



Welcome to

White Hat Hacking, protect your network

Bella Center 2019

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Slides are available as PDF, [kramse@Github
bella-center-jan-2019.tex](https://github.com/kramse/security-courses/tree/master/bella-center-jan-2019.tex) in the repo security-courses
Happy New Year 2019 - same problems

Who am I



- Master in computer science from University of Copenhagen
- Got interested in internet security around early 1990s reading the Morris Internet worm analysis
- Began reading a lot, there was no IT-security education except a bit of cryptography
- Today white-hat hacker, pentester, security consultant, internet samurai
- Teach a lot - 2019 Diploma in IT-Security KEA Kompetence, starts february
- Keywords: network and security, internet technologies, network packets, BGP
- **We need more people in IT-security**



We are all part of security

Internet Security a Short Story



Early internet before 1980 - Universities, mail was the popular app

TCP/IP 1980s - got IP/TCP

Systems were big servers VAXEN

Around 60.000s servers connected on the internet by 1988

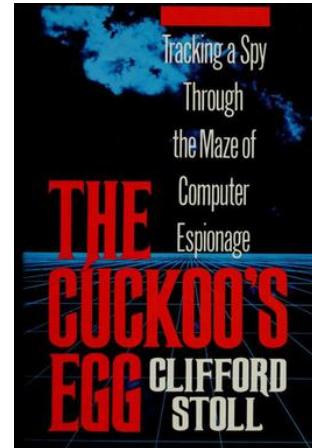
Security was not a high priority, research and development

- Cuckoo's Egg 1986
- Morris Internet Worm, On the evening of 2 November 1988

The Internet Worm Program: An Analysis

Purdue Technical Report CSD-TR-823, Eugene H. Spafford

Cuckoo's Egg 1986



Cuckoo's Egg: Tracking a Spy Through the Maze of Computer Espionage,
Clifford Stoll

During his time at working for KGB, Hess is estimated to have broken into 400 U.S. military computers

Source: https://en.wikipedia.org/wiki/Markus_Hess

Morris Internet Worm - 30 years ago



Used multiple vulnerabilities:

- Sendmail Debug functionality, we have similar things and Google Hacking
- Buffer overflow in fingerd, we still have those
- Weak passwords/password cracking, list of 432 words and /usr/dict/words, same problem today
- Trust between systems rsh, rexec, think Domain Admin today
- Found new systems using /etc/hosts.equiv, .rhosts, .forward, netstat ...

Also known as the Morris Internet Worm

The Internet Worm Program: An Analysis

Purdue Technical Report CSD-TR-823, Eugene H. Spafford

Resulted in creation of the CERT, <http://www.cert.org>

Internet Worms history repeats itself



Camouflage, tried to hide, malware today hides as well

- Program name set to 'sh', looks like a regular shell
- Used fork() to change process ID (PID)

New malware today can use the same strategies, have we learnt nothing

Using a small password list of 50 words it is possible to create your own botnet with 100.000s

Hackers don't give a shit

Your system is only for testing, development, ...

Your network is a research network, under construction, being phased out, ...

Try something new, go to your management

Bring all the exceptions, all of them, update the risk analysis figures - if this happens it is about 1mill DKK

Think like attackers - don't hold back

Ask for permission before you go full monty

Hackers don't give a shit:



KIWICON III
28TH & 29TH NOVEMBER 2009

New Zealand's Hacker con - Wellington

- About your project's scope
- It's managed by a third party
- It's a legacy system
- It's "too critical to patch"
- About your outage windows
- About your budget
- You've always done it that way
- About your Go-Live Date
- It's only a pilot/proof of concept
- About Non-Disclosure Agreements
- It wasn't a requirement in the contract
- It's an internal system
- It's really hard to change
- It's due for replacement
- You're not sure how to fix it
- It's handled in the Cloud
- About your Risk Register entry
- The vendor doesn't support that configuration
- It's an interim solution
- It's [insert standard here] compliant
- It's encrypted on disk
- The cost benefit doesn't stack up
- "Nobody else could figure that out"
- You can't explain the risk to "The Business"
- You've got other priorities
- About your faith in the competence of your internal users
- You don't have a business justification
- You can't show Return on Investment
- You contracted out that risk

