Cybercrime and The Underground Economy

CS 161: Computer Security
Prof. David Wagner

April 22, 2016
REQUEST FOR URGENT BUSINESS RELATIONSHIP

FIRST, I MUST SOLICIT YOUR STRICTEST CONFIDENCE IN THIS TRANSACTION. THIS IS BY VIRTUE OF ITS NATURE AS BEING UTTERLY CONFIDENTIAL AND 'TOP SECRET'. I AM SURE AND HAVE CONFIDENCE OF YOUR ABILITY AND RELIABILITY TO PROSECUTE A TRANSACTION OF THIS GREAT MAGNITUDE INVOLVING A PENDING TRANSACTION REQUIRING MAXIMUM CONFIDENCE.

WE ARE TOP OFFICIAL OF THE FEDERAL GOVERNMENT CONTRACT REVIEW PANEL WHO ARE INTERESTED IN IMPOURATION OF GOODS INTO OUR COUNTRY WITH FUNDS WHICH ARE PRESENTLY TRAPPED IN NIGERIA. IN ORDER TO COMMENCE THIS BUSINESS WE SOLICIT YOUR ASSISTANCE TO ENABLE US TRANSFER INTO YOUR ACCOUNT THE SAID TRAPPED FUNDS.

THE SOURCE OF THIS FUND IS AS FOLLOWS; DURING THE LAST MILITARY REGIME HERE IN NIGERIA, THE GOVERNMENT OFFICIALS SET UP COMPANIES AND AWARDED THEMSELVES CONTRACTS WHICH WERE GROSSLY OVER-INVOICED IN VARIOUS MINISTRIES. THE PRESENT CIVILIAN GOVERNMENT SET UP A CONTRACT REVIEW PANEL WHICH IDENTIFIED A LOT OF INFLATED CONTRACT FUNDS WHICH ARE PRESENTLY FLOATING IN THE CENTRAL BANK OF NIGERIA READY FOR PAYMENT.

HOWEVER, BY VIRTUE OF OUR POSITION AS CIVIL SERVANTS AND MEMBERS OF THIS PANEL, WE CANNOT ACQUIRE THIS MONEY IN OUR NAMES. I HAVE THEREFORE, BEEN DELEGATED AS A MATTER OF TRUST BY MY COLLEAGUES OF THE PANEL TO LOOK FOR AN OVERSEAS PARTNER INTO WHOSE ACCOUNT WE WOULD TRANSFER THE SUM OF US$21,320,000.00 (TWENTY ONE MILLION, THREE HUNDRED AND TWENTY THOUSAND U.S DOLLARS).
Discussion

• Why do Nigerian scammers say they’re from Nigeria? And why so many spelling mistakes?
Discussion

• Why do Nigerian scammers say they’re from Nigeria? And why so many spelling mistakes?

• Hint: It’s not an accident....
Answer

• Scammers want to quickly weed out all but the most gullible marks.

• Lesson: Crime is a business; criminals will follow easiest route to make a buck.
• You get an email from someone overseas who wants to hire you as their financial agent in the US. They’ll send you a cashier’s check for $8000, and you should deposit it in your bank account and wire $7500 to their supplier and keep $500 for your trouble.

• What’s that all about?
Answer

• It’s a scam! After you wire the money out, the cashier’s check will bounce and the bank will reverse the transaction.

• Possibility 1: Check fraud.

• Possibility 2: Laundering money out of stolen accounts. You’re being used as an unwitting money mule.

• Specialization....
Goals For Today

• A look at profit-driven cybercrime …
  – Monetization of malware
  – Monetization of spam

• … including the *Underground Economy*
  – Elements
  – Significance
  – Infiltration/disruption
Cybercrime
Suppose you’ve hacked a bunch of machines. How could you make money from this?
Monetizing Malware on 1 Machine

• General malware monetization approaches:
  – Keylogging: steal financial/email/social network accounts
  – Ransomware
  – Scareware ("fake AV")
### Threats and actions:

<table>
<thead>
<tr>
<th>Name</th>
<th>Risk level</th>
<th>Date</th>
<th>Files infected</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email-Worm.Win32.Myd</td>
<td>Critical</td>
<td>11.18.2008</td>
<td>65</td>
<td>Waiting removal</td>
</tr>
<tr>
<td>Win 32:Delf-XQ</td>
<td>Critical</td>
<td>11.18.2008</td>
<td>44</td>
<td>Waiting removal</td>
</tr>
</tbody>
</table>

### Description:
This program is potentially dangerous for your system. **Trojan-Downloader** stealing passwords, credit cards and other personal information from your computer.

