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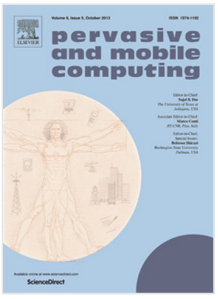

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Analysing the Resource Consumption Patterns of Mobile Applications in Early Development Phases

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Abstract

Mobile device capabilities have increased tremendously in recent years, and the complexity of the applications executed in these devices has evolved accordingly. However, despite the efforts made by mobile manufactures, resource consumption, particularly battery and data traffic, are still limiting factors for mobile applications. The most important aspects determining the consumption of a mobile application is its software architecture and its behaviour. Hence, by comparing the resource consumption of different software architectures before an application is built, mobile developers can make decisions that are better informed. This work presents the consumption analysis of two applications, each of them built with two different architectures in order to identify under which situation each architecture is more efficient. In addition, by generalizing the analysis of the two applications, a conceptual framework is created with which to analyse the consumption pattern of applications in their early development phases. This conceptual framework will allow mobile developers to estimate the resource consumption of their applications under different conditions of software architecture and usage scenarios, providing them with information relevant for decision making.

Keywords: Mobile software architecture, resource consumption, resource estimation, mobile-centric.

1. Introduction

Smartphones and mobile apps have probably been the technological innovations that have most influenced society at the beginning of this century. There are more than 7 billion mobile-cellular subscriptions, which means a penetration rate of 97% [4]. The population using smartphones is consuming apps and cloud services massively [6], so that global mobile data traffic will soon exceed the traffic generated by wired devices [7]. This is expected to occur already in 2016. A clear example of this massive usage is Facebook, the social network for keeping in touch with friends, family, and colleagues. The data provided in Facebook's report for the second quarter of 2015 [12] shows that, of its more than 960 million active daily users, more than 840 million make use of its services from a mobile device [12]. Such figures reflect the global dimension of the impact caused by mobile applications.

The reason why the use of this kind of application has become so widespread is not only the value of the functionalities they provide to their users but also the sustainability of those functionalities in terms of the devices' resources. It is well known that resource consumption, in particular battery use [37, 26] and network traffic [23], is a factor determining the success of mobile applications [43]. Mobile applications that drain

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