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Periodic Report on Dissemination

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- UNI PASSAU ...... Universität Passau
- FBK.................. Fondazione Bruno Kessler
- Imperial ............. Imperial College of Science, Technology and Medicine
- ULANC.............. Lancaster University

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Executive Summary

The deliverable documents the dissemination activities in the ALLOW project that have been undertaken during the third and last year of its life. During this year, the dissemination activities concentrated in particular on the production of scientific papers and demonstrators.

Publications in scientific journals, conferences and workshops, in different research areas (i.e., Business Process Management, Pervasive Computing, Human-Computer Interaction and Service-Oriented Computing) are reported.

The same is done for the Demonstrators that, based on the use cases addressed by ALLOW, have been exploited to showcase the project results to different audiences, but specifically to industry.

During the last year, partners in the consortium have established collaborations with domain experts interested in the project results. These links have been exploited, both at the partner level and at the consortium level, to disseminate, promote the project results, to find real scenarios to use for evaluation purposes, and to pave the way for possible adoptions of these results.

This deliverable provides a description of these different dissemination activities.
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Chapter 1

Introduction

The deliverable contains a report of the dissemination activities undertaken during the third and last year of the ALLOW project. More precisely, we report the publications and demonstrations achieved during this year (Chapter 2 and Chapter 3).

We give a short report of meetings (Chapter 4) done with domain experts in two different domains: Logistics and Health-care. We also report how different partners of the consortium have disseminated and promoted ALLOW project results (Chapter 5) through research or industrial partnerships, collaboration with other research projects, and organization of dedicated dissemination events. Finally we provide some concluding remarks (Chapter 6).
Chapter 2

Publications

In this section we report the publications (Journal, Conference, and Workshop papers) of the third year of the project, as well as the list of events where the project results have been presented. Regarding the publications we have classified them in journals, conferences, workshops and demonstrations. We have conducted an analysis respect to the previous years of the project and the result is depicted in Figure 2.1. As we can see, for this last year we have 1 Journal paper, 25 Conference papers, 10 Workshop papers and 3 Demonstrations.

![Figure 2.1: ALLOW Publications and Demonstrations.](image)

We have classified publications respect to their topic. To do this we have identified four relevant topics considered during the project that are Business Process Management (BPM), Pervasive Computing (PC), Human-Computer Interaction (HCI) and Service-Oriented Computing (SOC). The result of this analysis, also in relation with the previous years, is shown in Figure 2.2.

In the following sections we list all the publications divided per type (Journals, Conferences, Workshops and Demonstrations). After that, we conclude this chapter listing the joint publications among the ALLOW partners but also joint publications with external partners where the ALLOW concepts and techniques have been used.
2.1 Journals


2.2 Conferences


2.3 Workshops


### 2.4 Demonstrations


### 2.5 Joint Publications in ALLOW

• **Srdjan Marinovic, Tobias Unger, Naranker Dulay, and Frank Leymann.** Support Tasks for Pervasive Workflows. Submitted to 19th International Conference on Cooperative Information Systems (CoopIS 2011).


### 2.6 Joint Publications with external Partners and Research Projects


Chapter 3

Demonstrations

One of the main objectives of the last year of the project was to showcase the ALLOW project results to different audiences, so to allow a practical verification of the outcomes of the project, and to enable, on one side, checking their ability to solve problems posed by real-world applications, and on the other, the sharing of the knowledge and the identification of novel research challenges. To achieve this objective, demonstrators based on the ALLOW use cases, identified after meetings with domain experts (see Chapter 4), have been implemented and exploited to disseminate the project results to different audiences (industry and research). This Chapter presents the most relevant demonstrators realized in the last year. For each of them we provide the involved partners, a short description, and its available material (related publications and videos).

