

Flocon2010 – January 12th, 2010

Introduction to SIE (condensed)

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Security Information Exchange

Raison d'être

Providing common legal and privacy framework for sharing sensitive data

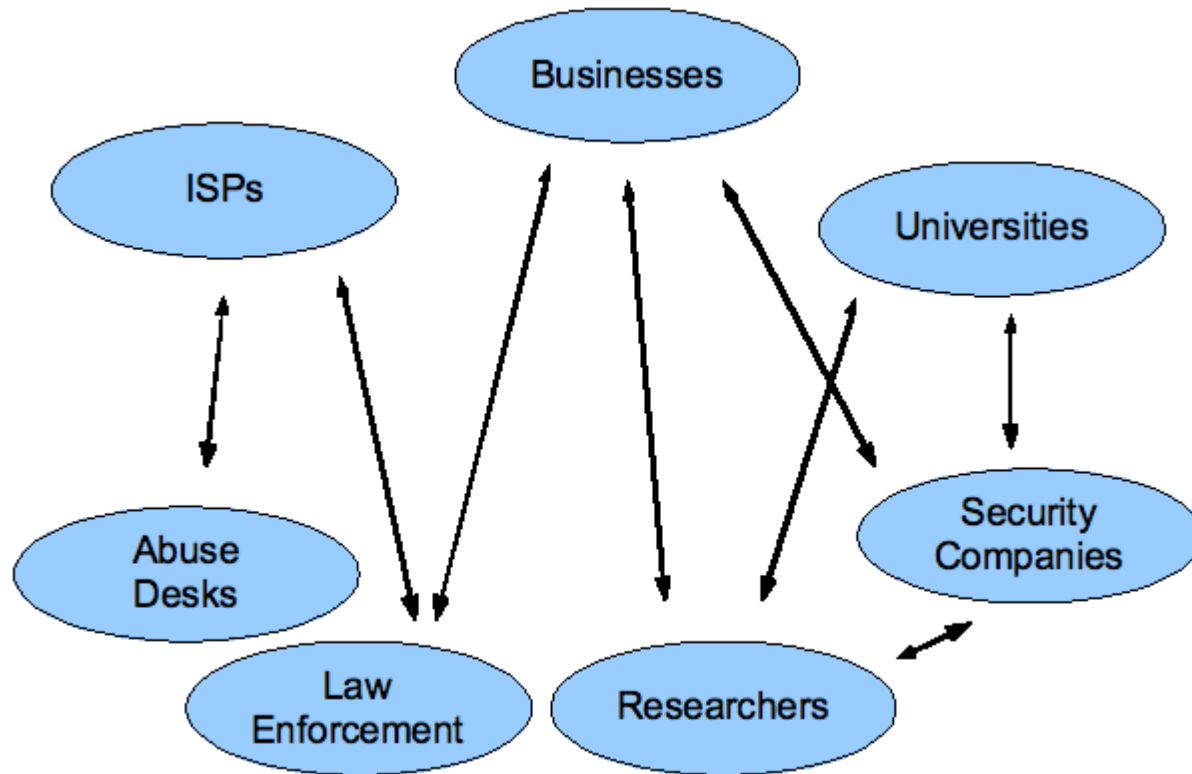
Centralizing security data collection and distribution to bring real-time efficiencies to analysis

