Social Engineering

Module 08

Unmask the Invisible Hacker.




Social Engineering Statistics

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Phishing

88% Clicking links within email of all reported phishing

Most common phishing attacks mimicking financial institutions

How much email is sent?

107 Trillion annually | 294 Billion each day

90% of all email is spam or virus

77% Percentage of phishing of all socially based attacks

13.3 Million user reported phishing attacks in 2013

Vishing

2.4 M customers targeted for phone fraud for all of 2012

2.3 M customers targeted for phone fraud for first half of 2013

Average loss for targeted business $42,546 per account

60% of US adults who send and receive text messages received mobile spam in 2012

What do Smishers ask for?

14% Reply to text

26% Call a number

60% Click on a link

Impersonation

1.8 Million victims of medical theft in 2013 due to websites impersonating medical providers

88% of reported stolen assets were personal data

Average Victims of impersonation

41.7 year old | $4,187 lost

Top place for thief is work area

According to the survey conducted by Social-Engineer.Org *http://www.social-engineer.org*

Module Objectives

- Overview of Social Engineering Concepts
- Understanding various Social Engineering Techniques
- Understanding Insider Threats
- Understanding Impersonation on Social Networking Sites

- Understanding Identity Theft
- Social Engineering Countermeasures
- Identity Theft Countermeasures
- Overview of Social Engineering Pen Testing



Module Flow

What is Social Engineering?

Social engineering is the art of **convincing people** to reveal confidential information. Common targets of social engineering include help desk personnel, technical support executives, system administrators, etc.

Social engineers depend on the fact that people are **unaware of their valuable information** and are careless about protecting it

Impact of Attack on Organization

Economic Losses

Lawsuits and Arbitrations

Temporary or Permanent Closure

Loss of Privacy

Damage of Goodwill

Dangers of Terrorism

Behaviors Vulnerable to Attacks

I. **Human nature of trust** is the basis of any social engineering attack

II. **Ignorance about social engineering** and its effects among the workforce makes the organization an easy target

III. **Fear** of severe losses in case of non-compliance to the social engineer's request

IV. Social engineers lure the targets to divulge information by **promising something for nothing** (**greediness**)

V. Targets are asked for help and they comply out of a sense of **moral obligation**

Factors that Make Companies Vulnerable to Attacks

01

Insufficient Security Training

02

Unregulated Access to the Information

03

Several Organizational Units

04

Lack of Security Policies

Why is Social Engineering Effective?

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01 Security policies are as strong as their weakest link, and humans are the most susceptible factor

02 It is difficult to detect social engineering attempts

03 There is no method to ensure complete security from social engineering attacks

04 There is no specific software or hardware for defending against a social engineering attack

Phases in a Social Engineering Attack

Research on Target Company

Dumpster diving, websites, employees, tour company, etc.

Select Victim

Identify the frustrated employees of the target company

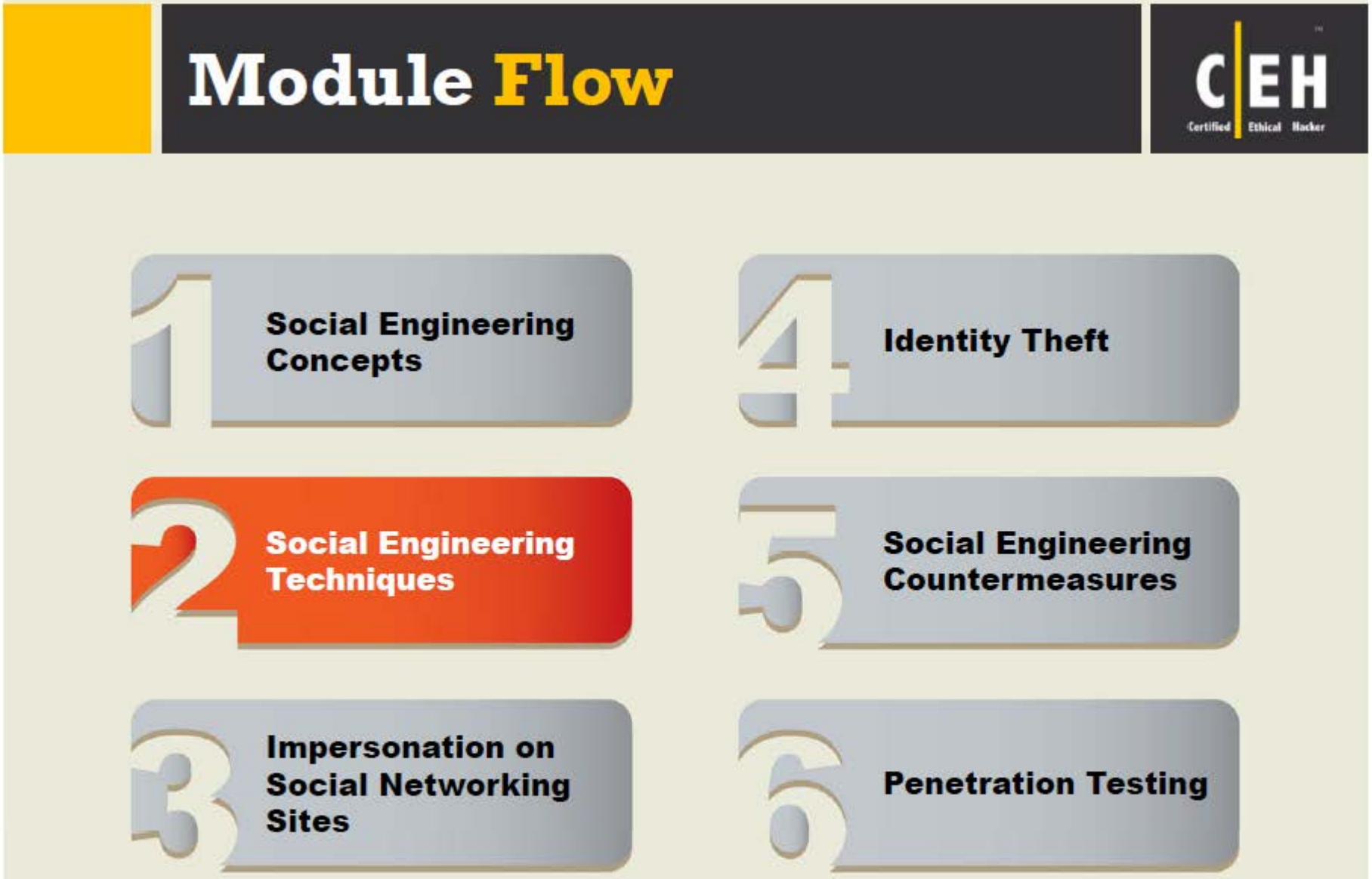
Develop Relationship

Develop relationship with the selected employees

Exploit the Relationship

Collect sensitive account and financial information, and current technologies

Module Flow



Types of Social Engineering

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Human-based Social Engineering

Gathers sensitive information by interaction

Computer-based Social Engineering

Social engineering is carried out with the help of computers

Mobile-based Social Engineering

It is carried out with the help of mobile applications

Human-based Social Engineering: Impersonation

1. It is most common human-based social engineering technique where attacker pretends to be someone legitimate or authorized person
2. Attackers may impersonate a legitimate or authorized person either personally or using a communication medium such as phone, email, etc.
3. Impersonation helps attackers in tricking a target to reveal sensitive information

Human-based Social Engineering: Impersonation (Cont'd)

Posing as a legitimate end user

- Give identity and ask for the sensitive information

"Hi! This is John, from finance department. I have forgotten my password. Can I get it?"

Posing as an important user

- Posing as a VIP of a **target company**, **valuable customer**, etc.

"Hi! This is Kevin, CFO Secretary. I'm working on an urgent project and lost my system password. Can you help me out?"

Posing as technical support

- Call as **technical support staff** and request IDs and passwords to retrieve data

"Sir, this is Mathew, Technical support, X company. Last night we had a system crash here, and we are checking for the lost data. Can u give me your ID and password?"

Impersonation Scenario: Over-Helpfulness of Help Desk

- Help desks are mostly vulnerable to social engineering as they are in place **explicitly to help**
- Attacker calls a company's help desk, pretends to be someone in a **position of authority** or relevance and tries to **extract sensitive information** out of the help desk

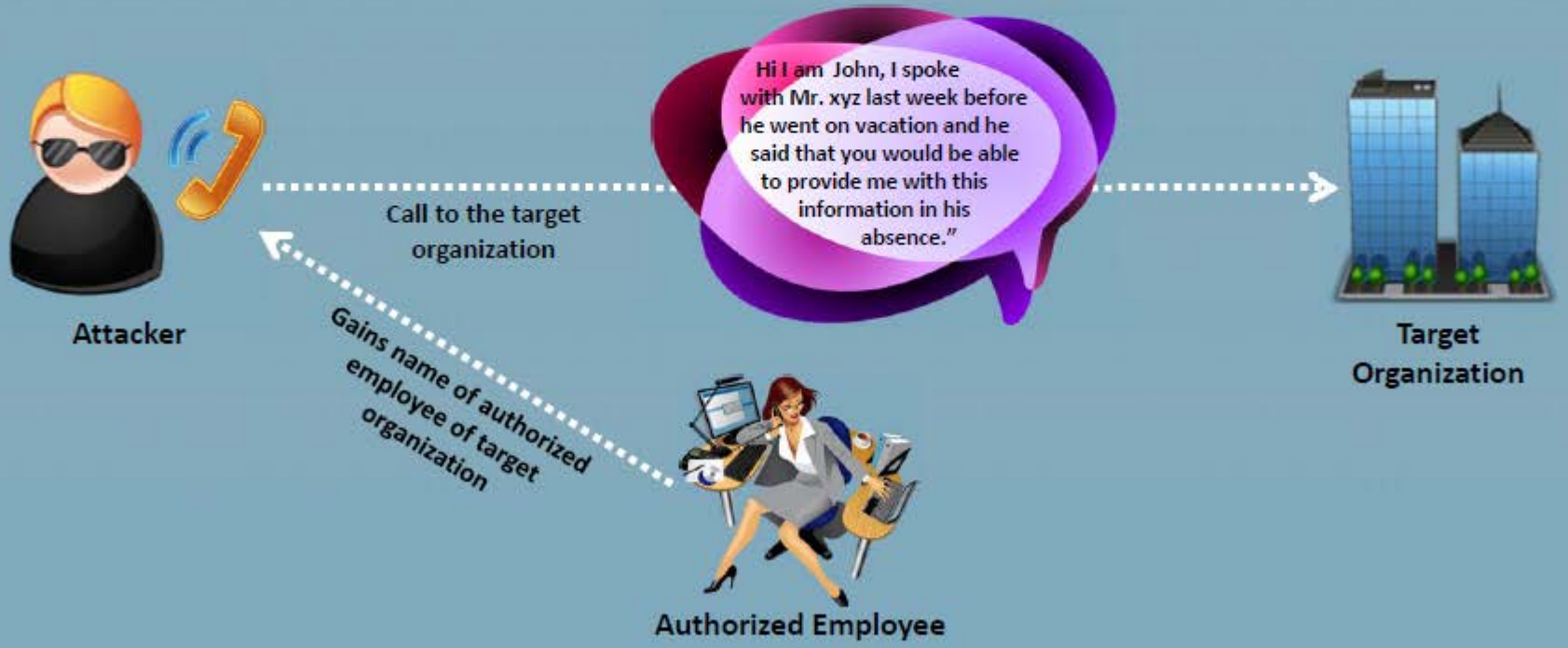
"A man calls a company's help desk and says he has forgotten his password. He adds that if he misses the deadline on a big advertising project, his boss might fire him.

The help desk worker feels sorry for him and quickly resets the password, unwittingly giving the attacker clear entrance into the corporate network"

Impersonation Scenario: Third-party Authorization

Attacker **obtains the name of the authorized employee** of target organization who has access to the information he/she wants

Attacker then **call to the target organization** where information is stored and claims that particular employee has requested that information be provided



Impersonation Scenario: Tech Support

- Attacker **pretends to be technical support staff** of target organization's software vendors or contractors
- He/she may then **claims user ID and password** for troubleshooting problem in the organization

Attacker: *"Hi, this is Mike with tech support. We have had some folks in your office report slowdowns in logging in lately. Is this true?"*

Employee: *"Yes, it has seemed slow lately."*

Attacker: *"Well, we have moved you to a new server, so your service should be much better. If you want to give me your password, I can check your service. Things should be better for you now."*

Impersonation Scenario: Repairman

- Attacker may pretend to be **telephone repairman** or **computer technician** and enters into target organization
- He/she may then **plant a snooping device** or gain hidden passwords during activities associated with their duties

Impersonation Scenarios: Trusted Authority Figure

Hi, I am John Brown. I'm with the external auditors Arthur Sanderson. We've been told by corporate to do a **surprise inspection** of your disaster recovery procedures. Your department has 10 minutes to show me how you would recover from a website crash.

Hi I'm Sharon, a sales rep out of the New York office. I know this is short notice, but I have a group of prospective clients out in the car that I've been trying for months to get to **outsource their security training** needs to us.
They're located just a few miles away and I think that if I can give them a quick tour of our facilities, it should be enough to push them over the edge and get them to sign up.
Oh yeah, they are particularly interested in what **security precautions** we've adopted. Seems someone hacked into their website a while back, which is one of the reasons they're considering our company.

