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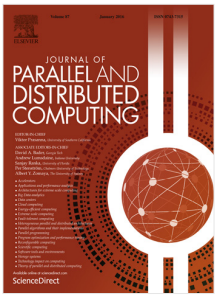

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An Efficient Data Exchange Mechanism for Chained Network Functions

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Abstract

Thanks to the increasing success of virtualization technologies and processing capabilities of computing devices, the deployment of virtual network functions is evolving towards a unified approach aiming at concentrating a huge amount of such functions within a limited number of commodity servers. To keep pace with this trend, a key issue to address is the definition of a secure and efficient way to move data between the different virtualized environments hosting the functions and a centralized component that builds the function chains within a single server. This paper proposes an efficient algorithm that realizes this vision and that, by exploiting the peculiarities of this application domain, is more efficient than classical solutions. The algorithm that manages the data exchanges is validated by performing a formal verification of its main safety and security properties, and an extensive functional and performance evaluation is presented.

Keywords: parallel algorithms, high speed packet processing, data exchange mechanism, network function virtualization

1. Introduction

New paradigms have recently emerged that aim at transforming the network into a more flexible and programmable platform. In particular, Network Function Virtualization (NFV) [1] proposes to replace dedicated middleboxes, used to deliver a multitude of network services by means of a growing number of (cascading) dedicated appliances, with software images that run on general-purpose servers. This allows leveraging high-volume standard machines (e.g., Intel-based blades) and computing virtualization to consolidate and optimize the processing in the data plane of the network. This results in a more flexible deployment

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