

Information Security's Third Wave

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Overview

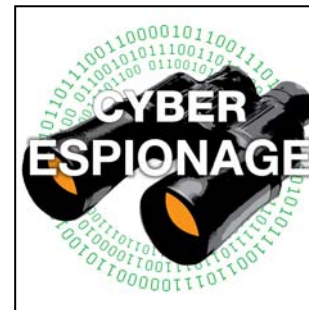
- + Cyber security will never be the same...
- + Theories of Cyber War and its Problems
- + Cyberwarfare in Practice: Russia, Estonia, and Georgia
- + Regional Trends
- + Conclusions

2008: Tipping Point



“Little changes can have big effects; when small numbers of people start behaving differently, that behavior can ripple outward until a critical mass or ‘tipping point’ is reached, changing the world.”

Malcom Gladwell's "Tipping Point"



Strategic Hacking: A New Era

- + Cyber security is now in the top 5 national security priorities of most great powers and many middle powers
- + Defense is not enough; major players are developing the offense
- + Private sector defense contractors are going on the offensive; underground elements are often employed as well
- + Everyone is attacking everyone else, even allies vs. allies
- + 2 likely scenarios: chaos or severe restriction

Everyone Attacks Everyone Else

- + UK Army Intelligence Report (*Daily Telegraph*; February 8, 2009)
 - “Security sources have revealed that the list of foreign agencies operating within the UK includes **Iran, Syria, North Korea and Serbia...**”
 - “...and some members of the European Union, such as **France and Germany**”
- + Germany: penetrated over 30 nations’ government systems by 2009
 - Source: *Der Spiegel*, March, 2009
- + Israel vs. Most of the Middle East
- + Fatah vs. Hamas
- + China
 - NOT just the official level
 - Chinese amateur crackers attack official systems and defense contractors
 - Foreign governments and private contractors fight back
- + Russia attacks everyone...no surprise
- + Myanmar (seriously, MYANMAR!!)
 - 2007 attacks against Irrawaddy.com
 - Using Russian criminal malware

Offense Becomes More Attractive

- + All of the major US Defense Contractors are developing defensive and offensive “cyber solutions” offerings
- + "One of the reasons we're looking at a Cyber Command is to unify all aspects of cyber defense, so that you don't separate out offense, defense, intelligence, so that all of the various aspects work together," (Dep. Secretary of Defense William Lynn, *VoA News*, June 15, 2009)
- + The UK's GCHQ is looking for “naughty boys” to conduct offensive (and defensive) operations (Lord West, in *The Register*, June 29, 2009)

Emerging Models of Cyber Conflict

- + Centralized Model:
 - Authorized institutions
 - Working in secret
 - Big budgets

- + Decentralized Model
 - Uses Underground
 - Working with “open secrets”
 - Lower budgets

