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Hardware Oriented Authenticated Encryption Based on Tweakable Block Ciphers The Design of Authenticated Encryption Scheme Base on Error-Propagation Fast Software Encryption Study of Authenticated Encryption Scheme Fast Software Encryption Advances in Cryptology - ASIACRYPT 2000 Advances in Cryptology -- ASIACRYPT 2014 Authenticated Encryption in the Symmetric and Asymmetric Settings Experimental Review of Authenticated Encryption Algorithms for Android Fast Software Encryption Multimedia Encryption and Authentication Techniques and Applications Fast Software Encryption Design and Cryptanalysis of a Customizable Authenticated Encryption Algorithm Fast Software Encryption API Security in Action Selected Areas in Cryptography Selected Areas in Cryptography - SAC 2015 Fast Software Encryption Selected Areas in Cryptography -- SAC 2013 Authenticated Encryption in Hardware Advances in Cryptology -- ASIACRYPT 2014 Advances in Cryptology - CRYPTO 2001 Real-World Cryptography Protocols for Authentication and Key Establishment Analysis and Design of Authentication and Encryption Algorithms for Secure Cloud Systems A Hardware Benchmarking Platform for the Standardization of Authenticated Encryption Algorithms Design, Analysis, and Implementation of Symmetric-key (Authenticated) Ciphers Authenticated Encryption in Practice Advances in Cryptology – EUROCRYPT 2014 Security without Obscurity Applied Cryptography and Network Security Advances in Cryptology -- ASIACRYPT 2014 Topics in Cryptology –- CT-RSA 2015 Information Technology Selected Areas in Cryptography The Modern Cryptography Cookbook Progress in Cryptology – INDOCRYPT 2021 Progress in Cryptology – LATINCRYPT 2012 Manticore and CS Mode Serious Cryptography

Topics in Cryptology –- CT-RSA 2015 Nov 23 2020 This book constitutes the refereed proceedings of the Cryptographer's Track at the RSA Conference 2015, CT-RSA 2015, held in San Francisco, CA, USA, in April 2015. The 26 papers presented in this volume were carefully reviewed and selected from 111 submissions. The focus of the track is on following subjects: timing attacks, design and analysis of block ciphers, attribute and identity based encryption, membership,

secure and efficient implementation of AES based Cryptosystems, chosen ciphertext attacks in theory and practice, algorithms for solving hard problems, constructions of hash functions and message authentication codes, secure multiparty computation, authenticated encryption, detecting and tracing malicious activities, implentation attacks on exponentiation algorithms and homomorphic encryption and its applications.

Advances in Cryptology -- ASIACRYPT 2014 Dec 05 2021 The two-volume set LNCS 8873 and 8874 constitutes the refereed proceedings of the 20th International Conference on the Theory and Applications of Cryptology and Information Security, ASIACRYPT 2014, held in Kaoshiung, Taiwan, in December 2014. The 55 revised full papers and two invited talks presented were carefully selected from 255 submissions. They are organized in topical sections on cryptology and coding theory; authenticated encryption; symmetric key cryptanalysis; side channel analysis; hyperelliptic curve cryptography; factoring and discrete log; cryptanalysis; signatures; zero knowledge; encryption schemes; outsourcing and delegation; obfuscation; homomorphic cryptography; secret sharing; block ciphers and passwords; black-box separation; composability; multi-party computation.

API Security in Action Jun 11 2022 API Security in Action teaches you how to create secure APIs for any situation. By following this hands-on guide you'll build a social network API while mastering techniques for flexible multi-user security, cloud key management, and lightweight cryptography. Summary A web API is an efficient way to communicate with an application or service. However, this convenience opens your systems to new security risks. API Security in Action gives you the skills to build strong, safe APIs you can confidently expose to the world. Inside, you'll learn to construct secure and scalable REST APIs, deliver machine-to-machine interaction in a microservices architecture, and provide protection in resource-constrained IoT (Internet of Things) environments. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology APIs control data sharing in every service, server, data store, and web client. Modern data-centric designs—including microservices and cloud-native applications—demand a comprehensive, multi-layered approach to security for both private and public-facing APIs. About the book API Security in Action teaches you how to create secure APIs for any situation. By following this hands-on guide you'll build a social network API while mastering techniques for flexible multi-user security, cloud key management, and lightweight cryptography. When you're done, you'll be able to create APIs that stand up to complex threat models and hostile environments. What's inside Authentication Authorization Audit logging Rate limiting Encryption About the reader For developers with experience building RESTful APIs. Examples are in Java. About the author Neil Madden has in-depth knowledge of applied cryptography, application security, and current API security technologies. He holds

a Ph.D. in Computer Science. Table of Contents PART 1 - FOUNDATIONS 1 What is API security? 2 Secure API development 3 Securing the Natter API PART 2 - TOKEN-BASED AUTHENTICATION 4 Session cookie authentication 5 Modern token-based authentication 6 Self-contained tokens and JWTs PART 3 - AUTHORIZATION 7 OAuth2 and OpenID Connect 8 Identity-based access control 9 Capability-based security and macaroons PART 4 - MICROSERVICE APIs IN KUBERNETES 10 Microservice APIs in Kubernetes 11 Securing service-to-service APIs PART 5 - APIs FOR THE INTERNET OF THINGS 12 Securing IoT communications 13 Securing IoT APIs

