DATA SECURITY MANAGEMENT

Information Security Policies, Procedures, and Standards: Establishing an Essential Code of Conduct

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INSIDE

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This chapter introduces the reason why organizations write security policy. Aside from discussing the structure and format of policies, procedures, standards, and guidelines, this chapter discusses why policies are needed, formal and informal security policies, security models, and a history of security policy.

PAYOFF IDEA

Information security policy establishes what management wants done to protect the organization's intellectual property or other information assets. Standards are used to establish a common and accepted measurement that people will use to implement this policy. Procedures provide the details — the how of the implementation, while guidelines identify the things that management would like to see implemented. Policy is an essential and important part of any organization because it identifies how the members of that organization must conduct themselves. To the information security manager, policy establishes what is important to the organization and what defines the shape of the work that follows.

THE IMPACT OF ORGANIZATIONAL CULTURE

The culture of an organization is very important when considering the development of policy. The workplace is more than just a place where people work. It is a place where people congregate to not only perform their

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assigned work, but to socialize and freely exchange ideas about their jobs and their lives.

It is important to consider this culture when developing policies. The more open an organization is, the less likely that policies with heavy sanctions will be accepted by the employees. If the culture is more closed, meaning that there is less communication between the employees about their concerns, policies may require a higher degree of sanctions. In addition, the tone, or focus, of the policy will vary from softer to harder.

Regardless of the level of communication, few organizations have their day-to-day operations precisely documented. This highly volatile environment poses challenges to the definition of policy, but it is even more essential to good security operations.

THE HISTORY OF SECURITY POLICY

Security policy is defined as the set of practices that regulate how an organization manages, protects, and assigns resources to achieve its security objectives. These security objectives must be tempered with the organization's goals and situation, and determine how the organization will apply its security objectives. This combination of the organization's goals and security objectives underlie the management controls that are applied in nearly all business practices to reduce the risks associated with fraud and human error.

Security policies have evolved gradually and are based on a set of security principles. While these principles themselves are not necessarily technical, they do have implications for the technologies that are used to translate the policy into automated systems.

Security Models

Security policy is a decision made by management. In some situations, that security policy is based on a security model. A security model defines a method for implementing policy and technology. The model is typically a mathematical model that has been validated over time. From this mathematical model, a policy is developed. When a model is created, it is called an informal security model. When the model has been mathematically validated, it becomes a formal model. The mathematics associated with the validation of the model is beyond the scope of this chapter, and will not be discussed. Three such formal security models are the Bell-LaPadula, Biba, and Clark-Wilson security models.

The Bell-LaPadula Model. The Bell-LaPadula, or BLP, model is a confidentiality-based model for information security. It is an abstract model that has been the basis for some implementations, most notably the U.S. Department of Defense (DoD) *Orange Book.* The model defines the no-

tion of a secure state, with a specific transition function that moves the system from one security state to another. The model defines a fundamental mode of access with regard to read and write, and how subjects are given access to objects.

The secure state is where only permitted access modes, subject to object are available, in accordance with a set security policy. In this state, there is the notion of preserving security. This means that if the system is in a secure state, then the application of new rules will move the system to another secure state. This is important, as the system will move from one secure state to another.

The BLP model identifies access to an object based on the clearance level associated with both the subject and the object, and then only for read-only, read-write, or write-only access. The model bases access on two main properties. The *simple security property,* or *ss-property*, is for read access. It states that an object cannot read material that is classified higher than the subject. This is called "no read up." The second property is called the *star property,* or **-property,* and relates to write access. The subject can only write information to an object that is at the same or higher classification. This is called "no-write-down" or the "confinement property." In this way, a subject can be prevented from copying information from one classification to a lower classification.

While this is a good thing, it is also very restrictive. There is no discernment made of the entire object or some portion of it. Neither is it possible in the model itself to change the classification (read as downgrade) of an object.

The BLP model is a discretionary security model as the subject defines what the particular mode of access is for a given object.

The Biba Model. Biba was the first attempt at an integrity model. Integrity models are generally in conflict with the confidentiality models because it is not easy to balance the two. The Biba mode has not been used very much because it does not directly relate to a real-world security policy.

The Biba model is based on a hierarchical lattice of integrity levels, the elements of which are a set of subjects (which are active information processing) and a set of passive information repository objects. The purpose of the Biba model is to address the first goal of integrity: to prevent unauthorized users from making modifications to the information.

The Biba model is the mathematical dual of BLP. Just as reading a lower level can result in the loss of confidentiality for the information, reading a lower level in the integrity model can result in the integrity of the higher level being reduced.

Similar to the BLP model, Biba makes use of the *ss-property* and the **-property*, and adds a third one. The *ss-property* states that a subject cannot access/observe/read an object of lesser integrity. The **-property*

states that a subject cannot modify/write-to an object with higher integrity. The third property is the *invocation property*. This property states that a subject cannot send messages (i.e., logical requests for service) to an object of higher integrity.

The Clark-Wilson Model. Unlike Biba, the Clark-Wilson model addresses all three integrity goals:

- preventing unauthorized users from making modifications
- maintaining internal and external consistency
- preventing authorized users from making improper modifications

Note: Internal consistency means that the program operates exactly as expected every time it is executed. External consistency means that the program data is consistent with the real-world data.

The Clark-Wilson model relies on the well-formed transaction. This is a transaction that has been sufficiently structured and constrained as to be able to preserve the internal and external consistency requirements. It also requires that there be a separation of duty to address the third integrity goal and external consistency. To accomplish this, the operation is divided into sub-parts, and a different person or process has responsibility for a single sub-part. Doing so makes it possible to ensure that the data entered is consistent with that information which is available outside the system. This also prevents people from being able to make unauthorized changes.

Exhibit 1 compares the properties in the BLP and Biba models.

These formal security models have all been mathematically validated to demonstrate that they can implement the objectives of each. These security models are only part of the equation; the other part is the security principles.