Hi, I'm with Aircon Express Services. We received a call that the computer room was getting too warm and need to check your HVAC system. Using **professional-sounding** terms like HVAC (Heating, Ventilation, and Air Conditioning) may add just enough credibility to an intruder's masquerade to allow him or her to gain access to the **targeted secured resource**.

Human-based Social Engineering: Eavesdropping and Shoulder Surfing

Eavesdropping

- Eavesdropping or **unauthorized listening of conversations** or reading of messages
- Interception of audio, video, or written communication
- It can be done using **communication channels** such as telephone lines, email, instant messaging, etc.

Shoulder Surfing

- Shoulder surfing uses direct observation techniques such as **looking over someone's shoulder** to get information such as passwords, PINs, account numbers, etc.
- Shoulder surfing can also be done from a longer distance with the aid of **vision enhancing devices** such as binoculars to obtain sensitive information

Human-based Social Engineering: Dumpster Diving

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Dumpster Diving

Dumpster diving is **looking for treasure** in someone else's **trash**

Human-based Social Engineering: Reverse Social Engineering, Piggybacking, and Tailgating

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Reverse Social Engineering

- A situation in which an attacker presents himself as an **authority** and the target seeks his advice offering the information that he needs
- Reverse social engineering attack involves **sabotage**, **marketing**, and **tech support**

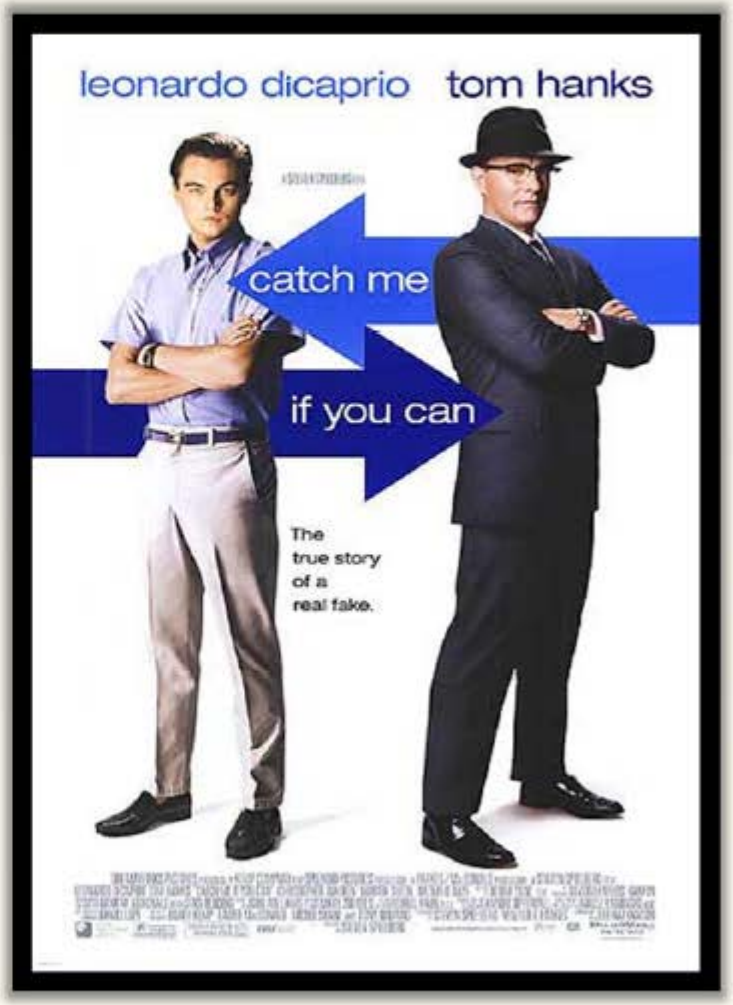
Piggybacking

- "I forgot my ID badge at home. Please help me."
- An authorized person allows (intentionally or unintentionally) an **unauthorized person** to pass through a secure door

Tailgating

- An unauthorized person, wearing a **fake ID badge**, enters a secured area by closely following an authorized person through a door requiring key access

Watch these Movies



Watch this Movie

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Social Engineering

In the 2003 movie "**Matchstick Men**", Nicolas Cage plays a con artist residing in Los Angeles and operates a fake lottery, selling overpriced water filtration systems to unsuspecting customers, in the process collecting over a million dollars

Manipulating People

This movie is an excellent study in the art of social engineering, the **act of manipulating people** into performing actions or divulging confidential information

Computer-based Social Engineering

Pop-up Windows

Windows that suddenly pop up while surfing the Internet and ask for **users' information** to login or sign-in

Hoax Letters

Hoax letters are emails that issue **warnings** to the user on new viruses, Trojans, or worms that may harm the user's system

Chain Letters

Chain letters are emails that offer **free gifts** such as money and software on the condition that the user has to **forward the mail to the said number of persons**

Instant Chat Messenger

Gathering **personal information by chatting** with a selected online user to get information such as birth dates and maiden names

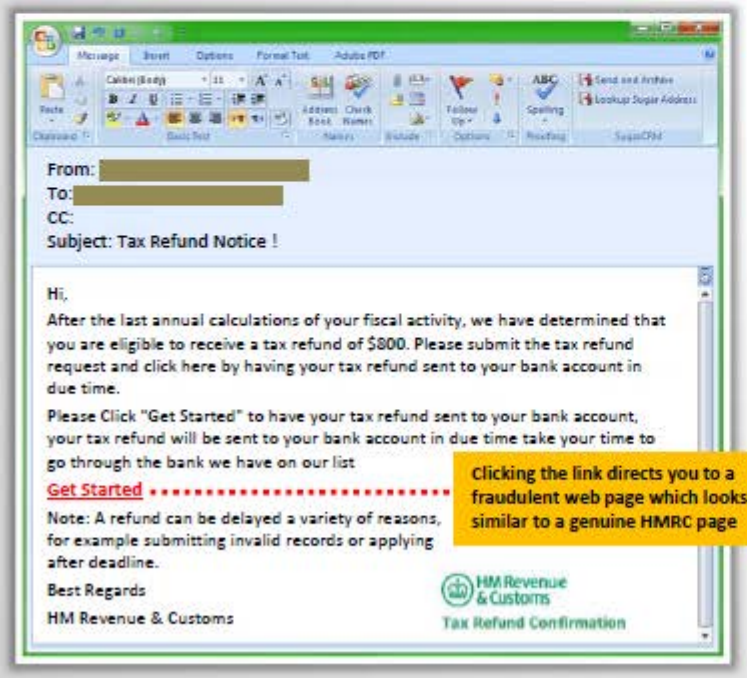
Spam Email

Irrelevant, unwanted, and unsolicited email to collect the **financial information**, **social security numbers**, and **network information**

Computer-based Social Engineering: Phishing

An **illegitimate email** falsely claiming to be from a **legitimate site attempts** to acquire the user's personal or account information

Phishing emails or pop-ups redirect users to **fake webpages** of mimicking trustworthy sites that ask them to submit their personal information



Clicking the link directs you to a fraudulent web page which looks similar to a genuine HMRC page

http://www.hmrc.gov.uk

Computer-based Social Engineering: Spear Phishing

Spear phishing is a direct, targeted phishing attack aimed at **specific individuals within an organization**

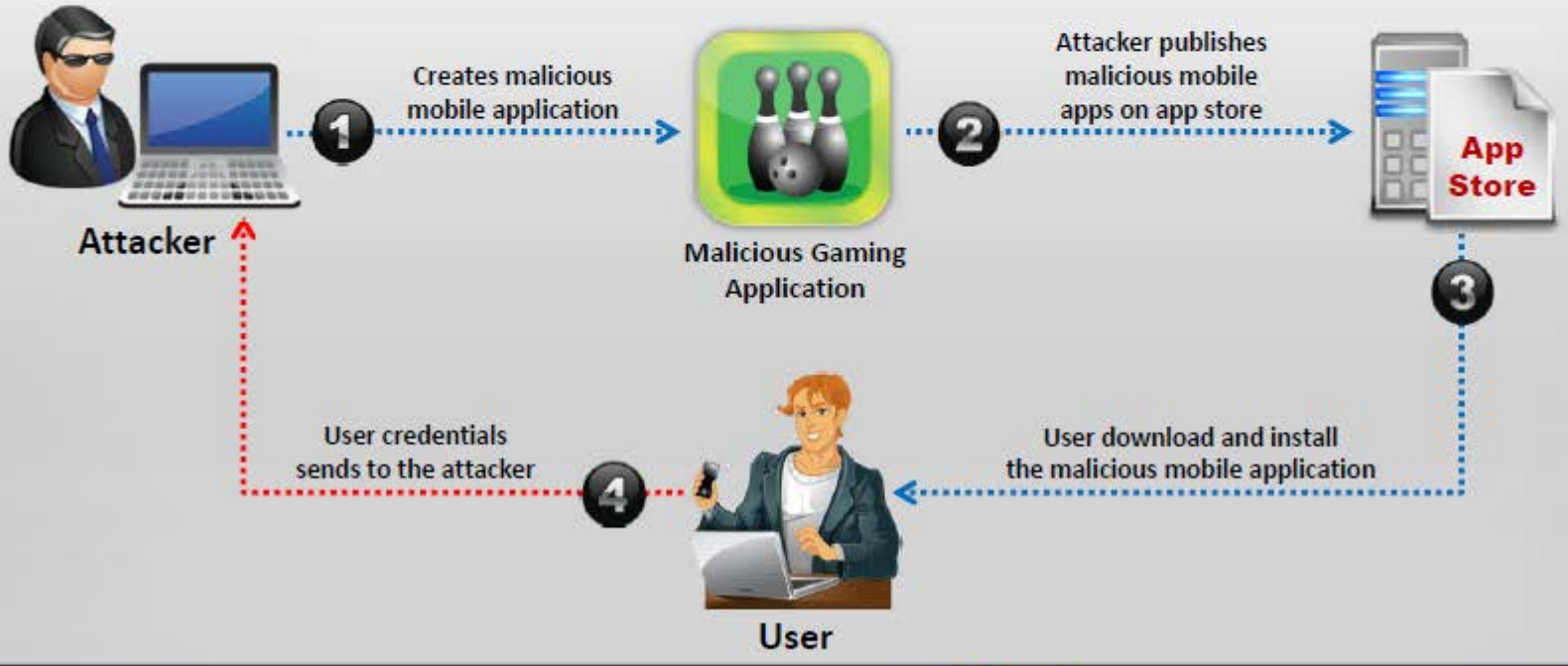
In contrast to normal phishing attack where attackers send out hundreds of generic messages to random email addresses, attackers use spear phishing to send a message with specialized, **social engineering content** directed at a **specific person or a small group of people**

Spear phishing **generates higher response rate** when compared to normal phishing attack

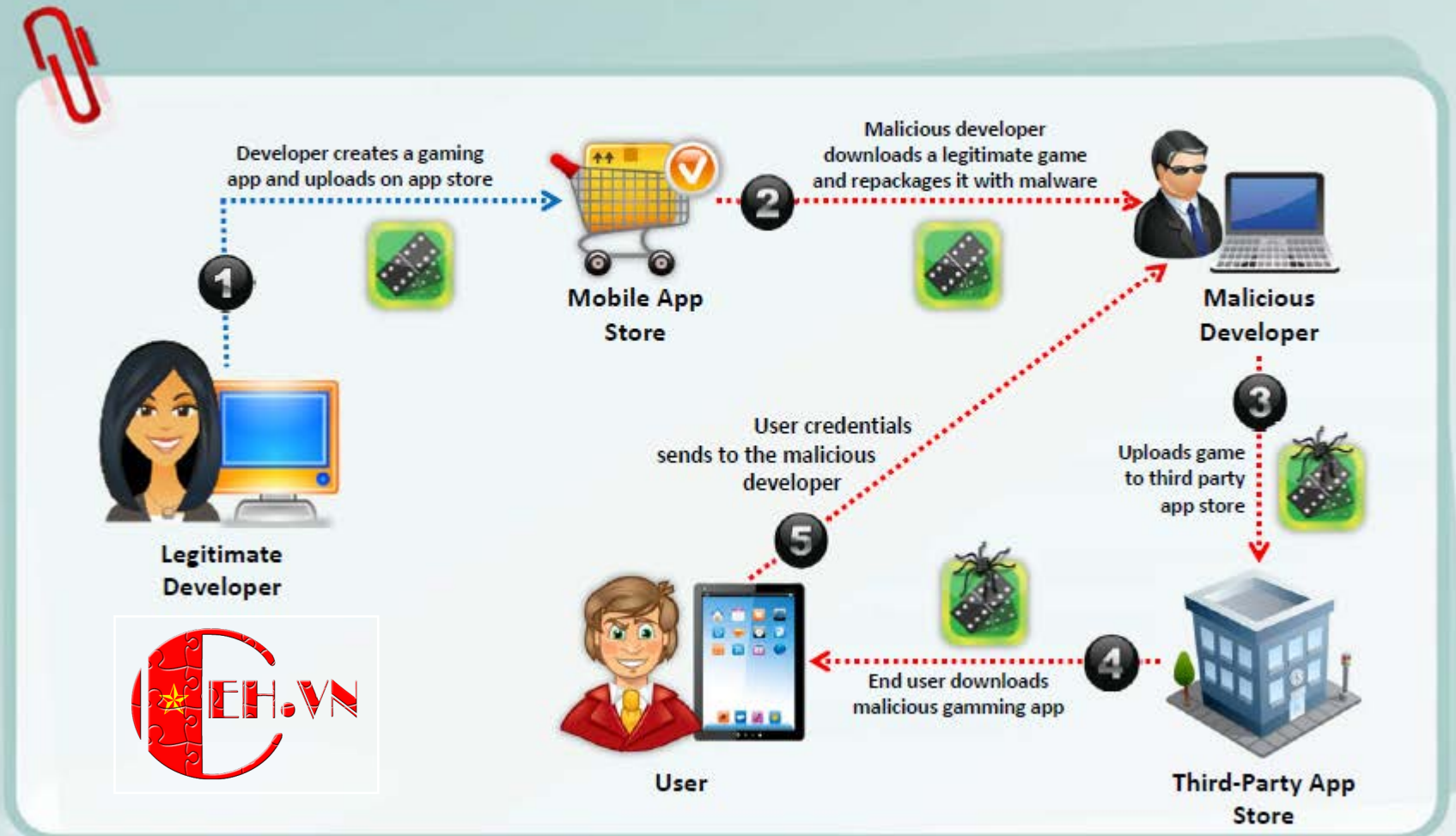
Mobile-based Social Engineering: Publishing Malicious Apps

