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submitted by

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Honeypot Implementation

in a

Cloud Environment

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1 Introduction

1.1 Problem description

1.2 Justification, motivation and benefits

1.3 Research questions

1.4 Limitations

2 Background

This chapter concludes the fundamental knowledge that is needed to comprehend the upcoming practical work. Firstly, an introduction to cloud computing will be held. Next, a throrough understanding of honeypots is given. Lastly, we introduce some concepts of intrusion detection systens.

2.1 Cloud Computing

Nowadays it is one of the well-known keywords and has been used by vary large companies such as Google, or Amazon, however, the term "cloud computing" dates back to the late 1996, when a small group of technology executives of Compaq Computer framed new business ideas around the Internet.[Reg20] In this section, we want to give basic unterstandings of cloud computing, and give a short introduction to HeiCloud.

2.1.1 Definition of Cloud Computing

Considering the definition of Brian Hayes, cloud computing is "a shift in the geography of computation" [Hay08]. Thus, computational workload is moved away from local instances towards services and data centers that provide the need of users [AFG+10].

Considering the definition of the National Institute of Standards and Technology (NIST), cloud computing "is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." NIST the geographical shift, but also mentions the . Morever, the term is composed of five essential characteristics, three service models (see 2.1.2), and four deployment models (see 2.1.3.)

On-demand-self-service
Broad network access
Resource pooling
Rapid elasticity
Measured service

2.1.2 Service models

Software-as-a-Service (SaaS)

Platform-as-a-Service (PaaS)
Infrastructure-as-a-Service (IaaS)

2.1.3 Deployment models

Private Cloud
Community Cloud
Public Cloud
Hybrid Cloud

2.1.4 Cloud Security

[NCM12]

2.1.5 HeiCloud

2.2 Honeypots

The first public honeypot [Spi03]

2.2.1 Definition of a Honeypot

On the Internet there are a dozen of defintions for honeypots. Thus, to cope with all the subtle differences, we want to take a closer look at some of the definitions and narrow down our own one.

Spitzner defines honeypots as a "security resource whose value lies in being probed, attacked, or compromised."[Spi03]

High-interaction honeypots

Low-interaction honeypots

Pure honeypots

2.2.2 Honeynets

[Spi03]

2.2.3 Legal Issues

[Spi03]

2.3 Intrusion Detection System

3 Previous Work

3.1 The Bait'n'Switch Honeypot

[PD05]

3.2 Intrusion Trap System

[PD05]

3.3 Honeycomb

[PD05]

3.4 Honeypots in a cloud environment

[KPM+21]

4 Practical Work

4.1 Attack vectors

4.2 Proposed Honeypots

4.3 Concept

4.4 HoneyTrap

5 Experimental Work

Connect results of Honeypots with NIDS/IDS to update rules.

5.1 SNORT

6 Evaluation

6.1 T-Pot

7 Conclusion

7.1 Future work

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