Welcome to

IT-sikkerhed 2014

PROSA Superhelteseminar

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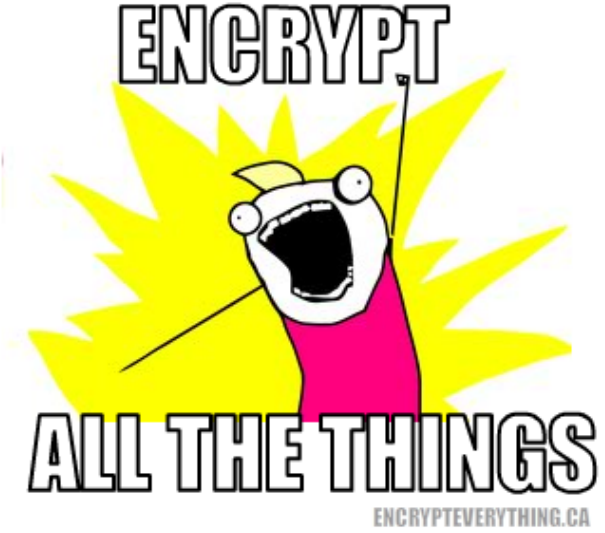
http://www.solidonetworks.com

Generic advice

SOLIDO NETWORKS

Recommendations

- Lock your devices, phones, tables and computers
- Update software and apps
- Do NOT use the same password everywhere
- Watch out when using open wifi-networks
- Multiple browsers: one for Facebook, and separate for home banking apps?
- Multiple laptops? One for private data, one for work?
- Think of the data you produce, why do people take naked pictures and SnapChat them?
- Use pseudonyms and aliases, do not use your real name everywhere
- Enable encryption: IMAP**S** POP3**S** HTTP**S** TOR OpenPGP VPN SSL/TLS



Planen idag

Don’t Panic!

Kl 17:30-19:30 - med pause

Mindre enetale, mere foredrag 2.0 med sociale medier, informationsdeling og interaktion

Send gerne spørgsmål senere

PS er her nogle timer efter foredraget til spørgsmål og snak

The current situation

Internet security sucks

Personal computers like laptops suck at security

Mobile devices suck even more at security - less CPU/MEM/storage

We depend on cloud services and underfunded infrastructure - OpenSSL

We depend on others and the whole internet - DDoS

Goals: Internet Ninjas

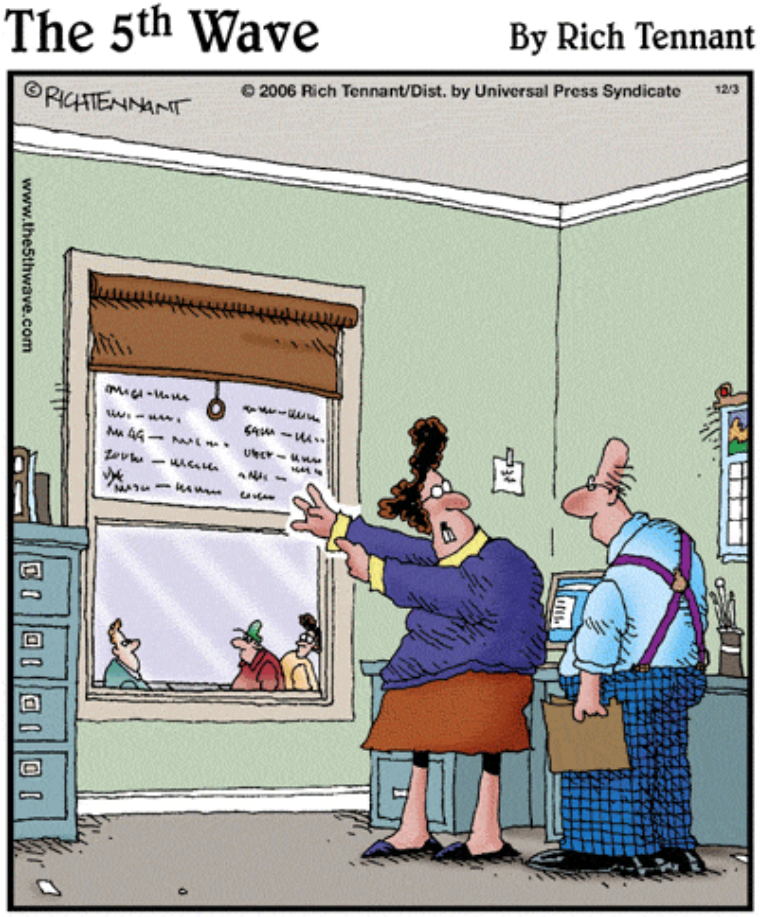
Superhelte er ninajer

Kender internet, teknologierne og mulighederne

Rettidig omhu og defense in depth

Konsekvenserne ved dårlig sikkerhed

Formål: sund paranoia



"Don't be silly — of course my passwords are safe. I keep them written on my window, but then I pull the shade if anyone walks in the room."

Opbevaring af passwords

Security is magic

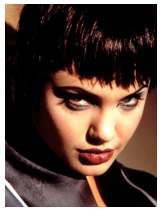
.

Think security always appropriate paranoia

Follow news about software security

Support communties, join and learn

Hackerværktøjer er også til dig!



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

Most popular hacker tools `http://sectools.org/`

Kali Linux the new backtrack

BackTrack `http://www.backtrack-linux.org`

Kali `http://www.kali.org/`

100.000s of videos on youtube: ”kali hack” 60.000, ”backtrack hack” 125.000

it's a Unix system, I know this

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Skal du igang med sikkerhed?

Installer et netværk, evt. bare en VMware, Virtualbox, Parallels, Xen, GNS3, ...

Brug BackTrack, se evt. youtube videoer om programmerne

Quote fra Jurassic Park `http://www.youtube.com/watch?v=dFUlAQZB9Ng`

Metasploit and Armitage Still rocking the internet

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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.

`http://www.metasploit.com/`

Armitage GUI fast and easy hacking for Metasploit
`http://www.fastandeasyhacking.com/`

Kursus Metasploit Unleashed
`http://www.offensive-security.com/metasploit-unleashed/Main_Page`

Bog: Metasploit: The Penetration Tester's Guide, No Starch Press
ISBN-10: 159327288X

Fri adgang til hackerværktøjer

I 1993 skrev Dan Farmer og Wietse Venema artiklen
Improving the Security of Your Site by Breaking Into it

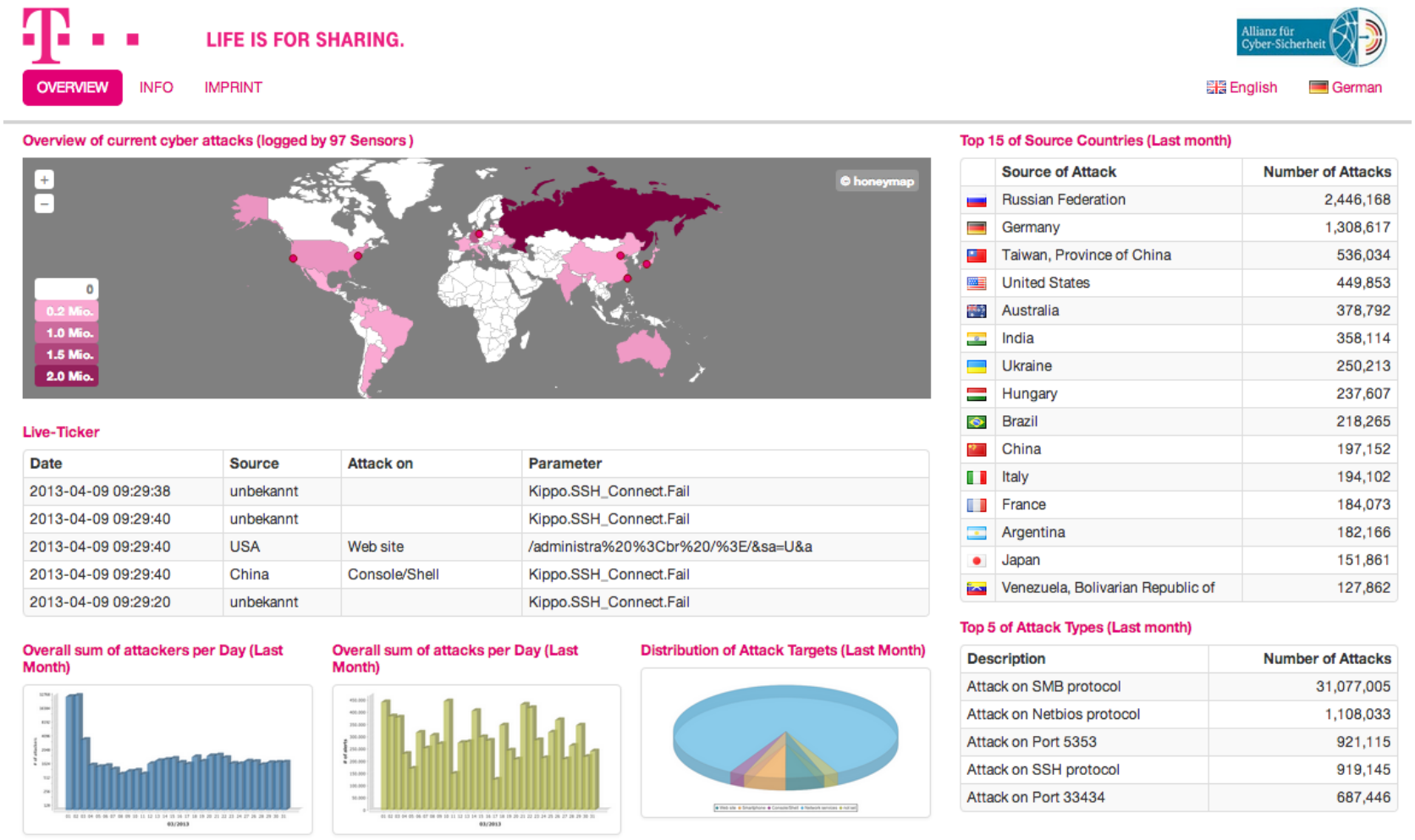
I 1995 udgav de softwarepakken SATAN
Security Administrator Tool for Analyzing Networks

