Reflections on Unwanted Traffic After the IAB Workshop

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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 and growing economic losses**

Evolution of Threats - I

We had:

- Worms and viruses that simply did wreak havoc on the network

Now we see:

- malware that propagates, compromises hosts and enables command and control infrastructure and services platforms for malicious activity
  - Code Red (DDoS against IP)
  - Blaster (DDoS against hostname)
  - Deloder (Arbitrary DDoS toolkit)

Evolution of Threats - II

Initial major threat from botnets

- (D)DoS attacks

Today it forms an array of employment functions for

- (mostly) threats with economic motivations
- (to a lesser degree) threats have religious, political, etc, motivation 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-03.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 belongings and assets are bought and sold
- The shopping malls are managed by criminals
- They use the tools they have developed to run their business
- Inventory: credit cards, bank accounts, internet routers, business critical servers, bots, botnets, etc.

They work hard for our money!

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

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

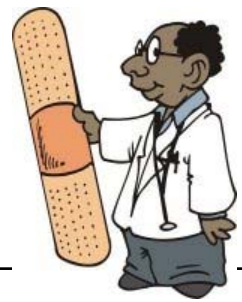
uRPF/BCP 84

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

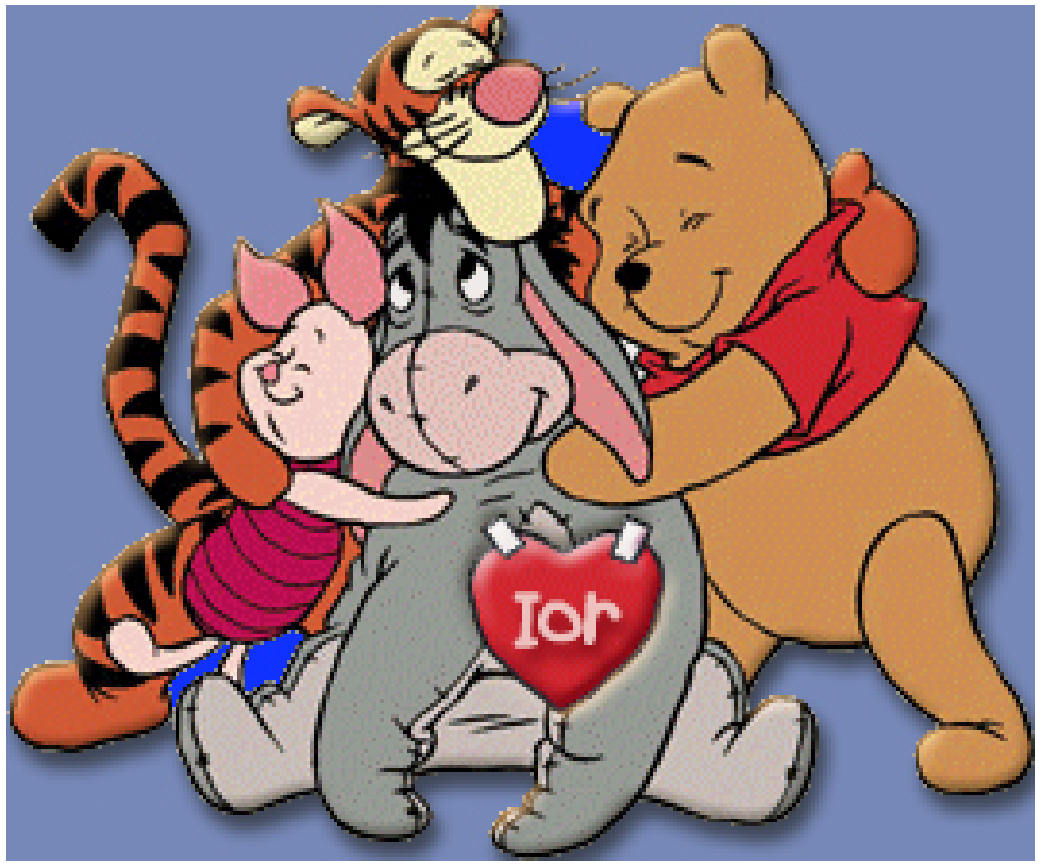
Bad - going on worse

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 as we don’t act!

The hydra!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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.

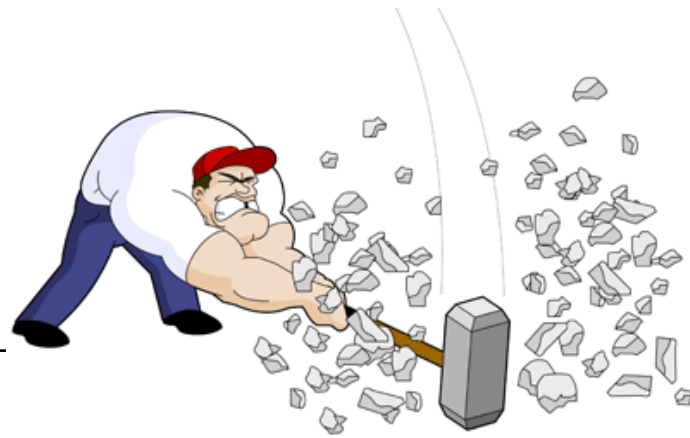
Update ingress filtering (BCP38 [RFC2827] and BCP 84 [RFC3704]).

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 kids 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

End of presentation

Questions?