### Advice:
You need to remove this threat as soon as possible!
Monetizing Malware on 1 Machine

• General malware monetization approaches:
  – Keylogging: steal financial/email/social network accounts
  – Ransomware
  – Scareware (“fake AV”)
  – Transaction generators (“man-in-the-browser”)
    • Malware watches user’s surfing …
    • … waits for them to log into banking site (say) …
    • … and then injects additional banking transactions like “send $50,000 to Nigeria” …
    • … and alters web server replies to mask the change in the user’s balance
Monetizing Large-Scale Malware

- Monetization that leverages *botnet scale*
  - DDoS (extortion)
  - Spam
  - *Click fraud*
  - Scam *infrastructure*
    - Hosting web pages (e.g., phishing)
    - Redirection to evade blacklisting/*takedown* (DNS)
    - Proxying traffic to thwart tracing / provide *IP diversity*

- Which of these cause serious pain for infected user?
  - **None.** Users have *little incentive* to prevent
  
  \[ ⇒ \textbf{Externality} \text{ (cost one party’s actions impose on another)} \]
Spam & Spam Profit
Monetizing Spam

• In what different ways can spammers make money off of sending spam?
  – And who has incentives to thwart these schemes?
    • (Other than law enforcement)

• Scheme #1: advertise goods or services
  – Examples: fake Rolexes, Viagra, university degrees
  – Profit angle: increased sales
  – Who’ll try to stop it: brand holders
Anatomy of a modern Pharmaceutical spam campaign

Spammer
- Bulk email sender
- Open proxies/botnet

Spam emails
- Email with link
- Other recipients
- Email with target (disposable hosting)

Email recipient
- Impotent? Curious?
- Clicks on link

Paid commission

Affiliate program
- Commission (up to 40%)

Sale made
- Generic pills (Sildenafil citrate)
- Non-US supply (India, Mexico etc.)
- Patent expired
- Mere cents per pill = massive markup

Shipped to customer

Diagram by Stuart Brown
modernlifeisrubbish.co.uk
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• Scheme #2: phishing
  – Profit angle: transfer $$$ out of accounts; sell accounts to others; use accounts for better spamming (e.g. Facebook)
  – Opponents: issuers of accounts
  – Note: targeted phishing (“spear-phishing”) doesn’t actually need much in the way of spam due to low volume
Monetizing Spam, cont.

• Scheme #3: scams
  – Examples: pen pal relationships, 419 (“Nigerian”)
  – Profit angle: con victim into sending money
  – Opponents: scambaiters (e.g., www.419eater.com)

• Scheme #4: recruiting crooks/underlings
  – Examples: money mules, reshippers
  – Profit angle: enables profiting from cybercrime
  – Opponents: ?
Monetizing Spam, cont.

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  Money mules take incoming (fraudulent) financial transfers to their bank accounts, wire-transfer 90% out of country, keep 10%

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  – Opponents: ?

Reshippers receive shipments of goods (e.g., a laptop bought using a stolen account) and re-mail them outside the country.
• Scheme #5: pump-and-dump
  – Example: “Falcon Energy (FPK) is about to go through the roof! Don’t miss out on $eriou$ Profit$!”
  – Profit angle: penny-stock momentarily goes up, dump pre-bought shares when it does
  – Opponents: Securities and Exchange Commission
  – Note: unlike other monetization techniques, the “back channel” is out-of-band
    • No link in messages back to the scammer

• Scheme #6: recruiting bots
  – Examples: “important security patch!”, “someone sent you a greeting card!”
  – Profit angle: get malware installed on new machines
  – Opponents: ?
Welcome to Storm!

