HONEY, I'M HOME!
CUSTOMIZING HONEYPOTS FOR FUN & !PROFIT

Kat Fitzgerald
Security Engineering Mgr

@rnbwkat
evilkat@rnbwmail.com

1

$ whoami

- *CEO @BSidesChicago,*
  2019 COO @dianainitiative,
  CFP Chair @BSidesPGH, DefCon 3!
- *Based in Kirkland, WA and a natural creature of winter, you can typically find me sipping Casa Noblé Añejo whilst simultaneously defending my systems using OSS, magic spells and Dancing Flamingos*
- *Honeypots, Refrigerators and IoT (Internet of Threats) 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.

3

DISCLAIMER (PART 2)

- I'm obsessed(?) with home security equipment, honeypots and colos
- If you want to have a life, perhaps tone it down a bit
- YMMV

4

WHY WE ARE NOT HERE

- This is not a demo of 5000 different honeypots
- I'm not showing you all my honeypots (duh)
- Honeypots are only PART of your Security Posture

5

WHY WE ARE HERE

- Spending exceeded $150 billion - 2021
- 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

6

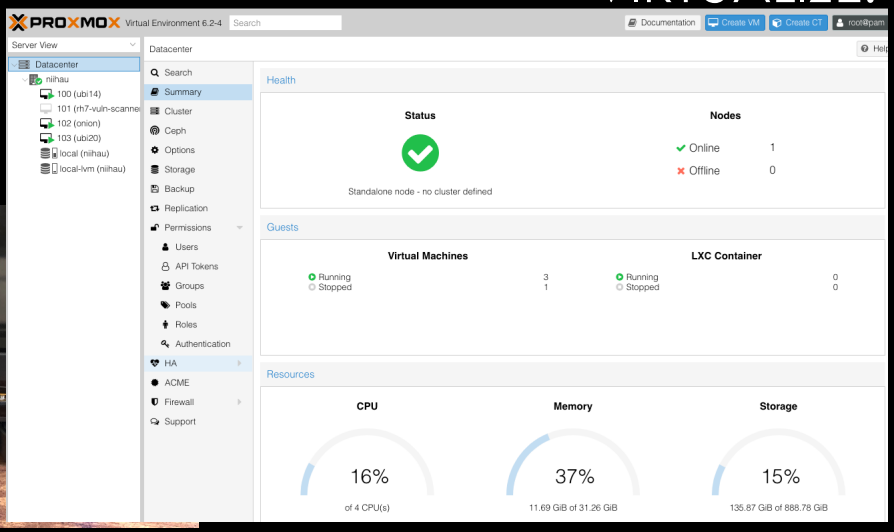
BUT FIRST..

Your Lab!

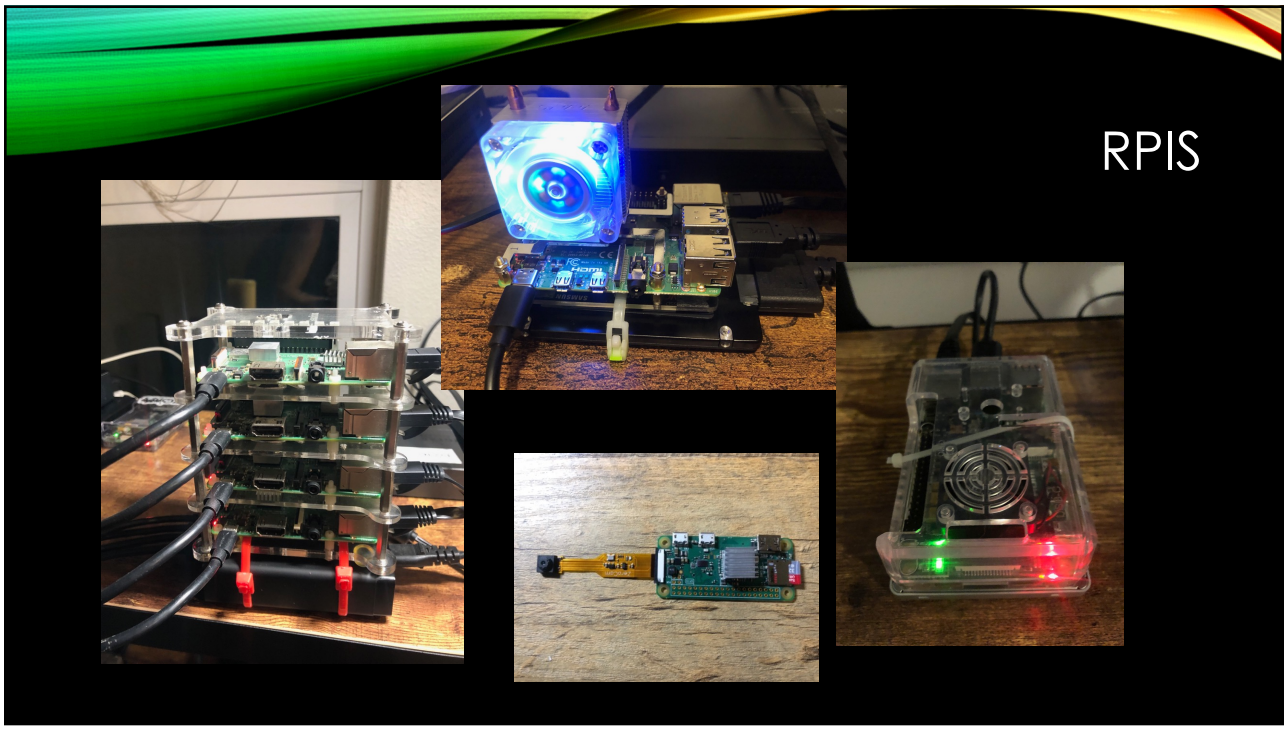
- Virtualize
  - Proxmox
- PIs
- OpenWRT
- OpnSense

