Chapter III
Ambient E-Service:
Applications and Embracing Model

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ABSTRACT

Most of existing mobile services were designed based on the client/server architecture. Those mobile services neither paid much attention to mobile users' interactions with their environments nor considered the collective efforts between the mobile users in a dynamic peer group. In this chapter, the notion of ambient e-service is so defined as to identify a new scope of mobile e-service, which address dynamic collective efforts between mobile users (enabled by mobile peer-to-peer technology), dynamic interactions with ambient environments (envisioned by location-based service), the moment of value (empowered by wireless technologies), and low cost service provision. The notable features of ambient e-services are the exhilarated linkage based on social context and significantly rapid growth of connections. We also present an ambient e-service framework that characterizes ambient e-services with three dimensions (value stack, environment stack, and technology stack), followed by several exemplars of ambient e-service applications. Moreover, we present the ambient e-service embracing model (ASEM) that addresses the integrated consideration of trust, reputation, and privacy required for fostering the growth of ambient e-services and steers the directions of future fruitful relevant research. The embracing model can also guide the government or service providers to implement the ambient e-service applications that satisfy customers' unique needs under various circumstances.

INTRODUCTION TO AMBIENT E-SERVICE

The notion of ambient e-service is defined to identify a new scope of mobile e-services. Until now, there are two different design paradigms in mobile commerce. Most current mobile commerce applications are grounded in the client/server architecture, where the only interactions involved are between a service provider and a mobile user.

Mobile users are standalone. Users under such service environment cannot interact with each other easily. Although the issues of human-computer interaction with mobile devices has been brought to public attention for the last several years (Paternò, 2003). In current mobile service scenarios, interactions, or cooperation between mobile users are not considered as important issues. Therefore, collective efforts from mobile user groups cannot be produced.

Fortunately, the peer-to-peer (P2P) technology with mobile devices makes it possible for mobile users to communicate with each other easily. Mobile users can exchange information wirelessly under a sensors-enabled environment. Ambient e-service is designed based on the P2P architecture that highlights the collaborative interactions of mobile users.

The notion of ambient e-services addresses dynamic collective efforts between mobile users (enabled by mobile-P2P), dynamic interactions with ambient environments (envisioned by location-based services), moment of value, and low cost service provision. The collective effort is based on the collaborative interactions of mobile users, which facilitate the low cost service provision. In a sensor-enabled environment, information presentations are embedded in everyday objects such as pens, walls, or doors. It makes the environment become an interface of the context information. Using the mobile P2P technology, users can exchange their information wirelessly and proceed with highly extensive interactions. Grounded on location-based service, location information of mobile users can be retrieved. Hence, ambient e-service can provide personal, timely, and relevant services to mobile users.

Compared to the client/server design, an ambient e-service has two major distinguished features. First, under the client/server architecture, it is not possible to effectively attain the collective efforts that are tailored to the contexts of the user. Second, with the P2P design, the number of connections grows by a significantly rapid pace especially in an open space. For a better understanding of ambient e-services, we will use an ambient

Figure. 1. Ambient e-service framework