

Computer Security in 2016: Where are we? What to expect? Are we affected?

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CERN School of Computing 2016

Delete any YouTube video

1. Send this:

```
POST live_events_edit_status_ajax?action_delete_event=1
Host: www.youtube.com
```

```
event_id: ANY_VIDEO_ID
session_token: YOUR_TOKEN
```

2. Receive this:

```
{
  "success": 1
}
```

3. Report to Google and get \$5'000 bounty

<http://kamil.hism.ru/posts/about-vrg-and-delete-any-youtube-video-issue.html>

Blunders happen to everyone

... but better to be ready to react fast

Security on the Internet?

https

Apple's "goto fail" SSL bug (late 2012 – Feb 2014)

```
if ((err = SSLHashSHA1.update(&hashCtx, &clientRandom)) != 0)
    goto fail;
if ((err = SSLHashSHA1.update(&hashCtx, &serverRandom)) != 0)
    goto fail;
if ((err = SSLHashSHA1.update(&hashCtx, &signedParams)) != 0)
    goto fail;
if ((err = SSLHashSHA1.final(&hashCtx, &hashOut)) != 0)
    goto fail;

err = sslRawVerify(ctx,
                  ctx->peerPubKey,
                  dataToSign,
                  dataToSignLen,
                  signature,
                  signatureLen);

if(err) {
    sslErrorLog("SSLDecodeSignedServerKeyExchange: sslRawVerify "
               "returned %d\n", (int)err);
    goto fail;
}

fail:
SSLFreeBuffer(&signedHashes);
SSLFreeBuffer(&hashCtx);
return err;
```

The diagram illustrates the flow of the 'goto fail' bug. A red box highlights two 'goto fail;' statements. A red arrow points from the first 'goto fail;' to the second, and another red arrow points from the second to the 'fail:' label at the bottom left.

Heartbleed bug (OpenSSL)





SERVER, ARE YOU STILL THERE?
IF SO, REPLY "HAT" (500 LETTERS).

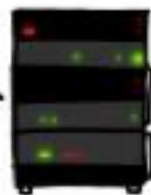


a connection. Jake requested pictures of deer.
User Meg wants these 500 letters: HAT. Lucas requests the "missed connections" page. Eve (administrator) wants to set server's master key to "14835038534". Isabel wants pages about snakes but not too long". User Karen wants to change account password to "CoHeBaSt". User



HAT. Lucas requests the "missed connections" page. Eve (administrator) wants to set server's master key to "14835038534". Isabel wants pages about "snakes but not too long". User Karen wants to change account password to "CoHeBaSt". User Isabel requests pages

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Shellshock

(remote command execution in *bash*)



Since 1989

Software and protocols
we all rely on
are vulnerable

```
goto fail;  
goto fail;
```

A simple mistake...
but honest or intentional?

How to plant backdoors in encryption?

		Undetectability	Lack of Conspiracy	Deniability	Ease of Use	Severity	Durability	Moniterability	Scale	Precision	Control
Design	Low resistance to cryptanalysis	H	L	M	M	H	H	L	H	L	L
	Backdoor constants	H	L	L	M	M	M	L	H	L	H
	Implementation fragility	H	M	H	L	M	M	L	M	L	L
Implementation	Bad randomness	M	H	H	L	M	L	L	M	M	L
	Leaked key data	H	M	L	H	H	L	L	M	M	L
	Weak key generation	M	H	H	H	H	L	L	M	M	L
	Incorrect error handling	H	H	H	M	M	M	M	M	M	L
	Nonce reuse	L	H	H	M	M	L	L	M	M	L
	Flawed API usage	M	H	H	H	H	L	H	M	M	L

From: *"Surreptitiously Weakening Cryptographic Systems"*
<https://eprint.iacr.org/2015/097.pdf>

Software and protocols
we all rely on
are sometimes *made* or *kept* vulnerable



*“You can’t have
a backdoor
that’s only
for the good guys.”*

Tim Cook, Apple

Banning encryption?



Photo: [Guillaume Paumier](#), CC-BY

“The Second Crypto War”
is ongoing

Shellshock

(remote command execution in *bash*)



Since 1989

Code from 2004, running as *root*

```
foreach my $f (<$_[0]/*.out>) {  
    [..]  
    my $nf="$f.cut";           # files are in /tmp  
    system "  
        head -100 $f > $nf;  
        echo \"----CUT----\" >> $nf;  
        tail -100 $f >> $nf";
```

Two **root privilege escalation** vulnerabilities:

- **\$f** tainted (name of user-created file, can include shell commands)
- **\$nf** controlled by user (can be a symbolic link to system files)

Code from 2004, still running as *root*

Reported by a user:

*“I was in a usual boring meeting
and just did ps aux in lxplus :)”*

We often rely on very old code
... but who knew secure coding
back in 2004?



Source: Dick Thomas Johnson/flickr (CC BY)

DRAM *rowhammer* bug => kernel exploit

Access repeatedly a row of DRAM memory

```
code1a:  
    mov (X), %eax    // Read from address X  
    mov (Y), %ebx    // Read from address Y  
    clflush (X)      // Flush cache for address X  
    clflush (Y)      // Flush cache for address Y  
    jmp code1a
```

This can cause bit flips in neighboring rows

Proof-of-concepts: **privilege escalation exploits**

- e.g. modifying page table entries (PTEs)
- goal: gain write access to its own page table
- result: **gain read-write access to all of physical memory**

Attack techniques are highly sophisticated
... and they only get better

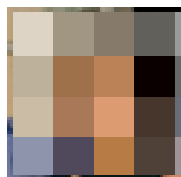
Two main attack vectors



Prepare for your day and stay in touch.

See More

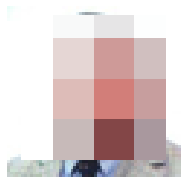
Job Changes



████████████████████ has a new job.
Now Senior Software Engineer at ██████████

 [Say congrats](#)

Work Anniversaries



██████████ is having a work anniversary.
1 year this April at ██████████

 [Say congrats](#)



████████████████████ is having a work anniversary.
4 years this April at CERN.

 [Say congrats](#)



Wed 24/06/2015 14:09

Emilie M Bogart <Emilie.Bogart@jiscs.com>

RD78 Collaboration Meeting June 29/30 2015, Jones Institute, 1st announcement

To Stefan Lueders

i You replied to this message on 24/06/2015 15:07.

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Dear Collaborator:

On the last meeting in Amsterdam we decided to have the next RD78 Collaboration meeting at Jones Institute. The date is now fixed (as we proposed in Amsterdam)

time:

Monday, June, 29. and Tuesday, June, 30. in 2015

location:

CERN, 1211 Geneva 23, Switzerland

For the Collaboration meeting you find the following information:

accomodation:

Do a reservation at the CERN hostel and send mail to Emilie.Bogart@jiscs.com or look into our web-page to find a list of other hostels in Geneva or France.

further information:

<http://RD78.JISCS.COM/RD78/RDCERN45252GL.PDF>

Please inform us, wheather you attend the meeting, and if you like to report a topic or want to have it discussed.

In case you are missing a colleague on this mailing list, please forward it and let us know about the missing address, to be included in the list in future.

