Citizen Lab, Munk School of Global Affairs, University of Toronto

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Targeted Digital Threats Against Civil Society

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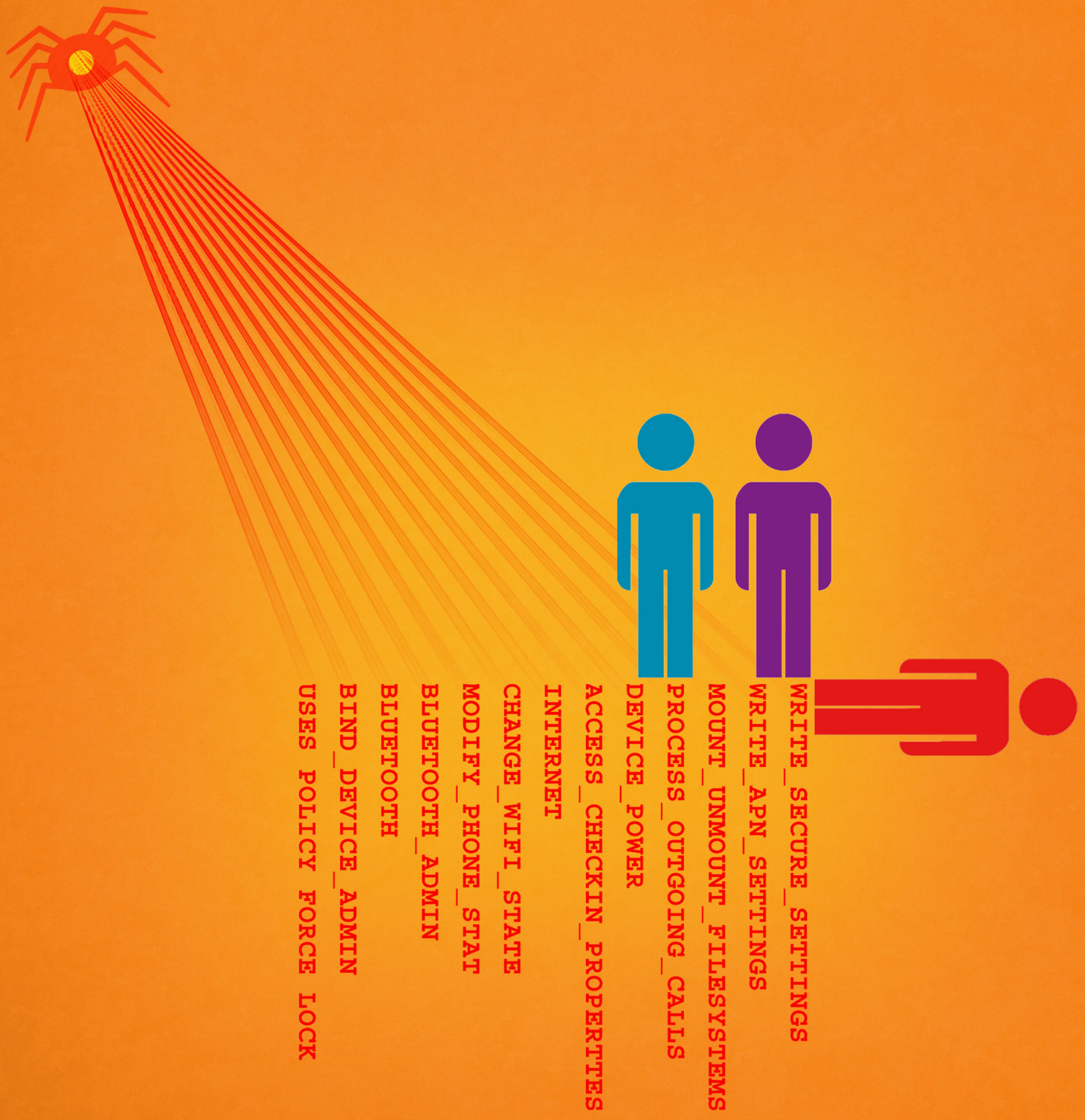
https://targetedthreats.net/



