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V2



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White Paper

Cost Transparency for Smart Card enabled services

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Trailblazer 8 acknowledges the contribution of the wider European IT community and Citizen Groups to its work on User Requirements. Much of this work has been voluntary, but has been produced to the highest professional standards, and we would like to take this opportunity to express our gratitude and appreciation for this work. We would also like to acknowledge the research work undertaken by the Gartner Group on Total Cost of Ownership (TCO).

eEurope Smart Cards Trailblazer 8

eEurope Smart Cards Trailblazer 8 on User Requirements is an informal group of participating organisations and individuals working to produce a User Requirements Best Practice Manual for European wide implementations of Smart Card enabled services.

The objective of Trailblazer 8 is to ensure that the user interface, functionality and process of ICT systems employing smart card technology:

- meet identified requirements to support Citizen aspirations,
- are attractive to Citizens,
- and guarantee inclusiveness for all categories of Citizen.

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Synopsis

Cost transparency is a major requirement from the Citizen's perspective. The Citizen needs to understand how much it costs to access a given service from a given access device. If these costs are variable then the terms and conditions that apply must be clearly stated and the reasons for any additional costs over the 'standard' charge explained.

This paper is aimed at providers of Smart Card based services and sets out the means of identifying the true cost of service provision and illustrates alternative usage and cross charging models. These models are then examined from the perspective of the Citizen to indicate their possible reactions to each model. Finally the paper sets out guidelines for communicating the cost of a service to the Citizen.

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1 Executive Summary

Cost transparency is a major requirement from the Citizen's perspective. The Citizen needs to understand how much it costs to access a given service from a given access device. If these costs are variable then the terms and conditions that apply must be clearly stated and the reasons for any additional costs over the 'standard' charge explained.

This paper is aimed at providers of Smart Card based services and sets out the means of identifying the true cost of service provision and illustrates alternative usage and cross charging models. These models are then examined from the perspective of the Citizen to indicate their possible reactions to each model. Finally the paper sets out guidelines for communicating the cost of a service to the Citizen.

1.1 Recommendations

1. Each service provider, whether of applications, content, or infrastructure, should carry out a Total Cost of Ownership (TCO) study to identify: Fixed costs, variable costs, direct costs, and indirect costs. In each case they should allocate costs, where appropriate, to the Provider or those to be borne by the Citizen.
2. Each such TCO study must be based upon a usage and volumetric analysis that is dependent upon Citizen uptake of the service.
3. A high degree of co-operation is required between all the service tiers to develop a holistic view of total usage and thus calculate end-to-end TCO for a given service. The likely owner of this high level TCO model is the Service Aggregator who, from the Citizen's perspective, is the gateway to their personalised eEurope services.
4. The recommended charging model is that the stakeholders involved in any given service provision for eEurope should have a cross-charging agreement, which can be complex, involving detailed charging for each access and a clearing function, or simple, where each agrees that the cost differential will be broadly neutral. As this will encourage take-up and Citizen usage it may well be the more cost effective over time. However this model does imply complex commercial agreements that may impact upon service delivery unless they are given appropriate prioritisation.
5. The service provider responsible for the central Identification, Authentication, and Authorisation services (e.g. PKI, PINs, Biometrics, Security Tokens, etc.) should be an integral part of the cross-charging mechanism. Since they are, by definition, a "trusted third party" they should normally be the overall provider of this service, and in particular take responsibility for providing the necessary cross-charging audit trails whilst protecting Citizen confidentiality.
6. Simple for the Citizen to understand, a service charge should be agreed that is uniform, or nearly so, across all access routes. Charges may change over a period of time due to the dynamic nature of the charge balancing but these changes should be 'smoothed' to encourage Citizen take-up and usage.

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7. Compliance with *e*Europe Cost Transparency Guidelines (see section 6) should be mandatory for accreditation as an *e*Europe Service Provider.

