THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

Developing an Internet and Blockchain Emulator for Research and Education

by

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Time   : 3:00pm to 4:00pn
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Abstract

To provide a learning and testing environment for cybersecurity and network, we have developed an open-source Internet Emulator (called SEED Emulator), which allows us to create a miniature Internet that can run inside a single personal machine or on multiple cloud machines. Even though it is small, it has all the essential elements of the real Internet. Many interesting network technologies can be deployed on the emulator. We have used this emulator to create a DNS infrastructure, a Botnet, a Darknet, an Internet worm, and BGP prefix hijacking attacks. We have also deployed the Ethereum blockchain on the emulator, creating a Blockchain emulator with tens or even hundreds of nodes, all inside a single computer. We are currently extending this work to emulate wireless ad hoc networks.

This emulator was initially developed for education uses, but since it was released in 2021, many research groups have started to use it for their research in the cybersecurity, blockchain, and networking fields. In this talk, I will present the design and features of the SEED emulator and its applications in both research and education. I will also demonstrate some of the interesting activities using the emulator.

Biography

Dr. Wenliang (Kevin) Du, IEEE Fellow, is the Laura J. and L. Douglas Meredith Professor at Syracuse University. His current research interest focuses on Internet/blockchain emulation and cybersecurity education. He received his bachelor's degree from the University of Science and Technology of China in 1993 and Ph.D. degree from Purdue University in 2001. He founded the SEED-Labs open-source project in 2002. The cybersecurity lab exercises developed from this project are now being used by 1,060 institutes worldwide. His self-published book, "*Computer & Internet Security: A Hands-on Approach*", has been adopted as textbook by 258 institutes. He is the recipient of the 2017 Academic Leadership award from the 21st Colloquium for Information System Security Education. His research has been sponsored by multiple grants from the National Science Foundation and Google. He is a recipient of the 2021 ACSAC Test-of-Time Award and the 2013 ACM CCS Test-of-Time Award.

** ALL ARE WELCOME **