Accepted Manuscript

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PII: S0140-3664(17)30798-3
DOI: 10.1016/j.comcom.2017.07.007
Reference: COMCOM 5533

To appear in: *Computer Communications*

Received date: 17 September 2015
Revised date: 12 July 2017
Accepted date: 15 July 2017

Please cite this article as: Sebastian Sonntag, Lennart Schulte, Jukka Manner, No links left behind, *Computer Communications* (2017), doi: 10.1016/j.comcom.2017.07.007

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Abstract

Today, smartphones are connected to one cellular network at a time, and the user is therefore fully dependent on the chosen operators network coverage and condition. Especially in government safety applications like rescue operations, the data need is greater than can be guaranteed by one operator network alone. Often, the solution is a portable system that is able to connect to multiple networks at once. Additionally, new multisim mobile devices are being introduced to the market offering this functionality to the end user as well.

In this paper, we analyse the performance benefits of a transport layer approach to utilising multiple cellular networks with regard to throughput and availability. First, we provide a nationwide capacity analysis based on millions of measurements from deployed mobile networks in Finland. Then, we report our own measurements that were conducted utilising multiple mobile networks with Multipath TCP. All our findings suggest that a multipath transport with access to various operator networks has significant benefits concerning throughput and availability. In some cases, even the overall latency decreases.

Keywords: multipath, multi-homing, mobile network, multisim

1. Introduction

Traditionally, mobile devices, such as smartphones and tablets, have been able to access only one mobile network at a time. The user is therefore fully dependent on the quality and availability of his chosen operators network. When coverage, quality and, e.g., congestion become a problem, subscribers often seek a WIFI network instead. In many markets, cellular data is very expensive, which further drives users to connect to WIFI networks.

However, for governmental communication needs, the ability to connect to multiple cellular networks is a critical service, and multi-radio devices are therefore often installed in rescue vehicles and police car [1, 2]. Reports show that the data need ranges from 500 kbit/s to several Mbit/s [3, 4]. Similar needs are also emerging among companies, e.g. delivery trucks are increasingly tied to

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