Yingdi Yu

CONTACT INFORMATION

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RESEARCH INTERESTS

Named-Data Network, Network Security System, DNS, Network Measurement

EDUCATION

University of California, Los Angeles, USA

Ph.D. student in Computer Science **Sep. 2010 – present**

- Expected graduation date: June 2015
- Advisors: Professor Lixia Zhang (http://www.cs.ucla.edu/∼lixia/)

Shanghai Jiao Tong University, China

M.S. in Electrical Engineering **Sep. 2007 – Mar. 2010**

Shanghai Jiao Tong University, China

B.S. in Electrical Engineering **Sep. 2003 – Mar. 2007**

PROJECTS

ndn-cxx (ongoing)
ndn-cxx is a C++ library, implementing Named Data Networking (NDN) primitives that can be used to implement various NDN applications. ndn-cxx is the only library that provides effective security support for NDN applications. In this project, I designed and implemented the security part of the library, including key management, validation framework, trust management, and etc..
https://github.com/named-data/ndn-cxx

ChronoSync/ChronoChat
ChronoSync is a decentralized synchronization protocol in Named Data Networking (NDN). I improved the original design by solving the scalability problems and provided a new library implementation for NDN applications. The new library is demonstarted through ChronoChat, a multi-party decentralized chat application in NDN.
https://github.com/bruinfish/ChronoSync
https://github.com/named-data/ChronoChat

Signature logger (ongoing)
In NDN, the security model shifts from connection-oriented security to obejct-oriented security. However, the lifetime of objects may not match the lifetime of object's signature. We solved this problem by providing a distributed signature logger, which records the history of signatures and can be audited. With this system, an "expired" signature can still be validated with the history information stored in the logger.
https://github.com/bruinfish/sig-logger

Name-based Access Control (ongoing)
We explored content-based confidentiality as another pillar of NDN security. Content is encrypted at the time of production, so that its secrecy is independent of any intermediate devices including routers, data storage, proxies. We designed name-based access control protocol and implemented a application level library to facilitate content encryption and key distribution in order to fully support content-based confidentiality in NDN.
https://github.com/named-data/ndn-group-encrypt

Secure multi-party NDN communication using Web-of-Trust
Although traditional hierachical trust model has been widely used in many NDN applications, it may not be the perfect trust model for all the NDN applications. In this project, we experimented Web-of-Trust in securing ChronoChat as a step to explore other trust models for NDN applications.

Measure deployment of DNS validators
DNSSEC deployment is still in progress. In this project, we measured the deployment of DNSSEC at the resolver side. We designed a set of tools to detect DNSSEC validation behaviors and identify the implementation of DNSSEC validators. We also infer the impact of DNSSEC deployment on end users.
http://validator-search.verisignlabs.com/

Behavior analysis of DNS caching resolvers
The behavior of DNS caching resolvers can directly affect the performance of DNS resolution and the workload of DNS authoritative servers. In this project, we investigated the behavior of six popular caching resolver implementations, especially focusing on the authoritative server selection. Our results revealed some flaws in the algorithm design and implementation. The result could also be used to passively identify the implementation of DNS caching resolvers.

Teaching

University of California, Los Angeles, USA

Teaching Assistant

Teaching assistant for undergraduate courses in Computer Science Department, including:
CS 31: Introduction to Computer Science (Fall 2011)
CS 35: Software Construction Lab (Winter 2012, Fall 2012)
CS 118: Network Fundamentals (Spring 2012, Winter 2013, Spring 2013, Winter 2015)

Publications

Yingdi Yu, Alexander Afanasyev, David Clark, kc claffy, Van Jacobson, and Lixia Zhang "Schematizing Trust in Named Data Networking", *ACM Information Centric Networking (ICN)*, 2015.

Alexander Afanasyev, Zhenkai Zhu, Yingdi Yu, Lijing Wang, Lixia Zhang "The Story of ChronoShare, or How NDN Brought Distributed Secure File Sharing Back", *IEEE MASS 2015 Workshop on Content-Centric Networks*, October 2015

Yingdi Yu, Duane Wessels, Matt Larson, and Lixia Zhang "Check-R: A New Method of Measuring DNSSEC Validating Resolvers", *INFOCOM 2013 workshop on Traffic Measurement Analysis*, 2013.

Yingdi Yu, Duane Wessels, Matt Larson, and Lixia Zhang "Authoritative Name Server Selection of DNS Caching Resolvers", *ACM SIGCOMM Computer Communication Review*, Apr. 2012.

Yingdi Yu "Public Key Management in Named Data Networking", *NDN, Technical Report NDN-0029*, Apr. 2015

Yingdi Yu, Alexander Afanasyev, Zhenkai Zhu, and Lixia Zhang "An Endorsement-based Key Management System for Decentralized NDN Chat Application", *NDN, Technical Report NDN-0023*, Jul. 2014

Yingdi Yu, Yaohui Jin, Weiqiang Sun, Wei Guo, and Weisheng Hu "On the Efficiency of Inter-Domain State Advertising in Multi-Domain Networks", *IEEE Global Communications Conference*, Nov. 2009.

Hong Cheng, Yaohui Jin, Yu Gao, Yingdi Yu, Weisheng Hu, and Nirwan Ansari "Per-flow Resequencing in Load-Balanced Switches by Using Dynamic Mailbox Sharing", *IEEE International Conference on Communication*, May. 2008.

Programming

C++, Perl, Python, SQL, Java.