EETS regulations. Moreover, there is likely to be a strong case for co-operation between Toll Chargers within – and conceivably beyond – individual Member States.

The Commission has made it clear that the status of Europe-wide bodies must be informal – it has no powers to delegate responsibility to other bodies and the line of legal authority must rest with the Governments of Member States. There must be a viable business model, in which the party receiving a service is willing to pay a price for it.

The possibility of basing EETS on existing regional systems has been identified. The roadmap reflects an EETS IM implementation scenario where interoperability gradually grows from local systems and regional co-operations into Europe-wide coverage. It is likely that groups of stakeholders will develop their own pan-European forums. Toll Chargers, with their practical experience of running tolling systems, are already represented through ASECAP, and EETS Providers may wish to develop their own international bodies. In general, already existing international organizations (e.g. ASECAP and the Stockholm Group) are expected to play important roles in EETS IM implementation and operation.

The distribution of EETS Interoperability Management as defined in the 27 March decision, brings higher requirements on European regulations concerning specifications, procedures etc. than with a centralized organization.

The EETS Decision states that EETS Providers need access to certified interoperability constituents before they can perform Member States registration and go through "Suitability for use"- examination. Both these steps will require access to agreed specifications and procedures, which is also concluded in the EETS decision. This is a critical timeline in the development of EETS.

The analyses made in WP03 shows that the WP02 functions and procedures could easily have been implemented in both EasyGo and TIS-PL interoperability management bodies.

WP03 also confirm that the IM related functions and procedures defined in the previous CESARE IV reports, are still valid.

Open issues

WP03 identified a number of open issues. Some of these issues are of particular importance and should be included in a second decision. Some (but not all) of these issues are related to:

• Cooperation between Member States
• Cooperation between the European Commission, the ETC Committee (Comité Télépeage) and other bodies on a European level with EETS Providers and Toll Chargers respectively
• Security measures
• Common procedures and requirements related to quality assurance
• Common requirements to monitor EETS Providers and Toll Chargers
• The responsibilities of notified bodies

Next steps proposed

In the concluding list of required short term actions defined in WP03 to enable EETS IM implementation in accordance with the roadmap, ASECAP is considered to represent Toll Chargers and the Stockholm Group to represent Member States and act on their behalf. Some of the short term actions proposed are:

• CEN should proceed with the work on the relevant standards for electronic fee collection. This includes in particular the security framework and conclusion of the work item on "EFC Security Framework" to allow for standardisation work on this important subject to commence
• The EC needs to coordinate and finance Project teams to carry out standardisation related to EETS security and related test procedures
• The EC needs to develop and finance platforms to ensure that all stakeholders are able to contribute to the development of EETS specifications
• The Stockholm Group, ASECAP and potential EETS Providers should engage (i.e. try to find all possible measures to support) in the completion of the interface standardisation work and take the initiative to the development of specifications and profiles related to (among others) the ISO 12855 standard

THE CESARE IV
Work Packages development in detail
WORK PACKAGE 03 "IM PREPARATION AND IMPLEMENTATION"

- The Stockholm Group, ASECAP, potential EETS Providers and other necessary stakeholders should identify and proceed with those elements of the EETS specification that are required for getting EETS IM in place but not dependant on standards
- The EC should support the creation of the EETS specification by financing expert groups or Projects where necessary
- ASECAP and the Stockholm Group, supported by technical expertise, should develop and agree on a format for and contents of EETS Domain Statements.
- The European Commission should proceed with the establishment of the Coordination Group of notified

bodies as this group has a key task in the preparation of the certification process.

The following three reports were produced by WP03:
- D 3.1 - **An Implementation plan for the IM**
- D 3.2 - **The EETS Road Map**
- D 3.3 - **Final IM operational functions and procedures**

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Work Packages development in detail
WORK PACKAGE 04 "COMMUNICATION"

WP04, which worked all along the duration of the Project in close cooperation with the Project Leader and the Project Management Team, was asked to ensure the dissemination of the outcome of the CESARE IV Project and to establish permanent and regular contacts with the external world, mainly with the stakeholders and the Advisory Forum, composed by representatives of the future potential EETS providers.

Major achievements
WP04 developed the CESARE IV communication strategy by realising the following:
- a **web-site** for a proper external dissemination of the Project's news and results, as well as for an efficient internal information towards the Project partners;
- a regular **newsletter**, both in electronic and paper versions, which was disseminated to the Project's partners and to the external world, containing the most relevant information about CESARE IV development;
- a **video**, published on the Project's web-site, explaining the main contents of the Project and containing interviews to heavy lorries drivers about their opinion on the future EETS application;
- the redaction of specific **articles**, published in specialised magazines and containing the major findings and information about the different Work Packages' activities;

- the participation in several International events and, above all, the organisation of a final **CESARE IV event**, in close cooperation with ASECAP. The conference, whose title was "*Paving the way to a Pan-European electronic tolling reality: the CESARE IV Project and future perspectives*" was held in Brussels, Belgium, in October 2009 and was aimed at illustrating the latest interoperability developments in the light of the European Commission's Decision on EETS, together with the results of the CESARE IV Project.