FURTHER READING

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Ron Deibert, "Towards a cyber security strategy for global civil society?" Global Information Society Watch, 2011, http://www.giswatch.org/en/freedom-expression/towards-cyber-security-strategy-global-civil-society

Seth Hardy, "What is an APT without a sensationalist name?" SecTor Conference, October 18, 2011, http://sector.ca/Media/Past-Events/what-is-an-apt-without-a-sensationalist-name-13636

Targeted malware attacks are particularly dangerous to NGOs and other organizations that take real-world risks while often having little if any IT security budget. This presentation describes a variety of targeted malware attacks observed in the wild against human rights organizations, and the techniques (both social and technical) that they use to be successful. It then looks at the technical details of a data exfiltration network: what information is being stolen, how it is leaving your network, and where it is going. The presentation concludes with observations on how this kind of targeted malware differs from those used for financial gain, and steps that organizations can take to defend themselves, even with very limited resources.

Citizen Lab, "Information Operations and Tibetan Rights in the Wake of Self-Immolations: Part I," March 9, 2012, https://citizenlab.org/2012/03/information-operations-and-tibetan-rights-in-the-wake-of-self-immolations-part-i/

This post is the first in a series of analyses that the Citizen Lab prepared regarding the urgent and ongoing threat presented by information operations deployed against Tibetans and others who advocate for Tibetan rights and freedoms, including in Tibetan areas of China. The Citizen Lab is concerned with the apparent increase in the use of social engineering linked to the issue of self-immolation to target Tibetan activists with malware, as well as the reported increase in magnitude of information controls (in close coordination with more physical measures) utilized by the Chinese government in Tibetan areas.

Morgan Marquis-Boire and Seth Hardy, "Syrian Activists Targeted with BlackShades Spy Software," Citizen Lab, June 19, 2012, https://citizenlab.org/2012/06/syrian-activists-targeted-with-blackshades-spy-software/

The use of remote surveillance software against activists has been a feature of the ongoing conflict in Syria. The EFF and Citizen Lab report on the use of a new toolkit by a previously observed attacker, which has been circulating malware which surreptitiously installs BlackShades Remote Access Trojan (RAT) on victim's machines.

Citizen Lab, "Spoofing the European Parliament," June 20, 2012, https://citizenlab.

org/2012/06/spoofing-the-european-parliament/

The Citizen Lab analyzes a recent targeted malware attack against the Tibetan community which spoofs a June 14, 2012 resolution of the European Parliament on the human rights situation in Tibet. While such repurposing of authentic content for use as a malware delivery mechanism is not unusual, this incident raises serious questions surrounding the use of legitimate political resources for illegitimate ends.

Morgan Marquis-Boire, "From Bahrain with Love: FinFisher's Spy Kit Exposed?," Citizen Lab, July 25, 2012, https://citizenlab.org/2012/07/from-bahrain-with-love-finfishers-spy-kit-exposed/

This Citizen Lab posts analyzes several pieces of malware targeting Bahraini dissidents, which were shared with us by Bloomberg News. The analysis suggests that the malware used is FinSpy, part of the commercial intrusion kit, Finfisher, distributed by the United Kingdom-based company, Gamma International.

Citizen Lab, "Recent Observations in Tibet-Related Information Operations: Advanced Social Engineering for the Distribution of LURK Malware," July 26, 2012, https://citizenlab.org/2012/07/recent-observations/

The Citizen Lab has analyzed recent targeted malware attacks against Tibetan organizations that share a common payload —LURK malware—and command-and-control server, as well as several other features.

Seth Hardy, "IEXPL0RE RAT," Citizen Lab, August 2012, https://citizenlab.org/wp-content/uploads/2012/09/IEXPL0RE_RAT.pdf

This report describes a Remote Access Trojan (RAT) that three human rights-related organizations taking part in our study received via email in 2011 and at the end of 2010. We refer to this RAT as the IEXPL0RE RAT, after the name of the launcher program. This RAT has the ability to record user keystrokes (including passwords), copy and delete files, download and run new programs, and even use the computer's microphone and camera to listen and watch the user in real-time.