Selected Areas in Cryptography - SAC 2015 Apr 09 2022 This book contains revised selected papers from the 22nd International Conference on Selected Areas in Cryptography, SAC 2015, held in Sackville, NB, Canada in August 2015. The 26 full papers and 3 short papers presented in this volume were carefully reviewed and selected from 91 submissions. They are organized in topical sections named: privacy enhancing technologies; cryptanalysis of symmetric-key primitives; implementation of cryptographic schemes; short papers; privacy preserving data processing; side channel attacks and defenses; new cryptographic constructions; authenticated encryption; on the hardness of mathematical problems; and cryptanalysis of authenticated encryption schemes.

A Hardware Benchmarking Platform for the Standardization of Authenticated Encryption Algorithms Jun 30 2021

Advances in Cryptology - CRYPTO 2001 Nov 04 2021 This book constitutes the refereed proceedings of the 21st Annual International Cryptology Conference, CRYPTO 2001, held in Santa Barbara, CA, USA in August 2001. The 33 revised full papers presented were carefully reviewed and selected from a total of 156 submissions. The papers are organized in topical sections on foundations, traitor tracing, multi-party computation, two-party computation, elliptic curves, OAEP, encryption and authentication, signature schemes, protocols, cryptanalysis, applications of group theory and coding theory, broadcast and secret sharing, and soundness and zero-knowledge.

Advances in Cryptology -- ASIACRYPT 2014 Dec 25 2020 The two-volume set LNCS 8873 and 8874 constitutes the refereed proceedings of the 20th International Conference on the Theory and Applications of Cryptology and Information Security, ASIACRYPT 2014, held in Kaoshiung, Taiwan, in December 2014. The 55 revised full papers and two invited talks presented were carefully selected from 255 submissions. They are organized in topical sections on cryptology and coding theory; authenticated encryption; symmetric key cryptanalysis; side channel analysis; hyperelliptic curve cryptography; factoring and discrete log; cryptanalysis; signatures; zero knowledge; encryption schemes; outsourcing and delegation; obfuscation; homomorphic cryptography; secret sharing; block ciphers and passwords; black-box separation; composability; multi-party computation.

Fast Software Encryption Nov 16 2022 This book constitutes the thoroughly refereed post-conference proceedings of the 20th International Workshop on Fast Software Encryption, held in Singapore, March 11-13, 2013. The 30 revised full papers presented were carefully reviewed and selected from 97 initial submissions. The papers are organized in topical sections on block ciphers, lightweight block ciphers, tweakable block ciphers, stream ciphers, hash functions, message authentication codes, provable security, implementation aspects, lightweight authenticated encryption, automated cryptanalysis, Boolean functions.
Progress in Cryptology – LATINCRYPT 2012 Jun 18 2020 This book constitutes the proceedings of the 2nd International Conference on Cryptology and Information Security in Latin America, LATINCRYPT 2012, held in Santiago, Chile, on October 7-10, 2012. The 17 papers presented together with four invited talks and one student poster session were carefully reviewed and selected from 47 submissions. The papers are organized in topical sections on elliptic curves, cryptographic protocols, implementations, foundations, and symmetric-key cryptography.
Manticore and CS Mode May 18 2020 We describe a new mode of encryption with inexpensive authentication, which uses information from the internal state of the cipher to provide the authentication. Our algorithms have a number of benefits: (1) the encryption has properties similar to CBC mode, yet the encipherment and authentication can be parallelized and/or pipelined, (2) the authentication overhead is minimal, and (3) the authentication process remains resistant against some IV reuse. We offer a Manticore class of authenticated encryption algorithms based on cryptographic hash functions, which support variable block sizes up to twice the hash output length and variable key lengths. A proof of security is presented for the MTC4 and Pepper algorithms. We then generalize the construction to create the Cipher-State (CS) mode of encryption that uses the internal state of any round-based block cipher as an authenticator. We provide hardware and software performance estimates for all of our constructions and give a concrete example of the CS mode of encryption that uses AES as the encryption primitive and adds a small speed overhead (10-15%) compared to AES alone.
Authenticated Encryption in Hardware Jan 06 2022
Security without Obscurity Feb 24 2021 The traditional view of information security includes the three cornerstones: confidentiality, integrity, and availability; however the author asserts authentication is the third keystone. As the field continues to grow in complexity, novices and professionals need a reliable reference that clearly outlines the essentials. Security without Obscurity: A Guide to Confidentiality, Authentication, and Integrity fills this need. Rather than focusing on compliance or policies and procedures, this book takes a top-down approach. It shares the author’s knowledge, insights, and observations about information security based on his experience developing dozens of ISO Technical

