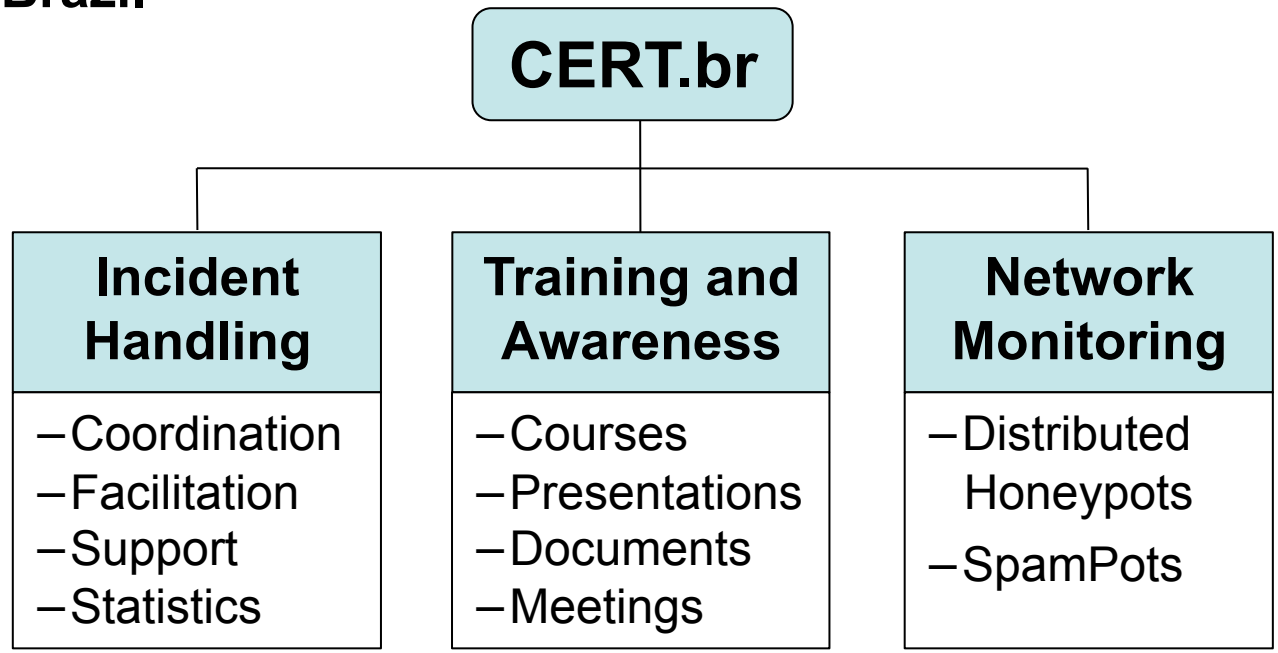
Fighting E-mail Abuse and Phishing in Brazil

Cristine Hoepers
cristine@cert.br

CERT.br – Computer Emergency Response Team Brazil
NIC.br - Network Information Center Brazil
CGI.br - Brazilian Internet Steering Committee

CERT.br Activities

Created in 1997 as the national focal point to handle computer security incident reports and activities related to networks connected to the Internet in Brazil



International Partnerships

FIRST Improving Security Together MEMBER

Anti-Phishing Working Group APWG

SEIPartner CERT Courses

The Honeynet PROJECT®

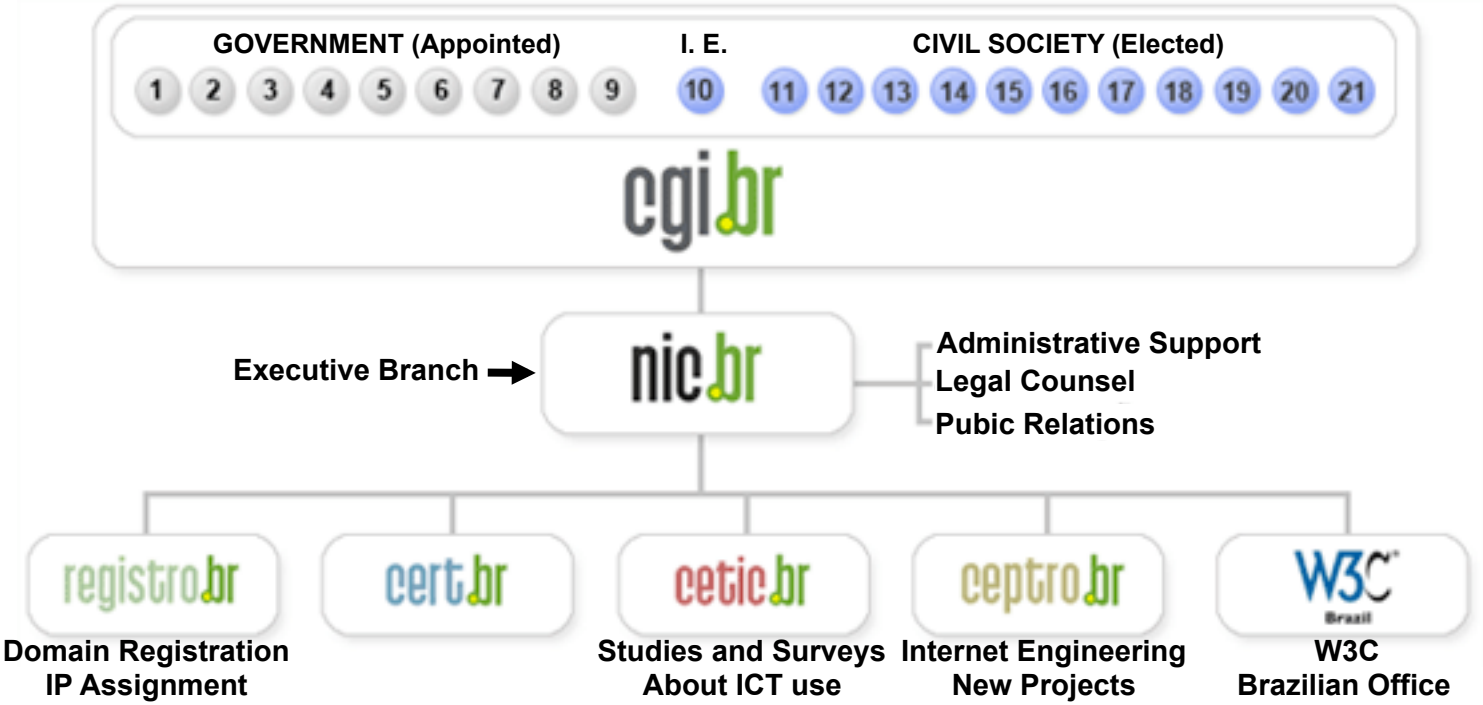
Our Parent Organization:
The Brazilian Internet Steering Committee - CGI.br

CGI.br is a multi-stakeholder organization that, among the diverse responsibilities, has the main attributions:

- to propose policies and procedures related to the regulation of Internet activities
- **to recommend standards for technical and operational procedures**
- to establish strategic directives related to the use and development of Internet in Brazil
- **to promote studies and technical standards for the network and services' security in the country**
- to coordinate the allocation of Internet addresses (IP) and the registration of domain names using <.br>
- **to collect, organize and disseminate information on Internet services, including indicators and statistics**

http://www.cgi.br/internacional/

CGI.br and NIC.br Structure



1 – Ministry of Science and Technology (Coordination)
2 – Ministry of Communications
3 – Presidential Cabinet
4 – Ministry of Defense
5 – Ministry of Development, Industry and Foreign Trade
6 – Ministry of Planning, Budget and Management
7 – National Telecommunications Agency
8 – National Council of Scientific and Technological Development
9 – National Forum of Estate Science and Technology Secretaries
10 – Internet Expert

11 – Internet Service Providers
12 – Telecommunication Infrastructure Providers
13 – Hardware and Software Industries
14 – General Business Sector Users
15 – Non-governmental Entity
16 – Non-governmental Entity
17 – Non-governmental Entity
18 – Non-governmental Entity
19 – Academia
20 – Academia
21 – Academia