Network analysis report - 2015

Marina.Koritsidou <Marina.Koritsidou@perrydale.com>

Thu 07/09/2015 15:46 PM

To: [REDACTED]

Dear,

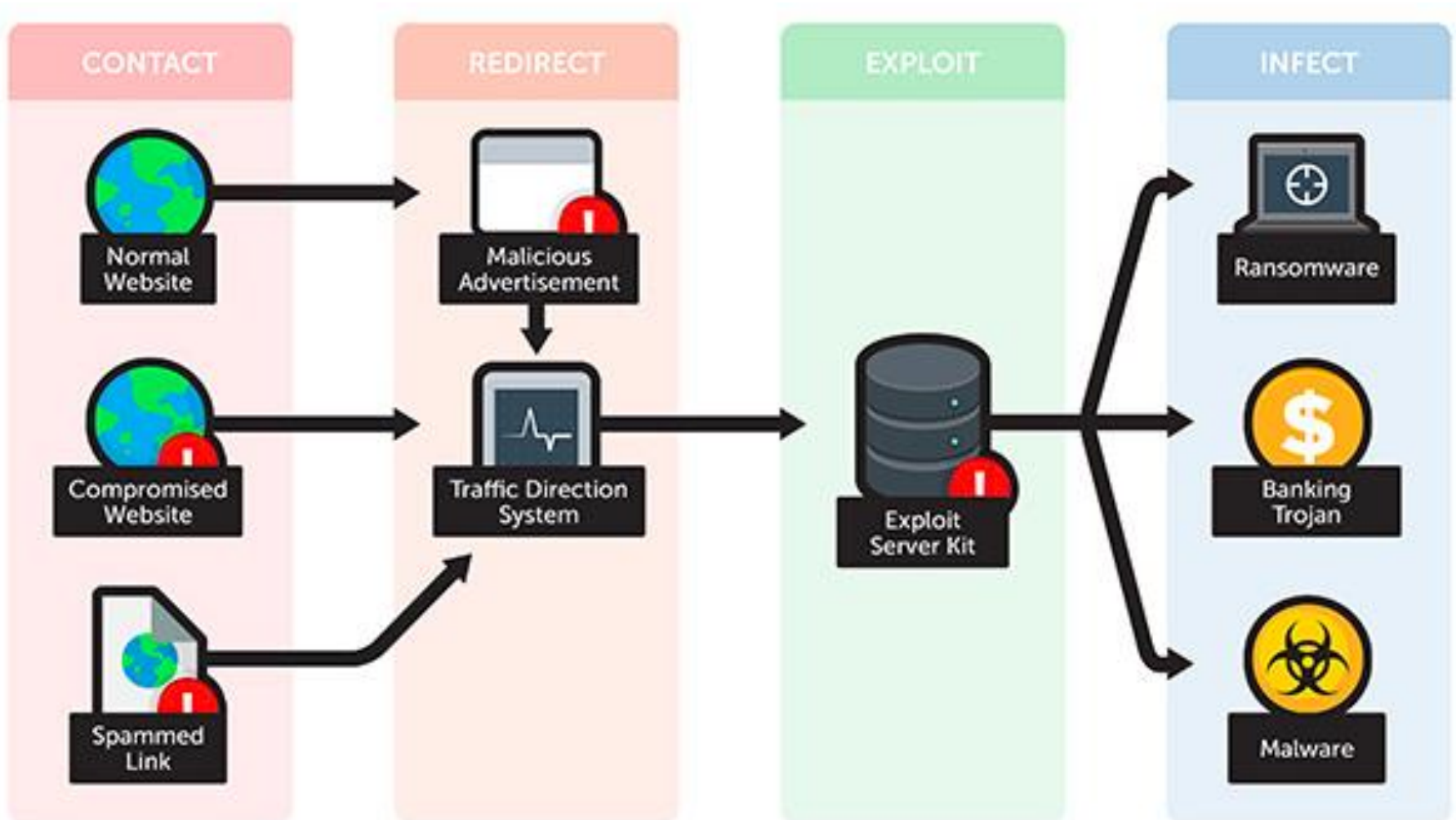
Network analysis report - 2015.07

<http://Report.PerryDale.com/en/FAR201507.pdf>



**Exploit to
Flash vulnerability
CVE-2015-5119**

Exploit kit infection chain



Source: Trend Micro

Attacking is so much easier
than defending

Becoming obsolete...



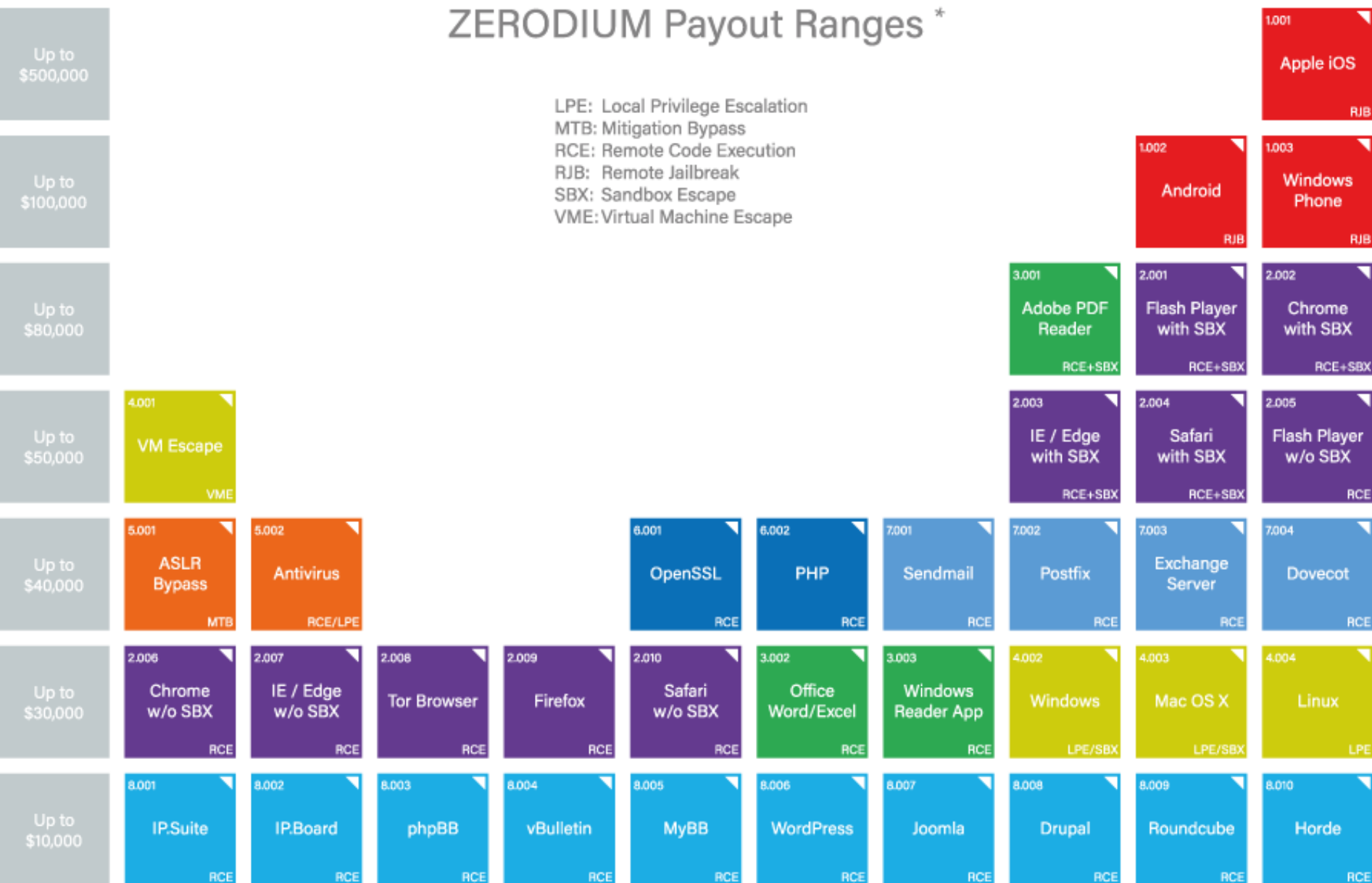
Firefox disables Flash by default
Amazon stopped serving Flash ads



no Java browser plugin in Java 9

ZERODIUM Payout Ranges *

LPE: Local Privilege Escalation
 MTB: Mitigation Bypass
 RCE: Remote Code Execution
 RJB: Remote Jailbreak
 SBX: Sandbox Escape
 VME: Virtual Machine Escape



* All payout amounts are chosen at the discretion of ZERODIUM and are subject to change or cancellation without notice.

iOS 9 exploit sold(?) for 1M USD



“ZERODIUM will pay out **one million U.S. dollars** to each individual or team who creates and submits an **exclusive, browser-based, and untethered jailbreak for the latest Apple iOS 9** operating system and devices.”

