Welcome to

Tendenser i sikkerhed

March 2015

Henrik Lund Kramshøj, internet samurai
hlk@solido.net

http://www.solidonetworks.com

Slides are available as PDF, kramshoej@Github

No I wont get into danish politicians taking away our freedoms, much ...

Goals of today

Update on trends in information security and internet security

Offer input to what things to look into

I will try to limit myself to things from 2015

Hodge-podge of security related things - inspiration

Please give feedback and join me in discussions, dialogue ☺

Plan for today

Kl 17:00-20:30 and some breaks

Less presentation, more talk

Less me talking (only) and more 2.0 social media interaction

Generic advice

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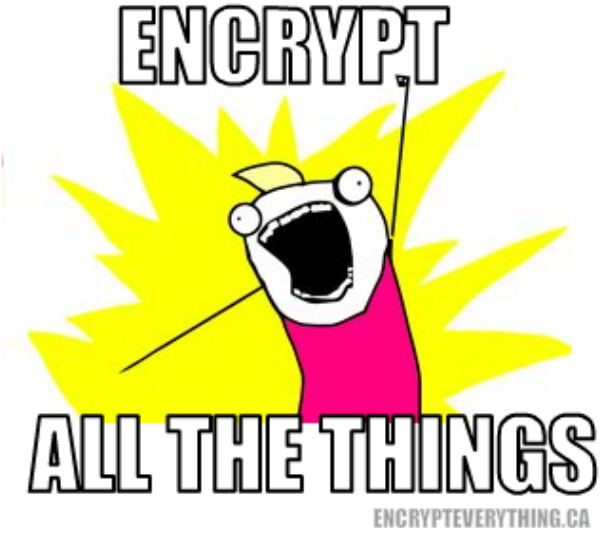
Recommendations



- 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, one for banking apps?
- Multiple laptops? One for private data, one for work?
- Think of the data you produce - where is it stored
- Use pseudonyms and aliases, do not use your real name everywhere
- Enable encryption: IMAP**S**, POP3**S**, HTTP**S** and full disk encryption
- Use Tor `http://torproject.org/`

Democracy now: Why do we bother?

Jacob Appelbaum @ioerror

Transparency and accountability are required properties of legitimate democratic institutions. "Anti-secrecy" rhetoric is hilariously tired.

In a democracy we need the citizens with freedom that can act without constant surveillance

Democracy requires that we can actively select which personal data to give up and to whom

Cryptography is peaceful protest against blanket surveillance

PS Wrote this slide loooong before Copenhagen shooting in 2015, still stand by it!

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`

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 others 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`

- Also check out their other projects
- Privacy Badger `https://www.eff.org/privacybadger`
- Surveillance Self-Defense is EFF's guide to defending yourself and your friends `https://ssd.eff.org/`

Add-ons Galore

You can find lots of privacy add-ons, above is a collection by @tykling from Twitter

`https://addons.mozilla.org/en-US/firefox/collections/tykling/tykling-firefox-addons/`

`https://www.denfri.dk/2015/03/5-firefox-tilfoejelser-der-kan-redde-dit-privatliv/`

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!

Overview of malware bypass today

Quote: The primary malware installation, sometimes referred as an infection, can be achieved using several attack vectors. The goal is always to run malicious code. Some of the most common attack vectors are:

- 1. Browser-based social engineering: where a user is tricked into clicking on a legitimate-looking URL which in turn triggers code execution using browser or browser-plugin vulnerabilities in Java and Flash. More advanced attacks can hide in legitimate traffic without requiring any user-interaction. These are commonly referred to as drive-by downloads.
- 2. Email-based social engineering and spear phishing: where a user receives an email that contains a hidden or visible binary, which executes when the user clicks on it.
- 3. Credential theft: when guessed or stolen credentials are used to access a remote machine and execute (malicious) code, such as installing a backdoor.

Source: Great summary article by Alon Nafta, senior security engineer at SentinelOne

How Malware Bypasses Our Most Advanced Security Measures, february 2015

`http://www.darkreading.com/perimeter/how-malware-bypasses-our-most-advanced-security-measures/a/d-id/1318974?_mc=RSS_DR_EDT`

Overview of malware bypass today, continued

Evasion techniques To evade detection, during and after installation, malware uses five primary techniques.

1. Wrapping. This process attaches the malicious payload (the installer or the malware itself) to a legitimate file. ... IceFog is a well-known malware commonly wrapped with a legitimate-looking CleanMyMac application and used to target OS X users. On the Windows platform, OnionDuke has been used with legitimate Adobe installers shared over Tor networks to infect machines.

2. Obfuscation. This involves modifying high level or binary code it in a way that does not affect its functionality, but completely changes its binary signature. ... Malware authors have adopted the technique to bypass antivirus engines and impair manual security research. ...

Source: How Malware Bypasses Our Most Advanced Security Measures

`http://www.darkreading.com/perimeter/how-malware-bypasses-our-most-advanced-security-measures/a/d-id/1318974?_mc=RSS_DR_EDT`

Overview of malware bypass today, continued

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3. Packers. These software tools are used to compress and encode binary files, which is another form of obfuscation.... These techniques are extremely effective at circumventing static signature engines.

4. Anti-debugging. Like obfuscation, anti-bugging was originally created by software developers to protect commercial code from reverse-engineering. Anti-debugging can prevent a binary from being analyzed in an emulated environments such as virtual machines, security sandbox, and others. ...

5. Targeting. This technique is implemented when malware is designed to attack a specific type of system (e.g. Windows XP SP 3), application (e.g. Internet Explorer 10) and/or configuration (e.g. detecting a machine not running VMWare tools, which is often a telltale sign for usage of virtualization). ...

