Adwaith V. Gautham

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Blog: pwnthebox.net | CTF-team: ReasonablySuspiciousActivity

Research Interests

- My primary interests lie in Systems and Network security. I am interested in Reverse Engineering, Binary Analysis, Security vulnerabilities and Exploit development, Malware Analysis, Program Analysis. Offlate, I have been exploring security of the pre-OS state - Firmware analysis and security, TPM, Root-of-Trust and measurements, UEFI-BIOS etc., Please checkout my blog pwnthebox.net for more details and work.

Education

National Institute of Technology Karnataka — Mangalore, India
Bachelor of Technology in Computer Science and Engineering; CGPA: 7.62/10.00 — *August 2016 - May 2020*

Relevant Coursework: C Programming, Operating Systems, Systems Programming, Computer Organization and Architecture, Compiler Design, Computer Networks, Wireless Networks, Number Theory and Cryptography, Information Security, Network Security, Data Structures and Algorithms, Design and Analysis of Algorithms.

Experience

Cisco Systems — Bangalore, India
Software Engineer — *August 2020 - present*

- **TPM, Remote Attestation, Router Security, Trustworthy Path Routing**:
  - Contributed to the R&D of Trustworthy Path Routing. Refer latest IETF draft. Wrote infrastructure to parse and deserialize CBOR serialized data related to Trustworthy Path Routing. It deals with remote attestation and integrity verification of routers. In the process, learned about Trusted Platform Module, Root-of-Trust, Measurements.
  - Currently working on TPM and Software-TPM.

Cisco Systems — Bangalore, India
Software Engineering Intern — *May 2019 - July 2019*

- **High Fidelity Data Collection and Control Plane Telemetry**:
  - Enhanced Cisco's Packet Processing Framework in such a way that counters related to it could be extracted and used for monitoring purposes.
  - Designed and implemented a fast, efficient Zero-copy message passing API using Shared Memory to share large amounts of data among processes.
  - Learning: In-depth understanding of Router Architecture, Advanced C programming concepts, Fast Packet Processing Frameworks(VPP).

Skills

- **Programming Languages**: C, C++, Rust, x86/x64 Assembly, mips Assembly, Python, bash
- **Keywords**: Buffer Overflow, Control-Flow Hijacking, Shellcode, ROP, Ret2Libc, Malware, Static-Dynamic analysis, ELF, PE/COFF, UEFI, BIOS, Firmware, TPM, Instrumentation, LLVM, Solvers

Projects

- **ROP Compiler**: Tool which automates the process of ROP(Return Oriented Programming) Gadget chaining
  - Learning: Buffer Overflow Vulnerability, OS Security, Automating Exploit Development
- **libelfp**: An ELF Parsing Library written in Pure C. Work in progress
  - Learning: Understand the *NIX Executable and Linkable Format(ELF) in detail.
- **packcap**: Simple packet capture tool written in C
  - Learning: Understand internals of a packet sniffer and various protocol headers.
- **Mini C Compiler**: A Compiler for a subset of the C programming language
  - Learning: Implemented Lexer and Parser using Flex and Bison. Wrote Semantic Analyser and Intermediate Code Generator from scratch.
- **Implementation of PI AQM in Linux Kernel**:
  - Learning: Active Queue Management, Kernel Programming

Blog

- **pwnthebox.net**: A Systems and Security Blog
  - RE-BE Series: A series of articles on OS Security Vulnerabilities, Exploit Dev, Exploit Mitigation. Most of them are summaries, analyses and implementations of research papers.
  - Packet Overflow! : A series of articles to understand Computer Networks better. Work in progress.

Achievements

* University selection examinations:
  - Joint Entrance Examination Mains (National-level): Ranked 3033 out of 1.2 million candidates.
  - Joint Entrance Examination Advanced (National-level): Ranked 7290 out of 200,000+ candidates.
  - Karnataka Common Entrance Test (State-level): Ranked 17 out of 175,000+ candidates.

Service

* Headed the Systems and Security Research Group, Computer Society, IEEE-NITK, 2019-2020.
* Conducted college-level CTFs in 2018 and 2019 as part of Engineer, our annual technical fest.
* Headed the Computer Science Committee for Engineer'19, our technical fest.
* I like conducting talks and workshops on topics I find interesting.