

**EG07-n080**



## **The Role of Financial Institutions Payment and contractual aspects of EETS**

Prepared by  
Expert Group 7  
Working to support the European Commission DG TREN  
in the work on **Directive 2004/52/EC**

Document name: **EG07-n080 final report v1.0 061013**

Status: Final report

Document nature: Expert Group 7

Dissemination level: 17 October 2006

Date of issue: Klaus PHILIPP

Contact persons : AGES International GmbH & Co.KG, Düsseldorf,  
Germany  
Tel: +49-2836-8209  
Fax: +49-2836-85306  
Email: [k.philipp@tcl-logistik.com](mailto:k.philipp@tcl-logistik.com)

Philippe HAMET  
European Commission DG TREN  
Tel: +32.2.295.18.61  
Email: [philippe.hamet@cec.eu.int](mailto:philippe.hamet@cec.eu.int)

## Table of Content

<b>1.</b>	<b>Executive Summary .....</b>	<b>5</b>
<b>2.</b>	<b>Scope of work .....</b>	<b>6</b>
<b>3.</b>	<b>Roles Model CESARE III .....</b>	<b>7</b>
<b>4.</b>	<b>Definitions .....</b>	<b>8</b>
4.1.	Electronic European Toll Service .....	8
4.2.	Interoperability.....	8
4.3.	Charging.....	8
4.4.	Financial Matters .....	9
4.4.1	Payment .....	9
4.4.2	Payment Mean .....	9
4.4.3	Payment Mode .....	9
4.4.3.1	Pay- Before Mode .....	9
4.4.3.2	Pay-Now Mode .....	9
4.4.3.3	Pay-After Mode .....	9
4.4.4	Payment Guarantee .....	9
4.4.5	Organisations .....	9
4.4.5.1	Financial Institutions .....	9
4.4.5.2	Non-bank financial companies (NBFC).....	10
4.4.5.3	Other Organisations.....	10
<b>5.</b>	<b>EETS and contractual issues .....</b>	<b>11</b>
5.1.	Relationship between roles .....	11
5.2.	Responsibilities .....	11
5.2.1	Toll Charger.....	11
5.2.2	EETS Provider.....	11
5.2.3	Service User .....	12
5.2.4	Interoperability Manager .....	12
5.3.	Interfaces.....	13
5.3.1	Interface between Toll Charger and EETS Provider .....	13
5.3.2	Interface between EETS Provider and Service User.....	13
5.3.3	Interface between Toll Charger and Service User.....	14
5.4.	Contractual relationships.....	14
5.4.1	Legal Status of the tolls .....	14
5.4.1.1	Models for Tolls.....	14
5.4.1.2	Valuation of the Models .....	15
5.4.1.3	On Balance .....	16

5.4.2	Status of EETS Provider.....	16
5.5.	Liability chain (risk and guarantees).....	17
5.6.	Postpaid and Prepaid Contracts.....	18
5.6.1	Postpaid Contract.....	18
5.6.2	Prepaid Contract.....	19
<b>6.</b>	<b>EETS, charging and payment processes .....</b>	<b>21</b>
6.1.	Charging processes .....	21
6.1.1	Information Flow for DSRC.....	21
6.1.2	Information Flow for GNSS.....	22
6.2.	Payment processes.....	24
6.2.1	Information Flow for Post Payment .....	24
6.2.2	Information Flow for Pre Payment.....	24
6.2.2.1	Universal and mobile Pre Payment scheme.....	25
6.2.2.2	One to one individual Pre Payment.....	25
6.3.	Security aspects .....	25
6.3.1	Requirements .....	25
6.3.2	ICT security threats .....	26
6.3.3	Handling of fare dodgers .....	26
<b>7.</b>	<b>EETS and invoicing .....</b>	<b>28</b>
7.1.	Tolls and Invoicing.....	28
7.2.	Tolls and VAT.....	29
7.3.	VAT on Toll Service related Charges.....	30
7.4.	Tolls and Currency Issues.....	30
<b>8.</b>	<b>Summary of Recommendations.....</b>	<b>32</b>

**Annexes**

**DISCLAIMER**

**The following report represents the opinion of its authors, expressed under a contract provided by the European Commission. However, in no way can the European Commission be formally committed by its conclusions or its statements.**

This report has been prepared for DG TREN, as part of its work on implementing the Directive 2004/52/EC, by Expert Group 7, whose members were

<b>Capello</b>	Vittorio	Autostrade per Italia	IT
<b>Eriksröd</b>	Tore	ASFINAG Maut Service GmbH	AT
<b>Giorgi</b>	Paolo	Autostrade per Italia	IT
<b>Grünkorn</b>	Mrs. Anne	DVB LogPay GmbH	GE
<b>Knipping</b>	Andreas	DKV Euro Service GmbH & Co. KG	GE
<b>Lankheit</b>	Christoph	Tollcollect GmbH	GE
<b>Lassauce</b>	Philippe	AXXES	FR
<b>Martinez</b>	Jean-Michel	Eurotoll	FR
<b>Philipp (leader)</b>	Klaus	AGES International GmbH & Co. KG	GE
<b>Ramos</b>	Joao	Via Verde Portugal S.A.	PT
<b>Rodriguez de la Rubia</b>	Juan	Serviabertis	ES
<b>Selezneff</b>	André-Jacques	MasterCard	BE
<b>Tzoneva</b>	Mrs. Eva	SHELL	UK

---

### List of Acronyms

CARDME	Concerted Action for Research and Demand Management in Europe
CESARE	Common EFC System for an ASECAP Road Tolling European System
CI	Contract Issuer
DG TREN	Direction Générale de Transport et Energy
DSRC	Dedicated Short Range Communication
EC	European Community
EETS	European Electronic Toll Service
EG	Expert Group
EP	EETS Provider
EFC	Electronic Fee Collection
FI	Financial Institution
GNSS	Global Navigation Sattelite System
HGV	Heavy Goods Vehicles
ICT	Information and Communication Technology
IOPM	Interoperability Manager
MoU	Memorandum of Understanding
NBFC	Non-bank financial company
OBE/OBU	On-Board Equipment/On-Board-Unit
OJ	Official Journal
PMI	Payment Means Issuer
RSE	Road Side Equipment
SAM	Secure Access Module
SU	Service User
TC	Toll Charger
TSP	Transport Service Provider
TTP	Trusted Third Party
VAT	Value Added Tax

## 1. Executive Summary

Expert Group 7 addresses the requirements on Charging and payment flows and related issues within the Electronic European Toll Service described in Directive 2004/52/EC.

The Group has recognized that the CESARE III's logical roles model can be a sound basis for further discussion and has decided to build its discussion, following the same concept. A short description of the Model is provided in Chapter 3. For simplicity, this document concentrates only on the four basic CESARE roles. The distinction between the logical model and its implementation in real life by physical organisations is presented in Annex A. This distinction is important for the understanding that the actual delivery of EETS is not confined to one single set of actors. Each of the key roles can be played by a number of qualified sub-actors.

Apart from the definition of roles, special definitions are needed for the purposes and understanding of EG07's work and listed in Chapter 4. Mainly the distinction between **charging** and **payment** is important for the further reflections.

The core of the document is built by Chapters 5 and 6.

Chapter 5 firstly looks into the responsibilities of each **role** (and not into the specific organisation, carrying out these responsibilities), then into the (non-technical) interfaces between the roles, followed by the contractual relationships. It is to state that the way these relationships are legally defined determines the organisation of the entire EETS process. Reflections on liability complete this chapter.

Chapter 6 deals with the processes related to charging and payment supplemented by necessary security issues.

VAT and currency issues of the invoices are addressed in chapter 7, followed by a comprehensive list in chapter 8 of all recommendations made.

EG07 has looked into a broad area which requires a wide range of expertise. Certainly some questions are left open since the expertise of fiscal or legal experts are required for a detailed analysis.

The discussions have shown that the EETS must be built on a basis where all participants can see a reasonable business case. This includes both the Toll Chargers and the EETS Providers. EG07 assumes that a profitable business may not be reached only by increasing efficiencies (cost savings, etc.) and economy of scale but will probably require a financial contribution by the Service Users for additional service provided. Due to the diversity of existing European Tolling Systems it will be challenging for EETS Providers to realise the required efficiency improvement to create a sound business case for the parties involved.

As it is obvious that the Interoperability Management will play a key role in the further establishment of the EETS, it seems that the definition of this role should be given priority.

## 2. Scope of work

European Directive 2004/52/EC provides a framework for the interoperability of toll collection systems within the European Union. The Directive sets an initial target date of July 2006 for an agreement on the definition of the European Electronic Toll Service (EETS).

According to the time-line declared by the EC, the EETS is expected to be offered to heavy goods vehicles in the year 2009 and in 2011 to all other vehicles.

The target of the EC is to offer this common service using

one single OBU

one single contract

and thus covering the technical as well as the procedural and contractual aspects of interoperability.

Whereas the Directive strongly emphasises all aspects of technical interoperability the requirements on payment flows and related issues also need to be addressed.

As the questions of payment and clearing go beyond financial institutions, Expert Group 7 has extended the title of the group to “The role of the financial institutions - payment and contractual aspects of EETS”.

Expert Group 7 “The Role of Financial Institutions” was established by the European Commission to fill this gap and provide recommendations for the definition of the contractual and legal issues related to the EETS taking into account the experience of banks, payment card issuers, contract issuers in this area.

Especially questions such as

- clearing between entities
- payment guarantees
- risk management
- liability
- legal rules that apply to means of payment and/or invoicing
- the roles of financial and non-financial institutions particularly in the context of bank law

have to be handled.

Whereas the Directive is equally applicable to HGV and light vehicles, the Expert Group has focused mainly on the interoperability for HGV. EG07 recognised that there could be specific requirements for light vehicles such as

- Consumer protection laws
- Privacy
- Security
- Business model

These issues should be evaluated thoroughly at a later stage.

It is to be stressed that the Expert Group included no legal or fiscal expert. Since in the development of this document, the Expert Group has identified legal and fiscal issues that need to be addressed, this lack of such expertise has not allowed validating from a legal nor fiscal point of view the views expressed hereafter.

It is thus recommended that legal and fiscal reviews of this document be made before any public use of it.

This report provides recommendations, which will be presented at an EFC Expert Group meeting for discussion.

### 3. Roles Model CESARE III

CESARE III defines four basic roles of an interoperable European Electronic Toll Service.