Would you like to be one of our newest bots?
Just read your postcard!
(Or even easier: just wait 5 seconds!)
The *Storm* Spambot

Infected systems

Reachability check

Overnet (UDP)
The Storm Botnet

Operated using “bulletproof hosting”
Spam “Campaign” Mechanics

- Botmaster
  - HTTP proxies
    - HTTP
      - Proxy bots
        - TCP
          - Workers
Campaign Mechanics: Harvest

- Botmaster
- HTTP proxies
- HTTP
- Proxy bots
- TCP
- Workers
Campaign Mechanics: Spamming

Botmaster

HTTP proxies

HTTP

Proxy bots

TCP

Workers
Campaign Mechanics: Spamming

- Botmaster
- HTTP proxies
- HTTP
- Proxy bots
- TCP

Campaign Mechanics: Spamming
The Rise of the Underground Economy
ProAgent Spy Software is one of the most powerful monitoring and surveillance applications available today.

It is an ultimate solution for monitoring spouses, children, employees, or anyone else!

ProAgent records all typed keystrokes, all active window texts, all visited web sites, usernames, passwords and more and sends e-mail reports to your e-mail address that you specified when creating the server, completely hidden!

ProAgent can work in all kind of networks, it doesn’t matter if the PC is behind a firewall or behind a router or in a LAN, ProAgent works in all of these conditions without any problems.

Click here to purchase **ProAgent v2.1** Special Edition...

Click here to download **ProAgent v2.1** Public Edition...
allBots Inc.

Social Networking Bots

GOOD News!!! We have something more for you! Yes, we have just integrated CAPTCHA Bypassers in all of our bots.

Winsock (Multi-threaded) Bots

Click here for 30+ MySpace Bots

Become an Affiliate and Start Earning Now

---

**Accounts Creator**
(You Just Need To Type In The CAPTCHAs To Create Accounts)

<table>
<thead>
<tr>
<th>Social Networks</th>
<th>MySpace Accounts Creator with Picture Uploader, Profile &amp; Layout Manager</th>
<th>Buy Now</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$180.95 - $140.00</td>
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**Friend Adders, Message Senders, Comment Posters & Others**
(All Bots Work In A Conventional Manner, They Gather Friend IDs/Names And Send Friend Requests, Messages, Comments Automatically)

**Chaining Feature** Is Available On All Bots for All Networks Except Facebook
Наш магазин аккаунтов рад предложить аккаунты различных почтовых служб и бесплатных хостингов для любых задач. Вы получите аккаунты СРАЗУ после оплаты заказа через Webmoney.

Также доступна услуга залива редиректов на Pochta.ru, Cwahi.net и 0catch.com что является уникальной услугой - вы получаете готовые редиректы в течение часа после заказа. При покупке аккаунтов менее 1000 штук действует специальный тариф.

www.FreedomScripts.org - разработка софта на заказ
Mega Софт для дорвеев - Zerber
Одобрятор друзей - Мой мир

Twidium - безопасный и профессиональный инструмент для раскрутки твиттера
накрутить фолловеров в Твиттер

Заработать на продаже аккаунтов

Купить аккаунты Одноклассников
Купить аккаунты Вконтакте

### Сейчас в продаже

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<td>327199</td>
<td>до 10K: $5</td>
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<tr>
<td>Mail.ru Second Hand</td>
<td>0</td>
<td>до 10K: $4</td>
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<td>Yandex.ru</td>
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</tr>
<tr>
<td>Narod.ru</td>
<td>5315</td>
<td>до 10K: $50</td>
</tr>
</tbody>
</table>

### Новости

**06 Апр 2013**
Временно не продаем аккаунты Twitter.com

**15 Мар 2013**
Отличная цена на аккаунты Facebook.com! Всего $80 за 1000 шт. Дешевле не бывает!

**07 Фев 2013**
Сенсационная цена на аккаунты Yahoo.com. Теперь отличные аккаунты со всеми регистрационными данными по цене от $7 за 1000 шт!
Список доступных акков

Сервис по продаже аккаунтов аукциона eBay.

