INTERNET BACKGROUND RADIATION

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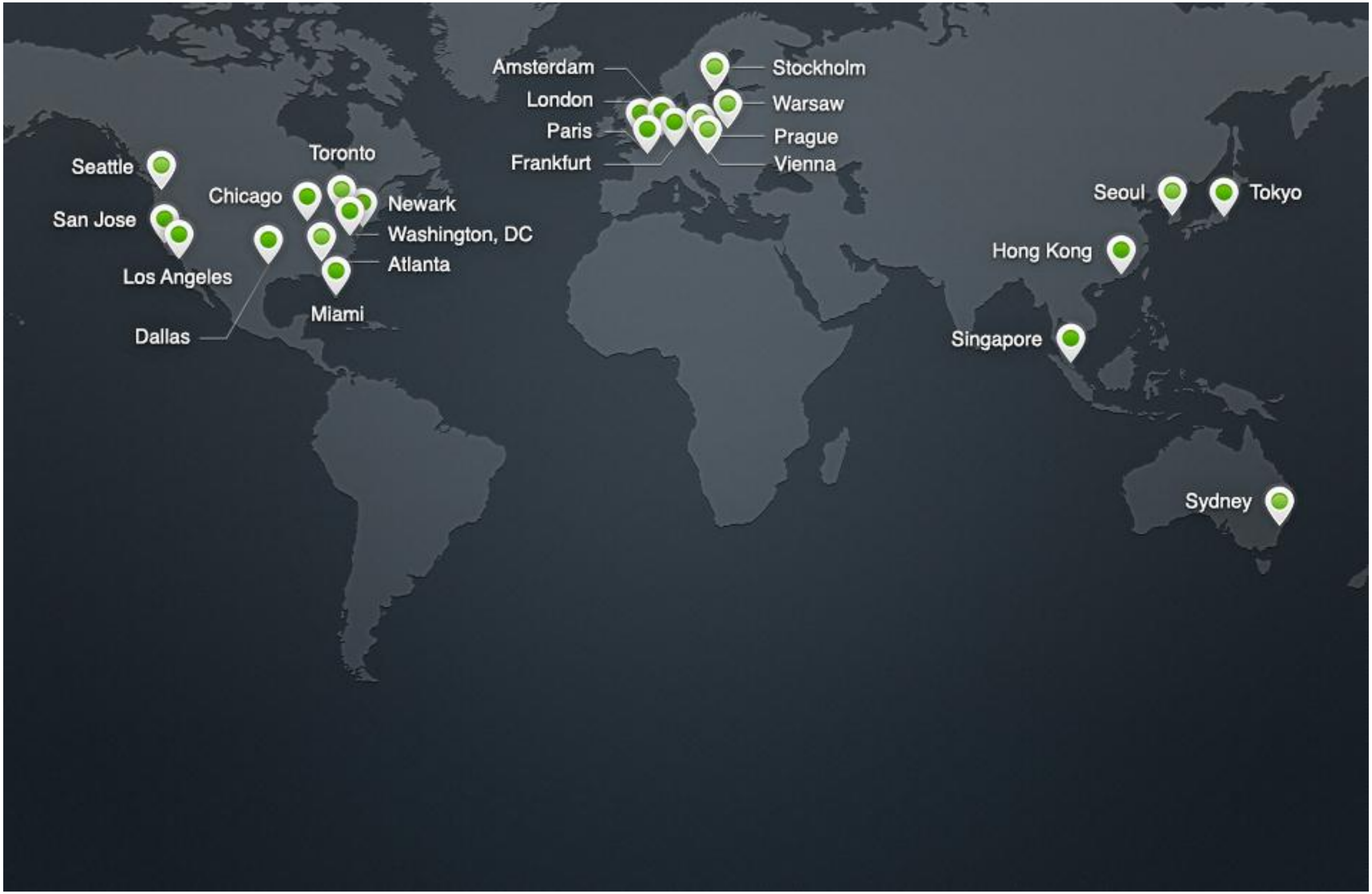
Virus Bulletin Conference 2012