EXHIBIT 1 — BLP and Biba Model Properties

Property	BLP Model	Biba Model
ss-property	A subject cannot read/access an object of a higher classification (no read up)	A subject cannot observe an object of a lower integrity level
*-property	A subject can only save an object at the same or higher classification (no write down)	A subject cannot modify an object of a higher integrity level
Invocation property	Not used	A subject cannot send logical service requests to an object of higher integrity

Security Principles

In 1992, the Organization for Economic Cooperation and Development (OECD) issued a series of guidelines intended for the development of laws, policies, technical and administrative measures, and education. These guidelines include:

1. *Accountability*. Everyone who is involved with the security of information must have specific accountability for their actions.
2. *Awareness*. Everyone must be able to gain the knowledge essential in security measures, practices, and procedures. The major impetus for this is to increase confidence in information systems.
3. *Ethics*. The method in which information systems and their associated security mechanisms are used must be able to respect the privacy, rights, and legitimate interests of others.
4. *Multidisciplinary principle*. All aspects of opinion must be considered in the development of policies and techniques. These must include legal, technical, administrative, organizational, operational, commercial, and educational aspects.
5. *Proportionality*. Security measures must be based on the value of the information and the level of risk involved.
6. *Integration*. Security measures should be integrated to work together and establish defensive depth in the security system.
7. *Timeliness*. Everyone should act together in a coordinated and timely fashion when a security breach occurs.
8. *Reassessment*. Security mechanisms and needs must be reassessed periodically to ensure that the organization's needs are being met.
9. *Democracy*. The security of the information and the systems where it is stored must be in line with the legitimate use and information transfer of that information.

In addition to the OECD security principles, some additional principles are important to bear in mind when defining policies. These include:

10. *Individual accountability*. Individuals are uniquely identified to the security systems, and users are held accountable for their actions.
11. *Authorization*. The security mechanisms must be able to grant authorizations for access to specific information or systems based on the identification and authentication of the user.
12. *Least privilege*. Individuals must only be able to access the information that they need for the completion of their job responsibilities, and only for as long as they do that job.
13. *Separation of duty*. Functions must be divided between people to ensure that no single person can a commit a fraud undetected.

14. *Auditing*. The work being done and the associated results must be monitored to ensure compliance with established procedures and the correctness of the work being performed.
15. *Redundancy*. This addresses the need to ensure that information is accessible when required; for example, keeping multiple copies on different systems to address the need for continued access when one system is unavailable.
16. *Risk reduction*. It is impractical to say that one can completely eliminate risk. Consequently, the objective is to reduce the risk as much as possible.

There are also a series of roles in real-world security policy that are important to consider when developing and implementing policy. These roles are important because they provide distinctions between the requirements in satisfying different components of the policy. These roles are:

1. *originator* — the person who creates the information
2. *authorizer* — the person who manages access to the information
3. *owner* — may or may not be a combination of the two previous roles
4. *custodian* — the user who manages access to the information and carries out the authorizer's wishes with regard to access
5. *user* — the person who ultimately wants access to the information to complete a job responsibility

When looking at the primary security goals — *confidentiality*, *integrity,* and *availability* — security policies are generally designed around the first two goals, confidentiality and integrity. Confidentiality is concerned with the privacy of, and access to, information. It also works to address the issues of unauthorized access, modification, and destruction of protected information. Integrity is concerned with preventing the modification of information and ensuring that it arrives correctly when the recipient asks for it.

Often, these two goals are in conflict due to their different objectives. As discussed earlier, the Bell-LaPadula model addresses confidentiality, which incidentally, is the objective of the Trusted Computing Standards Evaluation Criteria developed by the U.S. Department of Defense.

The goal of integrity is defined in two formal security models: Biba and Clark-Wilson. There is no real-world security policy based on the Biba model; however, the objectives of the European ITSEC criteria are focused around integrity.

Availability is a different matter because it is focused on ensuring that the information is always available when needed. While security can influence this goal, there are several other factors that can positively and negatively influence the availability of the information.

The Chinese Wall policy, while not a formal security model per se, is worth being aware of. This policy sees that information is grouped according to information classes, often around conflicts of interest. People frequently need to have access to information regarding a client's inside operations to perform their job functions. In doing so, advising other clients in the same business would expose them to a conflict of interest. By grouping the information according to information classes, the provider cannot see other information about their client. The Chinese Wall is often used in the legal and accounting professions.

However, the scope of security policy is quite broad. To be successful, the security policy must be faithfully and accurately translated into a working technical implementation. It must be documented and specified unambiguously; otherwise, when it is interpreted by human beings, the resulting automated system may not be correct. Henceforth, it is absolutely essential that the definition of the policy be as specific as possible. Only in this manner is it possible for the translation of security policy to an automated implementation to be successful.

In addition, several policy choices must be made regarding the computing situation itself. These include the security of the computing equipment and how users identify themselves. It is essential to remember that confidentiality and integrity are difficult to combine in a successful security policy. This can cause implementation problems when translating from the written policy to an automated system. The organization's real-world security policy must reflect the organization's goals.

The policy itself must be practical and useable. It must be cost-effective, meaning that the cost of implementing the policy must not be higher than the value of the assets being protected. The policy must define concrete standards for enforcing security and describe the response for misuse. It must be clear and free of jargon, in order to be understood by the users. Above all, the policy must have the support of the highest levels of senior management. Without this, even the best security policy will fail.

It is also very important that the policy seek the right balance between security and ease of use. If one makes it too difficult for the users to get their jobs done, then one negatively impacts business and forces the users to find ways around the security implementation. On the other hand, if one leans too much to ease of use, one may impact the organization's security posture by reducing the level of available security.

WHY DOES ONE NEED POLICY?

People have understood the need for security for a long time. Ever since an individual has had something of value that someone else wanted, they associated security with the need for the protection of that asset. Most people are familiar with the way that banks take care of our money and

important documents by using vaults and safety deposit boxes. If the banks did not have policies that demonstrated how they implement appropriate protection mechanisms, the pubic would lose faith in them.

Security itself has a long history, and computers have only recently entered that history. People have installed locks on their doors to make it more difficult for thieves to enter, and people use banks and other technologies to protect their valuables, homes, and families. The military has long understood the need to protect its information from the enemy. This has resulted in the development of cryptography to encode messages so that the enemy cannot read them.

Many security techniques and policies are designed to prevent a single individual from committing fraud alone. They are also used to ensure supervisory control in appropriate situations.

The Need for Controls

Policy is essential for the people in the organization to know what they are to do. There are a number of different reasons for it, including legislative compliance, maintaining shareholder confidence, and demonstrating to the employee that the organization is capable of establishing and maintaining objectives.