> We realize that SATAN is a two-edged sword - like many tools, it can be used for good and for evil purposes. We also realize that intruders (including wannabees) have much more capable (read intrusive) tools than offered with SATAN.

Se `http://sectools.org` og `http://www.packetstormsecurity.org/`

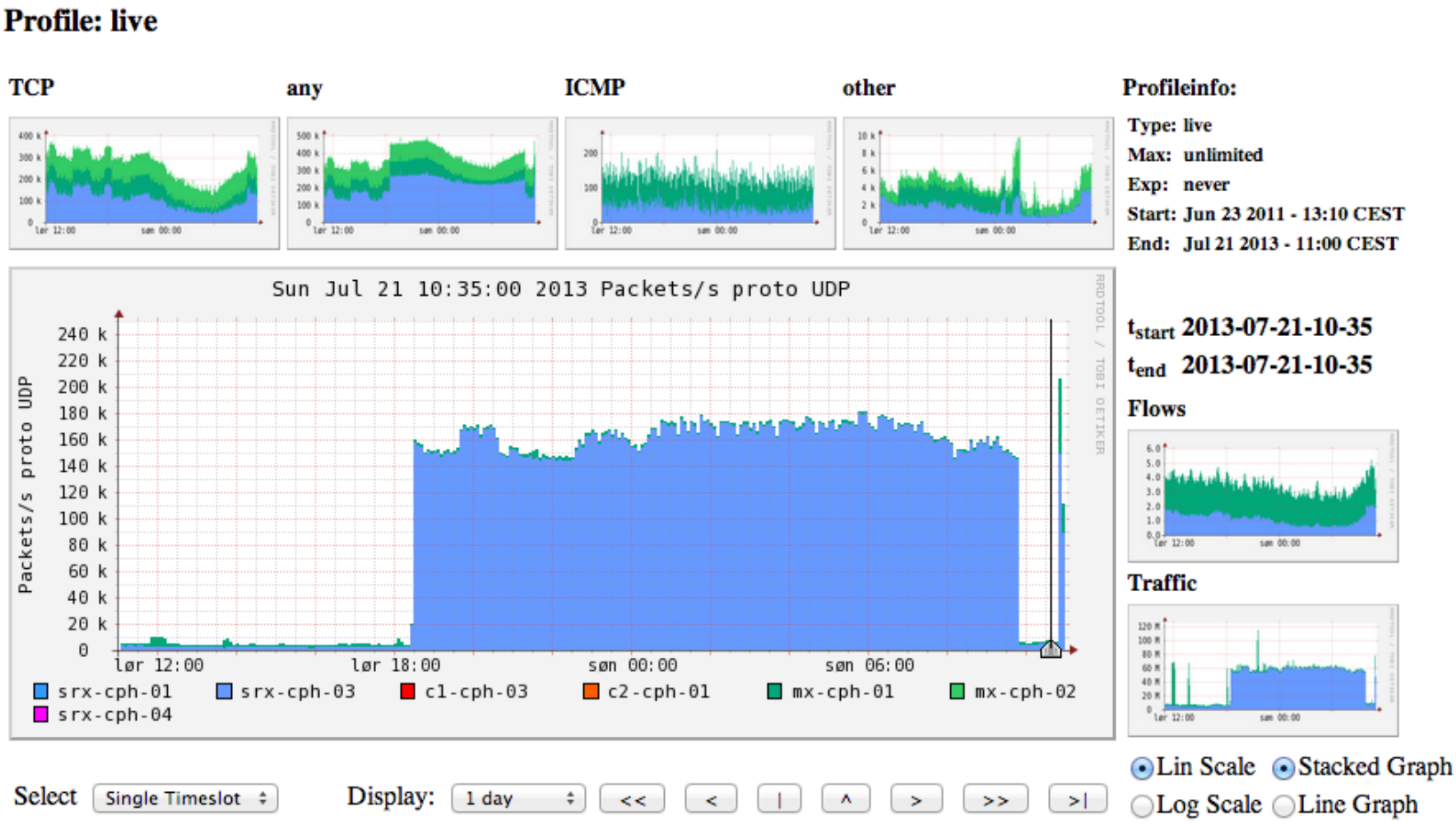
Kilde: `http://www.fish2.com/security/admin-guide-to-cracking.html`

Attack overview



http://www.sicherheitstacho.eu/?lang=en

Netflow NFSen



An extra 100k packets per second from this netflow source (source is a router)

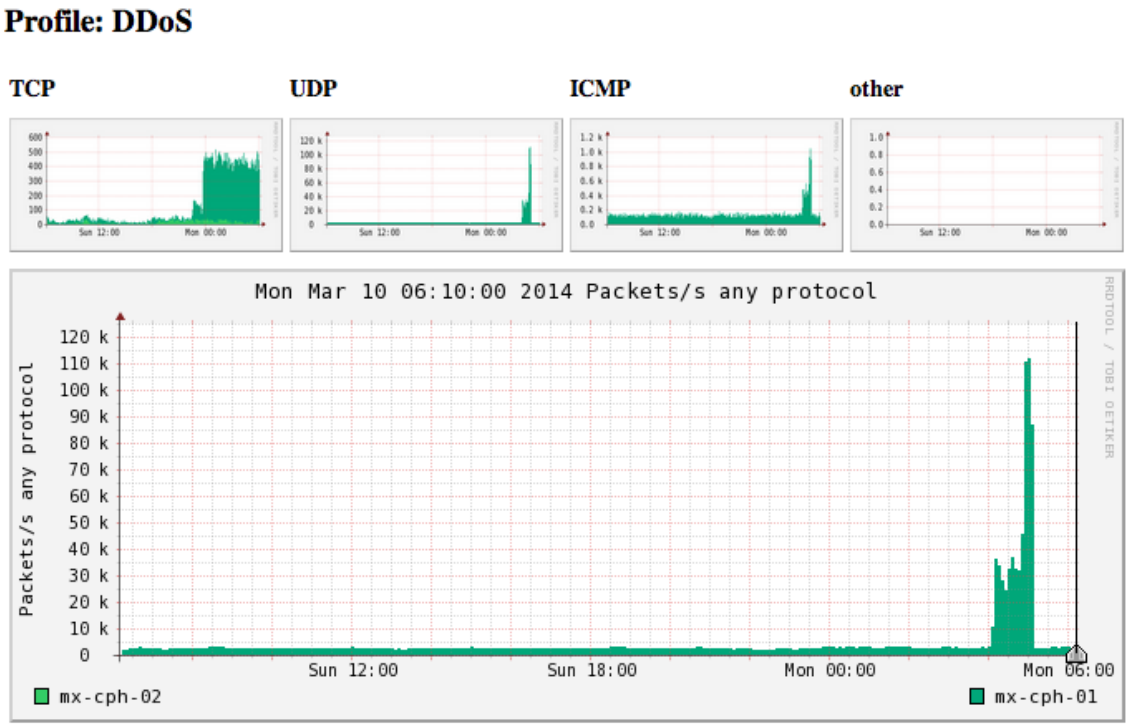
Alert (TA14-017A) UDP-based Amplification Attacks

Protocol	Bandwidth Amplification Factor	Vulnerable Command
DNS	28 to 54	see: TA13-088A [1]
NTP	556.9	see: TA14-013A [2]
SNMPv2	6.3	GetBulk request
NetBIOS	3.8	Name resolution
SSDP	30.8	SEARCH request
CharGEN	358.8	Character generation request
QOTD	140.3	Quote request
BitTorrent	3.8	File search
Kad	16.3	Peer list exchange
Quake Network Protocol	63.9	Server info exchange
Steam Protocol	5.5	Server info exchange

Source: US-CERT

http://www.us-cert.gov/ncas/alerts/TA14-017A

Detecting DDoS



We created a DDoS profile with the common types.

