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CYBER OFFENSIVE CAPABILITIES: A GLIMPSE ON A MULTIPOLAR DIMENSION

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Dissertação apresentada no âmbito do Programa de Pós-Graduação em Relações Internacionais (PPGRI) do Instituto de Relações Internacionais (IREL) da Universidade de Brasília (UnB) como requisito parcial para a obtenção do título de Mestre em Relações Internacionais.

Área de Concentração: Política Internacional e Comparada

Orientador: Prof. Dr. Antonio Jorge Ramalho da Rocha

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Para minha família.

RESUMO

Um dos aspectos mais notáveis no Século 21 é a adoção da tecnologia da informação em múltiplos aspectos do cotidiano de indivíduos, da sociedade e de estados nacionais. A crescente interconectividade irá se ampliar exponencialmente nos próximos anos com a adoção de redes 5G, a internet das coisas, grandes volumes de dados (Big Data) e o uso de aprendizado de máquina. Como consequência, atividades econômicas e a vida concreta estarão ainda mais expostas a ameaças cibernéticas ofensivas. Se comparado a outras dimensões como terra, ar, mar e espaço, o espaço cibernético tem características únicas, pois pode ser modificado por cliques e configurações - oceanos e montanhas são mais difíceis de se mover. Além disso, o relativo anonimato, a irrelevância de distâncias geográficas, o baixo custo de aquisição e desenvolvimento de artefatos ofensivos e a possível negação de atribuição tornaram essa dimensão em um novo teatro-de-operações para os estados. Ao contrário de estudos pregressos que focaram em análises orientadas ao pior cenário possível, o presente estudo pretende apresentar uma análise empírica dos conflitos cibernéticos. Para tanto, um algoritmo de coleta e processamento de dados empíricos foi elaborado para testar as hipóteses deste estudo. Como resultado, foram identificados 29 países que realizaram ações cibernéticas ofensivas, além de 85 países que adquiriram capacidades cibernéticas ofensivas de provedores privados. Os montantes desafiam a tradicional percepção de que apenas alguns atores teriam essa capacidade ofensiva. Isso indica que o espaço cibernético, como um teatro de operações, favorece a difusão de poder entre estados nacionais. A maioria das ações ofensivas correspondem a instrumentos tradicionais como espionagem, vigilância e desinformação, potencializados pelas características peculiares do espaço cibernético. Nesse sentido, as capacidades cibernéticas ofensivas oferecem alternativas para a competição entre os estados abaixo do uso da força. Com isso, atores estatais têm alcançado resultados estratégicos que influenciam o equilíbrio de poder relativo sem que seja necessário se expor ao risco de respostas militares convencionais ou nucleares de seus oponentes.

Palavras-chave: Espaço cibernético; conflitos cibernéticos; capacidades cibernéticas ofensivas; patrocínio estatal; guerra cibernética.

ABSTRACT

One of the most striking features of the 21st century is the widespread adoption of information technology in every aspect of the modern life of individuals, society, or nation-states. The growing interconnectivity will increase exponentially in the years to come with the adoption of new 5G networks, the internet of things (IoT), large volumes of information (Big Data), and the use of machine learning (artificial intelligence). As a result, economic activity and ordinary life will be even more exposed to the threat of cyber offensive actions. When compared to land, sea, air, and space, cyberspace has unique features. Its “geography” is easily modified, oceans and mountains are hard to be changed, but entire cyberspace regions can be turned on or off with a button click. Additional features such as the relative anonymity, the irrelevance of geographical distances for some processes and purposes, the low cost of acquiring or developing offensive capabilities, and the plausible deniability of actions have turned this dimension into a theater of operations for nation-states. Many scholars focus their analysis on the worst-case scenario where cyber offensive actions will revolutionize war, but fail to provide enough evidence to support it. This research intends to provide empirical analysis regarding cyber conflict. For that purpose, an algorithm to collect and process the empirical data was built and used to examine hypotheses. As a result, this research gathered evidence of 29 different countries engaging in cyber offensive actions and 85 nations acquiring cyber offensive technologies from private vendors. The numbers challenge the average perception of concentration of cyber capabilities in a few "traditional" actors. This entails that cyberspace, as an operational theatre, favors the diffusion of power among nation-states. The majority of the cyber offensive actions are a variation of traditional instruments of statecraft such as surveillance, espionage, and disinformation, potentialized by cyberspace's peculiar characteristics. In this sense, cyber offensive capabilities are providing alternatives for the bargaining and interactions to nation-states below the threshold of the use of force. Actors are able to achieve strategic outcomes and influence the balance of power without having to resort to an armed attack and minimize the risk of a military or nuclear response from their targets.

Keywords: Cyberspace; cyber conflict; cyber offensive capabilities; state-sponsored actions; cyberwar.

FIGURES

TABLES

Contents

1. INTRODUCTION

This research delves into the current state of cyber conflict and its consequences for nation-state competition. The study does not intend to present conceptual innovations, instead it focuses on empirical evidence to present its conclusions regarding the use of cyber offensive capabilities. With this approach this research will avoid inflating threats by considering hypothetical cases where devastating consequences could be achieved through offensive cyber offensive operations.

One of the most striking features of the 21st century is the widespread adoption of information technology in every aspect of the modern life of individuals, society, and nation-states. This process is referred to as the "Fourth Industrial Revolution," and the internet is its iconic expression (J. Nye 2010).

The internet went from innovation to one of the essential pillars of the modern economy. According to the United Nations, since 2014, all countries possess a digital footprint, though it varies in sophistication and scale (2020). A previous study also demonstrated that security is a major concern regarding cyberspace, as more than eighty countries have published national strategies for cyber security (Izycki and Colli 2019).

Moreover, the growing interconnectivity will increase exponentially in the years to come with the adoption of new 5G networks, the internet of things (IoT), large volumes of information (Big Data), the use of machine learning (artificial intelligence) and the use of quantum computing. As a result, economic activity and ordinary life will be even more exposed to the threat of offensive cyber operations (Kello 2017).

When compared to land, sea, air, and space, cyberspace has unique features. Its "geography" is easily modified, oceans and mountains are hard to be changed, but entire cyberspace regions can be turned on or off at the click of a button (Kramer 2009).

Additional features such as the relative anonymity, the irrelevance of geographical distances for some processes and purposes, the low cost of acquiring or developing offensive capabilities, and the plausible deniability of actions have turned this dimension into a theater of operations for nation-states (J. Nye 2010). Further, the collective perception is that the number of incidents and the number of actors will increase in the future (Geers and Lewis 2015).

Cyberspace can be conceptualized in different manners, but a straightforward approach defines it as a hybrid composed of physical and logical layers. Its infrastructure - servers, submarine cables, internet exchange points, internet connection providers - is oriented by economic laws, limited resources, and increasing marginal costs. The logical layer - content providers, web applications, data, information - allows for economies of scale given its intangible nature (J. Nye 2010).

These features have generated high frequency and low-intensity offensive actions (Rid and Buchanan 2015), potentialized by the absence of clear framing regarding international law application.

The actors in cyberspace vary from individuals to nation-states. Individuals (Edward Snowden and Chelsea Manning), hacktivists groups, and public disclosure services (such as WikiLeaks and Cryptome) have not displayed the same sophistication as nation-states. However, their actions caused worldwide political impacts (Coleman 2014).

The core of cyberspace infrastructure is owned and managed by multinational companies and organizations such as Amazon, Apple, Facebook, Google and Twitter –, an Internet Corporation for Assigned Names and Numbers (ICANN) is responsible for the domain name system (Domain Name System - DNS) and the Internet Engineering Task Force (IETF) is responsible for establishing the internet protocols globally.

Private actors also have a market share of offensive actions. Indeed, a noticeable number of them are the providers of cyber capabilities to state actors (Kello 2017). By 2018, at least 60 countries acquired some cyber offensive artifacts (Izycki and Brandão 2019).

This panorama prompts the following questions: what is the current state of affairs regarding nation-state cyber conflict? Will firing bits and bytes become more, or as frequent as, throwing bombs and firing bullets?

The debate regarding cyberspace and cyber conflict needs to be based on evidence and not extrapolations of the worst-case scenarios (Valeriano and Maness 2018). Threat inflation is a scourge of cybersecurity, in part due to private vendors because it is good for business and also for governments to take advantage of discourse to enhance their prerogatives and powers in cyberspace.

Following the steps of Valeriano and Maness (Valeriano and Maness 2018), this research intends to analyze empirical data about cyber offensive actions performed by - or that can be attributed to - nation-states, instead of focusing on high-profile hypothetical cyber-attacks. The purpose of this research is to provide a clear picture of the stakeholders and their behavior so that future policy decisions are based on accurate observations of cyberspace.

This research has two main goals for the fields of international security and international relations.

The first is a methodological contribution. This research built an algorithm to collect and process the empirical data used to examine its hypothesis. The extensive use of Python3 and Natural Language Processing (NLP) can be adjusted to different subjects within social sciences by preparing a customized ontology.

The second contribution of this research is to gather evidence of 29 different countries engaging in offensive cyber actions and 85 nations acquiring offensive cyber technologies from private vendors. The numbers challenge the average perception of concentration of cyber capabilities in a few "traditional" actors. This implies that cyberspace, as an operational theatre, favors the diffusion of power among nation-states.

To summarize, this master's research will provide an innovative contribution with an unprecedented dataset gathered from open source and official data. Besides the raw data, this

research will provide a unique perspective by addressing the nation-state stakeholders, their behavior, and their goals when conducting cyber offensive actions.

2. Conceptual Framework

To address such a complex issue as conflict in cyberspace, it is necessary to define the issue before engaging in analysis. The first item for the scope definition regards what conflict means in the context of this research.

There is a great divide regarding the nature of cyber conflicts. A host of authors consider that cyberspace introduced a revolution to state affairs, and there is an equally engaged group that claims that it is mere technological evolution.

The revolutionary faction began with the seminal work of Arquilla and Ronfeldt (1993) - Cyberwar is coming! - and continuously assert that cyberspace conflict will eventually escalate to the level of war (Kello 2017). Similar thinking was presented in the "cyber–Pearl Harbor" scenario by Leon Panetta, Central Intelligence Agency Director (2012). Influential works by Clarke and Knake (2010) also evaluate countries according to their cyber capabilities to wage war.

To this group, there is little doubt that the coming changes will be dramatic enough to induce structural transformations in the framework and pattern of states' mutual relations. If this is the case, current concepts and dynamics will become unfit to assess and predict future conflicts.

On the other side of the spectrum, evolutionists consider that cyberspace's intrinsic characteristics will prevent a purely cyber conflict. According to Thomas Rid This realm's engagement will be a variation from countries influencing each other, through espionage and sabotage (Rid 2011), a silent and persistent battle.

Rid (2011), Lindsay (2013), and Gartzke (2013) assert that cyber offensive actions lack the kinetic effects (destruction and loss of human lives) to be an autonomous instrument to pursue political goals. Rid goes as far as to say that cyberwar will never take place, given that conflict without death and violence to achieve a political goal (Clausewitz) is not war.

In this sense, Nye points out that it is unlikely that cyber conflicts provoke escalation, because states face constraints in cyber offensive actions (2018). This, in turn, would convert the so-called "offensive's advantage" into a myth (Valeriano, Jensen and Maness 2018).

This theoretical schism appears unsolvable given the currently available evidence. Perhaps only time will settle this dispute, with the emergence of conclusive concrete cases. However, both sides agree that there is an increase in cyber engagements, and further studies about the subject are necessary.

It should be highlighted however, that offensive cyber capability applications as a support for conventional weapons are very promising. Their use for command and control, remote sensoring, terrain monitoring, enhanced communications systems, and increased striking precision is already in place and improving.

The case of the 2008 Georgian War in which intense offensive cyber actions preceded the Russian invasion is a real example of the supportive nature to conventional engagement. Several attacks against government services and denial of service attacks were seen during the confrontation (Georgia 2009).

Another interesting example where cyber actions have displayed a supporting role to conventional actions is the Russian-Ukrainian conflict (ongoing since 2014). The cases of BlackEnergy (Kaspersky 2016) and Industroyer (Cherepanov 2017) campaigns are additional evidence that cyber actions are used to degrade the opponent's morale and infrastructure as part of an ongoing broader conventional conflict.

In fact, the use of new technology in conventional operations is inexorable and constant throughout history and is accelerating with the possibilities presented by cyberspace. This, however, should not be understood as cyberwar itself, as Rid clearly stated. Despite the relevance of cyber actions as support to the conventional military operations, this subject is not going to be addressed further in this study.

To avoid trying to solve this complex theoretical issue, this research will consider a broad idea of cyber conflict that can be achieved through offensive cyber actions. According to Valeriano and Maness (Valeriano and Maness 2016), it means "the use of computational technologies for malevolent and destructive purposes to impact, change, or modify diplomatic or military interactions."

This definition includes both Computer Network Attacks (actions from cyberspace that produce effects beyond the digital realm) and Computer Network Exploitation (actions and results remain contained in cyberspace) equally relevant. This vocabulary is often used by the United States government (Kramer 2009).

It is also relevant to incorporate the idea brought by Kello (2017), referring to cyberspace as a dimension in a state of *unpeace*. The concept portrays cyberspace as an intermediate where states can engage aggressively without crossing the armed attack threshold, thus not provoking war. However, at the same time, their actions are extremely detrimental to their targets.

It is assumed that to perform cyber actions, states need power, that they derive from capabilities and intent to perform actions (Voo, et al. 2020). The concept of power is used often, however there are various definitions of power.

There are at least three dimensions of power. The first, introduced by Robert Dahl, is the ability to enforce a third-party to do as you desire, something that they would not otherwise do. The second dimension of power proposed by Peter Bachrach and Morton Baratz addresses the notion of agenda-setting or framing, without necessarily any coercion instruments. Steven Lukes created the third face of power as he indicates that ideas and beliefs can shape a desirable outcome to the one exercising it (J. Nye 2010).

The three facets of power were later reorganized by Joseph Nye between the dichotomy of hard power (coercion and material retribution induce third parties' behavior) and soft power (persuasion, ideological attraction, and agenda-setting in a cooperative fashion induce behavior).

There are examples of soft and hard power applied through cyberspace: cyber actions with kinetic consequences and cyber actions with cybernetic effects (J. Nye 2010).

Nye (2010) provides a few examples to synthesize the concepts of Soft and Hard power and its effects within and beyond cyberspace:

Table 1 – Physical and Virtual Dimensions of Cyber Power

		Cyber Effects	Kinetic Effects
Kinetic Action	Hard Power	Government controls over internet/telecom companies	Bomb internet exchanges, cut submarine cables, or bomb threat actors HQ
	Soft Power	Providing infrastructure to human rights activists	Criminally prosecuting alleged state-sponsored hackers
Cyber Action	Hard Power	Wiper attacks (data destruction), denial of service attacks	SWIFT system heists, attacks against Critical Infrastructures
	Soft Power	Set norms and standards (5G), data privacy laws (GDPR)	Disinformation campaigns, public diplomacy in social networks

Source: Nye, Cyber Power, pg. 5, 2010

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Source: Nye, Cyber Power, pg. 5, 2010

This research focuses on the bottom line: Cyber Actions taken through Hard and Soft Power. Whether that entails Cyber, Kinetic, or both effects are part of the analysis.

Regarding offensive capabilities that fulfill cyber actions, this research adopts the position of Rid and McBurney (2012) that these are "computer codes that are used or designed to be used, with the aim of threatening or causing physical, functional, or mental harm to structures, systems, or living beings."

Cardenal et al. (2017) suggest that some facets of cyber actions should be granted the status of sharp power since they are not coercive (military or economic) nor cultural/attractive (positive appeal and values). The idea is to frame actions such as censorship and disinformation (misinformation included) as exercises in sharp power.

In a similar fashion, Lopes proposes an alternative for that dichotomy called *software power*. The concept conveys alternative uses for power in cyberspace. It entices academics because it offers a view of power that allows projection without space-time conventional restraints while it is conditioned by the anarchical international order (Lopes 2016).

As a theoretical proposition, both concepts are very interesting. However, the elements that transform "public diplomacy" (soft power) into a "disinformation campaign" are, at best, murkier to be spotted in a real case. Lopes' concept is very promising, but it will not be addressed further in this dissertation. It merits a study of its own as a lens to interpret the data presented here.

Regarding the tactics in which cyber action takes shape, Ciaran Martin (2020), former Chief of the National Cyber Security Center and currently a professor at King's College, proposes a five-tier offensive cyber action level.

- Hacking: computer operations in pursuit of specific national defense objectives
- Adversarial infrastructure destruction: targeted destruction of adversary digital infrastructure
- Counter-influencing: promoting unhelpful info or 'prepositioning' on adversary critical infrastructure
- Kinetic: offensive cyber-operation to achieve significant and painful disruption in adversary country
- Systems wide: an all-out attack on military and civilian networks in the context of conflict

A similar approach is proposed by the Belfer Center for Science and International Affairs (Harvard Kennedy School) in its National Cyber Power Index 2020 – NCPI (Voo, et al. 2020). With the concept of national objectives that countries pursue with cyber means, the NCPI lists seven capabilities to be developed by nations:

- Surveilling and Monitoring Domestic Groups;

- Strengthening and Enhancing National Cyber Defenses;
- Controlling and Manipulating the Information Environment;
- Foreign Intelligence Collection for National Security;
- Commercial Gain or Enhancing Domestic Industry Growth;
- Destroying or Disabling an Adversary's Infrastructure and Capabilities; and,
- Defining International Cyber Norms and Technical Standards.

Based on these two sources, this research considered the following goals to identify offensive cyber capabilities as the wielding of cyber power:

- Surveillance - ability to surreptitiously access the digital communication, location of users (online or offline), data usage, and metadata produced (United Nations 2019)
- Disinformation - the adoption of the information disorder theoretical framework, which includes false information (inadvertently or deliberately) or genuine information or opinion to cause harm (Wardle and Derakhshan 2017)
- Espionage - unauthorized access into a system to collect information for immediate use or to manipulate the decision-making process in the long-term (Valeriano, Jensen and Maness 2018)
- Sabotage/Degradation - attempts to physically compromise the target's ability to operate properly (Valeriano, Jensen and Maness 2018)

Through soft or hard power, nation-states engage in offensive cyber actions and pursue particular national strategic objectives. None of these cyber-enabled actions are unprecedented, but their impact, scale, and low costs make this approach advantageous.

Policymakers tend to assess opponent’s behavior based on the information available about capabilities and intentions (Jervis). This research aims to present an overview of offensive cyber capabilities and their use by nation-states.

3. Literature Review

A significant number of previous researchers devoted time and effort to gather and analyze offensive cyber actions. Their objectives and methodologies are somewhat different from the ones undertaken in this research. However, they provided invaluable lessons regarding successes and pitfalls.

The book "A fierce domain conflict in cyberspace, 1986 to 2012", by Healey and Grindal (2013), is one of this research's precursors. The book collects a vast number of historical records

related to cyber conflict. It is an extensive data collection that includes actions from State and non-state actors. A few incidents are also included without acknowledgment of their occurrence.

In that same year, the United Nations Institute for Disarmament Research (UNIDIR) published a study about national cyber capabilities. The document pointed to 67 countries with civilian cybersecurity programs and 41 countries with units or military doctrines for cyber defense (2013). The document was based on National Strategies, Military Doctrines, and national legislation. It provided an official outlook of countries' intentions towards cyberspace, but it did not consider actual offensive cyber actions undertaken by nation-states.

The Wall Street Journal published an article that cataloged the world's cyber forces. The research was based on open-source material, interviews with cybersecurity experts, and historical data gathered to portray the 'new arms race' (Valentino-DeVries, Thuy Vo and Yadron 2015). The article did not discern state and non-state actors, often presenting private vendors and hacking groups as evidence of nation-state offensive cyber capabilities. The lack of rigorous criteria in classifying information weakens the conclusions regarding the countries' actual offensive cyber capabilities.

Another interesting project that collected information regarding offensive cyber capabilities is the Cyber Operations Tracker (2020), maintained by the Council on Foreign Relations (CFR). It is an ongoing database of over 300 records. The collection is a product of open-source monitoring of offensive cyber actions claimed by a nation-state. The dataset also proposes a taxonomy of incidents, origins, targets (nation and sector), and if the action is supported from the targeted country (2019). This project heavily influenced the collection proposed in this research.

Lindsay (2014) produced an interesting collection and analysis of historical records of offensive cyber actions attributed to China. The prominent cases are addressed in the study, and the conclusion is that espionage and intellectual property theft are the main objectives of Chinese offensive cyber actions. The drawback is the limitation of scope to only Chinese cases.

The collective research spearheaded by Florian Roth provided additional inspiration for this research. It is a project that gathers information regarding Advanced Persistent Threats (APT) executed or sponsored by nation-states (Roth 2019). This project is extensive in it’s special attention to attribution (normalizing different threat actors' names), the origin of threat groups (evidence that supports claims, not mere finger-pointing), and the collection of additional incident characteristics. Several of these paradigms were observed when modeling the methodology for this research.

Several other relevant works could be mentioned: Richardson (2011), Farwel and Rohozinski (2011), Bencsáth et al. (2012) and Jorge (2017). They are relevant because of the rigorous analysis of offensive cyber actions attributed to nation-states. However, the articles focus on particular incidents or campaigns - the first two address the Stuxnet case and the last two Flame, Duqu and Gauss. This limits the possibilities to extrapolate a global perspective based on a few selected cases that are considered outliers in terms of offensive actions (Valeriano and Maness 2014).

The most relevant works for this dissertation are the studies done by Valeriano and Maness in several papers and books. In the paper, '*The dynamics of cyber conflict between rival antagonists, 2001–11'*, the authors gathered over 110 incidents within interstate rivalry between 2001 and 2011. Later in their book, their collection increased to 192 incidents that covered and analyzed interstate rivalry (2014).

Their research is prolific and challenges the popular perception that cyberspace is on the brink of a global conflict. They provide solid evidence to support the claim that cyber conflicts are regionally oriented and usually involve countries with a prior geopolitical interest in the dispute.

According to Valeriano and Maness (2018), nation-states' use of offensive cyber capabilities is constrained, and there are no escalatory patterns identified so far. The most common goal for countries is to conduct espionage or create low severity disruption of their targets' online services.

There are several works regarding empirical analysis of offensive cyber actions. However, few of them delve into a broad comparative analysis. Inquiries regarding the causes or objectives of cyber actions are rare. These previous studies are relevant as they present interesting strategies regarding analytical tools and methodology. Thus, they have influenced this research.

An additional concern is the use of frameworks that only address actions associated with destruction and death, given that these events, albeit possible, have not happened. This is the reason to create an analytical framework to understand the lower-intensity conflicts.

4. Research Questions

The combination of the low cost of entry, the relative anonymity (plausible deniability), and the fact that cyberspace enhanced traditional means of statecraft has turned cyberspace into an attractive theater of operations for countries.

This research`s focus will not be on the potential consequences of cyber actions but the actual usage by nation-states during the last twelve years. Arguably, countries can destroy each other through conventional nuclear weapons, but they choose not to do so. Thus, one should not consider the potential damage of a cataclysmical offensive cyber action but base the analysis on empirical grounds.

The main objective is to deliver an in-depth portrait of offensive cyber capabilities and actions by nation-states over the last decade. The overarching results will allow the academic community to better understand different behaviors, strategies, and objectives that countries display when engaging in cyberspace.

To achieve the main objective the research will collect, classify and describe the goals of cyber offensive actions, its protagonists, and its targets.

As a secondary goal, this research intends to use the available data to enquire if there is a presence of a hegemon in cyberspace, with capabilities to act across the globe in an unmatched manner. Or if there is a bipolar confrontation where the United States and China strive for

leadership. As a third scenario, if there is a multipolar cyberspace where several regional actors display similar capabilities to act and engage.

Finally, the volume of data will allow the uncovering of trends associated with cyberspace and nation-state behavior. This will be useful for future researchers, to highlight subjects that were not fully explored in this dissertation for the sake of brevity.

5. METHODOLOGY

There are a few previous works that engage in cyber-attack historical analysis such as Healey and Grindal (2013), the UNIDIR (2013), a study published by the Wall Street Journal (Valentino-DeVries, Thuy Vo and Yadron 2015), the Council of Foreign Relations (2020), several open-source projects available at code sharing platforms (Bandla 2020), the Mitre Corporation (MITRE 2019), and Malware Information Sharing Platform – MISP (2019). They are all relevant because of the prior collection of data regarding cyber-attacks and how to process them. However, they have not delved into the motivations, the goals, and the intended targets of the attacks.

Despite the numerous references of cyber-attacks in traditional media outlets, rarely do they present technical remarks or concrete evidence supporting their stories. They are often the product of human sources that disclose details about a cyber-attack, such as the attribution of authorship, techniques employed, and the target's compromise level. However, without backing it up with data and concrete evidence, a story can be told to serve a political purpose, whether to be detrimental to the victim or the alleged perpetrator of the cyber-attack.

Thereby, to evaluate the current condition of cyber conflicts, this research sought objective data concerning cyber-attacks and Nation-State offensive capabilities. The goal is not to rely solely on conventional news, instead, the research identified sources of technical reports that could withstand a rigorous analysis. As a result, this research relied on four major sources:

- technical reports by cybersecurity private companies and national incident response teams (CSIRTs);
- independent studies by non-governmental organizations and universities;
- information leakage suffered from private vendors of spyware and governmental agencies;
- reports from export controls of European countries.

The four different sources of information provide insight into distinct features of Nation-State offensive cyber capabilities.

The first two – technical reports and independent studies – are clustered together for collection and processing. They usually describe complex campaigns that are frequently referred to as Advanced Persistent Threats (APT). They display detailed information about sophisticated long-term campaigns conducted or sponsored by Nation-States. The data provided by these

documents is strong evidence of both offensive cyber capability and intent, given that they analyze actual cyber-attacks.

This research gathered 1,885 technical reports describing cyber-attacks from 2008 to 2020. The research organized the documents into campaigns or groups based on who the attacks were attributed to, which resulted in 461 different threat-actors.

The technical reports and independent studies gathering process is described in the next session.

5.1. *Research Limitations*

This research sets ambitious goals for itself, but some limitations regarding the methodology will be explicitly addressed in this subsection.

The data gathering is dependent on the publicizing of cyber offensive actions and cyber capability acquisition. Therefore, there are unknown state-sponsored cyber actions that were not publicly disclosed and remained beyond this research's reach (Voo, et al. 2020). That does not mean that the data is not representative, but that it is only a fraction of the whole.

Another limitation to consider are the data sources. This research went to great lengths to gather a host of sources. Nevertheless, 80.6% of the dataset is provided by cybersecurity companies' technical reports. Given the nature of their services, some details might not be shared because of confidentiality clauses (Egloff and Wenger 2019). Alternatively, the analysis might be considered skewed for marketing purposes (Valeriano and Maness 2014).

Conversely, market competitiveness creates a balance that can be used by private companies to challenge fragile assumptions or conclusions once a technical report goes public. This reduces the possibility of inaccurate reports (Eichensehr 2020).

Western sources are predominant (73%), from which 48% are from American companies. This suggests that most of the targets of the cyber offensive actions are from western countries (customers of those companies).

Finally, the technical knowledge of the author is another limitation. Technical reports often delve into details that could not be validated or refuted by the author. Thus, the content is assumed to be accurate or questioned by another technical report (market competition).

Despite these limitations, the research data represents a significant sample from cyber offensive capabilities and actions from 2008 to 2020, allowing their use as projections on a global scale.

5.2. *Technical Reports and Independent Studies*

The technical reports and independent studies collection process was made possible by creating and maintaining automated scripts, specially developed for this purpose. This was done through several scripts built with the Python programming language.

The starting point was a sample-dataset provided at GitHub, the repository kbandla/APTnotes. This repository contained over 300 reports (from 2008 to 2016) from 20 different providers who described cyber-attacks considered APTs. Most of the reports were about offensive actions conducted by Nation-States and directed against other countries.

The first step was creating a model for identifying new documents that contained information about similar cyber-attacks, preferably conducted or sponsored by Nation-States.

Among the 20 different providers originally collected by the kbandla/APTnotes repositories were cybersecurity vendors, CSIRTs, and NGOs. From these categories, this research undertook an effort to identify companies and institutions with similar profiles.

The search for private cybersecurity vendors was the easiest task since most private companies advertise their products by publishing blog posts and white papers that describe APT threat actors. Nation-States are high-profile and first-tier actors facilitated the search because the reports received traditional media coverage.

The Forum of Incident Response and Security Teams (FIRST) was an important source to CSIRTs. The FIRST gathers 531 incident response teams across the world. Most of the CSIRTs have a webpage where they share content about cyber-attacks relevant and within the scope of this research.

To look for NGOs and independent cybersecurity researchers was more challenging. The fact that there is no equivalent to FIRST demanded a decentralized search across open-source data. Cybersecurity conferences – such as DefCon, Black Hat, Virus Bulletin – were excellent places to find NGOs and independent researchers publicizing their findings.

The tracking of technical reports and independent studies was a fundamental step towards the dataset for this research. Once those sources were identified, they were put into a daily monitoring routine. The Python scripts automatically "visited" the APT source's web pages to look for new reports or blog posts. Once the script found a new piece of information, they retrieved the content (e.g., web scraping). They sent an alert to notify a human supervisor in order to validate the collected item.

This process is operated incrementally. Thus, a new source can be included in the script, and the news reports are collected as they are published. The previous APT reports or blog posts are also collected retroactively to increase the dataset.

By the end of this dissertation's collection – December 2020 – 234 different sources were being monitored daily by the proprietary Python scripts.

5.3. *Data Breaches*

This research also gathered data from private vendors and state-sponsored APT threat actor's data breaches. The leaks have granted unprecedented access to the restricted private market and the development of offensive cyber capabilities.

There have been two major data breaches from offensive capabilities in private vendors from offensive capabilities: from Gamma Group in 2014 (WikiLeaks 2014), from Hacking Team in 2015 (WikiLeaks 2015). Both of the private vendor's data breaches are not clearly attributed to a state-actor. However, the sheer volume of information disclosed is remarkable. The Gamma Group breach amounted to 40 GB and included customer information, manuals, training materials, and source code for the spyware sold. The Hacking Team leak included more than a million emails exchanged from the Italian branch, overseas offices, and government customers.

The attack on the CIA became known as Vault 7. The agency suffered a cyber-attack from a non-governmental group, and its cyber weapons were published online (WikiLeaks 2017). The leak was claimed by the Shadow Brokers, an alleged hacktivist group that wanted to sell the exploits and later publicize the tools used by the American intelligence agency. There is a suspicion that the Shadow Brokers were, in fact, a hacking group working for the Russian government, but no evidence supporting this was presented (Risk Based Security 2016).

An Iranian state-sponsored APT threat-actor also suffered a data breach. A group called Lab Dookhtegan (Cimpanu 2019), allegedly composed of dissidents from the Iranian Revolutionary Guard cyber branch, leaked information about Iranian hackers' personal identities, details about their attacks, and source code of offensive cyber capabilities. Lab Dookhtegan remains active to this day, publishing new information monthly.

WikiLeaks gathered a massive amount of information from the data breaches and, through its web interface at www.wikileaks.org facilitated the collection for this research. By simple queries to WikiLeaks' online platform, data regarding offensive capabilities acquisition and government tools could be gathered and downloaded. In some cases, it was possible to infer if the entity responsible for the purchase was a military branch, law enforcement, or an intelligence agency based on the information released during the breaches.

5.4. *Report from Exports Controls*

The fourth source for this research was reports collected from export controls publicized – the countries in which some private vendors have their headquarters. This data was available for only a few countries: the United Kingdom, Switzerland, Germany.

A third-party (McGrath, Novak and Gallagher 2016) gathered and indexed the open-source project called Transparency Toolkit. The data is available for download and online queries.

The reports did not identify the private vendor selling, nor the exact software being sold. However, they identified the country for whom the export license was issued. That helped as additional evidence of intent from the acquiring country.

5.5. *Processing the data collected*

The collected information comprises two datasets relevant for this research but with distinct characteristics. The technical reports provided information about actual offensive cyber capabilities. The second set was collected from the data breaches and granted information about countries' intent by developing or acquiring offensive cyber technology from private companies.

Both sets provided invaluable information about Nation-States offensive cyber capabilities. The first gave insights into 34 countries that have displayed offensive capabilities. The second set of information provided a detailed overview of the 85 countries that acquired offensive capabilities, though the dataset lacks evidence for their actual use.

The first dataset was analyzed with Natural Language Processing (Spacy – Python 3.7). Spacy is a Python library that enables text processing and entity extraction without the loss of syntactical meaning. This processing step required more customized Python scripts for the adequate use of Spacy.

In the next section, the natural language process is described.

5.6. *The Classification and Entity Recognition*

Python scripts for natural language processing were applied into the first dataset. This process included building custom dictionaries (Appendix D), removing stop-words from the text, word lemmatization, phrase matching, and text extraction.

The overarching goal of the scripts was looking for cyber-attack attribution (whether it was state-executed, state-sponsored, or a non-state actor), information on the victims (if it was a government and/or which industry it targeted), the countries affected by the attack, and the purpose of the cyber-attacks/campaigns (e.g., financial gain, espionage, sabotage). It was also possible to collect and classify MITRE Attacks Techniques and CVEs employed during the offensive actions.

The entity recognition was entirely done using Spacy and its Large English library (a total of 65,000 English words), with the inclusion of few additional particular expressions. Since most of the documents were originally written in English (over 95%), this facilitated the use of Spacy's text extracting features. This research used the free service provided by Google Translator to translate all documents into English.

