Mobile Applications and CriticalTouch

1 Introduction

The '90s saw the sudden popularity of the Internet and the Internet came to be used in a big way for communication, entertainment, and business. Many legacy applications were web enabled for access through the Internet.

The current decade sees a similar take off of wireless data services. People already use the ubiquitous wireless handset for communication, entertainment, and business.

Most wireless applications share some characteristics and requirements. Even though these applications have very simple business logic, writing them is still complex because they need to handle multiple wireless and wire line protocols, be extremely stable and be available 24X7.

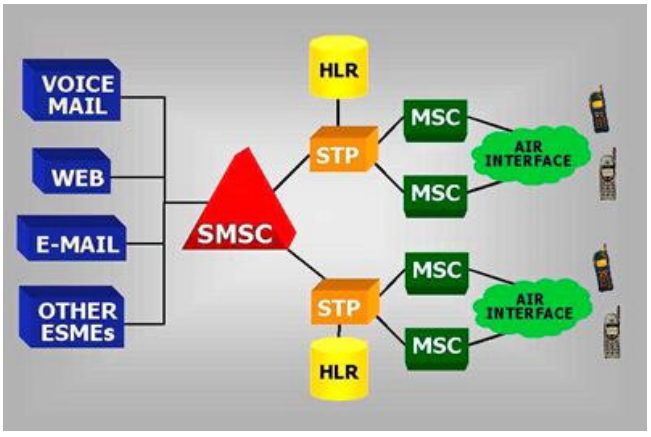
Since the business logic in these applications is fairly simple, these Wireless specific requirements should be handled outside these applications in a mobile applications operating system.

CriticalTouch is such a framework.

2 SMS architecture

SMS provides a mechanism for transmitting short messages to and from wireless devices. Messages can be of three types

- From a mobile device to another mobile device
- From an application to a mobile device
- From a mobile device to an application



The diagram above shows the architecture of an SMS Based system. Applications are shown in the left had side of the diagram. These applications are usually connected to the SMSC via a TCP connection and use SMSC specific protocols for communicating with the SMSC. An application can also be connected to the SMSC via a small GSM modem.

The SMSC communicates with mobiles via the MSC (Mobile Switching centers).

The SMSC acts as a store-and-forward system for short messages. The network provides guaranteed delivery of text messages to the destination. An active mobile handset is able to receive or submit a short message at any time; independent of whether a voice or data call is in progress.

The mobile device can be configured with the address of the SMSC for sending and receiving SMS messages.

SMSCs store messages for a handset if the handset is switched off. The message is sent to the mobile when it is switched on. Messages usually expire after two days.