We can ask RDDtools about max, average etc.

```
rrdtool graph x -s -24h DEF:v=DDoS/mx-cph-01.rrd:packets:MAX VDEF:vm=v,MAXIMUM PRINT:vm:%.lf
```

But DNS is bad! DNS Amplification?!

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This is the official homepage for PacketQ, a simple tool to make SQL-queries against PCAP-files, making packet analysis and building statistics simple and quick. PacketQ was previously known as DNS2db but was renamed in 2011 when it was rebuilt and could handle protocols other than DNS among other things.

Look how easy it's to count DNS-packets in a PCAP-file.

```
# packetq -s "select count(*) as count_dns from dns" packets.pcap
[ { "table_name": "result",
      "head": [
      { "name": "count_dns","type": "int" } ],    "data": [ [95501] ] } ]
```

https://github.com/dotse/packetq/wiki

Using PacketQ

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Using PacketQ

Let's have a practical look at how PacketQ works by trying to figure out what kind of DNS ANY queries are being sent towards our name-server.

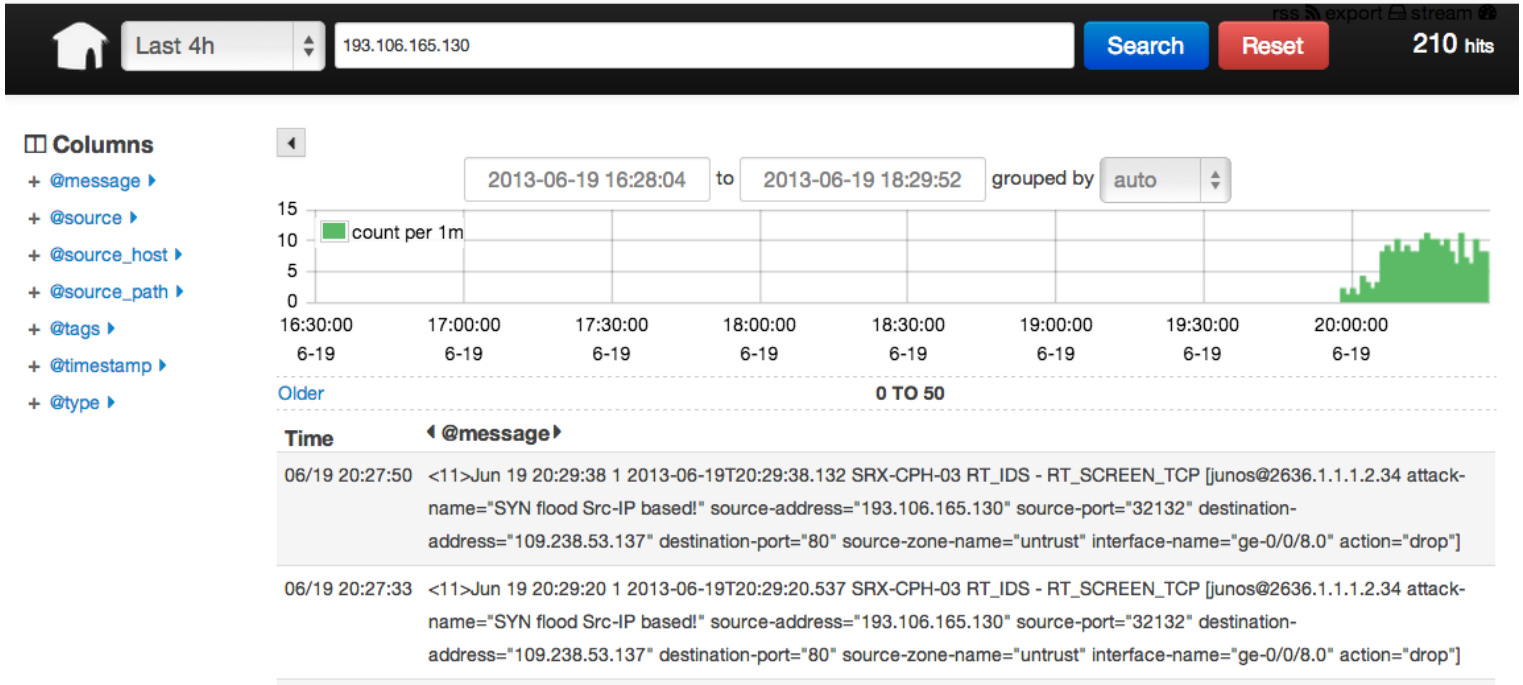
DNS ANY traffic is currently commonly abused for DNS amplification attacks (See Blog post "DDoS-Angriffe durch Reflektierende DNS-Amplifikation vermeiden" in German). The first thing I want to know is what are the IP addresses of the victims of this potential DNS amplification attack:

```
packetq -t -s "select src_addr,count(*) as count from dns where qtype=255 group
by src_addr order by count desc limit 3" lolo.20130118.070000.000179
"src_addr" ,"count"
"216.245.221.243",933825
"85.126.233.70" ,16802
"80.74.130.55" ,91
```

Discussion: bridging the gaps between Devops and Security? Good thing, easy?