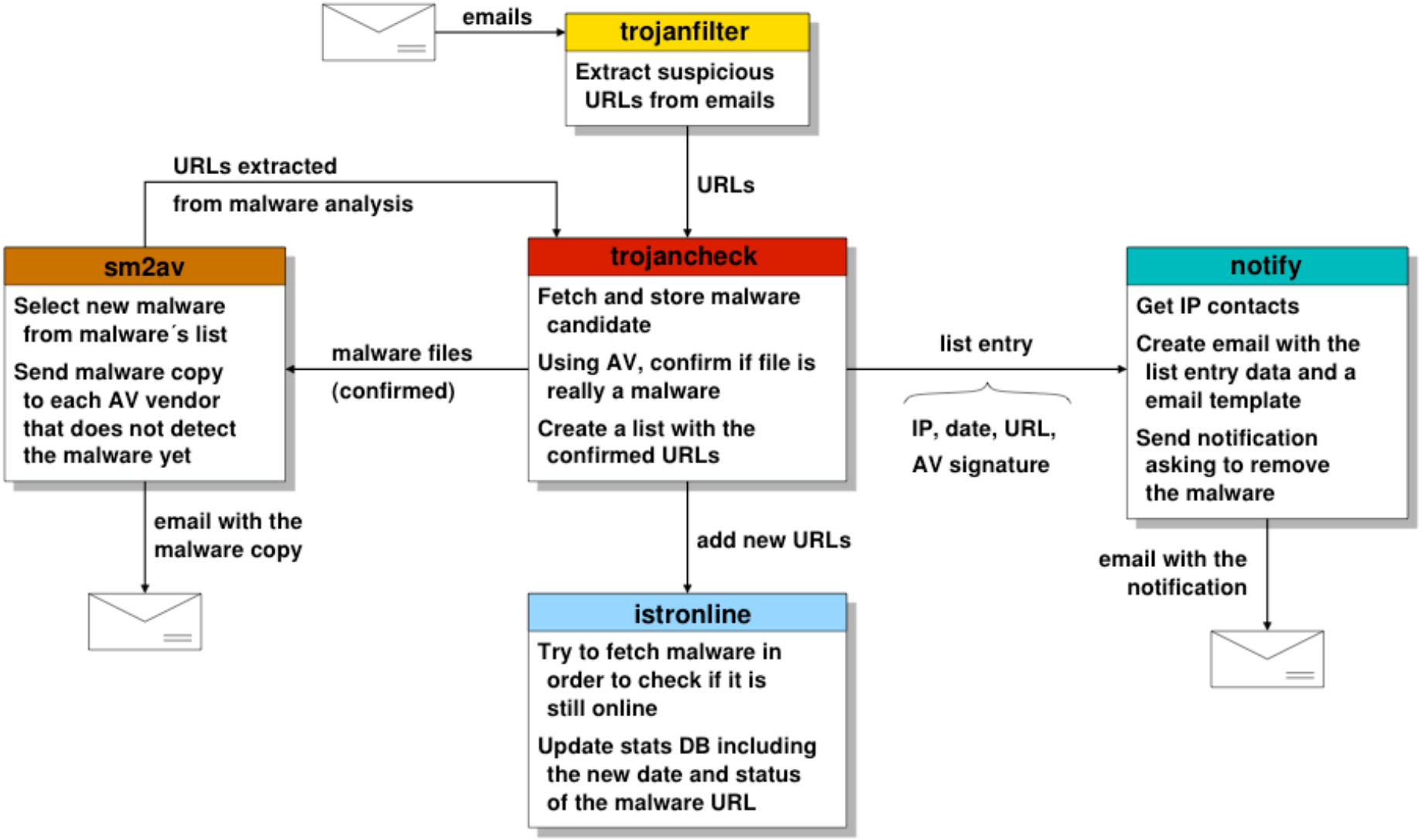
Agenda

- Overview of the financial fraud scenario
  - New malware rates
  - Antivirus detection rates
- Technical challenges
- Abuse detection and international cooperation
- User awareness initiatives

Profile of Financial Motivated Fraud in Brazil

- Since 2005 fraud enabled by spam is among the top incidents notified to CERT.br
- Most common MO
  - "Generic" spam with links to ID theft malware
    - Could be a direct link to an executable, or
    - A link to a page that redirects to a file download
      - Usually involves an obfuscated scripting code
  - Most spam is sent via abuse of 3rd party networks
    - more on this later in this presentation

Overview of the System that Processes the Malware



Phishing Related Malware: 2006–2009/Q1

Category	2006	2007	2008	2009/Q1
Unique URLs	25087	19981	17376	2695
Unique trojan samples (unique hashes)	19148	16946	14256	1858
AntiVirus signatures (unique)	1988	3032	6085	785
AntiVirus signatures (grouped by "family")	41	125	447	467
File Extensions	73	112	112	51
Domains	5587	7795	5916	1121
Unique IP Addresses	3859	4415	3921	867
IP Allocation's Country Codes	75	83	78	55
Email notifications sent by CERT.br	18839	17483	15499	2234

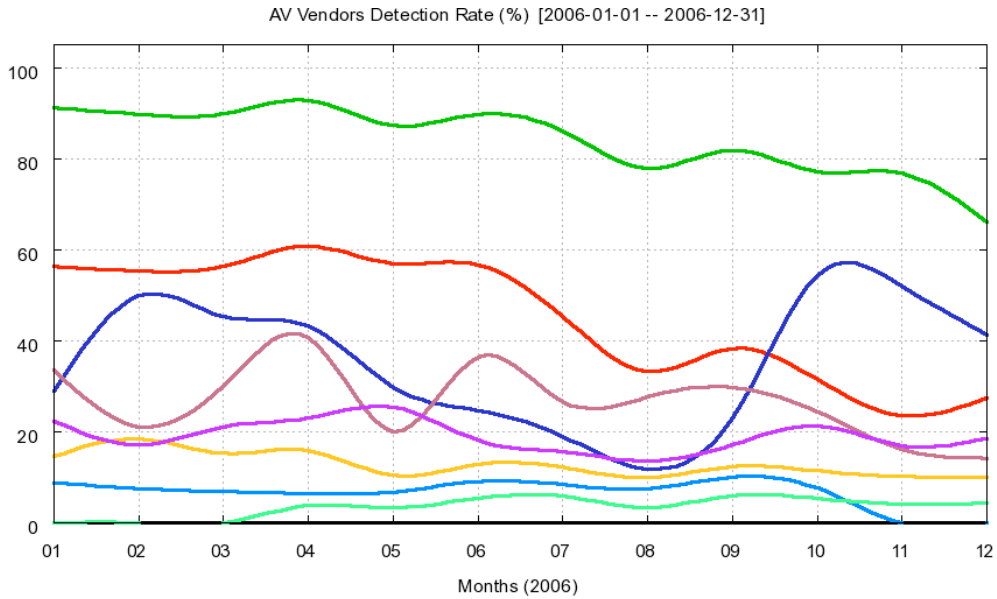
Includes:

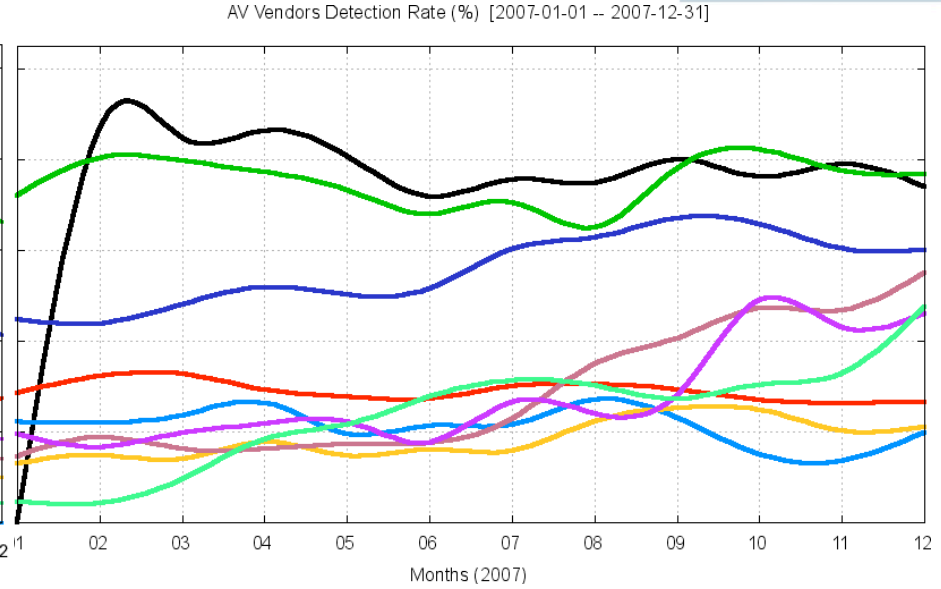
- Keyloggers
- Screen loggers
- Trojan Downloaders

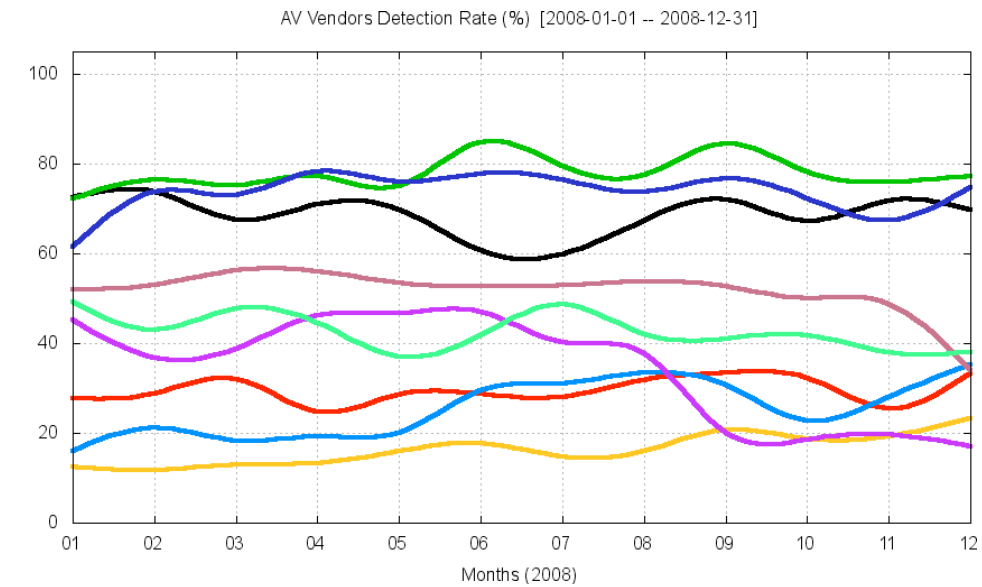
Does **NOT** include:

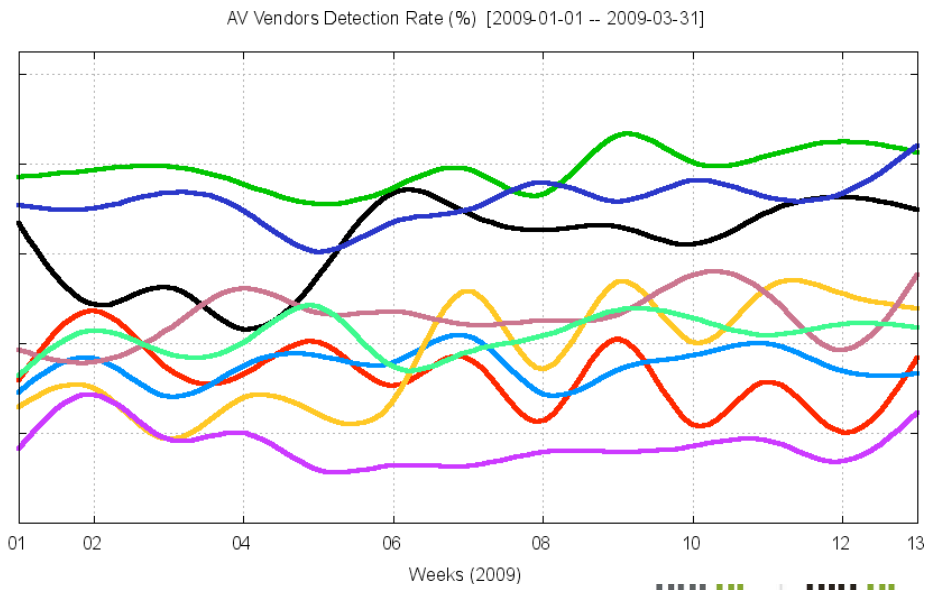
- Bots/Botnets
- Worms

2006–2009/Q1 AVs Detection Rate

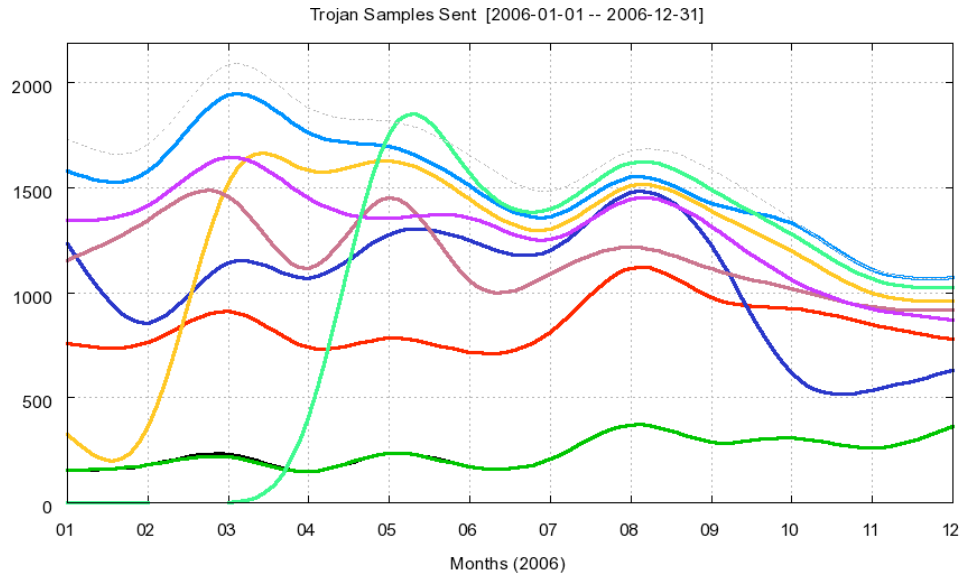


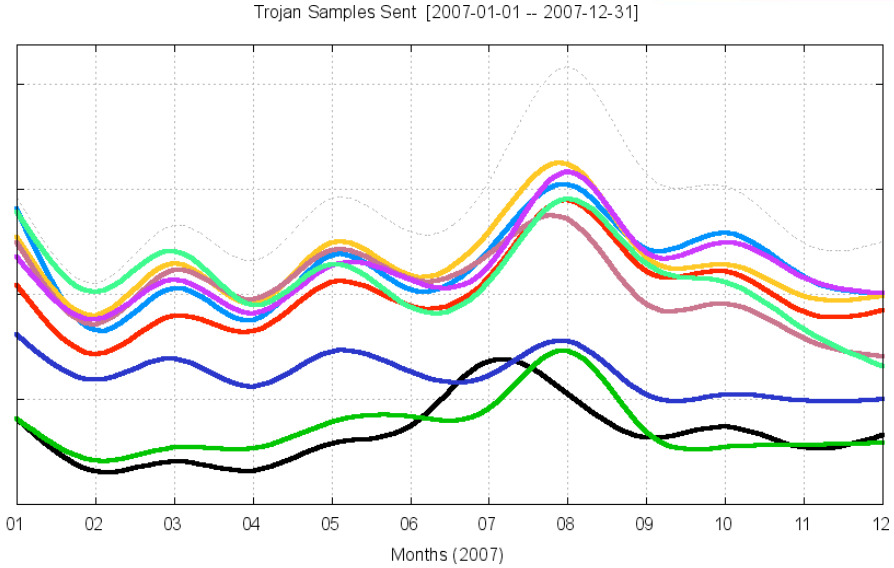


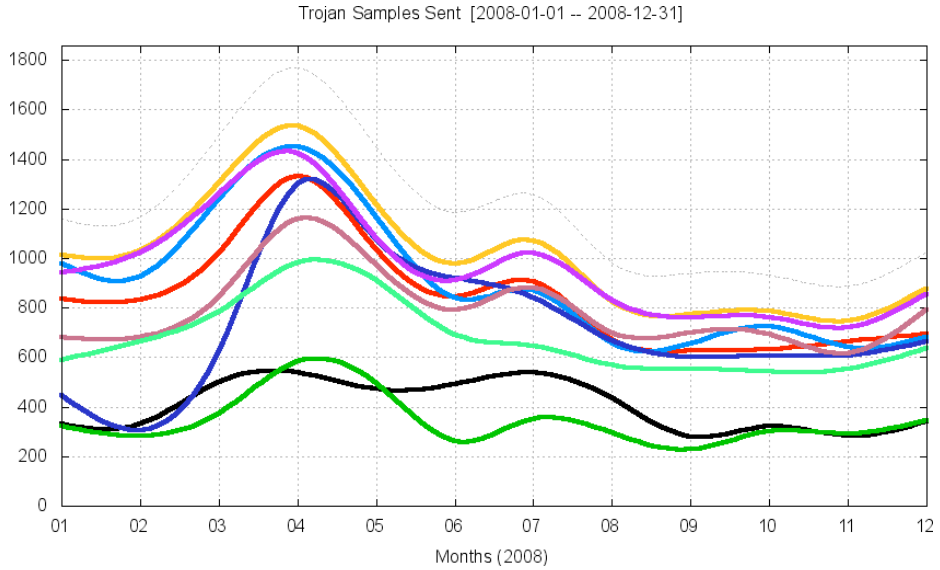


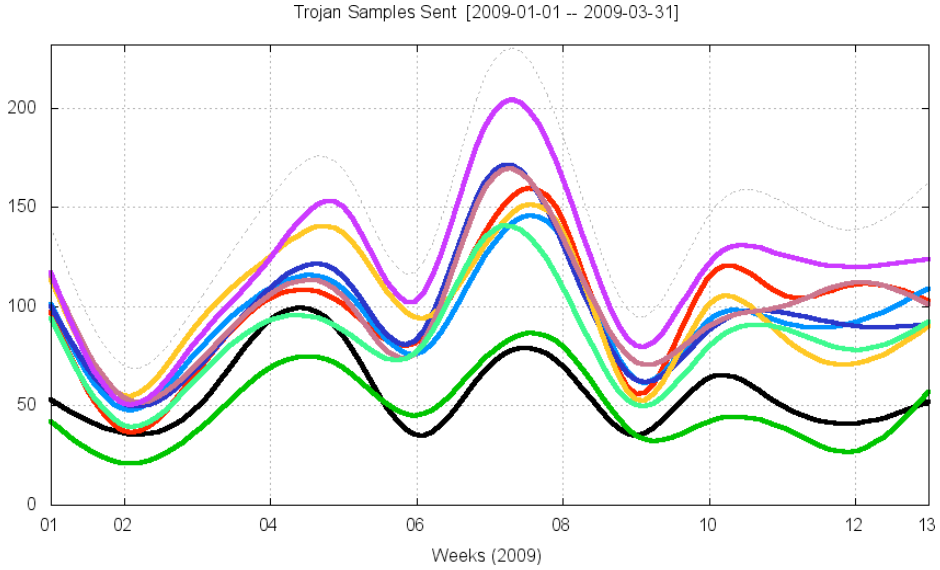


2006 – 2009/Q1 Samples Sent to AVs









Technical Challenges (1/3)

