Tutorial Proposal - IEEE International Symposium on Computers and Communications (ISCC 09)

Title: Mobile Network Cooperation at Its Best in Beyond 3G: Network Composition

Instructor: Roch H. Glitho, PhD, Concordia University and Ericsson, Montreal, Canada

Abstract
Mobile network cooperation is well known in cellular networking where networks belonging to different operators cooperate to give roaming end-users seamless access to basic services. However mobile network cooperation as known today is not yet at its best. It relies on substantial off-line agreements and cumbersome manual configurations. Network composition is an emerging concept that brings network cooperation to its best. It is rooted in ambient networking, a beyond 3G networking approach proposed by a European Union 6th Framework project. It enables scalable and dynamic cooperation between heterogeneous networks and seamless access to new services. Off-line agreements and manual configurations are non existent or kept to a bare minimum. This tutorial is devoted to network composition. We start by discussing roaming in 3G cellular networks and pinpointing the shortcomings. This is followed by an introduction to ambient networking, the setting for network composition. We then discuss the principles, protocols and algorithms of network composition. A concrete case study on registry composition is finally presented for illustration purpose.

History

- An early version of this tutorial was presented at the 7th International Conference on New Technologies of Distributed Systems (Notere 2007), Marrakesh, Morocco, June 4-8, 2007
- A more recent version will be presented at the 2009 IEEE 69th Vehicular Technology Conference (VTC2009)-Spring 26–29 April 2009, Barcelona, Spain (**http://www.ieeevtc.org/vtc2009spring/**)

Objectives
Two major goals are assigned to this tutorial:

1. Introduce roaming in the IP multimedia subsystem (IMS) of 3G networks and the shortcomings.

2. Present the more general concept of network cooperation that is emerging for beyond 3G as part of the ambient networking concept and show how this novel concept addresses the shortcomings of roaming in 3G

The attendees will get acquainted with the following: - Shortcomings of roaming as known today in IMS. - Ambient networking - Network composition including composition degrees and procedures - Registry composition

Outline

1. Introduction
2. Network cooperation in 3G
    a. The IP Multimedia Sub-System (IMS)
    b. Cooperation at the control layer of IMS including roaming scenarios
    c. The drawbacks
3. Ambient networking as the setting for network composition
    a. Overall architecture of ambient networks
    b. Media delivery as example of ambient network functional entity
4. Network composition
    a. Composition degrees and scenarios
    b. Composition procedure
    c. Signalling for composition
5. Registry composition as a case study
    a. Problem statement, scenarios and procedures
    b. Negotiation for registry composition
    c. Signalling for registry composition
6. Conclusions

Audience

This tutorial is designed to appeal to a wide range of audience. R&D telecommunications engineers, telecommunications managers, academic researchers and graduate students will benefit from attending the tutorial.

Novelty

It is the very first tutorial that discusses the shortcomings of roaming in 3G and present how these shortcomings are being addressed in beyond 3G

Biography

Roch H. Glitho [SM] (http://www.ece.concordia.ca/~glitho/) holds a Ph.D. (Tekn. Dr.) in tele-informatics (Royal Institute of Technology, Stockholm, Sweden) and M.Sc. degrees in business economics (University of Grenoble, France), pure mathematics (University Geneva, Switzerland), and computer science (University of Geneva). He works in Montreal, Canada as an Adjunct Associate Professor at Concordia University where he teaches a graduate course on next generation networks. He also works as a consultant at Ericsson Canada. In the past he worked as a Senior Specialist in network management for Ericsson Telecom in Stockholm, and as an R&D engineer for a computer manufacturer in Oslo, Norway. His industrial experience includes research, international standards setting (e.g. contributions to ITU-T, ETSI, TMF, ANSI, TIA, and 3GPP), product management, project management, systems engineering and software/firmware design. He is an IEEE distinguished lecturer, a senior technical editor of IEEE Communications Magazine, and

a technical editor of IEEE Communications Surveys and Tutorials. In the past he has served as Editor-In-Chief of IEEE Communications Magazine and IEEE Communications Surveys & Tutorials Magazine. His research areas include architectures for end-users services, distributed systems, non conventional networking and networking technologies for emerging economies. In these areas, he has authored more around 90 peer-reviewed papers, more than twenty of which have been published in well-known refereed journals. He has also guest-edited some 10 special issues of refereed journals and has more than 20 patents in the aforementioned areas.