



Welcome to

# IT Kick Off 2019

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Slides are available as PDF, [kramse@Github  
bella-center-jan-2019.tex](https://github.com/kramse/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, security consultant, internet samurai  
does security testing - penetration testing
- Teach a lot - 2019 Diploma in IT-Security KEA Kompetence, starts february  
This education is new only existed for about 3 years and is needed
- Keywords: network and security, internet technologies, network packets



**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 around 1983

Systems were big servers VAXEN

Around 60.000s servers connected on the internet by 1988

Security was not a high priority, research and development

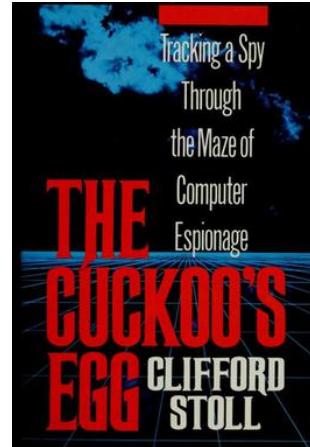
Two examples from history

- Cuckoo's Egg 1986 A real spy story
- 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 A real spy story



*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](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*

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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)
- Worms in the 2000s spread quickly, like Code Red 2001 to approx 350.000 systems in a week
- SQL Slammer "It spread rapidly, infecting most of its 75,000 victims within ten minutes."

New malware today can use the same strategies

Except a lot of malware tries to stay hidden, less noisy

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

Source: [https://en.wikipedia.org/wiki/Timeline\\_of\\_computer\\_viruses\\_and\\_worms](https://en.wikipedia.org/wiki/Timeline_of_computer_viruses_and_worms)

