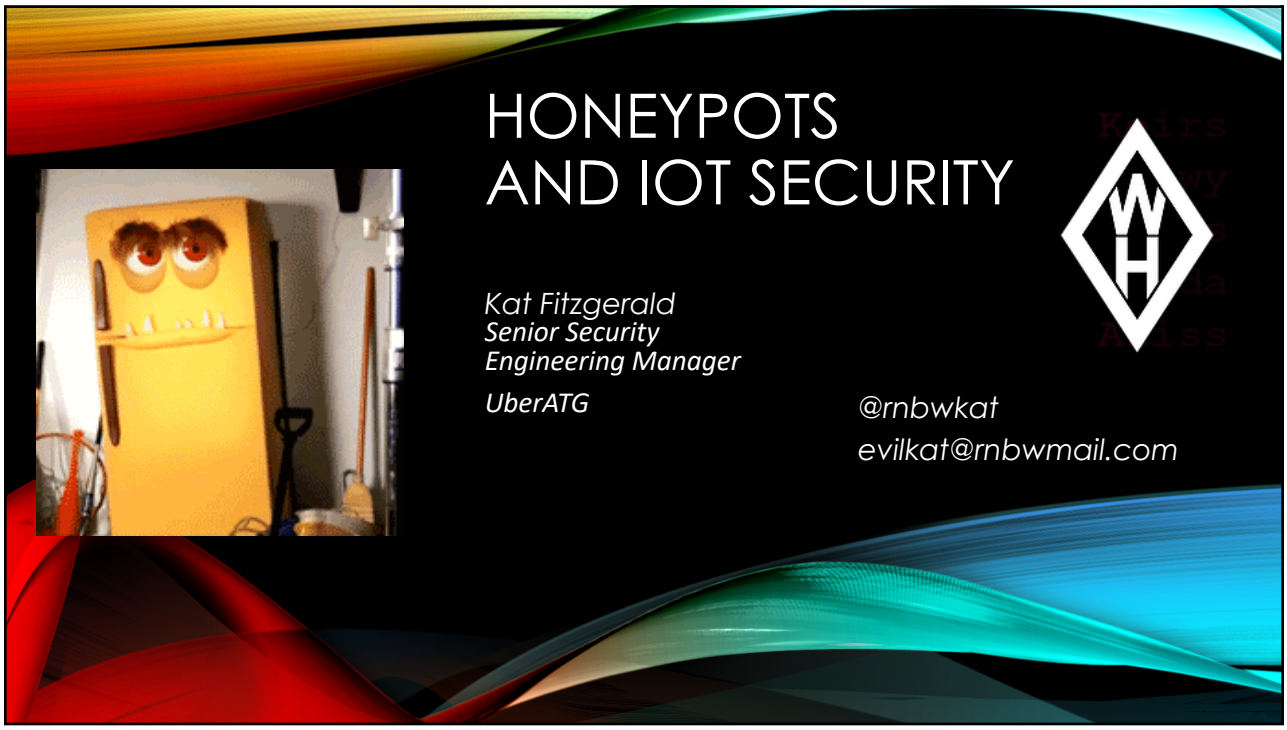

HONEYPOTS
AND IOT SECURITY
Kat Fitzgerald
Senior Security
Engineering Manager
UberATG
@rnbwkat
evilkat@rnbwmail.com

1


$ whoami
• @BSidesChicago & @BSidesPGH (CFP)
• Lots of years in Security
• Based in Pittsburgh and a natural creature of winter, you can typically find me sipping Grand Mayan Extra Añejo whilst simultaneously defending my systems using OSS, magic spells and Dancing Flamingos.
• Honeypots, Refrigerators, and IoT are a few of my favorite things!

2

DISCLAIMER

- The views and opinions expressed in this presentation are my own and do not necessarily reflect the official policy or position of any current or previous employer. Examples of exploitations, coding and vulnerabilities discussed within this presentation are only examples and they should not be utilized in the real-world.

Those of you with an overwhelming fear of the unknown will be happy to learn that there is no hidden message revealed by reading this disclaimer backwards.