Enabling cross-analysis between disparate data sets

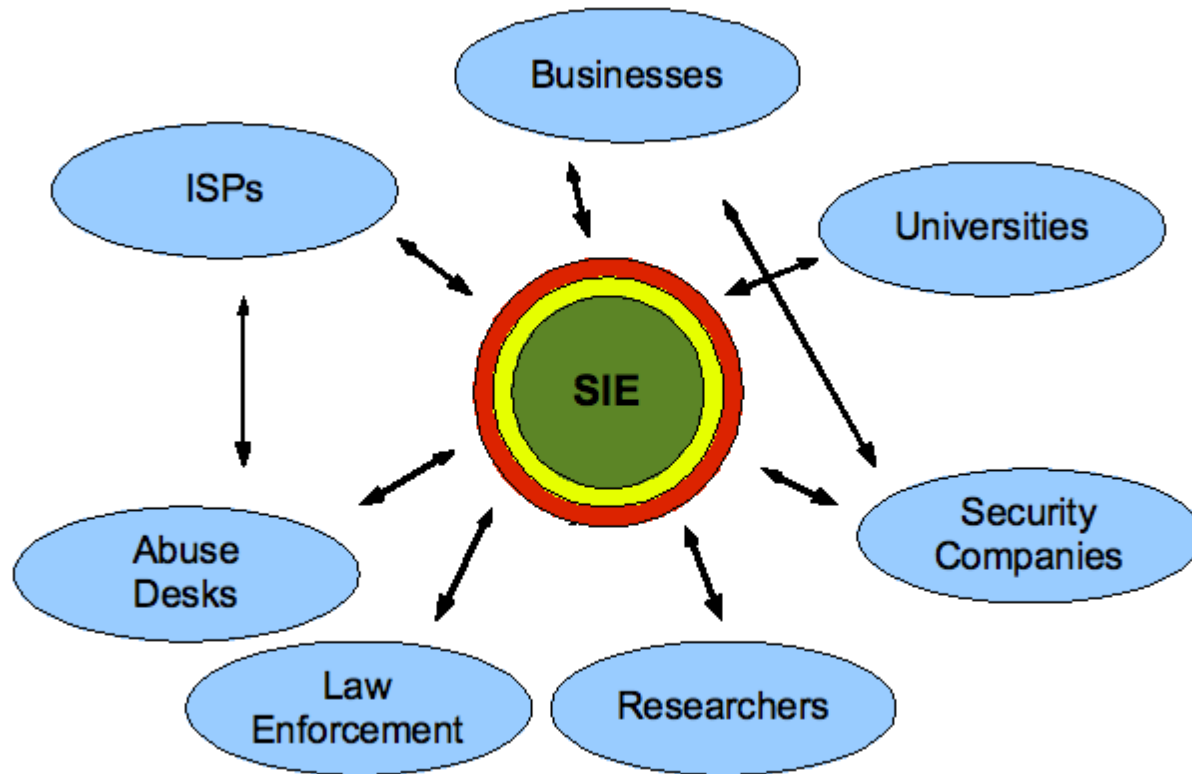
Creating network effect between participants (stone soup)



Decentralized - bi-lateral

