Definition of a first approach for interoperability from operators point of view for the European Car-Sharing network

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1. Summary

Interoperability and co-modality are defined here as any kind of interaction or established mechanism between the Car-Sharing service and other services. It can be obtained in many ways, including joint awareness campaigns or allowing one customer to use different services with the same kind of identification. It is common that the lack of interoperability is posed as a barrier based on an approach from technological point of view, but in fact the core of the matter is only how an automatic cooperation between two or more bodies can be established.

Cooperation is crucial for Car-Sharing because it does not provide a complete mobility solution, but just a complementary service in the ordinary mobility scheme.

This Draft of Interoperability provides a document to debate which should be the Guidelines of the Standards to produce this Cooperation.

The next concepts of interoperability will be treated separately:

- Basic provided information for the cooperation
- Joint Marketing
- Promotion of the cooperation
- Roaming in Car-Sharing
- Cooperation/Competition in Car-Sharing.
- Car-Cash cooperation
- Public subsidies
- Others issues

The philosophy laying under this draft of Car-Sharing interoperability, rather than produce an standardization on the operation of Car-Sharing, is to design the process of linking different systems based on the assumption that data/billing and risk will not be transferred between the parts of cooperations when it is not strictly necessary. This guide will produce a global framework and a starter point to get agreements and procedures. This philosophy cannot be extended to all mobility systems, but Car-Sharing can be interconnected with almost each one of them.
2. **Basic provided information for the cooperation**

Car-Sharing must be used in most cases in conjunction with other modes of mobility; in that sense it would be useful to produce global information. The information may be classified in different levels because every Car-Sharing operator wishes to publish different level of information depending on the security, the audience of this information and their marketing strategies. The draft will produce approaches of contents for different levels of informations and will also establish available solutions to interchange them. It will also provide some advice on how to organise this global information.

On the other hand in the daily Car-Sharing practice, users may be informed on other modes of mobility, traffic status, personalized public transport informations for each costumer based on a predefined preferences, etc.

### 2.1 Car-Sharing Public information

Car-Sharing can provide information on:

- Situation of the cars
- Description of the cars
- Conditions of use, tariffs
- Availability and scheduling

Currently, most companies offer Car-Sharing information on the status of the cars with an exhaustive description of their characteristics. They publish the terms of use and different fares as well. Less common is that the car availability is published, i.e., if the car is not available and the booking forecast of the near future.

This last issue has marketing implications, since sometimes Car-Sharing companies assume that customers may have a car at any time. Publication of the availability may jeopardize this commercial vision. In such cases web applications seek the best available option according to customer demands, but the visualization of the global availability of a given car is never available.

On the contrary, the publication of the next vehicles availability may be taken into account as a marketing argument based on the transparency of the system.

As far as this subject is concerned, there is not any kind of standard established to publish these informations. This guide proposes a methodology based on the standard KML (Keyhole Markup Language) that can be applied to all those data with geographical components.
The publication of this information offers some advantages:

- Finding new customers.
- Provide basic information to customers about new services that produce new consumptions.
- Avoiding that those services that use Car-Sharing information to publish them for their needs, could generate errors due to the use of bad or not updated procedures when copying data.

But there are some disadvantages as well:

- Loss of the possibility to make marketing whereas costumers read these informations.
- Loss of the brand concept.
- When the availability of the vehicles is published certain trade policies may be compromised.

### 2.2 Car-Sharing information for the Customers

Car-Sharing can provide information to their customer on the following issues:

- Reservations
- Billing details
- Historic of reservations
- Other statistical data
- Personal details
- Web preferences or default values to search
- Contractual details

Currently these informations are provided to the customers through different ways:

- Directly in the office, when possible
- By telephone, often in a call Center
- By Internet, when the customer is registered.
In more or less developed systems, all Car-Sharing companies have a CRM system which includes all this information plus other needed that helps the operation of the vehicles: management of induced refunds; accidents management, recovery of lost personal belongings, etc...

In the first two cases usually a closer customer and cost efficiency is seeking and it requires to deal with assured points to receive customer information. They may have the complicity of administrations, which have a wide network of distributed services throughout the territory.

Call-centres may be pooled with other Car-Sharing services when they are provided from the same call- centre. Sometimes, for instance in the case of the German Cambio company, such services are offered to their franchises.

In the case of Internet channel, the aim is to bring personal information of Car-Sharing customer to his/her personal or company website or to other useful places from the customer point of view. In the operator website all information on the active bookings is available, plus details of consumption, bookings that have already been used, contact information, preferences for the customer reservations and even details of the contract: type of contract, payment systems, etc... All these services can be obtained in the operator website that requires the customer identification. It happens very often that a contactless card number and the PIN code are needed to open the car.

