

Extended Berkeley Packet Filter for Intrusion Detection Implementations

COMP4906 Honours Thesis Proposal

by

William Findlay

November 3, 2019

Under the supervision of Dr. Anil Somayaji
Carleton University

Abstract

Acknowledgments

Contents

1	Introduction	1
1.1	Motivation	1
1.2	System Introspection and Observability	1
2	Background	1
2.1	Extended Berkeley Packet Filter	1
2.1.1	Linux Superpowers	1
2.1.2	The Verifier	1
2.1.3	eBPF Programs	1
2.1.4	XDP Programs	1
2.2	Intrusion Detection	1
2.3	Process Homeostasis	1
3	Implementing ebpH	1
4	Methodology	1
	References	2
	Appendix Testificate	3

List of Figures

List of Tables

List of Listings

1 Introduction

As our computer systems grow increasingly complex, so too does it become more and more difficult to gauge precisely what they are doing at any given moment. Consider your own personal computer or smart phone; how confident are you that you know exactly what background processes are running, what each one is responsible for, and why they are there in the first place?

1.1 Motivation

1.2 System Introspection and Observability

2 Background

2.1 Extended Berkeley Packet Filter

2.1.1 Linux Superpowers

2.1.2 The Verifier

2.1.3 eBPF Programs

2.1.4 XDP Programs

2.2 Intrusion Detection

2.3 Process Homeostasis

3 Implementing ebpH

4 Methodology

References

- [1] A. Starovoitov, “Tracing filters with bpf,” The Linux Foundation, RFC 0/5, Dec. 2013. [Online]. Available: <https://lkml.org/lkml/2013/12/2/1066>.
- [2] S. Goldstein, “The next linux superpower: Ebpf primer,” USENIX SRECon16 Europe, Jul. 2016. [Online]. Available: <https://www.usenix.org/conference/srecon16europe/program/presentation/goldshtein-ebpf-primer>.
- [3] *Iovisor/bcc*, Oct. 2019. [Online]. Available: <https://github.com/iovisor/bcc>.

Appendix A Testificate