

Graphical User Interfaces for Platform Based Local Mobile Services in the Maintenance Industry

Wolf ENGELBACH, Steffen, EHRHARDT, Sandra FRINGS
Fraunhofer IAO, Nobelstr. 12, 70569 Stuttgart, Germany

Tel: +49 711 9702128, Fax: +49 711 9702401, Email: wolf.engelbach@iao.fhg.de

Platform Concept

Local mobile services offer commercial opportunities in consumer and business oriented applications. Platforms can capsule technical details and thus enable also non-technical companies to provide such services to their clients or employees. Such platforms overcome the current gap between network providers and single SMEs¹ [1]. Such a platform is relevant for different industries such as health care, tourism and machine manufacturing [2]. Partial solutions are already implemented in different industries, but they are all missing either a generic service creation environment or the localisation aspect of the content and services they offer [1, 3].

Existing concepts like Simple Mobile Services intend to simplify the mobile user interface to avoid complexity [4] but they do not offer the opportunity to design solutions for specific industries or companies in an easy way. The project ModiFrame aims to develop a technical framework for SMEs to develop and operate mobile services [5], only it is limited to data communication and is mainly stressing the technical but less the organisational aspects.

Analysing existing and intended platforms for local mobile services, we identified generic roles having tasks and interests in very complex environments [1, 2]. The platform consists of technical services that can be combined and configured according to the demand of specific industries and companies. A Platform Operator is responsible for the overall architecture and the platform during the runtime. The workflow on the platform is described in figure 1:

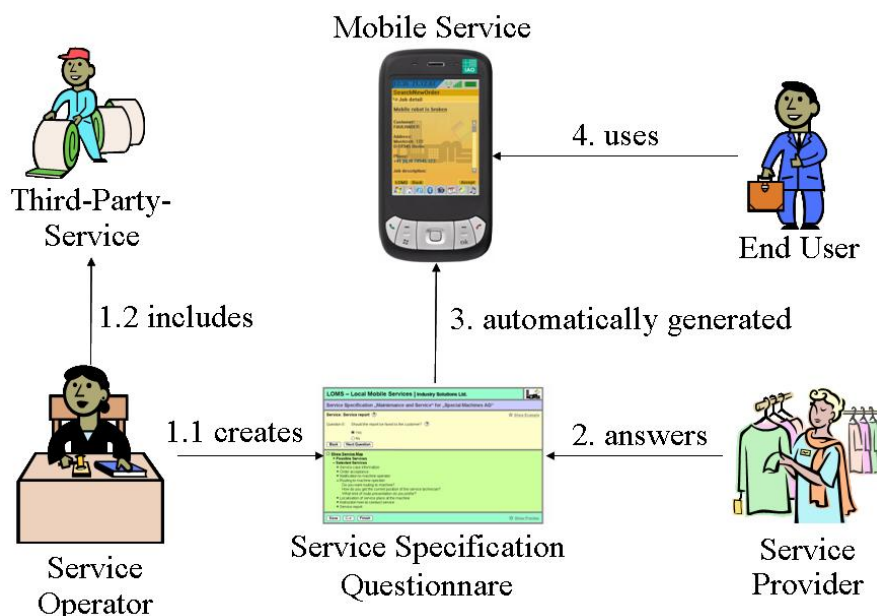


Figure 1: Service creation workflow

¹ SME: Small and medium sized enterprises

The Service Operator is a mediator between the technically oriented Platform Operator and the business oriented Service Provider. He creates (1.1) a generally valid Service Specification Questionnaire for each specific industry (e.g. newspapers or machine construction). Moreover, the Service Operator integrates, if necessary, specific third-party-services (1.2, e.g. news, weather, forecast). A Service Provider (e.g. newspaper editor or machine manufacturer) then receives the relevant service specification questionnaire from his Service Operator and answers (2) all the questions in this questionnaire in order to define (3) the local mobile services for his clients (e.g. newspaper readers) or employees (e.g. service technicians). A Mobile User accesses (4) mobile services offered by his LOMS service provider and hosted on the platform.

Maintenance Scenario

In this article we present a Maintenance Scenario that profits from such a platform. Specifically we highlight the Graphical User Interfaces to illustrate functionalities necessary for service providers and mobile users². Currently, the described scenario is being implemented by the consortium of the ITEA³ project Local Mobile Services (LOMS)⁴.

The scenario is designed for a machine manufacturer that needs mobile support of his service technicians at the machine operator's site and beyond with location- and context-adapted information, based on functional modules from his existing service management system.

The highlights for demonstration activities based on this scenario are:

- Machine-triggered mobile service order and matching
- Routing to the location of machine operator, and within the machine operator's premises
- Location identification of the machine
- Point of service at the machine
- Context- and location-aware mobile information support for the service technician
- Semi-automated report generation

Service Provider User Interface

There are technically oriented user interfaces for the Platform Operator and the Service Operator to operate the system. One core idea of the LOMS platform design is that the Service Provider does not need to have technical knowledge, and thus he needs an easy to use and to understand Graphical User Interface (GUI) to receive and answer the Service Specification Questionnaire.