There are a number of legal requirements that require the development of policies and procedures. These requirements include the duty of loyalty and the duty of care. The duty of loyalty is evident in certain legal concepts, including the duty of fairness, conflict of interest, corporate opportunity, and confidentiality. To avoid a conflict of interest situation, individuals must declare any outside relationships that might interfere with the enterprise's interests. In the duty of fairness, when presented with a conflict of interest situation, the individual has an obligation to act in the best interest of all affected parties.

When presented with material inside information such as advance notices on mergers, acquisitions, patents, etc., the individual will not use them for personal gain. Failing to do so results in a breach of corporate opportunity.

These elements have an impact should there be an incident that calls the operation into question. In fact, in the United States, there are federal sentencing guidelines for criminal convictions at the senior executive level, where the sentence can be reduced if there are policies and procedures that demonstrate due diligence. That means that having an effective compliance program in place to ensure that the corporation's policies, procedures, and standards are in place can have a positive effect in the event of a criminal investigation into the company.

For example, the basic functions inherent in most compliance programs

- Establish policies, procedures, and standards to guide the workforce.
- Appoint a high-level manager to oversee compliance with the policies, procedures, and standards.
- Exercise due care when granting discretionary authority to employees.
- Ensure that compliance policies are being carried out.
- Communicate the standards and procedures to all employees.
- Enforce the policies, standards, and procedures consistently through appropriate disciplinary measures.
- Implement procedures for corrections and modification in case of violations.

The third element from a legal perspective is the Economic Espionage Act of 1996 in the United States. The EEA, for the first time, makes the theft of trade secret information a federal crime, and subjects criminals to penalties including fines, imprisonment, and forfeiture. However, the EEA also expects that the organization who owns the information is making reasonable efforts to protect that information.

In addition to the legal requirements, there are also good business reasons for establishing policies and procedures. It is a well-accepted fact that it is important to protect the information that is essential to an organization, just like it is essential to protect the financial assets.

This means that there is a need for controls placed on the employees, vendors, customers, and other authorized network users. With growing requirements to be able to access information from any location on the globe, it is necessary to have an organizationwide set of information security policies, procedures, and standards in place.

With the changes in the computing environment from host-based to client/server-based systems, the intricacies of protecting the environment have increased dramatically. The bottom line then is that good controls make good business sense. Failing to implement good policies and procedures can lead to a loss in shareholder and market confidence in the company should there be an incident that becomes public.

In writing the policies and procedures, it is necessary to have a solid understanding of the corporation's mission, values, and business operations. Remember that policies and procedures exist to define and establish the controls required to protect the organization and that security for security's sake is of little value to the corporation, its employees, or the shareholders.

Searching for Best Practices

As changes take place and business develops, it becomes necessary to review the policy and ensure that it continues to address the business need. However, it is also advisable for the organization to seek out relationships with other organizations and exchange information regarding

their best practices. Continuous improvement should be a major goal for any organization. The review of best industry practices is an essential part of that industry improvement, as is benchmarking one organization against several others.

One organization may choose to implement particular policies in one way, while another does it in a completely different fashion. By sharing information, security organizations can improve upon their developed methods and maintain currency with industry.

There are a number of membership organizations where one can seek opinions and advice from other companies. These include the Computer Security Institute Public Working forums and the International Information Integrity Institute (I-4). There are other special-interest groups hosted by engineering organizations, such as the Association for Computing Machinery (ACM).

As in any situation, getting to that best practice, whether it be the manufacturing of a component or the implementation of a security policy, takes time.

MANAGEMENT RESPONSIBILITIES

In the development and implementation of policy, management has specific responsibilities. These include a clear articulation of the policy, being able to live up to it themselves, communicating policy, and providing the resources needed to develop and implement it. However, management is ultimately responsible to the legislative bodies, employees, and shareholders to protect the organization's physical and information assets. In doing so, management has certain legal principles that it must uphold in the operation of the organization and the development of the policies that will govern how the organization works.

Duty of Loyalty

An employee owes to their employee a legal duty of honesty, loyalty, and utmost good faith, which includes the avoidance of conflict of interest and self-interest. In carrying out the performance of their day-to-day responsibilities, empoyees are expected to act at all times in their employers' best interest unless the responsibility is unlawful. Any deviation from this duty that places an employee's interest above the employer's can be considered a breach of the employee's duty of care, loyalty, or utmost good faith. Fiduciary employees will owe a higher standard of care than ordinary employees.

If a manager knows that an employee may be putting his or her own interest above that of the employer's, it is incumbent upon the manager to warn the employee, preferably in writing, of the obligation to the employer. The manager should also advise the employer of the situation to

prevent her or him from also being held accountable for the actions of the employee.

Conflict of Interest

Conflict of interest can be defined as an individual who makes a decision with the full knowledge that it will benefit some, including themselves, and harm others. For example, the lawyer who knowingly acts on the behalf of two parties who are in conflict with each other, is a conflict of interest.

Duty of Care

The duty of care is where the officers owe a duty to act carefully in fulfilling the important tasks assigned to them. For example, a director shall discharge his or her duties with the care and prudence an ordinary person would exercise in similar circumstances, and in a manner that he or she believes is in the best interests of the enterprise.

Furthermore, managers and their subordinates have a responsibility to provide for systems security and the protection of any electronic information stored therein, even if they are not aware of this responsibility. This comes from the issue of negligence, as described in the Common Law of many countries.

Even if the organization does cause a problem, it may not be held fully responsible or liable. Should the organization be able to demonstrate that it:

- took the appropriate precaution, controls, and practices that are generally used,
- meets the commonly desired security control objectives,
- uses methods that are considered for use in well-run computing facilities, and
- used common sense and prudent management practices,

then the organization will be said to have operated with due care, as any other informed person would.

Least Privilege

Similar to its counterpart in the function role, the concept of least privilege means that a process has no more privilege than what it really needs in order to perform its functions. Any modules that require "supervisor" or "root" access (i.e., complete system privileges) are embedded in the kernel. The kernel handles all requests for system resources and permits external modules to call privileged modules when required.

Separation of Duties/Privilege

Separation of duties is the term applied to people, while separation of privilege is the systems equivalent. Separation of privilege is the term used to indicate that two or more mechanisms must agree to unlock a process, data, or system component. In this way, there must be agreement between two system processes to gain access.

Accountability

Accountability is being able to hold a specific individual responsible for his or her actions. To hold a person accountable, it must be possible to uniquely and effectively identify and authenticate that person. This means that an organization cannot hold an individual responsible for his or her actions if that organization does not implement a way to uniquely identify each individual. There are two major themes: (1) the identification and authentication of that individual when the user accesses the system; and (2) the validation that that individual initiated or requested a particular transaction.