http://securityblog.switch.ch/2013/01/22/using-packetq/

Big data tools

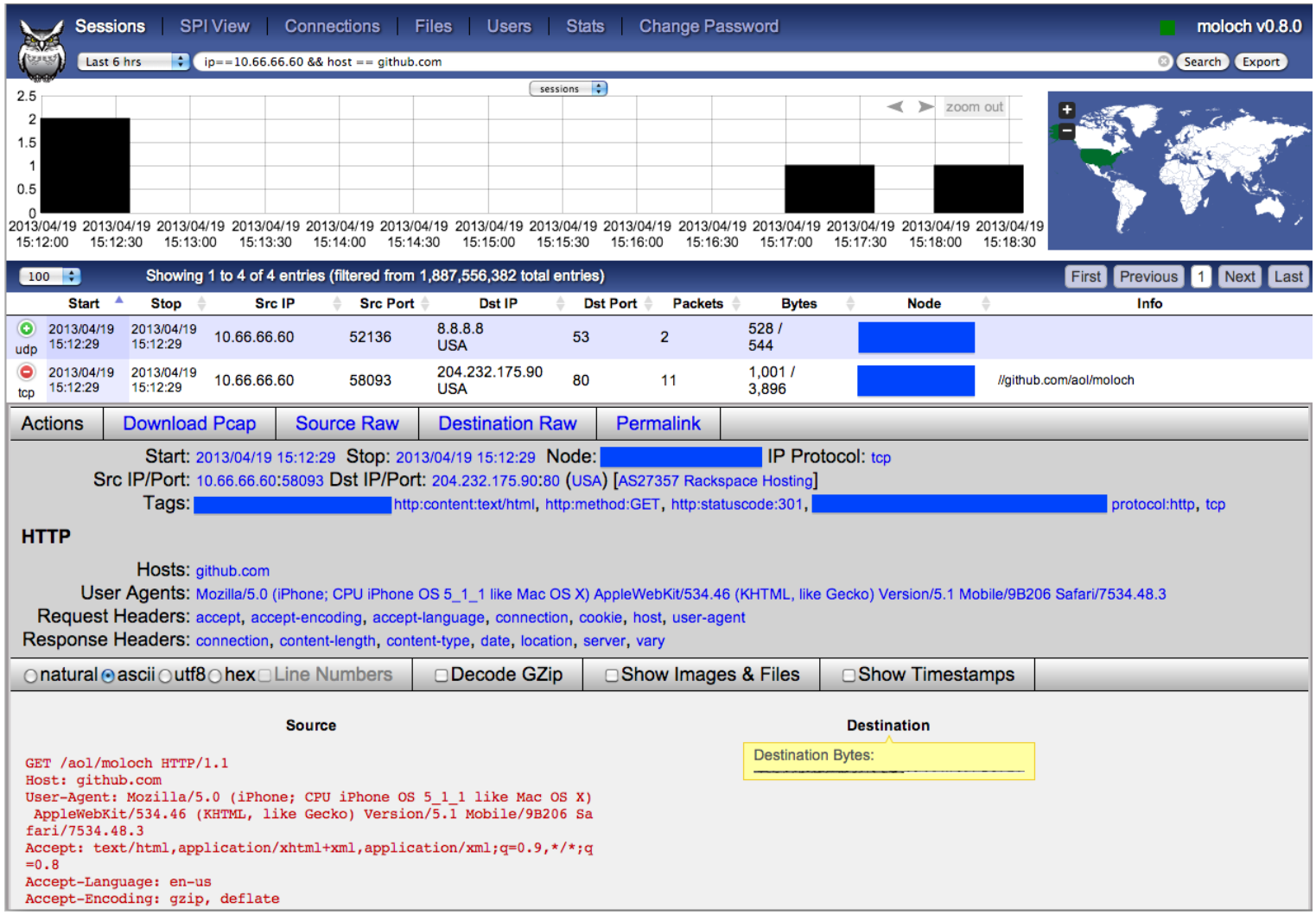


Moloch `https://github.com/aol/moloch`

DSC and PacketQ `https://github.com/dotse/packetq/wiki`

Logstash, Elasticsearch and Kibana

Moloch



Picture from `https://github.com/aol/moloch`

Suricata with Dashboards

Picture from Twitter

https://twitter.com/nullthreat/status/445969209840128000

New link March 2014: 10Gbits

http://pevma.blogspot.se/2014/03/suricata-prepearing-10gbps-network.html

http://suricata-ids.org/2014/03/25/suricata-2-0-available/

Security devops

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We need devops skillz in security

automate, security is also big data

integrate tools, transfer, sort, search, pattern matching, statistics, ...

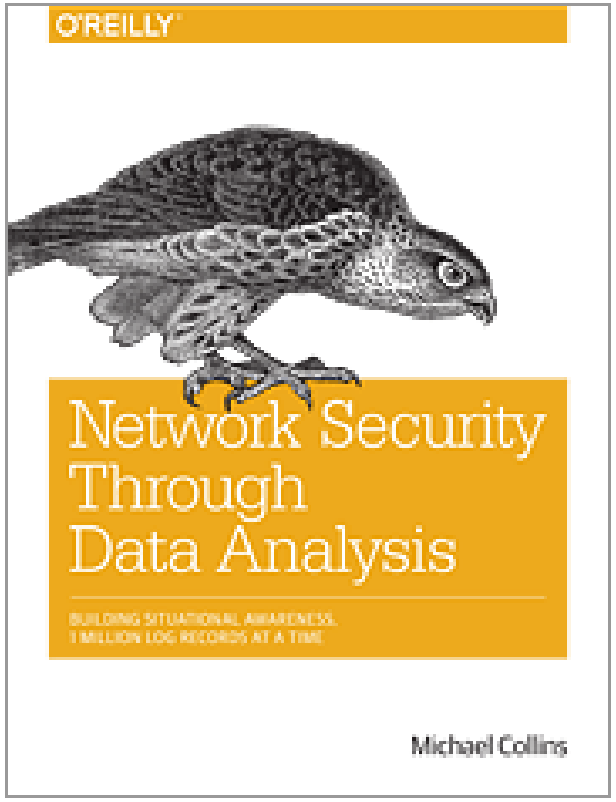
tools, languages, databases, protocols, data formats

Example introductions:

- Seven languages/database/web frameworks in Seven Weeks
- Elasticsearch the definitive guide
  `http://www.elasticsearch.org/guide/en/elasticsearch/guide/current/index.html`
- `http://www.elasticsearch.org/overview/kibana/`
- `http://www.elasticsearch.org/overview/logstash/`

We are all Devops now, even security people!

Network Security Through Data Analysis



Low page count, but high value! Recommended.

Network Security Through Data Analysis: Building Situational Awareness
By Michael Collins
Publisher: O'Reilly Media Released: February 2014 Pages: 348

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The Bro Network Security Monitor

Bro is a powerful network analysis framework that is much different from the typical IDS you may know.

While focusing on network security monitoring, Bro provides a comprehensive platform for more general network traffic analysis as well. Well grounded in more than 15 years of research, Bro has successfully bridged the traditional gap between academia and operations since its inception.

`http://www.bro.org/`

BRO more than an IDS

> The key point that helped me understand was the explanation that Bro is a domain-specific language for networking applications and that Bro-IDS (http://bro-ids.org/) is an application written with Bro.

Why I think you should try Bro

`https://isc.sans.edu/diary.html?storyid=15259`

Bro scripts

```
global dns_A_reply_count=0;
global dns_AAAA_reply_count=0;
...
event dns_A_reply(c: connection, msg: dns_msg, ans: dns_answer, a: addr)
{
++dns_A_reply_count;
}

event dns_AAAA_reply(c: connection, msg: dns_msg, ans: dns_answer, a: addr)
{
++dns_AAAA_reply_count;
}
```

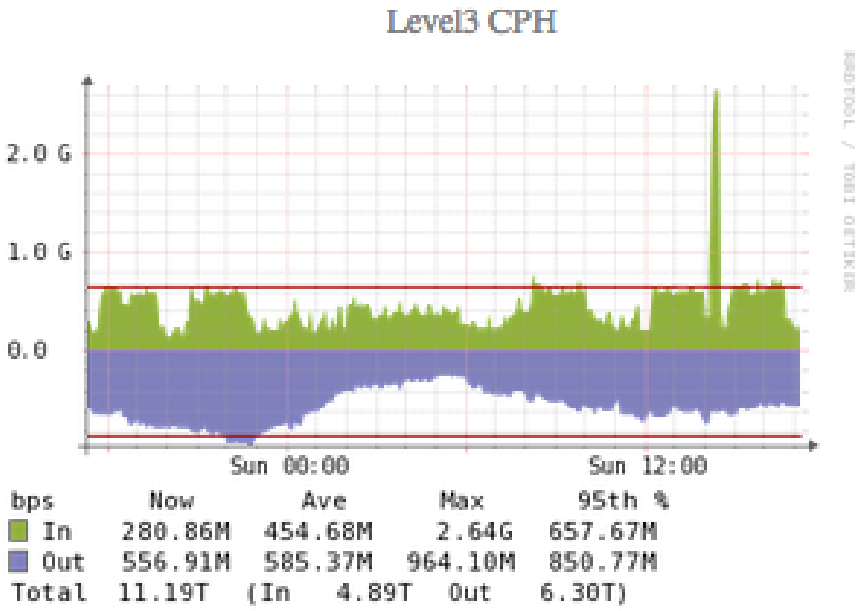
source: dns-fire-count.bro from

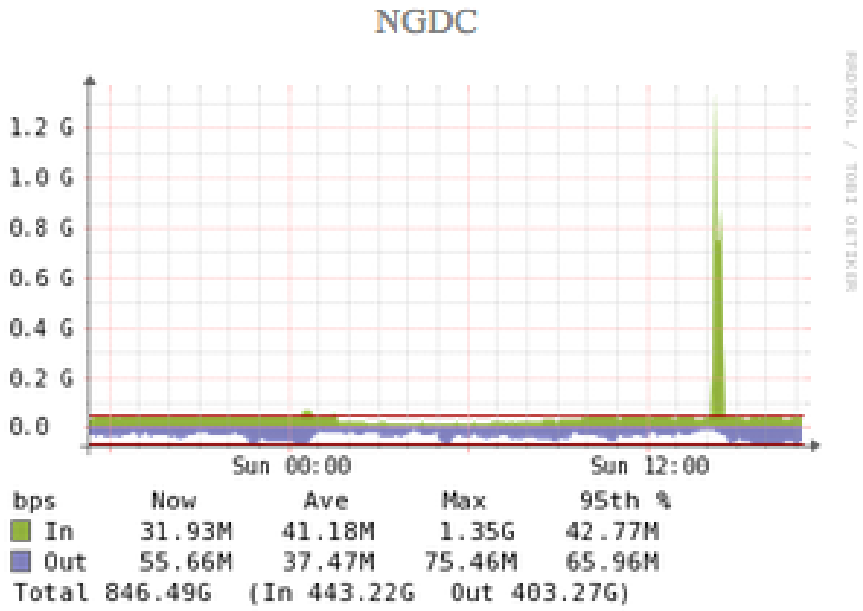
https://github.com/LiamRandall/bro-scripts/tree/master/fire-scripts

Security Onion

- Security Onion is a Linux distro for IDS, NSM, and log management
- `securityonion.blogspot.dk`
- `http://blog.securityonion.net/p/securityonion.html`