7

VIRTUALIZE!



8


RPIS

9


NETWORK
192.168.2.5
NETGEAR
ProSAFE
Plus Switch
GS108E
https://openwrt.org/

10

OK – NOW WHAT?

- Install all the things!
- OSes come in all shapes and sizes
- Plan!
  - unplan (rePlan?)
- Don't forget Windoze
  - https://www.microsoft.com/en-us/evalcenter/
  - *Snapshots (180 days)*
- Red Fish / Blue Fish
- Security Onion vs Wazuh

11

HONEYPOTS

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

12

PICK ONE

- OpenCanary -- https://opencanary.readthedocs.io/en/latest/
- Adhd – https://www.activecountermeasures.com/free-tools/adhd/
- Honey Badger -- https://github.com/adhdproject/honeybadger (GEO!)
- CHN-- https://communityhoneynetwork.readthedocs.io/en/stable/
- Canarytokens -- https://canarytokens.org/generate
- T-pot -- https://github.com/telekom-security/tpotce
- Cowrie -- https://github.com/cowrie/cowrie
- PIs w/lights -- https://github.com/mattymcfatty/HoneyPi
- Lots more -- https://github.com/paralax/awesome-honeypots

- What about the "Real Thing"? Hmmmm..

13

ADHD

ACTIVE DEFENSE HARBINGER DISTRIBUTION

ADHD Version: **4.0.0** | GitHub Page | Project Page

Black Hills Information Security

ADHD

- Credentials
- Artillery
  - Example 1: Running Artillery
  - Example 2: Triggering a Honeyport
  - Example 3: Adding a File to a Watched Directory
- Bear Trap
  - Example 1: Basic Usage
- BeEF
  - Example 1: Hooking a Web Browser
  - Example 2: Browser Based Exploitation With BeEF
- CanaryTokens
  - Example 1: Creating Callbacks Using Local Canary Instance
  - Example 2: Creating Callbacks Using CanaryTokens.org
- Cowrie
  - Example 1: Running Cowrie
  - Example 2: Cowrie In Action
  - Example 3: Viewing Cowrie's Logs

https://www.activecountermeasures.com/free-tools/adhd/

14

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

15

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

16

Date	Time	Source	Source Port	Target	Target Port	Protocol
2020-11-19	00:16:59	110.154.181.126	14649	192.168.100.100	23	6
2020-11-19	00:17:26	74.120.14.37	54522	192.168.100.100	23	6
2020-11-19	00:17:31	167.248.133.92	64123	192.168.100.100	23	6
2020-11-19	00:17:31	167.248.133.40	39580	192.168.100.100	23	6
2020-11-19	00:17:31	45.129.33.5	56294	192.168.100.100	23	6
2020-11-19	00:18:03	192.241.217.154	44838	192.168.100.100	23	6
2020-11-19	00:18:31	64.64.104.10	15188	192.168.100.100	23	6
2020-11-19	00:18:43	185.175.93.14	49700	192.168.100.100	23	6
2020-11-19	00:19:14	83.97.20.35	55995	192.168.100.100	23	6

