



Welcome to

Hacking - protect yourself

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Slides are available as PDF, kramse@Github
hacking-protect-yourself-short.tex in the repo security-courses

Goal of this presentation



Don't Panic!

Introduce hacking and a couple of hacker tools

List some tools that can be used to protect your computer and data

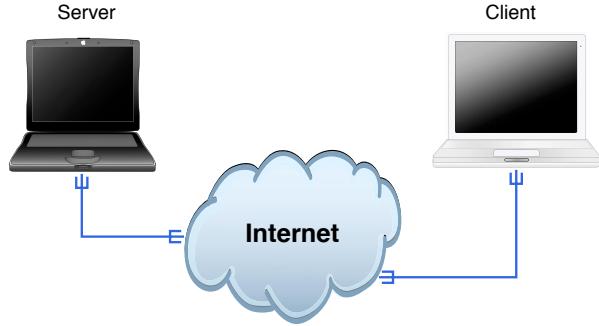
PS Sorry about the many TLAs ... og danglish

Introduktion til hacking



<http://www.imdb.com/title/tt0113243/> Hackers (1995)

Internet today



Clients and servers

Rooted in academic networks

Protocols which are more than 20 years old, moved to TCP/IP in 1981

Trying to migrate to IPv6 - a lot of hacking opportunities here

Hackers don't give a shit

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

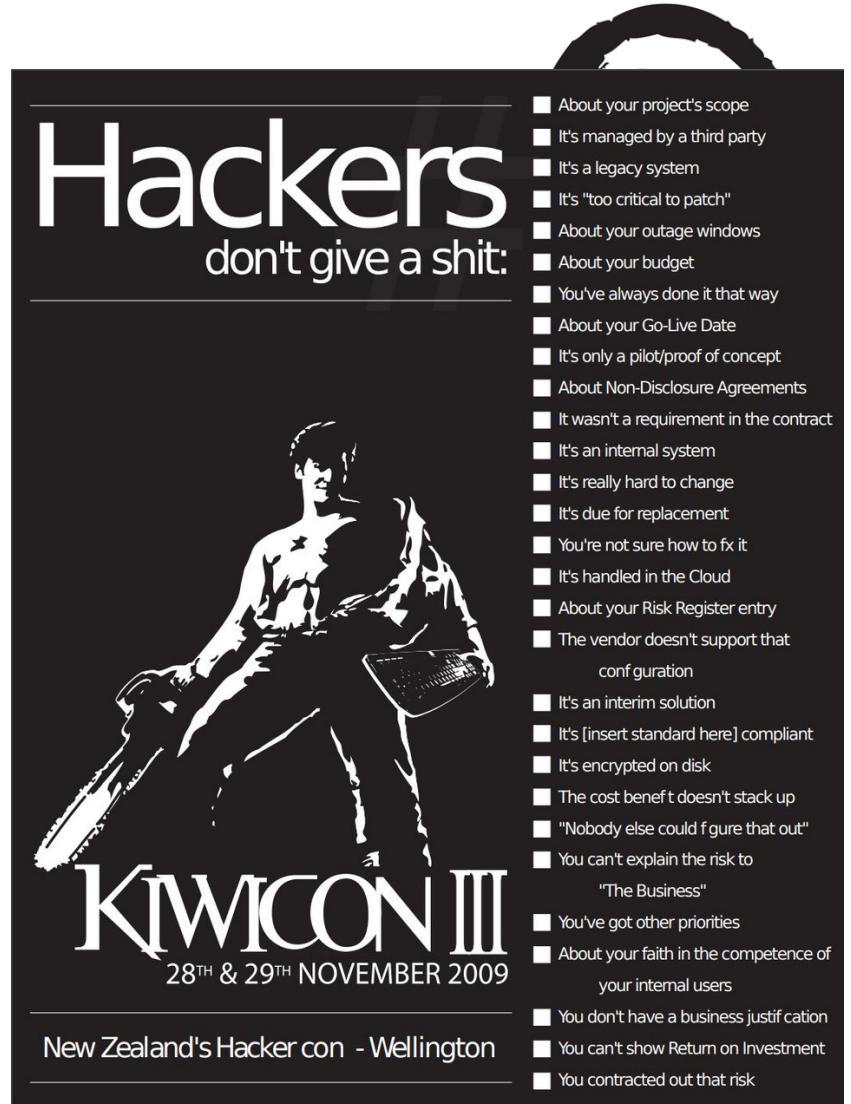
Your network is a research network, under construction, being phased out, ...

