



Risk Mitigation Strategies: Lessons Learned from Actual Insider Attacks

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Agenda

- Background
- Exploration of each type of insider crime:
 - Theft/Modification of information for financial gain
 - Theft of information for business advantage
 - IT sabotage
- Best practices
- Summary
- Discussion

TRUE STORY:

Credit union customers lose all access to their money from Friday night through Monday...

Fired system administrator sabotages systems on his way out



TRUE STORY:

Financial institution discovers \$691 million in losses ...

Covered up for 5 years by trusted employee



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***COULD THIS HAPPEN TO
YOU?***

What is CERT?



- Center of Internet security expertise
- Established in 1988 by the US Department of Defense on the heels of the Morris worm that created havoc on the ARPANET, the precursor to what is the Internet today
- Located in the Software Engineering Institute (SEI)
 - Federally Funded Research & Development Center (FFRDC)
 - Operated by Carnegie Mellon University (Pittsburgh, Pennsylvania)

Definition of Malicious Insider

From the CERT/US Secret Service *Insider Threat Study*

Current or former employees or contractors who

- intentionally exceeded or misused an authorized level of network, system or data access in a manner that*
- affected the security of the organizations' data, systems, or daily business operations.*

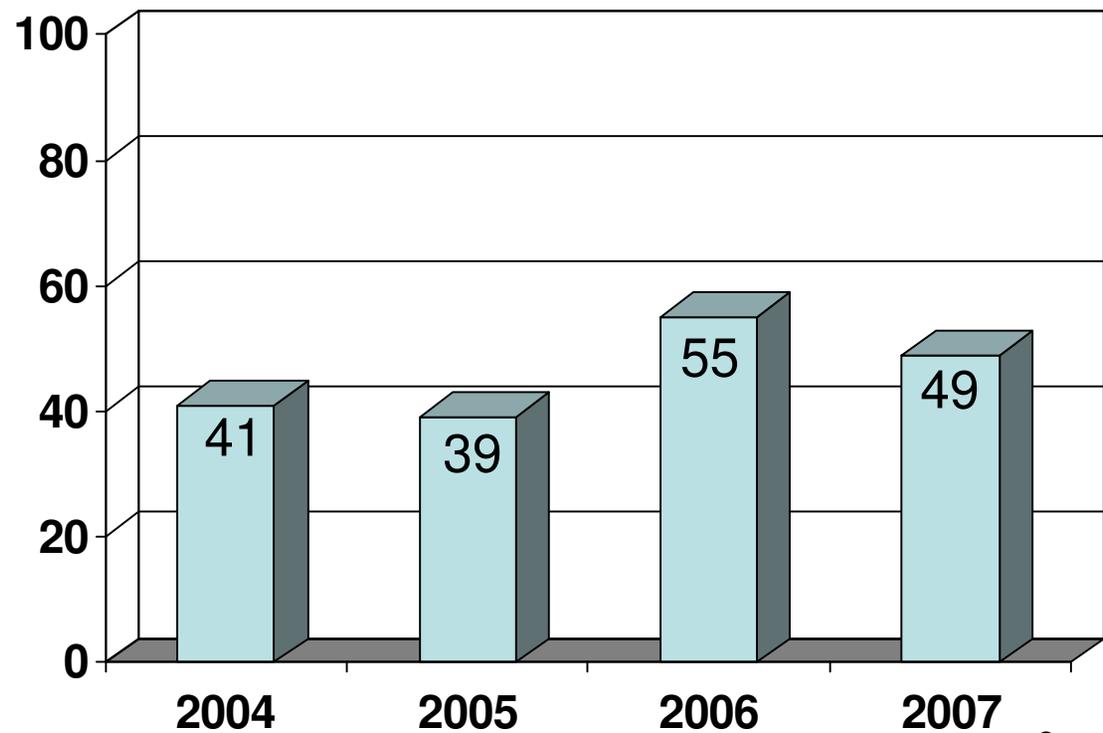


How bad is the insider threat?

