

Summer Internship Report

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About the Company

Air2Web, headquartered in Atlanta in the US, has hosted its Mobile Internet Platform linked to several Carriers (Mobile operators) around the world. They provide hosted service to various enterprises like banks, logistics companies, manufacturing companies etc and help them reach their employees/ dealers/ customers on their wireless devices primarily on SMS. The platform has multiple APIs that help deliver on any device (Digital, WAP, Pager, Palms, IMode) or any network (GSM/ CDMA/ TDMA/ GPRS). They shield the enterprises from the complexities and changes in technologies pertaining to devices and network and we need just an XML feed all the time.

Air2Web brings with it, over two years hands on experience with more than 65 production deployments with blue-chip customers providing wireless enabled financial applications, critical field force applications, customer relationship management, M-commerce and subscription-based content services in a wide variety of verticals.

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Abstract

Wireless applications can be used effectively by various organizations as a productivity tool for improving efficiency, reducing costs and for providing enhanced customer support/service.

I developed server-client applications using J2ME for GPRS enabled mobile phones. The main aim of the project was to develop an SMS Group Messaging application. Using this application, a person can create a profile, create a group, add members to the group, send SMS to group members, edit his/her profile and also edit groups for which he/she is the moderator.

Apart from this application, I also worked on some banking applications. These applications provide a variety of services for CitiBank and ICICI Bank.

Another important part of my project was to implement SSL in GPRS enabled mobile phones.

Challenges

1. GUI:

The J2ME MIDP (Mobile Information Device Profile) does not provide a rich graphical user interface. One of the challenges was to provide a rich GUI so that the application was extremely user-friendly.

2. Size Restrictions:

J2ME applications cannot have a size more than 64 KB. So making the application small and providing a rich GUI at the same time was a challenge.

3. Security:

Most of the applications, especially the banking applications, need to be highly secure. So implementing SSL was necessary.

Theory

1. Java 2 Platform Micro Edition, J2ME:

The Micro Edition of the Java 2 Platform provides an application environment that specifically addresses the needs of commodities in the vast and rapidly growing consumer and embedded space, including mobile phones, pagers, personal digital assistants, set-top boxes, and vehicle telematics systems.

2. Connected Limited Device Configuration, CLDC:

The Connected Limited Device Configuration (CLDC) defines the base set of application programming interfaces and a virtual machine for resource-constrained devices like mobile phones, pagers, and mainstream personal digital assistants. When coupled with a profile such as the Mobile Information Device Profile (MIDP), it provides a solid Java platform for developing applications to run on devices with limited memory, processing power, and graphical capabilities.

3. Mobile Information Device Profile, MIDP:

The Mobile Information Device Profile (MIDP), when combined with the Connected Limited Device Configuration (CLDC), is the Java runtime environment for today's most popular compact mobile information devices, such as cell phones and mainstream PDAs.

4. J2ME Wireless Toolkit:

The toolkit is fully compatible with the Java Technology for the Wireless Industry (JTWI) specification (JSR 185). It also includes support for Wireless Messaging API (WMA) 2.0 (JSR 205), Mobile Media API (MMAPI) 1.1 (JSR 135), PDA Optional Packages (JSR 75), Java APIs for Bluetooth (JSR 82), Mobile 3D Graphics (JSR 184), and J2ME Web Services API (JSR 172).

5. Obfuscation:

Obfuscators are tools that help protect your software from decompilation. They also help reduce the size of the packaged application. Obfuscation can be defined as a technique used to complicate code. Obfuscation makes code harder to understand when it is de-compiled, but it typically has no affect on the functionality of the code. Obfuscation programs can be used to protect Java programs by making them harder to reverse-engineer. A very good obfuscator that can be embedded with the wireless toolkit is ProGuard. This obfuscator was used in every application that was developed.

6. Third-Party API's for providing a rich GUI:

Synclast is an open-source third-party API developed for J2ME and offers a very rich GUI. Another such API is J2ME-Polish.

7. Personal Information Management, PIM:

This package gives J2ME devices access to personal information management data that resides natively on mobile devices. Information to be accessed are contained in address books, calendars, and to-do lists residing in many mobile devices. There is no standard API in the CLDC space that allows access to the PIM data. So this package is essential. But most of the real devices are not yet implementing this API since a reference implementation of this is not there for CLDC. So this can only be tested in the toolkit and not on a real device. This package was essential in the Group SMS application. While adding members to the group, a person can simply choose to select a person from the contact list instead of having to remember or to type the mobile number.