Initially, this research selected a random sample of documents to submit it to human classification and text extraction. Thus, creating a dictionary of words associated with the classification criteria. For example, for identifying a state-directed or state-sponsored cyber-

attack, the dictionary included the following words: state-sponsored, state conducted, state-led, and state support.

The dictionaries used for classification were a preparatory measure done before the automated text extraction. Nevertheless, it was common to append new words to the dictionaries as more documents were submitted to the next phase. This was done during Python scripts human supervision.

The text extraction automation process had two preparatory steps performed with Spacy: the exclusion of stop-words and the word lemmatization.

Stop-words are broadly defined as common words that do not interfere with the natural language process. Thus, as the 362 words – provided by Spacy's English Library default feature – do not help clarify the meaning of sentences, they are automatically excluded from the process.

The next step was the lemmatization of the text. This process reduces the words of the text into their radical form (e.g., the words processing and processed are understood by the script as "process"). Despite the reduction to their radical, the text still retains its syntactic meaning, so the original sentence's purpose is not lost during the script execution.

After removing stop-words and the lemmatization, the text is ready for phrase matching and text extraction step.

The phrase matching iterated the dictionaries built in the preparatory step aforementioned. Spacy automatically classifies the processed text according to its syntactical meaning. Thus, the comparison of dictionary words to the main-text had an improved performance because it was oriented to their meaning. Nationalities' adjectives and countries' names were only compared to the GPE word category provided by Spacy. The hacking group and victim's names were solely compared to the ENTITY word category.

Once the processing script matched a dictionary's word to the main text, it was stored in the database as an attribute for the document. Thus, every document processed was compared to every dictionary, and when a match was found, the information was added in a database. This allowed for multiple classifications of each document.

An additional classification was performed to cluster the reports into campaigns/threat actors. According to the myriad of names that private vendors use to refer to. Therefore, sources were classified as known APT groups base on the numerous names used by vendors. the, sources classify known APT groups according to the myriad of names that private vendors use. This was instrumental in performing analysis regarding the capabilities and intents of Nation-States.

The result was a dataset that classifies each document regarding authorship, if nation-affiliated, which group was attributed, the target's nature, and the duration of the cyber-attack/campaign.

5.7. *Parsing Structured Data*

The second dataset was built from structured data. The data breaches from Hacking Team, Gamma Group, Vault 7, and Lab Dookhtegan consisted of a huge volume of files. Wikileaks successfully indexed the files with a user friendly interface. It allowed queries to search for countries that developed cyber weapons and those that acquired offensive cyber capabilities from private vendors. There was evidence to attribute the spyware purchase to a military force, law enforcement, or intelligence agency in some cases.

The evidence provided by both leaks is abundant. Besides commercial information about how the spyware operates; the e-mail communication, invoices from the purchases, and even spreadsheets detailing the buyers provided a full picture of this share of the cyber-weapons market.

On a few occasions, the second dataset's information was successfully correlated to the information collected in the first dataset (the intent was materialized in actual capabilities). This was the case for reports from The Citizen Lab and Amnesty International that corroborated the purchases of cyber offensive capabilities from Morocco, United Arab Emirates (UAE), Saudi Arabia, and Bahrain.

Based on the available information, this research considered a set of twelve private vendors as providers of offensive cyber capabilities: Amesys, Area SpA, Cyberbit, Dreamlab, Elbit, FinFisher, Hacking Team, Sandvine, NICE Systems, NSO Group, SS8, and Trovicor (Teach 2020).

Thus, the parsing of data searched for evidence of commercialization of cyber capabilities from those twelve providers to any Nation-State. Once the script identified a match to both conditions, it added the database's information to further analysis.

5.8. *Threat actors and document clustering*

A factor that improved attribution is the increase of evidence accumulated over the years. Threat actors have been monitored for long periods of time, and information is shared among multiple stakeholders in the cybersecurity community (Roth 2019). In most cases, only the correlation from different malware and campaigns over long periods of time allowed an attribution with a higher confidence level.

One additional variable must be explained about attribution and its consequences for this research. The attributed attacks can describe a threat group, intrusion sets, and campaigns. The clustering of documents within the same threat actor based on different methodologies is the minimal analytical unit for this research (MITRE 2019).

Despite significant improvements, attribution remains a challenge in cyberspace. Those mainly responsible for it are research institutions and private cybersecurity vendors, but even

nation-states also attribute offensive cyber actions more often in the last few of years than during the early 2000's (Egloff and Wenger 2019).

The plausible deniability is also a concern because no state actor accepted or claimed responsibility for a particular offensive cyber action attributed to another country. It should be noted that the authorship of even kinetic actions might remain unclear. Recent examples of those are the Malaysian Flight 17 (shot down over Ukraine, likely by militias armed with Russian equipment) and the Abqaiq–Khurais refinery attacks in Saudi Arabia (allegedly by Houthi rebels armed with Iranian drones). Neither of these attacks were clearly attributed.

Each document is processed individually and, if possible, is indexed to a threat actor (based on different methodologies provided by its original author). This set of documents allows the threat actors profiling: motivations, resources, targets, preferred sectors, and state-affiliation. It also allowes for the cross-checking of references from multiple vendors, increasing confidence in the analytical process.

Hence, the set of documents provides attributes to the threat actors, and its affiliation to a country is the object of the analysis for Nation-State behavior in cyberspace.

An additional challenge is faced and created by the cybersecurity vendors. A myriad of vendors addresses the same threat actor with different names within the cybersecurity industry. It occurs due to human, technical and operational reasons (Roth 2018).

Due to the "human factor", cybersecurity vendors name threat actors after operations (e.g., Electric Powder) or malware used (e.g., NetTraveler). Also, vendors do not relate to threat actors (e.g., TEMP.Zagros and MuddyWater).

As for technical reasons, threat actors often share tools and infrastructure (e.g., Winniti) and split or join forces. Most importantly, vendors see different pieces of the same puzzle (different malware samples, C2 infrastructure, TTP, and IoCs).

Finally, the ability to conduct forensic investigations in ways in which other vendors might disagree with, is a strong reason for the multiplicity of threat actor names. A second operational reason is market competitiveness. By creating their own names, vendors do not implicitly recognize their competitor's research as better, more thorough, or precedent setting.

In order to avoid double-counting the same threat actor, the threat actors' synonyms are compliant with Roth (2018), MISP (2019), and MITRE Corporation (2019). This means that the most accurate landscape of threat actors available by the end of 2020 was taken. As new information is uncovered, groups with no established affiliation certainly will be tracked.

5.9. *Merging the Datasets*

Since the main goal of this research is to portray a clear picture of the cyber offensive capabilities of Nation-States. To achieve that goal, it was necessary to combine the two datasets.

Whenever available, the information collected was associated with a country (purchase, origin, or target), a date/period (acquisition or attack), and the victim's characteristics.

The compiled dataset is the basis for the Nation-State behavior analysis accomplished in this research. It was possible to identify which demonstrate intent (acquired technology that enables them to perform cyber-attacks) and which states displayed actual offensive cyber capabilities (performing cyber actions).

In the next section, we will perform a comprehensive analysis of the dataset. We will go deeper into the cases of documented cyberattacks attributed to Nation-States. The origins and targets of the attacks, their relation to each other, and regular geopolitical issues will be the subject of analysis.

6. Overarching Results

The data gathering process collected over 3000 documents. After the analysis, 1,885 documents remained describing APTs campaigns/threat actors. The analysis performed a classification of each document concerning the support of state-actors.

As mentioned before, the attribution process is a complex endeavor. Nevertheless, 1,034 documents (54.9%) establish some level of authorship. In most cases, the technical analysis identified the threat actor, its idiom, country, or origin region.

In some cases, there is the attribution of a threat-actor nationality, but there is no evidence that it had the support, sponsor, or acquiescence of the hosting country. In light of this, it became important to undertake this dichotomous classification within documents: state-sponsored attacks and independent threat actors acting from a particular country or region.

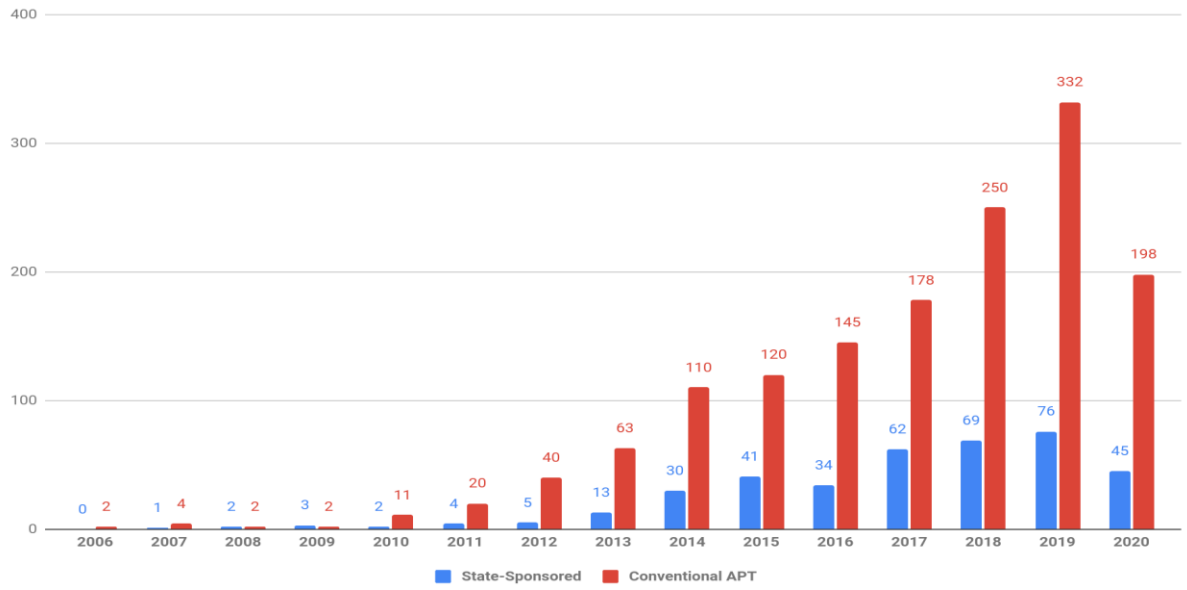
This research adopts Tim Maurer's notion of proxies acting on behalf of governments, i.e., when an intermediary conduct or contribute to a offensive cyber action that is enabled knowingly by a beneficiary (2018). Three forms of state-sponsored relationships are defined:

- Delegation: the principal grants authority to an agent to act on its behalf
- Orchestration: providing support (ideational or material) and directing them at particular targets
- Sanctioning: tolerates the actions of the threat-actor despite having the capabilities to stop it

From the documents with attribution, a total of 389 documents presented evidence of state-sponsored cyber offensive activities. The number represents 20,6% of the 1,885 documents and is equivalent to 37.6% of all documents with some attribution. It is an impressive figure, especially in light of the common idea that attacks remain anonymous on the internet.

Another interesting feature provided by the dataset is the increase of cyber-attacks during the 2006 and 2020 period.

Figure 1 – Number of reported APTs attacks (2008-2020)



Source: Izycki, Eduardo

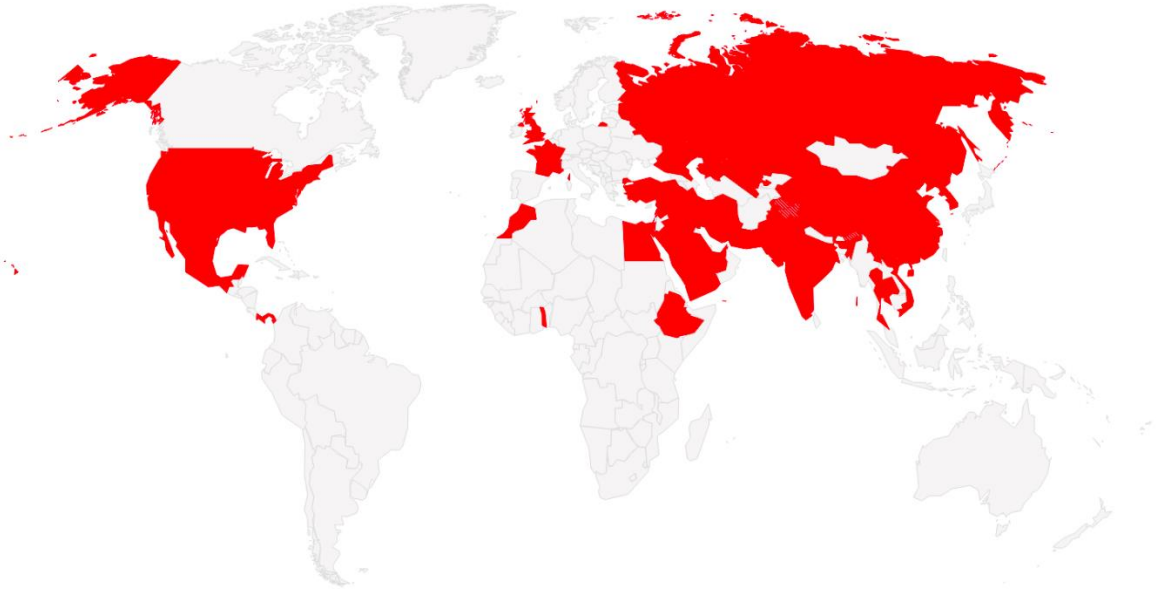
The reports are systematically increasing over the years. The 2020 apparent drop is probably due to the natural delay in producing reports as they refer to activities from the weeks and months before.

The results of the research also validate an established idea: multiple actors are engaging in offensive actions in cyberspace. However, the figures and the countries involved might come as a surprise. There is evidence that 29 different nations have already performed offensive cyber actions, either directly or by supporting a threat actor.

The list goes well beyond the traditional cyber powerhouses: China, Russia, Iran, Israel, North Korea, and the United States. It includes the likes of Bahrain, Egypt, Ethiopia, France, India, Iraq, Lebanon, Mexico, Morocco, Kazakhstan, Pakistan, Panama, South Korea, Syria, Saudi Arabia, Thailand, Togo, Turkey, the United Arab Emirates, the United Kingdom, Uzbekistan, Vietnam, and Yemen.

The 29 countries have proven offensive cyber capabilities and have demonstrated the intent to act within cyberspace.

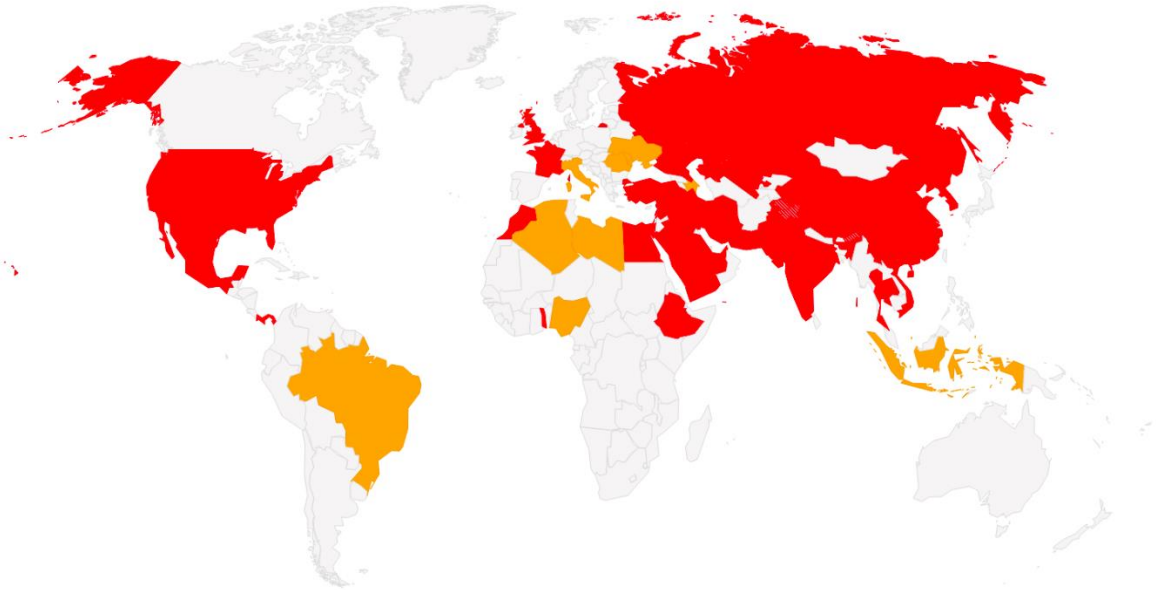
Figure 2 – Countries with state-sponsored APT activity (2008-2020)



Source: Izycki, Eduardo

The figures became even more impressive for the cases of native threat actors identified without evidence of state support. A total of 40 countries were shown to have indigenous human resources to perform sophisticated cyber offensive actions.

Figure 3 – APT activity attributed to a country without evidence of state support (2008-2020)



Source: Izycki, Eduardo

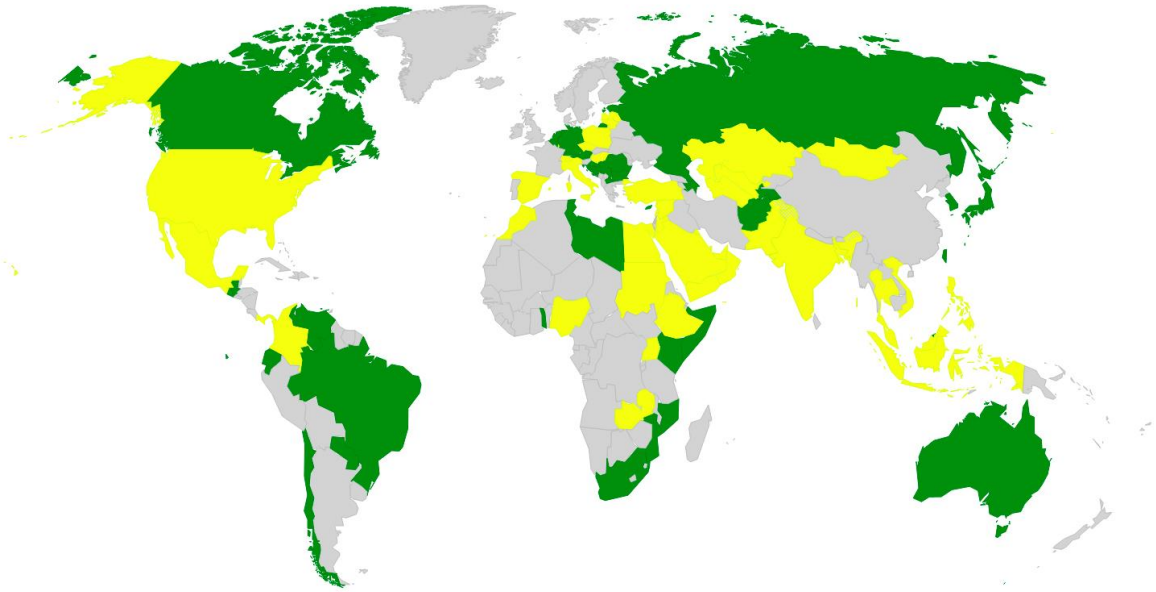
The included countries with APTs originating from its borders are Brazil, Ukraine, Indonesia, Italy, Romania, Azerbaijan, Algeria, Nigeria, Palestine, Libya, and Moldova.

The 11 aforementioned countries are considered to have proven indigenous offensive cyber capabilities despite no evidence of allocation to their local government.

The dataset also portrays a host of 85 countries that acquired offensive cyber capabilities from the private sector, although no concrete evidence of its use has been provided. This staggering number coupled with the sophistication level presented by each software acquired suggests that offensive capabilities are widespread in cyberspace.

Moreover, the purchasing of state-of-the-art offensive cyber capabilities was not a one-time deal; 45 countries (52,9%) acquired offensive solutions more than once. It consists of an additional confirmation of intent by Nation-States to be assertive in cyberspace.

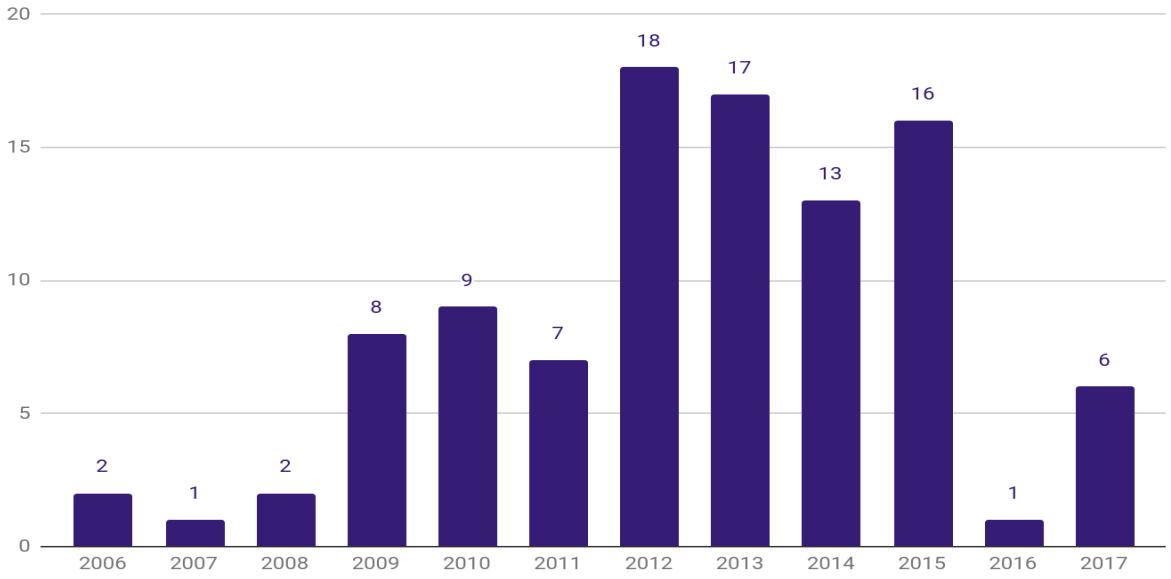
Figure 4 – Cyber offensive acquisition from third party vendors (2008-2020)



Source: Izycki, Eduardo

The purchasing of cyber offensive capabilities presents a similar pattern of increases over the years compared to APTs. Unfortunately, the acquisition data is unknown in several cases. Furthermore, this information was dependent on data breaches and public reporting, both of which occur with a considerable delay.

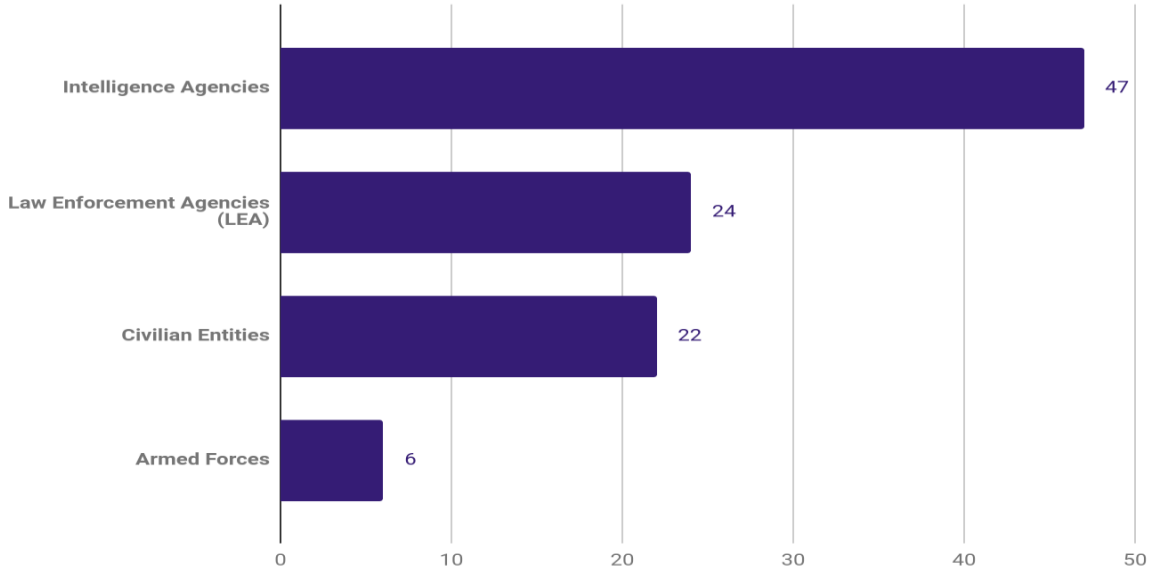
Figure 5 – Cyber offensive acquisition yearly distribution (2008-2020)



Source: Izycki, Eduardo

The dataset also provides evidence that allows us to speculate about the intent of offensive cyber capabilities acquisition. In 99 cases, it was possible to identify the national entity responsible for the purchase. This research classified entities in four categories: Law Enforcement Agencies (LEA), Intelligence Agencies, Armed Forces, and Civilian Entities.

Figure 6 – Cyber offensive acquisition customer distribution (2008-2020)



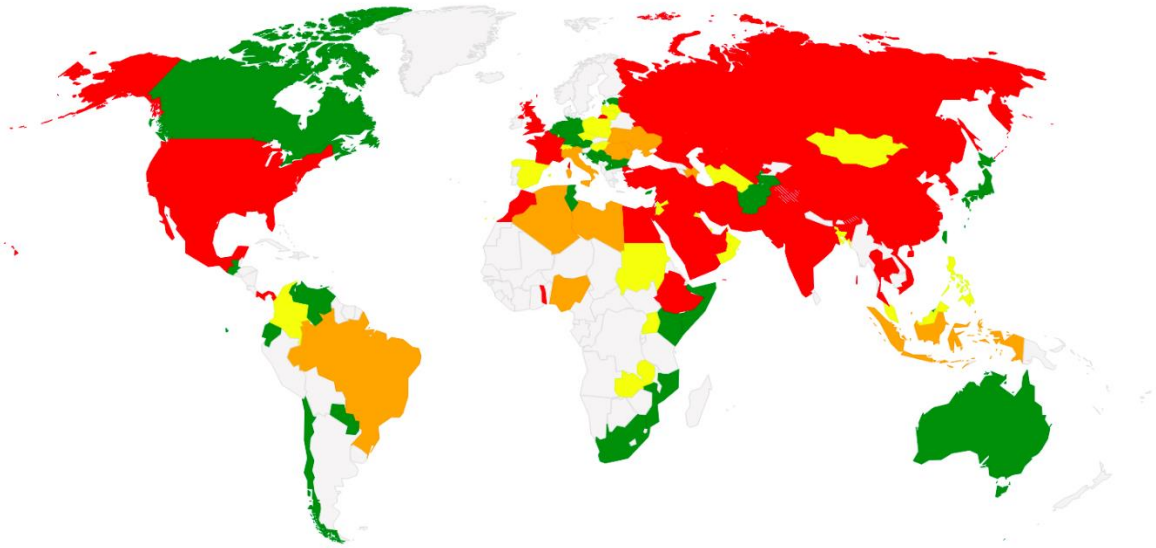
Source: Izycki, Eduardo

Intelligence Agencies (47) and Armed Forces (6) are purchasing offensive cyber capabilities which strongly suggest the extraterritorial use of those assets. Arguably, even LEA could operate outside their own borders. However, that is less likely given the judicial oversight regarding their use (at least nominal).

The civilian entities that acquired offensive cyber capabilities are mostly related to ministries of telecommunications, finances, and local governments. Therefore, it is unlikely that their regular use would result in extraterritorial consequences.

The following picture portrays a map where all the 95 countries identified by this research data are presented. The countries with at least one state-sponsored APT (red), countries with at least one APT from a domestic threat-actor (orange), countries with multiple purchases (yellow), and countries with at least one acquisition (green). In the cases where countries fit in more than one category, the country is presented by the color scale (from red to green).

Figure 7 – Global summary of Nation-State cyber offensive capabilities (2008-2020)



Source: Izycki, Eduardo

The landscape displays an abundance of Nation-States with offensive cyber capabilities. Over the last decade, the number of players, capacity, and intent has become more noticeable. The next sections will address different phenomena (such as targeting, objectives and complexity).

7. Nation-State Cyber Offensive Actions

This section is dedicated to an in-depth analysis of offensive cyber actions attributed to Nation-States. The state-sponsored threat actors, target geographical dispersion, the preferred sectors, the actions complexity, and the purpose of the attacks will be addressed in detail.

7.1. *Threat Actors*

As explained in the methodology section, threat actors are classified based on different methodologies. They represent groups of intrusive activities that may occasionally overlap but are useful for analytical purposes.

The following table illustrates the number of state-sponsored threat-actors identified (first column) within the dataset and the total documents indexed to each country (second column). The proportion of threat-actors and documents indicates the available information regarding threat-actors, i.e., the bigger the number of documents, the more details regarding that country's offensive cyber actions.

The numbers display the traditional countries occupying the top of the table (China, Iran, Russia, United States, North Korea, and Israel). There are 14 countries in an intermediate position that display more than one active threat actor supported by a few documents. The last 9 countries have a single threat actor identified, and the documents all relate to a single deployed campaign.

Table 3 – Number of threat actors and documents related (2008-2020)

Country	Threat Actors	Documents
China	42	75
Iran	12	38
Russia	12	48
United States	6	13
North Korea	4	32
Israel	3	6
Kazakhstan	3	3
Ethiopia	3	5
Lebanon	3	3
Egypt	3	4
Pakistan	3	8
United Arab Emirates (UAE)	2	4
India	2	3
South Korea	2	2
Syria	2	3
Turkey	2	5
United Kingdom	2	6
Vietnam	2	5
France	1	3
Uzbekistan	1	2

Source: Izycki, Eduardo

The number of state-sponsored threat actors is the first key indicator regarding countries' behavior in cyberspace. It signals the offensive diversity displayed by the country since they represent different intrusions techniques. Thus, countries with a bigger number of threat groups are considered offensively more capable.

It should not be taken as an absolute measure because it depends on uncovering a threat-group in action. The numbers reflect only the known threat-actors and those that were attributed as state-sponsored. Thus, other countries may be on the list, and the actual number of actors is much higher for the countries already on the list.

7.2. *Indigenous Technology or Outsourcing*

Another difference regarding the state-sponsored threat-actors is the deployment of indigenous technology or outsourced offensive capabilities.

A cluster of countries whose threat-actors develop or adapt publicly available artifacts to perform cyber offensive actions. The decision to use public tools often shared with cybercriminal non-state actors is a conscious decision to conceal the threat-actor origin. Using the same backdoors and malware, state-actors intend to blend in, using false-flags and a more challenging attribution process (Bartholomew and Guerrero-Saade 2016).

The second group of countries deployed acquired solutions from private vendors and later self-made cyber offensive technology. Countries first acquired and then developed their own tools suggesting that there is a maturing process regarding the use and development of cyber offensive capabilities among nations.

The third tier comprises countries that deployed offensive capabilities from private vendors or completely outsourced the offensive actions performed on their behalf. This is the case in Kazakhstan (Hunter 2016), UAE (Bing and Schectman 2019), Iraq (Senft, Dalek, et al. 2014), Yemen (2018), and Thailand (CitizenLab 2014).

Table 4 – Indigenous or outsourced cyber offensive capabilities (2008-2020)

Indigenous	Both Uses	Outsourced	
China,	Lebanon,	Kazakhstan,	Iraq,
Russia,	India,	Ethiopia,	Yemen,
United States,	Pakistan,	Egypt,	Bahrain,
North Korea,	Vietnam,	Morocco,	Thailand,
United Kingdom,	Turkey,	UAE,	Panama,
Iran,	South Korea,	Mexico,	Togo
Israel,	Syria,	Saudi Arabia,	
France	Uzbekistan		

Source: Izycki, Eduardo

This three-layer level suggests that there is a difference regarding the autonomy of offensive cyber capabilities. The development of local technology suggests that these countries

would customize their tools to engage particular targets. Moreover, they could sustain trade embargos or hostilities and continue to engage in offensive cyber actions. The lower level is dependent on third-parties, most of the western nations, that could disable the necessary infrastructure for the deployment of offensive tools, rendering them inoperative.

7.3. *Target's Geographical Dispersion*

A second key indicator extracted from the dataset of state-sponsored APTs is the target's geographical dispersion. With the use of natural language processing, the research produced a list of threat actor's targets.

By grouping threat actors to their state-sponsored government, the research accomplished/created a target geographical dispersion landscape. The following table illustrates the total of unique targeted countries, the most frequently targeted country, and the region most targeted by each country (the sum of referenced attacks against multiple countries).

