INFORMATION SECURITY AND PRIVACY QUICK REFERENCE

THE ESSENTIAL HANDBOOK FOR EVERY CISO, CSO, AND CHIEF PRIVACY OFFICER

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Before joining Hamilton College, Joe served as the chief information officer at the University of Washington Bothell in the Seattle area. During his 12 years at UW Bothell, Joe was responsible for learning technologies, data centers, web development, enterprise applications, help desk services, administrative and academic computing, and multimedia production. He implemented the UW Bothell information security program, cloud computing strategy, and IT governance, and he developed new initiatives for supporting teaching and learning, faculty research, and e-learning.

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Contents at a Glance

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Introduction

It is a massive understatement to say that information security and privacy are enormous domains. Whether you are early in your career in the field or the most senior and experienced leader in your organization, you know the near impossibility of keeping up with the volume of laws, regulations, guidance, standards, and best practices from national, state, provincial, city, and other levels of government along with international standards bodies, helpful industry organizations, individual companies, and other sources of information security and privacy documentation.

As a manager or leader in information security and privacy, you also face the daunting challenge that much of what you learned when you entered the field has changed. Knowing the best way to protect information and privacy in 2000, 2010, or 2020 may not provide you with the right answers in 2025 or 2030. If you spent considerable time studying for one of the major industry certifications or credentials, there's a good chance you haven't cracked open your *Study Guide* or rewatched those helpful videos since the day you passed the exam. Attending industry events or taking continuing education courses online provides you with focused and specific learning opportunities but on very narrow topics.

If you need one more angle to your information overload, you're certainly aware that whether you're looking at government standards or objectives for a certification exam, they often either say the same thing in different ways or overlap in ways that are hard to untangle. And CISOs, CSOs, chief privacy officers, and anyone else leading or managing information security and privacy need to be able to quickly find answers and guidance across the multiple domains of expertise and share information with a common taxonomy regardless of their specific title or role. If your primary expertise is either information security or privacy, you know that there is critical information in the other domain that is important to your success but not immediately in your personal knowledge base.

This collection of challenges is what *Information Security and Privacy Quick Reference: The Essential Handbook for Every CISO, CSO, and Chief Privacy Officer* aims to address for your day-to-day work. Unlike a certification study guide that may be many hundreds or a thousand pages, and unlike the maze of government and industry documentation, the *Information Security and Privacy Quick Reference* gives you a small, one-source reference to the most common guidance, definitions, and best practices. This is by design *not* an encyclopedia of information security and privacy but instead core information that you might turn to daily or carry with you anywhere.

By gathering the key information that professionals may have learned if they studied for the CISSP, CISM, or CIPP/US, looking for common ground, and exploring a broader body of knowledge that encompasses all three, this book should be a useful reminder on any critical information security or privacy task you face.

Information Security and Privacy Quick Reference

CHAPTER 1

Security and Privacy Foundations

In the ever-evolving landscape of information security and privacy, it is crucial for professionals to have a solid foundation in both domains. This chapter is designed to equip you with essential knowledge and insights that are fundamental to safeguarding information and ensuring privacy in your organization. As security and privacy threats become more sophisticated, understanding the core principles and frameworks that underpin these fields will enable you to develop robust strategies and implement effective controls.

By exploring the foundational concepts of security and privacy, you will gain a comprehensive understanding of key principles such as confidentiality, integrity, availability, authentication, authorization, and accounting. Additionally, you will delve into the intricacies of privacy in the modern era and the foundational principles that guide privacy practices. This chapter also covers critical frameworks and policies that provide structure and guidance for security and privacy initiatives. By the end of this chapter, you will be well-versed in the foundations of creating and enforcing policies, establishing security awareness programs, and developing strategic approaches to security and privacy management. This knowledge is vital for protecting your organization's assets and ensuring compliance with regulatory requirements.

Security 101

We often hear how important security is, but we don't always understand why. Security is essential because it helps to ensure that an organization can continue to exist and operate despite any attempts to steal its data or compromise its physical or logical elements. Security is an element of business management rather than only an information technology (IT) or information systems (IS) concern. Furthermore, IT/IS and security are different. IT/IS

comprises the hardware and software that support the operations or functions of a business. Security is the business management tool that ensures the reliable and protected operation of IT/IS. Security exists to support the organization's objectives, mission, and goals.