- + Internally Focused
 - Highly Defensive
 - Highly Restrictive

- + In Reality: most are hybrids

Regional Trends - Russia



Justified Self Assertion

New Nationalism

Cyber War / Hactavism is a Reality

Cyber Crime

2008: Cyber War Becomes Reality



Increasing Nationalism

Cyber Criminals = Strategic Asset

The state wields cyber attack expertise for domestic and international advantage

Political Dispute with Russia? – Expect Cyber Harassment

Regional Trends - China

Cyber Espionage

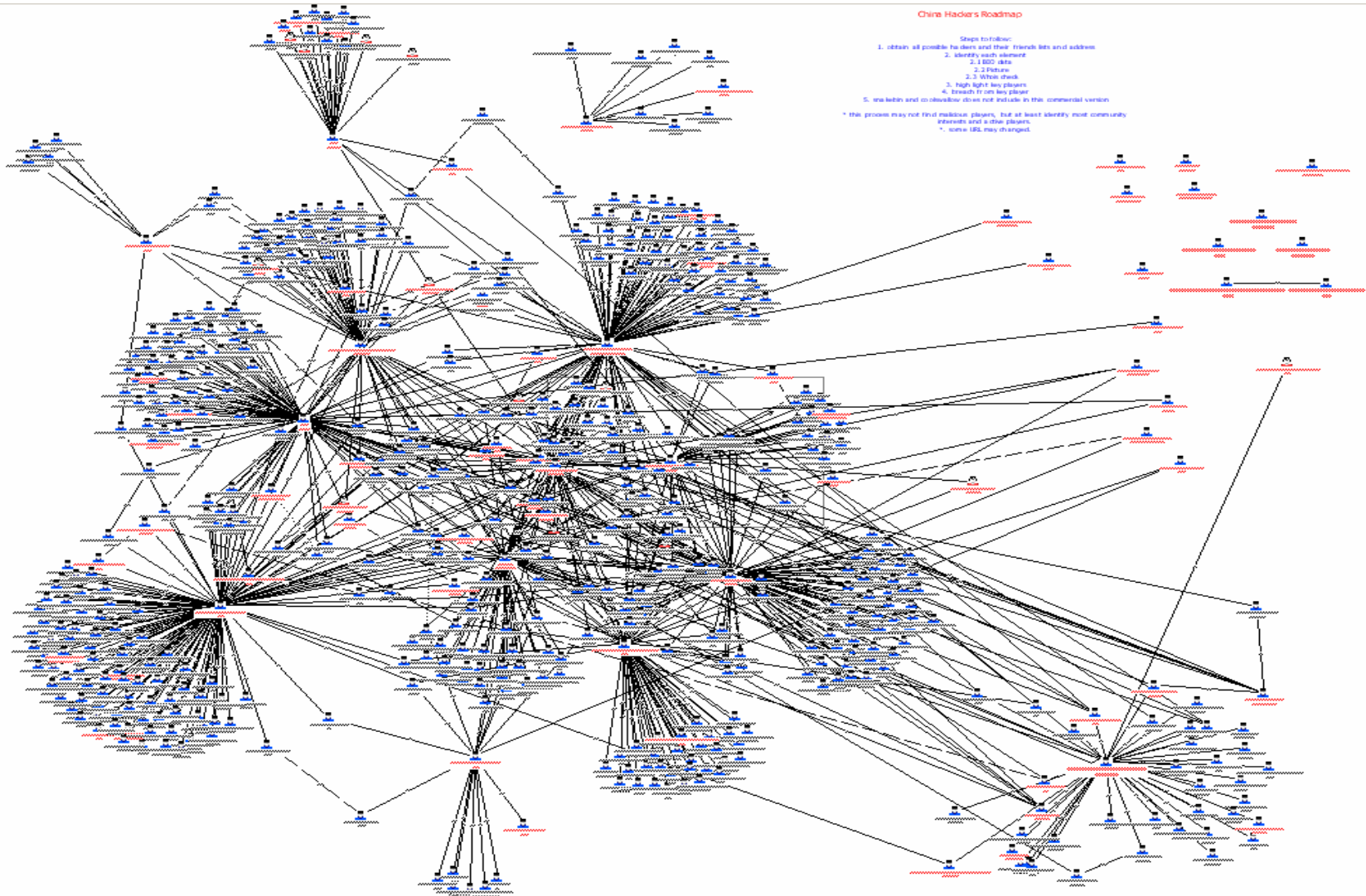
Cyber Crime

Cyber Sabotage

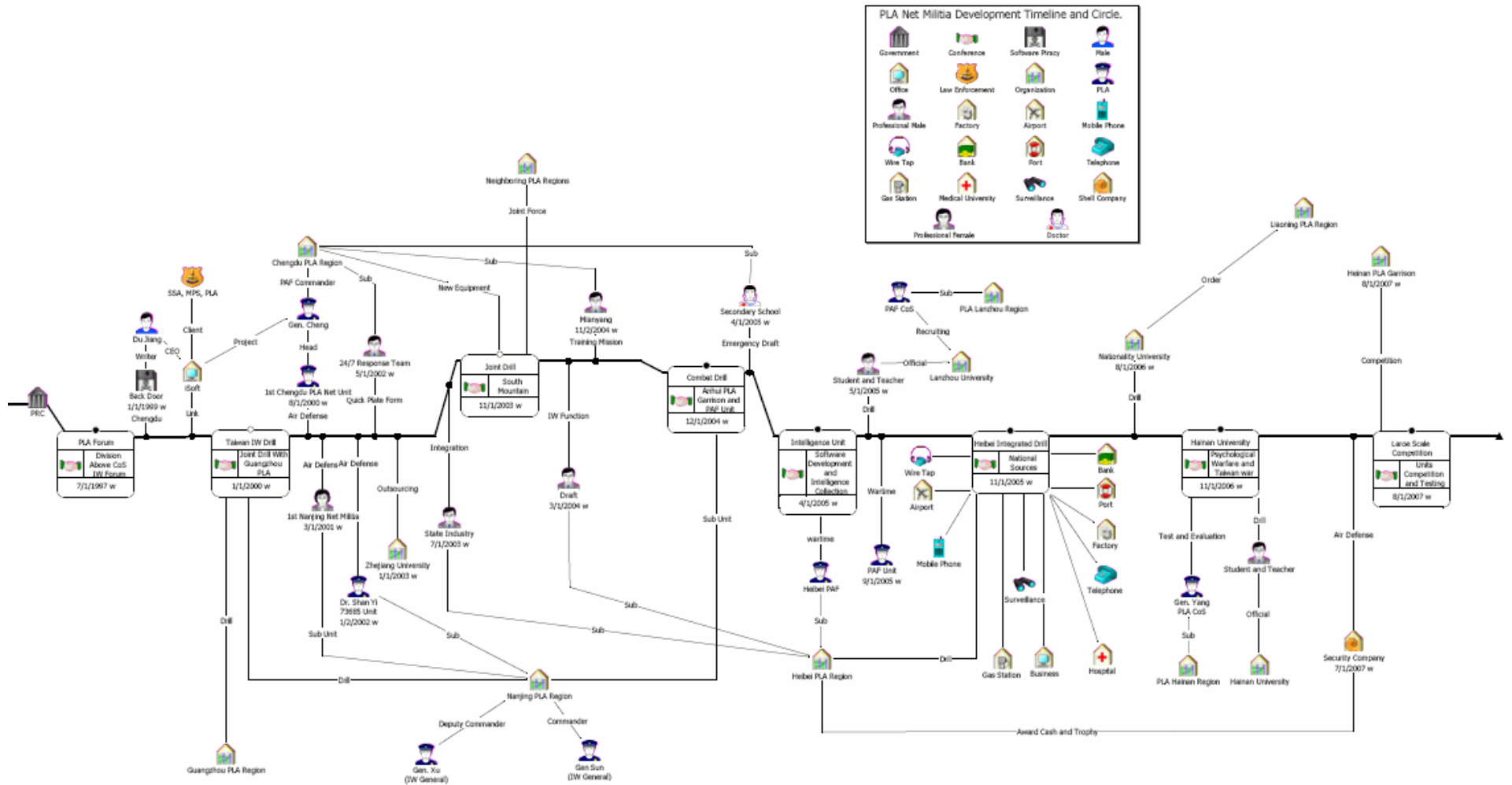
Cyber Militias



Structure of Chinese Underground



China: Net Militias



China's Net Militias



China's Dirty Secrets

- + They are just as vulnerable as everyone else...in some ways, more so.
- + Chinese vs. Chinese attacks are rampant, almost as common as external attacks
 - Rival data centers
 - Rival departments within *the same company*
- + Corruption makes many organizations more vulnerable...
- + “The state” is not a monolith...there are rivalries within

Regional Trends – Greater Middle East



Secular Hacking

Ideological Hacking

Religiously Motivated Hacking

Fatwa Justification

Contracted Hacking

2008 Headlines: Middle East Fatwas Justify Cyber Fraud



Sheikh Al-Tantawi

Defend Islam against Internet based defamations

Cyber fraud is legitimate fund raising

Prediction: Middle East - Threat Region - Cyber Fraud



**Al-Azhar University
Fatwa Committee**

Jihadists and Cyber Cartels: Moving Closer?

تميز شبكة البقاع الإسلامية تميز

شربيا يادنا الله

عزى رات عزى رات

حديث لوق كاستة القارم

لكرس الردة

شارك في مجلة أنصار الإسلام (.. حصاد المجاهدين ..)!

1-4 دولة العراق الإسلامية / التقرير الإخباري لبعض مناطق جانب الكرخ من ولاية بغداد

4-1 دولة العراق الإسلامية / الرد على المدعو أبو تراب الجزائري - مجلة العرب القطرية

تنظيم القاعدة ببلاد المغرب الإسلامي [مهلة أخيرة من المجاهدين للتمسا بخصوص المختطفين]

Cihaderi.net

Hayat: İman-Cihad ve Şehadettir...

PAKISTAN'DA İHRAH SAĞDIRISI: 10 ÖLÜ

Pakistan'ın kuzeybatısında bir kontrol noktasında düzenlenen ihrah saldırısında 10 belirlenene göre 10 kişinin ölküğü bildirildi.

Pakistan'ın kuzeybatısında bir kontrol noktasında düzenlenen ihrah saldırısında 10 belirlenene göre 10 kişinin ölküğü bildirildi. Askeri yetkiler, saldırının Kuzey Batı Sınır Bölgesindeki Kohat kasabasında bir askeri okuluın yakınında düzenlendiğini açıkladı.

Yetkiler, saldırı anında asker adaylarının kontrol noktasından geçmekte ölkükünü belirtti.

