Security Engineering A Guide To Building Dependable Distributed Systems Ross J Anderson

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Security Engineering

"O'Reilly Media, Inc." Today the vast majority of the world's information resides in, is derived from, and is exchanged among multiple automated systems. Critical decisions are made, and critical action is taken based on information from these systems. Therefore, the information must be accurate, correct, and timely, and be manipulated, stored, retrieved, and exchanged s

Systems Security Engineering Artech House

As more companies move toward microservices and other distributed technologies, the complexity of these systems increases. You can't remove the complexity, but through Chaos Engineering you can discover vulnerabilities and prevent outages before they impact your customers. This practical guide shows engineers how to navigate complex systems while optimizing to meet business goals. Two of the field's prominent figures, Casey Rosenthal and Nora Jones, pioneered the discipline while working together at Netflix. In this book, they expound on the what, how, and why of Chaos Engineering while facilitating a conversation from practitioners across industries. Many chapters are written by contributing authors to widen the perspective across verticals within (and beyond) the software industry. Learn how Chaos Engineering enables your organization to navigate complexity Explore a methodology to avoid failures within your application, network, and infrastructure Move from theory to practice through real-world stories from industry experts at Google, Microsoft, Slack, and LinkedIn, among others Establish a framework for thinking about complexity within software systems Design a Chaos Engineering program around game days and move toward highly targeted, automated experiments Learn how to design continuous collaborative chaos experiments

The CERT Guide to

System and Network Security Practices CRC Press

Can a system be considered truly reliable if it isn't fundamentally secure? Or can it be considered secure if it's unreliable? Security is crucial to the design and operation of scalable systems in production, as it plays an important part in product quality, performance, and availability. In this book, experts from Google share best practices to help your organization design scalable and reliable systems that are fundamentally secure. Two previous O ’ Reilly books from Google—Site Reliability Engineering and The Site Reliability Workbook —demonstrated how and why a commitment to the entire service lifecycle enables organizations to successfully build, deploy, monitor, and maintain software systems. In this latest guide, the authors offer insights into system design, implementation, and maintenance from practitioners who specialize in security and reliability. They also discuss how building and adopting their recommended best practices requires a culture that ’ s supportive of such change. You ’ ll learn about secure and reliable systems through: Design strategies Recommendations for coding, testing, and debugging practices Strategies to prepare for, respond to, and recover from incidents Cultural best practices that help teams across your organization collaborate effectively

Data Privacy O'Reilly Media

Engineer privacy into your systems with these hands-on techniques for data governance, legal compliance, and surviving security audits. In Data Privacy you will learn how to: Classify data based on privacy risk Build technical tools to catalog and discover data in your systems Share data with technical privacy controls to measure reidentification risk Implement technical privacy architectures to delete data Set up technical capabilities for data export to meet legal requirements like Data Subject Asset Requests (DSAR) Establish a technical privacy review process to help accelerate the legal Privacy Impact Assessment (PIA) Design a Consent Management Platform (CMP) to capture user consent Implement security tooling to help optimize privacy Build a holistic program that will get support and funding from the C-Level and board Data Privacy teaches you to design, develop, and measure the effectiveness of privacy programs. You'll learn from author Nishant Bhajaria, an industry-renowned expert who has overseen privacy at Google, Netflix, and Uber. The terminology and legal requirements of privacy are all explained in clear, jargon-free language. The book's constant awareness of business requirements will help you balance trade-offs, and ensure your user's privacy can be improved without spiraling time and resource costs. About the technology Data privacy is essential for any business. Data breaches, vague policies, and poor communication all erode a user's trust in your applications. You may also face substantial legal consequences for failing to protect user data. Fortunately, there are clear practices and guidelines to keep your data secure and your users happy. About the book Data Privacy: A runbook for engineers teaches you how to navigate the trade-off s between strict data security and real world business needs. In this practical book, you’ll learn how to design and implement privacy programs that are easy to scale and automate. There’s no bureaucratic process—just workable solutions and smart repurposing of existing security tools to help set and achieve your privacy goals. What's inside Classify data based on privacy risk Set up capabilities for data export that meet legal requirements Establish a review process to accelerate privacy impact assessment Design a consent management platform to capture user consent About the reader For engineers and business leaders looking to deliver better privacy. About the author Nishant Bhajaria leads the Technical Privacy and Strategy teams for Uber. His previous roles include head of privacy engineering at Netflix, and data security and privacy at Google. Table of Contents