8. Record Management Store, RMS:

The Mobile Information Device Profile -- the platform for mobile Java applications -- provides a mechanism for MIDP applications to persistently store data across multiple invocations. This persistent storage mechanism can be viewed as a simple record-oriented database model and is called the record management system (RMS). In a record-oriented approach, J2ME RMS comprises multiple *record stores*.

Applications Developed

- **Group Messaging Client**
- **Banking Application for ICICI**
- **Banking Application for CitiBank**
- **GPRS Based Application for CitiBank**

Group Messaging Client :

Features :

➤ Create Profile

- **Email Address**
- **Nickname**
- **Mobile Number**
- **Password and Confirm Password**

➤ Login

- **Email Address**
- **Password**

➤ Create Group

- **Group Name**
- **Group Description**
- **Add/Remove Members**

➤ **Send SMS to Group**

- **Similar to sending normal SMS except that before sending, the application will ask the user to enter the group name.**

➤ **Edit Profile**

- **Change Nickname**
- **Change Password**
- **Confirm Password**
- **Change Mobile Number**

➤ **Edit Group**

- **Add New Members**
- **Remove Members**
- **Delete Group**

Banking Application for ICICI :

Features :

- **Login**
- **Check balance, transactions, leads**
- **Various buttons for different applications and offers like bill payment, information about ATM centres available in the city and other bank related information.**

Banking Application for CitiBank :

Features :

- **Login**
- **Leads – Fresh leads, Today’s leads and Update leads**

Basically, a lead is a contact. This application is essentially for CitiBank employees. They can login in their GPRS enabled mobile phone and check if they have any new leads, any appointments and update them, if necessary.

Another GPRS based Application for CitiBank :

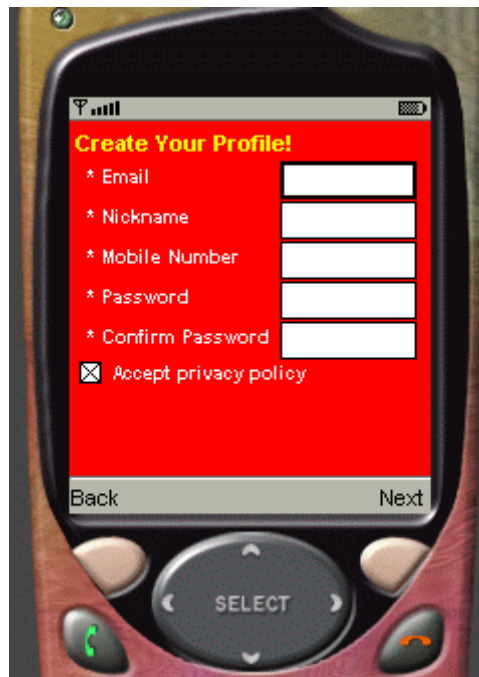
Description :

This application for GPRS enabled mobile phones, scraps information from the CitiBank website, www.citibank.co.in and displays it on the phone. Information include daily updates, flash messages, insurance, loans, investments and lot of other offers provided by CitiBank. For instance, if the user clicks the loans button, information about available loan offers, as displayed in the CitiBank website, will be provided on the phone.

Screenshots

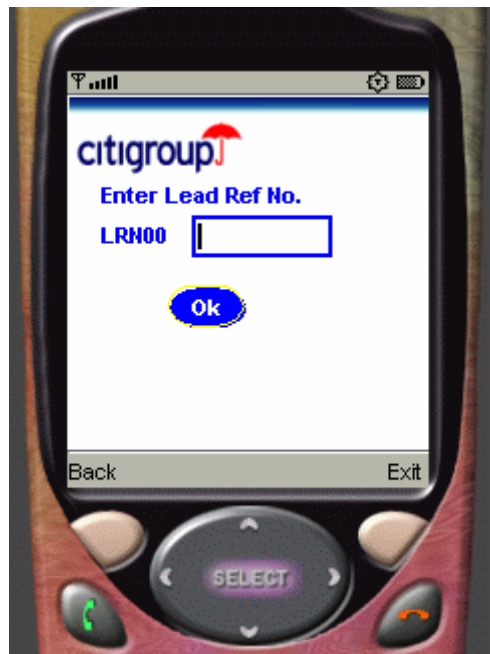
Group Messaging Application Sample Screens





CitiBank Application Sample Screens





ICICI Application Sample Screens





Conclusion

The challenges posed were accomplished and the applications have a richer GUI than most of the present J2ME applications available. They are also very user-friendly and secure and easy to use. The internship has helped a lot in enriching my knowledge about J2ME and application development for mobile phones.