2 Introduction

In order to gain widespread Citizen acceptance of Smart Card enabled services, whether governmental or commercial, it is important that the Citizen is informed of the true cost of using such a service. Since there are many potential stakeholders involved in the actual service delivery this can be a complex calculation on a case by case basis. The issue that must be addressed is how to mitigate this complexity and inform the Citizen in a clear, consistent, and easily understood manner, whilst ensuring that the financial interests of the service providers are protected.

It is important to note that a 'service' from the Citizen's perspective may, in fact, be multiple services from the service provider's perspective. For example even a simple request to a library system may involve the library itself, the libraries network supplier, the Internet, an ISP (Internet Service Provider), a local network, and an access terminal. Each of which may be separately owned and may have different charging models. If the Citizen accesses the same service, on consecutive days, from different terminals, there is no guarantee that the same service providers or charging models will apply. Should the Citizen access a complex service that aggregates different back end services (e.g. booking a hotel and theatre combination using a credit card), then the complexity may increase exponentially.

In order to simplify this charging complexity this paper breaks the cost and charging models into discrete analytical steps:

1. Understanding the Total Cost of Ownership (TCO) for a given service from the service provider's perspective.
2. Understanding the additional 'hidden costs' of the service from the Citizens perspective.
3. Alternative usage charging and cross-charging models.
4. Guidelines for informing the Citizen on how a particular service is charged.
5. Consideration of Citizen reaction to the alternative models and how this may affect usage patterns and hence influence the 'per user' cost aspect of the total TCO.

From the above it can be seen that this is an iterative process, whereby the charging model chosen (in steps 3-5 above) may well influence the uptake of the service and thus the TCO calculations in step 1.

The commercial process to select a particular charging model is inherently complex, as many stakeholders may be involved, each with different business models. Discussion of this process is out of scope for this paper as it is written from an *eEurope Trailblazer 8* 'Citizen Centric' viewpoint.

3 Total Cost of Ownership (TCO)

The TCO Model originally developed by Gartner Group and now supported, in principle, by major IT vendors such as IBM, Microsoft and Sun, is a model that helps enterprises understand the direct and indirect costs associated with owning and using Information Technology (IT) systems throughout their lifecycle.

The TCO Model divides the total costs into two classifications:

- Direct IT expenses, such as hardware, software, management labour, operations labour and support.
- Indirect IT expenses, those items that often go un-accounted for in most organisations including end user self and peer support, casual learning, and productivity losses due to downtime.

It should be noted that individual vendors have produced their own, subtly modified, versions of the TCO model. Care should be taken when using these as opposed to the vendor neutral model.

3.1 Direct costs

Direct costs can be obtained through analysis of Information Systems (IS) budgets. Most organisations often do not have sufficiently accurate records to provide this information quickly and efficiently. They do not track IS costs accurately and costs are often hidden in differing departmental budgets. It normally takes a fairly detailed audit to capture these costs accurately.

3.2 Indirect costs

Indirect costs, those IS costs borne by end users providing IS support to themselves and peers, are hardly ever measured by organisations. But it is the indirect costs that can grow unchecked. According to the Gartner Group's research, the average organisation can have more than 50% of the total costs allocated to such indirect expenses. Costs can be estimated however by reviewing past experience and by surveying users.

In a Citizen Centric environment, many of these costs are borne by the Citizen rather than the service provider and their impact may severely influence take-up and usage of the service. The obvious exception to this is system downtime, which will have an immediate effect upon revenue, brand value, and Citizen usage.

