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A Quantitative Cross Comparative Analysis of Tools for Anamoly Detection

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Quite obviously….

- For a small organization, doing a quantitative cross comparison of commercial tools for network security is **lengthy** and **difficult**

Moving on…

1. The Problem
2. The Tools
3. What Are We Looking For?
4. The Process
5. The RESULTS!!!
6. In Conclusion

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The Problem….

1. …. A Transit Network
2. +/- 10 Million Speaking Hosts Per Day
3. 10Gbps Links
4. Unusual Traffic
    1. Large FTP Transfers
    2. Legitimate SSH & DNS Traffic
5. Intercontinental Peerings

The Difficult Part….

- You must give the tools the same data
- You must understand different tool terminology
- You must tune the tools to give “similar” results
  - And you’ll never get them to see exactly the same things…
- You must not just trust the tool results, but verify them with other means
  - Raw NetFlow analysis via NfSen, exchange of evidence with friendly CERTs
- You must work out your success criteria

Lengthy…very lengthy

- It took us **more than one year**
- Preparation: 6-7 months
  - Shortlist vendors, get in touch with them, convince them to engage in a *comparative* trial with no upfront commitment, make them spell out a price figure even before the trial, set up the legal bit, get the boxes delivered, installed and configured
  - One (established) vendor pulled out (we remained with 3)
- Tool learning curve and tuning: 3-4 months
- Comparative testing: 1 month
- Result analysis and reporting: 1 month

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What if you can't afford all that?

1. You decide on the basis of vendor's visits (cool! ☺)
2. You buy the cheapest, or the more expensive, but not what you need (cool! ☺)
3. You buy what others have bought, for their own network and needs (cool! ☺)
4. You don't buy at all (cool! ☺)

- We're showing some results, today, but we don't want you to convince to buy either or the two (best performing tools) we tested
- But we'd very much like to discuss how small CERTs could share these experiences (**and that'd be really cool!** ☺)

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The Good Stuff…the Tools

- StealthWatch – Lancope
  - Per Host Behavioral Analysis
  - Requires 1 Point to be Defined
  - Normally Found in Campus Networks
- Netreflex - Guavus
  - Fuses BGP & ISIS Data
  - Creates a 18 x 18 Router Matrix

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The Process…

- 13 days of cross comparative testing (balancing MM - WR)
- 1066 Investigated anomalies, results precision bounds estimated
- 14 Anomoly Types
- Analyzed raw netflow using nfsen
- Certain Events forwarded to CERTS for Confirmation