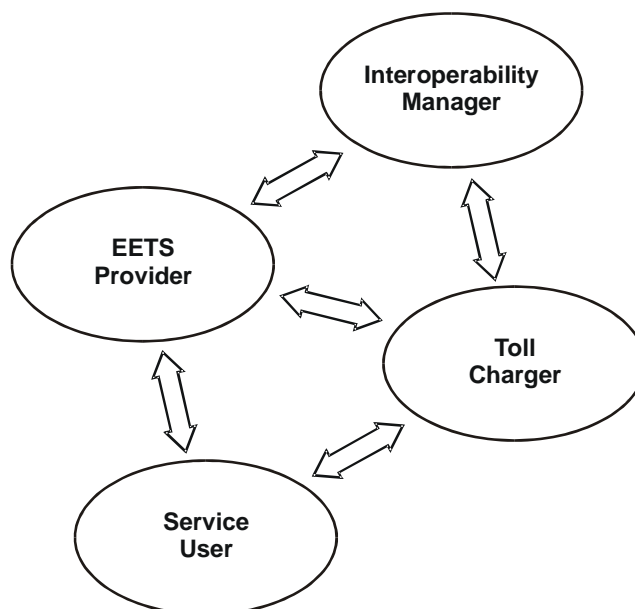


Figure 1: Basic CESARE III model

Each of the different roles represents a functional grouping of responsibilities. At a concrete level each role (and its related responsibilities) is taken over by an **organisation** (or a legal entity) being present in real life. The organisation or entity may be of different nature for different toll charging schemes. An organisation taking a specific role may delegate the operations of functions to other organisations, which fulfils a part of the role (sub-role).

- **The Toll Charger**

The Toll Charger (TC) has the mandate to levy toll in his toll domain.

- **The EETS Provider**

EETS Providers (EP) offer EETS to Service Users by issuing OBE and associated contracts and by handling related payment flows.

- **The Service User**

The Service User (SU) uses EETS in the tolled domains of more than one country and is liable for paying the toll.

- **The Interoperability Manager**

The Interoperability Manager (IOPM) sets the rules for interoperability in EETS and plays therefore a regulatory role.

## 4. Definitions

### 4.1. Electronic European Toll Service

In general a toll service provided to a user (customer) is a charge levied against a right to using a vehicle within a tolled road network (toll domain)<sup>1</sup>. This understanding is always valid, no matter whether the toll is regarded as a tax, charge, duty or usage fee (list not exhaustive).

In particular the Electronic European Toll Service (EETS) can be defined as follows:

EETS is a service enabling users to pay the charges related to the use of a vehicle in all toll domains under the operation of Directive 2004/52/EC by using only one OBE-set relating to only one contract. It will be offered in complement to national or local toll services and is optional to the SU.

### 4.2. Interoperability

Interoperability is generally defined as “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” [ref. Cardme]

When used in relation with tolling systems in road transport, interoperability means the provision for the driver of a seamless journey using one single OBE on all contractually participating operators.

Several dimensions of interoperability can be distinguished which need to be addressed in order to satisfy this goal:

- **technical interoperability**, includes physical interoperability and syntactical interoperability (not relevant in this document)
- **procedural interoperability**, is the use of a common format of presentation, the same working procedures and data delivery, and common data elements definitions for the information to be exchanged. A common interpretation of the data objects as well as common rules for their manipulation and use are required.
- **contractual interoperability**, is expressed through contracts, in objectives and needs related to the provision of that seamless journey. These objectives and needs cover the exchange of information as well as a coherent policy on the use of this information and the making of connections.

### 4.3. Charging

For the understanding of this document, it is important to highlight the following:

For Policy Makers and Toll Operators today “Charging” is commonly considered as a legal right to levy a toll or tax from the SU for the use of an infrastructure in a toll domain.

For the Financial Sector “Charging” is commonly considered as the effective recording on an account of a transaction with the agreement of the SU.

---

<sup>1</sup> The definition is a generalization of the classic definition of a toll as “a charge, a tax, or a duty for permission to pass a barrier or to proceed along a road, over a bridge, etc.” in this document toll service will have the same meaning as road charging.



**For both sectors Charging raises a claim, which needs to be settled through payment. This latter understanding will be used by the Expert Group in the rest of this document.**

## **4.4. Financial Matters**

### **4.4.1 Payment**

Payment is the remittance of a monetary countervalue for the delivery of goods or services. Such Payment may be carried out through various means, defined hereunder.

### **4.4.2 Payment Mean**

A Payment Mean is the actual tool by which the payment is effected.

### **4.4.3 Payment Mode**

The Payment Mode identifies the general timing of the actual monetary transfer with regard to the charge transaction. In the financial sector it is often split in the following categories: Pay-Before, Pay-Now and Pay-After.

#### **4.4.3.1 Pay- Before Mode**

The Service User has paid in advance to the EP for rights of using (a) not yet defined tolled road network(s) inside the EETS domain of application. This mode is commonly referred to as Pre-paid Mode.

#### **4.4.3.2 Pay-Now Mode**

The Service User pays for toll charges via an agreed payment mean at the time it is presented,

#### **4.4.3.3 Pay-After Mode**

The Service User pays the toll charges via an agreed Payment Mean after he consumed the service, commonly referred to as Post-paid Mode.

### **4.4.4 Payment Guarantee**

A Payment Guarantee is one way a Payer secures a Payee that under agreed conditions, an obligation to pay a claim will be executed at first request.

### **4.4.5 Organisations**

#### **4.4.5.1 Financial Institutions**

A Financial Institution acts as a trusted third party that provides financial services. Financial Institutions generally fall under financial regulation from a government authority<sup>2</sup>.

The current categories of Financial Institutions, which may legitimately provide those services throughout the EU, are:

- **credit institutions** which take deposits from users to fund payment transactions and which should continue to be subject to the prudential requirements under Directive 2000/12/EC<sup>3</sup>;

---

<sup>2</sup> On 1 December 2005, the European Commission issued a proposal for a directive on payment services, "New Legal Framework for Payments" (COM 2005/603). The aim is to remove local barriers and the remaining legal obstacles within the Union, and to create a single payment market in the European Union. The directive proposal provides a legal framework for the Single European Payment Area (SEPA), which is being prepared by the European banks. The legal basis for the proposal is Articles 47(2) and 95(1) of the EC Treaty.

See [http://europa.eu.int/comm/internal\\_market/payments/docs/framework/com\\_2005\\_603\\_en.pdf](http://europa.eu.int/comm/internal_market/payments/docs/framework/com_2005_603_en.pdf)

- **electronic money institutions** which issue electronic money to fund payment transactions and which should continue to be subject to the prudential requirements under Directive 2000/46/EC<sup>4</sup>;
- **post office giro institutions**, as referred to in the second indent of Article 2(3) of Directive 2000/12/EC, which are so entitled under national or Community law to provide payment services.
- **payment institutions**: other natural or legal persons who have been granted authorisation in accordance with Article 6 of Directive 2000/12/EC to provide and execute payment services throughout the Community.

#### 4.4.5.2 Non-bank financial companies (NBFC)

Such companies - also known as a **non-bank** - provide banking services without meeting the legal definition of a bank, i. e. one that does not hold a banking license and whose main activity consists for example of concluding leasing agreements.

Operations are, regardless of this, still exercised under bank regulation. NBFCs frequently act as suppliers of loans and credit facilities, however they are typically not allowed to take deposits from the general public and have to find other means of funding their operations such as issuing debt instruments.

#### 4.4.5.3 Other Organisations

These companies may provide EETS and related services without a need to hold a banking license.

---

<sup>3</sup> The title of this Directive of the European Parliament and of the Council of 20 March 2000 is called: "Relating to the taking up and pursuit of the business of credit institutions" (OJ L 126, 26.5.2000, p. 1.)

<sup>4</sup> The title of this Directive of the European Parliament and of the Council of 18 September 2000 is called "On the taking up, pursuit of and prudential supervision of the business of electronic money institutions (OJ L 275, 27.10.2000, p. 39.)

## 5. EETS and contractual issues

### 5.1. Relationship between roles

The CESARE III approach recognizes that each of the four logical basic roles mentioned in Chapter 3 is seen as an abstract **group of responsibilities**, which can be taken by an **actor**. In real life, actors can be different organisations or entities, acting on their own or in partnership with other organisations, to deliver the set of selected responsibilities, required for the provision of EETS. The concept of **sub-actors** is introduced, to illustrate that the number of set ups, in which interoperability and EETS can be delivered is practically unlimited (see Annex A).

It is essential that whatever the allocation of responsibilities among actors or sub-actors within a role or across roles, the **relationships** among the four key roles are well defined and maintained standard. This is equally applicable in terms of technical, contractual, procedural or any other aspect of the EETS framework.

### 5.2. Responsibilities

Irrespective of how functions are performed at the concrete level (split between physical organizations or done by one entity), each basic role is associated with a clear set of responsibilities.

#### 5.2.1 Toll Charger

The TC is responsible for

- levying Tolls due by the SU travelling on the Road Network for which the TC has been given the right
- operating the tolling system to ensure subsequent data capturing
- establishing contractual relationship with EPs on a non discriminatory basis
- accepting OBUs issued by contractually participating EPs
- implementing the defined security architecture
- providing proof of transactions made by the SU
- pricing the toll
- ensuring equal treatment of the SU regarding toll due
- ensuring necessary data exchanges
- managing black lists regarding EETS
- claiming payment from the EPs
- generating a charge and forward it to the EP
- compensating EPs for services rendered to TC
- enabling enforcement
- supporting the certification processes
- ensuring the defined quality of the service

#### 5.2.2 EETS Provider

The EP is responsible for

- establishing and maintaining contractual relationships with TCs for EETS,
- establishing and maintaining contractual relationships with SUs for EETS,
- fulfilling its contractual payment obligation to the TCs for Tolls due,
- issuing certified EETS OBE
- managing the OBEs during their lifetime

- claiming payment from the SUs
- implementing the defined security architecture
- managing data exchange and interfaces regarding EETS management
- providing the invoice process for the Tolls to the SU
- developing the acceptance network, to increase its competitiveness (if an EP can not offer EETS in the entire EETS domain this should not prevent him from playing the role)
- ensuring payment of the toll consumed by his SU whenever supported by genuine claims from the TCs
- maintaining customer relation with the SU
- ensuring the defined quality of the service

### **5.2.3 Service User**

The SU is responsible for

- signing an EETS contract with an EP
- providing and maintaining correct input of data required for an OBE personalisation
- ensuring a proper usage of the OBE
- paying the invoices from the EETS

### **5.2.4 Interoperability Manager**

The IOPM is responsible for

- setting and maintaining rules and regulations for EETS including minimum service levels
- defining the rules and process of certifying OBE and RSE
- setting of the security rules
- establishing the basic model contracts among the roles
- performing ongoing audit review for governance
- providing central registration service
- qualifying the EP according to the entry criteria
- defining rules to settle disputes between actors
- establishing and maintaining criteria for acting as an EP

IOPM should be subject to a governance model defined by the stakeholders of EETS

**[RE 1]: it is recommended that the EETS business model has to allow for viable financial relationships between all parties. The party receiving a service must be willing to pay a price for the service.**

**[RE 2]: it is recommended that the responsibilities of the IOPM are taken by a Board of Representatives whose filling is a fair representation of the roles.**

**[RE 3]: it is recommended that the organisation of the IOPM and its tasks should be studied in more detail.**

### 5.3. Interfaces

An interoperable EETS is based on data exchange throughout Europe and can involve relationships among multiple physical organizations. To avoid unnecessary complexity and to ensure that EETS is delivered cost-effectively, a common basis for the interfaces between the key roles must be found. This includes:

- the interface between TC and EP
- the interface between EP and SU
- the interface between TC and SU

Among others, interfaces are established to cover EETS transactions, hotlists, to channel payment flows and associated documents, such as invoices or statements.