Problem: DDoS traffic before filtering

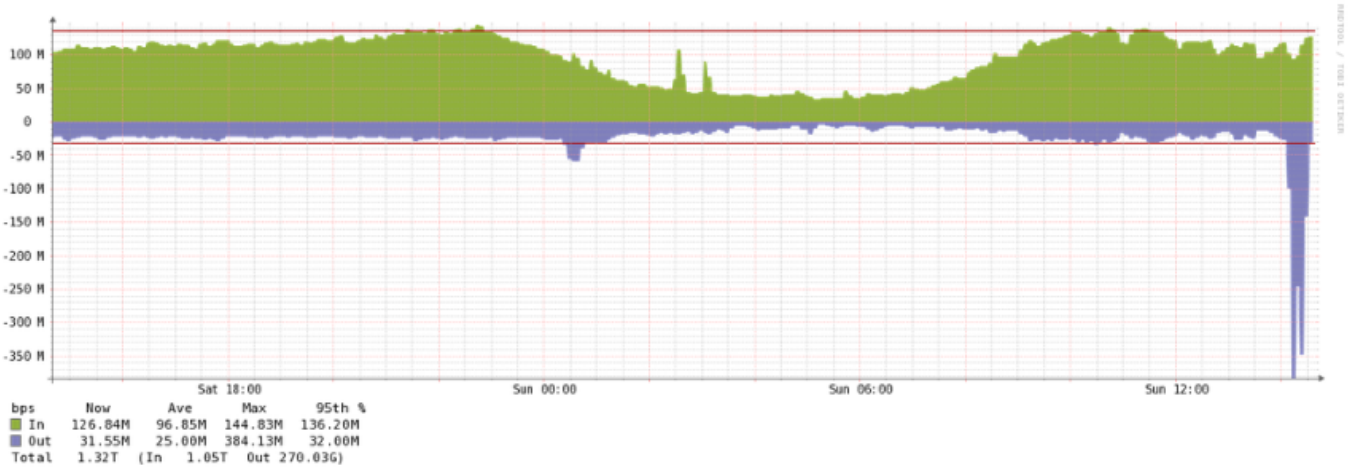




Problem: We receive unauthenticated chaotic traffic

Only two links shown, at least 3Gbit incoming for this single IP

Goal: DDoS traffic after filtering



Solution: Discard early, discard on edge, reduce noise

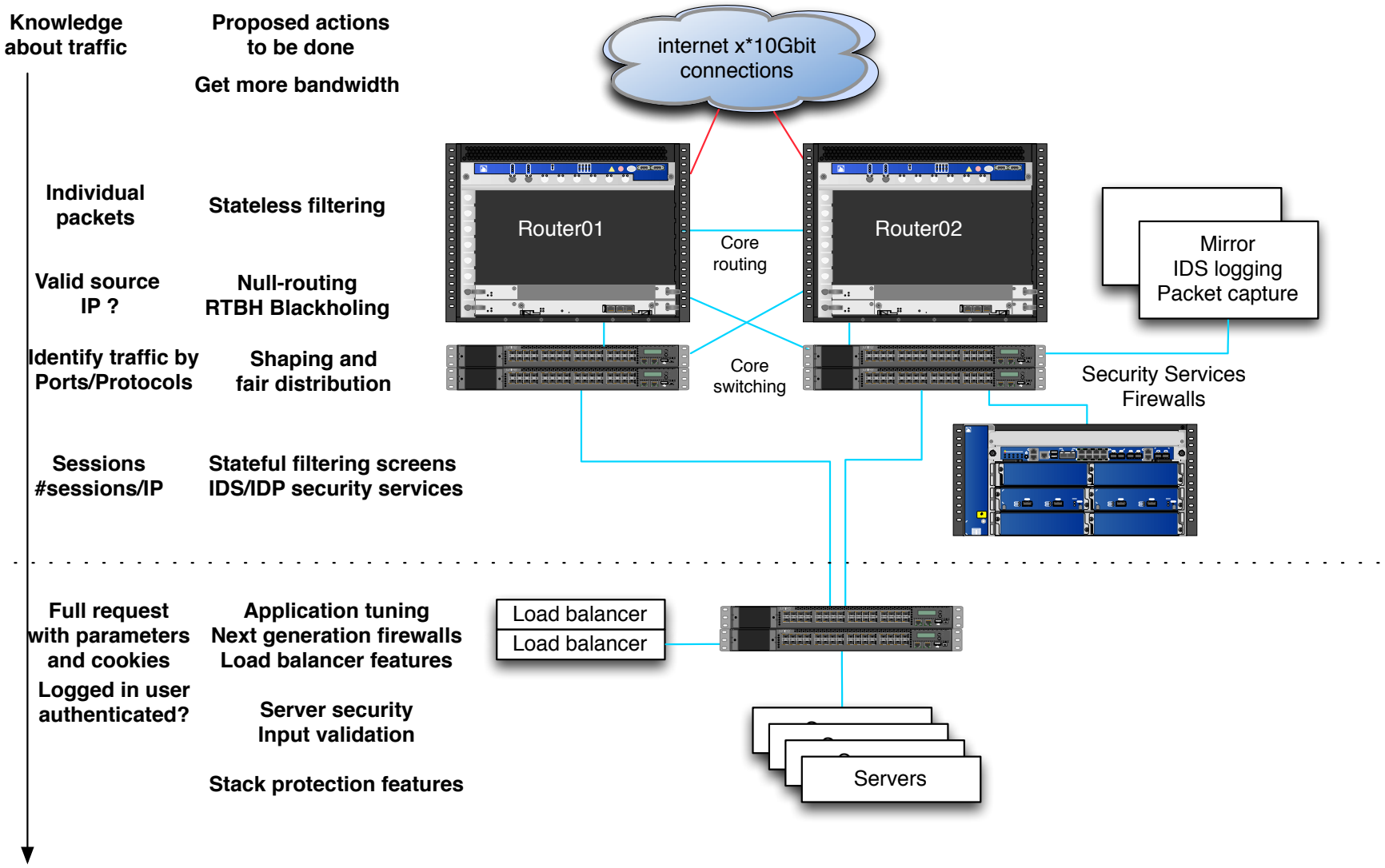
Only use CPU resources for potentially real traffic

Link toward server (next level firewall actually) about 350Mbit outgoing

Drinking from a water hose, eating an elephant

Reduce problems until manageable, divide and conquer

Defense in depth - multiple layers of security



Stateless firewall filter limit protocols

```
term limit-icmp {
    from {
        protocol icmp;
    }
    then {
        policer ICMP-100M;
        accept;
    }
}
term limit-udp {
    from {
        protocol udp;
    }
    then {
        policer UDP-1000M;
        accept;
    }
}
```

Routers also have extensive Class-of-Service (CoS) tools today

Strict filtering for some servers, still stateless!