Добрые юзеры аукциона eBay предлагают вашему вниманию свои аккаунты.
Постоянным клиентам и тем, кто берет более 5 акков, различные бонусы и скидки.
Все аккаунты с доступом к мылу холдера.

Вы сами выбираете акк (несколько акков) из списка. Говорите мне. Оплачиваете и получаете.
Все акки предварительно проверяются перед продажей, в случае, если что-то не работает - 100% замена.

Актив/не актив смотрите сами по юзер ид. По активности не сортирую, так как это для каждого субъективно.

Также в продаже бывают акки PayPal. Цены рыночные. Постоянно не про даю.

Оплата по WM.
Перед покупкой следует обязательно ознакомиться с FAQ.
По работе с товаром не консультирую.
Работа через гаrant сервис приветствуется.

Мои цены:

seller/баер акк до 10 фидов = 5$
seller/баер акк 10-25 фидов = 10$
seller/баер акк 25-50 фидов = 15$
seller/баер акк более 50 фидов = 25$
Advertisement

i have boa wells and barclays bank logins....
have hacked hosts, mail lists, php mailer send to all inbox
i need 1 mastercard i give 1 linux hacked root
i have verified paypal accounts with good balance...and i can cashout paypals
Marketplace Ads for Services

Percentage of Labeled Data

Ad Type (Services)

Cashier Available
Cashier Wanted
Confirming Available
DoS Available
Phisher Wanted
Confirmer Wanted
Carder Wanted
Phisher Available
Carder Available
DoS Wanted
Pay-Per-Install (PPI)
Installs4Sale.net - надежный сервис по загрузкам, достойный доверия

Контакты
- 560869831
- 550525933
info [at] installs4sale.net

Приемущества
- Быстро осуществляем отгрузку практически в любой регион. Принимаем заказы на миксы стран по вашему выбору.
- Для постоянных клиентов действуют скидки и бонусы в виде дополнительного объема загрузок.
- Договоритесь по всем ценам и получить индивидуальные условия вы можете в службе поддержки. Пишите!
GangstaBucks.com - it pays on time! We pay for all installs!

Join our ranks and by tomorrow you could get your first payout!
### Goldinstall Rates for 1K Installs for each Country.

<table>
<thead>
<tr>
<th>Country</th>
<th>Price</th>
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<tr>
<td>OTH</td>
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<td>GB</td>
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</tr>
<tr>
<td>CA</td>
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<td>PT</td>
<td>30$</td>
</tr>
<tr>
<td>LB</td>
<td>6$</td>
</tr>
</tbody>
</table>
Defenses
The Underground Economy

- Why is its emergence significant?
  - Markets enable efficiencies
    - *Specialization*: individuals rewarded for doing a single thing particularly well
  - Lowers barrier-to-entry
    - Only need a single skill
    - Some underground market activities are legal
  - Competition spurs innovation
    - Accelerates *arms race*
    - Defenders must assume a more pessimistic threat model
  - Facilitates non-$ Internet attacks (political, nation-state)
    - Provides actors with cheap attack components
    - Provides stealthy actors with plausible cover
The Underground Economy, cont.

• What problems do underground markets face?

• Depending on marketplace architecture, can present a target / single point of failure

• By definition, deals are between crooks
  – Major issue of betrayal by “rippers”

• Markets only provide major efficiencies if they facilitate deals between strangers
  – Susceptible to infiltration
Life As A Spammer …

• Storm infiltration study found:
  – Modern spam campaigns can send 10s of billions of spams using mailing lists of 100s of millions of addresses
  – 3/4 to 5/6 of all spam delivery attempts fail before the message is even sent to the receiver’s server …
    • … due to heavy & effective use of black-listing
  – It takes around 20,000 “postcard” spams to get one person to visit the postcard site
    • 1 in 10 of the visitors will click to download the postcard
  – It takes around 12,000,000 Viagra spams to get one person to visit the site and make a purchase (~$100)
  – Even given those low rates, huge volume ⇒ profitable

