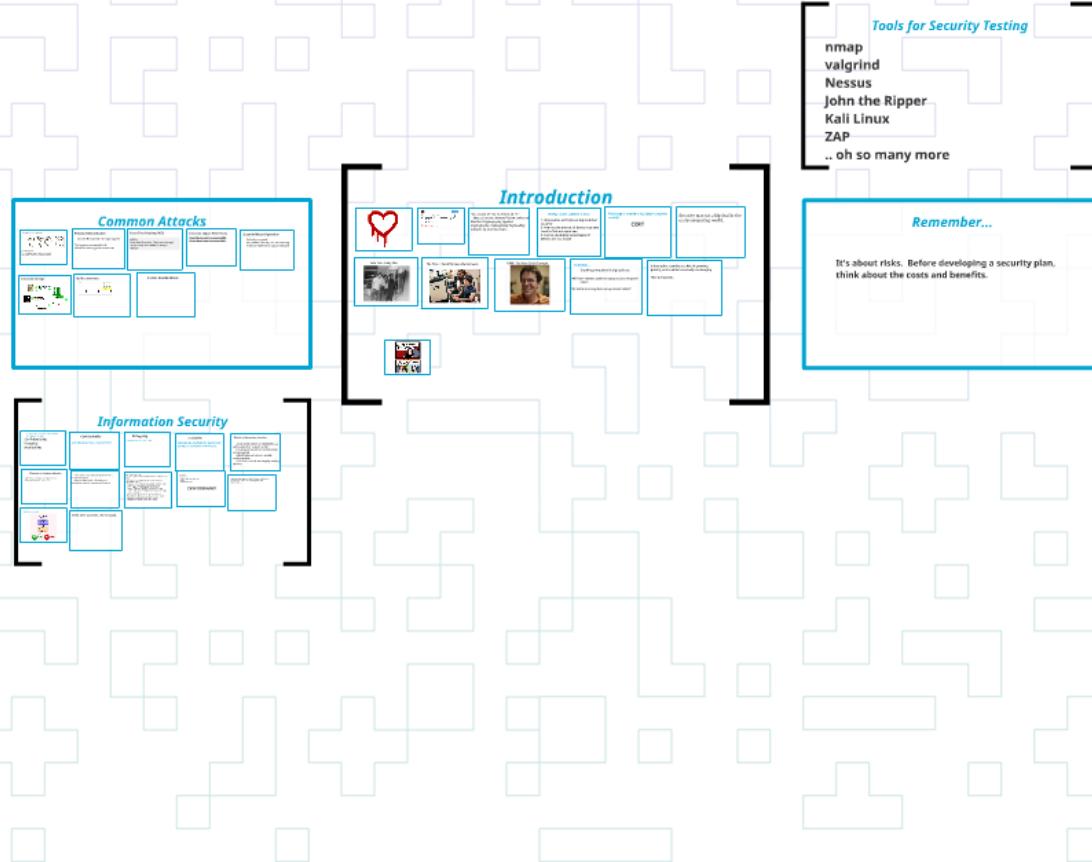
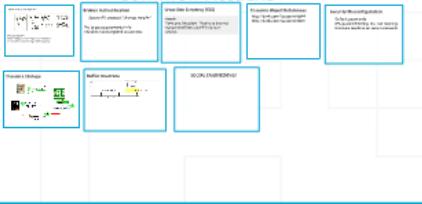


Security

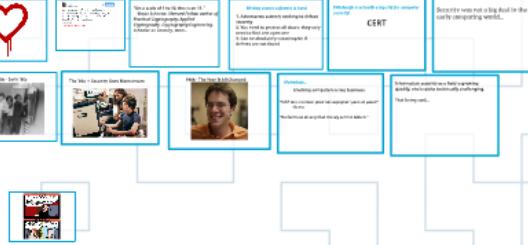


Security

Common Attacks



Introduction



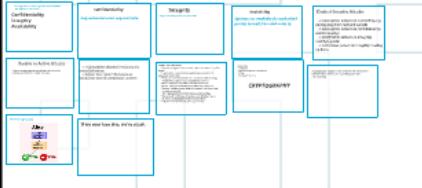
Tools for Security Testing

nmap
valgrind
Nessus
John the Ripper
Kali Linux
ZAP
.. oh so many more

Remember...

It's about risks. Before developing a security plan, think about the costs and benefits.