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```
term some-server-allow {
    from {
        destination-address {
            109.238.xx.0/xx;
        }
        protocol tcp;
        destination-port [ 80 443 ];
    }
    then accept;
}
term some-server-block-unneeded {
    from {
        destination-address {
            109.238.xx.0/xx;
        }
        protocol-except icmp;
    }
    then {
        count some-server-block;
        discard;
    }
}
```

Wut - no UDP, yes UDP service is not used on these servers

Summary: Goal of protection mechanisms

DDoS attacks increase in size

+100Gb happens regularly

Even 200Gb is becoming more common

No vendor can deliver a single device with 100%

Slice the attacks - Divide and conquer

Use the available features and resources in combination - optimize your infrastructure

Allowed traffic to next layer

Basic filtering and routers can eliminate a lot

Characteristics after employing the techniques:

Known bad sources removed

Maximum 100Mbit ICMP

Maximum 1000Mbit UDP

Only port 80/tcp and 443/tcp to some range

LESS traffic to consider on firewall/next device

DDoS in 2014

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SC Magazine > News > Arbor Networks observes several large NTP-based DDoS attacks

Adam Greenberg, Reporter

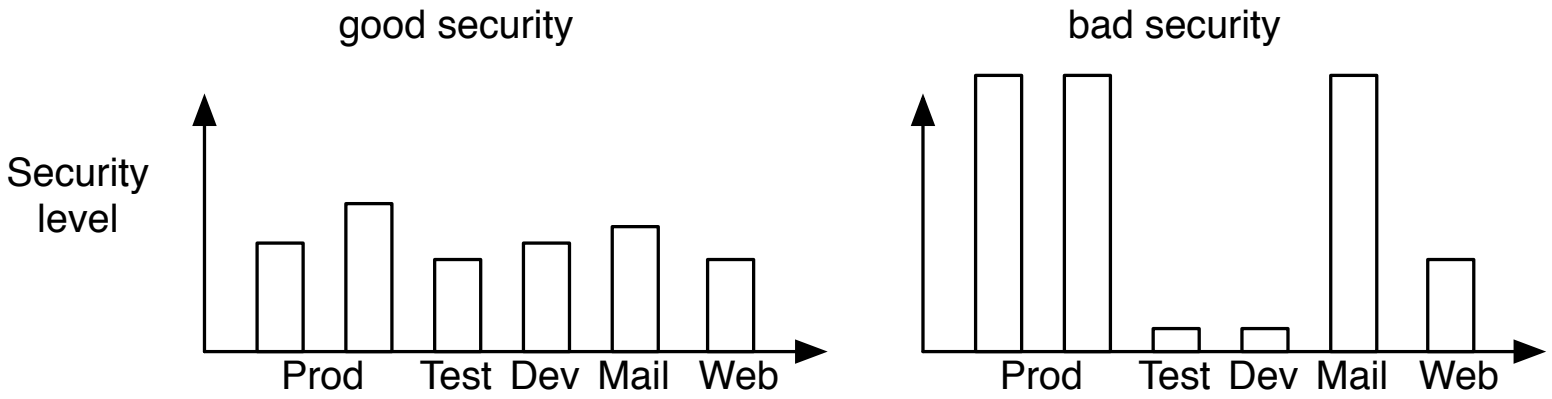
February 14, 2014

Arbor Networks observes several large NTP-based DDoS attacks

Arbor Networks announced on Friday that it observed several large NTP-based distributed denial-of-service (DDoS) attacks this week, including one on Monday that peaked at 325 gigabytes per second.

- Several big players you need to research before needing them!
- Arbor Networks sells software solutions for carriers
  http://www.arbornetworks.com/
- Prolexic sells DDoS services, DNS and BGP based
  http://www.prolexic.com/
- CloudFlare proxy based
  http://www.cloudflare.com/

Afbalanceret sikkerhed



Det er bedre at have et ensartet niveau

Hvor rammer angreb hvis du har Fort Knox et sted og kaos andre steder

Hackere vælger ikke med vilje den sværeste vej ind

Part II

Udviklingsstandarder

Hvad gør I for at undgå problemer som de her nævnte? - kan man gøre mere?

Man børe være klar over hvilke teknologier man bruger

Standardiser på et mindre antal produkter, biblioteker, sprog

Regler og procedurer skal hele tiden opdateres:

- Kvalitetssikring
- Retningslinier for tilladte tags
- Retningslinier for brug af SQL

Ved at fokusere på antallet af produkter kan man måske indskrænke mulighederne for fejl, høj kvalitet er ofte mere sikkert

nye produkter kan være farlige til man lærer dem at kende!

Retningslinier

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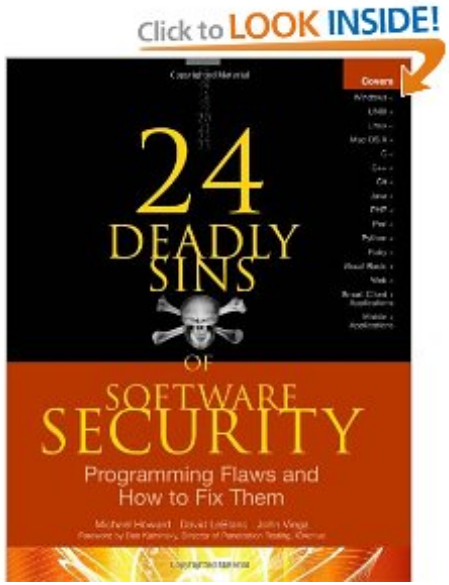
- Hvis der ikke findes retningslinier for udvikling så etabler disse
- eksempel:
  javascript må gerne benyttes til at validere forms for at give hurtig feedback til brugeren
- serveren der modtager input fra brugeren validerer alle data sikkerhedsmæssigt
- Retningslinierne er medvirkende til at foretage en afbalanceret investering i sikkerheden
- undgå dyre hovsa løsninger
- undgå huller i sikkerheden, ens niveau
- Der findes vejledninger til både gamle og nye sprog/systemer,
  eks Ruby On Rails Security Guide `http://guides.rubyonrails.org/security.html`

Deadly sins bogen