3.3 Major Cost Categories

The TCO Model originally developed by Gartner Group categorises costs as follows:

- Direct expenses
 - Hardware and Software (capital expenditures and lease fees for new installations, upgrades, and updates)
 - Administration (network, system, and storage administration labour and outsourcing fees, reactive and proactive management tasks)

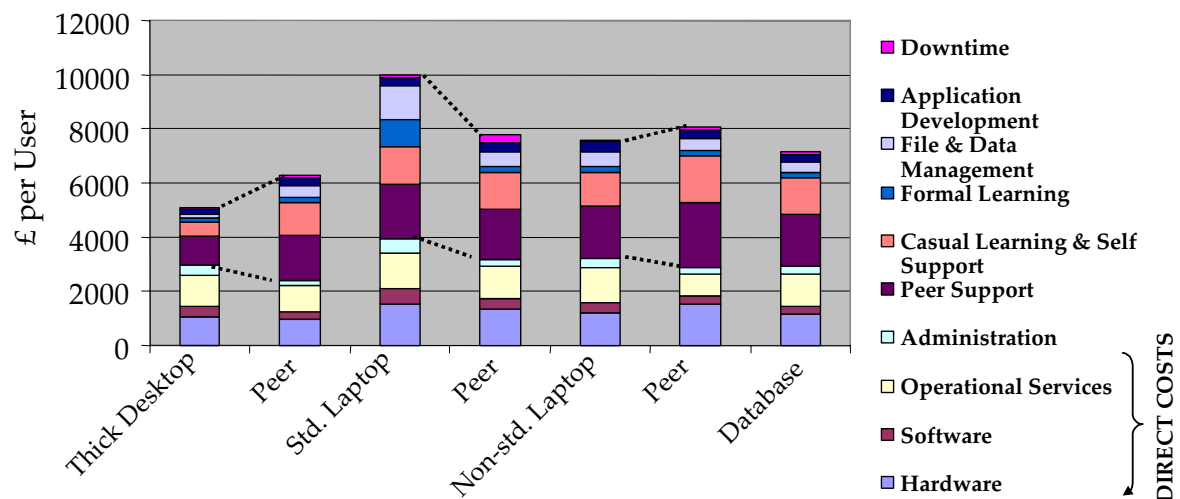
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- Operational Services (helpdesk, training, purchasing, travel, maintenance and support contracts, overhead labour)
- Indirect expenses
 - End user costs (peer support, casual learning and self support, and "futz")
 - Formal Training
 - Application Development
 - File and Data Management
 - Downtime (lost productivity due to planned and unplanned outages)

Total costs and cost allocations will vary considerably and the TCO Model provides a methodology in which to understand industry average costs and to compare this against an organisations actual costs.

Typical TCO comparison chart:



3.4 TCO Best Practise for eEurope Service Providers

In this context a service provider may be one of the following:

- An Application Service Provider: provides a defined service, e.g. access to Library Systems, may buy in content from a Content Provider.
- A Service Aggregator: provides a package of services and/or content.
- A Content Provider: provides data and or complex objects, e.g. a catalogue of books and/or videos with associated image data.
- A Network Service Provider (NSP): provides communication services for the Citizen to access eEurope-enabled services.
- An Access Point Provider: provides one or more access points that are eEurope-enabled.

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- An Internet Service Provider (ISP) or other Gateway: provides a link to the wide-area network that will service eEurope.

Each of the above should carry out their own TCO study, using trained TCO analysts to identify:

- Fixed costs (do not change with usage).
- Variable costs (dependant upon Citizen usage).
- Direct costs (both fixed and variable).
 - Direct costs borne by the provider.
 - Direct costs borne by the Citizen.
- Indirect costs (both fixed and variable).
 - Indirect costs borne by the provider.
 - Indirect costs borne by the Citizen.

Each such study must be based upon a usage and volumetric analysis that is highly dependent upon Citizen uptake of the service. In the case of (say) a Network Service Provider this will be highly dependent upon the usage models of the services being offered over their network and the number of accredited access points.

A high degree of co-operation is required between all the service tiers to develop a holistic view of total usage and thus calculate likely end-to-end costs for a given service. This implies an iterative process that will build a high level TCO model showing the costs of providing a given service over different access paths. The likely owner of this high level TCO model is the Service Aggregator who, from the Citizen's perspective, is the gateway to their personalised eEurope services.