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

Ask for permission to go full monty on your security

Think like attackers - don't hold back



Hackers don't give a shit:

- 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

KIWICON III
28TH & 29TH NOVEMBER 2009

New Zealand's Hacker con - Wellington

Hacking seems like magic



Hacking looks like magic

Hacking is not magic



- Hacking only requires some ninja training
- We have been doing this since at least 1995 when SATAN was released
- Listen, Plan, Act, Do hacking

The Internet Worm 2. nov 1988



Udnyttede følgende sårbarheder

- buffer overflow i fingerd - VAX kode
- Sendmail - DEBUG
- Tillid mellem systemer: rsh, rexec, ...
- dårlige passwords

Avanceret + camouflage!

- Programnavnet sat til 'sh'
- Brugte fork() til at skifte PID jævnligt
- password cracking med intern liste med 432 ord og /usr/dict/words
- Fandt systemer i /etc/hosts.equiv, .rhosts, .forward, netstat ...

Lavet af Robert T. Morris, Jr.

Medførte dannelsen af CERT, <http://www.cert.org>

Teknisk hvad er hacking



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



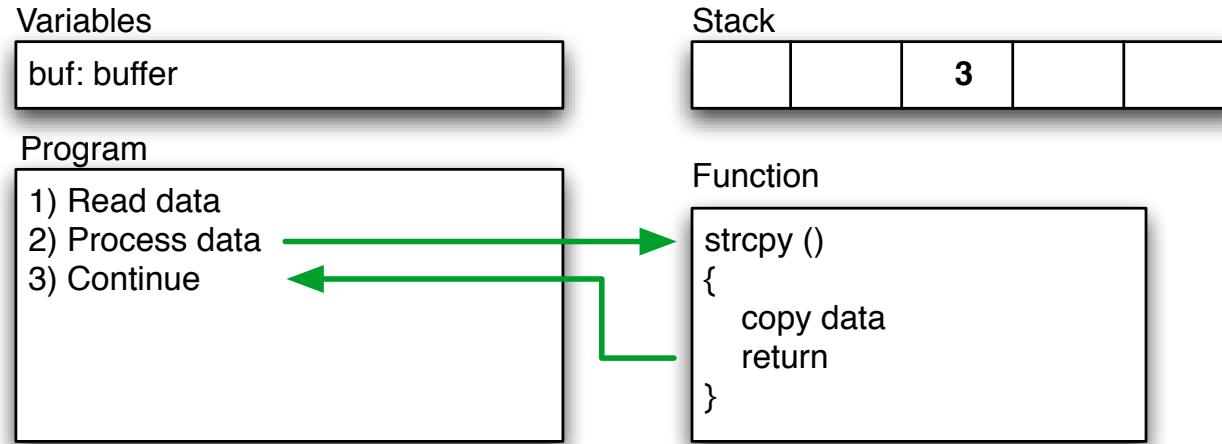
buffer overflows et C problem



Et buffer overflow er det der sker når man skriver flere data end der er afsat plads til i en buffer, et dataområde. Typisk vil programmet gå ned, men i visse tilfælde kan en angriber overskrive returadresser for funktionskald og overtage kontrollen.