24 Deadly Sins of Software Security Michael Howard, David LeBlanc, John Viega 2. udgave, første hed 19 Deadly Sins

OWASP top ten

> The OWASP Top Ten provides a minimum standard for web application security. The OWASP Top Ten represents a broad consensus about what the most critical web application security flaws are.

The Open Web Application Security Project (OWASP)

OWASP har gennem flere år udgivet en liste over de 10 vigtigste sikkerhedsproblemer for webapplikationer

`http://www.owasp.org`

OWASP WebGoat

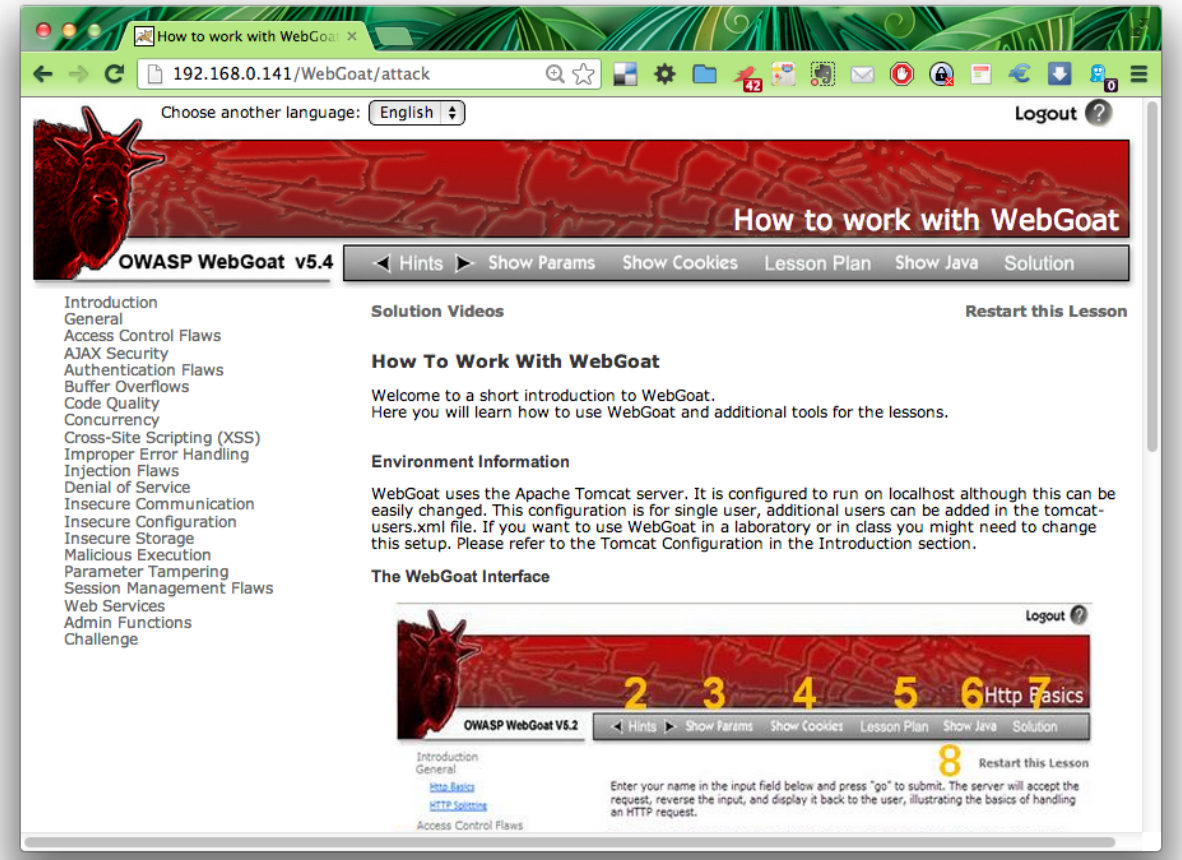
WebGoat fra OWASP, `http://www.owasp.org`

Træningsmiljø til webhacking

Downloades som Zipfil og kan afvikles direkte på en Windows laptop

`https://www.owasp.org`

WebGoat overview



Perfect for learning web hacking/protection

Burpsuite

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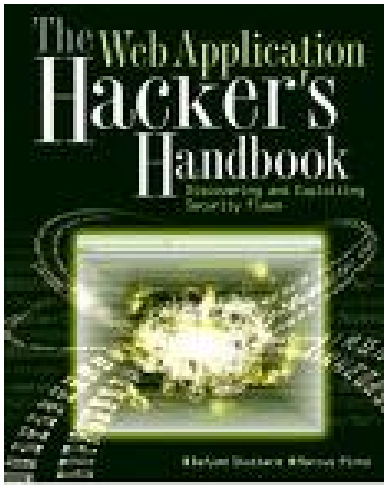
> Burp Suite is an integrated platform for performing security testing of web applications. Its various tools work seamlessly together to support the entire testing process, from initial mapping and analysis of an application's attack surface, through to finding and exploiting security vulnerabilities.
>
> Burp gives you full control, letting you combine advanced manual techniques with state-of-the-art automation, to make your work faster, more effective, and more fun.

Burp suite indeholder både proxy, spider, scanner og andre værktøjer i samme pakke - NB: EUR 249 per user per year.

`http://portswigger.net/burp/`

More Web application hacking



The Web Application Hacker's Handbook: Discovering and Exploiting Security Flaws
Dafydd Stuttard, Marcus Pinto, Wiley 2007 ISBN: 978-0470170779

Protect yourself: Why think of security?

> Privacy is necessary for an open society in the electronic age. Privacy is not secrecy. A private matter is something one doesn't want the whole world to know, but a secret matter is something one doesn't want anybody to know. Privacy is the power to selectively reveal oneself to the world. A Cypherpunk's Manifesto by Eric Hughes, 1993

Copied from `https://cryptoparty.org/wiki/CryptoParty`

Face reality

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- Criminals sell your credit card information and identity theft
- Trade infected computers like a commodity
- Governments write laws that allows them to introduce back-doors - and use these
- Governments do blanket surveillance of their population
- Governments implement censorship, threaten citizens and journalist
- Governments will introduce back-doors in products we use
- Danish police and TAX authorities have the legals means, see *Rockerloven*

You are not paranoid when there are people actively attacking you!

Use protection - always

Turkey: Erdogan bans Twitter

Censorship on the internet - lol

The Net interprets censorship as damage and routes around it.

John Gilmore

John Gilmore is an American computer science innovator, Libertarian, Internet activist, and one of the founders of Electronic Frontier Foundation. He created the alt.* hierarchy in Usenet and is a major contributor to the GNU project.

*This **scientist** article is a stub. You can help Wikiquote by expanding it.*

Sourced [edit]

- **The Net interprets censorship as damage and routes around it.**
  - As quoted in *TIME* magazine (6 December 1993)