An illustrative example of this situation could be the possibility to see at the same time the personal bookings and the personal schedule in such a way that is very difficult to forget when the bookings are needed.

The publication of the informations in a secure environment, a fact that is already guaranteed for Car-Sharing operators, may have moreover the next advantages and drawbacks.

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DRAWBACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adds value to the service</td>
<td>Loss of the capacity of direct marketing when booking due to the fact that the navigation process is not directly done in the provider website.</td>
</tr>
<tr>
<td>Allows to create new services based on the combination of intermodal information.</td>
<td>Loss of the brand concept.</td>
</tr>
</tbody>
</table>

Table 1. Advantages and drawbacks of external publication of Car-Sharing informations

2.3 Standards to use (technical approaches)

In the case of public information, publishing information based on updated (on fly) structured XML or RPC services may be enough as a star-up technology.

In the case of the customer information, as a started technology, OAuth might be a good recommendation. OAuth is an open protocol that allows users to share their private resources (e.g.
photos, videos, reservations ...) stored on one website with another website without having to hand out his/her username and password.

From the operator point of view, there are well known approaches to solve the interoperability in the process of exchanging data from Car-Sharing for both general and personalized information.

2.4 Using Car-Sharing information.

Public and personal information may be used in a wide type of different applications. Some examples are:

- Mobility planners.
- Routers.
- Calculators, e.g. environmental impact calculators.
- Personal Agenda.
- Professional Agenda.
- General “Mashups”, e.g. carpooling with Car-Sharing, external application development.
- Others.

These applications can be included too in the website of Car-Sharing operators, for example to provide an integrated agenda, or a calculator of the environmental impacts of mobility.

2.5 Use of information from other modes or services in Car-Sharing

Car-Sharing may use information from other services. People may wish receive the following informations while driving:

- Road statement,
- Public Transport statement
- Other service status, in general
- Alert informations desired by user, changes on personal agenda, etc.
- News.

When a trip is being planned normally it is interesting to have information on:

- Public works in road infrastructure.
• Public Transport supply.
• Others.

The development of standards in other services, for example the road statement, in the same way that they are proposed here for Car-Sharing purposes, could be useful for Car-Sharing activities.
3. **Joint Marketing**

New marketing activities trends are based on individuals.

As the time goes by marketing products are more based on the production of individual services than in general ones. In those circumstances a combined marketing products may be thought. Today the technology allows such product since they are very specialized and of easy using.

In this approach of guidelines the joint promotion is defined as a consumption of a product that itself is a combination of other (among them including Car-Sharing). The most important example, but not the only one, would be the integration of the Car-Sharing scheme into the existing public transport in a city. Some activities that are associated to a trip (this is the case of some events) could use combined products (the ticket to entry the event plus the use of Car-Sharing, for example). Or some touristy activities that requires a kind of mobility that could be adapted to Car-Sharing supply might be included itself within a combined package.

3.1 **Types of automatisms**

Car-Sharing needs to be identified for its consumption. It is not possible to consume Car-Sharing if the potential customer has not previously become a client. This indicates that in the case of public transport only combined tickets can be consumed. At first, this could appear like a kind of restriction, specially in those countries where a large proportion of public transport users are anonymous, but it is clear that the regular Car-Sharing customer is also a regular public transport user and therefore he/she is normally a user having a flat rate pass.

In any case, the technological issue should not be a barrier to offer a joint product. The best solution would be a single identification system for each service. But it could also be so effective having two cards or two different methods of payment.

When the product is temporary, in other words, when it is limited in the time, e.g. sports events, it would seem to be necessary using open and flexible protocols, in that case the use of promotion codes may be a good solution.

In the case of Public Transport plus Car-Sharing services, several strategies from the standpoint of Car-Sharing operator may be established and might have a lot of relevance. Some kind of products:

- Discount for the purchase of PT for Car-Sharing users.
- Discount on membership or subscription fees in Car-Sharing for PT users.
- Combined product, one single price including the membership of Car-Sharing and the Public Transport pass.

Each one of these three strategies are designed for different purposes. If it is need to increase the number of Car-Sharing customers the most logical way is to offer a discount in the fees for PT users.
On the contrary, if what is needed is to give prestige and rewarding Car-Sharing users, a good option is to set reductions in the purchase of public transport passes.

The combined product is a joint product that substitutes the previous one. For getting it, specific agreements should be reached.

All options may be technologically integrated when technologies of access and means of payment for both PT and Car-Sharing are compatibles.
4. Promotion of the cooperation

In this case it deals with the cooperation on different promotions. From technological point of view this chapter does not add very substantial information, so that it is just presented as a commercial approach. This cooperation will be separated in two issues:

- Consuming Car-Sharing as result of other commercial promotion.
- Using other products as a Car-Sharing promotion.