Morgan Marquis-Boire, Bill Marczak, and Claudio Guarnieri, *The SmartPhone who Loved Me: FinFisher Goes Mobile?*, Citizen Lab, August 29, 2012, https://citizenlab.org/2012/08/the-smartphone-who-loved-me-finfisher-goes-mobile/

This post describes our work analyzing several samples which appear to be mobile variants of the FinFisher Toolkit, and scanning we performed which identified more apparent FinFisher command and control servers.

Citizen Lab, "Human Rights Groups Targeted by PlugX RAT," September 28, 2012, https://citizenlab.org/2012/09/human-rights-groups-targeted-by-plugx-rat/

In this Citizen Lab blog post, we report on malware campaigns targeting human rights groups using the PlugX Remote Access Trojan.

Morgan Marquis-Boire, *Backdoors are Forever: Hacking Team and the Targeting of Dissent*, Citizen Lab, October 10, 2012, https://citizenlab.org/wp-content/uploads/2012/10/12-2012-backdoorsareforever.pdf

In this report, Citizen Lab Security Researcher Morgan Marquis-Boire describes analysis performed on malicious software used to compromise a high profile dissident residing in the United Arab Emirates. The findings indicate that the software is a commercial surveillance backdoor distributed by an Italian company known as Hacking Team. The report also describes the potential involvement of vulnerabilities sold by the French company, VUPEN.

Seth Hardy, "APT1's GLASSES—Watching a Human Rights Organization," Citizen Lab, February 25, 2013, https://citizenlab.org/2013/02/apt1s-glasses-watching-a-human-rights-organization/

In this report we found malware used in a targeted attack against a Tibetan human rights organization which was closely related to malware described by Mandiant. In their report, Mandiant described how APT1 (referred to as "Comment Crew" or "Byzantine Candor" in other reports) has targeted a large number of organizations in a wide range of industries, stealing terabytes of data. Our report demonstrates that APT1 is not only involved in industrial and corporate espionage, but also in attacks against civil society actors documented as early as 2010. This observation reflects other findings showing that in some cases the same threat actors and infrastructure are used to target government and industry are also used against civil society groups.

Ron Deibert and Sarah McKune, "Civil Society Hung Out To Dry in Global Cyber Espionage," *CircleID*, March 4, 2014, http://www.circleid.com/posts/20130304_civil_society_hung_out_to_dry_in_global_cyber_espionage/

Canada Centre for Global Security Studies and Citizen Lab Director Ron Deibert and Senior Researcher Sarah McKune authored an article in CircleID on an often overlooked dimension of cyber threats and cyber espionage: the targeting of civil society actors.

Morgan Marquis-Boire, Bill Marczak, Claudio Guarnieri, and John Scott-Railton, *You Only Click Twice: FinFisher's Global Proliferation*, Citizen Lab, March 13, 2013, https://citizenlab.org/2013/03/you-only-click-twice-finfishers-global-proliferation-2/

This report describes the results of a comprehensive global Internet scan for the command-

and-control servers of FinFisher's surveillance software. We have found command-and-control servers for FinSpy backdoors, part of Gamma International's FinFisher "remote monitoring solution," in a total of 25 countries: Australia, Bahrain, Bangladesh, Brunei, Canada, Czech Republic, Estonia, Ethiopia, Germany, India, Indonesia, Japan, Latvia, Malaysia, Mexico, Mongolia, Netherlands, Qatar, Serbia, Singapore, Turkmenistan, United Arab Emirates, United Kingdom, United States, Vietnam. The report also details the discovery of FinFisher in Ethiopia, which targets individuals using pictures of Ginbot 7, an Ethiopian opposition group, as bait to infect users. Additionally, it provides examination of a FinSpy Mobile sample found in the wild, which appears to have been used in Vietnam.

