

Limitations for Interstate E-Government and for Interdisciplinary Projects

Reinhard Riedl
University of Zurich
riedl@ifi.unizh.ch

Abstract

We present a European R&D-Project on Interstate E-Government and we discuss the challenges of information exchange on the level of e-government services and on the level of project management.

1. Introduction and Background

Heterogeneity of legacies, ontologies, administrative processes and national laws renders the procurement of interstate e-government services a nearly unsolvable problem in Europe, whereby the soft factors are much more critical than HW/SW non-interoperability is. Interdisciplinary research and development projects are necessary in order to come up with prototypical solutions. And indeed such solutions are possible if the rules of distributed system engineering are carefully applied. However, the required heterogeneity of projects, which realize the prototypical development of prospective solutions, renders the direct exchange of knowledge an equally unsolvable problem. Therefore, creative inventions of boundary objects are required, which enable some form of information tunneling of knowledge and context barriers. Interdisciplinary research and development may help expert communities to learn from each other, but an interdisciplinary co-operation on a particular goal is likely to fail unless partners know each other's research or development context very well.

When a European citizen moves from City A in Country X to City B in Country B, she first has to find out about the administrative requirements of this process. Then she usually has to visit one or numerous authorities or agencies in her current place of residence or in her home country in order to obtain the required personal documents. And finally, she has to visit one or numerous authorities or agencies in the destination of her migration in order to deliver these documents and other information and in order to obtain necessary certificates and registrations – for example a certificate of residence, a social number or a car registration certificate, but also objects like a parking license or the registration for the different types of garbage collections. This creates

significant costs for her and for the involved authorities. The costs for her may be reduced by mailing requests for documents to remote authorities, but this requires that the citizen knows which documents she needs or that a help desk is available. Anyway, this procedure does not cut down administrative costs, but it may even increase them.

In the Interstate E-Government research and development project “FASME - Facilitating Administrative Services for Mobile Europeans”, the feasibility of digital one stop government for this scenario is investigated. More precisely, it is analyzed, whether citizen-owned Javacards might be used for the transport of personal data between different authorities. The answer is no&yes. No, they cannot serve that way due to lots of consistency problems and yes, digital one stop government is possible, and Javacards may provide mobile access to e-government service with exactly the type of computing facility needed in order to remove most of the administrative burden from the citizen and to reduce costs significantly for the governmental authorities. The project is funded by the Framework Program of the European Commission and the Swiss National Fund. It is run in the Information Society Technology (IST) track of the Commission's R&D program. The distinctive feature of the project is that it fits very well with the e-Europe Initiative of the European Commission in general, and in particular with the E-Europe Smartcard Charter Initiative and the goals of European Commission to support trust and confidence (T&C) technology. The European Commission has identified the lack of public engagement in the building of infrastructure for electronic commerce as one of the major flaws of European politics in the past. The basic goal of FASME is the development of an intelligent ID-card, which can host flexible and securely competing commercial services. The introduction of a European wide Javacard-based identity card could provide infrastructure for innovative mobile commerce applications, based on the principle one or a few cards for all (instead of one card for each service). Thus it would support the political goals of the e-Europe Initiative. The following drawing depicts the strategic position of the FASME project. Mobile citizens need support, local administrations want to reduce

costs, and the European Commission wants to support mobility and to stimulate mobile commerce.

FASME is lead by a German consulting company, which is specialized on consulting of municipalities and which has about 150 employees. The core research and development work is done by four European Universities. The requirements are mainly delivered by 6 European municipalities, which are depicted in the map below. The evaluation criteria were formally defined in terms of communication channels, which are successfully implemented. More precisely, for three types of different registration scenarios, the main one of which is the registration of living place, complete user support for the migration among three core cities – Newcastle-upon-Tyne, Cologne, and Grosseto – will be implemented prototypically and the implementations will be analyzed with respect to various quality criteria, among which complete functionality, security, and usability are most important. Project success is normalized in such a way that a quantity of two third unidirectional communication channels, which meet the predefined quality standards, corresponds to 100% project success.

The project team is an interdisciplinary team with industrial consultants, experts on administration issues, scientists working on information management, distributed systems and software engineering, databases, and embedded Java technology, experts in data protection law, and social scientists. The work plan is split into concurrent processes with well-defined interdependencies [1]: Project management, Specification of business processes, Sociological and juridical analysis, Design and modeling, Initial prototyping, Organizational. The stage for the project is set firstly by the heterogeneity of legacies, processes, ontologies, cultural attitudes and whatever more in the involved cities, and secondly it is set by the heterogeneity of the project team, whose members have quite different skills and goals. The IT in the various cities ranges from very old mainframes to contemporary client/server systems. The technology used in the project itself is state of the art and anticipation of future developments. Since the computing and storage capacities of Javacards do not suffice so far for interesting applications, and since there is no on-card integration of biometric devices with Javacards available, part of the prototypical implementation has to rely on “dirty tricks” and even on emulations, since the research goal requires a system design, which will also work, when foreseeable more powerful Javacards will be commercially available.