- Widespread use of obfuscation in the webpages – impact in automated detection of and response to new malware URLs
  - "Proprietary" obfuscation (e.g. xor, ceaser cipher, etc)
  - JScript.Encode

    http://en.wikipedia.org/wiki/JScript.Encode

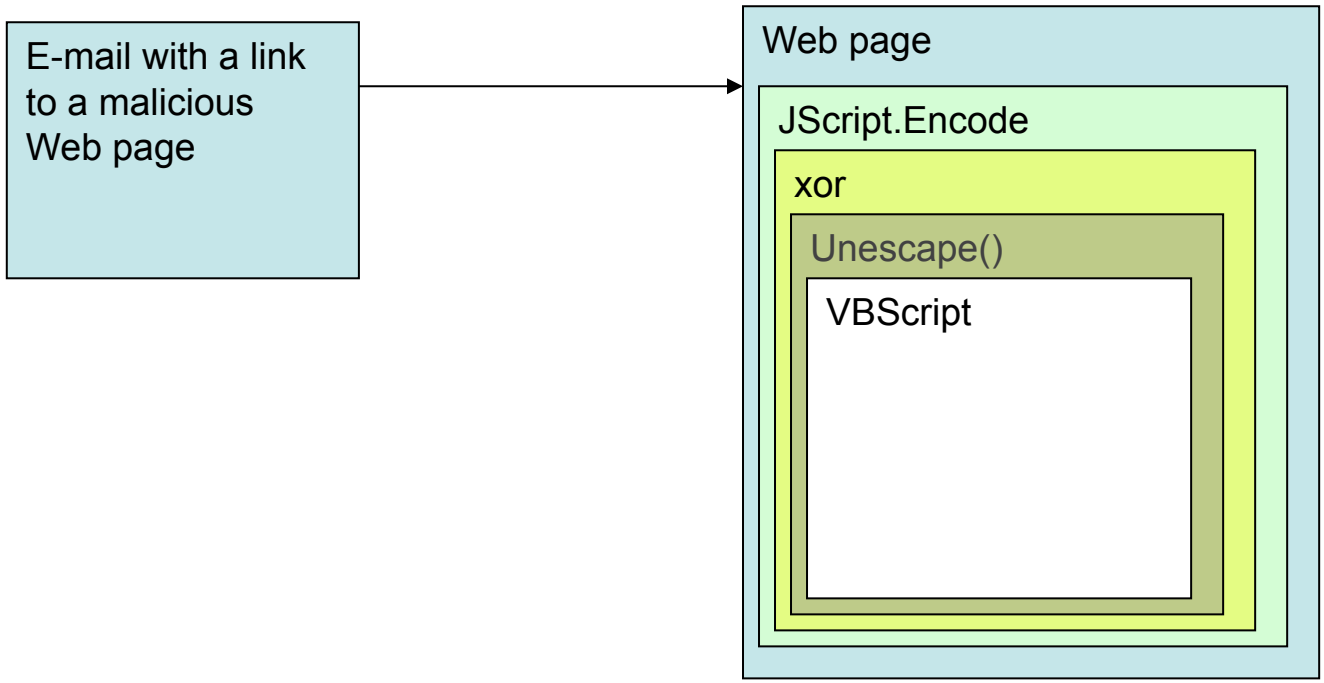
    "JScript.Encode is a method created by Microsoft used to encode both server and client-side JavaScript or VB Script source code in order to protect the source code from copying."
  - JavaScript `unescape()` function

    http://www.javascripter.net/faq/unescape.htm

```
unescape("It%27s%20me%21")
// result: "It's me!"
```

Technical Challenges (2/3)

Levels of obfuscation



Technical Challenges (3/3)

- What about links to financial fraud related malware in Social Networks' sites, instant messaging services and alike?
  - It is difficult to report
    - e-mail: just bounce or forward – it is easy to explain to the user
  - when reported, the information is usually incomplete
    - the context is important in cases the malware is encripted or not yet detected

cert.br

Understanding and Reducing the Abuse of Brazilian Broadband Networks for sending Spam: SpamPots Project

1st Phase Review

cgi.br | nic.br

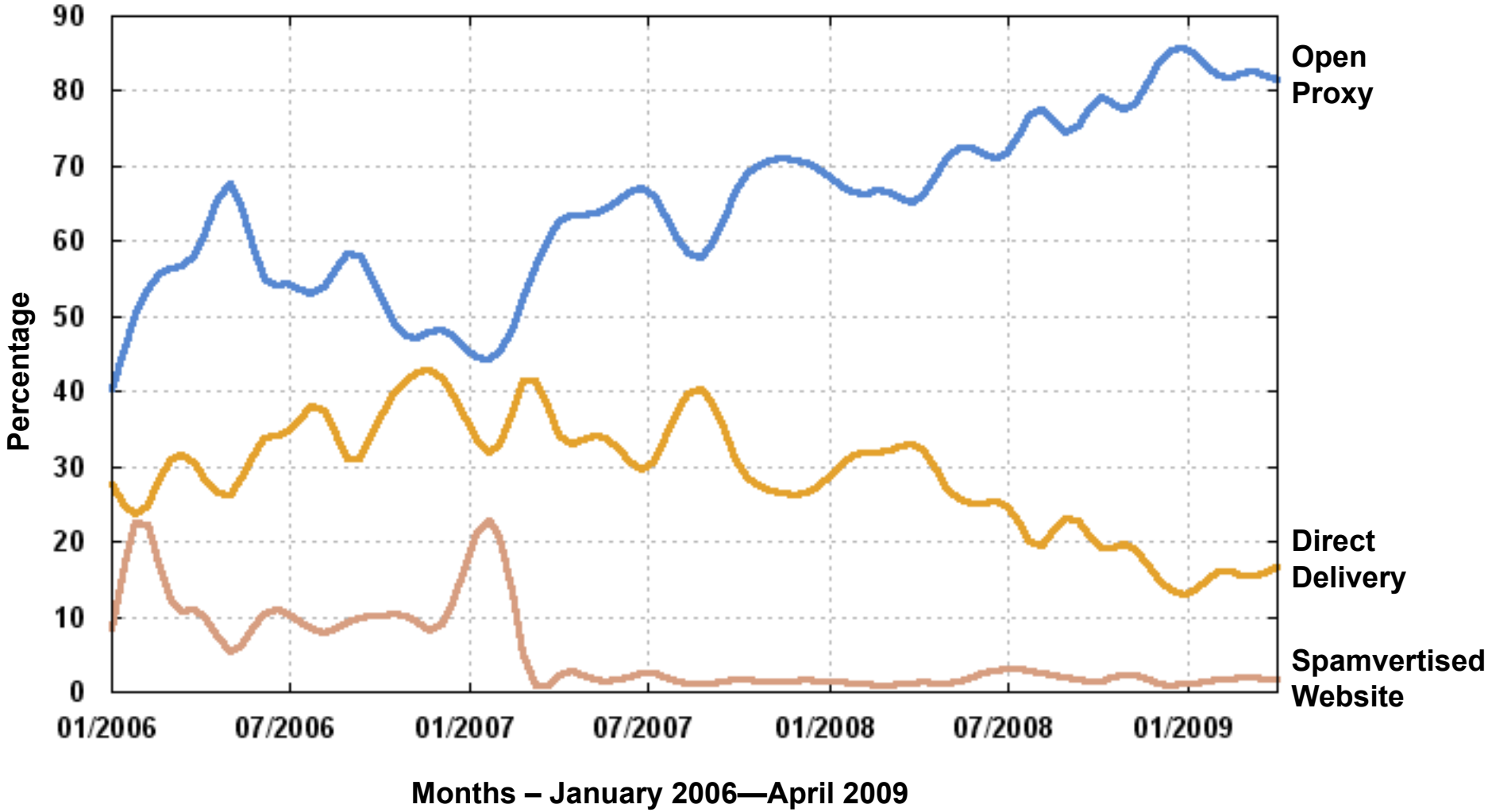
Motivation (1/2)

- Brazil is a big "source" of spam
- Scans for open proxies are always in the top 10 ports in our honeypots' network statistics

  http://www.honeypots-alliance.org.br/stats/
- Spam complaints related to open proxy abuse have increased in the past few years
- Financial fraud is still using spam

Motivation (2/2)

