Abstract

By the introduction of NTT DoCoMo's "i-mode", mobile Internet access infrastructure has been widely spread in Japan, and also the increase of rich contents constructed the basis of mobile commerce. In the 3G environment, DoCoMo is planning to support loading various applications in the mobile phone by utilizing memory devices such as IC chip, thus enabling mobile commerce service in both virtual and the real world.

Keywords

Mobile commerce, Electronic commerce, Mobile Devices, 3G, UIM, Contactless IC chip

1. Introduction

In Japan, subscribers of DoCoMo’s mobile Internet access service “i-mode” exceeded 27 million at the end of September 2001 and is still increasing. There are 3 major factors for the success of i-mode. The first factor is that DoCoMo adopted C-HTML as the language for i-mode web site, which is a subset of HTML and it encouraged Service Providers to create attractive contents easily. The second factor is that usage charge of i-mode is based on packet data volume instead of duration charge. Finally, DoCoMo provides billing system for Service Providers that reduces their billing cost. By these key factors, DoCoMo was able to create a positive feedback loop, or the rising spiral among the users and Service Providers. Based on the widely spread mobile Internet access environment in Japan, DoCoMo is targeting the expansion of Mobile Commerce service in the 3G mobile communications.

2. DoCoMo’s Vision on Mobile Commerce

2.1 Objective

From user’s convenience point of view, DoCoMo would like to support, a) mobile commerce services in both virtual and real world, and b) loading various applications in the mobile phone as if it becomes a wallet.

2.2 2chip Solution for Mobile Commerce

Inside the 3G smart phone, User Identification Module (UIM) which contains subscriber information, will be loaded, and in addition, DoCoMo is studying the possibility of loading contactless IC card R/W (reader/writer) as the 2nd IC chip. DoCoMo will provide
advanced multi applications on UIM and/or IC chip of the mobile phone as shown in Table 1.

Table 1 Mobile Commerce Applications

<table>
<thead>
<tr>
<th>Category</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>Credit Card, Cash Card, Electronic Money, Security Account</td>
</tr>
<tr>
<td>Transportation</td>
<td>Commuter Pass, Bus, Railway, and Airline Ticket, Express Ticket</td>
</tr>
<tr>
<td>Entertainment</td>
<td>Admission Ticket (Sports/Concert/Amusement Park)</td>
</tr>
<tr>
<td>Identification</td>
<td>Employee Card, Point Savings Card License Card, Membership Card</td>
</tr>
</tbody>
</table>

The features of UIM are, a) tamper-proof and high level of security, b) data processing by application programs on UIM, and c) light and small size. We can utilize various kinds of secure data and applications on the smart phone by UIM. On the other hand, the features of contactless IC card reader/writer are; a) able to become a local secure communication without using cellular network, b) high speed local communication and processing, and c) as contactless IC card itself being a tamper-proof device, the wireless interface within ensures high level quality of security. Taking the advantage of the high speed processing of 100m.s., it can be utilized at ticket gate scanning information such as train pass. In order to provide secure and safe mobile commerce, DoCoMo is studying the possibility of supplying additional security functions such as issuing client certification to the mobile phone based on PKI technology.

2.3 Mobile Commerce in the Real World

To conduct mobile commerce in the real world, the local interface between the mobile phone and the real shops will be the key issue. There are several types of interface such as contactless IC Chip as described before, IrDA, Bluetooth, etc. The most important point is that how to minimize the cost impact to the merchant to support the local interface, and also ensuring security of information communicated between the smart phone and the shop.

3. Key Issues for Mobile Commerce

To support multi-application on the mobile device is a key issue whether it can bring high value to mobile devices. It enables to realize multi-function in just one device. Security and privacy is also a very important factor. It is said that the most reason that consumer refrains from using electronic commerce including mobile commerce is that the consumers feel unsecured to send private information including credit card numbers through the Internet. By establishing the infrastructure of security such as certificate authority, it will prevent from eavesdropping, tampering and repudiation that create confidence between the consumer and Service provider. Customers’ convenience for using mobile commerce is another factor. When using many services over the Internet, various ID and passwords are required which is quite troublesome for the users to remember and use. Keeping the level of security, it is necessary to improve the simplicity of operation, especially from the mobile terminal which is comparatively small unlike with PCs. Services such as “Single sign-on is” one of the solution. Lastly, the payment scheme that suits mobile environment is required from all mobile commerce players (e.g. credit card company, merchant, user, mobile operator). It should be a scheme that gives minimum impact to the existing payment system. DoCoMo strongly feels to support on establishing a common mobile payment scheme. By supporting these issues, it will bring value to mobile communications market and lead to a sound growth of mobile commerce.