2007 e-Crime Watch Survey

- CSO Magazine, USSS,
Microsoft & CERT
- 671 respondents

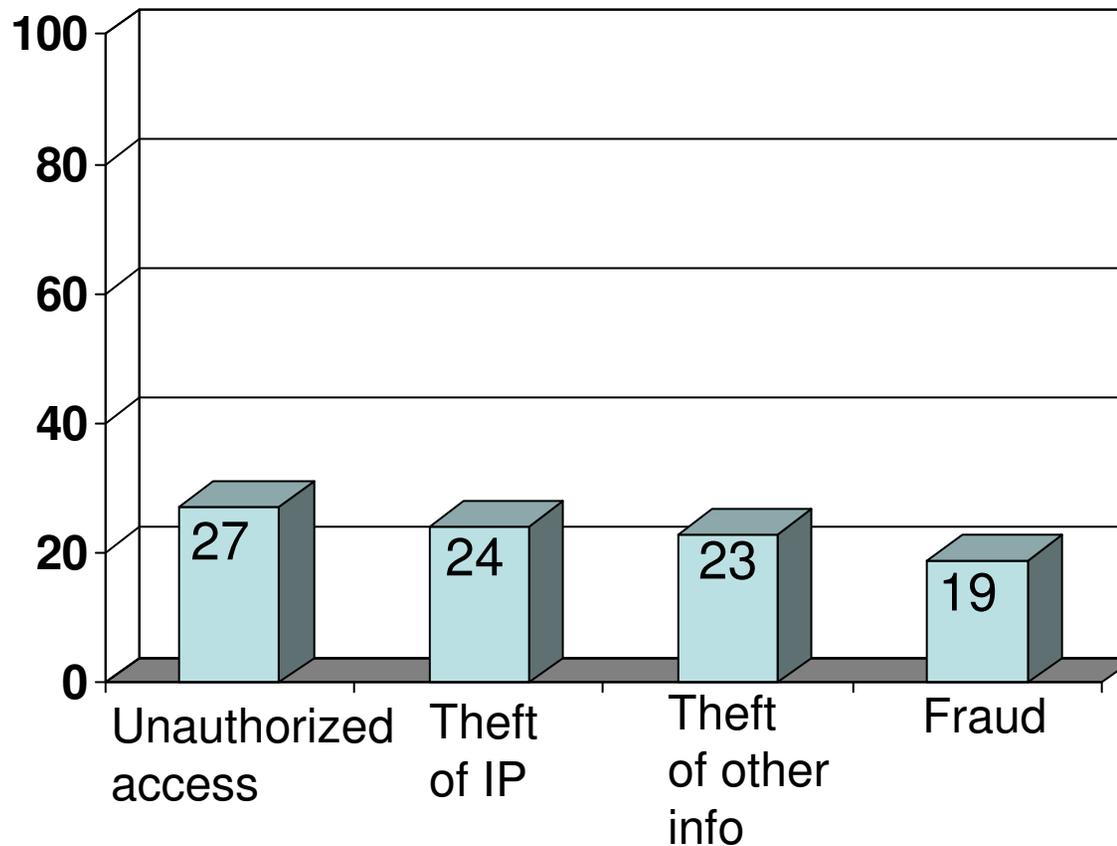
Percentage of Participants Who Experienced an Insider Incident



9

Most Common Insider Incidents

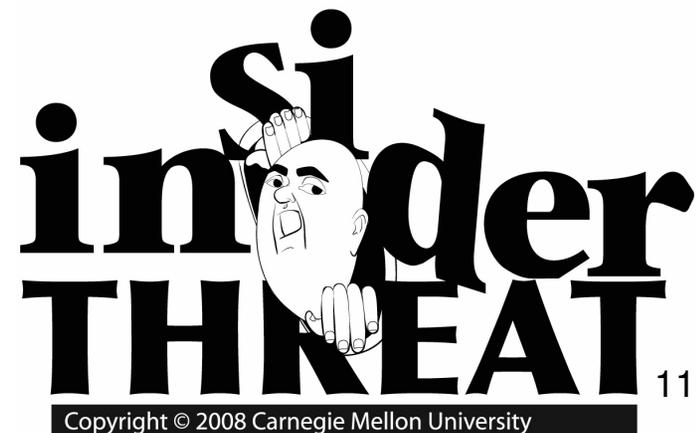
Percentage of Participants Who Experienced Specific Type of Insider Incident



Source of CERT's Insider Threat Case Data

- CERT/U.S. Secret Service *Insider Threat Study*
 - 150 actual insider threat cases
 - 1996-2002
- Carnegie Mellon CyLab *MERIT** Project
 - Approximately 100 insider threat cases
 - Cases not included in the CERT/US Secret Service study
 - Cases through 2007
- Case data includes both technical and behavioral information