Management Support for Policy

Management support is critical to the success of any initiative, be it the development of a new product or service, or the development of a policy. If senior management does not approve the intent behind the activity, then it will not be successful. This is not restricted to the development of the organization's security policy, but any activity. However, security policy can both raise and address significant issues in any organization. Obtaining management support is often the most difficult part of the planning process.

PLANNING FOR POLICY

Planning and preparation are integral parts of policy, standards, and procedure development, but are often neglected. Included in the preparation process is all of the work that must be done. Policy lays out the general requirements to take; the standards define the tools that are to be used; and the procedures provide employees with the step-by-step instructions to accomplish it.

Well-written procedures never take the place of supervision, but they can take some of the more mundane tasks and move them out to the employees. Employees use policy to provide information and guidance in making decisions when their managers are not available. The policy should identify who is responsible for which activity.

An effective set of policies can actually help the organization achieve two key security requirements: separation of duties and rotation of assignments. No single individual should have complete control over a

complete process from inception to completion. This is an element in protecting the organization from fraud.

Planning during policy development must include attention to security principles. For example, individuals who are involved in sensitive duties should be rotated through other assignments on a periodic basis. This removes them from sensitive activities, thereby reducing their attractiveness as a target. Rotation of duties can also provide other efficiencies, including job efficiency and improvement. The improvement aspect is achieved as the result of moving people through jobs so that they do not develop short cuts, errors creeping into the work or a decrease in quality.

Once the policies are established, it is necessary to define the standards that will be used to support those policies. These standards can include hardware, software, and communications protocols to who is responsible for approving them.

There is no point in progressing through these steps unless there is a communication plan developed to get the information out to the employees and others as appropriate. This is particularly important because management does not have the luxury of sitting down with every employee and discussing his or her responsibility. However, management does have a responsibility to communicate to every user in an ongoing fashion about the contents of the policy and the employee's responsibilities in satisfying it.

The ability to provide the information to the employees is an essential part of the development of the policies, standards, and procedures. Through these vehicles, the employees will understand how they should perform their tasks in accordance with the policies.

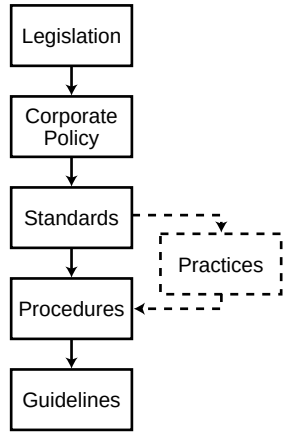
Part of the planning process involves establishing who will write the policies and related documents, who will review them, and how agreement on the information contained is reached. For example, there are a number of experts who are consulted when establishing how management's decision will be written to allow for subsequent implementation. These same experts work with writers, management, and members from the community of interest to ensure that the goals of the policy are realistic and achievable. In addition to these people who effectively write the policy, additional resources are required to ensure that the policies are reasonable. For example, Human Resources and Legal are among the other specialists who review the policy.

THE POLICY MANAGEMENT HIERARCHY

There are essentially five layers in the policy management hierarchy. These are illustrated in Exhibit 2.

Legislation has an impact on the organization regardless of its size. The impact ranges from revenue and taxation, to handling export-con-

EXHIBIT 2 — Policy Management Hierarchy



trolled material. Legislation is established by government, which in turn often creates policy that may or may not be enacted in legislation.

The second layer — policy — references the policy that is developed by the organization and approved by senior management and describes its importance to the organization. Standards are derived from the policy. The standard defines specific, measurable statements that can be used to subsequently verify compliance.

The fourth layer — procedures — are step-by-step instructions that explain what the user must do to implement the policy and standards. The final layer — guidelines — identify things that the organization would like to see its members do. These are generally recommendations; and while the standards are mandatory, guidelines are optional.

There may be one additional layer, which is inserted between the standards and the procedures. This layer addresses practices, which can be likened to a process. The standard defines what must be done; the practice defines why and how; while the procedures provide specific step-by-step instructions on the implementation. These documents are discussed later in this chapter, including their format and how to go about writing them.

THE TYPES OF POLICY

There are three major classifications of policy, one of which has been discussed: regulatory, advisory, and informative. It is also important to note that an organization can define specific policies applicable to the entire organization, while individual departments may provide policy for themselves.

Regulatory

Regulatory policy is not often something that an organization can work around. Rather, they must work with them. Governments and regulatory and governing bodies that regulate certain professions, such as medicine and law typically create this type of policy. In general, organizations that operate in the public interest, such as safety or the management of public assets, or that are frequently held accountable to the public for their actions, are users of regulatory policy.

This type of policy consists of a series of legal statements that describe in detail what must be done, when it must be done, who does it, and can provide insight as to why it is important to do it. Because large numbers of groups use these policies, they share the use and interpretation of these policies for their organizations. In addition to the common objectives of confidentiality, integrity, and availability (CIA), there are two premises used to establish regulatory policy.

The first is to establish a clearly consistent process. This is especially true for organizations involved with the general public, and they must show the uniformity with how regulations are applied without prejudice. Second, the policy establishes the opportunity for individuals who are not technically knowledgeable in the area to be sure that the individuals who are responsible are technically able to perform the task.

Regulatory policy often has exclusions or restrictions regarding their application. Frequently, regulatory policies are not effective when people must make immediate decisions based on the facts before them. This is because many situations present many different outcomes. Establishing a policy that is capable of addressing all possible outcomes results in a policy that is highly complex, difficult to apply, and very difficult to enforce.

Advisory

An advisory policy provides recommendations often written in very strong terms about the action to be taken in a certain situation or a method to be used. While this appears to be a contradiction of the definition of policy, advisory policy provides recommendations. It is aimed at knowledgeable individuals with information to allow them to make decisions regarding the situation and how to act.

Because it is an advisory policy, the enforcement of this policy is not applied with much effort. However, the policy will state the impact for not following the advice that is provided within the policy. While the specific impacts may be stated, the policy provides informed individuals with the ability to determine what the impacts will be should they choose to alternate course of action.