Generally, a security framework that provides a starting point for implementing security should be adopted. Once security is initiated, fine-tuning that security is accomplished through continuous evaluation and stress testing. There are three common types of security evaluation:

- **Risk assessment** is identifying assets, threats, and vulnerabilities to calculate risk. Once risk is understood, it is used to guide the improvement of the existing security infrastructure.
- **Vulnerability assessment** uses automated tools to locate known security weaknesses, which can be addressed by adding more defenses or adjusting the current protections.
- **Penetration testing** uses trusted teams to stress test the security infrastructure to find issues that may not be discovered by the prior two means and to find those concerns before an adversary takes advantage of them.

Security should be cost-effective. Organizations do not have infinite budgets and, thus, must allocate their funds appropriately. Additionally, an organizational budget includes a percentage of monies dedicated to security, just as most other business tasks and processes require capital, not to mention payments to employees, insurance, retirement, and so on. You should select security controls that provide the most significant protection for the lowest resource cost.

Security should be legally defensible. The laws of your jurisdiction are the backstop of organizational security. When someone intrudes into your environment and breaches security, especially when such activities are illegal, prosecution in court may be the only available response for compensation or closure. Also, many decisions made by an organization will have legal liability issues. If required to defend a security action in the courtroom, legally supported security will go a long way toward protecting your organization from facing significant fines, penalties, or charges of negligence.

Security is a journey, not a finish line. It is not a process that will ever be concluded. It is impossible to fully secure something because security issues are always changing. Our deployed technology is changing with the passage of time, by users' activities, and by adversaries discovering flaws and developing exploits. The defenses that were sufficient yesterday may not be sufficient tomorrow. As new vulnerabilities are discovered, new means of attack are crafted, and new exploits are built, we have to respond by reassessing our security infrastructure and responding appropriately.

Confidentiality, Integrity, and Availability (CIA)

The CIA triad is a fundamental concept in information security, representing the three core principles that guide the protection of data and systems. This section provides an overview of these principles—confidentiality, integrity, and availability—and their importance in maintaining a secure information environment.

Confidentiality

Confidentiality is the concept of ensuring the protection of the secrecy of data, objects, or resources. The goal is to prevent or minimize unauthorized access to data. Confidentiality is maintained through various countermeasures such as encryption, strict access control, rigorous authentication procedures, data classification, and extensive personnel training. Violations of confidentiality can occur through intentional attacks, human error, oversight, or misconfigured security controls. Key concepts related to confidentiality include:

- **Sensitivity:** Determining whether information could cause harm if disclosed.
- **Discretion:** Controlling disclosure to minimize harm.
- **Criticality:** Measuring how vital to the company's mission the information is.
- **Concealment:** Hiding or preventing disclosure of information.
- **Secrecy:** Keeping information secret.
- **Privacy:** Keeping personally identifiable information confidential.
- **Seclusion:** Storing information in a secure location.
- **Isolation:** Keeping information separated from others.

Integrity

Integrity is the concept of protecting the reliability and correctness of data. It ensures that data is not altered in an unauthorized manner. Integrity protection allows for authorized changes while preventing unauthorized modifications, whether they are intentional, malicious, or accidental. Key aspects include:

- **Data integrity:** Ensuring that data remains accurate and consistent over its life cycle.

- **System integrity:** Ensuring that a system performs its intended function in an unimpaired manner.
- **Process integrity:** Ensuring that processes operate correctly without unauthorized modification.

Availability

Availability is the principle that ensures authorized users have timely and uninterrupted access to data and resources. It is crucial for maintaining the functionality of systems and services. Availability can be impacted by hardware failures, software issues, or malicious attacks such as denial of service (DoS). Measures to ensure availability include:

- **Redundancy:** Having backup systems in place.
- **Failover:** Switching automatically to a standby system.
- **Load balancing:** Distributing workloads across multiple systems.
- **Maintenance:** Updating and patching regularly to prevent system failures.

Disclosure, Alteration, and Destruction (DAD)

The DAD triad is a fundamental concept in information security that represents the failures of security protections in the CIA triad. Understanding the DAD triad is essential for identifying and mitigating the risks associated with security breaches. The DAD triad consists of three key elements: disclosure, alteration, and destruction.

- **Disclosure:** Occurs when sensitive or confidential material is accessed by unauthorized entities. This is a direct violation of confidentiality. Disclosure can happen through various means, such as data breaches, unauthorized access, or accidental exposure due to misconfigurations. Attackers who gain access to sensitive information and remove it from the organization are performing *data exfiltration*. Additionally, disclosure can occur accidentally, such as when an administrator misconfigures access controls or an employee loses a device.
- **Alteration:** Refers to the unauthorized modification of information, which violates the principle of integrity. This can happen through malicious activities like injecting fraudulent transactions into financial

records or through accidental means such as typographical errors or system malfunctions. Attackers may seek to alter data for financial gain, reputational damage, or other malicious purposes. Natural activities, such as power surges causing bit flips, can also lead to unintended alterations.