Why FASME at all? What are the requirements for the solution? We shall first discuss the underlying problem scenario. Hereby, we shall rely on the schematic approach depicted in the next diagram, which we have to apply to

the various perspectives at the project. We first had to identify the existing pain, i.e. the principal problems, which are encountered. Second we had to derive high level requirements, which in turn lead to the definition of tasks in a third step. Then the goal was to find joint solutions for all these tasks derived, which equally respect the constraints of the various perspectives. Clearly, this is likely to be impossible, which is why innovative 80% solutions are required first. The primary task of an R&D project is the design and prototypical implementation of such 80% solutions. When we apply the above diagram to the first diagram depicted the main perspectives at the project, and then we obtain the following schema, which has to be filled with details in the next analysis step.

3. Different Perspectives

Some of the more serious economic problems for Europe are the unbalanced geographic distribution of human resources, the inflexibility of skilled workers with respect to a change of living place, and the lack of an intercultural networking. On the one hand, European cultural tradition is a great potential for economic creativity, on the other hand, many cross national Intra-European co-operations fail because of the cultural gap. Thus, better support and stimulation for co-operation and the exchange of skilled workers are urgently needed, and first of all, legal and administrative hindrance to migration has to be removed. This does not require a unification of Europe. On the contrary, the respect for local traditions is an important constraint for any reengineering of government processes. From this, we derive straightforwardly the necessity to develop and offer interstate e-government services, which support migrating citizens in the whole migration process, and which are designed in such a way that they gain European-wide user acceptance. This task comprises many subtasks; e.g. those which are addressed by the FASME project, but equally a partial progress towards legal harmonization and the fulfillment of other goals of the E-Europe Initiative.

The non-standard nature of processes is the main problem for authorities concerned with migrating citizens. That relates to language issues and administrative ontology, and it relates to processes, documents, and legal issues. Since administrative cases with foreigners are rather sporadic, usually no local knowledge base is available, and special training for civil servants is too expensive. Moreover, procedures for conflict resolution among different admissible perspectives contradicting each other is usually not established for the special type of problems arising when foreigners settle down. Thus, in most cases, ad hoc solutions are provided. This creates

significant per case costs, and may sometimes lead to rather random behavior of authorities towards foreigners. Some access to a brokering service for legal information would be required. Various European authorities are even planning an outsourcing of administrative tasks to the citizens, who should then take care of the management of their personal data themselves. Clearly, the latter in turn would create dramatic consistency management problems, and overall administrative costs would rather increase than decrease. We may conclude various tasks for the FASME system from this perspective. First and foremost it should reduce costs, and second it should increase the quality of service for the customers, i.e. the citizens. It should enable both a secure networking with remote authorities and an electronic information through the migration process for the citizen. Further it should standardize the interpretation and relevance management for personal data delivered by remote authorities. Finally, it should support a better linking with other local authorities.

The administrative burden is conceived as a serious hindrance by European citizens. It costs time and it is difficult to understand how and why processes are supposed to take place. Due to a lack of proper information, mistakes are made on both sides, which may turn out to have seriously unpleasant consequences for the citizen. Even more, usually the distribution of responsibilities and duties to provide proper information for the citizens seems to be rather implicit and fuzzy in most places. As a result, it may happen for instance, that taxes are paid twice as high as required, or foreign European citizens do not get part of the social benefits, which native citizens do in comparable situations. A much better support is most urgently required. This might start with the offering of one stop government and with the communication in the language of the citizen, rather than in the local language. However, much more is needed. Citizens have to be guided through the processes, whose underlying principles are not known to them. They have to be supported in the cognitive process of adapting to the administrative rules derived from a cultural tradition, which might seem strange to them at first time. From these observations, we may derive various concrete tasks for the FASME system. Apart from digital guidance as indicated above, it has to provide some facility for the ad hoc shipping of personal data from one authority to another. This shipping has to be trustworthy and clearly it must respect data protection law. Furthermore, user-friendly access to these facilities should be possible from everywhere and at all times. These perspectives define tasks for interstate e-government and the FASME project. But there are also important constraints, which are defined by the acceptance criteria of citizens, local administrations and European politics.