Citizen Lab, "Permission to Spy: An Analysis of Android Malware Targeting Tibetans," April 18, 2013, https://citizenlab.org/2013/04/permission-to-spy-an-analysis-of-android-malware-targeting-tibetans/

In January 2013, we were provided with a sample of a highly targeted attack delivered through email that contained compromised versions of two Android applications that are popular in the Tibetan community: KakaoTalk (a mobile messaging client) and TuneIn (an Internet radio application). The email message repurposed a legitimate private email message sent by an information security expert in the Tibetan community to a member of the Tibetan parliament-in-exile. The compromised versions of the Android applications contained malware that is is designed to send a user's contacts, SMS message history, and cellular network location to attackers.The cellular network information gathered by this malware would only be useful to actors with detailed knowledge of the cellular communication provider's technical infrastructure. These findings demonstrate the risks communities face from targeted mobile malware. While the majority of targeted attacks we observe are designed to exploit the Windows operating system, we are also observing attacks targeting OS X, Linux and Android. Attackers will continue to adopt new methods and widen targeting of platforms. We had this report translated into Tibetan and circulated amongst the community to raise user awareness of targeted mobile malware threats.

Morgan Marquis-Boire, Bill Marczak, Claudio Guarnieri, and John Scott-Railton, *For Their Eyes Only: The Commercialization of Digital Spying*, Citizen Lab, April 30, 2013, https://citizenlab.org/2013/04/for-their-eyes-only-2/

The report features new findings, as well as consolidates a year of our research on the commercial market for offensive computer network intrusion capabilities developed by Western companies. Taken together with our previous research into FinFisher, we can now assert that FinFisher's command-and-control servers are currently active, or have been present, in 36 countries (Australia, Austria, Bahrain, Bangladesh, Brunei, Bulgaria, Canada, Czech Republic, Estonia, Ethiopia, Germany, Hungary, India, Indonesia, Japan, Latvia, Lithuania, Macedonia, Malaysia, Mexico, Mongolia, Netherlands, Nigeria, Pakistan, Panama, Qatar, Romania, Serbia, Singapore, South Africa, Turkey, Turkmenistan, United Arab Emirates, United Kingdom, United States, Vietnam.) We have also identified a FinSpy sample that appears to be specifically targeting Malay language speakers, masquerading as a document discussing Malaysia's upcoming 2013 General Elections.We identify instances where FinSpy makes use of Mozilla's Trademark and Code. The latest Malay-language sample masquerades as Mozilla Firefox in both file properties and in manifest.

John Scott-Railton and Morgan Marquis-Boire, "A Call to Harm: New Malware Attacks Target the Syrian Opposition," Citizen Lab, June 21, 2013, https://citizenlab.org/2013/06/a-call-to-harm/

Syria's opposition has faced persistent targeting by Pro-Government Electronic Actors throughout the Syrian civil war. A pro-government group calling itself the Syrian Electronic Army has gained visibility throughout the conflict with high profile attacks against news organizations. Meanwhile, Syrian activists continue to be targeted with online attacks apparently for the purposes of accessing their private communications and stealing their secrets. Researchers have identified a common theme among the attacks against the Syrian opposition: sophisticated social engineering that is grounded in an awareness of the needs, interests, and weaknesses of the opposition. This report describes two types of attacks that follow this theme: One is a malicious installer of the circumvention tool Freegate, while the other is an e-mail attachment calling for jihad against Hezbollah and the Assad regime or promising interesting regional news. The report was translated into Arabic by Cyber Arabs.

Katie Kleemola and Seth Hardy, "Surtr: Malware Family Targeting the Tibetan Community," Citizen Lab, August 2, 2013, https://citizenlab.org/2013/08/surtr-malware-family-targeting-the-tibetan-community/

In this report, we document the discovery of a malware family we call "Surtr," which we have observed used in attacks against Tibetan groups since November 2012. This malware family continues to be used in campaigns and we are actively tracking its development and the threat actors and infrastructure behind its operation. Before we published our report, we prepared a special advisory for the Tibetan community that we circulated privately to increase user awareness. We also submitted technical details on the malware family to the DeepEnd Research Library of Malware Traffic patterns, which is a community resource that collects traffic analysis of malware families from open sources to help researchers identify and track these malware families and develop defenses against them.