MALTRAFFIC

Quick CloudFlare Background



Overview

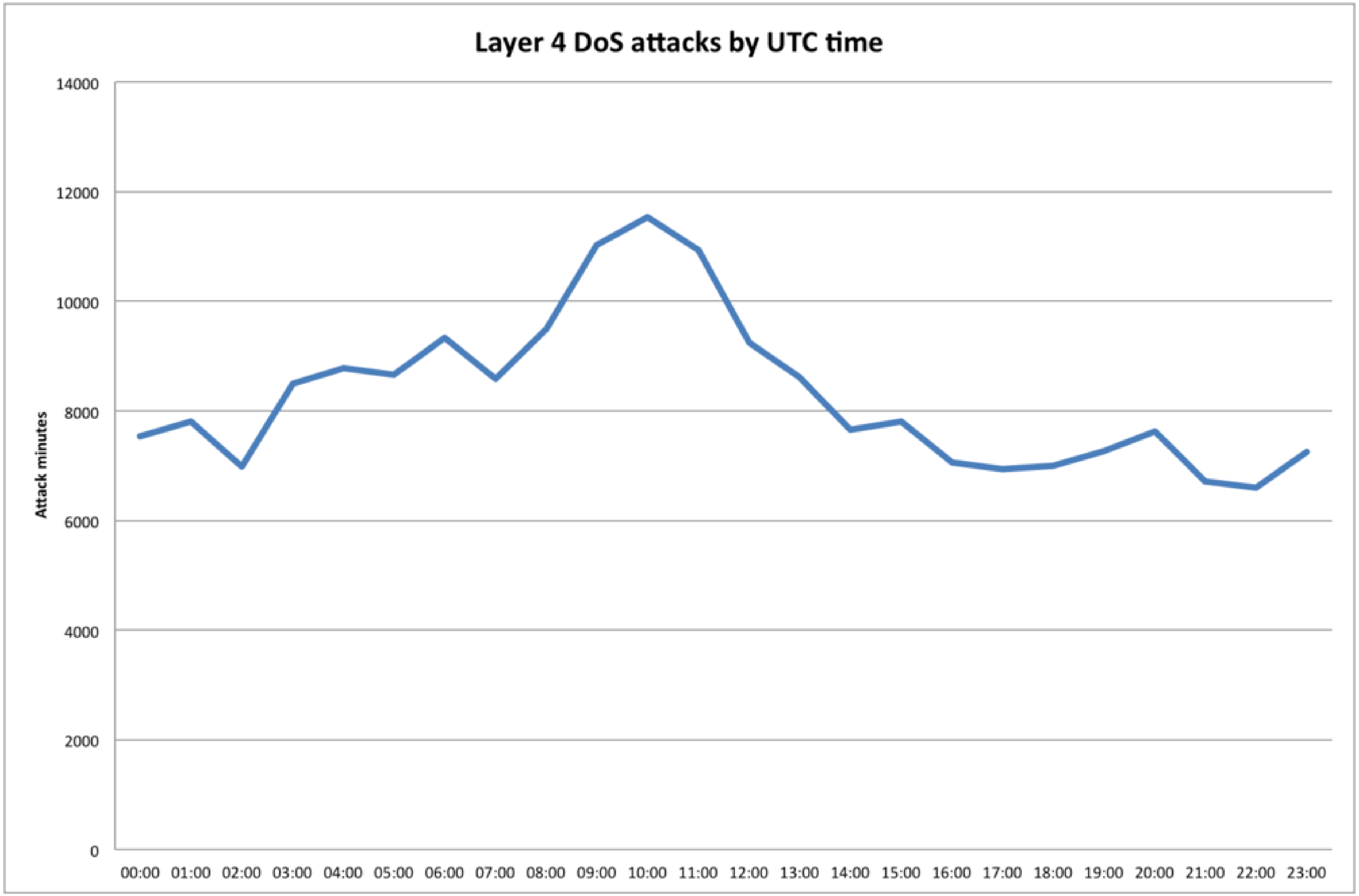
- 64 billion page views per month

- 40% of the time we see a layer 4 DDoS attack
- 95.5% of the time we see a layer 7 DDoS attack
- Largest DDoS attack we've seen was 65Gbps