Table 5 – State-sponsored geographical distribution (2008-2020)

Country	Country's Region	Unique Targets	Most Frequent	Prevalent Region	Total Targets
Russia	Europe	74	Ukraine	Europe	204
United States	Americas	68	Iran	Europe	121
North Korea	Southeast Asia	64	South Korea	Southeast Asia	175
China	Southeast Asia	61	China	Southeast Asia	316
United Kingdom	Europe	61	China	Europe	86
Iran	MENA	47	Iran	MENA	179
Ethiopia	Africa	25	Ethiopia	Africa	31
Lebanon	MENA	23	Lebanon	MENA	24
Israel	MENA	21	Iran	Southeast Asia	31
Syria	MENA	21	Syria	MENA	24
France	Europe	19	Iran	MENA	26
Turkey	MENA	16	Syria	MENA	23
Pakistan	Southeast Asia	15	India	Southeast Asia	28
Vietnam	Southeast Asia	13	Vietnam	Southeast Asia	40
Saudi Arabia	MENA	12	Saudi Arabia	MENA	22
UAE	MENA	11	UAE	MENA	17
South Korea	Southeast Asia	9	North Korea	Southeast Asia	9
Kazakhstan	Central Asia	7	Kazakhstan	Europe	10
Mexico	Americas	5	Mexico	Americas	14
India	Southeast Asia	4	Pakistan	Southeast Asia	5
Bahrain	MENA	2	Bahrain	MENA	2
Egypt	MENA	2	Egypt	MENA	4

Morocco	MENA	2	Morocco	MENA	4
Panama	Americas	2	Panama	Americas	2
Yemen	MENA	1	Yemen	MENA	2
Iraq	MENA	1	Iraq	MENA	2
Thailand	Southeast Asia	1	Thailand	Southeast Asia	1
Togo	Africa	1	Togo	Africa	1
Uzbekistan	Central Asia	1	Uzbekistan	Central Asia	2

Source: Izycki, Eduardo

The top 6 countries attacked more than 45 unique countries, displaying a global distribution of targets and an impressive number of total attacks (over 85 targets). They are Russia, the United States, North Korea, China, the United Kingdom, and Iran.

A second cluster of countries is discernible. Their most frequent targets are foreign countries, an indication of extraterritorial behavior. Despite that, their behavior appears regionally oriented as their prevalent region is the one in which they are located. They are Lebanon, Israel, Turkey, Pakistan, France, Vietnam, India, and South Korea. France and Lebanon are the only two countries that attacked more frequently outside their region (MENA and Europe, respectively).

The third tier of countries are internally oriented, i.e., the most common target is located within their borders, and when the attacks were extraterritorial, the person/institution targeted was national. That is Ethiopia, the UAE, Syria, Mexico, Kazakhstan, Bahrain, Egypt, Morocco, Panama, Yemen, Iraq, Thailand, Togo, and Uzbekistan.

Additional insight is the strong correlation (25/29 - 86%) between the attacker's origin and its preferred target region.

If focused on the target, the results are somewhat similar. Considering the origin of the target and its most frequent attackers, in 51/82 countries (62.2%), most attackers are from the same region. And 11 of those countries have threat-actors from their own country as the most frequent attacker. The own state-sponsored attacks are the most common.

This evidence suggests that offensive cyber actions appear to be heavily influenced by geography and geopolitical imperatives.

7.4.*Preferred Targeted Sectors*

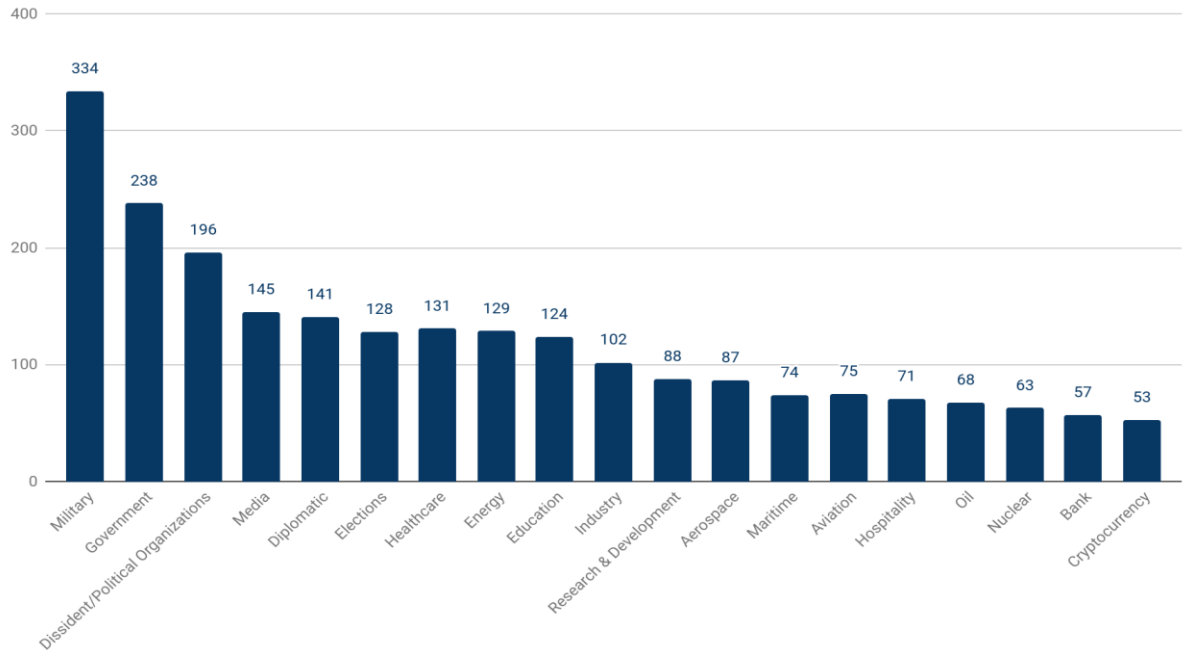
The third key indicator produced from the dataset of state-sponsored APTs is the most targeted sector. Once again, with natural language processing, the research produced a list of economic and organizational sectors most frequently the target of state-sponsored APTs.

The Malware Information Sharing Platform (MISP), an initiative carried out by the Computer Incident Response Center Luxembourg (CIRCL), was the basis for the classification of APTs attacks regarding its preferred sectors. MISP is an open-source framework used by more

than 6000 entities, and it is a benchmark for information sharing of threat intelligence, including cybersecurity indicators.

The most frequently targeted sectors are represented in the following table. The fact that Military, Government, Diplomatic, and Elections are at the top 6 targeted sectors illustrates how nation-states APTs target other government functions.

Figure 8 – State-sponsored APTs targeted sector distribution (2008-2020)



Source: Izycki, Eduardo

Delving into data extracted from the state-sponsored APTs dataset, the following table aggregates the sectors most commonly targeted per country.

Table 6 – Preferred targeted sectors distributed by country (2008-2020)

Countries	Preferred Sectors (Referenced Documents)
Russia	Government (62), Dissident (43), Military (98), Diplomatic (51), Elections (46)
United States	Government (4), Military (8), Energy (4), Research & Development (4), Nuclear (7)
North Korea	Government (15), Military (32), Aerospace (14), Cryptocurrency (18)
China	Government (62), Dissident/Political Organizations (52), Military (89), Healthcare (50)
United Kingdom	Government (3), Military (4), Nuclear (3)
Iran	Government (30), Military (32), Energy (23)
Ethiopia	Dissident/Political Organizations (4), Media (3)
Lebanon	Ten sectors tied (2)
Israel	Military (7), Industry (9), Nuclear (8)

Syria	Government (3), Dissident/Political Organizations (3)
Turkey	Government (5), Military (4)
Pakistan	Government (7), Military (15), Diplomatic (7)
Saudi Arabia	Government (4), Dissident/Political Organizations (5), Media (4)
UAE	Government (6), Dissident/Political Organizations (9), Military (6), Media (7)
South Korea	Dissident/Political Organizations (2), Elections (2)
Kazakhstan	Dissident/Political Organizations (3)
France	Hospitality (2), Media (3), Oil (2)
Vietnam	Dissident/Political Organizations (7), Maritime (6)
Mexico	Government (9), Dissident/Political Organizations (11), Healthcare (9), Media (10)
India	Military (10), Diplomatic (4), Education (4), Energy (4), Media (4), Elections (4)
Bahrain	Dissident/Political Organizations (2), Media (2)
Egypt	Dissident/Political Organizations (5)
Morocco	Dissident/Political Organizations (4), Media (3)
Panama	Dissident/Political Organizations (1), Military (1), Maritime (1), Elections (1)
Yemen	Twelve sectors tied (2)
Iraq	Government (2), Education (2), Oil (2), Elections (2)
Thailand	Dissident/Political Organizations (2), Media (2)
Togo	Dissident/Political Organizations (1)
Uzbekistan	Dissident/Political Organizations (2)

Source: Izycki, Eduardo

The sector's target is an interesting variable to relate to targets' geographical dispersion and attacks' purposes to identify Nation-State patterns in cyberspace.

7.5.*Actions Complexity*

Another key indicator resulted from the state-sponsored APTs analysis is the action complexity. It is based on the CVE (Common Vulnerabilities and Exposures), the Common Vulnerability Scoring System (CVSS), and the use of zero-day exploits.

The MITRE Attack is a knowledge base built as an open-source project to describe tactics and techniques observed in real-world attacks. The framework describes threat-actors behavior to prepare for a robust security process (MITRE Corporation 2017). This research uses the number of different tactics and techniques performed by threat-actors as an indicator of their ability to perform multiple actions. Thus, the bigger the number, the more versatile the threat actors are and more capable of offensive cyber actions.

The CVE is a database of publicly disclosed cybersecurity vulnerabilities. The vulnerabilities are classified according to a CVSS. The vulnerability ratings (Critical, High, Medium, and Low) are commonly used to prioritize vulnerability remediation activities.

The CVSS considers the attack vector, attack complexity, privileges required, user interaction, scope, and impact metrics (availability, integrity, and confidentiality). The less complex the attack and the more damage it causes, the higher its CVSS score.

This research uses the vulnerabilities ratings to measure threat actors' ability to leverage their offensive capabilities to conduct offensive cyber actions.

The third factor considered is the reference of the use of zero-day vulnerabilities in cyber offensive actions. A zero-day (also referred to as 0-day) is a vulnerability (a software or hardware flaw) that is only known by a threat-actor. The threat-group can be identified or purchased in the thriving exploit market, usually at a prohibitive cost. This research considers the reported use of a zero-day to indicate sophistication level or financial resources availability.

After identifying those indicators in the original report sources, the threat actors were grouped according to their state-sponsored country. Countries with more identified threat-groups tend to have more CVE's explored over time. Thus, simply counting is not enough. An additional layer to the analysis is the proportion of the most severe CVE's being exploited. Threat-actors that exploit unique vulnerabilities are more versatile, and the ones that explore more severe vulnerabilities are considered more capable of offensive attacks.

The following table displays the proportion of CVE according to their rating by CVSS standards. This evaluation is performed by NIST (National Institute of Standards and Technology).

Table 7 – Countries CVE rating count (2008-2020)

Country	Critical	High	Medium	Low
Russia	101	36	7	0
China	82	31	12	3
North Korea	45	28	0	0
India	20	10	0	0
United States	14	3	5	0
Israel	10	3	3	0
Ethiopia	8	0	0	0
Turkey	8	3	2	0
United Kingdom	7	0	0	0
Kazakhstan	6	0	0	0
Mexico	5	0	0	0
Saudi Arabia	5	0	0	0
Morocco	5	0	0	0
South Korea	5	0	0	0
Panama	5	0	0	0
Egypt	5	1	0	0
UAE	5	2	1	0

Uzbekistan	5	3	0	0
Pakistan	5	4	0	0
France	3	0	0	0
Iran	3	11	1	1
Vietnam	0	3	0	0
Yemen	0	2	1	1

Source: Izycki, Eduardo

Moreover, the average difference between reported exploitation and the CVE registry year is also similar across countries. New CVE's tend to be explored by sophisticated actors, given that an exploit needs to be created for exploitation.

Table 8 – Total number of CVE's and average age (2008-2020)

Country	CVE's	Average
Russia	145	2,05
China	134	2,63
North Korea	74	2,61
India	31	2,10
United States	22	2,55
Iran	19	1,74
Israel	16	1,94
Turkey	13	2,77
Pakistan	9	3,67
Ethiopia	8	2,75
UAE	8	1,63
Uzbekistan	8	1,63
United Kingdom	7	3,00
Kazakhstan	6	2,33
Egypt	6	3,00
Mexico	5	2,60
Saudi Arabia	5	2,60
Morocco	5	2,60
South Korea	5	2,60
Panama	5	2,60
Yemen	4	8,75
France	3	3,67
Vietnam	3	1,33

Source: Izycki, Eduardo

This suggests that offensive actions are performed by exploiting recent CVE's in a reproduced pattern among countries (except for Yemen).

All countries showed a tendency to explore Critical or High-level CVE's. This evidence suggests that despite differences in the number of threat-groups and volume of CVE's explored, the offensive cyber actions are similar regarding their severity.

7.6. *Attacks Objectives*

The final key indicator concerns the attack's objectives. This indicator addresses the offensive cyber actions impact: espionage, surveillance, disinformation, sabotage, and financial purposes.

The same offensive cyber techniques can produce different outcomes. A threat-group can perform an offensive technique against a target that equally enables espionage, surveillance, and sabotage. In fact, discerning what exactly happened after an offensive cyber action requires extensive forensic work.

The following table presents the consequences of the attacks as observed in each technical report. The same threat-actor performed attacks with different goals given a long time of activity. The threat-actors are grouped according to their country of origin.

Table 9 – State-sponsored APTs objectives dispersion by country (2008-2020)

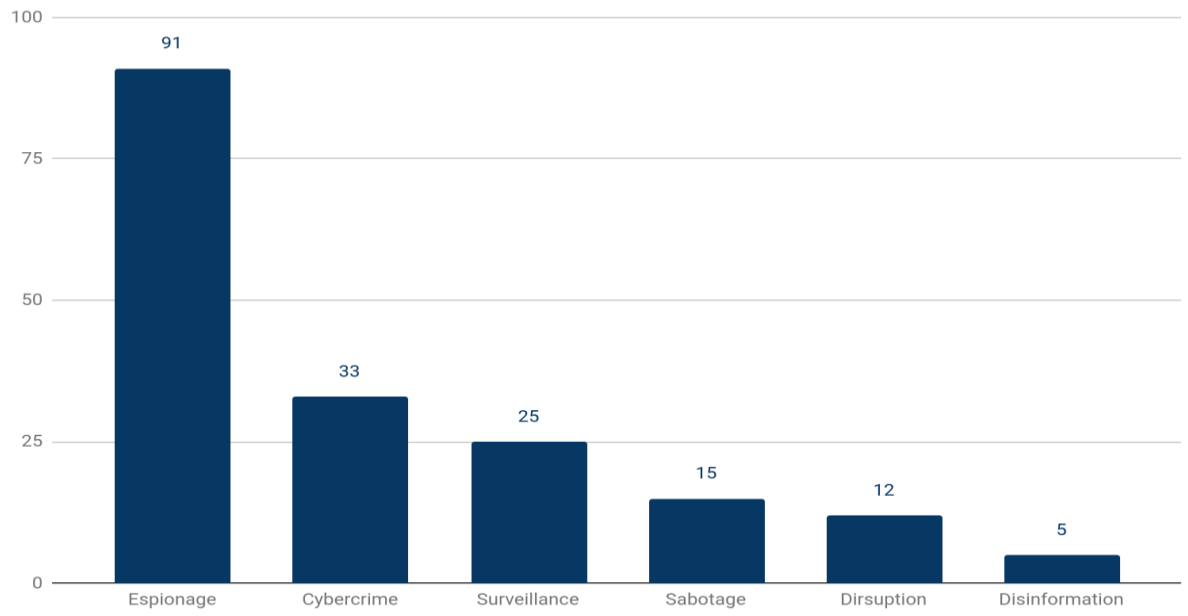
Country	Espionage	Surveillance	Disruption	Disinformation	Sabotage	Cybercrime
China	23	5	4	1	0	10
Iran	13	2	1	2	1	3
Russia	12	0	3	2	6	9
North Korea	6	0	3	0	5	7
United States	6	0	0	0	1	0
United Kingdom	5	0	0	0	0	0
Pakistan	4	0	0	0	0	2
Turkey	3	0	0	0	0	1
France	3	0	0	0	0	0
UAE	2	1	0	0	0	0
Lebanon	2	1	0	0	0	0
Mexico	1	1	0	0	0	0
Vietnam	1	1	1	0	0	0
Ethiopia	1	1	0	0	0	0
Kazakhstan	1	1	0	0	0	0
Saudi Arabia	1	1	0	0	0	0
Bahrain	1	1	0	0	0	0
Uzbekistan	1	1	0	0	0	0
Israel	1	0	0	0	2	0

India	1	0	0	0	0	1
South Korea	1	0	0	0	0	0
Yemen	0	2	0	0	0	0
Egypt	0	1	0	0	0	0
Syria	0	1	0	0	0	0
Morocco	0	1	0	0	0	0
Iraq	0	1	0	0	0	0
Thailand	0	1	0	0	0	0
Togo	0	1	0	0	0	0
Panama	0	1	0	0	0	0

Source: Izycki, Eduardo

Acts of espionage (91) are more frequently observed among countries. Followed by cybercriminal activities (33) and surveillance (25). The two outcomes related to "real-world" consequences: sabotage (15) and disruption (12) represent a small number of threat-actor's actions. Finally, disinformation (5) is not frequently related to APTs attacks, thus there are a small number of occurrences.

Figure 9 – State sponsored APTs distribution according its objectives



Source: Izycki, Eduardo

The data provides a first insight regarding offensive cyber actions. Threat-actor's objectives are mostly related to cyber consequences, whereas results that produce some effect in the "real-world" are less common (14,9%). The results are backed up by previous research

undertaken by Izycki and Vianna (2021), where they demonstrated that kinetic results are unusual in offensive cyber actions.

8. Cyber Offensive Capabilities Acquisition

This section focuses on the acquisition of offensive cyber capabilities by Nation-States from private providers. The dataset was built from reports, vendors' data breaches and national export controls issued licenses.

This research considered a set of 12 private vendors as providers of offensive cyber capabilities: Amesys, Area SpA, Cyberbit, Dreamlab, Elbit, FinFisher, Hacking Team, Sandvine, NICE Systems, NSO Group, SS8, and Trovicor. A brief analysis of each provider is available in Appendix A

Table 10 – Cyber offensive capabilities private vendors and distribution by region (2008-2020)

	Africa	Americas	Central Asia	Europe	MENA	Southeast Asia
Amesys	0	0	0	0	2	0
Area SpA	0	0	0	0	2	0
Cyberbit	2	0	2	0	0	2
Dreamlab	0	0	1	0	1	0
Elbit	1	0	0	0	0	0
FinFisher	7	6	3	18	10	11
Hacking Team	5	21	4	13	13	6
Sandvine	2	0	1	0	7	2
NICE Systems	2	1	2	0	0	0
NSO Group	4	3	2	5	5	0
SS8	0	2	0	0	1	1
Trovicor	1	0	1	0	6	1
TOTAL	**24**	**33**	**16**	**36**	**47**	**23**

Source: Izycki, Eduardo

The table reflects 179 identified purchases from private vendors from 2006 to 2017. The most prolific sellers are Hacking Team (Italy), FinFisher (UK/Germany), and NSO Group (Israel). In Appendix A, there is a further profiling on each provider and its advertised services.

The providers of offensive cyber capabilities are all from western countries. This contradicts the dominant narrative that Chinese technology is the enabler for digital authoritarianism. The evidence points to western companies providing the tools for offensive cyber actions against the civilian population and foreign governments (in some cases, including their own country of origin).

Table 11 – Cyber offensive capabilities sales according to the private vendor's origin (2008-2020)

Country Name	Total
Germany	64
Italy	63
Israel	31
Canada	12
United Kingdom	11
United States	4
Switzerland	2
France	2

Source: Izycki, Eduardo

These results do not deny the use of Chinese technology to engage in surveillance operations, there are frequent publications by Amnesty International and other ONGs describing human rights violations in the Xinjiang province. For instance, the Australian Strategic Policy Institute has research that lists 164 sales of technology from Chinese companies abroad (2019). These results were not incorporated into this research because the definition of surveillance adopted by the Australian institute does not match with our own.

A total of 85 different countries purchased at least one piece of software or service provided by one of the aforementioned private providers. The complete list of each country's purchases is included in Appendix B.

8.1. *Multiple Acquisitions*

One of the most striking figures is the number of countries that acquired more than a single offensive solution. The 45 countries are listed below with the respective number of purchases observed.

Table 12 – Countries with cyber offensive capabilities multiple acquisition (2008-2020)

Nome	Region	Purchases
Mexico	Americas	13
UAE	MENA	8
Egypt	MENA	7
Saudi Arabia	MENA	6
United States	Americas	5
Kazakhstan	Central Asia	5
Bahrain	MENA	5
Nigeria	Africa	5
Oman	MENA	5

Ethiopia	Africa	4
Uzbekistan	Central Asia	4
Hungary	Europe	4
Pakistan	Southeast Asia	3
Turkey	MENA	3
Syria	MENA	3
Morocco	MENA	3
Thailand	Southeast Asia	3
Panama	Americas	3
Qatar	MENA	3
Singapore	Southeast Asia	3
Spain	Europe	3
Malaysia	Southeast Asia	3
Italy	Europe	3
Sudan	Africa	3
Lebanon	MENA	2
Vietnam	Southeast Asia	2
India	Southeast Asia	2
Philippines	Southeast Asia	2
Zambia	Africa	2
Yemen	MENA	2
Indonesia	Southeast Asia	2
Mongolia	Central Asia	2
Bangladesh	Southeast Asia	2
Switzerland	Europe	2
Kuwait	MENA	2
Czechia	Europe	2
Lithuania	Europe	2
Uganda	Africa	2
Luxemburg	Europe	2
Latvia	Europe	2
Turkmenistan	Central Asia	2
Honduras	Americas	2
Jordan	MENA	2
Poland	Europe	2
Colombia	Americas	2

Source: Izycki, Eduardo

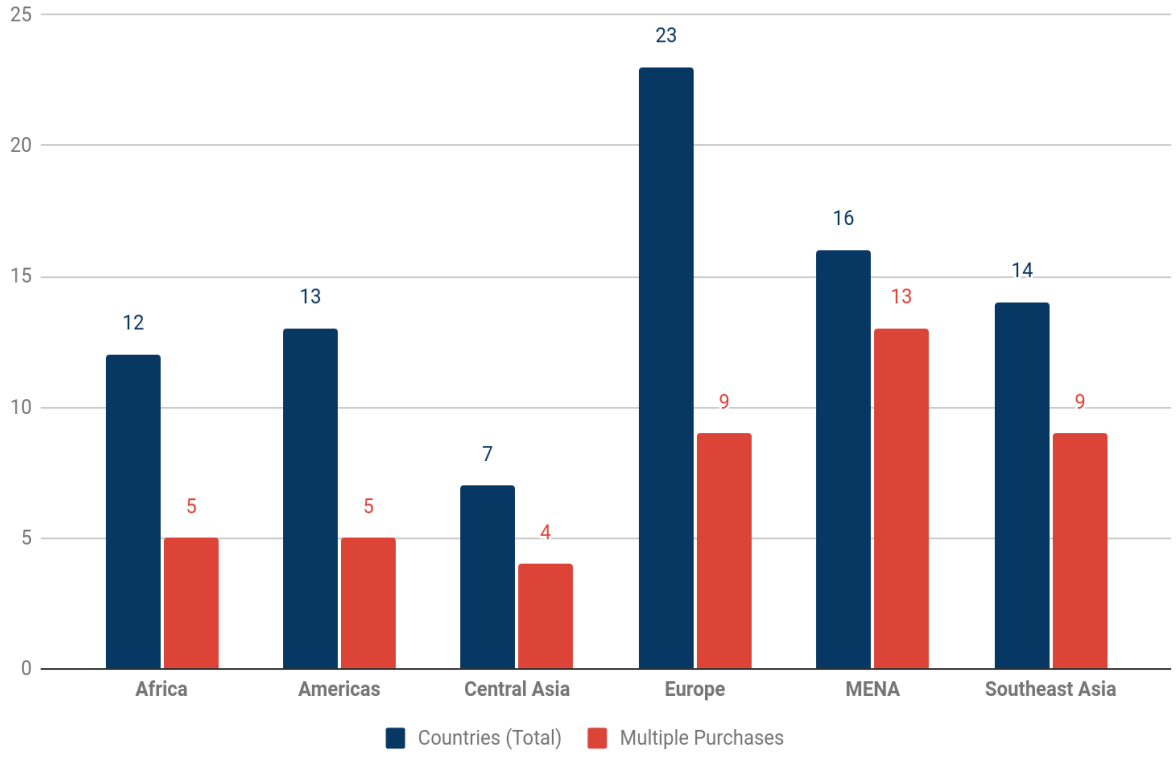
This research assumes that the repeated purchases are evidence of the intensive pursuit of offensive cyber capabilities within countries. In three regions, there is a concentration of multiple acquisition countries: Central Asia, MENA, and Southeast Asia.

The acquisition of multiple offensive cyber solutions suggests that the countries acquiring them intend to expand their repertoire since private vendors have different strategies to compromise targets and explore different vulnerabilities (Teach 2020).

Thus, even advanced offensive cyber capabilities - exploring a zero-day vulnerability - might not be useful against the desired target if it is not vulnerable or does not have a particular hardware or software set-up. Hence, the willingness of countries to acquire offensive artifacts from more than one private vendor is considered as evidence of intent to perform offensive cyber actions.

Unlike conventional weaponry, where interoperability is a requirement, offensive cyber capabilities can and often operate independently. Moreover, a threat-actor can use one artifact to compromise the target and another (from a different provider) to extract information (espionage) or send disruptive payloads (ransomware).

Figure 10 – Cyber offensive capabilities acquisition by region (2008-2020)



Source: Izycki, Eduardo

The cost of acquisition varies from the extension of services acquired. Still, the Remote-Control Service (also known as Galileo), provided by Hacking Team, cost less than 1 million dollars and yearly maintenance was lower than 200 thousand dollars (on average - reference to 2013/2014). This indicates that the cost of acquisition for a state-of-the-art offensive cyber solution is negligible for a nation-state.

8.2. *Customers*

The sources gathered during this research allowed for the identification of customer acquisition on 99 occasions. The Hacking Team (WikiLeaks 2015) and FinFisher (WikiLeaks 2014) data breaches provided a colossal amount of information regarding commercial activities (e-mails exchange, balance spreadsheets, customers list).

The Citizen Lab reports (Munk School of Global Affairs & Public Policy, University of Toronto) were another instrumental resource for identifying the customer and stocktaking offensive cyber capabilities.

This research classified entities in four categories: Law Enforcement Agencies (LEA), Intelligence Agencies, Armed Forces, and Civilian Entities.

Table 13 – Cyber offensive capabilities acquisition distribution according customer (2008-2020)

Entities	Purchases
Intelligence Agencies	47
Law Enforcement Agencies (LEA)	24
Civilian Entities	22
Armed Forces	6

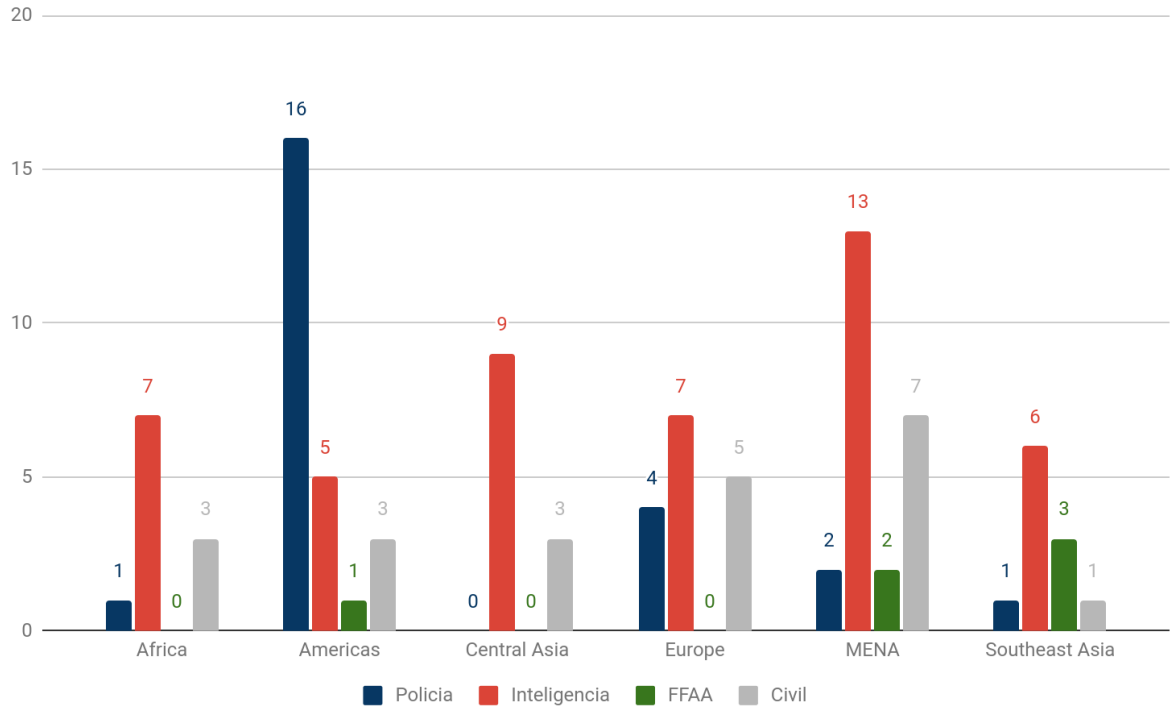
Source: Izycki, Eduardo

Intelligence agencies are the top customers in every region, except in the Americas where Mexico LEA made purchases on 13 different occasions (J. e. SCOTT-RAILTON 2017) (SCOTT-RAILTON, et al. 2017). This is an indication of intent to surreptitiously use the acquired offensive cyber capabilities.

Moreover, generally, intelligence agencies do not have extensive oversight from the Judicial branch and Attorney General in most countries, which is an additional cause for concern over its use.

Further, intelligence agencies and armed forces are focused on external targets. This suggests that the proliferation of offensive cyber capabilities over time increases the likelihood of extraterritorial use and the risk of cyber skirmishes.

Figure 11 – Acquisition distribution according customer and region (2008-2020)



Source: Izycki, Eduardo

Most customers' profile indicates that the use of offensive cyber capabilities is an expression of intent to project power externally.

9. DISCUSSION

The data presented in the last section is the empirical evidence that supports the discussion and analysis presented in this section. The data concerning state-sponsored APT is a reliable indicator of intent and capability. The data gathered from offensive cyber capability acquisition is trustworthy evidence of nation states' intent.

This section presents conclusions based on the empirical data gathered. The first point is that there is an unprecedented diffusion of power among the countries compared in regard to their offensive capabilities in a conventional conflict. Moreover, offensive capabilities are not constrained to six "traditional" cyber powers but a roster of over twenty countries (Voo, et al. 2020).

9.1. *Diffusion (not equality) of Cyber Offensive Capabilities*

Conventional wisdom suggests that there are only a handful of countries with meaningful offensive cyber capabilities. Four variables from this research demonstrate that there is unprecedented diffusion of offensive cyber capabilities:

- The existence of state-sponsored threat-actors in 29 different countries
- The small role of countries with indigenous capabilities
- The similar complexity displayed in cyber attacks
- The acquisition of cyber offensive solutions by additional 66 countries

This research demonstrates that there is evidence that 29 countries are already engaged in state-sponsored offensive cyber actions. Though their complexity is similar (in terms of CVE's), only a small group of countries displayed autonomous capabilities of developing or customizing their own offensive cyber tools.

The complexity of the offensive actions is evidence that countries possess similar capabilities in terms of vulnerabilities exploited during state-sponsored APTs. All countries exploited 50% or more CVE's considered critical or high.

Table 14 – CVE's severity according to country (2008-2020)

Country	Critical	High	Medium	Low
Russia	70,1%	25,0%	4,9%	0,0%
China	64,1%	24,2%	9,4%	2,3%
North Korea	61,6%	38,4%	0,0%	0,0%
India	66,7%	33,3%	0,0%	0,0%
United States	63,6%	13,6%	22,7%	0,0%
Israel	62,5%	18,8%	18,8%	0,0%
Ethiopia	100,0%	0,0%	0,0%	0,0%
Turkey	61,5%	23,1%	15,4%	0,0%
United Kingdom	100,0%	0,0%	0,0%	0,0%
Kazakhstan	100,0%	0,0%	0,0%	0,0%
Mexico	100,0%	0,0%	0,0%	0,0%
Saudi Arabia	55,6%	44,4%	0,0%	0,0%
Morocco	62,5%	25,0%	12,5%	0,0%
South Korea	83,3%	16,7%	0,0%	0,0%
Panama	100,0%	0,0%	0,0%	0,0%
Egypt	100,0%	0,0%	0,0%	0,0%
UAE	62,5%	37,5%	0,0%	0,0%
Uzbekistan	100,0%	0,0%	0,0%	0,0%
Pakistan	100,0%	0,0%	0,0%	0,0%
France	18,8%	68,8%	6,3%	6,3%
Iran	100,0%	0,0%	0,0%	0,0%
Vietnam	0,0%	100,0%	0,0%	0,0%
Yemen	0,0%	50,0%	25,0%	25,0%

Source: Izycki, Eduardo

Thus, offensive cyber actions can be deployed by multiple countries. However, only 16 countries are not constrained by external factors: China, Russia, the United States, North Korea, the United Kingdom, Iran, Israel, France, Syria, Lebanon, India, Pakistan, Vietnam, Turkey, South Korea, and Uzbekistan.

This is evidence that the conventional powers will not dominate this dimension as they have done in others, such as air, sea, or land (Nye 2010).

The remaining 79 countries displayed or acquired capabilities to perform offensive cyber actions. Still, they are highly dependent on private providers or third parties responsible for executing the actions themselves.

To have a world-class Navy or Air Force, a country must spend 100 million on a plane, a satellite system over 1 billion, 3 billion on a single combat ship. The cost of offensive cyber capabilities is negligible compared to that (Kramer 2009).