- **Destruction:** Involves the damage or inaccessibility of resources, which violates the principle of availability. This can be the result of intentional actions like distributed denial-of-service (DDoS) attacks or unintentional events such as hardware failures or natural disasters. Destruction can significantly impact an organization's operations by making critical data or services unavailable to authorized users.

The DAD triad is a useful tool for cybersecurity planning and risk analysis. It helps professionals to assess the threats and vulnerabilities associated with their systems and to implement appropriate security controls. For example, when evaluating the security of an organization's website, one might consider the following questions based on the DAD triad:

- Does the website contain sensitive information that would damage the organization if disclosed to unauthorized individuals?
- If an attacker were able to modify information contained on the website, would this unauthorized alteration cause financial, reputational, or operational damage to the organization?
- Does the website perform mission-critical activities that could damage the business significantly if an attacker were able to disrupt the site?

By using the DAD triad, professionals can better understand the potential impacts of security incidents and develop strategies to mitigate these risks.

The DAD triad highlights the critical failures of security mechanisms in protecting confidentiality, integrity, and availability. By recognizing these potential failures, organizations can implement more effective security measures to safeguard their information and systems.

Authentication, Authorization, and Accounting (AAA)

In the realm of information security, AAA services form a foundational mechanism essential for maintaining secure environments. The three As in this abbreviation stand for authentication, authorization, and accounting. These elements are critical in ensuring that only authorized users can access resources and perform actions and that their activities are appropriately logged and monitored.

Authentication

Authentication is the process of verifying the identity of a subject. It ensures that the entity requesting access is, in fact, who they claim to be. This verification can be achieved through various methods such as passwords, smart cards, biometric scans, or other authentication factors. The process of authentication is crucial as it forms the first line of defense against unauthorized access. Without proper authentication, no further security measures can be effectively applied.

Authorization

Once a subject's identity is authenticated, the next step is authorization. Authorization determines what an authenticated subject is allowed to do. It involves defining permissions and access rights, ensuring that users can only perform actions or access resources for which they have been explicitly granted permission. This control is vital in maintaining the principle of *least privilege*, where users have the minimum level of access necessary to perform their job functions.

Accounting

Accounting, sometimes referred to as *auditing*, involves tracking the actions of authenticated and authorized subjects. This process includes recording log entries of user activities, system events, and access to resources. Accounting is essential for maintaining accountability, as it allows organizations to review logs and monitor for compliance with security policies. It also plays a crucial role in detecting and investigating security incidents, ensuring that any unauthorized or suspicious activities can be traced back to specific users or processes.

Privacy in the Modern Era

Privacy concerns are an integral part of our daily lives, as we frequently hear reports of companies misusing personal information and data breaches leading to the exposure of massive quantities of personal data. These issues have led to ongoing legislative debates at both federal and state levels, resulting in new laws aimed at regulating various aspects of privacy. In this complex environment, privacy professionals play a crucial role in guiding organizations through the maze of ethical obligations, laws, regulations, and industry standards.

Introduction to Privacy

Privacy is a fundamental right inherent to every individual, rooted in the principle that people should be able to protect themselves and their information from unwanted intrusions by others or the government. Historically, the concept of privacy in the United States was significantly shaped by Louis D. Brandeis, who in 1890 coauthored an influential article titled "The Right to Privacy." Brandeis emphasized the need for legal remedies to protect individuals from unauthorized intrusions, a sentiment that resonates even more in today's technologically advanced society.

Brandeis's ideas gained further prominence when he became a Supreme Court justice. In his dissenting opinion in the case of *Olmstead v. United States*, he argued for a constitutional right to privacy, asserting that the Fourth Amendment protects individuals from unjustifiable government intrusions. This perspective laid the groundwork for modern privacy rights, emphasizing the importance of safeguarding personal information against both governmental and private sector misuse.

Online Privacy and Privacy Notices

In the digital age, online privacy has become a critical concern. Organizations must navigate the challenges of collecting, using, and protecting personal information in an online environment. Consumers often provide information to companies actively (by filling out forms) or passively (through automated data collection). Therefore, privacy policies must cover both types of data collection and be transparent about how data is used.