Attackers create **malicious apps** with attractive features and **similar names** to that of popular apps, and publish them on major **app stores**

Unaware **users download these apps** and get infected by malware that sends **credentials to attackers**



Mobile-based Social Engineering: Repackaging Legitimate Apps



Mobile-based Social Engineering: Fake Security Applications

01	Attacker infects the victim's PC
02	The victim logs onto his/her bank account
03	Malware in PC pop-ups a message telling the victim to download an application onto his/her phone in order to receive security messages
04	Victim downloads the malicious application on his/her phone
05	Attacker can now access second authentication factor sent to the victim from the bank via SMS

Mobile-based Social Engineering: Using SMS

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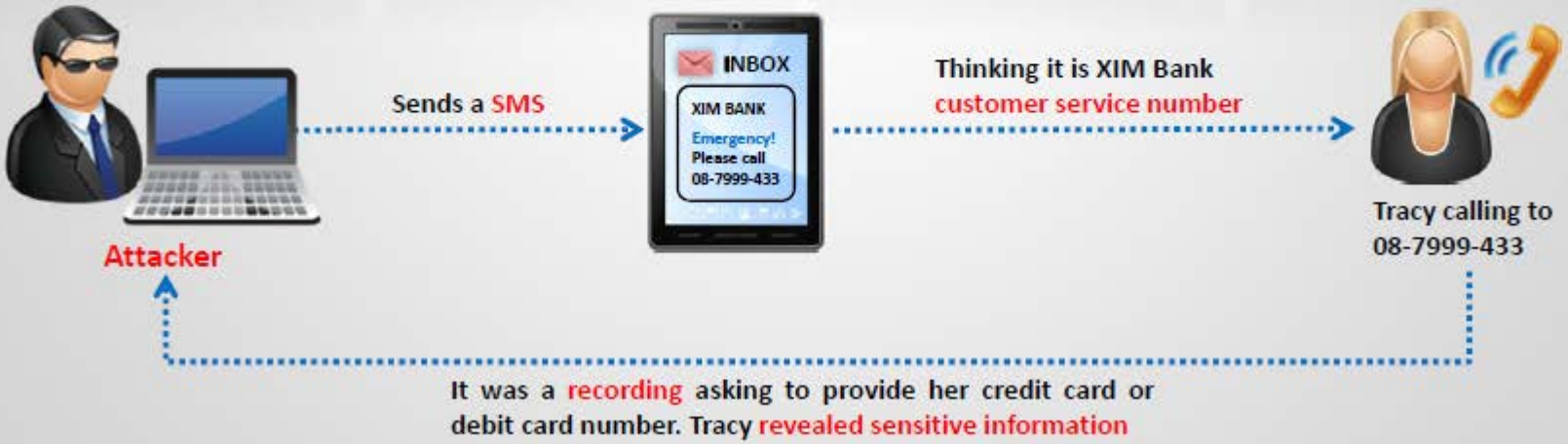
1 Tracy received an **SMS** text message, ostensibly from the security department at XIM Bank

2 It claimed to be **urgent** and that Tracy should call the phone number in the SMS immediately. Worried, she called to check on her account.

3 She called thinking it was a XIM Bank customer service number, and it was a **recording** asking to provide her credit card or debit card number

4 Predictably, Tracy **revealed the sensitive information** due to the fraudulent texts



Insider Attack

Spying

If a competitor wants to cause damage to your organization, steal critical secrets, or put you out of business, they just have to **find a job opening**, prepare someone to pass the interview, have that person hired, and they will be in the organization

Revenge

It takes only **one disgruntled person** to take revenge and your company is compromised

Insider Attack

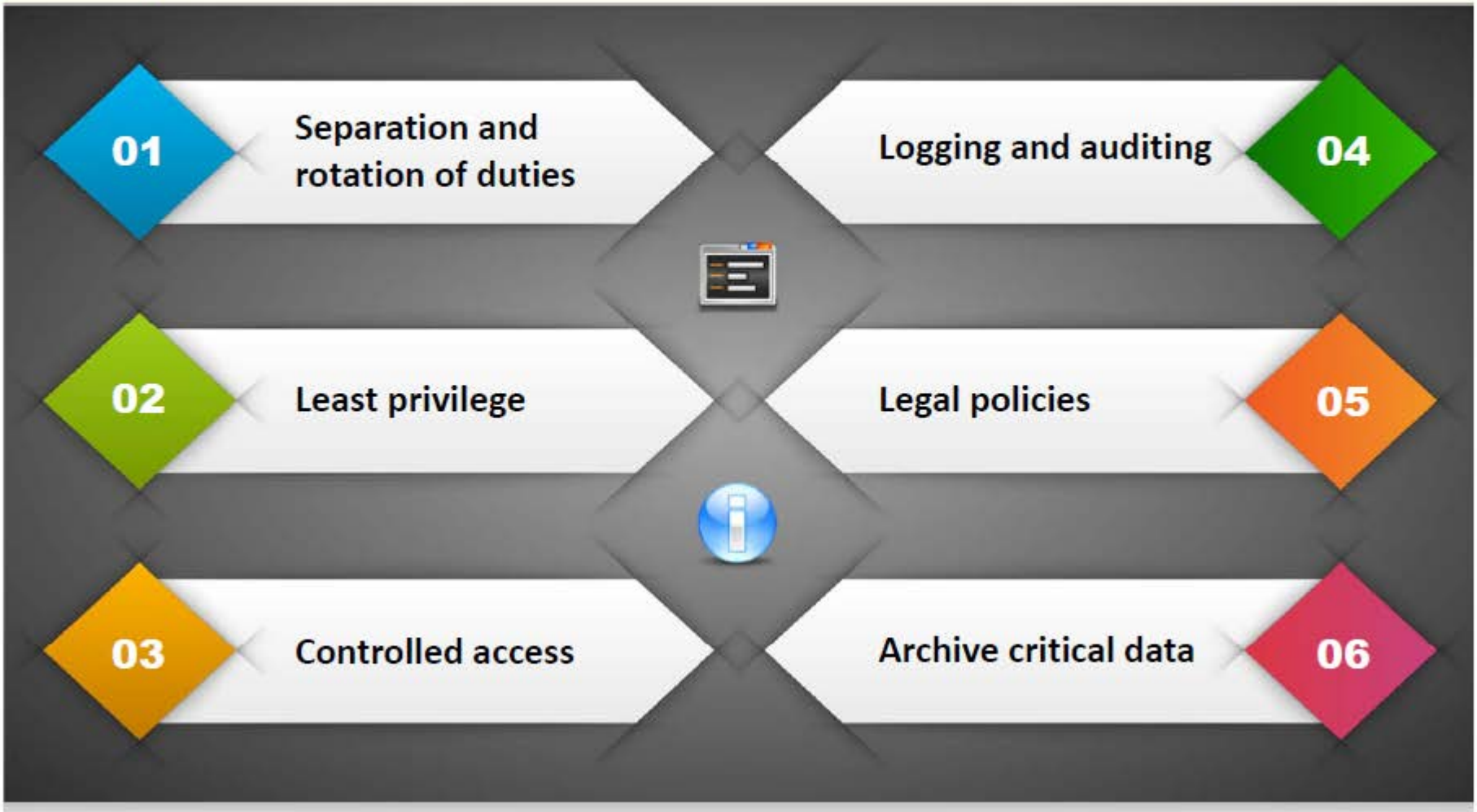
- An inside attack is easy to launch
- Prevention is difficult
- The inside attacker can easily succeed

Disgruntled Employee

1. An employee may become **disgruntled towards the company** when he/she is disrespected, frustrated with their job, having conflicts with the management, not satisfied with employment benefits, issued an employment termination notice, transferred, demoted, etc.

2. Disgruntled employees may **pass company secrets** and **intellectual property** to competitors for monetary benefits

Preventing Insider Threats

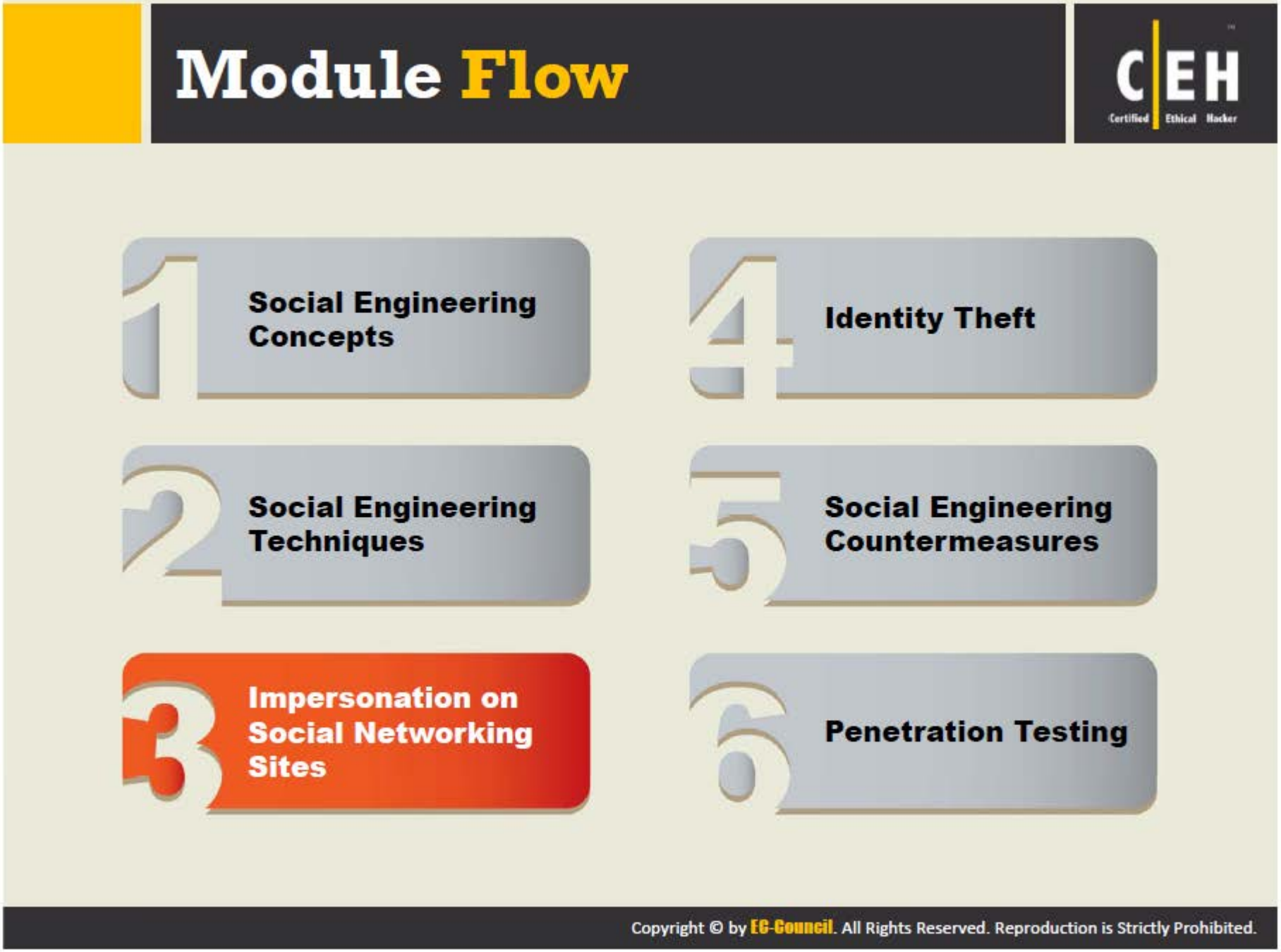


There is no single solution to **prevent** an insider threat

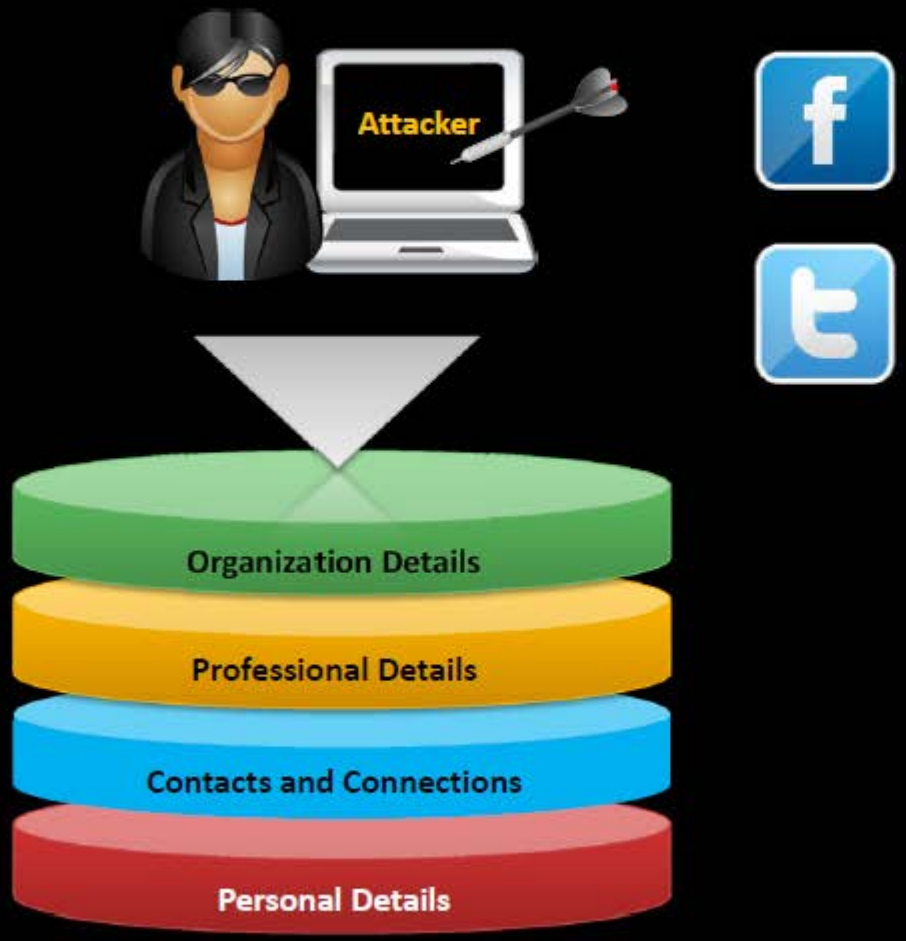
Common Social Engineering Targets and Defense Strategies