The number of countries capable of engaging in cyberspace is impressive. A comparison with different dimensions would result in a restricted number of potential protagonists at the global level, rendering an unprecedented nation-state competition with a relative reduction of power differentials (Nye 2010).

The preeminence of the United States regarding conventional forces is not observed within offensive cyber capabilities. Even the idea of complete superiority or dominance in this field is highly doubtful.

As the table above displays, countries like China, Russia, North Korea, Turkey, and India display similar CVE severity. This suggests that it is not significant in qualitative terms of offensive capabilities.

There is a level of power diffusion, but in a belligerent scenario where there are trade embargos or hostilities, it is reasonable to conclude that the vast majority of countries would only be able to retain their offensive cyber capabilities if the original provider allowed it to continue. The dependence on private vendors can also be subject to a suspension order by the third-party host nation, in a similar fashion to suspension of ammunition or equipment during a conflict.

Therefore, there is power diffusion but there is not power equality among the several players in cyberspace.

9.2. *Geography Matters*

One of the most singular characteristics of cyberspace is its disregard for borders. This allows any engaging country to mount an offensive cyber action against targets which are physically far from its own territory.

While this allows for a more diverse set of strategic options, this research's empirical evidence suggests that geopolitical goals are a dominating factor for offensive cyber actions. It is ironic that the virtual space is still in large part determined by real-world constraints.

Two variables from this research support this conclusion: the target's geographical dispersion and the acquisition of offensive cyber capabilities.

Considering the countries that performed state-sponsored offensive cyber actions, 86% (25/29) of most of their targets were countries within the same geographical region.

The countries that do not display this behavior are the United States (targeting Europe and Southeast Asia), Israel (Southeast Asia and Europe), France (MENA and Europe), and Kazakhstan (Europe and Central Asia). However, the last two focused their actions on targets in their vicinity: France (Germany, Luxembourg, and Algeria) and Kazakhstan (Russia and Kazakhstan).

Building the relation from the target's perspective ushers similar results. There are 124 countries identified as targets of state-sponsored offensive cyber action. In 41 of them, 3 or fewer actions were registered. Thus, they were not counted for this particular relationship. Considering the remaining 82, in 66% of countries (54), most of the actions are sponsored by a country in the same region.

Table 15 – Geographical distribution of targets related to its attributed origin (2008-2020)

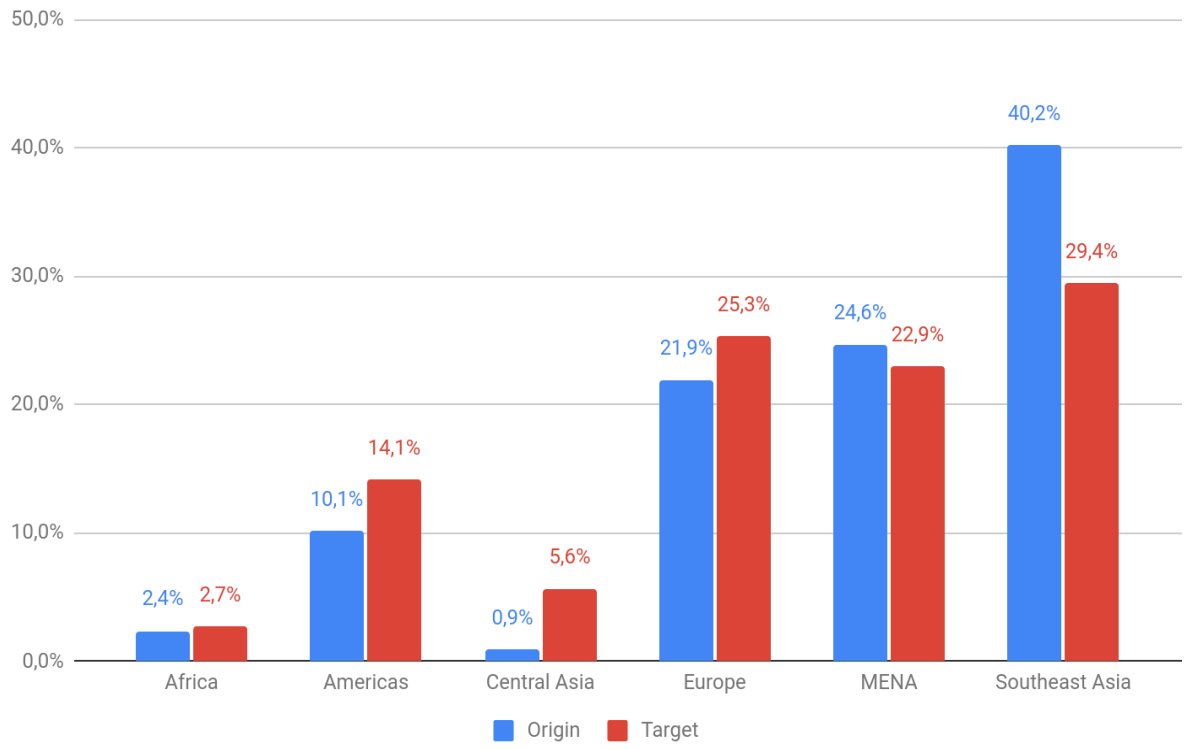
		Targets					
		Africa	Americas	Central Asia	Europe	MENA	Southeast Asia
State-Sponsored Actions	Africa	11	4	0	10	2	5
	Americas	7	31	9	31	29	30
	Central Asia	0	1	5	4	1	1
	Europe	10	37	27	119	53	50
	MENA	0	37	15	63	174	45
	Southeast Asia	8	81	20	116	52	268

Source: Izycki, Eduardo

Further evidence of geopolitical orientation is produced by building a relational matrix from the state-sponsored actions to its preferred targets.

Except for the Americas (two regions tie for first place), every region displays a preference to engage in offensive cyber actions against targets within its own region.

Figure 12 – APTs targets and origins distributed according region (2008-2020)



Source: Izycki, Eduardo

It is important to emphasize that 204/297 of European offensive cyber actions are attributed to Russia, close to 2/3 of the total. Thus, the offensive behavior is heavily influenced by Russian actions.

Further, there is convergence in the data provided by the acquisition of cyber capabilities from the private sector, breaking down by region.

Southeast Asia and MENA regions stand out in total acquisitions, unique countries, multiple purchases, and intelligence / Armed Forces customers.

Table 16 – Purchases, type of customer, and state-sponsored target distribution by region (2008-2020)

Region	Total	Countries	Multiple Purchases	Intelligence / FFAA	State-Sponsored Target
Africa	23	12	5	7	2,7%
Americas	33	13	5	6	14,1%
Central Asia	16	7	4	9	5,6%
Europe	36	**23**	9	7	25,3%
MENA	**54**	16	**13**	**15**	22,9%
Southeast Asia	27	14	9	9	**29,4%**

Source: Izycki, Eduardo

The data gathered confirms the position from Valeriano and Maness that the overwhelming majority of cyber conflicts occur between long-standing rivals seeking to harm each other in the context of regional disputes (Valeriano and Maness 2014).

Although the dataset can provide no causal relationship, the regions that were targeted by a larger number of attacks were more inclined to acquire offensive cyber capabilities. Further study could determine if this is evidence of a cyber-arms race.

9.3.*Profiling Nation-State Behavior*

The data gathered confirms the position from Valeriano and Maness that the overwhelming majority of cyber conflicts occur between long-standing rivals seeking to harm each other in the context of regional disputes (Valeriano and Maness 2014).

Although the dataset can provide no causal relationship, the regions that were targeted by a larger number of attacks were more inclined to acquire offensive cyber capabilities. Further study could determine if this is evidence of a cyber-arms race.

9.3.1. GLOBAL PLAYERS

The first cluster of countries is composed of China, Iran, Israel, Russia, the United Kingdom, and the United States. All six countries have indigenous offensive cyber capabilities. They have a high number of total and unique targets. They engage with high geographical dispersion (across at least five regions). Their objectives with cyber actions are mainly espionage and sabotage, and the preferred sectors are government and military.

Table 17 – Global players main features

Country	Total Targets	Unique Targets	Espionage	Sabotage	Preferred Sectors
China	316	61	23	0	Military (89), Government (62), Dissidents (52)
Russia	204	74	12	6	Military (98), Government (62), Diplomatic (51), Elections (46)
Iran	179	47	13	1	Military (32), Government (30), Energy (23)
United States	121	68	6	1	Military (8), Government (4), Industry (5), Nuclear (7),
Israel	31	21	1	2	Industry (9), Nuclear (8), Military (7)
United Kingdom	86	61	5	0	Military (4), Government (3), Nuclear (3)

Source: Izycki, Eduardo

Despite their similarities, Chinese and Iranian state-sponsored threat-actors also consistently engage in offensive cyber actions with surveillance purposes (respectively 5 and 2).

Another difference relates to the cybercriminal actions performed by Chinese (10), Russian (9), and Iranian (3) state-sponsored threat-actors. This suggests that offensive capabilities are deployed by the same actors against a broad spectrum of targets and the state-sponsored actions are not a full-time commitment.

Moreover, these countries engage in multiple purpose campaigns simultaneously, suggesting they have a significant number of human resources.

The United States and Israel engaged in an offensive cyber action against the Iranian nuclear program (Stuxnet). They unleashed threat-actors for the purposes of espionage, respectively the Equation Group (Falliere, Murchu and Chien 2011) and Duqu 2.0 (Kaspersky 2015)

The United States had another joint venture with the United Kingdom (possibly with other Five Eyes countries). The Snowden leaks revealed that the GCHQ targeted attacks against the G20 Meeting as a state-conducted offensive cyber action (The Guardian 2013).

China used offensive cyber actions to conduct a long-term espionage campaign to speed up its technological development (FireEye 2013). Traditional espionage is also a frequent objective pursued by China through cyber means (Glyer, et al. 2020). Furthermore, there are a significant number of cases where the deployment of surveillance against its own citizens was observed (Amnesty International 2019).

Russia conducts multiple-layer pressure against its geopolitical goals, for instance, pressure on Estonia (Ashmore 2009), denial of service during the Georgian campaign (Georgia 2009), and destabilizing Ukraine (FireEye 2017). Its offensive cyber actions range from attacks

against critical infrastructures, sophisticated disinformation campaigns, and multi-targeted espionage. The actions against the power supply in Ukraine are strong evidence of the versatility of Russian threat-actors, since the knowledge to target industrial protocols was necessary, and it is an unusual skill (Lipovsky 2016).

Iran conducts multiple campaigns against opposition figures, including nationals living abroad and in countries with geopolitical interests (Qatar, Bahrain, Syria, and Lebanon) (Gundert, Chohan and Lesnewich 2018). Simultaneously it engages against its regional rivals (Saudi Arabia - 11, Israel - 11, Turkey - 8, UAE - 7, Iraq - 6) to assert itself within the MENA region (Insikt Group 2019).

This tier demonstrates the ability to engage against different targets with different purposes, denoting versatility and resources to adapt to multiple targets. It is reasonable to assume that innovative actions are not a problem for this group. Thus, cybersecurity initiatives by their targets can be overcome by these threat-actors.

9.3.2. REGIONAL CONTENDERS

The second group of countries is composed of France, India, Lebanon, North Korea, Pakistan, South Korea, Syria, Turkey, UAE, and Vietnam.

These ten countries display some level of self-made offensive cyber capabilities. They have multiple acquisitions of offensive cyber technologies from private vendors. Their actions are regionally oriented. Their objectives with cyber actions are mainly espionage, and the preferred sectors vary according to their own geopolitical imperatives.

Table 18 – Regional contenders main features

Country	Espionage	Purchases	Targets in own region	Most Targeted Countries
France	3	0	33,3%	Iran (4), Algeria (3), Turkey (2), Germany (2)
North Korea	6	0	44,0%	South Korea (30), US (11), India (8), China (7), Russia (7)
Pakistan	4	3	60,7%	India (8), Pakistan (6), Others (1)
Lebanon	2	2	37,5%	Lebanon (4), US (3), Israel (3), Saudi Arabia (2), Jordan (2)
Turkey	3	3	56,5%	Syria (4), Turkey (3), Iraq (2), Albania (2)
Vietnam	1	2	85,0%	Vietnam (9), Cambodia (7) Philippines (6), China (5)
India	1	2	66,7%	Pakistan (6), China (4), Bangladesh (3), Sri Lanka (2)
Syria	0	3	87,5%	Syria (2), Lebanon (2), Saudi Arabia (2)

South Korea	1	1	70,6%	Russia (3), Japan (3) China (2), North Korea (2)
UAE	2	8	70,6%	UAE (3), Qatar (3), Bahrain (2), US (2)

Source: Izycki, Eduardo

Regarding the origins of their cyber offensive capabilities, all countries displayed indigenous development. There were no acquisitions from France and North Korea, though the former has private companies selling technologies worldwide (Amesys/Bull and VUPEN).

France tends to act less regionally contained, targeting Algeria and Germany probably due to their location and historical ties. The actions against Iran and Turkey are aligned with the negotiations for the Iranian Nuclear Deal that involved the three countries in 2015 (ESET 2015).

North Korea has a huge number of unique targets (64), but its offensive cyber actions are strongly skewed towards South Korea (18%) (Sherstobitoff 2013). The actions against countries in other regions were mostly financially motivated against banks (SWIFT System) and cryptocurrency exchanges (Guerrero-Saade and Moriuchi 2017). North Korean threat-actors act as organized cybercriminals, likely to circumvent the several embargoes imposed by the United States (Group-IB 2017).

South Korea also fits the profile of regionally oriented offensive cyber actions. However, the South Korean threat-actor remains shrouded in secrecy since most of the reports described technical details without providing more details on its profile (Tencent 2019).

The case of India (Levene, Grunzweig and Barbehenn 2018) and Pakistan (Falcone, et al. 2018) is a further demonstration of cyber actions' geopolitical orientation. Both countries have a nuclear balance, historically engaged in several skirmishes, and constantly face each other in cyberspace (Inskit Group 2016).

The MENA region is also prolific in examples of regional engagement. Lebanon (Lookout and EFF 2018), Syria (Hasbini, Pontiroli and Saad 2014), and Turkey (Arsene, et al. 2020) display preferential targets within the same region. The Syrian Civil War's intricate consequences are one of the main reasons for these three countries' cyber offensive actions.

The UAE case is unique because its national digital authority hired former employees from the National Security Agency (NSA) to conduct offensive cyber actions. Called Project Raven (Bing and Schectman 2019), the entire technical staff was outsourced, but they were physically in the UAE and constantly supervised by the Emiratis during campaigns against Bahrain, Qatar, and American targets (Bing and Schectman 2019).

Finally, the Vietnam case reaffirms the group's characteristics. Besides a clear targeting of Southeast Asian countries (Wright 2020), the main sectors that Vietnamese threat-actors target was the maritime industry, perfectly aligning with the ongoing tensions in the South China Sea (Lassalle, Koessel and Adair 2017).

All countries in the group, except for Syria, performed offensive actions with the purpose of espionage. But financially motivated actions (North Korea, Pakistan, Turkey, and India) and surveillance operations (Lebanon, Vietnam, and Syria) have also occurred.

The group's similarities reside in the nascent self-made offensive cyber capabilities, the acquisition from third parties, and the focus on targets within the region (actions are not as widespread as in the case of Global Players).

9.3.3. LOCAL PLAYERS

The third cluster of countries is composed of Kazakhstan, Saudi Arabia, Ethiopia, Egypt, Uzbekistan, Morocco, Mexico, Bahrain, Yemen, Iraq, Thailand, Panama, and Togo.

These thirteen countries are dependent on private vendors to acquire or engage in offensive cyber actions. They have multiple providers. Their actions are focused on their own territory and citizens (occasionally targeting nationals abroad), and their objectives with cyber actions are mainly surveillance against dissidents and rival political organizations.

Table 19 – Local players main features

Country	Purchases	Intelligence	Espionage	Surveillance	Political Targeting
Kazakhstan	5	3	1	1	3
Saudi Arabia	6	2	1	1	5
Ethiopia	4	1	1	1	4
Egypt	7	4	0	1	5
Uzbekistan	4	3	1	1	2
Morocco	3	1	0	1	4
Mexico	13	1	1	1	11
Bahrain	5	0	1	1	2
Yemen	2	0	0	2	2 (Tied)
Iraq	0	0	0	1	0
Thailand	3	0	0	1	2 (Tied)
Panama	3	2	0	1	1 (Tied)
Togo	1	0	0	1	1 (Tied)

Source: Izycki, Eduardo

Uzbekistan is the only country that displayed some level of indigenous development of cyber capabilities. The self-made capabilities - threat-actor named SandCat - were uncovered due to the developer's operational security flaw. The State Security Service (SSS) tested the offensive cyber tool in an uncontrolled environment where Kaspersky's anti-virus solution was installed, thus identifying the new malware (Zetter 2019).

All countries from this group show a preference for surveillance operations against citizens from their own countries. That is reinforced by the political targeting performed by all countries, except for Iraq (Senft, et al. 2014). Political targets are considered dissidents, expatriate communities, and rival political organizations or parties.

In Kazakhstan (Galperin, et al. 2016), Ethiopia (Marczak, et al. 2014), Saudi Arabia (Amnesty International 2018), Mexico (Scott-Railton, Marczak, et al. 2017), Morocco (Amnesty International 2019), and Panama (Marczak, Guarnieri, et al. 2014), the extraterritorial actions are targeted against the migrants or expatriate nationals living abroad. This means that offensive cyber actions are motivated by domestic reasons but the effects reach different parts of the world. That is empirical evidence of the strategic advantages introduced by operating in cyberspace.

Finally, despite local interest, this group exhibits intent to engage in cyberspace with multiple means. Twelve countries - excluding Iraq - acquired offensive cyber solutions. Except for Togo (Scott-Railton, Anstis, et al. 2020), all eleven countries acquired multiple solutions, and most of them (8) placed them in intelligence agencies.

9.4. *Building Cyber Offensive Capabilities*

Three interesting cases arise from the profiling of nation-state behavior in cyberspace: Lebanon (Marczak, Scott-Railton, et al. 2015), Turkey (Marczak, Dalek, et al. 2018), and Vietnam (Marquis-Boire, et al. 2013). These countries have acquired offensive cyber solutions from private vendors and later developed their own capabilities.

Offensive cyber capabilities are increasingly becoming efficient tools for countries to compensate their lesser power in other domains (Barrinha and Renard 2020).

The acquisition of third-party solutions precedes the deployment of self-made tools, which suggests that a maturation process is in place. There is no evidence of reverse engineering or technology transfer. Nevertheless, in all three cases, countries displayed progression with similar targeting and objectives patterns.

Table 20 – Lebanon, Turkey, and Vietnam comparison

	Lebanon	**Turkey**	**Vietnam**
Acquired Solutions	**Gamma International, FinFisher** - 2015 By the General Directorate of General Security (Intelligence Agency) and	**Hacking Team**, 2011 By the Turkish National Police	**Hacking Team**, 2011 By the Vietnam GD1 (Military Intelligence) **Gamma International**,

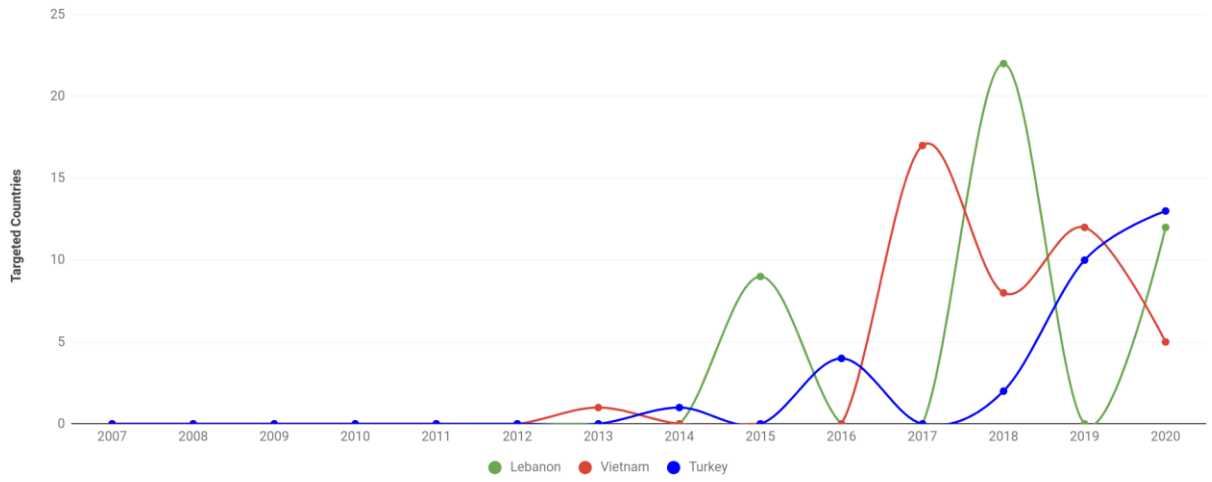
	Internal Security Forces (National Police)	**Sandvine - PacketLogic**, 2018 (Türk Telekom)	FinFisher – 2013 (Unknown user)
State-Sponsored Threat-Actors	**Dark Caracal** (2018) and **Volatile Cedar** (2015)	**StrongPity** (2012) and **Sea Turtle** (2017)	**APT32/OceanLotus** (2013)
Targeted Region	MENA	MENA	Southeast Asia

Source: Izycki, Eduardo

The three countries acquired offensive capabilities from the private sector in early 2010, and there is evidence that they were deployed against several targets.

Following that first experience with third-party technology, the three countries increased their offensive cyber actions through state-sponsored threat-actors, according to the chart below.

Figure 13 – Number of countries target by year (2008-2020)



Source: Izycki, Eduardo

This suggests that there is a maturing process for deploying and developing indigenous offensive cyber capabilities. The threat-actors did not explicitly reverse-engineer the acquired technologies, nor did they appear to demand a knowledge transfer as part of the purchase. However, the training received, and the experience gathered during the actual use against real targets probably helped during the development process.

This suggests that the pool of potential nation-state cyber actors can increase significantly, considering that 85 countries have acquired technology from the private sector.

9.5. *Correlating Cyber Offensive Capabilities and Authoritarianism*

There are differences in the framing of defensive cyber actions. While most western countries use "cybersecurity," a significant number of nations prefer to use "information security,"

where information content is within the scope of protection. This division reflects the views on an "open and free internet" versus those who defend the principle of "cyber sovereignty" and government action to maintain order in cyberspace (Barrinha and Renard 2020).

This difference is also emphasized when using cyber capabilities against political targets (opposition and activists) and the acquiring of offensive cyber tools by intelligence agencies.

By applying the Chi-Square Distribution test for Independence, this research correlates the data gathered on purchasing offensive cyber capabilities with the World index's Freedom of the World – FOTW (Freedom House 2020).

The index is produced by Freedom House and assesses political rights and civil liberties. It establishes three levels: Free, Partly Free, and Not Free.

The Freedom in the World annual global report describes the status of political rights and civil liberties. It is composed of numerical ratings and descriptive texts for each country and territory. The report's methodology is derived largely from the Universal Declaration of Human Rights, adopted by the UN General Assembly in 1948.

From the 198 countries that are considered for the FOTW, 82 countries (41.41%) are classified as Free, 60 labeled as Partly Free (30.30%), and 56 as Not Free (28.28%). Thus, if the acquisition of offensive cyber capabilities is not related to the FOTW, it would be expected to observe a proportional distribution of purchases among the three categories.

Therefore, the question set out is the following: is the number of intelligence agency purchases of offensive cyber capabilities independent of the FOTW classification?

- The null hypothesis (H0) is that intelligence agencies' acquisition of cyber offensive capabilities is not related to the FOTW index on political freedom.
- The alternative hypothesis (H1) is that the intelligence agencies' purchasing is related to the FOTW index on political freedom.

There are two degrees of freedom (three categories of FOTW), and this research sets the level of significance at 5%. Also, as displayed below, all expected frequencies are above 5.

The following table displays the data gathered concerning the acquisition of offensive cyber capabilities by intelligence agencies according to the FOTW index

Table 21 – Cyber offensive capabilities purchase by intelligence agencies and FOTW index (observed values)

Observed Data	Total Purchases	Intelligence Agencies	TOTAL
Free	26	6	38
Partly Free	11	14	39
Not Free	16	12	40
TOTAL	85	32	117

Source: Izycki, Eduardo

Considering the proportion of countries in each FOTW category, the expected results would be the following:

Table 22 – Cyber offensive capabilities purchase by intelligence agencies and FOTW index (expected frequencies)

Expected Frequencies	Total Purchases	Intelligence Agencies	TOTAL
Free	19,95	12,05	48,45
Partly Free	15,59	9,41	35,45
Not Free	17,46	10,54	33,09
TOTAL	85	32	117

Source: Izycki, Eduardo

The calculated Chi-Square result for the observed and expected data is 8.78, and the P-Value is 99,37%.

The critical value for two degrees of freedom and 5% significance is 5.99. This was obtained by applying an MS Excel formula: CHISQ.INV(0,95; 2).

This means that the Chi-Square result is larger than the critical value, thus rejecting the null hypothesis that intelligence agencies purchasing offensive cyber capabilities are independent of the FOTW classification.

A second question is set out to determine if performing surveillance actions through cyberspace is independent of the FOTW classification?

- The null hypothesis (H0) is that performing surveillance actions through cyberspace is not related to the FOTW index on political freedom.
- The alternative hypothesis (H1) is that performing surveillance actions through cyberspace is related to the FOTW index on political freedom.

There are two degrees of freedom (three categories of FOTW), and this research sets the level of significance at 5%. Also, as displayed below, all expected frequencies are above 5.

The following table displays the data gathered concerning the acquisition of offensive cyber capabilities by intelligence agencies according to the FOTW index.

Table 23 – Surveillance actions by cyber means and FOTW index (observed values)

Observed Data	Surveillance Actions	Remaining Actions	TOTAL
Free	1	19	20
Partly Free	4	8	12
Not Free	20	94	114
TOTAL	25	121	146

Source: Izycki, Eduardo

Considering the proportion of countries in each FOTW category, the expected results would be the following:

Table 24 – Surveillance actions by cyber means and FOTW index (expected frequencies)

Expected Frequencies	Surveillance Actions	Remaining Actions	TOTAL
Free	12,47	7,53	20
Partly Free	7,48	4,52	12
Not Free	71,08	42,92	114
TOTAL	91,04	54,96	146

Source: Izycki, Eduardo

The calculated Chi-Square result for the observed and expected data is 129.84.

The critical value for two degrees of freedom and 5% significance is 5.99. This was obtained by applying an MS Excel formula: CHISQ.INV(0.95; 2).

This means that the Chi-Square result is larger than the critical value, thus rejecting the null hypothesis that performing surveillance actions through cyberspace is independent of the FOTW classification.

Therefore, there is a correlation between authoritarian countries, surveillance actions through cyberspace, and the acquisition of offensive capabilities allocated to intelligence agencies.

Based on this simple statistical test, there is room to consider that the use of offensive cyber capabilities may be influenced by its relation to political freedom and civil rights. It is possible to infer the future use of offensive cyber capabilities in the countries according to FOTW classification would likely be deployed against their own population for political purposes. Further research would be necessary to assert this categorically, but this sample serves at least to raise this hypothesis.

Furthermore, considering that 53 countries (62.3%) that acquired offensive cyber capabilities are classified as Not Free or Partly Free, the number of surveillance actions is expected to be even higher than is currently known

9.6. *Is the best defense a good offense?*

The football adage is often applied to cyberspace due to an alleged offensive natural inclination. Although it is a contested argument (Valeriano, Jensen and Maness 2018), the overwhelming evidence suggests that offensive cyber capabilities do not deter other states from engaging in cyber actions (Martin 2020).

From the twenty most frequent targets of offensive cyber-attacks, only five are not also actors with actual offensive cyber actions (Germany, Japan, Canada, Taiwan, and Indonesia).

Four of the five countries remaining have potential offensive capabilities. Germany has (at least) two private vendors of offensive cyber capabilities (Trovicor and Gamma Group), Canada is a member of the Five Eyes (network of intelligence agencies whose offensive capabilities were revealed by Edward Snowden), Taiwan has an unconfirmed state-sponsored threat actor (attribution by a single Chinese cybersecurity company), and Indonesia acquired offensive capabilities for its National Encryption Agency (Lembaga Sandi Negara).

Table 25 – Top 20 most targeted countries, state sponsored APTs and cyber offensive capabilities

Country	Total	Cyber offensive capabilities
United States	88	13
China	72	75
India	56	3
Russia	54	48
Germany	48	Private Sector Provider (2)
Japan	**46**	**LEA Purchase**
Iran	44	38
Saudi Arabia	43	3
Turkey	37	5
South Korea	35	2
Pakistan	32	8
United Kingdom	32	6
France	31	3
Canada	31	Five Eyes Member
Taiwan	29	Threat Actor (not confirmed)
Vietnam	27	5
Israel	26	6
Mexico	25	8
Indonesia	25	Intelligence Agency Purchase
UAE	23	4

Source: Izycki, Eduardo

Except for Japan, every country within the top 25 target list has demonstrated some offensive cyber capabilities. How to reconcile the evidence with the idea of cyber deterrence? To put it bluntly, it is impossible.

The evidence presented is undermining the idea that offensive cyber capabilities will deter other countries' actions in an analogy with nuclear weapons during the Cold War. Ciaran Martin asserts that offensive cyber capabilities appear to be incapable of affecting opponent psychology when deciding to engage (Martin 2020).

One reason for the enduring belief in deterrence frameworks for offensive cyber capabilities comes from the constant comparison with nuclear weapons (J. Nye 2011). One must be skeptical with analogies about it because nuclear actions are an escalation of conventional weapons, while offensive cyber actions are mostly below the threshold of the use of force (UN Charter, Article (2)4).

A study regarding cyber deterrence merits research on its own, but the empirical evidence opposes the concept's effectiveness. As this research presents through its results, offensive cyber actions are a potentialized form of power projection. Thus, “cyber deterrence” seems only plausible by combining with different statecraft tools (criminal indictments, economic sanctions, and threat or use of force).

Cyberspace does not appear as an enclosed boxing ring where states can only engage and respond with offensive cyber actions (Martin 2020). As an additional resource available for nation-states, offensive cyber capabilities must be considered another tool to be used in the international arena.

9.7.*Multipolarity in Cyberspace*

In a simplified concept, a system is considered multipolar when three or more countries share comparable influence over the others considering their economic, cultural, political, and military capabilities.

As stated above, cyber capabilities are instruments for a countries' cultural, military, and economic power projection. In this sense, cyberspace can be viewed as a microcosm of the international order and provide useful analogies for what the future might hold.

Regarding the complexity of attacks, the fact that countries displayed similar CVE severity levels suggests the absence of dominance by any particular country. Moreover, 16 countries displayed evidence of self-made cyber capabilities.

Conventional forces are also measured in quantities of equipment and troops. In terms of threat actors and targets engaged, the numbers displayed by China, Russia, and Iran (Table nº 2) are equal or superior to the United States.

These variables indicate that the United States does not exercise dominance in cyberspace. Thus, one should not consider this dimension under a unipolar order.

Although the United States and China are clearly rivals engaging in cyberspace, the goals are not the same as those from the Cold War (Lewis 2021).

Considering the global and regional players' behavior, there is no clear alignment of countries that suggests a bi-polar order in cyberspace between China and the United States. Russia and Iran engage with China frequently. The same applies to the United States and France, countries that were supposed to be in the same “pole”.

- Russia -> China (5)

- China -> Russia (9)
- Iran -> China (6)
- China -> Iran (4)
- The United States -> France (4)
- France -> The United States (1)

Another example is the North Koreans who frequently perform actions against Chinese targets, its main ally. Furthermore, the United States and India's mutual actions against each other.

- North Korea -> China (7)
- The United States -> India (4)
- India -> The United States (2)

The fact that several countries possess similar offensive capabilities and no clear alignment in a bipolar structure (i.e., China and Russia engage each other) suggests that cyberspace offers a glimpse of multipolarity in action.

Cyberspace provides opportunities for allies and rivals to mutually engage each other, while there is no clear balance of power in place. The multiple agendas collide or occasionally coalesce, offering a grim perspective on a multipolar international order.

10. CONCLUSIONS

Many actors play significant roles in cyberspace, whether they are individuals, non-state actors, private companies, or the nation-state. As service users, maintaining internet infrastructure, providing content, providing security, and (occasionally) as threat actors.

Despite the importance of all those actors, nation-states remain the most aggressive and incisive actors in that ecosystem (J. Nye 2010).

This research set out to provide an in-depth view of nation-state offensive cyber capabilities. As a result, it gathered evidence of 29 different countries engaging in offensive cyber actions (Section 7.1) and (at least) 85 nations acquired offensive cyber technologies from private vendors (Sections 8.1 and 8.2). The numbers are impressive, especially considering the average perception of concentration of cyber capabilities in a few "traditional" actors.

A theoretical implication for this result is that the evolutionary faction appears to be correct in its predictions (so far), but there is some merit to the revolutionary perspective.

The majority of offensive cyber actions are a variation of traditional instruments of statecraft (sabotage, surveillance, espionage, and disinformation) potentialized by cyberspace's unique characteristics (Sections 7.4 and 9.2). This means that the environment is new but its purposes are well known.

There is a revolutionary component, though; offensive cyber actions allow countries to promote attacks against critical infrastructures, or, at least, to access and be surreptitiously in

place to strike those targets in the future. That is indeed new, although rare in cyberspace (Section 7.6).

