MobileTrade: A Maemo Client to Trading/Auction Web Services

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Abstract

A wide range of Trading/Auction Business Systems (TBS) exists at the software solutions market for PCs. Some of them use Service Oriented Architecture (SOA) and web services for efficient distributed implementation of TBS business processes. Nevertheless, recent solutions are rather PC-based, hence they are not efficiently mobile. In this progress report, we describe the current state of the project MobileTrade from the Petrozavodsk State University. MobileTrade is a Maemo client to web services of such TBS as the eBay auction. Its current iteration (phase) started after the 6th FRUCT seminar in Autumn 2009; the target is publishing the MobileTrade demo release for the Maemo 5 platform running on Nokia N900 Internet tablets.

I. INTRODUCTION

Nowadays there is a wide range of Trading Business Systems (TBS) at the software solutions market for PCs. Examples include "1C: Enterprise 8. Trade Management" [1], SAP R\3 [2], Microsoft Dynamics (former Axapta) [3], and Oracle E-Business Suite [4]. The most of mobile device extensions of these solutions focuses on providing interface as on the PC-like system, and likely no new business models are be available. However, the pure mobility is required, as the following examples show: Mobile Trading System [5] and Agent+ [6]. They are oriented to mobile phones and PADs at the client side.

In a typical TBS, the use cases assume extensive use and maintenance of a central database (CDB). A user can retrieve, process, and store business data, e.g., make orders for goods, checking goods availability, or viewing business reports. In today's business world, mobility is usual, and those operations should be done regardless of the user location and quality of the network environment or access channel,

Many recent solutions, however, are not pure mobile. Access the company TBS may be restricted within its LAN because of security reasons. Although a protected protocol like HTTPS can be used, the focus is on Internet browsers for PCs or laptops, hence a workplace is required when a user is outside. Summarizing, (i) a workplace at a third-party is insecure, (ii) deploying own secure workplaces at all points of interest is expensive, (iii) a laptop as a workplace is better than PC but it is not a pure at-hand tool compared with any mobile device (weigh and size barriers).

The MobileTrade project develops a mobile solution for a potentially wide range of TBSes. It exploits the features of Nokia Internet tablets (Maemo-based [7]) and Service-Oriented Architecture (SOA). It combines the abilities of classical TBS (potentially a proprietary or any well know TBS system could be used as a back-end TBS) with the idea of free access of small players to the large training markets.

As a result, a client works within trading/auction processes regardless of her location and poor Internet access. When a network is unavailable the local mirror database is used

(synchronized with CBD when possible). This service is very useful for the trade agents that travel to customers and would benefit from making on-site sell agreements and for individuals who want to sell or buy goods on equal rights as the large retailed companies. In the latter case, TBS implements a rendezvous service keeping seller announcements.

In this progress report, we describe the current (third) iteration of the MobileTrade project. Its primarily target is moving to the Maemo 5 platform (with further porting to Maemo 6) and publishing the demo release for N900 users. The existing prototype for Maemo 4.1 Diablo [8] requires modification. The architecture must follow the modular approach with possibility to consists of several debian packages. The GUI is redesigned because of moving from GTK to Qt. Additionally, we extend the application to support such an action system as eBay [9].

II. TBS BUSINESS PROCESS AND MOBILITY

TBS includes accounting (fiscal, taxation, personnel), support for trade, logistic, and some other business processes. An example TBS is "1C: Enterprise 8. Trade Management" (1C company, Russia), which is one of the most popular in Russia. Other examples can be found in [2]–[4]. Users are trade agents, storekeepers, managers, etc. A typical TBS maintains a central data base (CDB); users retrieve and store business data, view reports, and produce documents.

The portability of various TBS can be solved based on the Service Oriented Architecture (SOA) and web services [10]. As a result, a new network component is easily introduced for other systems. Web services use the Simple Object Access Protocol (SOAP) for communication between clients and TBS.

Consider the scenario of a "classical" TBS. Let TBS include accounting module (fiscal, taxation, personnel) and support for trading, logistic, and some other business processes. The system users are trade agents, storekeepers, managers, etc. Basically, TBS maintains a central database (CDB), and the users retrieve and store business data, view reports, and produce and consume documents.

Often the business processes require extensive traveling (outside company buildings). It would be a competitive advantage to simplify work processes if the user would have access to TBS data and could input and collect new data from clients. Nowadays it is typically collected in paper form or in text files at PDA or laptops. Hence, after returning to the office, the user or somebody else has to update the data in the CDB. This way leads to extra work, results in mistakes when reading user's notes, and unwanted delays in the business process. There are already some mobile device oriented solutions [5], [6], but they are restricted to a certain TBS and cannot give a flexibility that one could expect from solutions build on the SOA principles.

Another scenario regards individuals who what to sell own or buy other's goods. The former publish sell announcements in TBS CDB, and the latter can access them and contact with the sellers directly. In this case, TBS implements a rendezvous service for an open sellers/customers community. This functionality (client) already exists for PCs but its availability on mobile devices allows more flexibility for users. A well-know class of such TBS is auction systems, e.g., eBay [9].