Try something new

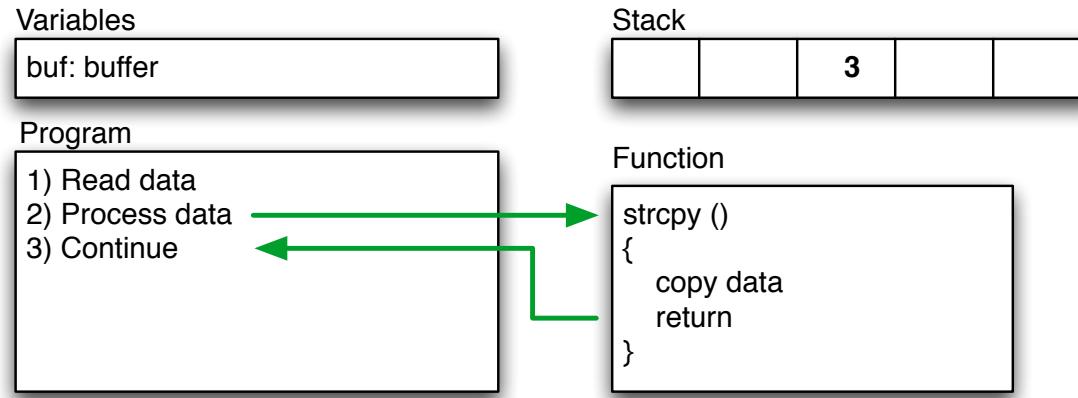


Do you think like an attacker?

Why not.

- This talk will try to convince you to start attacking yourself, your company, your life.
- Start using Nmap, Wireshark, Kali Linux
- Learn some hacking skills, so you can recognize bad and insecure design

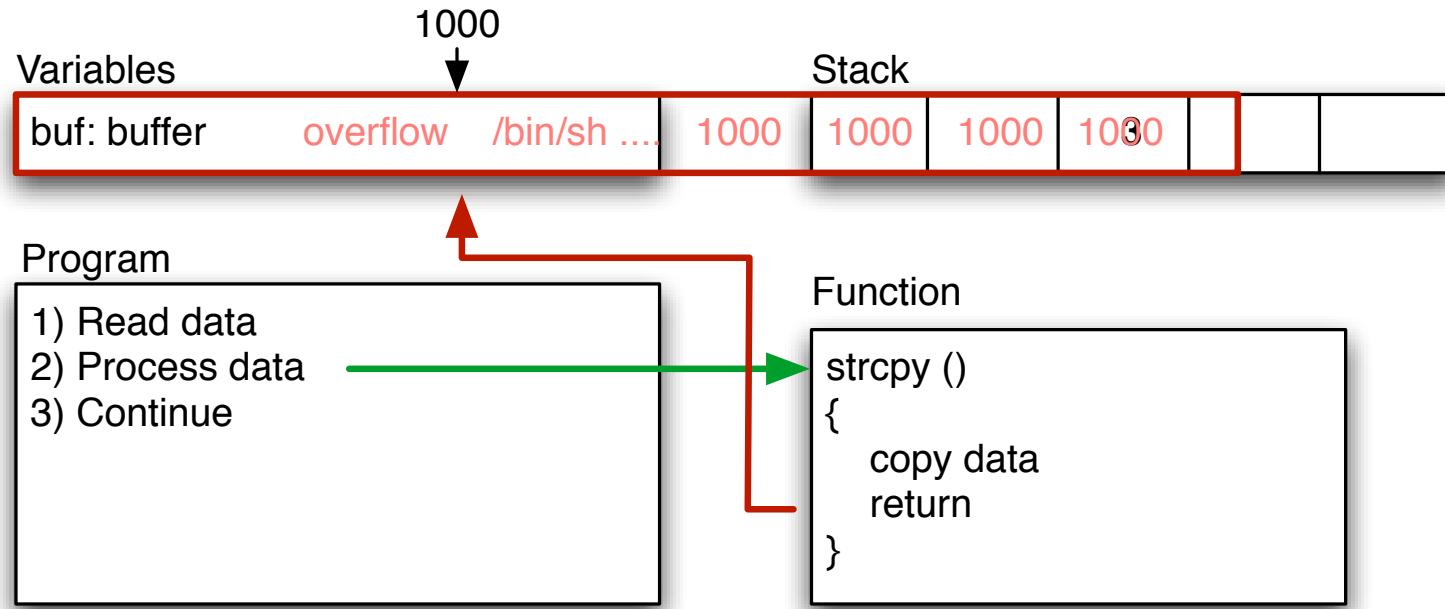
Buffer Overflows - normal programs



```
main(int argc, char **argv)  
{    char buf[200];  
    strcpy(buf, argv[1]);  
    printf("%s\n", buf);  
}
```

