

An Evaluation of Distributed Denial of Service Attacks in IoT Networks

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Project Aim

Investigate and Evaluate the Susceptibility of IoT Systems, Devices, and Networks to Various Botnet Attacks



Make Recommendations on Detection and Mitigation Solutions



The Problem

Security

Always-On Connections

One-Time Setup



Resource Constraints

Low power processors

Low Memory



Previous Work

Security Evaluations

IoT DDoS Simulations

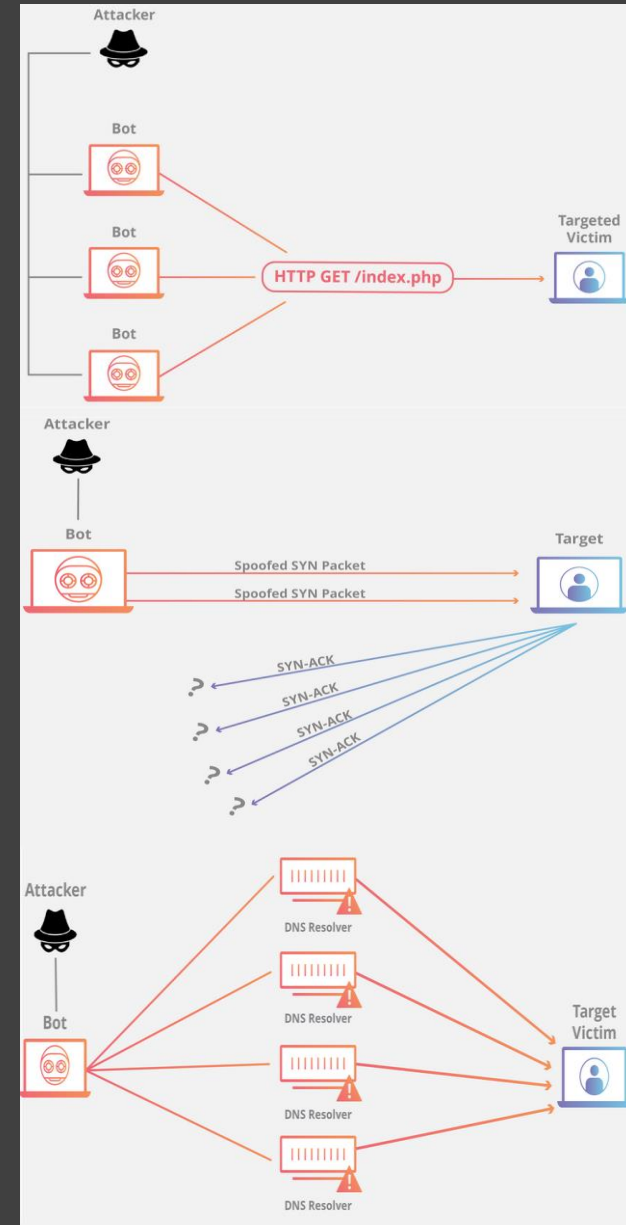


DDoS Attack Types

Application Layer Attacks
HTTP GET/POST

Protocol Attack
SYN Floods, Ping of Death

Volumetric Attacks
UDP/ICMP/TCP Floods

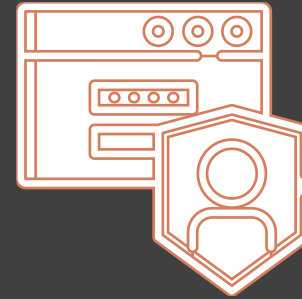


Evaluation

OS Level Security Features

Secure Boot

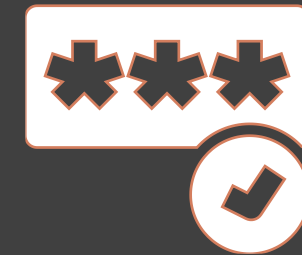
Firewalls



Encryption

Cryptography Algorithms

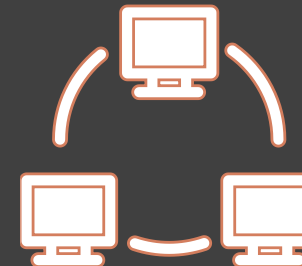
User Authentication



Network Protocols

IPv6

802.15



Simulation Options

Network Simulator

Discrete-Event Network Simulator

Well Documented, Used in Academia



Cooja

Contiki NG WSN Simulator

Hardware Emulation of Contiki Nodes



Mininet

Real Kernel

OpenFlow Support



Outcomes

Analysis

In-Depth OS/Network Security Analysis



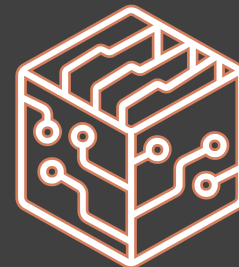
Recommendations

Detection/Mitigation Techniques



Simulation

IoT DDoS Simulation/Analysis



Project Plan

February 21st – March 14th

OS Security System Research
Simulation Software Research



March 14th – April 1st

Outline Security Evaluation Criteria



April 1st – April 14th

IoT OS Security System Research
IoT OS Security Vulnerability
Research



April 14th – May 5th

Investigate DoS Simulation
Techniques

Investigate DDoS Simulation
Techniques

May 5th – May 18th

Semester 2 Examinations

May 18th – May 25th

End of Semester Break

May 25th – Mid-June

Project Design Plan

Begin Portfolio Layout

Mid-June

Submit Project Design Plan

Mid-June – June 30th

Begin Documenting OS
Security Evaluation

July 1st – July 14th

DoS Simulation Implementation

July 14th – July 31st

DDoS Simulation Implementation
Research Detection/Mitigation
Techniques



August 1st – August 7th

Finalize OS Security Evaluation

August 7th – August 14th

Finalize Simulation Testing

August 14th – August 31st

Finalize Documenting of Results

Finalize Detection/Mitigation
Recommendations

September Week 1

Final Portfolio Submission

Acknowledgements

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