I FIGHT FOR THE USERS
EPISODE I

Attacks Against Top Consumer Products

DEF CON

Urbane SECURITY

Who are we?



@zfasel



@SecBarbie

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Our Credentials?



(null)



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Before we get started…



Con Speaker Rule 101

If you're naming vendors and
don't want your talk pulled,
even if it's already known
and even if the impact is low,
don't disclose too much ahead of time.

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TL;dr

- Bluetooth -> All the things!
- Wireless Security Products -> CCTV LOLZ
- Consumer Windows Install -> Whoops

- Q&A after talk

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3 Topics in One Talk?

- Keep it close to 20 minutes
- So 15+15+15 = 45! MATH!
- Also squirel.

Bluetooth all the things!

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Another Bluetooth Talk?

- BlueHydra* - Zero_Chaos & Granolocks
- BLE Locks From Miles Away – Rose & Ramsey
- BLE GATT Proxy Tool – Jasek
- BLE-REPLAY & BLESUITE - Foringer & Trabun

So what's different here?







"Rules"

- Never reveal the secret
- Never repeat a trick for the same audience
- Practice. Over and Over.



"Rules"

- ~~Never reveal the secret~~
- Never repeat a trick for the same audience
- ~~Practice. Over and Over.~~

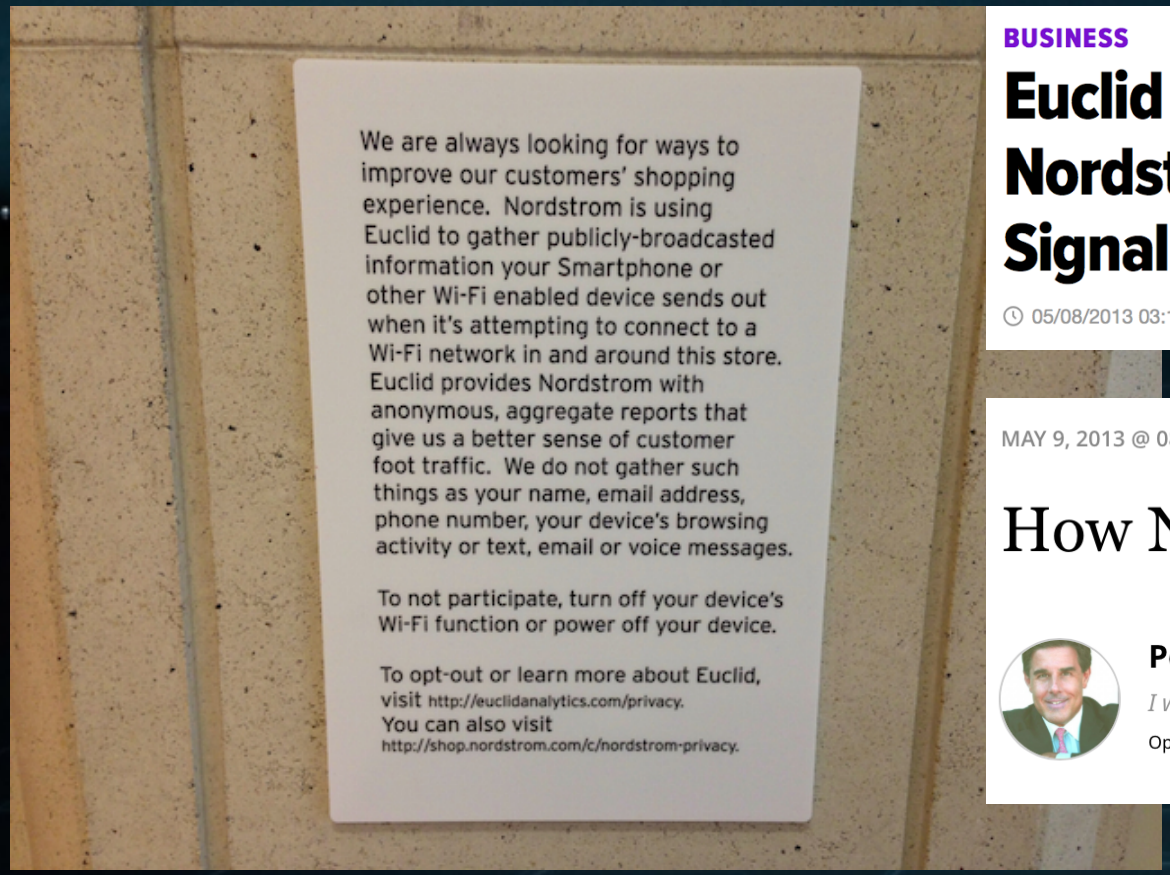
How do you wirelessly ID someone?

- Car on the way in?
  - ALPR
  - ETC RFID
  - Bluetooth
- Came in by foot?
  - Facial Recognition
  - Voice Recognition
  - Cell Phone?
    - WiFi
    - Bluetooth
    - IMSI Catcher
- Proximity
  - Credit Card RFID
  - Car Keys RFID
  - Work badges
- The not fancy ways
  - Reservation Names
  - RFID Loyalty cards
  - Credit cards
  - Social engineering

How do you wirelessly ID someone?

- ~~Car on the way in?~~
  - ~~ALPR~~
  - ~~ETC RFID~~
  - ~~Bluetooth~~
- Came in by foot?
  - ~~Facial Recognition~~
  - ~~Voice Recognition~~
  - Cell Phone?
    - WiFi
    - Bluetooth
    - ~~IMSI Catcher~~
- Proximity
  - ~~Credit Card RFID~~
  - Car Keys RFID
  - ~~Work badges~~
- The not fancy ways
  - ~~Reservation Names~~
  - RFID Loyalty card
  - ~~Credit cards~~
  - ~~Social engineering~~

Say it isn't so!



BUSINESS

Euclid Analytics And Retailers: How Stores Like Nordstrom Track You Via Your Smartphone's Wi-Fi Signal

05/08/2013 03:10 pm ET | **Updated** May 13, 2013

MAY 9, 2013 @ 08:23 AM **81,943** VIEWS

How Nordstrom Uses WiFi To Spy On Shoppers

Peter Cohan, CONTRIBUTOR

I write about tech stocks and the startup economy. **FULL BIO**

Opinions expressed by Forbes Contributors are their own.



Wifi caught on to this

- iOS8 and Android 6.0
- Historical SSIDs identify real mac
- Take it as a data point, but not trust it

That leaves us with

- Came in by foot?
  - Cell Phone?
    - Bluetooth
- Proximity
  - Car Keys RFID
- The not fancy ways
  - RFID Loyalty card

That leaves us with

- Came in by foot?
  - Cell Phone?
    - Bluetooth

~~- Proximity~~
  ~~- Car Keys RFID~~
~~- The not fancy ways~~
  ~~- RFID Loyalty card~~

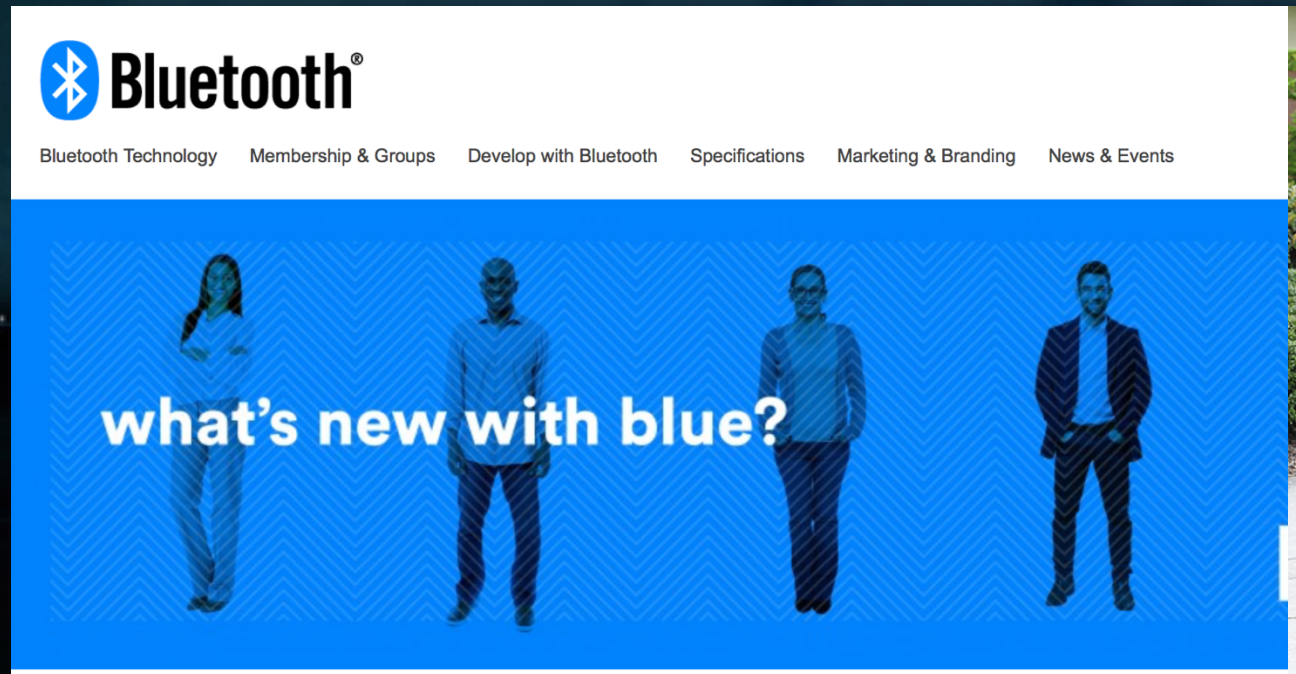
I’m Blue (dabadeedabad1e)

- Bluetooth Classic
  - 79+1 1Mhz Channels, 1600 hops/second
  - NAP + UAP and LAP make up hop sequence
  - LAP is included in every message
  - We know this. Duh. But many personal devices are now Bluetooth Smart (except for headsets/headphones).
- BLE (Bluetooth Smart)
  - 37+3 2Mhz Channels, Interval/Increment/Channels is dictated by master upon connection.
  - 4 byte access address
  - 6 byte mac address in advertising announcements

Bluetooth Has Security Too?

