

Chapter 34

Technologies to Improve the Quality of Handovers: Ontologies, Contexts and Mobility Management

Edson Moreira

University of São Paulo, Brazil

Bruno Kimura

University of São Paulo, Brazil

Renata Maria Vanni

University of São Paulo, Brazil

Roberto Yokoyama

University of São Paulo, Brazil

ABSTRACT

Modern life makes people internet-dependents. They want to move connected and care for always getting the best options for connectivity, hoping between providers. Freedom for choosing providers and the business options which these exchanges can offer are the motivations for this chapter. After pointing out some characteristics which make the basics of the current handover technologies, we describe an information infrastructure, based on context and ontologies which can be used to foster an intelligent, efficient and profitable scenario for managing handovers in the Next Generation Networks. Some experiments are described and the potential of using these technologies are evaluated.

INTRODUCTION

Future computing will be based on the idea that users are highly mobile, their devices ubiquitously instrumented to sense the surroundings and continuously interacting with local and re-

mote environments. Sensors will look for signs of locally emanated events, objects, people and services of interest to the user. Users will also use communicating channels to interact with remote environments, looking for information on events, objects, people and services elsewhere. The mobile user, whether inside a car or public transportation

DOI: 10.4018/978-1-60960-042-6.ch034

or even inside a public place or at home, will be inserted into rich-in-information contexts.

This paper deals with the possibilities that can be exploited by the users, service providers (access or content providers), or third parties, to build services with aggregated value through a good strategy using context information for handovers decision. The proposal of structuring the relevant information into an ontology, besides creating the common agreed terminology which will facilitate the integration of services, provides semantic relations between information which could enable the search reformulation and extent, the combination and proper correlation of capabilities for the services being offered.

A TAXONOMY FOR HANDOVER MANAGEMENT

Various terms and classifications for the handover process are found in the literature, these classifications vary with the perspective and approach in which mobility aspects of the handover process are analyzed. The distinctions can be made in accordance with the scope, coverage range, performance characteristics, state transitions, types of mobility, and handover control modes.

The most common classification outlooks are: layer, system, technology, decision, performance, procedure and connection. Some classification and types of handover perspectives are briefly presented in Table 1, which was created based on RFC 3753.

The process of access point changing is called hard handover when the connection to the access point to which the mobile device is connected is broken before the new connection is established. However, the process called soft handover occurs when the connection is broken after the new connection is established. Another important operational factor is the entity that is able to decide on the handover's performance. The options are essentially the network-based handover, where the

decision is made by the network to which the mobile device is connected; and the second option is the client-based handover, where the client/device is the entity that has the decision-making power.

In addition to the classifications in REF_Ref244439661 \h * MERGEFORMAT Table 1, there is also an outlook of why users perform handovers—REF_Ref244439812 \h * MERGEFORMAT Figure 1.

An imperative handover occurs only for technical reasons, that is, the access point change is made by a technical analysis. This analysis can be based on parameters such as signal strength, coverage, QoS offered by another network, among others. The term “imperative” is because the analysis shows that if the change is not made, there is a significant deterioration in the performance or loss of connection. The handover is classified into two types: reactive and proactive. The “reactive” responds to changes made by the device interfaces, such as availability and unavailability of the network access. This type is subdivided into “anticipated” and “unanticipated” (Patanapongpibul, Mapp, & Hopper, 2006). The “anticipated” type is a soft handover which knows the access points' situation and/or base candidates for a new connection. In the “unanticipated” case, the device loses or is about to lose the connection to the network in use and has no coverage information on the candidate networks in the position it is, that is, there is no access point option for a new connection. Therefore, the “unanticipated” type is an example of hard handover.

The “proactive” is the counterpart of the “reactive”. The proactive type uses soft handover techniques to choose new access points. In Figure 1, the “proactive” type is subdivided into “knowledge-based” and “mathematical model-based”. The first one uses knowledge based on information provided by other users and/or by candidate networks, for example, the topology of the networks in an area. The second “mathematical model-based” type uses mathematical

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/technologies-improve-quality-handovers/50609

Related Content

Conducting Semantic-Based Network Analyses from Social Media Data: Extracted Insights about the Data Leakage Movement

Shalin Hai-Jew (2015). *Design Strategies and Innovations in Multimedia Presentations* (pp. 369-427).

www.irma-international.org/chapter/conducting-semantic-based-network-analyses-from-social-media-data/133006

Color Image Segmentation: From the View of Projective Clustering

Song Gao, Chengcui Zhang and Wei-Bang Chen (2012). *International Journal of Multimedia Data Engineering and Management* (pp. 66-82).

www.irma-international.org/article/color-image-segmentation/72893

Secure Techniques for Remote Reconfiguration of Wireless Embedded Systems

Abdellah Touhafi, An Braeken, Gianluca Cornetta, Nele Mentens and Kris Steenhaut (2011). *Handbook of Research on Mobility and Computing: Evolving Technologies and Ubiquitous Impacts* (pp. 930-951).

www.irma-international.org/chapter/secure-techniques-remote-reconfiguration-wireless/50633

The State of Computer Simulation Applications in Construction

Mohamed Marzouk (2011). *Gaming and Simulations: Concepts, Methodologies, Tools and Applications* (pp. 1554-1576).

www.irma-international.org/chapter/state-computer-simulation-applications-construction/49467

Static Signature Verification Based on Texture Analysis Using Support Vector Machine

Subhash Chandra and Sushila Maheshkar (2017). *International Journal of Multimedia Data Engineering and Management* (pp. 22-32).

www.irma-international.org/article/static-signature-verification-based-on-texture-analysis-using-support-vector-machine/178931