  - Unsourced variant:

    The Net treats censorship as a defect and routes around it.
- How many of you have broken no laws this month?
  - As quoted in a speech to the First Conference on Computers, Freedom, and Privacy in 1991
- If you're watching everybody, you're watching nobody.
  - As quoted in Subject: [IP] John Gilmore on government trustworthiness and spy gear
- **When the X500 revolution comes, your name will be lined against the wall and shot.**
  - As quoted in Peter Gutmann's X509 style guide

The Net interprets censorship as damage and routes around it.

http://en.wikiquote.org/wiki/John_Gilmore
http://en.wikipedia.org/wiki/John_Gilmore_(activist)

Directly connection Tor Users from Turkey

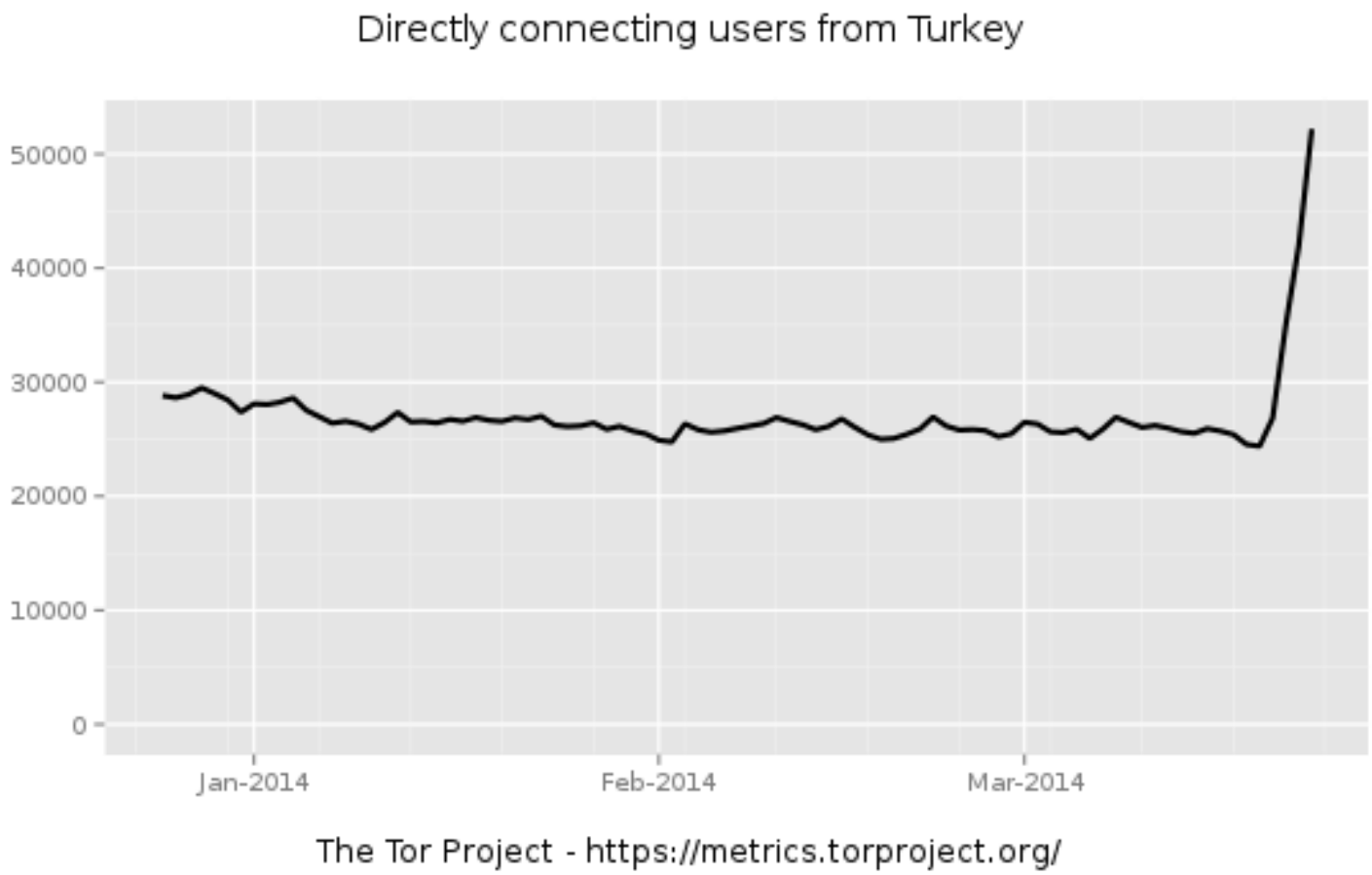


Image from `https://metrics.torproject.org`
via `https://twitter.com/runasand`

Directly connection Tor Users from Turkey +10.000

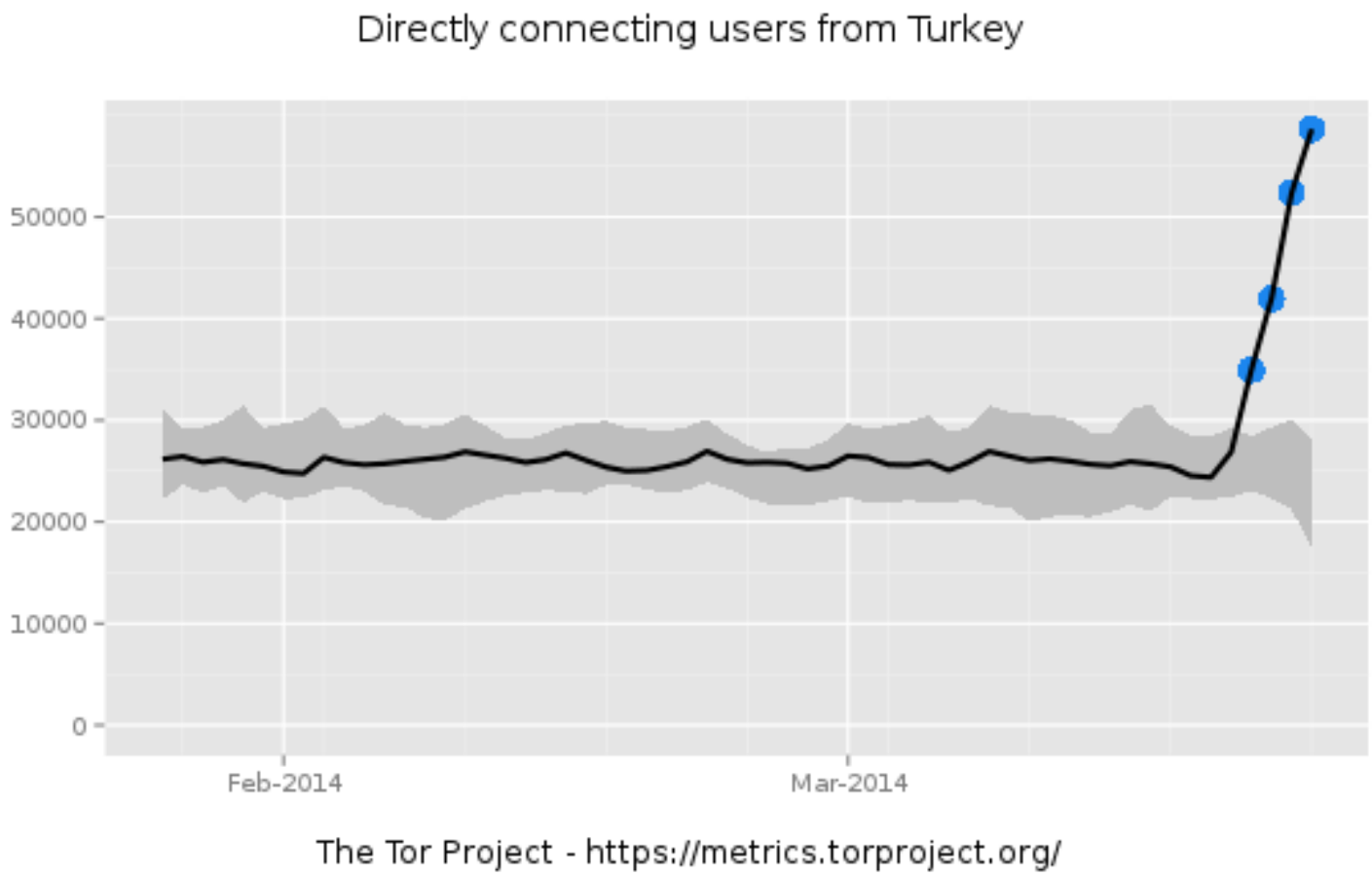


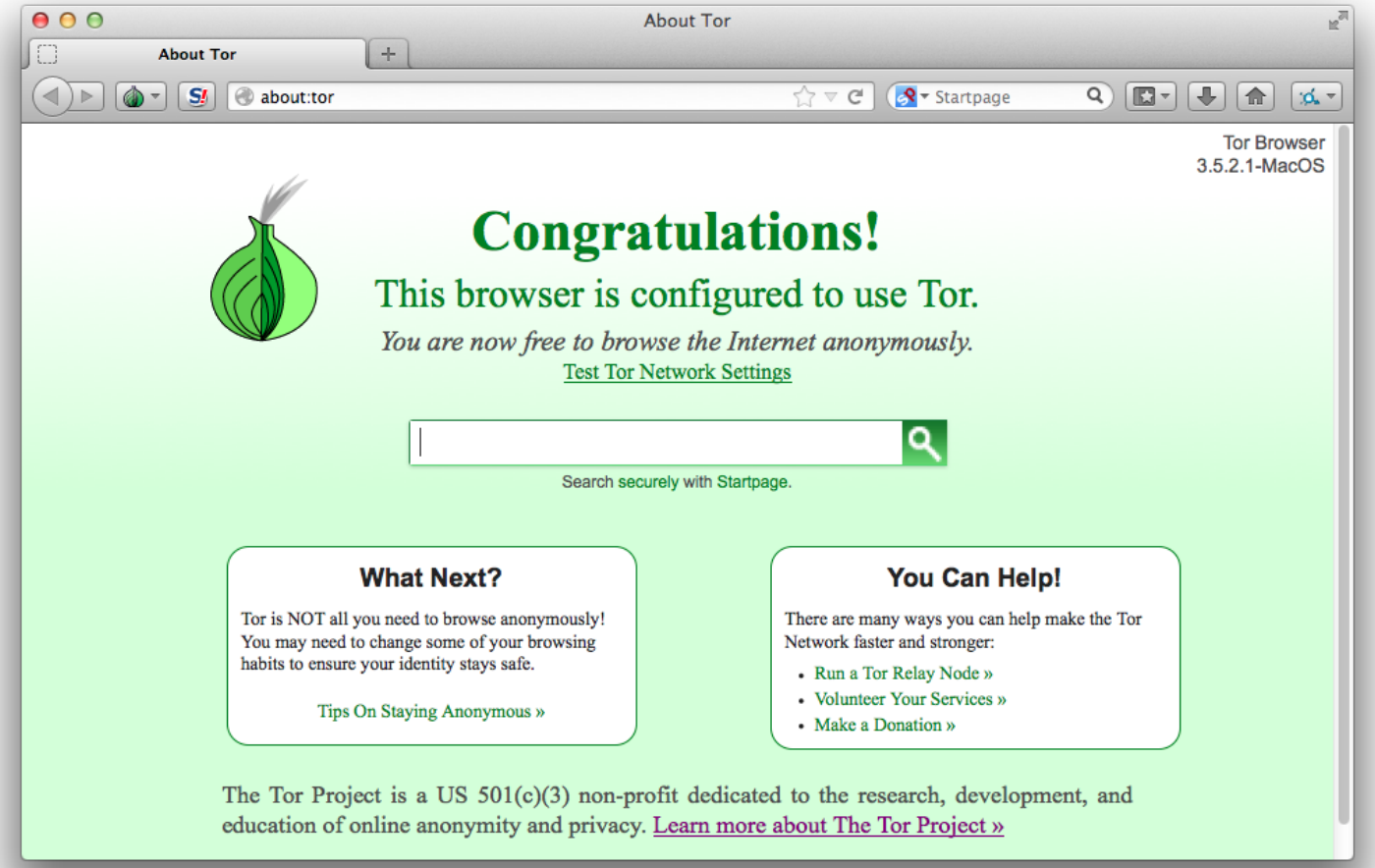
Image from `https://metrics.torproject.org` via `https://twitter.com/ioc32/status/448791582423408640`

Tor project install

Der findes diverse tools til Tor, Torbutton on/off knap til Firefox osv.

Det anbefales at bruge Torbrowser bundles fra `https://www.torproject.org/`

Torbrowser - anonym browser



Mere anonym browser - Firefox in disguise

Whonix - Tor to the max!

Whonix is an operating system focused on anonymity, privacy and security. It's based on the Tor anonymity network[5], Debian GNU/Linux[6] and security by isolation. DNS leaks are impossible, and not even malware with root privileges can find out the user's real IP. `https://www.whonix.org/`

Torbrowser er godt, Whonix giver lidt ekstra sikkerhed

Multiple browsers

- Strict Security settings in the general browser, Firefox or Chrome?
- More lax security settings for ”trusted sites” - like home banking
- Security plugins like HTTPS Everywhere and NoScripts for generic browsing

HTTPS Everywhere

HTTPS Everywhere is a Firefox extension produced as a collaboration between The Tor Project and the Electronic Frontier Foundation. It encrypts your communications with a number of major websites.

`http://www.eff.org/https-everywhere`

Secure your mobile

Orbot:
Proxy With Tor

Orweb:
Private Web Browser

ChatSecure:
Private and Secure Messaging

ObscuraCam:
The Privacy Camera

Ostel:
Encrypted Phone Calls

CSipSimple:
Encrypted Voice Over IP (VOIP)

K-9 and APG:
Encrypted E-mail

KeySync:
Syncing Trusted Identities

TextSecure:
Short Messaging Service (SMS)

Pixelknot:
Hidden Messages

Dont forget your mobile platforms `https://guardianproject.info/`

DNSSEC trigger

Lots of DNSSEC tools, I recommend DNSSEC-trigger a local name server for your laptop

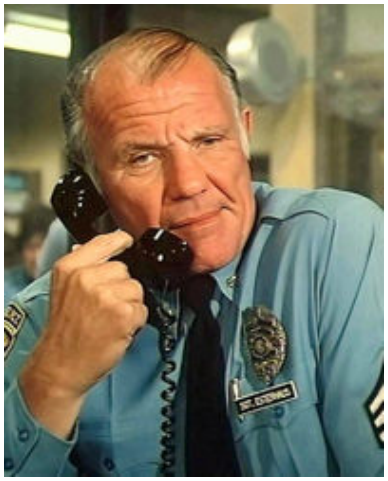
- DNSSEC Validator for firefox
  `https://addons.mozilla.org/en-us/firefox/addon/dnssec-validator/`
- OARC tools `https://www.dns-oarc.net/oarc/services/odvr`
- `http://www.nlnetlabs.nl/projects/dnssec-trigger/`

Følg med Twitter news

Twitter has become an important new resource for lots of stuff

Twitter has replaced RSS for me

Be careful - spørgsmål?



Hey, Lets be careful out there!

Henrik Lund Kramshøj, internet samurai
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Billede: Michael Conrad `http://www.hillstreetblues.tv/`

VikingScan.org - free portscanning