The impacts associated with not following the policy can include:

- omission of information that is required to make an informed decision

- failure to notify the correct people who are involved in making the decision or complete the process
- missing important deadlines
- lost time in evaluating and discussing the alternatives with auditors and management

It is important to consider that the risks associated with not following the advisory policy can be significant to the organization. The cost of lost productive time due to the evaluation of alternatives and discussions alone can have a significant impact on the organization, and on determining the validity and accuracy of the process.

Advisory policies often have specific restrictions and exclusions. For example, the advisory policy may set out that latitude in determining the course of action can only be extended to experienced individuals, while less-experienced persons must follow the policy as defined, with little opportunity for individual decision-making. It is also important that any exceptions to the policy be documented and what is to be done when those situations are encountered.

Informative

The third type of policy is informative in nature, the purpose of which is to communicate information to a specific audience. That audience is generally any individual who has the opportunity or cause to read the policy. This policy implies no actions or responsibilities on the part of the reader and no penalty is imposed for not following the policy.

Although informative policies typically carry less importance than regulatory or advisory policies, they can carry strong messages about specific situations to the audience. Due to the wide audience intended for informational policies, references to other, more specific policies are made to provide even more information. This means that the distribution of the informative policies can be conducted with little risk to the organization, keeping policies that contain more sensitive information for a limited distribution.

Corporate versus Departmental

The only difference between corporate and departmental policy is the scope. For example, the organization may specify policy regarding how customer interactions will be handled. Specific organizations may choose to define policy about how to handle customer interactions specific to that department. There is no other difference other than the corporate or organizational policy applies to the entire organization, while departmental policy is specific to only that department. With the scope being narrowed, the process of reviewing and approving the policy can be

much shorter due to the reduced number of people that must review it and express their opinions about it.

Program versus Topic Policy

Aside from these major policy types, it is important to make the distinction between program and topic policy. Program policy is used to create an organization's overall security vision, while topic-specific policies are used to address specific topics of concern. In addition to the topic policies are application-specific policies that are used to protect specific applications or systems.

WRITING POLICY

Having examined the different types of policy, the importance of management support and communication of the new policy, and why policy is needed in an organization, we now turn to the process of writing policy for the organization.

Topics

Every organization must develop a basic set of policies. These can normally be found as a document prepared by the organization and can be used by an information security professional to reinforce the message as needed. Policy is the result of a senior management decision regarding an issue. Consequently, there is a wide range of topics available. These include:

1. shared beliefs
2. standards of conduct
3. conflict of interest
4. communication
5. electronic communication systems
6. Internet security
7. electronic communication policy
8. general security policy
9. information protection policy
10. information classification

This is not an all-inclusive list, but is intended to identify those areas that are frequently targeted as issues. It is not necessary to identify all of the policy topic areas before getting started on the development. It is highly likely that one policy may make reference to another organizational policy, or other related document.

There is a specific format that should be used in any policy, but it is important that if there are already policies developed in an organization,

EXHIBIT 3 — Reviewing Principles while Developing Policies

Policy Statement	Principle 1	Principle 2
Entire policy statement	If this principle applies, then put an X in this column.	If this principle applies, then put an X in this column.

one must make new policies resemble the existing ones. This is important to ensure that when people read them, they see them as policy. If a different style is used, then it is possible that the reader might not associate them with policy, despite the fact that it is identified as a policy.

The Impact of Security Principles on Policy Development. The organization should select some quantity of security principles that are important to it. When developing policies and related documents, the chosen principles should be reconsidered from time to time, and a review of the correlation of the policy (or standard, procedure, and guidelines) to the chosen principles should be performed. This can easily be done through the implementation of a matrix as shown in Exhibit 3.

In the matrix, the desired principles are listed across the top of the matrix, and the policy statements are listed down the left-hand column. An "X" is marked in the appropriate columns to illustrate the relationship between the principle and the policy statement. By correlating the principles to the policy (or policy components), the policy writer can evaluate their success. This is because the principles should be part of the objectives or mission of the organization. If there is a policy or component that does not address any principles, then that policy or component should be reviewed to see if it is really necessary, or if there is a principle that was not identified as required. By performing this comparison, the policy writer can make changes to the policy while it is under development, or make recommendations to senior management regarding the underlying principles.

Policy Writing Techniques

When writing the policy, it is essential that the writer consider the intended audience. This is important because a policy that is written using techniques that are not understood by the intended audience will result in confusion and misinterpretation by that audience.

Language. Using language that is appropriate to the intended audience is essential. The language must be free of jargon and as easy to understand as possible. The ability of the user community to understand the policy allows them to determine what their responsibilities are and what

they are required to do to follow the policy. When the policy is written using unfamiliar language, misinterpretations regarding the policy result.

Focus. Stay focused on the topic that is being addressed in the policy. By bringing in additional topics and issues, the policy will become confusing and difficult to interpret. An easy rule of thumb is that for each major topic, there should be one policy. If a single policy will be too large (i.e., greater than four pages), then the topic area should be broken down into sub-topics to ensure that it is focused and covers the areas intended by management.

Format

Policy is the cornerstone of the development of an effective information security architecture. The policy statement defines what the policy is, and is often considered the most effective part of the policy. The goal of an information security policy is to maintain the integrity, confidentiality, and availability of information resources. The basic threats that can prevent an organization from reaching this goal include theft, modification, destruction, or disclosure, whether deliberate or accidental.

The term "policy" means different things to different people. Policy is management's decision regarding an issue. Policy often includes statements of enterprise beliefs, goals, and objectives, and the general means for their attainment in a specified subject area.

A policy statement itself is brief and set at a high level. Because policies are written at a high level, supporting documentation must be developed to establish how employees will implement that policy. Standards are mandatory activities, actions, rules, or regulations that must be performed in order for the policy to be effective.

Guidelines, while separate documents and not included in the policy, are more general statements that provide a framework on which procedures are based. While standards are mandatory, guidelines are recommendations. For example, an organization could create a policy that states that multi-factor authentication must be used, and in what situations. The standard defines that the acceptable multi-factor authentication tools include specific statements regarding the accepted and approved technologies.

Remember that policies should:

1. be easy to understand
2. be applicable
3. be doable
4. be enforceable
5. be phased in
6. be proactive

7. avoid absolutes
8. meet business objectives

Writing policy can be both easy and difficult at the same time. However, aside from working with a common policy format, the policy writer should remember the attributes that many journalists and writers adhere to:

- *What*. What is the intent of the policy?
- *Who*. Who is affected? What are the employee and management responsibilities and obligations?
- *Where*. Where does the policy apply? What is the scope of the policy?
- *How*. What are the compliance factors, and how will compliance be measured?
- *When*. When does the policy take effect?
- *Why*. Why is it necessary to implement this policy?

