Chapter IV
On a Personalized System for Device Independent and Position Aware Communication

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ABSTRACT

This chapter introduces a personalized system for device independent and position aware communication. It combines the advantages of mobile universal messaging and location aware architectures, and supports its users by providing additional and helpful information. One focus is the integration into the well-known session initiation protocol to ease the implementation into existing applications. We think the combination of both approaches can support the user and help him to get more information. The chapter also focuses on how to design a modular, secure, and scalable communication system that could easily be ported to other fields of application and gives an outlook on future trends in this field.

INTRODUCTION

Since the early attempts to support human communications by technological media such as the telegraph or telephone, a long time has passed. Many new technologies of communication have been developed and people became accustomed to them. Nowadays, we have so many ways to pass messages to each other that it becomes a complex task to maintain all these different systems.

Additionally new methods to communicate not only with human beings but also with machines arise. This includes a range of applications from simple Web-based software up to the completely voice-controlled household. The speed of development brings benefits together with problems. Two main issues can be identified: on the one hand, a user needs several devices to use the different methods of communication, and, on the other hand, the exact address of the recipient needs to be known to establish a connection via a particular channel of communication. In addition, the user needs to know or at least needs to try out the media-related address on which his partner is reachable. These problems get more severe the more different channels of communication a user utilizes. To tackle these issues a system that eases the management of communication is needed. This system should provide an extended phonebook, where the addresses of all users are stored as well as the functionality to translate between potentially incompatible media. Furthermore, the system should be easy to use and should offer various services to its users. There already are systems that are capable of these two functionalities as shown in this chapter. But in respect of supporting the user with the given data much more can be done. This chapter describes a system that provides the usual functionalities and also supports the user with all information it has. Additionally input data from positioning devices, either native ones (e.g., GPS) or passive ones (e.g., cell phone positioning) is used to connect the existing information with locations to extend the support of the users. This system combines the two aspects: uniform communication and user support in a modular, scalable, secure, and user-centered communication platform.

After introducing three example communication systems and giving a short comment on location systems, the concept of the communication and location system (CoLoS) is presented. To show the potential of the system a prototypical implementation is described.

BACKGROUND

As mentioned in the *Introduction*, there already are systems that enable a communication independent of the underlying media. The first of its kind was the mobile people architecture (MPA) (Appenzeller et al., 1999) developed by the Mosquito Group of the Stanford University. It is typical for device independent communication systems. The main goal of all such systems is to provide access to all its users independent of the actual communication devices used. In the mobile people architecture, this is mainly achieved by extending the traditional ISO-OSI reference model by a personal layer. This layer represents an individual person by managing all the owner's devices and their reachability. Thus communication requests no longer go directly to the devices but to the user itself, that is, to his representative, the so-called personal proxy. This proxy decides how to proceed with the incoming request, routes it to the appropriate device, and manages the communication. This so-called personal level routing is the main achievement of the MPA, but it brings one bottle-neck namely the personal proxy. All the communication has to go through the proxy although there may be an alternative, faster way. This problem is solved in the iceberg architecture (Wang et al., 2000). The system is based on the MPA but has one major difference: it no longer has decentralized proxies for every user but concentrates many proxies in centralized units called iceberg points of presence (IPoPs). These IPoPs have interfaces to many access networks (e.g., telephony, cellular, and Internet) and are interconnected by fast network connections. This ensures that all communication can be routed in a fast and direct way. There is also a billing unit in the system to charge the users for certain services. The iceberg architecture is therefore a highly developed system that enables device independent communication but it does not support the user beyond this functionality and is limited to communication services.

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