Within the project LOMS, the interfaces for the Service Operator and Service Provider are implemented using the V-Manage-Suite⁵. Special attention was put on the Graphical User Interface of the Service Provider by Fraunhofer IAO. The Service Provider will not use this kind of software very often, but his decisions influence the later service execution dramatically. Therefore the User Interface should offer a clear orientation, e.g. with a frame of its context, and a comprehensive explanation for each service and question, including a preview example of the mobile user application. Moreover, an overview of the available and selected services must be available. Former questionnaires can be accessed in the entrance dialog in order to change the selection or to modify the selected services.

In figure2 the overall structure of the user interface is visible, with the name of the service operator (Industry Solutions Ltd.) in the first line and the name of the questionnaire (Maintenance

² In the Workshop the Graphical User Interfaces for all services in the scenario can be shown.

³ Information Technology for European Advancement (www.itea2.org)

⁴ www.loms-itea.org, www.dloms.org

⁵ A graphical XML-editor that has been developed by the European Software Institute (ESI)

and Service) as well as the Service Provider (Special Machines AG) in the second line. In the main section, the described service and its related questions are presented, including an explanation for the current question. It is always possible to save the current status of the questionnaire, as well as to exit or finish it in the bottom line.

The screenshot shows the LOMS interface for 'Service Specification „Maintenance and Service“ for „Special Machines AG“'. The current service is 'Machine triggered service order'. Question 1 asks 'Do you want to use machine triggered service order?' with radio buttons for 'Yes' and 'No'. A 'Show Service Map' button is visible. A help box is open, providing context for the question. At the bottom, there are 'Save', 'Exit', and 'Finish' buttons, and a 'Preview' button on the right.

Figure 2: Service Specification Questionnaire: Sample Question and Help

The area containing the expandable service map displays all possible as well as selected services in the current Service Specification Questionnaire (see figure 3).

The screenshot shows the LOMS interface for 'Service Specification „Maintenance and Service“ for „Special Machines AG“'. The current service is 'Service report'. Question 8 asks 'Should the report be faxed to the customer?' with radio buttons for 'Yes' and 'No'. The 'Show Service Map' button is expanded, showing a tree view of services: '+ Possible Services' and '- Selected Services'. Under 'Selected Services', there are several sub-items, some with their own questions. At the bottom, there are 'Save', 'Exit', and 'Finish' buttons, and a 'Show Preview' button on the right.

Figure 3: Service Specification Questionnaire: Sample Service Map

When the Service Provider has answered all the questions in the Service Specification Questionnaire, the LOMS concept is that the services are automatically deployed to the service delivery platform. This includes the BPEL code for process description and the access rights to the selected (existing) web services. Moreover, the HTML code of the mobile user interface is generated, not only depending on the selected services, but also device dependent or with the logo and colours of the service provider. The BPEL code is deployed to an ActiveBPEL server, and the HTML code to a web server.

Mobil User Interface

With this process the services and interfaces for the intended mobile user become available. In the sample scenario, the service technicians are mobile users who repair machines at their clients' premises. The technicians receive an electronic Mobile Maintenance Guide, which is the application on the service technician's mobile device. In the project scenario it is a rich client since some programmes are necessary to display and interact with video, audio and graphical files, but without such features also a browser-based thin client would be sufficient.

The following figures illustrate some sample mobile user interfaces in the maintenance scenario [6]. The first screenshot (figure 4a) offers an overview of the available services, which are the ones that the service provider has chosen. The second one (figure 4b) shows the first service "Connect" with the networks that the services provider has specified in the service specification questionnaire.



Figure 4a/b: Service Overview and Network Connection

The next screenshot (figure 5a) offers information about a machine that is broken; this content is taken online via web service from the service management system of the service provider. The last screenshot (figure 5b) offers the opportunity to send a notification about the acceptance of the service case to the client who requested the repair action.



Figure 5a/b: Machine Data and Notification

Lessons Learnt

The discussion within the project team has shown that the platform idea is convincing. Nevertheless, the elaboration and implementation of consistent business cases and detailed processes for the involved roles leads to two main challenges. First: within the bootstrap-approach of the project it has been obvious that a lot of discussion is needed to get a common understanding of terms, interfaces, responsibilities and components in the architecture. Second: to achieve simplification for the mobile user and the service provider requires a tricky realisation of the platform and complex options for the service operator.

The platform, for which tools and services are being prototypically developed within the LOMS project in 2007 takes the maintenance scenarios into account and covers IT components of the Service Creation Environment for the three main players during the run-time of the platform: platform operator, service operator, and service provider. It allows a broad access for many SMEs (the service providers) in different industries to up-to-date mobile services which will improve their business perspectives and will offer more opportunities to their clients or employees.

During a realisation of the platform, the organisational set-up for the service operator will be a crucial step, since he has to manage the marketing and sales activities towards the service provider, and he has to define the core questions for the service provide that are supposed to simplify his work. The service provider himself also needs to organise the marketing towards the mobile user and to convince him for trying the local mobile service.

Literature

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