<https://www.zerodium.com/ios9.html>

Attacking is so much easier
than defending

... and cheaper, too

Your personal files are encrypted by CTB-Locker.



Your personal files are encrypted by CTB-Locker.

Your documents, photos, databases and other Important files have been encrypted with strongest encryption and unique key, generated for this computer.

Private decryption key is stored on a secret Internet server and nobody can decrypt your files until you pay and obtain the private key.

You only have 96 hours to submit the payment. If you do not send money within provided time, all your files will be permanently crypted and no one will be able to recover them.

Press 'View' to view the list of files that have been encrypted.

Press 'Next' for the next page.



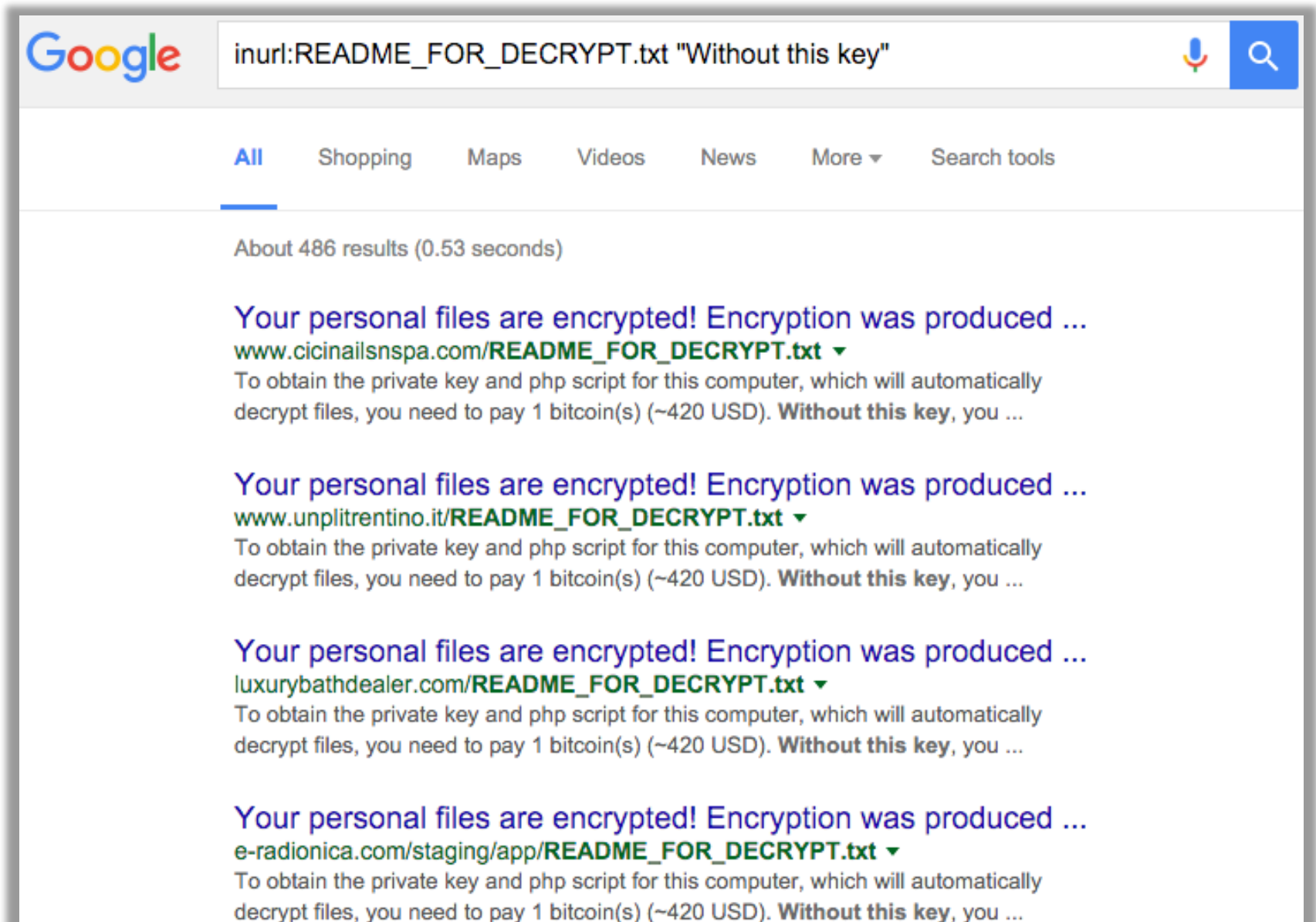
WARNING! DO NOT TRY TO GET RID OF THE PROGRAM YOURSELF. ANY ACTION TAKEN WILL RESULT IN DECRYPTION KEY BEING DESTROYED. YOU WILL LOSE YOUR FILES FOREVER. ONLY WAY TO KEEP YOUR FILES IS TO FOLLOW THE INSTRUCTION.

View

95:58:56

Next >>

Ransomware on Linux web servers



The image shows a Google search interface. The search bar contains the query: `inurl:README_FOR_DECRYPT.txt "Without this key"`. Below the search bar, there are navigation tabs for "All", "Shopping", "Maps", "Videos", "News", "More", and "Search tools". The search results show "About 486 results (0.53 seconds)". Four search results are visible, each with a blue title, a green URL, and a snippet of text. The titles all read "Your personal files are encrypted! Encryption was produced ...". The URLs are www.cicinailsnsipa.com/README_FOR_DECRYPT.txt, www.unplitrentino.it/README_FOR_DECRYPT.txt, luxurybathdealer.com/README_FOR_DECRYPT.txt, and e-radionica.com/staging/app/README_FOR_DECRYPT.txt. The snippets all mention "To obtain the private key and php script for this computer, which will automatically decrypt files, you need to pay 1 bitcoin(s) (~420 USD). Without this key, you ...".

Google

inurl:README_FOR_DECRYPT.txt "Without this key"

All Shopping Maps Videos News More Search tools

About 486 results (0.53 seconds)

Your personal files are encrypted! Encryption was produced ...
www.cicinailsnsipa.com/README_FOR_DECRYPT.txt ▼
To obtain the private key and php script for this computer, which will automatically decrypt files, you need to pay 1 bitcoin(s) (~420 USD). **Without this key**, you ...

Your personal files are encrypted! Encryption was produced ...
www.unplitrentino.it/README_FOR_DECRYPT.txt ▼
To obtain the private key and php script for this computer, which will automatically decrypt files, you need to pay 1 bitcoin(s) (~420 USD). **Without this key**, you ...




Your personal files are encrypted! Encryption was produced ...
luxurybathdealer.com/README_FOR_DECRYPT.txt ▼
To obtain the private key and php script for this computer, which will automatically decrypt files, you need to pay 1 bitcoin(s) (~420 USD). **Without this key**, you ...

Your personal files are encrypted! Encryption was produced ...
e-radionica.com/staging/app/README_FOR_DECRYPT.txt ▼
To obtain the private key and php script for this computer, which will automatically decrypt files, you need to pay 1 bitcoin(s) (~420 USD). **Without this key**, you ...

Victim of ransomware? Your data got encrypted?

“To be honest, we often advise people just to pay the ransom.”

- FBI

 private.key	1 700	1 311	2015-09-25 21:52
 public.key	458	373	2015-09-24 20:29
 decrypt.exe	67 584	28 903	2015-08-28 10:50



ANGLER REVENUE

The average life of an Angler server is one day - in that day we found ~9,000 unique IP addresses with around 3600 compromised users. The average amount per user that pays the ransom is \$300, leading to an annual revenue of more than **\$34 Million**.