شبكة البقاع الإسلامية

وصايا أمير أنصار السنة (هبة شرعية) .. الوصية الثانية .. توبة من الذنوب شقطة الطويات

وصايا أمير أنصار السنة (هبة شرعية) .. الوصية الأولى .. لا عوبة لتجاهل بالتحريم

الجناب الإسلامي في العراق / الحصاد السنوي لتعليمات العسكرية لسنة 2007

27-2 مؤسسة العراق الإعلامية / حوار مجلة أنصار مع أمير الجناب الإسلامي في العراق خطه الله

يقدم

إلى أهلنا في الموصل: الصور و وصايا و أراظوا و أكتوا العدة

أبحاث في السنة الشرعية

الوسائل والوسائل

من ينادي أن قرأ جهاد حتى النصر

أردو مجلہ

اسلام اور عصر حاضر

جدید دور کے تناظر میں اسلام کو درپیش چیلنجز پرکھتے

ردیف	صفحہ	موضوع
378	42	جہاد کے لغوی اور شرعی معنی اور اور کتب جہاد کے حوالہ جات (321 تا ... آخر صفحہ)
168	20	قتل مسلم - قتل انسانیت (321 تا)
45	3	جوڈیش حملوں کے بارے میں 33 علماء کرام کا مشترکہ فتویٰ
53	6	مسلمان قیدیوں کو دشمن کے ہاتھوں سے چھڑانے کے لیے مال اور جان کی قربانی دینے کا بیان
308	28	چوہ ماہ کے دہشت گرد کا قتل (321 تا)
483	43	پر ڈنمارک والے کون ہیں؟... بڑے بڑے مکتبے... عظیم سپرور (321 تا ... آخر صفحہ)
676	35	خود کشی جہاد: ایک اور سوال (321 تا ... آخر صفحہ)
27	0	سینئر اہلکار
43	0	سعودی حکومت نے مقدس آلہ القاعدہ کو شیطانی قرار دے دیا
140	10	انگلینڈ میں بائیس جماعت کا دشمن کے بارے میں لشکر پر حملہ (321 تا)

Cyber Revolution in Iran: Ongoing

- + Government uses service deactivation and monitoring to disrupt opposition communications
- + Opposition uses DDoS attacks and twitter to spread dissident messages
- + *Pro-opposition Hacker Group “209,” Organizing and Coordinating its Hacking Campaigns through Twitter (Right)*



Regional Trends – Brazil

**2008 Proof of Concept: Hacks Change Data of
Brazilian Ministry of Natural Resources
Management**

Result: millions of Reais in illegal logging

Permissive Environment

Financially Motivated

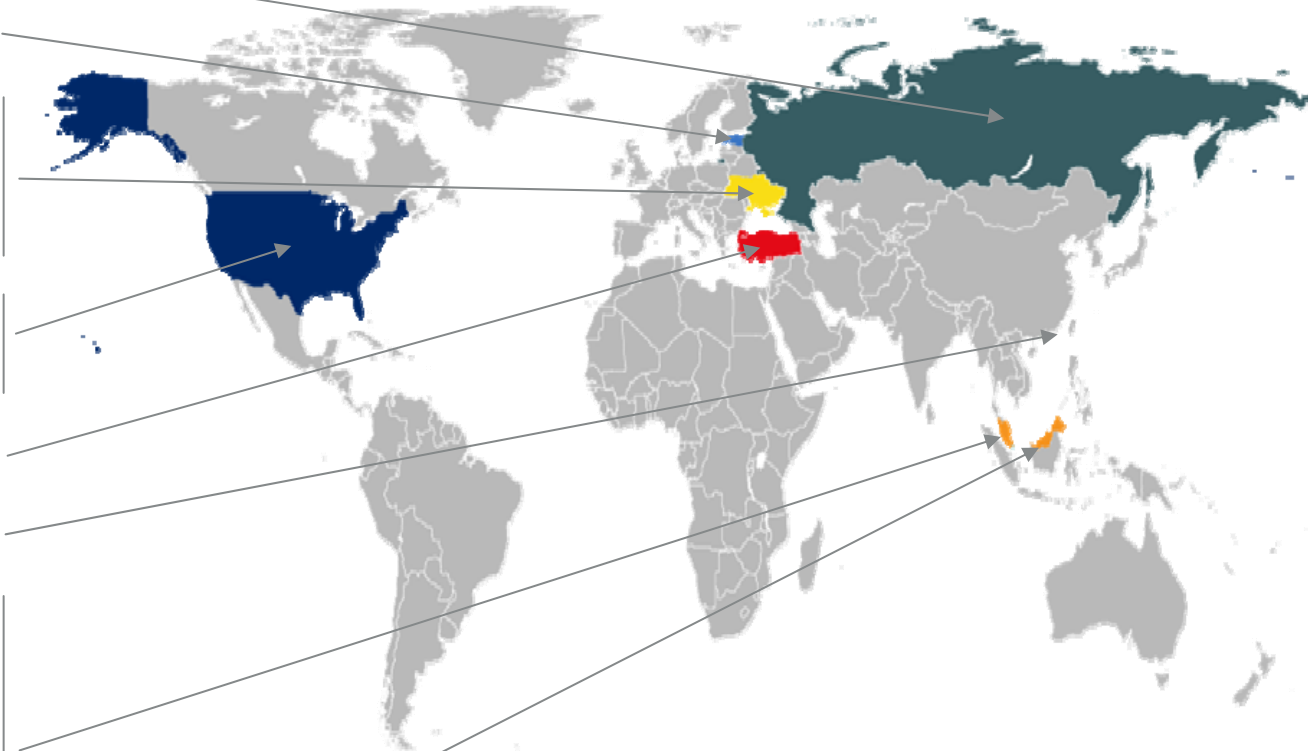
Innovative Attack Vectors



Catalyst: Bullet Proof Hosting

Provider Name	Origin
Madet Ltd.	Russia
STARLINE_EE	Estonia
UATELECOM	Ukraine
UrkTeleGroup	Ukraine
Colocall Ltd.	Ukraine
HopOne	USA
Net Access	USA
ABDAllah	Turkey
Hostfresh	Hong Kong
TIMETELECOM	Malaysia
TMNET-BORNEO	Malaysia
MALAYSIA BERHAD	Malaysia
PRIADIUS NET	Malaysia
Applied Info Mgt	Malaysia
Starhub Internet	Singapore

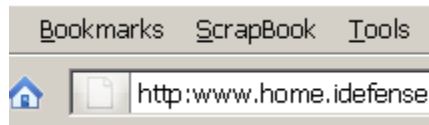
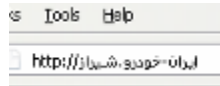
Published in 2002