The fact that only the United States, Israel (Stuxnet), Russia (NotPetya, and Triton & Trisis), and Iran (Shamoon) manage to conduct sabotage with kinetic effects through offensive cyber actions suggests that despite feasible, actions that reach the threshold of attack are still quite uncommon (Izycki and Vianna 2021).

Additional evidence to support the evolutionary claim is the geographical orientation behind most offensive cyber actions (Section 7.3). This highlights that despite cyberspace being a human-made environment, it is highly influenced by geopolitical imperatives from the "real world."

Therefore, the evidence presented frame offensive cyber capabilities as an additional tool of statecraft, not a revolution in the making. It has benefits, such as the difficulties in attribution (plausible deniability) and the almost unprecedented low escalation risk, which encourage nations to deploy these tactics to achieve strategic objectives.

The number of actors and their similarities regarding exploited CVE's suggest diffusion of power, but there is hardly equality of cyber capabilities. Most countries depend on third-party technologies from the foreign private sector (Sections 7.2 and 9.1). The roster of countries that have displayed self-made capabilities is small (16) compared to the number of countries offensively capable.

This creates an opportunity that many states are resorting to. The low-cost ability to erode the advantages of geopolitical rivals and challenge the status-quo is present. In this sense, the international dynamics is influenced by cyber capabilities, resulting in countries punching above their weight on the international system (Barrinha and Renard 2020).

Regarding political alignments in cyberspace, several countries possess a similar level of offensive capabilities (Section 7.5), which means that no nation acts in a dominant position. Moreover, there is not a bipolar structure similar to the Cold War. This suggests that cyberspace offers a glimpse of multipolarity dimension. There is no clear balance of power, and multiple agendas collide or occasionally coalesce (Section 9.7).

Cyber conflict is ambiguous and less oriented towards conventional military strategies, and international conflict studies lack the analytic tools to reframe strategies for it (Lewis 2021). The fact that cyber actions do not create an existential threat gives states plenty of room to maneuver in cyberspace and to engage with competitors. This is seen by the cumulative effect that offensive cyber actions can achieve, i.e., a single action might not be relevant but repeated engagement can influence the relative balance of power.

In this sense, offensive cyber capabilities are not transforming the nature of war itself. Rather, it provides alternatives for the bargaining and interactions of nation-states below the threshold of the use of force. Actors are able to achieve strategic outcomes and influence the balance of power without having to resort to an armed attack and minimize the risk of a military or nuclear response from their targets (Harknett and Smeets 2020).

For example, this research identified: North Korean actions to circumvent economic sanctions through cyber theft, China's acquisition of state-of-the-art technology by cyber espionage, and Russia's ability to behave aggressively in its vicinity and challenge the United States.

More broadly, this research also points to the fact that offensive cyber actions are tolerated by western and non-western standards, provided they do not aim to destroy or provoke loss of functionality in critical infrastructure services. This threshold is extracted from the dataset given the few occurrences in the last decade and the reports from the Open-Ended Working Group (OEWG) and Group of Governmental Experts (GGE) on Advancing responsible State behavior in cyberspace in the context of international security, both at the United Nations.

The data indicates that there is an increasingly clear distinction between offensive cyber capabilities and cybersecurity (Martin 2020). While both can be a measure of cyber power and a useful indicator for policy making, the evidence suggests that offensive cyber capabilities do not deter other countries from engaging in cyberspace (Section 9.6).

The issues with attribution, the lack of clear red lines, and the challenges of clearly responding to an attack (imposing costs) explain the lack of effectiveness of deterrence strategies by the countries with the most notable offensive cyber capabilities.

Looking forward, a continuous increase in offensive cyber actions is expected, given that more countries are acquiring and developing offensive capabilities (Section 9.4). The argument that security is a traditional government function has often been used to justify the acquisition of offensive capabilities, which reinforces the nation-state's role in cyberspace (Nye 2018).

However, the evidence so far suggests that escalation is not a salient issue since no conflict has started with offensive cyber actions and then become a conventional conflict. One could argue the opposite, that the Stuxnet is an example of de-escalatory action because the alternative would be a conventional strike against the Iranian nuclear program (Valeriano, Jensen and Maness 2018).

The episode of the Israeli Armed Forces bombing of the Palestinian cyber force headquarters (Groll 2019) is the single clear case of escalation from cyber to a physical response. Interestingly, Israel argues that it did not happen against a nation-state but a non-state actor (Hamas cyber division).

Conversely, the use of offensive cyber actions against political opposition (domestic targets) and expatriates is expected to rise given a countries' profile of acquiring offensive cyber capabilities, assuming the evaluation as authoritarian by the FOTW Index (Section 9.5). This echoes the findings of Valeriano and Maness (2015, 2018).

Regions such as MENA and Southeast Asia are likely to continue with the highest number of offensive cyber actions. For the former, the tensions among regional competitors (Iran and Saudi Arabia), Turkey's rise, and the civil wars in Syria and Yemen remain. The latter, with tensions in the South China Sea and the increasing geopolitical competition in the Indian Ocean and Himalayas (Section 9.2).

The use of offensive cyber actions is foreseeable in other regions due to border and resource disputes, albeit the likely use in a broader spectrum in support of conventional weapons. For examples:

- The River Nile dispute involving Egypt and Ethiopia (backed by Sudan) could spark the use of cyber-enabled means from both sides, given all sides' proven capabilities.
- Border disputes in Central Asia and Caucasus – such as the conflict between Armenia and Azerbaijan for the Nagorno-Karabakh region – are another potential theatre of operations for offensive cyber capabilities.

Nevertheless, a pure cyber conflict is unlikely to reach the threshold of force – physical destruction, injuries and death or the long-term loss of critical infrastructure functionality. This kind of cyber action appears to be dependent on a broader conventional conflict involving nation-states. Instead, cyberspace is a domain where relative power can be influential and strategic balance can evolve without resorting to the level of armed conflict.

A few closing remarks on the future of offensive cyber capabilities and some encouragement for future researcher is appropriate at this point.

Offensive cyber capabilities will be directly impacted by the increase of interconnectivity prompted by 5G and the adoption of AI, quantum computing and other disruptives technologies. The first conclusion is that offensive cyber actions will dramatically increase with the widespread adoption of additional disruptive technologies.

The 5G technology is going to enable the increase of connected devices to the internet of all things, it is predicted that smart devices will be so common that they will be placed on disposable items such as fruits and vegetables. This, in turn, will increase the attack surface available for threat actors who will be granted a new universe of big data to perform espionage and surveillance against its targets.

With AI the speed and operational width for offensive actions (no longer exclusive to humans) will increase, for instance, providing endless reconnaissance capabilities and mind-blowing intrusion persistence (limited by human knowledge nowadays). This may increase escalatory consequences, as AI enabled cyber actions might inadvertedly cross accepted thresholds.

As for quantum computing the prospects are even more staggering. The computational power of these new machines will render the current cryptography standards useless, which means that the whole defense apparatus in place is going to overwhelmed by it. It is most likely that security measures will also improve with quantum technology, but the difference from the “haves” and “have nots” tends to be huge during this transition period.

To my fellow researchers in the fields of international relations and cyber security I believe this research opens several topics for further research that I welcome you to follow by using the data provided by this research.

First, the issue of deterrence applied to cyberspace can be explored under the light of empirical evidence. The conceptual framework of this concept – frequently mentioned in cyber security national strategies – can be tested against cases of offensive cyber actions and the countries response to it. The subject welcomes a fresh approach from the adoption of nuclear deterrence concepts from the Cold War.

A second subject that can be further studied is the nation-state profiling suggested in Section 9.3. The proposed taxonomy is intended to set the grounds for a policy debate regarding behavior in cyberspace and how countries should consider their rivals actions. The acquisition or development of offensive cyber capabilities ought not to be viewed as simple threatening behavior according to the proposed framework.

Another issue that derives from the development of cyber capabilities is the existence of a security dilemma and an arms race in cyberspace. Albeit the increase of offensive cyber capabilities worldwide, this research was unable to determine if there is any causal relationship. Are countries responding to their peers by acquiring and developing new capabilities? This is an issue that should be taken into consideration in further studies.

Finally, the offensive cyber actions that aim to produce disinformation against their targets is another subject that can be further explored. In this research the number of cases (5 documents) was very small because these actions are not usually described as APTs. An important addition to this line of research would benefit from the inclusion of the current dataset from data provided by the social networks (Twitter and Facebook) that started to proactively disclose these kinds of operations from 2020 onwards.

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APPENDIX A - CYBER CAPABILITIES PROVIDERS

Amesys

The Advanced Middle East Systems (AMESys) was a subsidiary from the French technology company Bull SA (acquired in 2010). It provided the EAGLE system which provides Monitoring Centres, Internet Monitoring, Audio Surveillance and Location Monitoring technology. In 2013, this product was divested to Nexa Technologies with the help of former Amesys employees (Stéphane Salies, a former Bull SA director).

The EAGLE System allows the creation of investigations focused on individuals. It also performs analysis of different data including web traffic, VoIP, chat protocols and search engine queries.

This research identified two cases for government acquisition, Libya and Syria, including former Lybian secret police during the Gaddafi regime.

- Libya
- Syria

The human-rights NGO called *Fédération internationale pour les droits humains* prosecuted Amesys in 2011 for being complicit for tortures during Gaddafi's regime in Libya.

Cyberbit and Elbit Systems

Elbit Systems is an Israeli traditional military and defense equipment provider. In 2015, it acquired Cyberbit to bolster its cybersecurity and intelligence collection portfolio.

Their approach to the offensive capabilities market is that boundaries between national security, defense and law enforcement agencies (even local ones) are increasingly blurred. That creates opportunities for an all-encompassing intelligence solution.

Cyberbit's capabilities include bulk metadata collection and analytics, malware, open-source intelligence, satellite communications, and a platform that can unify all of that. It can all be acquired in a single purchase or as separate modules.

Additional features include the PC Surveillance System (PSS), a solution that provides zero-days exploits to plant malware for "monitoring and extracting information". The user can bypass encryption and security mechanisms to control and collect data from the target device.

This includes VoIP conversations, e-mails exchange, web browsing history, keystrokes, screen shots, extract credentials, obtain geo-location in real time, and activation of microphone and cameras. The advertised solution is flexible to act in conformity to local legislation worldwide.

This research identified six sales to state users, including intelligence agencies and a law enforcement agency.

- Ethiopia
- Kazakhstan
- Philippines
- Thailand
- Uzbekistan
- Zambia

The most noticeable cases include the actions against opposition political organizations in Ethiopia (Ginbot 7), Bahraini human rights activists and Malay language speakers during the 2013 General Elections.

Dreamlab

Dreamlab Technologies is Swiss company operating in Bern since 2004. Its main product is called iProxy and provides communications monitoring coming across the internet. In one of its commercial enterprises Dreamlab was associated with Gamma Group. The bundle allowed for the customer to deploy Gamma's FinFisher intrusion software.

This research found evidence of Dreamlab's equipment in two countries:

- Oman
- Turkmenistan

Gamma Group

Gamma Group is a British-German enterprise that provides “ethical hacking” programs. Its product, called FinSpy suite, possesses a host of functionalities that derives from the privileged access granted with the remote control of the target`s device.

The tool allowed the customer to access web browsing, keystrokes, audio collected by the phone, instant messaging, and voice conversations. Moreover, credentials to private services (user/password) would also be collected by the FinSpy suite, allowing the customer to go further than the compromised device into other systems. The tool also worked cross-platforms (mobile and desktop) and operating systems (Windows, iOS, Android).

The company gained unwanted notoriety in 2014 as a result of a data breach - by a hacktivist identified as “PhineasFisher,” - that made public 30 GB of information regarding technical capabilities and their customers (WIKILEAKS).

The offensive actions are a product of multiple vectors such as zero-day vulnerabilities, spear-phishing attacks, drive-by downloads, and social engineering deployed against the targets.

Its architecture includes a main server (Master FinFisher) that acts as a command and control, and FinProxy that host and deploy malware solutions. The FinSpy module communicates with the FinProxy, to communicate with the Master Server.

The company also provides solutions for hacking into devices with physical access (FinFisher USB Suite) and a Remote Hacking Kit to remotely gain access to the target computer.

Other features include dynamically changing files as the download occurs (FinFly), high-performance password cracking (FinCrack), sniffing strokes from remote keyboards (Fin Wi-Fi KeySpy), attacks against Bluetooth protocol (FinBluez),

This research identified 55 sales to state users, including intelligence agencies and a law enforcement agency.

- South Africa
- Germany
- Angola
- Saudi Arabia
- Australia
- Austria
- Bahrain
- Bangladesh
- Belgium
- Bosnia & Herzegovina
- Brunei Darussalam
- Bulgaria
- Canada
- Kazakhstan
- Egypt
- United Arab Emirates
- Slovenia
- Spain
- United States
- Estonia
- Ethiopia
- Gabon
- Netherlands
- Hungary
- India
- Indonesia
- Italy
- Japan
- Jordan
- Latvia
- Lebanon
- Lithuania
- Macedonia
- Malaysia
- Morocco
- Mexico
- Mongolia
- Nigeria
- Oman
- Panama
- Pakistan
- Paraguay
- Qatar
- Kenya
- United Kingdom
- Czechia
- Romania
- Serbia
- Singapore
- Taiwan
- Turkmenistan
- Turkey
- Uganda
- Venezuela
- Vietnam

The most noticeable cases include the actions against opposition political organizations in Ethiopia (Ginbot 7), Bahraini human rights activists and Malay language speakers during the 2013 General Elections.

Hacking Team

Hacking Team is an Italian company provider of “ethical hacking” programs. The company was later acquired by a Swiss group called Memento Labs. Its main product was called Remote Control System (RCS), a later version was branded Galileo. Its functionalities allowed the customer to have full control over the target device.

The tool allowed the customer to access web browsing, keystrokes, audio collected by the phone, instant messaging, and voice conversations. Moreover, credentials to private services (user/password) would also be collected by the RCS, allowing the customer to go further than the compromised device into other systems. The tool also worked cross-platforms (mobile and desktop) and operating systems (Windows, iOS, Android).

The company gained unwanted notoriety in 2014 as a result of a data breach - by a hacktivist identified as Phineas Phisher - that made public 30 GB of information regarding technical capabilities and their customers (WIKILEAKS).

This research identified 61 sales to state users, including Armed Forces, intelligence agencies and law enforcement agencies.

- Saudi Arabia
- Azerbaijan
- Bahrain
- Brazil
- Kazakhstan
- Chile
- Cyprus
- Colombia
- South Korea
- Egypt
- United Arab Emirates
- Ecuador
- Spain
- United States
- Ethiopia
- Guatemala
- Honduras
- Hungary
- Italy
- Lebanon
- Lithuania
- Luxemburg
- Malaysia
- Morocco
- Mexico
- Mongolia
- Nigeria
- Oman
- Panama
- Poland
- Czechia
- Russia
- Singapore
- Sudan
- Switzerland
- Thailand
- Turkey
- Uzbekistan
- Vietnam

Among the famous cases, the targeting of Moroccan media outlet Mamfakinch, the Emirati human rights activist Ahmed Mansoor, Ethiopian Satellite Television Service (ESAT) employees, and the use against Korean speaking targets by the South Korean National Intelligence Service (NIS).

Sandvine

Sandvine is a rebranding of Procera Networks after Francisco Partners (an American private equity firm) acquired the Ontario-based networking equipment company. The group is known to have multiple investments in companies with dual-use technology (among them NSO Group).

Its main product is called PacketLogic. It is a Deep Packet Inspection (DPI) device. It can interact in different manners (degrade, block, inject, and log) a great number of types of Internet traffic. This was used by governments to inject malicious programs into the target devices (Turkey) and to suppress legitimate traffic (acting as a censorship mechanism in Egypt to block access to Report Without Borders, Human Rights Watch and other ONGs).

This research identified three countries that acquired the Sandvine PacketLogic:

- Egypt
- Turkey
- Pakistan

One of the most prominent cases is the use of Sandvine by the Türk Telekom to bundle legitimate internet traffic with malware used by StrongPity APT. The targets were physically located in Syria and Turkey.

NICE Systems

The company was founded by former Israeli military personnel, NICE (Neptune Intelligence Computer Engineering) began as a provider of intelligence and defense related products.

The group has multiple solutions that include real-time predictive analysis and surveillance packages that can provide data for the predictive actions of the first product.

The company's products are used in over 150 countries, including customers in the Fortune 100. The main product NiceTrack Mass Detection Center (MDC) can be utilized in a bulk collection system for a big data set-up.

This research identified five cases where NICE Systems equipment was sold individually or bundled together with Hacking Team RCS.

- Colombia
- Kazakhstan
- Nigeria
- Uganda
- Uzbekistan

NSO Group

NSO Group was founded in 2010 by Unit 8200 three former agents, Israel's military intelligence service. The company's chairman was also a retired general from the Israeli Armed Forces. Its core product is called Pegasus and its targets are mobile devices by a combination of malware and social engineering skills.

One of the striking features of Pegasus is its zero-click installation vector, by which the target is compromised without any action of the human target. It also has one-click vectors, that require some level of social engineering or other instances to trick the victim.

After the initial access to the target device, Pegasus can collect and exfiltrate all the data available in the device. Emails, instant messages, keystrokes logging, web browsing, search history, record audio/video, screen shots from the camaras, follow its GPS location, and so forth.

The NSO Group came to public awareness due to Citizen's Lab work. As part of the Munk School of Global Affairs and Public Policy at the University of Toronto, the Lab researched several cases of targeting of human rights defenders across the Middle-East (they previously exposed FinFisher and Hacking Team campaigns).

This research identified 19 sales to state users.

Probable User/Buyer

- Bahrain
- Croatia
- Honduras
- Hungary
- Kazakhstan
- Latvia
- Morocco
- Mozambique
- Nigeria
- Poland
- Saudi Arabia
- Switzerland
- Uzbekistan
- Zambia

Confirmed User/Buyer

- Mexico
- Panama
- United Arab Emirates
- Togo

The high-profile cases of the Pegasus include the targeting of Emirati human rights activist Ahmed Mansoor, several targets in Mexico public and private sector, Amnesty International and

Saudi dissidents (Omar Abdulaziz, Ghanem al-Masarir, and Yahya Assiri), and Togolese civil society (including a Catholic Bishop).

Another interesting fact is the lawsuit that Facebook and WhatsApp against NSO Group claiming it has engaged in unlawful conduct for exploiting an audio-calling vulnerability in WhatsApp. The action affected over 1400 app's customers. Several companies - such as Microsoft, Google, and Cisco - joined the action as amicus curiae in support of WhatsApp.

No definitive decision has been made, but the court acknowledged that NSO Group might be held responsible for the actions undertaken by its "sovereign" customers.

SS8

SS8 provides lawful interception and cyber offensive capabilities. Their line of products includes communications interception, social media monitoring, and analytics.

The hacking of Blackberry's phones offered by the United Arab Emirates mobile operator, Etisalat. The company also provided cyber offensive solutions for the GCHQ.

This research identified three sales to nation-states.

- Pakistan (Ufone)
- Suriname
- United Arab Emirates

Trovicor

Trovicor is a German company that has roots in the Siemens conglomerate and later initiatives with Nokia Siemens Networks (NSN), the latter known as Nokia Networks. It provides lawful interception, mobile locations, analytics, open-source intelligence, and cyber offensive capabilities.

The company's cyber offensive technologies deploy zero-day exploits provided by Gamma Group/FinFisher. Thus, features such as social engineering, phishing, gaining access to targets device, collecting information, and ultimately taking control of the device.

This research identified nine sales to state users, including Armed Forces, intelligence agencies and law enforcement agencies.

- Bahrain
- Bangladesh
- Egypt
- Ethiopia
- Oman
- Syria
- Tajikistan
- Tunisia
- Yemen

APPENDIX B - CYBER CAPABILITIES PURCHASES

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Gamma International, FinFisher Sales to India. Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2013/04/for-their-eyes-only-2/

"Gamma International, FinFisher Sales to Indonesia. Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2015/10/mapping-finfishers-continuing-proliferation/Customer: National Encryption Body (Lembaga Sandi Negara)

Unknown other entities"

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Gamma International, FinFisher Sales to Jordan. Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2015/10/mapping-finfishers-continuing-proliferation/

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Gamma International, FinFisher Sales to Kenya. Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2015/10/mapping-finfishers-continuing-proliferation/Customer: National Intelligence Service (NIS)

Gamma International, FinFisher Sales to Latvia. Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2013/04/for-their-eyes-only-2/

"Gamma International, FinFisher Sales to Lebanon (2015). Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2015/10/mapping-finfishers-continuing-proliferation/Customer: General Directorate of General Security

Internal Security Forces (ISF)"

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Gamma International, FinFisher Sales to Mongolia. Gamma International, FinFisher. Retrieved from: Transparency Toolkit. Link: https://citizenlab.org/2015/10/mapping-finfishers-continuing-proliferation/Customer: Special State Security Department (SSSD)

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Hacking Team Sales to Cyprus (2013). Hacking Team. Retrieved from: Transparency Toolkit. Link: https://wikileaks.org/hackingteam/emails/emailid/3168Customer: Intelligence

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Hacking Team Sales to Egypt (2015). Hacking Team. Retrieved from: Transparency Toolkit. Link: https://wikileaks.org/hackingteam/emails/emailid/3168Customer: Egypt TRD GNSE

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APPENDIX C - COUNTRIES PROFILES

In this appendix the information gathered about mentioned countries is compiled into an infographic profile. The purpose is to offer the reader an easy access to a summary of the findings regarding every nation-state.

The countries are ordered alphabetically, because it is not a ranking to list the most powerful countries in cyberspace. Rather, it is a synthesis of the data collected and analyzed during this research.

To graphically represent the results four variables are display into a radar chart:

- Offensive Capabilities - the value considers the launching of state-sponsored actions, the homegrown private companies selling cyber offensive technologies, APT originated from the country (not classified as state-sponsored action) or the acquisition of at least one cyber offensive capability from private vendors.
- Offensive Intent – the value ponders the launching of state-sponsored actions, the number of purchases of offensive capabilities, and the acquisition by intelligence agencies or armed forces.
- Target Frequency - index built with the number of cyber offensive actions that targeted each country. The data was normalized from 1 to 0, the former being the country most frequent targeted and the latter the least targeted.
- Freedom House Index - the overall value provided by the FOTW assessment for the 2020 report. The index was normalized from 0 to 1, the original values are from 0 to 100.

The information regarding the identified threat-groups (list), the objectives pursued with state-sponsored cyber offensive actions, homegrown private vendors (list), and the purchased cyber offensive capabilities (list) are also displayed in the profile.

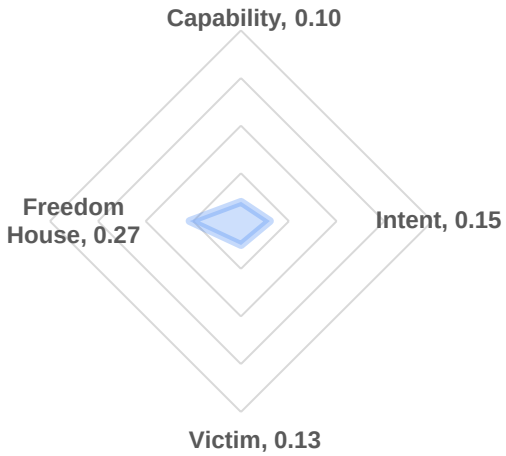
The total number of purchases and sales from a country is not restricted to cyber offensive technologies. The sources collected for this purpose provided evidence of a broader range of acquisitions that included monitoring centers, off-the-air telephone interception, satellite interception, and many other categories.

The data concerning the acquisition of cyber offensive technologies is also listed. The cases where the customers are identified (name and taxonomy) are highlighted because this correlation was alluded during the dissertation. In some cases, neither seller, nor the customer was identified (data extracted from exports reports).

Finally, a map also illustrates the origins of attacks against the country (Victim Profile). In the case of state-sponsored APTs the maps display the targets of those actions (Targeting Profile).

AFGHANISTAN

COUNTRY PROFILE



OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

FREEDOM HOUSE
Not Free (0.27)

VICTIM
Targeted in 11 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

THREAT ACTORS

No threat-actors found

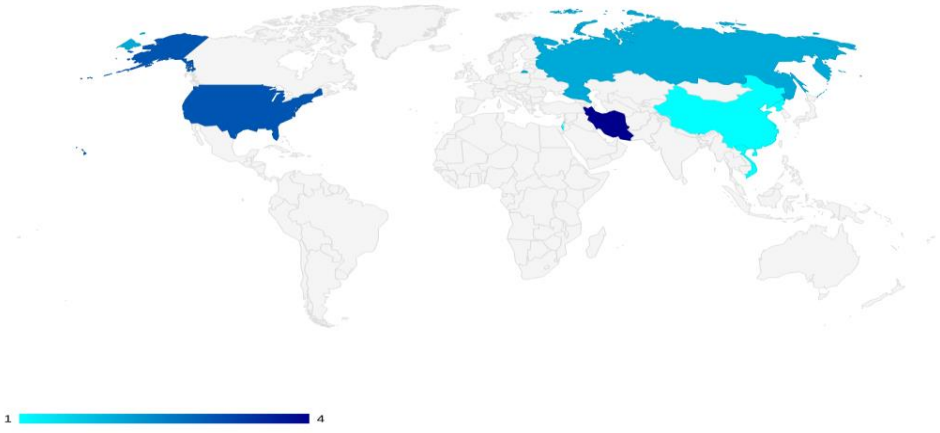
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Netsweeper systems Use in Afghanistan

VICTIM PROFILE



ALGERIA

OFFENSIVE ACTIONS
Homegrown APTs (1)

CYBER TECH EXCHANGE
No sales or purchases found

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

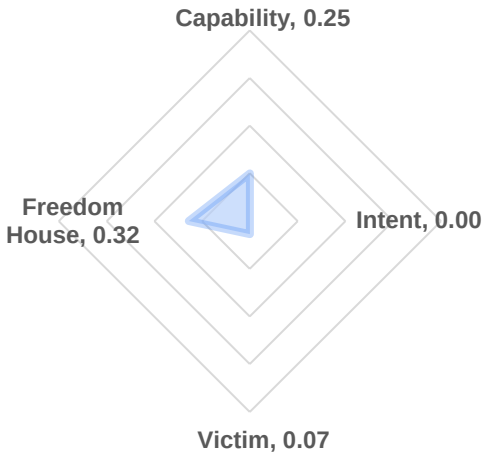
FREEDOM HOUSE
Not Free (0.32)

VICTIM
Targeted in 6 documents

THREAT ACTORS
APT Threat Actors (1)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

APT-C-44 (2020)

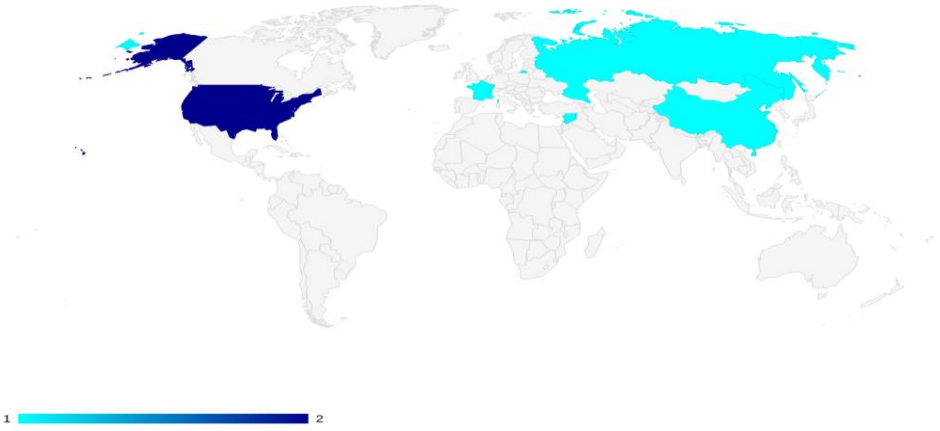
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

VICTIM PROFILE



AUSTRALIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

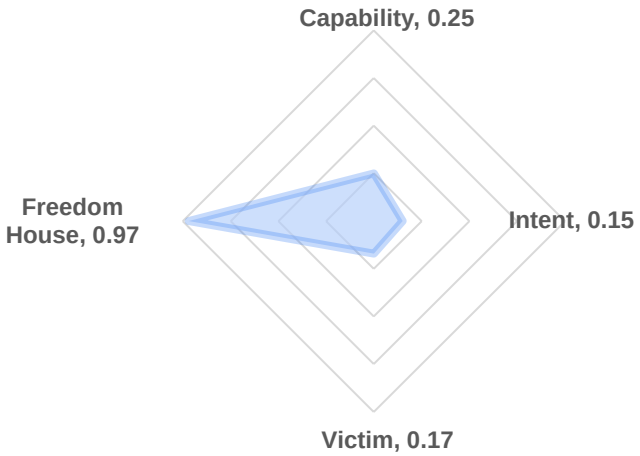
FREEDOM HOUSE
Free (0.97)

VICTIM
Targeted in 15 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 5 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

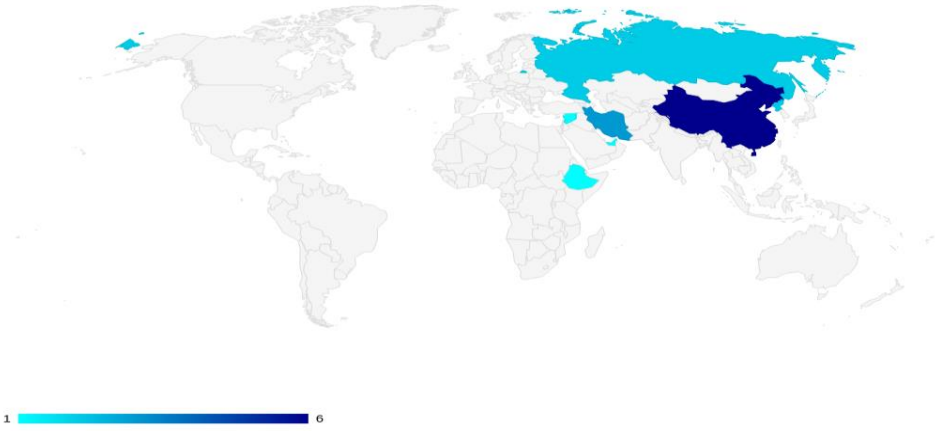
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Australia

VICTIM PROFILE



AUSTRIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

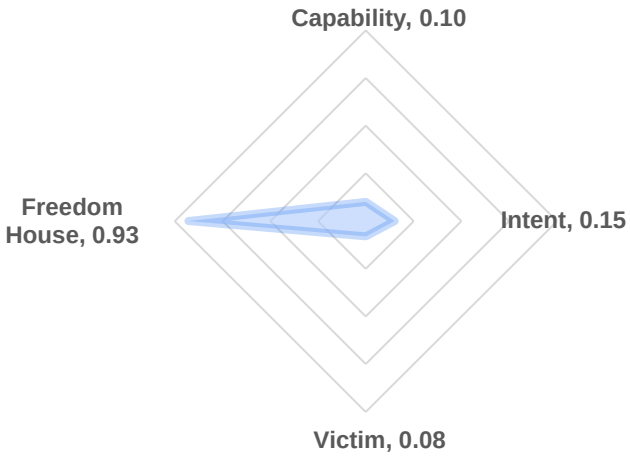
FREEDOM HOUSE
Free (0.93)

VICTIM
Targeted in 7 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 3 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

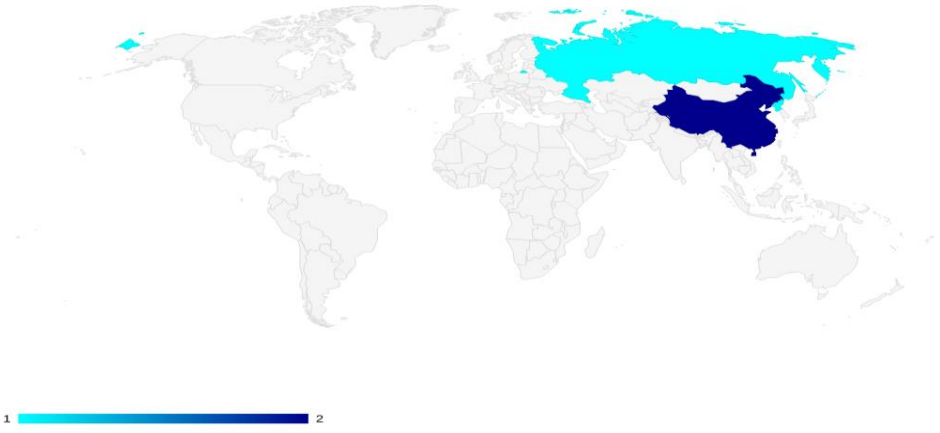
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Austria

VICTIM PROFILE



AZERBAIJAN

OFFENSIVE ACTIONS
Homegrown APTs (3)

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

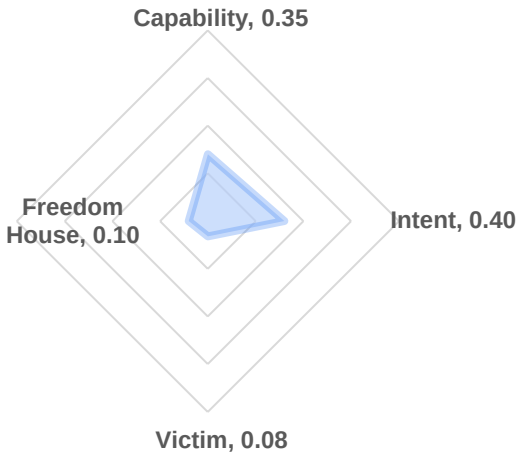
FREEDOM HOUSE
Not Free (0.1)

