AROMA IST-4-027567

D09

First report on AROMA algorithms and simulation results

Contractual Date of Delivery to the CEC: 30/10/2006
Actual Date of Delivery to the CEC: 10/11/2006
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Workpackage: WP3
Est. person months: 54
Security: PU
Nature: Report
Version: 001
Total number of pages: 354

Abstract:

This deliverable provides a description and performance evaluation of a first version of the resource management algorithms and procedures developed within WP3. The evaluation will mainly be carried out by means of simulations using the simulators at their first development stage.

Keyword list: Quality of Service (QoS), End-to-end QoS; Radio Resource Management (RRM), Common RRM (CRRM), QoS architecture, All-IP, Heterogeneity.

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DOCUMENT HISTORY

Date	Version	Status	Comments
12.06.06	v1	Int	ToC for comments
29.09.06	v2	Int	Updated ToC (after Madrid meeting) for comments
27.10.06	v3	Int	Integrated Version
03.11.06	v4	Int	Version for PCC Review
10.11.06	001	Apr.	Approved version delivered to the Commission

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EXECUTIVE SUMMARY

The scope of this document is to describe and present an initial evaluation of a first version of resource management algorithms and procedures developed within WP3. The evaluations have been carried out by means of simulations using the first version of the developed simulators, whose capabilities are reported in D06. Also, analytical models have been derived in order to gain insight into some of the targeted problems.

Based on the consideration that it ought to be mandatory to increase and harmonise the general knowledge on RRM strategies, and in orderto facilitate the future success of 3G and beyond networks with an ever increasing sophistication in RRM strategies, intrinsic RRM studies in novel technologies such as e.g. HSDPA, HSUPA and MBMS are developed together with further knowledge on how to manage wireless technologies such as WLAN. Furthermore, taking into account that the network optimization process could imply the tuning of a large set of radio parameters in thousands of cells in the UMTS Terrestrial Radio Access Network (UTRAN), some initial automated tuning mechanisms for RRM parameters are discussed.

On the other hand, for each of legacy and emerging technologies, the development of Common RRM (CRRM) algorithms within the radio access network (RAN) is vital for a proper functioning of a heterogeneous network topology. Building on top of IST-EVEREST results on CRRM functional model and algorithms, new concepts and approaches are identified, developed and evaluated, also including additional technologies such as HSUPA or WLAN.

Based on ongoing efforts at 3GPP aiming at the specification of evolved network architecture, the key drivers for E2E QoS are discussed in this document. In this context, a functional reference QoS model is proposed, accompanied by preliminary resource management strategies considering both the radio and the IP segments co-ordinately and operating synergistically. Finally, a basic methodology for moving from conceptual algorithms proposals towards their practical implementation is covered.

The rest of this deliverable is structured as follows. Section 2 is devoted to provide some preliminary technical studies with broad applicability for the rest of the activities. Section 3 is devoted to intrinsic RRM mechanisms. Section 4 covers automated tuning of RRM parameters, while Section 5 is devoted to CRRM. Then, Section 6 presents the overall vision of the resource management problem encompassing radio and IP segments as well as some initial evaluations. Section 7 sets the pillars for the definition of an implementation methodology. Finally, Section 8 summarizes the conclusions.