Privacy notices are the primary means organizations use to communicate their privacy practices to users. These notices should be posted conspicuously on websites and written in plain language accessible to the general audience. Effective privacy notices strike a balance between satisfying legal and ethical disclosure obligations and remaining readable to laypersons. Layered privacy notices, which provide brief summaries in plain language alongside detailed legal terms, are an excellent approach to achieve this balance.

Managing User Preferences and Accountability

Managing user preferences is another essential aspect of privacy in the modern era. Organizations must provide users with options to control how their data is used, including the ability to opt in or opt out of data collection and sharing practices. This requires implementing procedures and mechanisms that allow users to state their preferences and for the organization to track and honor them. These activities are good privacy practices and may be required by law in some jurisdictions and industries.

Accountability mechanisms are crucial to ensure that organizations adhere to their privacy policies and comply with relevant laws and regulations. This includes regular audits, employee training, and the implementation of robust data protection measures. Organizations must monitor compliance with privacy policies and procedures, maintain a dispute resolution process, and review compliance with privacy laws and regulations annually. Documenting cases of privacy violations and taking corrective actions are also essential components of accountability.

Privacy Program Development

Developing a comprehensive privacy program is vital for organizations to effectively manage and protect personal information. A privacy program should include policies and procedures for data collection, storage, and sharing as well as mechanisms for responding to data breaches and other privacy incidents. The program should be built on strong data governance practices, including creating an inventory of personal information and implementing a data life cycle management process.

Organizations should foster a culture of privacy awareness, ensuring that all employees understand the importance of protecting personal information and their role in maintaining privacy standards. Privacy programs should also include continuous monitoring and enforcement practices to adapt to evolving business needs and information practices. This involves periodic reviews, regular updates to privacy assessments, and dashboard-style monitoring of key metrics such as compliance with data retention standards and the number of privacy incidents.

Privacy in the modern era is a multifaceted issue that requires a careful balance between technological advancements and the protection of individual rights. Historical perspectives, such as those provided by Louis D. Brandeis, continue to influence contemporary privacy practices and legal frameworks. As organizations navigate the complexities of online privacy, managing user preferences, and accountability, the development of robust privacy programs remains essential. Privacy professionals play a key role in guiding organizations through these challenges, ensuring that personal information is safeguarded and ethical standards are upheld.

Foundational Privacy Principles

Privacy is a fundamental right and a critical aspect of information security. Understanding and implementing foundational privacy principles is essential

for organizations to protect personal information and comply with legal and ethical standards. This section provides an overview of basic privacy principles, drawing from established frameworks and best practices.

Privacy Principles Overview

Privacy principles serve as guidelines for organizations to manage and protect personal information. These principles ensure that data-handling practices are transparent, accountable, and aligned with the rights of individuals. The generally accepted privacy principles (GAPP) provide a structured approach to privacy management.

Generally Accepted Privacy Principles (GAPP)

The GAPP framework, developed by the American Institute of Certified Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA), includes 10 key principles that organizations should follow:

- **Management:** Organizations must define, document, communicate, and assign accountability for their privacy policies and procedures. This includes creating written privacy policies, assigning responsibility to a privacy officer, and ensuring policies are consistent with applicable laws. Organizations should also conduct privacy risk assessments regularly and maintain a privacy incident management process.
- **Notice:** Organizations should inform individuals about their privacy practices, including the purposes for which personal information is collected, used, retained, and disclosed. This transparency helps build trust with stakeholders. Notice should be provided at the time of data collection and when there are changes to privacy policies.
- **Choice and consent:** Individuals should have the ability to choose how their personal information is used and shared. Organizations must obtain consent from individuals before collecting or using their data for specified purposes. Consent can be implicit or explicit, depending on the sensitivity of the information and the context of its use.
- **Collection:** Organizations should collect personal information only for legitimate purposes and by lawful and fair means. This minimizes the risk of unnecessary data collection and potential misuse. The collection practices should be clearly stated in the organization's privacy policies, and individuals should be informed about the methods and types of data collected.