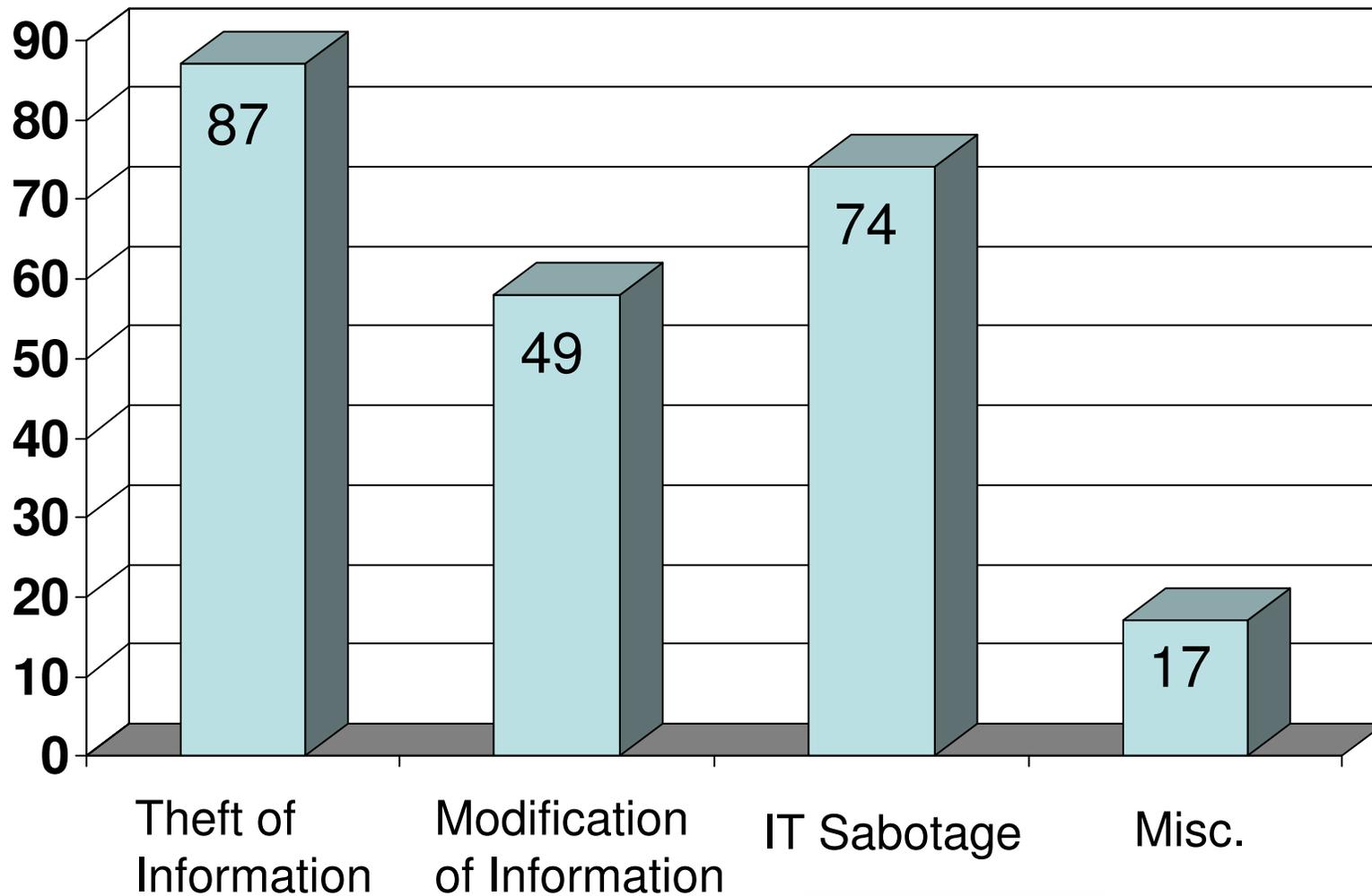
MERIT: Management and Education of the Risk of Insider Threat