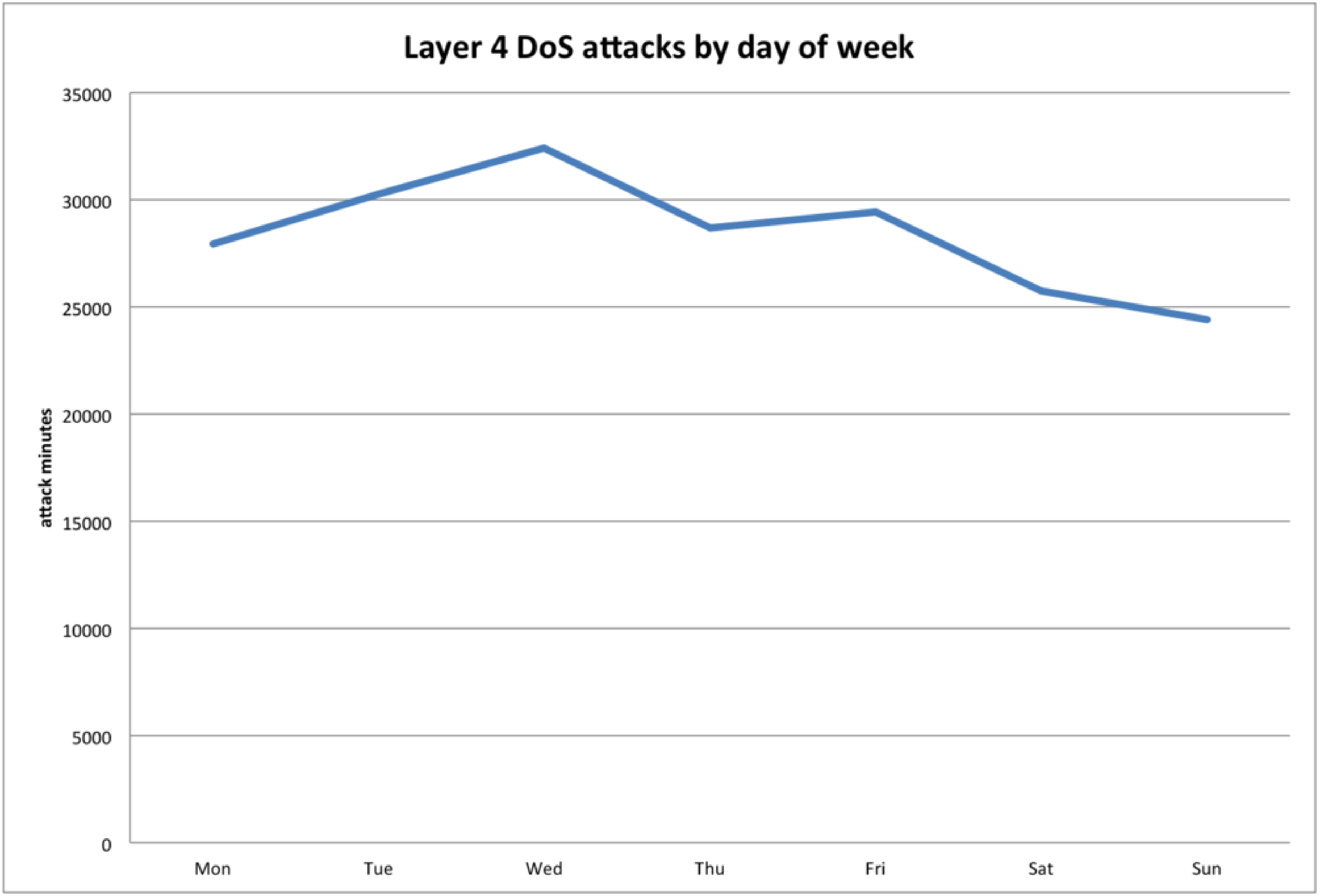
- Overall trend in layer 4 DDoS is slightly down
- Overall trend in layer 7 DDoS is up (overall 10%; large: 21%)
- Layer 7 attacks from from 0.05% of connecting IPs