90,000

targeted victims per day



9,000

observed served exploits in a single day



40%

of users being served exploits were compromised



62%

of Angler infections delivered Ransomware

Opportunistic attacks

Criminals are just after the money,
so they usually chose the “easy targets”

PLEASE DO NOT LOG ONTO
YOUR PC EQUIPMENT OR
COMPANY WIFI UNTIL
FURTHER NOTICE



For update information contact CSD via ext. 1419



Sony Pictures Entertainment breach

Hacked By #GOP

Warning :

We've already warned you, and this is just a beginning.

We continue till our request be met.

We've obtained all your internal data including your secrets and top secrets.

If you don't obey us, we'll release data shown below to the world.

Determine what will you do till November the **24th, 11:00 PM(GMT)**.

Data Link :

<https://www.sonypicturesstockfootage.com/SPEData.zip>

<http://dmiplaewh36.spe.sony.com/SPEData.zip>

<http://www.ntcnt.ru/SPEData.zip>

<http://www.thammasatpress.com/SPEData.zip>

<http://moodle.universidadebematech.com.br/SPEData.zip>

Targeted attacks

Much harder to protect against,
much more devastating



... but who is really behind this attack?

8 months

“Average time between intrusion and detection”



Source: Evan Long/flickr (CC BY-NC)

Two types of organisations:

those that know they've been hacked
and those that don't know




Source: Bruce Williams/flickr (CC BY-SA)

“We are currently experiencing *the largest DDoS attack in github.com's history* [...] *we believe the intent of this attack is to convince us to remove a specific class of content.*” Mar 27

 **GitHub Status** @githubstatus · Mar 29
The DDoS attack has evolved and we are working to mitigate

← ↻ 173 ★ 67 ...

 **GitHub Status** @githubstatus · Mar 30
After 113 hours of sustained DDoS attacks our defenses are holding. We will keep our status at yellow until the threat has subsided.

← ↻ 575 ★ 382 ...



Target: BBC and NYTimes on Github

This page has been translated from Chinese... to English Show original

This repository Search Explore Gist Blog Help SebastianLopienski

greatfire / Wiki Watch 713 Star 4,506 Fork

bbc

greatfire edited this page 20 hours ago · 1 Revision

BBC

RSS Free web version over the wall

Pages 13

The Dalai Lama's visit to Japan, "the right to pass human happiness"

The Dalai Lama's visit to Japan since 1967, the beginning of the interval and sometimes as long as 10 years, almost a year after the 1998 visit to Japan, also twice a year in some years, excluding Japan, he visits in turn, has made a special visit to Japan has been at least 19 times .

March 18, 2015: the current page image being DDOS attack. Please read the contents of the mirror or on the Github download the free Android browser over the wall to read.

Free to browse Android app

Automatic over the wall to access blocked sites.

Man-on-the-side attack



1. A web site you visit loads <http://hm.baidu.com/h.js>
(Baidu analytics)
2. Your browser requests this JavaScript file from Baidu,
but gets a response from elsewhere (!)

```
192.168.70.160 61.135.185.140 0x0002 64 <- SYN (client)
61.135.185.140 192.168.70.160 0x0012 42 <- SYN+ACK (server)
192.168.70.160 61.135.185.140 0x0010 64 <- ACK (client)
192.168.70.160 61.135.185.140 0x0018 64 <- HTTP GET (client)
61.135.185.140 192.168.70.160 0x0018 227 <- Injected packet 1 (injector)
192.168.70.160 61.135.185.140 0x0010 64
61.135.185.140 192.168.70.160 0x0018 228 <- Injected packet 2 (injector)
61.135.185.140 192.168.70.160 0x0019 229 <- Injected packet 3 (injector)
192.168.70.160 61.135.185.140 0x0010 64
192.168.70.160 61.135.185.140 0x0011 64
```

From <http://netres.ec/?b=153DB4E>

1. The injected, malicious script hammers two github projects

```
url_array = ["https://github.com/greatfire", "https://github.com/cn-nytimes"];
```

Github didn't give in... this time.

“Superhuman” espionage malware

Equation group victims map

- Finance
- Diplomatic / Embassies
- Energy / Infrastructure
- Military
- Telecommunications
- Islamic Scholars
- Other / Unknown
- Government
- Research institution
- University
- Aerospace
- Medical
- Media

High infection rate

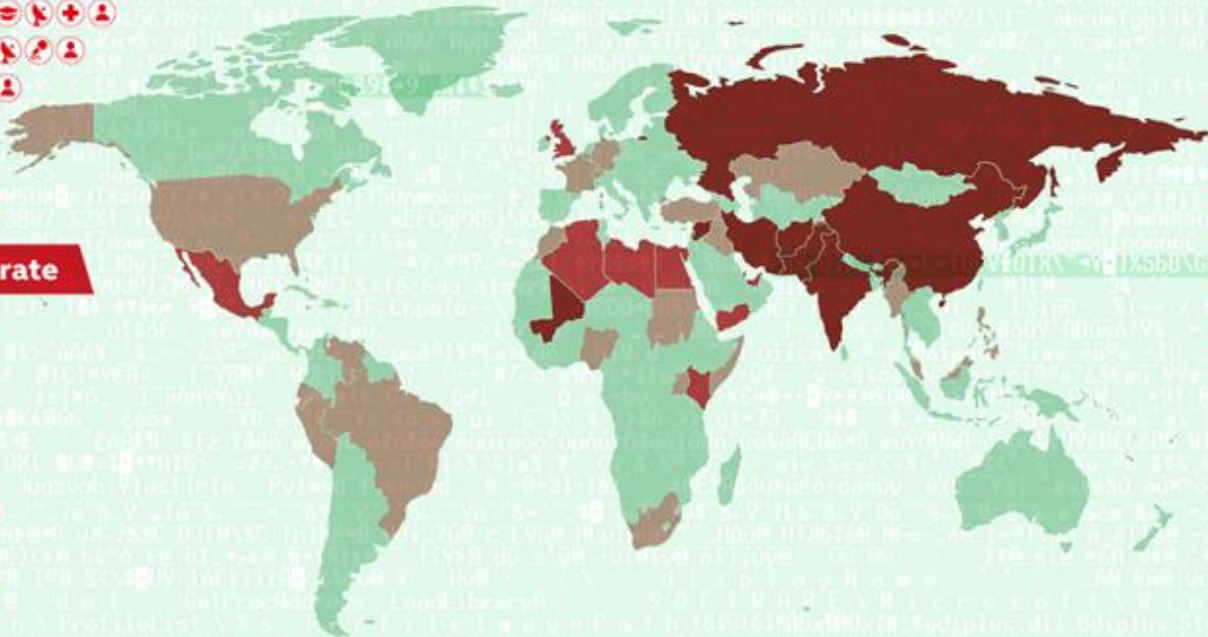
- Iran
- Russian Federation
- Pakistan
- Afghanistan
- India
- China
- Syria
- Mali