Information Security



Introduction



"On a scale of 1 to 10, this is an 11."
-Bruce Schneier, Harvard Fellow, author of Practical Cryptography, Applied Cryptography, Cryptography Engineering, Schneier on Security, more..

Writing secure software is hard.

1. Adversaries actively seeking to defeat security
2. You need to protect all doors; they only need to find one open one
3. Can be absolutely catastrophic if defects are not found

Pittsburgh is actually a big city for computer security!

CERT

Security was not a big deal in the early computing world...



Nowadays...

Cracking computers is big business.

"Nihil tam munitum quod non expugnari pecunia possit"
-Cicero

"No fort is so strong that money cannot take it."

Information security as a field is growing quickly, and is quite technically challenging.

That being said...







Carol

@Carols10cents



Following

Re: heartbleed, (╯°□°)╯︵ ┻━┻ (╯°□°)╯︵ ┻━┻
︵ ┻━┻ (╯°□°)╯︵ ┻━┻ (╯°□°)╯︵ ┻━┻ (╯°□°)╯︵ ┻━┻
︵ ┻━┻ (╯°□°)╯︵ ┻━┻ (╯°□°)╯︵ ┻━┻ (╯°□°)╯︵ ┻━┻
︵ ┻━┻ (╯°□°)╯︵ ┻━┻

View translation

Reply Retweet Favorite More

"On a scale of 1 to 10, this is an 11."

*-Bruce Schneier, Harvard Fellow, author of
Practical Cryptography, Applied
Cryptography, Cryptography Engineering,
Schneier on Security, more..*

Writing secure software is hard.

- 1. Adversaries actively seeking to defeat security**
- 2. You need to protect all doors; they only need to find one open one**
- 3. Can be absolutely catastrophic if defects are not found**

Pittsburgh is actually a big city for computer security!

CERT

Security was not a big deal in the early computing world...

Late '60s - Early '80s



The '80s -> Security Goes Mainstream



1988 - The Year It All Changed



Nowadays...

Cracking computers is big business.

"Nihil tam munitum quod non expugnari pecunia possit"

-Cicero

"No fort is so strong that money cannot take it."

Information security as a field is growing quickly, and is quite technically challenging.

That being said...

MOVIE HACKING...

IF I CAN JUST OVERCLOCK THE UNIX
DJANGO, I CAN BASIC THE DDOS
ROOT. DAMN. NO DICE. BUT WAIT... IF I
DISENCRYPT THEIR KILOBYTES WITH A
BACKDOOR HANDSHAKE
THEN... JACKPOT.

2012-02-20

REAL HACKING...

HI, THIS IS ROBERT
HACKERMAN. I'M THE
COUNTY PASSWORD
INSPECTOR.

HI BOB! HOW CAN I
HELP YOU TODAY?

Information Security

Security service needs to provide three qualities (the InfoSec or CIA Triad):

Confidentiality
Integrity
Availability

Confidentiality

Only authorized users may read data.

Integrity

Only authorized parties can write data.

Availability

Systems are available for authorized parties to read from and write to.

Kinds of Security Attacks

- > **Interruption** (attack on availability, e.g. pulling plug from network switch)
- > **Interception** (attack on confidentiality; eavesdropping)
- > **Modification** (attack on integrity; modifying data)
- > **Fabrication** (attack on integrity; making up data)

Passive vs Active Attacks

- > Passive: eavesdropping, monitoring, traffic analysis
- > Active: modification or creation of data

- > Vulnerability: identified weakness of a controlled system
- > Exploit: (aka "sploit") Technique or mechanism used to compromise a system

- Kinds of malicious code:
- * **Bacteria** - program that consumes system resources (e.g. fork bomb)
 - * **Logic bomb** - code within a program which executes an unauthorized function
 - * **Trapdoor** - secret undocumented access to a system or app
 - * **Trojan horse** - system that pretends to be another
 - * **Virus** - replicates itself **WITH** human intervention
 - * **Worm** - replicates itself **WITHOUT** human intervention
 - * **Zombie** - malicious code which is triggered (e.g. time of day, remote command)
 - * **RAT** - Remote Administration Tool (e.g. BackOrifice)
 - * **Bot network** - collection of zombies controlled by master
 - * **Spyware** - surreptitiously monitors your actions
 - * **DOS** (Denial of service) attacks (e.g. via LOIC)

- Protections:
- * Firewalls
 - * Limiting System Permissions
 - * CDNs
 - * Well-written code

CRYPTOGRAPHY

Public-Key Cryptography



If we ever lose this, we're stuck.

