Virtualization, Containerization, Composition, and Orchestration of Cloud Computing Services

Isaac Odun-Ayo[1(✉)], Victor Geteloma[1], Ibukun Eweoya[1], and Ravin Ahuja[2]

[1] Department of Computer and Information Sciences, Covenant University, Ota, Nigeria
isaac.odun-ayo@covenantuniversity.edu.ng
[2] Delhi College of Engineering, Delhi, India

Abstract. Cloud Computing is a dynamic concept which applies virtualization cum allied techniques to facilitate the provision of services to users. To support provision of resources to users by the service and deployment models, core technologies such as virtualization, containerization and orchestration are used on the cloud. However, the task of having to determine a research focus is challenging and rigorous. A systematic map enables a synthesis of a scheme for categorizing data in a domain that interests researchers. This work conducts a systematic mapping study of virtualization, containerization and orchestration of cloud computing services. The results indicated that articles on virtualization in the area of valuation research and experience papers were 8.56% and 3.28% respectively. In addition, many articles discussed deployment based on validation and solution research with 4.92% and 13.93% respectively. There were more papers published that discussed orchestration in terms of philosophical papers with 2.45%. The lowest publications on models were on the topic of orchestration which was 1.9%. Also, the lowest number of papers on evaluation research was on deployment which was 3.28%. Furthermore, the lowest numbers of articles on validation research were on composition enabler which was 0.82%, while that of solution proposal were on orchestration with 0.82%. The result of this research reveals the gaps that will be beneficial to the trio of researchers, industries, and providers.

Keywords: Cloud computing · Virtualization · Containerization · Composition · Orchestration · Systematic mapping

1 Introduction

Cloud is a parallel and distributed computing system consisting of a collection of interconnected and virtualized computer with a dynamic provisioning and it makes its resources available with reference to standard agreements between all the cloud stakeholders [1]. Virtualization is the core technology being adopted on the cloud. It allows the provision of virtual resources to clients in form of operating system, servers, file, and storage. The importance of virtualization is underscored as it is often considered

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