Closing security vulnerabilities 11 Scaling, hiring, and considering regulations

Designing Secure Software John Wiley & Sons Since 2001, the CERT ® Insider Threat Center at Carnegie Mellon University ’ s Software Engineering Institute (SEI) has collected and analyzed information about more than seven hundred insider cyber crimes, ranging from national security espionage to theft of trade secrets. The CERT ® Guide to Insider Threats describes CERT ’ s findings in practical terms, offering specific guidance and countermeasures that can be immediately applied by executives, managers, security officers, and operational staff within any private, government, or military organization. The authors systematically address attacks by all types of malicious insiders, including current and former employees, contractors, business partners, outsourcers, and even cloud-computing vendors. They cover all major types of insider cyber crime: IT sabotage, intellectual property theft, and fraud. For each, they present a crime profile describing how the crime tends to evolve over time, as well as motivations, attack methods, organizational issues, and precursor warnings that could have helped the organization prevent the incident or detect it earlier. Beyond identifying crucial patterns of suspicious behavior, the authors present concrete defensive measures for protecting both systems and data. This book also conveys the big picture of the insider threat problem over time: the complex interactions and unintended consequences of existing policies, practices, technology, insider mindsets, and organizational culture. Most important, it offers actionable recommendations for the entire organization, from executive management and board members to IT, data owners, HR, and legal departments. With this book, you will find out how to Identify hidden signs of insider IT sabotage, theft of sensitive information, and fraud Recognize insider threats throughout the software development life cycle Use advanced threat controls to resist attacks by both technical and nontechnical insiders Increase the effectiveness of existing technical security tools by enhancing rules, configurations, and associated business processes Prepare for unusual insider attacks, including attacks linked to organized crime or the Internet underground By implementing this book ' s security practices, you will be incorporating protection mechanisms designed to resist the vast majority of malicious insider attacks.

The Cybersecurity Manager's Guide Addison-Wesley Professional The world has changed radically since the first edition of this book was published in 2001. Spammers, virus writers, phishermen, money launderers, and spies now trade busily with each other in a lively online criminal economy and as they specialize, they get better. In this indispensable, fully updated guide, Ross Anderson reveals how to build systems that stay dependable whether faced with error or malice. Here's straight talk on critical topics such as technical engineering basics, types of attack, specialized protection mechanisms, security psychology, policy, and more.

Countering Cyber Sabotage CRC Press

Software Security Engineering draws extensively on the systematic approach developed for the Build Security In (BSI) Web site. Sponsored by the Department of Homeland Security Software Assurance Program, the BSI site offers a host of tools, guidelines, rules, principles, and other resources to help project managers address security issues in every phase of the software development life cycle (SDLC). The book ’ s expert authors, themselves frequent contributors to the BSI site, represent two well-known resources in the security world: the CERT Program at the Software Engineering Institute (SEI) and Cigital, Inc., a consulting firm specializing in software security. This book will help you understand why Software security is about more than just eliminating vulnerabilities and conducting penetration tests Network security mechanisms and IT infrastructure security services do not sufficiently protect application software from security risks Software security initiatives should follow a risk-management approach to identify priorities and to define what is “ good enough ” – u nderstanding that software security risks will change throughout the SDLC Project managers and software engineers need to learn to think like an attacker in order to address the range of functions that software should not do, and how software can better resist, tolerate, and recover when under attack

Chaos Engineering

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Cyber Security Engineering is the definitive modern reference and tutorial on the full range of capabilities associated with modern cyber security engineering. Pioneering software assurance experts Dr. Nancy R. Mead and Dr. Carol C. Woody bring together comprehensive best practices for building software systems that exhibit superior operational security, and for considering security throughout your full system development and acquisition lifecycles. Drawing on their pioneering work at the Software Engineering Institute (SEI) and Carnegie Mellon University, Mead and Woody introduce seven core principles of software assurance, and show how to apply them coherently and systematically. Using these principles, they help you prioritize the wide range of possible security actions available to you, and justify the required investments. Cyber Security Engineering guides you through risk analysis, planning to manage secure software development, building organizational models, identifying required and missing competencies, and defining and structuring metrics. Mead and Woody address important topics, including the use of standards, engineering security requirements for acquiring COTS software, applying DevOps, analyzing malware to anticipate future vulnerabilities, and planning ongoing improvements. This book will be valuable to wide audiences of practitioners and managers with responsibility for systems, software, or quality engineering, reliability, security, acquisition, or operations. Whatever your role, it can help you reduce operational problems, eliminate excessive patching, and deliver software that is more resilient and secure.