~ $1.5-2M/year revenue
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Another study based on making purchases of spam-advertised pharmaceuticals found that 3 merchant banks hosted 95% of all sales …

… suggesting a novel way to suppress spam is to undermine the credit-card processing

~ $1.5-2M/year revenue
Merchant Bank bottlenecks

3 banks host 95+% of all sales
Уважаемые Вебмастера,
В связи с событиями произошедшими в течение последних двух месяцев, когда под удар попали все банковские и процессинговые счета компании, мы вынуждены сообщить, что, поскольку до сегодняшнего дня не удалось найти достаточно надежного решения для продолжения работы, а долги перед поставщиками и партнерами продолжают расти, мы вынуждены полностью остановить функционирование партнерской программы Medinc.
Мы были рады работать с вами, друзья, и нам жаль, что сотрудничество в рамках данного проекта более невозможно.
В случае, если нам удастся найти надежное, по нашему мнению, процессинговое решение и возобновить работу, все вебмастера получат уведомления на почтовые адреса, указанные при регистрации.

Dear webmasters,
Due to the recent developments which led to all our bank and processing accounts being jeopardized, we have to inform you, that functioning of the Medinc partnership program will be discontinued, as no reliable solution has been found to keep it working, and the debts to suppliers and partners keep increasing.
We were happy to work with all of you, and we are very sorry that we can’t cooperate with you anymore within this project. If we manage to find a reliable processing solution to resume working, all webmasters will receive an email notification sent to the address submitted during registration.
6/29/2012

Dear Partners,

As you may have noticed, in the last couple of days we've had problems with processing. We don't have a solution yet, and there is no concrete time when it will be resolved.

....... 

From this point forward, GlavMed is switching to a "PAUSED" mode. No new orders will be processed until the processing issue is resolved.

....... 

We urge you to temporarily switch your traffic to other shops/projects.
Infiltration opportunity
Via protocol emulation, extracted ("milked") > 1M malicious binaries over 6 months
The majority of the world’s top malware appeared in PPI downloads.

Table 2: FireEye’s top 20 malware families observed in their MAX Cloud network on the April–June 2010 time
Наш магазин аккаунтов рад предложить аккаунты различных почтовых служб и бесплатных хостингов для любых задач. Вы получите аккаунты СРАЗУ после оплаты заказа через Webmoney.

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Одобрятру друзей - Мой мир

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накрутить фоловеров в Твиттер

Зарабатывайте на продаже аккаунтов

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Временно не продаем аккаунты Twitter.com

15 Мар 2013
Отличная цена на аккаунты Facebook.com! Всего $80 за 1000 шт. Дешевле не бывает!

07 Фев 2013
Сенсационная цена на аккаунты Yahoo.com. Теперь отличные аккаунты со всеми регистрационными данными по цене от $7 за 1000 шт!

06 Фев 2013
If you need quality **bulk accounts**, you've come to the right place. You can get your accounts immediately after your payment - there is no need to wait.

All the accounts are provided in **any format** you like. Just use our **free account converter** to get them in the way you need.

Special rates are applied if you purchase less than 1000 accounts.

We accept Liberty Reserve and Paypal.

Please, review our terms and conditions before purchasing any accounts.

---

<table>
<thead>
<tr>
<th>Provider</th>
<th>Quantity</th>
<th>Rate for 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotmail.com</td>
<td>449292</td>
<td>1K-10K: $5</td>
</tr>
<tr>
<td>Hotmail.com Verified</td>
<td>423418</td>
<td>1K-10K: $6</td>
</tr>
<tr>
<td>Outlook.com Plus</td>
<td>9661</td>
<td>1K-10K: $4</td>
</tr>
<tr>
<td>Gmail.com USA PVA</td>
<td>4340</td>
<td>1K-10K: $100</td>
</tr>
<tr>
<td>Yahoo.com</td>
<td>14058</td>
<td>1K-10K: $8</td>
</tr>
<tr>
<td>Yahoo.com USA</td>
<td>8688</td>
<td>1K-10K: $15</td>
</tr>
<tr>
<td>NokiaMail.com</td>
<td>0</td>
<td>1K-10K: $10</td>
</tr>
</tbody>
</table>

06 Apr 2013
Twitter accounts are not available. We will start selling them shortly.

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06 Apr 2013
Twitter accounts are not available. We will start selling them shortly.