Social Engineering Targets	Attack Techniques	Defense Strategies
Front office and help desk 	Eavesdropping, shoulder surfing, impersonation, persuasion, and intimidation	Train employees/help desk to never reveal passwords or other information by phone
Perimeter security 	Impersonation, fake IDs, piggy backing, etc.	Implement strict badge, token or biometric authentication, employee training, and security guards
Office 	Shoulder surfing, eavesdropping, Ingratiation, etc.	Employee training, best practices and checklists for using passwords Escort all guests
Phone (help desk) 	Impersonation, Intimidation, and persuasion on help desk calls	Employee training, enforce policies for the help desk
Mail room 	Theft, damage or forging of mails	Lock and monitor mail room, employee training
Machine room/ Phone closet 	Attempting to gain access, remove equipment, and/or attach a protocol analyzer to grab the confidential data	Keep phone closets, server rooms, etc. locked at all times and keep updated inventory on equipment

Module Flow

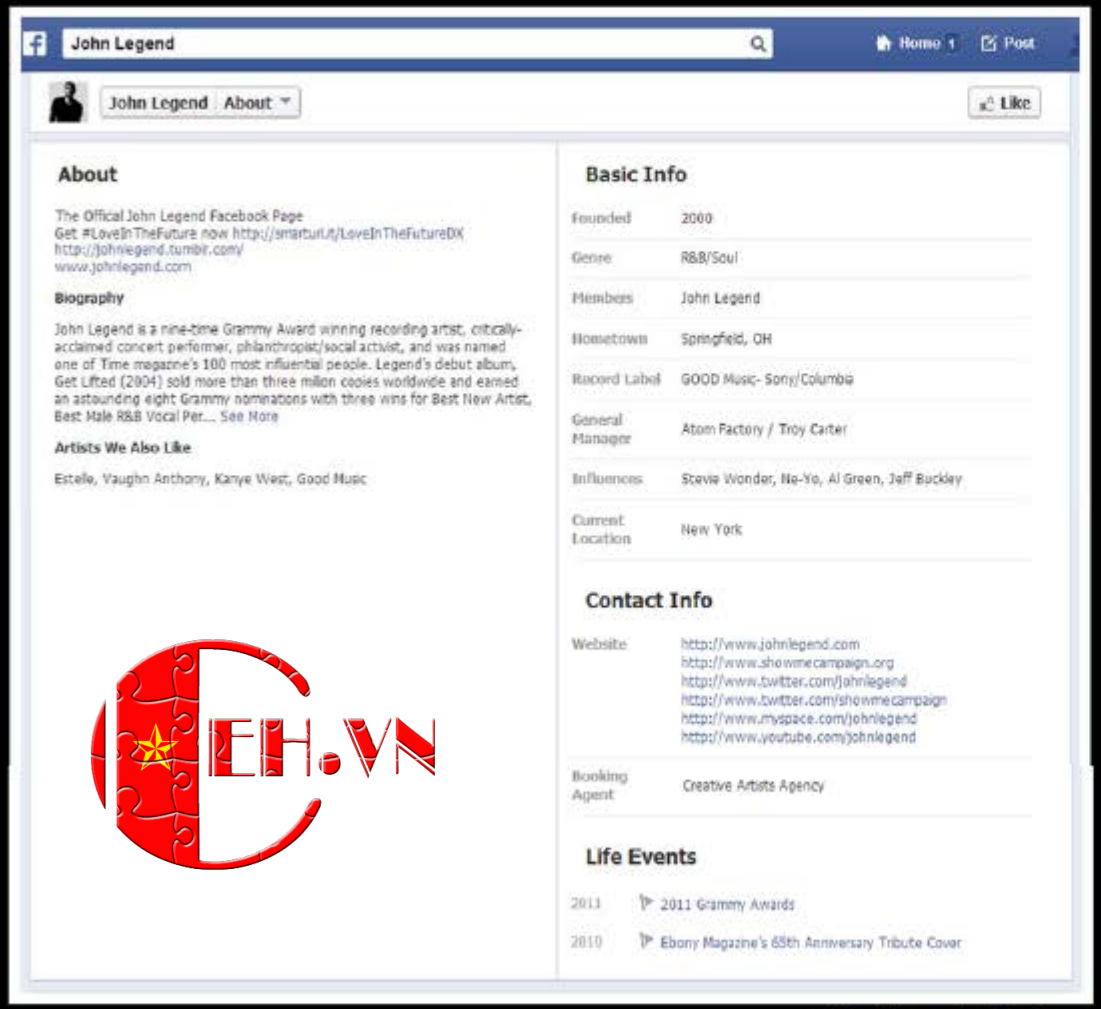


Social Engineering Through Impersonation on Social Networking Sites



- Malicious users **gather confidential information** from social networking sites and create accounts in others' names
- Attackers use others' profiles to create large networks of friends and **extract information** using social engineering techniques
- Attackers try to join the target **organization's employee groups** where they share personal and company information
- Attackers can also use collected information to carry out other forms of **social engineering attacks**

Social Engineering on Facebook



http://www.facebook.com

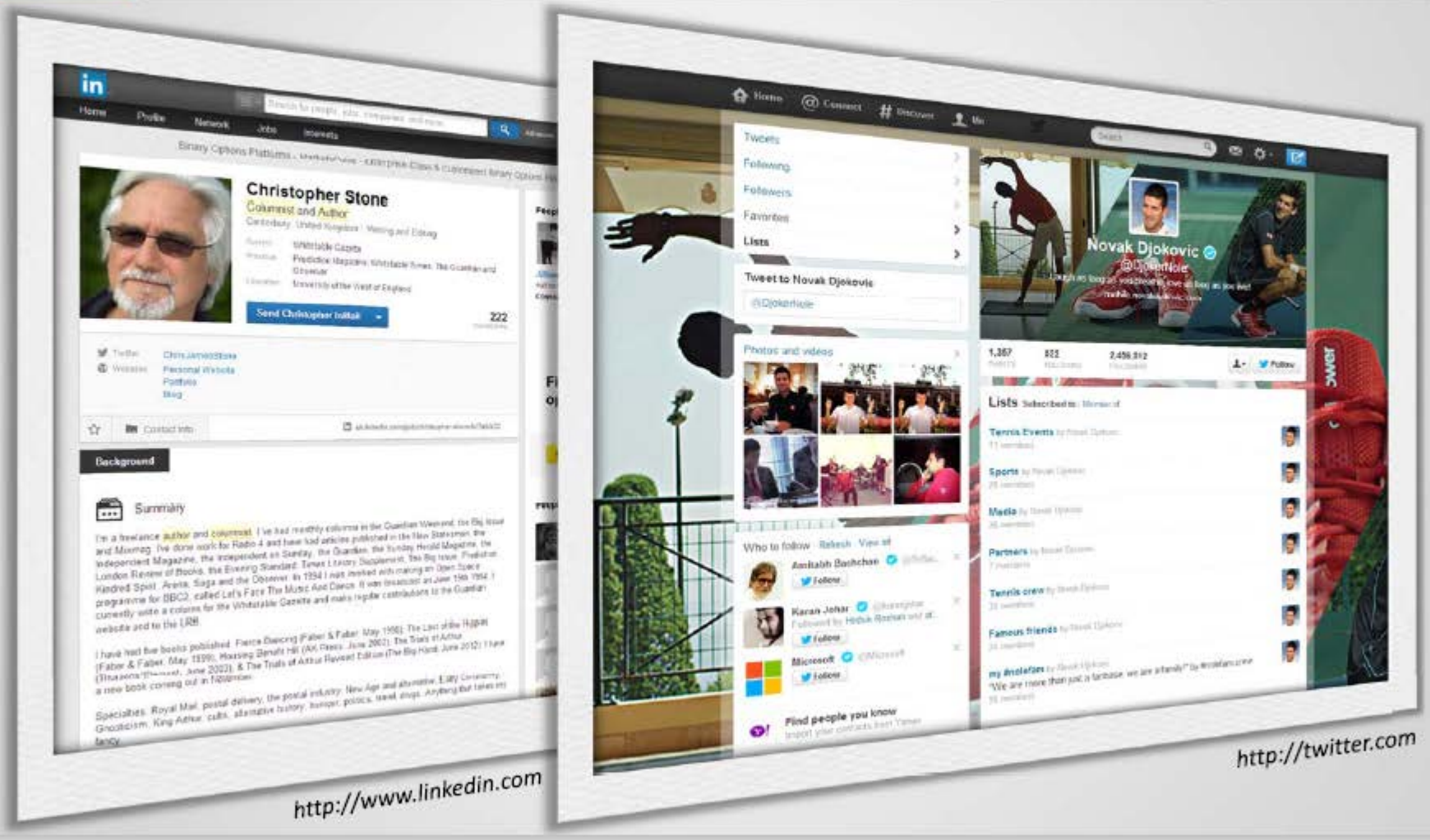
Attackers create a **fake user group** on Facebook identified as "Employees of" the target company

Using a **false identity**, attacker then proceeds to "friend," or invite, employees to the fake group, "Employees of the company"

Users join the group and **provide their credentials** such as date of birth, educational and employment backgrounds, spouses names, etc.

Using the details of any one of the employee, an attacker can **compromise** a secured facility to **gain access** to the building

Social Engineering on LinkedIn and Twitter



Attackers scan details in **profile pages**. They use these details for spear phishing, impersonation, and identity theft.

Risks of Social Networking to Corporate Networks

Data Theft

A social networking site is an **information repository** accessed by many users, enhancing the risk of information exploitation

Involuntary Data Leakage

In the absence of a strong policy, employees may unknowingly **post sensitive data** about their company on social networking sites

