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Computer Security

Human Factors

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Before Starting

EBay has been compromised so that people who clicked on some of its links were automatically diverted to a site designed to steal their credentials.

http://www.bbc.com/news/technology-29241563

Outline

- Security Awareness, Training, and Education
- Employment Practices and Policies
- E-Mail and Internet Use Policies
- Computer Security Incident Response Teams

Security Awareness, Training, and Education

- Human resource security
- A siginificant topic for computer security
- Full discussion is beyond this course
- Some Standards
  - ISO27002 (Code for Practice for Information Security Management)
  - NIST 800-100 (Information Security Handbook: A Guide for Managers)
  - PCI DSS v3 (Payment Card Industry Data Security Standard)

Security Awareness, Training, and Education

- Employee behavior is a critical concern in ensuring the security of computer systems and information assets.
- Motivation: the programs provide 4 major benefits
  1. Improving employee behavior
  2. Increasing the ability to hold the employees accountable for their actions
  3. Mitigating liability of the organization for an employee's behavior
  4. Complying with regulations and contractual obligations

Security Awareness, Training, and Education

- Problems associated with employee behavior
  - Errors
  - Omissions
  - Fraud
  - Actions by disgruntled employees

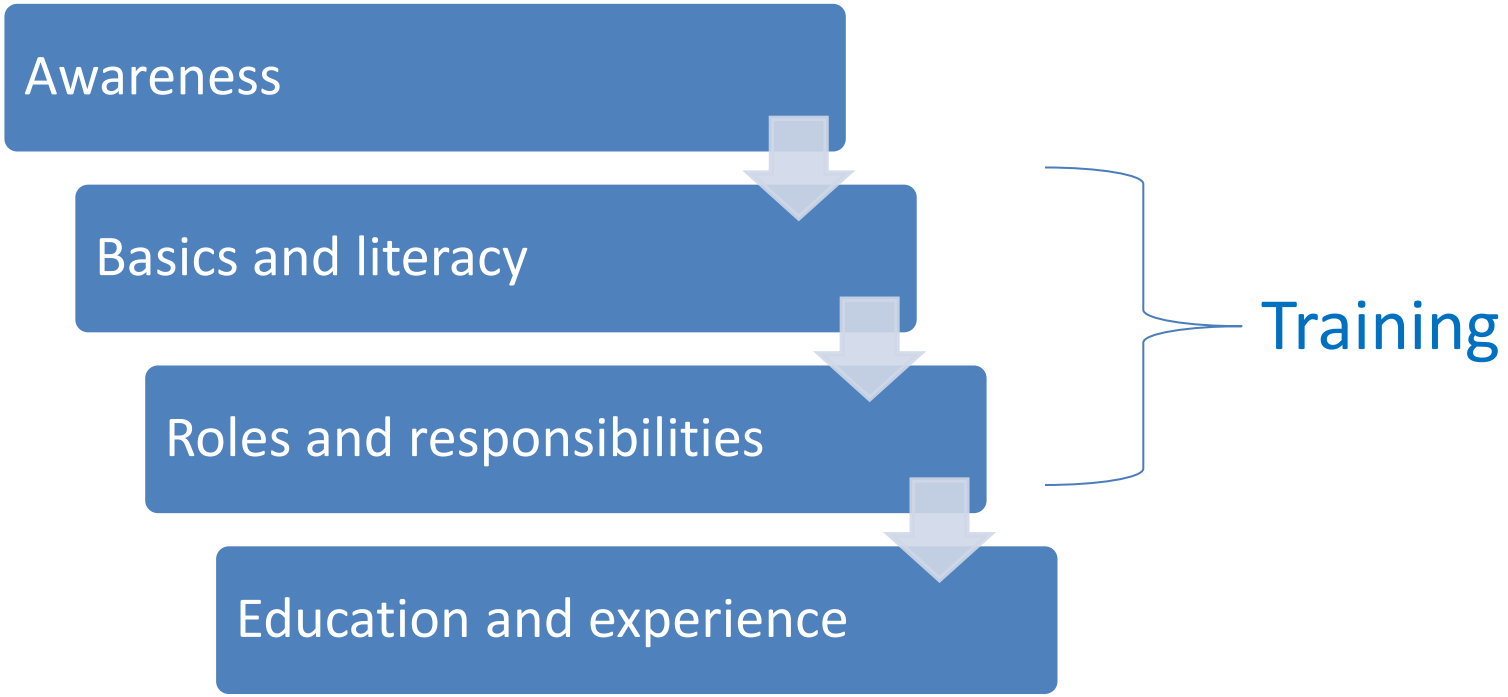
- Security awareness, training, and education programs can reduce the problems of
  - Errors and
  - Omissions