- Data drawn from monitoring between January 2012 to July 2012

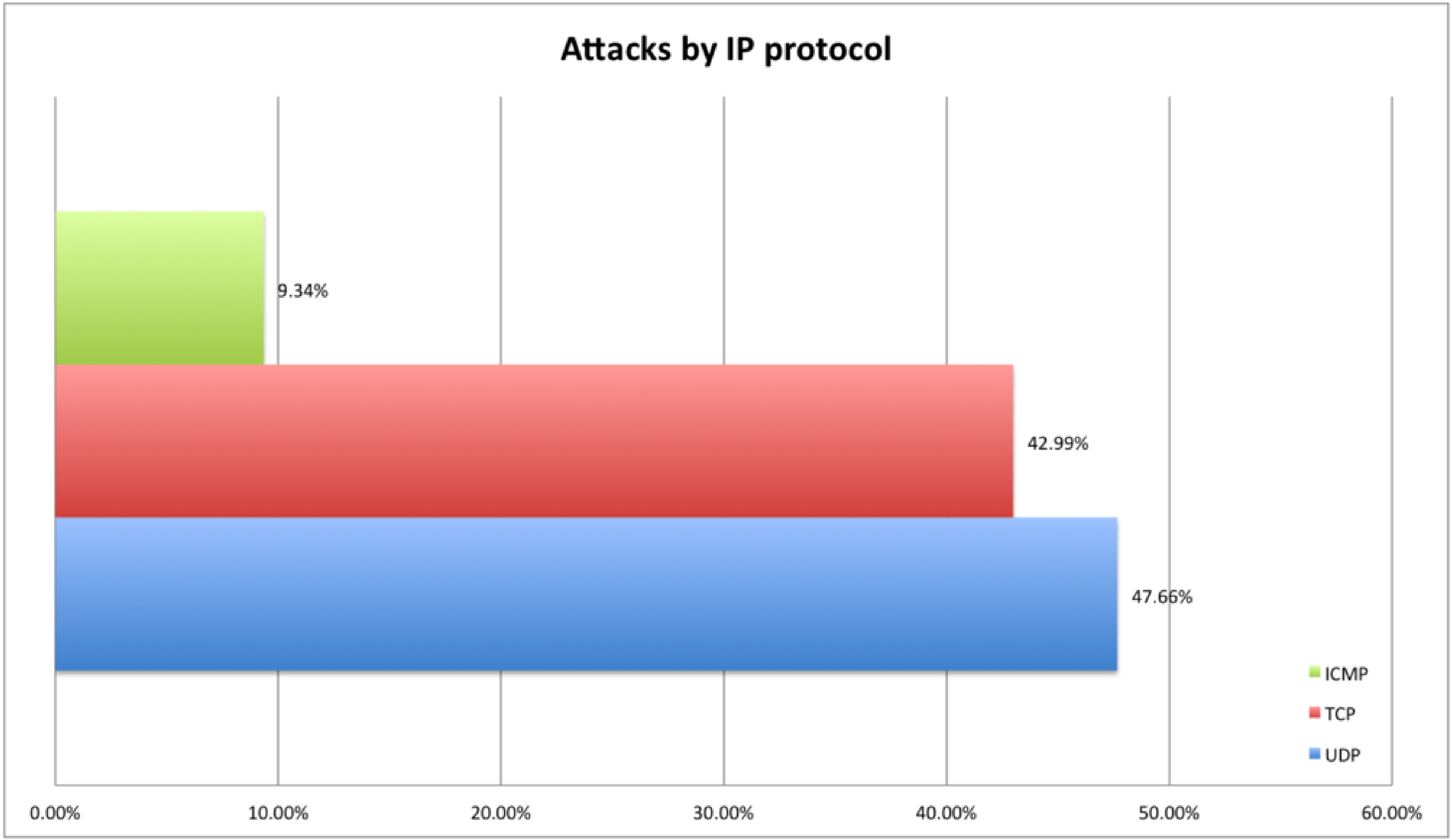
Layer 4 DoS by UTC time



Layer 4 DoS by day of week



Layer 4 Protocol Breakdown



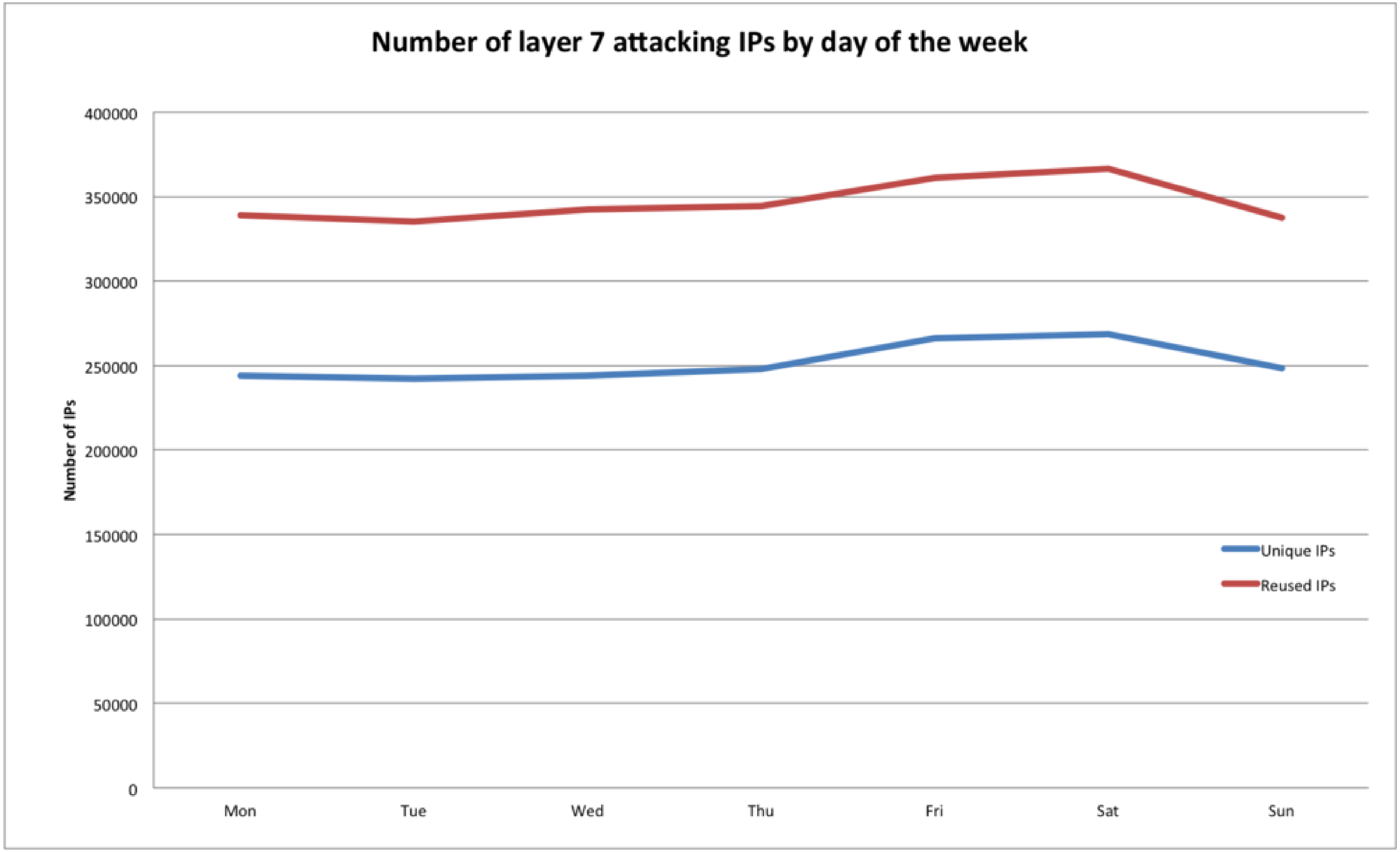
Layer 4 Port Data

- TCP
  - 92% against port 80
  - SYN flooding
- UDP
  - 97% against DNS
  - Reflection/amplification attacks
- Other significant attack ports
  - TCP port 53 (DNS)
  - UDP port 514 (syslog)