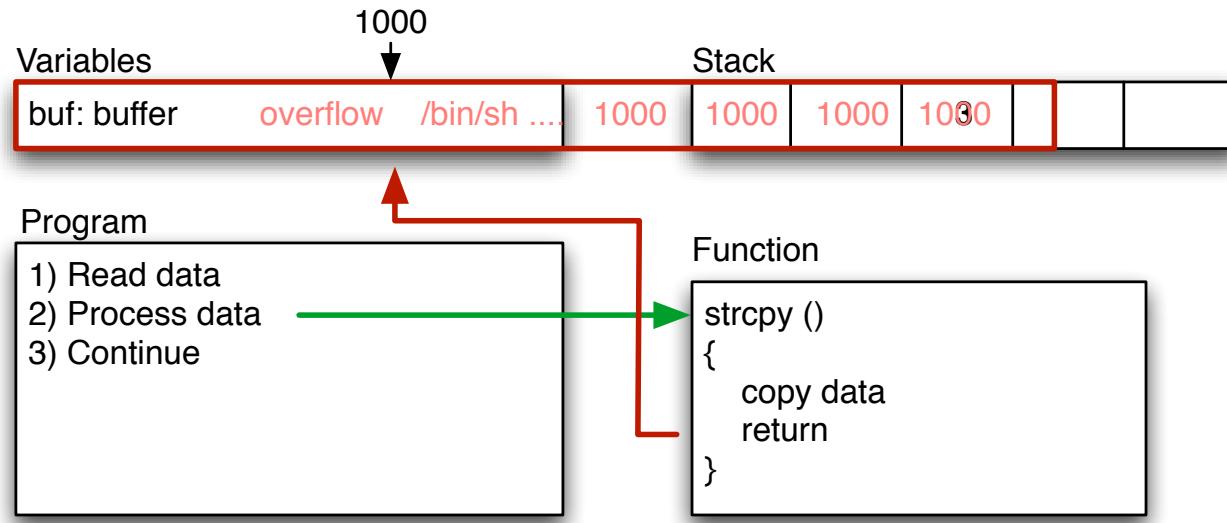
Stack protection er et udtryk for de systemer der ved hjælp af operativsystemer, programbiblioteker og lign. beskytter stakken med returadresser og andre variable mod overskrivning gennem buffer overflows. StackGuard og Propolice er nogle af de mest kendte.

Buffer og stacks



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

Overflow - segmentation fault



Bad function overwrites return value!

Control return address

Run shellcode from buffer, or from other place

Exploits



```
$buffer = "";
>null = "\x00";
$nop = "\x90";
$nopsize = 1;
$len = 201; // what is needed to overflow, maybe 201, maybe more!
$the_shell_pointer = 0xdeadbeef; // address where shellcode is
# Fill buffer
for ($i = 1; $i < $len;$i += $nopsize) {
    $buffer .= $nop;
}
$address = pack('l', $the_shell_pointer);
$buffer .= $address;
exec "$program", "$buffer";
```

Demo exploit in Perl

Hvordan finder man buffer overflow, og andre fejl



Black box testing

Closed source reverse engineering

White box testing

Open source betyder man kan læse og analysere koden

Source code review - automatisk eller manuelt

Fejl kan findes ved at prøve sig frem - fuzzing

Exploits virker typisk mod specifikke versioner af software

The Exploit Database - <http://www.exploit-db.com/>



EXPLOIT
DATABASE

GET CERTIFIED

Verified Has App

Show 15 ▾

Search:

Date	D	A	V	Title	Type	Platform	Author
2019-02-25	↓		✗	Drupal < 8.6.9 - REST Module Remote Code Execution	WebApps	PHP	leonjza
2019-02-25	↓	☒	✗	Xlight FTP Server 3.9.1 - Buffer Overflow (PoC)	DoS	Windows	Logan Whitmire
2019-02-25	↓		✗	Advance Gift Shop Pro Script 2.0.3 - SQL Injection	WebApps	PHP	Mr Winst0n
2019-02-25	↓		✗	News Website Script 2.0.5 - SQL Injection	WebApps	PHP	Mr Winst0n
2019-02-25	↓		✗	PHP Ecommerce Script 2.0.6 - Cross-Site Scripting / SQL Injection	WebApps	PHP	Mr Winst0n
2019-02-25	↓		✗	zzzphp CMS 1.6.1 - Remote Code Execution	WebApps	PHP	Yang Chenglong
2019-02-25	↓		✗	Jenkins Plugin Script Security 1.49/Declarative 1.3.4/Groovy 2.60 - Remote Code Execution	WebApps	Java	wetw0rk
2019-02-23	↓		✗	Drupal < 8.6.10 / < 8.5.11 - REST Module Remote Code Execution	WebApps	PHP	Charles Fol
2019-02-22	↓		✗	Teracue ENC-400 - Command Injection / Missing Authentication	WebApps	Hardware	Stephen Shkardoon
2019-02-22	↓		✓	Micro Focus Filr 3.4.0.217 - Path Traversal / Local Privilege Escalation	WebApps	Linux	SecureAuth
2019-02-22	↓		✓	Nuuo Central Management - Authenticated SQL Server SQL Injection (Metasploit)	Remote	Windows	Metasploit
2019-02-22	↓		✗	WebKit JSC - reifyStaticProperty Needs to set the PropertyAttribute::CustomAccessor flag for CustomGetterSetter	DoS	Multiple	Google Security Research
2019-02-22	↓		✗	Quest NetVault Backup Server < 11.4.5 - Process Manager Service SQL Injection / Remote Code Execution	WebApps	Multiple	Chris Anastasio
2019-02-21	↓		✗	AirDrop 2.0 - Denial of Service (DoS)	DoS	Android	s4vitar
2019-02-21	↓		✓	MikroTik RouterOS < 6.43.12 (stable) / < 6.42.12 (long-term) - Firewall and NAT Bypass	Remote	Hardware	Jacob Baines
Showing 1 to 15 of 40,914 entries							
FIRST PREVIOUS 1 2 3 4 5 ... 2728 NEXT LAST							

Metasploit



What is it?

The Metasploit Framework is a development platform for creating security tools and exploits. The framework is used by network security professionals to perform penetration tests, system administrators to verify patch installations, product vendors to perform regression testing, and security researchers world-wide. The framework is written in the Ruby programming language and includes components written in C and assembler.

Idag findes der samlinger af exploits

Udviklingsværktøjerne til exploits er idag meget raffinerede!

<http://www.metasploit.com/>

<http://www.fastandeasyhacking.com/> Armitage GUI til Metasploit

<http://www.offensive-security.com/metasploit-unleashed/>

Forudsætninger



Bemærk: alle angreb har forudsætninger for at virke

Et angreb mod Telnet virker kun hvis du bruger Telnet

Et angreb mod Apache HTTPD virker ikke mod Microsoft IIS

Kan du bryde kæden af forudsætninger har du vundet!

Eksempler på forudsætninger



Computeren skal være tændt

Funktionen der misbruges skal være slået til

Executable stack

Executable heap

Fejl i programmet

alle programmer har fejl

Kali Linux the pentest toolbox



The most advanced penetration testing distribution, ever.

From the creators of BackTrack comes Kali Linux, the most advanced and versatile penetration testing distribution ever created. BackTrack has grown far beyond its humble roots as a live CD and has now become a full-fledged operating system. With all this buzz, you might be asking yourself: - What's new ?

KALI LINUX
"the quieter you become, the more you are able to hear"

**PENETRATION TESTING,
REDEFINED.**

A Project By Offensive Security

Kali <http://www.kali.org/>

100.000s of videos on youtube alone, searching for kali and \$TOOL

Also versions for Raspberry Pi, mobile and other small computers

Trinity breaking in

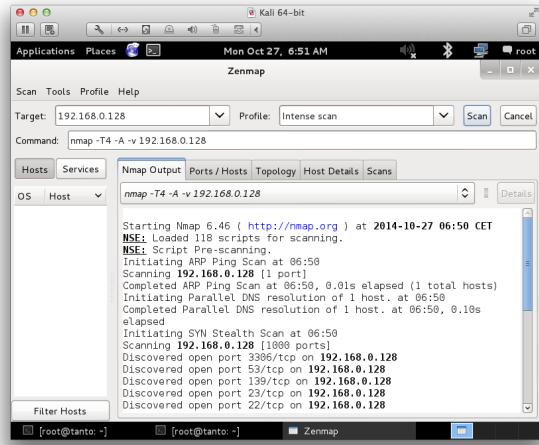


```
80/tcp      open      http  
81/tcp      open      host2-nc  
10/tcp     [ nobile ]  
11  
12 $ nmap -v -sS -O 10.2.2.2  
13 Starting nmap V. 2.54BETA25  
13 Insufficient responses for TCP sequencing (3). OS detection is  
13 inaccurate  
14 Interesting ports on 10.2.2.2:  
14 (The 1539 ports scanned but not shown below are in state: cl  
51 Port      State      Service  
51 22/tcp    open       ssh  
58  
68 No exact OS matches for host  
68  
24 Nmap run completed -- 1 IP address (1 host up) scanned  
50 $ sshhuke 10.2.2.2 -rootpw="210HQ0101"  
Connecting to 10.2.2.2:ssh... successful.  
Re Attempting to exploit SSHv1 CRC32... successful.  
IP Resetting root password to "210HQ0101".  
System open: Access Level <9>  
Mn $ ssh 10.2.2.2 -l root  
root@10.2.2.2's password: ■  
RTF CONTROL  
ACCESS GRANTED
```