Committee 68 and ANSI accredited X9 standards. Starting with the fundamentals, it provides an understanding of how to approach information security from the bedrock principles of confidentiality, integrity, and authentication. The text delves beyond the typical cryptographic abstracts of encryption and digital signatures as the fundamental security controls to explain how to implement them into applications, policies, and procedures to meet business and compliance requirements. Providing you with a foundation in cryptography, it keeps things simple regarding symmetric versus asymmetric cryptography, and only refers to algorithms in general, without going too deeply into complex mathematics. Presenting comprehensive and in-depth coverage of confidentiality, integrity, authentication, non-repudiation, privacy, and key management, this book supplies authoritative insight into the commonalities and differences of various users, providers, and regulators in the U.S. and abroad.

Real-World Cryptography Oct 03 2021 "A staggeringly comprehensive review of the state of modern cryptography. Essential for anyone getting up to speed in information security." - Thomas Doylend, Green Rocket Security An all-practical guide to the cryptography behind common tools and protocols that will help you make excellent security choices for your systems and applications. In Real-World Cryptography, you will find: Best practices for using cryptography Diagrams and explanations of cryptographic algorithms Implementing digital signatures and zero-knowledge proofs Specialized hardware for attacks and highly adversarial environments Identifying and fixing bad practices Choosing the right cryptographic tool for any problem Real-World Cryptography reveals the cryptographic techniques that drive the security of web APIs, registering and logging in users, and even the blockchain. You'll learn how these techniques power modern security, and how to apply them to your own projects. Alongside modern methods, the book also anticipates the future of cryptography, diving into emerging and cutting-edge advances such as cryptocurrencies, and post-quantum cryptography. All techniques are fully illustrated with diagrams and examples so you can easily see how to put them into practice. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Cryptography is the essential foundation of IT security. To stay ahead of the bad actors attacking your systems, you need to understand the tools, frameworks, and protocols that protect your networks and applications. This book introduces authentication, encryption, signatures, secret-keeping, and other cryptography concepts in plain language and beautiful illustrations. About the book Real-World Cryptography teaches practical techniques for day-to-day work as a developer, sysadmin, or security practitioner. There's no complex math or jargon: Modern cryptography methods are explored through clever graphics and real-world use cases. You'll learn building blocks like hash functions and signatures; cryptographic protocols like HTTPS and secure messaging; and cutting-edge

advances like post-quantum cryptography and cryptocurrencies. This book is a joy to read—and it might just save your bacon the next time you're targeted by an adversary after your data. What's inside Implementing digital signatures and zero-knowledge proofs Specialized hardware for attacks and highly adversarial environments Identifying and fixing bad practices Choosing the right cryptographic tool for any problem About the reader For cryptography beginners with no previous experience in the field. About the author David Wong is a cryptography engineer. He is an active contributor to internet standards including Transport Layer Security. Table of Contents PART 1 PRIMITIVES: THE INGREDIENTS OF CRYPTOGRAPHY 1 Introduction 2 Hash functions 3 Message authentication codes 4 Authenticated encryption 5 Key exchanges 6 Asymmetric encryption and hybrid encryption 7 Signatures and zero-knowledge proofs 8 Randomness and secrets PART 2 PROTOCOLS: THE RECIPES OF CRYPTOGRAPHY 9 Secure transport 10 End-to-end encryption 11 User authentication 12 Crypto as in cryptocurrency? 13 Hardware cryptography 14 Post-quantum cryptography 15 Is this it? Next-generation cryptography 16 When and where cryptography fails

Fast Software Encryption Apr 21 2023 This book constitutes the thoroughly refereed post-conference proceedings of the 19th International Workshop on Fast Software Encryption, held in Washington, DC, USA, in March 2012. The 24 revised full papers presented together with 1 invited talk were carefully reviewed and selected from 89 initial submissions. The papers are organized in topical sections on block ciphers, differential cryptanalysis, hash functions, modes of operation, new tools for cryptanalysis, new designs and Keccak.

Selected Areas in Cryptography Sep 21 2020 This book contains revised selected papers from the 28th International Conference on Selected Areas in Cryptography, SAC 2021, held as a virtual event September and October 2021.* The 23 full papers presented in this volume were carefully reviewed and selected from 60 submissions. They cover the following research areas: design and analysis of symmetric key primitives and cryptosystems, including block and stream ciphers, hash functions, MAC algorithms, and authenticated encryption schemes, efficient implementations of symmetric and public key algorithms, mathematical and algorithmic aspects of applied cryptology, and secure elections and related cryptographic constructions. *The conference was originally planned to take place at the University of Victoria, BC, Canada. Due to the COVID-19 pandemic, it was held virtually.

Design and Cryptanalysis of a Customizable Authenticated Encryption Algorithm Aug 13 2022 "It is common knowledge that encryption is a useful tool for providing confidentiality. Authentication, however, is often overlooked. Authentication provides data integrity; it helps ensure that any tampering with or corruption of data is detected. It also provides assurance of message origin. Authenticated encryption (AE) algorithms provide both confidentiality and

integrity / authenticity by processing plaintext and producing both ciphertext and a Message Authentication Code (MAC). It has been shown too many times throughout history that encryption without authentication is generally insecure. This has recently culminated in a push for new authenticated encryption algorithms. There are several authenticated encryption algorithms in existence already. However, these algorithms are often difficult to use correctly in practice. This is a significant problem because misusing AE constructions can result in reduced security in many cases. Furthermore, many existing algorithms have numerous undesirable features. For example, these algorithms often require two passes of the underlying cryptographic primitive to yield the ciphertext and MAC. This results in a longer runtime. It is clear that new easy-to-use, single-pass, and highly secure AE constructions are needed. Additionally, a new AE algorithm is needed that meets stringent requirements for use in the military and government sectors. This thesis explores the design and cryptanalysis of a novel, easily customizable AE algorithm based on the duplex construction. Emphasis is placed on designing a secure pseudorandom permutation (PRP) for use within the construction. A survey of state of the art cryptanalysis methods is performed and the resistance of our algorithm against such methods is considered. The end result is an algorithm that is believed to be highly secure and that should remain secure if customizations are made within the provided guidelines."--Abstract.

The Modern Cryptography Cookbook Aug 21 2020 Learning cryptography and security is fun instead of saying it hard or Complex. This book have concepts, examples of Cryptography principle followed with Applied Cryptography. Chapters presented in this book are independent and can be read in any order. Most of the example utilizes openssl. In Summary you are going to learn and explore below topics URL Encode Decode, Base64 Encode Decode, ASCII string to hex, Convert ASCII to Hex, PEM Formats, Cryptography Algorithms, Symmetric Key cryptography, Authenticated encryption, Types of Asymmetric Key Algorithms, Quantum Breakable Algorithms, Quantum Secure Algorithms, Cryptography Algorithms, Symmetric Key cryptography, Block ciphers Modes of Operation, Authenticated encryption (both encryption and message integrity)Quantum Breakable AlgorithmsQuantum Secure AlgorithmsAES (Encryption/Decryption), DES (Encryption/Decryption), 3DES (Encryption/Decryption)BlowFish(Encryption/Decryption), RC4 (Encryption/Decryption)Assymtetric Key Cryptography, RSA (Encryption/Decryption), DSA (Keygen,Sign File,Verify Sig), PKI, TLS v1.3, ECDSA Key exchange, Diffie-Hellman, Message Digests, MAC (Message Authentication Codes), HMAC Generate HMAC, Secure Password Hashing bcrypt password hash PBKDF2 (PBE Encryption/Decryption)scrypt password hash Crypt hash functions and limitation, MD5 password generate Generate password for /etc/passwordCipher SuiteManaging Certificates.(Self Sign/rootCA, create

ecc,rsa,dsa certificates)SMIMEGPG (Sign/verify/store,create Authentication Key)GnuPG for SSH authenticationHardening Modern Certificates & TLS ConfigurationNginx Secure Configuration ()Apache Secure ConfigurationHAProxy Secure ConfigurationAWS ELB Secure ConfigurationTesting HTTPS Services, Openssl HTTPS Testing, SSH Key Gen, Java Keytool/Keystore IPtables

Hardware Oriented Authenticated Encryption Based on Tweakable Block Ciphers Aug 25 2023 This book presents the use of tweakable block ciphers for lightweight authenticated encryption, especially applications targeted toward hardware acceleration where such efficient schemes have demonstrated competitive performance and strong provable security with large margins. The first part of the book describes and analyzes the hardware implementation aspects of state-of-the-art tweakable block cipher-based mode ?CB3. With this approach, a framework for studying a class of tweakable block cipher-based schemes is developed and two family of authenticated encryption algorithms are designed for the lightweight standardization project initiated by the National Institute of Standards and Technology (NIST): Romulus and Remus. The Romulus family is a finalist for standardization and targets a wide range of applications and performance trade-offs which will prove interesting to engineers, hardware designers, and students who work in symmetric key cryptography.

Fast Software Encryption Sep 14 2022 This book constitutes the thoroughly refereed post-conference proceedings of the 18th International Workshop on Fast Software Encryption, held in Lyngby, Denmark, in February 2011. The 22 revised full papers presented together with 1 invited lecture were carefully reviewed and selected from 106 initial submissions. The papers are organized in topical sections on differential cryptanalysis, hash functions, security and models, stream ciphers, block ciphers and modes, as well as linear and differential cryptanalysis.

Multimedia Encryption and Authentication Techniques and Applications Oct 15 2022 Intellectual property owners must continually exploit new ways of reproducing, distributing, and marketing their products. However, the threat of piracy looms as a major problem with digital distribution and storage technologies. Multimedia Encryption and Authentication Techniques and Applications covers current and future trends in the des

The Design of Authenticated Encryption Scheme Base on Error-Propagation Jul 24 2023

Authenticated Encryption in the Symmetric and Asymmetric Settings Jan 18 2023

Selected Areas in Cryptography -- SAC 2013 Feb 07 2022 This book constitutes the proceedings of the 20th International Conference on Selected Areas in Cryptography, SAC 2013, held in Burnaby, Canada, in August 2013. The 26 papers presented in this volume were carefully reviewed and selected from 98

submissions. They are organized in topical sections named: lattices; discrete logarithms; stream ciphers and authenticated encryption; post-quantum (hash-based and system solving); white box crypto; block ciphers; elliptic curves, pairings and RSA; hash functions and MACs; and side-channel attacks. The book also contains 3 full-length invited talks.

Information Technology Oct 23 2020

Analysis and Design of Authentication and Encryption Algorithms for Secure Cloud Systems Aug 01 2021 Along with the fast growth of networks and mobile devices, cloud computing has become one of the most attractive and effective technologies and business solutions nowadays. Increasing numbers of organizations and customers are migrating their businesses and data to the cloud due to the flexibility and cost-efficiency of cloud systems. Preventing unauthorized access of sensitive data in the cloud has been one of the biggest challenges when designing a secure cloud system, and it strongly relies on the chosen authentication and encryption algorithms for providing authenticity and confidentiality, respectively. This thesis investigates various aspects of authentication and encryption algorithms for securing cloud systems, including authenticated encryption modes of operation, block ciphers, password hashing algorithms, and password-less/two-factor authentication mechanisms. Improving Authenticated Encryption Modes. The Galois/Counter Mode (GCM) is an authenticated encryption mode of operation for block ciphers. It has been widely adopted by many network standards and protocols that protect the security of cloud communications, such as TLS v1.2, IEEE 802.1AE and IPsec. Iwata et al. recently found a flaw in GCM's original proofs for non-96-bit nonce cases, and then presented new security bounds for GCM. The new bounds imply that the success probabilities of adversaries for attacking GCM are much larger than the originally expected ones. We propose a simple change to repair GCM. When applied, it will improve the security bounds by a factor of about 2^{20} while maintaining most of the original proofs. Analyzing Polynomial-Based Message Authentication Codes. We investigate attacks on polynomial-based message authentication code (MAC) schemes including the one adopted in GCM. We demonstrate that constructing successful forgeries of these MAC schemes does not necessarily require hash collisions. This discovery removes certain restrictions in the attacks previously proposed by Procter and Cid. Moreover, utilizing a special design of GCM for processing non-96-bit nonces, we turn these forgery attacks into birthday attacks, which will significantly increase their success probabilities. Therefore, by considering the birthday attacks and the security proof flaw found by Iwata et al., cloud system designers should avoid using GCM with non-96-bit nonces if they do not revise the design of GCM. Analyzing Block Ciphers. We propose a new framework for analyzing symmetric-key ciphers by guessing intermediate states to divide ciphers into small components. This framework is suitable for lightweight

ciphers with simple key schedules and block sizes smaller than key lengths. Using this framework, we design new attacks on the block cipher family KATAN. These attacks can recover the master keys of 175-round KATAN32, 130-round KATAN48 and 112-round KATAN64 faster than exhaustive search, and thus reach many more rounds than the existing attacks. We also provide new attacks on 115-round KATAN32 and 100-round KATAN48 in order to demonstrate that this new kind of attack can be more time-efficient and memory-efficient than the existing ones. Designing Password Hashing Algorithms. Securely storing passwords and deriving cryptographic keys from passwords are also crucial for most secure cloud system designs. However, choices of well-studied password hashing algorithms are extremely limited, as their security requirements and design principles are different from common cryptographic primitives. We propose two practical password hashing algorithms, Pleco and Plectron. They are built upon well-understood cryptographic algorithms, and combine the advantages of symmetric-key and asymmetric-key primitives. By employing the Rabin cryptosystem, we prove that the one-wayness of Pleco is at least as strong as the hard problem of integer factorization. In addition, both password hashing algorithms are designed to be sequential memory-hard, in order to thwart large-scale password searching using parallel hardware, such as GPUs, FPGAs, and ASICs. Designing Password-less/Two-Factor Authentication Mechanisms. Motivated by a number of recent industry initiatives, we propose Loxin, an innovative solution for password-less authentication for cloud systems and web applications. Loxin aims to improve on passwords with respect to both usability and security. It utilizes push message services for mobile devices to initiate authentication transactions based on asymmetric-key cryptography, and enables users to access multiple services by using pre-owned identities, such as email addresses. In particular, the Loxin server cannot generate users' authentication credentials, thereby eliminating the potential risk of credential leakage if the Loxin server gets compromised. Furthermore, Loxin is fully compatible with existing password-based authentication systems, and thus can serve as a two-factor authentication mechanism.

Authenticated Encryption in Practice Apr 28 2021 We study authenticated encryption (AE) schemes, or symmetric cryptographic protocols designed to protect both the privacy and the integrity of digital communications. When the AE schemes that we propose or study are secure, we prove so using the modern cryptography approach of practice-oriented provable security; this approach involves formally defining what it means for an AE scheme to be secure, and then deriving proofs of security via reductions from the security of the construction's underlying components. When we find that an AE scheme is insecure, we support our discoveries with example attacks and then propose security improvements. We first study the AE portion of the Secure Shell (SSH) protocol. The SSH AE scheme is based on the Encrypt-and-MAC paradigm. Despite previous negative results on

the Encrypt-and-MAC paradigm, we prove that the overall design of the SSH AE scheme is secure under reasonable assumptions. Our proofs for SSH contribute to the field of cryptography in several ways. First, we extend previous formal definitions of security for AE schemes to capture additional security goals, namely resistance to replay and re-ordering attacks. We also formalize a new AE paradigm, Encode-then-E & M, that captures the differences between the real SSH AE scheme and the previous Encrypt-and-MAC model. We state provable security results about both the Encode-then-E & M paradigm and the SSH AE scheme. Motivated by the differences between previous models and real AE schemes, we then consider and prove security results about generalizations of two other natural AE paradigms, MAC-then-Encrypt and Encrypt-then-MAC, as well as further generalizations of the Encode-then-E & M paradigm. Motivated by practical requirements and the IPsec community, we propose CWC --- the first block cipher-based AE scheme that is simultaneously provably secure, fully parallelizable, and free from intellectual property claims. Finally, we discover and propose fixes to security defects with the WinZip AE-2 AE scheme. Our attacks exploit interactions between AE-2's provably secure Encrypt-then-MAC core and the rest of the system. Since WinZip could have avoided certain attacks by applying the provable security approach to the whole AE-2 scheme, our results suggest the importance of pushing the provable security approach further into real systems.

Study of Authenticated Encryption Scheme May 22 2023

Selected Areas in Cryptography May 10 2022 This book constitutes the thoroughly refereed post-conference proceedings of the 18th Annual International Workshop on Selected Areas in Cryptography, SAC 2011, held in Toronto, Canada in August 2011. The 23 revised full papers presented together with 2 invited papers were carefully reviewed and selected from 92 submissions. The papers are organized in topical sections on cryptanalysis of hash functions, security in clouds, bits and randomness, cryptanalysis of ciphers, cryptanalysis of public-key crypthography, cipher implementation, new designs and mathematical aspects of applied cryptography.

Fast Software Encryption Jul 12 2022 This book constitutes the thoroughly refereed post-conference proceedings of the 23rd International Conference on Fast Software Encryption, held in Bochum, Germany, in March 2016. The 29 revised full papers presented were carefully reviewed and selected from 86 initial submissions. The papers are organized in topical sections on operating modes; stream-cipher cryptanalysis; components; side-channels and implementations; automated tools for cryptanalysis; designs; block-cipher cryptanalysis; foundations and theory; and authenticated-encryption and hash function cryptanalysis.

Advances in Cryptology -- ASIACRYPT 2014 Feb 19 2023 The two-volume set LNCS 8873 and 8874 constitutes the refereed proceedings of the 20th International Conference on the Theory and Applications of Cryptology and Information