Bluetooth®

Bluetooth Technology | Membership & Groups | Develop with Bluetooth | Specifications | Marketing & Branding | News & Events





Posted on April 2, 2015 by Martin Woolley

← Previous Next →

Bluetooth Technology – Protecting Your Privacy

People are increasingly aware of, and concerned about, security—in particular, their privacy in both the physical and the digital world. The term "privacy" alludes to various types of issues, depending upon the context. One privacy issue concerns the possibility of being tracked "where you go" in the physical world without your awareness or consent. "Where you go" could mean the places you drive or the route you walk.

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Access Address?

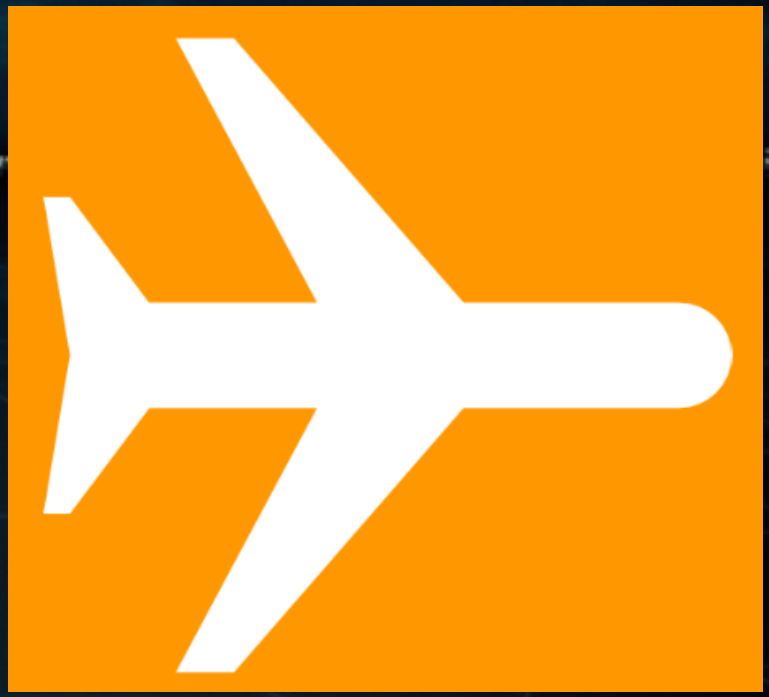
- Address used once connected.
- Change upon disconnect/reconnect
- Long term tracking is not reliable
- Provides as good of short term tracking as random broadcast mac addresses, but applies to connected devices.

GAP and GATT

- Generic Access Profile
- Generic Attribute Profile
- Long story short, methods for sharing info about the connection or devices.

In Preparation For Takeoff

- Why are all these new devices advertising?
- Wait a second…
- if (paired == FALSE)
  ble.mode(“advertise”)



Can we disconnect BLE?

- Hell yes we can (momentarily and proximity dependent)
- USRP b210 = 56mhz bandwidth
- BLE = 80mhz, minus 6mhz broadcast
- 50-75% coverage
- So jam 2428 to 2478 Mhz…
- GNURadio + Rand Noise = some success
- Depending on the host, odd reliability

Option 2 – Spoof Disconnect

- Blast LL_TERMINATE_IND Control Packet
- Have to sniff the Access Address first and catch it on the right channel / right time
- Some devices don’t take kindly to this and won’t reconnect well

We've talked about tracking before, right?

- Sort Of?
- Focused on "it's possible", but not researching specific device behaviors.

Leaves us With Implementation Issues

Hello Amazon/Best Buy



Pavlok



- Static Mac
- Mac in Name (Pavlok-XXXX)
- Serial is its mac, also available via GATT in case you didn’t have it already in ascii->hex

Trackr



- Effectively Static Mac Address
- Manufacturer Data In broadcast = MAC
- Broadcasts Constantly

Tile



- Effectively Static Mac Address
- “Tile Identifier” in GATT
- Stays connected…only while app is open.

Fitbit One



- Randomized Mac, but effectively static after >4 months
- Doesn’t remain connected, so it broadcasts

Withings Active



- Mac Randomizes
- But…Advertises MAC as Manufacturer Data in Advertisement Data (ADV_IND)

Pebble Steel



- 2 Bytes of MAC in Manufacturer Name - “Pebble Time LE XXXX”
- Says Mac is random, but after days was still the same even after reboots
- Serial Number in Device Info
- Goes to sleep every so often
- Uses both Classic and BLE

Fitbit Alta



- Randomized Mac, but effectively static after >4 months and battery loss
- Unlike the one, stays connected for notifications

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Garmin vivofit

- Static Mac, but…
- Bluetooth only works when in a “sync” mode.



Microsoft Band 2



- Dynamic Mac on reboot
- “<Name>’s Band <XX:XX> LE” as device name

Apple Watch



- Dynamic Mac
- Maintains dynamic mac between disconnects
- Rotates appear time based, but not 100% sure how often

Huawei Watch



- Android Wear
- Random Mac, and doesn't respond to BLE broadcasts

iOS Devices



- BLE for Safari?!?
- Other Apps Too
- Does randomize heavily, and while it announces it as an i<Device>, no trackability

So who's doing it right?

- Apple Watch
- Android Wear
- iOS Itself

Tool?

- This is where we were going to release a tool to track LAP / BLE Access Addresses / BLE Broadcast MACs
- BlueHydra totally one upped us, and we had no idea...
- Go try it out and contribute (we will be)

Where do we go from here?

- We need to continue to test devices to document the implementation issues when it comes to bluetooth device privacy.
- github.com/urbanesec/bledevices

Tl;dr?

- When MACs are random, look for:
  - Lack of randomization, even if it says it is.
  - GAPs leaking serials
  - GATTs leaking serials
  - Device Names
- You can deauth BLE devices to get some to respond to advertisement channel requests to get advertisement addresses (MACs).
- While the standard supports it, devices don’t.

Consumer Wireless Cameras
Home (and office) "Security"

What we are not talking about

ACTi: admin/123456 or Admin/123456
American Dynamics: admin/admin or admin/9999
Arecont Vision: none
Avigilon: Previously admin/admin, changed to Administrator/<blank> in later firmware versions
Axis: Traditionally root/pass, new Axis cameras require password creation during first login (though root/pass may be used for ONVIF access)
Basler: admin/admin
Bosch: None required, but new firmwares (6.0+) prompt users to create passwords on first login
Brickcom: admin/admin
Canon: root/camera
Cisco: No default password, requires creation during first login
Dahua: admin/admin
Digital Watchdog: admin/admin
DRS: admin/1234
DVTel: Admin/1234
DynaColor: Admin/1234
FLIR: admin/fliradmin
FLIR (Dahua OEM): admin/admin
Foscam: admin/<blank>
GeoVision: admin/admin
Grandstream: admin/admin
Hikvision: Previously admin/12345, but firmware 5.3.0 and up requires unique password creation
Honeywell: admin/1234
Intellio: admin/admin
IQinVision: root/system
IPX-DDK: root/admin or root/Admin
JVC: admin/jvc
March Networks: admin/<blank>
Mobotix: admin/meinsm
Northern: Previously admin/12345, but firmware 5.3.0 and up requires unique password creation
Panasonic: Previously admin/12345, but firmware 2.40 requires username/password creation
Pelco Sarix: admin/admin
Pixord: admin/admin
Samsung Electronics: root/root or admin/4321
Samsung Techwin (old): admin/1111111
Samsung (new): Previously admin/4321, but new firmwares require unique password creation
Sanyo: admin/admin
Scallop: admin/password
Sentry360 (mini): admin/1234
Sentry360 (pro): none
Sony: admin/admin
Speco: admin/1234
Stardot: admin/admin
Starvedia: admin/<blank>
Trendnet: admin/admin
Toshiba: root/ikwd
VideoIQ: supervisor/supervisor
Vivotek: root/<blank>
Ubiquiti: ubnt/ubnt
W-Box: admin/wbox123
Wodsee: admin/<blank>