# 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, stay aware

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

Make sure to alert someone if something is strange

if something can become a threat

May need to repeat this multiple times, until fixed

# Hackers don't give a shit:



KIWICON III  
28<sup>TH</sup> & 29<sup>TH</sup> NOVEMBER 2009

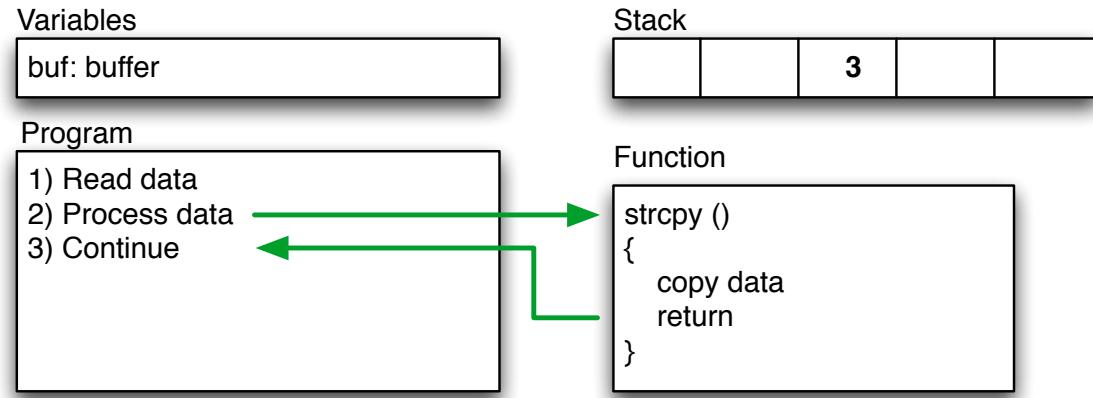
New Zealand's Hacker con - Wellington

- 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

# Buffer Overflows - normal programs



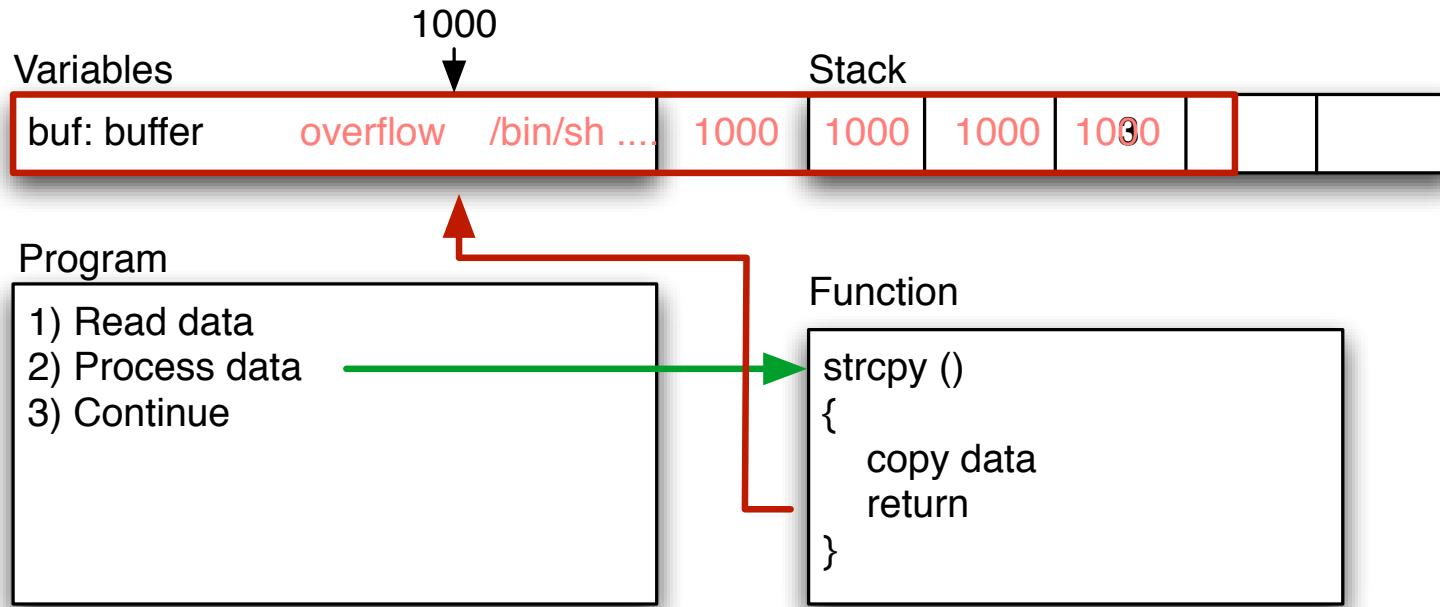
How do attacks even work?



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

All programs have flaws

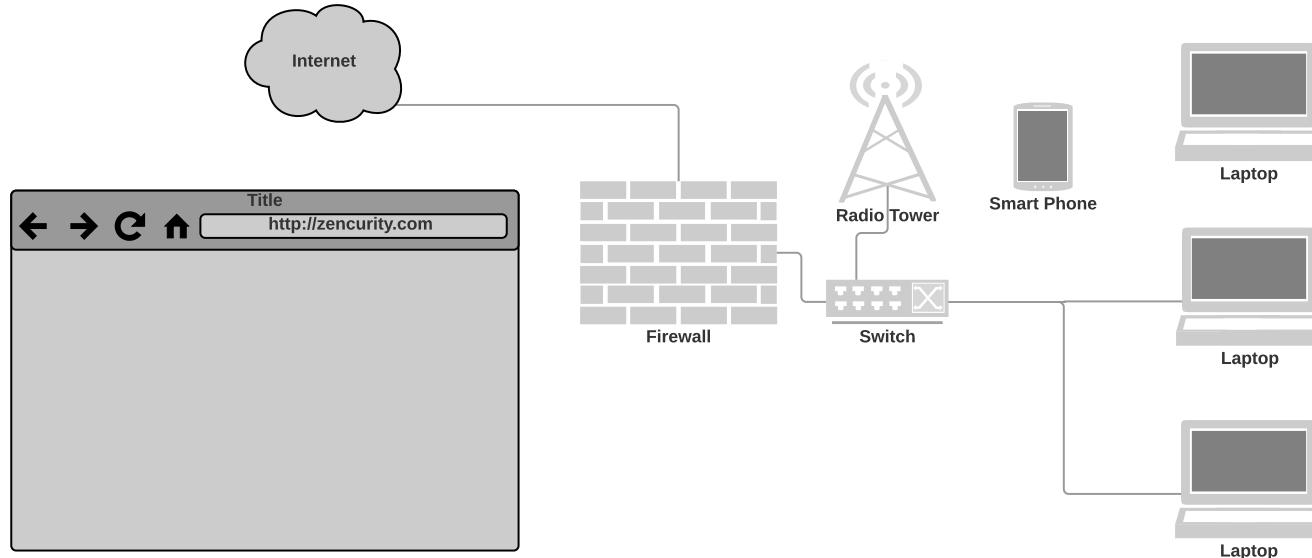
# Buffer Overflows - bad programs



## Using LARGE input with shell code

Software written many years ago, and never updated - are probably even more insecure, isolate, replace, phase out