#### 5.3.1 Interface between Toll Charger and EETS Provider

The degree of standardisation of the interface between TC and EP is decisive for the establishment of the EETS.

From the **contractual** perspective, there must be a common contractual framework regulating those elements that are important for ensuring a minimum service level for the SUs. This implies that the interface between TC and EP must be regulated to some extent, as the service level is dependent on the co-operation of TCs and EPs. Also the basic roles of the TC and EP must be reflected in the contractual framework. Through standardisation of some elements the closing of the required bilateral agreements between the respective TCs and EPs will be easier.

From the **technical** perspective a standardisation of the data exchange between TC and EP would make the overall EETS system more efficient. This is especially due to reduced investments in ICT systems, as fewer variants have to be developed. It must be recognized that a 100% standardisation cannot be achieved for the data exchange. Despite the EETS, there will always be differences in the nature of the tolling systems, e.g. due to technology shifts which cannot be implemented at the same time all over Europe. Consequently, the data available from a TC will differ.

**[RE 4]: it is recommended that a common contractual framework should govern the interface between TC and EP, irrespective of the country(ies) of operation, number of entities involved and type of toll charged. The local legislation impact should be brought to the unavoidable minimum.**

**[RE 5]: it is recommended that technical and content standards be established for the required exchange of data to minimise the cost of delivery of EETS to the SU.**

#### 5.3.2 Interface between EETS Provider and Service User

The SU may expect that the EP will offer a single interface for the registration for EETS, and a single process/channel for the delivery of the required on-board equipment.

Furthermore, the EP has to ensure that all the rules and regulations applying to the use of the EETS are communicated clearly to his SUs. This includes the obligations regarding keeping the personalized data updated, adhering to local tolling regulations, mounting and using the OBU correctly as well as how the SU must react in case of any malfunctions.

**[RE 6]: it is recommended to define a minimum set of terms and conditions used by all EPs.**

### 5.3.3 Interface between Toll Charger and Service User

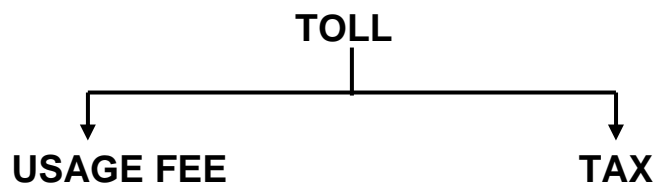
When a SU enters the domain of a TC an implicit contractual relationship is established between TC and SU regardless of EETS.

Regarding EETS the TC does not know the SU therefore there is no direct interface between TC and SU. In case the TC grants discounts to the SU the TC may require SU data.

## 5.4. Contractual relationships

### 5.4.1 Legal Status of the tolls

A number of countries collect from road users sums of money in connection with the usage of their vehicles on toll roads. This can be done in the form of a **usage fee** (as in the case of Austria) or a **tax / duty** (as in the case of Germany or Switzerland).



Usually (but not exclusively), a **usage fee** is charged when a service is provided – e.g. the right to access the toll domain. In such cases tolls are subject to VAT.

A **tax** is typically charged on the basis of public law and is considered as revenue to the state or the authority, granted the right to charge it. In such cases tolls are not subject to VAT.

To a large extent the legal status of the Tolls charged to the SU define the business models that can be used for the provision of EETS. The models differ in the contractual relationships between the key roles, as well as in ownership, charging, invoicing, and payment flows. Currently, the models exist next to each other, each offering certain advantages and disadvantages, high-lighted below. The common element between all models is that there is always a relation between TC and SU, no matter whether it is mediated by other players or not. Therefore the TC stays responsible for all events related to the use of his infrastructure.

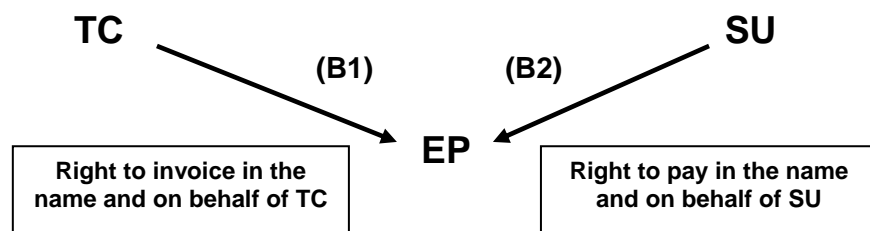
#### 5.4.1.1 Models for Tolls

Two contractual models are commonly used for the provision of EETS:

- a) The “resale” model (model A), in which the EP buys the Tolls from the TC and invoices them to a SU in his own name.
- b) The “agency” model (model B), in which the TC sells directly the Toll to the SU. There are two angles to this model:

B1) the EP acts as an agent **of the TC** and issues the invoice in the name and on behalf of the TC, to the SU

B2) the EP acts as an agent **of the SU** and ensures the payment of the invoices of the TC in the name and on behalf of the SU.



The relationship represented in B1 can be seen as one involving cession of claims and might fall under financial regulations.

#### **5.4.1.2 Valuation of the Models**

##### **Model A Resale**

###### **Advantages**

- the SU can receive all his invoices (one per country) from the same EP,
- the recovery of VAT for the SU is facilitated by the minimised number of invoices
- reduced administrative effort
- the SU can channel payments for all tolls due to only one party – its EP
- the EP has a clear commercial relationship with the SU, on the basis of which the EP can issue a payment guarantee to the TC
- the TC does not need to know SU's data (unless a loyalty discount scheme is in place)
- the model allows for fast market penetration of EETS because of simple contractual relations

###### **Disadvantages**

- the EP needs to be VAT registered in all the countries, where EETS is offered to SUs – otherwise the EP cannot issue VAT invoices in its own name
- This process being registered could entail some additional costs to the EP, in cases where he is acting as local and not as Pan-European player
- As of today the model is not applicable in those cases where the Toll is regarded as a tax

##### **Model B Agency**

###### **Advantages**

- the EP will issue the invoice to the SU in the name and on behalf of the TC. The advantages for the SU from model A are preserved
- The EP does not need to register for VAT purposes outside its own country
- The TC is only required to maintain transaction data and not SU data.

###### **Disadvantages**

- The TC still has to bear liability for the correctness of the invoices and VAT treatment (if applicable), although he has no control over or knowledge of SU data.
- The EP has to issue invoices in the name and on behalf of various TC's across Europe.
- The contractual framework could be more complex due to the number of involved parties
- If model B1 (where EP acts as agent of the TC) may involve cession of claims then only financial institutions might be able to apply it
- The EP will issue the invoice to the SU in the name and on behalf of the TC and forward a copy of the invoice to the TC for tax authority control purposes.
- The SU will receive one invoice per TC, which will increase the complexity of administrative work
- In case of breach of the contract by the TC (except for fault) , the TC shall owe the EP an indemnity

A further refinement can be found in the solution considered by Portuguese and Spanish TCs and EPs. Each local EP would be allowed to produce a single document per country containing the toll invoices of the TCs, but itemized separately. This allows the EP to simplify the process and send only two documents to the client, both produced by the same EP (e.g., Portuguese SUs receive two documents, issued by the Portuguese EP – one for tolls in Portugal, one for tolls in Spain).

### 5.4.1.3 On Balance

Regarding tolls as usage fee, we see Model A and Model B applicable. For tolls as taxes, only the Agency model (model B) is applicable.

Presently, several multinational players are already equipped to operate the above mentioned contractual models. In this respect they can build upon their existing capabilities such as toll payments, customer invoicing, VAT recovery, clearing, billing and contract management, in addition to their existing relationships with SUs and TCs.

Many national players have already developed similar capabilities but face difficulties in extending them to other regions unless the above-mentioned barriers are addressed and dealt with.

Furthermore it is a requirement of the Single Market that everybody has equal chances to be well placed to play the EP role in a European context, either alone or in partnership with others.

**[RE 7]: it is recommended that regulations across Europe allowing the reselling of tolls from the TC to the EP and from the EP to the SU be harmonised. The principles behind the reselling model should be basis for future Tolling Systems.**

**[RE 8]: it is recommended that the implementation of the reselling model should allow for civil responsibility to be split from fiscal and commercial liabilities – e.g. the EP should not be responsible for incidents the SU might have while using the Tolled Road.**

### 5.4.2 Status of EETS Provider

The EP should be properly equipped to fulfil all responsibilities as defined under chap.5.2.2. According to the activity-portfolio resulting from that, the EP will have to undertake financial activities as well. Implications on the status of an EP arise from the fact that some of these activities might be needed to be covered by only financial institutions according to chap.4.4.5.1.

An approach to solve the problem can be found in Directive 2000/12/EC Annex “List of activities subject to mutual recognition”, published in OJ 26.05.2000. The services/business activities subject to financial institutions are described as:

- Acceptance of deposits and other repayable funds, and means of using them.
- Lending (including, inter alia: consumer credit, mortgage credit, factoring, with or without recourse, financial or commercial transactions (including forfeiting))
- Financial leasing
- Money transmission services
- Issuing and administering bank Payment Means (e.g. credit cards, travellers' cheques and bankers' drafts).
- Guarantees and commitments
- Trading for own account or for account of customers
- Participation in securities issues and the provision of services related to such issues
- Advice to undertakings on capital structure, industrial strategy and related questions and advice as well as services relating to mergers and the purchase of undertakings
- Money brokerage
- Portfolio management and advice
- Safekeeping and administration of securities
- Credit reference services
- Safe custody services



As far as the EP's activity-portfolio is concerned the following financial activities might occur:

- Acceptance of deposits (in case of Pre-paid Mode/pre-paid account)
- Issuing and administering bank Payment Means (in case of Pre-paid Mode/electronic purse)
- Guarantees and commitments
- Credit reference services (in case of Post-paid Mode).

