

Scalable Distributed Service Integrity Attestation for Software-as-a-Service Clouds

Abstract:

Software-as-a-service (SaaS) cloud systems enable application service providers to deliver their applications via massive cloud computing infrastructures. However, due to their sharing nature, SaaS clouds are vulnerable to malicious attacks. In this paper, we present IntTest, a scalable and effective service integrity attestation framework for SaaS clouds. IntTest provides a novel integrated attestation graph analysis scheme that can provide stronger attacker pinpointing power than previous schemes. Moreover, IntTest can automatically enhance result quality by replacing bad results produced by malicious attackers with good results produced by benign service providers. We have implemented a prototype of the IntTest system and tested it on a production cloud computing infrastructure using IBM System S stream processing applications. Our experimental results show that IntTest can achieve higher attacker pinpointing accuracy than existing approaches. IntTest does not require any special hardware or secure kernel support and imposes little performance impact to the application, which makes it practical for large-scale cloud systems.