All the **Project's public documents** and **further information** can be found at the Project's web-site: **www.cesareiv.eu**

CONCLUSIONS

During its two years of activity, CESARE IV management bodies were in permanent contact with the European Commission, constantly informing EC about the Project's developments and achievements: CESARE IV partners made every effort to make the fourth and final phase of the Project as much successful as possible in terms of contributing to the definition of the EETS and to clarify the legal and procedural aspects of European ETC interoperability, thus contributing to the adoption of the EC Decision and Guidelines for EETS. There is no doubt that CESARE IV is and remains a research study, but if the Project's results can be taken into account by the EC and by the Members States of the European Union as a useful tool to ease and promote the implementation of EETS throughout Europe one could say that CESARE IV has successfully achieved its main objective.

GLOSSARY OF ACRONYMS AND DEFINITIONS

Term	Definition
Certification	In the ETC Directive and the EETS Decision this word refers to all compliance checks with EETS rules, for all stakeholders and equipments. Regarding the vocabulary, the present report is more specific: • Equipments (OBE and RSE) are "Certified" • EETS Providers are "Approved" • Toll Chargers are "Qualified" • Notified Bodies are "Appointed"
EETS Service Provider (EP)	A legal entity (or group of legal entities) providing the European Electronic Toll Service (EETS) for all EETS toll domains to Service Users.
Enforcement	The process of compelling observance of a law, regulation, etc. (EN ISO 17573).
EETS toll transaction	The data describing the charged road use concluded by the Toll Charger according to national and local law taking into account the toll declarations.
Interoperability	The ability of systems to provide services to and accept services from other systems and to use the services so exchanged to enable them to operate effectively together (EN ISO 17573).
Interoperability Manager (IM)	In the EETS context, the Interoperability Manager (IM) is an entity or an organisation (i.e. a set of entities), which plays the role of managing the interoperability of the European Electronic Tolling Service, including in their functions the governance and other main components of the Service.
Notified Body	Body in charge of certain parts of the equipments and stakeholders certification/qualification/approval
On-Board Equipment (OBE)	Equipment fitted within or on the outside of a vehicle and used for toll purposes.
Role	Identifier for a behaviour, which may appear as a parameter in a template for a composite object, and which is associated with one of the component objects of the composite object. Roles defined in the European Electronic Service: Interoperability Manager (IM), Toll Charger (TC), EETS Provider (EP) and Service User (SU).
Service User (SU)	A generic term used for the customer of an EETS Provider, one liable for toll, the owner of the vehicle, a fleet operator, a driver etc. depending on the context (EN ISO 17573).
Toll	A charge, a tax, a fee, or a duty in connection with using a vehicle within a toll domain (EN ISO 17573).
Toll Charger (TC)	A legal entity (or group of legal entities) in charge of the Toll Charging role, including amongst others, the operation of toll domains, collection of tolls and enforcement tasks.
Toll Context Data	A set of EETS relevant data related to a certain Toll domain. This information is expected to be loaded in the OBE in tolling systems based on GSSM/GPS technology.
Toll Domain	An area or part of a road network where a toll regime is applied (EN ISO 17573).

Acronyms and Abbreviations	
CEN	Comité Européen de Normalisation
CESARE	Common Electronic Fee Collection System for a Road Tolling European Service
CtTp	Comité Télépéage
DSRC	Dedicated Short Range Communications
EC	European Commission
EFC	Electronic Fee Collection
EETS	European Electronic Toll Service
EP	EETS Provider
ETC	Electronic Toll Collection
ETC Committee	European Electronic Toll Committee
ETSI	European Telecommunication Standardization Institute
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
GSM	Global System for Mobile Communications
HGV	Heavy Goods Vehicle
IBTTA	International Bridge Tunnel and Turnpike Association
IM	Interoperability Manager (EETS Interoperability Manager)
ISO	International Organization for Standards
ITS	Intelligent Transport Systems
NB	Notified Body
OBE	On-Board Equipment
RSE	Road Side Equipment
SU	Service User (EETS Service User)
TC	Toll Charger (EETS Toll Charger)
UMTS	Universal Mobile Telecommunications System

PARTNERS

The CESARE IV Project is led by ASECAP and the Project partners are represented by 10 ASECAP members and 7 Public Administrations, as follows:

ASECAP members

AISCAT
Associazione Italiana
Società Concessionarie
Autostrade e Trafori

APCAP
Associação Portuguesa
das Sociedades Concessionárias
de Auto-Estradas ou Pontes
com Portagens

ASETA
Asociación de Sociedades
Españolas Concesionarias
de Autopistas, Túneles, Puentes
y Vías de Peaje

ASFA
Association professionelle
des Sociétés Françaises
Concessionnaires ou Exploitantes
d'Autoroutes
et d'Ouvrages Routiers

ASFINAG
Autobahnen
- und Schnellstraßen
Finanzierungs -
Aktiengesellschaft

DARS D.D.
Družba za avtoceste v
Republiki Sloveniji, d.d.

NORVEGFINANS
Norske
Vegfinansieringsselskapers
Forening

SUND & BAELT
Holding A/S

TEO
Fonds Routier National
Hellenique

TOLL COLLECT
GmbH

Public Administrations from 7 European countries

FINLAND
Ministry of Transport and
Communications

FRANCE
Ministry for Ecology, Energy,
Sustainable Development and Sea

GERMANY
Ministry of Transport, Building
and Urban Affairs

THE NETHERLANDS
Ministry of Transport, Public
Works and Water Management

SWEDEN
Swedish Road Administration

SWITZERLAND
Swiss Federal Customs
Administration

UNITED KINGDOM
Department for Transport

CONTACTS

For further information about CESARE IV Project, please contact CESARE IV Work Package 04
"Communication" to the following address: **emanuela.stocchi@aiscat.it**