In considering the policy attributes, it is easier for the policy writer to perform a self-evaluation of the policy before seeking reviews from others. Upfront self-assessment of the policy is critical. By performing the self-assessment, communication and presentation of the policy to senior management will be more successful. Self-assessment can be performed in a number of ways, but an effective method is to compare the policy against the desired security principles.

It is important for the policy writer to ascertain if there are existing policies in the organization. If so, then any new policies should be written to resemble the existing policies. By writing new policies in the existing format, organization members will recognize them as policies and not be confused or question them because they are written in a different format.

A recommended policy format includes the following headings:

- *Background*: why the policy exists
- *Scope*: who the policy affects and where the policy is required
- *Definitions*: explanations of terminology
- *References*: where people can look for additional information
- *Coordinator/Policy Author*: who sponsored the policy, and where do people go to ask questions
- *Authorizing Officer*: who authorized the policy
- *Effective Date*: when the policy takes effect
- *Review Date*: when the policy gets reviewed
- *Policy Statements*: what must be done
- *Exceptions*: how exceptions are handled
- *Sanctions*: what actions are available to management when a violation is detected

While organizations will design and write their policies in a manner that is appropriate to them, this format establishes the major headings and topic areas within the policy document. The contents of these sections are described later in this chapter in the section entitled "Establishing a Common Format."

DEFINING STANDARDS

Recall that a standard defines what the rules are to perform a task and evaluate its success. For example, there is a standard that defines what an electrical outlet will look like and how it will be constructed within North America. As long as manufacturers follow the standard, they will be able to sell their outlets; and consumers will know that if they buy them, their appliances will fit in the outlet.

The definition of a standard is not easy because implementation of a standard must be validated regularly to ensure that compliance is maintained. Consider the example of an electrical outlet. If the manufacturing line made a change that affected the finished product, consumers would not be able to use the outlet, resulting in lost sales, increased costs, and a confused management, until the process was evaluated against the standards.

Consequently, few organizations actually create standards unless specifically required, due to their high implementation and maintenance costs.

A recommended format for standards documents includes the following headings:

- *Background*: why the standard exists
- *Scope*: who requires the standard and where is it required
- *Definitions*: explanations of terminology
- *References*: where people can look for additional information
- *Coordinator/Standards Author*: who sponsored the standard, and where do people go to ask questions
- *Authorizing Officer*: who authorized the standard
- *Effective Date*: when the standard takes effect
- *Review Date*: when the standard gets reviewed
- *Standards Statements*: what the measures and requirements are

While organizations will design and write their standards in a manner that is appropriate to them, this format establishes the major headings and topic areas within the policy document.

It is important to emphasize that while the standard is important to complete, its high cost of implementation maintenance generally means that the lifetime, or review date, is at least five years into the future.

DEFINING PROCEDURES

Procedures are as unique as the organization. There is no generally accepted approach to writing a procedure. What will determine how the procedures look in the organization is either the standard that has been developed previously or an examination of what will work best for the target audience. It can be said that writing the procedure(s) is often the most difficult part, due to the amount of detail involved.

Due to the very high level of detail involved, writing a procedure often requires more people than writing the corresponding documents. Consequently, the manager responsible for the development of the procedure must establish a team of experts, such as those people who are doing the job now, to document the steps involved. This documentation must include the actual commands to be given, any arguments for those commands, and what the expected outcomes are.

There are also several styles that can be used when writing the procedure. While the other documents are written to convey management's desire to have people behave in a particular fashion, the procedure describes how to actually get the work done. As such, the writer has narrative, flowchart, and play script styles from which to choose.

The narrative style presents information in paragraph format. It is conversational and flows nicely, but it does not present the user with easy-to-follow steps. The flowchart format provides the information in a pictorial format. This allows the writer to present the information in logical steps. The play script style, which is probably used more than any other, presents step-by-step instructions for the user to follow.

It is important to remember that the language of the procedure should be written at a level that the target audience will be able to understand. The key procedure elements as discussed in this chapter are identifying the procedure needs, determining the target audience, establishing the scope of the procedure, and describing the intent of the procedure.

A recommended format for procedure documents includes the following headings:

- *Background*: why the procedure exists, and what policy and standard documents it is related to
- *Scope*: who requires the procedure and where is it required
- *Definitions*: explanations of terminology
- *References*: where people can look for additional information
- *Coordinator/Procedure Author*: who sponsored the procedure, and where do people go to ask questions
- *Effective Date*: when the procedure takes effect
- *Review Date*: when the standard gets reviewed
- *Procedure Statements*: what the measures and requirements are

While organizations will design and write their procedures in a manner that is appropriate to them, this format establishes the major headings and topic areas within the policy document.

DEFINING GUIDELINES

Guidelines, by their very nature, are easier to write and implement. Recall that a guideline is a set of nonbinding recommendations regarding how management would like its employees to behave. Unlike the other documents that describe how employees must perform their responsibilities, employees have the freedom to choose what guidelines, if any, they will follow. Compliance with any guideline is totally optional.

Policy writers often write the guidelines as part of the entire process. This is because as they move through the documents, there will be desired behaviors that cannot be enforced, but are still desired nonetheless. These statements of desired behavior form the basis for the guidelines.

Similar to the other documents, a recommended format for guideline documents includes the following headings:

- *Background*: why the guideline exists, and what policy and standard documents it is related to
- *Scope*: who requires guidelines and where are they required
- *Definitions*: explanations of terminology
- *References*: where people can look for additional information
- *Coordinator/Guidelines Author*: who sponsored the guidelines, and where people go to ask questions
- *Effective Date*: when the standard guidelines take effect
- *Review Date*: when the standard guidelines get reviewed
- *Guidelines Statements*: what the measures and requirements are

Unlike the other documents, it is not necessary to have an approver for a guideline. As it is typically written as part of a larger package, and due to its nonbinding nature, there is no approving signature required.

PUBLISHING THE POLICY

With the documents completed, they must be communicated to the employees or members of the organization. This is done through an employee policy manual, departmental brochures, and online electronic publishing. The success of any given policy is based on the level of knowledge that the employees have about it. This means that employees must be aware of the policy. For this to happen, the organization must have a method of communicating the policy to the employees, and keeping them aware of changes to the policy in the future.