4 Usage and Cross-Charging Models

4.1 Usage

There are three fundamental usage models whereby the Citizen accesses a service via an access point that is:

1. Owned and controlled by the provider of the service that the Citizen is using, e.g. a Library owned terminal located in a Library building.
2. Owned and controlled by the Citizen, e.g. a home PC used to access local authority services.
3. Provided by a third party, e.g. an ATM provided by a bank or a Kiosk provided by a shopping centre. Infrastructure could also be shared by a number of providers.

Each of these has a further dimension in the sense that in each case the network(s) used to access the service may have a different owner, and that multiple networks may be involved. Broadly these fall into two categories:

1. Owned by the access point provider.
2. Owned by a third party, e.g. an ISP or NSP.

Note however, that there may be more than one network involved in accessing any given service from a given access point, and that this will vary considerably if the Citizen chooses to access the same service from a number of different access points.

4.2 Cross-Charging

The usage model chosen by the Citizen has a significant bearing in determining the appropriate cross-charging model for a given access path to a specific service. Once again these fall into two broad categories, which, in this case are determined by contractual arrangements:

1. The Citizen is using an access point where an existing contractual agreement is in place between the Citizen and the ISP or NSP, the only charges applicable (if any) are those levied by the actual service provider that is being accessed. Typical examples are a Broadband connection to a home PC (Citizen pays an agreed contractual fee for the service), a mobile network connection, or the Citizen uses an ATM owned by their bank (service provided as a 'value add' by the bank). The assumption in this case is that the Citizen knows the details of the contract they have entered into and any charges they may incur.
2. Where third parties are involved the charging model becomes more complex. Suppose, for example, that the Citizen is a resident of Local Authority 'A' but chooses to reserve a book from a Library owned by that authority (free service) using an access point owned by Local Authority 'B'. This will utilise Local Authority 'B's bandwidth, a wide-area connection provided by a third party, before accessing the 'free' service of Local Authority 'A'. An additional factor here is that Local Authority 'A' may be in country 'C', and Local Authority 'B' in country 'D'.

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Who pays the third party and Local Authority 'B'? Local Authority 'A' is legally required to provide the service to residents, Local Authority 'B' is under a statutory responsibility to provide free services to its residents and not to 'strangers', and the third party network provider has a contract with both. This scenario also applies when the access point is owned by any other third party with which the Citizen does not have an existing contractual relationship (e.g. the Kiosk in a shopping centre). In this case the Citizen has no prior understanding of, or contractual agreement to, any charges that they may incur. Commonly this is dealt with by displaying a 'splash screen' detailing the extra charge or that a charge may be made when the amount is unknown.

In this scenario, which can become more complex as more stakeholders are involved, there are two charging models:

1. The stakeholders involved have a cross-charging agreement, which can be complex, involving detailed charging for each access and a clearing function, sharing costs of system components and infrastructure, or simple, where each agrees that the cost differential will be broadly neutral.
2. The Citizen is charged (possibly via their e-purse) for access on alien networks in addition to any charge for the basic service.

5 Perspectives on Charging Models

5.1 Service Provider

The implications of the two models from the service provider's perspective are:

1. Can be highly complex and involves detailed commercial negotiation. If the usage figures are over or under estimated the risks are high that one or more service providers could face unforeseen costs. To be successful requires complex back office systems that are able to dynamically adjust costing ratios and charges to the real world.
2. Simplicity, but the risk is that the highly variable rates of charging may deter usage and may make some access routes uneconomic and thus deter stakeholders from offering eEurope enabled services.

Model two is obviously more attractive from a service provider's perspective as it lowers the cost of provision and moves the responsibility, and risk, to the Citizen. However it may deter take-up of the system and increase the 'churn rate' (number of Citizens dropping out), which will probably increase the costs in the longer term.