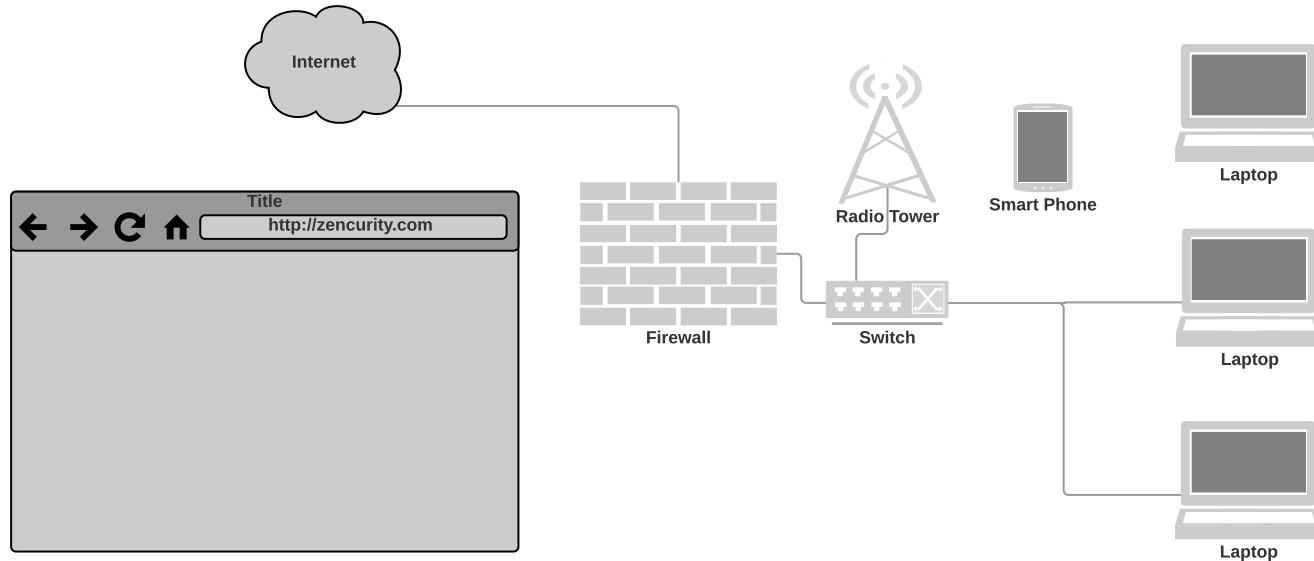
All programs have flaws

Buffer Overflows - bad programs



Using LARGE input with shell code

Your Privacy under Attack



- Your data travels far
- Often crossing borders, virtually and literally

Data found in Network data



Lets take an example, DNS

Domain Name System DNS breadcrumbs

- Your company domain, mailservers, vpn servers
- Applications you use, checking for updates, sending back data
- Web sites you visit

Advice show your users, ask them to participate in a experiment

Join this Wireless network SSID and we will show you who you are on the internet

Maybe use VPN more - or always!

Recommendations - Comply Everywhere



Follow company guidelines, be skeptical, stop and think

Then take control of your own security

Laptop storage must be encrypted

Firewall must be enabled

Suggestions

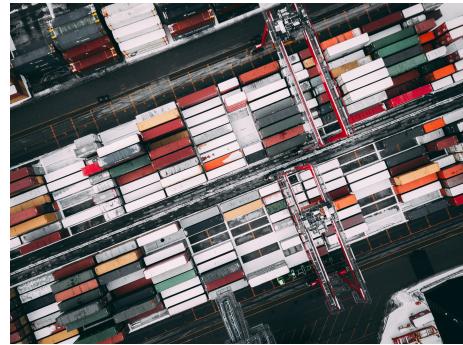
- Write an email to everyone in your organisation:
"Hi All, we need to identify systems without full disk encryption
- come see us, we have christmas cookies left, Best regards IT"



I like your 2 Feet Principle, direct surroundings

Keep reporting phishing attempts, attempted breakins etc.

Start Attacking from the Inside



- Now imagine you were in control of a company laptop
- Do you have a large internal world wide network?
Having a large open network may cost you 1.9 billion DKK - ref Maersk
- Try scanning everything, start in a small corner, expand
- Scan all your danish segments, one by one, then the nordic, then the world
- Yes, things may break - FINE, BREAKING is GOOD

Better to break while we are ready to un-break

Questions?



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Need help with infrastructure security or pentesting, ask me!

You are always welcome to send me questions later via email