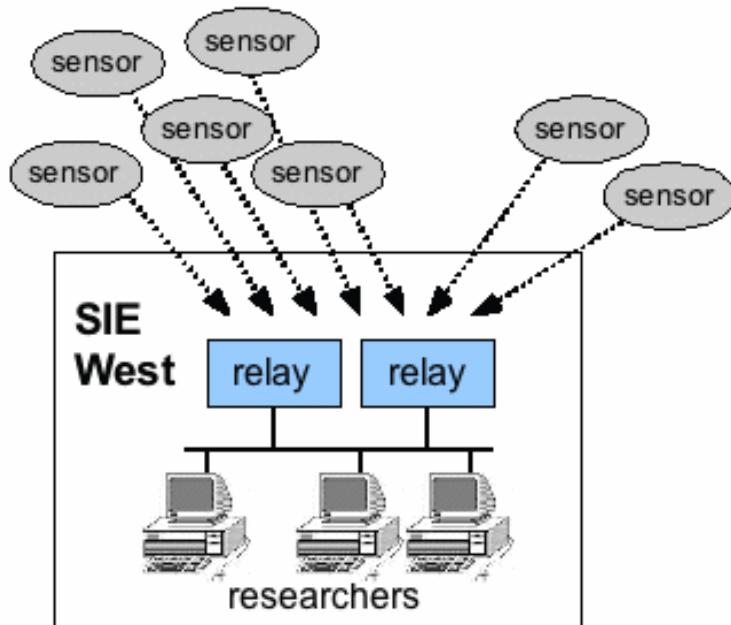


Centralized - multi-lateral



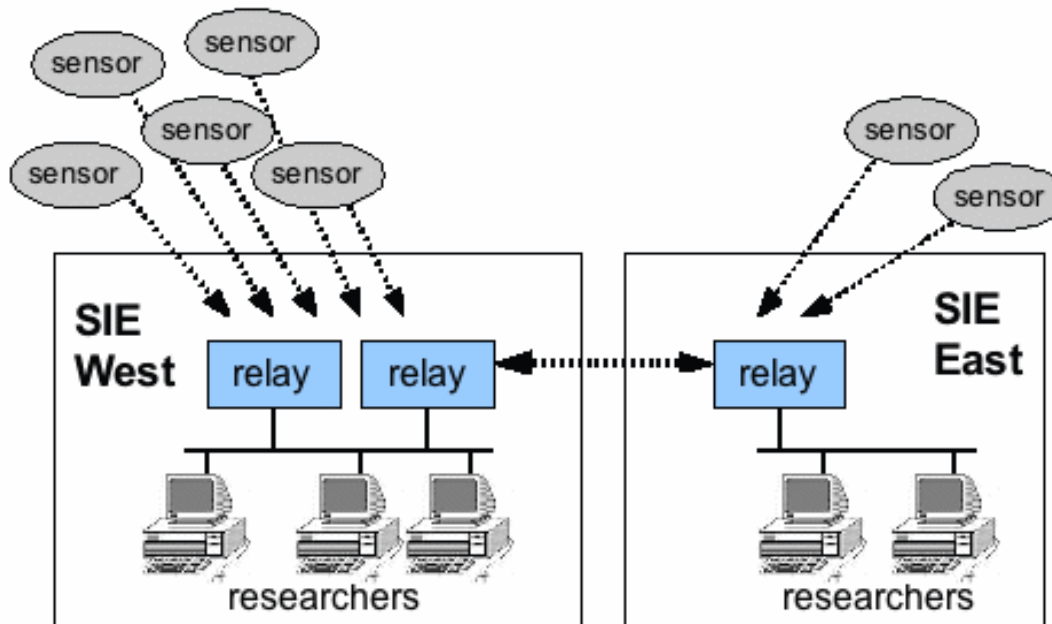
Efficient **sharing** within common **legal/privacy** framework