Source: How Malware Bypasses Our Most Advanced Security Measures

`http://www.darkreading.com/perimeter/how-malware-bypasses-our-most-advanced-security-measures/a/d-id/1318974?_mc=RSS_DR_EDT`

Most vulnerable operating systems in 2014

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Operating system	# of vulnerabilities	# of HIGH vulnerabilities	# of MEDIUM vulnerabilities	# of LOW vulnerabilities
Apple Mac OS X	147	64	67	16
Apple iOS	127	32	72	23
Linux Kernel	119	24	74	21
Microsoft Windows Server 2008	38	26	12	0
Microsoft Windows 7	36	25	11	0
Microsoft Windows Server 2012	38	24	14	0
Microsoft Windows 8	36	24	12	0
Microsoft Windows 8.1	36	24	12	0
Microsoft Windows Vista	34	23	11	0
Microsoft Windows RT	30	22	8	0

An average of 19 vulnerabilities per day were reported in 2014, according to the data from the National Vulnerability Database (NVD).

Source:

`http://www.gfi.com/blog/most-vulnerable-operating-systems-and-applications-in-2014/`

Most vulnerable applications in 2014

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Application	# of vulnerabilities	# of HIGH vulnerabilities	# of MEDIUM vulnerabilities	# of LOW vulnerabilities
Microsoft Internet Explorer	242	220	22	0
Google Chrome	124	86	38	0
Mozilla Firefox	117	57	57	3
Adobe Flash Player	76	65	11	0
Oracle Java	104	50	46	8
Mozilla Thunderbird	66	36	29	1
Mozilla Firefox ESR	61	35	25	1
Adobe Air	45	38	7	0
Apple TV	86	29	49	8
Adobe Reader	44	37	7	0
Adobe Acrobat	43	35	8	0
Mozilla SeaMonkey	63	28	34	1

Not surprisingly at all, web browsers continue to have the most security vulnerabilities because they are a popular gateway to access a server and to spread malware on the clients.

Source:

`http://www.gfi.com/blog/most-vulnerable-operating-systems-and-applications-in-2014/`

DNS attacks, February 2015 - ongoing for +10 years!

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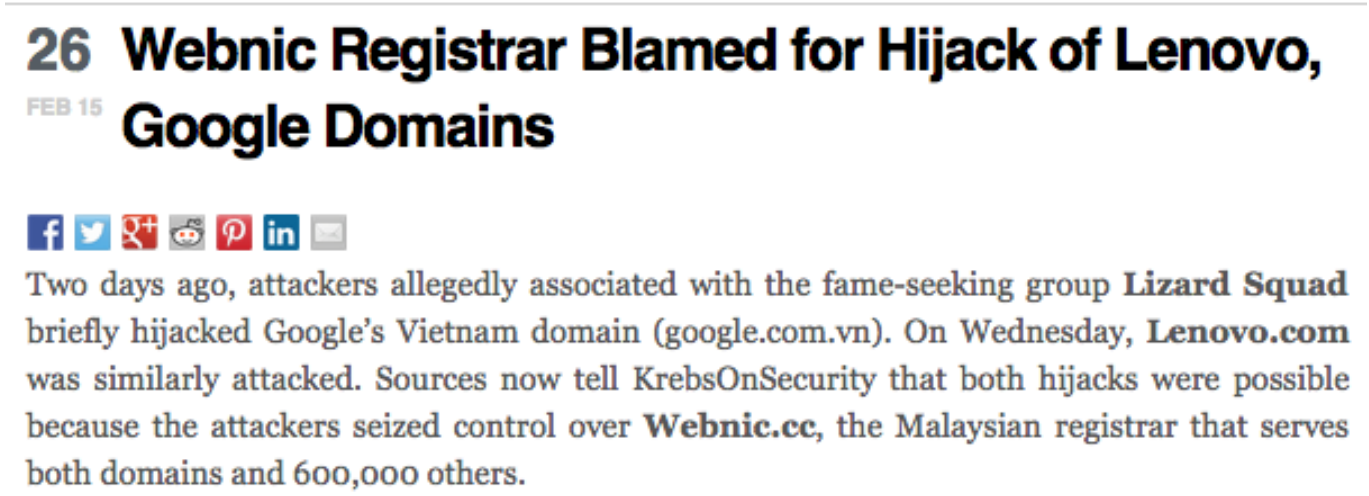


26 FEB 15

Webnic Registrar Blamed for Hijack of Lenovo, Google Domains

Two days ago, attackers allegedly associated with the fame-seeking group **Lizard Squad** briefly hijacked Google's Vietnam domain (google.com.vn). On Wednesday, **Lenovo.com** was similarly attacked. Sources now tell KrebsOnSecurity that both hijacks were possible because the attackers seized control over **Webnic.cc**, the Malaysian registrar that serves both domains and 600,000 others.

DNS insecurity has huge impact on your security!