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THE RESULTS

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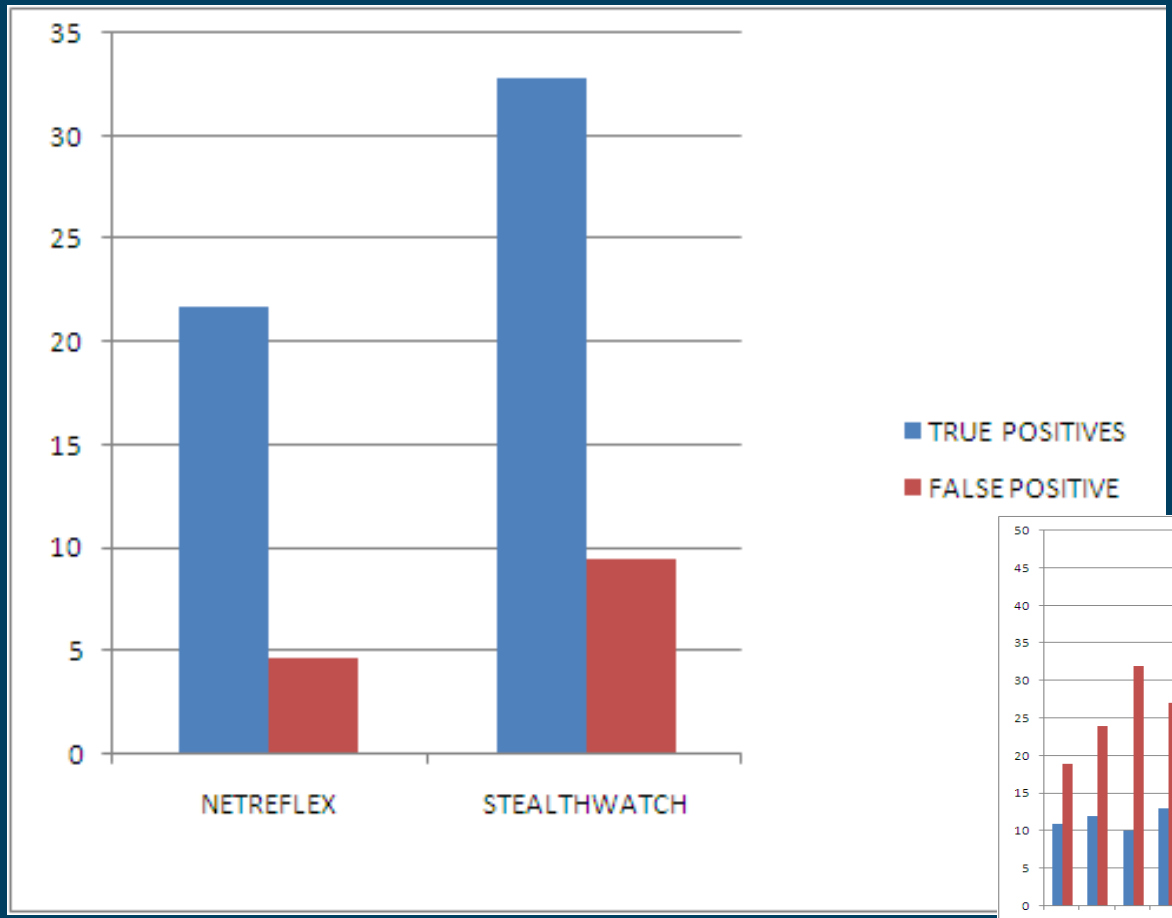
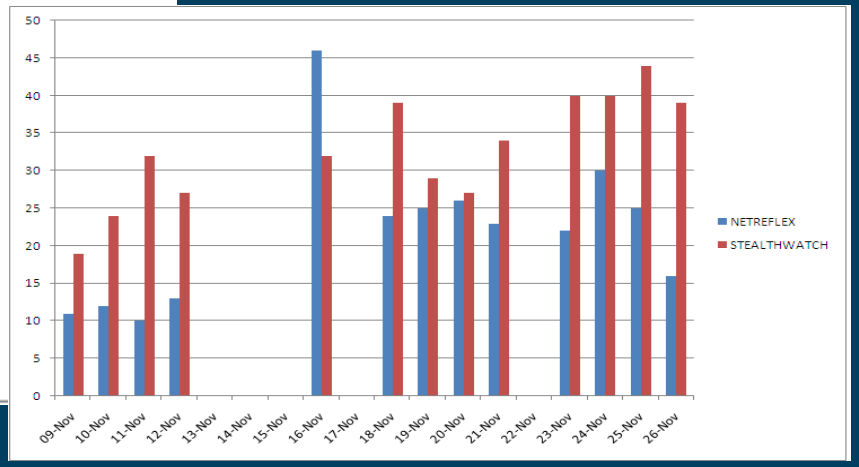
True and False Positives



SW 32.8 anomalies per day, followed by NetReflex (21.7)