# Your Privacy under Attack



- Your data travels far
  - Often crossing borders, virtually and literally
  - Many technologies are old and insecure

## 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
- Privacy issue - how to monitor company without invading employee privacy

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!**

# Your data has already have been owned by criminals



A screenshot of a web browser displaying the Have I Been Pwned? website at https://haveibeenpwned.com. The page has a teal header with the site's logo and navigation links. Below the header is a large button containing the text "';--have i been pwned?'". Underneath the button, a sub-header reads "Check if you have an account that has been compromised in a data breach". A search bar contains the email address "hlk@kramse.org". To the right of the search bar is a dark blue button labeled "pwned?". Below the search bar, the main content area has a dark brown background. It displays the message "Oh no — pwned!" in white. At the bottom of this section, smaller text reads "Pwned on 7 breached sites and found no pastes (subscribe to search sensitive breaches)".

Your data is already being sold, and resold on the Internet

Stop reusing passwords, use a password safe to generate and remember

Check your own email addresses on <https://haveibeenpwned.com/>

Go ahead try the web site - hold up your hand if you are in those dumps

# Recommendations - Comply Everywhere, Act Anywhere



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

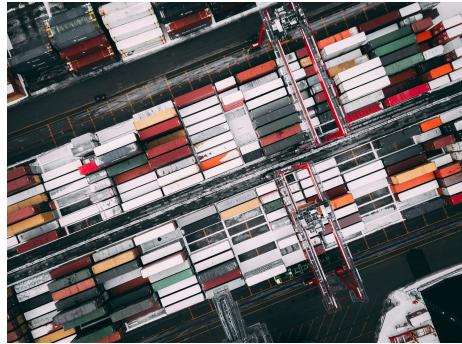
- Write an email to everyone in your organisation:  
"Hi All, we need to identify systems without full disk encryption  
- come see us, we have christmas cookies left, Best regards IT"



I like your 2 Feet Principle, direct surroundings

Keep reporting phishing attempts, attempted breakins etc.

# Imagine Attacks from the Inside



- Now imagine you were in control of a company laptop
- Do you have a large internal world wide network?  
NotPetya cost Maersk about 1.9 billion DKK
- entry via software update mechanism of M.E.Doc [uk] a Ukrainian tax preparation program

**Better to break while we are ready to un-break**

# Various key attack types, clients and employees



- Phishing - sending fake emails, to collect credentials
- Spear phishing - targetted attacks
- Person in the middle - sniffing and changing data in transit
- Drive-by attacks - web pages infected with malware, often ad servers
- Malware transferred via USB or email
- Credential Stuffing, Password related, like re-use of password, see slide about being pwned

**If we all wait a bit, and not click links immediately**

Hackers try to create "urgency", click this or loose money

# Overlapping Security Incidents



New data breaches every week, these from danish news site  
version2.dk

Problem, we need to receive data from others

Data from others may contain malware

Have a job posting, yes

- then HR will be expecting CVs sent as .doc files

**Flere detaljer i gigantisk hotel-hack: 5,25 mio. ukrypterede pasnumre taget**

Jakob Møllerhøj | Sikkerhed | 07. jan 2019

3

**7,6 millioner spillerkonti løkket fra populært onlinespil**

Niels Møller Kjemstrup | Sikkerhed | 07. jan 2019

2

**Største løk i tysk historie: Politikeres og kunstneres data smidt på nettet**

Morten Egedal | Sikkerhed | 04. jan 2019

2

**Gentleman-aftale mellem politiske partier skal danne mur mod dataløk, hacking og fake news**

Louise Holst Andersen | Sikkerhed | 04. jan 2019

12

**Boligfond beklager løk af følsomme persondata: En menneskelig fejl**

Sikkerhed | 28. dec 2018

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# 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