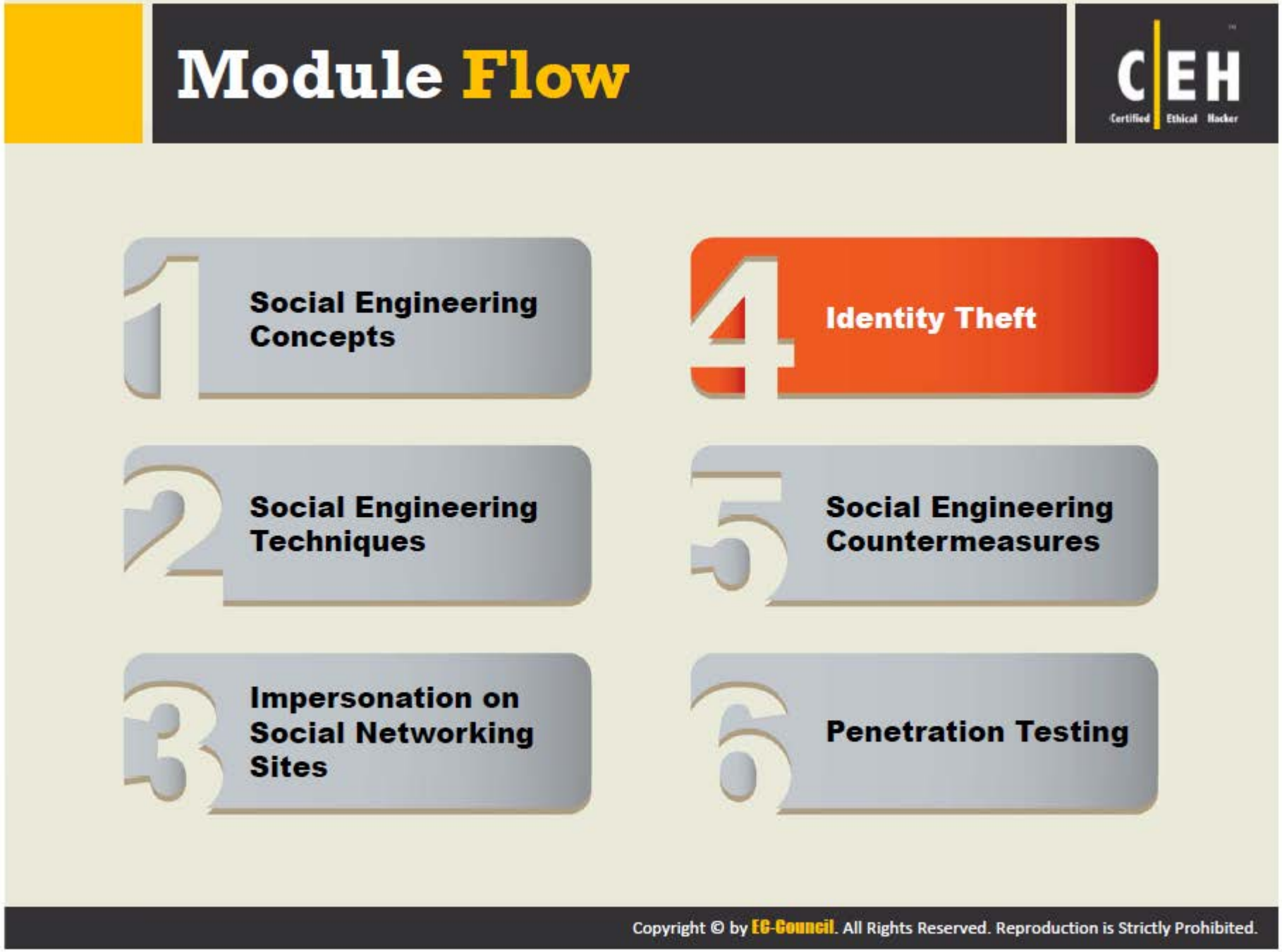
Targeted Attacks

Attackers use the **information** available on **social networking sites** to perform a targeted attack

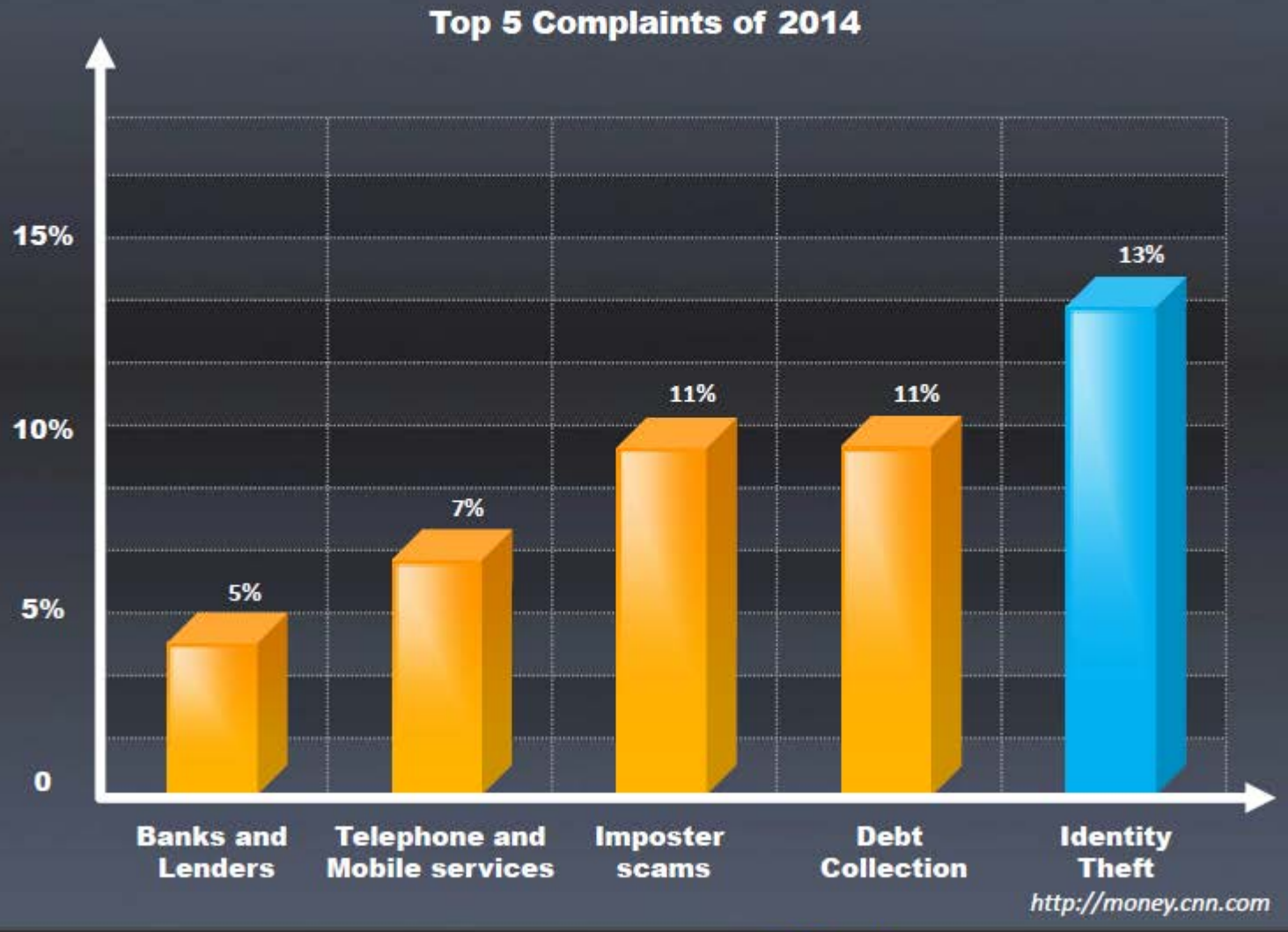
Network Vulnerability

All social networking sites are subject to **flaws** and **bugs** that in turn could cause vulnerabilities in the organization's network

Module Flow



Identity Theft Statistics



Identify Theft

1. Identity theft occurs when **someone steals your personally identifiable information** for fraudulent purposes

2. It is a crime in which an imposter obtains personal identifying information such as **name**, **credit card number**, **social security** or **driver license numbers**, etc. to commit fraud or other crimes

3. Attackers can use identity theft to **impersonate employees of a target** organization and physically access the facility

How to Steal an Identity

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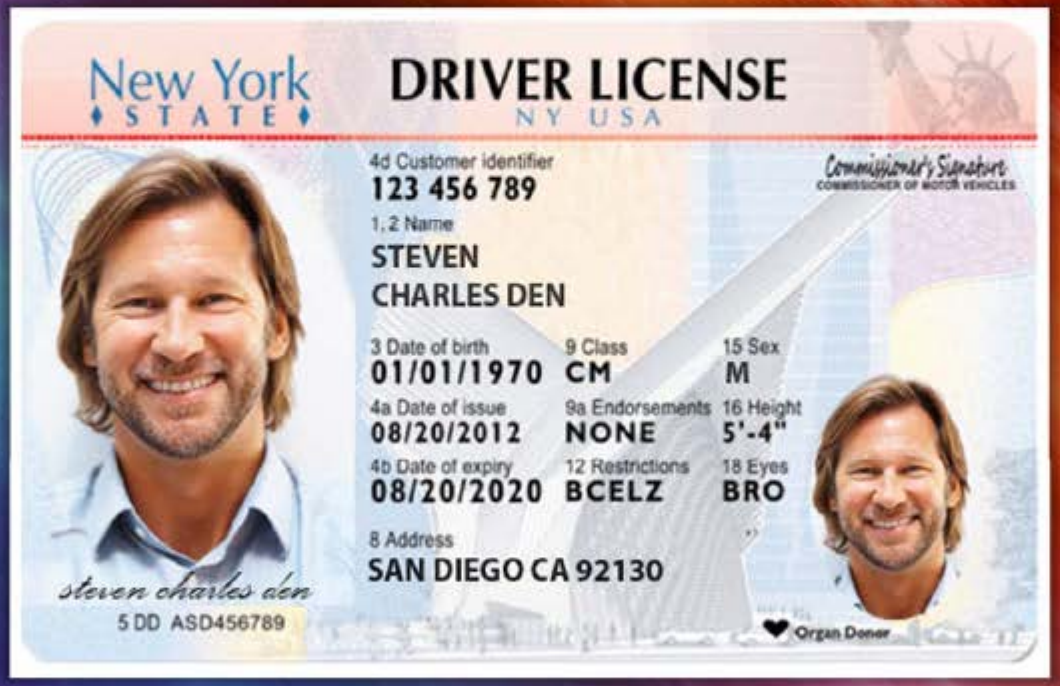
Original identity – Steven Charles

Address: San Diego CA 92130

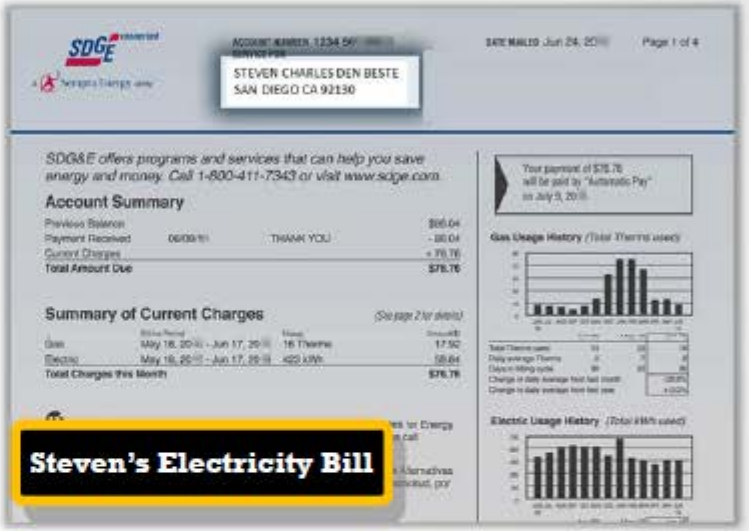


Note: The identity theft illustration presented here is for demonstrating a typical identity theft scenario. It may or may not be used in all location and scenarios.

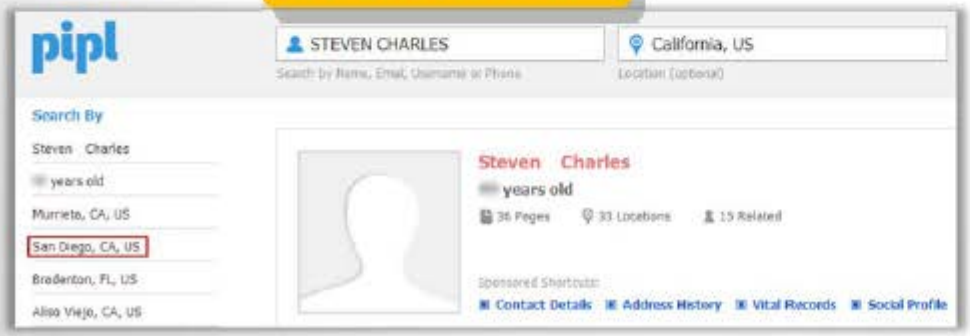
STEP 1

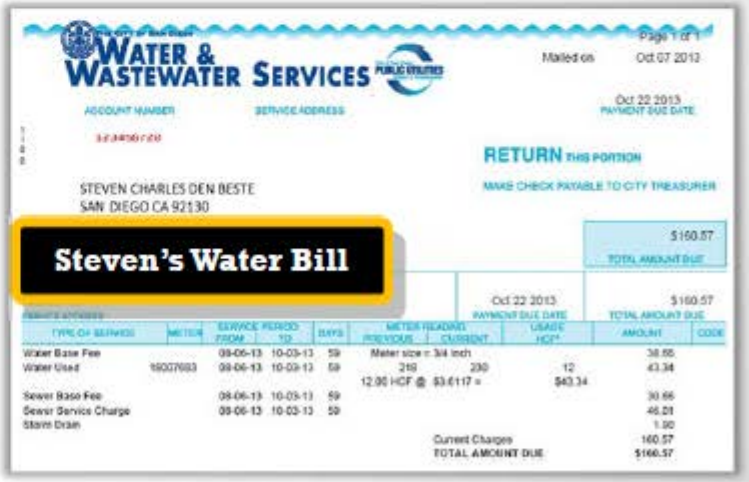
- Search for Steven's address on **social networking sites** (Facebook, Twitter, etc.) or on **people search sites**
- Get hold of Steven's telephone bill, water bill, or electricity bill using **dumpster diving**, **stolen email**, or **onsite stealing**

Steven's Address



Steven's Electricity Bill





Steven's Water Bill

STEP 2

01 Go to the **Department of Motor Vehicles** and tell them you lost your driver license

02 They will ask you for **proof of identity** such as a water bill and electricity bill

03 Show them the **stolen bills**

04 Tell them you have **moved from the original address**

05 The department employee will ask to complete **replacement of the driver license form** and **change in address form**

