Anti-Forensics AF

@dualcoremusic

mov eax, 0x6b; int 0x80 ☣

- Rapper
- Some other stuff idk

Overview

- Memory Forensics vs SMC*
  - Windows
  - Linux
- Android (Anti-)Forensics
- Fun with SD cards

Disclaimers

- !Professional
- TROLOLOLOL
- !Expert / YMMV
- DO ILLEGAL THINGS

Memory Forensics

- Focus on software protection (malware)
- Persist, thwart detection
- Inhibit acquisition and analysis

Memory Forensics

- All the cool stuff happens in memory
- Loading from disk
- Why can’t I hold all these sections?

Memory Forensics

- No longer referenced, no longer needed
- Analysis tools madbro
- Lots of fun to be had

Memory Forensics

- Demo
  - thekeysarelikerightnexttoeachother.exe
    - Rekall (winpmem)

```
<tatclass> YOU ALL SUCK DICK
<tatclass> er.
<tatclass> hi.
<andy\code> A common typo.
<tatclass> the keys are like right next to each other.
```

Memory Forensics

- PE header not needed after loading
- Zero the header (`RtlZeroMemory`)
- Process continues to run
- Analysis tools fail
- Win: XP → 10

Memory Forensics

- Completeness:

```
winpmem-2.1.post4.exe -o lol.aff4

"C:\Program Files\Rekall\rekal.exe" -f lol.aff4

> procdump proc_regex="thekeys",
    dump_dir="C:/Users/int0x80/Desktop/"
```

Memory Forensics

- Demo
  - thekeysarelikerightnexttoeachother-linux
    - LiME
    - Volatility

Memory Forensics

- ELF header not needed after loading
- Zero the header (`memset`)
- Process continues to run
- Analysis tools fail

Memory Forensics

- Completeness:

```
git clone https://github.com/504ensicsLabs/LiME

cd LiME/src/

make

sudo insmod ./lime-$(uname –r).ko \
  "path=/tmp/lol.lime format=lime"
```

Memory Forensics

- Completeness:

```
git clone https://github.com/
volatilityfoundation/volatility

cd volatility/

sudo python setup.py install
```

Memory Forensics

- Completeness:

```
cd tools/linux/

make

head module.dwarf

.debug_info
...
```

Memory Forensics

- Completeness:

```
sudo zip \
  volatility/plugins/overlays/linux/Ubuntu1604.zip \
  tools/linux/module.dwarf \
  /boot/System.map-$(uname -r)
```

```
python vol.py --info | grep ^Linux
Volatility Foundation Volatility Framework 2.5
LinuxUbuntu1604x64 - A Profile for Linux Ubuntu1604
x64
```

Memory Forensics

- Completeness:

```
python vol.py –f /tmp/lol.lime \
  --profile=LinuxUbuntu1604x64 linux_pslist

python vol.py –f /tmp/lol.lime \
  --profile=LinuxUbuntu1604x64 linux_procdump \
  -D /tmp -p <PID>
```

Android (Anti-)Forensics

- Use Encryption

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- Also "Use Tor, Use Signal"

