CSE 363: Computer Security

Final Project Proposal

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Introduction and Outline of Project

The Basics of Botnets

A botnet (the combination of the words robot and network) is a group of network enabled malware infected. Bots, the infected devices, are controlled by a central server or servers, often called the "bot-herder" or the "command and control server".

Outline of Project

Here is what we would tentatively like to cover in each section of our paper:

(a.) Introduction

- (a.) What are botnets?
- (b.) Examples of botnets
- (c.) Famous cases of botnet attacks

(b.) Taxonomy of Botnets

- **(a.)** Architecture / Design
- **(b.)** Communication Methods
- **(c.)** Purpose

(c.) Attack Vectors

- (a.) Vulnerabilities
- (b.) Phishing
- (c.) Worm-Like
- (d.) External Devices

(d.) Mitigation Techniques

- (a.) Firewalls
- (b.) Intrusion Detection Systems (IDS)
- (c.) Challenge and Response Tests

(e.) Experimentation

(a) Existing botnet frameworks

(b) Developing a basic botnets

(c) Implementing mitigation techniques (if time permits)

Taxonomy of Botnets

Botnets can be constructed in a number of ways and fulfill many different purposes for an attacker. They can either be centralized, using a client-server model, or decentralized, using a peer-to-peer model.

Attack Vectors

Botnets exploit various attack vectors to infect devices and expand their network. The most common methods that botnets use are exploiting vulnerabilities, phishing, worm-like propagation, and using external devices. Botnets exploit vulnerabilities such as unpatched software, misconfigurations, and security loopholes found within operating systems, applications, or IoT devices.

Mitigation Techniques

There any a myriad of different techniques that try to mitigate the damage caused by botnets, or limit their spread altogether. We would like to focus on a few different techniques: firewalls, intrusion detection systems, and challenge response tests.

Experimentation

We first plan to look into existing botnet frameworks to examine their methods and features. After research into frameworks, we plan to build a simulated botnet, with various bot devices running in containers. Using a modularized approach we can change the purpose of the botnet dynamically to explore the differences. We plan to compare botnet communication and architecture methods by running a set of tasks for the different methods. If time permits we plan on testing different mitigation techniques.

Conclusion

Our project will explore botnets in a variety of different contexts. We will attempt to approach the subject both from a research-based approach, creating an overview

of botnets as they relate to computer security, and from an experimental approach by attempting to implement a basic version of a botnet.