How misdirection can be used to steal information without being detected

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Magician & Computer Scientist
Magicians and hackers have a lot in common

- They like to wear black
- They like to “shock” people
- They have Secret Knowledge
Assumptions
Magicians’ Arsenal

- Actions
- Props
- People
- Basic Psychology
  - Misdirection
- Advanced Psychological Techniques
- Example of the Magician-Hacker
ACTIONS
Feint

- Pretend to do something, but in reality nothing happens (the hand is empty)
- “A False Show”

Hack: Purposeful delay, “Checking your computer for viruses”
Bluff

- “Feint” but calling attention to the action
- Pretending, when nothing really has happened or will happen.

Hack: “We have detected a virus on your computer”
Phish, Used in Social Engineering
Sleight

- ..is a Secret Action, combined with technique
- Sleights may require years of practice
- Sleights are less valuable if they are well known
- Sleights can be worth money
- Sleights are sold with an underground economy

Hack: Exploit, Buffer Overflow, 0Day. Etc.
Temps or Timing

- Timing is used to improve deception
- Or make people forget

Hack: Planning ahead, low frequency port scan
PROPS
Gimmick

• A secret device
• Performs some useful function which is unexpected because it is secret

Hack: Rootkit
Gaff

- A visible device with a secret function

Hack: Easter Egg, backdoor, hidden function
Fake (Feke)

- A simulation or emulation of a real device

Hack: Trojan Horse, Man-in-the-middle
PEOPLE
BUT FIRST A DEMONSTRATION
Secret Accomplice, Stooge, Shill

- Someone who knowingly helps the attacker
- The victim does not know the insider is an enemy
- The more trusted, the less they are suspected
- “The Enemy of my Enemy” ploy

Hack: Insider Threat, “Friend Request” from stranger
Unwitting accomplice

• Someone who **unknowingly** helps
  – “Please forward this to everyone you know”
  – “I’m trying to help one of your colleagues who’s visiting us today…”

Hack: Social Engineering
The Patsy, or “Fall Guy”

- Innocent
- But takes the blame
Naturalness – first principle of magic

• Often takes years to perfect some sleights
• Failure to deceive occurs if unnatural
  – i.e. Email from your “friend”
    • The more natural it is, the greater probability of it succeeding

Hack: Everywhere
And when naturalness isn’t possible

- Minimize the unnaturalness as much as possible
  - E.g. Reduce the number of log entries, alerts
  - Make log entries look more natural
    - “AAAAAAAAAAAAAAAAAAAAA” => “ProjectDirectory”
    - English Shellcode
- Hide what you can’t eliminate
  - E.g. Oracle.com vs Orade.com vs. 0racle.com

Hack: replicate legitimate e-mail, similar domain names
And when you can’t, make the unnatural natural

- Contrived Justification
  - Create a reason for the unnatural action
  - Social Engineering

- Repetition
  - Making the unnatural natural
  - Make a script kiddy attack have the same log pattern as your attack

Hack: Social engineering, port scans with secret attack
THE COIN VANISH
Misdirection

• A way to control attention so they don’t see anything unnatural
Focus their attention away from the unnatural

- **Stimulate Interest**
  - Attract attention
  - Appeal to their interests
- **Distract attention from the unnatural part**
  - “OMG! Check out what she is doing in this picture!”

Hack: Spam, thumbnails w/flesh tones
Directed Misdirection

• Can be caused by an action, or be distracting by its very nature.
• Can cause suspicion
• Attracts interest because of the topic
  – Lady Gaga! / Beyonce!
  – Justin Bieber!
  – Free iPad!
• or uniqueness of the event
  – Setting off a fire alarm
  – Manipulating the HVAC
  – Another attack
Discovered Misdirection

- Done ahead of time
- Undetermined *when* it happens. However, when discovered, it commands attention.
- If you can control the timing.....

