

# Mobile Phone Service Enhancements Using an X- internet Approach

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**Abstract** Presently, the advanced computing capabilities of information communication hardware and equipment far exceed the ability of software that utilizes these features. Mobile phones have extraordinary features for multimedia and communications and are the prime example of current software limitations. The multimedia usage of mobile phones is limited in its speed because of the computations requirements for internet connection, poor user interface and battery power drainage, due to heavy computation requirements. While these devices are very convenient and portable, there are serious problems for users to fully utilize the data processing and communications capabilities. This paper proposes an improvement of mobile phone service by developing software based on an X-internet approach.

**Keyword:** Mobile phone, Service Enhancements, X-internet

## 1. Introduction

Ubiquitous consists of a conversational logic that has developed in recent years as a concept, which connects people, objects, and space over time, and provides various types of information and communication equipment to be used as tools in the ubiquitous. When information terminals become intelligent tools, and the arrival of ubiquitous computing environments arrives in the near future, mobile virtual reality content-related technologies, which emphasizes mobility and interactivity will be in the spotlight[1]. There is no place for doubt that computers are becoming a type of leading equipment in information and communication tools. However, mobile phones are already equipped with various functions of leading tools compared to other devices even though many types of equipment are to be converted into multi-purposed, personalized, and computerized tools [2]. In recent years, mobile phones have increasingly decreased in size, but the performance becomes multi-functional tools. However, mobile phones may have some disadvantages as follows.

First, it is necessary to always connect to a certain network in order to receive wireless services. This will increase the battery exhaustion and calculation loads in the calculation process of encoding and decoding. Second, a mobile phone has some limitations in multimedia output speeds and interface performances. Third, a mobile phone has disadvantages in power because only a mobile phone can use services by connecting it to a network. Fourth, there is the possibility of loss due to the miniaturized size and easy mobility. The loss of a mobile phone is also the loss of stored data. Fifth, certain frequent connections with a server to receive information will require not only a large amount of server resources and bandwidth, but also a long user's wait time [3]. Sixth, in the side of content providers (CP), it is difficult to develop contents, which satisfy requirements of various mobile communication companies, due to the increase in costs to supply it to the different platform required in each company and weakening in the ability of developments [4].

This paper attempts to use X-internet in order to improve these problems. X-Internet can improve the response speed of user interfaces using a storage function,

which can save state information to a local section as much as is necessary, and a client can perform certain tasks without maintaining a connection to a server using a container and transfer the results of the work to the server after modifying and adding data. The objective of this study is to reduce costs with this minimum data transmission due to the fact that a certain level of data processing can be achieved in an off-line state by implementing this type of X-internet and use the minimum power and bandwidth. In addition, this study attempts to update the data used in a mobile phone using the Internet and save data when a mobile phone is lost.

In this paper, Chapter 2 introduces X-internet that is a basic idea in this study. Chapter 3 designs a system based on X-internet. Chapter 4 attempts to design another system using the system designed in Chapter 3. Finally, Chapter 5 presents the conclusion and future direction of the study.

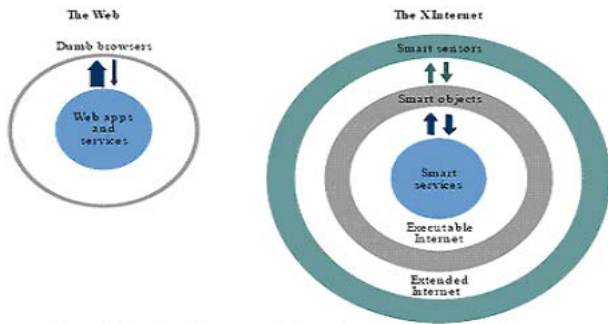
## 2. Relative works

Most businesses desire to implement abundant UIs and complicate applications by maintaining the advantage of Internet. According to this requirement, this study proposes X-internet as an alternative method. This chapter investigates the concepts and characteristics of X-internet.

### 2.1 X-internet

At the beginning of the year 2000, the traditional Web based Internet presented some difficulties in satisfying the development of computers for clients and various requirements of users. Thus, X-internet that satisfies the performance of computers for clients and maintains the advantage of Web has become a new trend [5,6]. Executable Internet is a type of Smart Client (Engines and various other components) based internet system and able to intelligently presents applications. This means an application environment, which browses Rich UI applications like CS using the Smart Client based on Internet. In addition, the extended Internet support that the Smart Client provides include not only various developments and operational environments, such as Web

browser, 4GL Tool, and independent modules, but also smart interfaces between the existing S/W component and the external equipment. Also, this system can be easily operated with the existing system and is a type of extended internet system, which can also be easily operated with external environments by supporting multi-OS environments, such as Windows, WinCE, Palm, and Embedded LINUX.