3.1 Adaptable Pervasive Flows: Towards a more intelligent Environment

Involved Partners: FBK, USTUTT (IPVS)

Short Description: In the ALLOW Project a new programming paradigm is being investigated for the design of human-oriented pervasive systems. Adaptable Pervasive Flows (APFs) are an extension of traditional workflow concepts to deal with dynamically changing environments in the real world (e.g. healthcare or logistics). They model the behavior of real world entities (e.g. human or cars) and adapt their execution plan to achieve well-defined goals. For this purpose, a flow is context-aware: during execution information on the underlying environment is obtained (e.g. status of object and humans) to identify possible adaptation needs. At the same, dynamic adaptations of the flows are triggered to reflect these changes. In particular, flows and their control plan are manipulated automatically at runtime, through a set of adaptation mechanisms (i.e., built-in, horizontal, vertical and fragment-based). To guarantee quality properties like performance, reliability, etc., the execution of APFs is distributed on different devices. In particular, APFs are partitioned into fragment and fragments are dynamically migrated to different nodes in the network where they are executed in a distributed fashion. One of the key result of ALLOW has been the design and the development of a framework to manage the execution, adaptation and distribution of pervasive flows in an integrated way.

To demonstrate the ALLOW framework in action, we use a real-world scenario from the domain of logistics. The scenario is based on processes in the automobile terminal of the Bremerhaven sea port, where nearly 2 million new vehicles are handled each year. At the sea port, cars arrive by ship and need to be delivered to retailers. Before the cars can be delivered, a series of activities needs to be completed such as customization procedures, car shipment and repair, etc. The management of car delivery is a highly complex process, as each car requires an individual treatment, and the processes might be disturbed by changes in the execution context such as car failures. This requires sophisticated modeling that allows for run-time adaptation, and distribution of the application. In our demonstration,
we will illustrate the ALLOW framework in action and present the outcome of our algorithms to the end users. We have created a visualization environment (see Figure 3.1) which will enable users to interact with our framework and simulate how pervasive flows in the logistics domain can be executed, adapted and distributed. In particular, they are be able to:

- Run the reference “Car Logistics” scenario and simulate the execution of each business processes attached to each entity (i.e., vehicle, driver, storage locations, trucks, etc.),
- Generate unexpected events that trigger adaptation at run-time (i.e, car damage, driver not available, resources not available, etc.),
- View the different adaptation strategies supported by our framework and how they are used during the scenario execution. This includes vertical and horizontal adaptation.
- Inspect the physical layout for the execution of the flows and see the outcome of a flow distribution algorithm. This illustrates how a decentralized execution of flows can save scarce energy resources on the devices used for interacting with the flows.

The goal of this demonstration is to show the novel concepts and advantages of the ALLOW Framework when applied to a real and complex pervasive system. It has been presented at the FET11 Exhibition (European Future Technologies Conference and Exhibition) in Budapest and at the 9th International Conference on Business Process Management (BPM 2011) in Clermont-Ferrand, France.

Related Publications:


Available Videos: Please visit the following links for a video snapshots of a live demonstration.

• http://www.allow-project.eu/demo/ALLOWCarLogistics1.mp4
• http://www.allow-project.eu/demo/ALLOWCarLogistics2.mp4

Contact Person: bucchiarone@fbk.eu FBK, Italy

3.2 Teleo-Reactive Policies for Pervasive Flows

Involved Partners: IMPERIAL

Short Description: Human-centric Pervasive Systems manage people and human actions as services within the system’s operations. These systems are used in patient healthcare, workflow management, logistics etc. In order to manage Human Agents and Actions the pervasive systems need to address (i) the conditions under which actions that have been started may change while the actions are ongoing, (ii) humans may misbehave by delaying the requested actions or simply not do them, (iii) priorities are often required between multiple actions, (iv) some actions may need to be suspended to cater for more important ones. Event condition actions cannot cope with these issues. Our proposed solution are Teleo-Reactive (TR) specifications where conditions are continuously evaluated, actions are durative, and actions are hierarchically ordered and only the action associated with the highest true condition is run. Running actions are pre-empted when higher conditions become true or their associated condition is no longer true. The TR implementation runs on Java SE 1.5 and Android 1.6 platforms and also supports authorization policies. A demonstrator centered around patient care in the nursing home in Mainkhofen, Germany was developed.