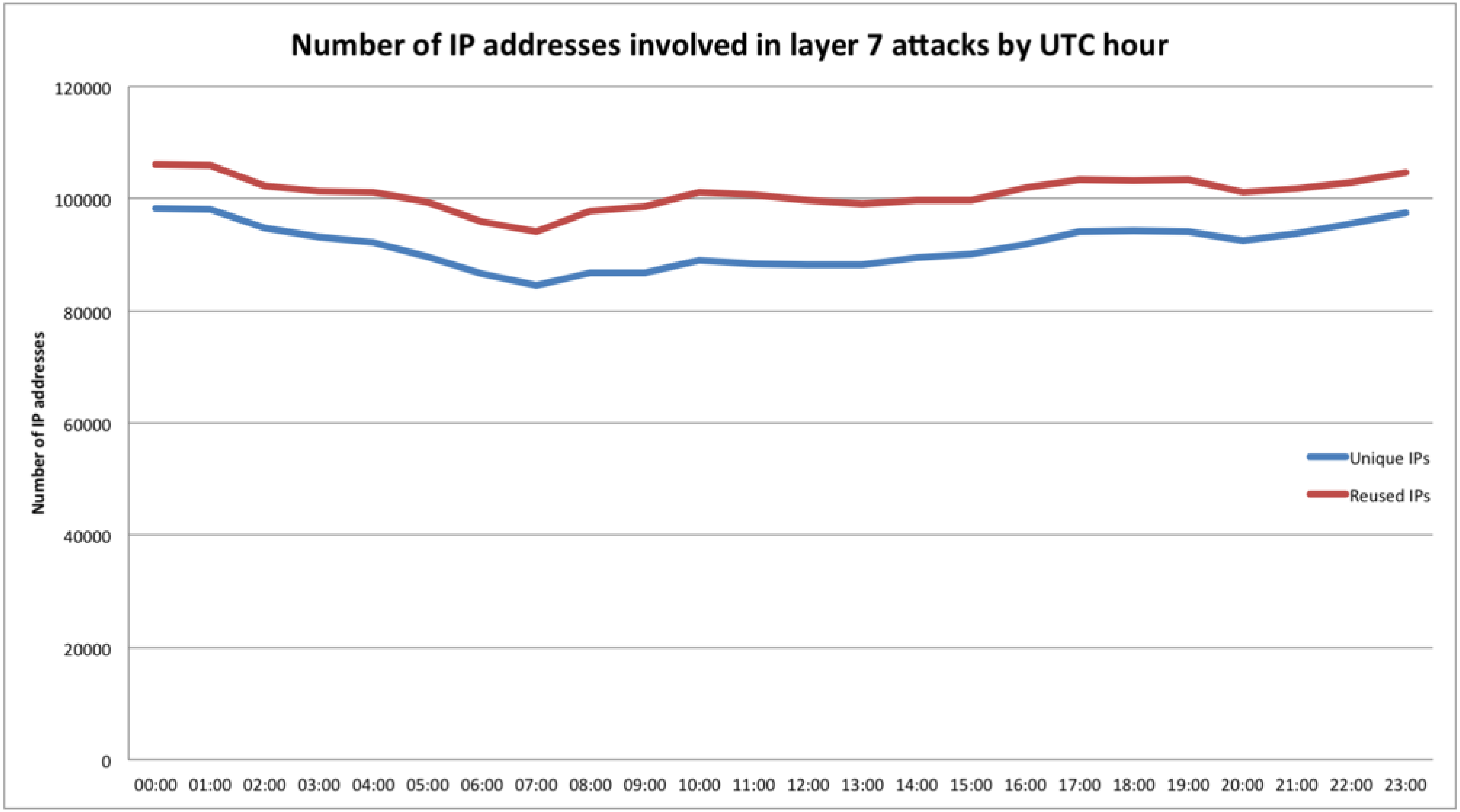
Layer 4 Source Network Data

- Addresses are spoofed:
  - 23% from Martian addresses
  - 3.45% from China Telecom
  - 2.14% from China Unicom
  - 1.74% from Comcast
  - 1.45% from Dreamhost
  - 1.36% from WEBNX.
- 37,284 different networks around the world. With a total of 41,838 networks, we've apparently been attacked during July by 89% of the networks.