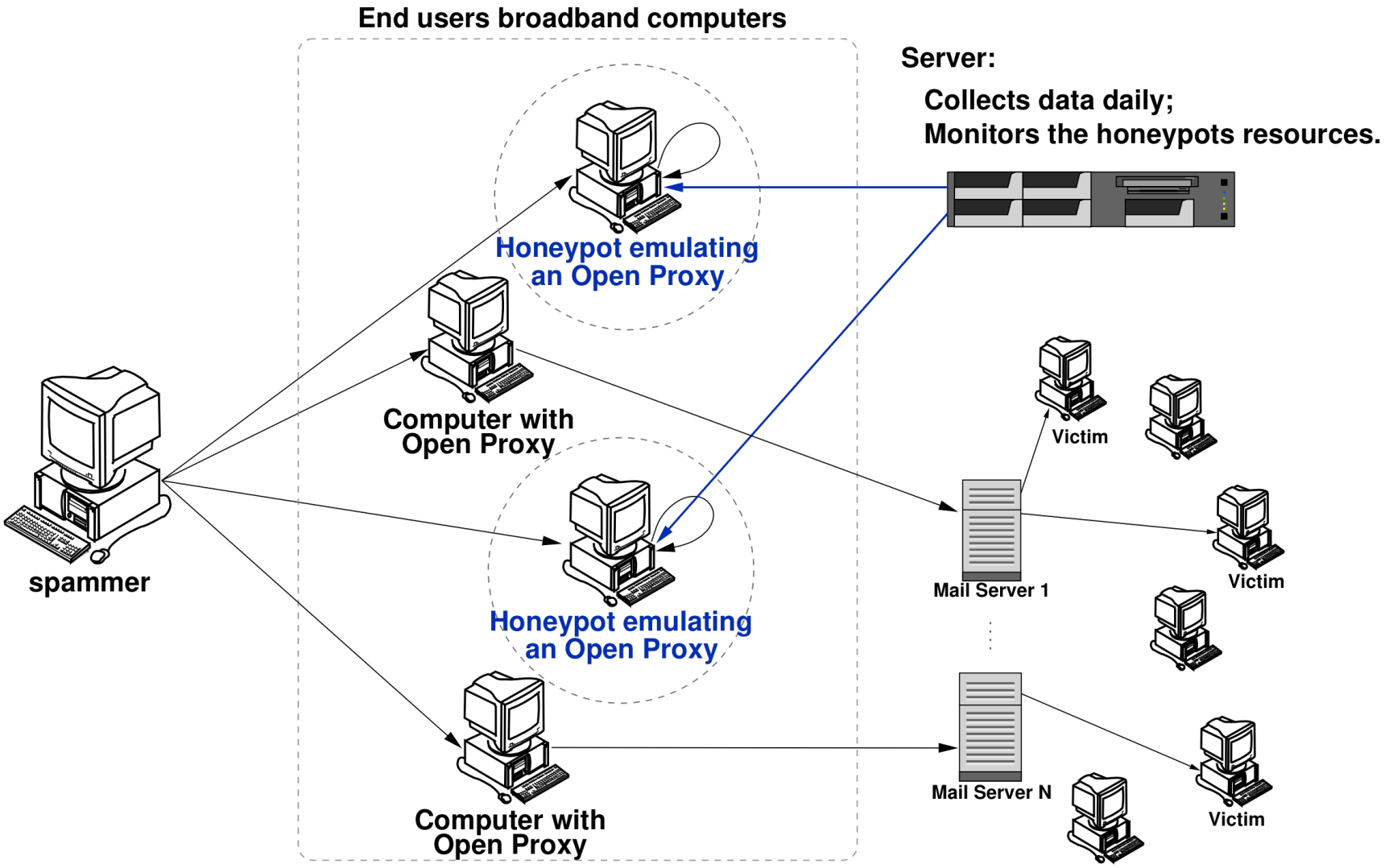
Spams Reported by SpamCop to CERT.br – Most Common Abuse



The SpamPots Project

- Main Goals
  - Have metrics about the abuse of our networks
    - Basically measure the problem from a different point of view: **abuse of infrastructure** X spams received at the destination
  - Help develop the spam characterization research
  - Measure the abuse of end-user machines to send spam
- Structure of the 1st phase
  - Deployment of 10 low-interaction honeypots, **emulating open proxy/relay services** and capturing spam
    - 5 broadband providers
    - 1 home and 1 business connection each

Location of the Sensors in the 1st Phase



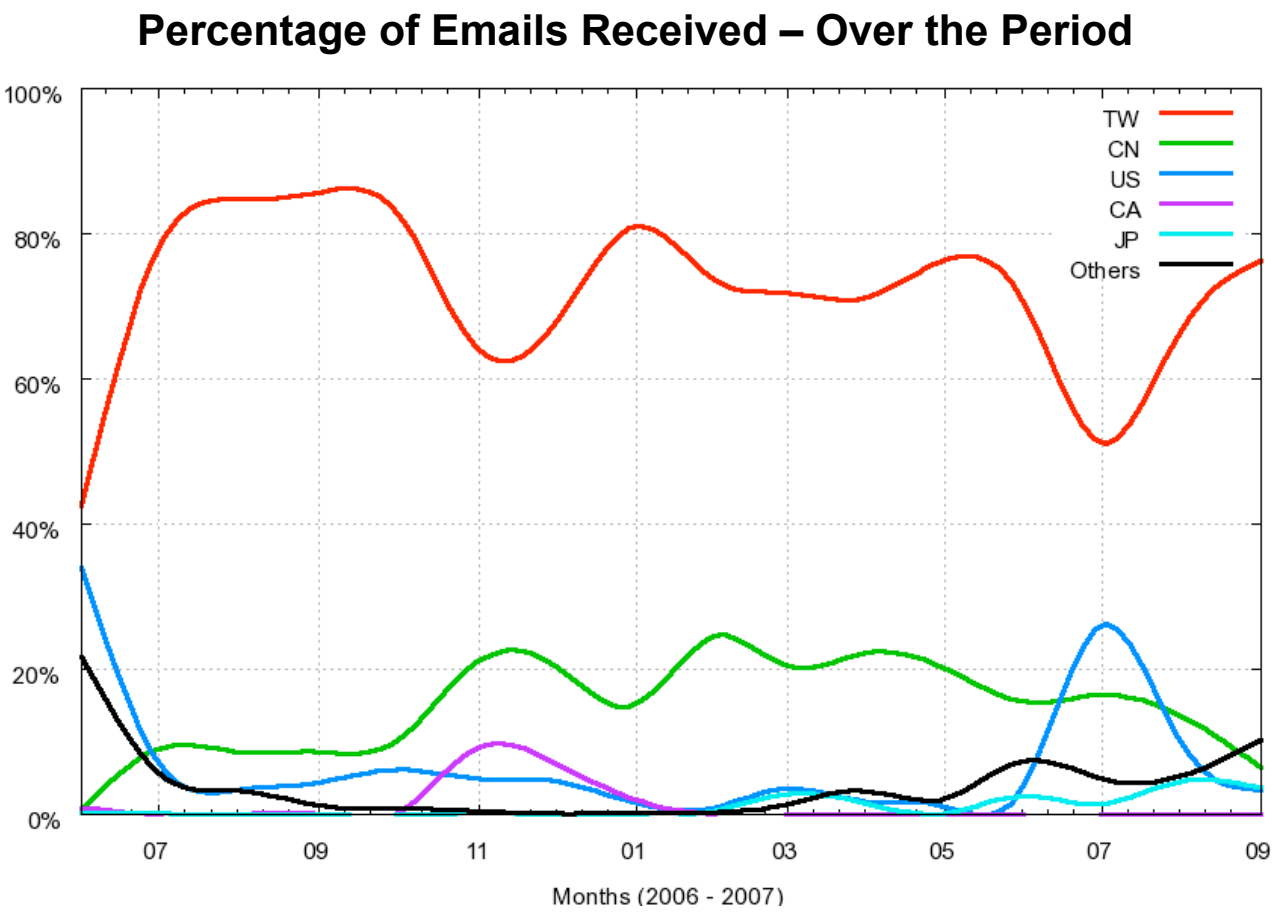
Total Data Collected in 466 Days of Operation

Data collected by 10 sensors

E-mails captured (injected):	524.585.779
Potencial recipients:	4.805.521.964
Average recipients/e-mail:	≈ 9.1
Average captured e-mails/day:	≈ 1.2 Million
Unique IPs that injected spam:	216.888
Unique Autonomous Systems (AS):	3.006
Unique Country Codes (CCs):	165

Distribution by Country Code

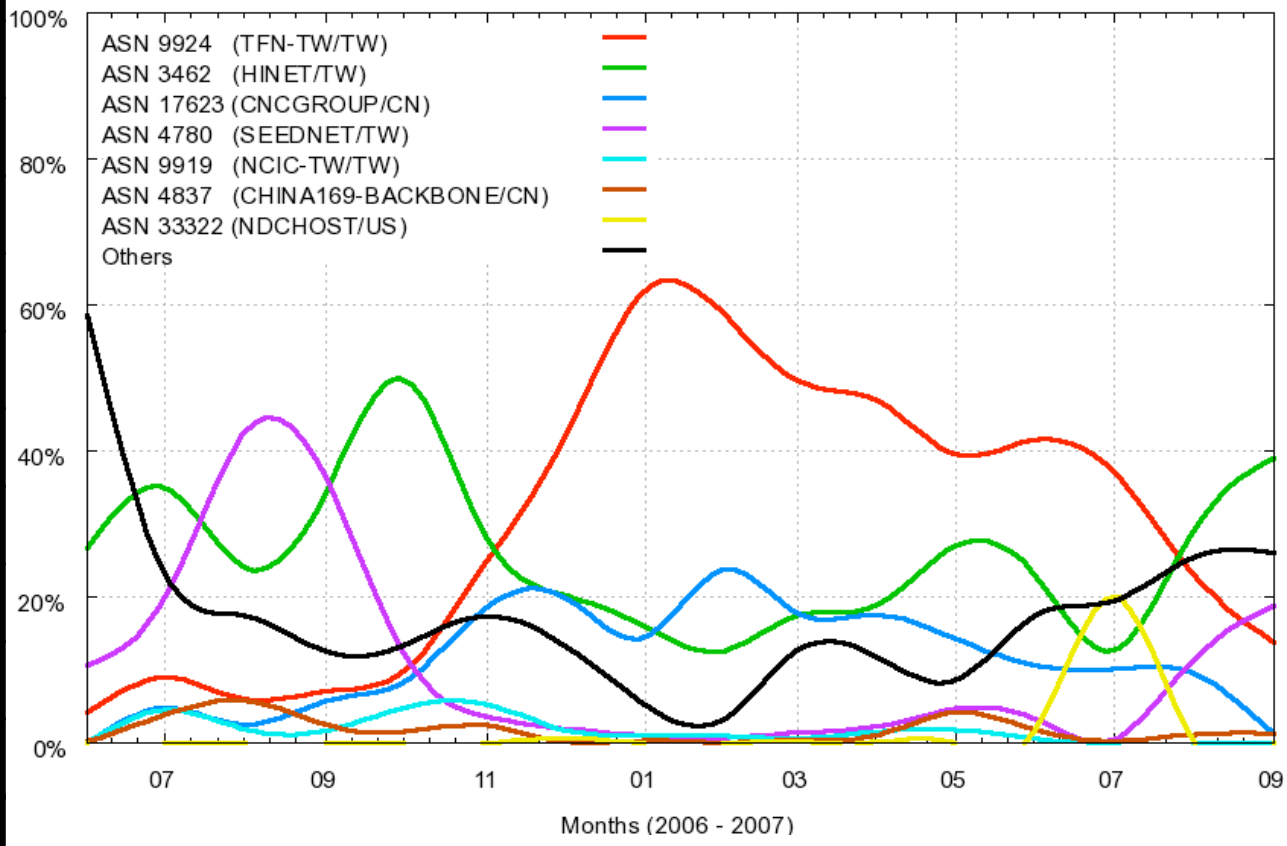
#	CC	E-mails	%
01	TW	385,189,756	73.43
02	CN	82,884,642	15.80
03	US	29,764,293	5.67
04	CA	6,684,667	1.27
05	JP	5,381,192	1.03
06	HK	4,383,999	0.84
07	KR	4,093,365	0.78
08	UA	1,806,210	0.34
09	DE	934,417	0.18
10	BR	863,657	0.16
		Subtotal:	99.50