![Figure 3.2: Teleo-Reactive Policies Demonstrator.](image)

Related Publication: Srdjan Marinovic, Kevin P. Twidle, Naranker Dulay, Morris Sloman: Teleo-Reactive policies for managing human-centric pervasive services. CNSM 2010: 80-87

Contact Person: n.dulay@imperial.ac.uk Imperial College, UK
3.3 A Miniaturized Display Network for Situated Glyphs

Involved Partners: ULANC

Short Description: User interfaces for pervasive flows have unique requirements that are determined by the characteristics of complex work environment such as hospitals and industrial sites:

- A key function of flow interfaces is to help people discover the activities that can be performed in a given space, at a given time with the devices and objects at hand.
- Due to the prevalence of manual tasks interaction needs to be hands-free
- Due to time sensitivity of many task users need to be able to perceive and understand information with a minimum of attention, as quickly as possible and in a reliable manner.

Consider the situation depicted in Figure 3.3, where a nurse can choose to perform multiple activities with multiple patients and objects. She might decide to use saline water with patient one or patient three, or she might decide to support patient two instead. In each case, she needs information that matches her activity. As existing studies have shown, medical personnel would benefit most from having specific information available (e.g., guidelines) about their current activity, linked to equipment and patients that are relevant to this activity. These insights have led us to the development of a novel user interfaces concept based on situated glyphs, context-sensitive, adaptive and multivariate graphical signs that provide in-situ task information.

In the field of information visualization, a glyph is a single graphical unit designed to convey multiple data. Different parts of the representation or different visual attributes (e.g., shape, size, colour) are utilized to encode different values. Up until now glyph-based systems have primarily been used for desktop-based visualization. In contrast, we are interested in how glyphs can be embedded in the built environment (walls, doors, etc) and in digital equipment (machines and medical devices) to build situated work-place information systems. We demonstrate a novel approach for building situated information systems using wirelessly connected miniaturized displays. These displays are spatially distributed in a physical work environment and present situated glyphs to provide activity centric notification and feedback. The demo showcases how such miniaturized display networks can be used in dynamic workplaces, e.g., a hospital to support complex activities (Figure 3.4).

The prototype implemented in ALLOW consists of four modules:

- A OLED-160-G1 display module manufactured by 4DSystems, featuring a resolution of 160x128 pixels at 65k colors and consuming 110 mA at maximum and 14 mA at minimum, with an average of about 20 mA at 4 V. Consumption depends on contrast which is regulated by environmental conditions.
D9.1c

CHAPTER 3. DEMONSTRATIONS

Figure 3.4: Situated Glyphs Demonstrator.

- The core module is made of a Jennic JN5139 wireless microcontroller that integrates memory, CPU and IEEE 802.15.4/ZigBee connectivity. It has a wireless operating range of about 30m indoors and consumes 45mA during wireless operation. A port of Contiki to the Jennic JN5139 provides IPv6 communication capabilities. Wireless networking is based on the IEEE802.15.4 standard, which targets low-power wireless sensor networks and in our case is geared towards single-hop, reliable, high-speed operation. A sustainable throughput of 8 \( kb/s \) through a TCP-connection is achievable.

- A rechargeable lithium-polymer battery of the same physical size as the display with a capacity of 1000 \( mAh \) and associated power conversion unit.

- User interaction support with a touch panel. On startup each ambient display assigns itself a unique IPv6-address. Applications on the Application Server connect to the TCP server on the display. The system is able to run at least for 6 hours with full bright display, constant wireless transmission and constant usage of input. In average settings, runtimes of 3 or more days are expected which fits our need. In the demo, we will showcase this custom-made display network presenting situated glyphs designed to support complex dynamic activities in a hospital environment.