Policy Manual

Organizations have typically chosen to create policy manuals and provide a copy to each individual. This has been effective over time because the policies were immediately available to those who needed to refer to them. However, other problems, such as maintenance of the manuals, became a problem over time. As new updates were created, employees were expected to keep their manuals updated. Employees would receive the updated manual, but due to other priorities would not keep their manuals up-to-date. This resulted in confusion when an issue arose that required an examination of policy.

Even worse, organization started to see that the high cost of providing a document for each member of the organization was having a negative effect on their profit lines. They began to see that they were getting little value from their employees for the cost of the manuals. Consequently, organizations began to use electronic publishing of their policies as their communication method.

Departmental Brochures

Not all policies are created for the entire organization. An individual department also had to create policies that affected their individual areas. While it was possible to create a policy manual for the department, it was not practical from an expense perspective. Consequently, departments would create a brochure with the policies that pertained only to their area.

Putting the Policy Online

With the growth of the personal computer and the available access to the information online, more and more organizations have turned to putting the policies online. This has allowed for increased speed in regard to getting new policies and updates communicated to employees.

With the advent of the World Wide Web as a communication medium, organizations are using it as *the* method of making policies available. With hyperlinks, they can link to other related documents and references.

Awareness

However, regardless of the medium used to get the information and policies to the employees, they must be made aware of the importance of remaining up-to-date with the policies that affect them. And even the medium must be carefully selected. If all employees do not have access to a computer, then one must provide the policies in printed form as well. An ongoing awareness program is required to maintain the employee's level of knowledge regarding corporate policies and how they affect the employee.

ESTABLISHING A COMMON FORMAT

A common format makes it easier for readers to understand the intent of the policy and its supporting documents. If there have been no previous written policies or related documents, creating a common format will be simple. If there is an existing format used within an organization, it becomes more difficult. However, it is essential that the writer adapt the layout of written documents to match that which is already in use. Doing so will ensure that the reader recognizes the document for what it is, and understands that its contents are sanctioned by the organization. The format and order of the different sections were presented earlier in the chapter, but is repeated here for conciseness:

- *Background* (all)
- *Scope* (all)
- *Definitions* (all)
- *References* (all)
- *Coordinator/Document Author* (all)
- *Authorizing Officer* (policy, standard, procedure)
- *Effective Date* (all)
- *Review Date* (all)
- *Disposal* (all)
- *Document Statements* (all)
- *Exceptions* (policy)
- *Sanctions* (policy)

Each of these sections should appear in the document unless otherwise noted. There are sections that can be considered as part of one document, while not part of another. To retain consistency, it is recommended that they appear in the order listed throughout all the documents.

In the following chapter sections, the term "document" is used to mean either a policy, standard, procedure, or guideline.

Background. It is important that the document include a statement providing some information on what has prompted the creation of the document. In the case of a new policy, what prompted management's decision, as new policy is generally created as a reaction to some particular event. The other documents would indicate that it references the new policy and why that document is required to support the new policy. By including the background on the situation into the document, one provides a frame of reference for the reader.

Scope. In some situations, the document is created for the benefit of the entire corporation, while others are applicable to a smaller number of

people. It is important that the scope define where the document is applicable to allow people to be able to determine if the policy is applicable to them.

Definitions. It is essential that the documents, with the exception of the procedure, be as free as possible from technical jargon. Within documents other than the procedure, technical jargon tends to confuse the reader. However, in some situations, it is not possible to prevent the use of this terminology. In those situations, the effectiveness of the document is improved by providing explanations and definitions of the terminology.

Reference. Any other corporate documentation, including other policies, standards, procedure, and guidelines, that provides important references to the document being developed should be included. This establishes a link between the policy and other relevant documents that may support this policy, or that this policy may support.

If creating the document as an HTML file for publishing on the Web, then it is wise to include hyperlinks to the other related documentation.

Coordinator/Author. The coordinator or author is the sponsor who developed and sought approval for the document. The sponsor is identified in the policy document to allow any questions and concerns to be addressed to the sponsor. However, it is also feasible that the policy author is not the coordinator identified in the policy. This can occur when the policy has been written by a group of people and to be implemented by a senior manager.

Authorizing Officer. Because senior management is ultimately responsible for the implementation of policy, it is important that a member of that senior management authorize the policy. Often, the senior executive who accepts responsibility is also responsible for the area concerned. For example, the Chief Information Officer will assume responsibility for information systems policies, while the Chief Financial Officer assumes responsibility for financial policies.

If the standard is to be defined as a corporate standard, then the appropriate member of senior management should authorize the standard. If the standard is for one department's use, then the senior manager of that department approves it. Procedures are generally only for a department and require a senior manager's approval. Guidelines do not need approval unless they are for implementation within the company. In such situations, the senior manager responsible for the function should approve them.

Effective Date. This is the date when the document takes effect. When developing policy, it is essential that support be obtained for the policy,

and sufficient time for user education be allowed before the policy takes effect. The same is true for the supporting documents, because people will want access to them when the policy is published.

Review Date. The review date establishes when the document is to be reviewed in the future. It is essential that a review period be established because all things change with time. Ideally, the document should make a statement that establishes a time period and whenever circumstances or events warrant a review. By establishing a review date, the accuracy and appropriateness of the document can be verified.

Disposal. In the event that the document is classified or controlled in some manner within the organization, then specific instructions regarding the disposal are to be indicated in this section. If there are no specific instructions, the section can be omitted, or included with a statement indicating that there are no special instructions.

Document Statement(s). The policy statement typically consists of several text lines that describe what management's decision was. It is not long, and should be no more than a single paragraph. Any more than that, and the policy writer runs the risk of injecting ambiguity into the policy. However, the policy statements are to be clear enough to allow employees to determine what the required action is.

Statements within a standard must be of sufficient length to provide the detail required to convey the standard. This means that the standard can be quite lengthy in some situations.

Procedure statements are also quite detailed as they provide the exact command to be executed, or the task to be performed. Again, these can be quite lengthy due to the level of detail involved.

Exceptions. This section is generally included only in policy documents. It is advisable to include in the policy document a statement about how exceptions will be handled. One method, for example, is to establish a process where the exception is documented, an explanation provided about why an exception is the most practical way to handle the situation. With this done, the appropriate management is identified and agreement is sought, where those managers sign the exception. Exceptions should have a specific lifetime; for example, they should be reviewed and extended on an annual basis.