<http://nmap.org/movies.html>

Meget realistisk http://www.youtube.com/watch?v=511GCTgqE_w

Really do Nmap your world



- Nmap is a port scanner, but does more
- Finding your own infrastructure available from the guest network?
- See your printers having all the protocols enabled AND a wireless?

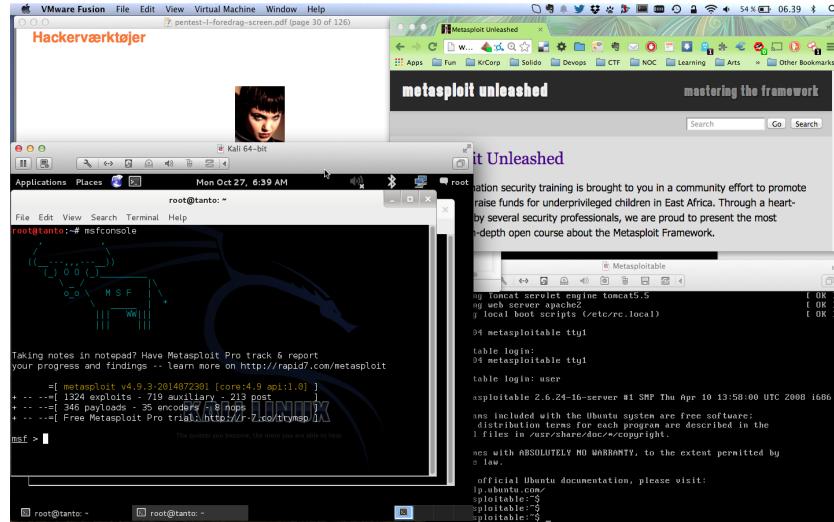
Hackertools are for everyone!



- Hackers work all the time to break stuff, Use hackertools:
- Nmap, Nping <http://nmap.org>
- Wireshark - <http://www.wireshark.org/>
- Aircrack-ng <http://www.aircrack-ng.org/>
- Metasploit Framework <http://www.metasploit.com/>
- Burpsuite <http://portswigger.net/burp/>
- Kali Linux <http://www.kali.org>

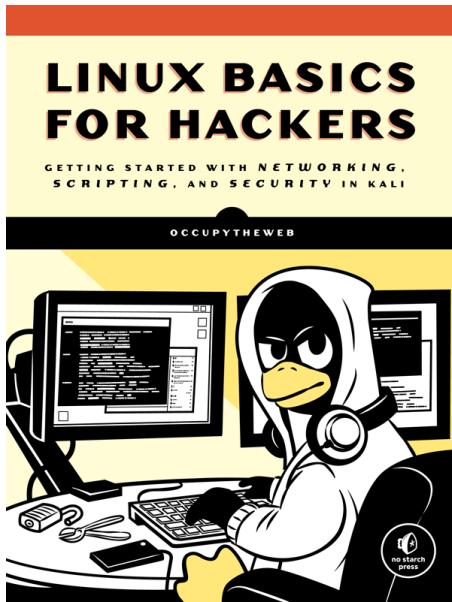
Most popular hacker tools <http://sectools.org/>