Data distribution model - today



- SF Bay Area, US (PAIX)
- Main sensor relays
- Some researchers getting feeds off switches

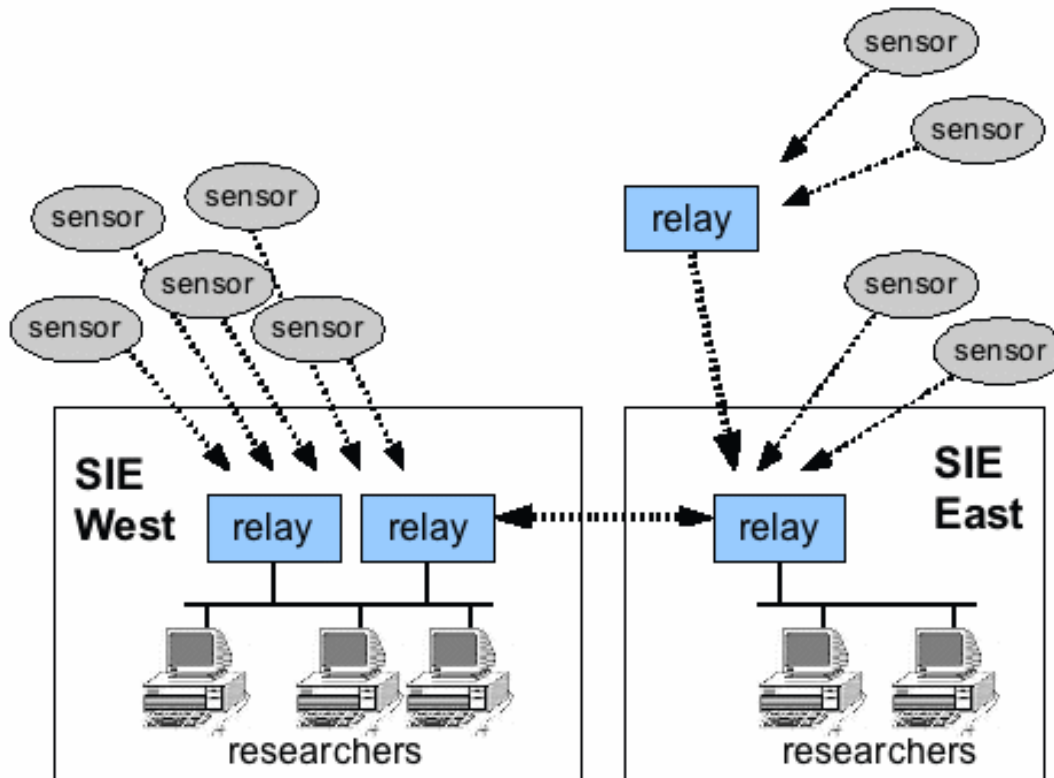
Data distribution model - east



- NYC, US
- Redundant facilities
- More researchers

SRV load balancing

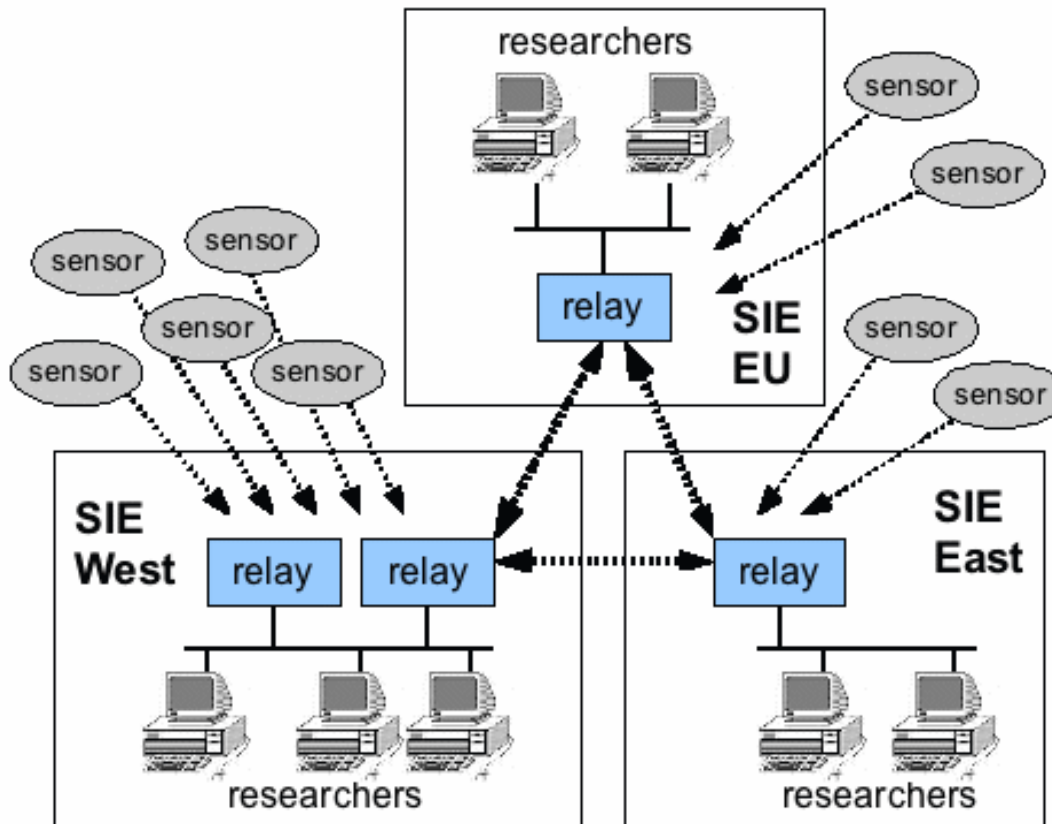
Data distribution model - relay



- Add relays at exchanges in different countries
- Add local sensors
- Local sharing or tools possible within relay