Weak / Default Passwords

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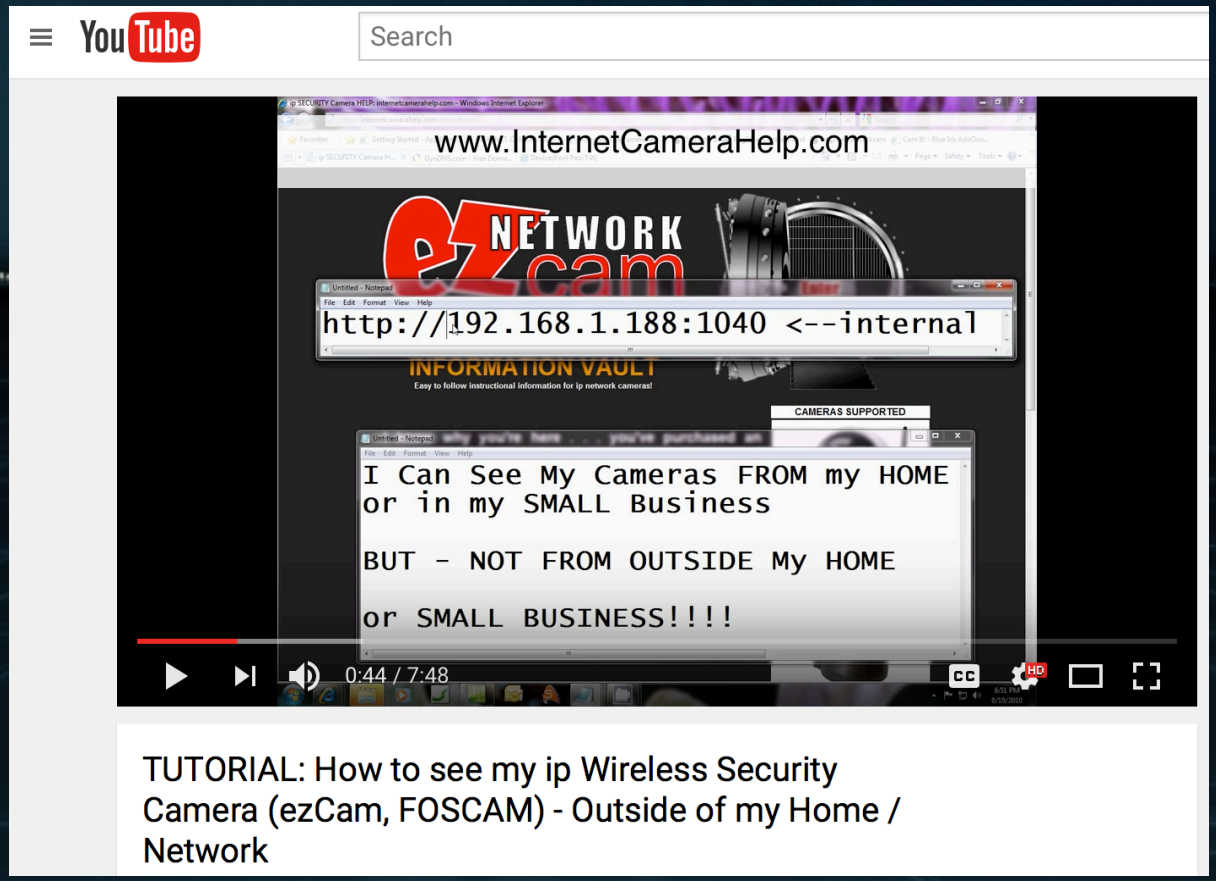
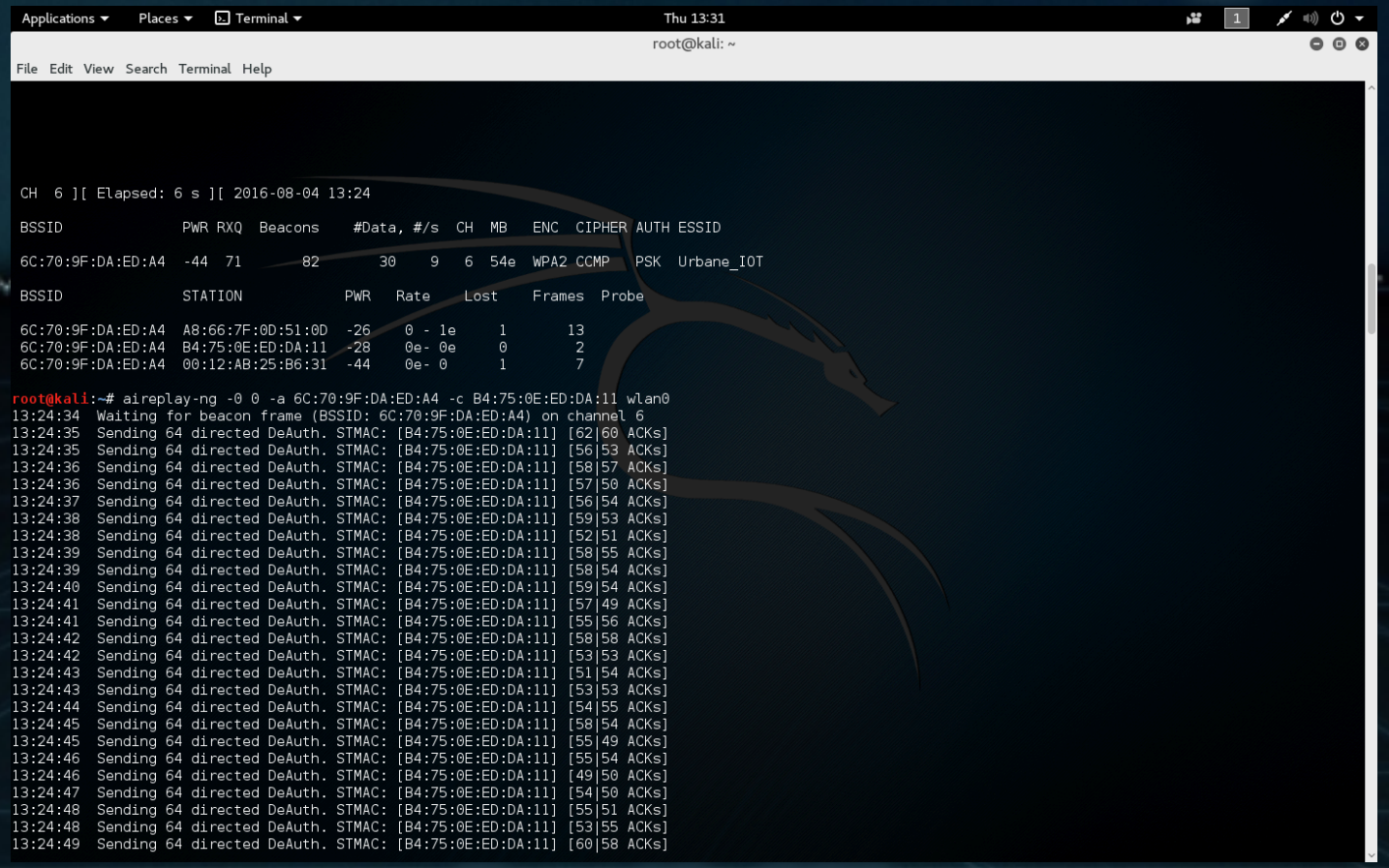
What we are not talking about



IP Weakness

(This guy can help you create some! INTERNETZ FTW!)

What we are not talking about



Deauth 101

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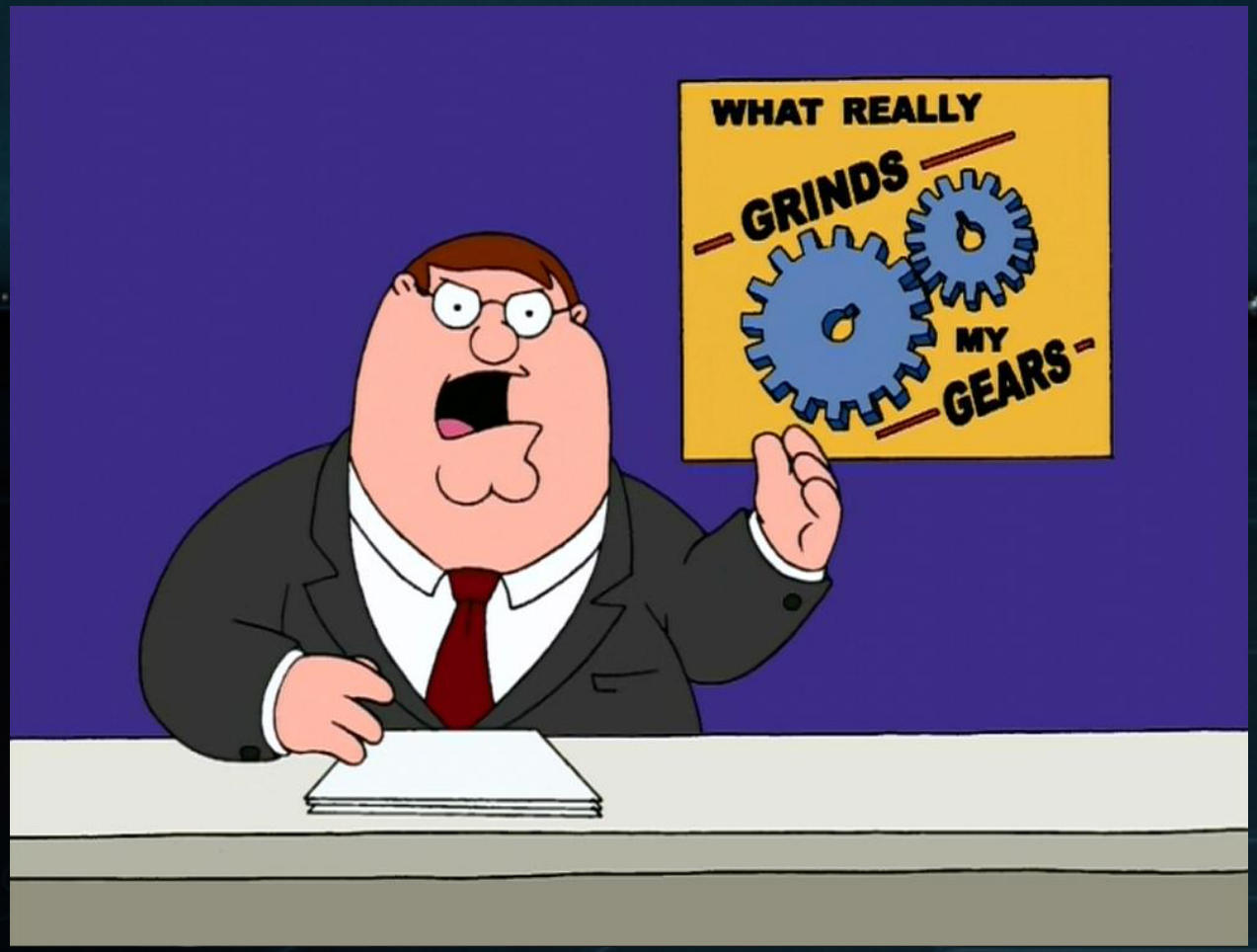
What we are not talking about

