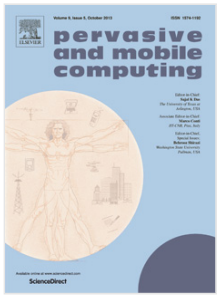
Accepted Manuscript



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PII: S1574-1192(15)00143-1
DOI: http://dx.doi.org/10.1016/j.pmcj.2015.07.005
Reference: PMCJ 621

To appear in: *Pervasive and Mobile Computing*

Received date: 15 October 2014
Revised date: 29 June 2015
Accepted date: 8 July 2015

Please cite this article as: T. Shi, M. Yang, X. Li, Q. Lei, Y. Jiang, An energy-efficient scheduling scheme for time-constrained tasks in local mobile clouds, *Pervasive and Mobile Computing* (2015), http://dx.doi.org/10.1016/j.pmcj.2015.07.005

An Energy-Efficient Scheduling Scheme for Time-constrained Tasks in Local Mobile Clouds

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ABSTRACT

Mobile Cloud Computing (MCC) enables mobile devices to use resource providers other than mobile devices themselves to host the execution of mobile applications. Various mobile cloud architectures and scheduling algorithms have been studied recently. However, how to utilize MCC to enable mobile devices to run complex real-time applications while keeping high energy efficiency remains a challenge. In this paper, firstly, we introduce the local mobile clouds formed by nearby mobile devices and give the mathematical models of the mobile devices and their applications. Secondly, we formulate the scheduling problem in local mobile clouds. After describing the resource discovery scheme and the adaptive, probabilistic scheduling algorithm, we finally validate the performance of the proposed algorithm by simulation experiments.

Keywords: Mobile cloud computing, ad-hoc network, offloading, task scheduling.

1. Introduction

Mobile devices become a crucial part of our daily life nowadays. Although there have been many advances in technology, mobile devices, due to the restrictions on weight, size, battery life, and heat dissipation, are more resource-constrained than their non-mobile counterparts. Tremendous expand a single mobile device's limited capabilities, offloading is used in Mobile Cloud Computing (MCC), using resource providers other than the mobile device itself to host the execution of mobile applications. There are two types of mobile cloud architectures nowadays. One is the remote cloud, which is defined as a powerful server or a cluster of computer hardware and software that offer the services to the mobile device through WAN connection. Under this architecture, mobile devices typically access cloud services through the cellular network or access points [1]. However, recent research [2] shows that, the remote cloud is unsuitable for complex real-time applications with real-time constraints due to the high communication latency. Therefore, the other architecture, local mobile clouds formed by nearby mobile devices have been proposed to