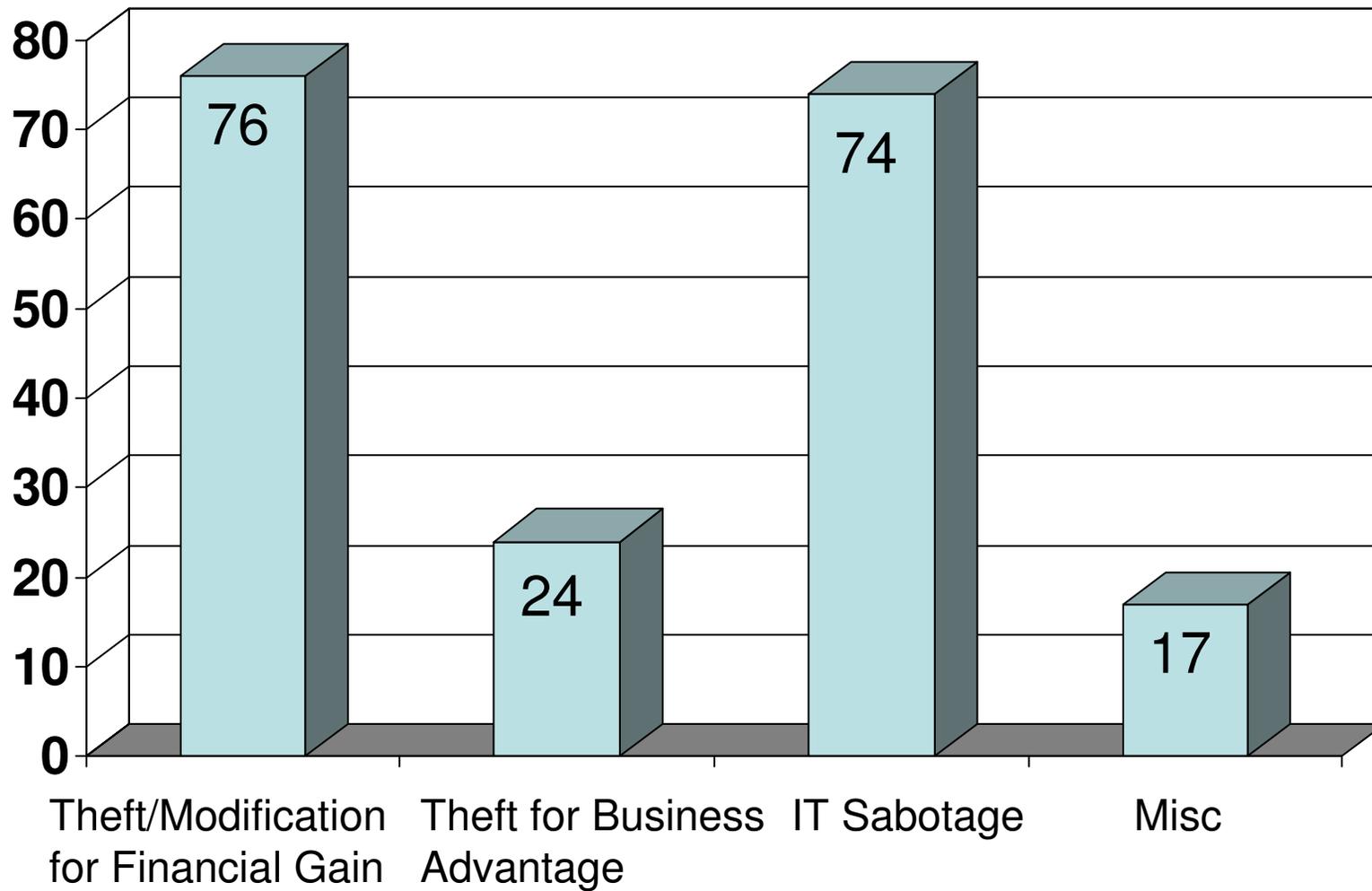
CyLab Common Sense Guide Best Practices

- Institute periodic enterprise-wide risk assessments.
- Institute periodic security awareness training for all employees.
- Enforce separation of duties and least privilege.
- Implement strict password and account management policies and practices.
- Log, monitor, and audit employee online actions.
- Use extra caution with system administrators and privileged users.
- Actively defend against malicious code.
- Use layered defense against remote attacks.
- Monitor and respond to suspicious or disruptive behavior.
- Deactivate computer access following termination.
- Collect and save data for use in investigations.
- Implement secure backup and recovery processes.
- Clearly document insider threat controls.

CERT's Insider Threat Case Breakdown



Slightly Different Breakdown



Insider Scenarios

Scenario 1: Insider uses IT to steal or modify information for financial gain

Scenario 2: Insider uses IT to steal information for business advantage

