

VULCAN: Vulnerability Assessment Framework for Cloud Computing

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Abstract. Assessing security of software services on Cloud is complex because the security depends on the vulnerability of infrastructure, platform and the software services.

In many systems, the platform or the infrastructure on which the software will actually run may not be known or guaranteed. This implies that the security of the software service must be assured regardless of the underlying infrastructure or platform, requiring a large number of combinations. Another common trend in Cloud and Service oriented Architecture (SoA) environments is Service composition, whereby new services can be created rapidly by composing existing services. Once again, the component services must be tested for security levels on a large number of platform and infrastructure combinations.

In this work we proposed a novel vulnerability assessment framework for cloud computing systems [1]. We have designed and developed a prototype of our framework. We also presented the design and development of our framework with some use cases.

Our contribution in this area have focused on the cloud solutions such as:

1. The design and development of an assessment framework for the cloud environment.
2. Extended our previous ontology definition for the cloud computing [2].
3. Designed an automated process for the ontology knowledge base creation from NVD data sources.
4. Proposed and designed necessary components and modules for vulnerability classification, and reasoning tasks for the cloud.

Within our framework, we achieve:

1. Software vulnerabilities modeling
2. Analysis of vulnerabilities for cloud computing and mobile environments
3. Software penetration tool environment
4. Discovery of new vulnerabilities from the known one via the use of reasoning tasks on our ontology knowledge base.

References

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2. Srujan Kotikela, Krishna Kavi, and Mahadevan Gomathisankaran. "Vulnerability Assessment in Cloud Computing". In: The 2012 International Conference on Security and Management (SAM 2012). Ed. by Kevin Daimi and Hamid R Arabnia. WORLDCOMP 2012. July 16 - 19, 2012, Las Vegas, Nevada, USA: CSREA Press, 2012, pp. 6773.