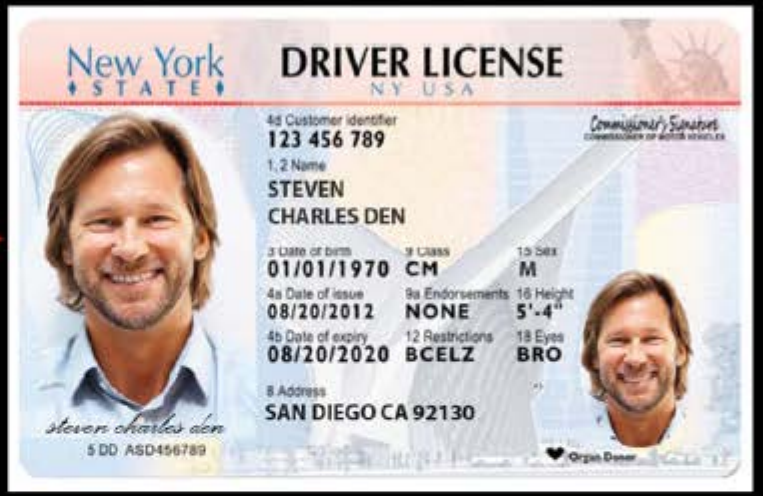
06 You will need a **photo for the driver license**

07 Your replacement driver license will be issued to your **new home address**

08 **Now you are ready to have some serious fun**

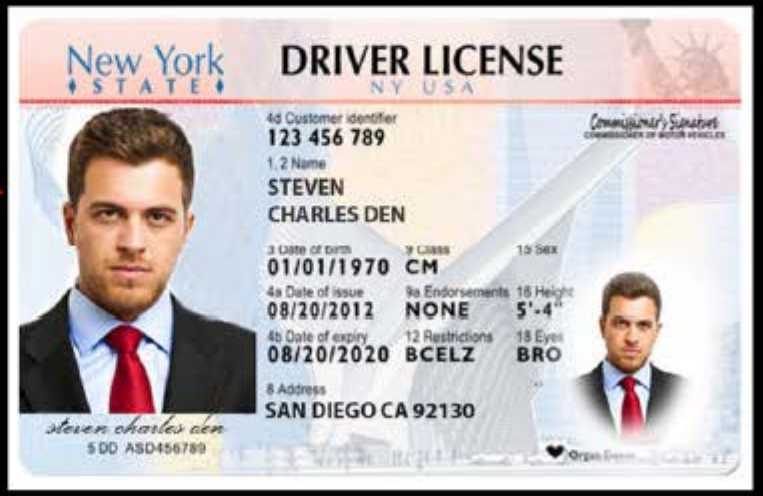
Comparison

Original



Same name: Steven Charles

Identity Theft



STEP 3

- Go to a bank in which the **original** Steven Charles has an account and tell them you would like to apply for a **new credit card**
- Tell them you **do not remember** the account number and ask them to look it up using Steven's name and address
- The bank will ask for your ID: Show them your **driver license as ID**, and if the ID is accepted, your credit card will be issued and ready for
- Now you are ready for **shopping**

Fake Steven is Ready to:

- Make purchases worth thousands of USD
- Apply for a new passport
- Apply for a new bank account
- Shut down your utility services
- Apply for a car loan

Real Steven Gets Huge Credit Card Statement

Somebody stole my identity!

Statement of Personal Credit Card Account

Check here if address or telephone number has changed. Please note changes on reverse side.

Account Number	Statement Closing Date	Current Amount Due
1234-567-890	01-31-14	$40, 000

STEVEN CHARLES DEN BESTE
SAN DIEGO CA 92130

MAIL PAYMENT TO :

872919345 00178255000000003

Detach here and return upper portion with check or money order. Do not staple or fold.

Statement of Personal Credit Card Account

Retain this portion for your files.

Cardmember Name	Account Number	Statement Closing Date
STEVEN CHARLES	1234-456-890	01-31-14

Statement Date:	02-01-14	Payment Due Date:	03-01-14
Closing Date:	01-31-14		
Credit Limit	$50, 000	Credit Available:	$10, 000
New Balance:	$40, 000	Minimum Payment Due:	$8, 000

Account Summary

Previous Balance:	+0	Transaction Fees:	+0
Purchases:	+40, 000	Annual Fees:	+0
Cash Advances:	+0	Current Amount Due:	+40, 000
Payments:	+0	Amount Past Due:	+0
Finance Charge:	+0	Amount Over Credit Line:	+0
Late Charge:	+0	NEW BALANCE:	+40, 000

Reference Number	Sold	Posted	Activity Since Last Statement		Amount
43210987	01-03	01-13	Payment, Thank You		-$74.25
01234567	01-12	01-13	Wings 'N' Things	Anytown, USA	$25.25
78901234	01-14	01-17	Record Release	Anytown, USA	$40.00
45678901	01-14	01-17	Sports Stadium	Anytown, USA	$75.25
3210987	01-22	01-23	Tie Tack	Anytown, USA	$9, 850
76543210	01-29	01-30	Electronic World	Anytown, USA	$30, 000

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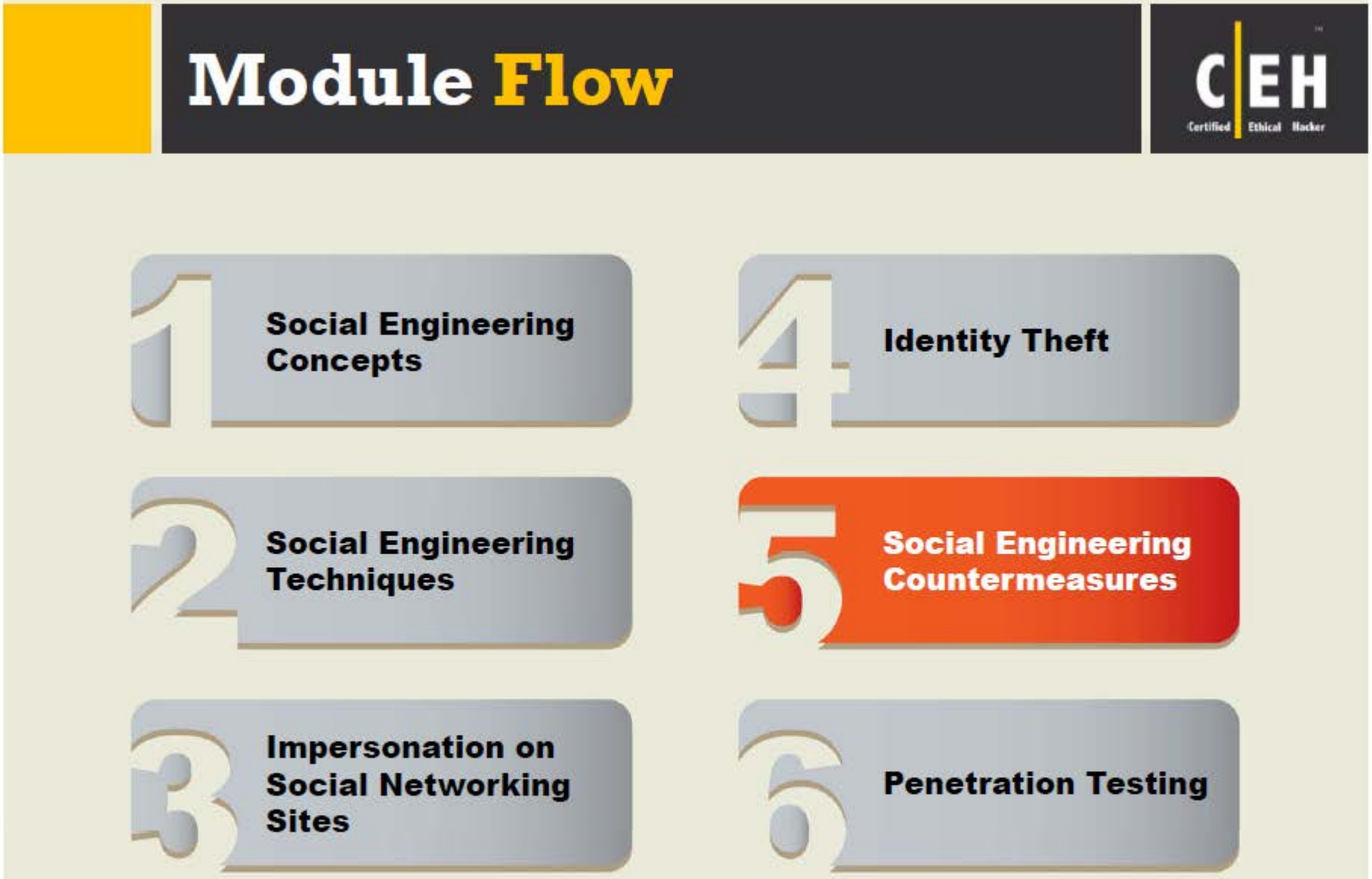
Identity Theft - Serious Problem

- Identity theft is a **serious problem and number of violations** are increasing rapidly
- Some of the ways **to minimize the risk of identity theft** include checking the credit card reports periodically, safeguarding personal information at home and in the workplace, verifying the legality of sources, etc.

http://www.ftc.gov

Module Flow



Social Engineering Countermeasures

- Good policies and procedures are ineffective if they are not taught and reinforced by the employees
- After receiving training, employees should sign a statement acknowledging that they understand the policies

Password Policies

1. Periodic password change
2. Avoiding guessable passwords
3. Account blocking after failed attempts
4. Length and complexity of passwords
5. Secrecy of passwords

Physical Security Policies

1. Identification of employees by issuing ID cards, uniforms, etc.
2. Escorting the visitors
3. Access area restrictions
4. Proper shredding of useless documents
5. Employing security personnel

Social Engineering Countermeasures (Cont'd)

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1 Training

An efficient training program should consist of all security policies and methods to increase awareness on social engineering

2 Operational Guidelines

Make sure sensitive information is secured and resources are accessed only by authorized users

3 Access Privileges

There should be administrator, user, and guest accounts with proper authorization

4 Classification of Information

Categorize the information as top secret, proprietary, for internal use only, for public use, etc.

5 Proper Incidence Response Time

There should be proper guidelines for reacting in case of a social engineering attempt

6 Background Check and Proper Termination Process

Insiders with a criminal background and terminated employees are easy targets for procuring information

Social Engineering Countermeasures (Cont'd)



Anti-Virus/Anti-Phishing Defenses > Use **multiple layers** of anti-virus defenses at end-user and mail gateway levels to minimize social engineering attacks

Two-Factor Authentication > Instead of fixed passwords, use two-factor authentication for **high-risk network services** such as VPNs and modem pools

Change Management > A **documented change-management** process is more secure than the ad-hoc process