Scenario 3: Insider uses IT in a way that is intended to cause harm to the organization or an individual

Misc: Cases that do not fall in to the above categories

Scenario 1:

Theft or Modification of Information for Financial Gain



Theft or Modification for Financial Gain

- Who did it?
 - Current employees
 - “Low level” positions
 - Gender: fairly equal split
 - Average age: 33
- What was stolen/modified?
 - Personally Identifiable Information (PII)
 - Customer Information (CI)
 - Very few cases involved trade secrets
- How did they steal/modify it?
 - During normal working hours
 - Using authorized access

Dynamics of the Crime

- Most attacks were *long, ongoing* schemes

	<i>At least 1 Insider Colluder</i>	<i>At least 1 Outsider Colluder</i>	<i>Outsider Induced</i>	<i>Acted Alone</i>
<i>Theft</i>	almost 1/3	2/3	1/2	> 1/3
<i>Modification</i>	almost 1/2	1/2	almost 1/3	1/3

Known Issues

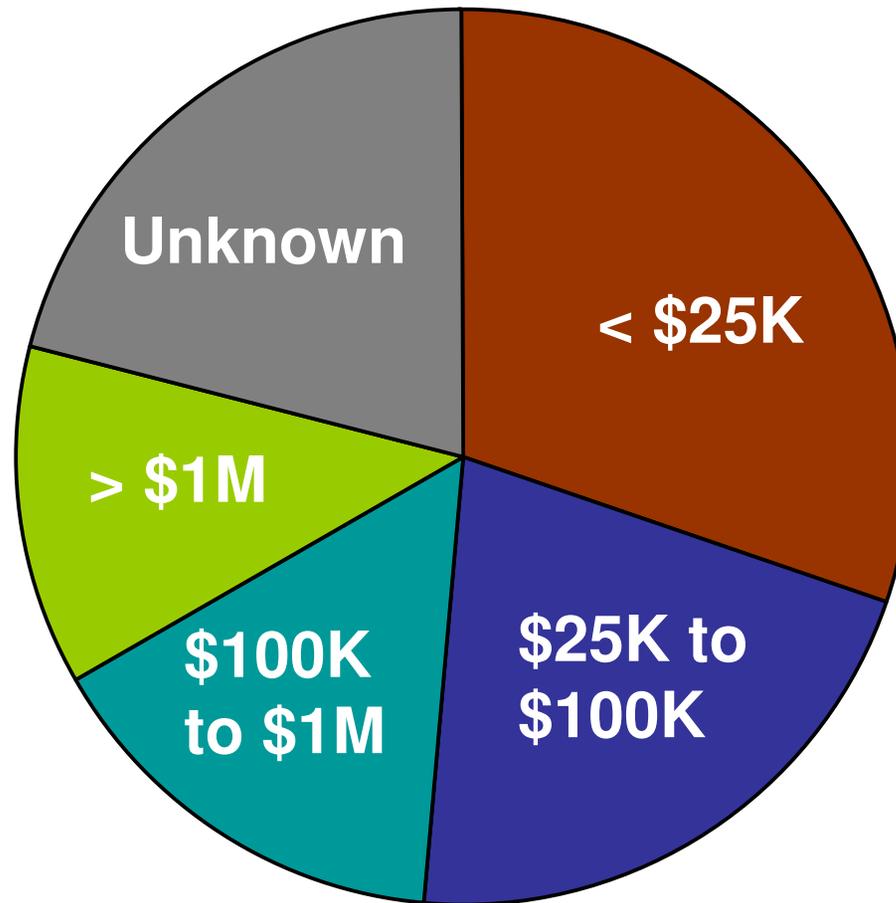
- Family medical problems
- Substance abuse
- Physical threat of outsiders
- Financial difficulties
- Financial compensation issues
- Hostile work environment
- Problems with supervisor
- Layoffs