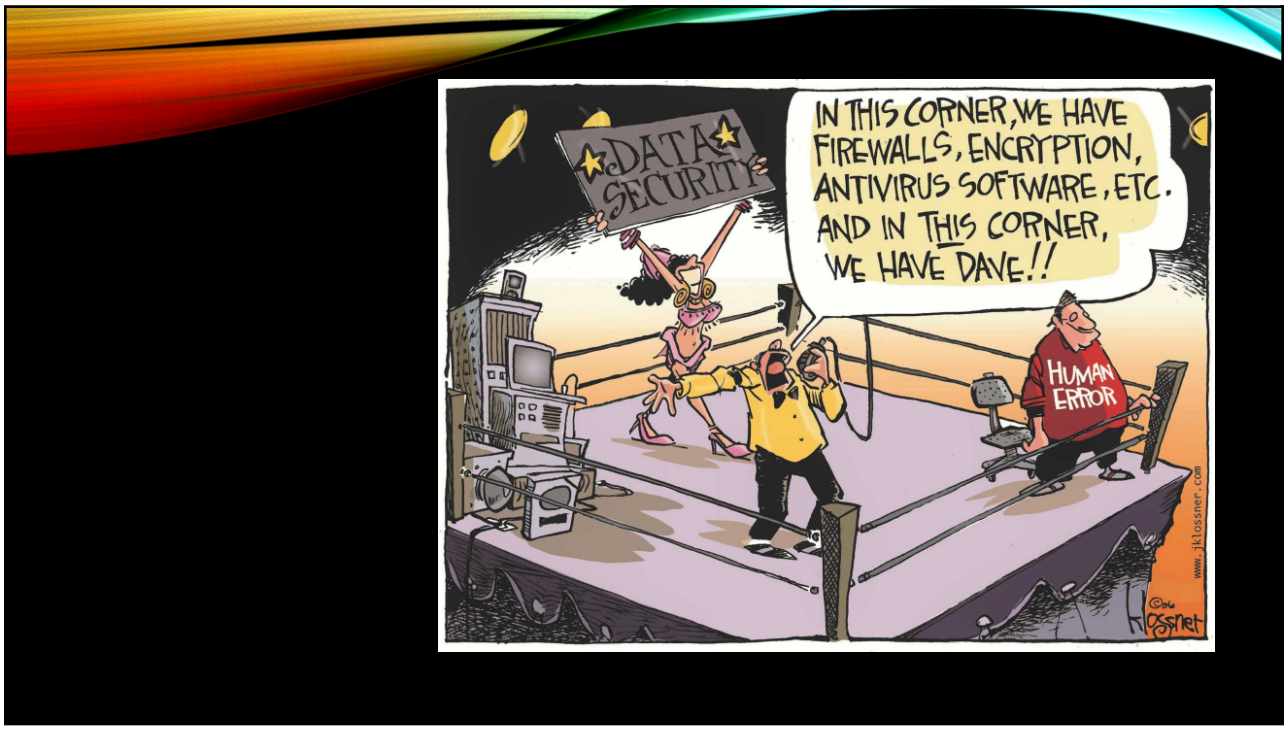
3

WHY ARE WE HERE?

- Spending exceeded $114 billion - 2018
- Attacks and breaches are commonplace
- Security "stuff" is vulnerable
- Lateral Movement – (this will become more important)
- But what about –
  - Your Security Architecture is not unique
  - What is your "typical day"

Instead of Brilliance, we have standardized mediocrity.
– John Strand, Offensive Countermeasures

4



5

I guess we did it wrong?

This $12 Course Can Turn You Into An Ethical Hacking Pro - ExtremeTech

2 days ago

6

And…

GoPro

Maker: GoPro, Inc.

Location: 28.05546° -82.41751° Error=213 ft

University of South Florida 3705 Spectrum Blvd Tampa, FL 33612 United States

Bluetooth Pairing Request

"Public F0:99:19:8B:19:FA" would like to pair with your iPhone. Enter the code shown on "Public F0:99:19:8B:19:FA".

Cancel Pair

Pig
xfinitywifi
TMobileWingman
Daddy Sunshine_5G
$$$$$$$$
PuppyLove
Hockey1
Trimble GNSS 7296
- DEN Airport Free WiFi
19CALTHA
RiceHome-5G
United_Wi-Fi
5314/5316/5414
FSCA
Fly-Fi
20202020
SouthwestWiFi
Fios-4IKNY-5G
DIRECT-
Foos WiFi 5G
attwifi
MOTOTRBO
FlyDulles

7

WHY ARE WE NOT HERE

- This is not a demo of 5000 different honeypots
- I'm not showing you all my honeypots (duh)

- BUT – there must be a better way!

8

WHAT IS A BREACH?

- Most breaches are NOT 0-day
- Most breaches are NOT "fancy"
- Most breaches don't come from "vulnerability scanners"

- Most breaches come from "Config Issues"
- A close 2nd - compromised credentials
- Trailing in 3rd - Over-Priv Users

9

EXAMPLES

- University attacked by its lightbulbs, vending machines and lamp posts
- Industrial
  - Shut down an Oil Rig
  - Blast Furnace
  - Toilet

10

HONEYPOTS

- Honeypots vs Deception
  - A resource with no value
    - Value = Use of Resource
  - Does Not Hack Back
    - (Yet?)
- Important Points
  - Deployment
  - Architecture/Customization = Planning!
  - 100's of "types"

11

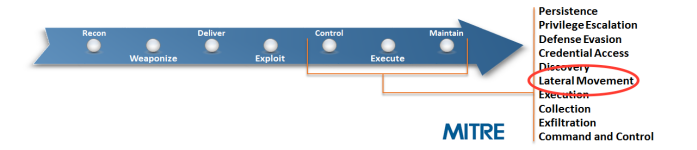
PICK ONE

- Adhd – https://www.activecountermeasures.com/free-tools/adhd/
- Honey Badger -- https://github.com/adhdproject/honeybadger
- Honey Badger Red -- https://github.com/prometheaninfosec/honeybadger-red
- Canarytokens -- https://canarytokens.org/generate
- OpenCanary -- https://opencanary.readthedocs.io/en/latest/
- WebThings -- https://iot.mozilla.org/docs/gateway-getting-started-guide.html
- T-pot -- https://github.com/dtag-dev-sec/tpotce
- Modern Honey Network -- https://github.com/pwnlandia/mhn
- Twisted-honeypot -- https://github.com/lanjelot/twisted-honeypots
- RPi and Dshield -- https://isc.sans.edu/diary/22680
- Lots more -- https://github.com/paralax/awesome-honeypots
- What about the "Real Thing"?

12

LATERAL MOVEMENT

- Enables an adversary to access and control remote systems on a network.
- *(See, I told you it would become important later)*



https://attack.mitre.org/wiki/Lateral_Movement

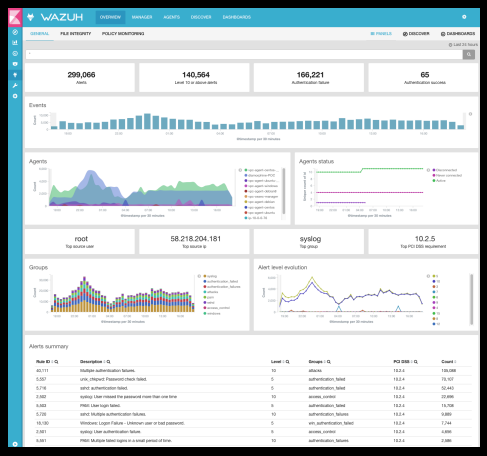
13

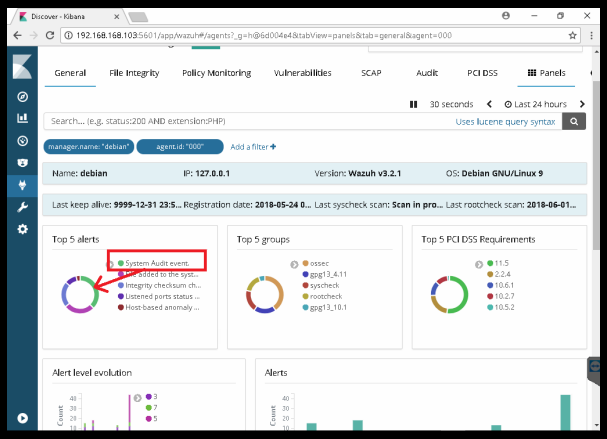
OODA VS CCAD

- OODA
  - Observe
  - Orient
  - Decide
  - Act
- CCAD
  - Confuse
  - Confound
  - Annoy
  - Delay

14

MONITORING - WAZUH.COM





15

DEPLOYMENT

- Plan, Plan, Plan!
  - Low, Medium, ~~High~~
  - Honeypots, Honeyports, Honeytokens, Honeycreds
  - Customization ← Ding ding ding!
  - Real vs Self-Signed Certs
  - Actual Applications
  - HIDS / OSSEC / Wazuh / SIEM
    - Rules! Tuning

- Where?
  - Server Farms
  - Shares
  - IoT
  - DMZ
  - IP space
  - MX
  - DNS
  - PoS
  - WP, Rpi, VMs, VPS