Distribution by Autonomous System

#	AS	CC	%
01	TFN-TW	TW	32.60
02	HINET	TW	25.04
03	CNCGROUP	CN	12.43
04	SEEDNET	TW	10.38
05	NCIC-TW	TW	1.75
06	CHINA169	CN	1.72
07	NDCHOST	US	1.59
08	CHINANET	CN	1.39
09	EXTRALAN	TW	1.29
10	LOOKAS	CA	1.07
			89.26

Percentage of Emails Received – Over the Period



TCP Ports Abused Over the Period (1/2)

#	TCP Port	Protocol	Usual Service	%
01	1080	SOCKS	socks	37.31
02	8080	HTTP	alternate http	34.79
03	80	HTTP	http	10.92
04	3128	HTTP	Squid	6.17
05	8000	HTTP	alternate http	2.76
06	6588	HTTP	AnalogX	2.29
07	25	SMTP	smtp	1.46
08	4480	HTTP	Proxy+	1.38
09	3127	SOCKS	MyDoom Backdoor	1.00
10	3382	HTTP	Sobig.f Backdoor	0.96
11	81	HTTP	alternate http	0.96

Requests to the HTTP and SOCKS Modules

Number of requests received by the modules, divided according to outbound requested connection type:

HTTP		
Type	Requests	%
connect to 25/TCP	**89,496,969**	**97.62**
connect to others	106,615	0.12
get	225,802	0.25
errors	1,847,869	2.01
total	91,677,255	100.00

SOCKS		
Type	Requests	%
connect to 25/TCP	**46,776,884**	**87.31**
connect to others	1,055,081	1.97
errors	5,741,908	10,72
total	53,573,873	100.00

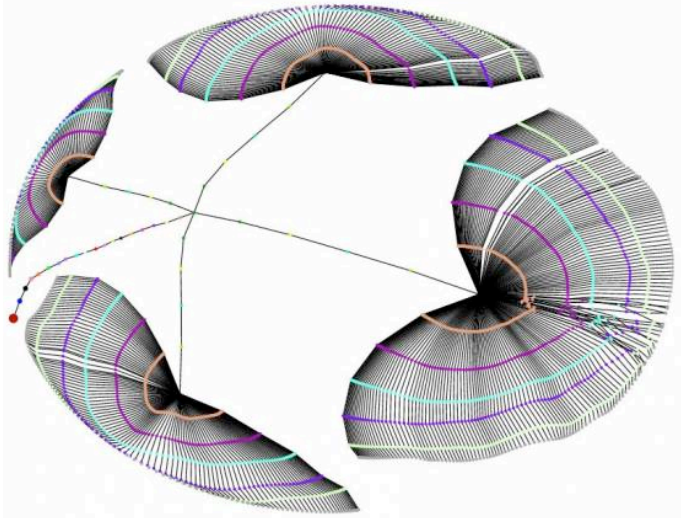
Among Other Misc Activities Observed...

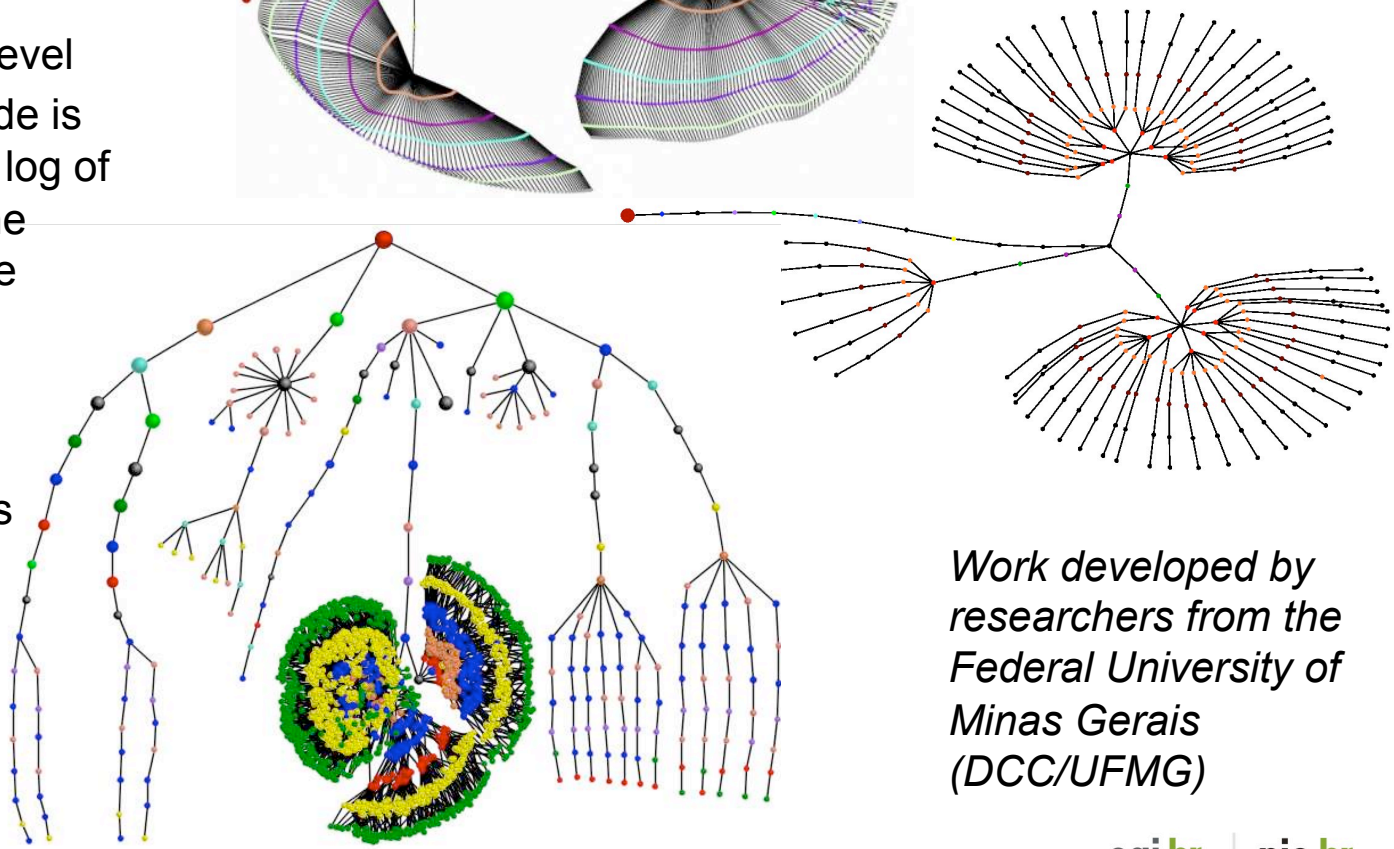
- Among the outgoing activity that was not aimed at port 25/TCP:
  - attempts to connect to Yahoo! servers using the Yahoo! Messenger Protocol, via the abuse of SOCKS proxies

Current Anti-spam Activities

Data Mining: Characterization of Spam Campaigns

- Frequent Pattern Tree showing different spam campaigns
  - node's color represents a different feature that varied among the messages at that level
  - diameter of the node is proportional to the log of the frequency of the characteristic in the campaign
- Some characteristics taken into account:
  - Common keywords
  - Message layout
  - Language
  - Encoding type
  - Similar URLs
  - Services abused