***A Closer Look at
THEFT
for Financial Gain***

Technical Aspects - Theft for Financial Gain

- Electronically
 - Downloaded to home
 - Looked up and used immediately
 - Copied
 - Phone/fax
 - Email
 - Malicious code
- Physically
 - Printouts
 - Handwritten
- Remaining unknown

Organizational Impacts - Theft for Financial Gain

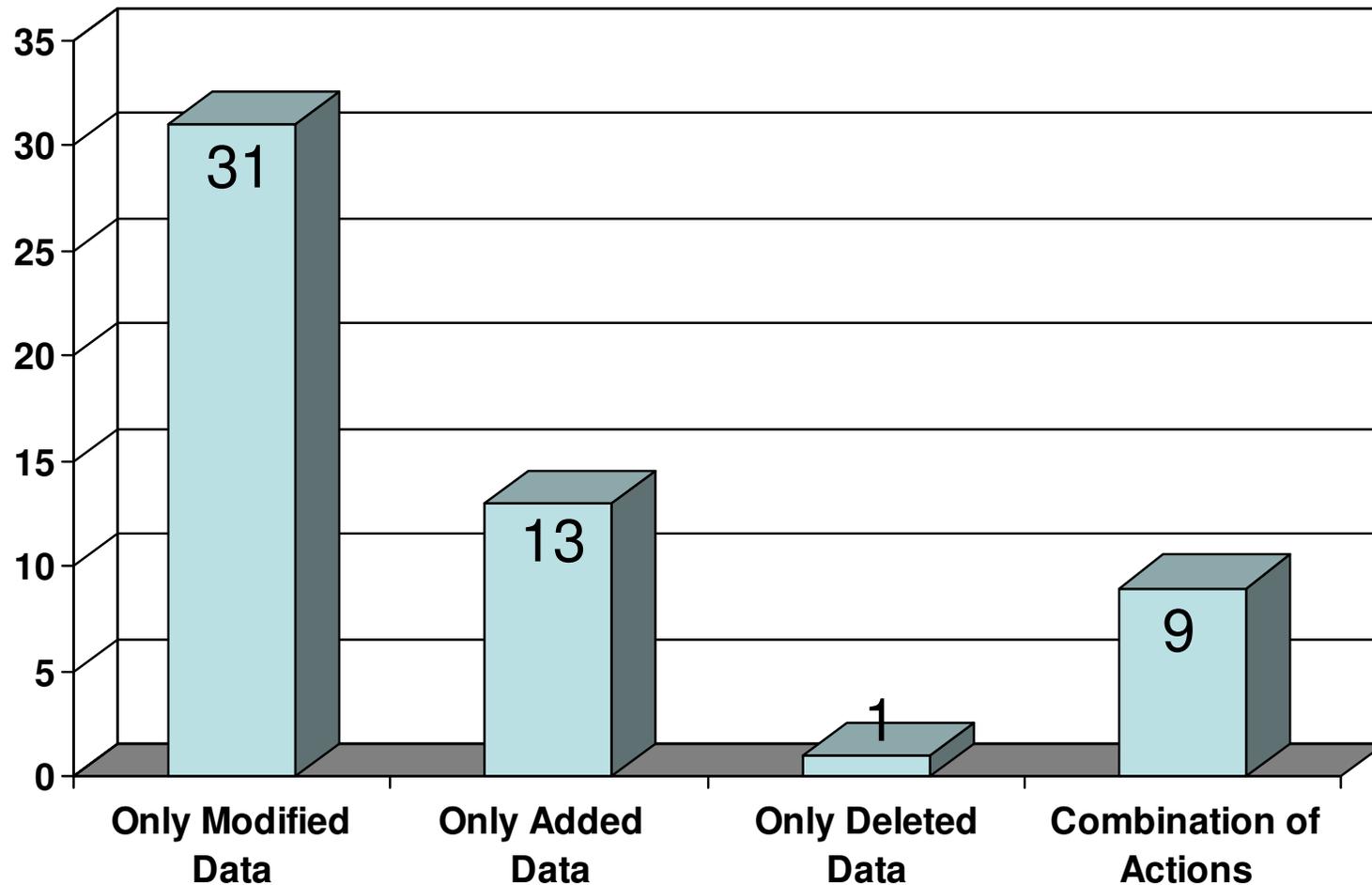


Additional Countermeasures - Theft for Financial Gain

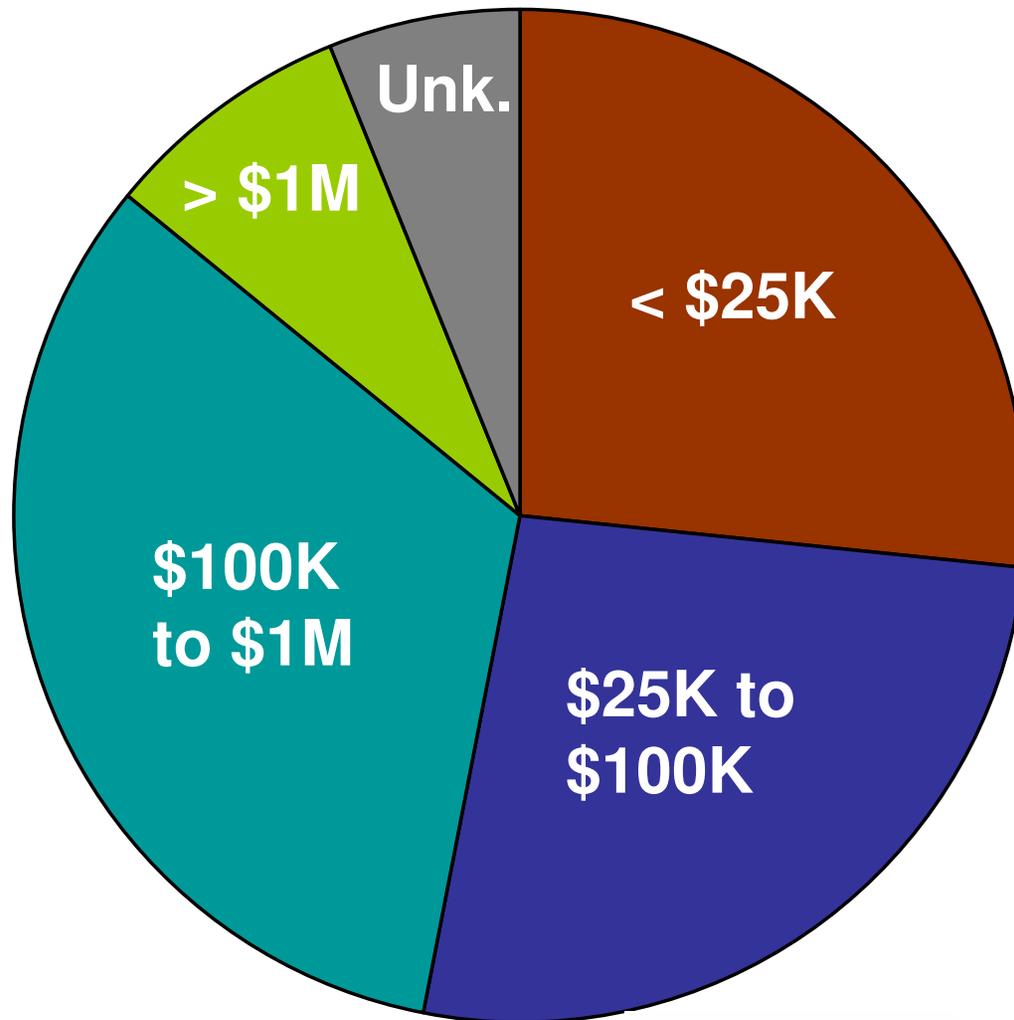
- Train managers on social networking issues
- Provide Employee Assistance Program or other recourse for employees experiencing personal problems
- Log, monitor, and audit for unusually large queries, downloads, print jobs, emails
- Do not overlook physical access controls
- Change passwords for all accounts upon termination, including EXTERNAL accounts!