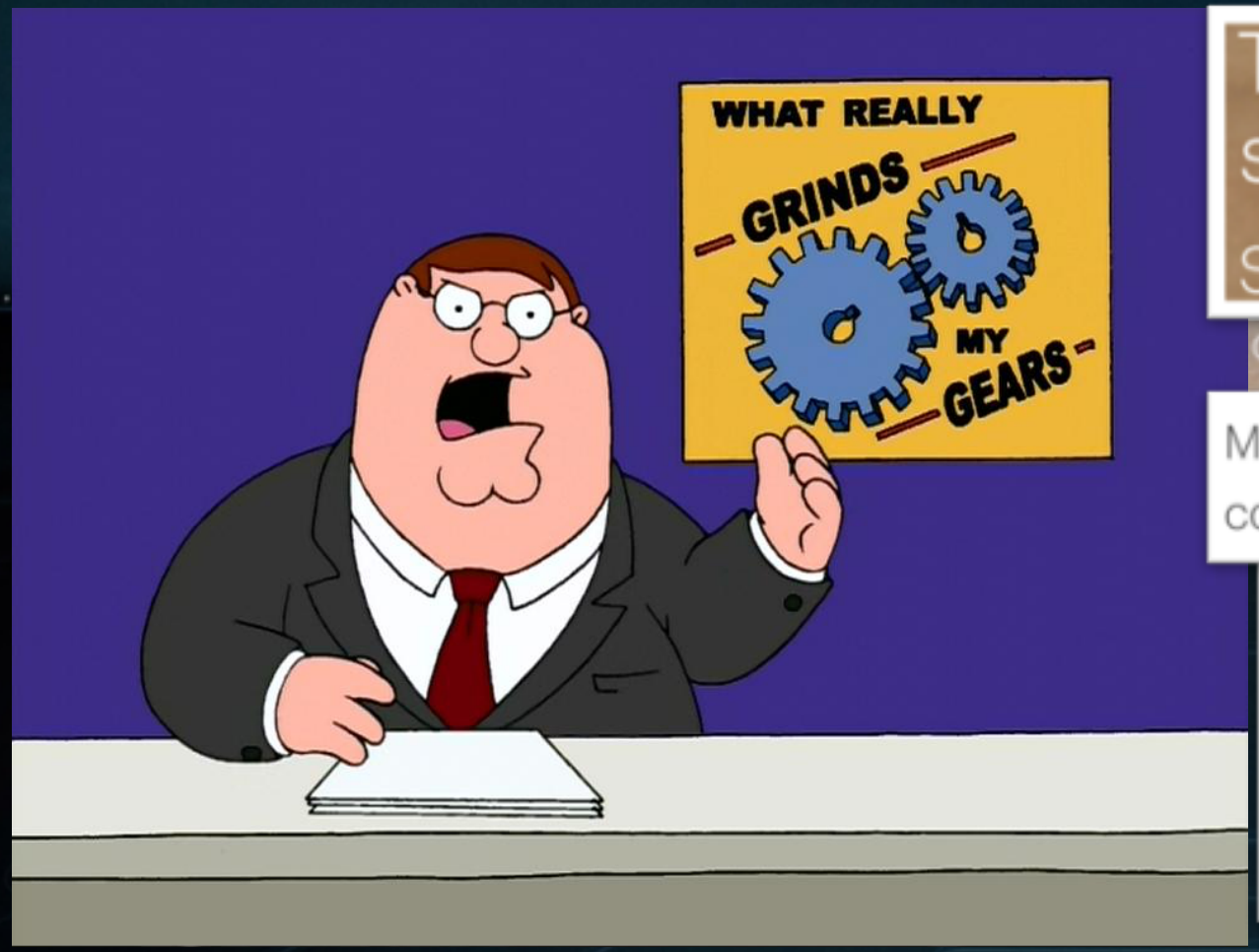


SHODAN

Who cares!



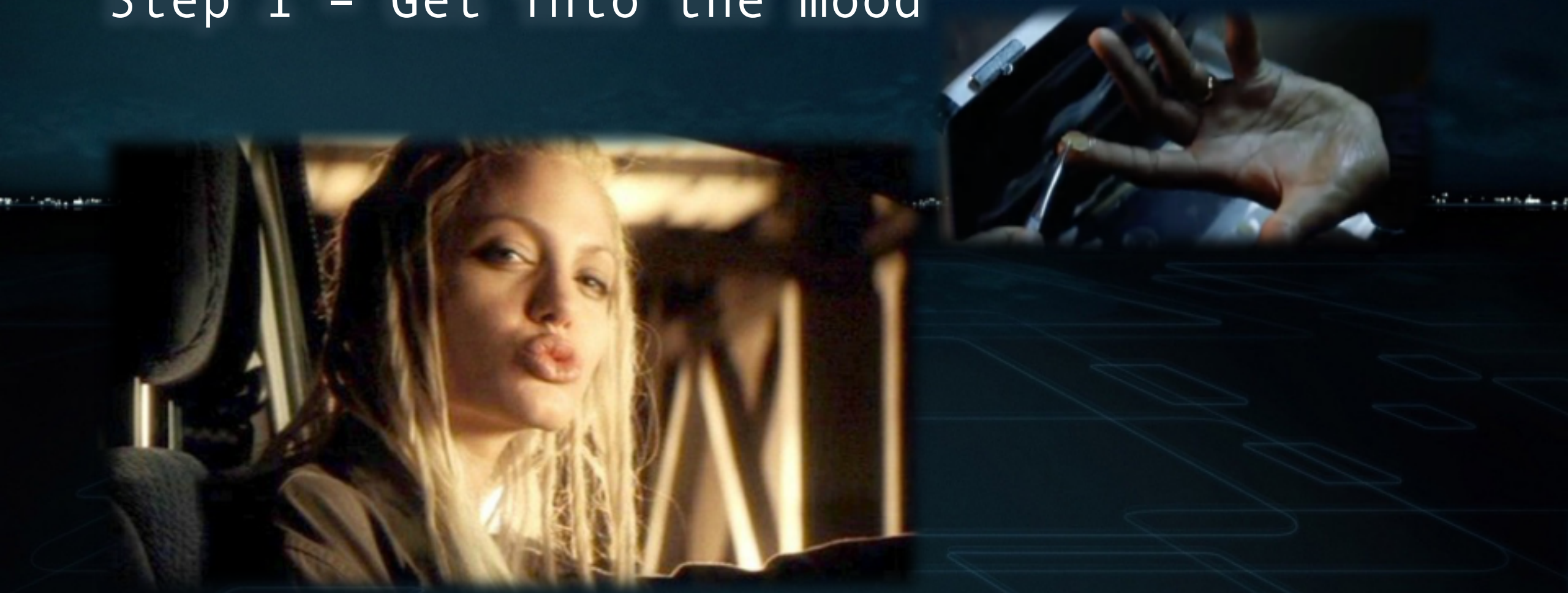
SECURITY?


WHAT REALLY
GRINDS
MY
GEARS


This is what an indoor security camera should be.
See your home 24/7.
Circle is the modern home security camera
For Your Business Security!
Meet Canary, the all-in-one home security system you control from your phone. It's built to last and sends
One security system. Endless possibilities.
100% Wire-free
Arlo Wire-Free cameras mean no cords, no outlets, and no limits on where your cameras can go or what they can watch
Smart Alerts
Arlo cameras detect motion and send you alerts instantly so you know when something unexpected happens.

What if?