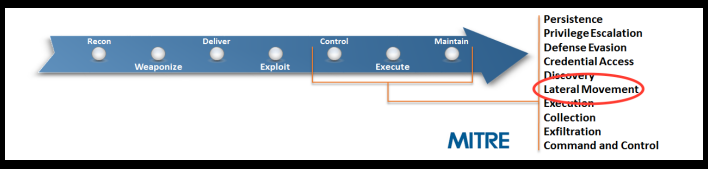
Showing 1 to 100 of 11,920 entries Previous 1 2 3 4 5 … 120 Next

DSHIELD
5 MINUTES!

17

LATERAL MOVEMENT

- Enables an adversary to access and control remote systems on a network.



18

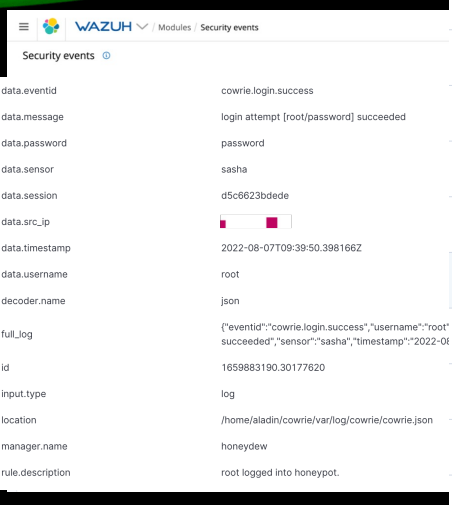
OODA VS CCAD

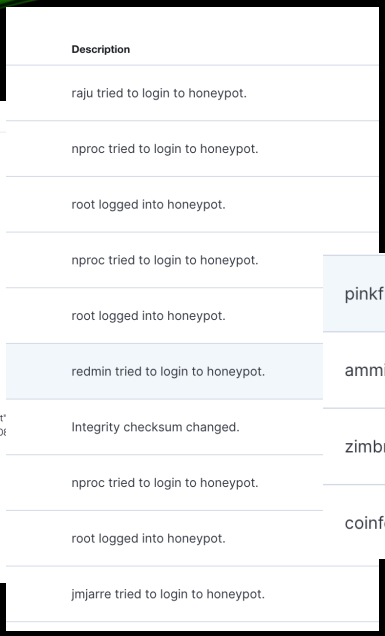
- OODA
  - Observe
  - Orient
  - Decide
  - Act
- CCAD
  - Confuse
  - Confound
  - Annoy
  - Delay