- **Use, retention, and disposal:** Personal information should be used only for the purposes for which it was collected. Organizations must retain data only as long as necessary and dispose of it securely when it is no longer needed. This ensures that personal information is not kept longer than required and reduces the risk of unauthorized access or misuse.
- **Access:** Individuals should have the right to access their personal information and request corrections if necessary. This empowers individuals to control their data and ensure its accuracy. Organizations should provide mechanisms for individuals to review and update their information and inform them of the procedures to do so.
- **Disclosure to third parties:** Organizations must disclose personal information to third parties only for legitimate purposes and with appropriate safeguards. This includes ensuring that third parties adhere to the same privacy standards. Organizations should inform individuals about any third-party disclosures and obtain their consent when necessary.
- **Security for privacy:** Organizations must implement appropriate security measures to protect personal information from unauthorized access, use, or disclosure. This includes physical, technical, and administrative controls. Security practices should be included in the organization's privacy policies, and individuals should be informed about the precautions taken to protect their data.
- **Quality:** Organizations should maintain the accuracy and completeness of personal information. This ensures that data is reliable and relevant for its intended use. Individuals should be informed about their responsibility to provide accurate information and to notify the organization of any corrections needed.
- **Monitoring and enforcement:** Organizations must regularly monitor their privacy practices and enforce compliance with privacy policies. This includes conducting privacy risk assessments and audits to identify and address potential issues. Organizations should also have procedures in place to handle privacy-related inquiries, complaints, and disputes and to take corrective actions when necessary.

Foundational privacy principles provide a comprehensive framework for managing and protecting personal information. By adhering to these principles, organizations can ensure that their privacy practices are transparent, accountable, and aligned with the rights of individuals. Implementing the GAPP helps organizations build trust with stakeholders, comply with legal and ethical standards, and effectively safeguard personal information. These principles are essential for maintaining the integrity and security of data in today's information-driven world.

Security and Privacy Frameworks

In today's interconnected world, organizations face a myriad of security and privacy challenges that require comprehensive frameworks to manage risks effectively. Security and privacy frameworks provide structured approaches for identifying, managing, and mitigating risks. These frameworks are essential for establishing consistent security policies, ensuring compliance with regulations, and protecting sensitive information.

Understanding Security Control Frameworks

Security control frameworks are structured collections of best practices, standards, and guidelines that organizations use to manage and mitigate security risks. These frameworks help organizations to implement effective security controls and establish a baseline for security practices. Key components of security control frameworks include:

- **Policies and procedures:** Formalized rules and guidelines that dictate how security measures are to be implemented and maintained.
- **Risk management:** Processes for identifying, assessing, and prioritizing risks, followed by the application of resources to minimize their impact.
- **Control implementation:** Specific security controls that are put in place to protect information assets, including technical, administrative, and physical controls.
- **Monitoring and reporting:** Continuous monitoring of security controls and regular reporting to ensure their effectiveness and compliance with standards.

Common Security Control Frameworks

Several well-known security control frameworks are widely adopted across various industries:

- **International Organization for Standardization (ISO) Standards:** ISO 27001 and ISO 27002 provide guidelines for establishing, implementing, maintaining, and continually improving an information security management system (ISMS).
- **National Institute of Standards and Technology (NIST):** The NIST Cybersecurity Framework (CSF) offers a policy framework of computer

security guidance for how private sector organizations in the United States can assess and improve their ability to prevent, detect, and respond to cyberattacks.

- **Control Objectives for Information and Related Technology (COBIT):** COBIT is a framework for developing, implementing, monitoring, and improving IT governance and management practices.
- **Sherwood Applied Business Security Architecture (SABSA):** SABSA is a framework and methodology for enterprise security architecture and service management.
- **Payment Card Industry Data Security Standard (PCI DSS):** PCI DSS is a set of security standards designed to ensure that all companies that accept, process, store, or transmit credit card information maintain a secure environment.
- **Federal Risk and Authorization Management Program (FedRAMP):** FedRAMP provides a standardized approach to security assessment, authorization, and continuous monitoring for cloud products and services used by U.S. federal agencies.

These frameworks often include maturity models that allow organizations to assess their progress and identify areas for improvement. They also offer certification programs that provide independent assessments of an organization's adherence to the framework.

Adopting Standard Frameworks

Adopting standard frameworks for security and privacy is crucial for organizations aiming to achieve a robust security posture. The process of adopting these frameworks involves several key steps:

- **Legal, regulatory, and contractual requirements:** Ensure that the security framework addresses all relevant legal, regulatory, and contractual obligations, including compliance with data protection laws, industry-specific regulations, and contractual security requirements.
- **Assessment and gap analysis:** Evaluate current security and privacy practices against the chosen framework to identify gaps and areas for improvement. This provides a clear roadmap for implementation.
- **Strategic planning and resource allocation:** Allocate necessary resources, develop budgets, and create business cases to support the implementation and maintenance of the framework. This step aligns the adoption process with the organization's goals and capacity.