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 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

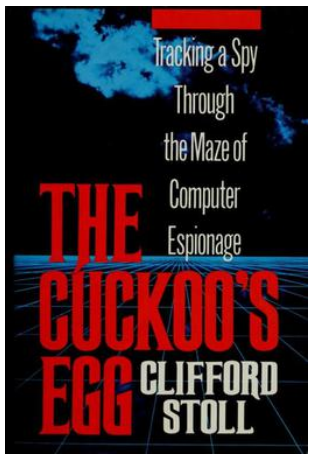
Early internet before 1980 - Universities, mail was the popular *app*

TCP/IP 1980s - big servers around 60.000s servers 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
- Buffer overflow in fingerd, we still have those
- Weak passwords/password cracking, used 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

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.
- We will start to discuss your laptop security stance, the apps you use and the breadcrumbs you and your use of the internet leaves all over the place.

Hackers don’t give a shit

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

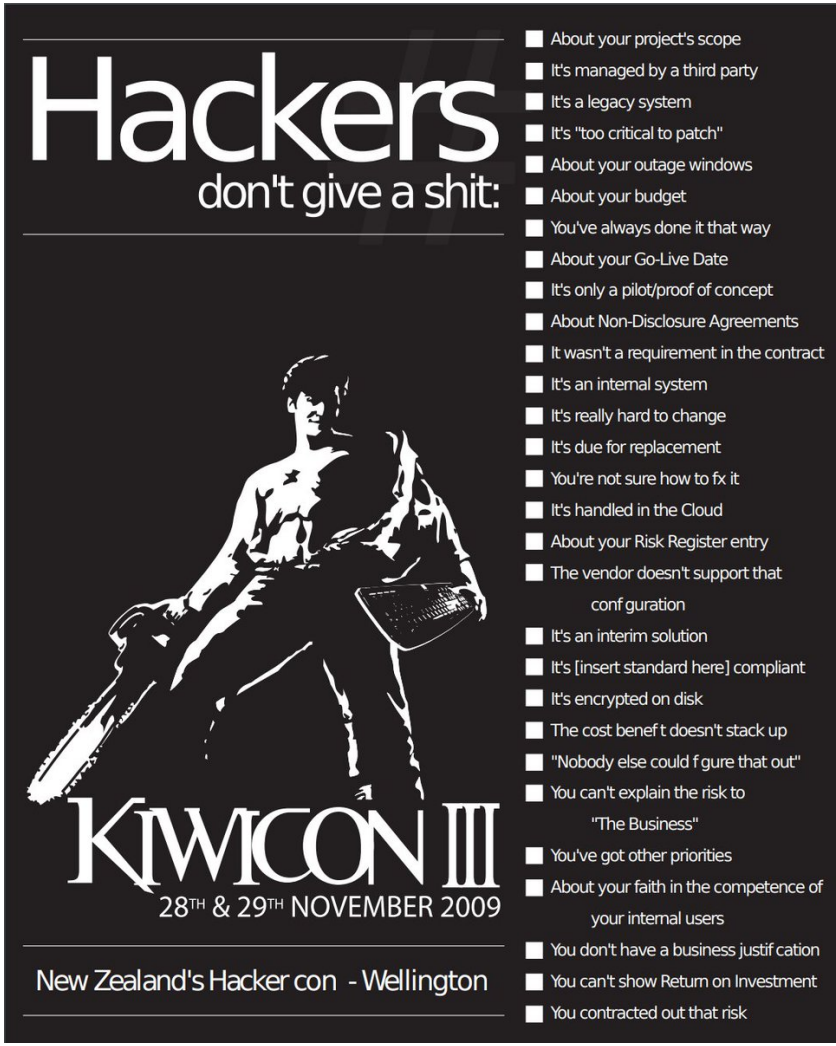
Your network is a research network, under construction, being phased out, ...

Try something new, go to your management

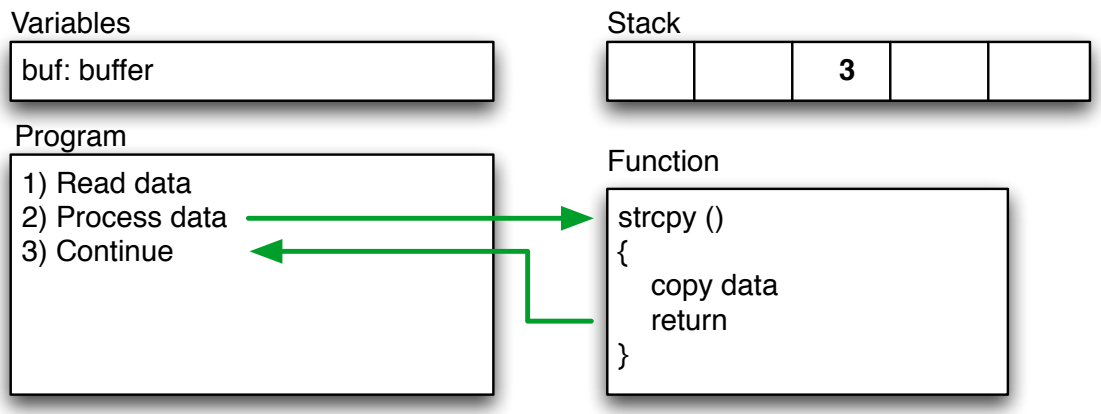
Bring all the exceptions, all of them, update the risk analysis figures - if this happens it is about 1mill DKK