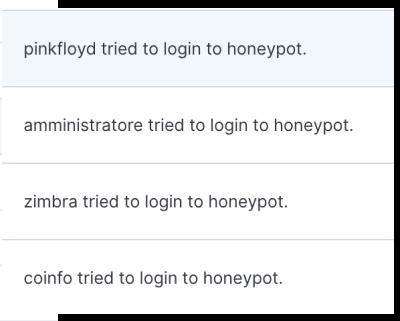
19

MONITORING

wazuh.com







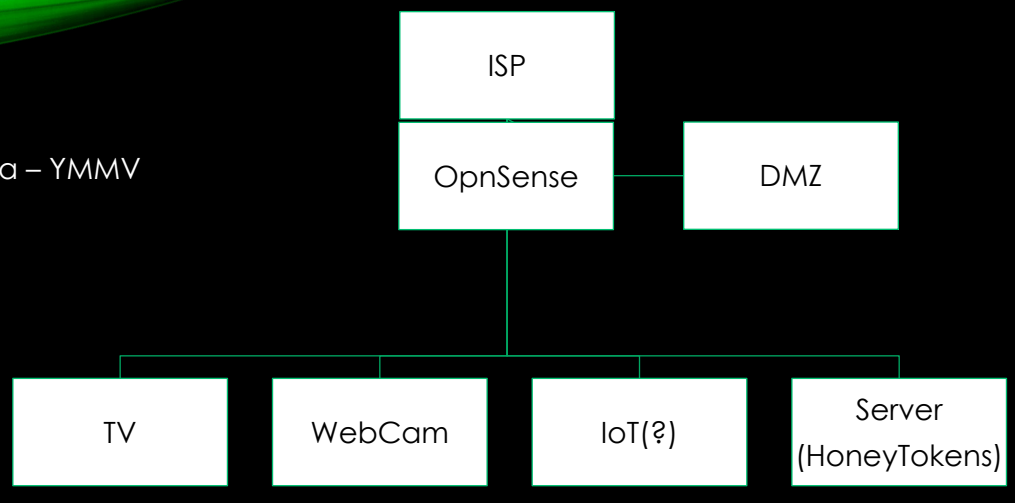
20

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
  - Cloud Storage
  - IoT (Shodan is your friend!!)
    - https://shodan.io
  - DMZ (Guest WiFi)
  - MX, DNS
  - PoS
  - WP, Rpi, VMs, VPS

21

- An Idea – YMMV




```
while true ; do nc -l -p 1500 -c 'echo -e "HTTP/1.1 200 OK\n\n $(date)"'; done
```

22

LET'S TALK CUSTOMIZATION

- Think
  - Over = No!
- What?
- Look around
- eBay = fun times
  - Wifi – old
  - Cameras
  - Enable ssh
- Shodan
- Where – more on this later

23

CUSTOMIZATION

- Start with your (friends? Neighbors?) devices
- Shodan
  - Banners
  - Versions!
  - HTML
- Certificates
- HoneyTokens
- Hosts
  - Filesystems
  - Commands
  - History
  - Processes
  - HoneyTokens
- Real Servers and Apps
  - Staging

Too legit to quit!!

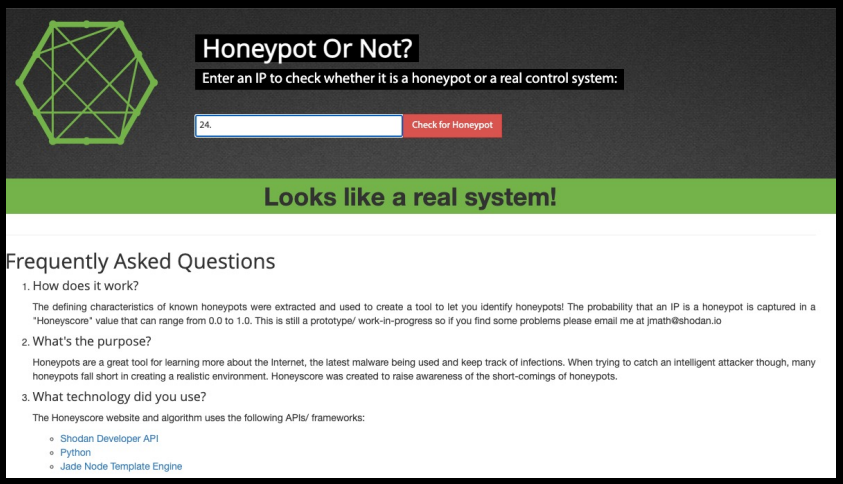
Make it look real!

Rename built-in user richard to phil, it's used as detection mechanism.

24

FINDING THEM

- https://honeyscore.shodan.io/



25

26

FOR REAL?

- Why not use real software?
- RDP
  - Honeytokens
  - Honeydocs
- Think about "discovery"?
- Don't forget monitoring agent

27

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
```

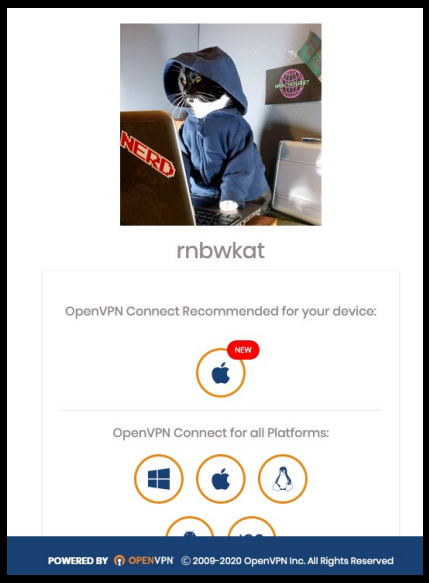
28

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
```