5.2 Citizen

Secondly, from the Citizen-Centric perspective:

1. Simple to understand, a service charge can be agreed that is uniform, or nearly so, across all access routes. Charges may change over a period of time due to the dynamic nature of the charge balancing systems and this may cause some resistance unless the changes are 'smoothed' over a period of time.
2. Complex, charges may vary widely and without a rigorous accreditation and enforcement policy may be opaque to the Citizen.

Model one is most attractive from the Citizen's perspective as it gives them a fixed, or nearly so, cost for a given service. As this will encourage take-up and Citizen usage it may well be the more cost effective over time. However this model does imply complex commercial agreements that may impact upon service delivery unless they are given appropriate prioritisation.

5.3 Recommended Model

On balance, the benefits of model two to the service provider are far outweighed by the risks and negative impacts upon the Citizen's view of the service offering. Model one carries less risk and is inherently transparent to the Citizen, but more complex and costly for the service provider. This may increase the overall costs to the Citizen unless 'good-enough' cross charging mechanisms are put in place to mitigate the cost and complexity of the back office systems. This will be easier to achieve once systems are in place and genuine Citizen usage data is available. It may be necessary therefore for service providers to accept some risk initially in order to lower their long-term costs in providing the service.

The recommended model then is that:

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The stakeholders involved in any given service provision for eEurope should have a cross-charging agreement, which can be complex, involving detailed charging for each access and a clearing function, or simple, where each agrees that the cost differential will be broadly neutral. Simple for the Citizen to understand, a service charge should be agreed that is uniform, or nearly so, across all access routes. Charges may change over a period of time due to the dynamic nature of the charge balancing but these changes should be 'smoothed' to encourage Citizen take-up and usage.

The service provider responsible for the central Identification, Authentication, and Authorisation services (e.g. PKI, PINs, Biometrics, Security Tokens, etc.) should be an integral part of the cross-charging mechanism. Since they are, by definition, a "trusted third party" they should normally be the overall provider of this service, and in particular take responsibility for providing the necessary cross-charging audit trails whilst protecting Citizen confidentiality.

6 Communicating Costs to the Citizen

The recommendations below merely apply to the issue of cost transparency. It is assumed that all other aspects of the TB 8 Best Practice Manual are being followed, particularly with regard to inclusivity and multi-lingual support. Implicit in this is the requirement that there should be a methodology for testing systems for comprehensibility by the potential users, and an accreditation process to grant eEurope certification.

6.1 Emergency Services

These are not chargeable. Any service provider wishing to do so should not be accredited to provide eEurope services.

6.2 Splash Screens

Where a service cannot conclusively know that an additional charge may be levied then this fact should be communicated to the Citizen. Text to the effect of “You may be charged an additional fee for accessing <service name> from this terminal, please refer to the terms and conditions displayed on the terminal” should be clearly displayed. The screen should enforce a positive acceptance or rejection of these terms *before* any charges are levied.

Where it is known that a charge *will* be made this should be clearly displayed to the Citizen *before* any charges are levied.

Explanatory ‘help’ screens should be available, without charge, to explain the terms and conditions.

6.3 Types of Charges

Any system levying charges on the Citizen for access should clearly state whether these charges are one-off, time, or transaction based. Explanatory ‘help’ screens should be available, without charge, to explain the terms and conditions.

6.4 Types of Payment

The method of payment (e-purse, credit card, account etc.) should be clearly displayed on the screen at all times that a chargeable service is being accessed.

6.5 Multiple Fees

Where a service usage is made up by adding charges from different service providers, for example the main service provider and (say) a kiosk, these should be displayed separately and totalled for the Citizens convenience.

6.6 Running Totals

Running totals of all fees being charged, together with the available balance (if appropriate) should be displayed on-screen at all times.

6.7 Credit Countdown

Where a credit facility (e.g. the e-purse) is running low, the system should give at least 60 seconds notice to allow the Citizen to complete their transaction. The system should also allow an emergency 'use once' five minutes credit.

6.8 Accreditation

Compliance with *eEurope* Cost Transparency Guidelines should be mandatory for accreditation as an *eEurope* Service Provider.