Medium-level infection rate

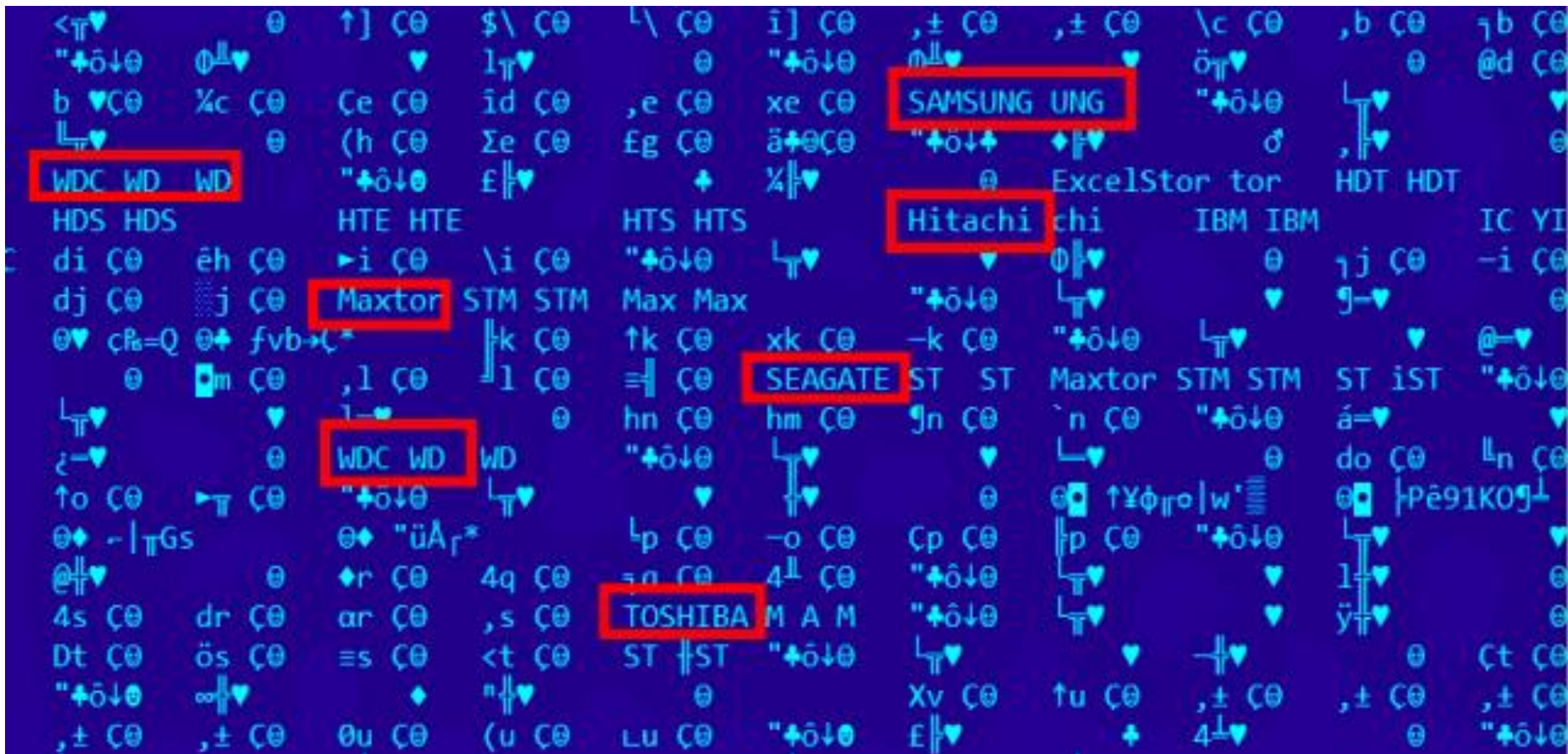
- Lebanon
- Yemen
- United Arab Emirates
- Algeria
- Kenya
- United Kingdom
- Libya
- Mexico
- Qatar
- Egypt

Low infection rate

- Turkey
- Somalia
- Myanmar
- Germany
- South Africa
- Nigeria
- United States
- Venezuela
- Sudan
- Palestinian
- Morocco
- Malaysia
- Kazakhstan
- Iraq
- Brazil
- Uganda
- Switzerland
- Singapore
- Philippines
- Peru
- France
- Equador
- Belgium
- Bahrain

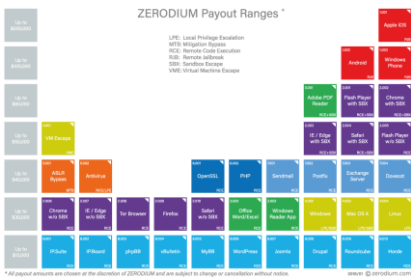


Reprogramming HDD firmware



From: Kaspersky Lab

What else is out there,
that we don't know about yet?



Who buys those exploits?

Who are ZERODIUM's customers?

ZERODIUM customers are major corporations in defense, technology, and finance, in need of advanced zero-day protection, as well as government organizations in need of specific and tailored cybersecurity capabilities.

From <https://www.zerodium.com/faq.html>



Cyber Security of Automotive Systems (W7701-166085/A)

Tender Notice

Status

Publishing status Awarded

Dates

Publication date 2015/10/06
Amendment date 2015/11/12
Date closing 2015/11/19 14:00 Eastern Daylight Time (EDT)

Activity

The following statistics are only for the English page and are provided in close to real time. To calculate the total activity for a tender notice, you will need to add the English and French statistics.

Page views -
(English page)
Unique page views -
(English page)

<u>Value of Related Contract History</u>	<u>Award Date</u>
<u>CAD 770 333.00</u>	2015/12/15
<u>CAD 91 980.00</u>	2016/01/26

Target: 2015 light-duty pickup truck ...?



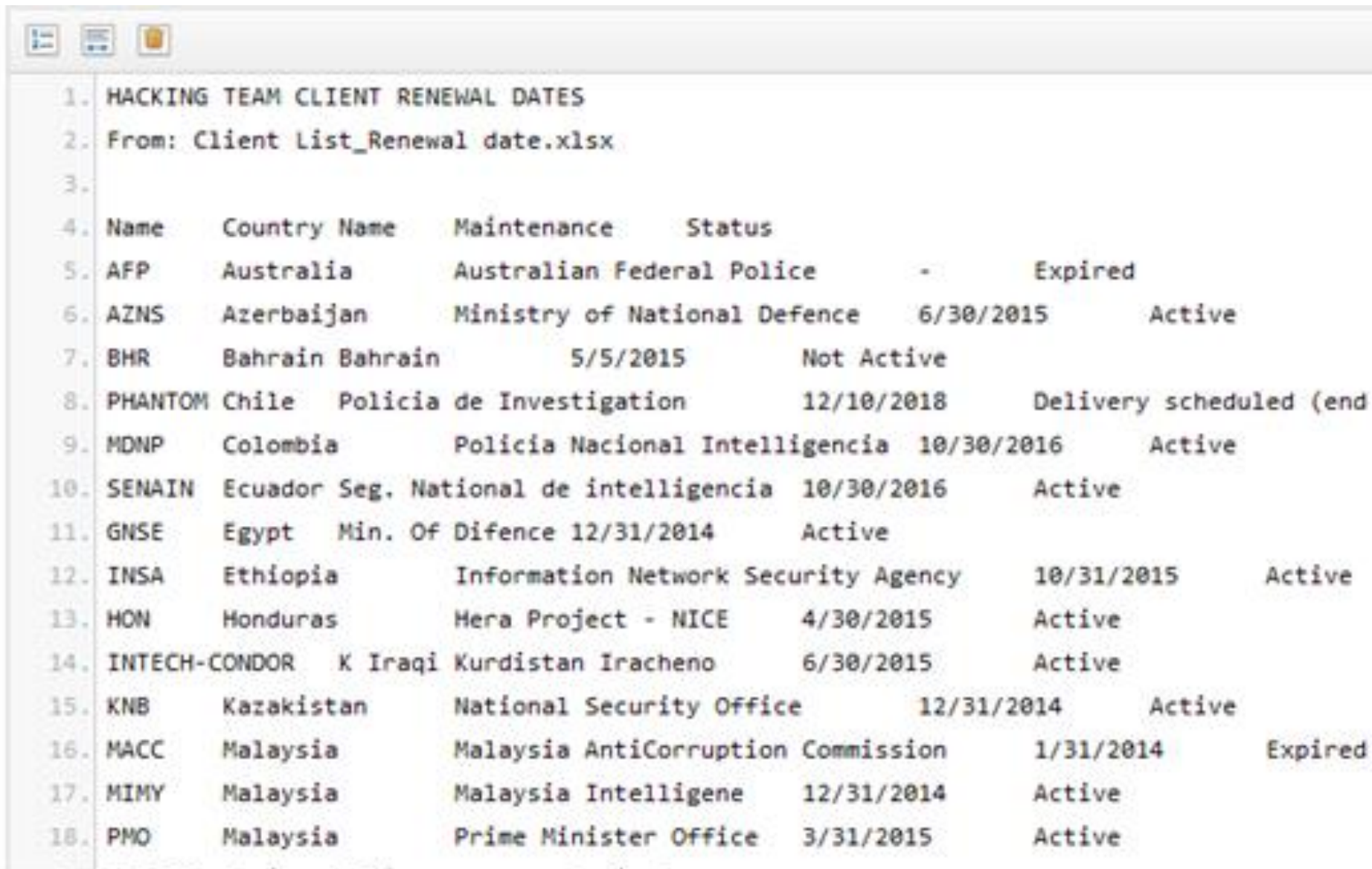
Is it possible to repel
government-sponsored attacks?