Number of false positives is 28% in SW, 21% in NetReflex



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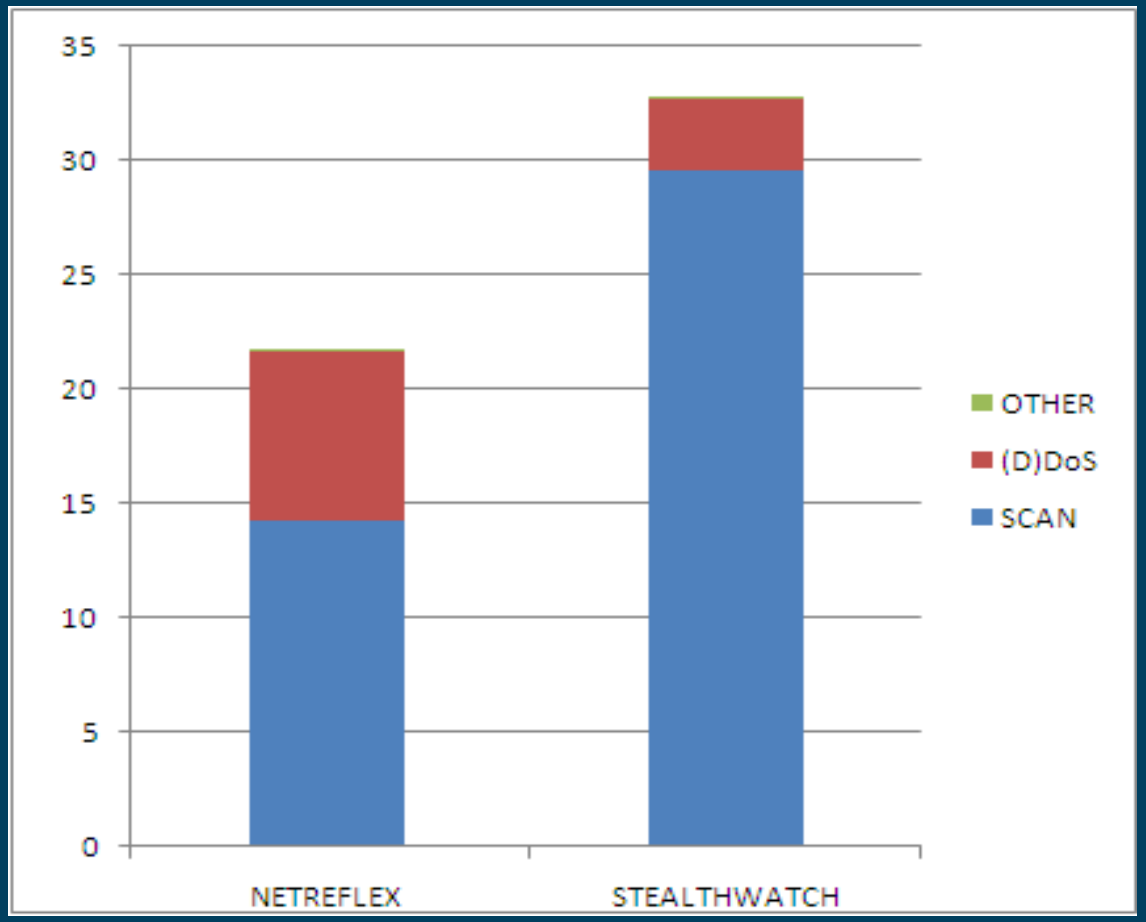
Type of Anomolies

- Scan vs DoS
- Other?
- No. of Anomolies Per Tool



Scan types

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	StealthWatch	NetReflex
Port scans (all ports)	Rare	Some
Ports 135, 139, 445 (windows file sharing)	A lot	- (*)
Port 22 (ssh)	A lot	A lot
Port 23 (telnet)	Some	-
Port 53 (DNS) Port 80 (Http) Port 1433 (SQL)	- Rare Rare	Some - - (*)
ICMP scans (ping)	Some	-

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(D)DoS types

	StealthWatch	NetReflex
UDP (small packets)	Rare	A lot
TCP (syn floods)	Rare	Some
ICMP floods (large packets)	Rare	-

Origin of Anomalies (1/2)