Contact Person: kortuem@comp.lancs.ac.uk, ULANC, UK.
3.4 Robust Flow Navigation

Involved Partners: USTUTT (IPVS)

Short Description: When executing a context-aware application that depends on uncertain context information, the application has to interpret the context information correctly in order to be executed successfully. The systems we build, leverage the structural information encoded in an Adaptable Pervasive Flow (in short: flow) to overcome the issues that usually arise when interpreting context information.

FlexCon uses this knowledge to decrease the uncertainty of a recognized context event by learning the statistical dependency of different events. FlexCon supports flows that are modeled using either the imperative or the declarative flow modeling paradigms or a mixture of both. FEvA deals with common mistakes in a sequence of recognized context events (false positives, missed events, out-of-order events). FEvA also uses the flow structure to identify possible errors in an event sequence delivered by the context management system and to resolve them using a best effort approach. This leads to a significantly higher number of successfully completed flows and leads to a graceful degradation as the error rate rises. Overall, FlexCon and FEvA establish the robustness in the execution of pervasive flows that is required to provide unobtrusive flow-based applications that run in the background and seamlessly support the user in her activities.

Related Publication:


Contact Person: wolfhs@ipvs.uni-stuttgart.de, USTUTT (IPVS), Germany.
Chapter 4

Meetings with Domain Experts

In order to facilitate the dissemination and evaluate the project’s results, as well as to receive feedback and recommendations from external partners, in the third year ALLOW has established meetings with domain experts. To show that the concept of flow-based pervasive applications is universally applicable, we have organized these meetings with experts in two different application domains: Health-Care and Logistics.

The outcome of these meetings has been the identification of realistic scenarios that have been used during the last year to demonstrate the main concepts and techniques developed in ALLOW. In the following sections we describe each domain, reporting the description of the scenarios identified and their use. We conclude this chapter showing how we have exploited them to evaluate the project results.

4.1 Health-care Domain

During the last year of ALLOW, we conducted a series of in-situ interviews and focus groups at two hospitals to better understand the nature of current hospital care as well as the concerns of nurses and doctors. One study was conducted at the Dementia ward at Mainkofen Hospital (see Figure 4.1), and the other one at Hannover Hospital. In the following we describe each of them presenting their common aspect and differences that we have discovered during the meetings. We conclude this section presenting how we have used this domain to demonstrate the ALLOW results.

4.1.1 Mainkofen Hospital

The dementia ward at Mainkofen is specifically constructed to support elderly patients with Dementia and Alzheimer’s diseases. It contains the patient rooms with two to four patients each. Each patient has a care plan which defines aspects of care specific to the patients, such as prescribed medication, physical exercises and medical tests.

At Mainkofen, delivery of care can be roughly divided in three phases: the preparation phase, action phase and documentation phase. The documentation phase is important to improve the patients care plan, in fact during it nurses enter notes about the provided care into a hospital information system. Throughout a day nurses produce hand-written notes to help them remember the events of the day. Before the shift-change, each nurse accumulates all the hand-written notes and enters a detailed summary into a hospital information system. Doctors check these notes and associated medical records.

4.1.2 Hannover Hospital

Hannover Hospital is a University Hospital that - unlike to Mainkofen Hospital - deals with a wide range of health aspects. The Department of Plastic, Hand and Reconstructive Surgery deals with serious
medical conditions (broken bones, burns, etc.) and thus medical care is more complicated and more regimented. Nevertheless, the general patient care bare similarities to Mainkofen Hospital.

The key difference is the importance placed ongoing quality assessment of medical care. In addition to the Preparation, Action and Documentation Phases described above, we found that the department mentioned before performs a regular review of patient care and patient conditions. The review is a collaborative group process where all relevant staff (doctors, head nurses, nurses) come together in one room to discuss what happened during the previous day or days.