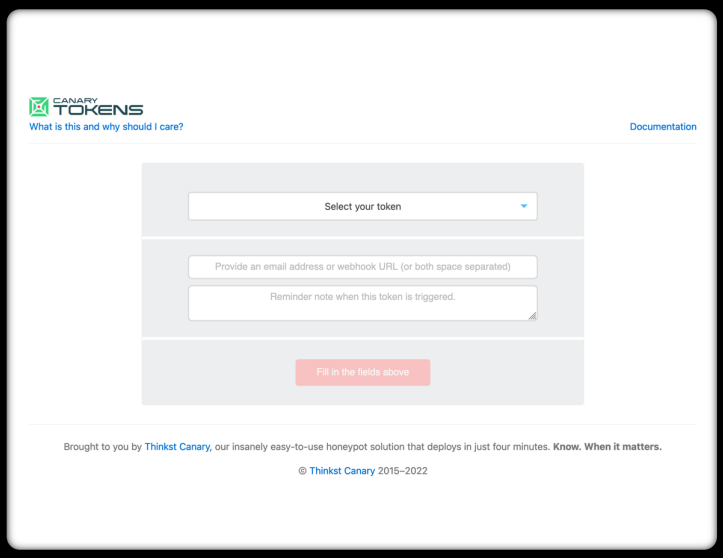
29

WHAT IS IT?



30

- https://www.canarytokens.org/generate



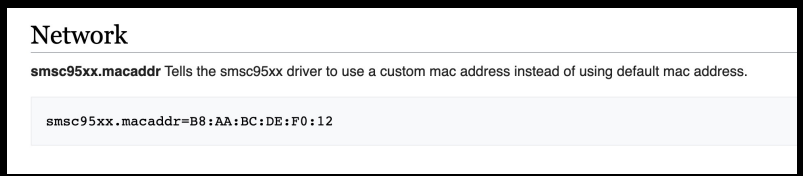
31

MORE CUSTOMIZATION

Cowrie

- The obvious
  - Hostname (and MAC!)
    - `openssl rand -hex 6 | sed 's/\(..\)/\1:/g; s/:$//'`
  - Versions
  - History
  - Commands
    - History –s (or just copy .bash_history)
    - Targets?
  - Filesystem
  - Processes
  - Usernames
    - Honeycreds

Remember Proxmox? Monitoring!



Network

smsc95xx.macaddr Tells the smsc95xx driver to use a custom mac address instead of using default mac address.

```
smsc95xx.macaddr=B8:AA:BC:DE:F0:12
```

32

CUSTOMIZATION EXAMPLES

- Banners = easy, but don't forget ssh headers/ciphers/version
- Ping?
- DNS?
- rsync is your friend – honeyfs / createfs
- ps a running system (cmdoutput.json)
  - Command, cpu, mem, pid, rss, start, stat, time, tty, user, vsz

```
$ ps -eo pcpu,%mem,pid,rss,start_time,stat,bsdtime,tty,user,vsz,args
%CPU %MEM   PID   RSS START STAT   TIME TT       USER         VSZ COMMAND
 0.0  0.0 14995  4456 03:32 S      0:00 ?        dovecot    50052 dovecot/imap-login [67.18.92.27 TLS proxy]
 0.0  0.0 15034  3500 03:32 S      0:00 ?        dovecot    49784 dovecot/imap-login
 0.2  0.0 15154 91232 03:35 Sl     0:51 ?        apache    383516 /usr/sbin/httpd -DFOREGROUND
 0.0  0.0 15233     0 Feb04 S<     0:00 ?        root           0 [kworker/22:1H]
 0.0  0.0 15525  4868 Feb04 Ss     6:14 ?        root      279644 php-fpm: master process
(/usr/local/emps/etc/php-fpm.conf)
 0.0  0.0 15533  6816 Feb04 S      0:00 ?        emps      280408 php-fpm: pool ordinary
 0.0  0.0 15538   408 Feb04 Ss     0:00 ?        root       20828 nginx: master process
/usr/local/emps/sbin/nginx -c /usr/local/emps/etc/nginx/nginx.conf
```

33

CUSTOMIZATION EXAMPLES (CONT)

- Users/passwds
  - rockyou
  - rockyou2021
  - Of course, default
  - Get creative with users
  - htpasswd
- Other "places"
  - Remember the real services/apps?
  - smb
  - rdp
  - ftp/ftps
- pwned

34

INTERACTIONS

- Let's take a quick look

35

TAKEAWAYS

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

36

THANK YOU!!!

- *Kat Fitzgerald*
  - @rnbwkat
  - evilkat@rnbwmail.com

37