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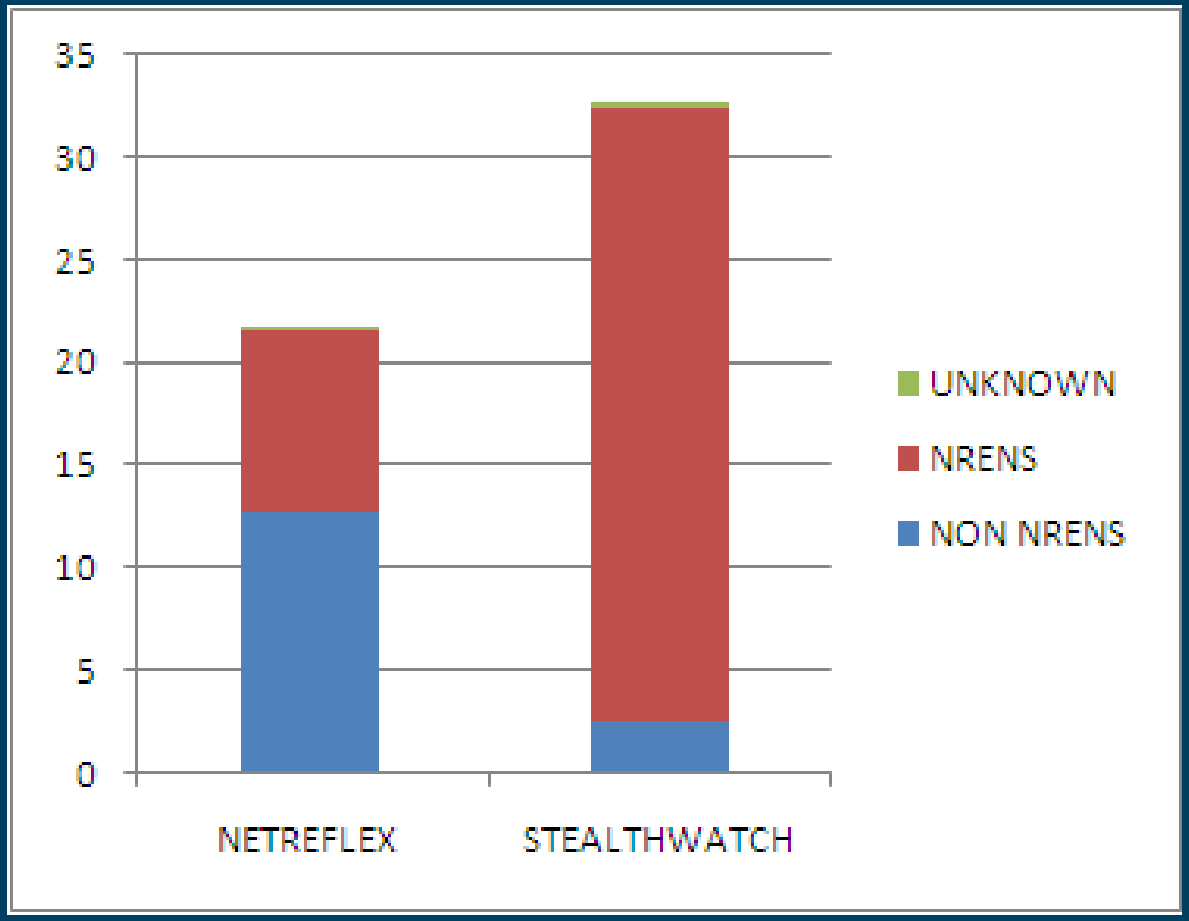
- Stealthwatch & NRENS
- Unknown?
- Netreflex Balanced



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Origin of Anomalies (2/2)