3 CriticalTouch overview

3.1 SMS Applications characteristics

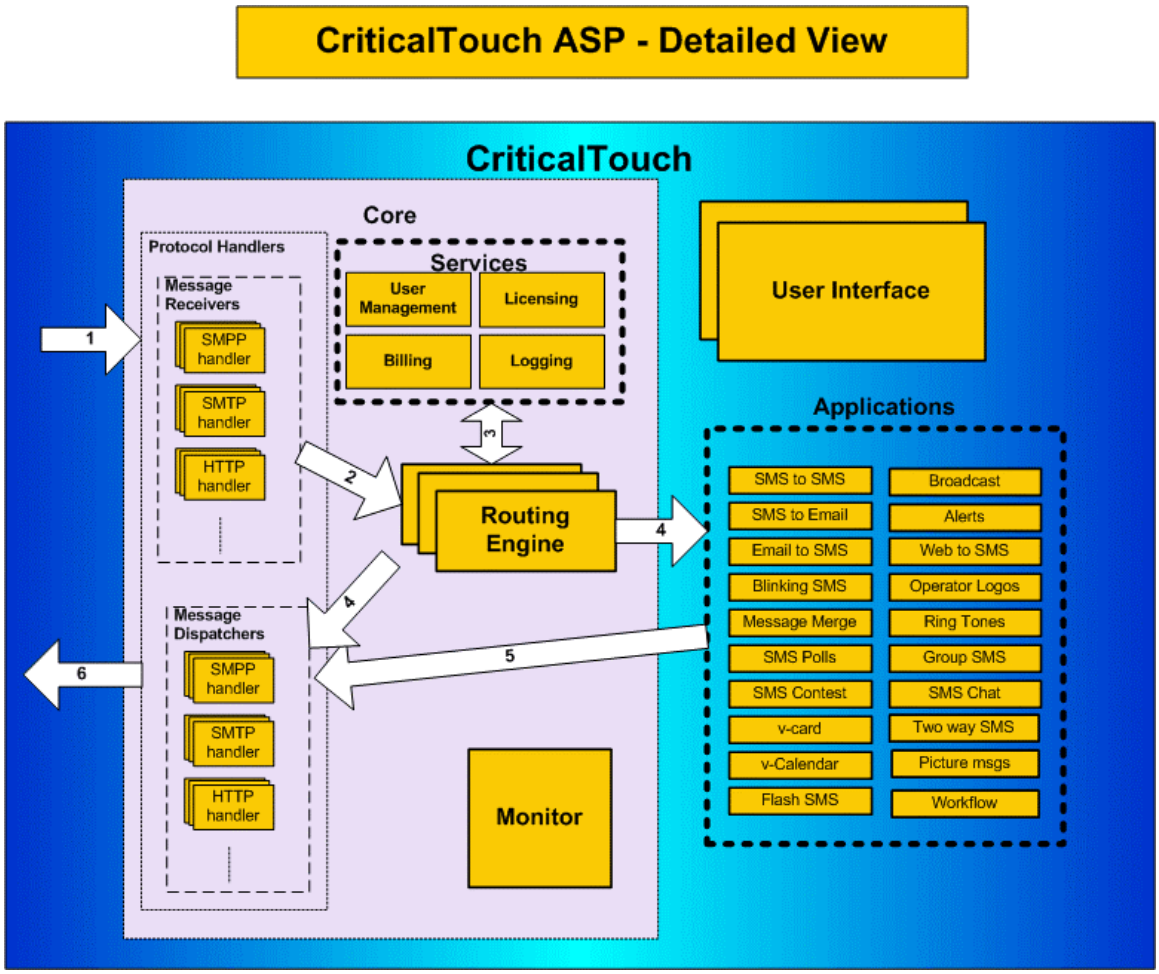
SMS based applications usually have most of the following characteristics

- Very simple business logic
- Short lifetime – for example an SMS poll will be valid only for a short duration of time.
- Same application should be available over SMS, http and email. For example a ring tone application should allow users to download ring tones via the web, or by sending a simple SMS or via email.
- Billing and access control requirements – SMS applications need access control to block unauthorized access. Carriers need to bill services provided by SMS Applications
- SMS applications need to be very efficient
- SMS applications need to be very scalable, especially when used by a carrier.
- SMS applications should be robust.

Since SMS applications generally have very simple business requirements, it is desirable that other requirements like scalability, reliability, billing, access via different media etc be abstracted into a mobile operating system.

CriticalTouch is such a framework. It abstracts salability, reliability, billing, workflow etc so that SMS applications can be developed as small business objects. Using Criticaltouch, we have implemented modules like stock alert, SMS directory etc within a day.

3.2 CriticalTouch Components



CriticalTouch consists of Receivers, core, and dispatchers.

3.2.1 Basic Components

3.2.1.1 Listeners/Receivers

The listeners provide the facility to receive messages via different media. Currently there are three listeners – HTTP, SMS, SMTP. All the listeners run within a tomcat web server.

3.2.1.2 Mediator

The mediator is the routing engine that performs routing of messages. Messages can be routed to one or more applications via an XML configuration file.

3.2.1.3 Dispatchers

Dispatchers are used by CriticalTouch to send messages out to the external world. Currently, three dispatchers exist – HTTP, SMS, and SMTP. The HTTP dispatcher sends http messages. The SMS dispatcher sends SMS messages via connecting to

SMSC or via GSM modem. The SMTP dispatcher sends email messages to the outside world using an email server.

3.2.2 Auxiliary components

3.2.2.1 Billing and Rating

The Billing module consists of the Billing Admin and Rating Engine modules. The Billing admin component maintains a database of users, products, and charging information. It has a browser based UI.

The runtime component of billing is called the Rating Engine. This component is used by CriticalTouch to authenticate, authorise and charge users using the data created by the Billing admin module.