III. MOBILETRADE CLIENT

MobileTrade is a cross-platform solution. The client runs on tablet- and desktop-based devices. Web-services implement the TBS—client interface. All data that a user need for her business activity (a partial copy of CDB) are stored locally in a mobile data base (MBD). A
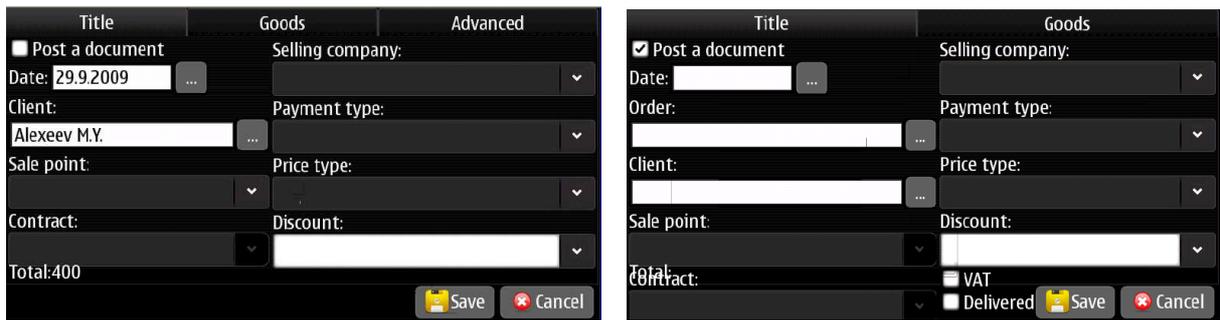
(a) Customer orders

(b) Customer sales

(c) Reports

Fig. 1. MobileTrade screenshots (N900, Maemo 5)

part of TBS functionality moves to the tablet; a user retrieves and stores business data, views reports, and produces documents as if she is in the company building.

At the first (Feb.–May. 2009) and second (Jul.–Oct. 2009) iterations, the project produced a MobileTrade demo application with for the Maemo 4.x platform (N8x0 tablets). The third iteration (Nov.2009—May 2010) moves to the Maemo 5 platform (N900 tablet) as well to desktop-based devices (Qt library).

Screenshors are shown in Fig. 1 The customer makes an order (Fig. 1(a)). Then customer's sales are available (Fig. 1(b)). The basic statistics are shown in the report (Fig. 1(c)). The high-level architecture is shown in Fig. 2.

The CDB—MBD synchronization happens when needed (e.g., new data are collected) and possible (e.g., Wi-Fi is available). For many functions no immediate network access is required since MBD substitutes CBD temporarily. Clearly, electricity is available at most client locations, hence the battery is not a very restrictive factor. Therefore, our application demonstrates a new type of mobile trade clients. Note that PDA has not enough capacity and features to implement such a client.

We focus on TBS "1C: Enterprise 8. Trade Management" web-services. User interface is closed to "1C: Enterprise 8" but adopted to a tablet display and mobile usability requirements. Our design, however, is flexible and configurable to other web-services (with the similar functionality).

The primary user is a trade agent who visits clients (they are geographically distributed), provides them with related advertisement and other information on goods, collect clients' orders and comments, and then forward the data to the TBS for further processing. The web-services support XML data.
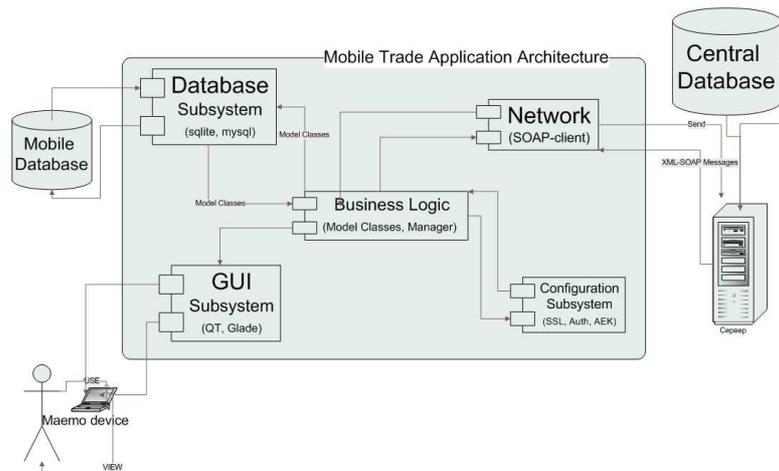
Fig. 2. High-level architecture of MobileTrade

MBD is an XML database implemented with SQLite. Web-service communications use the SOAP protocol with either an open (http) or protected (https) data transfer. Authentication is based on public/private key pair, and the OpenSSL library implements data encryption.

IV. CONCLUSION

We described the third iteration of the MobileTrade project. It proposes a pure mobile solution that enhances the existing TBS features and accelerates the recent SOA-based trends in this area. We combine the abilities of a classical TBS with an auction system.

Although the current MobileTrade use case scenario is simple, it captures the key mobility issues and allows further extensions for other types of users and functionality. Examples include making photos of clients and goods, constructing routes for visiting clients (GPS-based enhancements are also possible here), notifications from TBS about new clients, goods or special offers, immediate reading commercial codes using camera, providing information on closely located goods when a user walks in a warehouse.

The current MobileTrade C++/Ot implementation is for the Maemo 5 platform and Nokia Internet tablets (N900). It will be available at Gitorius (the infrastructure for hosting open source projects, http://gitorious.org/).

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