This list of services dedicated to financial institutions shows that all financial and non-financial organisations should be able to provide EETS and related services within a post-paid reselling model.

In this respect it has to be clarified whether these activities require authorisation/approval to act as financial institution according to Directive 2000/12/EC.

Regarding the application of Pre-Paid Mode/electronic purse the regulations of Directive 2000/46/EC on the taking up, pursuit of and prudential supervision of the business of electronic money institutions have to be considered. For further statements see chap.5.6.2.

**[RE 9] It is recommended that legal experts examine whether and under what circumstance some of the EET services offered by an EP need to be covered by a financial institution and how the contractual framework needs to be designed to meet European and national law for all EETS functions and different legal status of toll.**

### **5.5. Liability chain (risk and guarantees)**

The EP has to have full control of the usage made of the EETS application and security mechanism.

The **application** for Tolls calculation, of which the OBU is the carrier or facilitator, can be owned either by the TC or by the EP. In either case, the application should be able to certify the transaction made and as a consequence the Toll due.

If the EP calculates the Tolls, then the application should be certified by the IOPM with sufficient legal commitment that Tolls are correctly calculated. This calculation can be made in the OBE or in a back-office. It is done under the responsibility of the EP and certification by the IOPM.

In the context of tolling, the coverage of risk is often referred to as providing a "payment guarantee". It must be noted that this expression covers two different kinds of guarantees:

- a) a bank guarantee issued to secure claims
- b) a promise to accept all valid (genuine) toll transactions.

For issuing guarantees of type a) obviously a banking license is required. Guarantees of type b) can be issued by any company as they may agree in a contract. If contractually agreed, a type-b)-guarantee can be backed by a type-a)-guarantee.

The EP will be contractually required to provide a guarantee of payment to the TC for certified transactions and, in turn, might request for a guarantee of payment from all SUs. Aligning the terms and conditions of these guarantees will be important to minimise the commercial risk of all parties involved.

In Pay-After Mode the SU has the obligation to pay the EP for the Tolls after having received the service. This is managed by the EP and at his risks. Therefore, there should be remuneration by the TC for the management of risks, taken by the EP.

At a European scale, if an EP is asked by each TC for a bank guarantee it will be expensive, complicated to manage, and could be subject to discrimination among the EPs.

The TC has to be put in the position to stop the contract with an EP. The rules to do this have to be defined by the IOPM.

The chain of responsibility can rest on already existing relationships. It has to be recognised that several players have built up substantial expertise in credit assessment, receivables management and fraud prevention in the commercial transport sector.

An interoperable European system of toll charging and clearing has to be based on a reliable and trustful service of data exchange between the parties (see chap.6.3). Furthermore efficient data management is a pre-requisite of an efficient credit risk management.

***[RE 10]: it is recommended that European regulations acknowledge that the guarantee of payment, provided by the EP to the TC and required for EETS functioning, does not refer to any bank law obligation.***

***[RE 11]: it is recommended to evaluate and define how the risk of commercial failure of an EP can be managed at European level.***

## **5.6. Postpaid and Prepaid Contracts**

The EP and the SU can either agree on a Postpaid or a Prepaid Contract. This can be agreed independently from the TC, who has no right to decide on this contractual issue between EP and SU.

The TC's perspective is that he has to recognize the issuer of the OBU and to collect the toll from the EP. This means that the TC will not be obliged to check or update any balance in case of a prepaid contract. The TC will only check against a hotlist whether the OBU is valid. This sets certain requirements to the performance of the TC.

Whether the EP needs to collect the toll in advance (prepaid), is his own business decision based upon the risks involved. One option for the EP is to charge the toll to the selected payment means of the SU when the balance is less than an agreed amount.

### **5.6.1 Postpaid Contract**

Depending on the technical realisation of the final OBU, a minimum standard for a (daily) interchange of billing records and hotlist files among TCs and EPs is required. To calculate the toll consumed, the TC will either use the data generated the moment the vehicle exits the toll route (DSRC-closed system), passes a toll gantry (DSRC-open system) or the data received by the OBU continuously (Satellite).

It has to be taken into account, that the TC's processes may widely vary and that the time range of transmitting the billable records to the EP may take even several days. Then, every day, during the EP's invoicing process (day D), the credit risk will be checked and, if there is any problem, the EP will either contact the SU, charge the import toll into the SU's banking account or hotlist the relevant OBUs, which won't be accepted by the TCs as soon as they receive the new hotlist (usually the day D+1).

Besides the minimum standard EP and TC may agree on bilateral additional services, i.e. more frequent updates or ulterior information. This certainly will take into account the route network of the TC and the usage.

### 5.6.2 Prepaid Contract

More questions are arising in the context of the access to the system for SUs not being able to provide sufficient creditworthiness or collateral or by restrictive regulation or legislation are not allowed or handicapped to participate.

To meet the requirements of this clientele, one or more suitable ways of pre-payments have to be established for the EETS to grant interoperability:

a) Stored value on electronic medium

The SU pays the issuer of the medium a certain amount (cash or by debit entry) and gets the countervalue stored e.g. on a smartcard (or his mobile). The medium is read by the OBU (maybe linked with the electric starter) and the value (or part of it) is transmitted to and stored securely within the OBU. The relevant toll amount is automatically deducted from the amount stored in the OBU.

b) Stored value on central account

The SU pays the EP a certain amount (cash or by debit entry) and gets the countervalue stored on an account at the EP. Using a tolling network, the OBU is regarded like an OBU in post-paid mode. Every toll transaction is charged to that account.

The skill derives from the fact that from the basic idea the SU has the right to use his prepaid funds to the last extent i.e. Cent. Due to that fact an early warning function has to be technically and contractually realized:

- to inform the SU of the narrow exhaustion of the credit and to enable him to refill the bourse to carry on
- to inform the TC about the remaining credit to grant the access or to refuse (this might be more sophisticated to resolve for DCRS than GNSS, which is having continuous communication with the OBU)
- to enable financial institutions to transfer funds in duly time to the pre-paid mean used

As far as stored value is concerned it has to be clarified whether electronic money is questioned according to Article 1 of Directive 2000/46/EC and whether the medium-issuing organisation has to act as financial institution if it is not.

In Article 1 the Directive states

3. (b) "electronic money" shall mean monetary value as represented by a claim on the issuer which is:

- (i) stored on an electronic device;
- (ii) issued on receipt of funds of an amount not less in value than the monetary value issued;
- (iii) accepted as means of payment by undertakings other than the issuer.

4. Member States shall prohibit persons or undertakings that are not credit institutions, as defined in Article 1, point 1, first subparagraph of Directive 2000/12/EC, from carrying on the business of issuing electronic money.

**[RE 12]: it is recommended that the contractual framework for EETS sets a clearly defined split of responsibilities between EP and TC with respect to the different Payment Modes.**

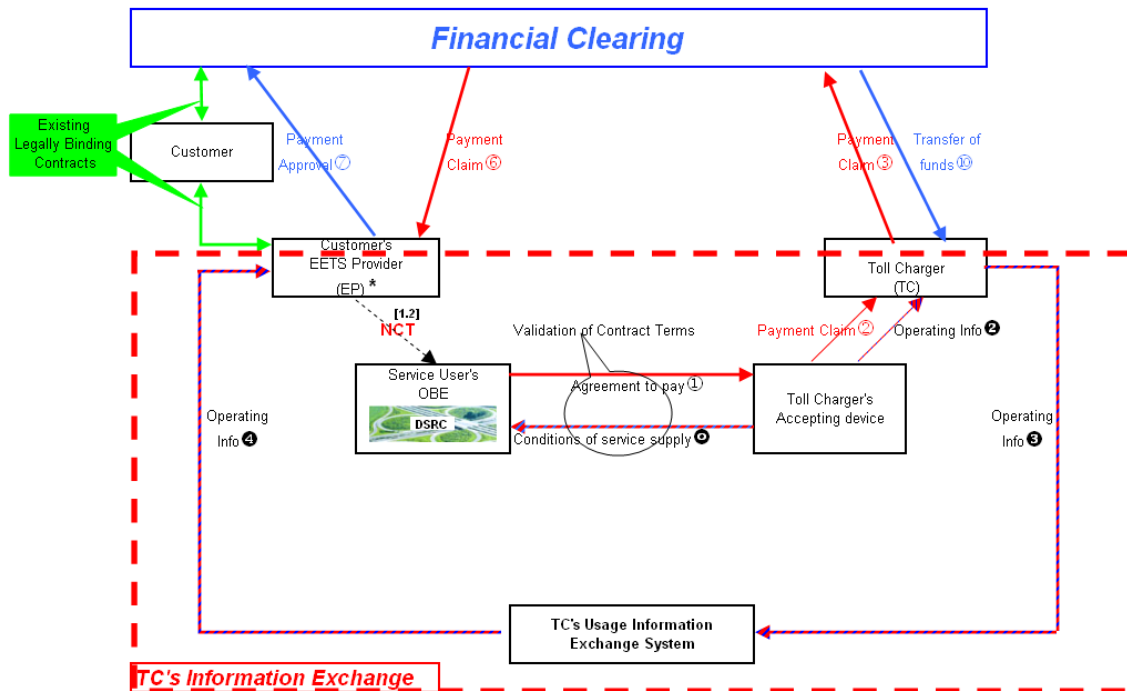
**[RE 13]: it is recommended that before defining a Pre-Paid Mode for the EETS, legal experts examine whether and under what circumstance the Pre-paid Mode offered by an EP falls under Directive 2000/46/EC and/or need to be covered by a financial institution according to Directive 2000/12/EC and how the contractual framework needs to be designed to meet European and national law.**

***[RE 14]: it is recommended to EETS stakeholders to investigate whether and under what circumstances Pay-Now and Pay-Before Modes could be viable alternatives to Pay-After Mode.***

## 6. EETS, charging and payment processes

### 6.1. Charging processes

#### 6.1.1 Information Flow for DSRC



\* This is the only place in the process where operating Info and payment claims are compared.

The EP stores and updates all required information on SU OBE. If the OBE is activated (not deactivated by the EP) and is passing a Toll Gate, the OBE identifies itself to the TC.

The TC checks with actual hotlist and grants or rejects access. Access granted, the TC may calculate the Toll to be charged according to his processes immediately or when leaving the Toll domain.

The TC sends the charging records to the EP and claims the payment accordingly.