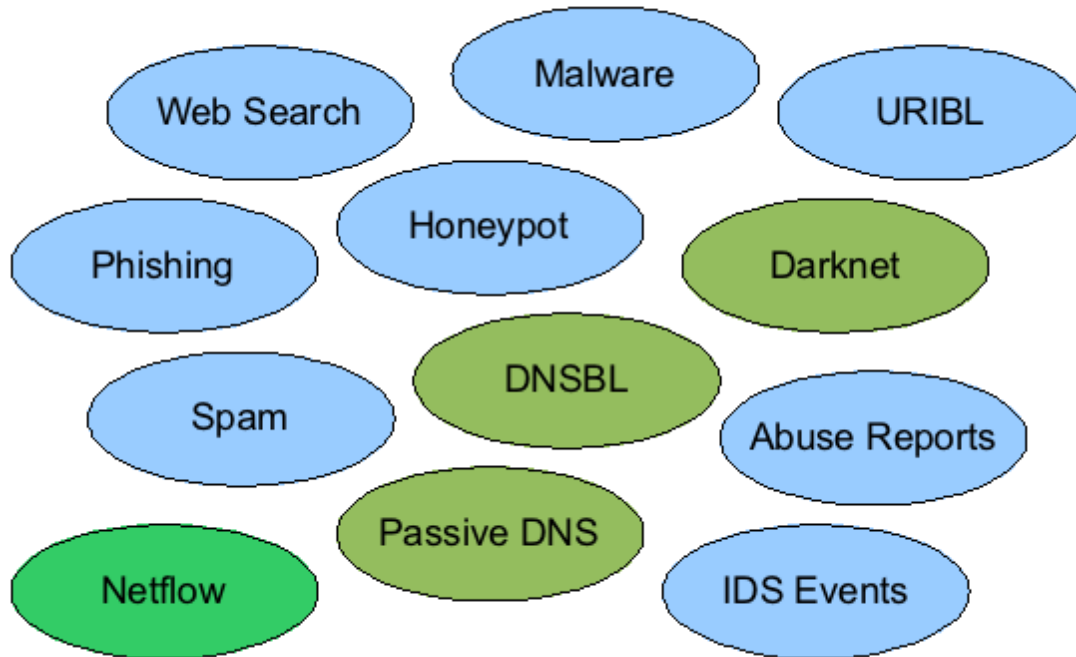


Data distribution model - promote



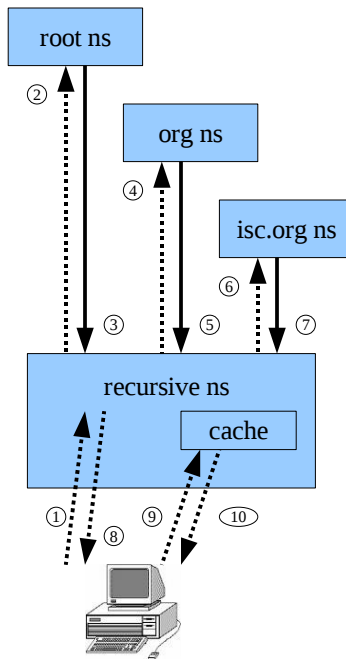
- Promote node when number of researchers is significant
- Scaling issues

Disparate data



pDNS

- SIE started with PassiveDNS in 2007
- Thanks to Florian Weimer (BFK)

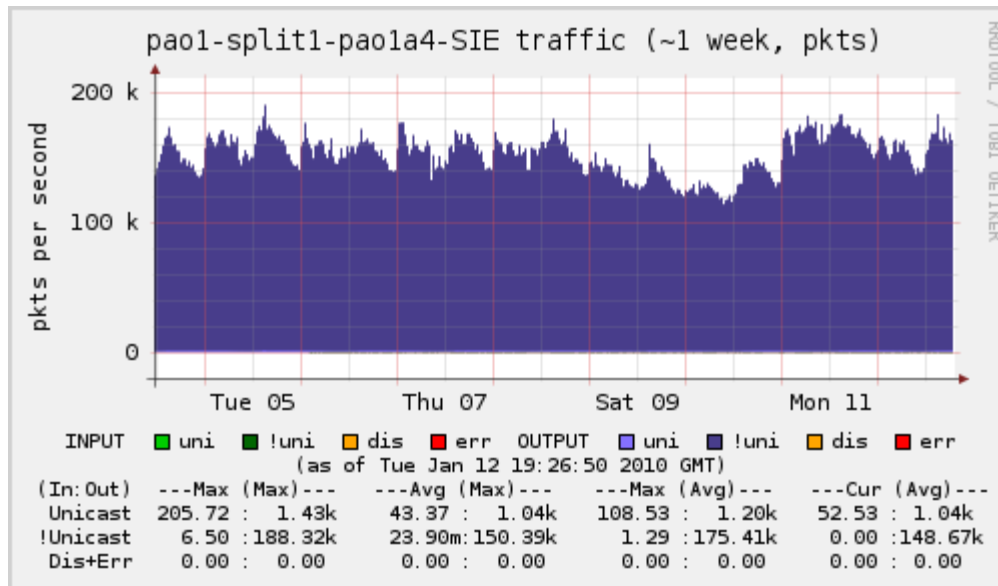


1. client queries for `www . isc . org` to recursive nameserver
2. recursive nameserver queries root server for "`www.isc.org`"
3. root nameserver responds with information for "`org`" nameservers
4. recursive nameserver queries `org` nameserver for "`www.isc.org`"
5. `org` nameserver responds with information for "`isc.org`" nameservers
6. recursive nameserver asks "`isc.org`" nameserver for "`www.isc.org`"
7. `isc.org` nameserver responds with "`www.isc.org`" answer
8. answer for "`www . isc.org`" is returned to client
9. client asks recursive nameserver again for "`www.isc.org`"
10. the nameserver might serve the answer from cache directly

Only query responses "above the recursive server" are recorded (in steps 3,5,7).

Fire hose

150 kpps (not-including sub-packets)