Security Awareness, Training, and Education

- Employees cannot be expected to follow policies and procedures of which they are unaware.
- Enforcement is more difficult if employees can claim ignorance when caught in a violation.
- The programs
  - Limit an organization's liability
  - Comply with regulations and contractual obligations, such as access to clients' data

Security Awareness, Training, and Education

- There is a need for a continuum of learning programs that starts with awareness, builds to training, and evolves into education.
- NIST SP 800-16



Security Awareness, Training, and Education

- A security awareness program seeks to inform and focus an employee's attention on issues related to security within one organization.

- Benefits of awareness
  - Employees are aware of their responsibilities regarding security and act accordingly
  - Employees understand the significance of relation between security and the organization
  - Promotes support to security staff recruitments and security products

Security Awareness, Training, and Education

Awareness

- Attribute: what is allowed or not allowed but not how
- Level: information
- Objective: recognition
- Teaching method: media, such as videos, newsletters, posters, etc. (identify learning)
- Test measure: true/false or multiple choice
- Impact timeframe: short term

Security Awareness, Training, and Education

Some Goals of security awareness programs

- Rise staff awareness in general
- Ensure that staff are aware of governmental laws and regulations related to security
- Organizational security policies and procedures
- Ensure that staff understand the significance of a sole employee
- Train staff according to their positions
- Inform staff that they are monitored
- Remind the consequences of security breaches
- Teach the significance of reporting
- Create a trusted system

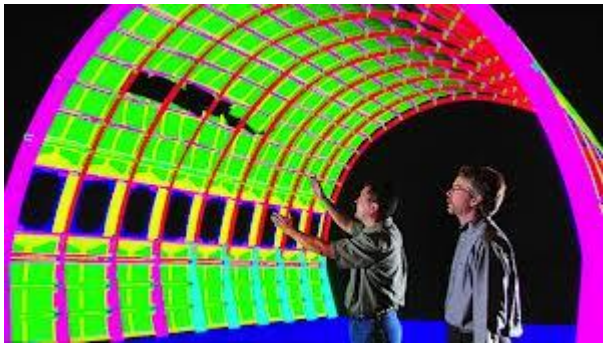
Security Awareness, Training, and Education

An organization should have a security awareness policy, which

- For every employee there should be an orientation program and periodic activities
- Everyone should have (given) time to participate the activities
- Responsibilities should be clearly defined.

Security Awareness, Training, and Education

- A security training program teaches people the skills to perform their information system related tasks more securely.



- Depending on the role of the user, training includes basic and advanced computer skills.

Security Awareness, Training, and Education

For general user, training focuses on good computer security practices

- Protecting the physical area and equipments (DVD, locking doors, etc)
- Protecting authentication credentials (passwords, PINs, tokens)

- Reporting security violations and incidents

Security Awareness, Training, and Education

Programmers, developers, and system maintainers require more specialized or advanced training.

Problem: They do not understand how to do security related tasks

Security Awareness, Training, and Education

The training objectives for these group

- Develop a security mindset in the developer
- Show how to build security into development life cycle
- Teach the developer how attackers exploit software and how to resist attack.
- Provide analysis with a toolkit of specific attacks and principles with which to interrogate systems.

Security Awareness, Training, and Education

- Management-level should teach managers
  - How to make trade-offs among risk, cost, and benefits
  - Need to understand the development lifecycles
  - Use the security checkpoints and evaluation techniques

- Executive level should teach
  - Difference between software security and network security
  - Understand security risks and costs
  - Understand security measurement and awareness

Security Awareness, Training, and Education

Training

- Attribute: how to …
- Level: knowledge
- Objective: skill
- Teaching method: practical instruction (lecture, case study workshop,..)
- Test measure: problem solving (apply learning)
- Impact timeframe: intermediate

Security Awareness, Training, and Education

- The most in-depth program in security education.
- This is targeted at security professionals and those jobs require expertise in security.

- Education
  - Attribute: why
  - Level: insight
  - Objective: understanding
  - Teaching method: theoretical instructions (discussion seminars, background reading)
  - Test measure: essay (interpret learning)
  - Impact timeframe: long-term

Employment Practices and Policies

- A large majority of significant computer crime are individuals who have legitimate access now, or who have recently had access.

- Managing personnel with potential access is an essential part of information security.

Employment Practices and Policies

Employees can be involved in security violations in a one of two ways:

- Falling to follow procedures
- Knowingly violates procedures

Employment Practices and Policies

Some threats from internal users:

- Gaining unauthorized access
- Altering data
- Deleting production and backup data
- Crashing or destroying systems
- Misusing systems
- Stealing strategic data

Employment Practices and Policies

Background checks and screening (for Hiring Process)

- Hiring presents management with significant challenges.

- A significant number of employers have a corporate policy that forbids discussing a former employee's performance in any way, positive or negative.
- Despite obstacles, employers must make a significant effort

Employment Practices and Policies

General guidelines for checking applicants:

- Ask for more details and educational history
- Investigate the accuracy of details
- Arrange experienced staff members to interview candidates

Employment Practices and Policies

- During employment, there are two elements of personnel security:
  - Security policy document
  - An ongoing awareness and training program for all employees.
- Principles for personnel security (ISO 27002):
  - Least privilege
  - Separation of duties
  - Limited reliance on key employees

Employment Practices and Policies

- Termination of employment: The termination process is complex and depends on
  - the nature of the organization
  - the status of employee
  - the reason for departure

- Some important actions:
  - Removing the person from authorized access lists
  - Removing person's access codes
  - Notifying departments and related people, such as guards

E-Mail and Internet Use Policies

A growing number of companies incorporate specific e-mail and Internet use policies into the organization's security policy.

E-Mail and Internet Use Policies

Motivation

- Significant employee time may be consumed in a non-work-related activities (surfing, game)
- Excessive and casual use of Internet and e-mail increases the risk of introducing malicious software
- Non-work-related activity could result in liability problems with other organizations
- They may be used by an employee to harm another employee
- May damage reputation of the organization

E-Mail and Internet Use Policies

Some policy issues regarding e-mail and Internet use :

- Business use only
- Reasonable personal use
- Policy scope
- Content ownership
- Privacy
- Unlawful activity prohibited
- Security policy
- Company policy
- Company rights
- Disciplinary actions

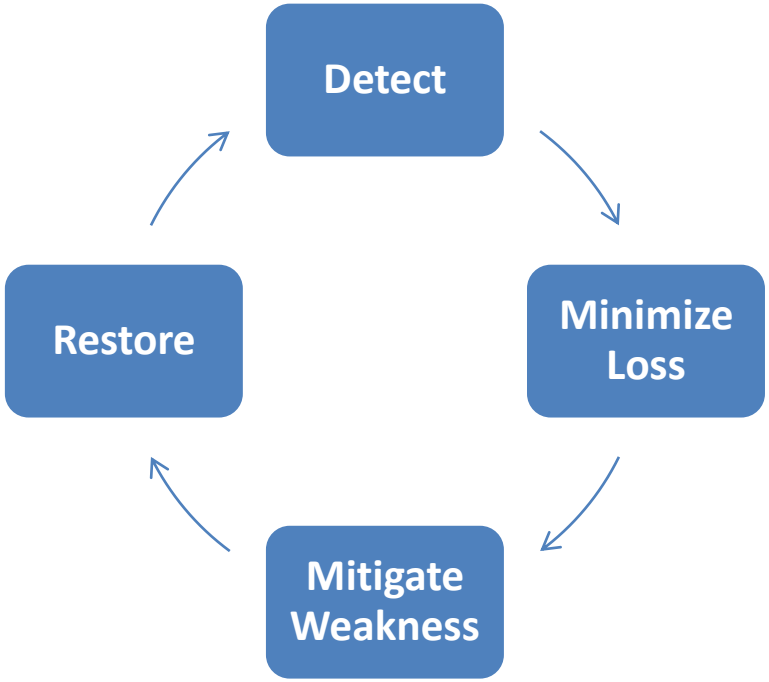
Computer Security Incident Response Teams

- The development of procedures to respond to computer incidences is regarded as an essential control for most organizations.
- The incident handling and response procedures need to
  - reflect the range of possible consequences of an incident on the organization
  - allow for a suitable response.

Computer Security Incident Response Teams

For a large and medium-sized organizations, a computer incident response team (CSIRT) is responsible for

- Rapidly detect incidents
- Minimizing loss and destruction
- Mitigating the weakness
- Restoring computer services



Computer Security Incident Response Teams

Benefits of incident response capability (NIST SP 800-61)

- Systematically response
- Recover quickly and minimize loss
- Handle future incidents
- Dealing properly with legal issues

Computer Security Incident Response Teams

- A good incident response policy should
  - Indicate the action
  - Specify the personnel
  - Detail the contacts of personnel for quick decision making

- Security incidents are generally categorized:
  - Unauthorized access to a system
  - Unauthorized modification of information

Computer Security Incident Response Teams

Security Incident Terminology

- Artifact: something used to attack the system (virus, exploit)
- Computer security incident response team (CSIRT)
- Constituency: The group of users, sites, networks, or organizations served by the CSIRT
- Incident: A violation of computer security policies or standard security practices
- Triage: The process of receiving, initial sorting, and prioritizing of information to facilitate its appropriate handling.
- Vulnerability: A characteristic of a piece of information which can be exploited to perpetrate a security incident.

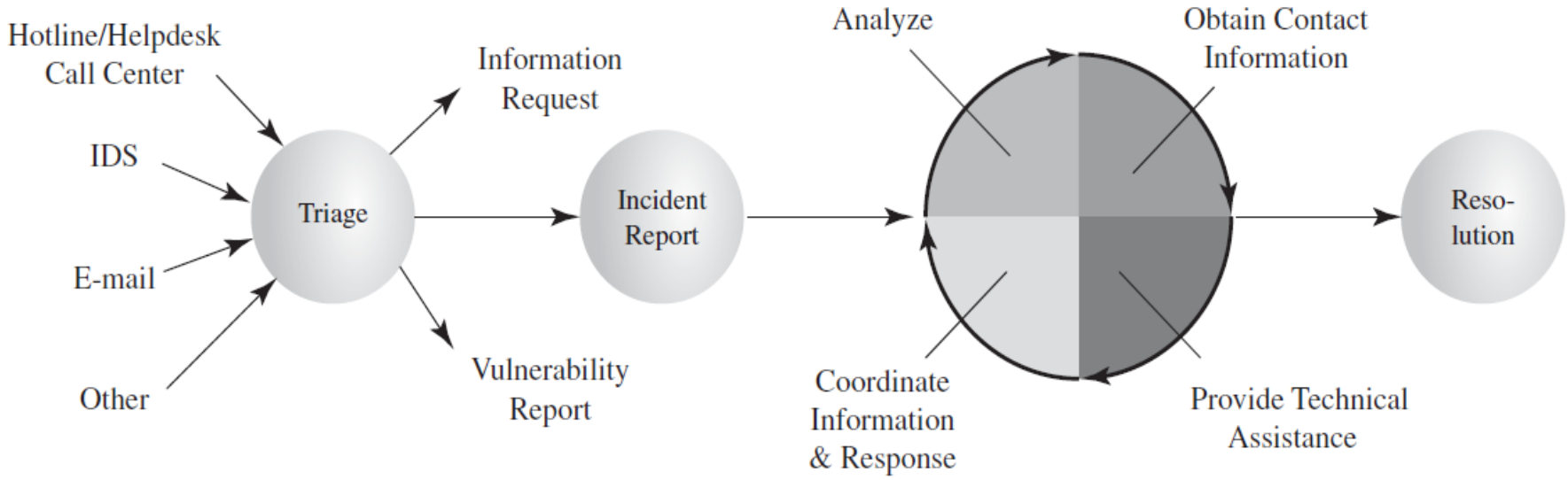
Computer Security Incident Response Teams

- Detecting incidents: Incidents can be detected by staff or automated tools.
- Incident detecting tools include
  - System integrity verification tools
  - Log analysis tools
  - Network and host intrusion detection tools (IDS)
  - Intrusion prevention systems

- The effectiveness of automated tools depends on the accuracy of their configuration, and the correctness of the patterns and signatures used.

Computer Security Incident Response Teams

Triage function ensures that all information destined for the incident handling service is channeled through a single focal point regardless of the method by which it arrives for appropriate redistribution and handling within the service.



Computer Security Incident Response Teams

- Responding to incidents: Response procedures must deal how to identify the cause of the security incident, whether accidental or deliberate.

- In determining the appropriate responses to an incident, a number of issues should be considered, such as:
  - How critical the system is
  - The current and potential technical effects

Computer Security Incident Response Teams

- Some potential response activities:
  - Take action to protect systems and networks
  - Rebuilding systems
  - Patching or repairing systems
  - Developing response strategies

- Documenting Incidents: There is a need to identify what vulnerability led to its occurrence and how this might be addressed to prevent the incident in the future.

Summary

- Employee behavior
- Problems with employee behavioir
- Security awareness, trainig, and education
- Employment practices and policies
- E-mail and Internet use policies
- Computer security incident response