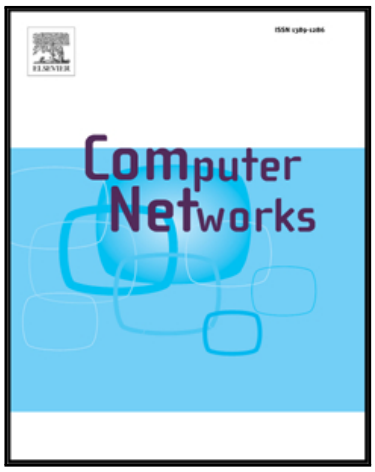

Energy-aware network/interface selection and handover application for android-based mobile devices

Mehmet Fatih Tuysuz , Murat Ucan

PII: S1389-1286(16)30415-7
DOI: 10.1016/j.comnet.2016.11.021
Reference: COMPNW 6063

To appear in: *Computer Networks*

Received date: 1 June 2016
Revised date: 25 October 2016
Accepted date: 29 November 2016

Please cite this article as: Mehmet Fatih Tuysuz , Murat Ucan , Energy-aware network/interface selection and handover application for android-based mobile devices, *Computer Networks* (2016), doi: 10.1016/j.comnet.2016.11.021

Energy-aware Network/Interface Selection and Handover Application for Android-based Mobile Devices

Mehmet Fatih Tuysuz, Murat Ucan
Department of Computer Engineering – Harran University
ftuysuz@harran.edu.tr, muratucann@gmail.com

***Abstract*—Considering recent number of energy-hungry applications, large-screen mobile devices, fast processors, multiple hardware integrated network connectivity, high amount of data consumption and audio-video communication times, it is clear to say that high battery capacity is what users ask for. However, although processing power doubles roughly every two years, progress in battery technology did not even double in the last decade. In order to meet the ever growing demand, vendors can simply increase battery sizes of mobile devices or focus on novel energy-efficient hardware and software solutions. In this context, this paper[1] proposes an energy-aware network/interface selection and handover application for Android based mobile devices. The proposed application computes and reports power consumption levels of each Point of Attachment in the vicinity for various web-applications (e.g. Facebook, Twitter, Skype, etc.), making use of real packet measurements and realistic computations, and then enables stations to handover horizontally/vertically to optimize energy efficiency. Results of extensive tests clarify that the proposed scheme not only saves energy but also increases overall throughput and hence, provides a better service quality.**

Keywords*: Energy Efficiency, Network Selection, Android, IEEE 802.11, Wireless Networks, Cellular Networks*

1. INTRODUCTION

Wireless networks and mobile devices have been experiencing an outstanding progress. Users demand uninterrupted, continuous, and seamless services with Quality of Service (QoS) from any source to any device at any time while on the move or stationary. In order to satisfy the increasing traffic demands and the service requirements, the next generation of wireless infrastructures (5G networks) paradigm will include a high deployment of base stations (BS) and several different radio access technologies (RATs), such as Wireless Local Area Networks (WLAN), Long Term Evolution (LTE), Worldwide Interoperability for Microwave Access (WiMAX), etc. as illustrated in Figure 1. However, there is no single RAT that can simultaneously offer high amount of bandwidth, low-latency, wide coverage and high QoS levels for mobile users. Therefore, next generation wireless systems have to make use of various solutions and technologies that enable a cooperative heterogeneous wireless environment where users will be always best connected (ABC) anytime and anywhere [1]. In this context, the main promise of the heterogeneous network integration is to provide mobile users with high performance and wide coverage, maintaining optimal energy efficiency.

In wireless networks, handover, also known as handoff, is the procedure of shifting an ongoing call or a data session from one Point of Attachment (PoA) to another. Consequently, handover procedure allows mobile stations to dynamically associate with the most suitable PoAs among available ones. If a handover occurs within the domain of a single RAT, it is called as horizontal handover. On the contrary, vertical handover (VHO) takes place among different RATs. Figure 1 demonstrates both horizontal and vertical handover procedures.

[1] This work was supported by The Scientific and Technological Research Council of Turkey (TÜBİTAK) under Grant No: 114E075.