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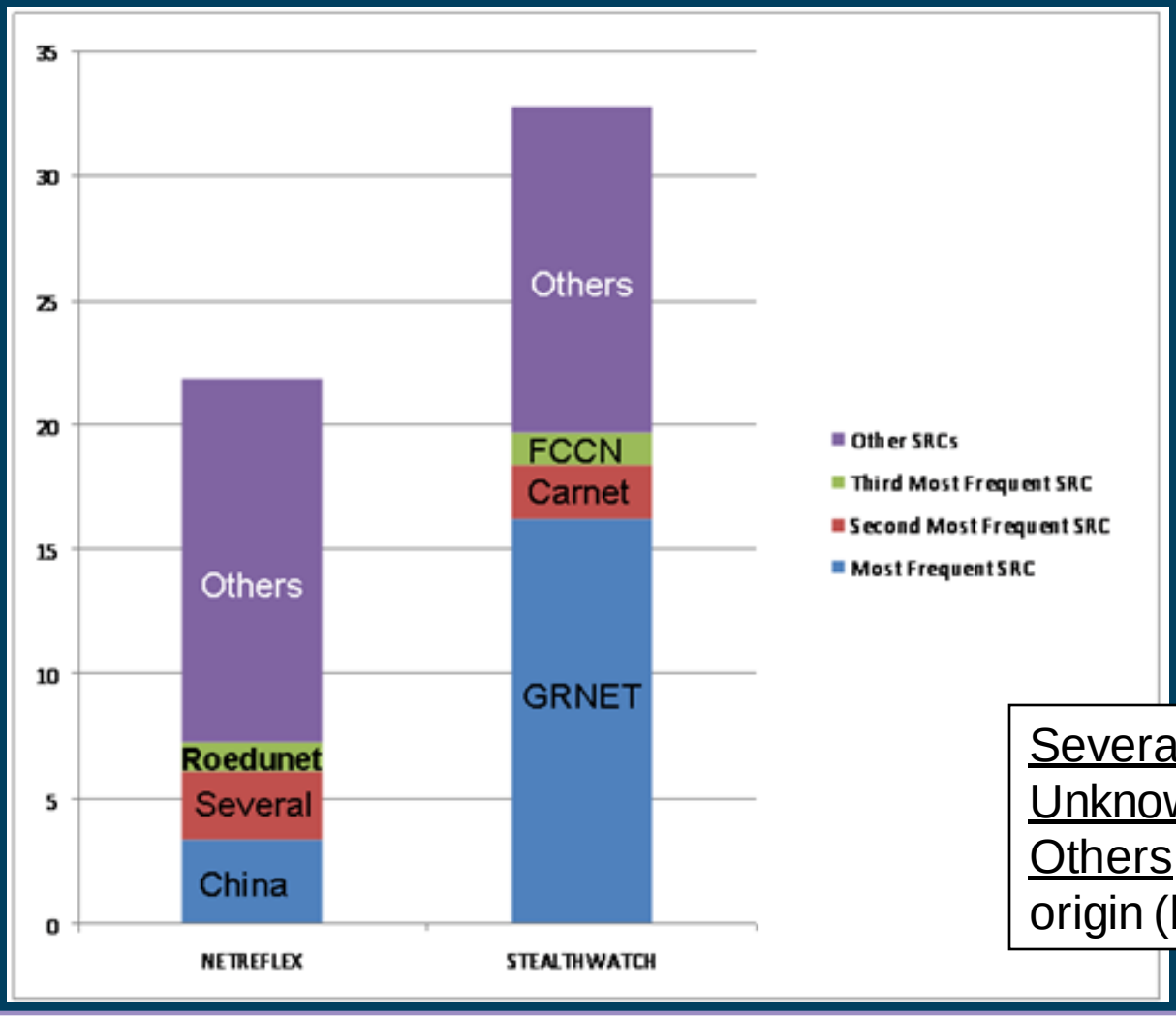

- DWS Clients =GRNET
- Several?
- International SRC's versus NRENs?

Several: multipoint origin
Unknown: could not track origin
Others: 1 single, identified origin (but not within top 3)