Security Engineering John Wiley & Sons Now that there ’ s software in everything, how can you make anything secure? Understand how to engineer dependable systems with this newly updated classic In Security Engineering: A Guide to Building Dependable Distributed Systems, Third Edition Cambridge University professor Ross

Anderson updates his classic textbook and teaches readers how to design, implement, and test systems to withstand both error and attack. This book became a best-seller in 2001 and helped establish the discipline of security engineering. By the second edition in 2008, underground dark markets had let the bad guys specialize and scale up; attacks were increasingly on users rather than on technology. The book repeated its success by showing how security engineers can focus on usability. Now the third edition brings it up to date for 2020. As people now go online from phones more than laptops, most servers are in the cloud, online advertising drives the Internet and social networks have taken over much human interaction, many patterns of crime and abuse are the same, but the methods have evolved. Ross Anderson explores what security engineering means in 2020, including: How the basic elements of cryptography, protocols, and access control translate to the new world of phones, cloud services, social media and the Internet of Things Who the attackers are – from nation states and business competitors through criminal gangs to stalkers and playground bullies What they do – from phishing and carding through SIM swapping and software exploits to DDoS and fake news Security psychology, from privacy through ease-of-use to deception The economics of security and dependability – why companies build vulnerable systems and governments look the other way How dozens of industries went online – well or badly How to manage security and safety engineering in a world of agile development – from reliability engineering to DevSecOps The third edition of Security Engineering ends with a grand challenge: sustainable security. As we build ever more software and connectivity into safety-critical durable goods like cars and medical devices, how do we design systems we can maintain and defend for decades? Or will everything in the world need monthly software upgrades, and become unsafe once they stop? *Engineering Safe and Secure Software Systems* Addison-Wesley

IT-SEC protects the information. SEC-OT protects physical, industrial operations from information, more specifically from attacks embedded in information. When the consequences of compromise are unacceptable - unscheduled downtime, impaired product quality and damaged equipment - software-based IT-SEC defences are not enough. Secure Operations Technology (SEC-OT) is a perspective, a methodology, and a set of best practices used at secure industrial sites. SEC-OT demands cyber-physical protections - because all software can be compromised. SEC-OT strictly controls the flow of information - because all information can encode attacks. SEC-OT uses a wide range of attack capabilities to determine the strength of security postures - because nothing is secure. This book documents the Secure Operations Technology approach, including physical offline and online protections against cyber attacks and a set of twenty standard cyber-attack patterns to use in risk assessments.

MITRE Systems Engineering Guide Addison-Wesley Professional

This reference guide to creating high quality security software covers the complete suite of security applications referred to as end2end security. It illustrates basic concepts of security engineering through real-world examples.

Cybersecurity: Engineering a Secure Information Technology Organization Wiley

This complete guide to physical-layer security presents the theoretical foundations, practical implementation, challenges and benefits of a groundbreaking new model for secure communication. Using a bottom-up approach from the link level all the way to end-to-end architectures, it provides essential practical tools that enable graduate students, industry professionals and researchers to build more secure systems by exploiting the noise inherent to communications channels. The book begins with a self-contained explanation of the information-theoretic limits of secure communications at the physical layer. It then goes on to develop practical coding schemes, building on the theoretical insights and enabling readers to understand the challenges and opportunities related to the design of physical layer security schemes. Finally, applications to multi-user communications and network coding are also included.

Security Strategy Simon and Schuster

CISSP Study Guide, Third Edition provides readers with information on the CISSP certification, the most prestigious, globally-recognized, vendor-neutral exam for information security professionals. With over 100,000 professionals certified worldwide, and many more joining their ranks, this new third edition presents everything a reader needs to know on the newest version of the exam's Common Body of Knowledge. The eight domains are covered completely and as concisely as possible, allowing users to ace the exam. Each domain has its own chapter that includes a specially-designed pedagogy to help users pass the exam, including clearly-stated exam objectives, unique terms and definitions, exam warnings, "learning by example" modules, hands-on exercises, and chapter ending questions. Provides the most complete and effective study guide to prepare users for passing the CISSP exam, giving them exactly what they need to pass the test Authored by Eric Conrad who has prepared hundreds of professionals for passing the CISSP exam through SANS, a popular and well-known organization for information security professionals Covers all of the new information in the Common Body of Knowledge updated in January 2015, and also provides two exams, tiered end-of-chapter questions for a gradual learning curve, and a complete self-test appendix **Guide to Computer Network Security** John Wiley & Sons Cutting-edge cybersecurity solutions to defend against the most sophisticated attacks This professional guide shows, step by step, how to design and deploy highly secure systems on time and within budget. The book offers comprehensive examples, objectives, and best practices and shows how to build and maintain powerful, cost-effective cybersecurity systems. Readers will learn to think strategically, identify the highest priority risks, and apply advanced countermeasures that address the entire attack space. Engineering Trustworthy Systems: Get Cybersecurity Design Right the First Time showcases 35 years of practical engineering experience from an expert whose persuasive vision has advanced national cybersecurity policy and practices. Readers of this book will be prepared to navigate the tumultuous and uncertain future of cyberspace and move the cybersecurity discipline forward by adopting timeless engineering principles, including: • Defining the fundamental nature and full breadth of the cybersecurity problem • Adopting an essential perspective that considers attacks, failures, and attacker mindsets • Developing and implementing risk-mitigating, systems-based solutions • Transforming sound cybersecurity principles into effective architecture and evaluation strategies that holistically address the entire complex attack space

Security Engineering for Vehicular IT Systems

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Security is too important to be left in the hands of just one department or employee-it's a concern of an entire enterprise. Enterprise Security Architecture shows that having a comprehensive plan requires more than the purchase of security software-it requires a framework for developing and maintaining a system that is proactive. The book is based

The Tangled Web

CRC Press

The Comprehensive Guide to Computer Security, Extensively Revised with Newer Technologies, Methods, Ideas, and Examples In this updated guide, University of California at Davis Computer Security Laboratory co-director Matt Bishop offers clear, rigorous, and thorough coverage of modern computer security. Reflecting dramatic growth in the quantity, complexity, and consequences of security incidents, Computer Security, Second Edition, links core principles with technologies, methodologies, and ideas that have emerged since the first edition ' s publication. Writing for advanced undergraduates, graduate students, and IT professionals, Bishop covers foundational issues, policies, cryptography, systems design, assurance, and much more. He thoroughly addresses malware, vulnerability analysis, auditing, intrusion detection, and best-practice responses to attacks. In addition to new examples throughout, Bishop presents entirely new chapters on availability policy models and attack analysis. Understand computer security goals, problems, and challenges, and the deep links between theory and practice Learn how computer scientists seek to prove whether systems are secure Define security policies for confidentiality, integrity, availability, and more Analyze policies to reflect core questions of trust, and use them to constrain operations and change Implement cryptography as one component of a wider computer and network security strategy Use system-oriented techniques to establish effective security mechanisms, defining who can act and what they can do Set appropriate security goals for a system or product, and ascertain how well it meets them Recognize program flaws and malicious logic, and detect attackers seeking to exploit them This is both a comprehensive text, explaining the most fundamental and pervasive aspects of the field, and a detailed reference. It will help you align security concepts with realistic policies, successfully implement your policies, and thoughtfully manage the trade-offs that inevitably arise. Register your book for convenient access to downloads, updates, and/or corrections as they become available. See inside book for details.

Security Engineering and Tobias on Locks Two-Book Set

Syngress

This book examines the requirements, risks, and solutions to improve the security and quality of complex cyber-physical systems (C-CPS), such as production systems, power plants, and airplanes, in order to ascertain whether it is possible to protect engineering organizations against cyber threats and to ensure engineering project quality. The book consists of three parts that logically build upon each other. Part I "Product Engineering of Complex Cyber-Physical Systems" discusses the structure and behavior of engineering organizations producing complex cyber-physical systems, providing insights into processes and engineering activities, and highlighting the requirements and border conditions for secure and high-quality engineering. Part II "Engineering Quality Improvement" addresses quality improvements with a focus on engineering data generation, exchange, aggregation, and use within an engineering organization, and the need for proper data modeling and engineering-result validation. Lastly, Part III "Engineering Security Improvement" considers security aspects concerning C-CPS engineering, including engineering organizations ’ security assessments and engineering data management, security concepts and technologies that may be leveraged to mitigate the manipulation of engineering data, as well as design and run-time aspects of secure complex cyber-physical systems. The book is intended for several target groups: it enables computer scientists to identify research issues related to the development of new methods, architectures, and technologies for improving quality and security in multi-disciplinary engineering, pushing forward the current state of the art. It also allows researchers involved in the engineering of C-CPS to gain a better understanding of the challenges and requirements of multi-disciplinary engineering that will guide them in their future research and development activities. Lastly, it offers practicing engineers and managers with engineering backgrounds insights into the benefits and limitations of applicable methods, architectures, and technologies for selected use cases.

Computer Security John Wiley & Sons A value-packed two-book set that combines the best of engineering dependable and secure software systems with the best in-depth look at physical lock security and insecurity In Security Engineering: A Guide to Building Dependable Distributed Systems, Cambridge University professor Ross Anderson updates his classic textbook and teaches readers how to design, implement, and test systems to withstand both error and attack. Now the latest edition brings it up to date for 2020. As people now go online from phones more than laptops, most servers are in the cloud, online advertising drives the Internet and social networks have taken over much human interaction, many patterns of crime and abuse are the same, but the methods have evolved. Ross Anderson explores what security engineering means in 2020, including: How the basic elements of cryptography, protocols, and access control translate to the new world of phones, cloud services, social media and the Internet of Things Who the attackers are – from nation states and business competitors through criminal gangs to stalkers and playground bullies Security psychology, from privacy through ease-of-use to deception The economics of security and dependability – why companies build vulnerable systems and governments look the other way How to manage security and safety engineering in a world of agile development – from reliability engineering to DevSecOps Security Engineering ends with a grand challenge: sustainable security. As we build ever more software and connectivity into safety-critical durable goods like cars and medical devices, how do we design systems we can maintain and defend for decades? Or will everything in the world need monthly software upgrades, and become unsafe once they stop? In Tobias on Locks and Insecurity Engineering, renowned investigative attorney and physical security expert Marc Weber Tobias delivers a comprehensive and insightful exploration of how locks are designed, built, and — ultimately — defeated by criminals, spies, hackers, and even lockpickers. In the book, you'll discover the myriad ways that security experts and bad actors have compromised physical locks using everything from the newest 3D printers to 99-cent ballpoint pens. The book explores the origins of different lock designs and the mistakes that design engineers make when they create new locks. It explains the countless ways that locks remain at risk for attack. The author explains the latest lock designs and technology, as well as how to assess whether a specific solution will work for you depending on your individual security requirements and use case. You'll also find ways to differentiate between fatally flawed locks and solid, secure options as well as examinations of lock security from the perspectives of forced entry, covert entry, and key-control. Together these two books are the perfect guides for security and information technology professionals, design engineers, risk managers, law enforcement personnel, intelligence agents, regulators, policymakers, investigators, lawyers, and more.

Engineering Information Security Packt Publishing Ltd Marko Wolf provides a comprehensive overview of the emerging area of vehicular IT security. Having identified potential threats, attacks, and attackers for current and future vehicular IT applications, the author presents practical security measures to meet the identified security requirements efficiently and dependably.

A Practical Guide to Security Engineering and Information Assurance

Cambridge University Press

This first-of-its-kind resource offers a broad and detailed understanding of software systems engineering from both security and safety perspectives. Addressing the overarching issues related to safeguarding public data and intellectual property, the book defines such terms as systems engineering, software engineering, security, and safety as precisely as possible, making clear the many distinctions, commonalities, and interdependencies among various disciplines. You explore the various approaches to risk and the generation and analysis of appropriate metrics. This unique book explains how processes relevant to the creation and operation of software systems should be determined and improved, how projects should be managed, and how products can be assured. You learn the importance of integrating safety and security into the development life cycle. Additionally, this practical volume helps identify what motivators and deterrents can be put in place in order to implement the methods that have been recommended.