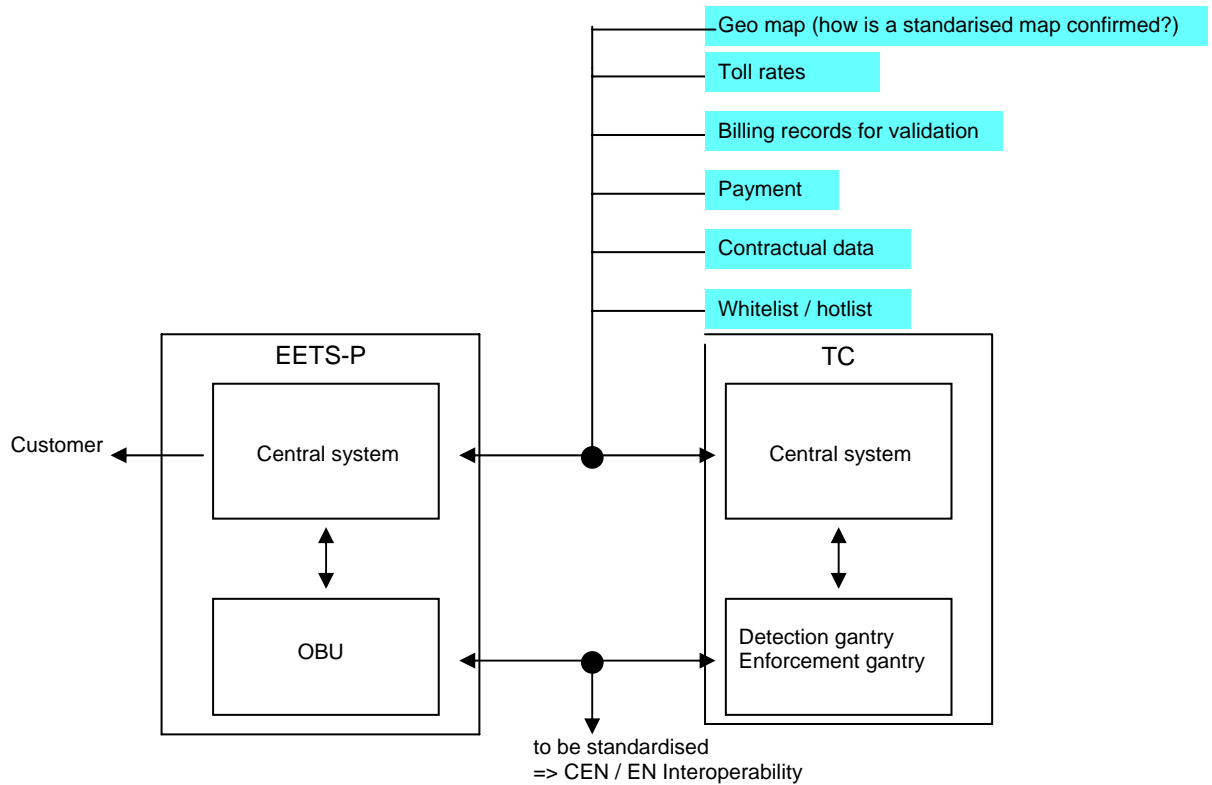
The EP updates and distributes hotlist according to standard agreed procedure (minimum daily, more frequent updates may be agreed between parties). If the TC receives relevant information about a SU (e.g. gathering roadside control informations), he will inform the EP accordingly.

The EP gives order to his bank to transfer funds from his bank account to the account of the TC. The EP integrates the billing records in its billing run and issues the invoice (or statement of account) to the SU.

The Payment Claim through the financial clearing (as illustrated above) is valid in case that the payment is made by charging a credit card or if the EP has authorized the TC to charge his bank account through a direct debit procedure.

If payment is initiated by the EP (based on an invoice from the TC) or if a fleet card is used for charging, then there is no payment claim through the financial clearing system.





Entering a GNSS operated Toll Road the (active) OBE continues to transmit information to the EP (not to the TC!) via GSM.

The EP validates and processes the information and submits the charging information (billing records) to the TC. The TC checks the data with his control and enforcement records. The EP issues a credit note to the TC according to the contractual agreement.

The EP updates and distributes hotlists according to a standard agreed procedure (daily).

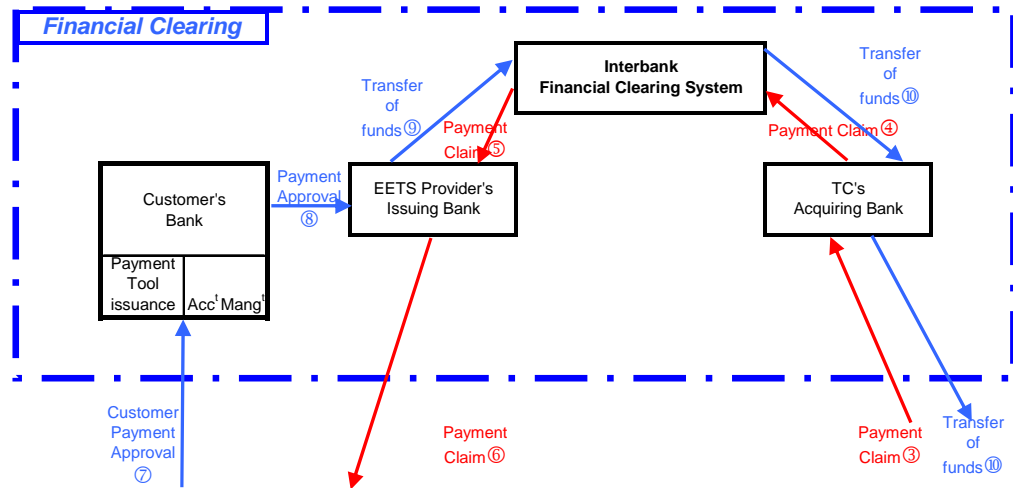
The EP gives order to his bank to transfer funds from his bank account to the account of the TC. The EP integrates the billing records in its billing run and issues the invoice (or statement of account) to the SU.

The payment of the SU will be initialised according to the payment mean agreed.

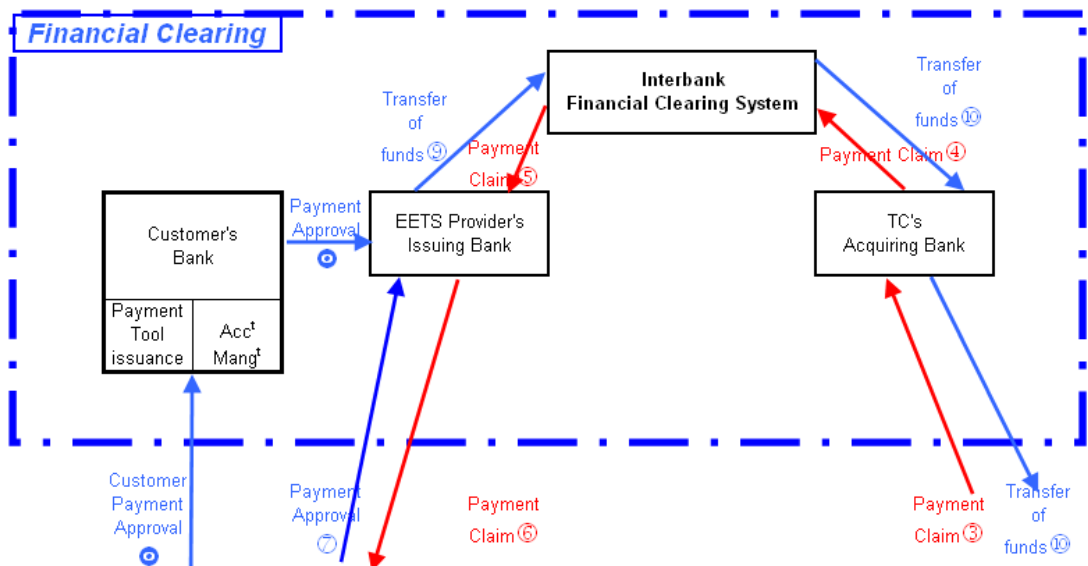
## 6.2. Payment processes

The following illustrations show the different information flows for Post Payment and Pre Payment, based upon charging through a credit card or a direct debit procedure.

### 6.2.1 Information Flow for Post Payment



### 6.2.2 Information Flow for Pre Payment



The two differences incurred by Pre-Payment in the Financial Clearing are:

2. a Customer Payment approval is requested by the EP from the SU before the first relationship with a TC can happen (therefore numbered ① in the chart above); and
3. the EP can thus direct the Payment Approval ⑦ as a response to certified Payment Claims directly to its bank for execution.



### 6.2.2.1 Universal and mobile Pre Payment scheme

Independent Payment means issuer will offer a possibility to the SU to transfer money to either a server-based (even anonymous) account or a smart card where the available balance will be stored.

To access these funds the OBE or a periferal device must be able to communicate with the storage and download the money equivalents according to the toll claim and transfer them to the central system of the EP. The central system will claim the payment from the payment issuer.

### 6.2.2.2 One to one individual Pre Payment

This procedure will be applied in case the EP gives no credit to the SU and will activate the OBE only if the SU transfers money in advance to his account with the EP (this means there are as many schemes as EPs exist).

If the credit is exhausted the EP will disactivate the OBE until new funds will appear on the SUs account. The contractual details may vary from one EP to another. No standardisation or additional technical features of the OBE will be necessary.

**[RE 15]: it is recommended on mid-term to evaluate a universal Pre Payment system able to communicate with the OBU, especially with regard to an EETS solution for private cars.**

## 6.3. Security aspects

### 6.3.1 Requirements

Regarding the Europe wide transmission of information related to EETS which - in the end - leads to money transfer, it is obvious that each party involved in a process has totally to trust the ones creating, processing and transmitting data and that the interests of each party have to be protected against threats/attacks from outside and inside the relevant process.

The EETS involves two main security risks relating to

- the implemented ICT infrastructure
  - o Components (Hard-, Software)
  - o Stored data within these components
  - o Communication links
  - o Data flows
- the breach of contract (e.g. fare dodgers).

To minimize the risks caused by fraud the following requirements have to be fulfilled:

- only certified components are allowed to be used
- technological and/or organisational prevention mechanisms have to be implemented in a way that
  - o data cannot be faked, manipulated, imposed, illegally created, withhold, used without authorization, unintentionally deleted, destroyed or lost
  - o components cannot be manipulated or spied out
  - o transactions cannot be defectively processed, created without authorization or unintentionally created
  - o communication links cannot be tapped
  - o end-to-end security is achieved
  - o transactions can be certified against SU claims
- a quick reaction in case of incidents has to be ensured
  - o detection of the security failure

- notification to the entities involved
- implementation of anti-fraud measures
- the TC will have to produce Proof of Transaction in the case of dispute with SUs on the toll applied

**[RE 16]: it is recommended to develop a legal framework regarding security and enforcement measures so that the EP can guarantee the payment of the service to the TCs.**

**[RE 17]: it is recommended to implement end-to-end-security mechanisms incl. proof of transaction. Its implementation and operational costs have to be justified by the probability and importance of the risks avoided.**

**[RE 18]: it is recommended to define clearly the responsibilities of the EP and the TC in front of the SU in case of malfunction of the OBU or the toll equipment.**

### 6.3.2 ICT security threats

EG 12 will be in charge of these issues. Annex B gives a preliminary analysis as input of EG 7 to EG 12.