Cryptography (crypto) is absolutely vital to the modern infrastructure of the web, especially public-key cryptography.

*Security service needs to provide three qualities
(the InfoSec or CIA Triad):*

Confidentiality
Integrity
Availability

Confidentiality

Only authorized users may read data.

Integrity

Only authorized parties can write data.

Availability

Systems are available for authorized parties to read from and write to.

Kinds of Security Attacks

- > *Interruption* (attack on availability, e.g. pulling plug from network switch)
- > *Interception* (attack on confidentiality; eavesdropping)
- > *Modification* (attack on integrity; modifying data)
- > *Fabrication* (attack on integrity; making up data)

Passive vs Active Attacks

- > Passive: eavesdropping, monitoring, traffic analysis
- > Active: modification or creation of data

-> Vulnerability: identified weakness of a controlled system

-> Exploit: (aka "sploit") Technique or mechanism used to compromise a system

Kinds of malicious code:

- * **Bacteria** - program that consumes system resources (e.g. fork bomb)
- * **Logic bomb** - code within a program which executes an unauthorized function
- * **Trapdoor** - secret undocumented access to a system or app
- * **Trojan horse** - system that pretends to be another
- * **Virus** - replicates itself WITH human intervention
- * **Worm** - replicates itself WITHOUT human intervention
- * **Zombie** - malicious code which is triggered (e.g. time of day, remote command)
- * **RAT** - Remote Administration Tool (e.g. BackOrifice)
- * **Bot network** - collection of zombies controlled by master
- * **Spyware** - surreptitiously monitors your actions
- * **DOS (Denial of service) attacks** (e.g. via LOIC)

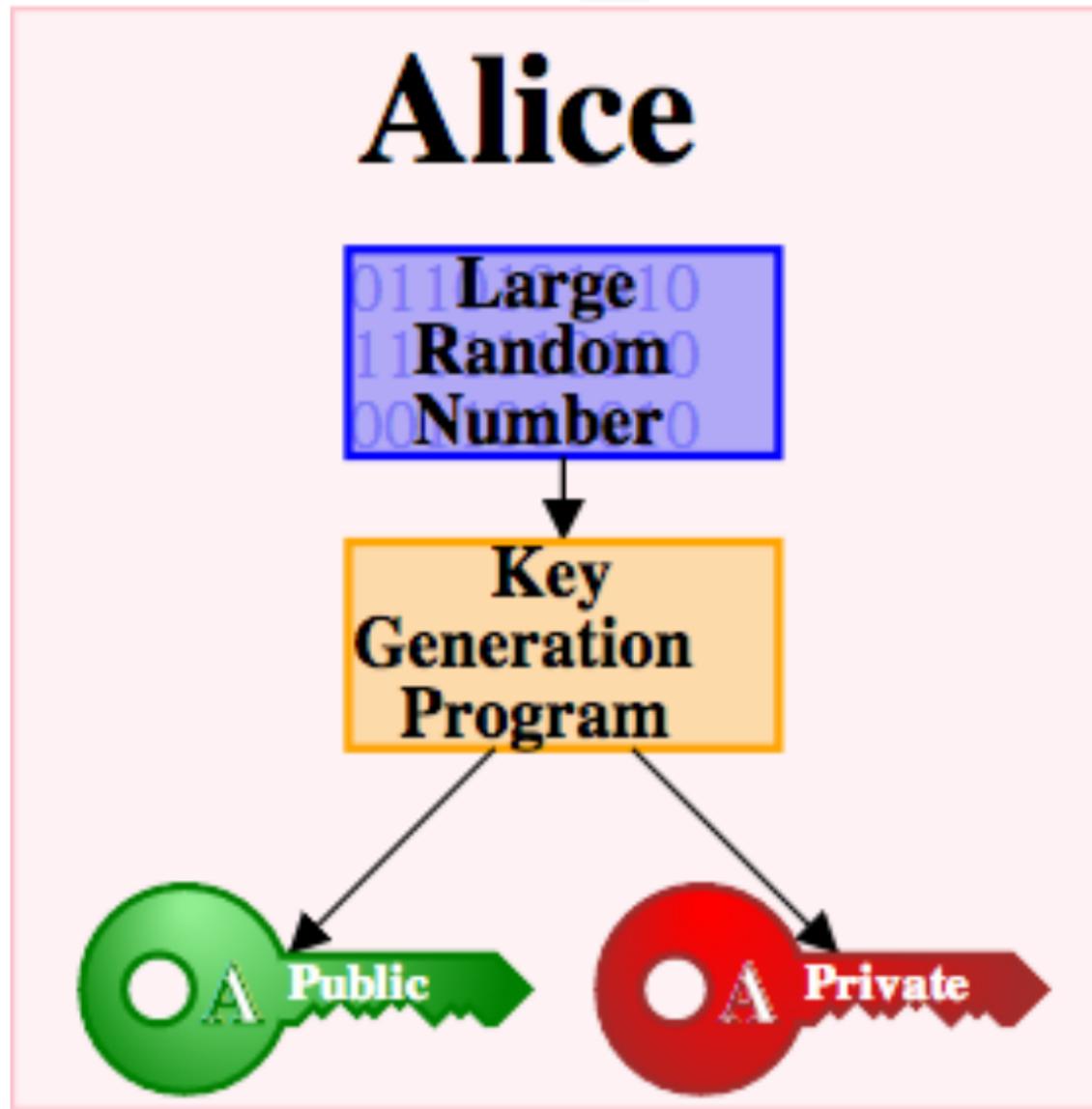
Protections:

- * Firewalls
- * Operating System Permissions
- * CDNs
- * Well-written code

CRYPTOGRAPHY

Cryptography (crypto) is absolutely vital to the modern infrastructure of the web, especially public-key cryptography.

Public-Key Cryptography



If we ever lose this, we're stuck.

Common Attacks

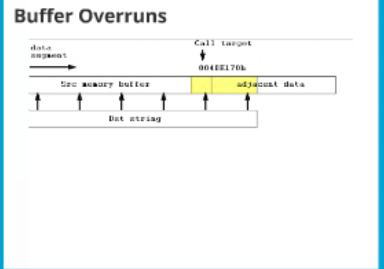
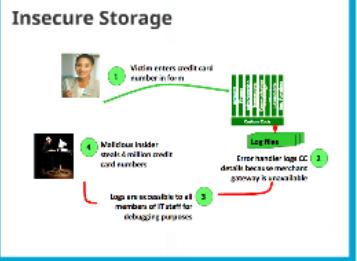


Broken Authentication
Session ID exposed; "change my p/w"
Try to guess passwords/info
Check for unencrypted session IDs

Cross-Site Scripting (XSS)
<html>
I love One Direction! They're so dreamy!
<script>eval("evil code!!!")</script>
</html>

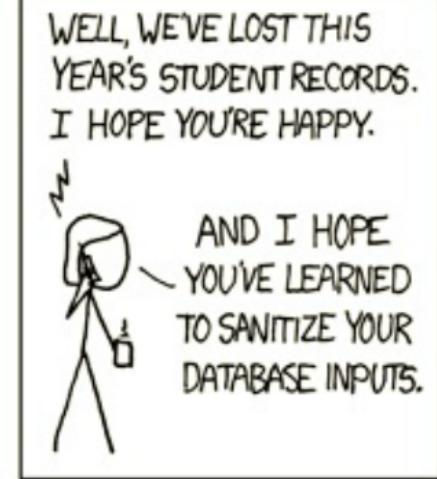
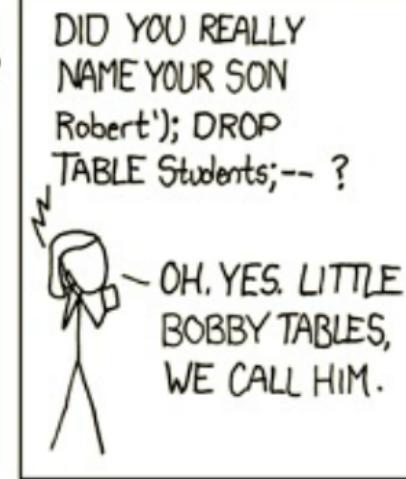
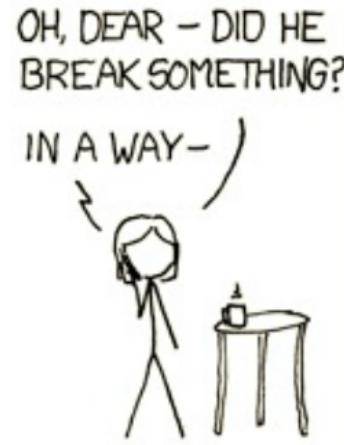
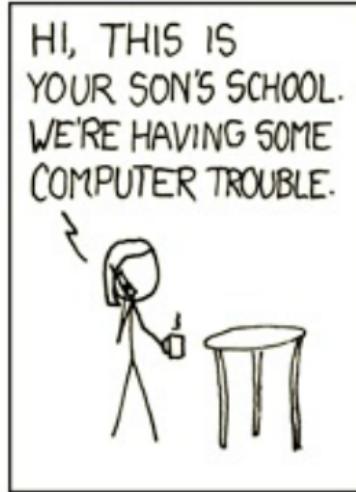
Insecure Object References
<http://bank.com/?account=9844>
<http://bank.com/?account=9845>