Tools

ncap – used primarily for DNS data

plugins – filter data for rebroadcast

nmsg – used to describe any data context

multi-site VPN – services and lookup tools

hardware – high packet rates

fast switch – line rate GigE, jumbo frames

servers – mostly Linux/FreeBSD, 64-bit, multi core, as much RAM as possible

storage – large disk for arrears, SSD



ncap

<ftp://ftp.isc.org/isc/ncap>

Evolution from pcap/dnscap

Defragmentation

Drop link layer info

Normalized network format

Nanosecond timestamps

User-defined flags

New features key to SIE

I/O – File, BPF, Unicast, broadcast, multicast

Plug-in modules

dedupe, pattern matching, table lookups



Broadcast architecture

Not a database – flow freely

Not a just a packet dump

Real time, not arrears

Loosely coupled multi-processor

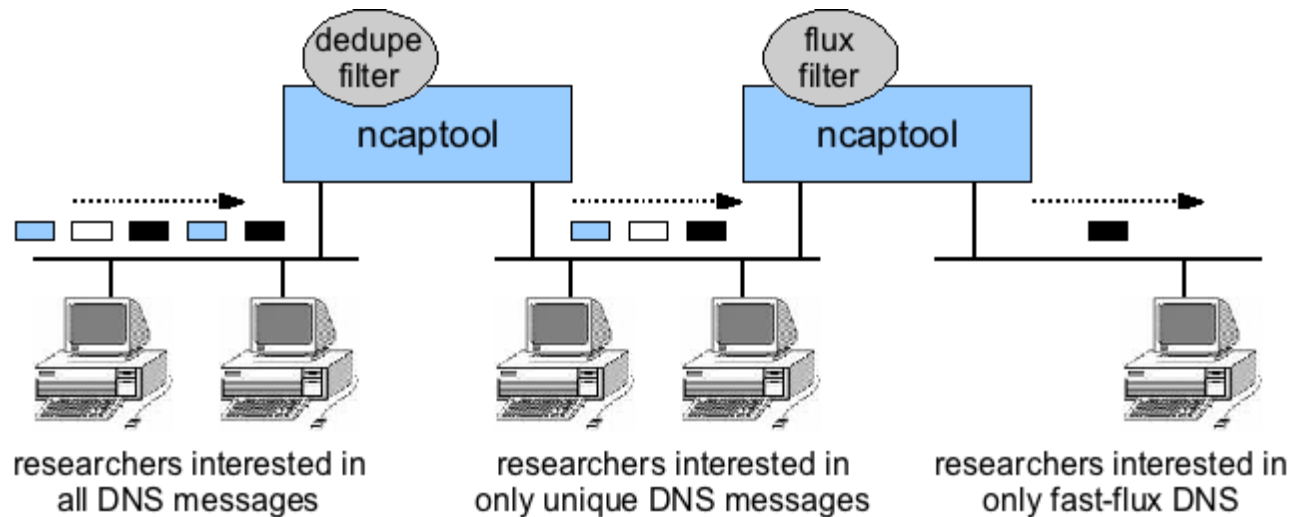
Ethernet switch

Partitions via VLANs or “channels”