VICTIM
Targeted in 7 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

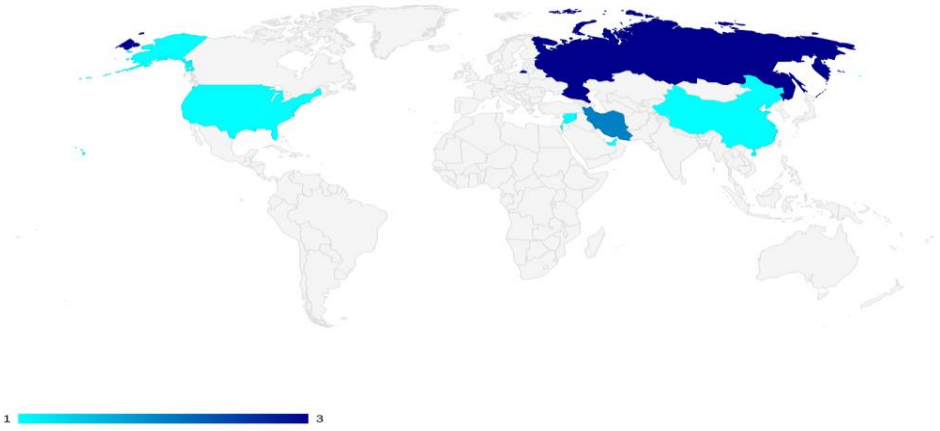
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Azerbaijan (Azerbajan NS / Intelligence) - 2013

VICTIM PROFILE



BAHRAIN

OFFENSIVE ACTIONS
State-Sponsored APTs (2)
Homegrown APTs (2)

CYBER TECH EXCHANGE
Purchases (5)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Espionage (1), Surveillance (1)

FREEDOM HOUSE
Not Free (0.12)

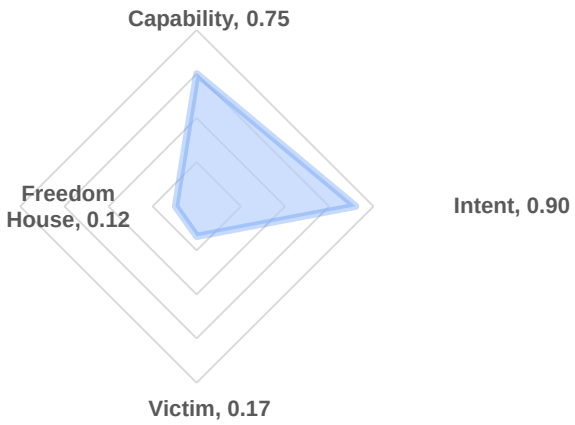
VICTIM
Targeted in 15 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

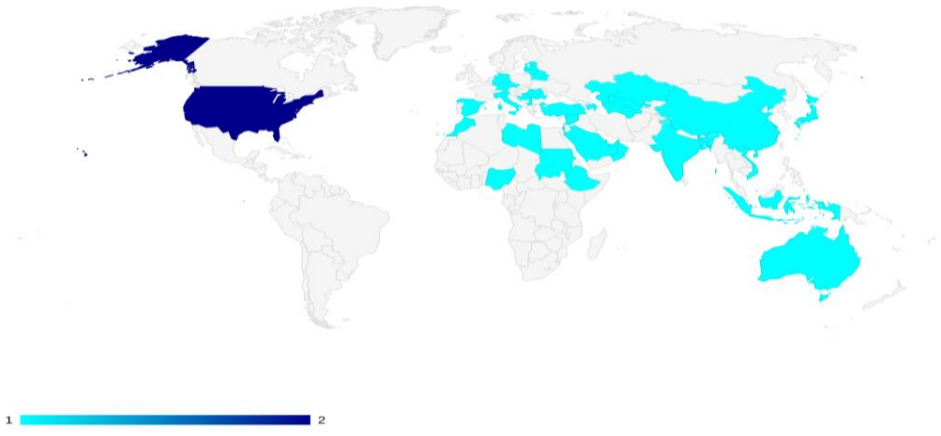
OFFENSIVE PRIVATE VENDORS

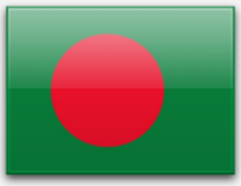
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Netsweeper systems Use in Bahrain
NSO Group Sales to Bahrain
FinFisher Sales to Bahrain - 2010
Trovicor Sales to Bahrain (Government of Bahrain / Civil) - 2009
Hacking Team Sales to Bahrain (Midworld Barhein / Civil) – 2013

TARGETING PROFILE





BANGLADESH

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

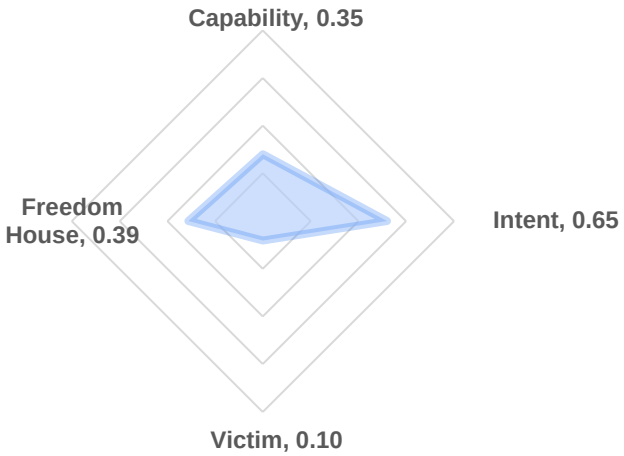
FREEDOM HOUSE
Partly Free (0.39)

VICTIM
Targeted in 9 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

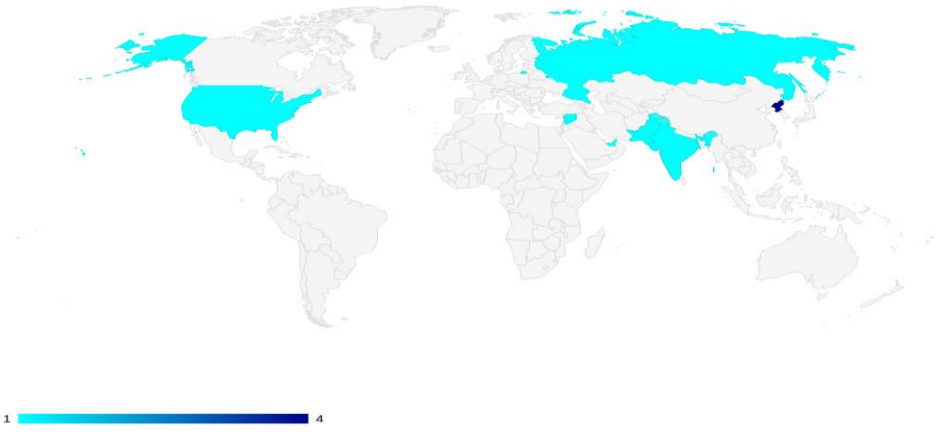
Ezzy Enterprise (Internet Monitoring, Intrusion, Phone Monitoring)

PURCHASED CAPABILITIES

FinFisher Sales to Bangladesh (Directorate General of Forces Intelligence (DGFI) / Intelligence)

Trovicor Sales to Bangladesh (Directorate General of Forces Intelligence (DGFI) / Intelligence)

VICTIM PROFILE



BELGIUM

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

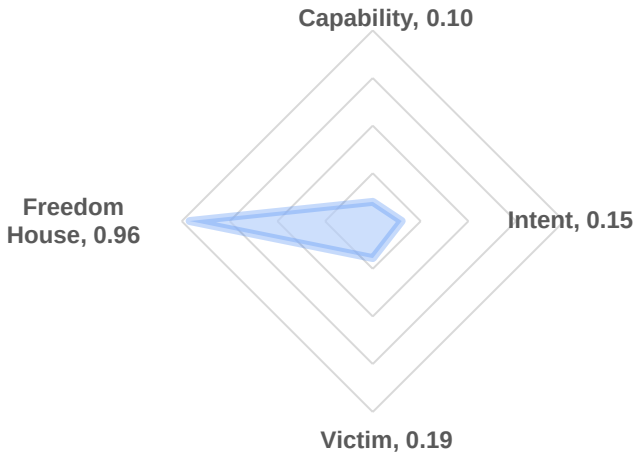
FREEDOM HOUSE
Free (0.96)

VICTIM
Targeted in 17 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

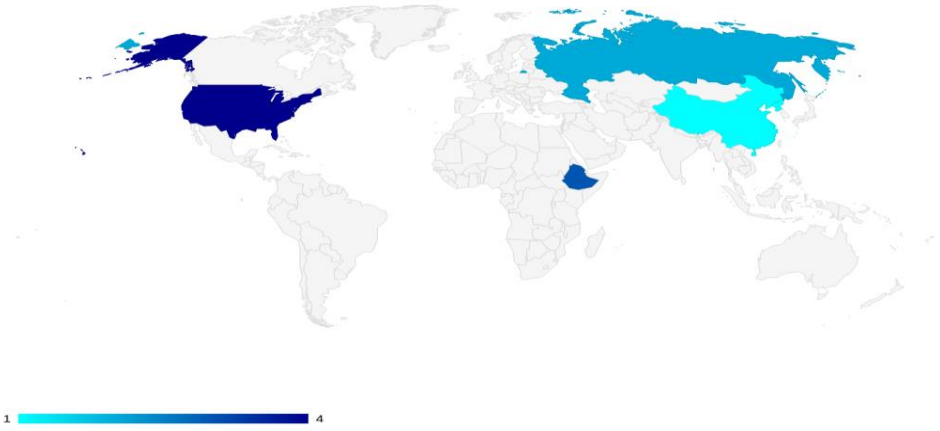
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Belgium (Federal Police / LEA)

VICTIM PROFILE



BOSNIA AND HERZEGOVINA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

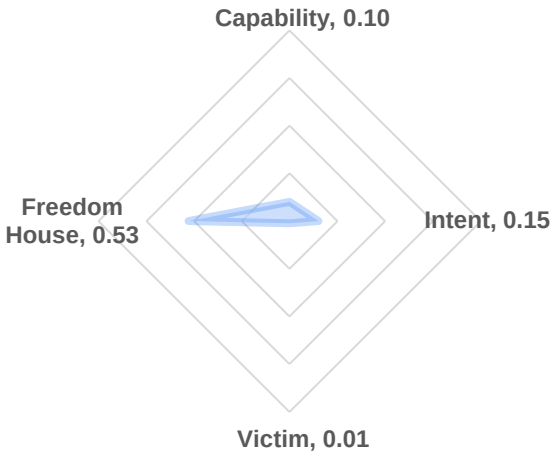
FREEDOM HOUSE
Partly Free (0.53)

VICTIM
Targeted in 1 document

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Bosnia and Herzegovina

VICTIM PROFILE

BRAZIL

OFFENSIVE ACTIONS
Homegrown APTs (5)

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

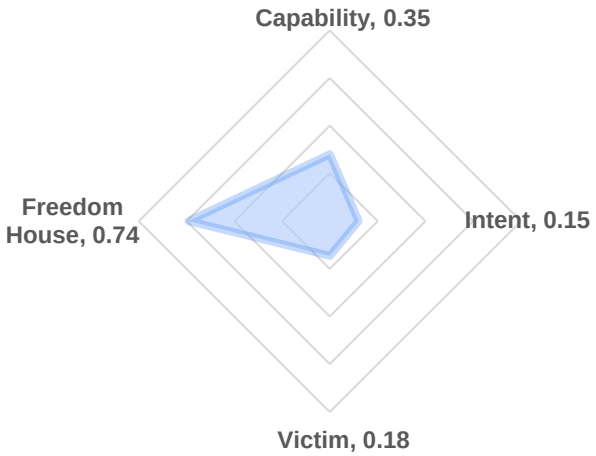
FREEDOM HOUSE
Free (0.74)

VICTIM
Targeted in 16 documents

THREAT ACTORS
APT Threat Actors (2)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

Operation Comando (2018)

Poseidon Group (2005)

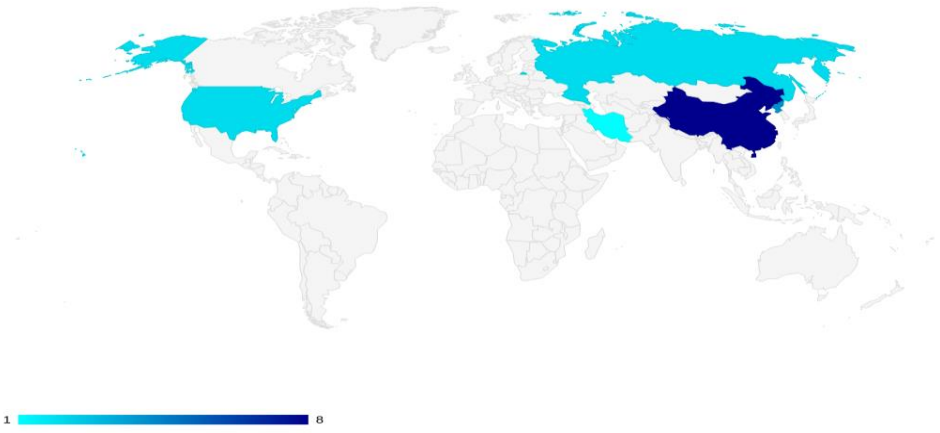
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Brazil (DPF / LEA) - 2015

VICTIM PROFILE



BRUNEI DARUSSALAM

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

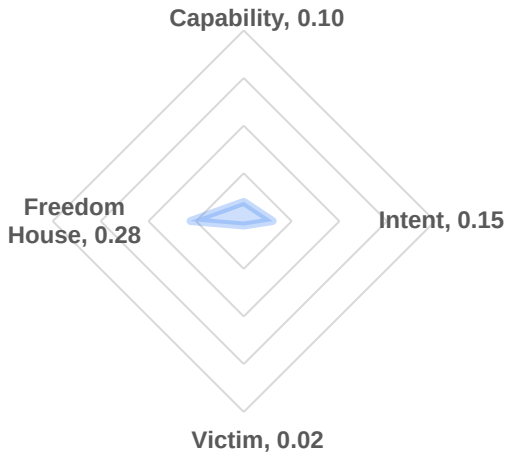
FREEDOM HOUSE
Not Free (0.28)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

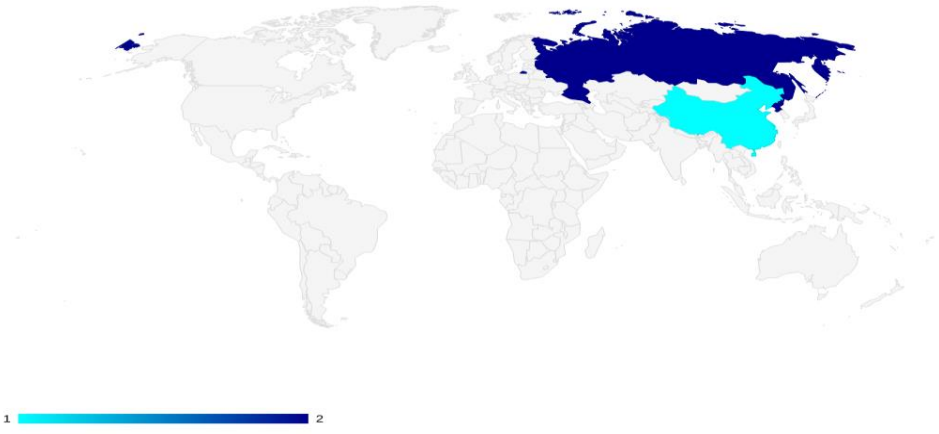
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Brunei

VICTIM PROFILE



BULGARIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

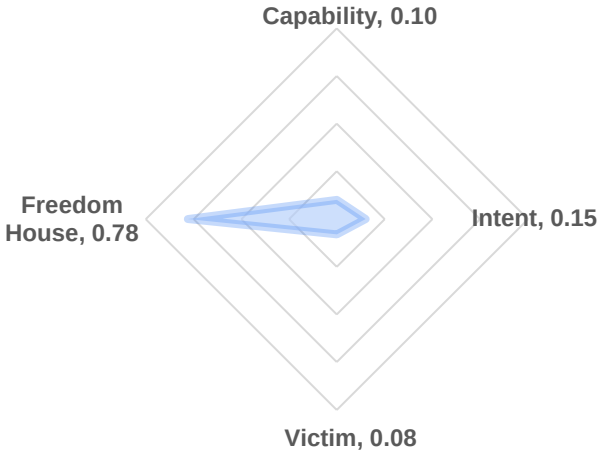
FREEDOM HOUSE
Free (0.78)

VICTIM
Targeted in 7 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

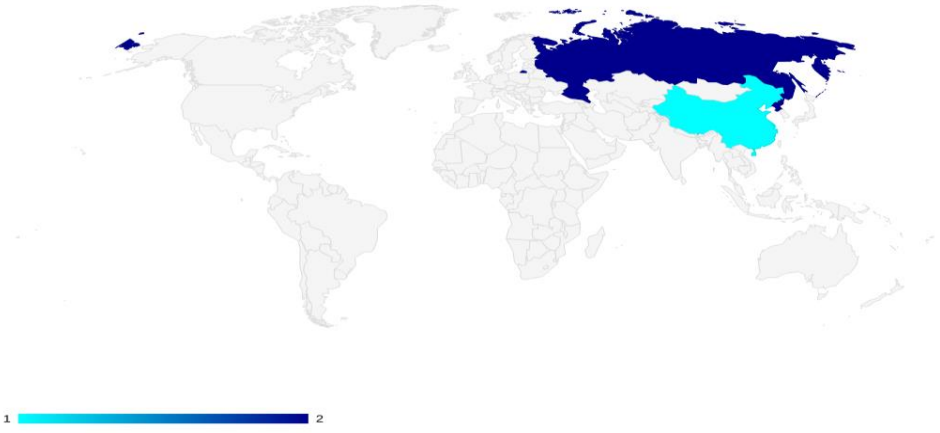
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Bulgaria

VICTIM PROFILE



CANADA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (12)
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

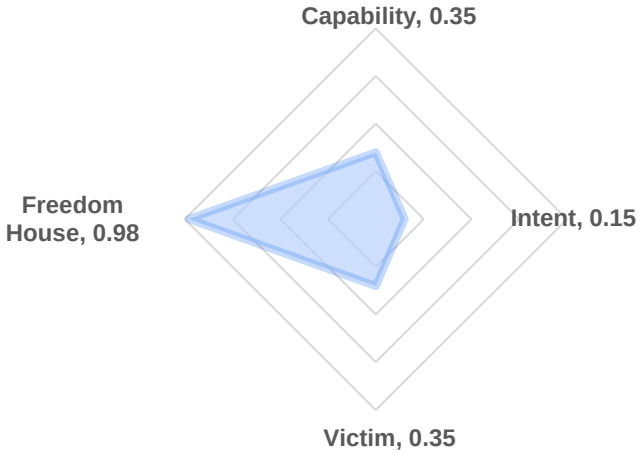
FREEDOM HOUSE
Free (0.98)

VICTIM
Targeted in 31 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 15 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

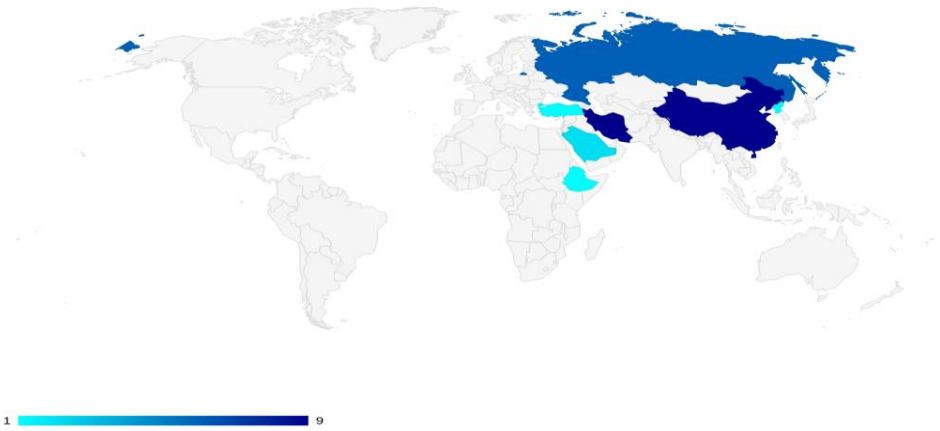
CRU (Intrusion)

Netsweeper (Internet Monitoring)

PURCHASED CAPABILITIES

FinFisher Sales to Canada

VICTIM PROFILE



CHILE

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

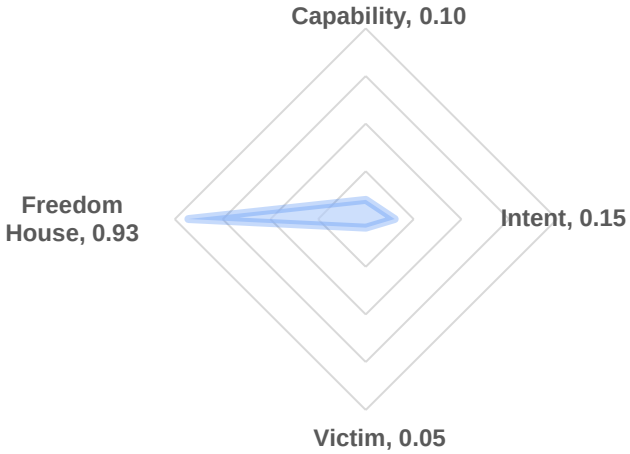
FREEDOM HOUSE
Free (0.93)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

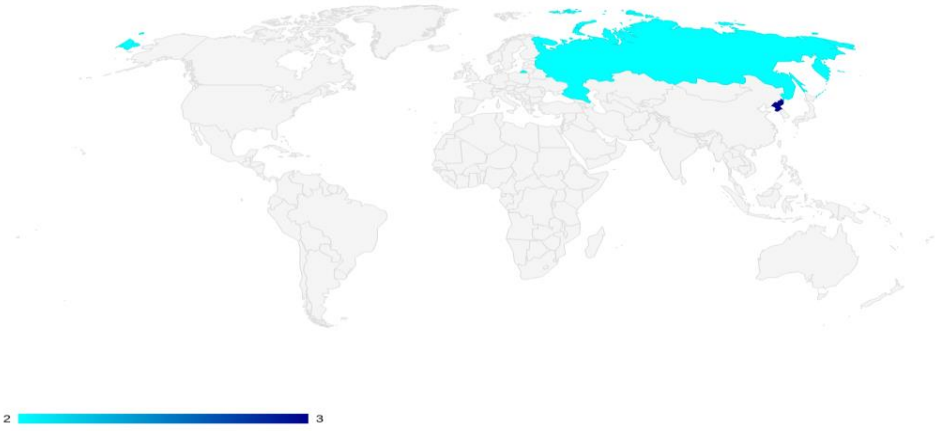
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Chile (PDI/DIE Chile / LEA) - 2014

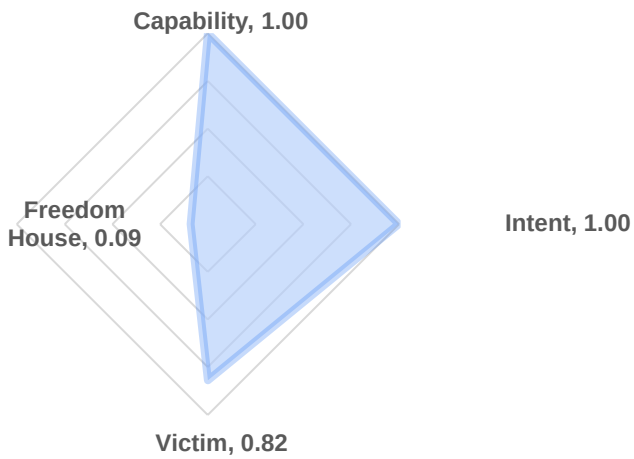
VICTIM PROFILE



COUNTRY PROFILE

Global Power

CHINA



OFFENSIVE ACTIONS

State-Sponsored APTs (75)
Homegrown APTs (229)

CYBER TECH EXCHANGE

Sales (7)

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (23), Surveillance (5), Disinformation (1), Crime (10)

FREEDOM HOUSE

Not Free (0.09)

VICTIM

Targeted in 72 documents

THREAT ACTORS

THREAT ACTORS

Anchor Panda (State-sponsored, PLA Navy) - 2012

APT 3 (State-sponsored, Ministry of State Security and Internet security firm Guangzhou Bo Yu Information Technology Company Limited ("Boyusec")) - 2007

APT 4 (State-sponsored, PLA Navy) - 2007

APT 12 - 2009

APT 17 (State-sponsored, Jinan bureau of the Chinese Ministry of State Security) - 2009

APT 18 (State-sponsored, PLA Navy) - 2009

APT 19 (A group likely composed of freelancers, with some degree of sponsorship by the Chinese government. (FireEye)) - 2013

APT 30 - 2005

APT 31 - 2016

APT 41 - 2012

Axiom - 2008

Barium - 2016

BlackTech - 2010

Bronze Butler (State-sponsored, National University of Defense and Technology) - 2010

Comment Crew (State-sponsored, 2nd Bureau of the People's Liberation Army (PLA) General Staff Department's (GSD) 3rd Department, commonly known by its Military Unit Cover Designator (MUCD) as Unit 61398) - 2006

Icefog - 2011

Ke3chang - 2010

Lead APT - 2016

Leviathan (State-sponsored, Hainan province) - 2013

Lotus Blossom - 2012

Naikon (State-sponsored, PLA Unit 78020) - 2012

Operation Shady RAT - 2006

State-Sponsored (34)
APT Threat Actors (118)

PRIVATE VENDORS

There are 8 private vendors

Operation Titan Rain (State-sponsored, PLA Unit 61398) - 2003

PassCV - 2016

Putter Panda (State-sponsored, Unit 61486 of the 12th Bureau of the PLA's 3rd General Staff Department (GSD)) - 2007

RedAlpha (State-sponsored, possibly PLA and/or Nanjing Qinglan Information Technology Co. Ltd) - 2015

RedDelta - 2020

Samurai Panda (State-sponsored, PLA Navy) - 2009

Stone Panda (State-sponsored, Tianjin bureau of the Chinese Ministry of State Security, Huaying Haitai) - 2006

Tonto Team (State-sponsored, Shenyang Military Region Technical Reconnaissance Bureau, possibly Unit 65017) - 2009

Tropic Trooper - 2011

Turbine Panda (State-sponsored, the Jiangsu Bureau of the MSS (JSSD/????????)) - 2010

Winnti Group - 2010

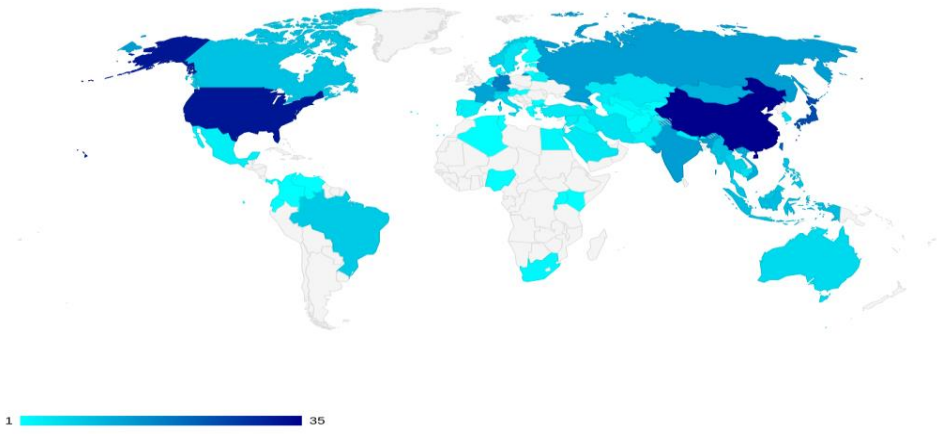
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

TARGETING PROFILE



COLOMBIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

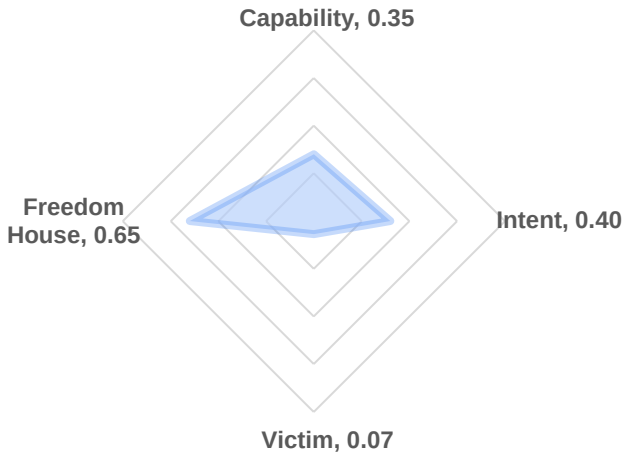
FREEDOM HOUSE
Partly Free (0.65)

VICTIM
Targeted in 6 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

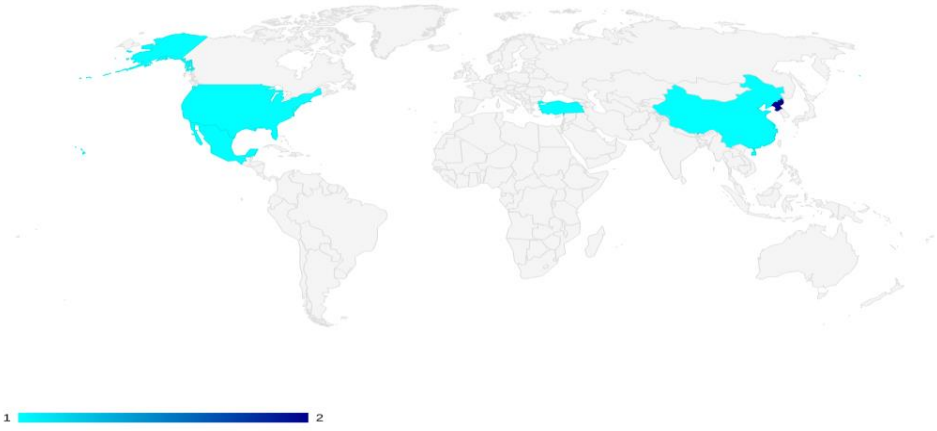
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NICE Systems Sales to Colombia (Police / LEA) - 2013

Hacking Team Sales to Colombia (DIPOL / LEA) - 2013

VICTIM PROFILE



CROATIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

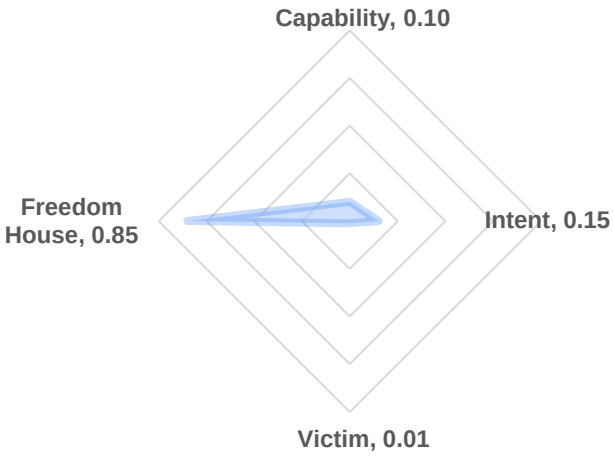
FREEDOM HOUSE
Free (0.85)

VICTIM
Targeted in 1 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

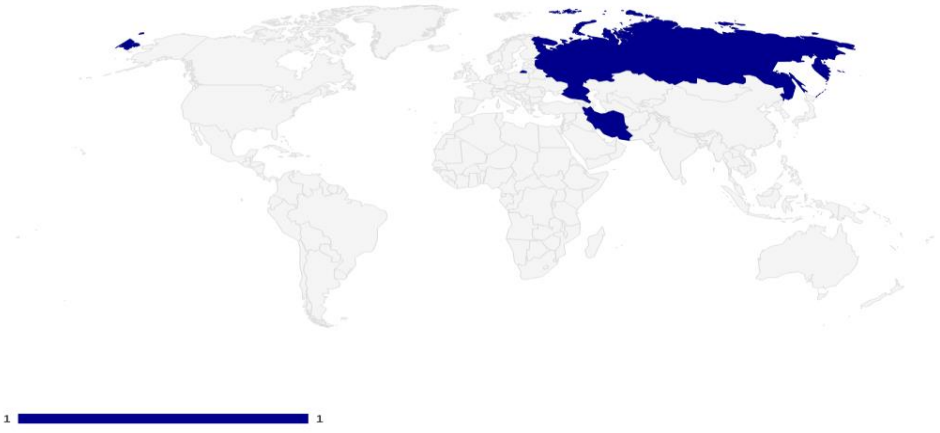
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NSO Group Sales to Croatia