### 4.1.3 Meetings Outcomes

The outcome of the meetings and studies, conducted in Mainkofen mental hospital, was to collect approx. 32 hours of user interface data and user feedback evaluating the influence of different context recognition granularity and context recognition error rates on user acceptance.

These data have been evaluated and used to investigate various processing methods on single and combined sensor modalities of recorded data trying to extract different aspects of context frames out of raw sensor data. While usually in context recognition scenarios, a sufficient sensor configuration guaranteeing an acceptable recognition rate is chosen in advance to the experiments, the restriction of the experimental site only permitted the usage of the sensors contained in a regular smart phone - not providing enough data to obtain suitable results with traditional methods.

To compensate the low quality of sensor information the applied classification methods have to be adapted on several levels from improving recognition on raw data of a single sensor modality up to the combination of several unreliable activity classifications with the knowledge provided by the predefined workflow specification. Additional to the ongoing evaluation of the previously collected sensor data, another experiment in the medical sector was prepared: The cooperation with the Hospital in Hannover ought to provide data collected with a slightly larger sensor setup in a hospital environment where the predefined workflows are executed more strictly than in the Mainkofen scenario.

To prepare this second experiment, besides negotiations with the responsible staff of the hospital and examinations of the hospital ward, considerations about the sensor setup and possibilities of a labeling method more convenient and accurate than in the Mainkofen experiment were performed. Another outcome of the meetings at the Hannover Hospital was to understand where problems in delivery of care occur, how treatment for individual patients should be changed and to define measures to this effect. In particular, review meetings are used to update patients’ care plans.
4.2 Logistics Domain: BIBA Research Center

BIBA Research Center: The BIBA - Bremer Institut für Produktion und Logistik GmbH\(^1\) is a scientific engineering research institute. It is composed of two divisions: Intelligent Production and Logistics Systems (IPS) and ICT applications for production (IKAP). It is involved in the Bremen Research Cluster for Dynamics in Logistics (LogDynamics) as well as in the International Graduate School for Dynamics in Logistics. BIBA maintains an internationally unique service center: the LogDynamics Lab which is used for the development and testing of innovative mobile solutions for logistic processes and systems.

Meeting Outcomes: The goal of the meeting was to identify logistic domains to exploit ALLOW concepts and results. After the presentation of the ALLOW concepts, results, and objectives, BIBA provided us a set of possible real case studies, in the area of self-organizing logistics, to use for our validation purposes. We have selected the Car Logistics Scenario. Its core idea is the management of logistic processes in a decentralized manner based on methods of autonomous control. It concerns the delivery of cars, is very similar to the warehouse scenario used in the first year of ALLOW, but its processes are affected by a high complexity (e.g., over 2 million vehicles have to be processed each year).

At the automobile terminal of the Bremen sea port, nearly 2 million new vehicles are handled each year; the object is to deliver cars from the manufacturer to the dealer. To achieve this goal several processes/services are involved. These include shipping or arrival both from sea or land side, storage, finishing and technical treatment to meet the customer’s requirements for the ordered vehicles as well as distribution to the retailers.

We have exploited this scenario to evaluate the effectiveness of our techniques for flow adaptation, evolution and distribution proposed during the last year. Based on the cooperation with BIBA we have implemented an interactive simulation as a demonstrator. This simulation drives the process of car shipment and treatment at the Bremerhaven and injects diverse dynamic changes and failures that provoke flow adaptations and flow evolution. Moreover, the concept of flow distribution is shown with this demonstrator. This demonstrator has been exhibited at the FET11 Exhibition session in Budapest and at the 9th International Conference on Business Process Management (BPM 2011).

