

Guest Editorial

Network security is a continuing endeavor as exhibited by this special issue on the subject. Although the problem of securing networks emerged almost simultaneously with their development, attaining a fixed set of complete solutions remains evasive. In the history of the development of computers and networking, solutions to challenging problems have become touchstones, and from among them we can draw a parallel to the current state of network development. The book¹ *Journey to the Moon: the History of the Apollo Guidance Computer* by Eldon C. Hall, offers one such touchstone. The unprecedented requirements for a manned lunar landing compelled the computer designers to adopt, at that time, new yet unproven technology – the integrated circuit (IC). To mitigate risk, they standardized the design of the computer on a single circuit type – the NOR gate in Resistor-Transistor-Logic (RTL). In the book, one of the computer designers, Jayne Partridge Hanley, poetically captured the benefits from a singularity of IC-type when she wrote these verses for “IC the Moon”:

It also had to be reliable
And large quantity buyable
As the parts failed
The causes we nailed
Making the process viable.

Today, we are witnessing a parallel in the adoption of the Internet Protocol (IP). IP convergence is the trend where the IP is becoming the standard transport for transmitting all information (voice, data, music, video, TV, teleconferencing, etc.). Although the motivation for this convergence is not necessarily for mitigating failures, one of the derived benefits it offers is that network security can focus on the IP instead of a plethora of transport protocols. This singularity can yield a network that is more robust to attack. However, the transport layer is but one of several layers in the network protocol stack, and this distinction indicates the primary difference between computer security and network security: the former is concerned with securing a single machine whereas the latter must be concerned with securing many machines connected together. Networks, therefore, admit scale and decentralization. These properties, coupled with the richness of the protocol stack, mean that networks have the capability to incorporate vastly different – and changing – technologies and implementations. Network security is thus prohibited from becoming a single act; instead, network security is a process. Therefore, our aim, in this special issue, is toward “making the process viable”.

We contend that this process’s viability is enhanced with early access to innovation, and this special issue’s papers are meaningful samples of such innovation. The first three papers set the tone by underscoring how a network’s exposure to threats motivates new approaches to network security. These papers are: “Detecting and Locating Man-in-the-Middle Attacks in Fixed Wireless Networks” by Ziqian Dong, Randolph Espejo, Yu Wan and Wenjie Zhuang; “Analysis on the Performance of Server-less RFID Searching Protocol” by Ping Huang, Haibing Mu and Fei Zeng; and “A Risk and Similarity Aware Application Recommender System” by Xiaoyuan Liang, Jie Tian, Xiaoning Ding and Guiling Wang.

¹ Eldon C. Hall, *Journey to the Moon: the History of the Apollo Guidance Computer*, American Institute of Aeronautics and Astronautics, 1996.

To many in the network security field, confidentiality is supreme, so this important topic is addressed by the following papers in this issue: “Building Secure and Fast Cryptographic Hash Functions Using Programmable Cellular Automata” by Alaa Eddine Belfedhal and Kamel Mohamed Faraoun; and “Hardware Accelerator Approach Towards Efficient Biometric Cryptosystems for Network Security” by Charles McGuffey, Chen Liu and Stephanie Schuckers.

Among the latest technology trends is cloud computing, and networking is a fundamental part of the cloud. We selected a paper for this special issue that addresses some of the underlying network security-related concerns of this technology: “Protecting User Privacy for Cloud Computing by Bivariate Polynomial Based Secret Sharing” by Ching-Nung Yang, Jia-Bin Lai and Zhangjie Fu.

With this special issue we set forth to raise awareness of new, potential solutions to network security. Like the designers of the Apollo Guidance Computer whose awareness of nascent IC technology enabled them to make important gains, those concerned with network security are also obliged to be aware of new, potential solutions.

Hong Zhao
Fairleigh Dickinson University

Kevin Kwiat²
Air Force Research Laboratory

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² Approved for Public Release; Distribution Unlimited: 88ABW-2015-3374 20150702