1219 S Dorsey Ln Apt 101, Tempe AZ 85281 **Vaibhav Hemant Dixit**

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Summary

Graduate student with industry experience, seeking opportunities 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, Docker, Jenkins.
Courses - Software Security, Automated Binary Analysis, Algorithms, Operating Systems, Embedded OS, 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 performance metrics, reviewed and fixed critical kernel bug fixes under tight deadlines.
- The product finally was launched in Samsung Galaxy mid-tier series.

Recent Projects

- **Threat Modelling of SDN Controllers**: Security framework for pentesting SDN. Reported dictionary attack from north-bound APIs (**CVE-2017-1000406**) and denial of service attacks on datastores: (**CVE-2017-1000411**).

- **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. Pulled topology using southbound APIs and created **complicated** logical graph using network of flow rules. Real time propagation of dummy packets in graph validates reachability and security compliance between hosts.

- **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

- **Challenges and preparedness of SDN-based Firewalls** at ACM CODASPY SDNNFV Workshop 2018, Tempe, Arizona
Vaibhav Hemant Dixit, S. Kyung, Z. Zhao, A. Doupé, Y. Shoshitaishvili and G-J Ahn.

- Science DMZ: **Software Defined Networking based Secured Cloud Testbed** at IEEE NFV-SDN 2017, Berlin
A. Chowdhary, **Vaibhav Hemant Dixit**, N. Tiwari, S. Kyung, D. Huang and G-J Ahn.

- HONEYPROXY: **Design and Implementation of Next-Generation Honeynet via SDN** at IEEE CNS 2017
S. Kyung, W. Han, N. Tiwari, **Vaibhav Hemant Dixit**, L. Srinivas, Z. Zhao, A. Doupé, and G-J Ahn.