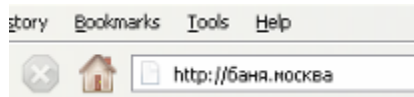
Press Exposure Kills: RBN, McColo, Intercage

Disruptor/Catalyst: Splintered Internet

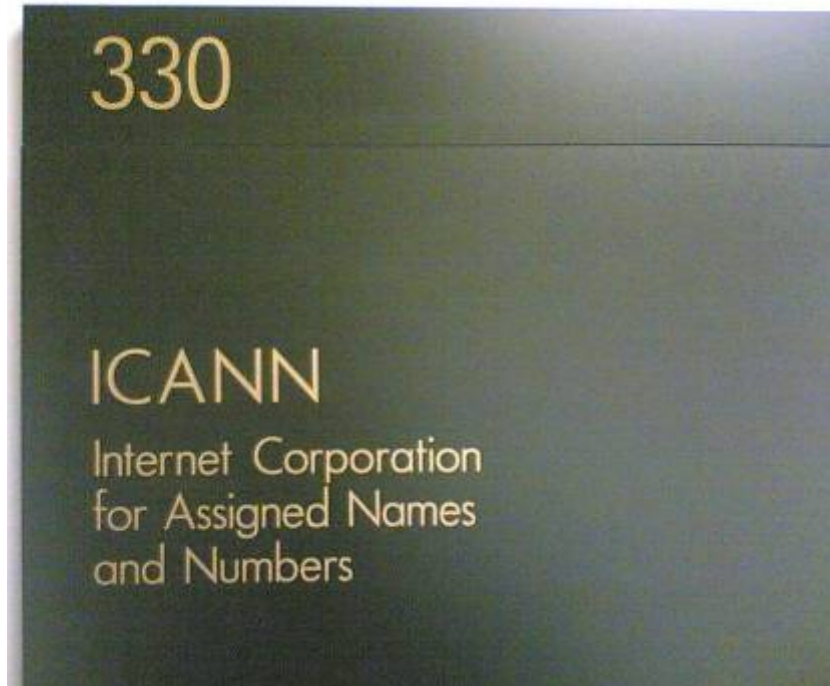
Farsi



Russian



Top Level Domains

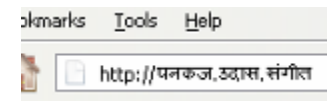


International Domains

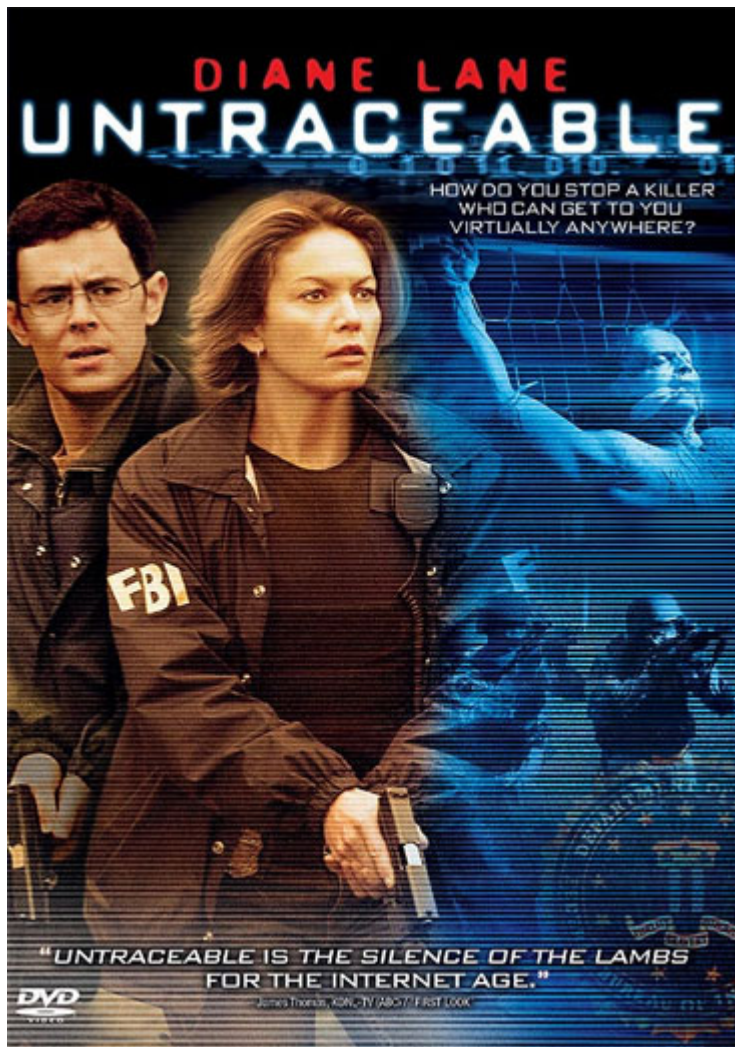
Arabic



Hindi



Catalyst: Evolving FastFlux, DoubleFlux, MetaFlux



Manipulates DNS

Distributed Botnets

Practically Untraceable

Permanent Malicious Infrastructure

Better than Bullet Proof Hosting

Asprox – OlateSuite - Storm

Why is Progress Elusive?

- + Conflicting Interests...turf wars...
- + Lack of conceptual clarity...almost no consensus among the expert communities
- + Foundational Theories are absent or poorly formed

Theories of Cyber Warfare

- + Until 2007, there was no empirical evidence of cyber conflict...only secretive examples of cyber espionage
- + Now, we have examples, and everything is much different than most theorists supposed
- + 2 biggest conceptual (and empirical) problems:
 - Deterrence
 - The Security Dilemma

Theories of Cyber Warfare: Deterrence

- + Basic premise: if you can't defend, threaten to attack in response
- + Model of nuclear deterrence in the Cold War
- + Many theorists think that this concept is useful for cyber warfare:

+ IT IS NOT!