Hackerlab setup



- Create hacker labs, encourage hacker labs!
- Software Host OS: Windows, Mac, Linux
- Virtualisation software: VMware, Virtual box, HyperV pick your poison
- Hackersoftware: Kali Virtual Machine <https://www.kali.org/>

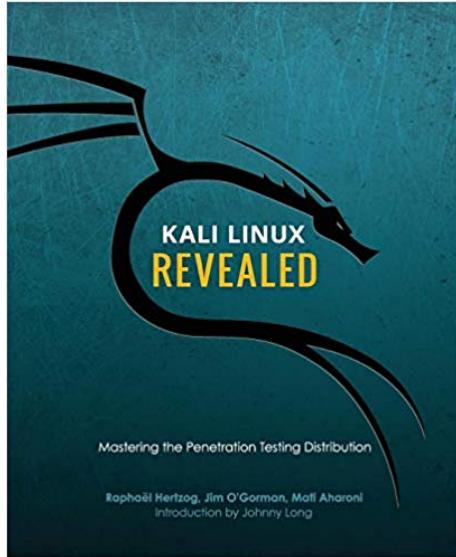
Book: Linux Basics for Hackers (LBhf)



Linux Basics for Hackers Getting Started with Networking, Scripting, and Security in Kali by OccupyTheWeb December 2018, 248 pp. ISBN-13: 9781593278557

<https://nostarch.com/linuxbasicsforhackers>

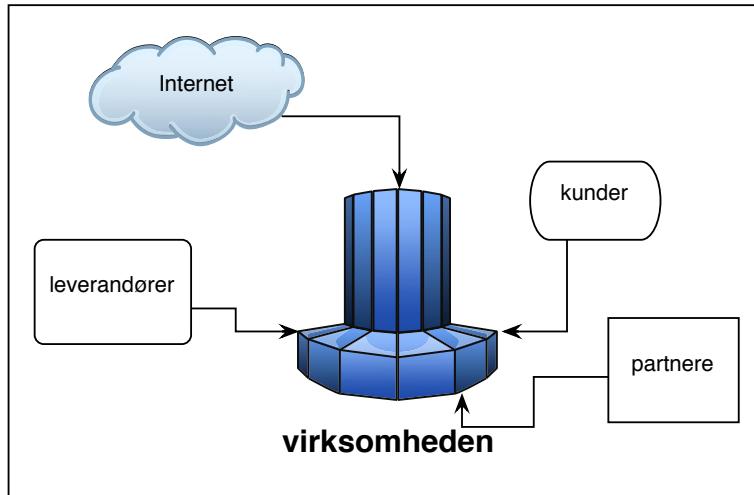
Book: Kali Linux Revealed (KLR)



Kali Linux Revealed Mastering the Penetration Testing Distribution

<https://www.kali.org/download-kali-linux-revealed-book/>
explains how to install Kali Linux