Step 1 – Get into the mood





arul's utilities

track ip addresses, phone numbers, etc

ck your IP Address

NETWORK

ddress tracker

phone tracker

ess network key

h webserver

C address lookup

IDR subnet

hostname

MAC Address and OUI Lookup

This program displays the name of the company that manufactured your network card. You can also do a reverse lookup and find the MAC addresses registered by a company.

ENTER MAC ADDRESS OR OUI (FIRST 6 DIGITS)

lookup MAC address

SELECT LOOKUP TYPE: LOOKUP MAC LOOKUP VENDOR

⚠ NOTICE

You're on camera!

Step 2 – Get some information

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Step 3 – Plan the attack!


The
Attack

#DIVERSITY!


















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Which ones are ‘Security’ Cameras?

















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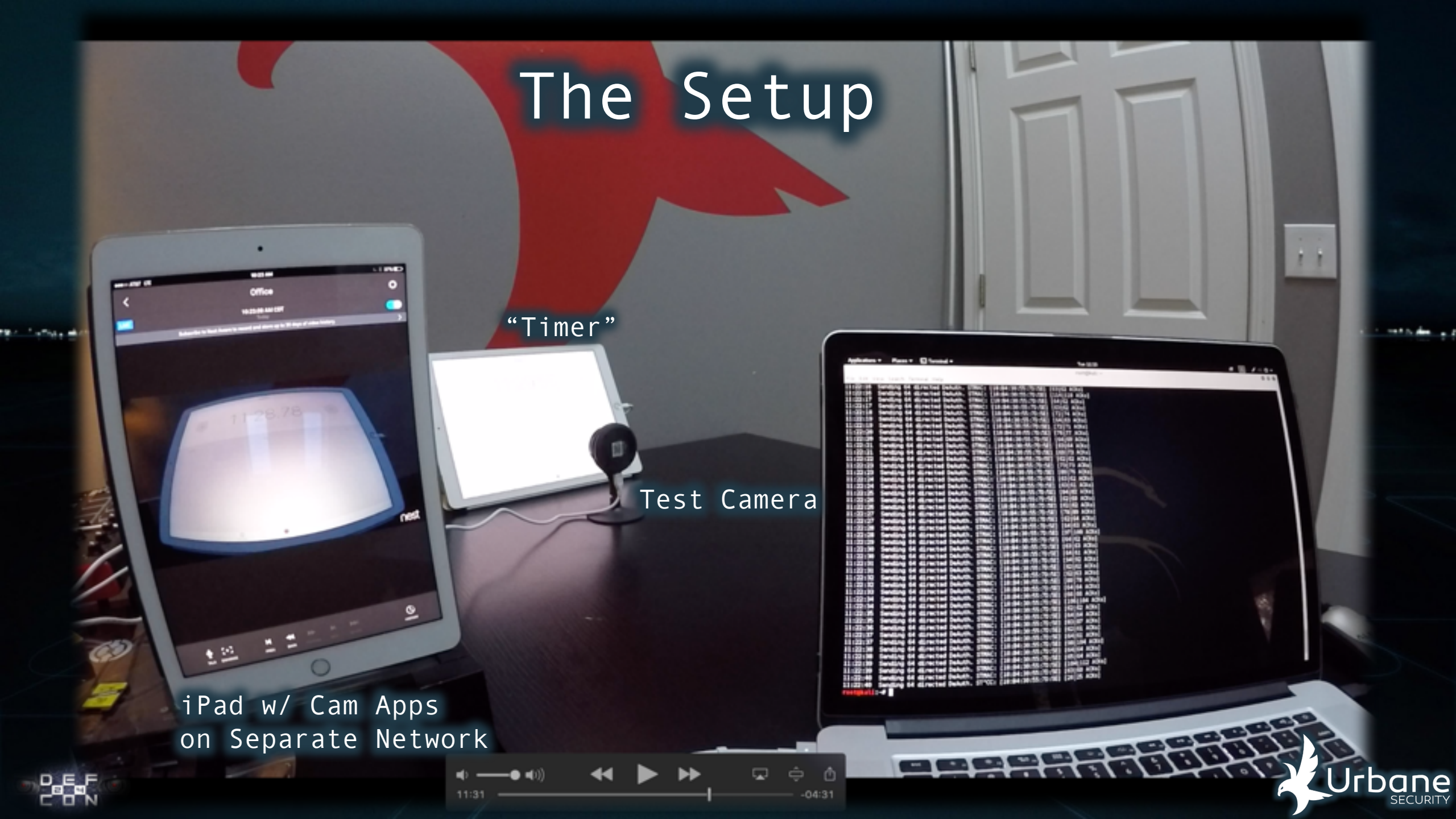
What was tested?

- Offline time
  - Does it do notification
  - How long does the notification take
  - Does it notify you if it comes back online?
- Any cached video
- Onboard video storage
- Wired network option
- Type of power (Battery vs. Wired)
- Addition Equipment needed for function?
- Other performance observations

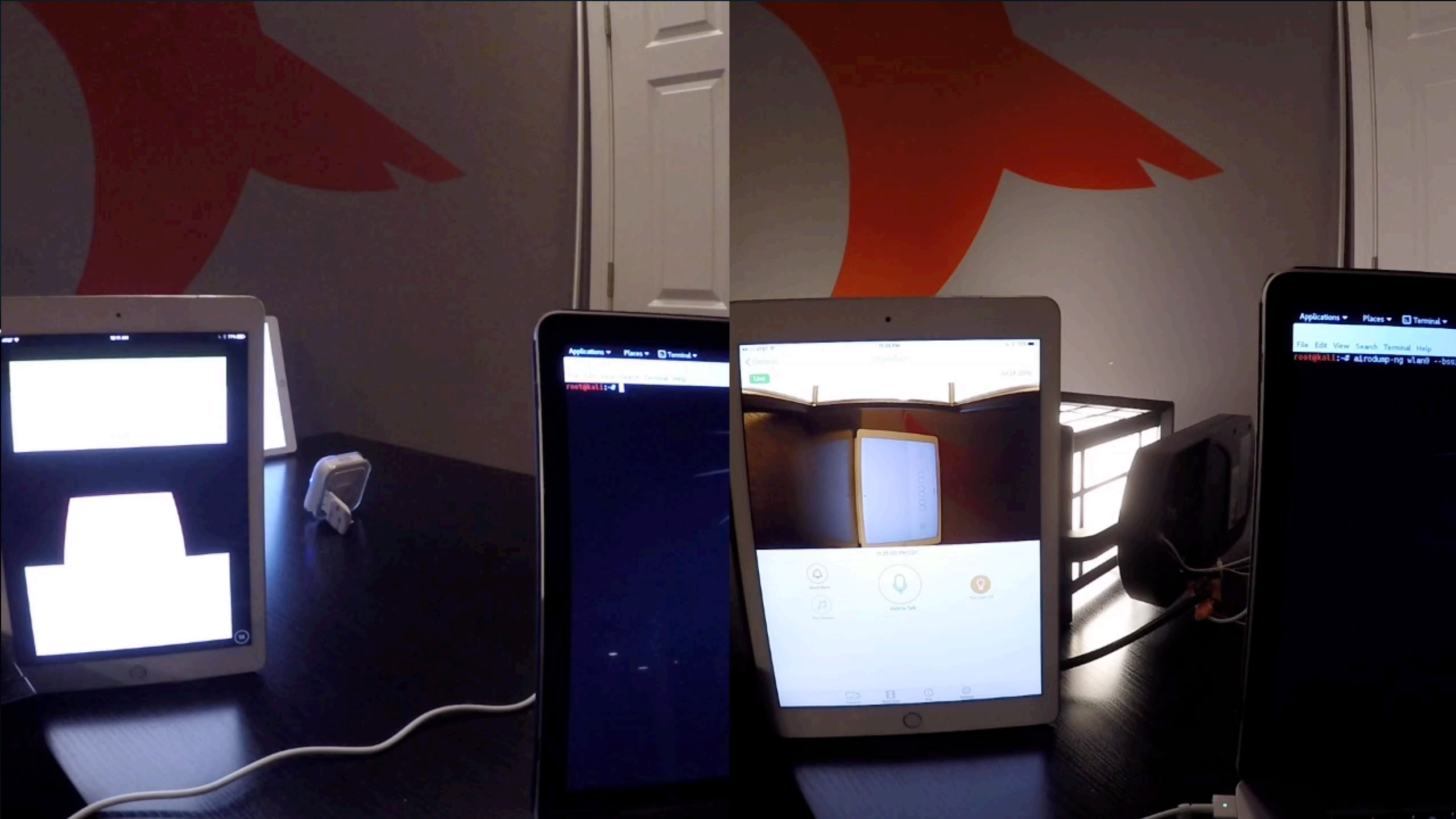
Test Procedures

- 0:00 - Stopwatch starts
- 1:00 – Targeted De-authorization Begins
  - Every :30 Hand wave for motion recognition
- 11:00 – Targeted De-authorization Ends
- 16:00 – Test ends

The Setup


“Timer”
Test Camera
iPad w/ Cam Apps
on Separate Network
11:31
-04:31

Time for the Demo Video


Applications
Places
Terminal
root@kali:~#
Live
Applications
Places
Terminal
File Edit View Search Terminal Help
root@kali:~# airodump-ng wlan0 --bss

You get the idea,
Now the Results…

Kuna



Smart Security Light
– Craftsman Version

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Kuna

Results

- Recovers after 1:39 seconds

Positive

- It’s a light
- It’s WIRED!