07 Feb 2013
Added Instagram accounts at a great rate: $50 per 1000.

04 Dec 2012
Just added **Fully Profiled Twitter Accounts** at a great rate - $30 per 1000. Accounts come with avatar, bio and random background.

19 Nov 2012
Great prices for wholesale Twitter.com and Hotmail.com orders!
Infiltration

ShadowCrew

Infiltrated (Secret Service)

CarderPlanet

CardersMarket

DarkMarket

Infiltrated (FBI)
State-sponsored Adversaries
26K Twitter accounts tweet 440K junk messages to drown out discourse / coordination.

Russian election protests – Saturday 10 December 2011

- Largest political event of its kind since the fall of the USSR
- An estimated 50,000 people gathered in Moscow and 10,000 in St Petersburg
- They allege widespread fraud in Sunday's polls
- More than 1,000 arrests
- Protestors pledge to take to the streets again on December 24
- They want Sunday's election results annulled
Geolocation of Logins

Nonspam Logins

56%
Geolocation of Logins

26K accounts purchased from *spam-as-a-service* program. Part of a “lot” of 975K. Used ~20K distinct IP addresses.
Takeaways

• Rise of cybercrime is a major challenge for security, because adversaries have become far more capable…

• But cybercriminals are lazy and look for easiest way to make a buck. So, focus defenses on the easiest ways to turn a technical security breach into money.

• “Follow the money.”
Extra Material
Welcome to Storm! What can we sell you?
Kirill Levchenko
klevchen@cs.ucsd.edu

I am a project scientist with the Systems and Networking group in the Computer Science department at the University of California, San Diego. My current research
Synthetic diversity aims to thwart content-based anti-spam filtering.

Figure 2: Snippet of a spam template, showing the transformation of an email header from template (top) to resulting content (bottom). The ▶-symbol indicates line continuations. Bold text corresponds to the formatting macros and their evaluation.