From the user's perspective these are trust & Confidence (this means security as it is perceived by users and not by engineering experts), access (global, preferably mobile, access), usability (the ease of use is essential for technological solutions for all), functionality and relevance of added value (users have to perceive some added value). From the perspectives of local administrations, these are local and global political situation (is it applauded by the voters), is there some pressure from central government?), support of the internal management (do they understand the possibilities?), support of the system administration (w.r. firewall and related integration issues), skill requirements (are there enough employees with skills sufficient to realize the project?), and costs (can it be afforded?) From the perspective of the European Commission, the main task is political feasibility

4. Challenges for Interstate E-Government

The primary challenge to interstate e-government solutions is the heterogeneity of systems, processes, and cultural background. We have analysed in some detail the administrative culture, the IT infrastructure, and various soft-factors. We would like to point out miscellaneous remarkable issues. Local councils provide a varying range of services, which differ significantly from city to city. And the number of legacy systems, and the complexity, respectively, reflects services provided by local councils. Drawing complete pictures is a thorny issue. All administrations, which we contacted, were interested in combining SmartCards and digital signature, while they completely differed in their understanding of what citizen registration was all about. While British civil servants always stressed the importance of anonymity, e.g. anonymous access to social fringe benefits like cheaper theatre tickets or free school meals for children of poor parents, civil servants in Two special European issues are nobility titles and academic degrees. Many countries in Europe have nobility titles. Each country treats them differently: For example, the Netherlands does not register any foreign nobility titles. The database systems provide facilities for registering titles, but only Dutch nobility titles are accepted. In Austria, academic degrees form part of the name. In Germany, academic titles such as Dr. and Prof. are registered as titles but do not form part of the name. Other Europeans nations do not register degrees at all. Any trans-national system must be able to correctly handle titles and decide in what cases an academic degree is part of a surname. Round trip migrations through Europe may thus lead to the loss of both nobility titles and academic degrees, which does not matter in those

countries, where these attributes are legally ignored, but it matters in those countries, where these attributes are officially registered.

Investigations of the citizen perspective revealed that users expect all interactions to take place in his or her mother tongue. Thus all user interfaces for the digital procurement of administrative services ought to be multilingual. The citizens ought to be able to submit all registration forms in their mother tongue. Interviews with legal experts revealed that the legal framework in a country will influence the data representation of an e-government project significantly and that global standards are politically not achievable. Homosexual marriages serve as a good example: Most European member states do not have legalised homosexual marriages yet. However, the Netherlands have legalised such marriages which has an impact on the registration process as a whole: instead of registering a mother and a father of a child the terminology used is now "Partner one" and "Partner two", reflecting the fact that both could be of the same gender. This especially poses a problem in a situation where the electronic representation of a registration file in the Netherlands should be transferred abroad: in most other European nation the attributes "Partner 1" and "Partner 2" must be mapped to "Mother" and "Father". This also raises the issue whether an e-government system must inherently be aware of legal differences in member states and capable of deciding, who the legal father or mother is according to a given national law.

5. Conclusions

The cooperation of two European authorities in serving a European citizen may both be understood as a dynamic virtual enterprise and as a sporadic event in a strategic cooperation in a supply-chain. For service quality reasons, citizens might prefer the latter option, while for data protection reasons the first might appear to be the preferable option. Both are far from being realistic as both would require IT support, which is able to interconnect legacies, which are not inter-operable so far. Therefore, the vision of the FASME project is far from becoming reality. Nevertheless, the project has provided valuable results. One of the main results is the unfeasibility of an exchange of information and the transport of personal data on a SmartCard. Using the terminology of [4] it may be said that brokering is not possible here. Instead we have to use boundary objects as they have been introduced in [3], which enable coordination without actually creating a bridge between the perspectives and the meanings of different constituencies. In the case of interstate e-government, an intermediary XML representation scheme

and a universal document service [2] may serve as boundary objects, whereby only documents with a well-defined context are exchanged, the responsibility for creation and for interpretation is assigned to local systems, and the IT infrastructure only guarantees the authenticity of the origin of documents. In this model, no consistency management takes place whatsoever. Documents are only stored for caching mechanisms in order to improve performance. Instead the key functionality is the creation of trustworthy documents on demand based on data somewhere locally available.

The bottom line of the above results is that the heterogeneity makes it nearly impossible to come up with feasible solutions for interstate e-government. In general, the actual process of migration of a citizen does not know established subprocesses connecting different legacies, which could straightforwardly be supported digitally. On the contrary, document services, which include the secure creation of trustworthy documents on demand, provide the basic functionality for distributed locally managed one stop e-government.