Usually these cooperations are made through commercial codes, normally based on a given level of consumption or upon concrete characteristics depending on the days of the week. As a general rule these cooperations are not maintained in a permanent way although they may be recurrent.

One of the characteristics of the Car-Sharing consumption causes that, as a result of another promotion, it is necessary to be previously registered as a client. Due to that it is suitable that these promotions includes as an alternative to become Car-Sharing member or not to become, and in such a case, to include it within the promotion. On the other hand, other circumstances should be taken into account, such as having a driving license, being over a given age (depending on the operator rules) and so on.

The consumption of other products on Car-Sharing promotions does not have some especial interest in this Guidelines but some comments on this issue should be made.

- Normally Car-Sharing promotion is been made through self-gift, e.g. when possible the gift obliges to buy the same product.
- Other interesting case is that one of the interchange of promotions. An agreement with other company that could have interest in promoting Car-Sharing is agreed in order to exchange promotions.
- Other promotions are made as usual.

From technological point of view, in order to have a good intermodality in such an issue, the main rule is having a good system of consumption promotions.

This practice may have a very satisfactory results and with high social implications. For instance, the promotion gift may be becoming a Car-Sharing member during two years and a check of 200 € of consumption, when in a volunteer and accepted way the new member send his/her old car.

It is not appropriate to detail the frame of the agreement since it is not an important question.
5. Roaming Car-Sharing

In terms of these guidelines, roaming Car-Sharing is understood as the use of Car-Sharing services at certain circumstances (e.g. when you are in a different city) by users of other compatibles services (generally other Car-Sharing companies) in which both companies have an previously agreement.

From the user point of view, it benefits from:

- avoiding start-up process in the roaming company.
- avoiding start-up fares in the roaming company.
- avoiding double billing.

On the other hand, using this service means paying a high rate for that.

Roaming is not easy, since it requires a considerably effort and normally has a trend to reduce the number of users. Some facts help to introduce roaming:

- To have the same service provider (for example, cambio Germany and cambio Brussels)
- Sharing some system infrastructure, for example in the case of the Italian network.
- Being a company without any kind of competence.

5.1 Framework Agreement

We can take into in account different possibilities but, as an example, the basis of an start-up agreement is here included.

Let’s call MYCARSHARING INC the company which has the customer, and let’s ROAMING LD the company which will provide the car of the Car-Sharing service.

MYCARSHARING INC will be for all purposes of services which engages the services of ROAMING LD; therefore, in that sense, it will be responsible for the conditions of service with ROAMING LD.

MYCARSHARING INC is responsible for all possibles legal consequences of the vehicle misuse or for the failure or omission of the documentation of the customer that it is necessary to operate in the same way as it would do whether the service would be be provided with its own vehicle, even if there are legal differences between two possible different countries.

ROAMING LD is required to offer a service with the same features that it would be offered to all its customers with the rates stipulated in this contract and should accept automatically MYCARSHARING bookings.

ROAMING LD will invoice the service to MYCARSHARING INC at the end of the month, which is the standard way of operating in Car-Sharing.
MYCARSHARING INC will provide an automated service for the customer authentication. To facilitate this transaction the two companies will certify that their systems are suitable for carrying out this operation in a safe and reliable way, based on a standard. So, the creation of a European standard would be highly desirable.

A possible solution for automating the roaming service could be linking the reservation to the card number, the method could identify the service definitely, because the card numbers are unique and set in the manufacturing of contactless cards commonly used in the car sharing. The on-board vehicle computer can detect the card and ask the Car-Sharing operator server that authorizes the service. Once the customer is inside the car, he/she can introduce the PIN that will travel encrypted to the server of the customer company which will validate it and then the service will start.

5.2 Infrastructure needs and other remarks

It is necessary a communication network between the two companies. A good Internet connection may be enough, since in any case we are facing with a number of limited services.

It will also be necessary a contactless reader compatible between the two companies. The standardization of this issue is better as the time goes by. The use of PIN (four digit numbers) is standardized too and it is used not only in Car-Sharing but in others services like automated teller machine (ATM).

5.3 Incidents resolution

Generally, the final customer will be in touch with MYCARSHARING INC which in turn will contact with ROAMING LD to solve finally the problem. In some circumstances direct contact may be permitted to better solve the problem.
6. **Cooperation/Competition in Car-Sharing.**

Sharing the infrastructure (vehicles), within the same geographical area, may be aimed for limiting the competition, in order to improve the overall system efficiency. This regulation usually arises from the establishment of certain privileges or restrictions on the activity of Car-Sharing. For example, an area with no possibility of general parking but with a limited number of free parking places for Car-Sharing vehicles. It can also occur in an operation to rebalance the existing supply in a given area. In such cases public bodies may be interested in regulating the supply to achieve a more balanced service. The situation may have similarities with the landline or mobile phones and public transport: in a non-regulated framework, investments are concentrated on those points more profitable while other disadvantaged areas received less service or even not any service. At certain points there is an oversupply, which regulation may allow less challenging investments in other areas. Today, this situation seems far away since Car-Sharing service is not seen by citizens as a public interest one. But from a technological point of view it is the same of the roaming one.