Seth Hardy, "Targeted Threat Index," Citizen Lab, October 18, 2013, https://citizenlab.org/2013/10/targeted-threat-index/

We published a short report on our first iteration of the Targeted Threat Index (TTI) following strong interest shown in the metric when we presented it at Canada's premier information security Conference SecTor in October 2013. We later refined and iterated on the

TTI and produced an expanded version of the analysis for our Usenix Security 2014 paper submission.

Eva Galperin, Morgan Marquis-Boire, and John Scott-Railton, *Quantum of Surveillance: Familiar Actors and Possible False Flags in Syrian Malware Campaigns*, Electronic Frontier Foundation, December 23, 2013, https://www.eff.org/deeplinks/2013/12/social-engineering-and-malware-syria-eff-and-citizen-labs-latest-report-digital

Citizen Lab security researchers Morgan Marquis-Boire and John Scott-Railton along with Electronic Frontier Foundation (EFF) Global Policy Analyst Eva Galperin published a technical paper outlining how Syrian pro-government attackers targeted the opposition, as well as NGO workers and journalists, with social engineering and Remote Access Tools. The report builds on extensive previous research and writings by EFF and Citizen Lab to update what we know about malware campaigns targeting the Syrian opposition. The report's accompanying piece was published in Wired magazine.

Bill Marczak, Claudio Guarnieri, Morgan Marquis-Boire, and John Scott-Railton, "Hacking Team and the Targeting of Ethiopian Journalists," Citizen Lab, February 12, 2014, https://citizenlab.org/2014/02/hacking-team-targeting-ethiopian-journalists/

In February 2014, we reported on targeted attacks against the Ethiopian Satellite Television Service (ESAT), an independent satellite television, radio, and online news media outlet run by members of the Ethiopian diaspora, that we revealed to be using Remote Control System, sold exclusively to governments by Milan-based Hacking Team. The malware communicated with an IP address belonging to Ariave Satcom, a satellite provider that services Africa, Europe, and Asia.

Bill Marczak, Claudio Guarnieri, Morgan Marquis-Boire, and John Scott-Railton, "Mapping Hacking Team's Untraceable Spyware," Citizen Lab, February 17, 2014, https://citizenlab.org/2014/02/mapping-hacking-teams-untraceable-spyware/

This report maps out covert networks of "proxy servers" used to launder data that Hacking Team's Remote Control System (RCS) exfiltrates from infected computers, through third countries, to an "endpoint," which we believe represents the spyware's government operator. This process is designed to obscure the identity of the government conducting the spying. For example, data destined for an endpoint in Mexico appears to be routed through four different proxies, each in a different country. This so-called "collection infrastructure" appears to be provided by one or more commercial vendors—perhaps including Hacking Team itself. Hacking Team advertises that their RCS spyware is "untraceable" to a specific government operator. However, we claim to identify a number of current or former government users of the spyware by pinpointing endpoints, and studying instances of RCS that we have observed. We suspect that agencies of these twenty-one governments are current or former users of RCS: Azerbaijan, Colombia, Egypt, Ethiopia, Hungary, Italy, Kazakhstan, Korea, Malaysia, Mexico, Morocco, Nigeria, Oman, Panama, Poland, Saudi Arabia, Sudan, Thailand, Turkey, UAE, and Uzbekistan.

Bill Marczak, Claudio Guarnieri, Morgan Marquis-Boire, John Scott-Railton, and Sarah McKune, "Hacking Team's US Nexus," Citizen Lab, February 28, 2014, https://citizenlab.org/2014/02/hacking-teams-us-nexus/

This report is a follow up to our previous report, titled "Mapping Hacking Team's "Untraceable" Spyware," which identifies 21 governments that we suspect are current or former users of Remote Control System (RCS). The report showed that computers infected with RCS send surveillance data back to the government operator through a series of servers in multiple third countries, called a proxy chain or circuit. We delve deeper into these proxy chains, and find that in at least 12 cases, US-based data centers are part of this dedicated foreign espionage infrastructure. Our analysis traces these proxy chains, and finds that US-based servers appear to assist the governments of Azerbaijan, Colombia, Ethiopia, Korea, Mexico, Morocco, Poland, Thailand, Uzbekistan, and the United Arab Emirates in their espionage and/or law enforcement operations.