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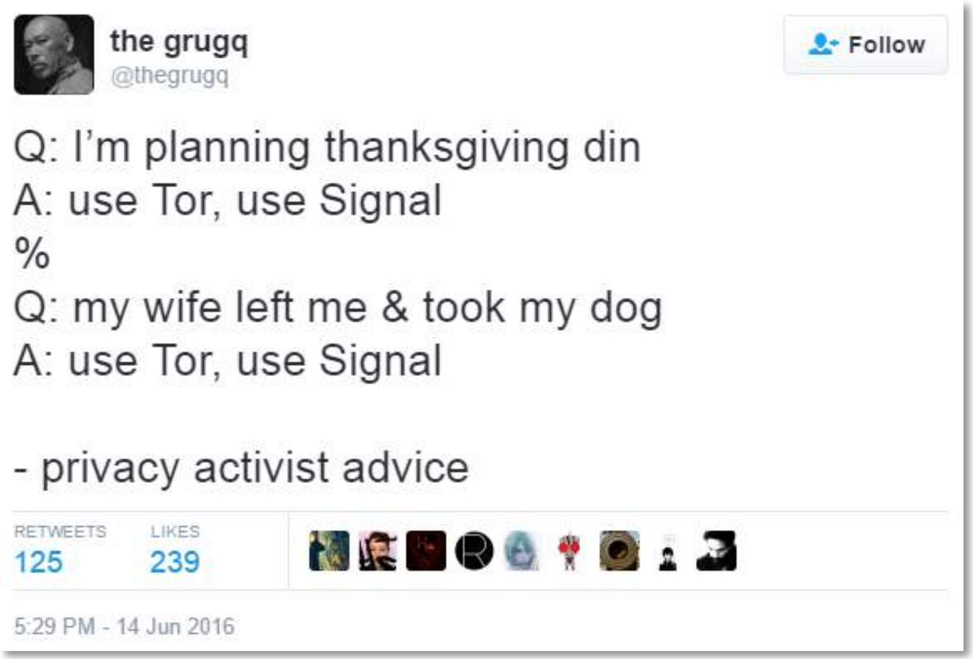
- Use Encryption
- Also "Use Tor, Use Signal"



the grugq
@thegrugq

Q: I'm planning thanksgiving din
A: use Tor, use Signal
%
Q: my wife left me & took my dog
A: use Tor, use Signal