Negatives

- App Only Notifications
- Status Lights!
- After offline for 10 minutes it doesn’t recover at all

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Kuna

MY KUNA IS OFFLINE

If your Kuna has been offline for more than 10 minutes, you may need to take it back through the set-up process to bring it online again. Here are a few simple steps to try and get it back online:

Step 1 - Power Cycle Your Kuna

Please turn off your Kuna (using the light switch it's connected to) and wait at least 10 seconds. Then, turn the light switch back on.

Step 2 - Check the Status LED

After the power is back on, the status LED at the bottom of your Kuna should flash from red to green, and then to solid blue in about a minute. If it does not turn blue after a minute, please proceed to Step 3.

Step 3 - Run Through the Set-Up Process

Please take your Kuna through the set-up process again to reconnect it to your Wi-Fi network.

https://help.getkuna.com/hc/en-us/articles/207854363-My-Kuna-Is-Offline

Immedia



Blink Wire-Free HD Home Monitoring
& Alert System

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Immedia Blink

Results

- Recovers after :09 seconds
- Records video in 5-10 second clips

Positive

- Easy to mount?

Negatives

- Requires a base-station (sync module)
- Battery Powered
- No SD or onboard storage
- No wired option

Amcrest



Amcrest ProHD WiFi Camera

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Amcrest

Results

- Recovers after 2:00 minutes

Positive

- 10 seconds onboard memory
- Wired Option

Negatives

- On/Off switch on unit

D-Link



D-Link DSC-2630L

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D-Link

Results

- Recovers after 1 minute

Positive

- SD Option
- Doesn’t claim to be a security camera!

Negatives

- No wired option

Netgear



Arlo Smart Home Security

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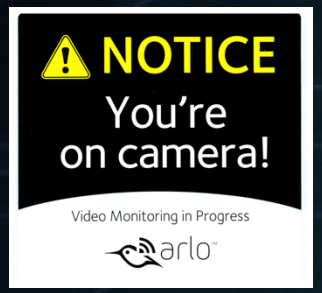
Netgear Arlo

Results

- Recovers after :45 seconds

Positive

- Versitile!
- That sticker!



Negatives

- Requires a base-station
- Battery Powered
- No SD or onboard storage
- No wired option

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Logitech



Logi Circle



Logitech Circle

Results

- Recovers after 1:30 seconds

Positive

- Consistant device push notifications

Negatives

- On/Off switch on unit
- No SD or onboard storage
- No wired option

Belkin



NetCam HD Plus



Belkin

Results

- Recovers after (:10) seconds

Positive

- 10 seconds onboard memory

Negatives

- On/Off switch on unit
- Inconsistent device push notifications

Samsung



Smart Cam HD Pro



Samsung Smart Cam

Results

- Recovers after :10 seconds *If there is immediate movement

Positive

- SD Card Option
- Wired Option

Negatives

- Cloud option not available - SD Storage Only

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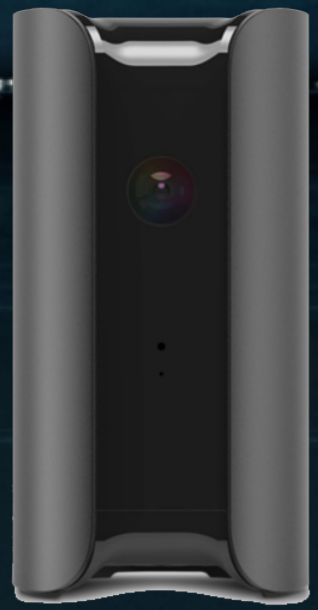
Canary



Canary All-In-One Home
Security Device

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Canary

Results

- Recovers after :02 seconds *If there is immediate movement

Positive

- Deauth quick Recovery
- Wired Option
- *Notification after 30 minutes offline

Negatives

- Movement required for recovery

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Nest



Nest Cam A00005



Nest

Results

- Recovers after :20 seconds

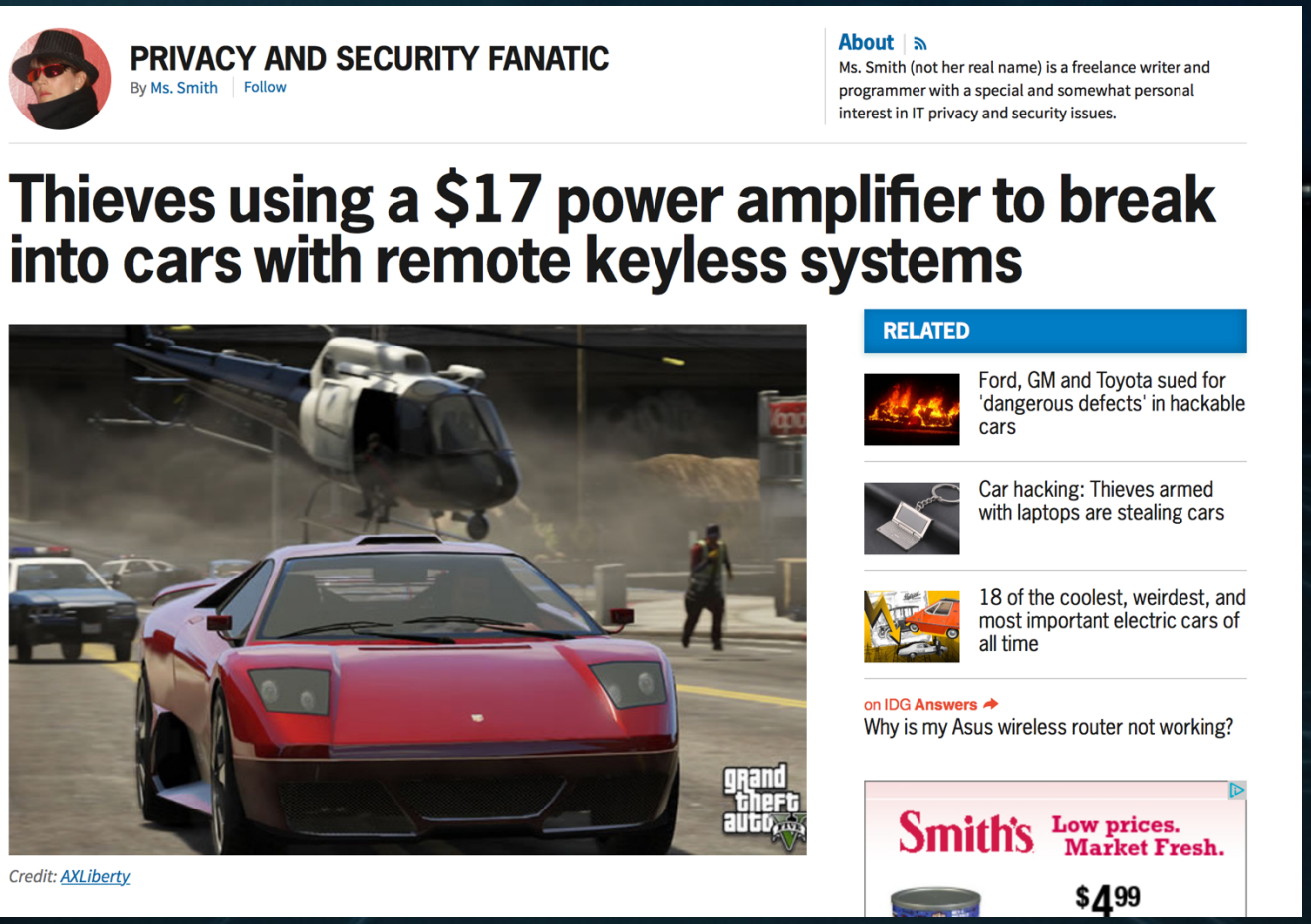
Positive

- Keeps between :30 – 4min cache
- Push notifications for activity are consistent

Negatives

- No SD Option
- No Wired Option

Bad Guys won't put in the effort...



PRIVACY AND SECURITY FANATIC

By Ms. Smith | Follow

About

Ms. Smith (not her real name) is a freelance writer and programmer with a special and somewhat personal interest in IT privacy and security issues.

Thieves using a $17 power amplifier to break into cars with remote keyless systems

Credit: AXLiberty

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on IDG Answers

Why is my Asus wireless router not working?

Smith's Low prices. Market Fresh.

$4.99

What should consumers do then?

- Wired > Wireless Cameras
- Verify and understand the limitations of the products*
- Cameras have unintended great uses!
  - Real Estate
  - Household / Business Cleaners
  - Dog Walkers
  - Etc.

Windows for Consumers


Start
Sheila Marchand
Regina Roberts
Essential App
20°
Los Angeles
Sunny
DELL
Start
68°
acer



Duo Labs / Featured Article / Mar 17, 2016

Bring Your Own Dilemma: OEM Laptops and Windows 10 Security

Late last year, Duo Labs, the security research team of Duo Security, purchased a stack of OEM (Original Equipment Manufacturer) laptops to see how secure they were. Some problems immediately jumped out at us, like the eDellRoot issue, but a few other issues took a bit more sorting through.