Theories of Cyber Warfare: Deterrence

- + Deterrence requires:
 - Capacity to impose pain on adversary
 - Credible threat to be able to impose pain
 - Ability to absorb first attack and respond
 - Ability to respond in variable way
 - Ability to identify attacker

- + With cyber attacks, many of these are not present
 - Difficult to identify attacker
 - Others can pose as attacker
 - Damage assessment is unclear
 - No guarantee that attack will not also hurt others

Theories of Cyber Warfare: The Security Dilemma

- + Basic premise: Efforts to increase your own security makes other insecure

- + With Cyber Warfare:
 - Everyone can attack easier than they can defend
 - Sometimes, defense and attack are difficult to distinguish
 - Most countries are talking more about offense
 - Private sector and underground are doing offense

- + Results:
 - Spiral of Mistrust
 - Incentives to go on the offense

The Security Dilemma: Game Theory Foundation

Player 2

Hold

Attack

Hold

(1) Low Threat ; (2) Low Threat

(1) Exploited ; (2) Dominant

Player
1

Attack

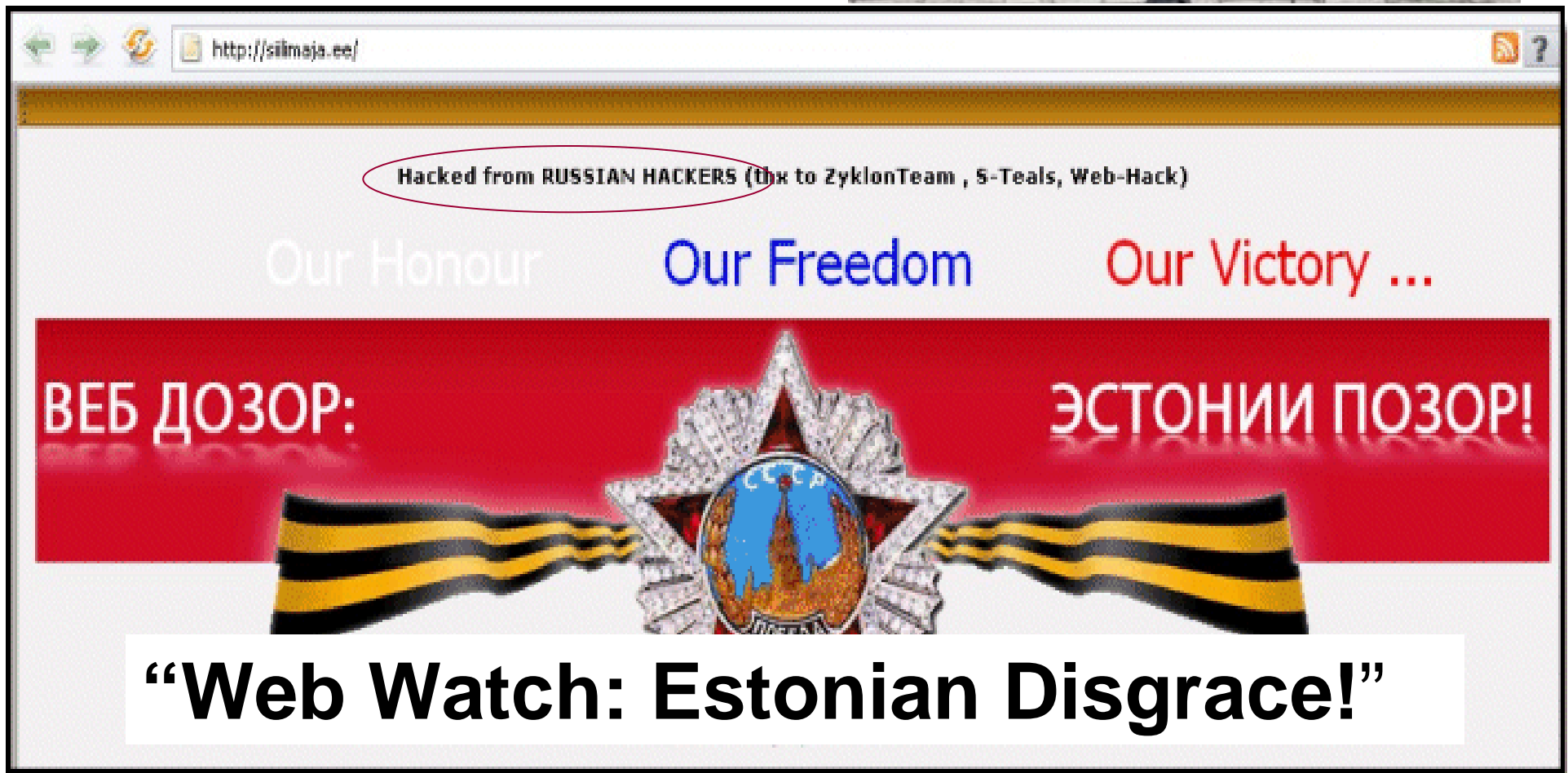
(1) Dominant ; (2) Exploited

(1) Arms Race ; (2) Arms Race

The Realities of Cyber Conflict

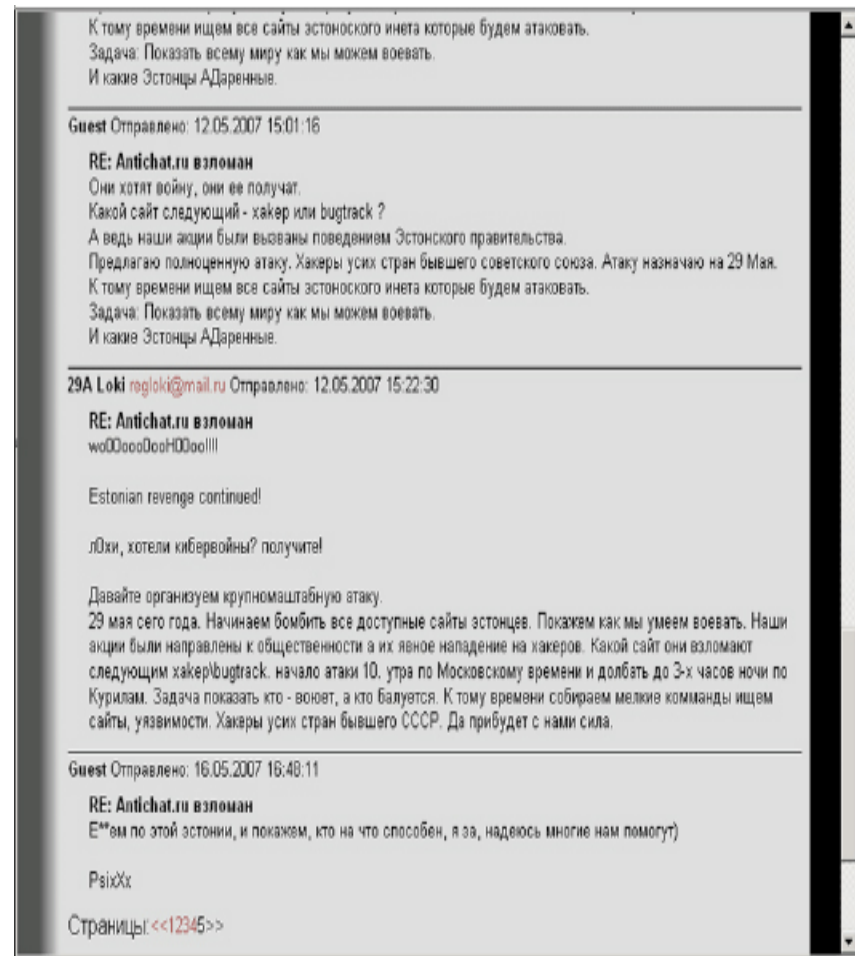
- + Nothing like the theorists though it would be
- + Messy...not entirely controllable
- + No understanding of ultimate consequences...interconnected networks yield extensive feedback
- + Symbolic effects are often as important as direct effects