This type of intermodality is obviously given only between Car-Sharing operators.

This type of interoperability has certain disadvantages that discourage its use. In the case of mobile telephony, perhaps the best known case in which roaming is done today, using the service does not imply any responsibility on the infrastructure of the company, besides the use of telephone service may rarely have repercussions for the company providing the service. In return, in Car-Sharing services a user may have an accident with a vehicle owned by the company Car-Sharing and causes, at least, a loss of profits in the company that provides the service.

Moreover, it has advantages for customers, since they may access to a network that integrates the different operators and therefore they have a better service.
7. **Car-Cash cooperation.**

The concept of Car-Cash is to achieve an economic benefit by renting an own car by hours. It might be thought that the connection of such a practice to Car-Sharing would be including the private car in the Car-Sharing operator network, but it is an option on which serious issues about the final service are arising. The vehicle is only part of the Car-Sharing company service and it is very difficult to obtain the rest of services from a private car.

However, it is possible to achieve an intermodality with people who wants to get profit by renting its own vehicle. The fastest and easiest solution is to obtain the vehicle infrastructure facilities from a Car-Sharing operator, i.e. installing the on-board computer, publishing in the website the availability of the vehicle... and ultimately “integrating the vehicle” as it was a part of the Car-Sharing network, but in an independent way. In that case, the owner of the vehicle will then assume the entire risk of the service, but he/she would not be worried on making duplicate keys, keeping the track of the car, invoicing and so on. In this case the insurance could also be negotiated by the service operator for other uses a part from the individual procedure.

The Car-Sharing operator or the Car-Sharing services provider may charge for the installation and maintenance services or for a percentage of the obtained turnover. Once registered, users of this system could make use of Car-Sharing network operator as another customer, so there would be a intermodality. In this case they could negotiate special conditions for the service: whether or not annual subscription, rates according to the consumption, etc. In this case, unlike the roaming, it is expected that the individual has no problem with the direct link between the customer and the Car-Sharing company.
8. **Public subsides**

The Car-Sharing service has some features that make it attractive to the society, so that in many parts of Europe it receives some kind of support or subsidies, either as capital contributions or as direct aid: the tag label from Paris, free parking in Brussels and so on.

Although today it might seem strange, there is the possibility that in the near future Car-Sharing service may be within the services that receive some kind of public subsidies. To be more precise, people who use Car-Sharing services might in certain circumstances receive grants or taxes discounts for their Car-Sharing operations.

Such aid should be counted in an automated way, as happens in other transport modes, and the mechanism for obtaining these resources must be automated too in a succeed scenario.

From the technical point of view of claiming these subsidies there will have no problem for most operators since currently Car-Sharing have a record of all uses of the fleet and may even monitor them to check the route, or other relevant characteristics of the the given trip.

It is also worth to mention that the grant model shall be consistent with the existing current business model all over the world. While the service is so personalized and payments made automatically and so far, inspects and fraud should be minimized at all.

Another important aspect is the need to define what is considered as Car-Sharing, to prevent other types of mobility with similar characteristics but with different impacts from the benefit of the aid. In that sense, it might be more practical linking the aid to the desired effects to achieve in each case.

In the near future it is likely that minor aids will be enough to encourage the use of Car-Sharing but when necessary Car-Sharing operators should be ready to incorporate public subsides without much trouble.
9. **Others**

Car-Sharing is usually an activity that it is carried out in groups for personal or professional purposes. For personal use, linking the Car-Sharing to social networks may be very interesting. Much of interoperability in which we think has already been developed in the information section, but the dimension and the connectivity of social networks overtakes the expectations of the mere information.

The intermodality of Car-Sharing with the social networking goes beyond the possibility of becoming a fan of Car-Sharing or sharing detailed information on developments in personalized news communications channels with other interested users. Intermodality through social networks may have many different angles, such as the ability to share the journey with others, or planning those activities related to the mobility and entertainment.

Today it is possible to provide geo-positioning services to your friends while making Car-Sharing or calculating the time that takes to reach you, without the need to call, which is a dangerous activity that causes lots of incidents when driving.

In any case the data protection laws must be applied in a strict way.

In the professional activity the Car-Sharing activity may also help the fleets management, when the Car-Sharing service is complementary to its own fleet. In such case both fleets will should have similar performances.