Accepted Manuscript

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PII: S0167-739X(17)32797-8
DOI: https://doi.org/10.1016/j.future.2018.04.007
Reference: FUTURE 4073

To appear in: *Future Generation Computer Systems*

Received date : 6 December 2017
Revised date : 16 March 2018
Accepted date : 1 April 2018

Please cite this article as: R. Rapuzzi, M. Repetto, Building situational awareness for network threats in fog/edge computing: Emerging paradigms beyond the security perimeter model, *Future Generation Computer Systems* (2018), https://doi.org/10.1016/j.future.2018.04.007

Building Situational Awareness for Network Threats in Fog/Edge Computing: Emerging Paradigms Beyond the Security Perimeter Model

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Abstract

The growing interest in fog and edge computing is gradually but inexorably outlining new architectural and usage models, distinguished by geographical dispersion and device heterogeneity. Unfortunately, the evolution of cyber-security paradigms has not gone with the same pace, leading to a substantial difficulty in protecting the new forms of distributed and heterogeneous systems against cyber-threats.

In this paper, we focus on situational awareness for network threats. We briefly review the main limitations of current cyber-security paradigms with respect to emerging fog/edge architectures, and we discuss how current challenges and emerging trends are pushing from vertical security frameworks to horizontal and distributed architectures. In this respect, we outline the main elements and relevant technologies for a multi-layer framework that create the necessary knowledge and awareness in relation to network threats over large and heterogeneous computing and networking environments.

Keywords: Cyber-security architectures, situational awareness, network threats, software-defined networking, fog and edge computing

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