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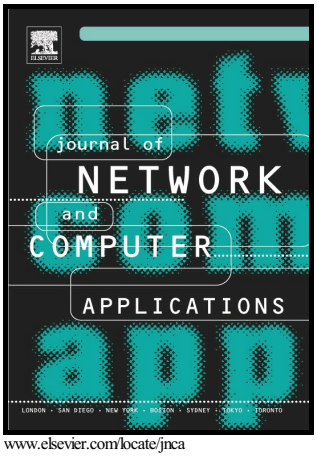

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ACCEPTED MANUSCRIPT

Supporting Mobility-Aware Computational Offloading in Mobile Cloud Environment

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Abstract

Mobile Cloud Computing (MCC) enables resource-constrained smartphones to run high processing and storage intensive applications through public clouds or cloudlet code offloading. However, handover support in the MCC context has not been thoroughly explored, since most works do not address the device's mobility during the offloading operation. This paper presents the Mobile Offloading System (MOSys), which supports seamless offloading operations during user mobility between wireless networks. To this end, MOSys benefits from the software-defined networking (SDN) paradigm for mobility management and remote caching techniques to reduce the offloading response time. Also, middleware is responsible for ensuring code and data offloading, profiling service, cloud discovery and application deployment. To evaluate the proposed system and to analyze mobility impact on the offloading performance, several experiments were conducted using different smartphones categories and benchmark applications, on three scenarios. Our results have shown that the MOSys' mobility management application is energy efficient, especially considering the low-cost smartphone category, while remote caching proved to be an attractive alternative for reducing the offloading response time.

Keywords: Mobile Cloud, Mobility Management, Seamless Offloading, Remote Caching, Software-Defined Networking

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1. Introduction

Since 2009, statistics indicated that mobile devices should become the dominant computing platform [1] as the number of application downloads reached 2.52 billion. More recently, nearly 60% of the world's population already owned a smartphone, and furthermore, according to the Statistics Portal[1], the number of smartphone users is expected to surpass the five billion mark by 2019.

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[1]https://www.statista.com/

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