MUSE: Challenges to Integrate the Multi-Disciplinary Field of BB Access in One Project

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Abstract: *The present paper discusses the managerial challenges of the MUSE integrated project on multi service broadband access. It addresses different aspects such as matrix organisation, project office, consensus process, standardisation, dissemination, and quality control.*

Introduction

MUSE (Multi Service Access Everywhere) is one of the major Integrated Projects in the strategic objective "Broadband for All" of the IST priority (Information Society and Technology) in the European FP6 (Framework Programme 6). Its overall goal is the research and development of a future, low cost, multi-service broadband access network [1,2]. It gathers a multi-disciplinary field of research, which ranges from network architectures, access and edge nodes, first mile solutions, and residential gateways (cf. Figure 1). The main outputs of MUSE are research reports specifying a multi-service access architecture, a detailed description of the functionality for each network element, prototypes, and evaluation reports of integrated lab trials. There is a balance of short-term research aimed at contributions in standardisation and medium to long-term research to investigate the feasibility of novel concepts.

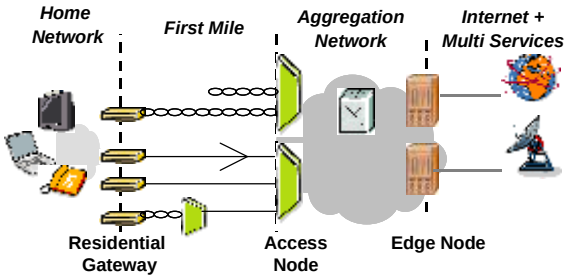

Figure 1: Scope of MUSE project ranging from residential gateway, via access and aggregation network, until edge node.

The MUSE consortium consists of major European players in the field of broadband access, among them vendors (Alcatel, Ericsson, Lucent Technologies, Siemens, Thomson, Infineon, ST Microelectronics), operators (BT, FT R&D, T-Systems, Telecom Italia, Telefonica, TNO (for KPN), TeliaSonera, Portugal Telecom, Telecom Poland, BSA), research institutes (IBBT, INRIA, NTUA, ACREO, BUTE, Lund TH, UC3 Madrid, TU Eindhoven, University of Essex, HHI), and a SME (Small and Medium Enterprise) in engineering (Robotiker). As such MUSE can play an important role in strengthening the voice of European players in the global standardisation on BB Access.

The project started in January 2004 and is planned for four years. A first phase of two years was successfully completed in February 2006. Its main focus was the definition and demonstration of a basic multi-service network architecture based on low cost packet technology (Ethernet and IP (Internet Protocol)). The consortium was granted a second phase, which started in January 2006 and runs until December 2007. In the second phase the access architecture is being matured and enhanced with multimedia service enablers and capabilities for fixed mobile convergence.

An integrated project is a new instrument for collaborative research in FP6. Table 1 illustrates the size of such project (numbers only for phase I, on-going phase II expected to become of the same order). The co-ordination of such project represents major challenges and required some innovations in project management, which are the topic of the present paper.

Table 1: MUSE by numbers in phase I

	Number
Total budget phase I	34 M€
Attendees per consortium meeting	120
People involved (including part-time)	300
Addressees of Public News Letter	900
Sessions per consortium meeting	52
Milestones	49
Deliverables	64
Publications	100
Standard contributions (co-signed / individual)	48 / 85
Number of Documents on FTP server	5113 (4.8 GB)

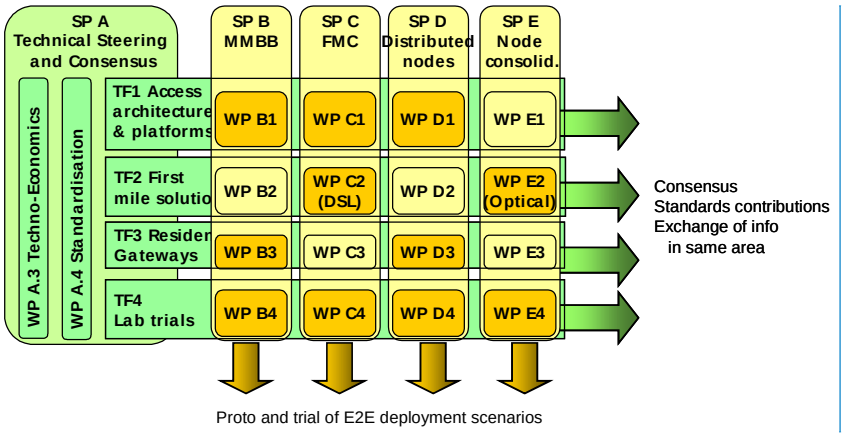

Figure 2: Matrix organisation with subprojects and task forces (MMBB: MultiMedia BroadBand, FMC: Fixed Mobile Convergence, E2E: End-to-End).