16

WHAT IS IT?

```
# uname -a
Linux RT-AC5300 2.6.36.4brcmarm #1 SMP PREEMPT Fri Oct 18 16:13:51 CST 2019 armv7l ASUSWRT
# df
Filesystem           1K-blocks      Used Available Use% Mounted on
rootfs                   40960     40960         0 100% /
/dev/root                40960     40960         0 100% /
devtmpfs                257456         0    257456   0% /dev
tmpfs                   257600       944    256656   0% /tmp
/dev/mtdblock4           65536      2064     63472   3% /jffs
```

17

COWRIE

```
# ls -al /etc
srwxrwxrwx    1 admin    root             0 May  5  2018 amas_lib_socket
-rw-rw-rw-    1 admin    root          1017 May  5  2018 cert.pem
drwxrwxrwx    2 admin    root           100 May  5  2018 cfg_mnt
srwxrwxrwx    1 admin    root             0 May  5  2018 cfgmnt_ipc_socket
-rw-rw-rw-    1 admin    root           380 May  5  2018 dnsmasq.conf
drwx------    2 admin    root           100 Feb 27 13:24 dropbear
lrwxrwxrwx    1 admin    root            20 Dec 31  1969 e2fsck.conf -> /rom/etc/e2fsck.conf
drwxrwxrwx    2 admin    root            60 May  5  2018 email
lrwxrwxrwx    1 admin    root            19 Dec 31  1969 ethertypes -> /rom/etc/ethertypes
-rw-r--r--    1 admin    root             0 Dec 31  1969 fstab
-rw-r--r--    1 admin    root            52 May  5  2018 group
-rw-rw-rw-    1 admin    root             0 May  5  2018 group.custom
-rw-r--r--    1 admin    root            52 May  5  2018 gshadow
-rw-r--r--    1 admin    root           176 May  5  2018 hosts
lrwxrwxrwx    1 admin    root            23 Dec 31  1969 hotplug2.rules -> /rom/etc/hotplug2.rules
-rw-r--r--    1 admin    root           365 May  5  2018 ipsec.conf
drwxr-xr-x   10 admin    root           200 May  5  2018 ipsec.d
-rw-rw-rw-    1 admin    root          1675 May  5  2018 key.pem
```

18

MORE EXAMPLES

- MicroPOS
- Compromised Creds
- (Mis)configuration mgmt system
- Hardware/Server rooms
- Mail Server
- Mirai
- Honeyport

19

PORTSPOOF (1)

nmap –p200-300 gonzo

PORT STATE SERVICE
200/tcp open src
201/tcp open at-rtmp
202/tcp open at-nbp
203/tcp open at-3
204/tcp open at-echo
205/tcp open at-5
206/tcp open at-zis
207/tcp open at-7
208/tcp open at-8
209/tcp open tam
210/tcp open z39.50
211/tcp open 914c-g
212/tcp open anet
213/tcp open ipx
214/tcp open vmpwscs
215/tcp open softpc
216/tcp open atls
217/tcp open dbase
218/tcp open mpp
219/tcp open uarps
220/tcp open imap3
221/tcp open fln-spx
222/tcp open rsh-spx
223/tcp open cdc
224/tcp open masqdialer

20

PORTSPOOF (2)

nmap -A gonzo
Starting Nmap 7.80 (https://nmap.org) at 2020-02-27 09:52 EST
Stats: 0:04:43 elapsed; 0 hosts completed (1 up), 1 undergoing SYN Stealth Scan

SYN Stealth Scan Timing: About 75.58% done; ETC: 09:58 (0:01:31 remaining)
Stats: 0:04:53 elapsed; 0 hosts completed (1 up), 1 undergoing SYN Stealth Scan

SYN Stealth Scan Timing: About 77.22% done; ETC: 09:58 (0:01:26 remaining)
Stats: 0:07:39 elapsed; 0 hosts completed (1 up), 1 undergoing SYN Stealth Scan

21

HIDING IN PLAIN SIGHT

84%

of organizations breached had evidence of the breach in their log files...

Source: Verizon Data Breach Report, 2014

22

TAKEAWAYS

- CCAD
- Low False Positives
- Lateral Movement
- Cost Effective
- Defend & Detect
- Additional IR
- Forensics
- REAL Threat Intelligence
  - It's About Thinking Differently, not "watching everything"

23

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evilkat@rnbwmail.com

24