4.3 ALLOW Concepts Dissemination and Validation

As key findings from our investigations at Mainkofen, Hannover Hospitals and at BIBA Research Center, we have identified several opportunities to use the scenarios described above with the ALLOW concepts and techniques. Table 4.1 summarizes which ALLOW concepts and techniques have been demonstrated and validated using the different scenario domains, while Table 4.2 presents which deliverable have used that domains to present and evaluate the main technical contributions of the last year. This pictures demonstrate that ALLOW concepts have been applied to different application domains and have been useful to demonstrate the project results.

\(^1\)http://www.biba.uni-bremen.de/
CHAPTER 4. MEETINGS WITH DOMAIN EXPERTS

Figure 4.2: Bremen Harbor.

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<tr>
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<td>Flow Modeling</td>
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<td>Flow Navigation</td>
<td>Health-Care</td>
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<td>Flow Adaptation</td>
<td>Logistics</td>
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<td>Flow Evolution</td>
<td>Logistics</td>
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<td>Flow Distribution</td>
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<td>UI Flow Evolution</td>
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<td>Context Recognition</td>
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<td>Flow Security</td>
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Table 4.2: Domains-Deliverables Analysis

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<td>D3.3</td>
<td>Health-Care</td>
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<tr>
<td>D4.3</td>
<td>Health-Care, Logistics</td>
</tr>
<tr>
<td>D5.3</td>
<td>Logistics</td>
</tr>
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<td>D5.4</td>
<td>Health-Care</td>
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<td>D7.3</td>
<td>Health-Care</td>
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Chapter 5

Other Dissemination Actions

The meetings described in Chapter 4 have not been the unique that we have done in the last year of ALLOW. Each partner has disseminated ALLOW concepts and results using public or private events. In Table 5.1 and 5.2 we report the most relevant, the complete list is reported in the Final Report of ALLOW.
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<thead>
<tr>
<th>Audience</th>
<th>Description</th>
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<td>Research Community</td>
<td>Uni Passau co-organized the First Workshop on Hybrid Pervasive/Digital Inference at Pervasive 2011 together with the Palo Alto Research Center and the University of Sidney. The workshop focused on one of the main aims of the ALLOW project, how to combine activity recognition with other structural knowledge, for example flows. <a href="http://pervasiveconference.org/2011/workshops.html">http://pervasiveconference.org/2011/workshops.html</a></td>
</tr>
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<td>Research Community</td>
<td>Gernot Bahle and Kai Kunze (Uni Passau) attended a meeting at the Ubiquitous Computing Lab at the Palo Alto Research Center (PARC) organized by Kurt Partridge and Oliver Brdiczka presenting the initial results of the Mainkofen user studies and experiments, spawning discussions on the integration of human centric flows with activity recognition. The outcome of the meeting was a better understanding on how constraints and structural knowledge extracted from work-flows can support activity recognition. Additionally, the meeting increased the visibility of the ALLOW project in the US research community.</td>
</tr>
<tr>
<td>Research Community</td>
<td>Uni Passau and USTUTT (IPVS) took part in the PERADA Summerschool in Budapest. Uni Passau presented the research findings of the ALLOW project in a lecture/tutorial session <a href="http://www.perada.eu/summer-school-10">http://www.perada.eu/summer-school-10</a>. The attendees learned about traditional context recognition and the augmentation of human centric flows to trace workflows and improve the inference process.</td>
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<td>Research Community</td>
<td>IPVS has disseminated ALLOW project results on an international level in bilateral talks Georgia Institute of Technology, Atlanta, Georgia. Prof. Umakishore Ramachandram is one of leading researchers in the field of embedded and pervasive systems. Joint future projects are envisioned.</td>
</tr>
<tr>
<td>Research Community</td>
<td>Kurt Rothermel (USTUTT (IPVS)) has been invited for the following invited talks where he presented ALLOW concepts: (1) Large-scale Context Management. Keynote at PerCom 2010, Mannheim, Germany, 2010. (2) Scalability Issues in Context Management. Talk at Osaka University, Osaka, Japan, 2010. (3) Global Context From Smart Homes to a Smarter Planet. Talk at GJS 2010, Osaka, Japan. (4) Management of Large-scale Context. Talk at Georgia Tech, Atlanta, USA, 2010 and (5) Large-Scale Acquisition and Management of Context Information. Talk at NEC, Heidelberg, Germany, 2011.</td>
</tr>
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<td>Research Projects</td>
<td>FBK has disseminated ALLOW project results on Adaptation and Evolution within the SOC research community through the collaboration with the S-Cube Network of Excellence on Service Oriented Computing (see <a href="http://www.s-cube-network.eu/">http://www.s-cube-network.eu/</a>). Adaptation and Evolution techniques proposed in ALLOW by FBK have been proposed as solutions for adaptation and evolution of service-based applications. This has been more important to evaluate them in a different application domain.</td>
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<td>Research Projects</td>
<td>USTUTT (IAAS) has written joint papers with MASTER and COMPAS FP7 EU Projects on fragment composition and constraint-based workflows.</td>
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Table 5.2: ALLOW Dissemination Actions - Part II

