

## Chapter 3.29

# Discovering Multimedia Services and Contents in Mobile Environments

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### **ABSTRACT**

*Accessing multimedia services from portable devices in nomadic environments is of increasing interest for mobile users. Service discovery mechanisms help mobile users freely and efficiently locating multimedia services they want. The chapter first provides an introduction to the topic service discovery and content location in mobile environments, including background and problems to be solved. Then, the chapter presents typical architectures and technologies of service discovery in infrastructure-based mobile environments, covering both emerging industry standards and advances in the research world. Their advantages and limitations, as well as open issues are discussed, too. Finally, the approaches for content location in mobile ad hoc networks*

*are described in detail. The strengths and limitations of these approaches with regard to mobile multimedia services are analyzed.*

### **INTRODUCTION**

Recently, the advances in mobile networks and increased use of portable devices deeply influenced the development of multimedia services. Mobile multimedia services enable users to access multimedia services and contents from portable devices, such as laptops, PDAs, and even mobile phones, at anytime from anywhere. Various new applications, that would use multimedia services on portable devices from both the fixed network backbone and peer mobile devices in its proximity, are being developed, ranging from entertainment

and information services to business applications for M-Commerce, fleet management, and disaster management.

However, to make mobile multimedia services become an everyday reality, some kinds of service infrastructures have to be provided or enhanced, in order to let multimedia services and contents on the network be discovered and utilized, and simultaneously allow mobile users to search and request services according to their own needs, independently of the physical places they are visiting and the underlying host platforms they are using. Particularly, with the explosive growth of multimedia services available in the Internet, automatic service discovery is gaining more and more significance for mobile users. In this chapter we focus on the issue of discovering and locating multimedia services and contents in mobile environments. After outlining necessary background knowledge, we will take an insight into mobile multimedia service discovery. Major service discovery architectures and approaches in infrastructure-based networks and in mobile ad hoc networks will be investigated. We present also a detailed analysis of their strengths and limitations with regard to mobile multimedia services.

## **DISCOVERING MOBILE MULTIMEDIA SERVICES AND CONTENTS IN INFRASTRUCTURE-BASED ENVIRONMENTS**

### **Overview**

In order to use various multimedia services on the network, the first necessary step is to find the exact address of service providers that implement the service. In most cases, end users might only know what kind of service (service type) and some service characteristics (e.g., data format,

cost) they want, but without having the server address. Currently, browsing is one often-used method to locate relevant information. As the number and diversities of services on the network grow, mobile users may be overwhelmed by the sheer volume of available information, particularly in an unacquainted environment. On the other side, user mobility presents new challenges for service access. Mobility means that users probably change their geographic locations frequently. Consequently, services available to users will appear or disappear dynamically while users move here and there. Moreover, mobile users are often interested in the services, (e.g., malls, restaurants) in the close proximity of his or her current place. Therefore, unlike classical distributed environments where location is often kept transparent, applications often need to dynamically obtain information that is relevant to their current location. The service search procedure should be customized according to user's context, (e.g., in terms of when (i.e., time) and where (i.e., location) a user is visiting).

Since most current multimedia services are designed for stationary environments, they do not address these issues. Recently, a number of service discovery solutions are developed. These solutions range from hardware-based technologies such as Bluetooth SDP, to single protocols, (e.g., SLP and SDS) to frameworks such as UPnP and Jini. From architectural point of view, we observed three models are used to discover services in different network environments (Wang, 2003): the broadcast model, the centralized service directory model, and the distributed service directories model. Next, we will investigate these paradigms in detail.

### **Broadcast Model**

The simplest architecture for service discovery is using broadcast to locate services and contents. The conceptual scheme of the broadcast model

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