VICTIM PROFILE



CYPRUS

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

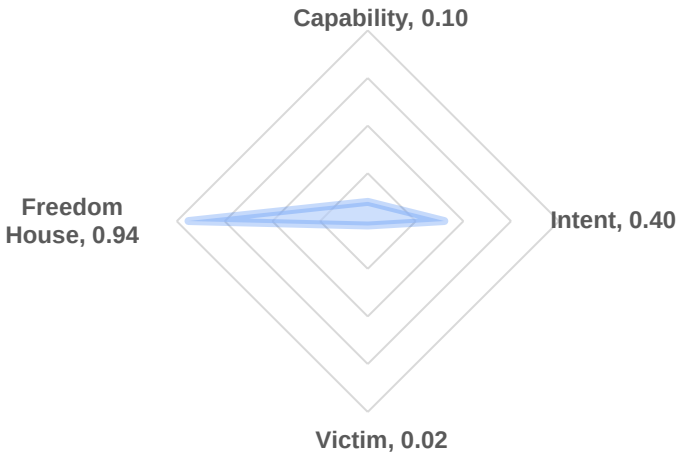
FREEDOM HOUSE
Free (0.94)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

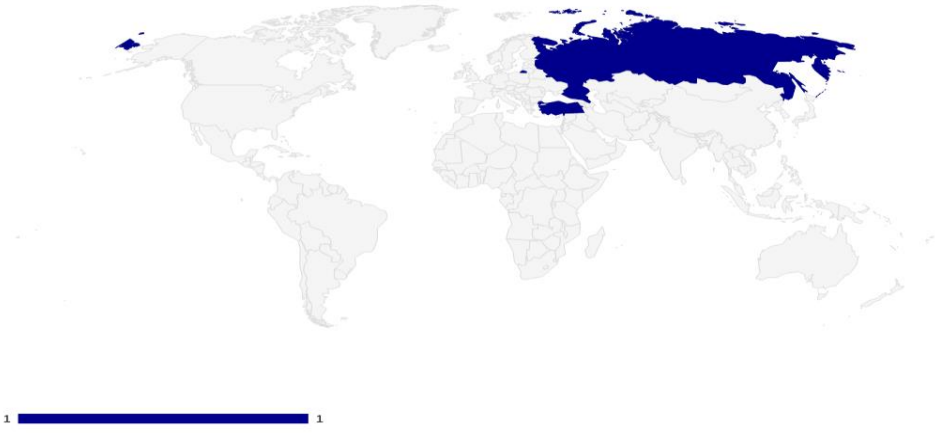
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Cyprus (Intelligence / Intelligence) - 2013

VICTIM PROFILE



CZECHIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

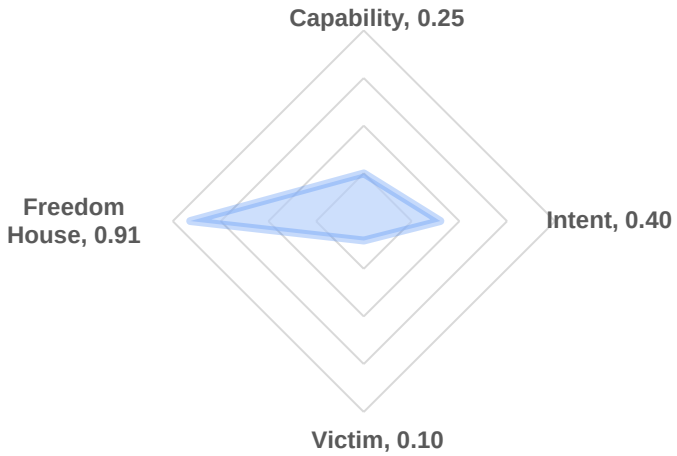
FREEDOM HOUSE
Free (0.91)

VICTIM
Targeted in 9 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 8 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

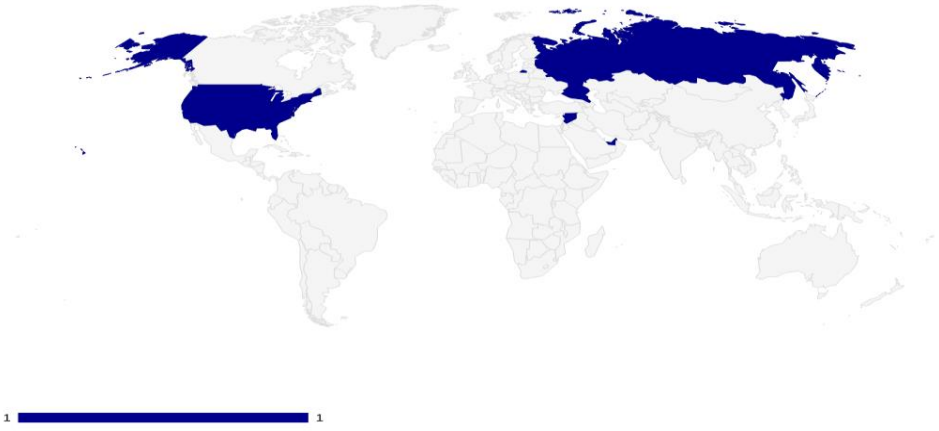
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Czech Republic

Hacking Team Sales to Czech Republic (UZC / LEA) - 2010

VICTIM PROFILE



DENMARK

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (6)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

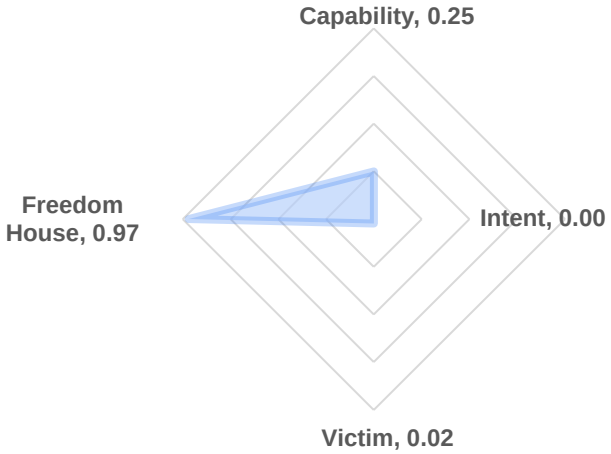
FREEDOM HOUSE
Free (0.97)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 7 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

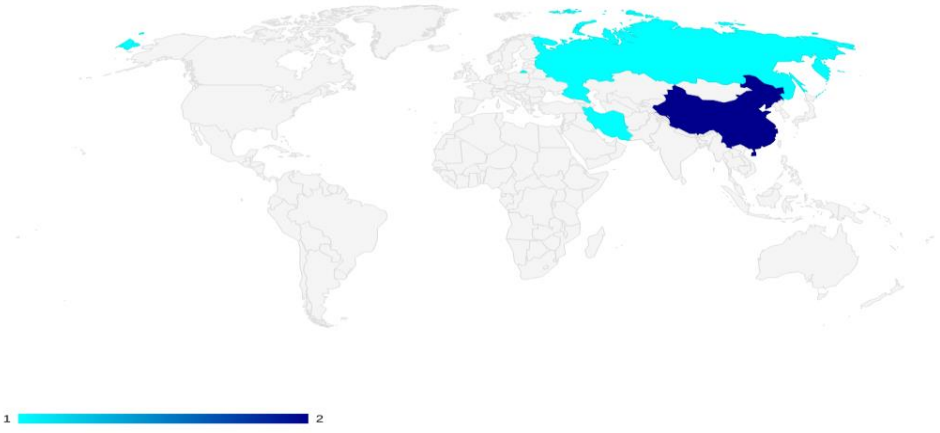
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

VICTIM PROFILE



ECUADOR

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

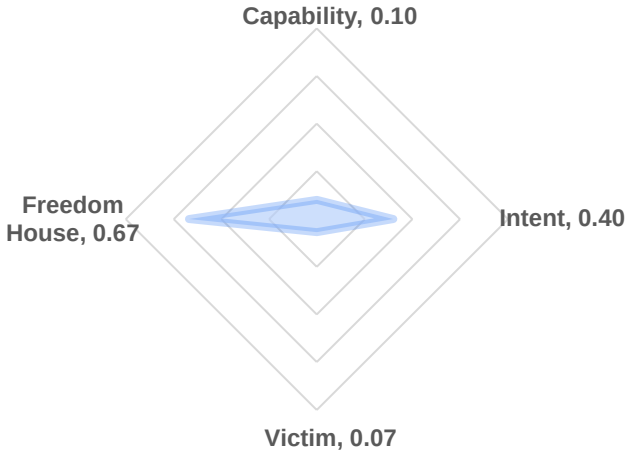
FREEDOM HOUSE
Partly Free (0.67)

VICTIM
Targeted in 6 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

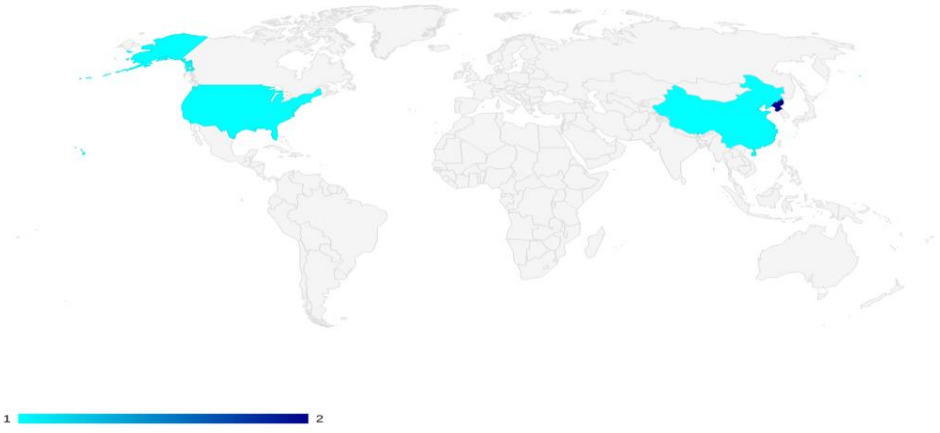
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Ecuador (SENAIN / Intelligence) - 2013

VICTIM PROFILE



EGYPT

OFFENSIVE ACTIONS
State-Sponsored APTs (4)
Homegrown APTs (3)

CYBER TECH EXCHANGE
Purchases (7)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
Surveillance (1)

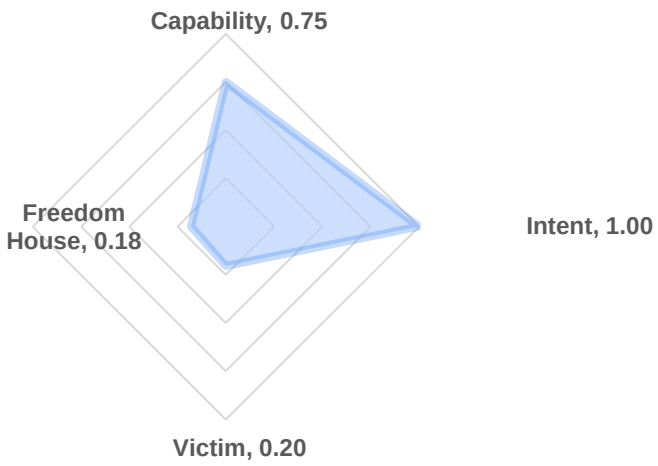
FREEDOM HOUSE
Not Free (0.18)

VICTIM
Targeted in 18 documents

THREAT ACTORS
No threat-actors found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

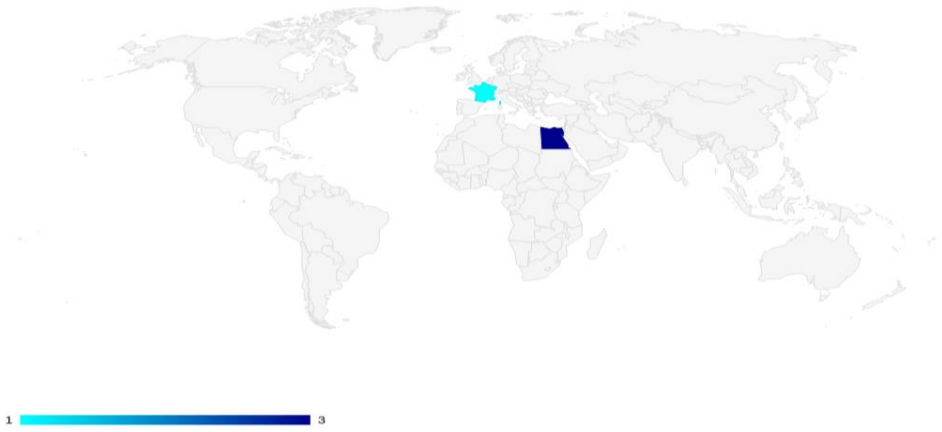
PURCHASED CAPABILITIES

Area SpA Sales to Egypt (Trd / Intelligence) - 2016
Egypt Purchase of Intrusion software Techology - 2015
Trovicor Sales to Egypt - 2009
FinFisher Sales to Egypt (Technology Research Department (TRD) / Intelligence)
Hacking Team Sales to Egypt (Egypt - MOD / Intelligence) - 2011
Hacking Team Sales to Egypt (Egypt TRD GNSE / Intelligence) – 2015

PRIVATE VENDORS

There are 1 private vendors

TARGETING PROFILE



ESTONIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

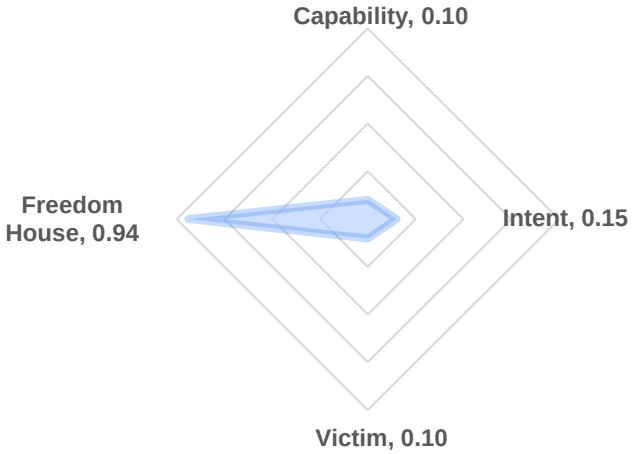
FREEDOM HOUSE
Free (0.94)

VICTIM
Targeted in 9 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

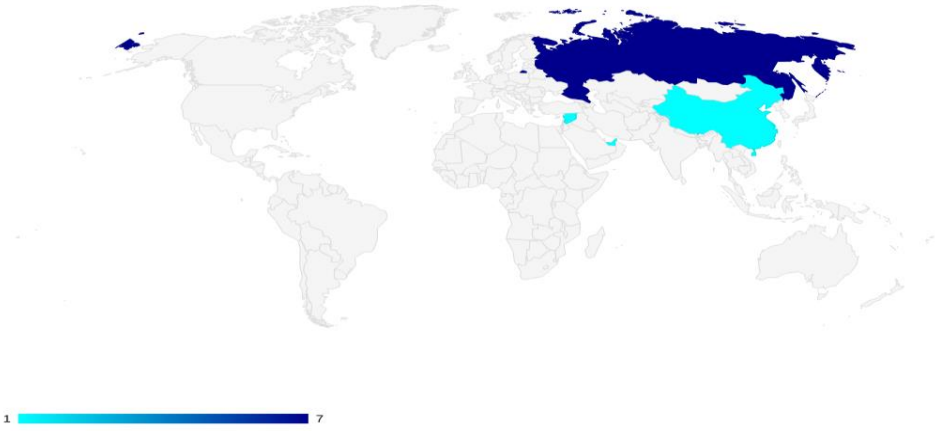
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Estonia

VICTIM PROFILE



ETHIOPIA

OFFENSIVE ACTIONS
State-Sponsored APTs (5)
Homegrown APTs (2)

CYBER TECH EXCHANGE
Purchases (4)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Espionage (1), Surveillance (1)

FREEDOM HOUSE
Not Free (0.22)

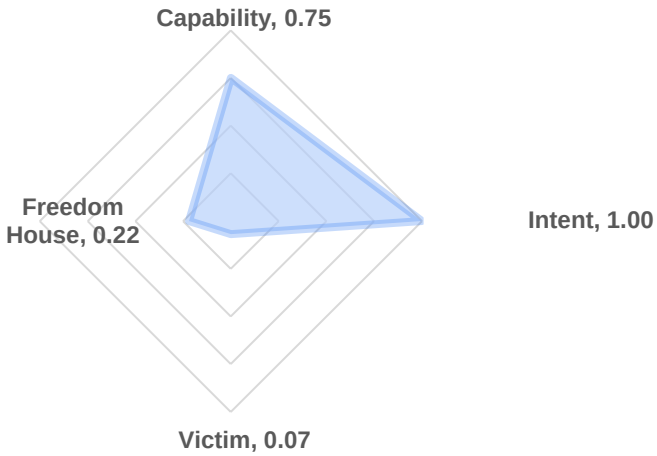
VICTIM
Targeted in 6 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

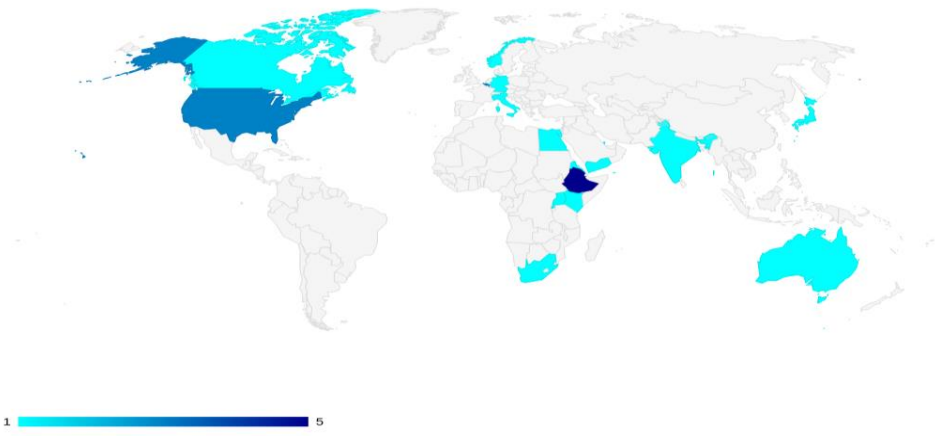
Cyberbit Sales to Ethiopia - 2017

Trovicor Sales to Ethiopia - 2010

FinFisher Sales to Ethiopia

Hacking Team Sales to Ethiopia (Information Network Security Agency / Intelligence) - 2012

TARGETING PROFILE



FINLAND

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (16)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

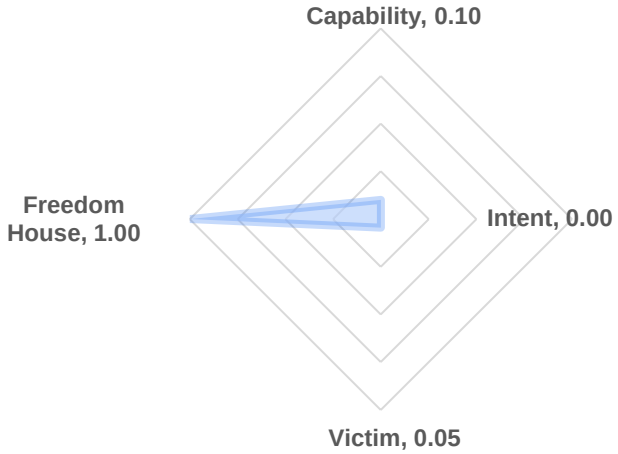
FREEDOM HOUSE
Free (1)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

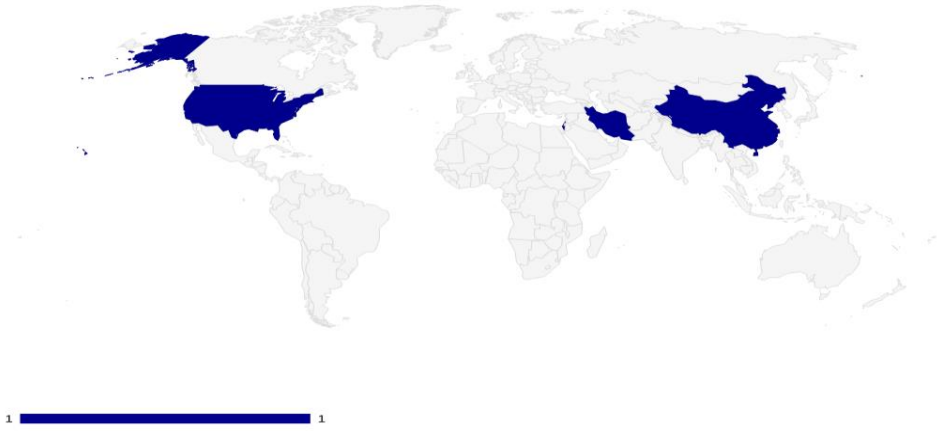
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

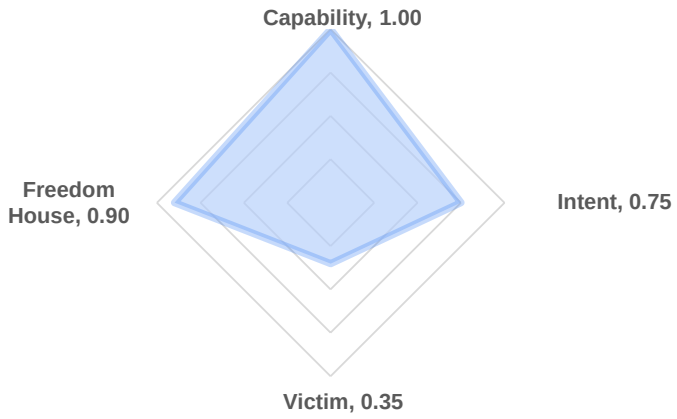
No purchases found

VICTIM PROFILE



COUNTRY PROFILE

Regional Contender



FRANCE

OFFENSIVE ACTIONS

State-Sponsored APTs (3)
Homegrown APTs (4)

CYBER TECH EXCHANGE

Sales (4)

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (3)

FREEDOM HOUSE

Free (0.9)

VICTIM

Targeted in 31 documents

THREAT ACTORS

State-Sponsored (1)
APT Threat Actors (3)

THREAT ACTORS

Snowglobe (2011)

OFFENSIVE PRIVATE VENDORS

Amesys (Internet Monitoring, Monitoring Centre, Audio Surveillance, Counter-Surveillance, Location Monitoring, Equipment, Monitoring Centres)

Bull Group (Analysis, Internet Monitoring, Phone Monitoring, Biometrics, Communications Monitoring)

Nexa Technologies (Internet Monitoring)

Qosmos (Internet Monitoring, Monitoring Centre, Analysis, Monitoring Centres)

VUPEN (Intrusion, Counter-Surveillance)

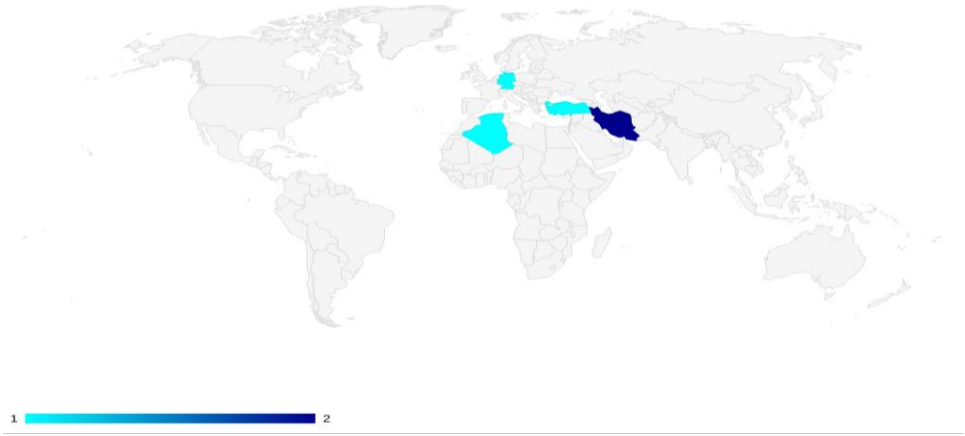
PURCHASED CAPABILITIES

No purchases found

PRIVATE VENDORS

There are 45 private vendors

TARGETING PROFILE



GERMANY

OFFENSIVE ACTIONS

No offensive actions found

CYBER TECH EXCHANGE

Sales (115)
Purchases (1)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

No objectives found

FREEDOM HOUSE

Free (0.94)

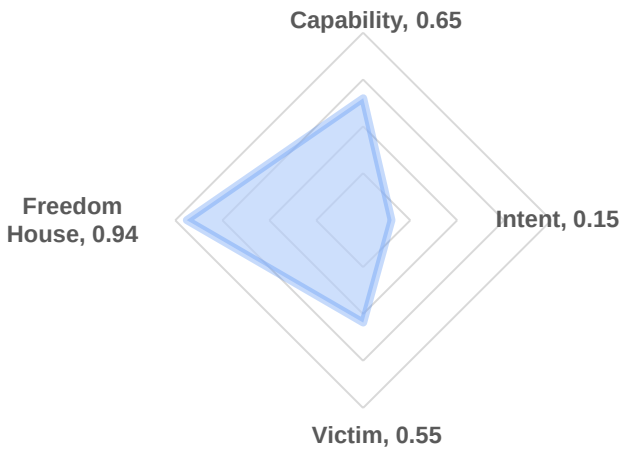
VICTIM

Targeted in 48 documents

THREAT ACTORS

APT Threat Actors (1)

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

DigiTask (Internet Monitoring, Intrusion, Location Monitoring)

Elaman (Internet Monitoring, Intrusion, Phone Monitoring, Monitoring Centre, Location Monitoring, Audio Surveillance, Video Surveillance, Analysis, Equipment, Monitoring Centres, Communications Monitoring, Technical Surveillance)

Gamma Group (Trojans , Tactical Interception)

MIB Electronic (Intrusion, Phone Monitoring, Audio Surveillance)

Trovicor (Monitoring Centre, Monitoring Centres)

Wolf Intelligence (Intrusion)

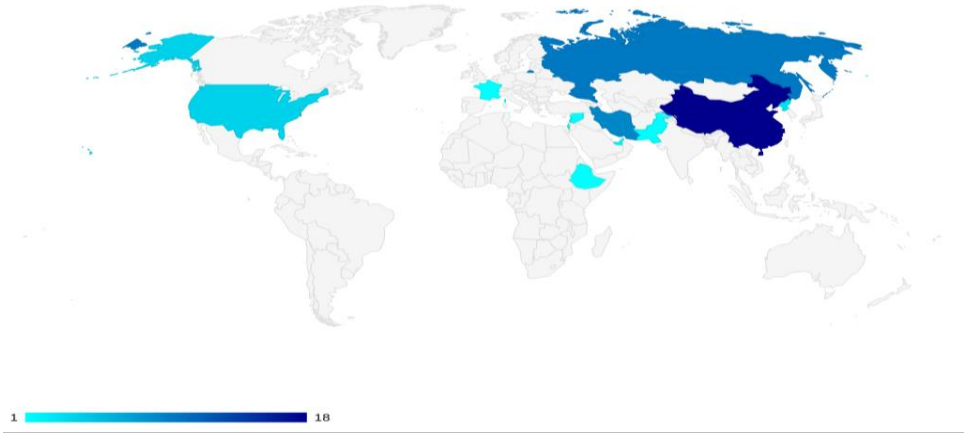
PURCHASED CAPABILITIES

FinFisher Sales to Germany

VICTIM PROFILE

PRIVATE VENDORS

There are 45 private vendors



GUATEMALA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

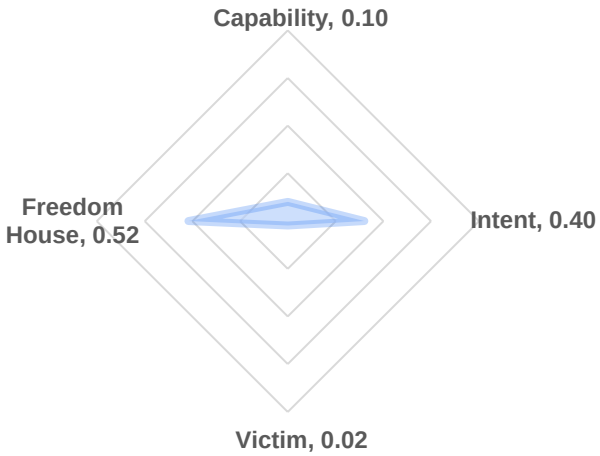
FREEDOM HOUSE
Partly Free (0.52)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

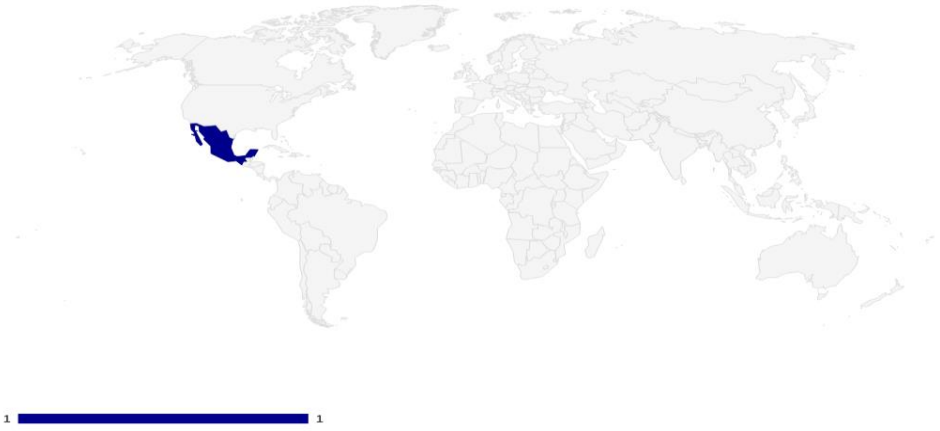
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Guatemala (MOI Guatemala / Intelligence) - 2014

VICTIM PROFILE



HUNGARY

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (4)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

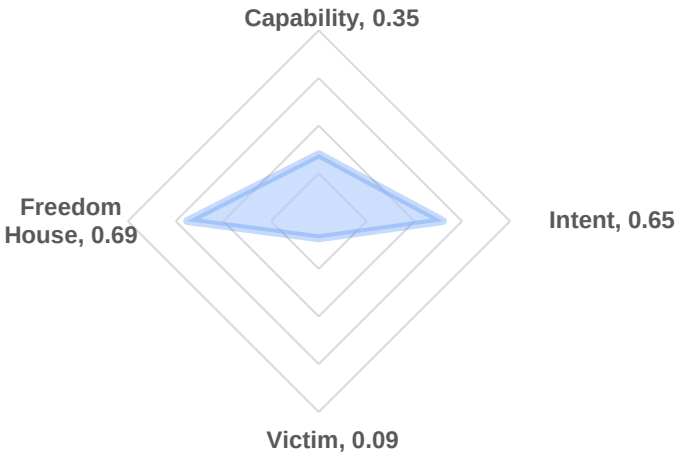
FREEDOM HOUSE
Partly Free (0.69)

VICTIM
Targeted in 8 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 3 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

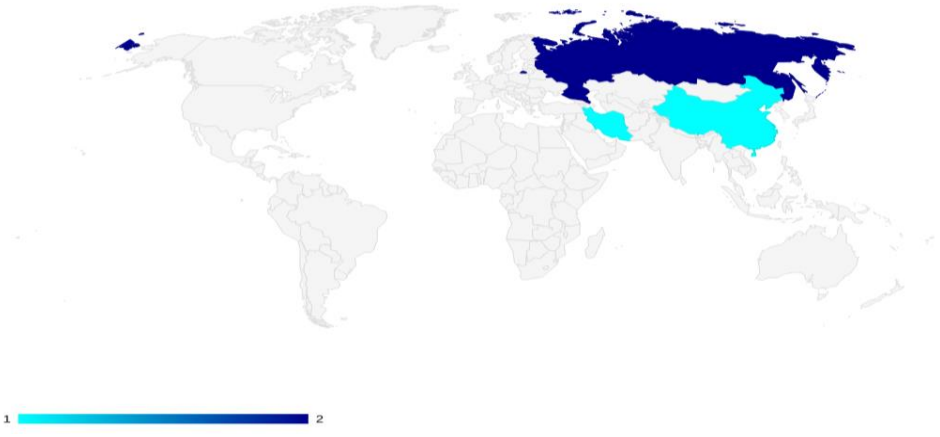
NSO Group Sales to Hungary

FinFisher Sales to Hungary

Hacking Team Sales to Hungary (SSNS - Ungheria / Intelligence) - 2009

Hacking Team Sales to Hungary (Information Office / Intelligence) - 2008

VICTIM PROFILE



INDIA

OFFENSIVE ACTIONS

State-Sponsored APTs (3)
Homegrown APTs (22)

CYBER TECH EXCHANGE

Purchases (2)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (1), Crime (1)

FREEDOM HOUSE

Partly Free (0.67)

VICTIM

Targeted in 56 documents

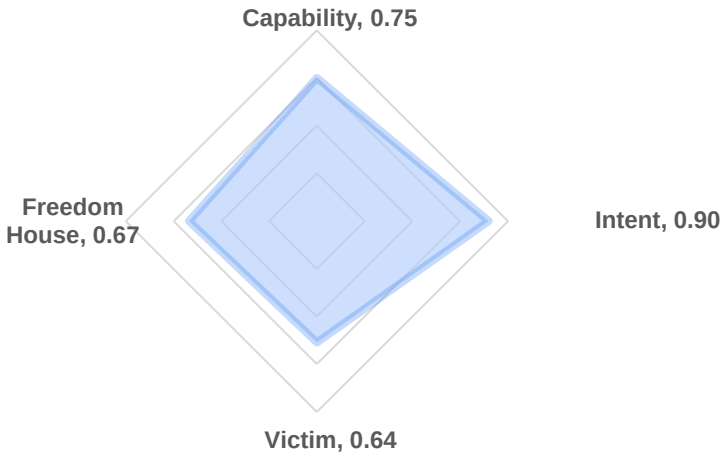
THREAT ACTORS

State-Sponsored (1)
APT Threat Actors (6)