Think like attackers - don’t hold back

Ask for permission before you go full monty

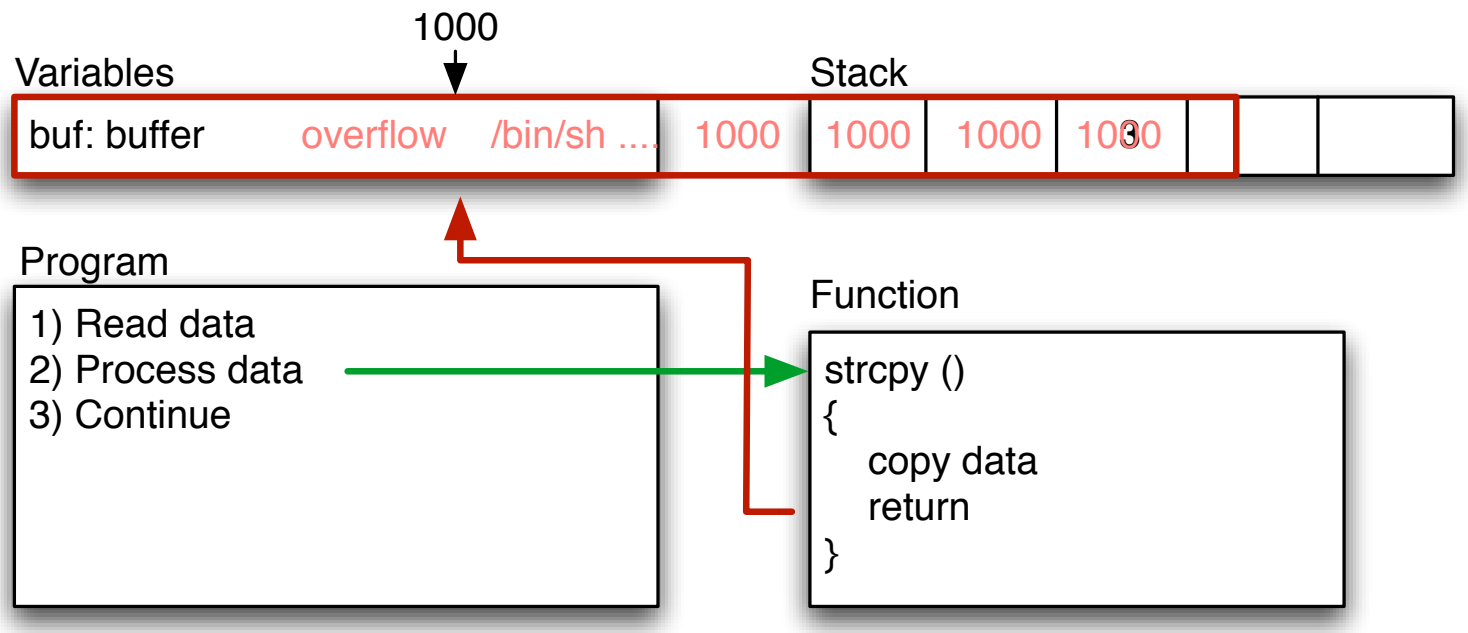


Buffer Overflows - normal programs



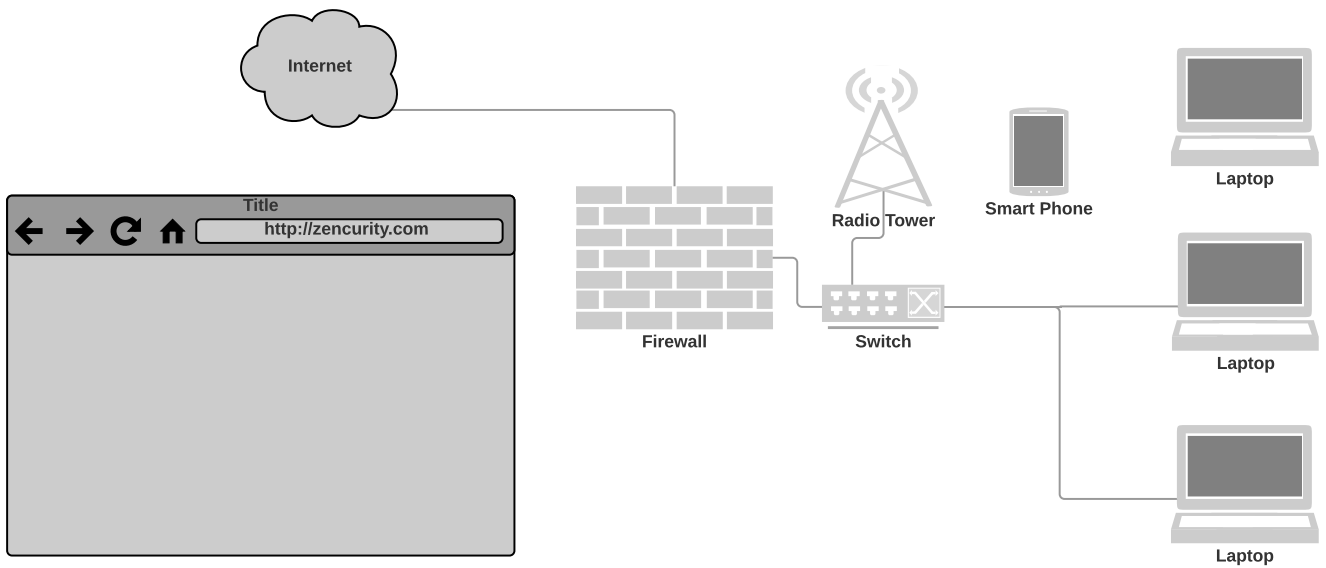

```
main(int argc, char **argv)
{       char buf[200];
         strcpy(buf, argv[1]);
         printf("%s\n",buf);
}
```

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

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 you 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