

11. Towards Green Software Testing in Agile and DevOps Using Cloud Virtualization for Environmental Protection



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Abstract

Among the software engineering activities, software testing is a crucial one which consumes more than 50% of total cost and time needed in the development process. As quality is the most important criterion for successful delivery of the software, complete testing is the only way to achieve it. The various surveys conducted during the past few years reported not only the problems of exhaustive testing but also the problems associated with energy consumption and the overall impact on the environment due to dedicated hardware and other infrastructure resources utilized for testing. In traditional test environment, the quality management and testing activities are performed using the dedicated environmental set-up. This in turn alarmingly increases the amount of carbon emission in the environment. Hence, this chapter provides a key solution to make this higher energy-consuming task into a less energy-consuming one. The objective of this chapter is twofold: firstly, to provide a green software testing framework using cloud-based virtualization, and secondly, to apply cloud-based testing in Agile and DevOps-based software development environments. This chapter focuses on an important paradigm shift from traditional testing with dedicated resources to a cloud-based testing solution to achieve environmental protection. Hence, the testing activities which include the test case generation and execution to deliver quality software can now be achieved by means of cloud-based virtualization and by means of service on the cloud termed as TaaS (testing as a service).