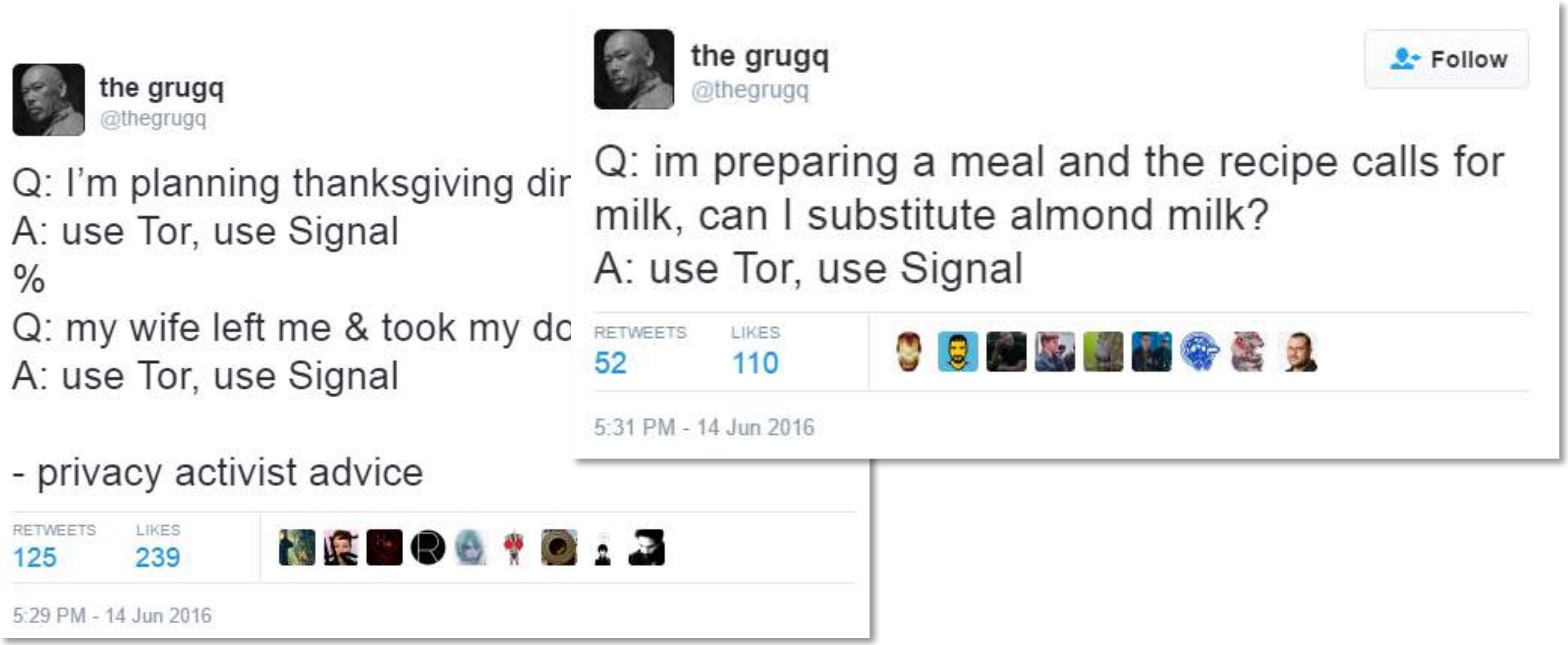
- privacy activist advice

RETWEETS 125
LIKES 239

5:29 PM - 14 Jun 2016

Android (Anti-)Forensics

- Use Encryption
- Also "Use Tor, Use Signal"



the grugq
@thegrugq

Q: I'm planning thanksgiving dir
A: use Tor, use Signal
%
Q: my wife left me & took my dc