***A Closer Look at
MODIFICATION
for Financial Gain***

Technical Aspects - Modification for Financial Gain



Organizational Impacts - Modification for Financial Gain



Additional Countermeasures - Modification for Financial Gain

- Audit/monitor for suspicious transactions
- Train managers on social networking issues
- Provide Employee Assistance Program or other recourse for employees experiencing personal problems

Scenario 2

Theft of Information for Business Advantage



Theft For Business Advantage

- Who did it?
 - Current employees
 - Technical or sales positions
 - All male
 - Average age: 37
- What was stolen?
 - Intellectual Property (IP)
 - Customer Information (CI)
- How did they steal it?
 - During normal working hours
 - Using authorized access

Dynamics of the Crime

- Most were *quick* theft upon resignation
- Stole information to
 - Take to a new job
 - Start a new business
 - Give to a foreign company or government organization
- Collusion
 - Collusion with at least one *insider* in almost 1/2 of cases
 - Outsider *recruited* insider in less than 1/4 of cases
 - Acted *alone* in 1/2 of cases

Known Issues

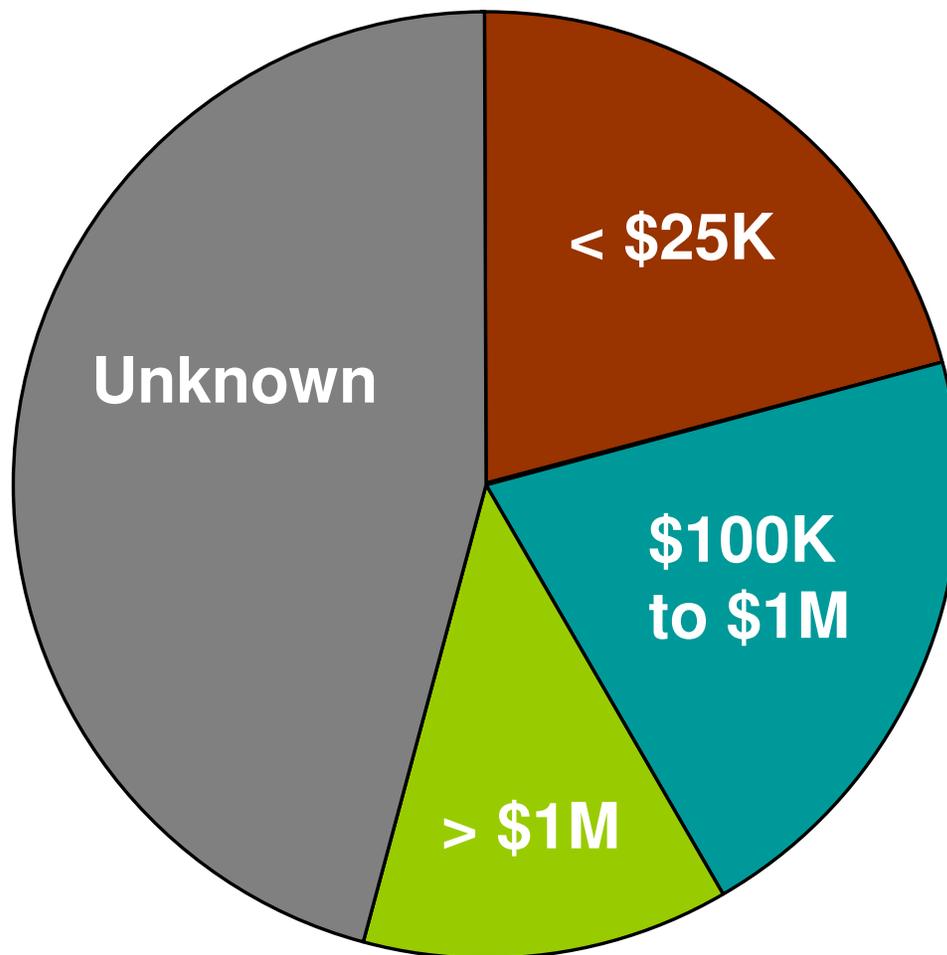
- Disagreement over ownership of intellectual property
- Financial compensation issues
- Relocation issues
- Hostile work environment
- Mergers & acquisitions
- Company attempting to obtain venture capital
- Problems with supervisor
- Passed over for promotion
- Layoffs

Technical Aspects - Theft for Business Advantage

- In order of prevalence:
 - Copied/downloaded information at work
 - Emailed information from work
 - Accessed former employer's system
 - Compromised account

- Many other methods

Organizational Impacts - Theft for Business Advantage



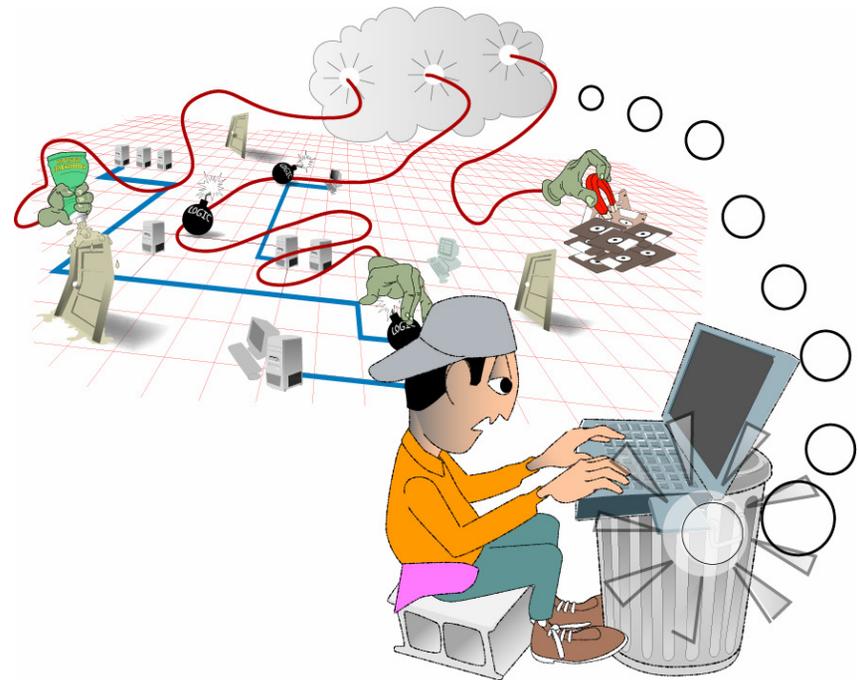
*** Note: None in range \$25K to \$100K.**

