

Accepted Manuscript

CoMe4ACloud: An end-to-end framework for autonomic Cloud systems

Zakarea Al-Shara, Frederico Alvares, Hugo Bruneliere, Jonathan Lejeune,
Charles Prud'Homme, Thomas Ledoux



PII: S0167-739X(17)32060-5
DOI: <https://doi.org/10.1016/j.future.2018.03.039>
Reference: FUTURE 4052

To appear in: *Future Generation Computer Systems*

Received date : 14 September 2017
Revised date : 5 February 2018
Accepted date : 21 March 2018

Please cite this article as: Z. Al-Shara, F. Alvares, H. Bruneliere, J. Lejeune, C. Prud'Homme, T. Ledoux, CoMe4ACloud: An end-to-end framework for autonomic Cloud systems, *Future Generation Computer Systems* (2018), <https://doi.org/10.1016/j.future.2018.03.039>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

CoMe4ACloud: An End-to-end Framework for Autonomic Cloud Systems

Zakarea Al-Shara^a, Frederico Alvares^a, Hugo Bruneliere^a, Jonathan Lejeune^b,
Charles Prud'Homme^a, Thomas Ledoux^a

^aIMT Atlantique-Inria-LS2N, 4 rue Alfred Kastler, 44307, Nantes, France

^bSorbonne Université-Inria-CNRS 4 place Jussieu, 75005 Paris, France

Abstract

Autonomic Computing has largely contributed to the development of self-manageable Cloud services. It notably allows freeing Cloud administrators of the burden of manually managing varying-demand services, while still enforcing Service-Level Agreements (SLAs). All Cloud artifacts, regardless of the layer carrying them, share many common characteristics. Thus, it should be possible to specify, (re)configure and monitor any XaaS (Anything-as-a-Service) layer in an homogeneous way. To this end, the CoMe4ACloud approach proposes a generic model-based architecture for autonomic management of Cloud systems. We derive a generic unique Autonomic Manager (AM) capable of managing any Cloud service, regardless of the layer. This AM is based on a constraint solver which aims at finding the optimal configuration for the modeled XaaS, i.e. the best balance between costs and revenues while meeting the constraints established by the SLA. We evaluate our approach in two different ways. Firstly, we analyze qualitatively the impact of the AM behaviour on the system configuration when a given series of events occurs. We show that the AM takes decisions in less than 10 seconds for several hundred nodes simulating virtual/physical machines. Secondly, we demonstrate the feasibility of the integration with real Cloud systems, such as Openstack, while still remaining generic. Finally, we discuss our approach according to the current state-of-the-art.

Keywords: Cloud Computing; Autonomic Computing; Model Driven Engineering; Constraint Programming

1. Introduction

Nowadays, Cloud Computing is becoming a fundamental paradigm which is widely considered by companies when designing and building their systems. The number of applications that are developed for and deployed in the Cloud is constantly increasing, even in areas where software was traditionally not seen as the core element (cf. the relatively recent trend on Industrial Internet of Things and

Email addresses: zakarea.al-shara@imt-atlantique.fr (Zakarea Al-Shara), frederico.alvares@imt-atlantique.fr (Frederico Alvares), hugo.bruneliere@imt-atlantique.fr (Hugo Bruneliere), jonathan.lejeune@lip6.fr (Jonathan Lejeune), charles.prudhomme@imt-atlantique.fr (Charles Prud'Homme), Thomas.Ledoux@imt-atlantique.fr (Thomas Ledoux)

Download English Version:

<https://daneshyari.com/en/article/6873000>

Download Persian Version:

<https://daneshyari.com/article/6873000>

[Daneshyari.com](https://daneshyari.com)