Synthetic diversity aims to thwart content-based anti-spam filtering.
<table>
<thead>
<tr>
<th>MACRO</th>
<th>SEEN LIVE</th>
<th>FUNCTIONALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0)</td>
<td>✓</td>
<td>Spam target email address.</td>
</tr>
<tr>
<td>(A)</td>
<td>✓</td>
<td>FQDN of sending bot, as reported to the bot as part of the preceding C&amp;C exchange.</td>
</tr>
<tr>
<td>(B)</td>
<td>✓</td>
<td>Creates content-boundary strings for multi-part messages.</td>
</tr>
<tr>
<td>(Cnum)</td>
<td>✓</td>
<td>Labels a field’s resulting content, so it can be used elsewhere through (V); see below.</td>
</tr>
<tr>
<td>(D)</td>
<td>✓</td>
<td>Date and time, formatted per RFC 2822.</td>
</tr>
<tr>
<td>(E)</td>
<td>✓</td>
<td>ROT-3–encodes the target email address.</td>
</tr>
<tr>
<td>(Estring)</td>
<td>✓</td>
<td>Random value from the dictionary named string.</td>
</tr>
<tr>
<td>(Gstring)</td>
<td>✓</td>
<td>Line-wrap string into 72 characters per line.</td>
</tr>
<tr>
<td>(Hstring)</td>
<td>✓</td>
<td>Defines hidden text snippets with substitutions, for use in HTML- and plain-text parts.</td>
</tr>
<tr>
<td>(I)</td>
<td>✓</td>
<td>Random number between 1 and 255, used to generate fake IP addresses.</td>
</tr>
<tr>
<td>(Istring)</td>
<td>✓</td>
<td>Produces quoted-printable “=20” linewrapping.</td>
</tr>
<tr>
<td>(K)</td>
<td>✓</td>
<td>IP address of SMTP client.</td>
</tr>
<tr>
<td>(M)</td>
<td>✓</td>
<td>6-character string compatible with Exim’s message identifiers (keyed on time).</td>
</tr>
<tr>
<td>(N)</td>
<td>✓</td>
<td>16-bit prefix of SMTP client’s IP address.</td>
</tr>
<tr>
<td>(Ostring: num)</td>
<td>✓</td>
<td>Randomized message identifier element compatible with Microsoft SMTPSVC.</td>
</tr>
<tr>
<td>(Pnum&lt;sub&gt;1&lt;/sub&gt;-num&lt;sub&gt;2&lt;/sub&gt;:string)</td>
<td>✓</td>
<td>Random string of num&lt;sub&gt;1&lt;/sub&gt; (up to num&lt;sub&gt;2&lt;/sub&gt;, if provided) characters taken from string. Quoted-printable “=” linewrapping.</td>
</tr>
<tr>
<td>(Qstring)</td>
<td>✓</td>
<td>Randomized percent-encoding of string.</td>
</tr>
<tr>
<td>(Rnum&lt;sub&gt;1&lt;/sub&gt;-num&lt;sub&gt;2&lt;/sub&gt;)</td>
<td>✓</td>
<td>Random number between num&lt;sub&gt;1&lt;/sub&gt; and num&lt;sub&gt;2&lt;/sub&gt;. Note, special-cased when used with (D).</td>
</tr>
<tr>
<td>(Ustring)</td>
<td>✓</td>
<td>Randomized percent-encoding of string.</td>
</tr>
<tr>
<td>(Vnum)</td>
<td>✓</td>
<td>Inserts the value of the field identified by (Cnum).</td>
</tr>
<tr>
<td>(W)</td>
<td>✓</td>
<td>Time and date as plain numbers, e.g. “20080225190434”.</td>
</tr>
<tr>
<td>(X)</td>
<td>✓</td>
<td>Previously selected member of the “names” dictionary.</td>
</tr>
<tr>
<td>(Ynum)</td>
<td>✓</td>
<td>8-character alphanumeric string, compatible with Sendmail message identifiers.</td>
</tr>
<tr>
<td>(Z)</td>
<td>✓</td>
<td>Another Sendmail-compatible generator for message identifiers.</td>
</tr>
</tbody>
</table>

Table 2: Storm’s spam-generation templating language.
Campaign Mechanics: Reporting

Botmaster

HTTP proxies

HTTP

Proxy bots

TCP

SPAM cans
Template points to spammer’s server

Modified template points to our server
Axiom of Criminal Laziness
Axiom* of Criminal Laziness

Cybercrooks will work energetically to sustain their current cash flow …

… but will not look out strategically beyond it to serve their long-term interests

(* This is a working hypothesis to explain the observed pace of attacker innovation – not something definitively established)
Phases of the Spam Value Chain

If we were to “snip” a link in this chain, which one would be the most disruptive for our least expenditure?

Measuring URLs, DNS servers, HTTP redirection, etc. all a matter of energetic crawling & recording.

But merchant banks / Visa / “fulfillment”?
Добро пожаловать в DOGMA MILLIONS!

- **60-70%** от дохода
- **3-5%** с рефералов

**Новости**

- **29-10-2009**
  - Лэндинги
  - Лэндинги на новом домене ожидают ваш трафик

- **02-10-2009**
  - Обновление модуля
  - Обновлен биuld модуля, улучшен отток и совместимость с некоторыми паладинами.

- **14-09-2009**
  - Новость
  - Новость об новой версии
60-70% Of revenue

3-5% With referrals

Our advantages
- Best exhaust of similar solutions
- Stable payments
- Reliability cooperation
- Individual approach
- Friendly support service

Additional information
Successfully convert the following countries: US, CA, AU, GB, DE, FR. Increased long-term performance and exhaust from each install. We offer individual and payment rates to constant partners. You can use your own Landing drain web traffic.

News

08.05.2010
Happy Holidays!
Dear webmaster! We congratulate you on the Day of Victory! Today osobrenno German installs go well ;)

05/05/2010
Access to auto-update
Dear webmaster! To improve the stability of our affiliate program and prevent discharges of our module access/Autoupdate temporarily closed
Study programs: