IoT Security Vulnerability: A Case Study of a Web Camera

Yogeesh Seralathan*, Tae (Tom) Oh**, Suyash Jadhav**, Jonathan Myers**, Jaehoon (Paul) Jeong+, Young Ho Kim^, and Jeong Neyo Kim^

*College of Computing and Information Sciences, Rochester Institute of Technology, Rochester, NY United States of America

**Department of Computing Security, Rochester Institute of Technology, Rochester, NY, United States of America

+ Department of Interaction, Science Sungkyunkwan University, Suwon, Republic of Korea

^Cyber Security Research Division, Electronics and Telecommunications Research Institute, Daejeon, Republic of Korea

ys4815@rit.edu, tom.oh@rit.edu, ssj8127@rit.edu, jlm4508@rit.edu, pauljeong@skku.edu, wtowto@etri.re.kr, jnkim@etri.re.kr

***Abstract*— The Internet of Things (IoT) are devices which are connected and controlled over the internet. The use of IoT devices has increased exponentially over time and knowingly or unknowingly our data is captured by IoT devices on a daily basis. Recent news on malware targeting IoT devices and some current research reveals that in most cases there are no security controls implemented on these devices. The exponential rise in the use of IoT devices, more processing of sensitive data by these devices, and their mass exploitation was the motivation behind our work. Malware like Mirai is currently being used to build large botnets which are used in DDoS attacks where up to 1.2 Terabytes of networks traffic is generated every second. We will discuss the threats when there is a compromise of an IoT device's security and provide a case study of an IP camera. We also cover aspects of how and why modern malware targets IoT devices specifically. We finally discuss the importance of securing IoT and provide essential security practices for mitigating device exploitation.**

***Keyword*— Internet of Things, security, vulnerability, Wire- Shark, nmap**

Yogeesh Seralathan received MS in Computer Science from Rochester Institute of Technology in 2017.

Tae (Tom) Oh (SM'09) received the B.S. degree in electrical engineering from Texas Tech University in 1991, and the M.S. and Ph.D. degrees in electrical engineering from Southern Methodist University in 1995 and 2001, respectively, while working for telecommunication and defense companies. He is currently an Associate Professor with the Department of Information Sciences and Technologies and the Department of Computing Security, Rochester Institute of Technology. His research includes mobile ad hoc networks, vehicle area networks, sensor networks, and mobile device security.

Suyash S. Jadhav born in Pune, INDIA on 31st March 1992. Holding Bachelor of Engineering in computer engineering form Pune University, India (2013); currently pursuing Master of Science in computing security at Rochester Institute of Technology.
He is currently working Google.

Jonathan L. Myers is currently pursuing his Bachelors of Science in Computing Security at the Rochester Institute of Technology.
He has worked as a Software Engineering Intern at Trademark Global in Lorain, Ohio. He currently works as a Research Assistant at the Rochester Institute of Technology. His areas of interest include binary exploitation, web application security, and security tool development.
Jonathan Myers is also an active member of the Security Practices and Research Student Association at the Rochester Institute of Technology.

Jaehoon (Paul) Jeong (M'12) received the B.S. degree from the Department of Information Engineering, Sungkyunkwan University, in 1999, the M.S. degree from the School of Computer Science and Engineering, Seoul National University, South Korea, in 2001, and the Ph.D. degree from the Department of Computer Science and Engineering, University of Minnesota, in 2009. He is currently an Assistant Professor

with the Department of Software, Sungkyunkwan University. His research interests include Internet of Things, vehicular networks, wireless sensor networks, and mobile ad hoc networks. He is a member of the ACM and the IEEE Computer Society.

Youngho Kim received his MS and BS degree in Computer Science from Korea University, Korea, in 1999 and 2001 respectively. He was a visiting research scholar at Rochester Institute of Technology (RIT) in 2013 and 2014. Since 2002, He has been a senior member of engineering staff at the Electronics and Telecommunications Research Institute (ETRI). His research interests include operating system, embedded system and mobile device security.

Jeongnyeo Kim received her MS degree and Ph.D. in Computer Engineering from Chungnam National University, Korea, in 2000 and 2004, respectively. She studied at computer science from the University of California, Irvine, USA in 2005. Since 1988, she has been a principal member of engineering staff at the Electronics and Telecommunications Research Institute (ETRI), where she is currently working as a management director of the Cyber Security System Research Department. Her research interests include mobile security, secure operating system, network security and system security