A: use Tor, use Signal

- privacy activist advice

RETWEETS 125 LIKES 239

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the grugq
@thegrugq

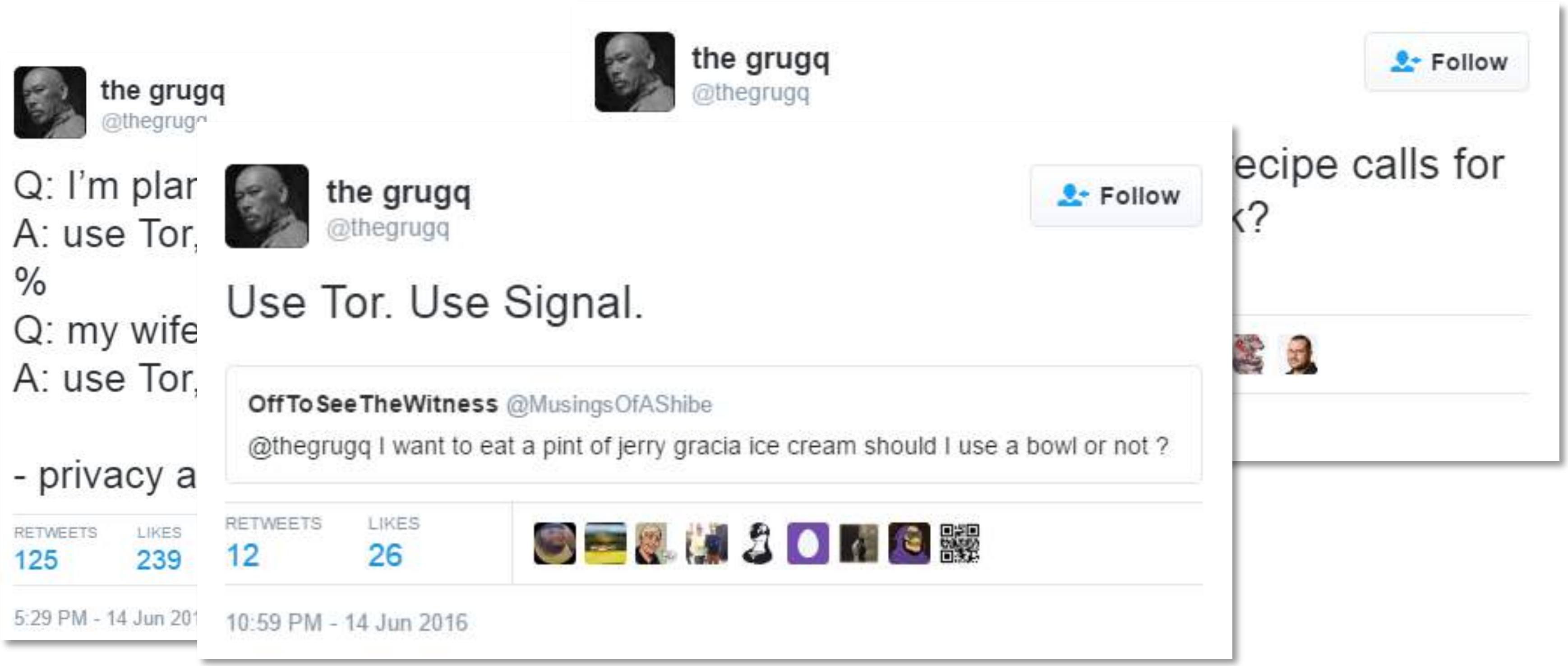
Q: im preparing a meal and the recipe calls for milk, can I substitute almond milk?
A: use Tor, use Signal