Security Misconfiguration
Default passwords
IPS, packet filtering, etc. not running
Insecure machine on secure network



SOCIAL ENGINEERING!

Injection (e.g. SQL injection)



Test your inputs!

Static analysis; ensure inputs are sanitized

Use Haskell or another type-safe language

Broken Authentication

Session ID exposed; "change my p/w"

Try to guess passwords/info

Check for unencrypted session IDs

Cross-Site Scripting (XSS)

```
<html>  
I love One Direction! They're so dreamy!  
<script>eval("evil code!!!!")</script>  
</html>
```

Insecure Object References

<http://bank.com/?account=9844>

<http://bank.com/?account=9845>

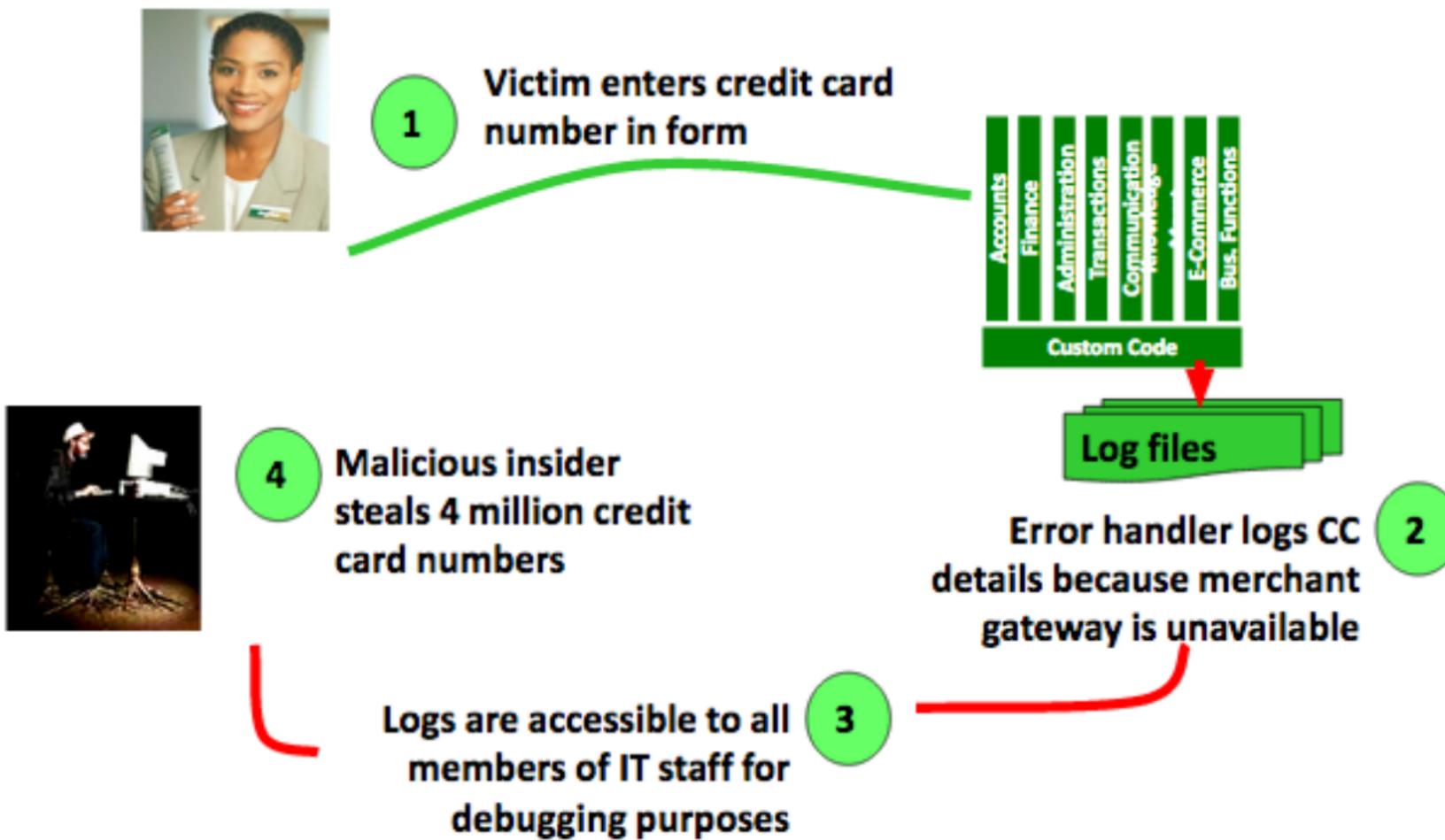
Security Misconfiguration