3.2.2.2 Monitor

This component is used for monitoring and viewing the health of all the other components in the system. It can be viewed using a browser based GUI.

4 CriticalTouch Features

Basic Features are given below.

4.1 SMS, Web & E-mail capability

The same Application can be made accessible via SMS, web or Email.

4.2 Open Standards

CriticalTouch leverages open standards like JDBC and JMS allowing it to be configured with different databases like Oracle, Mysql etc, different application servers like JBOSS and IBM Weblogic.

4.3 Portable

CriticalTouch is written in JAVA and has been tested on Windows and Linux

4.4 Low Cost of Ownership

CriticalTouch can be deployed in different configurations, depending on the requirements of the customer. A low-end installation can be a combination of Linux/MySQL/Jboss, whereas a higher end installation can be Solaris/Oracle/SwiftMQ.

4.5 Easy Integration with the existing legacy applications

CriticalTouch provides adapters to integrate with legacy applications

4.6 Easy and fast deployment

4.7 Scalability

CriticalTouch consists of multiple components, each of which can be run on a separate machine. If a single component is overloaded, multiple instances of that component can be run in different machines.

4.8 Security

Access control and Billing are provided for authentication, authorization and billing.

4.9 Proven 24 X 7 availability

4.10 Extensibility

CriticalTouch can be extended to provide services like payment services, and support for different protocols like MMS, GPRS etc.

5 CriticalTouch Based applications

SMS applications are used in various fields and are limited only by our imagination. Mos t SMS applications can be built very easily using CriticalTouch. Some categories of SMS applications are given below.

5.1 Marketing

SMS can be used as an excellent marketing tool. A supermarket that can announce a sale by sending an SMS broadcast to its loyal customers. An online market place can give access to prices via SMS pull or push.

5.2 Wireless access to Enterprise data

As the mobile workforce increases, the need for corporate data on the handset increases. It is most useful in Sales Force automation. Using a mobile application a salesman can do the following things

- Checking and updating stocks using a handset
- A pharma salesman can obtain details of the physician before he meets him
- Salesmen can file reports of a sales meeting immediately after the meeting.
- Using location aware applications, a salesman can be scheduled to meet a customer who is geographically close to the place of his current call.

Wireless access and Business Intelligence tools form a powerful combination. Wireless access provides access to real time sales data. This can be analyzed to give information of sales trends.

5.3 Support applications

IVR applications for support are very tedious and time consuming. A customer has to wait for a long time before she is connected to a customer care person. After this, it takes even more time to locate a person who has knowledge to address the issues of the customer.

This system can be replaced by a system where a user just sends an SMS to the support system. The system calls back the user after the correct person is available.

5.4 Location based services

Some location-based services are given below

- Targeted advertising. Pizza hut sends a special offer broadcast to any registered customer who is nearby
- Real estate search. A person who is looking for houses registers for alerts. Now as he roams a residential area, the system sends him alerts whenever he is near a house that is for sale.
- Dating - A person registers himself for a dating service. Now, as she enters a place say a city or a pub, she gets a list of persons who match her profile.

5.5 Alerts

Alerts can be of different types

- A trading system can send an alert if a stock goes below a certain price
- An airlines can give flight alerts to announce delay of flights
- An Operating system can send an alert when an application crashes, if the disk is full or if there is an attempt at unauthorized access.
- A power station can send alert if power trips.
- A home security system can send an SMS if an intruder is detected.

5.6 Entertainment

Carriers run a lot of applications that are basically meant for entertainment. Some of them are

- Download ring tones
- Download match scores
- Run contests
- Run polls

6 Glossary

Abbreviation	Explanation
SMS	Short Message Service
SMSC	Short Message Service Centre. The component that receives and forwards SMS messages to and from mobiles.
MSC	Mobile Switching Centre
HLR	Home Location Register. The database where mobile subscriber details are stored.
ESME	External Short Message Service Entity – any transmitter and receiver of SMS messages, usually an application that runs on a PC.
GSM	Global System for Mobile Commuications. Digital cellphone system used throughout Europe based on TDMA.
CDMA	Code Division Multiple access
TDMA	Time Division Multiple Access
TCP	Transmission Control Protocol.