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Vaibhav Hemant Dixit

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Summary

Graduate student researcher with 3 years of industry experience, seeking a full-time position in software development and cybersecurity engineering.

Education

Arizona State University, Tempe, AZ Master of Science, Computer Science ***May 2018, GPA 3.67***

Vellore Institute of Technology, Vellore, India Bachelor of Technology, Information Technology ***May 2013, GPA 3.6***

Technical Skills

Languages - C, Java, Python, Shell, JavaScript, D3, HTML, Yang

Skills - Pentesting, SDN, Openflow, TCP/IP, WLAN, REST, ELK, Git, Wireshark, Objdump, Gdb, Linux, Firewalls, Jenkins.

Courses – Software Security, Computer Networks, Algorithms, Operating Systems, Embedded OS Internals, Data Mining.

Professional Experience

Center for Cybersecurity and Digital Forensics, ASU (Graduate Research Assistant) ***Dec 2016 to present***

Designed a **novel** SDN-based **adaptive security** mechanism on ASU's Science-DMZ network. Continuous behavioral analysis of the attacker by propagating the attack to a quarantined research zone. **Devising** countermeasure generation algorithm on Elastic Search Cluster using attack graph with CVSS scores of compromised services. Results of this research proved useful in blacklisting IPs performing brute force attacks and for hardening campus network servers.

Samsung Electronics, India (Senior Software Engineer) ***Jul 2013 to Jun 2016***

Gained in-depth knowledge of 802.11 specification. Re-engineered Wi-Fi AP and P2P WLAN device drivers. Constructed 802.11 protocol based control plane networking features and unit tested Android kernel and supplicant. Implemented Open, WEP, WPA, WPA2 and 802.11w secured connection procedures for Wi-Fi driver and supplicant.

- Tirelessly improved the throughput and latency metrics and delivered the software for existing Samsung Android phones. Successfully submitted and reviewed critical kernel bug fixes under tight deadlines.
- The product finally was launched in Samsung Galaxy mid-tier series.

Recent Projects

- **SDN based flow policy conflict detection and resolution**: Single handedly designed a centralized SDN-Firewall application for **OpenFlow** policy conflict detection and dynamic violation resolution. Incorporated **Moving Target Defense** strategy for an unpredictable SDN network. Visualized the attack graph at the **Kibana** dashboard. Brainstorming and research produced a framework accepted at SDN-NFV conference. Additionally, performing continuous pentesting of SDN-controllers. Discovered an authentication vulnerability: CVE: **CVE-2017-1000406**
- **Attack Reflector**: An automated TCP/IP attack re-launch mechanism from victim to the attacker: Built a Python based network daemon to impersonate the victim IP addresses using **ARP spoofing and relaunch the attack** from victim to attacker. Used extensive libraries from Python Scapy packet for **Deep Packet Inspection** and modification.
- **Framework for exploit detection and patching in Capture the Flag competition**: Participated in a project based CTF game. Developed a Python vulnerability detection engine. Contributed to the defense framework to reverse engineer the binaries, patch the application/web vulnerabilities in real time. The team won the iCTF competition.
- **Embedded programming in Intel Quark based Galileo Board**: Project aimed to provide an understanding of internals of Linux and RTOS kernel architecture by implementing device drivers. Investigated Linux kernel source code including memory management, kernel synchronization, device driver design and trace, debug support. Programmed **ioctls**, **syscall** interface, **static and dynamic probes, MISC drivers**, etc.
- **Full-fledged compiler in C**: Developed a complete parser and compiler modules for lexical and semantic analysis.

Publications

- HONEYPROXY: **Design and Implementation of Next-Generation Honeynet via SDN**
  S. Kyung, W. Han, N. Tiwari, **Vaibhav Hemant Dixit**, L. Srinivas, Z. Zhao, A. Doupé, and G-J Ahn at **IEEE CNS - 2017**
- Science DMZ: **Software Defined Networking based Secured Cloud Testbed**
  A. Chowdhary, **Vaibhav Hemant Dixit**, N. Tiwari, S. Kyung, D. Huang and G-J Ahn at **NFV-SDN 2017**, Berlin

Miscellaneous activities: DIY projects on Raspberry-PI. Volunteer at Arizona Mentor Society. Avid biker and a runner.