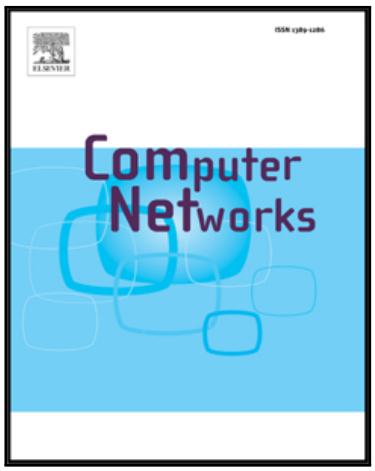

COMPOSER: A Compact Open-source Service Platform

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PII: S1389-1286(18)30175-0
DOI: 10.1016/j.comnet.2018.04.012
Reference: COMPNW 6474

To appear in: *Computer Networks*

Received date: 5 May 2017
Revised date: 13 March 2018
Accepted date: 19 April 2018

Please cite this article as: Ivano Cerrato, Fulvio Risso, Roberto Bonafiglia, Kostas Pentikousis, Gergely Pongrácz, Hagen Woesner, COMPOSER: A Compact Open-source Service Platform, *Computer Networks* (2018), doi: 10.1016/j.comnet.2018.04.012

COMPOSER: A Compact Open-source Service Platform

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Abstract

Compute and network virtualization enable to deliver network services with unprecedented agility and flexibility based on a) the programmatic placement of service functions across the available infrastructure and b) the real-time setup of the corresponding network paths. This paper presents and validates COMPOSER, a compact, flexible and high-performance service platform for the deployment of network services. COMPOSER supports multiple virtualization engines (e.g., virtual machines, containers, native network functions) and it can use seamlessly the above different execution environments to instantiate network services belonging to different chains, hence facilitating domain-oriented orchestration and enabling the joint optimization of compute and network resources. We demonstrate that COMPOSER can run on resource-constrained hardware, such as residential gateways, as well as on high-performance servers. Finally, COMPOSER integrates optimized data plane components that enable our platform to reach top-class results with respect to data plane performance as well.

Keywords: Service orchestration, Service virtualization, Compute node, High performance, Resource-constrained device, NFV, SDN, Service chain

1. Introduction

Compute and network virtualization enable the instantiation of Service Functions (SF) across the (possibly heterogeneous) resources available in the infrastructure of a network operator, ranging from Customer Premises Equipment (CPE), which are typically based on low-cost hardware, to high-end servers in the operator data centers.

In order to enable efficient service deployment and delivery on such resources, we designed COMPOSER (COMPact Open-source SERvice platform), that offers a high-level abstraction for composing service functions in arbitrary service graphs used to deliver virtualized services. We design and implement COMPOSER so that it is well-suited to run virtualized services on high-volume servers, as one would expect based on the current research and industry efforts. In addition, we demonstrate that COMPOSER brings the power and advantages of IT virtualization on resource-constrained hardware such as home/SOHO CPEs, also known as residential gateways, thus enabling

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