We have already stated the main result of the project, the development of a universal document service. Although this may be considered a major achievement for an R&D project, there were a lot of flaws in the original project design. The project was designed as an interdisciplinary project, because already at the beginning of the planning phase, the core project team including the main contractor was very well aware of the huge size of the project scope. A posteriori this decision from the project management is very well justified although the interdisciplinary nature of the project has been the origin and reason of a lot of quarreling. Furthermore, the project has been designed to rely on interfaces as windows for passing deliverables. Throughout the whole project, all partners have to rely on such input from other partners. This design decision is a posteriori a clearly wrong one. For example, the technical partners responsible for the application prototyping relied on input from experts in business informatics, psychology, sociology, and law in form of requirement specifications, i.e. in a representation style original to system engineering. However, all milestones and deadlines were missed in that respect. There were differences in the quality of misunderstandings, but the technical people never received any requirement specification from the academic or the industrial partners. The only ones who provided them with substantial information at all were the user partners, namely some of the municipalities participating in the project. This was achieved at workshops organized and lead by the technical partners. Furthermore, the business experts responsible for the specification of business models, processes, and requirements, relied on

input about general requirements from sociologists and on visual prototypes for user experiments to be provided by the technical partners. The technical partners first delivered these prototypes, but business experts expected an update of these prototypes every three to five weeks at least, as they had planned to visit user partners spread throughout Europe regularly once a month. When the technical partners did not receive any user requirements they stopped the delivery of these updates and a blockade resulted.

Finally, the sociologist relied on interviews to be performed by their project partners, but due to restricted resources and a lack of understanding of the meaning of these interviews, none of their partners provided these interviews which slowed down the project work of sociologists and prevented them from timely delivery of general requirements to the business experts which in turn did not specify the application scenarios for the technical group doing the application prototyping. Those and other similar troubles more nearly stopped the project. Project progress started only when some partners started to collect the necessary input themselves. For example, the sociologists started to draw up a context model, which was finally considered a useful source of information by the technical group, as this enabled them to answer soft questions about their research work during talks and project presentations. Although the sociological research work had not provided them with answers to their questions, it provided them with add-on information for presentations.

The technical partners themselves fetched information needed for requirements engineering on their own from the various municipalities willing to provide information in mini-workshops. However, this process was not transparent to the project management, which relied on conventional business technology. At the project presentation after nine months, the project was nearly turned down, because the presentation given by selected members of the project management did not reflect the engineering work down in the meantime. Although the results of the engineering work had been presented at a workshop, they could not catch the attention of the project management. As the architecture specification also had not passed the interfaces, it had remained unrecognized, leading to a very critical reviewing report upon the first project review.

The project structure and its problems somewhat reflect the problem scenario on which the project team is working. There is a reciprocal awareness of the research and development context missing. The project team is made up of a distributed research team, whose members belong to different communities of practice. Brokering

through the exchange of deliverables failed completely. And the choice of boundary objects was a rather unlucky one. Indeed, the visual prototypes had been intended to serve as boundary objects. However, they were occupied as research tools by the experts from business informatics and these experts insisted on a permanent usage of these boundary objects, which could not be afforded by the technical crew due to a shortage of human resources. This all spoiled the atmosphere in the project significantly.

We conclude that a different type of organizational structure and a different type of boundary object system should be used for future interdisciplinary R&D projects. Short time interdisciplinary research projects cannot expect convergence and the less they can rely on exchange of knowledge by way of intra-project deliverables. Any interdependencies will create long delays and they will lead to deep frustration among partners. Instead interdisciplinary projects should have various independent goals of equal importance and regular workshops should be used to exchange the results achieved. Apart from such workshops, the boundary object systems should not be restricted to the surface of visual images, but rather they should nurture and support the reciprocal exhibition of research and development context. This could be achieved with tools supporting the publishing of internal communication to project partners. The efforts for context sharing could thus be kept low, and nevertheless, partners would be enabled to learn about the work of other project members very effectively. It has to be noted though that during the project the reciprocal understanding has improved in FASME. Since our observations relate only to a monitoring period of 12 months, nothing can be concluded for interdisciplinary projects with duration of various years.

6. Conjecture

We conjecture that beyond some limit of heterogeneity, brokering is no longer possible, and boundary objects without brokering facilities have to be introduced. XML documents must not be used for direct one-to-one communication between European authorities through well-defined interfaces, as this is rather impossible right now. Instead, we can build an XML-bus, which serves as a boundary object. On the one hand, upon a citizen's request, authorities post documents to this XML-bus. On the other hand, authorities can take documents from this bus, but they have to give their own interpretation to the document. Hereby, the term bus is a metaphor only, since for security reasons, documents will not be published to the public, but they will always be encrypted with the public key of the receiver. We may describe the overall communication process as a tunneling

of cultural barriers through messaging via a boundary object. The situation with truly interdisciplinary projects is similar. No direct communication through interfaces will be possible in the beginning. Instead, here some undirected tunneling of knowledge and context boundaries ought to take place.

We further conjecture that a proper organizational implementation of boundary objects will eventually lead to a convergence of contexts, and the usage of information brokering will become feasible.

7. References

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