]HackingTeam[

Rely on us.



Hacking Team clients



1. HACKING TEAM CLIENT RENEWAL DATES
2. From: Client List_Renewal date.xlsx
3.
4. Name Country Name Maintenance Status
5. AFP Australia Australian Federal Police - Expired
6. AZNS Azerbaijan Ministry of National Defence 6/30/2015 Active
7. BHR Bahrain Bahrain 5/5/2015 Not Active
8. PHANTOM Chile Policia de Investigation 12/10/2018 Delivery scheduled (end
9. MDNP Colombia Policia Nacional Intelligencia 10/30/2016 Active
10. SENAIN Ecuador Seg. National de intelligencia 10/30/2016 Active
11. GNSE Egypt Min. Of Difence 12/31/2014 Active
12. INSA Ethiopia Information Network Security Agency 10/31/2015 Active
13. HON Honduras Hera Project - NICE 4/30/2015 Active
14. INTECH-CONDOR K Iraqi Kurdistan Iracheno 6/30/2015 Active
15. KNB Kazakistan National Security Office 12/31/2014 Active
16. MACC Malaysia Malaysia AntiCorruption Commission 1/31/2014 Expired
17. MIMY Malaysia Malaysia Intelligene 12/31/2014 Active
18. PMO Malaysia Prime Minister Office 3/31/2015 Active

Name	Country Name	Maintenance	Status
AFP	Australia	Australian Federal Police	- Expired
AZNS	Azerbaijan	Ministry of National Defence	6/30/2015 Active
BHR	Bahrain Bahrain	5/5/2015	Not Active
PHANTOM	Chile	Policia de Investigation	12/10/2018 Delivery scheduled (end
MDNP	Colombia	Policia Nacional Intelligencia	10/30/2016 Active
SENAIN	Ecuador	Seg. National de intelligencia	10/30/2016 Active
GNSE	Egypt	Min. Of Difence	12/31/2014 Active
INSA	Ethiopia	Information Network Security Agency	10/31/2015 Active
HON	Honduras	Hera Project - NICE	4/30/2015 Active
INTECH-CONDOR	K Iraqi	Kurdistan Iracheno	6/30/2015 Active
KNB	Kazakistan	National Security Office	12/31/2014 Active
MACC	Malaysia	Malaysia AntiCorruption Commission	1/31/2014 Expired
MIMY	Malaysia	Malaysia Intelligene	12/31/2014 Active
PMO	Malaysia	Prime Minister Office	3/31/2015 Active

Hacking Team clients



© OpenStreetMap

]HackingTeam[

Rely on us

HACKED



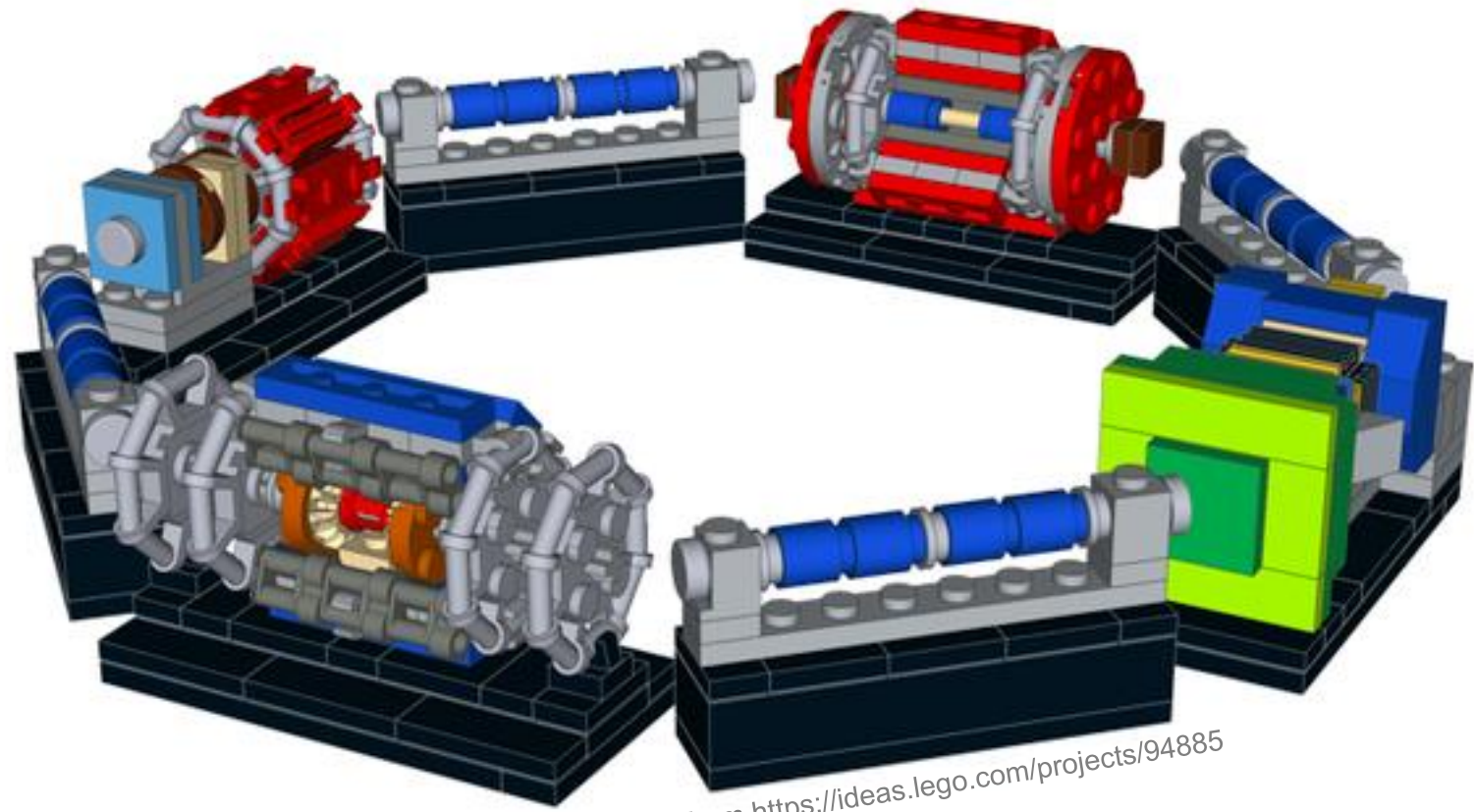
Leaked Flash exploits reused by criminals **within hours(!)**



CVE-2015-5119



What to do when
criminals or hacktivists of tomorrow
use the same attacks techniques
as governments of today?



From <https://ideas.lego.com/projects/94885>

How are we affected?