RETWEETS 52 LIKES 110

5:31 PM - 14 Jun 2016

Android (Anti-)Forensics

- Use Encryption
- Also "Use Tor, Use Signal"



the grugq
@thegrugq

Q: I'm plar
A: use Tor,
%
Q: my wife
A: use Tor,

- privacy a

RETWEETS 125 LIKES 239

5:29 PM - 14 Jun 201

the grugq
@thegrugq

Follow

ecipe calls for
k?

the grugq
@thegrugq

Follow

Use Tor. Use Signal.

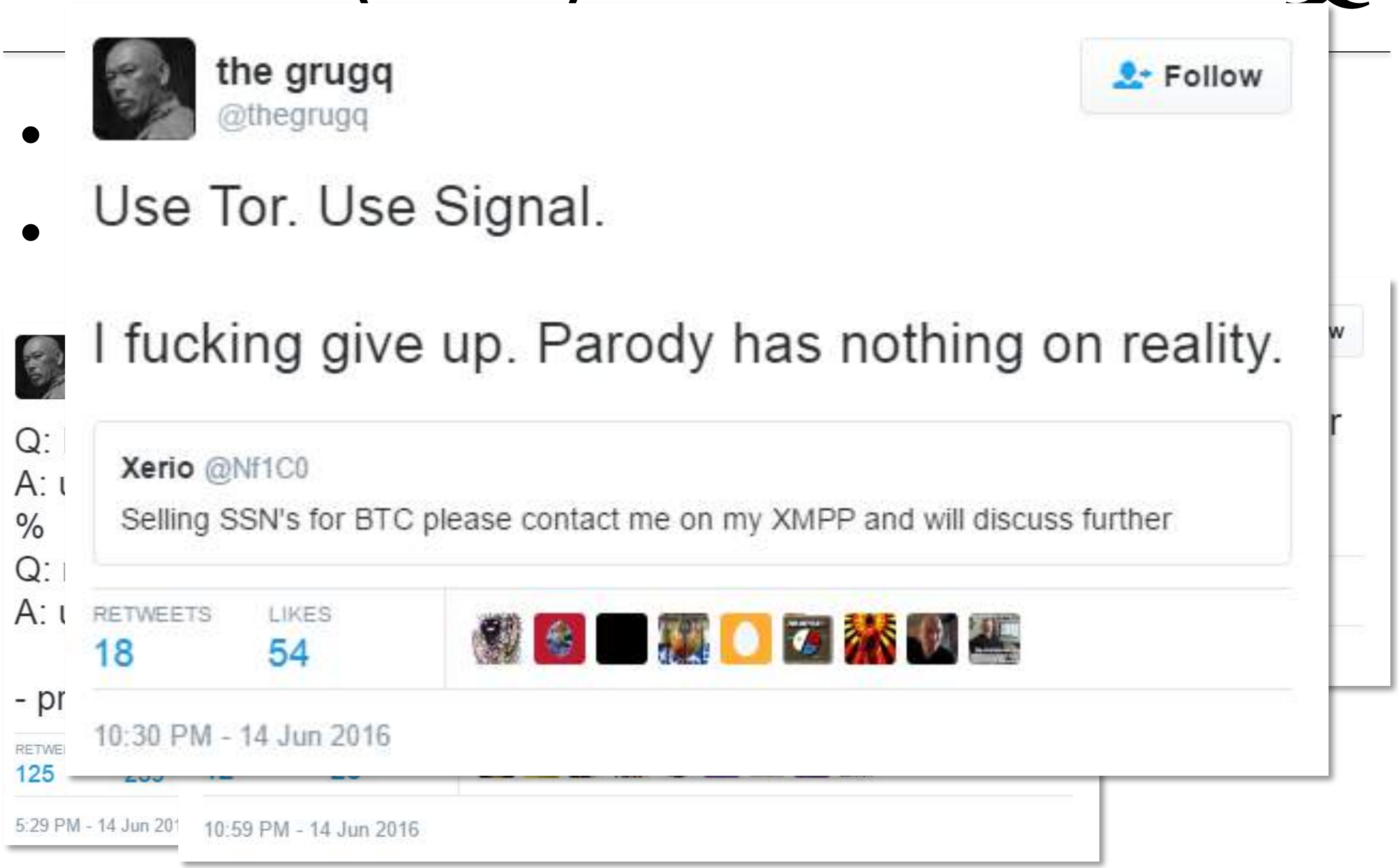
OffToSeeTheWitness @MusingsOfAShibe

@thegrugq I want to eat a pint of jerry gracia ice cream should I use a bowl or not ?

RETWEETS 12 LIKES 26

10:59 PM - 14 Jun 2016

Android (Anti-)Forensics



the grugq
@thegrugq

Use Tor. Use Signal.

I fucking give up. Parody has nothing on reality.

Xerio @Nf1C0

Selling SSN's for BTC please contact me on my XMPP and will discuss further

RETWEETS 18 LIKES 54

10:30 PM - 14 Jun 2016

Q:
A:
%
Q:
A:

- pr

RETWE
125

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10:59 PM - 14 Jun 2016

Android (Anti-)Forensics

- Use Encryption
- But first, a word about Android forensics

Android Forensics

- Not the easiest
- Acquisition/Imaging is a pain
  - Numerous caveats
  - `CONFIG_MODULES=y`
  - Cross-compile nc
  - Different interfaces

Android Forensics

- Acquisition/Imaging caveats:
  - Power
  - Decrypted
  - Unlocked
  - Rooted
  - USB Debugging

Android Forensics

- Memory acquisition/imaging caveats:
  - Power
  - Decrypted
  - Unlocked
  - Rooted
  - USB Debugging
  - `CONFIG_MODULES=y`

Android Forensics

- NAND acquisition done with nc

```
adb devices
adb push ./nc /sdcard/nc
adb forward tcp:4444 tcp:4444
adb shell
su
cp /sdcard/nc /dev/nc
chmod 777 /dev/nc
```

Android Forensics

- NAND acquisition done with nc

```
dd if=/dev/block/mmcblk0 bs=65535 | \
  /dev/nc -nvlp 4444
nc -nv 127.0.0.1 4444 > image.nand
sha256sum image.nand
cp -a image.nand image.nand.copy
sha256sum image.nand*
```

Android Forensics

- NAND exposed via different interfaces
- Check /proc/partitions
  - /dev/block/mmcblk*
  - /dev/mtd/mtd*
  - /dev/mtdblock*
  - /dev/emmc*
  - /*/*/*/* no, comment

Android Forensics

- Logical acquisition is easier

  -
    ```
    adb pull / ./dump
    ```

  -
    ```
    adb shell dumpsys &> ./dumpsys.log
    ```

  -
    ```
    adb backup -apk -obb -shared
      -all -system

    java -jar abe.jar unpack
           <backup.ab> <backup.tar> [pin]
    ```

Android Forensics

- Logical acquisition is easier