Project organisation

Subprojects and task forces

A first challenge was to establish an organisation that allows for a good communication between all organisational elements and avoids that subprojects act as individual projects. MUSE is therefore organised in a matrix of vertical subprojects and horizontal task forces (Figure 2).

A SP (SubProject) concentrates on solutions for a specific deployment scenario. Each subproject has a similar structure of WP (Work Packages) that address access platforms, first mile solutions, residential gateways, and lab trials. The deployment scenario per subproject focuses the developments inside a subproject and limits duplication of work between them. The subprojects consist of a non-overlapping subset of partners to keep the co-operation manageable and give sufficient focus to the work of individual partners. The outputs of a subproject are detailed solutions per network element, prototypes, and their evaluation in integrated lab trials.

A TF (Task Force) groups all experts in the same technical area from the various subprojects. The output of the task forces are common specifications, contributions to standardisation, position papers with recommendations, or comparisons of different approaches. The task force also allows subprojects for soliciting feedback on requirements from the entire consortium.

Subproject A is a special overarching subproject which ensures a coherent technical steering and consensus of the integrated project. It contains workpackages on techno-economics and co-ordination of standardisation. It also provides a forum for technical alignment between the task forces.

It took a couple of months to achieve an efficient operation of the matrix in practice. It required some time before all participants fully understood the different goals of the task forces and the subprojects. Small corrections to the objectives of task force deliverables and a few reallocations of manpower were necessary in the project plan.

Meetings

MUSE organises quarterly consortium meetings that co-locate all types of sessions, ranging from a plenary general assembly to eight parallel sessions in work packages. This ensures that the same people attend sessions of subprojects and task forces and, as such, ensure a good interaction between the two dimensions of the matrix. The consortium meetings have an average attendance of 120 people.

Conference calls supported by a web conferencing tool, discussions via e-mail exploders, and discussion forums on an internal website are used to interact and make progress in between the consortium meetings.

Resource allocation and focus

The challenge when allocating the resources per activity was to get sufficient focus and critical mass on work items per partner, while having the necessary minimum involvement of all partners in areas where consensus is required. Although the overall budget is large, the share per partner is limited. Partners allocated an agreed minimum of manpower for each deliverable together with a statement of the intended contribution. Partners that only follow-up an activity and give feedback in the consensus process allocated an agreed maximum of 1 person month per deliverable. The efforts to read the large amounts of information and discuss the opinions and comments that are generated by so many partners were initially underestimated, but is an essential part of the consensus work.

Research with competitors

The subproject organisation also allows for separating competing players and creates a framework in which it is possible to discuss innovative concepts within a smaller group of trusted, complementary partners. As a lesson learned from phase I, subproject confidential deliverables were introduced in phase II. They allow for describing detailed solutions within a subproject,

while requirements and evaluation results can still be reported in other deliverables open to the entire consortium. An integrated project consortium agreement regulates the access rights inside and across subprojects. This framework was necessary to ensure sufficient innovation in a research consortium that addresses a highly competitive area like BB Access.

Project Office and Project Server

The operation of an integrated project of this size requires the full time involvement of an overall project manager and an adminstrative responsible for the project office. This is complemented with part-time secretarial support, and ad hoc involvement of a legal counsellor, accountant, and IT assistant for the project website. The efforts of the project office are an overhead cost inherent to integrated projects and a full funding by the European Commission is therefore justified. The project is furthermore governed by a board of subproject leaders and task force leaders.

A project server hosts a public website and a password protected internal FTP server (File Transfer Protocol). The FTP server is a repository of all project documents, such as reports, meeting minutes, presentations, working documents, and deliverables. SP confidential documents are posted on separate password protected servers. The internal portal website also provides regularly updated announcements, an event and meeting calendar, a who-is-who, and e-mail exploders.

Standardisation

Standardisation of results of the project is an important objective of MUSE. In addition to the well-known arguments of economies of scale and interoperability, involvement in standardisation is relevant for the research in the project because:

- The feedback on the contributions by MUSE to standardisation directs further research studies.
- The objective of bringing research to standardisation is an extra motivation for the partners to aim for consensus.
- The process stimulates partners to bring in the position of their organisation, rather than opinions of individuals.
- The discussions in global standardisation are a good way of monitoring the state of the art and judge how MUSE can provide added value.

The approach of MUSE is to give priority to a few working groups in industry forums (DSL Forum [3], Home Gateway Initiative [4]) and standardisation bodies (ETSI TISPAN and TM6 [5], ITU-T SG15 Q2 and Q4 [6]) in order to make a difference as a project with sufficient critical mass. Other bodies and forums relevant to MUSE are monitored to identify evolutions that may impact the work in MUSE. Although very tempting from a political or marketing point of view, MUSE decided not to create a new forum, which would compete with existing organisations and further diverge the industry standards and standardisation resources. MUSE has more impact by enhancing the European voice in existing bodies and forums.