How to Detect Phishing Emails

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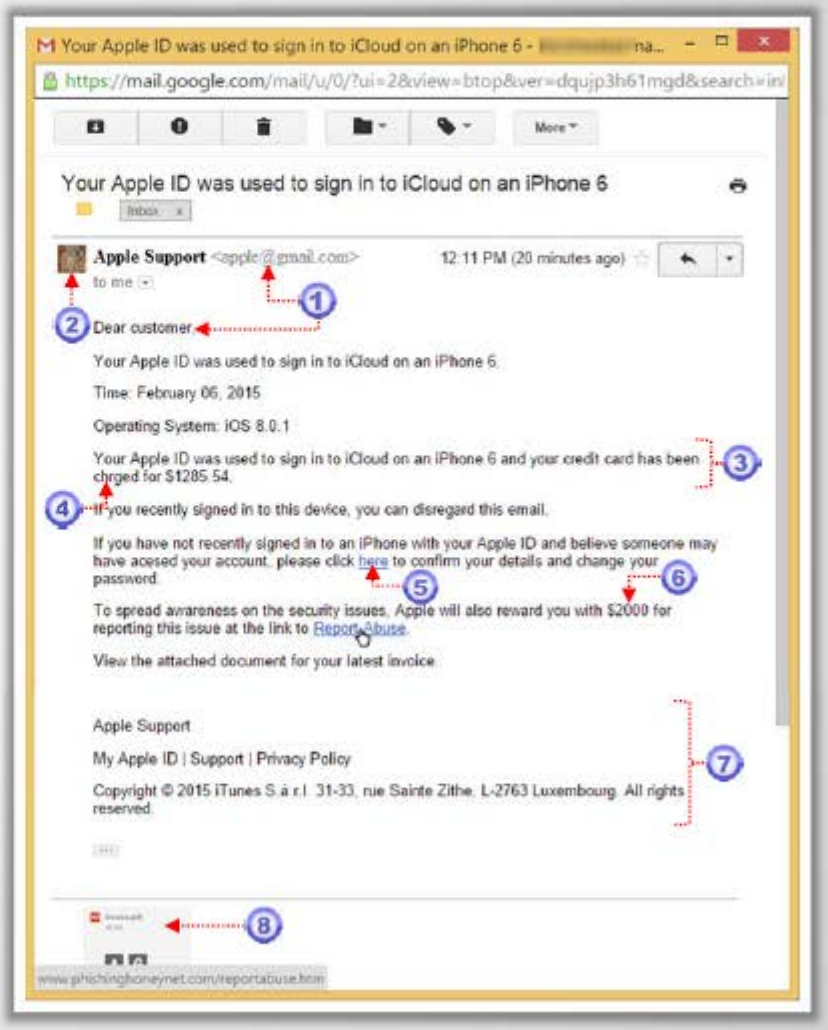
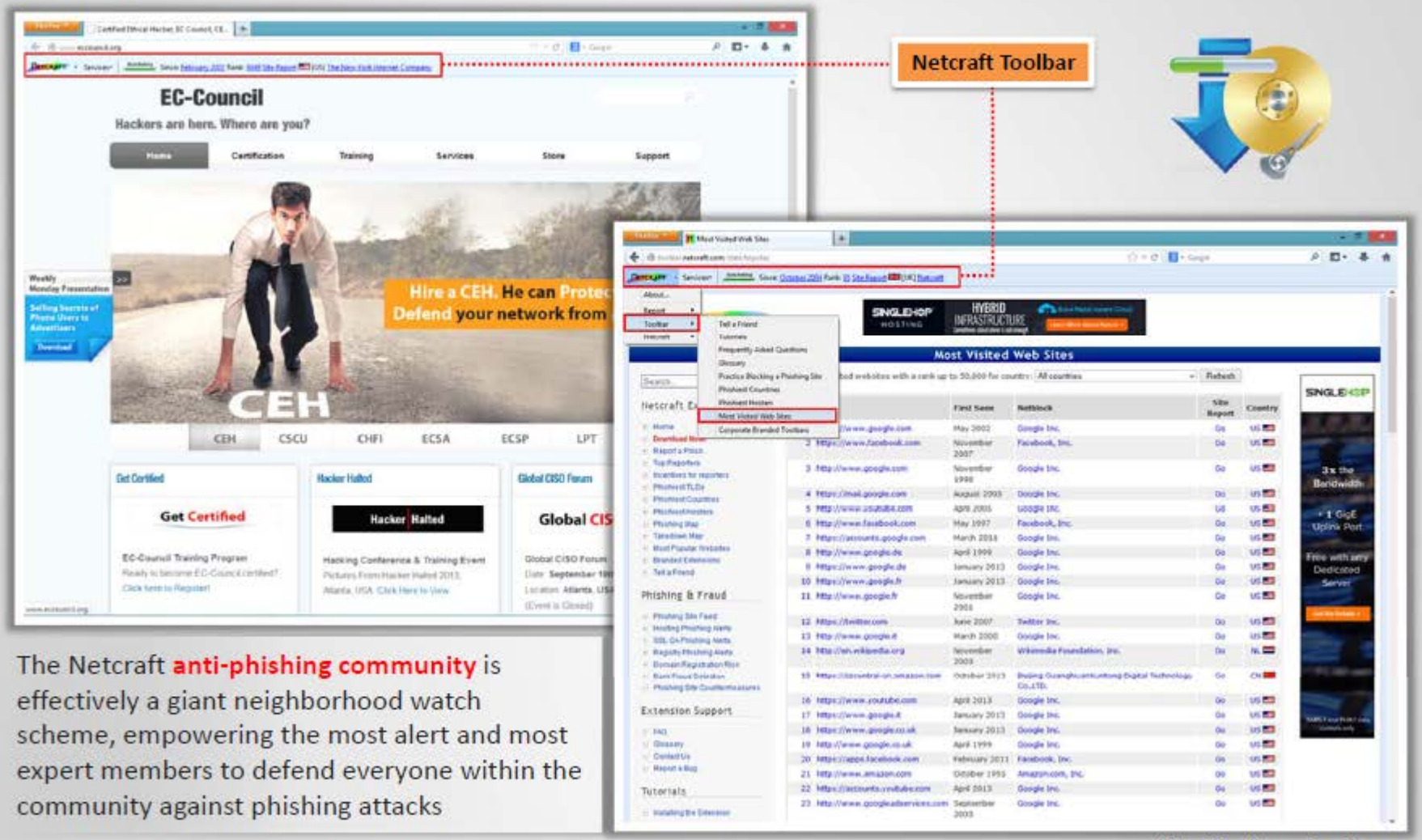
1. Seem to be from a bank, company, or social networking site and have a generic greeting
2. Seem to be form a person listed in your email address book
3. Gives a sense of urgency or a veiled threat
4. May contain grammatical/spelling mistakes
5. Includes links to spoofed websites
6. May contain offers that seem to be too good to believe
7. Includes official-looking logos and other information taken from legitimate websites
8. May contain a malicious attachment



Anti-Phishing Toolbar: Netcraft

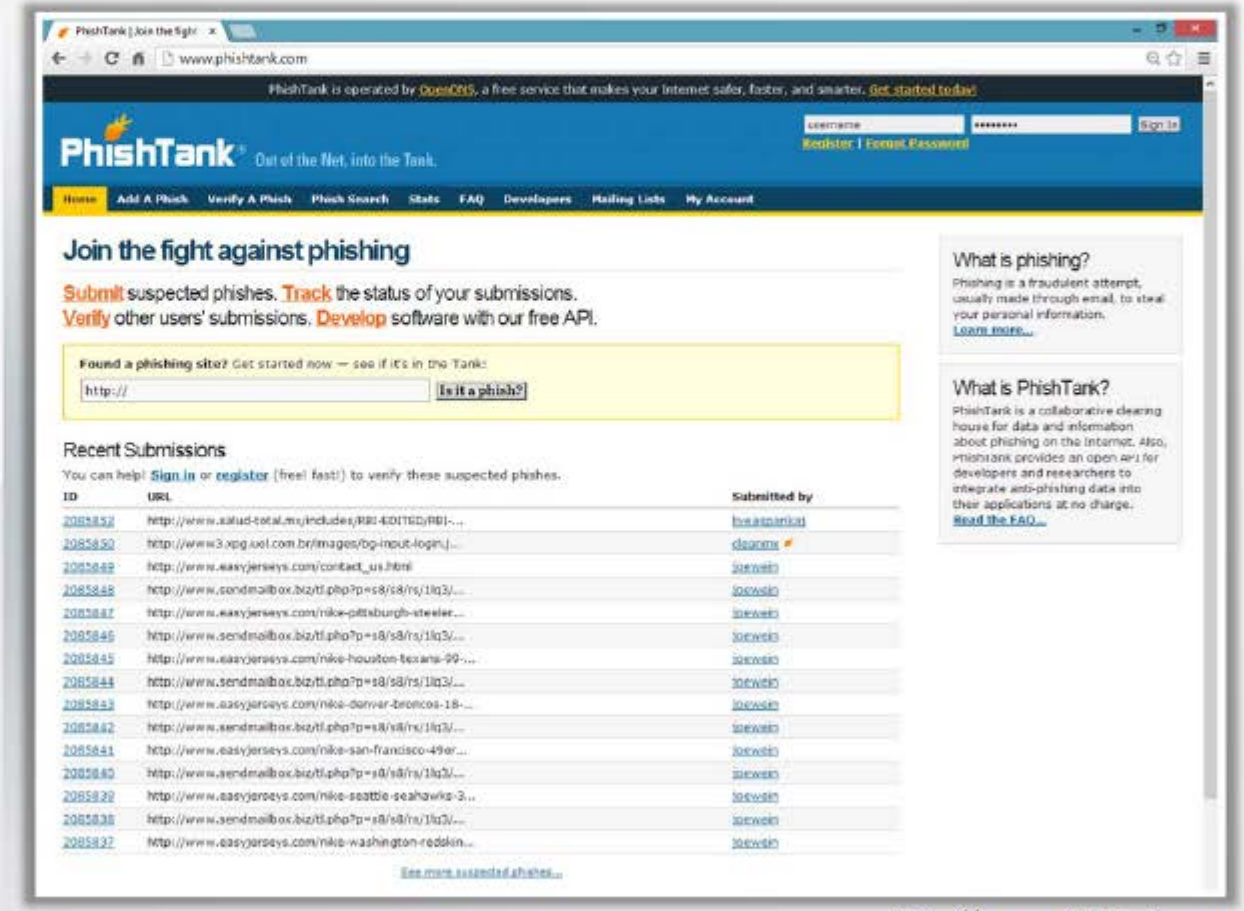


The Netcraft **anti-phishing community** is effectively a giant neighborhood watch scheme, empowering the most alert and most expert members to defend everyone within the community against phishing attacks

http://toolbar.netcraft.com

Anti-Phishing Toolbar: PhishTank

- PhishTank is a collaborative clearing house for data and information about **phishing** on the Internet
- It provides an **open API** for developers and researchers to integrate **anti-phishing data** into their applications



http://www.phishtank.com

Identity Theft Countermeasures

Secure or shred all documents containing private information

To keep your mail secure, empty the mailbox quickly

Ensure your name is not present in the marketers' hit lists

Suspect and verify all the requests for personal data

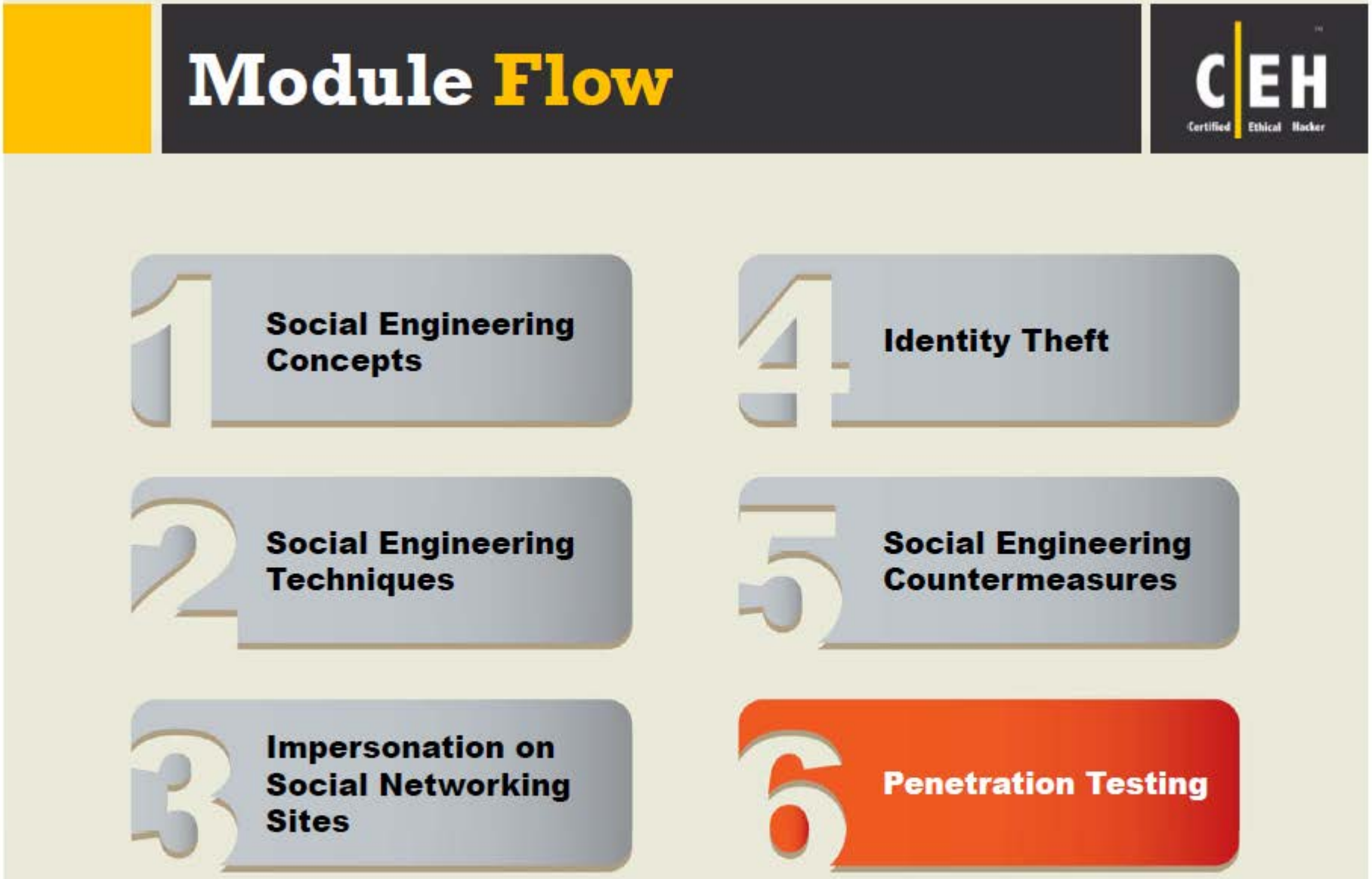
Review your credit card reports regularly and never let it go out of sight

Protect your personal information from being publicized

Never give any personal information on the phone

Do not display account/contact numbers unless mandatory

Module Flow



Social Engineering Pen Testing

The objective of social engineering pen testing is to **test the strength of human factors** in a security chain within the organization

