Reflections on Unwanted Traffic After the IAB Workshop

Apricot, March 1

Loa Andersson

Internet Architecture Board

MPLS WG co-chair

Why an "Unwanted Traffic" workshop

Lots of Unwanted Traffic on the Internet today

- (D)DoS, Spam, viruses, worms, etc.

The trend

- The ratio of Unwanted Traffic is increasing, not decreasing
- Persistence of infected hosts considerable

The impact

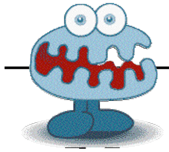
- Significant economic losses and growing

Evolution of Threats

From worms/viruses that simply wreak havoc on the network to malware that propagates, compromises hosts and enables command and control infrastructure and services platforms for malicious activity. E.g.:

- Code Red (DDoS against IP)
- Blaster (DDoS against hostname)
- Deloder (Arbitrary DDoS toolkit)
- Fully extensible today

(D)DoS was initial botnet threat, array of employment functions today; mostly with economic motivators, though religious, political, etc.. as well



The Workshop

IAB called the workshop to

- Assess the state of affairs
- Examine existing counter measures
- Collect input for action planning

Participants

The major findings are report in:

- draft-iab-iwout-report-00.txt

The Workshop Findings

An Underground Economy exists

- It drives majority of unwanted traffic

An arms race with the evolving underground economy

- Currently the situation is getting worse
- Increasing virulence of malware
- Persistence of existing compromised systems

An action plan is needed!

The Underground Shopping Mall

5th Floor
Servers:
Military
Government
Business

4th Floor
Retail:
Credit cards
Social Security No's
Bank Accounts

3rd Floor
Internet:
Hosts
Core Routers
Spoofed Addresses

2nd Floor
Equipment:
Bots & Botnets

The Root of All Evils: An Underground Economy

- **The Underground Economy is a virtual shopping mall where** your **belongings and assets are bought and sold**
- **The shopping mall and stores are managed by criminals**
- **They use the tools** we **have developed to run the warehouse**
- **Inventory list: credit cards, bank accounts,**
  core Internet routers, business critical servers, bots, botnets, etc.

Why an Underground Economy?

The monetary incentives are HUGE!

Lack of meaningful deterrence

- Vulnerable host platforms
- Lack of education to add protection or prompt repair
- Prosecution of miscreants - extremely difficult

No proactive actions from service providers

- Lack of resources
- Lack of adequate tools
- Efforts go into reactive patches (damage control, miscreants move around)
- Rare for mitigation to involve sanitizing hosts
- ROI

The botnet example

Vectors

- Vulnerability -> Exploit
- Compromise/Infection
- Propagation
- C & C

THE WORLD'S ONLY RELIABLE NEWSPAPER
COMPUTER VIRUS SPREADS TO HUMANS!
BAR GLASSES HELP YOU SEE STRAIGHT WHEN YOU'RE DRUNK!
911 MISUNDERSTANDS 'BEAR WITH ME' – MAN IS MAULED

Employment

- DDoS (spoof and non)
- Spam
- Spam w/phishing, host phishing sites
- Open proxies
- ID theft
- Key loggers
- Lift CD keys
- Click Fraud
- Stream video?
- Marketing!

Current Vulnerabilities and Existing Solutions

Vulnerabilities

Source address spoofing

BGP route hijacking

“Everything over HTTP”

Everyone comes from Everywhere

Complex network authentication

Security tools - unused

Solutions

Internet

Access control lists (ACL)

BGP null routing

BCP38

uRPF/BCP 84

Enterprise

Firewalls

ALGs

Anti-Spam SW

Why Existing Solutions Fail

Tools are inadequate …

…or improperly deployed

Competence is low …

… and education is inadequate

Network operators must demonstrate ROI for CAPEX and BCP investment, not immediately obvious

Hard Questions

Internet Architecture and stopping Unwanted Traffic

- **Cryptographic mechanisms**
- **Curtailing the openness**
- **Increasing the system complexity**
- **Architectural principles we need to preserve**
- **Separate control plane**
- **The adversary is very adaptive …**

  … and will take counter actions for any move we make to defend ourselves - e.g BlueSecurity example

Bad - going on worse

But we see things that can be done!

There is a light in the end of the tunnel!

Situation will stay “gloomy” only as long a we let!

Medium and Long Term

Tightening security of the routing infrastructure

Cleaning up the Internet Routing Registry Repository [IRR], and securing both the database and the access, so that it can be used for routing verifications

Take down bots and botnets

Even without a magic wand we are able to take measures to reduce the unwanted traffic

Community education (e.g., TCP MD5, use the filtering BCP’s, etc..)

Layer security, raise the bar

Actionable

Update the host requirements

Update the router requirements.

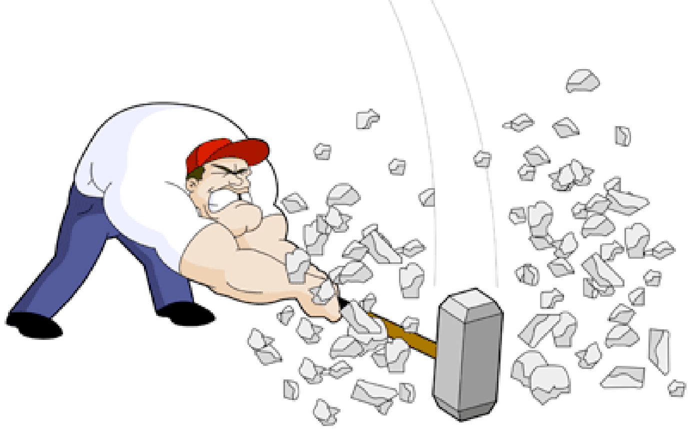
Update ingress filtering (BCP38 [RFC2827] and BCP 84 [RFC3704]).

The IAB

- inform the community about the existence of the underground economy.

The IRTF

- steps toward understanding the Underground Economy
- encourage research on effective countermeasures.



A Concluding Note

The Underground Economy is different from what we have seen before

- It’s no longer kiddies with nothing better to do
- It is a financially motivated illegal activity
- The technology and global connectedness of the Internet is just the enabler

The situation is getting worse

However, there is growing awareness of the issues of the Underground Economy and that is the first step towards effective solutions