Additional Countermeasures - Theft for Business Advantage

- Log, monitor, and audit access to critical information
- Enforce “need to know” access controls, including encryption
- Protect software in development
- Prohibit use of personal computers for any work-related activity

Scenario 3:

IT Sabotage with the Intent to Harm Organization or Individual



Insider IT Sabotage

- Who did it?
 - Former employees
 - Male
 - Highly technical positions
 - Age: 17 – 60
- How did they attack?
 - No authorized access
 - Backdoor accounts, shared accounts, other employees' accounts, insider's own account
 - Many technically sophisticated
 - Remote access outside normal working hours

Dynamics of Insider IT Sabotage

- Most insiders were disgruntled due to unmet expectations
 - Period of heightened expectations, followed by a precipitating event triggering precursors
- Behavioral precursors were often observed but ignored by the organization
 - Significant behavioral precursors often came before technical precursors
- Technical precursors were observable, but not detected by the organization

Known Issues

- Unmet Expectations
 - Insufficient compensation
 - Lack of career advancement
 - Inflexible system policies
 - Coworker relations; supervisor demands
- Behavioral precursors
 - Drug use; absence/tardiness
 - Aggressive or violent behavior; mood swings
 - Used organization's computers for personal business
 - Sexual harassment
 - Poor hygiene

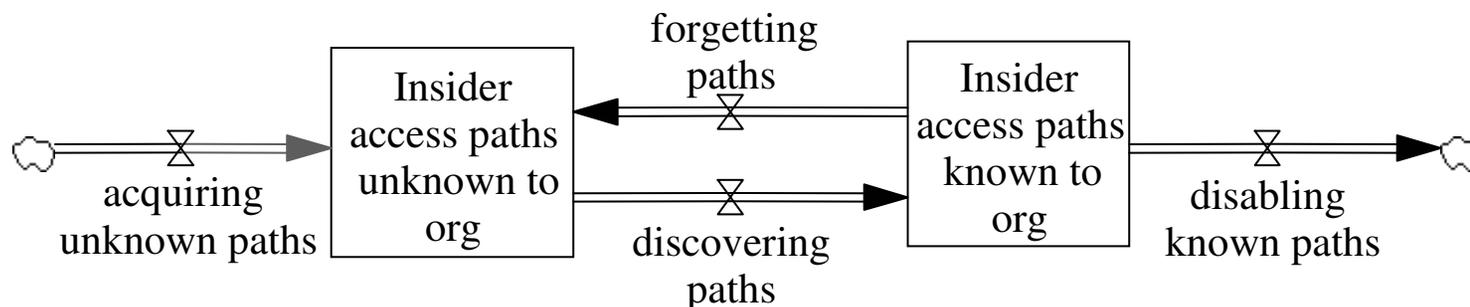
Technical Aspects of Insider IT Sabotage

- Insiders created or used unknown access paths to set up their attack and conceal their identity or actions.
- The majority attacked after termination.
- Organizations failed to detect technical precursors
- Lack of physical or electronic access controls facilitated the attack

More About Access Paths

- Access path
 - A sequence of one or more access points that lead to a critical system

An organization may not know about all of the access paths to its critical systems.



Organizational Impacts of IT Sabotage

- Inability to conduct business, loss of customer records
- Inability to produce products
- Negative media attention
- Private information forwarded to customers, competitors, or employees
- Exposure of personal or confidential information
- Web site defacements
- Many individuals harmed

Additional Countermeasures - IT Sabotage

- Train management on the patterns of behavior that could indicate an IT sabotage attack

Miscellaneous:

Cases not in the above scenarios

Examples of Miscellaneous Cases

- Reading executive emails for entertainment
- Providing organizational information to lawyers in lawsuit against organization (ideological)
- Transmitting organization's IP to hacker groups
- Unauthorized access to information to locate a person as accessory to murder

Summary

- Insider threat is a problem that impacts and requires understanding by everyone
 - Information Technology
 - Information Security
 - Human Resources
 - Management
 - Physical Security
 - Legal
- Use enterprise risk management for protection of critical assets from ALL threats, including insiders
- Incident response plans should include insider incidents
- Create a culture of security – all employees have responsibility for protection of organization's information



Discussion

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