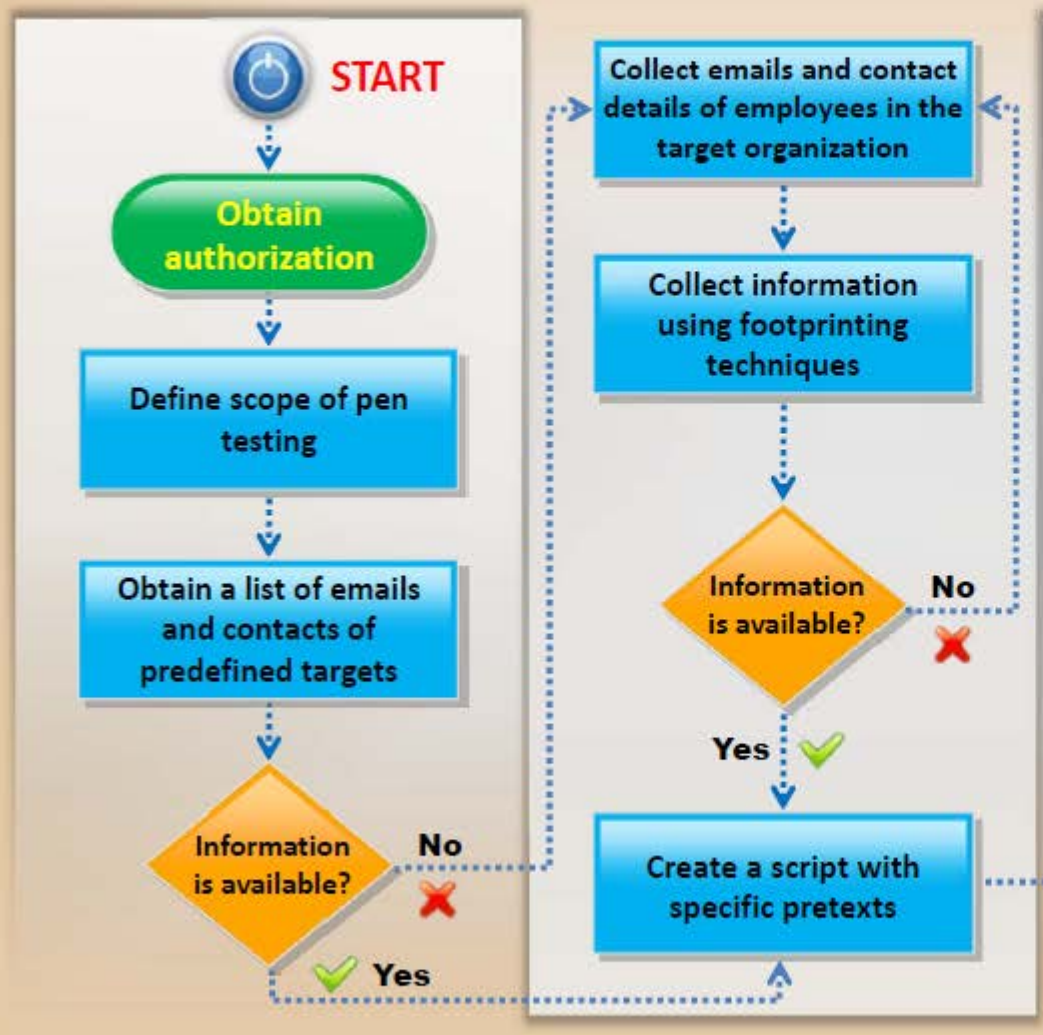
Social engineering pen testing is often used to **raise level of security awareness** among employees

Tester should **demonstrate extreme care and professionalism** for social engineering pen test as it might involve legal issues

01	Good Interpersonal Skills
02	Good Communication Skills
03	Creative
04	Talkative and Friendly Nature

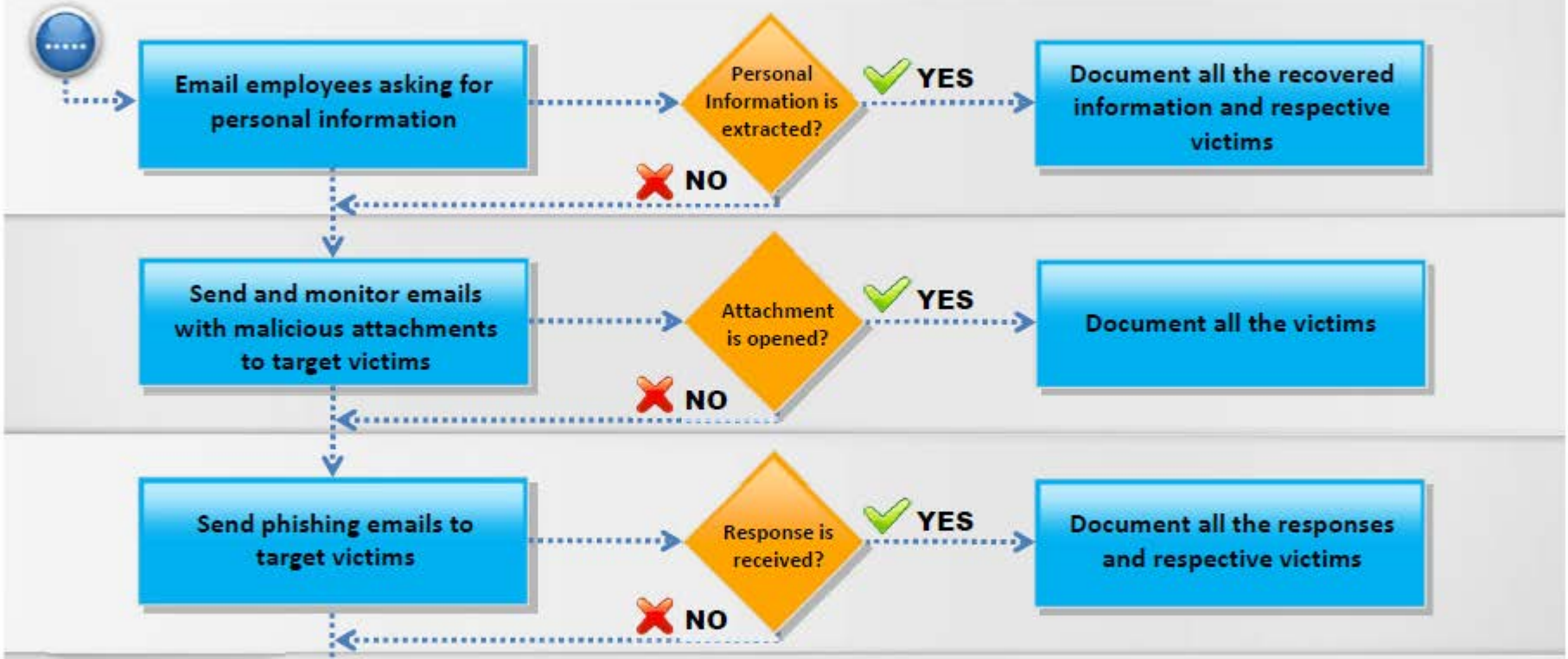



Social Engineering Pen Testing (Cont'd)



- Obtain management's explicit **authorization** and details that will help in **defining scope** of pen-test such as list of departments, employees that need to be tested, or level of physical intrusion allowed
- Collect **email addresses and contact details** of target organization and its human resources (if not provided) using techniques such as **dumpster diving**, email guessing, USENET and web search, and email spiders
- Try to **extract as much information as possible** about the identified targets using footprinting techniques
- **Create a script** based on the collected information considering both positive and negative results of an attempt

Social Engineering Pen Testing: Using Emails



- Email employees asking for personal information such as their user names and passwords by disguising as network administrator, senior manager, tech support, or anyone from a different department on pretext of an emergency
- Send emails to targets with malicious attachments and monitor their treatment with attachments using tools such as ReadNotify
- Send phishing emails to targets as if from a bank asking about their sensitive information (you should have requisite permission for this)

Social Engineering Pen Testing: Using Phone

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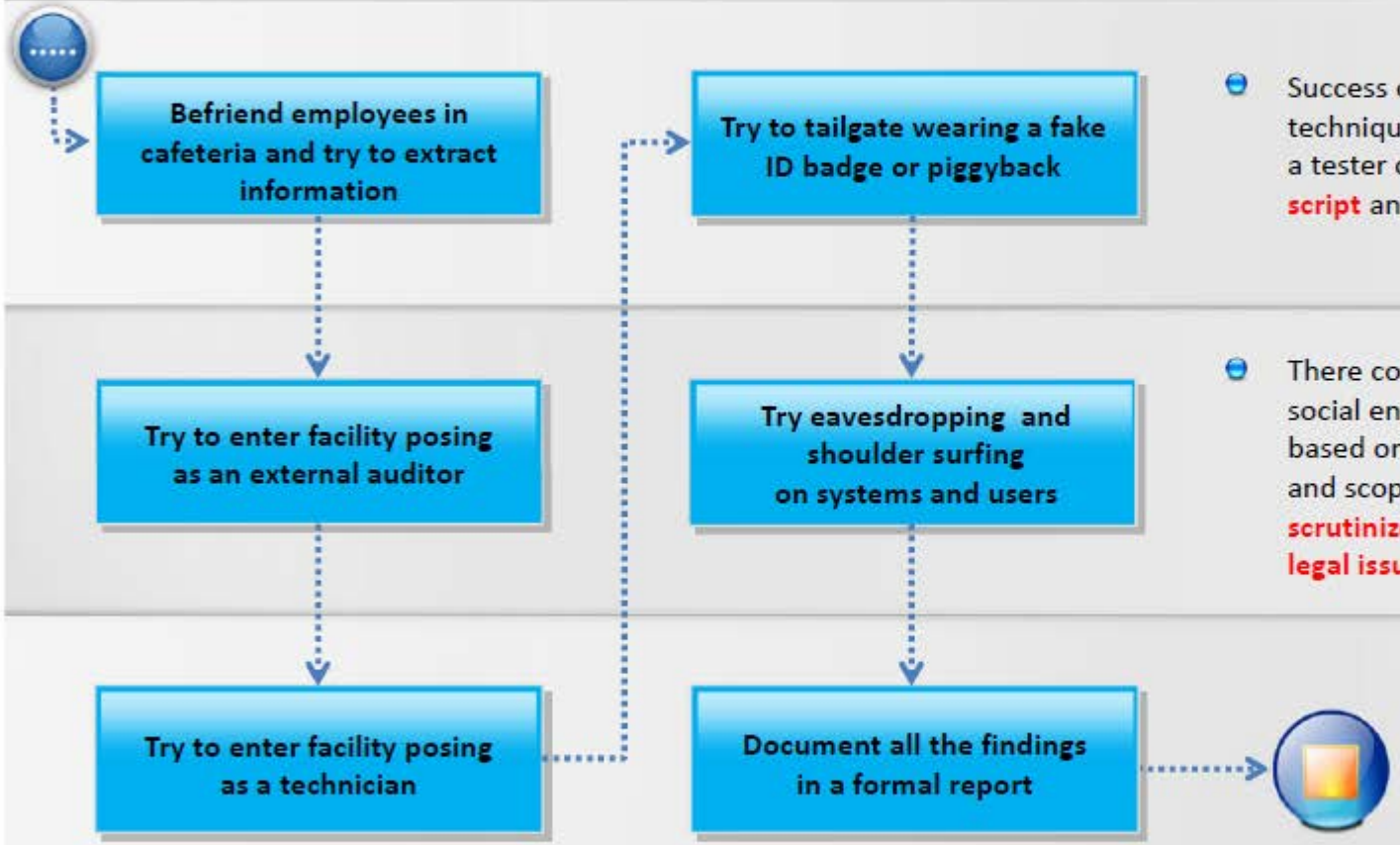
- Call a target posing as a colleague and ask for the sensitive information
- Call a target user posing as an important user
- Call a target posing as technical support and ask for the sensitive information
- Refer to an important person in the organization and try to collect data
- Call a target and offer them rewards in lieu of personal information
- Threaten the target with dire consequences (for example account will be disabled) to get information
- Use reverse social engineering techniques so that the targets yield information themselves

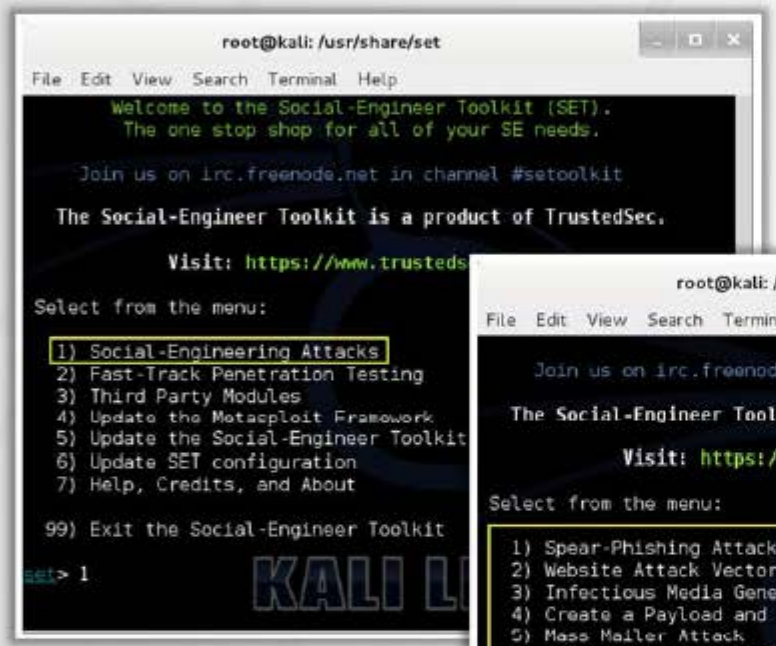
Social Engineering Pen Testing: In Person



- Success of any social engineering technique depends on how well a tester can **enact the testing script** and his **interpersonal skills**
- There could be countless other social engineering techniques based on available information and scope of test. **Always scrutinize your testing steps for legal issues**

Social Engineering Pen Testing:
Social Engineering Toolkit (SET)

- The Social-Engineer Toolkit (SET) is an open-source **Python-driven tool** aimed at penetration testing around social engineering



https://www.trustedsec.com

Module Summary

- Social engineering is the art of convincing people to reveal confidential information
- Social engineering involves acquiring sensitive information or inappropriate access privileges by an outsider
- Attackers attempt social engineering attacks on office workers to extract sensitive data
- Human-based social engineering refers to person-to-person interaction to retrieve the desired information
- Computer-based social engineering refers to having computer software that attempts to retrieve the desired information
- Identity theft occurs when someone steals your name and other personal information for fraudulent purposes
- A successful defense depends on having good policies and their diligent implementation