Security, ASIACRYPT 2014, held in Kaoshiung, Taiwan, in December 2014. The 55 revised full papers and two invited talks presented were carefully selected from 255 submissions. They are organized in topical sections on cryptology and coding theory; authenticated encryption; symmetric key cryptanalysis; side channel analysis; hyperelliptic curve cryptography; factoring and discrete log; cryptanalysis; signatures; zero knowledge; encryption schemes; outsourcing and delegation; obfuscation; homomorphic cryptography; secret sharing; block ciphers and passwords; black-box separation; composability; multi-party computation.
Advances in Cryptology – EUROCRYPT 2014 Mar 28 2021 This book constitutes the proceedings of the 33rd Annual International Conference on the Theory and Applications of Cryptographic Techniques, EUROCRYPT 2014, held in Copenhagen, Denmark, in May 2014. The 38 full papers included in this volume were carefully reviewed and selected from 197 submissions. They deal with public key cryptanalysis, identity-based encryption, key derivation and quantum computing, secret-key analysis and implementations, obfuscation and multi linear maps, authenticated encryption, symmetric encryption, multi-party encryption, side-channel attacks, signatures and public-key encryption, functional encryption, foundations and multi-party computation.
Design, Analysis, and Implementation of Symmetric-key (Authenticated) Ciphers May 30 2021 Modern cryptography has become an often ubiquitous but essential part of our daily lives. Protocols for secure authentication and encryption protect our communication with various digital services, from private messaging, online shopping, to bank transactions or exchanging sensitive information. Those high-level protocols can naturally be only as secure as the authentication or encryption schemes underneath. Moreover, on a more detailed level, those schemes can also at best inherit the security of their underlying primitives. While widespread standards in modern symmetric-key cryptography, such as the Advanced Encryption Standard (AES), have shown to resist analysis until now, closer analysis and design of related primitives can deepen our understanding. The present thesis consists of two parts that portray six contributions: The first part considers block-cipher cryptanalysis of the round-reduced AES, the AES-based tweakable block cipher Kiasu-BC, and TNT. The second part studies the design, analysis, and implementation of provably secure authenticated encryption schemes. In general, cryptanalysis aims at finding distinguishable properties in the output distribution. Block ciphers are a core primitive of symmetric-key cryptography which are useful for the construction of various higher-level schemes, ranging from authentication, encryption, authenticated encryption up to integrity protection. Therefore, their analysis is crucial to secure cryptographic schemes at their lowest level. With rare exceptions, block-cipher cryptanalysis employs a systematic strategy of investigating known attack techniques. Modern proposals are expected to be evaluated against these techniques. The considerable effort for evaluation,

however, demands efforts not only from the designers but also from external sources. The Advanced Encryption Standard (AES) is one of the most widespread block ciphers nowadays. Therefore, it is naturally an interesting target for further analysis. Tweakable block ciphers augment the usual inputs of a secret key and a public plaintext by an additional public input called tweak. Among various proposals through the previous decade, this thesis identifies Kiasu-BC as a noteworthy attempt to construct a tweakable block cipher that is very close to the AES. Hence, its analysis intertwines closely with that of the AES and illustrates the impact of the tweak on its security best. Moreover, it revisits a generic tweakable block cipher Tweak-and-Tweak (TNT) and its instantiation based on the round-reduced AES. The first part investigates the security of the AES against several forms of differential cryptanalysis, developing distinguishers on four to six (out of ten) rounds of AES. For Kiasu-BC, it exploits the additional freedom in the tweak to develop two forms of differential-based attacks: rectangles and impossible differentials. The results on Kiasu-BC consider an additional round compared to attacks on the (untweaked) AES. The authors of TNT had provided an initial security analysis that still left a gap between provable guarantees and attacks. Our analysis conducts a considerable step towards closing this gap. For TNT-AES - an instantiation of TNT built upon the AES round function - this thesis further shows how to transform our distinguisher into a key-recovery attack. Many applications require the simultaneous authentication and encryption of transmitted data. Authenticated encryption (AE) schemes provide both properties. Modern AE schemes usually demand a unique public input called nonce that must not repeat. Though, this requirement cannot always be guaranteed in practice. As part of a remedy, misuse-resistant and robust AE tries to reduce the impact of occasional misuses. However, robust AE considers not only the potential reuse of nonces. Common authenticated encryption also demanded that the entire ciphertext would have to be buffered until the authentication tag has been successfully verified. In practice, this approach is difficult to ensure since the setting may lack the resources for buffering the messages. Moreover, robustness guarantees in the case of misuse are valuable features. The second part of this thesis proposes three authenticated encryption schemes: RIV, SIV-x, and DCT. RIV is robust against nonce misuse and the release of unverified plaintexts. Both SIV-x and DCT provide high security independent from nonce repetitions. As the core under SIV-x, this thesis revisits the proof of a highly secure parallel MAC, PMAC-x, revises its details, and proposes SIV-x as a highly secure authenticated encryption scheme. Finally, DCT is a generic approach to have n-bit secure deterministic AE but without the need of expanding the ciphertext-tag string by more than n bits more than the plaintext. From its first part, this thesis aims to extend the understanding of the (1) cryptanalysis of round-reduced AES, as well as the understanding of (2) AES-like tweakable block ciphers. From its second part, it demonstrates how to simply

extend known approaches for (3) robust nonce-based as well as (4) highly secure deterministic authenticated encryption.