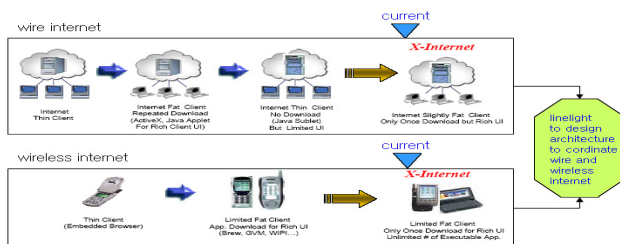


(Fig.1) Beginning and development of X-internet

2.2 Necessity of X-internet

Although application programs for businesses are generally developed and implemented based on the Web, it is naturally considered that the UI, which is the last step to meet end users, is 'text based simple screens' and 'slow screen output speeds'. Huge efforts of developers are required to provide UIs, which are similar to the past CS, according to the needs of users. Based on the fact that IT architectures are considered as 'cost reduction' and 'functions and flexibilities' from the viewpoint of deploys and maintains for managing S/Ws, the former main frame presented low values in both cost reduction and functions and flexibilities. In spite of appearing with a down-sizing in Client/Server environments, it also presented low effects in 'cost reduction' due to the increase in the load of PCs, which is mainly caused by the intention of Fat Clients, even though it provided excellent functions. The appearance of the Internet makes it possible to cater to the intention of Thin Clients and to simplify the process of production. In addition, it is possible to perform certain desirable results in 'cost reduction' due to the fact that all application programs can be processed using a single browser (however, there were some gaps from the reality.). Conversely, it presented certain functional retrogressions compared to that of Client/Server systems [7].

Fig. 2 presents the progress of wire and wireless Internet. From this progress, it is necessary to design architecture to integrate the advantages of wire and wireless Internet.



(Fig.2) Progresses of wire and wireless internet

2.3 Characteristics of X-internet

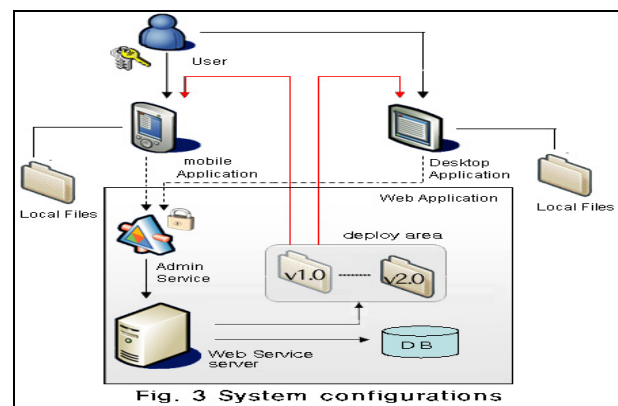
X-internet is a new technology, which can implement not only various functions in the basic C/S environment, but also applications in all device environments. In addition, it makes it possible to reduce the operation cost of networks due to the minimum data transmission compared to that of the existing Web browser. Moreover, X-internet is able to implement a smart user interface as the similar level as 4GL based on Web in XML and significantly reduce network traffics compared to the existing Web browser. Also, it can provide a platform, from which one is able to reduce the cost of development and maintenance [8].

X-internet provides various functions the same as CS by installing it locally to user's PC, notebook computer, PDA, and WebPad and easy deploys due to the centralized management in a limited area. The file size installed in a client is a very small size, which can be downloaded at one time. Because the required information or modified information is only communicated with a server without any retransmission of tag information, which is required to display it on the screen, it is possible to reduce bandwidths. In addition, the cost of the Internet can be reduced because off-line works are possible. Thus, this paper attempts to design and implement an X-internet based mobile phone service in order to update data through Internet and preserve data stored in a mobile phone when it is lost.

3. System design

X-internet based wire and wireless internet services can provide a local power, which is able to process additional works, while the existing characteristics of PC, PocketPC, and mobile phone are maintained. In addition, it is possible to request certain services that existed in other places through networks by introducing XML Web services and transfer data through on-line during an off-line work. Moreover, data can be automatically distributed by uploading it at a specific location, where data is up-loaded.

Thus, this study attempts to design and implement an X-internet based mobile phone service and to solve certain problems in data loss from the breakage or loss of mobile phones. In the system implementation applied in this study, the characteristics of X-internet can be achieved using .NET in an actual situation. Although it is not true that only .NET can implement the system, the implementation can be effectively achieved using MS .NET.



(Fig.3) System Configuration

### 3.1 User

In the case of the X-internet based system, users can do work both on-line and off-line using the local file of mobile applications. Each user can access to desktops or mobile applications using their private key. Although this access is not allowed to connect a server, it is possible to add or delete new data using local files. This means that an off-line state is possible.

### 3.2 Updating local files

This system makes it possible to work in an off-line state using desktops or mobile applications. If data updating occurred in desktops or mobile applications, users can transmit the updated data to a Web Service Server using user's private key through on-line

**Admin Service:** Admin Service verifies a private key, which is belonged to individual users, in order to verify an accurate user when data is updated from users. If the user is verified, the updated data will be transferred to a Web Service Server.

**Web Service Server:** The data transferred from the admin Service is loaded into database, and the updated data will be distributed to deploy areas whenever data is updated. In addition, this server can support the service, which is provided from a Web Service Server to users, in order to help easy updating the serviced data.

