

Le Guan

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Education

Ph.D., Information Security, Institute of Information Engineering, CAS, Jan. 2015

Dissertation: “Research on the Protection of Cryptographic Keys in Commodity Platform”, in Chinese

Advisor: Jiwu Jing

B.S., Information Security, University of Science and Technology of China, 2009.

Dissertation: “Public Key Infrastructure (PKI) Deployment in Mobile Environment”, in Chinese

Advisor: Jiwu Jing

Employment

04/15 - present

Post-Doc reseacher at IST, the penn state university.

Advisor: Peng Liu

Fields of Research Interest

Defense techniques for memory disclosure attacks.

Using hardware features to augment the protection of credential data.

Security techniques for ARM platform.

Research

Peer-Reviewed Publications

1. **Le Guan**, Peng Liu, Xinyu Xing, Xinyang Ge, Shengzhi Zhang, Meng Yu, and Trent Jaeger (2017). TrustShadow: Secure Execution of Unmodified Applications with ARM TrustZone. *Proceedings the 15th ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)*.
2. **Le Guan**, Jun Xu, Shuai Wang, Xinyu Xing, Lin Lin, Heqing Huang, Peng Liu, and Wenke Lee (2016). From Physical to Cyber: Escalating Protection for Personalized Auto Insurance. *Proceedings of the 14th ACM Conference on Embedded Network Sensor Systems (SenSys)*.
3. Jingqiang Lin, **Le Guan**, Ziqiang Ma, Bo Luo, Luning Xia, and Jiwu Jing (2016). Copker: A Cryptographic Engine against Cold-Boot Attacks. *IEEE Transactions on Dependable and Secure Computing*.
4. Jingqiang Lin, Bo Luo, **Le Guan**, and Jiwu Jing (2016). Secure Computing Using Registers and Caches: The Problem, Challenges, and Solutions. *IEEE Security & Privacy*.
5. **Le Guan**, Jingqiang Lin, Bo Luo, Jiwu Jing and Jing Wang (2015). Protecting Private Keys against Memory Disclosure Attacks using Hardware Transactional Memory. *the 36th IEEE Symposium on Security and Privacy (Oakland)*. San Jose, CA, USA, May 18-20, 2015. Acceptance rate: 55/407=13.5%.

6. **Le Guan**, Fengjun Li, Jiwu Jing, Jing Wang and Ziqiang Ma (2014). virtio-ct: A Secure Cryptographic Token Service in Hypervisors. *International Workshop on Data Protection in Mobile and Pervasive Computing (DAPRO) in conjunction with 10th International Conference on Security and Privacy in Communication Networks (SecureComm)*. Beijing, China, September 23, 2014.
7. **Le Guan**, Jingqiang Lin, Bo Luo and Jiwu Jing (2014). Copker: Computing with Private Keys without RAM. *the 21st Annual Network and Distributed System Security Symposium (NDSS)*. San Diego, California, USA, February 23-26, 2014. Acceptance rate: 18%.
8. Jing Wang, **Le Guan**, Limin Liu and Daren Zha (2014). Implementing a Covert Timing Channel Based on Mimic Function. *Information Security Practice and Experience (ISPEC)*. Springer International Publishing, 2014. 247-261.
9. Jing Wang, Peng Liu, Limin Liu, **Le Guan**, Jiwu Jing (2013). Fingerprint Embedding: A Proactive Strategy of Detecting Timing Channels. *Information and Communications Security (ICICS)*. Springer International Publishing, 2013. 229-244.

Projects

Protecting Enterprise IoT: From Defeating Mirai to a Clean-slate Design for Identity and Access Management

2017 - current, IST, Penn State Univ., US

We propose to develop a near-term solution, which fights with Mirai and other Scan-Load-Bot malware, and a longer term solution, which is a new way to do identity and access management.

Targeted Encryption of Sensitive Data for Android

2017 - current, IST, Penn State Univ., US

We developed a system that keeps track of sensitive data, and ensures that plain-text sensitive data never appear in DRAM using encryption technique.

Large-scale Malware Analysis Platform

2017 - current, IST, Penn State Univ., US

We developed a system that can quickly restore a clean execution environment for Android. This is particularly useful for large-scale malware analysis.

Auto-correcting Password Without Downgrading Security

2017 - current, IST, Penn State Univ., US

We design a client side scheme to auto-correct passwords input due to simple typos.

Memory Encryption for ARM Devices

2016 - 2017, IST, Penn State Univ., US

We developed a system that transparently encrypts the private data segments of a program on ARM platform.

Secure Applications on Hostile Environment For ARM

2015 - 2016, IST, Penn State Univ., US

A system utilizing ARM TrustZone feature to shield the execution of trusted applications in face of a malicious OS.

Secure Private Cloud

2013 - 2014, IIE, CAS, China

Private Cloud Environment Based on Rethat Enterprise Virtualization

Customized deployment with security in mind (virtual cryptographic token, Chinese cryptography integration)

Ultra-high Speed Crypto Machine

2013 - 2014, IIE, CAS, China

500,000 sign operation per second, owing to the extreme optimization of GPU-based implementation

Net-attached architecture, with conformation to standard PKCS#11 interface

Code Packer

2012 - 2012, IIE, CAS, China

A Component of S-SIM Secure Key Container

Customized packer for Android ELF binary. DES/AES/RC2/RC5

PKI Interoperation

2012 - 2012, IIE, CAS, China

A demo system that measures the interoperation level of both PKI server and client

OCSP server, LDAP crawler that dumps all certificates

Professional Service

Journal Reviewer

IEEE Transactions on Dependable and Secure Computing (TDSC)

Technical Program Committee

SecureComm 2017

Conference Reviewer

ESORICS 2016, FC 2016, ThrustCom 2016

Student Mentoring

Congwu Li, PhD candidate, IIE, CAS

Supervise the student on developing an OS-agnostic system that is resilient to memory attacks.

Bingyu Li, PhD candidate, IIE, CAS

Supervise the student on building virtualized cryptographic services.

Awards

National Scholarship (Awarded by Ministry of Education, China)

Institute of Information Engineering, CAS, 2013.

Institute Director Award

Institute of Information Engineering, CAS, 2013.

Merit Student

University of Chinese Academy of Sciences, CAS, 2012.

Outstanding Undergraduate Thesis Award of USTC

University of Science and Technology of China, 2009.

Outstanding Undergraduate of USTC

University of Science and Technology of China, 2009.

National Endeavor Scholarship

University of Science and Technology of China, 2008.

Outstanding Student Scholarship of USTC (second grade)

University of Science and Technology of China, 2007.

Outstanding Freshman Scholarship of USTC (third grade)

University of Science and Technology of China, 2005.

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