Applied Cryptography and Network Security Jan 26 2021 Cryptography will continue to play important roles in developing of new security solutions which will be in great demand with the advent of high-speed next-generation communication systems and networks. This book discusses some of the critical security challenges faced by today's computing world and provides insights to possible mechanisms to defend against these attacks. The book contains sixteen chapters which deal with security and privacy issues in computing and communication networks, quantum cryptography and the evolutionary concepts of cryptography and their applications like chaos-based cryptography and DNA cryptography. It will be useful for researchers, engineers, graduate and doctoral students working in cryptography and security related areas. It will also be useful for faculty members of graduate schools and universities.

Serious Cryptography Apr 16 2020 This practical guide to modern encryption breaks down the fundamental mathematical concepts at the heart of cryptography without shying away from meaty discussions of how they work. You'll learn about authenticated encryption, secure randomness, hash functions, block ciphers, and public-key techniques such as RSA and elliptic curve cryptography. You'll also learn: - Key concepts in cryptography, such as computational security, attacker models, and forward secrecy - The strengths and limitations of the TLS protocol behind HTTPS secure websites - Quantum computation and post-quantum cryptography - About various vulnerabilities by examining numerous code examples and use cases - How to choose the best algorithm or protocol and ask vendors the right questions Each chapter includes a discussion of common implementation mistakes using real-world examples and details what could go wrong and how to avoid these pitfalls. Whether you're a seasoned practitioner or a beginner looking to dive into the field, Serious Cryptography will provide a complete survey of modern encryption and its applications.

Protocols for Authentication and Key Establishment Sep 02 2021 Protocols for authentication and key establishment are the foundation for security of communications. The range and diversity of these protocols is immense, while the properties and vulnerabilities of different protocols can vary greatly. This is the first comprehensive and integrated treatment of these protocols. It allows researchers and practitioners to quickly access a protocol for their needs and become aware of existing protocols which have been broken in the literature. As well as a clear and uniform presentation of the protocols this book includes a description of all the main attack types and classifies most protocols in terms of their properties and resource requirements. It also includes tutorial material suitable for graduate students.

Advances in Cryptology - ASIACRYPT 2000 Mar 20 2023 This book constitutes

the refereed proceedings of the 6th International Conference on the Theory and Application of Cryptology and Security, ASIACRYPT 2000, held in Kyoto, Japan in December 2000. The 45 revised full papers presented together with two invited contributions were carefully reviewed and selected from a total of 140 submissions. The papers are organized in topical sections on cryptanalysis, digital signatures, cryptographic protocols, number-theoretic algorithms, symmetric-key schemes, fingerprinting, zero-knowledge and provable security, Boolean functions, pseudorandomness, and public-key encryption and key distribution.
Fast Software Encryption Mar 08 2022 This book constitutes the thoroughly refereed post-conference proceedings of the 21st International Workshop on Fast Software Encryption, held in London, UK, March 3-5, 2014. The 31 revised full papers presented were carefully reviewed and selected from 99 initial submissions. The papers are organized in topical sections on designs; cryptanalysis; authenticated encryption; foundations and theory; stream ciphers; hash functions; advanced constructions.
Progress in Cryptology – INDOCRYPT 2021 Jul 20 2020 This book constitutes the refereed proceedings of the 22nd International Conference on Cryptology in India, INDOCRYPT 2021, which was held in Jaipur, India, during December 12-15, 2021. The 27 full papers included in these proceedings were carefully reviewed and selected from 65 submissions. They were organized in topical sections as follows: authenticated encryption; symmetric cryptography; lightweight cryptography; side-channel attacks; fault attacks; post-quantum cryptography; public key encryption and protocols; cryptographic constructions; blockchains.
Experimental Review of Authenticated Encryption Algorithms for Android Dec 17 2022 The idea of this project is to develop an android version of several Authenticated Encryption algorithms which are qualified for the third round of CAESAR competition and run them on android platform/application to analyze the performance based on time, speed and memory as constraints. This experimental approach will help us conclude Android capabilities and also in detecting behavioral patterns of different algorithms implemented. These findings can be used to enhance the understanding for future developers.
Fast Software Encryption Jun 23 2023 This book constitutes the thoroughly refereed post-conference proceedings of the 22nd International Workshop on Fast Software Encryption, held in Istanbul, Turkey, March 8-11, 2015. The 28 revised full papers presented were carefully reviewed and selected from 71 initial submissions. The papers are organized in topical sections on block cipher cryptanalysis; understanding attacks; implementation issues; more block cipher cryptanalysis; cryptanalysis of authenticated encryption schemes; proofs; design; lightweight; cryptanalysis of hash functions and stream ciphers; and mass surveillance.