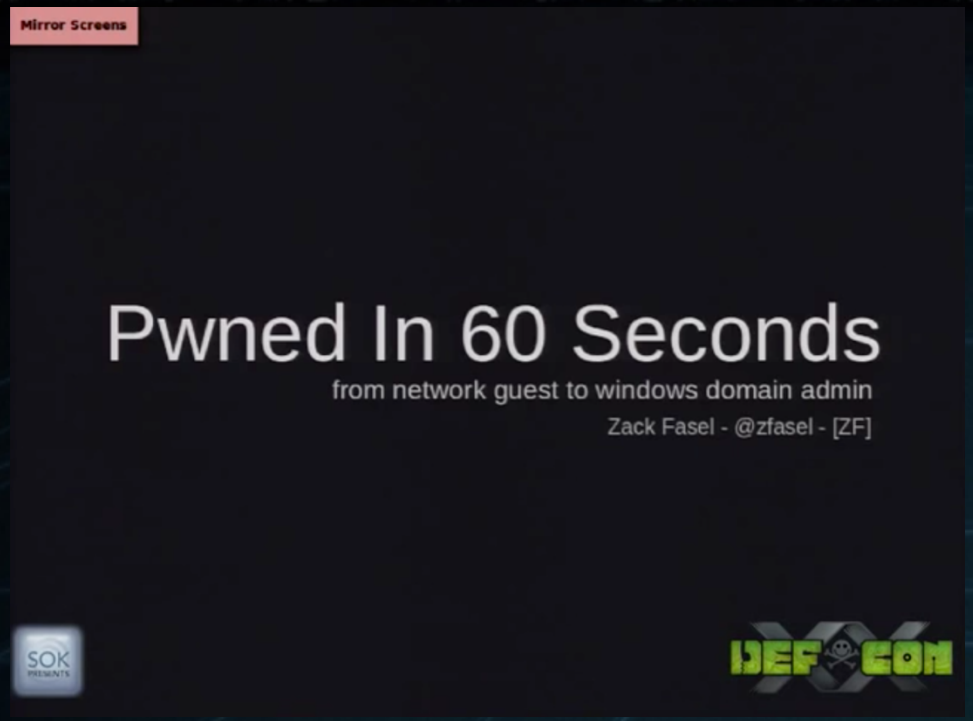
I took a look at the network by sniffing the laptops as they were first booted, and then, once configured. The idea was to judge how secure the laptops

What We Tell Users

- Patch your devices
- Install Anti-virus
- Use HTTPS only
- Use a password manager
- Watch out for suspicious downloads
- Don’t use suspicious wifi
- Pick “strong” passwords*

Let's talk about the past

- Back at DEF CON 20 Zack gave a talk…





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The Old Focus

- Corporate Accounts
- Internal Networks
- Relay Auth
- Mmmmm. Data

NTLM Hashes

- Md4(unicode($password)
- 128 bit hash
- Used for network authentication and signing

NTLM Network Authentication

- 3 way Handshake
  - Client -> Server: Sup, what do you support
  - Server -> Client: We speak klingon, Challenge Code
  - Client -> Sever: My voice is my passport, verify me.
- Two Flavors
  - V1 – Server Challenge Only
  - V2 – Client challenge added to server challenge
- Microsoft has recommended to move away from NTLM in favor of Kerberos
- Auto Authentication to Things

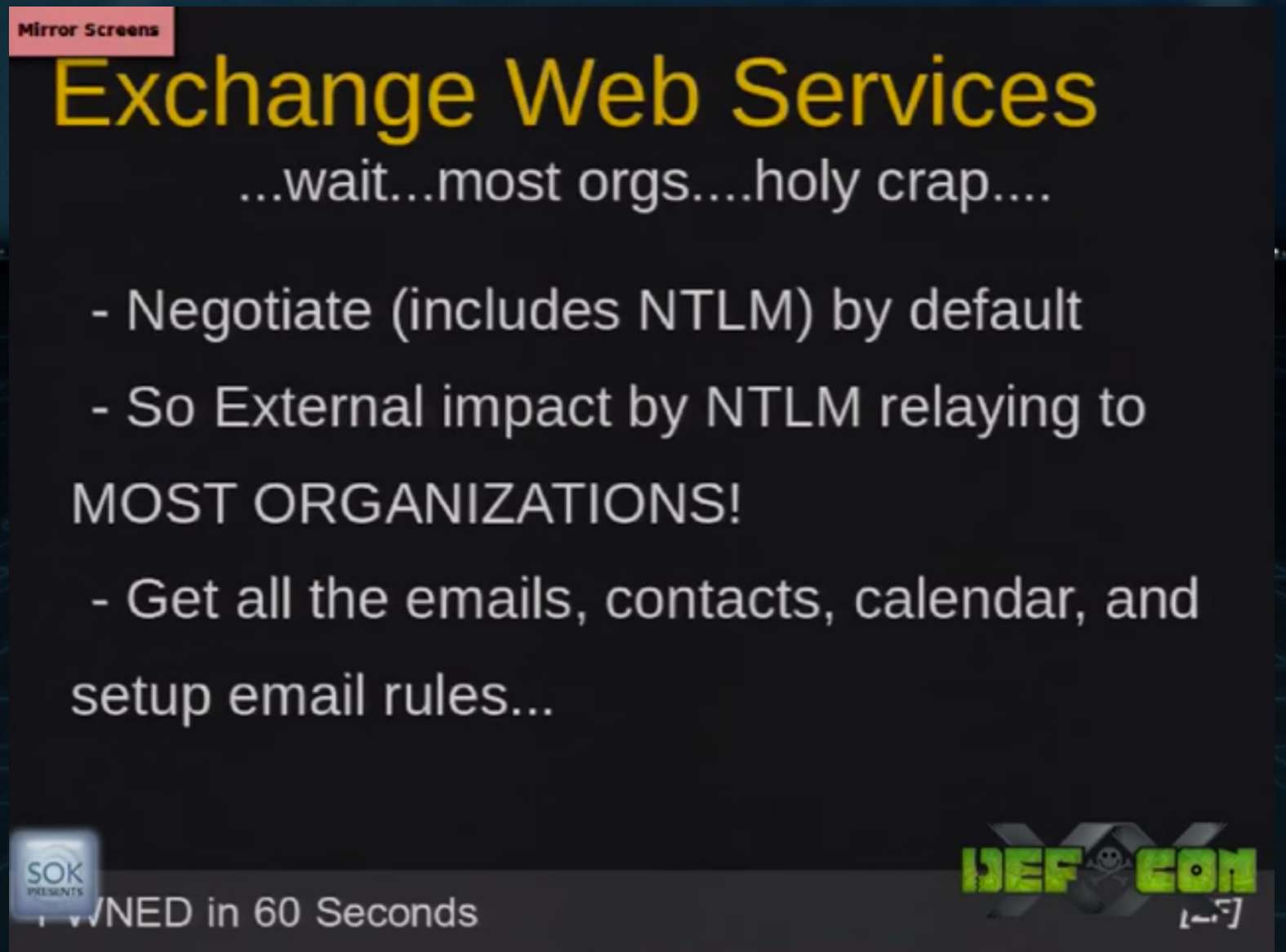
WPAD

- DHCP Option
- WPAD from DNS from DHCP
- LLMNR
- NBNS
- Windows 10 seems to be authing less to this, but some applications (LOOKING AT YOU CHROME) do.

Not Just WPAD

- This isn’t another “wpad is bad” talk.
- Injection of UNC paths in IE/Edge
- File formats with UNC Paths
- 3rd party applications without CORS

Corporate Internal Only?



THIS IS STILL A HUGE ISSUE

You might see where this is going

Corporate Internal Only?

- We've never really talked about impact of cracking the NTLM Network Challenges…
  - Corporate? VPN Access, Sharepoint, Shared Passwords, local admin if permissions are set?
- What about personal users?
  - Shared passwords?
  - Local file shares?
  - Provides only guest access remotely and admin.

One account for all things Microsoft

Set up a Microsoft account, and all of your Microsoft services—from Office to Outlook to Skype—work together through a single sign-in. Whether you use Windows, iOS, or Android devices, or switch between all three, your account keeps everything you need on the device in hand.

Sign in | Create account

All of these services work with your Microsoft account

Whether you use a couple Microsoft services or all of them, your account keeps everything important to you—settings, photos, and files—with you on any device.



Microsoft Store Products Support Search Microsoft.com 0 Sign in

Account Set-up Instructions FAQ En Español

One account for all things Microsoft

Set up a Microsoft account, and all of your Microsoft services—from Office to Outlook to Skype—work together through a single sign-in. Whether you use Windows, iOS, or Android devices, or switch between all three, your account keeps everything you need on the device in hand.