Fokus 2019: Firewalls og segmentering



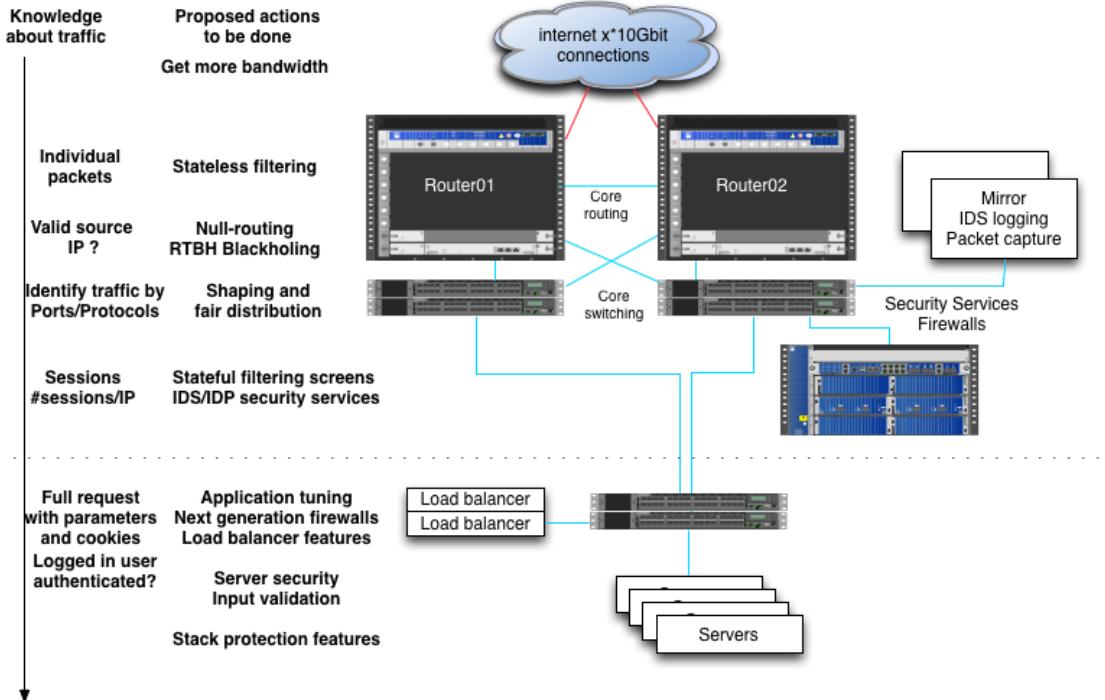
- Hvis du har et netværk, så bør du have en firewall
- En firewall tillader autoriseret trafik og blokerer resten
- Hvornår har du sidst set din løsning efter?
- Hvor lang tid tager det at se en 5.000 linier Cisco ASA config igennem?

Imagine Attacks from the Inside



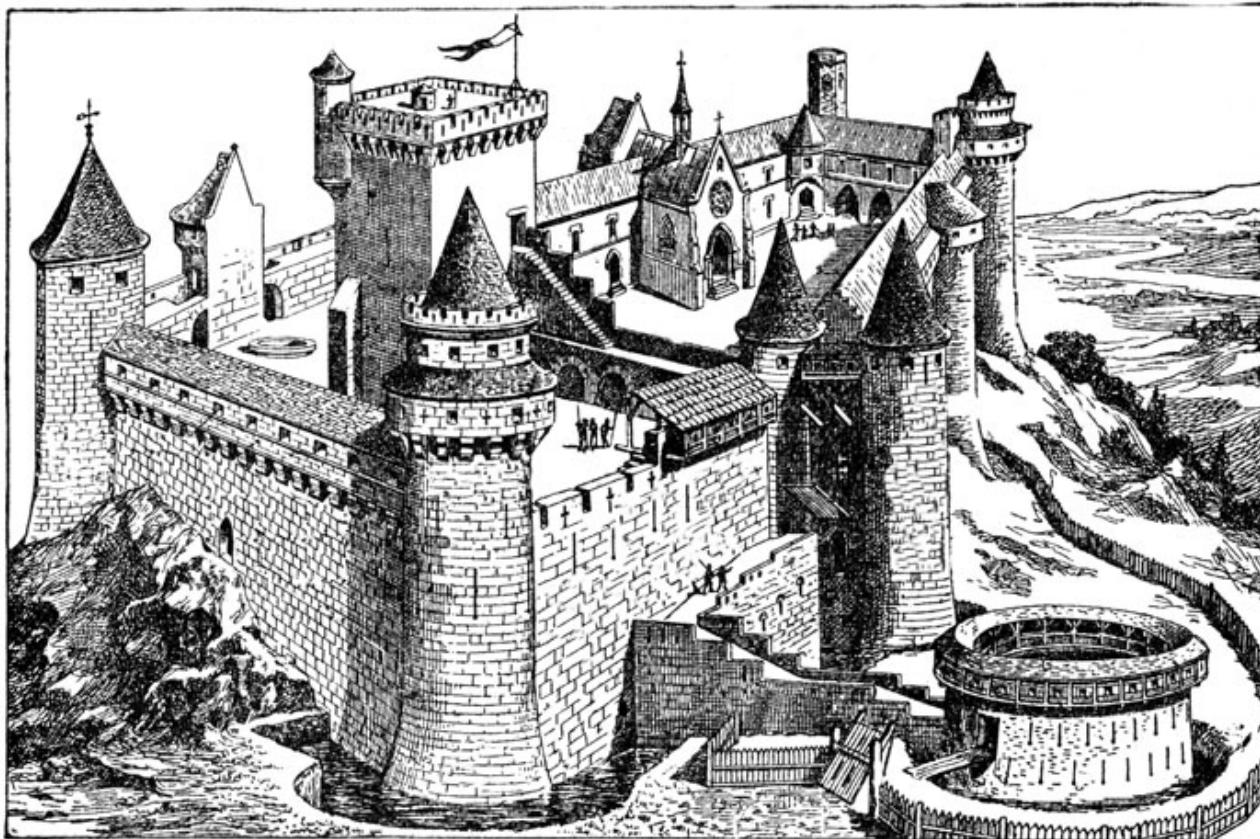
- Now imagine you were in control of a company laptop
- Do you have a large internal world wide network?
NotPetya cost Maersk about 1.9 billion DKK
- entry thought to be via software update of M.E.Doc [uk] an Ukrainian tax preparation program
- Attackers are very creative and have a large attack surface to most companies