Russian Attacks Against Estonia: May 2007

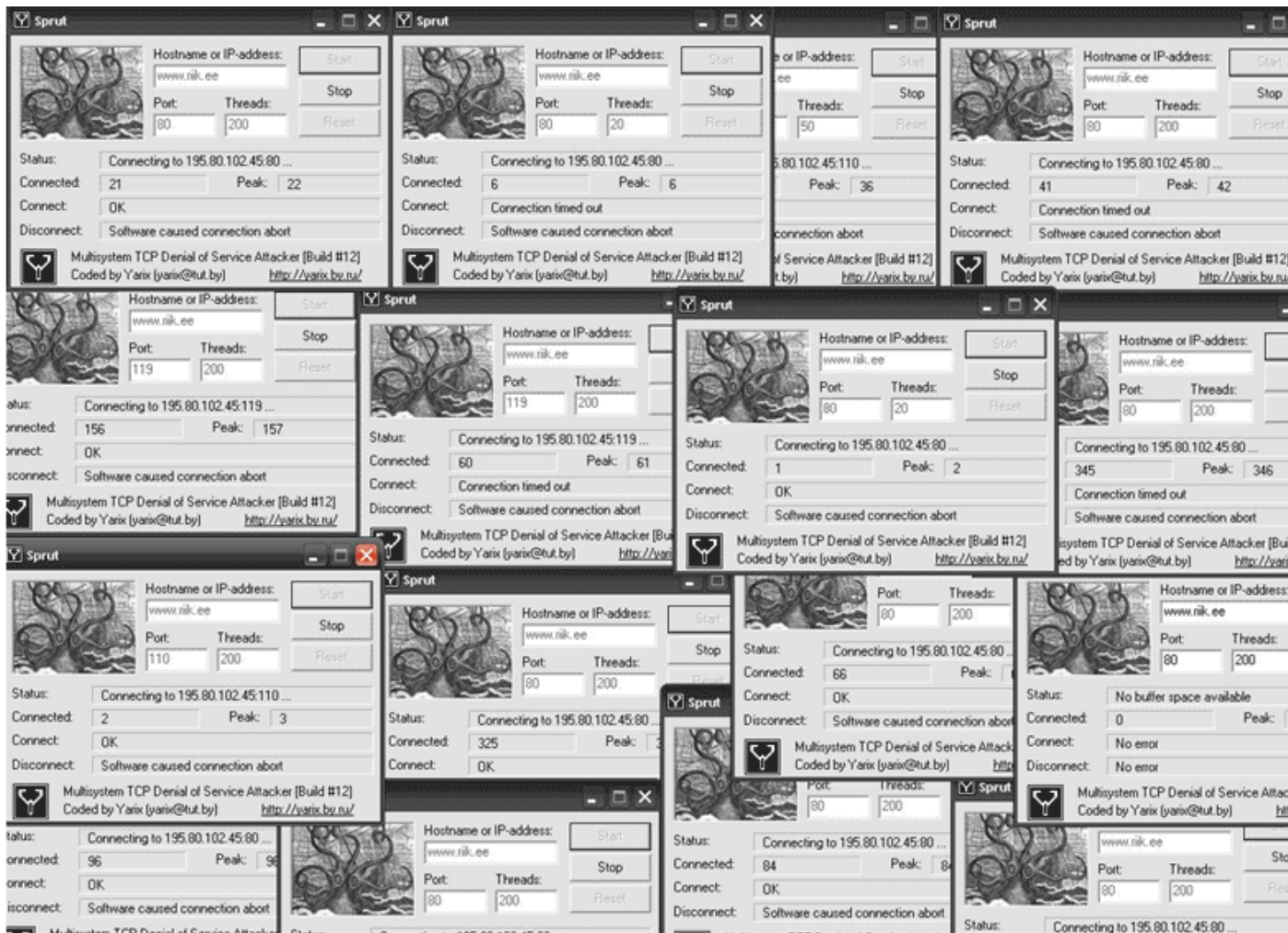


Russian DDoS Coordination

- + Organized on Blogs (e.g. antichat.ru, Livejournal)
- + New Attack lists circulated among hundreds of blogs in minutes
- + Highly coordinated
- + Hundreds of attackers
- + Many identified as ordinary people