John Scott-Railton, "Maliciously Repackaged Psiphon Found," Citizen Lab, March 13, 2014, https://citizenlab.org/2014/03/maliciously-repackaged-psiphon/

In March 2014, we documented a malicious repackaging of Psiphon 3, which is a circumvention tool originally developed by the Citizen Lab, which was spun out into a private Canadian corporation in 2008. The malware contains both a functioning copy of Psiphon, and the njRAT trojan. When executed, the implant communicates with a Syrian command-and-control server. This is likely part of a targeted attack against the Syrian opposition by a known actor, not all users of Psiphon. This report was translated into Arabic and disseminated to at risk users. (https://citizenlab.org/2014/03/arabic-warning-maliciously-repackaged-psiphon/)

Morgan Marquis-Boire, John Scott-Railton, Claudio Guarnieri, and Katie Kleemola, "Police Story: Hacking Team's Government Surveillance Malware," Citizen Lab, June 24, 2014, https://citizenlab.org/2014/06/backdoor-hacking-teams-tradecraft-android-implant/

This report analyzes Hacking Team's Android implant, and uses new documents to illustrate how their Remote Control System (RCS) interception product works. RCS is a surveillance malware toolkit marketed for "lawful interception" use. We identified and analyzed RCS Android implants that had lures with a political subtext suggesting targets in the Qatif Governorate of Saudi Arabia. Analysis of these implants revealed a range of surveillance functions.

Bill Marczak, John Scott-Railton, Morgan Marquis-Boire and Vern Paxson, "When Governments Hack Opponents: A Look at Actors and Technology," 23rd USENIX Security Symposium (USENIX Security 14), August 2014, https://www.usenix.org/conference/usenix-security14/technical-sessions/presentation/marczak

Repressive nation-states have long monitored telecommunications to keep tabs on political dissent. The Internet and online social networks, however, pose novel technical challenges to this practice, even as they open up new domains for surveillance. We analyze an extensive collection of suspicious files and links targeting activists, opposition members, and nongovernmental organizations in the Middle East over the past several years. We find that these artifacts reflect efforts to attack targets' devices for the purposes of eavesdropping, stealing information, and/or unmasking anonymous users. We describe attack campaigns we have observed in Bahrain, Syria, and the United Arab Emirates (UAE), investigating attackers, tools, and techniques. In addition to off-the-shelf remote access trojans and the use of third-party IP-tracking services, we identify commercial spyware marketed exclusively to governments, including Gamma's FinSpy and Hacking Team's Remote Control System (RCS). We describe their use in Bahrain and the UAE, and map out the potential broader scope of this activity by conducting global scans of the corresponding command-and-control servers. Finally, we frame the real-world consequences of these campaigns via strong circumstantial evidence linking hacking to arrests, interrogations, and imprisonment.

Seth Hardy, Masashi Crete-Nishihata, Katharine Kleemola, Adam Senft, Byron Sonne, Greg Wiseman, Phillipa Gill and Ronald J. Deibert, "Targeted Threat Index: Characterizing and Quantifying Politically-Motivated Targeted Malware," 23rd USENIX Security Symposium (USENIX Security 14), August 2014, https://www.usenix.org/system/files/conference/usenix-security14/sec14-paper-hardy.pdf

Targeted attacks on civil society and non-governmental organizations have gone underreported despite the fact that these organizations have been shown to be frequent targets of these attacks. In this paper, we shed light on targeted malware attacks faced by these organizations by studying malicious e-mails received by 10 civil society organizations (the majority of which are from groups related to China and Tibet issues) over a period of four years. Our study highlights important properties of malware threats faced by these organizations with implications on how these organizations defend themselves and how we quantify these threats. We find that the technical sophistication of malware we observe is fairly low, with more effort placed on socially engineering the e-mail content. Based on this observation, we develop the Targeted Threat Index (TTI), a metric which incorporates both social engineering and technical sophistication when assessing the risk of malware threats. We demonstrate that this metric is more effective than simple technical sophistication for identifying malware threats with the highest potential to successfully compromise victims. We also discuss how education efforts focused on changing user behaviour can help prevent compromise. For two of the three Tibetan groups in our study simple steps such as avoiding the use of email attachments could cut document-based malware threats delivered through e-mail that we observed by up to 95%.