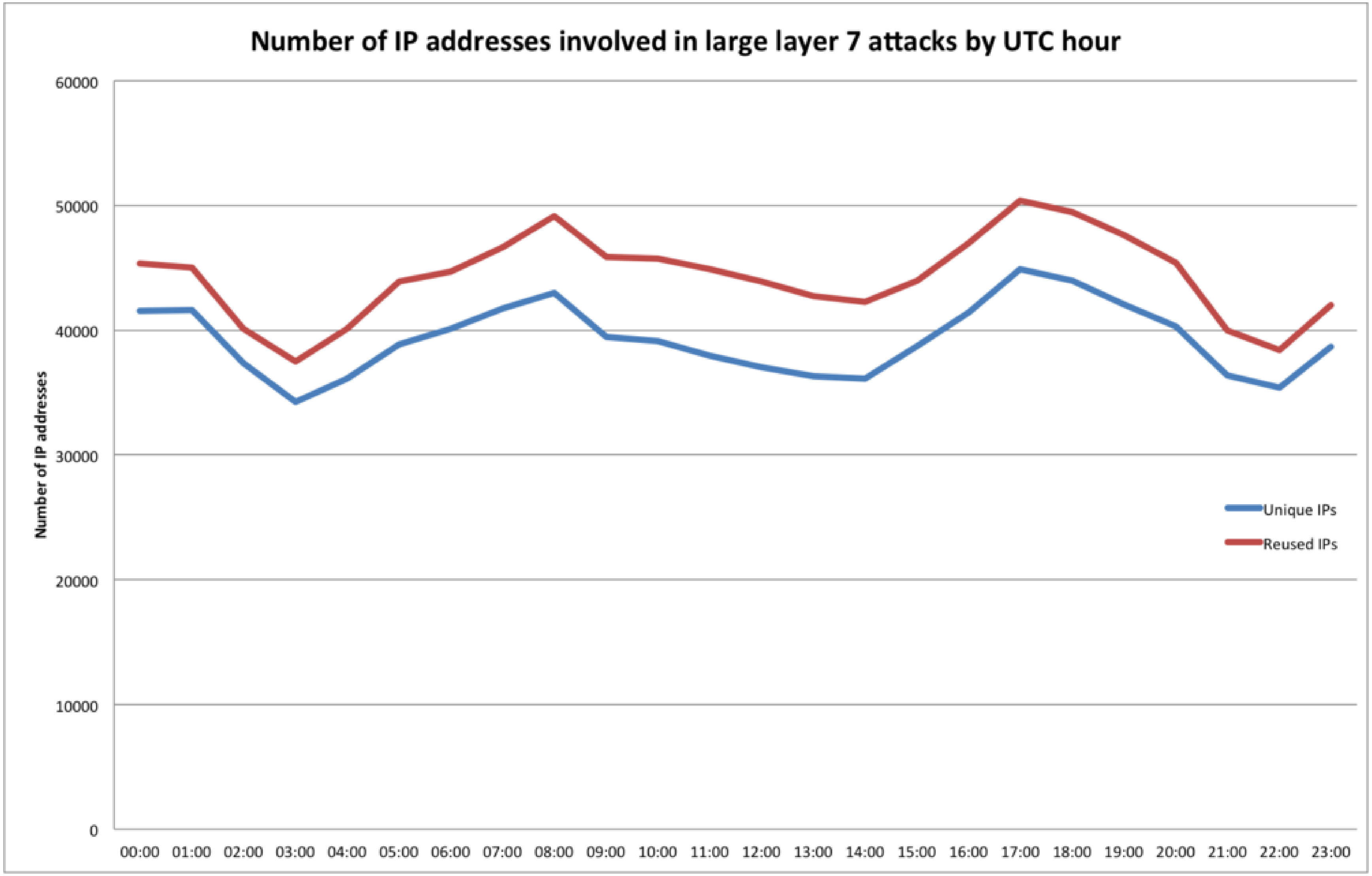
Layer 7 Number of IPs by day of week



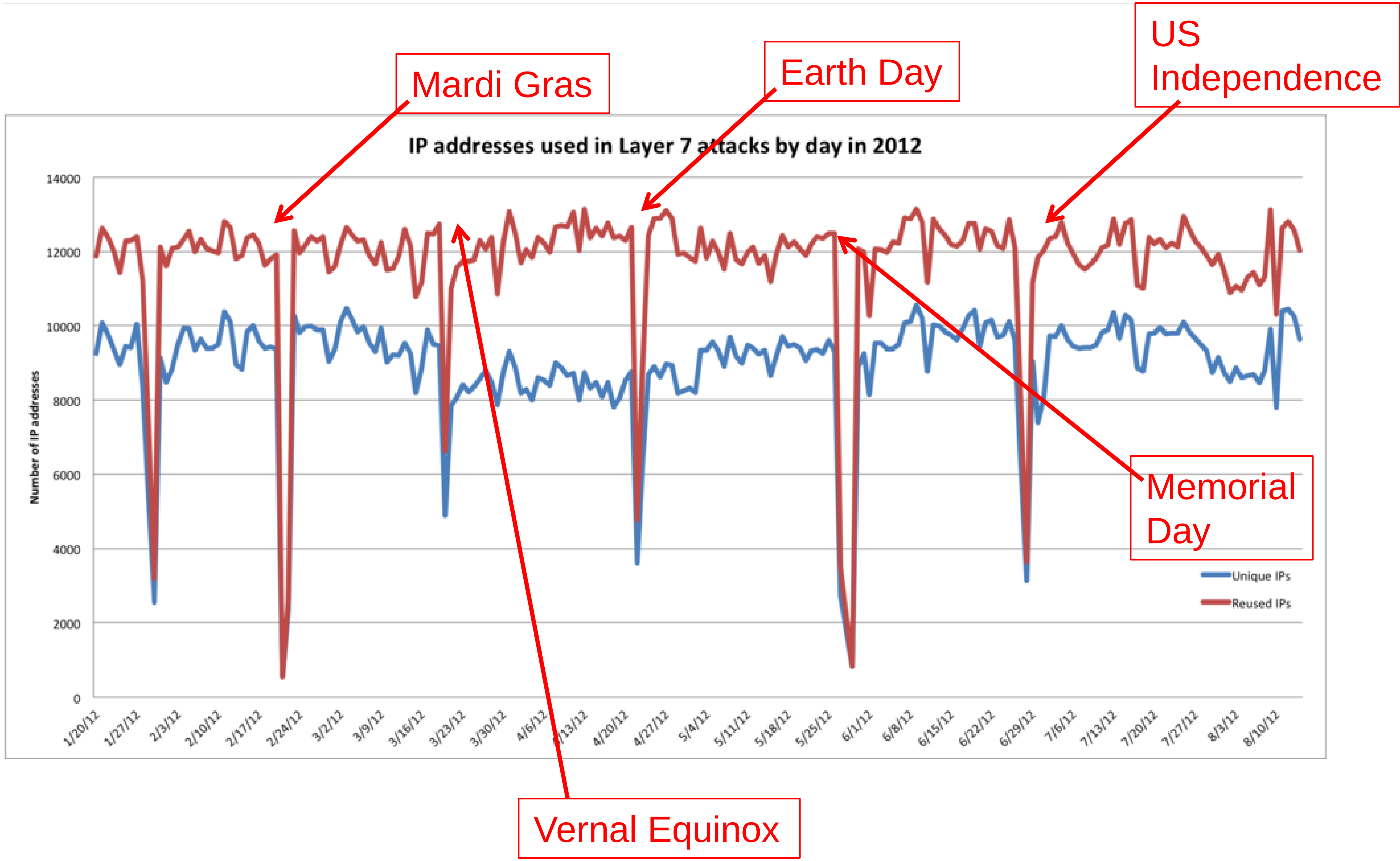
Layer 7 IPs by UTC Hour



Layer 7 IPs in large attacks by UTC Hour



Layer 7 IPs by day



IP addresses used in Layer 7 attacks by day in 2012

Mardi Gras

Earth Day

US Independence

Memorial Day

Vernal Equinox

Top countries performing Layer 7 attacks

- 18.34% from US
- 11.47% from China
- 7.88% Turkey
- 6.96% Brazil
- 6.55% Thailand

Not just about botnets

- We don’t do a good job of tracking this (yet)
- Four types of attacking forces:
  - Botnets
  - Legitimate servers participating in reflection attack
  - Supporters of campaigns using tools like LOIC
  - Booter web sites

Reflection Attacks

- UDP-based protocol are prone to source IP spoofing
- Use genuine UDP servers on Internet to attack by reflection
  - Send spoofed UDP query to legitimate server indicating source address as the target
  - Legitimate server replies to the query hitting the target
- Works well for DNS and SNMP
  - Saw a 25Gbps SNMP reflection attack from Comcast modems
- Has secondary effect
  - The legitimate servers think the target is attacking them!

Amplification

- A corollary to reflection attacks
- Exploit asymmetry between query and response sizes
- Send small query to many servers that returns a large response
- Can turn small outbound bandwidth into a large attack

- Examples:
  - DNS: Take 64 byte query and return 512 bytes response (8x increase in bandwidth)
  - DNSSEC/EDNS0 makes situation worse because of large response sizes
  - SNMP: Take 100 byte query and return up to the UDP datagram size (theoretically 65k bytes)

Booter Web Sites

- Originally used to ‘boot’ users off chat and online games
- Repurposed to knock web sites off line
- Buy access on hacker forums
- Usually simple PHP web sites
- The booter uses multiple VPS or other accounts to perform small DDoS attacks

Carpet Bombing

- Attacks come in waves
    - TCP SYN flood against target web server’s IP addresses
    - TCP SYN flood against the DNS server for the attacked site
    - DNS reflection attack against the same DNS server
    - Repeat for the rest of the /24

Attack Reasons

- Political/Economic
  - EuroVision Song Contest 2012
  - “Anonymous”
  - Mexican and Russian Elections
  - Government Web Sites
- Extortion
  - Typically against ‘sinful’ business types
    - Gambling Sites
    - Prostitution
- Feuds

An Appeal

- We have lots of data
- We have smart people who can write filters to capture more data

- What should we be doing?
- We need your help

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