Violations and Sanctions. This section is generally included only in policy documents. The tendency is for organizations to sacrifice clarity in the policy for sanctions. The sanctions must be broad enough to provide management with some flexibility when determining what sanction is applied. For example, an organization would not dismiss an employee

for a minor infraction. It is necessary that Human Resources and Legal review and approve the proposed sanctions.

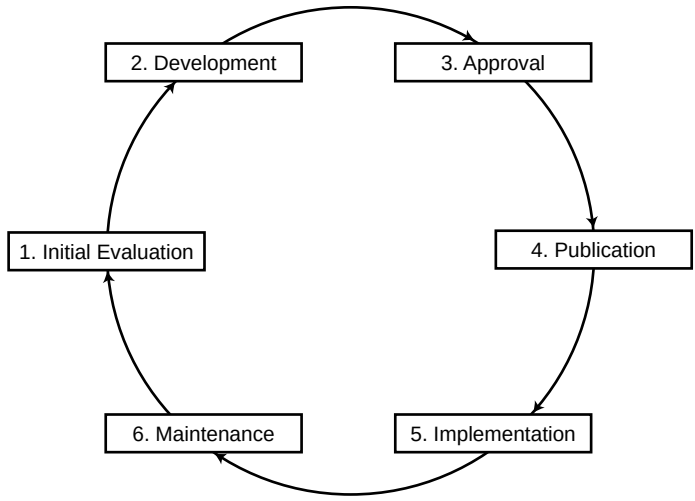
USING A COMMON DEVELOPMENT PROCESS

A common process can be used in the creation all these documents. The process of creating them is often managed through a project management approach if the individual writing them requires a number of other people to be involved and must coordinate their time with other projects. While it is not necessary, using this process in conjunction with a project management approach can ensure that management properly supports the document writing effort. One example of a process to use in defining and developing these documents consists of several phases as seen in Exhibit 4. Each of these development phases consists of discrete tasks that must be completed before moving on to the next one.

Phase One: Initial and Evaluation Phase

A written proposal to management is submitted that states the objectives of the particular document (policy, standard, etc.) and the need it is supposed to address. Management will then evaluate this request to satisfy itself that the expected benefit to the organization justifies the expected cost. If it does, then a team is assembled to develop and research the document as described in Phase Two. Otherwise, the submitter is advised that no further action will take place.

EXHIBIT 4 — Defining and Developing Documentation



Phase Two: Development Phase

In the development phase, funding is sought from the organization for the project. The organization can choose to assemble a new team, or use one that was previously used for another project. The team must work with management to determine who will be responsible for approving the finished document.

The structure of the team must be such that all interested parties (stakeholders) are represented and the required competency exists. The team should include a representative from management, the operations organization responsible for implementation (if appropriate), the development team, a technical writer, and a member of the user community that will ultimately be a recipient of the service or product.

By including a representative from management, they can perform liaison duties with the rest of the organization's management, legal, and other internal organizations as required. The development team is essential to provide input on the requirements that are needed when the product or service is being developed or assembled into the finished product. Operations personnel provide the needed input to ensure that the document can actually be put into practice once it is completed. The user community cannot be ignored during the development phase. If they cannot accept the terms of the document, having their input upfront, rather than later can shorten the development process. Finally, the technical writer assists in the creation of the actual language used in the document. While most people feel they can write well, the technical writer has been trained in the use of language.

Remember that unless the members of this team have these roles as their primary responsibility, they are all volunteers. Their reward is the knowledge that they have contributed to the content of the standard and the recognition of their expertise by virtue of having their names published in the document.

This team is the heart of the development process. The technical requirements are put forward, designed, and worded by the experts on the team. These people discuss and debate the issues until final wording is agreed upon. Consensus is the key, as unanimity is not often achieved.

As the draft is developed through a number of iterations and approaches the original design objectives, it is made available to the general population within the organization for review and comment. The review period generally lasts 30 days and allows for input from those outside the team.

During this review period, the document should be tested in a simulated exercise. For example, if the document being developed is a procedure, then a less-experienced person should be able to successfully perform the tasks based on the information within the procedure. If they cannot, then there is a deficiency that must be addressed prior to approval.

After the comments have been deliberated by the team and it feels that the document is technically complete, it moves on to Phase Three.

Phase Three: Approval Phase

When the team has completed the design phase, the document is presented to the appropriate body within the organization. Some organizations will have formalized methods for approving policy, while others will not. It is necessary during the development phase to establish who the approving body or person is.

The document is presented to the approving body and a discussion of the development process ensues, highlighting any reasons that the team felt were important considerations during development. The document is "balloted" by the approving body, and any negative issues should be addressed prior to approval of the document.

Phase Four: Publication Phase

Finally, the document is translated (if required) and published within the organization. At this point, the document is ready for implementation as of the effective date. In some situations, the effective date may be the date of publication.

Phase Five: Implementation

During implementation, the various groups affected by the new document commence its implementation. This implementation will be different, depending on where it is being placed into use. For example, a user's perspective will be different from that of an operational team. While the document is being used, people should be encouraged to send their comments and questions to the coordinator. These comments will be important during the review or maintenance phase.

Phase Six: Maintenance Phase

As decided during the development phase, the document is reviewed on the review date. During this review, the continuing viability of the document is decided. If the document is no longer required, then it is withdrawn or cancelled. If viability is determined and changes are needed, the team jumps into the development cycle at Phase Two and the cycle begins again.

SUMMARY

This chapter has examined why policy is important to information security and some issues and areas concerning the development of that policy. Information Security Policy establishes what management wants done

to protect the organization's intellectual property or other information assets. Standards are used to establish a common and accepted measurement that people will use to implement this policy. Procedures provide the details — the how of the implementation — while guidelines identify the things that management would like to see implemented.

Policy is an essential and important part of any organization because it identifies how the members of that organization must conduct themselves. To the information security manager, policy establishes what is important to the organization and what defines the shape of the work that follows.

References

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Chris Hare's experience encompasses more than 14 years in the computing industry with key positions ranging from application design, quality assurance, system administration/engineering, network analysis, and security consulting, operations, and architecture. His management career, coupled with in-depth technical knowledge, provides the foundation to integrate the intricate risks of technology to the ongoing survival of major corporations.

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