### 6.3.3 Handling of fare dodgers

The following situations have to be solved:

1. Non-equipped SUs trying to avoid the payment of toll.
  2. Vehicle class (Category) fraud.
  3. Equipped SUs denying the payment of real transactions.
  4. SUs with fake OBE's.
  5. SUs with stolen OBE's.
  6. SU accounts without funds.
  7. Manual data capturing fraud.
- To prevent the two first frauds, the TC should implement enforcement mechanisms supported by international regulations, which have already been defined by EG03.
  - The strict application of the *certification mechanisms* defined in anticipation will solve problems 3 and 4. While these mechanisms are not completely implemented (see Annex B.I), for problem 3 the EPs have to trust the TC's information and pay them if this information has been captured via an RSE or Satellite, and for problem 4 the solution is the use of hotlisting (or hotlisting).
  - In cases of stolen OBEs and/or user accounts without funds, the common solution is the use of hotlists.

Before the communication via hotlist of a fraudulent OBE to the TC, the EP must pay them for the transactions made with these OBE. To reduce the impact of these frauds a quick detection and a quick hotlist update and notification are necessary, moreover the capacity of the toll computers must be enough to manage the whole hotlist generated by all the EPs.

Regarding the hotlist the following aspects should be analyzed:

- Integration of different EETS' hotlists from different EPs.
- Updating intervals at Toll Plaza Computers and OBE (GNSS).
- Traceability (of the updates).

- The 7<sup>th</sup> situation appears (in DSRC environment only) when a technical problem occurs and the OBE cannot be correctly read, then, in a closed tolling system, the EFC Operator introduces manually (or via a barcode reader) the OBE label data.

The falsification of these paper labels by the SUs is very easy, moreover the own toll personal might commit fraud. Therefore the label data shouldn't be used to perform the transaction.

The rate of manual transactions has to be monitored. The EPs and the TCs have to meet from time to time to analyze the evolution of this rate.

Finally, to coordinate actions against repetitive fare dodgers a common plate numbers hotlist could be very useful, but it has to respect the European privacy laws.

**[RE 19]: in order to have an effective hotlist management, it is recommended that:**

- **a daily transaction file communication takes place between TC and EPs to speed up the fraudulent OBEs' detection. (This is a minimum standard. Where technically and economically suitable, a more frequent update is contractually to be foreseen).**
- **a daily hotlist elaboration and communication to the TC's facilities takes place in order to reduce the impunity period for fraudulent OBEs. (These are minimum standards. Where technically and economically suitable, a more frequent update is contractually to be foreseen or has to be enabled).**
- **intermediate processes among the EP components will be shortened in order to speed up hotlist communication and detection of fraudulent OBEs.**
- **TCs should be able to implement hotlists without limitations, provided that the EP manages the content with due diligence. In case of TC constraints, liability will be shifted to the TC.**
- **all these obligations and the consequences in case of non-fulfillment will be fixed in the contract agreement between TC and EP.**
- **Contrary wise procedures will be installed for a fast and exact de-listing.**

**[RE 20]: it is recommended to perform a legal analysis to evaluate under which conditions information on fare dodgers (maybe even hotlist of companies or plate numbers) can be exchanged between TCs as well as between EP and TC.**

**[RE 21]: In order to reduce the cost of fraud and toll dodging in the EETS environment, and thereby easing the introduction of EETS, it is recommended to improve the legal possibilities for collecting toll from non-payers across the national borders**

## 7. EETS and invoicing

### 7.1. Tolls and Invoicing

Two parameters define the invoicing process (who is invoicing what to whom) within EETS:

- The roles model laid out in Chapter 3 and
- The legal status of tolls and respective business models laid out in Chapter 5.4.1

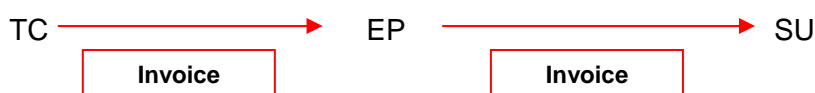
With respect to the first parameter, invoicing takes place at least at two levels:

- TC invoices EP (inter-company invoicing)
- EP invoices SU (customer invoicing)

The latter can be mediated by yet other EETS players.

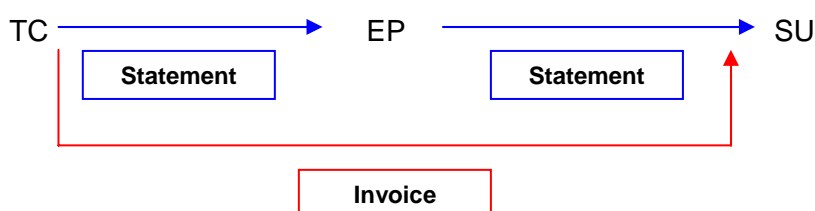
With respect to the second parameter mentioned above, the different business models can also drive different forms of invoicing:

- in the **re-sale model**, all players participating in the EETS delivery chain can issue invoices in their own name: TC to EP and EP to SU.



- in the **agency model**, there only exists one invoice – the one the SU receives from the TC – either directly or from the EP, but issued in the name and on behalf of the TC.

At inter-company level, the TC issues a **statement** to the EP. The EP also issues a statement to the SU, but only for money collection purposes. To reclaim VAT (if applicable), SUs are using the invoice of the TC.



The difference between statement and invoice is that a statement only shows gross amounts, and no itemized VAT is displayed. A valid invoice must include, among other things, gross, net amounts, as well as a calculated VAT amount.

EETS involves invoicing not only of tolls, but also of other items, such as service fees, OBU fees and other EETS products.

**[RE 22]: a review of existing national regulations is recommended to identify gaps in current practices, related to toll service in the context of EETS and adjust, where possible, local regulations.**

## 7.2. Tolls and VAT

As mentioned in Chapter 4.1 (footnote), the present document uses the term “toll” generically.

When viewed in a financial context, e.g., when used by tax authorities, the term toll can actually have one of the four following meanings:

- **tax** = where a duty to pay exists because public authorities have declared something to be a “taxable” attribute, e.g. generating income, owning property, having a pet, producing cars
- **duty** = where a duty to pay exists because of public governance rules, e.g. importing products from competitive markets, skimming the market of commodities, entering city centres (London)
- **fee** = where a duty to pay exists because public authorities have set a price for public services, e.g. issuing a passport, drawing up a official document for building a house
- **charge** = where a duty to pay exists because someone has received a service of the public or private sector, e.g. lunch in school or in a restaurant, painting of the house

Usually, where tolls are defined as a fee or usage charge, they are subject to VAT. When defined as tax or duty, they are not.

In other words, if one understands the provision of a road as an act of state, then the toll is not taxable, if one understands the provision of a road as public or private service, with the aim of making a profit, then toll is subject to VAT.

Anyone providing a service or trading with it is subject to VAT in the country one has provided this service, therefore:

**The VAT on Toll Payments is charged with the rate of the TC’s country.**

Following the model in 5.4.1 where toll is a usage charge, it is possible to trade it and each TC, EP or other intermediary is subject to VAT in each country with a toll road network. Furthermore, EPs need to be VAT registered and pay the tax in the TC country.

It is not obligatory for an EP to be VAT registered outside of its own country (e.g., if he delivers EETS also in other countries). If an EP applies the “resale” model, then he will only be able to issue a VAT **invoice** for tolls in the country, where he is registered. For toll service, delivered in any other country he will be able to issue a **statement** (without itemized VAT).

*Example:* An EP is based in country A and has contracts with TCs in several other countries (in all of which toll payments are subject to VAT). The EP is not VAT registered in countries, other than A. He will be able to issue a VAT invoice for the toll in his own country, for the toll service in any other country the SU will receive an invoice from the respective TC in each country.

The EP needs to provide an invoice with VAT of the country where the SU has used the toll road network

It is important to emphasize that, where SUs receive EETS in more than one European country, it is not possible to aggregate all toll charges on one single invoice because every national tax administration requires specific invoices for the goods and services sold in its country. As stated above, the toll charges for each country are subject to national VAT rates that usually vary across EU.

Under defined conditions, this VAT is recoverable by commercial users – both local and international therefore, issuing of a valid VAT invoice to the SU is a key activity within EETS.

The invoices can be issued either by the EP (resale model) or in the name and on behalf of the TC (agency model B1).

**[RE 23]: it is recommended for the implementation of the EETS that legal and tax experts investigate if the travelling on a road network within EETS can coherently be defined as a provision of service (no matter if provided by the state or a private enterprise, in order to categorise toll as a usage charge which can be bought and resold (reselling model)) – or if the travelling on a road network within EETS can be either usage charge or a duty, thus for latter the agent model needs to be applied.**

### 7.3. VAT on Toll Service related Charges

Quite often, the EPs raise different toll service-related charges to SUs – e.g., for the provision of guarantee to the TCs. Although related to the toll, these charges are not passed to the TCs. They are kept as income by the EPs for the service they deliver to the SU.

**The VAT on toll service related charges is applied with the rate of the EP’s country of residence.**

If the EP is a multinational company, then the VAT rate is defined based on the country, where the contract with the SU for the provision of the toll service has been signed.

*Example:* A Hungarian SU can approach his Hungarian EP, who will charge him a fee for the service, delivered e.g., in Austria. The SU will be charged with Austrian VAT for the toll and with Hungarian VAT for the service fee. Obviously, toll and service fee will be invoiced on two separate documents. If in an EETS world, the Hungarian SU chooses to sign a contract with an Italian EP, who can offer one contract for the payment of toll charges in several countries, the VAT on any service charges the Italian EP may levy on the service, will be applied according to the rate, valid in Italy.

### 7.4. Tolls and Currency Issues

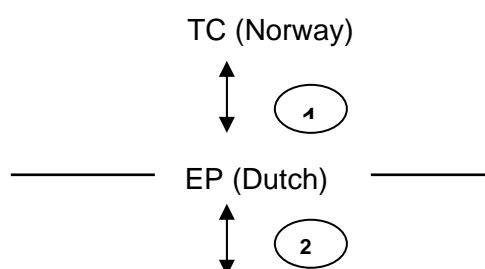
EETS can be associated with different currencies. Usually, invoicing and settlement **between TC and EP** take place in **the currency of the TC** (1 below).