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<th>Audience</th>
<th>Description</th>
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<tr>
<td>Research Projects</td>
<td>The research in the ALLOW project done by Imperial has resulted in joint papers with researchers on 4 other research projects. With the Ubival project on distributed orchestration of workflows, with the Caregrid project on trust management in the presence of uncertainty, with the Primma project on Collaborative Privacy Policy Authoring in a Social Networking Context and Privacy-preserving location sharing, with the ITA (US Army Research Labs and UK MoD) on Break-Glass Policies. ALLOW was also instrumental in Imperial’s participation in the newly started EU research and training network: iCareNet on Context awareness for healthcare, wellness, and assisted living. Imperial’s Telearactive implementation is also being used in the UK’s Homework project to allow home users to manage Home networks. The Break-glass policy is also been considered as a possible replacement for standard firewall approach.</td>
</tr>
<tr>
<td>Industry</td>
<td>Based on ALLOW technology an electronic co-driver for long-term test drives in the automotive domain is built by PORSCHE AG. The goal was to increase the quality of the test. The test drive is modeled as a (constrained-based) process model defined by USTUTT (IAAS). The tasks are refined at runtime according to the driver’s preferences, the car’s type, the car’s configuration, or the test’s objective. The recommendation system helps the driver planning the test sequence and controls the test’s compliance.</td>
</tr>
<tr>
<td>Industry</td>
<td>Kai Kunze (Uni Passau) discussed some findings of the user studies in Mainkofen at an informal meeting at Google, Mountain View, organized by Thad Starner. Uni Passau gained valuable insights on new approaches to combine data captured using computers with sensor data inference. This is essential for tracing a flow and using its structural knowledge to improve activity inference accuracy.</td>
</tr>
<tr>
<td>Industry</td>
<td>Through various contacts and meetings with Industry, Imperial has disseminated information about the ALLOW project to people from BT, Microsoft Research Cambridge, the GSMA, several Telecom operator, Ocado (an online grocer).</td>
</tr>
</tbody>
</table>
Chapter 6

Conclusion

In this deliverable, we described results of the dissemination activities undertaken during the 3rd and last year of the ALLOW project.

The main goal of this year has been to showcase the ALLOW project results to different audiences (industry and research), so to allow a practical verification of the outcomes of the project, and to enable, on one side, checking their ability to solve problems posed by real-world applications, and on the other, the sharing of the knowledge and the identification of novel research challenges.

The main ALLOW concepts, theories and techniques have been evaluated using two main scenarios (Health-Care and Logistics) identified during the project using meeting with domain experts. Demonstrators based on these scenarios have been implemented and exploited to disseminate the project results. In addition to this the project web site has been updated (with new scientific publications and demonstrators) in order to reflect the achieved results. Finally, each partner of the consortium has used research and industrial partnerships, collaboration with other research projects, and dedicated dissemination events to promote ALLOW project results.