Russian DDoS Attack Tool: Sprut



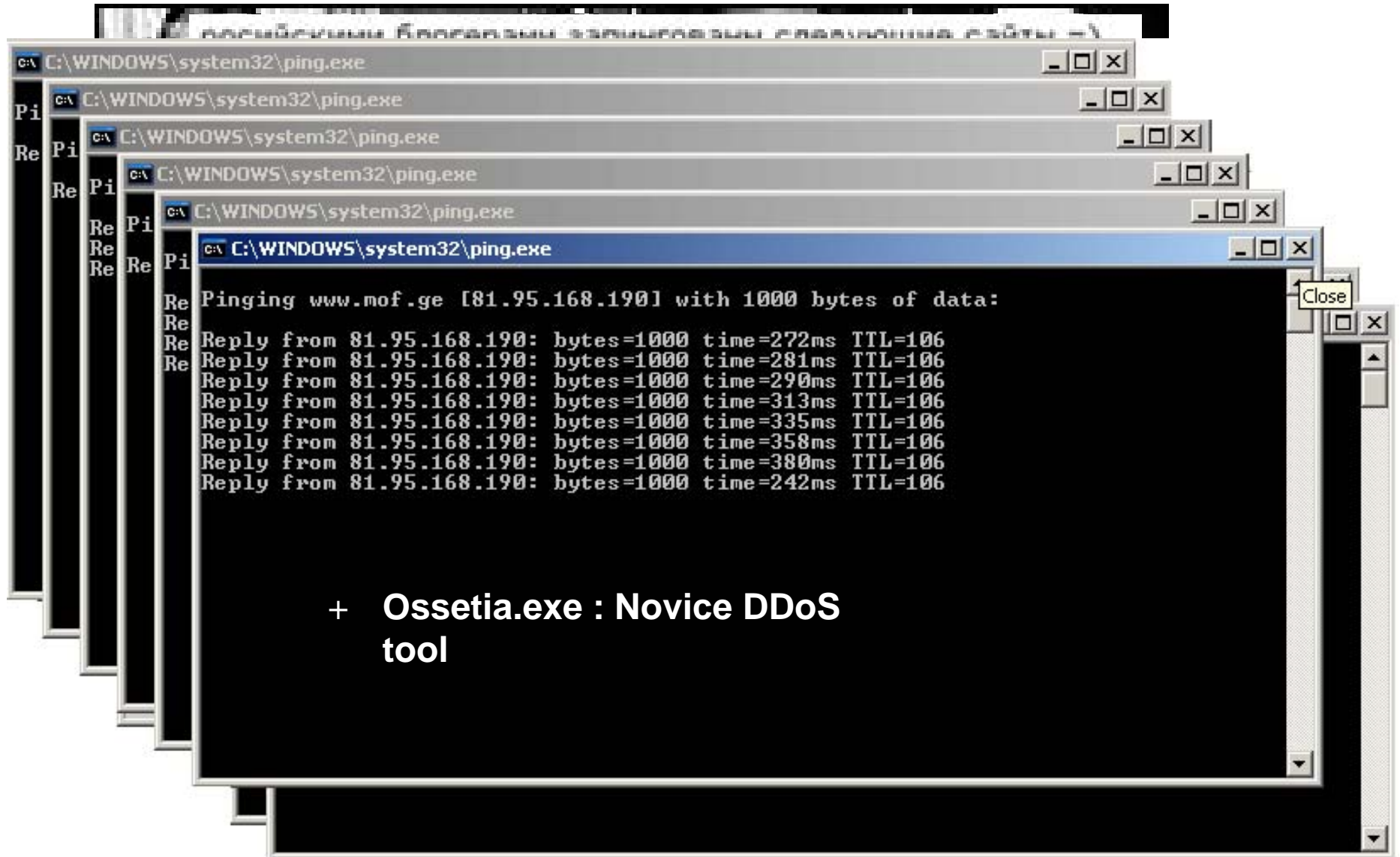
Effects on Estonia

- + Major disruption to government websites and e-government services
- + Varying disruption to financial institutions
 - Some banks shut down for 1 day or more
 - Most banks have problems for several hours
 - ATMs disrupted
- + No real response plan in Estonia, but with NATO assistance, they handled it well
- + Problem: nothing could have prevented the attacks completely

Russia vs. Georgia: August, 2008

- + Presaged by more robust equipment installation in Georgia
- + Unlike Estonia, Georgia fought back
- + Both sides attack the other's media sites
- + Russia completely shuts off Georgian government's web space
- + Georgia began hosting some sites on Blogger.com pages:
 - Why?
 - Because Russia can take down a country, but it can't stop Google.

Russia Takes Down Georgian Government Sites



+ **Ossetia.exe** : Novice DDoS tool

Pro-South Ossetian Spam

www.StopGeorgia.ru

Наш ответ на агрессию со стороны Грузии

Мы - представители русского хак-андраганда, не потерпим провокации со стороны Грузии в любых ее проявлениях. Мы хотим жить в свободном мире и существовать в свободном от агрессии и для Сетевом пространстве. Мы не нуждаемся в указании со стороны властей или иных лиц, а действуем согласно своим убеждениям, основанным на патриотизме, совести и вере в силу справедливости. Вы можете называть нас преступниками и кибер-террористами, развязывая при этом войну и убивая людей. Но мы будем бороться и не допустим агрессии в отношении России в Сетевом пространстве.

Мы требуем прекращения атак на информационные и правительственные ресурсы Рунета, а так же обращаемся ко всем СМИ и журналистам с просьбой объективно освещать происходящие события. До тех пор, пока ситуация не изменится, мы будем препятствовать распространению ложной информации на западных и грузинских правительственных и информационных ресурсах. Не мы развязали информационную войну, не нам отвечать за ее последствия.

Мы призываем к помощи всех, кому не безразлична лояль политическим грузинским сайтам, всех, кто имеет возможность препятствовать распространению черной информации.

StopGeorgia.ru

P.S. Существует одно официальное зеркало проекта - www.stopgeorgia.info. Все остальные ресурсы не имеют никакого отношения к движению StopGeorgia.ru.

ВНИМАНИЕ! НЕМЕЦКИЙ ДАТА-ЦЕНТР "NETDIREKT" - WWW.NETDIREKT.DE ОТКАЗАЛ В ХОСТИНГЕ ЗЕРКАЛУ ПРОЕКТА! ЗЕРКАЛО WWW.STOPGEORGIA.INFO НА ДАННЫЙ МОМЕНТ НЕ СУЩЕСТВУЕТ!

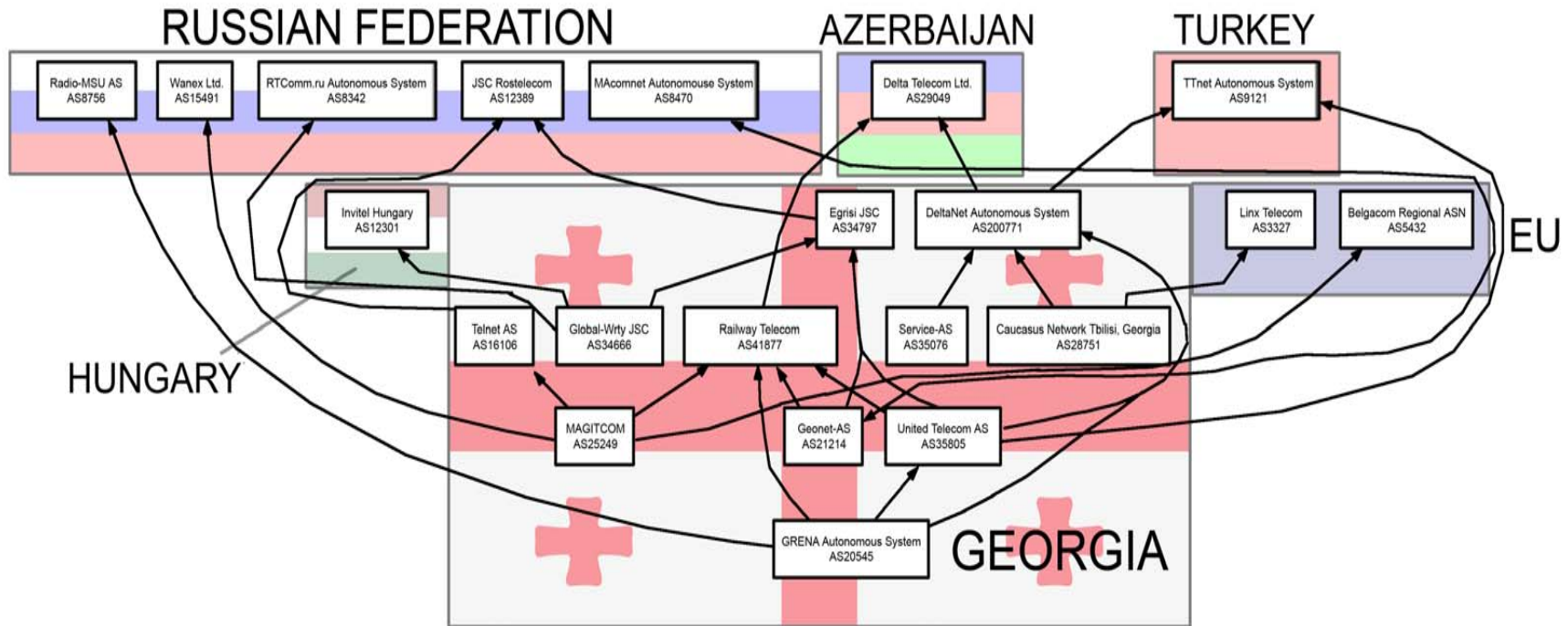
Друзья проекта
www.georgia.ru
www.stop-wat.us
Ленки на ресурсы
Инфо
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www.stopgeorgia.ru