**Invoices to SU** (issued by the EP or in the name and on behalf of the TC) are typically issued **in the currency of the SU** (2 below). As a service in order to facilitate VAT recovery the invoice may contain the VAT information in the original currency.

*Example:* A Norwegian TC co-operates with a Dutch EP, who serves customers from many European countries. The Norwegian TC will charge the Dutch EP in its own currency (i.e. in NOK). Although the EP invoice will be initially also in NOK, it will be eventually converted in the customer’s own currency (HUF, Polish Zloty, SEK, etc).

From a SU perspective, it is preferable to effect **one payment** for all toll charges, in their **home currency**, irrespective of country of TC.

This is already the scheme currently applied by multinational card issuers.



Customers ( HU, PL, SP, etc.)

It has to be noted that the EP has no right to apply currency exchange surcharges, as it risks to fall under banking licence requirements.

Another important implication for EP is that they will be required to offer currency flexibility to SUs across Europe, whereas today most of them collect payments in only one currency – their own. This means that the burden of cross-currency settlement (with, e.g., TC or SU's) is conferred upon the EP without being considered as falling under banking laws for currency exchange.

Potentially, a simplification could be achieved, if the future settlement of EETS can be made in one single currency – Euro.

## 8. Summary of Recommendations

[RE 1]: it is recommended that the EETS business model has to allow for viable financial relationships between all parties. The party receiving a service must be willing to pay a price for the service.

[RE 2]: it is recommended that the responsibilities of the IOPM are taken by a Board of Representatives whose filling is a fair representation of the roles.

[RE 3]: it is recommended that the organisation of the IOPM and its tasks should be studied in more detail.

[RE 4]: it is recommended that a common contractual framework should govern the interface between TC and EP, irrespective of the country(ies) of operation, number of entities involved and type of toll charged. The local legislation impact should be brought to the unavoidable minimum.

[RE 5]: it is recommended that technical and content standards be established for the required exchange of data to minimise the cost of delivery of EETS to the SU.

[RE 6]: it is recommended to define a minimum set of terms and conditions used by all EPs.

[RE 7]: it is recommended that regulations across Europe allowing the reselling of tolls from the TC to the EP and from the EP to the SU be harmonised. The principles behind the reselling model should be basis for future Tolling Systems.

[RE 8]: it is recommended that the implementation of the reselling model should allow for civil responsibility to be split from fiscal and commercial liabilities – e.g. the EP should not be responsible for incidents the SU might have while using the Tolloed Road.

[RE 9] It is recommended that legal experts examine whether and under what circumstance some of the EET services offered by an EP need to be covered by a financial institution and how the contractual framework needs to be designed to meet European and national law for all EETS functions and different legal status of toll.

[RE 10]: it is recommended that European regulations acknowledge that the guarantee of payment, provided by the EP to the TC and required for EETS functioning, does not refer to any bank law obligation.

[RE 11] it is recommended to evaluate and define how the risk of commercial failure of an EP can be managed at European level.

[RE 12]: it is recommended that the contractual framework for EETS sets a clearly defined split of responsibilities between EP and TC with respect to the different Payment Modes.

[RE 13]: it is recommended that before defining a Pre-Paid Mode for the EETS legal experts examine whether and under what circumstance the Pre-paid Mode offered by an EP falls under Directive 2000/46/EC and/or need to be covered by a financial institution according to Directive 2000/12/EC and how the contractual framework needs to be designed to meet European and national law.

[RE 14]: it is recommended to EETS stakeholders to investigate whether and under what circumstances Pay-Now and Pay-Before Modes could be viable alternatives to Pay-After Mode.



[RE 15]: it is recommended on mid-term to evaluate a universal Pre Payment system able to communicate with the OBU, especially with regard to an EETS solution for private cars.

[RE 16]: it is recommended to develop a legal framework regarding security and enforcement measures so that the EP can guarantee the payment of the service to the TCs.

[RE 17]: it is recommended to implement end-to-end-security mechanisms incl. proof of transaction. Its implementation and operational costs have to be justified by the probability and importance of the risks avoided.

[RE 18]: it is recommended to define clearly the responsibilities of the EP and the TC in front of the SU in case of malfunction of the OBU or the toll equipment.

[RE 19]: in order to have an effective hotlist management, it is recommended that:

- a daily transactions files communication from TC to EPs takes place to speed up the fraudulent OBEs' detection. (This is a minimum standard. Where technically and economically suitable, a more frequent update is contractually to be foreseen).
- a daily hotlist elaboration and communication to the TC's facilities takes place in order to reduce the impunity period for fraudulent OBEs. (These are minimum standards. Where technically and economically suitable, a more frequent update is contractually to be foreseen or has to be enabled).
- intermediate processes among the EP components will be shortened in order to speed up hotlist communication and detection of fraudulent OBEs.
- TCs should be able to implement hotlists without limitations, provided that the EP manages the content with due diligence. In case of TC constraints, liability will be shifted to the TC.
- all these obligations and the consequences in case of non-fulfillment will be fixed in the contract agreement between TC and EP.
- Contrary wise procedures will be installed for a fast and exact de-listing.

[RE 20]: it is recommended to perform a legal analysis to evaluate under which conditions information on fare dodgers (maybe even hotlist of companies or plate numbers) can be exchanged between TCs as well as between EP and TC.

[RE 21]: In order to reduce the cost of fraud and toll dodging in the EETS environment, and thereby easing the introduction of EETS, it is recommended to improve the legal possibilities for collecting toll from non-payers across the national borders

[RE 22]: a review of existing national regulations is recommended to identify gaps in current practices, related to toll service in the context of EETS and adjust, where possible, local regulations.

[RE 23]: it is recommended for the implementation of the EETS that legal and tax experts investigate if the travelling on a road network within EETS can coherently be defined as a provision of service (no matter if provided by the state or a private enterprise, in order to categorise toll as a usage charge which can be bought and resold (reselling model)) – or if the travelling on a road network within EETS can be either usage charge or a duty, thus for latter the agent model needs to be applied.

## Annex A: Logical role vs physical organisation

Most of the variability is expected in the roles of the TC and the EP.

The following example shows both possible contractual relations between these two roles, as well as the diverse possibilities of organisational structures within the basic roles, i.e. the concept of sub-actors is introduced. The definitions for each sub-actor are provided below:

### Toll Charger sub-actors:

- **Transport Service Provider (TSP):** The sub-actor that provides a transport service to the user (i.e. the road operator, road authority, the “owner” of the road infrastructure)
- **Principal:** The organisation or legal entity which is giving or defining the right of collecting toll. In legal terms the Principal can also be considered as the primary seller of the service.
- **EFC Operator (EFC):** The organisation that has the right to collect the toll and is operating the EFC infrastructure on behalf of a Transport Service Provider or Road Authority.
- **EFC Cluster:** The sub-actor that is built by several EFC Operators in order to achieve a common EFC system (e.g. in interconnected networks)

### EETS Provider sub-actors:

- **Contract Issuer (CI):** The organisation that issues the service rights to the customer, administers customer and vehicle data. It may have a direct contractual relation with the Toll Chargers but may also use an Interoperability Contract Agent (see below) for that purpose.
- **Payment Means Issuer (PMI):** The organisation that collects the money from the customer and handles the payment of services (e.g. credit or petrol card companies, banks)
- **Interoperability Contract Agent:** An entity that negotiates contracts with Toll Chargers and organises payment to them. It may also have contracts with several Contract Issuers which have in that case no direct contract with a Toll Charger. This role allows reducing the number of necessary contractual relations and gives also smaller Contract Issuers the possibility to offer the interoperable service. It

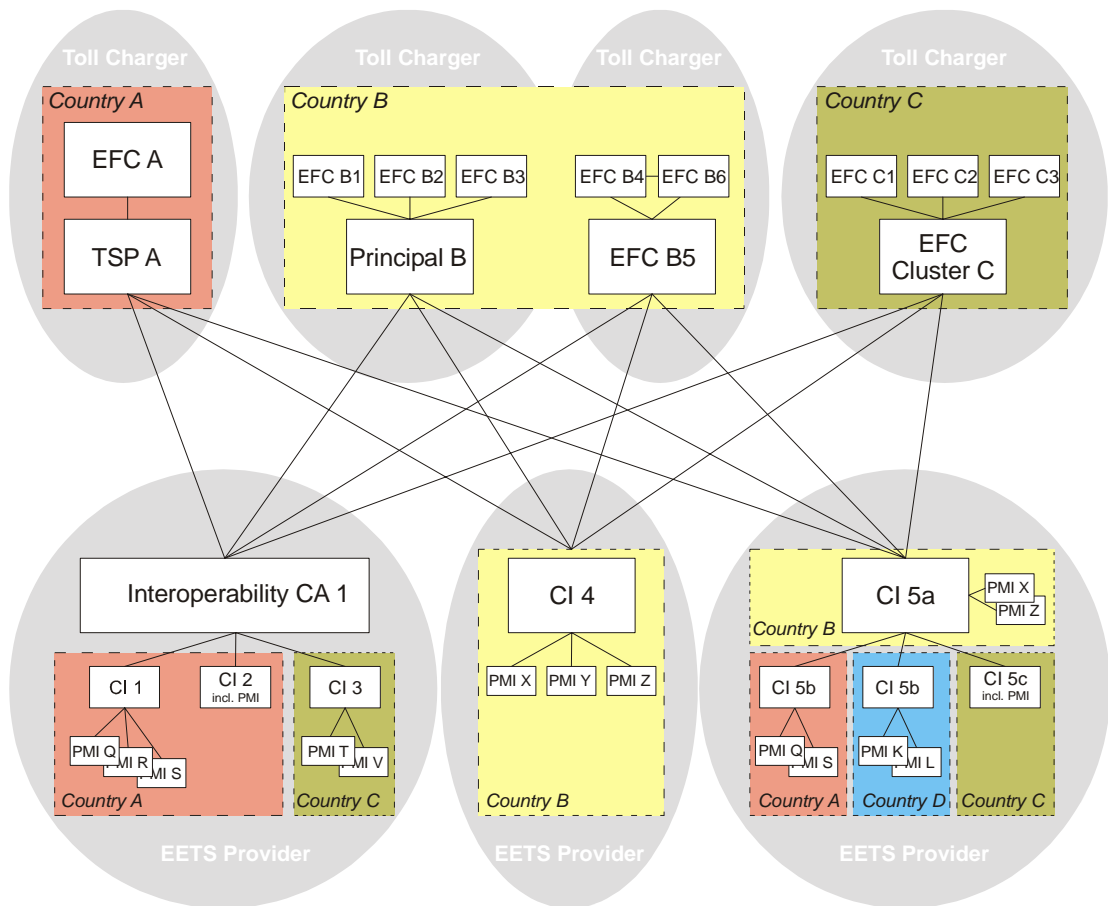


Figure 2: Possible contractual relations between and within some main actors

Some remarks to the example:

- In country A the TSP is having the contractual relation with the EPs, while in country C the EFC Cluster Organisation takes this responsibility.
- In country B there are two TC domains. In one the Principal is the contractual partner of the EPs, while in the other it is one EFC Operator authorised also by two other EFC Operators.
- The CI 4 in country B has three PMI, i.e. the customers of CI4 can select the PMI.
- Some CI do not offer PMI, but offer these service by their own (CI 2 and CI 5c)
- The Interoperability Contract Agent offers its services to CI in two countries.
- The CI5 is a multi-national CI. It has branches in several countries. Only one branch is negotiating with the TCs, but offers the service via their national branches also in the other countries.
- The example shows contractual relations, data flows may use different channels or common data clearing centres.