Hack: Discovering a server is infected with a virus
Constrained Misdirection

- Hacker controls the “view” of the victim
- Getting the victim to remotely access the system that is secretly under control

Hack: Virtual Machine, Man-in-the-middle
ADVANCED PSYCHOLOGICAL TECHNIQUES
Encourage false conclusion

• Develop a false premise
  – Provide evidence that the false premise is correct

• Create a false alarm
  – Purposely create a condition that “raised an alarm” and then proves it was wrong. Repeat
  – Causes alarms to be distrusted

Hack: DarkMarket Sting, EICAR signature in real virus Stuxnet?
Use multiple methods

• Spectator thinks that because a method wasn’t used one time, concludes it wasn’t used ever.
• Allows multiple ways to accomplish the same thing if one method will be detected
• Purposely reveal method to encourage false conclusion

Hack: Multiple 0days in virus
The Switch

• Let them examine everything before and/or after

Hack: Switching modified programs, self destruction
Fake Revelation

• Reveal an inferior method used by “others”
• An example will follow......
Summary

• By combining the toolkit and psychology of a magician
• With the skills of a hacker
• Creates a new style of hacking
• The goal: undetectable hacking
THE MAGICIAN-HACKER
Now let’s create a scenario...

- Company XYZ has valuable IP
- XYZ has excellent security
- Hacker is already inside
- If it is discovered that the IP is stolen, it is worth less $$
- Obvious exfiltration attempts would be detected

**WHAT WOULD THE MAGICIAN-HACKER DO?**
The Patsy

• Unlucky Lucy is administrator of the IP server
• Lucy is smart and alert!
• The magician-hacker has partial access to Lucy’s account and places some files in a directory she owns……
• Which are propagated through the network
• He also creates some web\forum accounts using Lucy’s name, and posts outrageous comments
• There is also Innocent Ivy……

Magic: Discovered Misdirection
More preparation from the Magician Hacker

• Places an archive of files on a public-facing server in an obscure but publicly accessible URL
• Causes the off-site backup to increase in size each day
• The file Lucy is sharing contains a 0day virus
• Next he generates a faked press release

Magic: Temps/Timing
“Company XYZ announces Adult Services”
Then he makes a phone call to Innocent Ivy

- “I found some porn on your web server.”
- Ivy reports this to Chief.
- Magician-Hacker reveals details of “new exploit”

Magic: Bluff, Unwitting Accomplice, Creating a False Conclusion, Reveal an inferior method used by others
Meanwhile...

- CEO is told of press release.
- Blogs are now commenting on press release.
- CEO now learns of porn on their website.
- Hacker posts screenshots of porn on social sites.
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- Virus signatures created by AV companies.

FIRST ROUND OF CHAOS

Magic: Creating a False Alarm, Appeal to their interests.
“Random” e-Mail to Ivy

• “One of your people, Lucy, was bragging about XYZ’s new adult services on a web forum.”
• Rough draft of the forged Press Releases, and jpegs, are also found in Lucy’s Directory
• Ivy reports to Chief, Lucy gets fired
• Blogs are now commenting on porn content
• Virus signatures updated to include new attack

SECOND ROUND OF CHAOS

Magic: Bluff, Directed Misdirection
And then…

• Second bogus Press Release published
  – Announces “Public Key,” with URL, signed w/key
  – Reiterates that Company is going into “Adult Services”
  – Claims CEO has “Issues” with company’s new direction

• Anti-virus finds hundreds of infected files

THIRD ROUND OF CHAOS

Magic: False Conclusion, misdirection
The plot thickens

- Infected machines start exporting random data to machines on the Internet
- Anti Virus software detected infected files in Innocent Ivy’s directory, but these are different
The Sucker Punch

• Source code of the virus is found in Ivy’s Directory
• Also — ”Adult” web pages are found
• Drafts of the second forged press release found
• Innocent Ivy fired

FIFTH ROUND OF CHAOS

Magic: Discovered Misdirection, Naturalness, Repetition
Circle of Chaos

Virus

IS IP leaking?

Wrongful termination

Change in System Administration

Confidence in Management

PR Nightmare
TO COMPLETE THE ILLUSION
The goal of the magician-hacker

- Steal the information from the database
- Don’t be detected while it happens
- Be as natural as possible
- Leave no evidence
What happened

1. A full backup of the server started
2. One small change DNS poisoning
3. When done, all traces of the modifications are removed

Magic: Sleight, Gaff, The Switch, Naturalness
PROFIT
Lessons

• Press releases should be signed
• Detecting the magician-hacker requires understanding new actions and motivations
• The obvious answer may not be the correct answer
• Unrelated events may not be unrelated
• Thorough forensics are critical
• People, like computers, are assets too and vulnerable to a Denial of Service
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