Protecting Information Assets
- Unit# 5 -

Creating a Security Aware Organization

Agenda

- Creating a Security Aware Organization
  - Awareness and Training InfoSec Controls
  - The Threat landscape
  - Employee risk
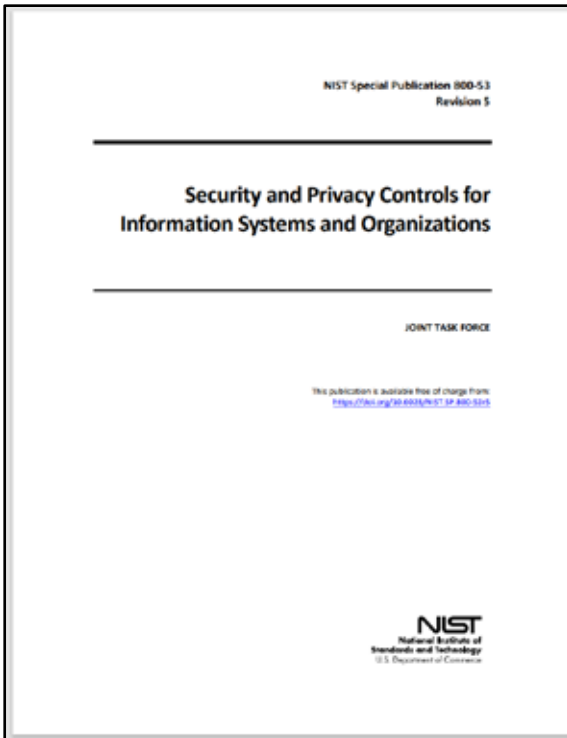 - Training course content (examples)
- Test Taking Tip
- Quiz

NIST Special Publication 800-53
Revision 5

Security and Privacy Controls for Information Systems and Organizations

JOINT TASK FORCE

This publication is available free of charge from:
https://doi.org/10.6028/NIST SP 800-53r5

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TABLE 1: SECURITY AND PRIVACY CONTROL FAMILIES

ID	FAMILY	ID	FAMILY
AC	Access Control	PE	Physical and Environmental Protection
AT	Awareness and Training	PL	Planning
AU	Audit and Accountability	PM	Program Management
CA	Assessment, Authorization, and Monitoring	PS	Personnel Security
CM	Configuration Management	PT	PII Processing and Transparency
CP	Contingency Planning	RA	Risk Assessment
IA	Identification and Authentication	SA	System and Services Acquisition
IR	Incident Response	SC	System and Communications Protection
MA	Maintenance	SI	System and Information Integrity
MP	Media Protection	SR	Supply Chain Risk Management

Note: NIST SP 800-53x InfoSec control documents can be found on the MIS Community Site, in the WrapUp post for this Unit 3a

NIST Special Publication 800-53B

Control Baselines for Information Systems and Organizations

JOINT TASK FORCE

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https://doi.org/10.6028/NIST.SP.800-53B

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TABLE 3-2: AWARENESS AND TRAINING FAMILY

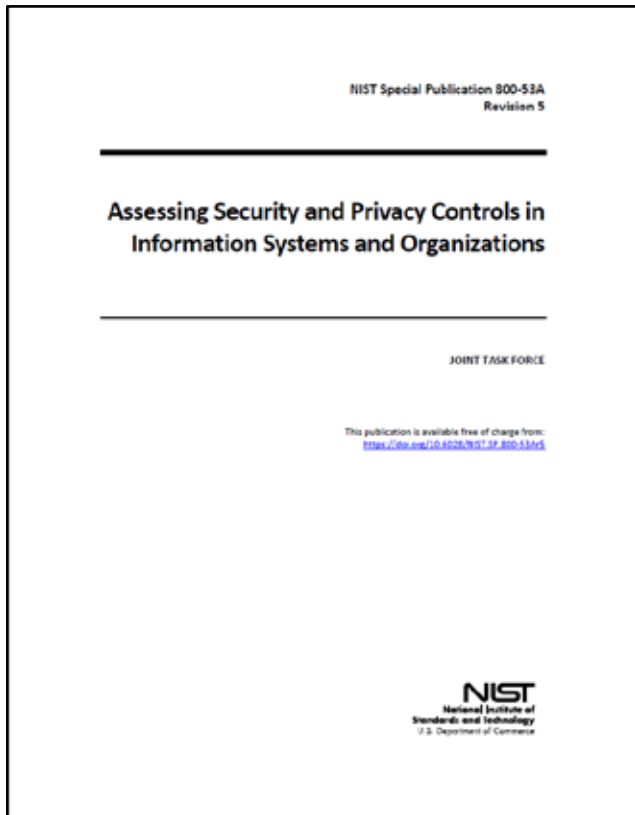| CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
			LOW	MOD	HIGH
AT-1	**Policy and Procedures**	X	X	X	X
AT-2	**Literacy Training and Awareness**	X	X	X	X
AT-2(1)	PRACTICAL EXERCISES				
AT-2(2)	INSIDER THREAT		X	X	X
AT-2(3)	SOCIAL ENGINEERING AND MINING			X	X
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR				
AT-2(5)	ADVANCED PERSISTENT THREAT				
AT-2(6)	CYBER THREAT ENVIRONMENT				
AT-3	**Role-Based Training**	X	X	X	X
AT-3(1)	ENVIRONMENTAL CONTROLS				
AT-3(2)	PHYSICAL SECURITY CONTROLS				
AT-3(3)	PRACTICAL EXERCISES				
AT-3(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR	W: Incorporated into AT-2(4).			
AT-3(5)	PROCESSING PERSONALLY IDENTIFIABLE INFORMATION	X			
AT-4	**Training Records**	X	X	X	X
AT-5	Contacts with Security Groups and Associations	W: Incorporated into PM-15.			
AT-6	**Training Feedback**				

TABLE 3-2: AWARENESS AND TRAINING FAMILY

CONTROL NUMBER	CONTROL NAME / CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
			LOW	MOD	HIGH
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AT-2(1)	PRACTICAL EXERCISES				
AT-2(2)	INSIDER THREAT		x	x	x
AT-2(3)	SOCIAL ENGINEERING AND MINING			x	x
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR				
AT-2(5)	ADVANCED PERSISTENT THREAT				
AT-2(6)	CYBER THREAT ENVIRONMENT				
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AT-3(2)	PHYSICAL SECURITY CONTROLS				
AT-3(3)	PRACTICAL EXERCISES				
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AT-3(5)	PROCESSING PERSONALLY IDENTIFIABLE INFORMATION	x			
AT-4	**Training Records**	x	x	x	x
AT-5	Contacts with Security Groups and Associations	W: Incorporated into PM-15			
AT-6	**Training Feedback**				

Remember the security categorization of the Dean's laptop?

Asset (Impact to)	Confidentiality	Integrity	Availability	Categorization
Staff Salary Data	High	Low	Medium	High
Student Data	High	Low	Low	High
Fundraising Presentations	Medium	Medium	High	High
Dean's Personal Data	Low	Low	Medium	Medium
Overall Impact	High	Medium	High	**High**

Determination of overall categorization…

How would you audit these risk controls?

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Revision 5

Assessing Security and Privacy Controls in Information Systems and Organizations

JOINT TASK FORCE

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https://doi.org/10.6028/NIST.SP.800-53Ar5

NIST
National Institute of
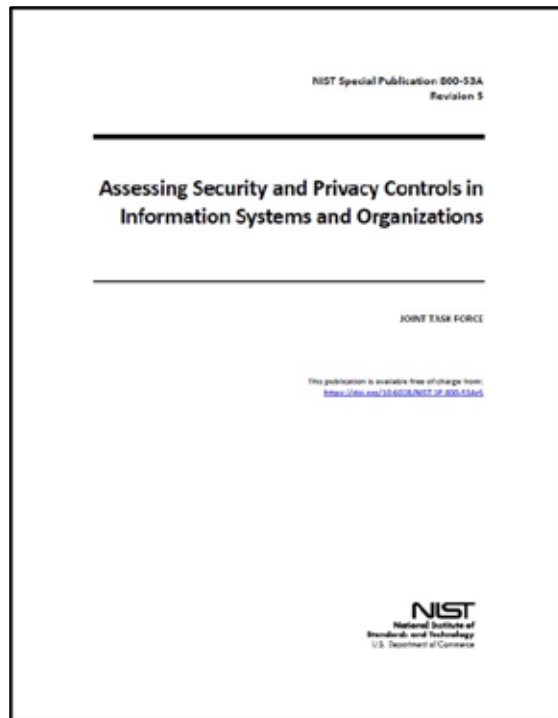Standards and Technology
U.S. Department of Commerce

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AT-2(1)	PRACTICAL EXERCISES				
AT-2(2)	INSIDER THREAT		X	X	X
AT-2(3)	SOCIAL ENGINEERING AND MINING			X	X
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR				
AT-2(5)	ADVANCED PERSISTENT THREAT				
AT-2(6)	CYBER THREAT ENVIRONMENT				
AT-3	**Role-Based Training**	X	X	X	X
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AT-3(2)	PHYSICAL SECURITY CONTROLS				
AT-3(3)	PRACTICAL EXERCISES				
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AT-3(5)	PROCESSING PERSONALLY IDENTIFIABLE INFORMATION	X			
AT-4	**Training Records**	X	X	X	X
AT-5	Contacts with Security Groups and Associations	W: Incorporated into PM-15.			
AT-6	**Training Feedback**				

Class exercise:

- **_Find an audit control checklist for AT-1…_**

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			LOW	MOD	HIGH
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AT-2	**Literacy Training and Awareness**	x	x	x	x
AT-2(1)	PRACTICAL EXERCISES				
AT-2(2)	INSIDER THREAT		x	x	x
AT-2(3)	SOCIAL ENGINEERING AND MINING			x	x
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR				
AT-2(5)	ADVANCED PERSISTENT THREAT				
AT-2(6)	CYBER THREAT ENVIRONMENT				
AT-3	**Role-Based Training**	x	x	x	x
AT-3(1)	ENVIRONMENTAL CONTROLS				
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AT-3(5)	PROCESSING PERSONALLY IDENTIFIABLE INFORMATION	x			
AT-4	**Training Records**	x	x	x	x
AT-5	Contacts with Security Groups and Associations	W: Incorporated into PM-15.			
AT-6	**Training Feedback**				

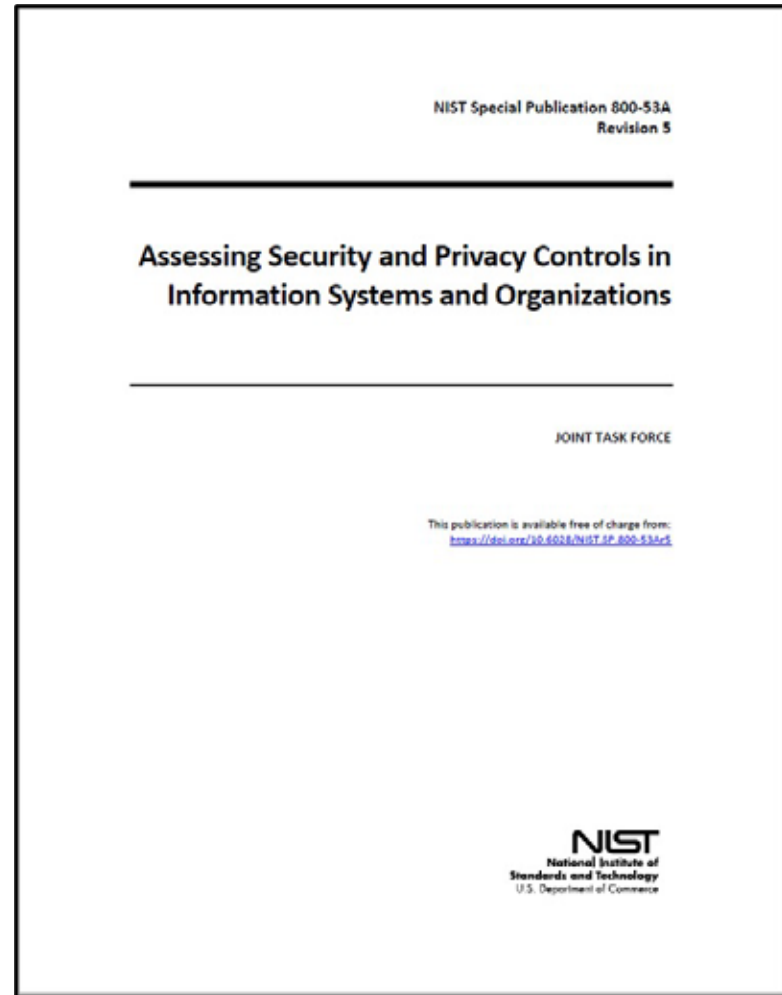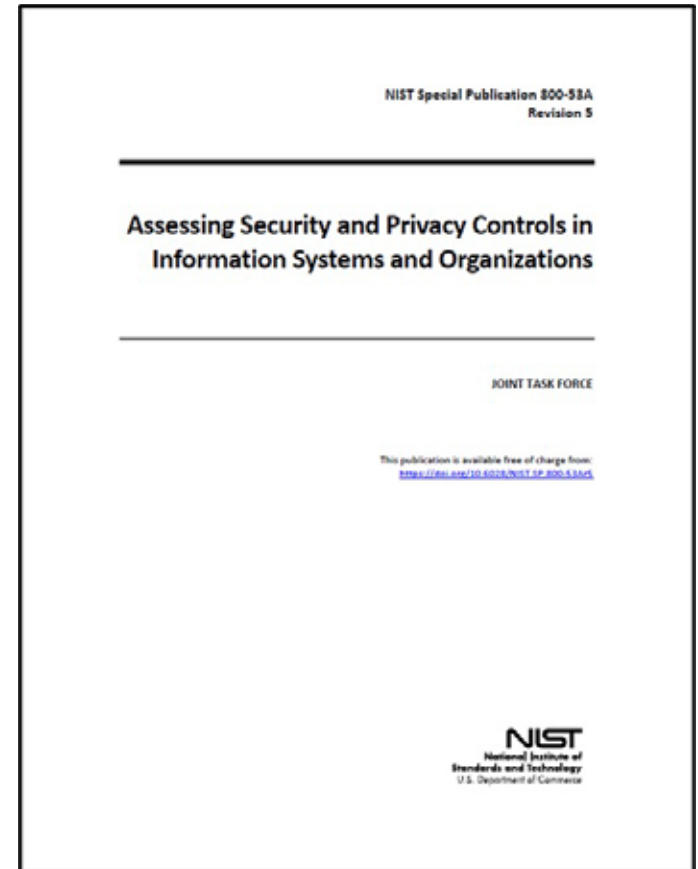| AT-01	POLICY AND PROCEDURES	
	ASSESSMENT OBJECTIVE: *Determine if:*	
	AT-01_ODP[01]	*personnel or roles to whom the awareness and training policy is to be disseminated is/are defined;*
	AT-01_ODP[02]	*personnel or roles to whom the awareness and training procedures are to be disseminated is/are defined;*
	AT-01_ODP[03]	*one or more of the following PARAMETER VALUES is/are selected: {organization-level; mission/business process-level; system-level};*
	AT-01_ODP[04]	*an official to manage the awareness and training policy and procedures is defined;*
	AT-01_ODP[05]	*the frequency at which the current awareness and training policy is reviewed and updated is defined;*
	AT-01_ODP[06]	*events that would require the current awareness and training policy to be reviewed and updated are defined;*
	AT-01_ODP[07]	*the frequency at which the current awareness and training procedures are reviewed and updated is defined;*
	AT-01_ODP[08]	*events that would require procedures to be reviewed and updated are defined;*
	AT-01a.[01]	an awareness and training policy is developed and documented;
	AT-01a.[02]	the awareness and training policy is disseminated to <*AT-01_ODP[01] personnel or roles*>;
	AT-01a.[03]	awareness and training procedures to facilitate the implementation of the awareness and training policy and associated access controls are developed and documented;
	AT-01a.[04]	the awareness and training procedures are disseminated to <*AT-01_ODP[02] personnel or roles*>.
	AT-01a.01(a)[01]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses purpose;
	AT-01a.01(a)[02]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses scope;
	AT-01a.01(a)[03]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses roles;
	AT-01a.01(a)[04]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses responsibilities;
	AT-01a.01(a)[05]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses management commitment;
	AT-01a.01(a)[06]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses coordination among organizational entities;
	AT-01a.01(a)[07]	the <*AT-01_ODP[03] SELECTED PARAMETER VALUE(S)*> awareness and training policy addresses compliance; and

Assessing Security and Privacy Controls in Information Systems and Organizations

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TABLE 3-2: AWARENESS AND TRAINING FAMILY

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AT-2	Literacy Training and Awareness	X	X	X	X
AT-2(1)	PRACTICAL EXERCISES				
AT-2(2)	INSIDER THREAT		X	X	X
AT-2(3)	SOCIAL ENGINEERING AND MINING			X	X
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR				
AT-2(5)	ADVANCED PERSISTENT THREAT				
AT-2(6)	CYBER THREAT ENVIRONMENT				
AT-3	Role-Based Training	X	X	X	X
AT-3(1)	ENVIRONMENTAL CONTROLS				
AT-3(2)	PHYSICAL SECURITY CONTROLS				
AT-3(3)	PRACTICAL EXERCISES				
AT-3(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR	W: Incorporated into AT-2(4).			
AT-3(5)	PROCESSING PERSONALLY IDENTIFIABLE INFORMATION	X			
AT-4	Training Records	X	X	X	X
AT-5	Contacts with Security Groups and Associations	W: Incorporated into PM-15.			
AT-6	Training Feedback				

How would you assess the training?

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AT-02	LITERACY TRAINING AND AWARENESS	
	ASSESSMENT OBJECTIVE: *Determine if:*	
	AT-02_ODP[01]	*the frequency at which to provide security literacy training to system users (including managers, senior executives, and contractors) after initial training is defined;*
	AT-02_ODP[02]	*the frequency at which to provide privacy literacy training to system users (including managers, senior executives, and contractors) after initial training is defined;*
	AT-02_ODP[03]	*events that require security literacy training for system users are defined;*
	AT-02_ODP[04]	*events that require privacy literacy training for system users are defined;*
	AT-02_ODP[05]	*techniques to be employed to increase the security and privacy awareness of system users are defined;*
	AT-02_ODP[06]	*the frequency at which to update literacy training and awareness content is defined;*
	AT-02_ODP[07]	*events that would require literacy training and awareness content to be updated are defined;*
	AT-02a.01[01]	security literacy training is provided to system users (including managers, senior executives, and contractors) as part of initial training for new users;

AT-02	LITERACY TRAINING AND AWARENESS	
	AT-02a.01[02]	privacy literacy training is provided to system users (including managers, senior executives, and contractors) as part of initial training for new users;
	AT-02a.01[03]	security literacy training is provided to system users (including managers, senior executives, and contractors) *<AT-02_ODP[01] frequency>* thereafter;
	AT-02a.01[04]	privacy literacy training is provided to system users (including managers, senior executives, and contractors) *<AT-02_ODP[02] frequency>* thereafter;
	AT-02a.02[01]	security literacy training is provided to system users (including managers, senior executives, and contractors) when required by system changes or following *<AT-02_ODP[03] events>*;
	AT-02a.02[02]	privacy literacy training is provided to system users (including managers, senior executives, and contractors) when required by system changes or following *<AT-02_ODP[04] events>*;
	AT-02b.	*<AT-02_ODP[05] awareness techniques>* are employed to increase the security and privacy awareness of system users;
	AT-02c.[01]	literacy training and awareness content is updated *<AT-02_ODP[06] frequency>*;
	AT-02c.[02]	literacy training and awareness content is updated following *<AT-02_ODP[07] events>*;
	AT-02d.	lessons learned from internal or external security incidents or breaches are incorporated into literacy training and awareness techniques.
	POTENTIAL ASSESSMENT METHODS AND OBJECTS:	
	AT-02-Examine	[SELECT FROM: System security plan; privacy plan; literacy training and awareness policy; procedures addressing literacy training and awareness implementation; appropriate codes of federal regulations; security and privacy literacy training curriculum; security and privacy literacy training materials; training records; other relevant documents or records].
	AT-02-Interview	[SELECT FROM: Organizational personnel with responsibilities for literacy training and awareness; organizational personnel with information security and privacy responsibilities; organizational personnel comprising the general system user community].
	AT-02-Test	[SELECT FROM: Mechanisms managing information security and privacy literacy training].

