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Chapter VIII

Service Discovery in Wireless and Mobile Networks

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Abstract

Service discovery is an important component of wireless and mobile network systems. An efficient service discovery mechanism would ensure high availability of services to users and applications, and high utilization of services. In this chapter, we discuss various issues and challenges facing the design and selection of a proper service discovery mechanism. This chapter also investigates service discovery mechanisms such as SLP, Jini, Salutation, and others, and assesses their suitability for applications in wireless and mobile environments.

Introduction

Mobile and wireless computing has evolved beyond the ability to wirelessly connect to read and browse the Web anywhere, anytime. Current trends involve exploiting local services, peers, and services in local and foreign networks with unknown infrastructures. For example, a mobile device should be able to use a printer in a new network or a personal digital assistant (PDA) should be able to use a faster Web cache service available in a new network. With the advent of location-based services and peer-to-peer computing, service discovery is now a critical middleware for the anywhere, anytime computing model adopted by mobile and pervasive computing networks (Helal, 2002). As the computing trends in wireless and mobile networks move more toward service–based, peer-to-peer computing, acquiring knowledge about available services poses great challenges due to the mobility of devices and the dynamic nature of the environment. The available services at any time and at any space may differ from those available at a different time and space. The anytime, anywhere computing model may also mean that mobile and wireless devices are not only consumers of services, but also providers of services. The number of services available in the network will continue to grow as more and more applications are developed day by day. An effective service discovery is therefore necessary to provide the knowledge of available services to the device and also to the networking infrastructure. Service advertisements and discovery can enable the pervasive space to dynamically change and evolve without major system reengineering. A service discovery scheme in wireless and mobile networks should (a) allow automatic discovery of services, (b) make new services in a network discoverable, (c) allow very little or no manual configuration of the device to make use of new services in a network or services in a new network, and (d) allow uninterrupted service provisioning.

In this chapter we will examine the important challenges for an effective service discovery model in wireless and mobile computing environments. In addition, we will investigate some of the existing service discovery models and their suitability to wireless and mobile networks. We will also investigate the future trends in the area of service discovery mechanisms.

Background

Services

A *service* is software that can perform specific function(s) on behalf of users and applications over a network. A *device* is any equipment that is used for computing, which includes conventional computers, small handhelds, specialty devices such as digital cameras, and printers. Most devices are represented on the network by one or more services; therefore, the term *service* is used in this chapter to represent both services and devices. *Web services* are a subset of services that can be accessed at an Internet universal resource identifier (URI).