Resources, assets

Motivations



criminals

**motivation:
profit**



hacktivists

**motivation:
ideology,
revenge**



governments

**motivation:
control,
politics**

*“ OK, so can someone make money
from hacking a science lab? ”*

Bitcoin mining by a rouge sysadmin

Inspired (issue 18, Feb 2015)

http://www.egi.eu/news-and-media/newsletters/Inspired_Issue_18/cryptocoin.html

*“[..] substantial amounts of mining jobs were submitted over the 2013 Christmas holidays before being discovered in early January. **The user had attempted to masquerade the mining activities as legitimate production jobs and also tried to hide his traces by planting false evidence of external attacks on the job submission machine. He failed and was caught.**”*

Computing power == money

*“ We just do fundamental research
– how can this motivate an attacker? ”*

CERN, “a fun real-world example”



Lab Mouse Security
@InfoSecMouse

+ Follow

Hacking CERN
Particles and Profit
[blog.securitymouse.com](http://blog.securitymouse.com/2014/07/hacking-cern-exploiting-python-lz4-for.html)
with @DonAndre



RETWEETS 33
FAVORITES 12

1:56 PM - 7 Jul 2014

Hacking CERN - Exploiting python-lz4 for Particles and Profit

TL;DR

Editor's Note: The TL;DR of this long technical report can be summarized as

- LZ4 was always critically vulnerable whether in Kernel or User-land
- Exploitation is easy regardless of the attack used (16MB or 2+MB)
- PoCs are written for python2.7 on 32bit ARM/x86 (scroll to the end)
- Updating is critical for all consumers of LZ4, not just python-lz4

Additional Note: The author of LZ4 claims that the PoC presented in the blog below was written against some ghostly alternative version of LZ4. For further proof of exploitation, the sample payload generated by the script at the end of this blog post will also crash python-lz4 (versions prior to r119) directly. The CERN software was simply used as a fun real-world example because their package depends on python-lz4. To test, call the Python bindings directly with:

<http://blog.securitymouse.com/2014/07/hacking-cern-exploiting-python-lz4-for.html>

LHC start-up? Death threats

The image shows a screenshot of a Twitter thread and an email snippet. The Twitter thread is titled "#CultOfSiduri #OpDamageControl" and is from the account "@cern". The tweet text says "Send email to update those at CERN who may be in danger:" followed by several redacted lines of text, each ending with "@cern.ch". Below the tweet is a retweet from "SIDURI" of a tweet by "JimRothschild @LordJimRoth" dated "Apr 3". The retweeted tweet says "@mrtbenigno @AnonOpAcc" and "Yeah, #CERN are risking our Universe to play God. Even if the risk is small they shouldn't do it! >0% = TOO RISKY!!!". The email snippet below the tweet is dated "April 3rd 2015" and is titled "Re: Death threats posted on dark net regarding upcoming CERN high energy experiment". It begins with "Dear Dr. [redacted]," and contains text about "higher energy particle collision experiments" and "anonymous theoretical physicists". A blue highlight in the email text reads "the only way to save our universe from destruction is to kill these 7 men, of which, unfortunately, you may be one."

#CultOfSiduri #OpDamageControl [edit] @cern 1 of 5

Send email to update those at CERN who may be in danger:

[redacted] @cern.ch

[redacted] @cern.ch

[redacted] @cern.ch

[redacted] @cern.ch

April 3rd 2015. Re: Death threats posted on dark net regarding upcoming CERN high energy experiment

Dear Dr. [redacted],

I regret to inform you that your life may be in danger for higher energy particle collision experiments. Due to warnings by prominent theoretical physicists, some anonymous theoretical physicists with the same dire predictions, some anonymous individuals have become convinced that the only way to save our universe from destruction is to kill these 7 men, of which, unfortunately, you may be one.

SIDURI retweeted

JimRothschild @LordJimRoth · Apr 3

@mrtbenigno @AnonOpAcc

Yeah, #CERN are risking our Universe to play God. Even if the risk is small they shouldn't do it! >0% = TOO RISKY!!!

View conversation

*“ But black hole fears aside,
why would someone
specifically target CERN? ”*

CERN Internet Exchange Point



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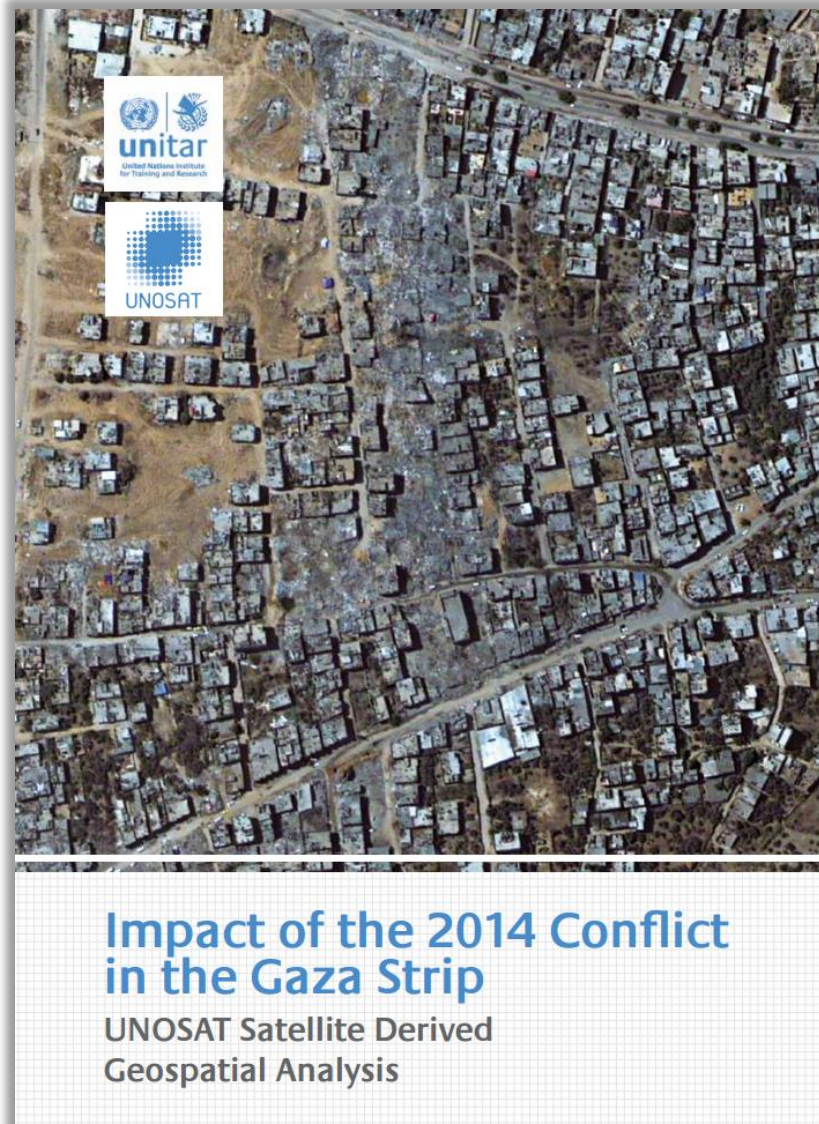
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The CERN Internet eXchange Point (CIXP) is a carrier-neutral exchange point based at CERN in Geneva, Switzerland.

Our partners are telecom operators and ISPs in Switzerland and France, as well as national and international research network operators. The service is provided jointly by CERN and Equinix's data-centres in Geneva and Zurich.



The URL?

https://unosat.web.cern.ch/unosat/unitar/publications/UNOSAT_GAZA_REPORT_OCT2014_WEB.pdf



The URL?

<https://zenodo.org>

Scope

All fields of science. All types of research or copyright, or breach confidentiality or n subjects.