**Deploy area:** it is easy to distribute without any installation processes for a particular management program. In addition, it presents an easy access through the Web and does not require management of a data updating process because the updated data will be automatically restored as an updated version by comparing it to the update information of management programs when a certain reconnection is attempted by saving data onto a local section at the moment of the connection. Users doesn't receive services from a server with a certain connection, but users can use the distributed services from a server in an off-line state from the loaded data in local files of desktops or mobile applications through an on-line. In addition, desktop applications can be used to continue the service when a mobile phone is lost or broken.

## 4. System implementation

The characteristics of X-internet can be implemented using .NET. Although the implementation is not always performed, most of the characteristics can be effectively implemented using MS .NET. This paper presents the update in applications or desktop applications without a mobile phone for the phone number stored in a mobile phone in mobile services in which the updated data can be newly loaded in a mobile phone in applications or desktop applications. This means that any difficulty accessing lost data, which is stored in mobile phone locals, due to the breakage or lost of a mobile phone can be solved.

### 4.1 Implementation environments

A mobile phone system was configured in a local environment in order to manage mobile phone numbers because the test applied in an actual mobile phone is difficult.

### 4.2 Implementation of an application before updating data

A user application consists of a mobile application as shown in Fig. 4 and desktop application environment as shown in Fig. 5. The implementation applied in this paper was limited to a phone number management process.

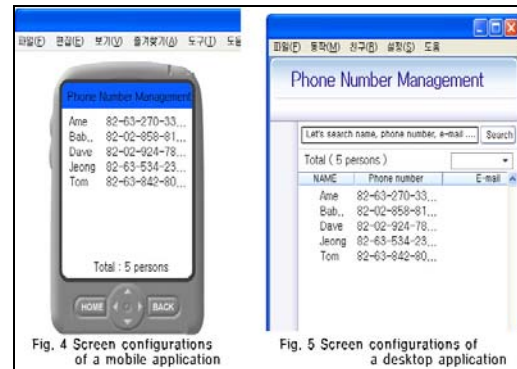


Fig. 4 Screen configurations of a mobile application

Fig. 5 Screen configurations of a desktop application

(Fig.4) Screen Configuration of a mobile application  
(Fig.5) Screen Configuration of a desktop application

Fig. 6 presents the screen configuration of a deploy area for the user in Web applications.

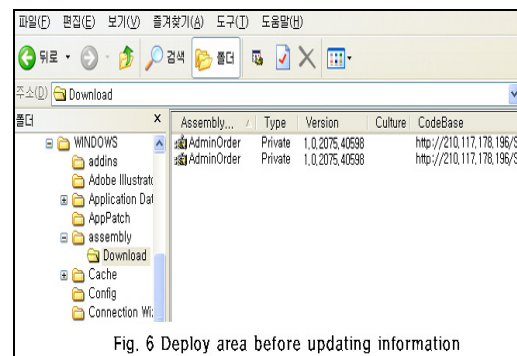


Fig. 6 Deploy area before updating information

(Fig.6) Deploy area before updating information

### 4.3 Implementation of an application after updating data

In a deploy area of the Web Application, the data that is to be distributed to the User Application is managed in its version. Fig. 7 presents the screen configuration of a deploy area after updating information. In the case of the update of the data in a deploy area, the updated data will be automatically restored as an updated version by comparing it to the update information of management programs when a certain reconnection is attempted by saving data into a local section at the moment of the connection.

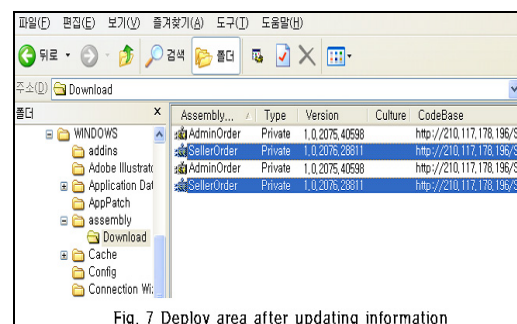


Fig. 7 Deploy area after updating information

(Fig.7) Deploy area after updating information

## 5. Conclusion and Future Works

Mobile phones are increasingly decreasing in size, but the performance becomes enhanced by multi-functional tools. However, it exhausts a large amount of battery and requires large loads in the calculation process of encryption and description. In addition, mobile phones have some limitations in multimedia output speeds and interface performances. Also, there is the possibility of loss due to the decreased size and easy mobility. The loss of a mobile phone could result in a loss of data. This paper designed and implemented a phone number management system among mobile services using X-internet in order to improve these problems. As a result, X-Internet can improve the response speed of user interfaces using a storage function, which can save state information to a local section as much as is required, and a client can perform certain works without maintaining a connection to a server using a container and transfer the results of the work to the server after modifying and adding data. Thus, it is possible to provide customized services according to the personal characteristics and thus take a step further towards the age of ubiquitous.

However, X-internet was not executed in a Windows 98/ME system because it downloaded most of the application programs using BITS. Thus, a Windows 2000 or above is required. In addition, because it neglects most of the code access securities due to the fact that it is executed as a fully reliable local application system, technologies that can improve these problems are required in future studies. In addition, a verification process to identify an accurate user is required because data will be automatically updated when they access the system through on-line.

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