Most are denial of service, by may create Mitm or confidentiality concerns

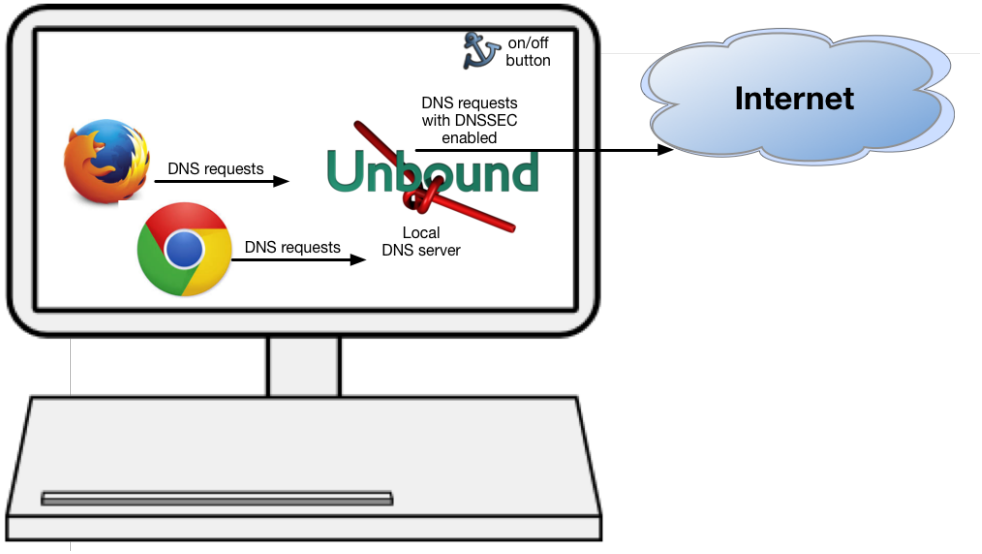
Select DNS providers with care

Sources:

`http://krebsonsecurity.com/2015/02/webnic-registrar-blamed-for-hijack-of-lenovo-google-domains/`

`http://www.version2.dk/artikel/google-og-lenovo-defaced-som-foelge-af-overset-sikkerhedsproblemstilling-91295`

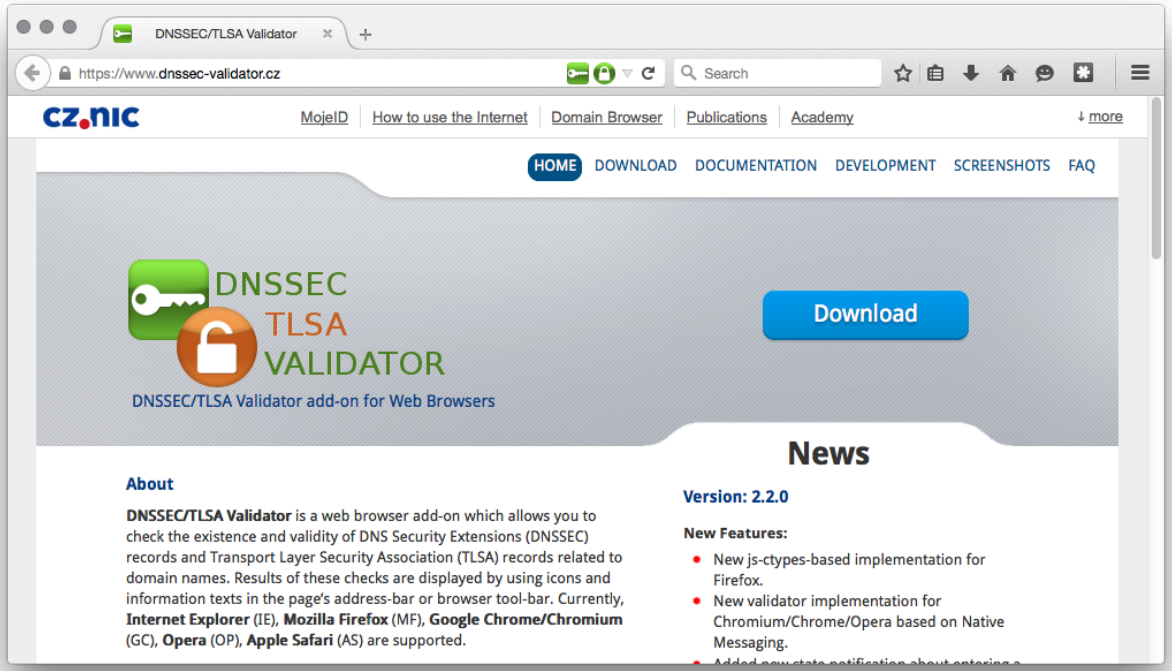
DNSSEC trigger



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/`

DNSSEC get started now



”TLSA records store hashes of remote server TLS/SSL certificates. The authenticity of a TLS/SSL certificate for a domain name is verified by DANE protocol (RFC 6698). DNSSEC and TLSA validation results are displayer by using several icons.”

DNSSEC and DANE

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Objective:

Specify mechanisms and techniques that allow Internet applications to establish cryptographically secured communications by using information distributed through DNSSEC for discovering and authenticating public keys which are associated with a service located at a domain name.

DNS-based Authentication of Named Entities (dane)

`https://datatracker.ietf.org/wg/dane/charter/`

`http://googleonlinesecurity.blogspot.dk/2011/04/improving-ssl-certificate-security.html`

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/
http://jpmens.net/2013/05/27/server-agnostic-logging-of-dns-querie

Storing query logs, old school or needed?

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- policy/protocols/ssl/expiring-certs.bro
- policy/protocols/ssl/extract-certs-pem.bro
- policy/protocols/ssl/heartbleed.bro
- policy/protocols/ssl/known-certs.bro
- policy/protocols/ssl/log-hostcerts-only.bro
- policy/protocols/ssl/validate-certs.bro
- policy/protocols/ssl/validate-ocsp.bro
- policy/protocols/ssl/weak-keys.bro

Looking at DNS PacketQ it was an Older link, but thinking the time is now for doing:

- Netflow session logging, full 1:1 - NFSen, Suricata Flow mode
- DNS query logs, keep it for at least a week? - with DSC and PacketQ
- SSL/TLS full logs over sessions, certs, keys - with Bro/Suricata
  `https://www.bro.org/sphinx-git/script-reference/scripts.html`
- Log and search with Elasticsearch?
  `https://www.elastic.co/guide/en/elasticsearch/guide/current/index.html`

Superfish February 2015

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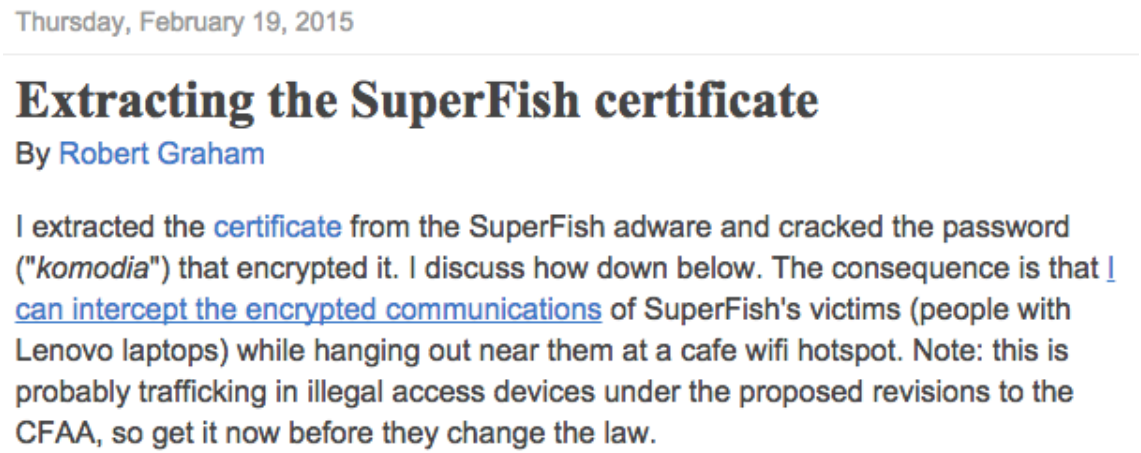
Yet another SSL/TLS related problem



Thursday, February 19, 2015

Extracting the SuperFish certificate

By Robert Graham

I extracted the certificate from the SuperFish adware and cracked the password ("*komodia*") that encrypted it. I discuss how down below. The consequence is that I can intercept the encrypted communications of SuperFish's victims (people with Lenovo laptops) while hanging out near them at a cafe wifi hotspot. Note: this is probably trafficking in illegal access devices under the proposed revisions to the CFAA, so get it now before they change the law.

Lenovo laptops included Adware, which did SSL/TLS Man in the Middle on connections. They had a root certificate installed on the Windows operating system, WTF!

Sources:

`http://blog.erratasec.com/2015/02/extracting-superfish-certificate.html`

`https://en.wikipedia.org/wiki/Superfish`

`http://www.version2.dk/blog/kibana4-superfish-og-emergingthreats-81610`

`https://www.eff.org/deeplinks/2015/02/further-evidence-lenovo-breaking-https-security-its-laptops`

FREAK

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> A group of cryptographers at INRIA, Microsoft Research and IMDEA have discovered some serious vulnerabilities in OpenSSL (e.g., Android) clients and Apple TLS/SSL clients (e.g., Safari) that allow a 'man in the middle attacker' to downgrade connections from 'strong' RSA to 'export-grade' RSA. These attacks are real and exploitable against a shocking number of websites – including government websites. Patch soon and be careful.

Source: Matthew Green, cryptographer and research professor at Johns Hopkins Univ

`http://blog.cryptographyengineering.com/2015/03/attack-of-week-freak-or-factoring-nsa.html` `http://www.smacktls.com/` `https://freakattack.com/`

OpenSSL, LibreSSL, Apple SSL flaw exit exit exit!, Android SSL, certs certs!!!111, SSLv3, Heartbleed, MS TLS

F this I'm going out drinking beer *drops mic*

PS From now on its TLS! Not SSL anymore, any SSLv2, SSLv3 is old and vulnerable

```
ssl_prefer_server_ciphers on;
ssl_protocols TLSv1 TLSv1.1 TLSv1.2; # not possible to do exclusive
ssl_ciphers 'EDH+CAMELLIA:EDH+aRSA:EECDH+aRSA+AESGCM:EECDH+aRSA+SHA384:EECDH+\
  \aRSA+SHA256:EECDH:+CAMELLIA256:+AES256:+CAMELLIA128:+AES128:+SSLv3:!aNULL:!\
  \eNULL:!LOW:!3DES:!MD5:!EXP:!PSK:!DSS:!RC4:!SEED:!ECDSA:CAMELLIA256-SHA:AES256\
  \-SHA:CAMELLIA128-SHA:AES128-SHA';
add_header Strict-Transport-Security max-age=15768000; # six months
# use this only if all subdomains support HTTPS!
# add_header Strict-Transport-Security "max-age=15768000; includeSubDomains";
```

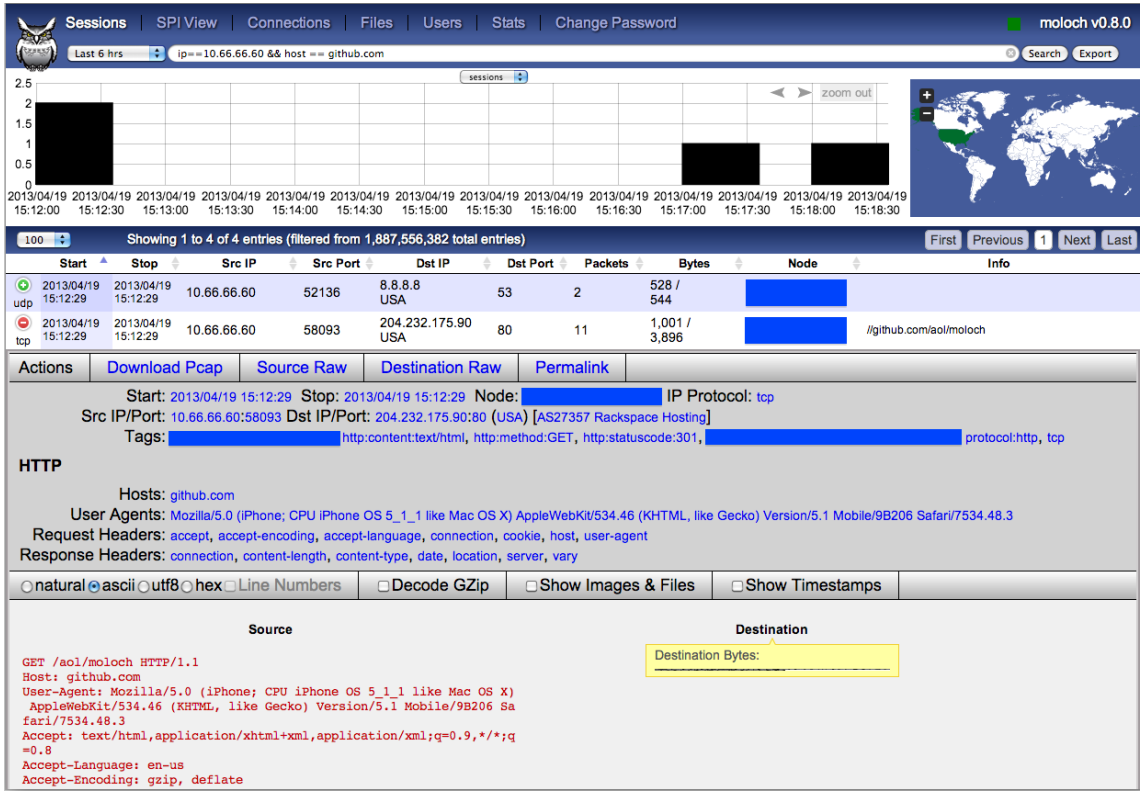
Listing 2.6: *SSL settings for nginx*
[configuration/Webservers/nginx/default]

Overview

This whitepaper arose out of the need for system administrators to have an updated, solid, well researched and thought-through guide for configuring SSL, PGP, SSH and other cryptographic tools in the post-Snowden age. ... This guide is specifically written for these system administrators.

`https://bettercrypto.org/`

Moloch packet capture



Moloch is a open source large scale IPv4 full PCAP capturing, indexing and database system - and for some it might make sense to have some traffic stored as full packet captures

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

New tools

Hacking is fun - learn a lot

Kibana 4

Burp Suite Professional

Security Onion and Suricata updates

Tor Browser 4.0.4

Tails 1.3

Kibana 4 february 2015

Highly recommended for a lot of data visualisation

Source: `https://www.elastic.co/products/kibana`

Hacker tools Burp

Tuesday, February 17, 2015

v1.6.11

This release adds a new Scanner check for path-relative style sheet import (PRSSI) vulnerabilities.

PRSSI vulnerabilities (sometimes termed "relative path overwrite") are not widely understood by security testers or application developers. The key prerequisite for the vulnerability (a CSS import directive that uses a path-relative URL) is both seemingly innocuous and very common. There are some other conditions that are needed for exploitability, but real vulnerabilities are quite prevalent in the wild. The impact of the vulnerability is in many cases serious, and equivalent to cross-site scripting (XSS).

Do it in your own network - your systems, keep it legal

Burp is a highly recommended commercial Web proxy EUR 275/user/year 2.000DKK

Pro version includes scanner and spidering functionality

February and March 2015, Security Onion updates

Security Onion 12.04.5.1 ISO image now available
We have a new Security Onion 12.04.5.1 ISO image now available that contains all the latest Ubuntu and Security Onion updates as of February 5, 2015!

Suricata IDS engine 2.0.7 updated packages for SO released

Learn NSM with Security Onion today - its free

Source:
`http://blog.securityonion.net/2015/02/security-onion-120451-iso-ir`
`html`
`http://blog.securityonion.net/2015/03/suricata-207.html`

February 2015: Tor Browser 4.0.4 Released

Tor - a privacy oriented encrypted anonymizing service, has announced the launch of its next version of Tor Browser Bundle, i.e. Tor version 4.0.4, mostly supposed to improve the built-in utilities, privacy and security of online users on the Internet.

Source: `http://thehackernews.com/2015/02/tor-browser-download.html`
`https://www.torproject.org/`

also new Tails 1.3 was released with bitcoin wallet
`http://thehackernews.com/2015/02/tails-tor-privacy-tools.html`
`https://tails.boum.org/download/index.en.html`

DDoS in 2014

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.

DDoS in 2015

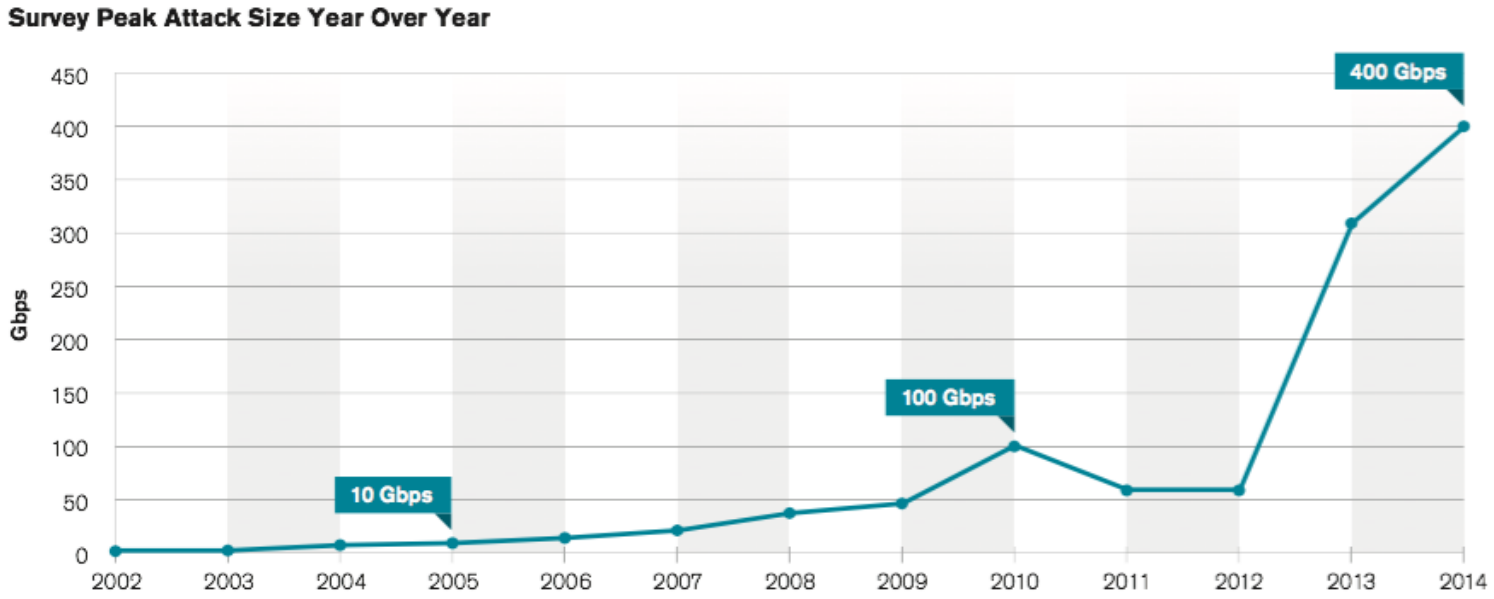
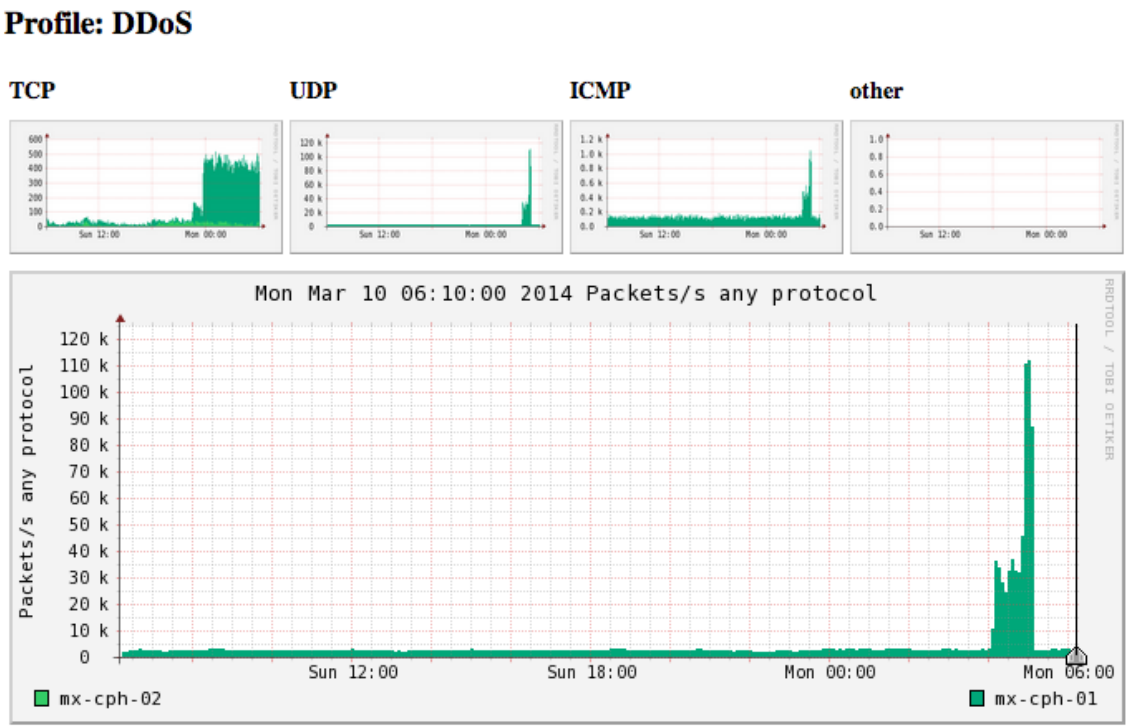


Figure 12 Source: Arbor Networks, Inc.

Source:
Arbor Networks: Worldwide Infrastructure Security Report, Volume X January 2015

Detecting DDoS

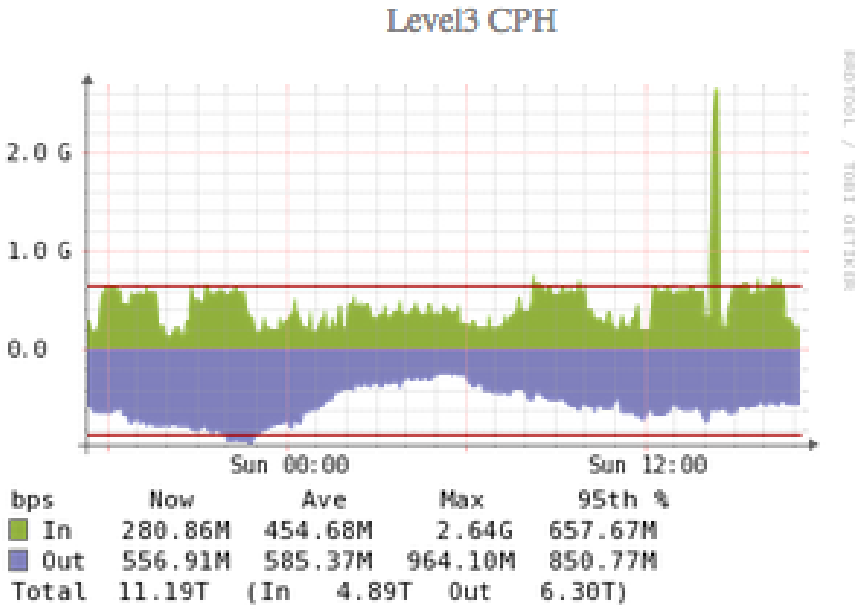


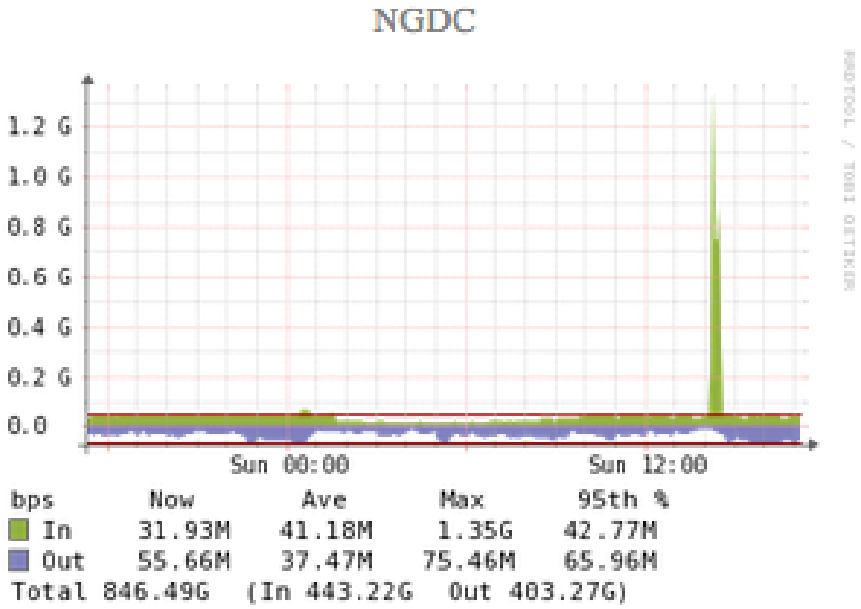
We created a DDoS profile with the common types.

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
```

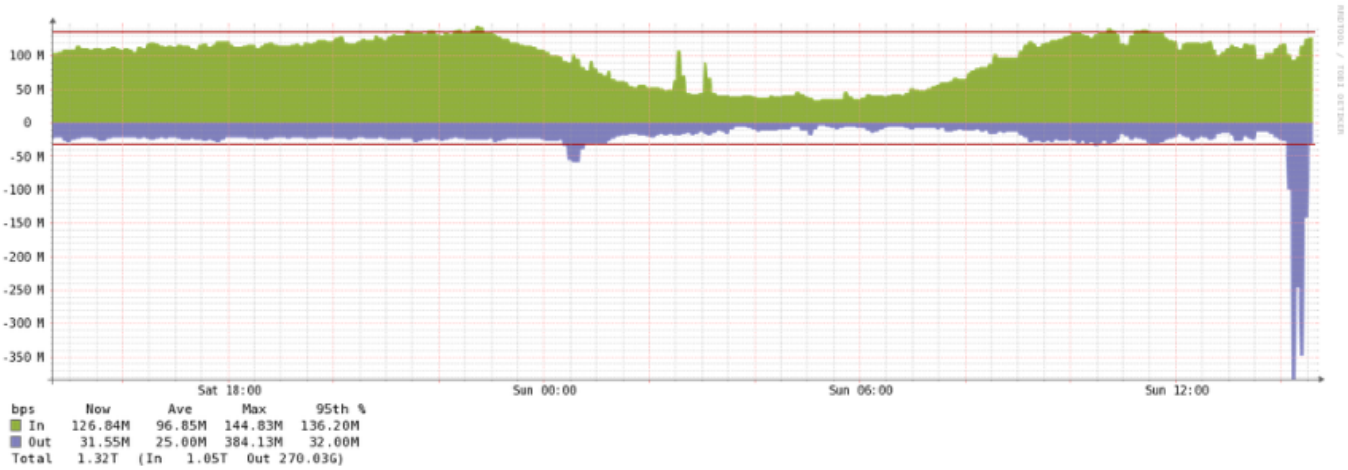
DDoS traffic before filtering





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

DDoS traffic after filtering



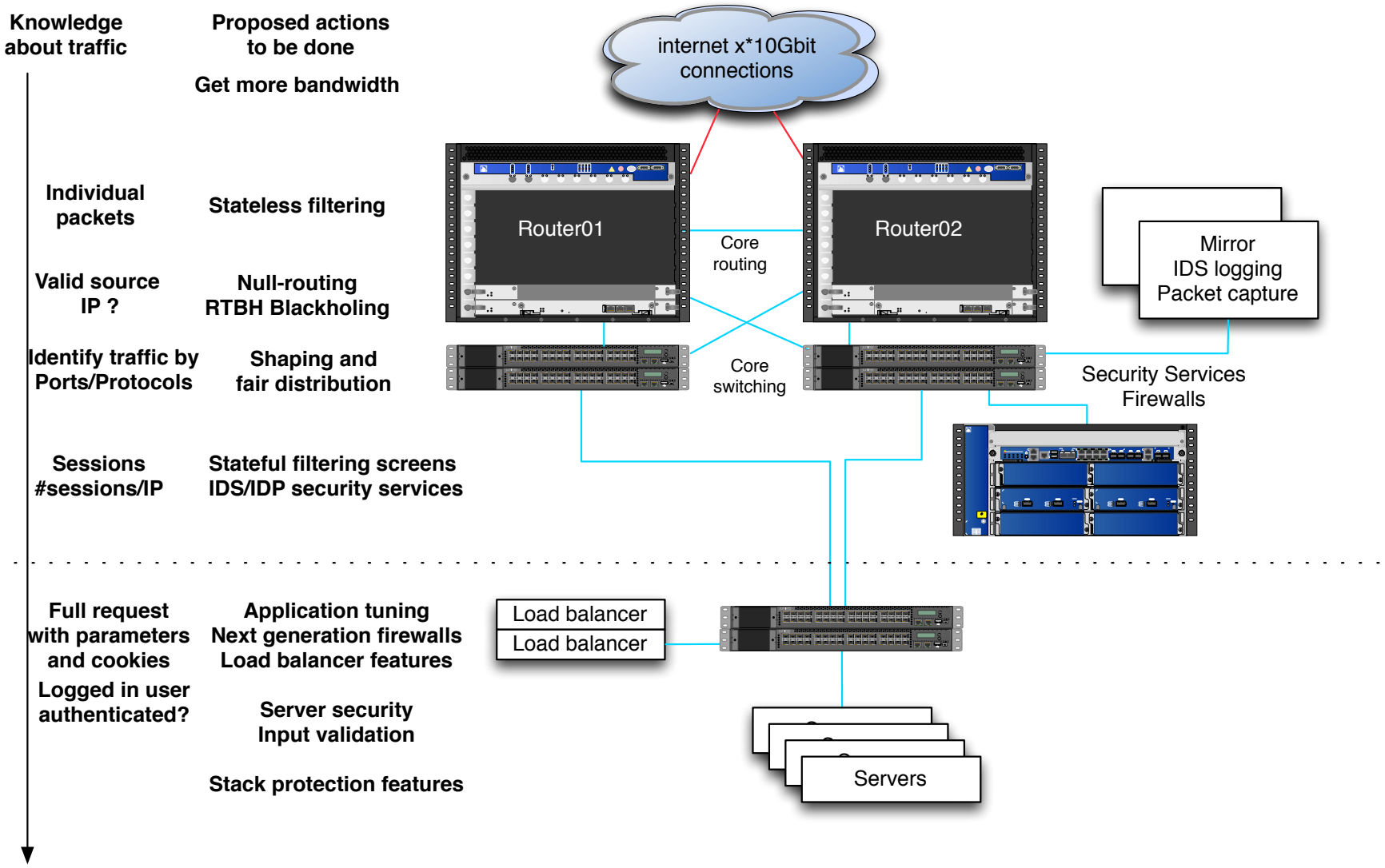
Link toward server (next level firewall actually) about 350Mbit outgoing

Problem: We receive unauthenticated chaotic traffic

Solution: Discard early, discard on edge, reduce noise

Only use CPU resources for potentially real traffic

Defense in depth - multiple layers of security



Proxy servers - protection services

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/

Multiple Major Danish ISPs have bought services from the above companies

Focus for the near future

Walk through your infrastructure
get a detailed view of data, flows, protocols, bandwidth, ports and services

Create a list of critical phone numbers and contacts, enter it in your phone

Automate updates for both clients and servers, goal update everything in hours

Learn to run Nmap and Metasploit scripts - identify vulnerable servers

consider the fact we have multiple overlapping critical security incidents now!

Near future - spring and summer 2014

Document your processes, systems, databases, backup and restore procedures
Finish before summer - so you can have vacation, will be needed!

Crypto Parties - get them started, keep them going!

Conferences: DKNOG, TheCamp this summer, RIPE in May, CCC Summercamp

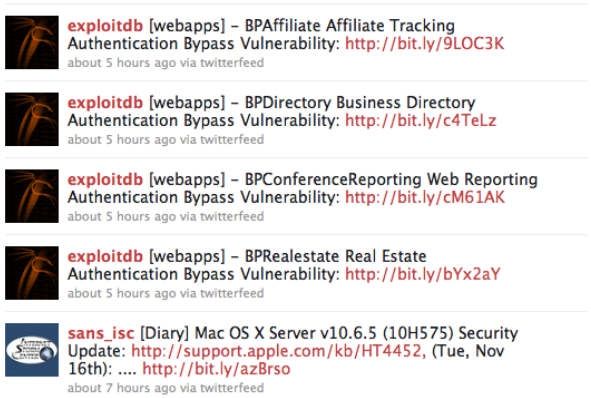
Chaos Communication Camp 2015

Chaos Communication Camp 2015: Save the date! Not just because of tradition, but because we can: There will be a Camp in 2015 again!

After more than three thousand guests at the last Camp in 2011, we expect many outdoor enthusiasts, who like to hack during the day and marvel at the light displays at night and will celebrate the ultimate party in the middle of the festival season with us. Lets just bring all the great experiences from the Congress out on the lawn and do all the experiments too dangerous for the halls of the CCH!

`http://events.ccc.de/2015/02/10/chaos-communication-camp-2015-save-the-date/`

Sources for information



Twitter has replaced RSS for me

Email lists are still a good source of data

Open Mike night ...

what did I forget? tells us about your favourites ☺

Things I forgot, didn't include: Gemalto hack, Citizenfour won an oscar February! Thunderbolt hack - thunderstrike

DNS censorship, NemID bashing, Apple malware, Android malware, iPhone malware?

Did you notice how a lot of the links in this presentation uses HTTPS - encrypted

Questions?

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Henrik Lund Kramshøj, internet samurai
hlk@solido.net

http://www.solidonetworks.com

You are always welcome to send me questions later via email