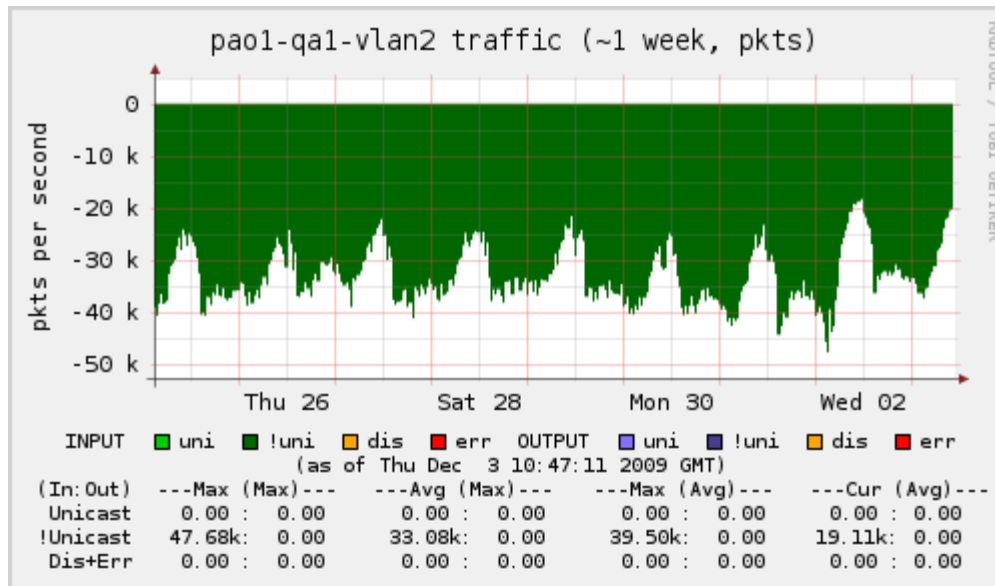
ncap

plug-in filters in action



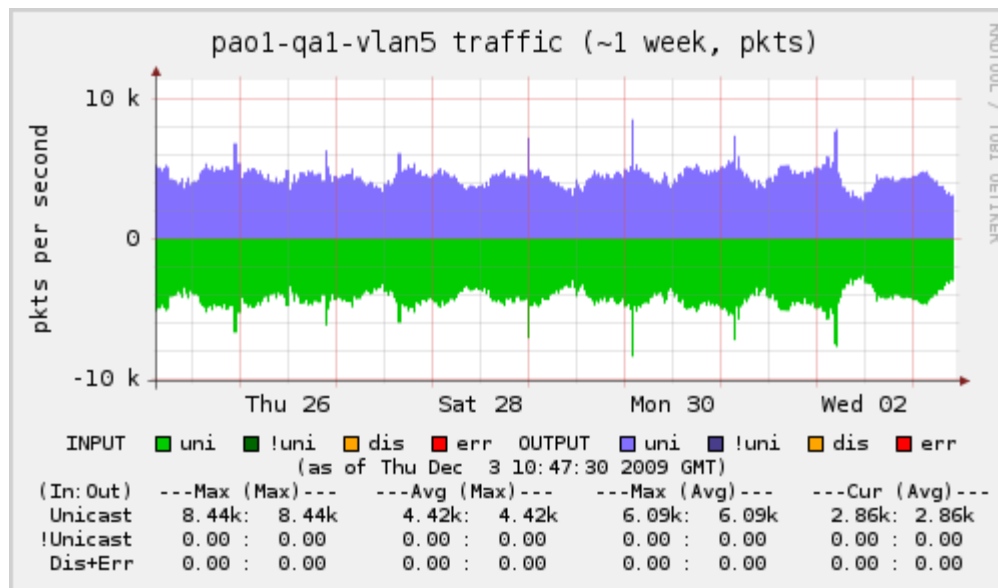
filters – raw passive dns

max at 40000 pps – too much



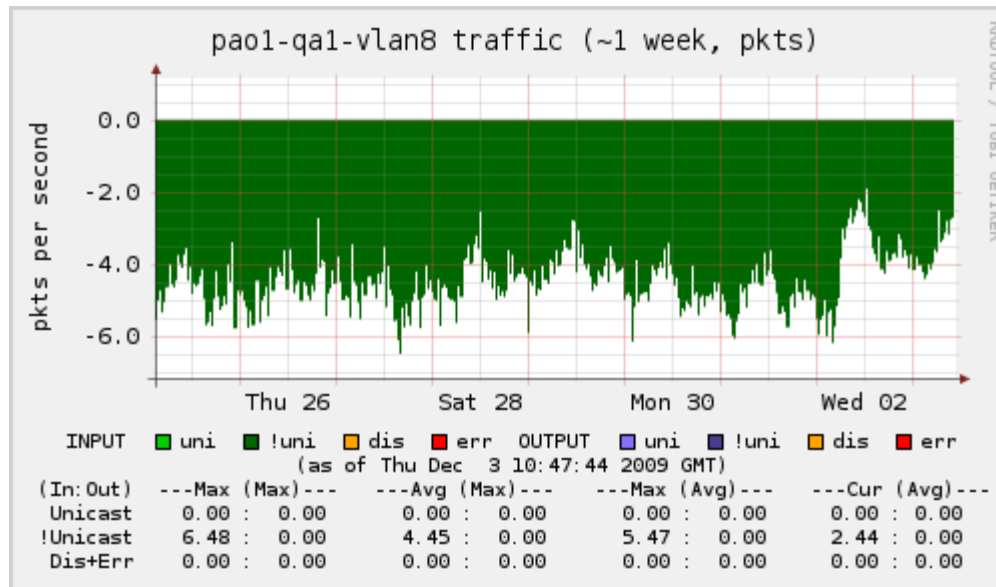
filters – deduplicated dns

max at 5000 pps - better



filters – fast-flux dns

rate is 2-4 pps



nmsg

Ncap is great, but what about non-packet data?

Needs:

- represent different data types – extensible

- fast/scalable – jumbo frames

 - Coalescing, Fragmentation

- multiple methods for I/O -

 - file, pipe, unicast, broadcast

- filtering methods



Channels (nmsg, et.al.)

Spam – yes, we want spam

URL Link Pairs – search engines

Conficker

sinkhole URL, DNS, P2P

<https://conficker.sie.isc.org>

Mitigation efforts – other botnets

Upcoming

Darknet (/17,/16,/16,/16,....)

Malware – not just hash



Channel example - pDNS

```
$ nmsgtool -l 10.0.202.255/8430 -o - -c 1
[137] [2009-12-03 12:29:57.804048000] [1:1 ISC ncap] [e46032b8] [] []
[192.55.83.30].53 [##.##.##.##].62855 udp [115]
dns QUERY,NOERROR,3324,qr
1 radio.wareznet.net,IN,A
0
2 wareznet.net,IN,NS,172800,ns1.wareznet.net
wareznet.net,IN,NS,172800,ns2.wareznet.net
3 ns1.wareznet.net,IN,A,172800,66.45.225.82
ns2.wareznet.net,IN,A,172800,66.45.225.83
.,CLASS512,TYPE41,32768,[0]
```



Channel example – web sinkhole

```
$ nmsgtool -l 10.16.80.255/8430 -o - -c 1
[330] 2009-03-02 22:12:27.558313023 [1:4 ISC http] [00000000 00000000]
type: sinkhole
srcip: YYY.YY.YYY.YY
srcport: 64707
dstip: 149.XX.XX.XX
dstport: 80
request:
GET /search?q=0 HTTP/1.0
User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1; SV1; .NET CLR 2.0.50727; .NET
CLR 3.0.04506.648; .NET CLR 3.5.21022; .NET CLR 1.1.4322)
Host: 149.XX.XX.XX
Pragma: no-cache
```

p0f data (kudos to Chris Lee)



Channel example - spam

```
$ nmsgtool -l 10.16.25.255/8430 -c 1 -o -  
[407] [2009-12-03 11:40:00.195077816] [1:2 ISC email] [0829f21a] [] []  
type: spamtrap  
srcip: 189.15.60.161  
helo: bl15-60-161.dsl.asiatel.tl  
from: REDACTED@spamtrapdomain.net  
bodyurl: http://dc0ca4266.xivivxt.cn/  
bodyurl: http://www.w3.org/1999/xhtmll  
bodyurl: http://94e433.xivivxt.cn/  
bodyurl: http://60436719c5.xivivxt.cn/  
bodyurl: http://4229da8a0.xivivxt.cn/  
bodyurl: http://2d0a7d68.xivivxt.cn/ff24490.gif  
bodyurl: http://08a6e3884b.xivivxt.cn/  
bodyurl: http://www.w3c.org/TR/1999/REC-html401-19991224/loose.dtd
```



Expand with pDNS

```
$ whois -h 10.255.1.16 124.42.113.146,ip | awk '$3 == "A" {print $1}'
```

faa76.gupicfd.cn

fb6886169.yepekfy.cn

...etc...

ns3.j8w.ru

www.vapagnj.cn

xidisqs.cn

xivivxt.cn

yepekfy.cn

zuidtn.cn

zuwohxc.cn

zuyimqg.cn

zuzewnp.cn

zuzovgw.cn



Combining data

Jose Nazario / Thorsten Holz - Malware08

Heuristics, Point system, Fast-flux

David Dagon / Wenke Lee

pDNS + string matching -> FakeAV

Richard Clayton – UKNOF13

pDNS hosts + active scans => blocking policies

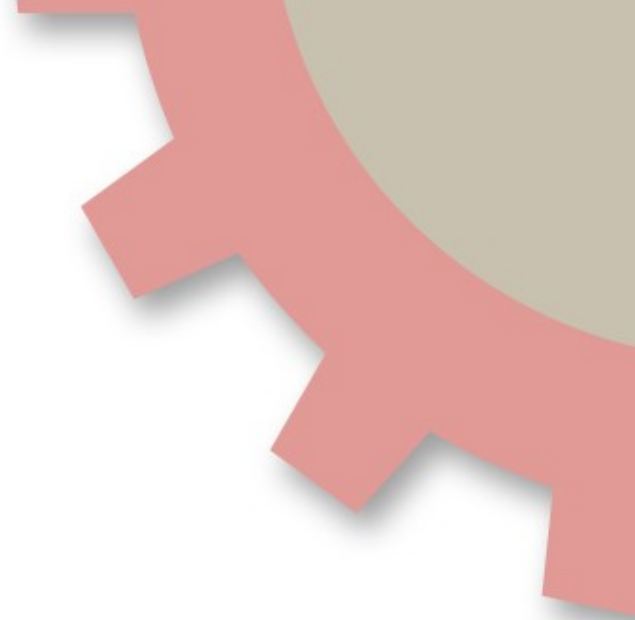
Andrew Fried – Blackhat DC 2010

Spam, BGP AS, pDNS, TLD zone data

Zeus/Avalanche (www.irs.gov.dhdkdztg.eu)

Ed Stoner – Flocon 2010

pDNS/ncap + netflow/silk



How organizations can help

Take bi-lateral sharing methods and enable real-time multi-lateral sharing via SIE

Bring servers to SIE and create value-added services

lots of data yet to be analyzed

get familiar with tools

Install sensors – enable researchers connected to SIE to analyze data that would otherwise be lost – your junk is another's treasure

pDNS, spam, netflow, darknet blocks, etc.



Questions?

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Nmsg:

<ftp://ftp.isc.org/isc/nmsg>

<https://lists.isc.org> (nmsg-dev)

Ncap:

<ftp://ftp.isc.org/isc/ncap>