## Annex B. SECURITY MECHANISMS.

This annex gives a preliminary analysis as input of EG 7 to EG 12.

### B.1. IT security threats

In the figure below are shown the different points where we can find a security problem:

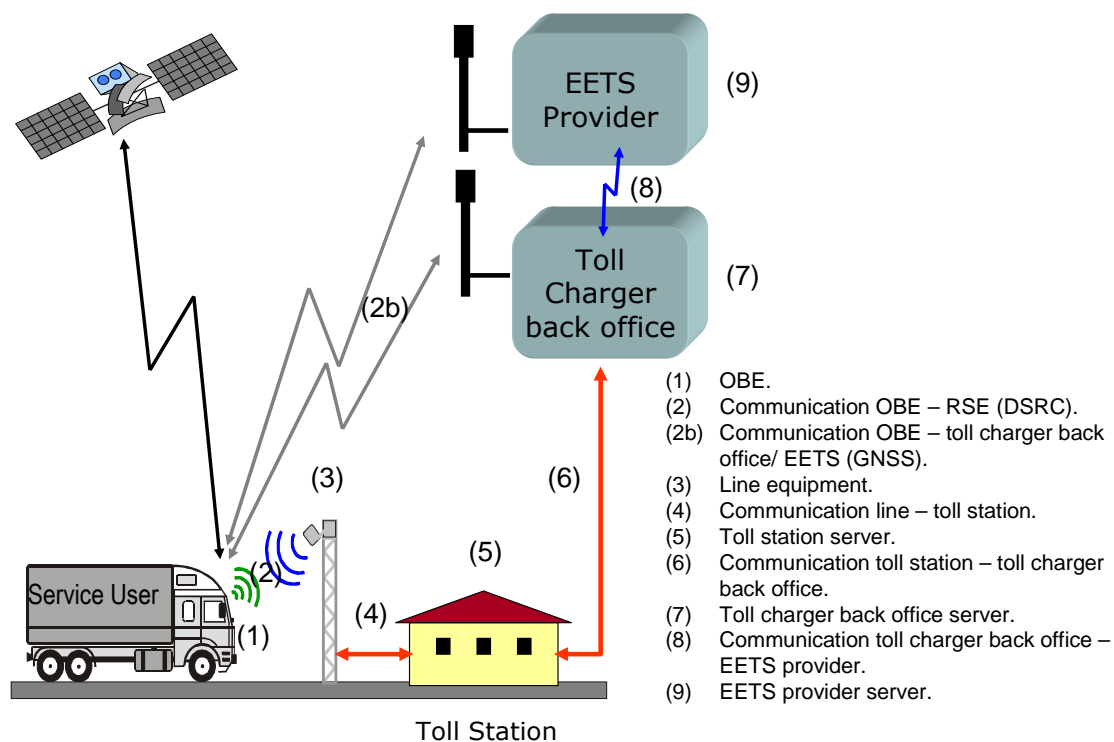


Figure 1: Security risks points

The main existing risks are:

1. Tampering of OBE data (1). (Fraud)
2. Cellular Network communications interception (2b). (Privacy)
3. DSRC communications interception (2). (Privacy)
4. Communications interception (4), (6) & (8). (Privacy)
5. Unauthorized access to the transactions data through remote or local connection to the computers involved (3), (5), (7) & (9). (Privacy)
6. Tampering of ETC files (3), (5), (7) & (9). (Fraud)

For points (2b) and (3) to (9) the common solution is the use of data & communication encryption. Today this is a well known, easy and cheap solution to implement, and should be complemented by the use of firewalls for protecting against outside attacks.

The DSRC communications interception (2) is very expensive due to the specialized and expensive equipment it requires and requires compromising toll personnel.

As explained in the CARDME-4 report, the solution for the risks in the DSRC EFC at the OBE - RSE level (1) is the use of cryptography (calculated security data or authenticators):

- Access Credentials: This is an access control certificate, which allows the RSE to access the OBE data.
- Operator Authenticator: certifies to the TC that the OBE is a genuine one.
- Issuer Authenticator: certifies to the EP that the transactions received from the TC are genuine.

These authenticators are the result of applying cryptographic algorithms to some OBE attributes, random numbers and corresponding keys.

This OBE cryptographic security will be very difficult and expensive to implement because:

- It will produce a longer and complex OBE – RSE dialog, which will worsen the performance of the EFC system and reduce the vehicle passage speed.
- It will require major changes in the lane equipments and software.
- Some existing RSEs are not capable of performing the on-line security calculations requested.
- The logistic for secret keys distribution among EPs and TCs (which should manage them at the lane level) is very complex and might require a dedicated body (Trusted Third Party).

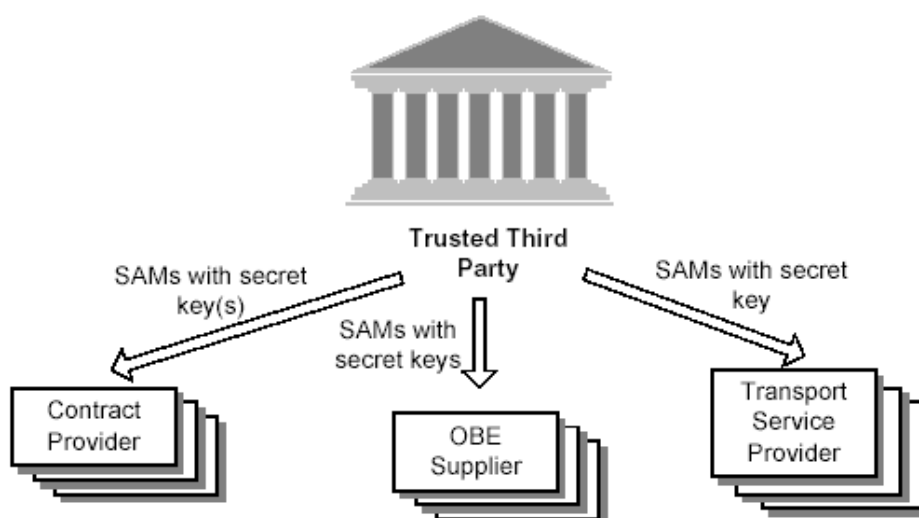


Figure 2: CARDME key management scheme

This is why CARDME-4 proposes an implementation scenario in 4 phases, with OBEs loaded with the Operator and Issuer keys from the start, but not applying those until the evolution of the EETS fraud makes it necessary.

The 4 steps implementation scenario could be as follows:

- Phase 0. Operators have their own different EFC-applications that are mostly non-interoperable, or interoperable only on a regional/national scale.
- Phase 1. A number of operators sign up to an EETS MoU. The OBE is loaded with different generations of Operator and Issuer keys from the start. Operators do not wish to check the Operator Authenticator for foreign transactions. Due to the limited scope of the MoU at this stage, Operators accept the - expectedly marginal - risk that a claim sent will be rejected because the Issuer Authenticator of a transaction proves to be incorrect (e.g. as a result of fraud using a fake OBE).
- Phase 2. The number of operators that have signed the MoU has increased, and the perceived fraud risks accordingly. Some operators have lots of foreign transactions and

decide it is time to check the Operator Authenticator to protect themselves against false foreign transactions. In order to support this functionality all RSEs have to be extended with functionality for secure key storage and cryptographic calculations. It is the primary responsibility of the Trusted Third Party (TTP) to maintain the integrity of the EFC-Operator keys. The TTP may therefore verify that certain facilities and procedures are in place before the key is exchanged.

- Phase 3. MoU Parties agree that it is necessary to enhance provisions against unauthorized access to OBE data. The writing of receipt is from now on also access protected, by the access credentials, as a measure against sabotage. From now on the dynamic access control function will be implemented by all EFC-Operators. This implies that an access credentials master key, associated with the Contract Issuer, is to be distributed by the TTP to all EFC-Operators. Comparable provisions as for checking the Operator Authenticator are required in the RSE. It should be noted that, whilst the existing OBEs can still be used without any restriction, the enhanced provisions against unauthorized access only apply to newly issued OBEs.

## **B.2. Tolling systems and control methods**

The control methods used by the TCs differ depending on the tolling systems. In the European scenario there are the following situations:

- Mono-lane systems with lifting-barrier. There is a hotlist associated and the barrier only opens if the credit status of the SU is OK.
- Mono-lane systems without lifting-barrier. There is an enforcement system in which, through lane visual semaphores and photos of offenders, it is possible to inform the SU and to promote the credit resolution and eventually revenue recovery. The HMI functionalities of the OBE may be used to signal the SU that transactions problems have occurred.
- Multi-lane DSRC systems – in this type of system, it is possible to use the HMI (Human – machine interface – Visual and sound signals) of the OBE to signal the SU that some service/equipment malfunction has occurred.
- GNSS – OBE alarms recorded and enforcement by fixed positions and by mobile patrol teams.

In all these situations, it's important to maintain a hotlist system through which it is possible to control and signal the SU when ever necessary.

The hotlist may also be complemented by the use of a “blocking bit”. In this case, a hotlisted OBE could be marked to be blocked; then, when it tries to pay the toll, the RSE sets the OBE as blocked and, after that, this blocked OBE won't be accepted by any TC.

This “blocking mechanism” may be useful to reduce the fraud; nevertheless, it may also have some risks: a malfunction in the lane software could block every OBE (hotlisted or not) passing through them. On the other hand, a quick hotlist distribution makes it unnecessary.

The blocking mechanism put the question of the ownership of the OBE's. Blocking OBE's with multiple technologies may induce a high cost for the EPs and on the client side. Lane malfunctions may then increase the cost for the EPs.