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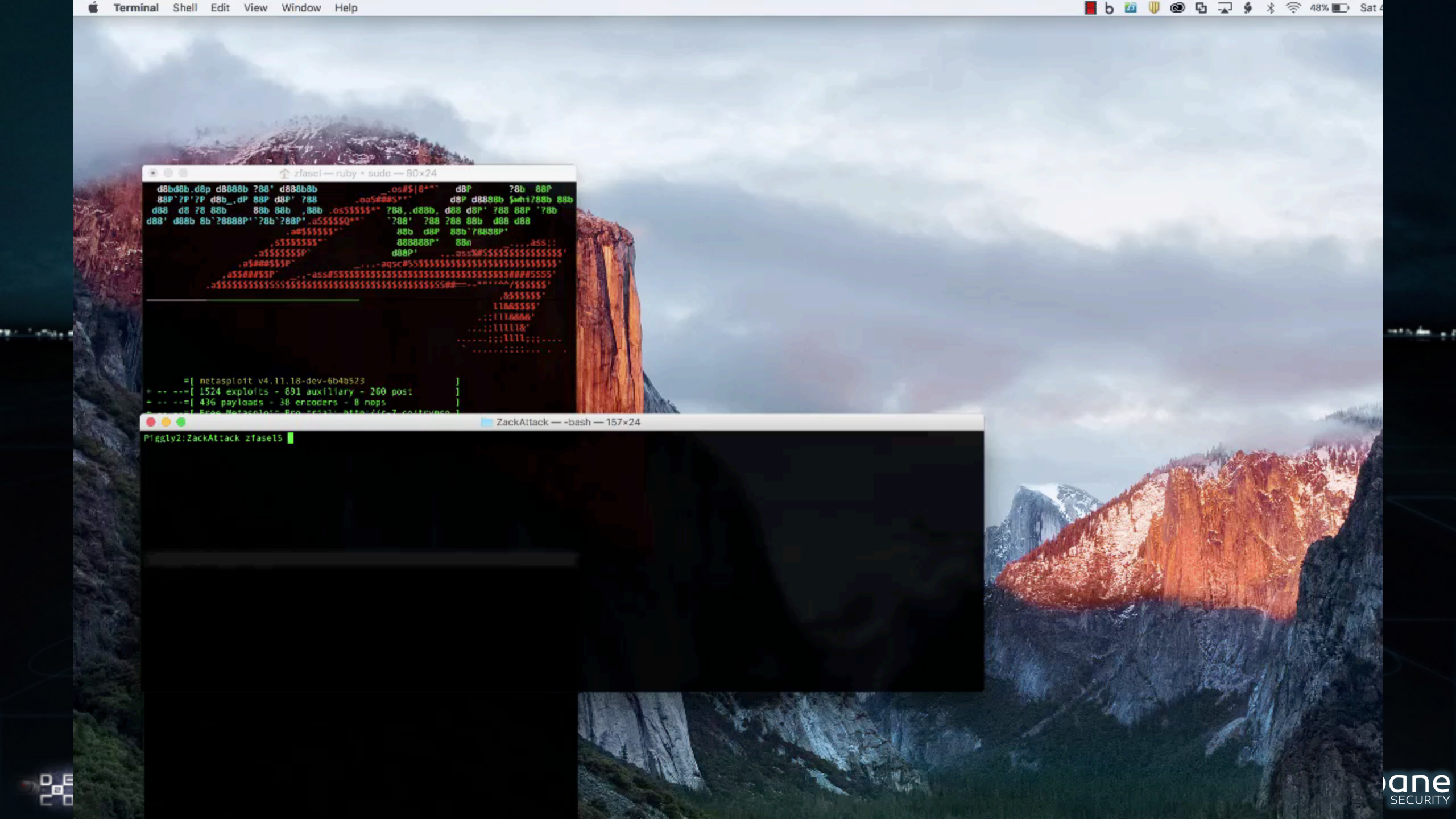
All of these se ces work with your Microsoft account

Whether you use a couple Microsoft services or al em, your account keeps everything important to you—settings, photos, and files—with you on any device.




Terminal Shell Edit View Window Help
zfasel — ruby • sudo — 80×24
=[metasploit v4.11.18-dev-6b4b523]
+ -- --=[1524 exploits - 891 auxiliary - 260 post]
+ -- --=[436 payloads - 38 encoders - 8 nops]
ZackAttack — -bash — 157×24
Piggly2:ZackAttack zfasel5

ZackAttack Update

Release 0.1.2

“for Zacks who can’t code good and wanna learn to do other stuff good too”

DEF CON

Urbane SECURITY

Now

```
[redacted]@outlook.com::MicrosoftAccount:8877665511223344:4e1fdc9ae799
[redacted]@outlook.com::MicrosoftAccount:8877665511223344:dfdb7bea83
[redacted]@gmail.com::MicrosoftAccount:8877665511223344:f1a22
[redacted]@gmail.com::MicrosoftAccount:8877665511223344:421420df0887dc
[redacted]@gmail.com::MicrosoftAccount:9988776655443322:ff142bc
[redacted]@hotmail.com::MicrosoftAccount:8877665511223344:fb8d381f3ae
[redacted]@gmail.com::MicrosoftAccount:8877665511223344:fb834779908
[redacted]@gmail.com::MicrosoftAccount:8877665511223344:fa2ae64da151bc77e
[redacted]@outlook.com::MicrosoftAccount:9988776655443322:f75f2422599
[redacted]@hotmail.com::MicrosoftAccount:9988776655443322:20d724ad3668df
```

So what?

- At a minimum, information disclosure of email of the user. That's bad enough.
- Offline password attacks.
- And if you can crack the password…



Microsoft Store Products Support

Account | Your info | Services & subscriptions | Payment & billing | Devices

Personal info

Privacy and cookies statement

To change the personal info that other people see, go to Profile.

Birthdate

March | 13 | 1937

Gender

Male

Country/region

United States

State

Select...

ZIP code

60657

Time zone

Central Time – CST

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Urbane SECURITY

Payment options

Add a payment option

Credit and debit cards, PayPal, bank account, etc.

Microsoft account

Once you add money to your account, it'll show up for fast checkout in the Windows and Xbox stores.
Learn more

Redeem Bitcoin

Redeem a code or gift card

Send a gift card by email

MasterCard **6505

Edit info

Remove

View order history

Card info

Name on card
Zachary Fasel

Billing address


Credit card number
**6505

Expiration date
09/2016

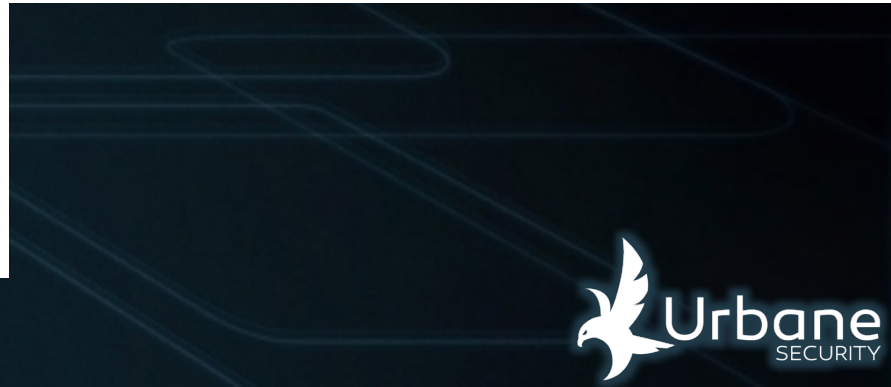
For purchases in
United States

How Apple and Amazon Security Flaws Led to My Epic Hacking





It turns out, a billing address and the last four digits of a credit card number are the only two pieces of information anyone needs to get into your iCloud account. Once supplied, Apple will issue a temporary password, and that password grants access to iCloud.



Zack 0

Search History

Enter your search term | All types | All dates | Off On | Clear all

TODAY

how to poison my boss and make it look lik...	9:53 am
is defcon cancelled?	9:52 am
mcafee for president	9:51 am
how do i hack microsoft accounts	9:50 am

Heavy Microsoft User?

- Outlook Emails!
- OneDrive
- Remote File Access
- WiFi Sense

Offline Cracking? That's Original….

- Breaches - both services and local
- Encrypted files / datasets
- Really bad services
- But harvestable from a LAN? And as a single signon token?

What We Tell Users

- Patch your devices
  - Doesn’t Mater
- Install Anti-virus
  - Some HIDS catch 1122334455667788, but that’s it
- Use HTTPS only
  - It’s only a matter of time you hit a HTTP endpoint
- Use a password manager
  - Still have your Microsoft account, but helps with other sites
- Watch out for suspicious downloads
  - Does not apply
- Don’t use suspicious wifi
  - Are you going to not use wifi when on the road?
- Pick “strong” passwords

What We Shouldn't Be Telling Users

- Use this cool VPN service! Totally Trustworthy!

What We Need To Tell Users

- Pick strong passphrases
- Enable 2-Factor (yes, it’s 10+ steps)
- Use unique creds per site
- Maybe avoid hotmail/outlook mail for a bit

How can we fix it?

- Disable NTLM Auth (but what user is going to do that)
- Don’t use a Microsoft account to log in to your windows system

So TL;DR

- Got a Stock Windows Laptop?
- Attacker on the same network?
- Use a Microsoft Account to log in?
- You're pwned.



Summary of Issues

- Fitness / Notification Devices can be tracked through various means
- WiFi Security Cameras can get blasted offline and see/know nothing
- Consumer Windows Laptops leak identity and creds for offline cracking



Acknowledgements

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- Mike Ryan, Michael Ossmann, Dominic Spill, Zero_Chaos, and Scott Lester on BLE
- Simple Nomad for OEM device research
- Mubix for complaining about ZackAttack enough

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Urbane SECURITY


END OF LINE
DEF CON
Urbane SECURITY

@zfasel

@secbarbie



Bits and Presentation Available at

urba.ne/defcon24

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