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Safe

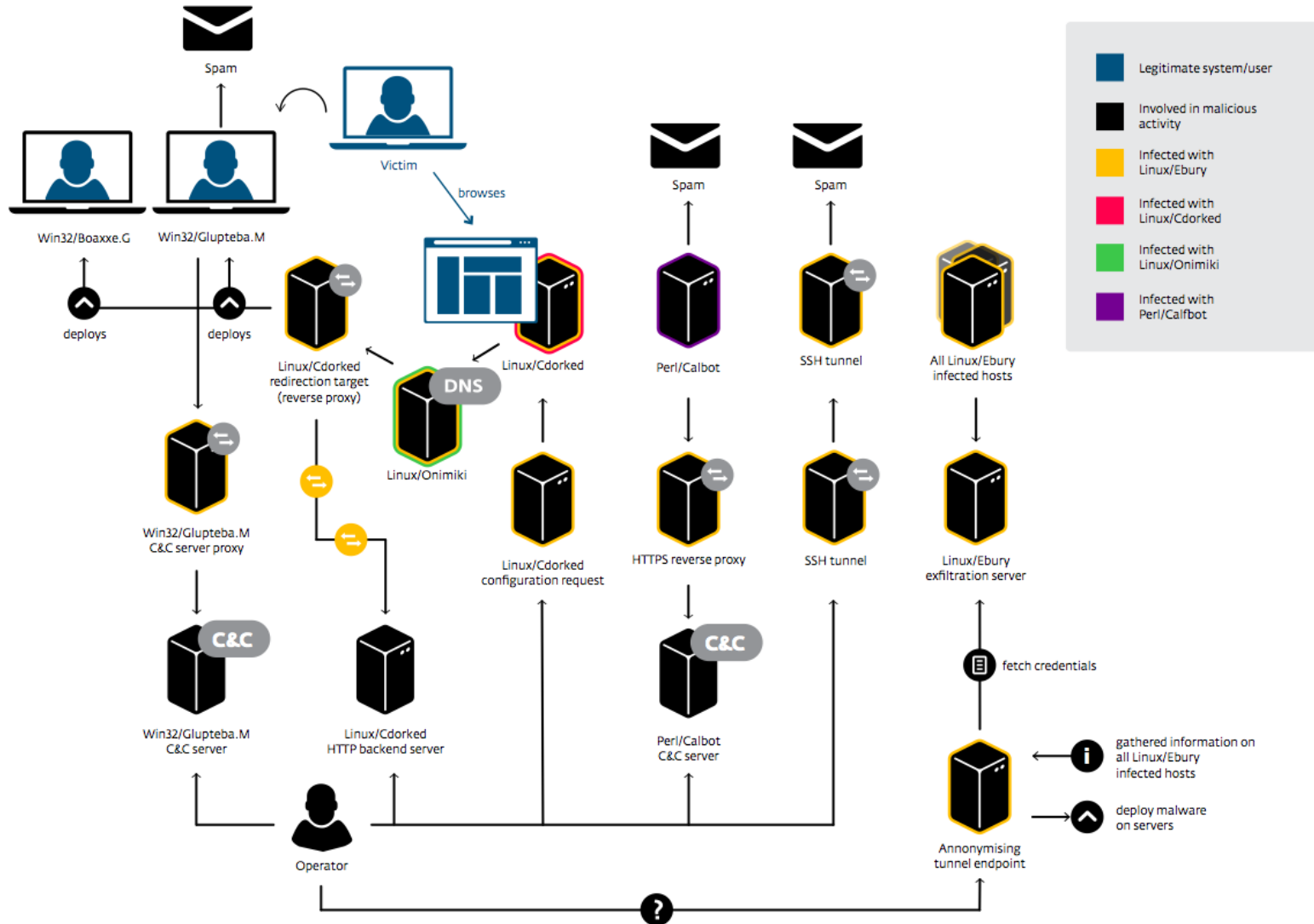
– more than just a drop box!

Your research output is stored safely for the future in same cloud infrastructure as research data from CERN's [Large Hadron Collider](#) using a CERN's battle-tested repository software [INVENIO](#) used by some of the world's largest repositories such as [INSPIRE HEP](#) and [CERN Document Server](#).

From <https://zenodo.org/policies>

We never do “just HEP”

Windigo operation



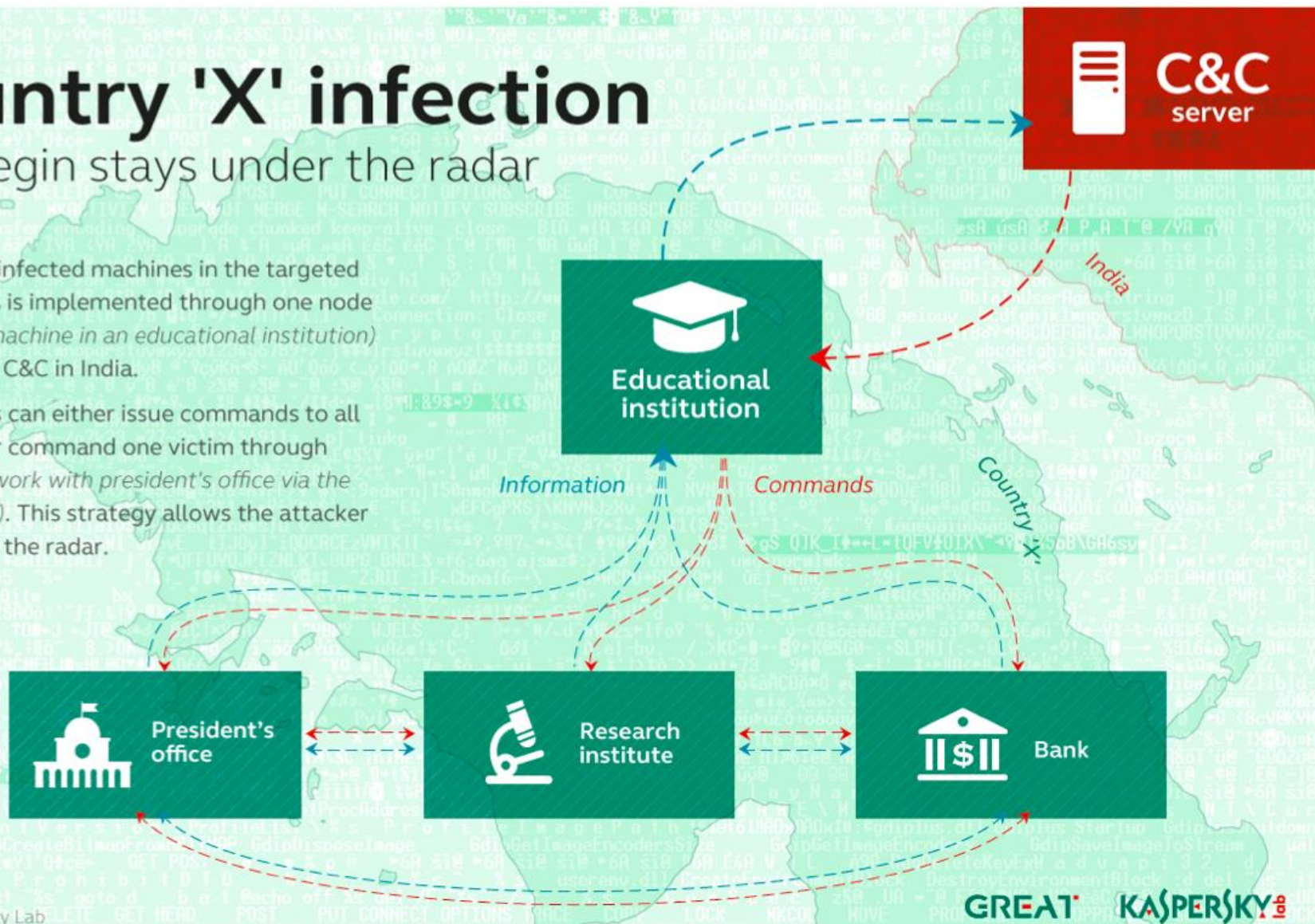
Educational/research labs as relays

Country 'X' infection

how Regin stays under the radar

Control over infected machines in the targeted organizations is implemented through one node (an infected machine in an educational institution) connected to C&C in India.

The attackers can either issue commands to all the victims or command one victim through another (eg. work with president's office via the bank network). This strategy allows the attacker to stay under the radar.



Watering hole attacks



We may be *not* the primary target

... but we may still be attacked

Conclusions?

People and technology