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Destination of Anomalies

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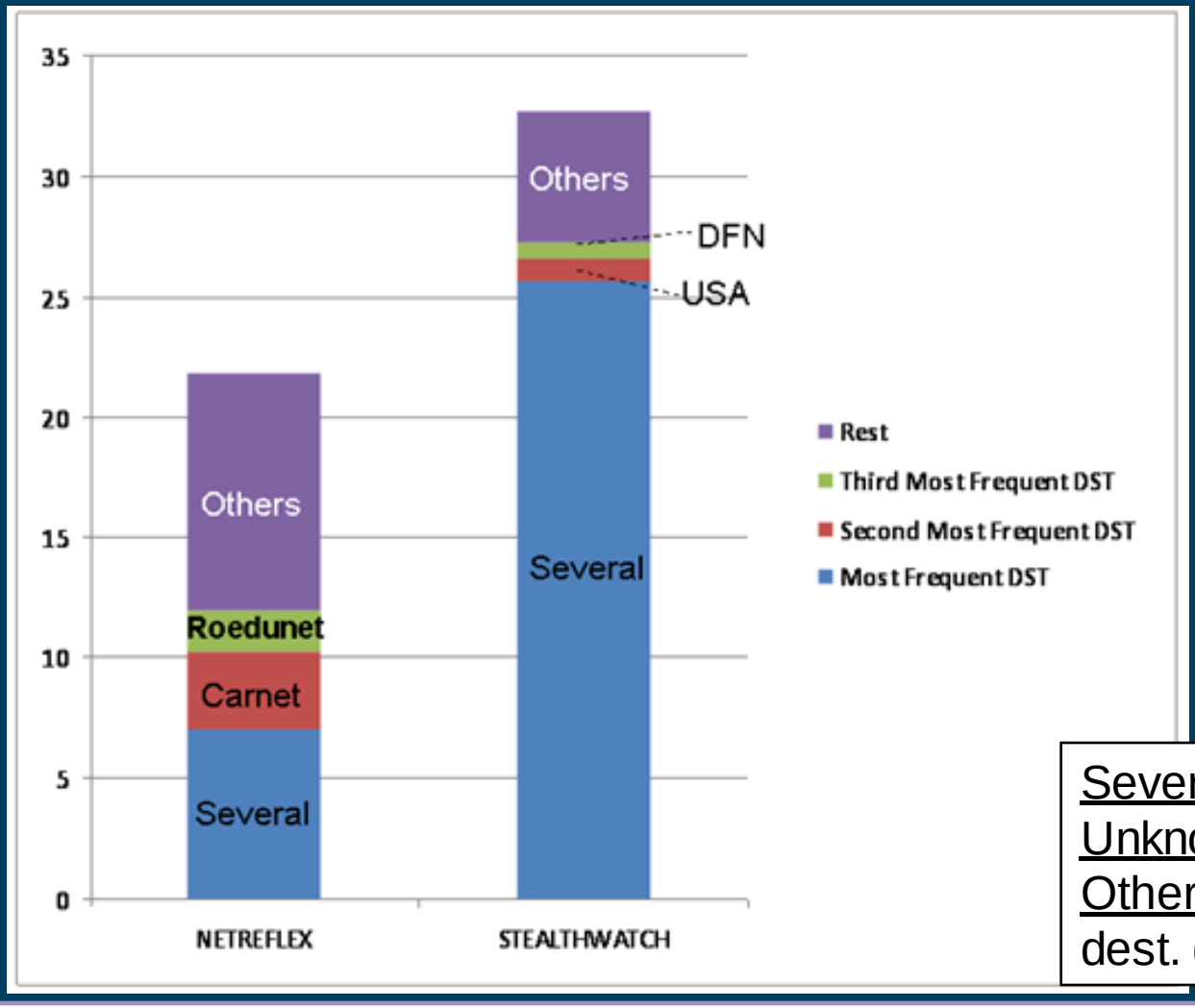

- SW, Scans & NRENS
- NR versus SW

Several: multipoint dest.
Unknown: could not track dest.
Others: 1 single, identified dest. (but not within top 3)

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Origin and type: SealthWatch

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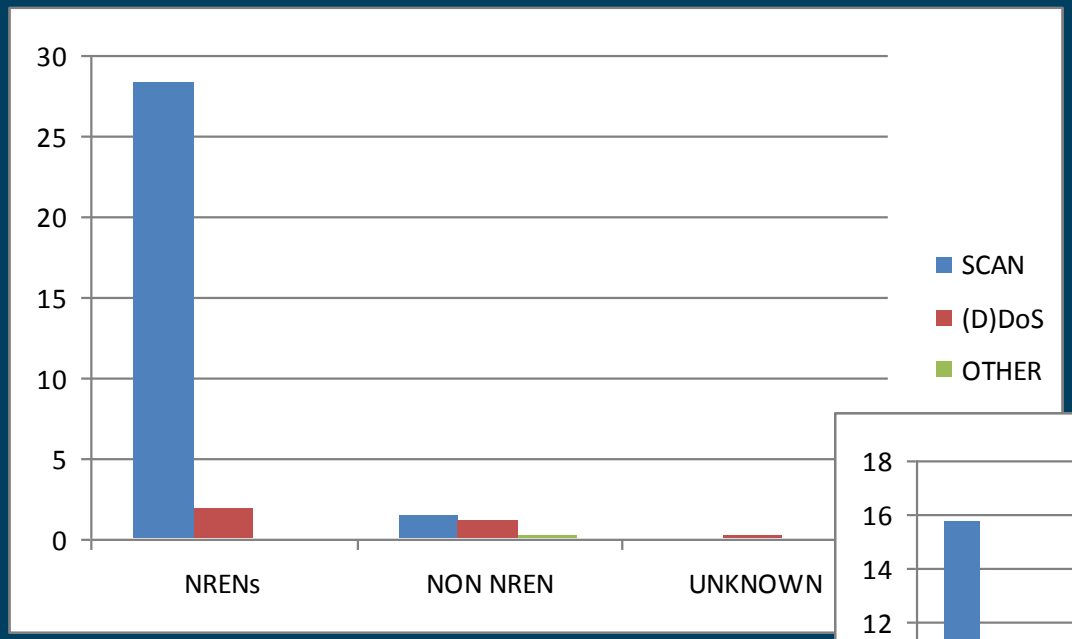