Big firewalls



Big firewalls are not a single device

Enhance and secure runtime environment



Gode operativsystemer



Nyere versioner af Microsoft Windows, Mac OS X og Linux distributionerne inkluderer:

- Buffer overflow protection
- Stack protection, non-executable stack
- Heap protection, non-executable heap
- *Randomization of parameters* stack gap m.v.

Vælg derfor hellere:

- Windows 10, end Windows Xp
- Mac OS X nyeste versioner
- Linux sikkerhedsopdateringer, sig ja når de kommer

Det samme gælder for serveroperativsystemer

NB: meget få embedded systemer har beskyttelse!

Hackertyper anno 1995



Lad os lige gå tilbage til hackerne

Hackertyper anno 2008



Lisbeth laver PU, personundersøgelser ved hjælp af hacking
Hvordan finder man information om andre

Fra mønstre til person



Først kan man finde nogle mønstre

Derefter søger med de mønstre

Nogle giver direkte information

Andre giver baggrundsinformation

Hvad er offentligt og hvad er privat? (googledorks!)

- Navn, fulde navn, fornavne, efternavne, alias'es
- Diverse idnumre, som CPR - tør du søge på dit CPR nr?
- Computerrelaterede informationer: IP, Whois, Handles
- Øgenavne, kendenavne
- Skrivestil, ordbrug mv.
- Tiden på din computer?
- Tænk kreativt ☺

Google for it



A screenshot of a Mac OS X browser window showing a Google search results page. The search query is "filetype:dat \"password.dat\"". The results section is titled "Web" and shows 1 - 10 of about 22 results. The first result is a log entry from Mon Oct 29 11:39:19 EST 2001. The second result is a CVS log for mrdatae/Attic/password.dat. Both results include links to cached versions and similar pages.

Google som hacker værktøj?

Googledorks <http://johnny.ihackstuff.com/>

Questions?



Henrik Lund Kramshøj hlk@zecurity.com

Need help with infrastructure security or pentesting, ask me!

You are always welcome to send me questions later via email

Reklamer: kursusafholdelse



Følgende kurser afholdes med mig som underviser

- Nmap workshop - 4 timer

Nmap for blue team, forsvaret. En workshop med Nmap pakken af værktøjer som gør dig i stand til at beskytte dit netværk bedre, fordi du effektivt kan undersøge det. Vi gennemgår almindelig portscanning, som sættes i system, samt andre værktøjer som Nping til verifikation af forbindelser mellem enheder og igennem filtre og firewalls.

- Suricata, Bro og DNS opsamling - 4 timer

Workshop: Suricata, Zeek og DNS opsamling Netværk idag er ofte blevet uoverskuelige, men kritiske for vores IT-brug. Denne workshop ser på applikationer til automatisk at afkode netværkstrafik med øvelser. Vi laver øvelser med Suricata, Zeek (tidligere Bro) og passiv DNS opsamling som eksempler på at kunne logge og gå tilbage i tiden. Niveauet er introduktion til værktøjerne og øvelserne bliver udført på Linux.