Новости
13.08.2008
День Траура. Скорбим по погибшим в Южной Осетии
10.08.2008
Форум проекта заглушен и работает в платном режиме
08.08.2008
Открыт сайт, посвященный ведению информационной войны с Грузией
07.08.2008
Грузия развязала военный конфликт с Южной Осетией
Читать

www.stopgeorgia.ru

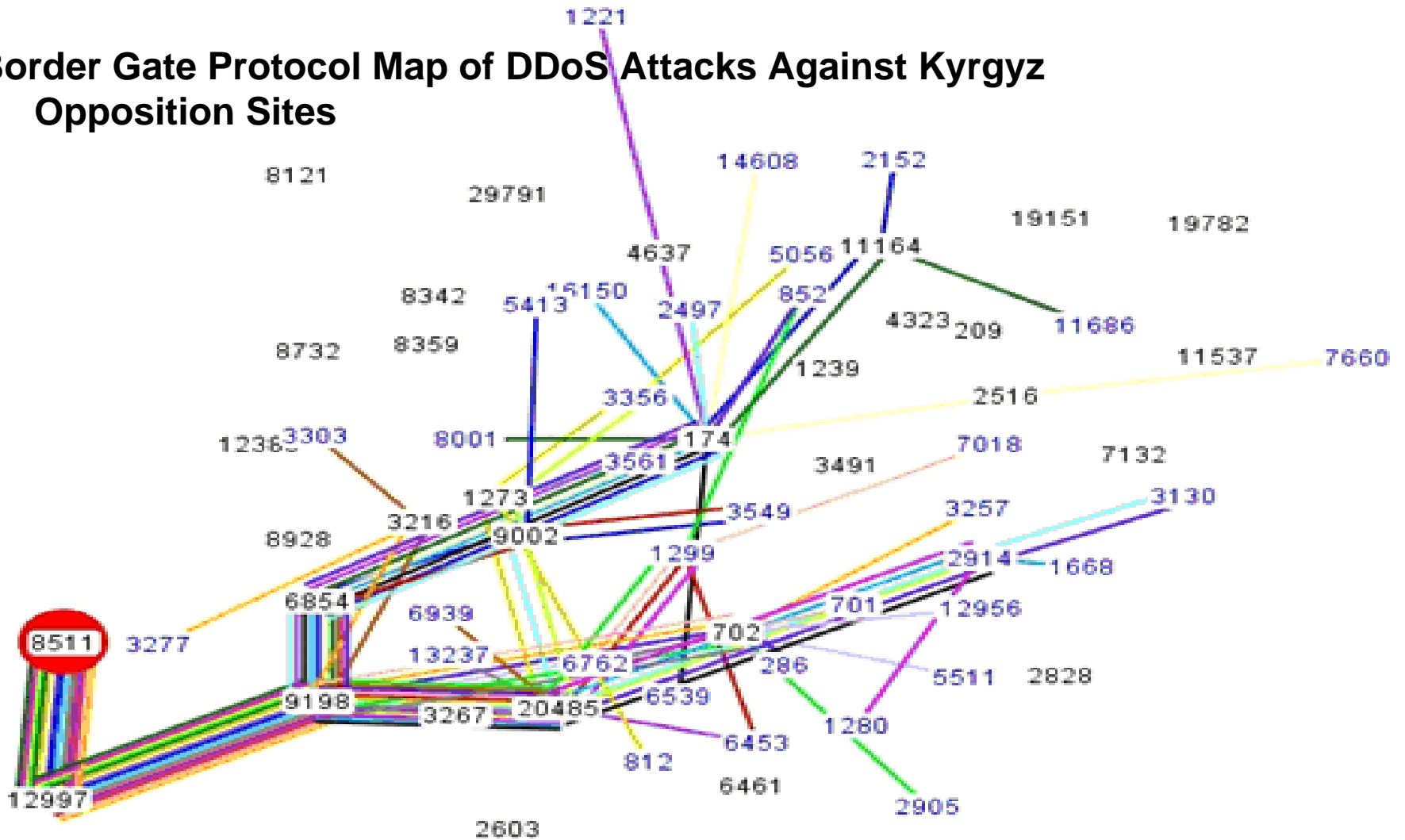
- + Russian Underground Claims Responsibility:
- + Stopgeorgia.ru

Russia Also Deactivated Cables



Kyrgyzstan: January, 2009

Border Gate Protocol Map of DDoS Attacks Against Kyrgyz Opposition Sites



Cyber Security Becomes a Public Affair

- + More offense:
 - Hints of a more offense-heavy strategy in new Administration's proto-policy
- + Law Enforcement, Contractors and Consultants already doing so or are planning to
 - Definitely pragmatic, but offense is a dangerous default
- + What deterrence?
 - Attacker Origin?
 - Second-order effects?
 - Damage Assessment?
- + Increased Budgets = Dramatic Shift in Industry Priorities

What does this mean for Policy?

- + Is a cyberczar a good idea?
 - In the US?
 - The EU?
- + What is “the cyber infrastructure”?
 - Is it even realistic to think we can secure it all?
 - What international legal problems does this raise?
 - Do the obligations it imposes outweigh the benefits?
- + Is more offense a good idea?
 - Alternative— trapped defense
 - Alternative— collective defense
- + Do we even know how to spend \$6 billion? Who will do it?
- + Where are the diplomats and the treaties?

What does this all mean?

- + The late 1980s and early 1990s: the age of the pure hacker
- + Late 1990s and early 2000s: the age of the cyber criminal
- + Now...
- + The age of political and strategic information operations...up to and including war

What does this all mean?

- + If you thought the worms of the 1990s were bad...
- + If you thought RBN and Rockphish and Conficker were bad...
- + Just wait...
- + Wait until you see what political and strategic organizations with billions of dollars, and incentives for offensive strategies, will do...

Q & A

Thank You

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