  -
    ```
    adb shell dumpstate \
      &> ./dumpstate.log
    ```

  -
    ```
    adb bugreport &> ./bugreport.log
    ```
  - `aflogical-ose`

Android Forensics

- Complete forensic acquisition/analysis sucks
- Likely violate traditional methodology
- Easy to disrupt :)

Android Anti-Forensics

- Use Encryption
- Example scenarios:
  - Raided by LE
  - Deploying hardware implant
  - ¯_(ツ)_/¯

Android Anti-Forensics

- Use Encryption
- Easiest solution:
  - Power down device
  - Everything encrypted
  - Lawyer up

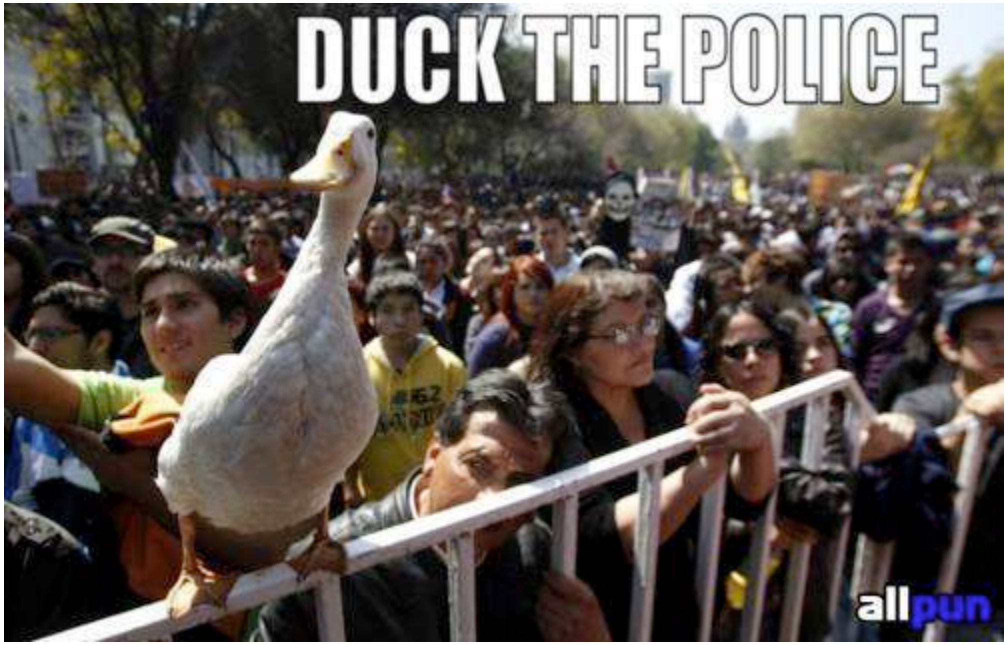
Android Anti-Forensics

- Power down if tampering detected
- Leverage device sensors
  - Bluetooth
  - Cellular
  - GPS
  - Motion
  - Power
  - WiFi

Android Anti-Forensics

- Android app: Duck The Police
- Device assertions:
  - Encrypted
  - Rooted
  - ~~Magnets~~
  - Sensors

- DEMO



Android Anti-Forensics

- Use Encryption
- Example scenarios:
  - Raided by LE
  - Deploying hardware implant
  - ¯_(ツ)_/¯
- WIN

SD Cards

- CTF Time!

SD Cards

- [SPOILER PREVENTION INTENSIFIES]

SD Cards

- `sdtool`
- Lock/Unlock device
- Physical lock disengaged
- Writes happen in memory
- Nothing written to device
- NO LOGS, NO CRIME

SD Cards

- `sdtool` caveats:
  - Direct access to MMC device required
  - Some USB hubs only expose mass storage
    - WON'T WORK

SD Cards

- Example scenarios:
  - Hardware implant
  - PORTAL of Pi (@thegrugq)
    - https://github.com/int0x80/notes/wiki/Linux:-PORTAL-of-Pi
  - Attack VM

SD Cards

- `sdtool`: http://www.bertold.org/sdtool/
- Edit Makefile to use clang instead of gcc

```
sudo ./sdtool /dev/mmcblk0 status
sudo ./sdtool /dev/mmcblk0 lock
sudo ./sdtool /dev/mmcblk0 unlock
```

Questions?

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