Default passwords

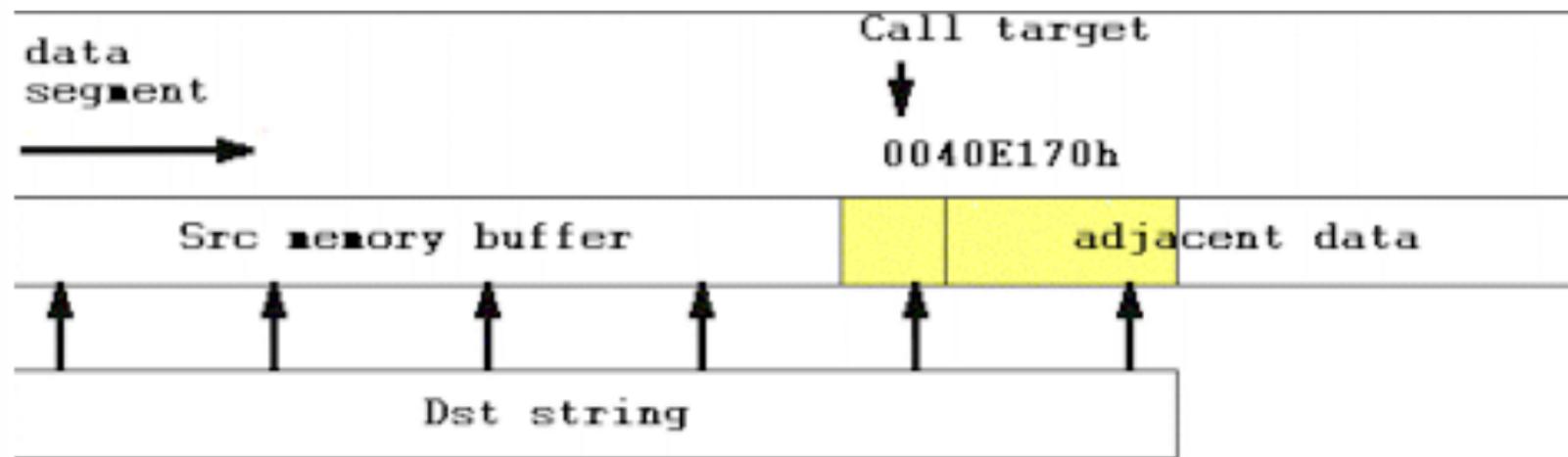
IPS, packet filtering, etc. not running

Insecure machine on secure network

Insecure Storage



Buffer Overruns



SOCIAL ENGINEERING!

Tools for Security Testing

nmap

valgrind

Nessus

John the Ripper

Kali Linux

ZAP

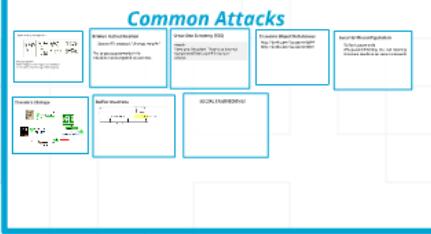
.. oh so many more

Remember...

**It's about risks. Before developing a security plan,
think about the costs and benefits.**

Security

Common Attacks



Introduction



Tools for Security Testing

nmap
valgrind
Nessus
John the Ripper
Kali Linux
ZAP
.. oh so many more

Remember...

It's about risks. Before developing a security plan, think about the costs and benefits.

Information Security