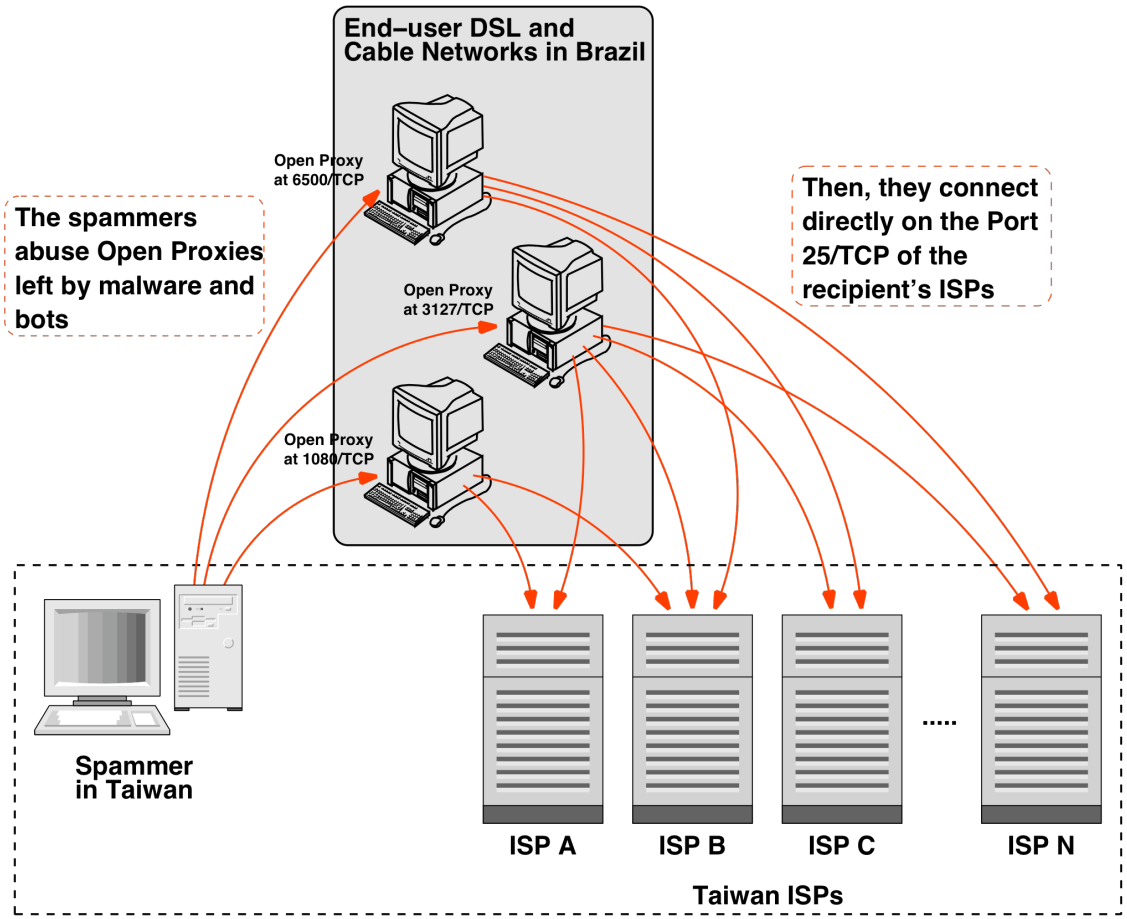


Work developed by researchers from the Federal University of Minas Gerais (DCC/UFMG)

Collaboration with TW Authorities

- MoU with TW NCC (National Communications Commission), TWCERT/CC and TWIA (Taiwan Internet Association)
  - Send data weekly about spam coming from and returning to Taiwan
  - They are identifying and shuting down spammers operations
  - We are discussing the implementation of a sensor in Taiwan

How spammers from Taiwan abuse the DSL and Cable Networks in Brazil



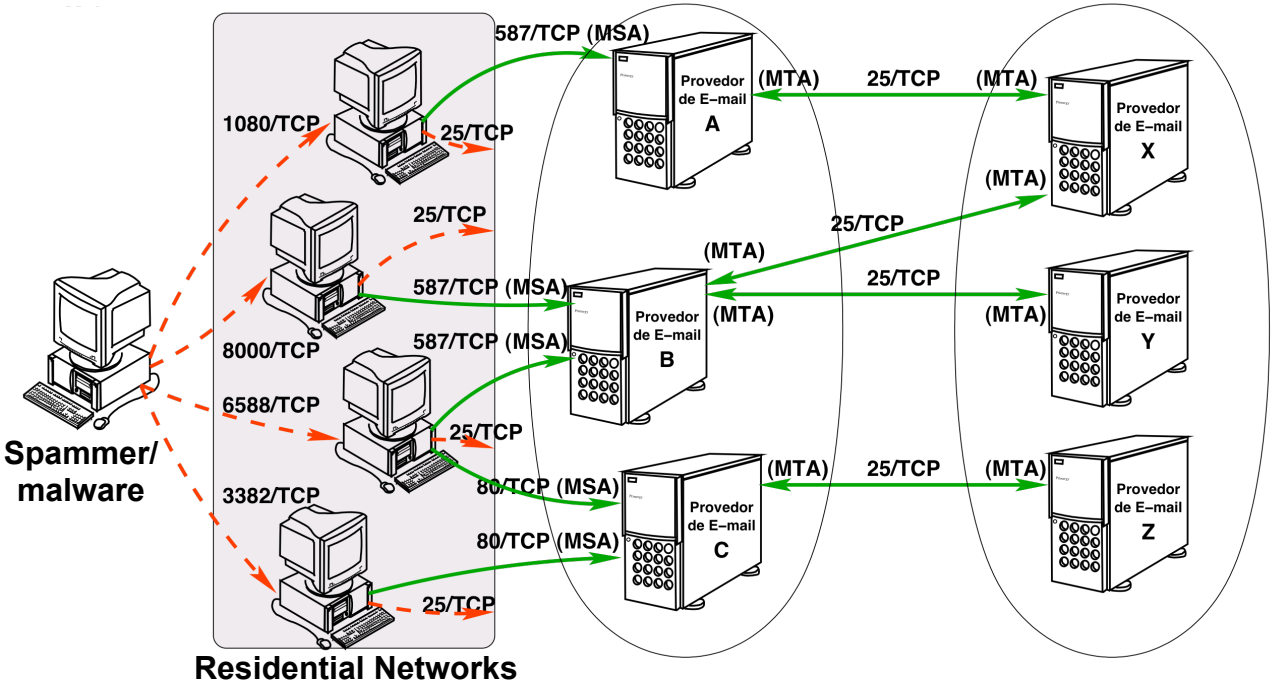
Collaboration with JP Authorities

- In the past few months the activities seen changed
  - IPs assigned to Philipines are attempting to send spam to mobile phones in Japan

- JPCERT/CC and the Japanese Embassy in Brazil contacted us regarding "spam coming from Brazil"
  - the data being collected at the active sensors is being sent to them so they can pursue their investigations
  - They are sharing a case study on the success of Port 25 Management adoption in Japan, regarding the abuse of Japanese networks for sending spam

Port 25 Management Adoption Task Force

- The scenario in Brazil is very unique: regulation split the services between:
  - broadband provider – provides conectivity and IP address (responsible for network services, filters, etc)
  - ISP – authenticate the user and provide services like e-mail, web, etc
- The adoption of port 25 management need to be articulated among competing sectors



Deployment of spampots' sensors worldwide

- Global view of the data
- Help other networks to understand and prevent being abused by spammers
- Better understand the abuse of the Internet infrastructure by spammers
- Use the spam collected to improve antispam filters
- Develop better ways to
  - identify phishing and malware
  - identify botnets via the abuse of open proxies and relays
- Provide data to trusted parties
  - help the constituency to identify infected machines
  - identify malware and scams targeting their constituency

We are Looking for Partners Interested in...

- Receiving data
  - spams, URLs, IPs abusing the sensors, etc
- Hosting a sensor
- Helping to improve the technology
  - Analysis, capture, collection, correlation with other data sources, etc
- All partners will have access to all data if they want
- We are currently working with networks in the following countries/economies: AU, UY, PL, TW, HK and JP.

User Awareness

Antispam.br Website - Malicious Code Through E-mail

Antispam.br ::

http://www.antispam.br/tipos/malware/

Comitê Gestor da Internet no Brasil

Sobre o NIC.br | Indicadores | Antispam.br | PTT.br

nic.br — Núcleo de Informação e Coordenação

cgi.br — Registro CERT.br

Início - Administradores de redes - Estatísticas - Sobre o Antispam.br

antispam.br

- O que é spam?
- Problemas causados pelo spam
- Origem e curiosidades
- Tipos de spam
- Como identificar
- Prevenção
- Boas práticas
- Dicas
- Como reclamar
- FAQ
- Links
- Glossário
- Créditos
- Mapa do site

Busca

ok

NIC.br Antispam.br CERT.br Registro.br

Tipos de spam

Voltar

Códigos maliciosos

São programas que executam ações maliciosas em um computador. Diversos tipos de códigos maliciosos são inseridos em *e-mails*, contendo textos que se valem de métodos de engenharia social para convencer o usuário a executar o código malicioso em anexo. Em geral, estes códigos também são utilizados em **spams enviados por fraudadores**.