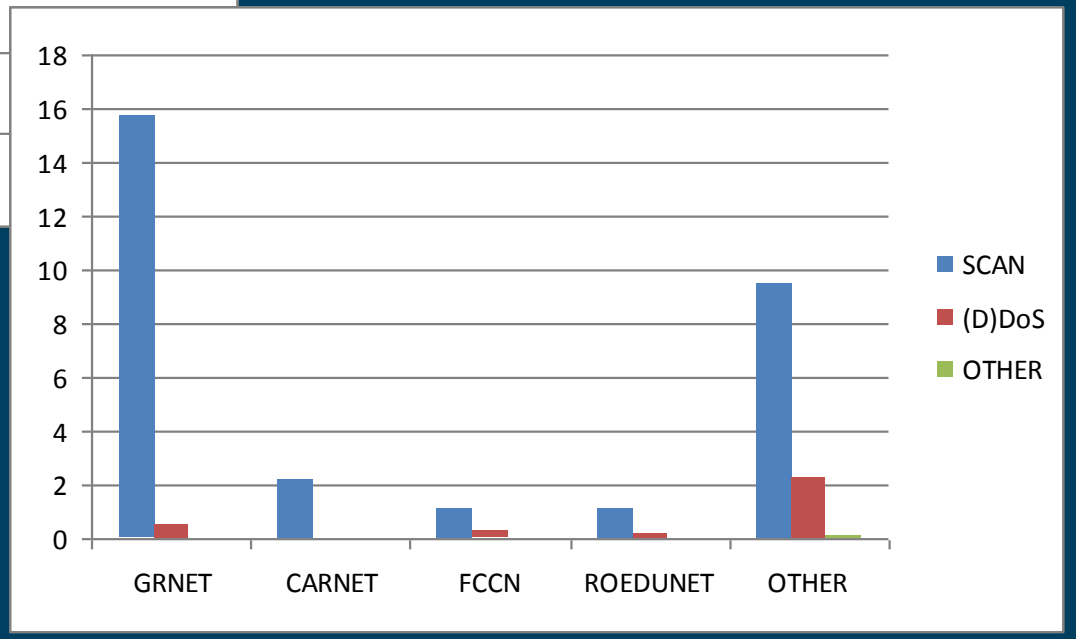

- SCANS Feature Prodominatly
- Primarily NRENS as SRCs

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Origin and type: NetReflex

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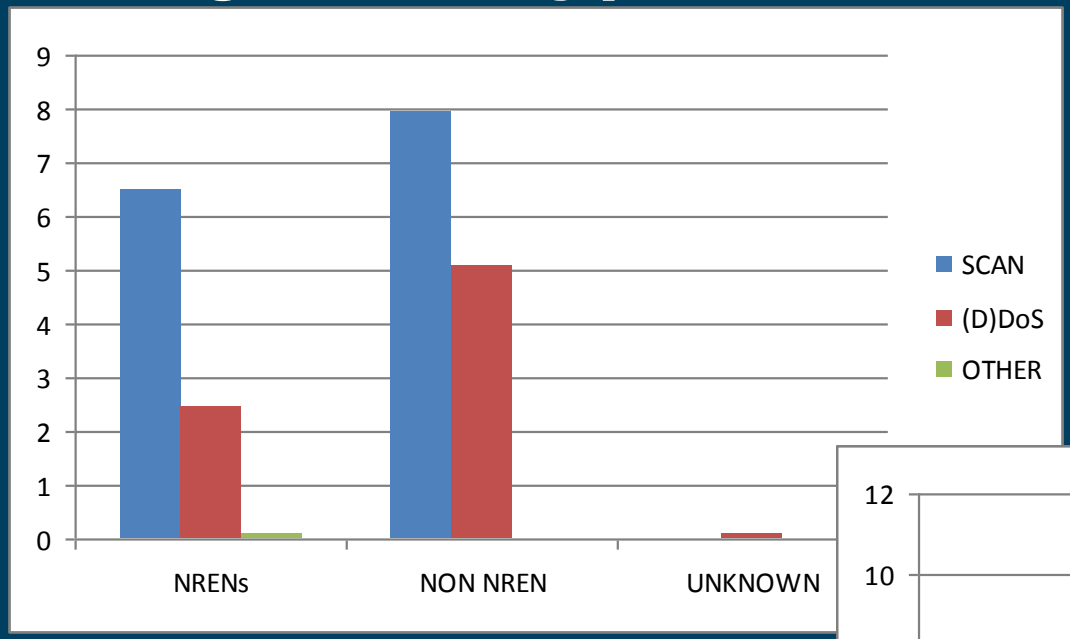

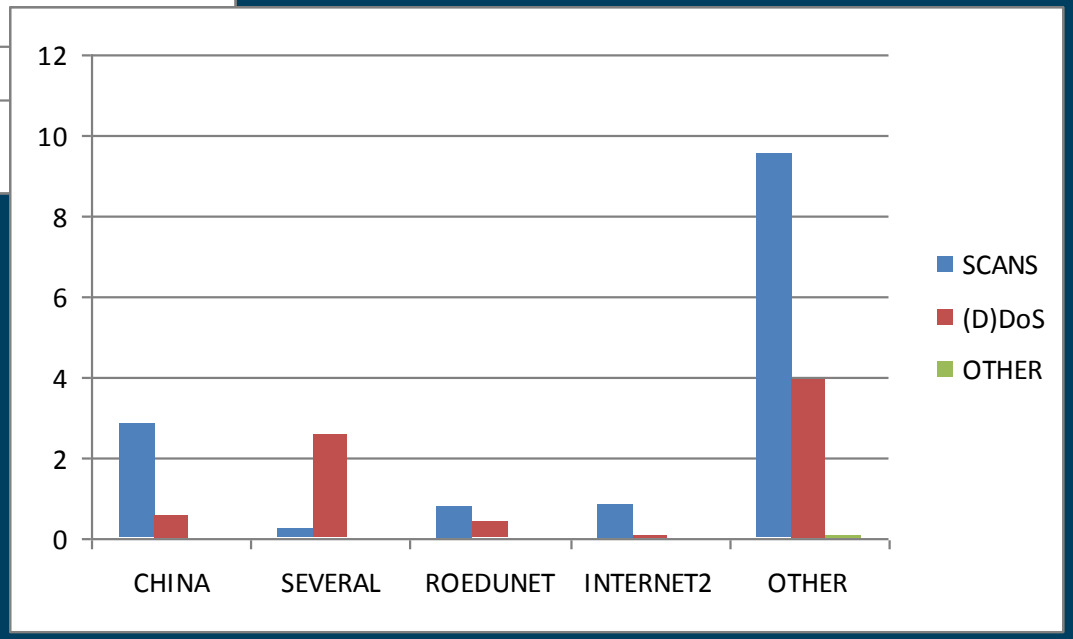

- Fair Anomaly Type Distribution
- Dispersion of NREN & Non NREN SRCs

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In Conclusion

- Aquired Anomaly Detection Tools To Trial
- Installed, Configured, Tweaked….and Tweaked Again
- Captured & Investigated over 1000 events in 13 days
- Cross-compared results amongts all tools and validated results
- …..and the descision is ??????

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Questions?

THANK-YOU

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