Morgan Marquis-Boire, “Schrodinger’s Cat Video and the Death of Clear-Text,” Citizen Lab, August 15, 2014, https://citizenlab.org/2014/08/cat-video-and-the-death-of-clear-text/

This report provides a detailed analysis of two products sold for facilitating targeted surveillance, known as network injection appliances. These products allow for the easy deployment of targeted surveillance implants and are being sold by commercial vendors to countries around the world. Compromising a target becomes as simple as waiting for the user to view unencrypted content on the Internet. While the technology required to perform such attacks has been understood for some time, there is limited documentation of the operation of these attacks by state actors. This report provides details on the use of such surveillance solutions including how they are built, deployed, and operated.

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DIGITAL SECURITY TOOLS

This section contains a series of guides and online resources on digital security. Digital security is highly specific to an individual or group's context and environment, and no one guide or tool can address all possible risks. We do not endorse any particular products or services.

Access, "Protecting Your Security Online," https://www.accessnow.org/pages/protecting-your-security-online

Association for Progressive Communications, "Digital Security First-Aid Kit for Human Rights Defenders," https://www.apc.org/en/irhr/digital-security-first-aid-kit

CloudFlare, "Protect Galileo: DDoS attack protection for at-risk public interest websites," http://www.cloudflare.com/galileo

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The President's Review Group on Intelligence and Communications Technologies, "Liberty and Security in a Changing World: Report and Recommendations of the President's Review Group on Intelligence and Communications Technologies," December 12, 2013, http://www.whitehouse.gov/sites/default/files/docs/2013-12-12_rg_final_report.pdf

INDUSTRY AND MULTI-STAKEHOLDER INITIATIVES

Global Network Initiative
http://www.globalnetworkinitiative.org/

The Global Network Initiative is a collection of ICT companies, civil society organizations, investors, and academics which aims to provide guidance, expertise and policy engagement to ICT companies on issues of protecting and advancing rights to privacy and freedom of expression.

Telecommunications Industry Dialogue
http://www.telecomindustrydialogue.org/home

The Telecommunications Industry Dialogue is a group of telecommunications operators and vendors who jointly address freedom of expression and privacy rights in the telecommunications sector in the context of the UN Guiding Principles on Business and Human Rights. The initiative was launched in March of 2013.

INTERNATIONAL ORGANIZATION AND INTERNATIONAL LEGAL RESOURCES

The following United Nations declaration and covenants form the basis for the definition of “human rights” used in this study:

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United Nations General Assembly, “International Covenant on Civil and Political Rights,” December 16, 1966, http://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx

United Nations General Assembly, International Covenant on Economic, Social and Cultural Rights, 16 December 1966, http://www.ohchr.org/EN/ProfessionalInterest/Pages/cescr.aspx

A number of reports, guides and resolutions by United Nations bodies and the European Commission have specifically dealt with the issue of human rights and ICTs:

Report of the Special Rapporteur on the promotion and protection of human rights and fundamental freedoms while countering terrorism, Martin Scheinin, “Compilation of good practices on legal and institutional frameworks and measures that ensure respect for human rights by intelligence agencies while countering terrorism, including on their oversight,” May 17, 2010, http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G10/134/10/PDF/G1013410.pdf?OpenElement

John Ruggie, “Guiding principles on business and human rights: Implementing the United Nations “Protect, Respect and Remedy,” Framework, 2011, http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf

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Office of the United Nations High Commissioner for Human Rights, “The right to privacy in the digital age,” June 30, 2014, http://www.ohchr.org/EN/HRBodies/HRC/RegularSessions/Session27/Documents/A.HRC.27.37_en.pdf