Dentre os códigos mais comuns enviados via spam, pode-se citar as seguintes categorias:

- **Backdoor:** Programa que permite a um invasor retornar a um computador comprometido. Normalmente este programa é colocado de forma a não ser notado.
- **Spyware:** Termo utilizado para se referir a uma grande categoria de software que tem o objetivo de monitorar atividades de um sistema e enviar as informações coletadas para terceiros. Podem ser utilizados de forma legítima, mas, na maioria das vezes, são utilizados de forma dissimulada, não autorizada e maliciosa.
- **Keylogger:** Programa capaz de capturar e armazenar as teclas digitadas pelo usuário no teclado de um computador. Normalmente, a ativação do keylogger é condicionada a uma ação prévia do usuário, como por exemplo, após o acesso a um site de comércio eletrônico ou Internet Banking, para a captura de senhas bancárias ou números de cartões de crédito.
- **Screenlogger:** Forma avançada de keylogger, capaz de armazenar a posição do cursor e a tela apresentada no monitor, nos momentos em que o mouse é clicado, ou armazenar a região que circunda a posição onde o mouse é clicado.
- **Cavalo de tróia:** Programa, normalmente recebido como um "presente" (por exemplo, cartão virtual, álbum de fotos, protetor de tela, jogo, etc), que além de executar funções para as quais foi aparentemente projetado, também executa outras funções normalmente maliciosas e sem o conhecimento do usuário.

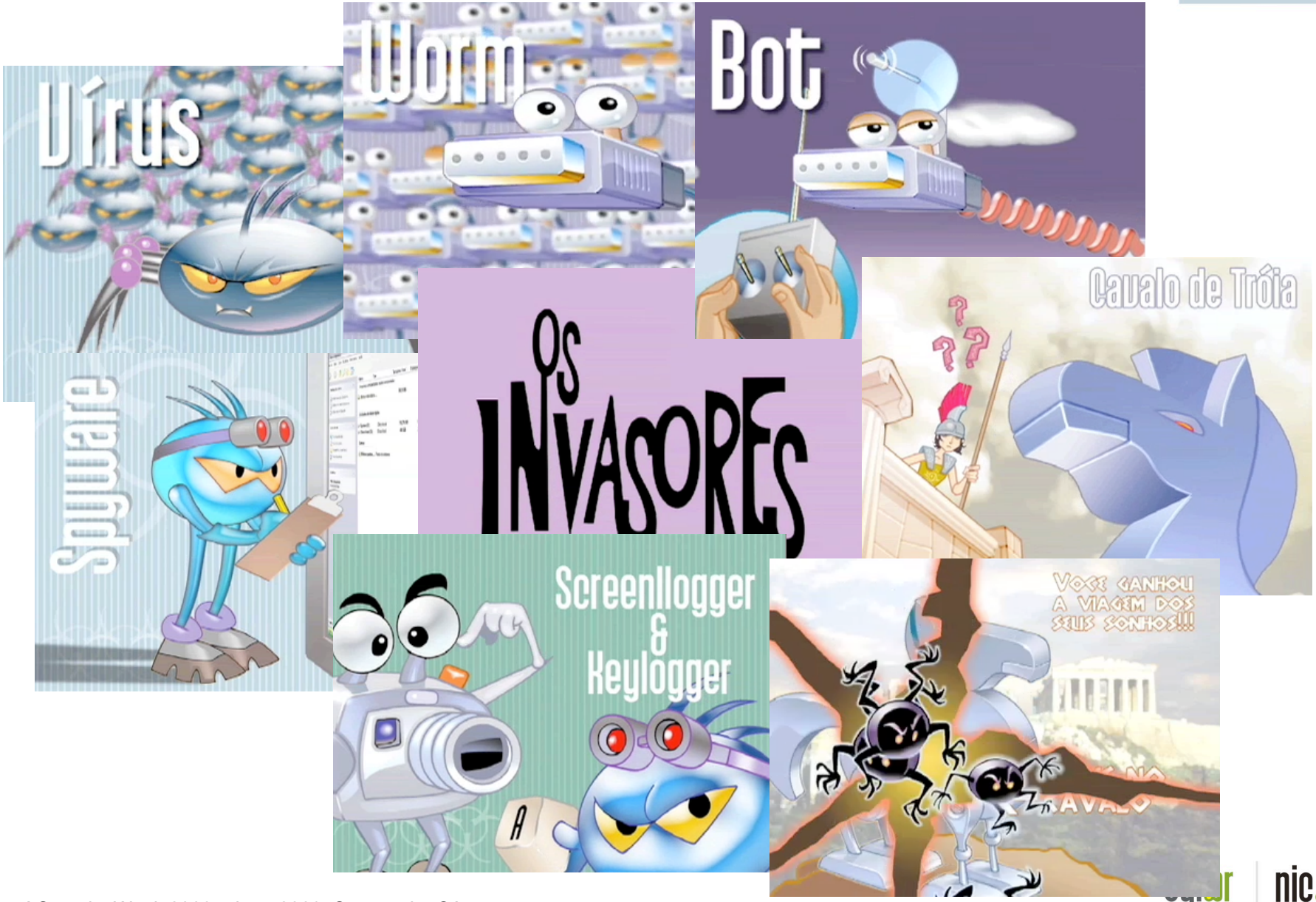
Antispam.br Website - Fraud, Phishing, Scam, etc

Cartoons

- 4 videos – ≈ 4 minutes each
  - The Internet
  - The Intruders
  - Spam
  - The Defense
  - Freely available on the Internet
  - In several formats and resolutions
- English version (subtitles) already available: **http://www.antispam.br/videos/english/**
- English (voice-over and written texts) to be released very soon
- Q-CERT interested in making an Arabic voice-over

Video 1: The Internet

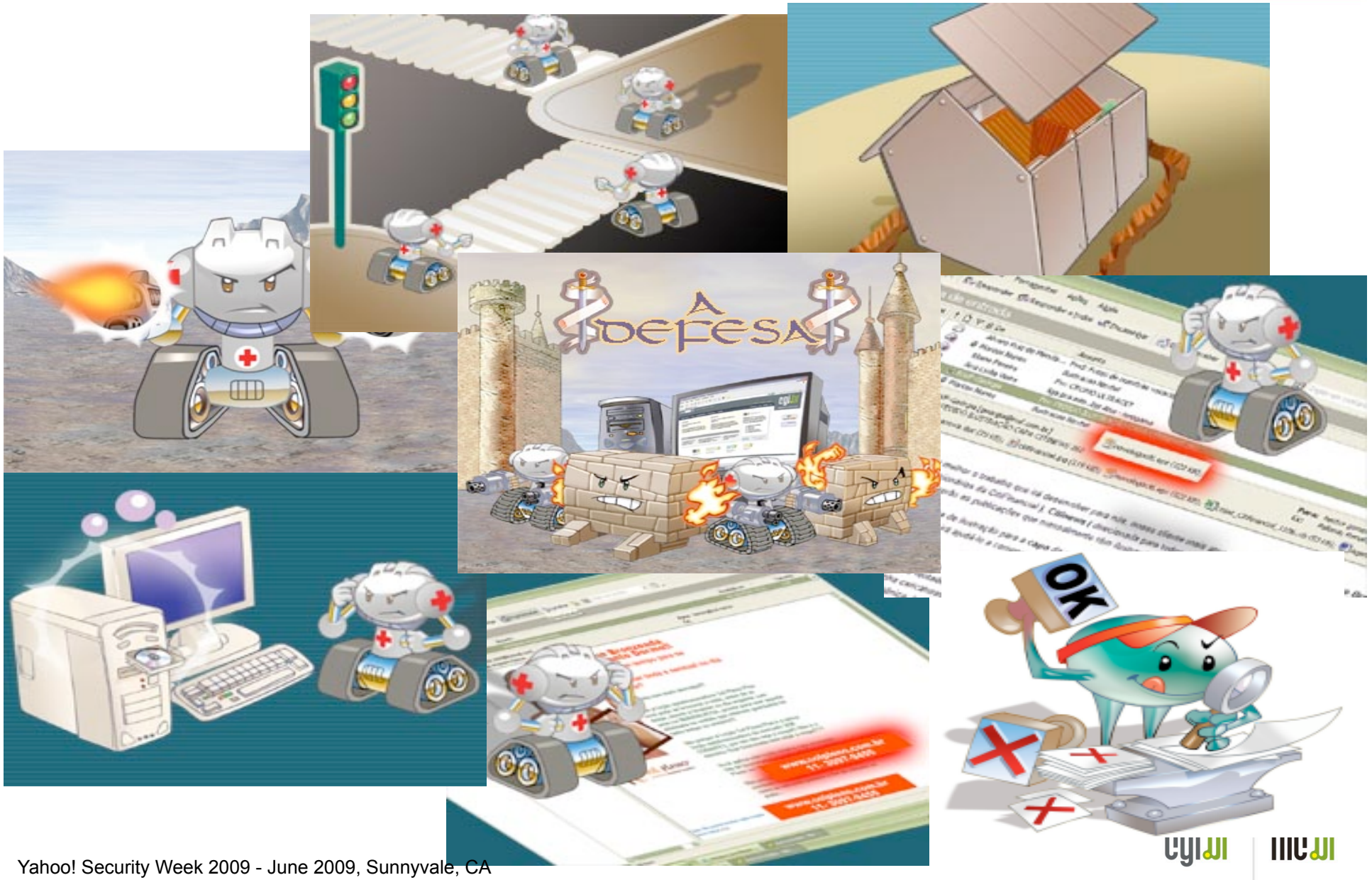
Video 2: The Intruders



Video 3: Spam


SPAM
SPIT
OU
SPIM
Spaum (online)
Localizar um contato...
Você tem 5 solicitações....
Oscar- Freelas para redator....
Robert- La donna é mobile...
Rodrigon-

Video 4: The Defense



Stickers with the Characters

Additional References

- This presentation (next week)
  http://www.cert.br/docs/presentations/
- CERT.br
  Computer Emergency Response Team Brazil
  http://www.cert.br/

- Contact information:

  Cristine Hoepers <cristine@cert.br>