MIS 5206 Protecting Information Assets

What is in this picture ?
What is missing from this diagram?
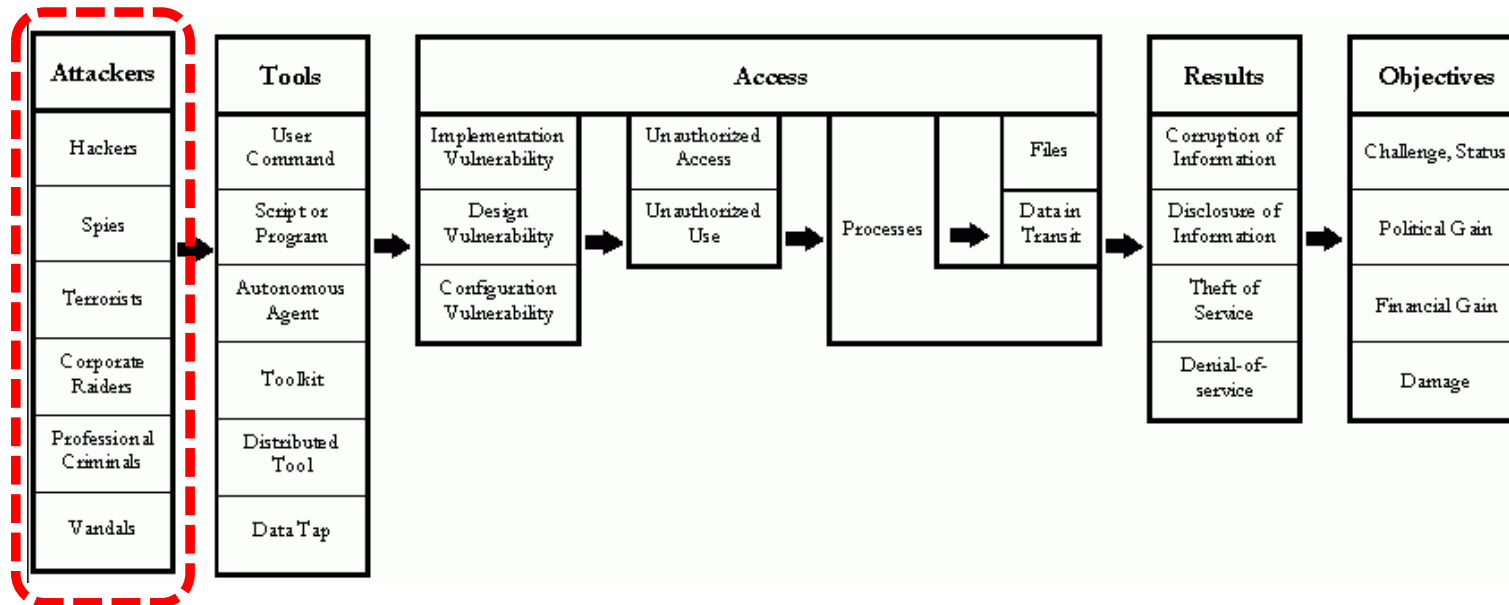
Howard's process-based taxonomy, from Hansman, S. and Hunt, R., 2004, "A taxonomy of network and computer attacks", Computers & Security, page 3, Elsevier Ltd. Cited from Howard, JD, 1997, "An analysis of security incidents on the internet 1989-1995. PhD thesis, Carnegie Mellon University.

The threat landscape….

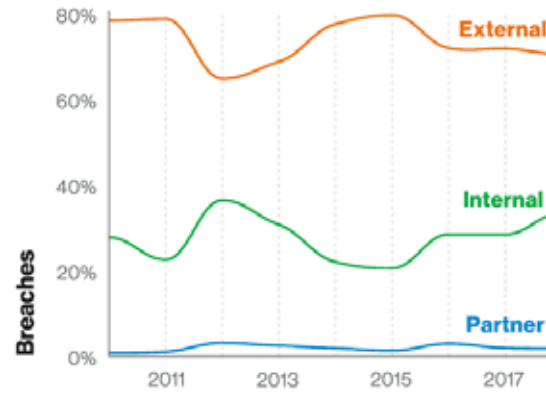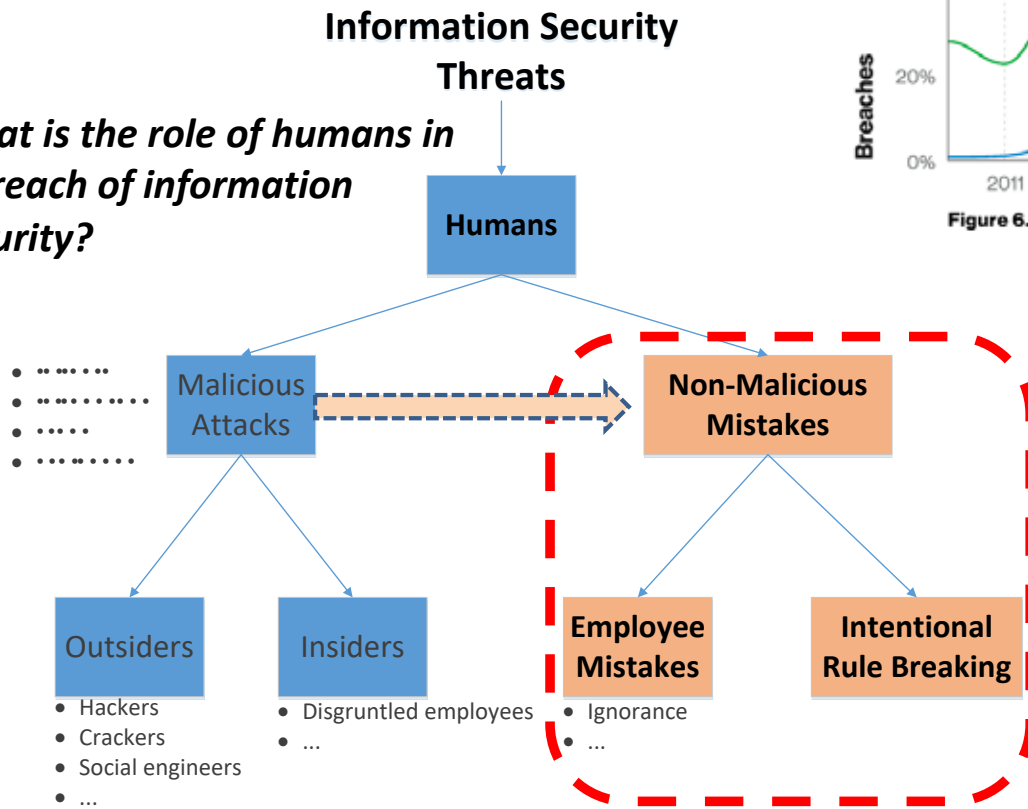**What is the role of humans in a breach of information security?**

Information Security Threats

Humans

Malicious Attacks

Non-Malicious Mistakes

Outsiders
- Hackers
- Crackers
- Social engineers
- …

Insiders
- Disgruntled employees
- …

Employee Mistakes
- Ignorance
- …

Intentional Rule Breaking

Figure 6. Threat actors in breaches over time

Figure 11. Actors in breaches (n=5,146)

https://www.verizon.com/business/resources/reports/dbir

What roles do employees play in these attack chains

DBIR
Data Breach Investigations Report
2008 2022

2019 Data Breach Investigations Report
verizon
business ready
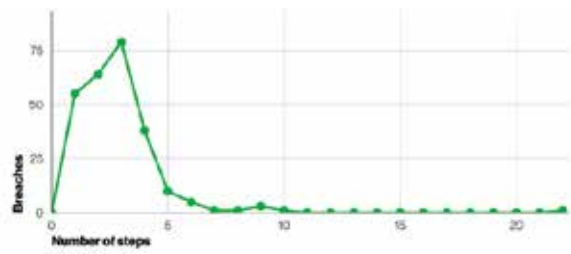
Figure 30. Number of steps per breach in non-Error breaches (n=258)

MIS 5206 Protecting Information Assets

Integrity

Availability
Confidentiality
Integrity

Confidentiality

Availability
Confidentiality
Integrity

Availability

Availability
Confidentiality
Integrity

Steps   14   12   10   8   6   4   2   0

Action — Error — Malware — Physical — Unknown — Hacking — Misuse — Social
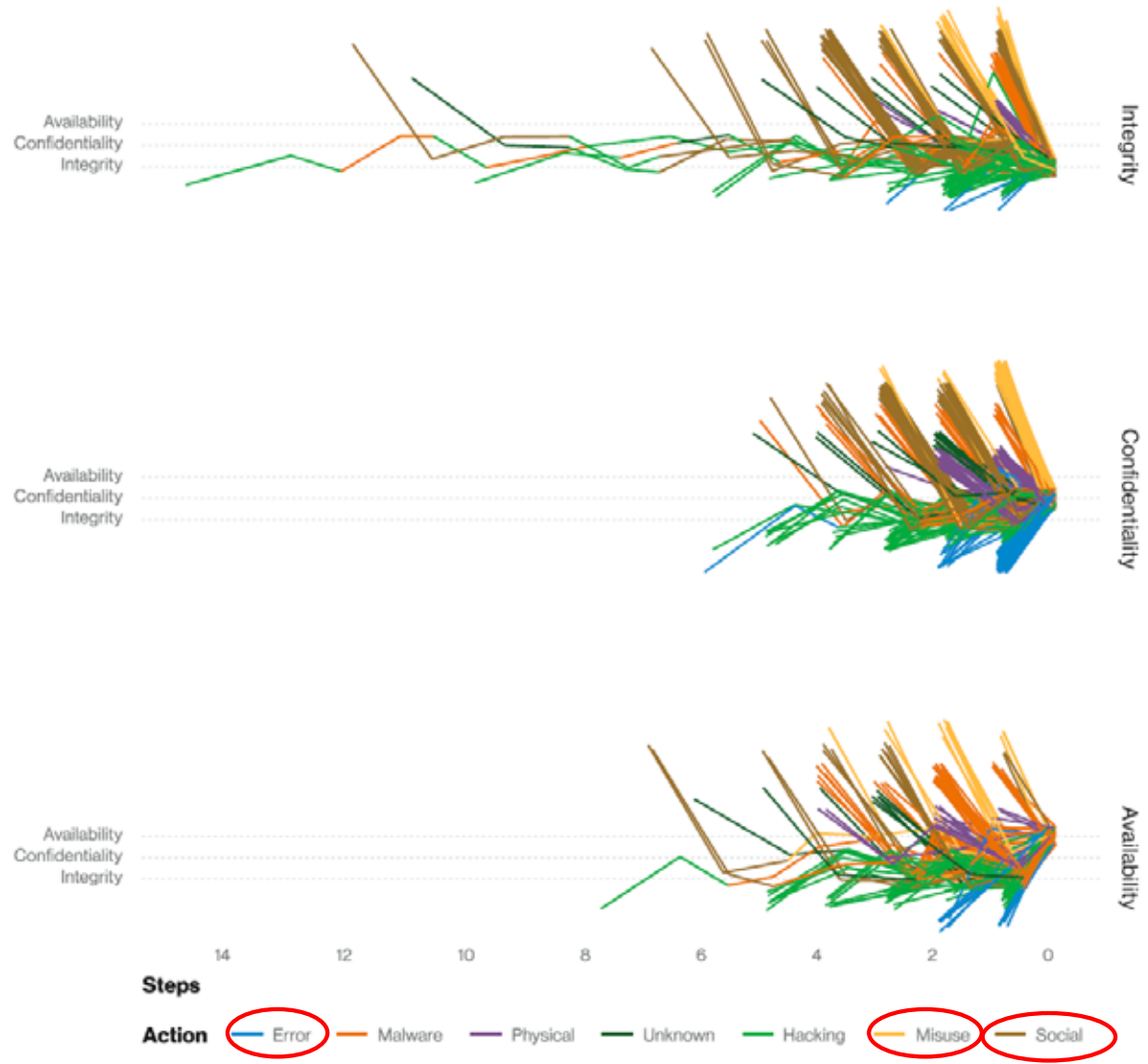
Figure 30. Attack chain by final attribute compromised[12] (n=941)

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Top Threats 2019-2020 — ENISA Threat Landscape, From January 2019 to April 2020, The year in review

European Union Agency for Cybersecurity (ENISA)

Top Threats 2019-2020	Assessed Trends	Change in Ranking
1 Malware ↗	—	—
2 Web-based Attacks ↗	—	↗
3 Phishing ↗	↗	↗
4 Web application attacks ↗	—	✓
5 Spam ↗	✓	↗
6 Denial of service ↗	✓	✓
7 Identity theft ↗	↗	↗
8 Data breaches ↗	—	—
9 Insider threat ↗	↗	—
10 Botnets ↗	✓	✓
11 Physical manipulation, damage, theft and loss ↗	—	✓
12 Information leakage ↗	↗	✓
13 Ransomware ↗	↗	↗
14 Cyberespionage ↗	✓	↗
15 Crytojacking ↗	✓	✓

Legend: Trends: ✓ Declining, — Stable, ↗ Increasing   Ranking: ↗ Going up, — Same, ✓ Going down

In which of these threats are humans the vulnerability?

Patterns in breaches
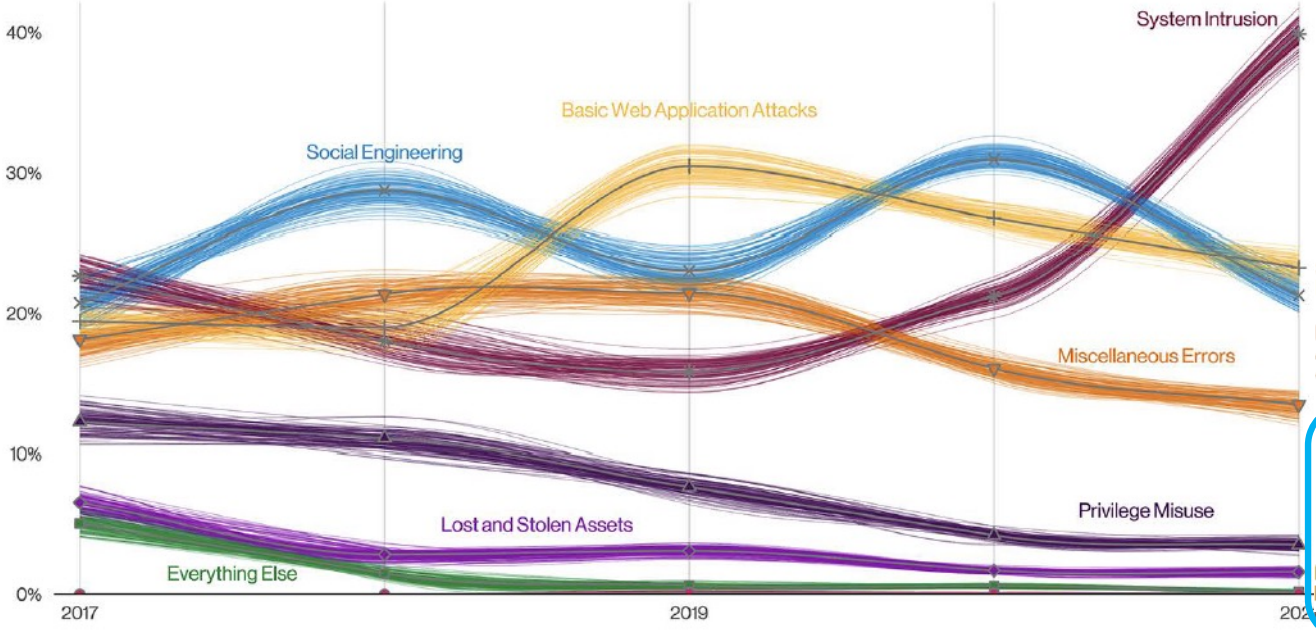
Figure 33. Patterns over time in breaches

System Intrusion	Complex attacks that leverage malware and/or hacking to achieve their objectives including deploying Ransomware.
Basic Web Application Attacks	These attacks are against a Web application, and after initial compromise, they do not have a large number of additional Actions. It is the "get in, get the data and get out" pattern.
Social Engineering	A psychological compromise of a person that alters their behavior into taking an action or breaching confidentiality.
Miscellaneous Errors	Incidents where unintentional actions directly compromised a security attribute of an information asset. This does not include lost devices, which are grouped with theft instead.
Privilege Misuse	Incidents predominantly driven by unapproved or malicious use of legitimate privileges.

Employee risk areas...

Employee Risk

Firewall and email filters to weed out phishing emails and malicious websites are important, but they're not enough

- Organizations must also ensure their security posture is good by:
  - Setting policies, educating staff, and enforcing good security hygiene
  - Taking advantage of the security options that are available
  - Training and testing employees
  - Implementing automated checks to ensure their security posture

Employee Risk

Malware delivery methods

- "When the method of malware installation was known, email was the most common, email was the most common point of entry."
  - ➤ Median company received 94% of detected malware by email

- Once introduced by email, additional malware is downloaded, often encoded to bypass detection and installed directly

2019 Data Breach Investigations Report

verizon✓
business ready

File Type

Office doc	Windows app	other
45%	26%	22%

100%
75%
50%
25%
0%
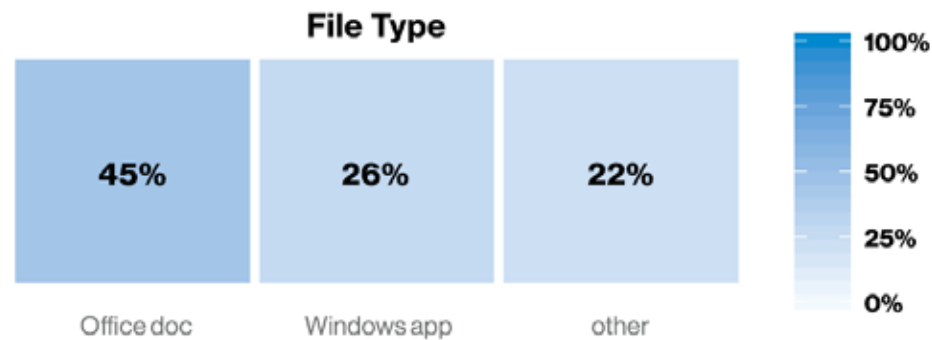
- 37% of breaches stole or used credentials

- Over 80% of breaches by hackers involve brute-force or use of lost or stolen credentials

DBIR

2020 Data Breach
Investigations
Report

verizon

Figure 1. Effectiveness of organizations' IT security posture prior to COVID-19 and due to COVID-19

1 = not effective to 10 = highly effective, 7+ responses presented

Cybersecurity in the
Remote Work Era:
A Global Risk Report

Sponsored by Keeper Security, Inc.
Independently conducted by Ponemon Institute LLC
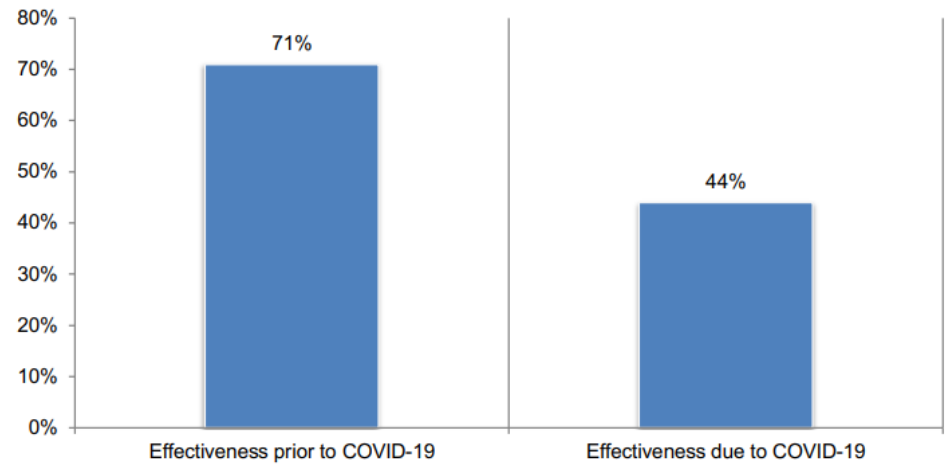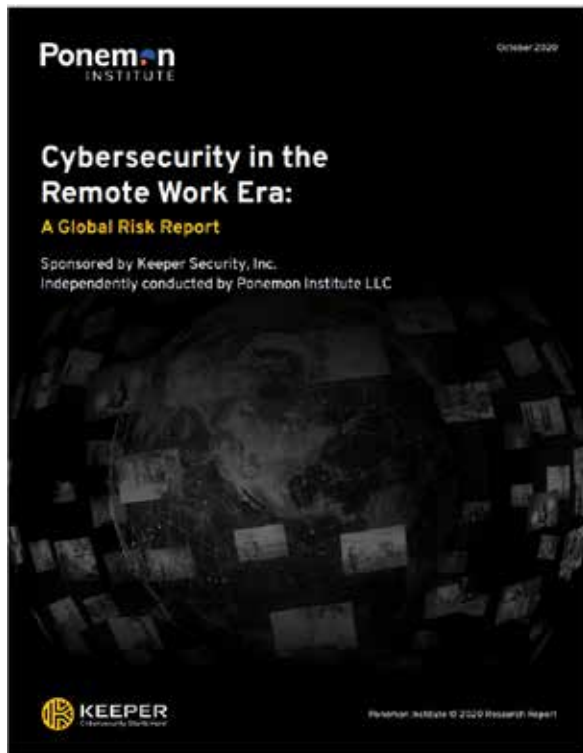
Figure 3. Security risks organizations are most concerned about
More than one response permitted

Risk	Percentage
A lack of physical security in the teleworker's work space	47%
Teleworkers' devices become infected with malware	32%
Criminals could gain control of teleworkers' devices to steal sensitive and confidential data	24%
The inability to secure communications on external networks outside your organization's control	23%
The difficulty in securing your organization's network	20%
Criminals could leverage the devices to gain access to the enterprise network	17%
Phishing and social engineering scams directed at teleworkers	15%
Teleworkers lose or have their devices stolen	12%
The difficulty in securing external access to internal-only resources	8%
Other	1%

Cybersecurity in the Remote Work Era: A Global Risk Report

Sponsored by Keeper Security, Inc.
Independently conducted by Ponemon Institute LLC

Figure 5. What challenges keep your organization's IT security posture from being fully effective due to teleworking?
Two responses permitted

Challenge	Percentage
Insufficient budget (money)	44%
No understanding how to protect against cyberattacks	42%
Insufficient enabling security technologies	27%
Lack of clear leadership	25%
Lack of in-house expertise	24%
Insufficient personnel	19%
Management does not see teleworking causing security risks	18%
Other	2%

MIS 5206 Protecting Information Assets

21
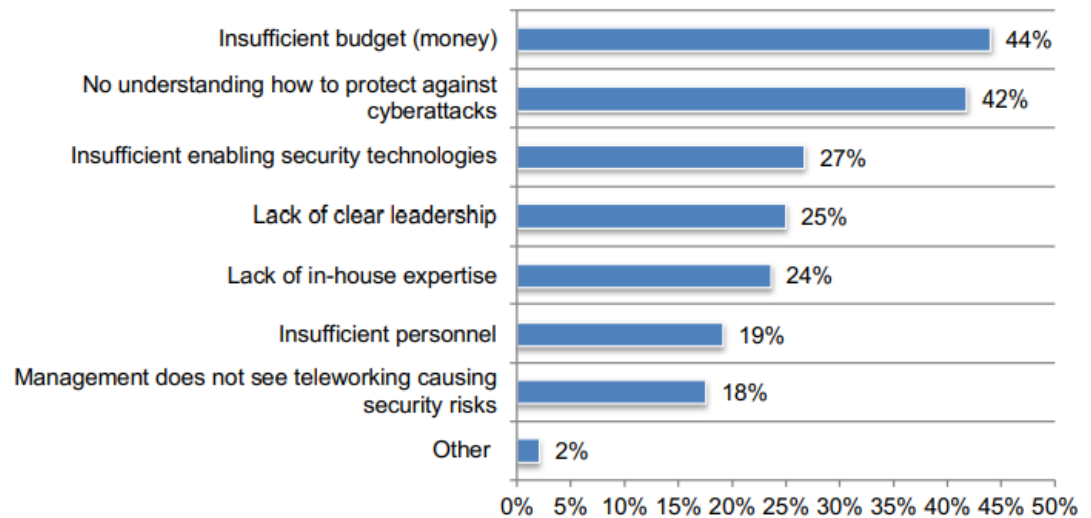
Why is teaching security awareness essential ?

- We have a culture of trust that can be taken advantage of with dubious intent

- Most people feel security is not part of their job

- People underestimate the value of information

- Security technologies give people a false sense of protection from attack

Non-malicious insider threat

1. A current or former employee, contractor, or business partner

2. Has or had authorized access to an organization's network, system, or data

3. Through action or inaction without malicious intent...

    Causes harm or substantially increases the probability of future serious harm to...
    confidentiality, integrity, or availability *of the organization's information or information systems*

Major characteristic is '*failure in human performance*'

Carnegie Mellon Univeristy's Software Engineering Institute's (SEI) Computer Emergency Response Team (CRT) CERT Definition (2013)

The Unintentional Insider threat

from an add for…

3M™ ePrivacy Filter Software
+ 3M™ Privacy Filter

"You spelled 'confidential' wrong."

How would you characterize insiders' information security mistakes

- **Ignorant**
  - An unintentional accident

- **Negligent**
  - Willingly ignores policy to make things easier

- **Well meaning**
  - Prioritizes completing work and "getting 'er done" takes over following policy

Willis-Ford, C.D. (2015) "Education & Awareness: Manage the Insider Threat", SRA International Inc., FISSA (Federal Information Systems Security Awareness) Working Group

http://csrc.nist.gov/organizations/fissea/2015-conference/presentations/march-24/fissea-2015-willis-ford.pdf

What are examples of insiders' accidents ?

- **Accidental Disclosure**
  - Posting sensitive data on public website
  - Sending sensitive data to wrong email address
- **Malicious Code**
  - Clicking on suspicious link in email
  - Using 'found' USB drive
- **Physical data release**
  - Losing paper records
- **Portable equipment**
  - Losing laptop, tablet
  - Losing portable storage device (USB drive, CD)

*Willis-Ford, C.D. (2015) "Education & Awareness: Manage the Insider Threat", SRA International Inc.,
FISSA (Federal Information Systems Security Awareness) Working Group*

http://csrc.nist.gov/organizations/fissea/2015-conference/presentations/march-24/fissea-2015-willis-ford.pdf

Example of an accident made by a well meaning employee…

"Terrific employee":

Utah Medicaid contractor loses job over data breach

By Kirsten Stewart The Salt Lake Tribune

Published January 17, 2013 5:26 pm

Health • Goold Health Systems CEO says mishap reinforces need to protect information.

– Account Manager handling health data for Utah

– Employee had trouble uploading a file requested by State Health Dept.

– Copied 6,000 medical records to USB drive

– Lost the USB drive, and reported the issue

– CEO admits the employee probably didn't even know she was breaking policy

  • this makes it accidental i.e. "well meaning…"

Auditing a Security Awareness Training control enhancement

AT-2(2)	SECURITY AWARENESS TRAINING | *INSIDER THREAT*
	ASSESSMENT OBJECTIVE: *Determine if the organization includes security awareness training on recognizing and reporting potential indicators of insider threat.*
	POTENTIAL ASSESSMENT METHODS AND OBJECTS: **Examine:** [*SELECT FROM:* Security awareness and training policy; procedures addressing security awareness training implementation; security awareness training curriculum; security awareness training materials; security plan; other relevant documents or records]. **Interview:** [*SELECT FROM:* Organizational personnel that participate in security awareness training; organizational personnel with responsibilities for basic security awareness training; organizational personnel with information security responsibilities].

TABLE 3-2: AWARENESS AND TRAINING FAMILY

CONTROL NUMBER	CONTROL NAME CONTROL ENHANCEMENT NAME	PRIVACY CONTROL BASELINE	SECURITY CONTROL BASELINES		
			LOW	MOD	HIGH
AT-1	Policy and Procedures	x	x	x	x
AT-2	Literacy Training and Awareness	x	x	x	x
AT-2(1)	PRACTICAL EXERCISES				
AT-2(2)	INSIDER THREAT		x	x	x
AT-2(3)	SOCIAL ENGINEERING AND MINING			x	x
AT-2(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR				
AT-2(5)	ADVANCED PERSISTENT THREAT				
AT-2(6)	CYBER THREAT ENVIRONMENT				
AT-3	Role-Based Training	x	x	x	x
AT-3(1)	ENVIRONMENTAL CONTROLS				
AT-3(2)	PHYSICAL SECURITY CONTROLS				
AT-3(3)	PRACTICAL EXERCISES				
AT-3(4)	SUSPICIOUS COMMUNICATIONS AND ANOMALOUS SYSTEM BEHAVIOR	W: Incorporated into AT-2(4)			
AT-3(5)	PROCESSING PERSONALLY IDENTIFIABLE INFORMATION	x			
AT-4	Training Records	x	x	x	x
AT-5	Contacts with Security Groups and Associations	W: Incorporated into PM-15			
AT-6	Training Feedback				

What phases of security awareness do organizations go through as their programs mature?

SANS Security Awareness Maturity Model ™

| Non-existent | Compliance-focused | Promoting Awareness & Behavior Change | Long-term Sustainment & Culture Change | Metrics Framework |

SANS 2022 Security Awareness Report™

Managing Human Risk

https://www.sans.org/blog/sans-2022-security-awareness-report/

Current Maturity Level

Maturity Level	numbers of respondents
Non-existent	~58
Compliance-focused	~308
Promoting Awareness & Behavior Change	~405
Long-term Sustainment & Culture Change	~158
Metrics Framework	~90

Program Maturity Over Time

Legend:
- Nonexistent
- Compliance Focused
- Behavior Change
- Long-term Sustainment
- Metrics Framework
- *we did not produce a 2020 report

MIS 5206 Protecting Information Assets

30
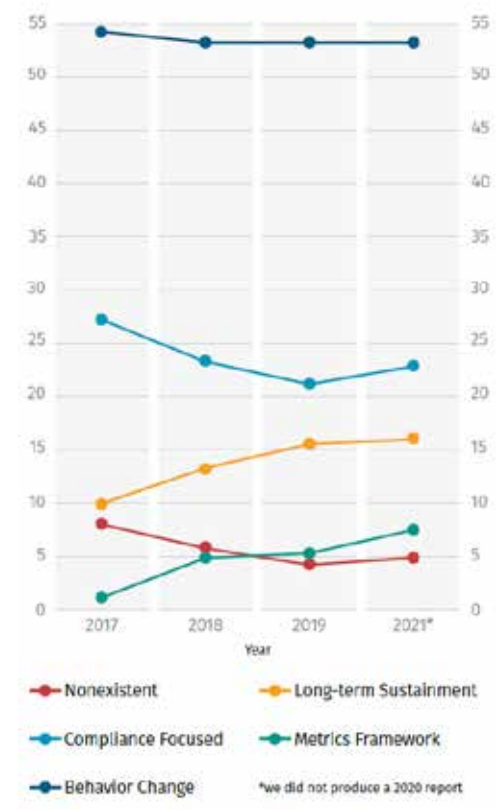
Reported Program Blockers and Supporters
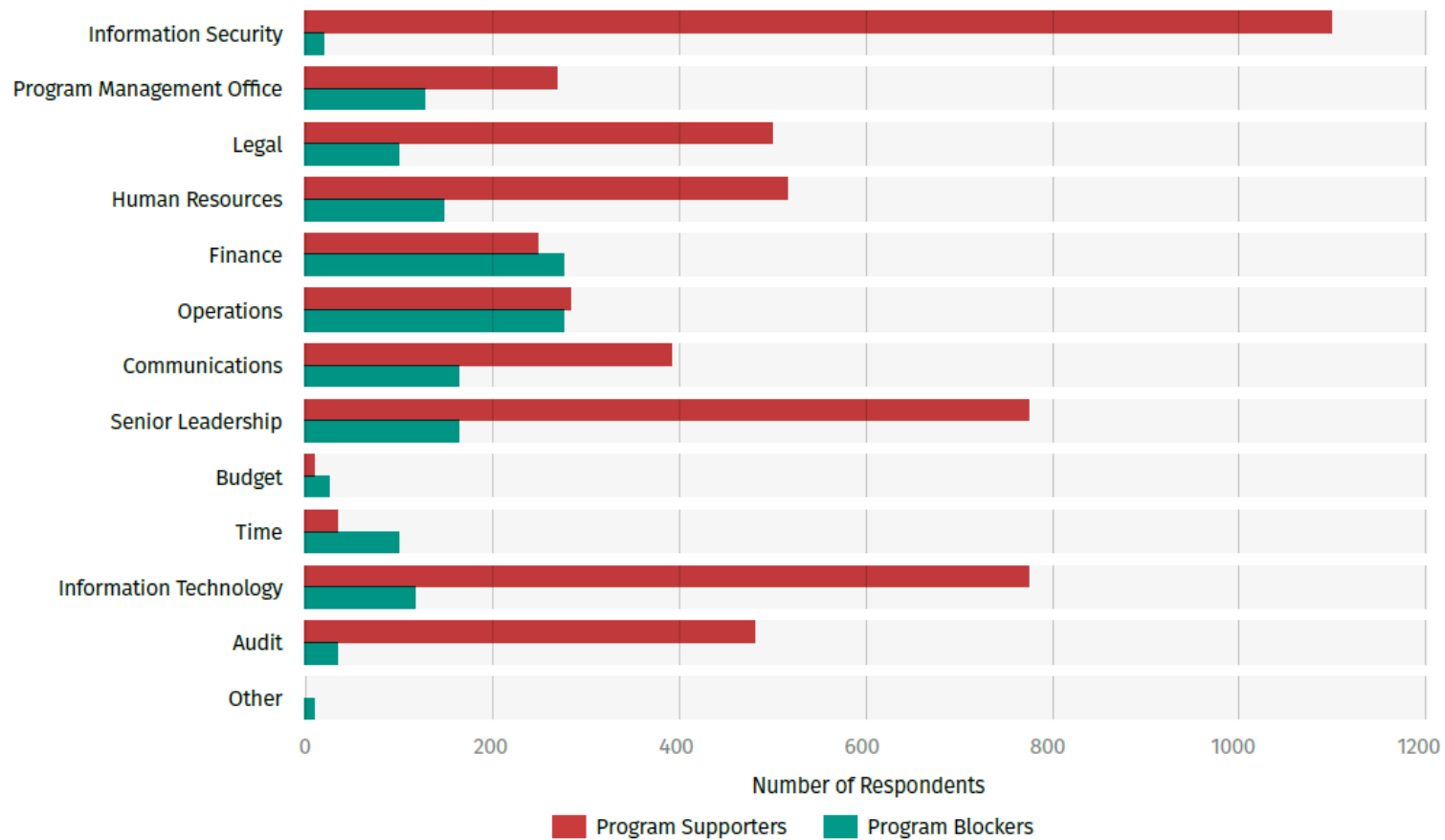
GAINING LEADERSHIP SUPPORT

Respondent data shows a correlation between executive support and program maturity. As organizational leaders often decide on critical program resourcing, identification of program goals, training time allocation, and program enforceability, executive support is a key ingredient in program success.

Leadership Support

Support Level

- 🟥 I have no support
- 🟩 I have less support than I need
- 🟦 I have the support I need
- 🟧 I have more support than I need

MIS 5206 Protecting Information Assets

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Top Reported Program Challenges

Lack of time
Lack of personnel
Lack of budget
Inability to engage employees
Bureaucratic/conservative culture
Metrics
Lack of skills/experience
Lack of leadership support
Other

Number of Respondents

SANS
SECURITY AWARENESS

2021 SECURITY AWARENESS REPORT™
MANAGING HUMAN CYBER RISK

> **Over 80% of security awareness professionals reported that they spend half or less of their time on awareness, indicating far too often that security awareness is a part-time effort.**

Percentage of Time Spent on Security Awareness

MIS 5206 Protecting Information Assets

Security Awareness Team Size, Correlated by Maturity Level
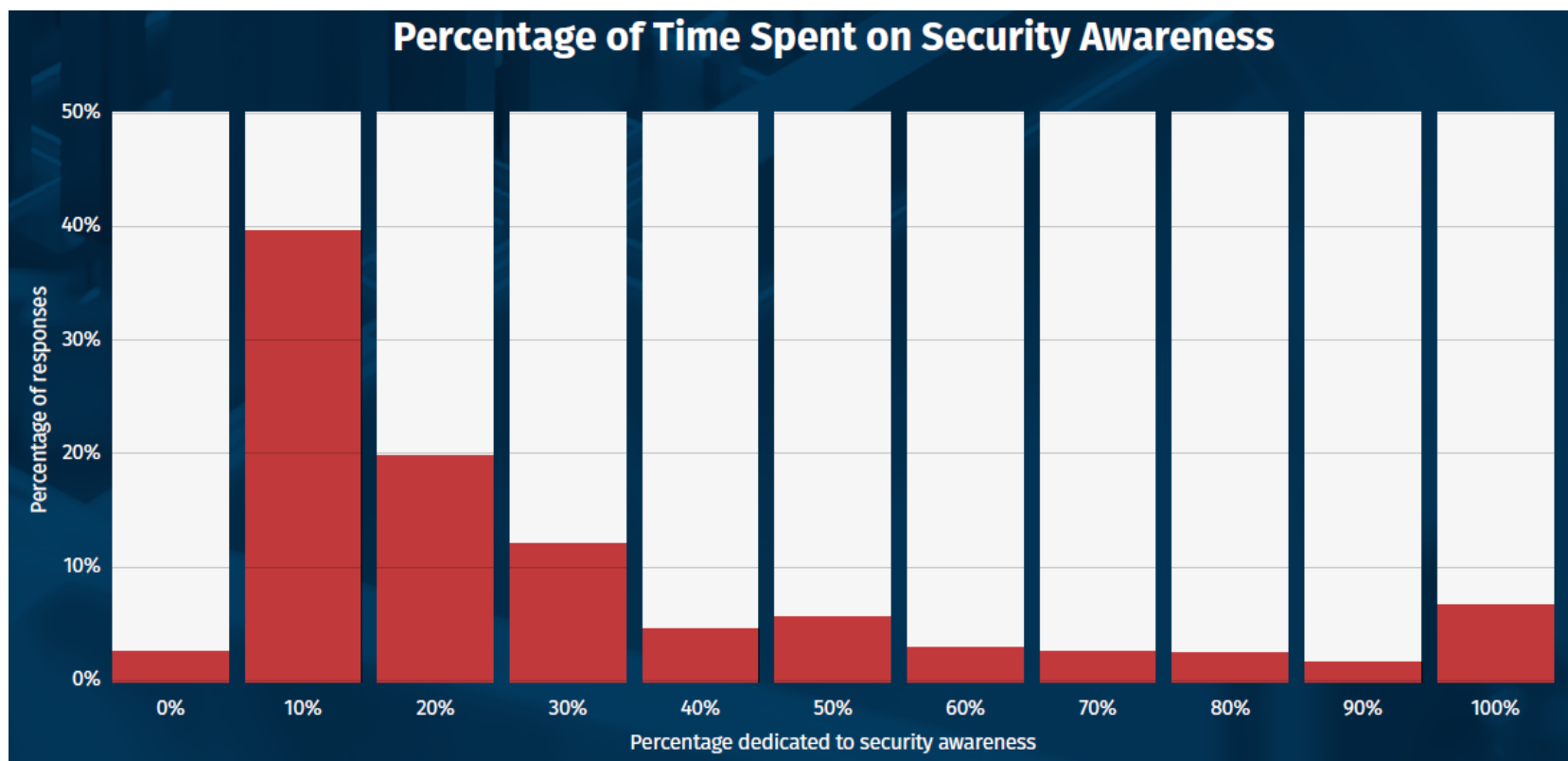
What should be in an information security training course ?

- Create a course outline of topics

- Prioritize the topics for teaching the course

Training courses examples…

Tip #3: Explain to the employees that while you make the best effort to secure company infrastructure, a system is only as secure as the weakest link

► You don't want them to just comply, you want them to cooperate

► You can't create a policy sophisticated enough to cover all possible vectors of attack

► You can't totally dehumanize humans. Humans have weaknesses and make mistakes.

KASPERSKY

Training course content example

A. Physical security

B. Desktop security

C. Wireless Networks and Security

D. Password security

E. Phishing

F. Hoaxes

G. Malware

   1. Viruses

   2. Worms

   3. Trojans

   4. Spyware and Adware

H. File sharing and copyright

Brodie, C. (2009), "The Importance of Security Awareness Training", SANS Institute InfoSec Reading Room, SANS Institute

Training course content example

A. **Password safety and security**

B. Email safety and security

C. Desktop security

D. FERPA Issues (i.e. student information security)

E. Acceptable Use Policy

Fowler, B.T. (2008), "Making Security Awareness Efforts Work for You", SANS Institute InfoSec Reading Room, SANS Institute

Training course content example…

Password safety and security

- 80% of hacking related data breaches involve compromised and weak credentials (login and password)
- 29% of all breaches involve the use of stolen credentials

  2019 Verizon Data Breach Investigations Report

- Security policies need to cover both computer <u>and</u> voice mail passwords

- Every employee should be instructed in how to devise a difficult-to-guess password

Training course content

Email and Voicemail

- Email usage policy, including the safeguards to prevent malicious code attacks including viruses, worms, and Trojan Horses
- Best security practices of voice mail usage

Phishing Prevention-The 100% rules!

- Never click a link in an email
- Never open unexpected attachments
- Never provide information, no matter how innocuous it may seem, to unsolicited phone callers, visitors or email requests
- Never agree to an unsolicited remote control session (such as WebEx, GoToMeeting, LogMeIn)
- Your best defense: "Can I call you back?"

KASPERSKY

Training course content

Every employee should know their responsibility to comply with the policies and the consequences for non-compliance

Handling sensitive information

- How to determine the classification of information and the proper safeguards for protecting sensitive information
- The procedure for disclosing sensitive information or materials
- Proper disposal of sensitive documents and computer media that contain, or have at any time in the past contained, confidential materials
- …

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AT-2(3)	SOCIAL ENGINEERING AND MINING			X	X
AT-3	**Role-Based Training**	X	X	X	X
AT-4	**Training Records**	X	X	X	X

NIST Special Publication 800-53B

Control Baselines for Information Systems and Organizations

JOINT TASK FORCE

This publication is available free of charge from:
https://doi.org/10.6028/NIST.SP.800-53B

October 2020
INCLUDES UPDATES AS OF 12-10-2020; SEE PAGE XI

U.S. Department of Commerce
Wilbur L. Ross, Jr., Secretary

National Institute of Standards and Technology
Walter Copan, NIST Director and Under Secretary of Commerce for Standards and Technology

Social Engineering

- Humans are a key driver of 82% of breaches (Verizon 2022 DBIR, page 8), and social engineering is responsible for a large percentage of these breaches

- Malware and stolen credentials are used as a second step after a social attack gets the threat actor in the door

- This is why having a strong security awareness program is important

These attacks split between Phishing and convincing Pretexting attacks, and are associated with business email compromises
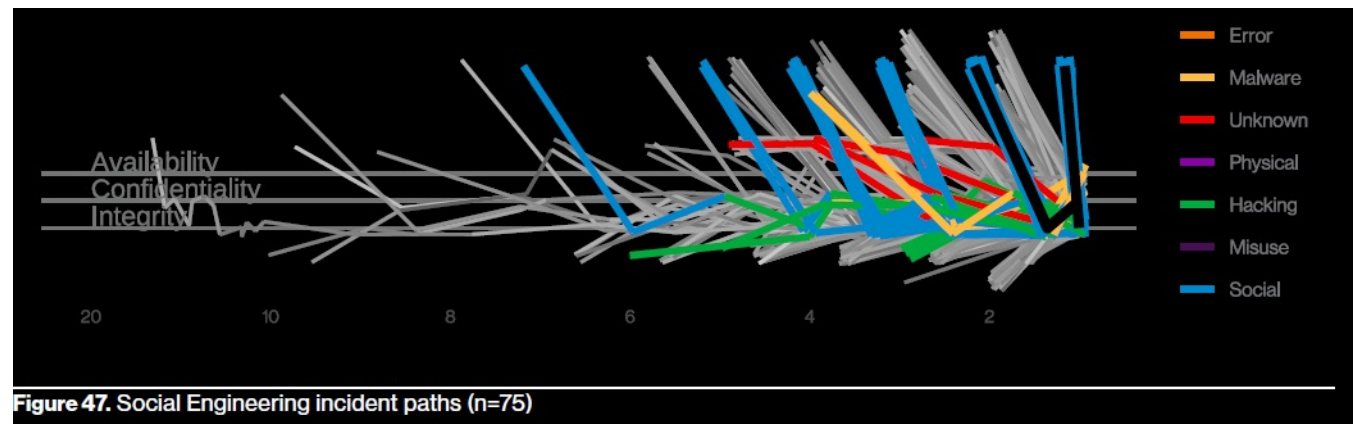
Figure 47. Social Engineering incident paths (n=75)

Legend: Error, Malware, Unknown, Physical, Hacking, Misuse, Social

Availability
Confidentiality
Integrity

20   10   8   6   4   2

Creating a Security Aware Organization

An ongoing information security awareness program is vital - because of the need and importance of defending against social engineering and other information security threats
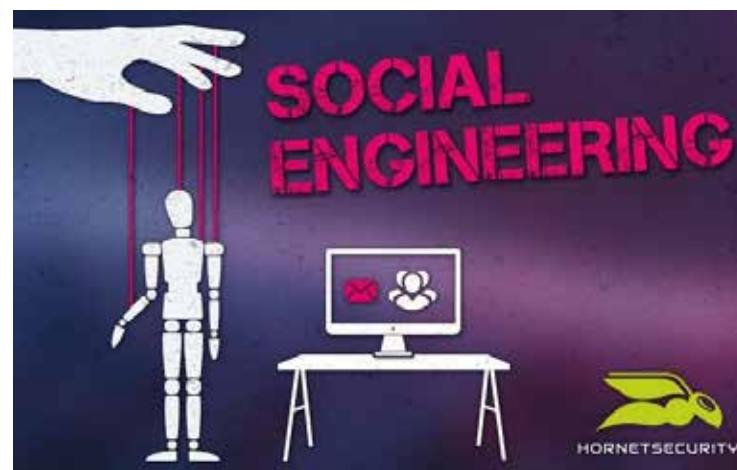
What is social engineering?

Social engineering attacks have the same common element: deception (with the goal of getting an employee to do something the social engineer desires…)

▶ A lot of cyberincidents start with a phone conversation with someone who poses as a co-worker and builds his understanding of company internal structure and operations by asking innocent questions

▶ A cybercriminal exploiting social weaknesses almost never looks like one

KASPERSKY
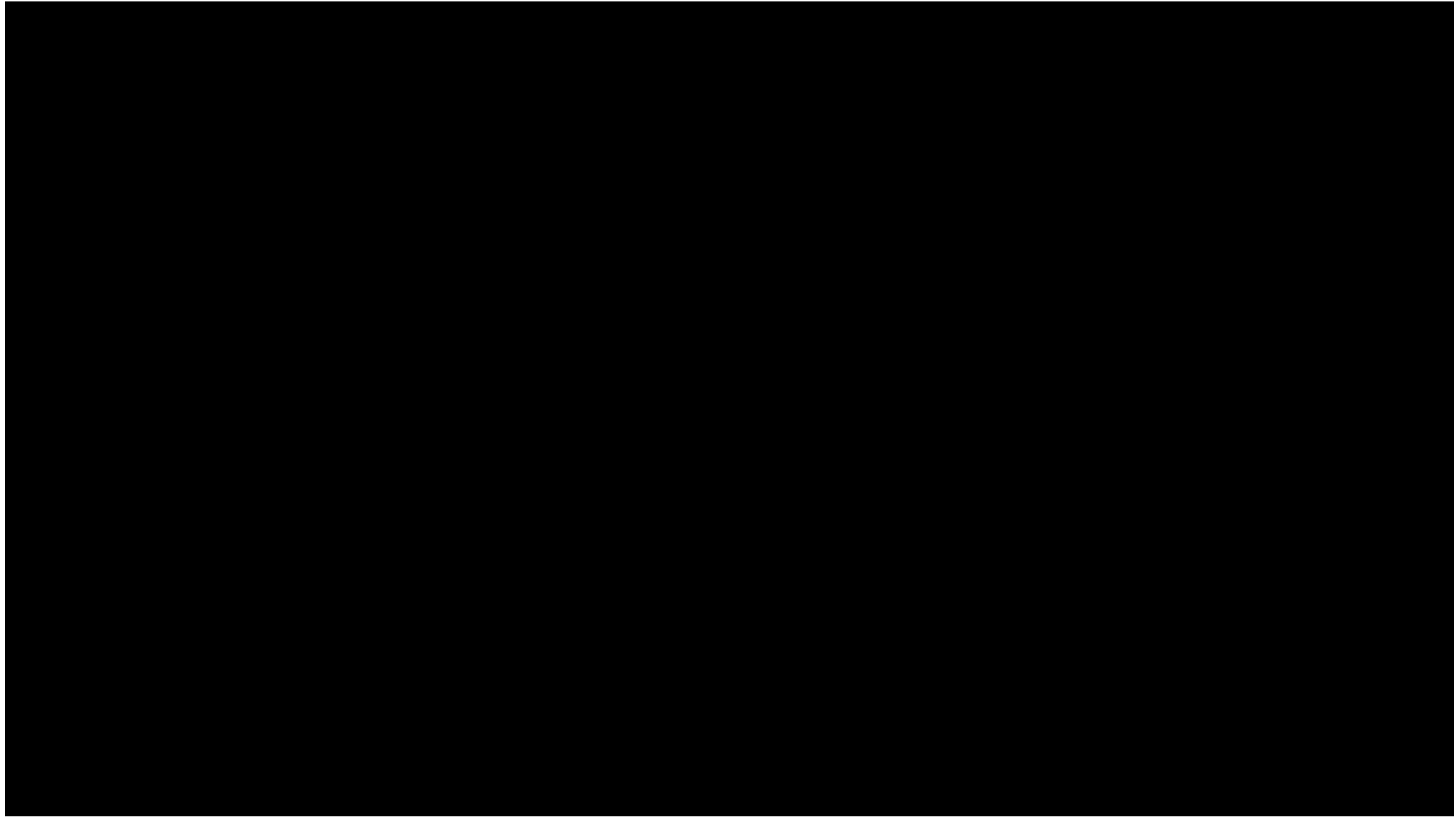
Common Social Engineering Strategies

- **Posing** as
  - ❑ a fellow employee
  - ❑ a new employee requesting help
  - ❑ someone in authority
  - ❑ a vendor or systems manufacturer calling to offer a system patch or update
  - ❑ an employee of a vendor, partner company, or law enforcement

- **Offering**…
  - ➢ help if a problem occurs, then making the problem occur, thereby manipulating the victim to call them for help
  - ➢ free software or patch for victim to install

Warning Signs of a Social Engineering Attack

- Refusal to give call back number
- Out-of-ordinary request
- Claim of authority
- Stresses urgency
- Threatens negative consequences of non-compliance
- Shows discomfort when questioned
- Name dropping
- Compliments or flattery
- Flirting

What is "just in time training?"

"Just in time training…"

Data from network incident reporting tools, such as security and information event management (SIEM) systems and data loss prevention(DLP) software… helps understand prevalence of data handling issues

User behavior analytics (UBA) and user entity behavioral analytics (UEBA) provides a way to parse through information collected by SIEM and DLP

UEBA can help provide "just in time training" as a mistake is made

- *UEBA might identify Jane Doe saving a company document to an unapproved internet site (e.g. Dropbox, Box or Google Drive) and deliver a system-generated pop-up that reminds her of the company's policy on storing company documents in an authorized ecosystem….*

Pendergast, T. (2016) "How to Audit the Human Element and Assess Your Organization's Security Risk", ISACA Journal, Volume 5 pp. 20-24

"Just in time training…"

- *If Jane does it again, the system then might provide a quick video on the reasons why it is best to avoid an unapproved cloud storage system.*

- *Months later, if Jane makes the same mistake again, she might be automatically enrolled in a 15-minute course on approved cloud storage and the appropriate way to store company documents. This is a perfect example of delivering the right training to the right person at the right time."*

Pendergast, T. (2016) "How to Audit the Human Element and Assess Your Organization's Security Risk", ISACA Journal, Volume 5 pp. 20-24

Test Taking Tip

- If you don't know the answer ... guess and then move on -

Your score will be higher if you guess and move on even if your guess is wrong

Here's why:
- Most certification tests do not penalize for wrong answers. That is, they only count the number of correct answers in computing the score
- In a 4 option multiple choice test, guessing at questions to which you do not know the answer is likely to get you an additional right answer ¼ of the time
- Guessing, and then moving on, gives you time to answer the questions that you do know, raising your score

Quiz and Solutions

1. An information system (IS) auditor is reviewing a third-party agreement for a new cloud-based accounting service provider. Which of the following considerations is the MOST important with regard to the privacy of the accounting data?
   a. Data retention, backup and recovery
   b. Return or destruction of information
   c. Network and intrusion detection
   d. A patch management process

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   c. Network and intrusion detection
   d. A patch management process

2. During an IS risk assessment of a health care organization regarding protected health care information (PHI), an IS auditor interviews IS management. Which of the following findings from the interviews would be of MOST concern to the IS auditor?
   a. The organization does not encrypt all of its outgoing email messages
   b. Staff have to type "[PHI]" in the subject field of email messages to be encrypted
   c. An individual's computer screen saver function is disabled
   d. Server configuration requires the user to change the password annually

3. Which of the following is the responsibility of information asset owners?
   a. Implementation of information security within applications
   b. Assignment of criticality levels to data
   c. Implementation of access rules to data and programs
   d. Provision of physical and logical security for data

3. Which of the following is the responsibility of information asset owners?
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4. With the help of a security officer, granting access to data is the responsibility of:
   a. Data owners
   b. Programmers
   c. Systems analysts
   d. Librarians

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   a. Establish ownership
   b. Perform a criticality analysis
   c. Define access rules
   d. Create a data dictionary

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6. Which of the following would MOST effectively reduce social engineering incidents?
   a. Security awareness training
   b. Increased physical security measures
   c. Email monitoring policy
   d. Intrusion detection systems

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7. Which of the following acts as a decoy to detect active Internet attacks?
    a. Honeypots
    b. Firewalls
    c. Trapdoors
    d. Traffic analysis

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    a. Honeypots
    b. Firewalls
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8. Which of the following is the BEST way for an IS auditor to determine the effectiveness of a security awareness and training program?
   a. Review the security training program
   b. Ask the security administrator
   c. Interview a sample of employees
   d. Review the security reminders to employees

8. Which of the following is the BEST way for an IS auditor to determine the effectiveness of a security awareness and training program?
   a. Review the security training program
   b. Ask the security administrator
   c. Interview a sample of employees
   d. Review the security reminders to employees

9. As his company's Chief Information Security Officer (CISO), George needs to demonstrate to the Board of Directors the necessity of a strong risk management program. Which of the following should George use to calculate the company's residual risk?
    a. threats x vulnerability X asset value = residual risk
    b. SLE x frequency = ALE, which is equal to residual risk
    c. (threats x vulnerability x asset value) x control gap = residual risk
    d. (total risk – asset value) x countermeasures = residual risk

10. Which of the following is not included in a risk assessment?
    a. Discontinuing activities that introduce risk
    b. Identifying assets
    c. Identifying threats
    d. Analyzing risk in order of cost or criticality

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Agenda

✓ Awareness and Training InfoSec Controls

✓ Creating a Security Aware Organization

  ✓ The Threat landscape

  ✓ Employee risk

  ✓ Training course content (examples)

✓ Test Taking Tip

✓ Quiz

Protecting Information Assets
- Unit# 5 -

Creating a Security Aware Organization