MUSE aims at co-signed contributions by many partners. In order to be effective in the standardisation, it is important that a number of key people are directly active in MUSE and the standardisation body. For all operators and vendors, it is important that there is a good co-ordination between participants in MUSE and representatives in standardisation in order to get a timely approval of a contribution and support during the standards meeting itself. In addition to co-signed contributions, MUSE partners make individual partner contributions with research results and consensus work that started in MUSE. A timely reaction is often needed in standardisation, which does not allow time for an agreement and approval by many partners. Consensus then continues in the standards meetings.

MUSE has made a slow and cautious start in standardisation, in order to gradually establish a quality reputation.

Dissemination

In addition to the conventional publications and project website [1], MUSE has chosen to organise its dissemination through dedicated sessions or workshops at existing conferences. There are already (too) many initiatives in the field of Broadband networks. Although the organisation of a workshop looks good at a technical audit, it should not be the role of the project to further proliferate the number of events and dilute their attendance. MUSE is also present at selected events with a booth and demonstrator (e.g. at BB Europe, NOC, or InfoCom).

The consortium launched the MUSE Season Schools on BB Access. While conventional workshops consist of short presentations, which highlight new results, these training events give more detailed tutorials on MUSE results, complemented with general short courses on network technology. There are about two such events per year and they are organised by the academic partners of MUSE. The MUSE Autum School organised by IBBT in Ghent in 2005, for instance, even involved practical lab sessions allowing for hands-on exercises in Ethernet and IP networking, QoS (Quality of Service), and signalling.

The fact that an integrated project operates with a project office and sufficient critical mass facilitates the successful organisation of dissemination events.

It should be noted that the involvement of more than 300 people from 36 partners in the project is an effective form of training and dissemination of results in itself.

Other Challenges and Lessons Learned

Consensus

MUSE aims for consensus in all technical decisions. In order to converge on a technical decision, questionnaires are issued to all relevant partners to solicit their view and to get a complete survey of opinions in the consortium. The results of the survey are discussed in a meeting to aim for consensus. In case no consensus can be reached, a majority choice is selected as preferred solutions and other solutions are documented as optional. In such cases, MUSE considers its research task as completed and leaves further decisions to the standardisation bodies.

Consensus among many partners is a slow and resource intensive process. A lesson learned is that it is important that the key people (e.g. experts and standards representatives) are involved from the start of the discussion to avoid that decisions are re-opened. There should also be good definitions from the beginning, so that all involved people have the same understanding of terms. It proved to be an effective approach that a small team of key people and opinionated actors work out a recommendation prior to obtaining the agreement from the partners at large.

Quality process

An internal quality review process is implemented prior to the release of each deliverable. Two internal reviewers, which did not contribute to the deliverable, are appointed per deliverable. They assess the quality versus manpower spent, the innovation of the content, the alignment with the MUSE objectives and vision, and the potential for exploitation. The feedback shows to be very useful to further improve the level and readability.

It also appeared necessary for the management team to assess the performance of individual partners and make a correction of the budget for a few underperforming partners. In a large integrated project, it is otherwise easy for "blind passengers" to hide behind the overall success of the project. If this were tolerated by the management team, more partners would follow the bad example, resulting in an inferior output of the project. A good alignment of commitments of the partner in the project with the interests of his organisation has the best chances of good output. It therefore helps to openly speak about internal reorganisations or strategies of partners and seek for the best solution in the MUSE project.

Communication with the project customer

Due to the novelty of the large integrated projects in FP6, the EC (European Commission) as project customer closely followed the progress. It is important to maintain an open communication via monthly reports, attendance of some of the consortium meetings, and internal web access. The EC has been perceptive for motivated decisions by the consortium.

Conclusions

The present paper discusses the organisational challenges of an integrated project based on the experiences of the MUSE project.

An integrated project is a well suited instrument for collaborative research when addressing a multi-disciplinary field or aiming at consensus. It gathers the many competences required to elaborate an integrated solution for multi-service access and evaluate it in lab trials. MUSE experienced a slow start in standardisation, but is gradually gaining influence. It indisputably contributes to the sharing of ideas and information among many researchers in the field of BB Access. It is a powerful tool to organise the dissemination of results. An integrated project provides sufficient flexibility to adapt the content of some activities in anticipation of new trends, as long as it can be motivated in the overall frame of objectives.

The down side is a large overhead, not only for the project management team, but also for each partner to remain informed of all aspects of the project. Due to the involvement of many partners, consensus decisions are achieved slower than in regular projects. The organisation of tasks in smaller subgroups is essential to make fast progress on specific work items. The establishement of subproject confidential deliverables is necessary to remove the reservations of competing players to perform innovative research in an integrated project.

The key word for the management of an integrated project in a field as broad as multi-service access is "focus". This applies to the prioritisation of research activities with sufficient critical mass at large, the selection of standardisation initiatives, the allocation of resources on a few focus items per partner combined with means to follow-up discussion threads that require consensus, and the presence at conferences for the dissemination.

Acknowledgement

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