PRIVATE VENDORS

COUNTRY PROFILE

Regional Contender



THREAT ACTORS

Confucius (2013)

Operation HangOver (2010)

Patchwork (2013)

SideWinder (2012)

Dark Basin (2013)

OFFENSIVE PRIVATE VENDORS

Aglaya (Intrusion)

ClearTrail (Intrusion, Monitoring Centre, Phone Monitoring, Internet Monitoring, Monitoring Centres, Communications Monitoring)

Paladion Networks (Internet Monitoring, Phone Monitoring, Intrusion, Monitoring Centre, Analysis, Monitoring Centres, Communications Monitoring)

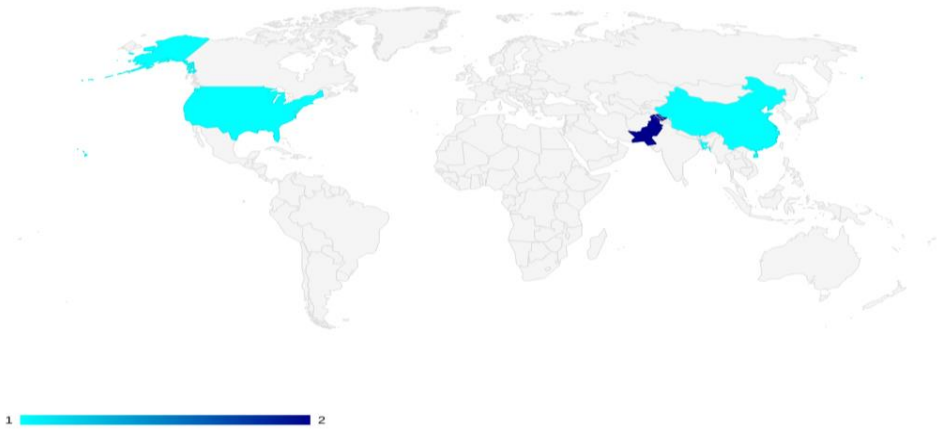
PURCHASED CAPABILITIES

Netsweeper systems Use in India

FinFisher Sales to India

There are 8 private vendors

TARGETING PROFILE



INDONESIA

OFFENSIVE ACTIONS
Homegrown APTs (3)

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

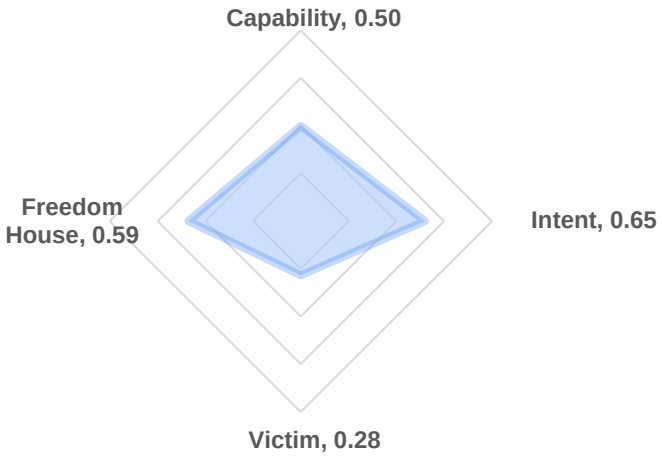
FREEDOM HOUSE
Partly Free (0.59)

VICTIM
Targeted in 25 documents

THREAT ACTORS
APT Threat Actors (1)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

Planetary Reef (2020)

OFFENSIVE PRIVATE VENDORS

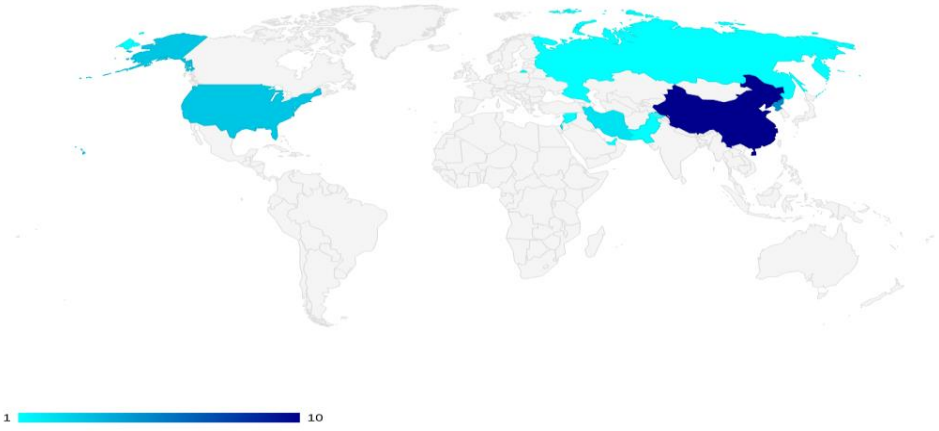
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Indonesia Purchase of Intrusion software Technology - 2015

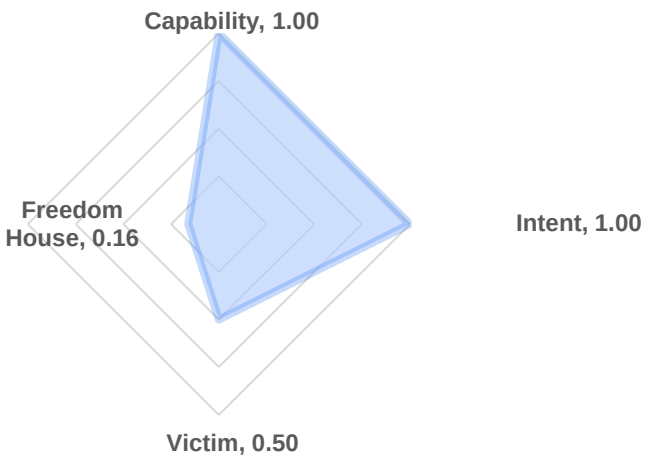
FinFisher Sales to Indonesia (National Encryption Body (Lembaga Sandi Negara))

VICTIM PROFILE



COUNTRY PROFILE

Global Power



IRAN

OFFENSIVE ACTIONS

State-Sponsored APTs (38)
Homegrown APTs (75)

CYBER TECH EXCHANGE

No sales or purchases found

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (13), Surveillance (2), Kinetic (1), Disinformation (2), Crime (3)

FREEDOM HOUSE

Not Free (0.16)

VICTIM

Targeted in 44 documents

THREAT ACTORS

APT 33 - 2013
Cadelle - 2011
Chafer (State-sponsored, Rana Intelligence Computing Company) - 2014
Cutting Kitten (State-sponsored, security company ITSecTeam) - 2012
DarkHydrus - 2016
DNSpionage - 2019
Flying Kitten - 2010
Group5 - 2015
Infy - 2013
Mabna Institute (State-sponsored, Islamic Revolutionary Guard Corps) - 2013
Magic Hound - 2013
MuddyWater (State-sponsored, Islamic Revolutionary Guard Corps) - 2017
OilRig - 2014
Rocket Kitten - 2011
Tortoiseshell - 2018
Cyber fighters of Izz Ad-Din Al Qassam - 2012

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

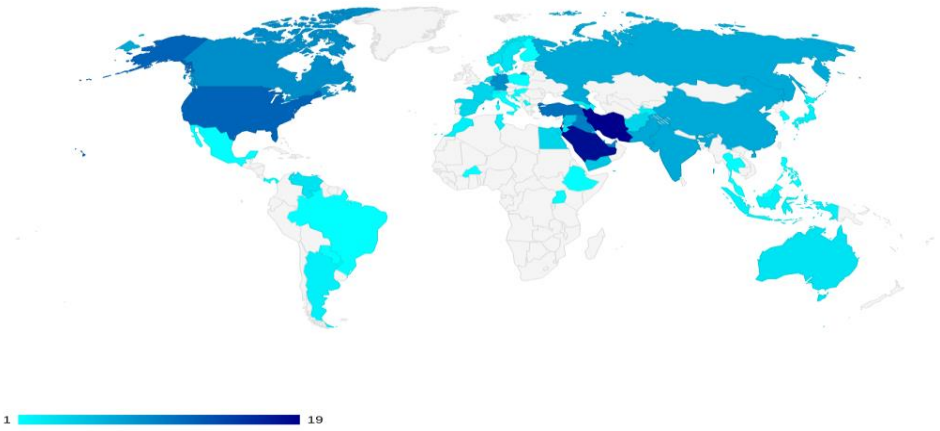
TARGETING PROFILE

THREAT ACTORS

State-Sponsored (17)
APT Threat Actors (33)

PRIVATE VENDORS

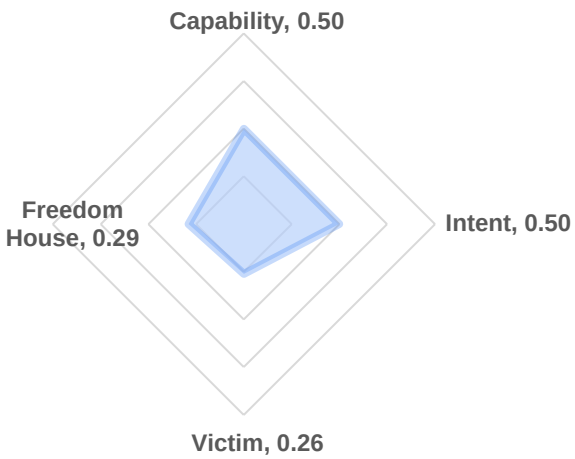
No private providers found



IRAQ

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

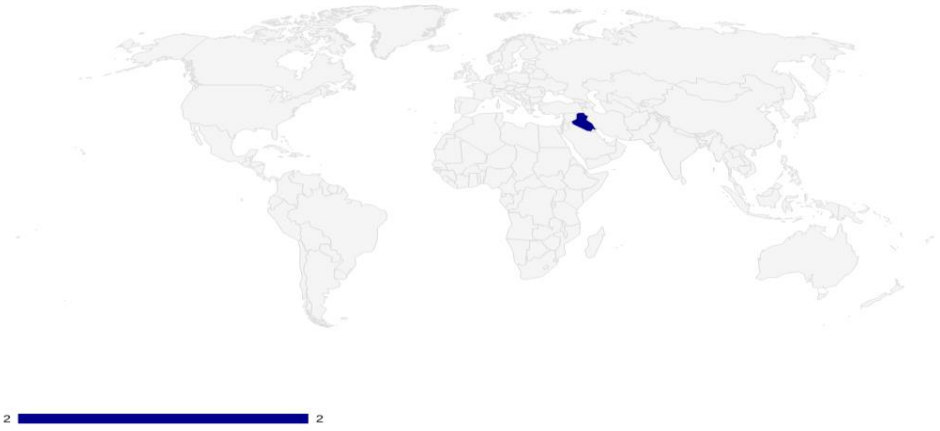
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

TARGETING PROFILE



OFFENSIVE ACTIONS

State-Sponsored APTs (2)

CYBER TECH EXCHANGE

No sales or purchases found

AUTONOMY

Third-Party Capabilities

OBJECTIVES

Surveillance (1)

FREEDOM HOUSE

Not Free (0.29)

VICTIM

Targeted in 23 documents

THREAT ACTORS

No threat-actors found

PRIVATE VENDORS

No private providers found

IRELAND

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (3)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

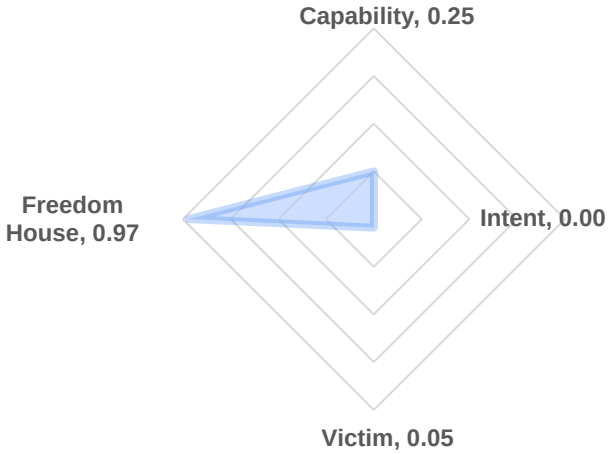
FREEDOM HOUSE
Free (0.97)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 8 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

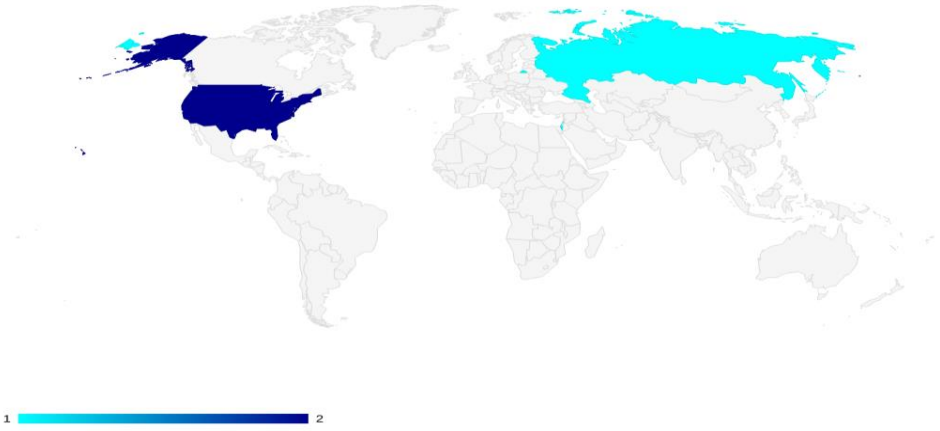
OFFENSIVE PRIVATE VENDORS

VigiTrust (LEA & Intelligence Services)

PURCHASED CAPABILITIES

No purchases found

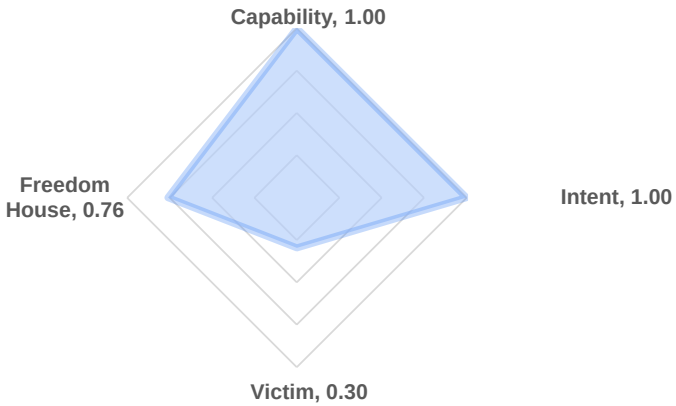
VICTIM PROFILE



ISRAEL

COUNTRY PROFILE

Global Power



OFFENSIVE ACTIONS

State-Sponsored APTs (6)
Homegrown APTs (14)

CYBER TECH EXCHANGE

Sales (51)

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (1), Kinetic (3)

FREEDOM HOUSE

Free (0.76)

VICTIM

Targeted in 26 documents

THREAT ACTORS

Circles (2015)
Unit 8200

OFFENSIVE PRIVATE VENDORS

Cellebrite (Phone Monitoring, Analysis)
Cyberbit (Counter-Surveillance, Internet Monitoring)
Elbit Systems (Intelligence Support, C4I. Collection, PC Surveillance, Intelligence)
NSO Group (Intrusion, Phone Monitoring)
Silicom (Internet Monitoring, Intrusion)
Wintego (Internet Monitoring, Intrusion)

PURCHASED CAPABILITIES

No purchases found

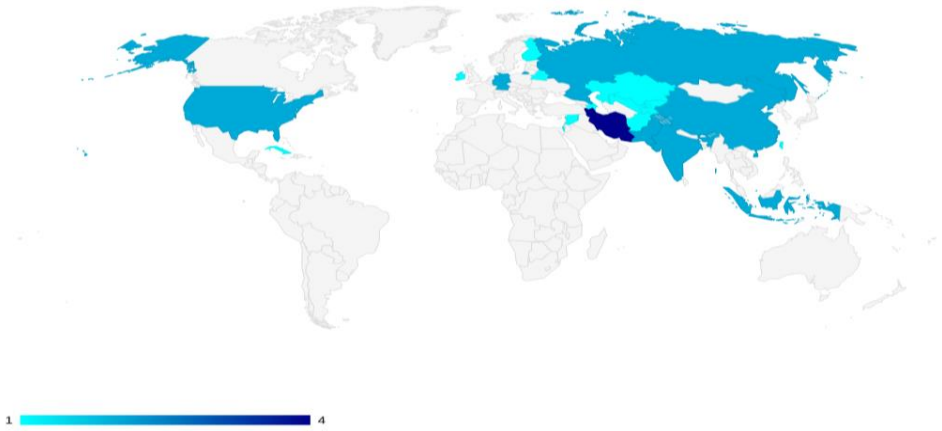
TARGETING PROFILE

THREAT ACTORS

State-Sponsored (1)
APT Threat Actors (4)

PRIVATE VENDORS

There are 29 private vendors



ITALY

OFFENSIVE ACTIONS

Homegrown APTs (6)

CYBER TECH EXCHANGE

Sales (64)
Purchases (3)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

No objectives found

FREEDOM HOUSE

Free (0.9)

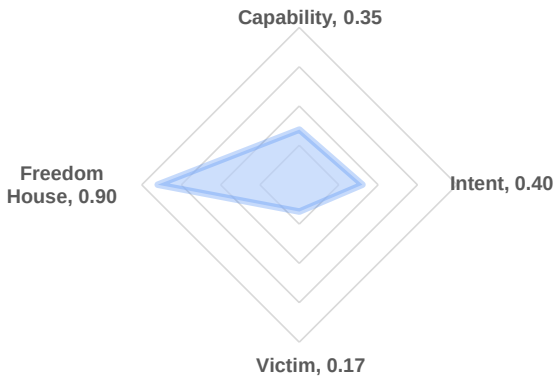
VICTIM

Targeted in 15 documents

THREAT ACTORS

APT Threat Actors (1)

COUNTRY PROFILE



THREAT ACTORS

Hacking Team (2003)

OFFENSIVE PRIVATE VENDORS

Area (Internet Monitoring, Monitoring Centre, Location Monitoring, Surveillance)

GR Sistemi (Internet Monitoring, Phone Monitoring, Intrusion, Biometrics, Communications Monitoring)

Hacking Team (Intrusion)

IPS (Internet Monitoring, Monitoring Centre, Analysis, Audio Surveillance, Video Surveillance, Intrusion, Monitoring Centres, Technical Surveillance)

PURCHASED CAPABILITIES

FinFisher Sales to Italy (Unknown multiple entities / Civil)

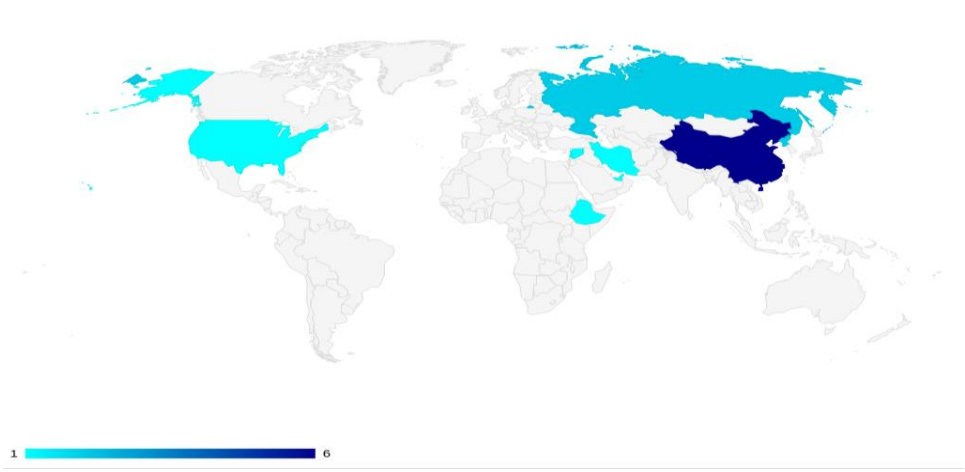
Hacking Team Sales to Italy (AREA / Civil) - 2014

Hacking Team Sales to Italy (Guardia di Finanza / Civil) – 2013

VICTIM PROFILE

PRIVATE VENDORS

There are 18 private vendors



JAPAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

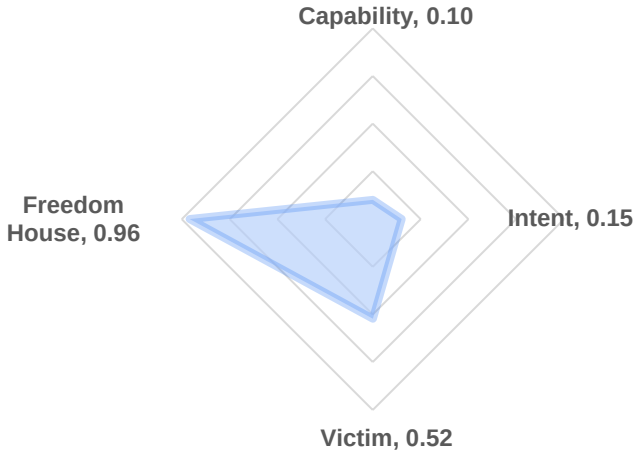
FREEDOM HOUSE
Free (0.96)

VICTIM
Targeted in 46 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 4 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

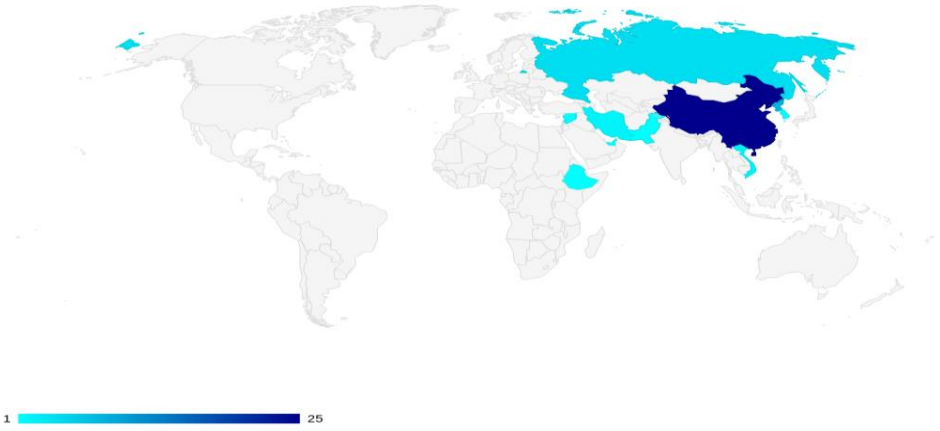
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Japan

VICTIM PROFILE



JORDAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

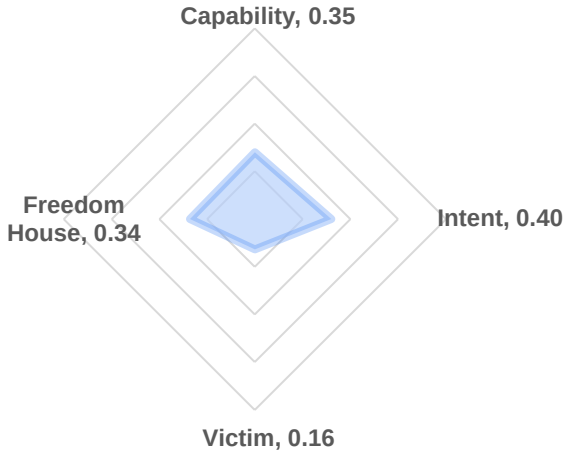
FREEDOM HOUSE
Not Free (0.34)

VICTIM
Targeted in 14 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

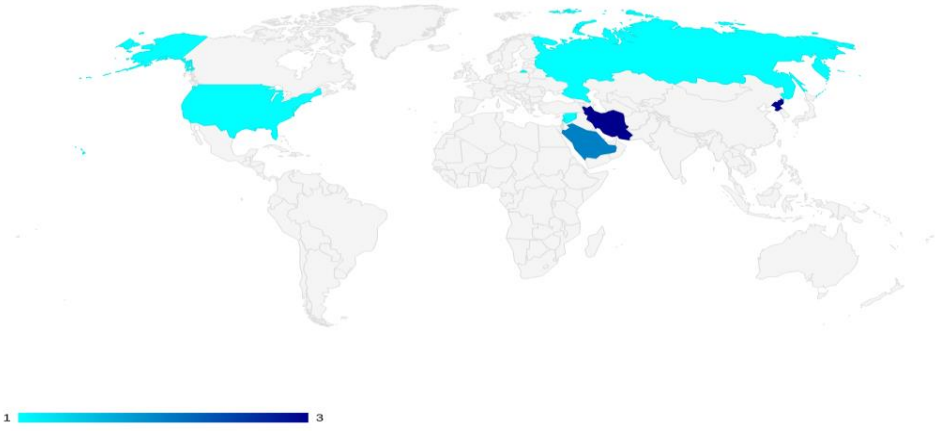
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Jordan Purchase of Intrusion software Techology - 2015

FinFisher Sales to Jordan

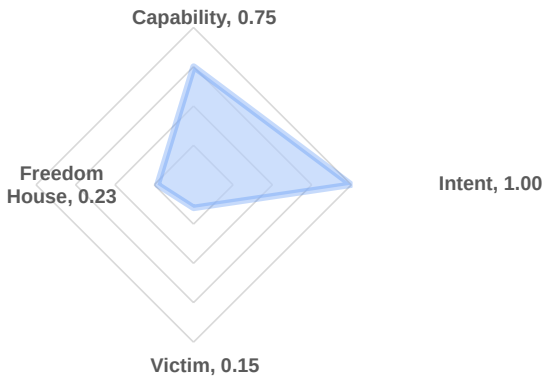
VICTIM PROFILE



KAZAKHSTAN

COUNTRY PROFILE

Local Player



OFFENSIVE ACTIONS

State-Sponsored APTs (3)
Homegrown APTs (2)

CYBER TECH EXCHANGE

Sales (2)
Purchases (5)

AUTONOMY

Third-Party Capabilities

OBJECTIVES

Espionage (1), Surveillance (1)

FREEDOM HOUSE

Not Free (0.23)

VICTIM

Targeted in 13 documents

THREAT ACTORS

State-Sponsored (2)
APT Threat Actors (3)

THREAT ACTORS

Operation Manul (2015)
Fxmsp (2016)
APT-C-34 (2019)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

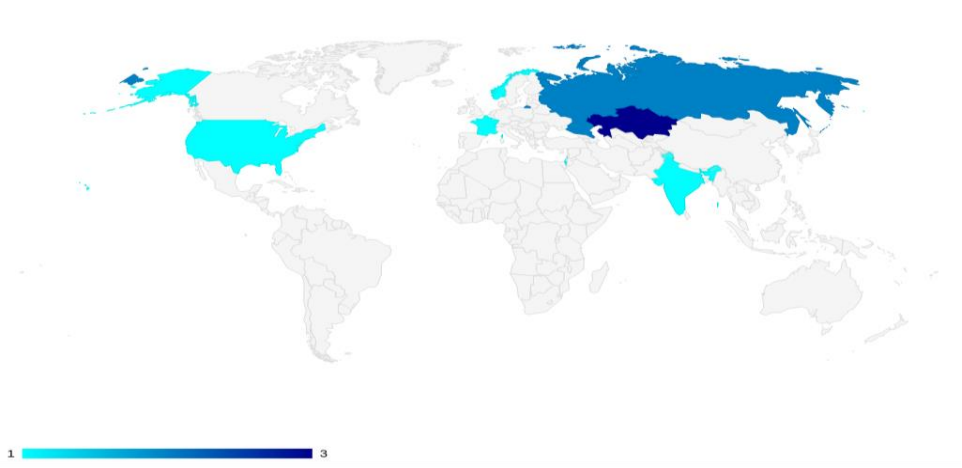
PURCHASED CAPABILITIES

NICE Sales to Kazakhstan (Committee of National Security (KNB) / Intelligence)
NSO Group Sales to Kazakhstan
Cyberbit Sales to Kazakhstan (National Security Committee / Intelligence) - 2017
FinFisher Sales to Kazakhstan
Hacking Team Sales to Kazakhstan (SIS of NSC / Intelligence) – 2012

PRIVATE VENDORS

No private providers found

TARGETING PROFILE



KENYA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

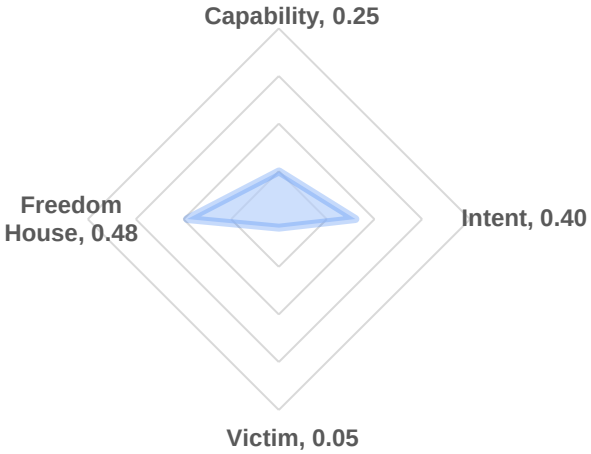
FREEDOM HOUSE
Partly Free (0.48)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

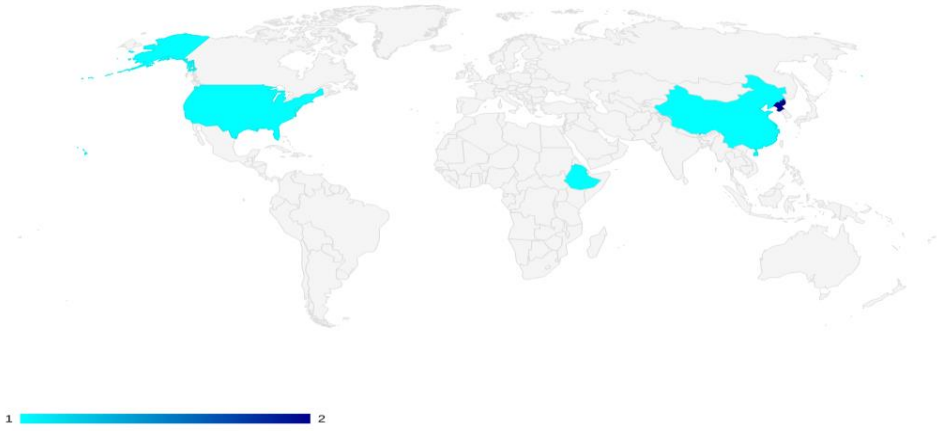
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Kenya (National Intelligence Service (NIS) / Intelligence)

VICTIM PROFILE



KUWAIT

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

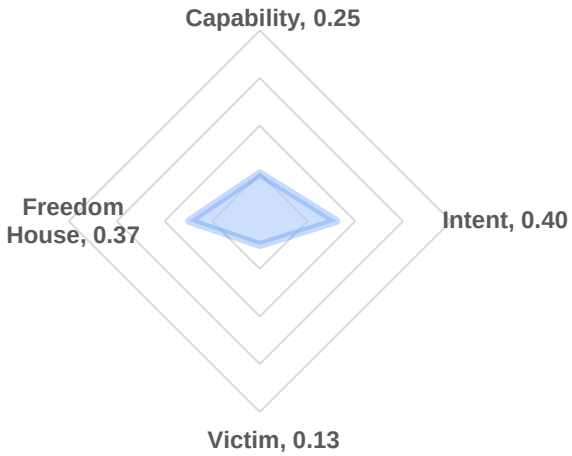
FREEDOM HOUSE
Partly Free (0.37)

VICTIM
Targeted in 11 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

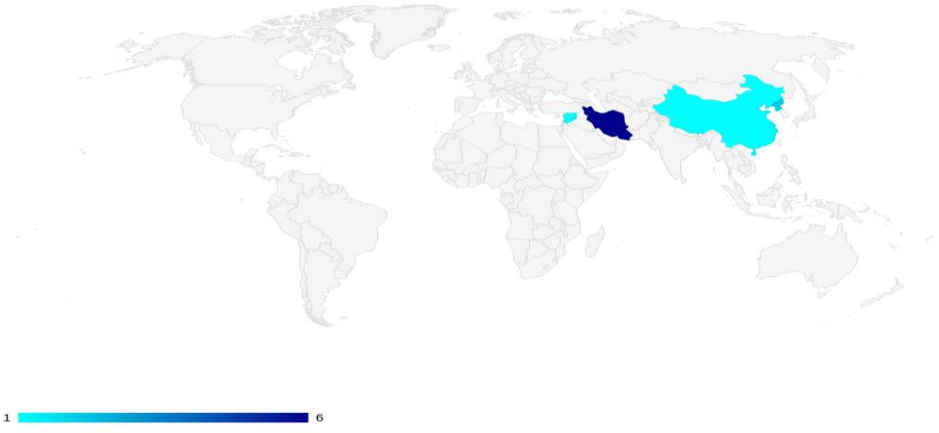
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Kuwait Purchase of Intrusion software Techology - 2015

Netsweeper systems Use in Kuwait

VICTIM PROFILE



LATVIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

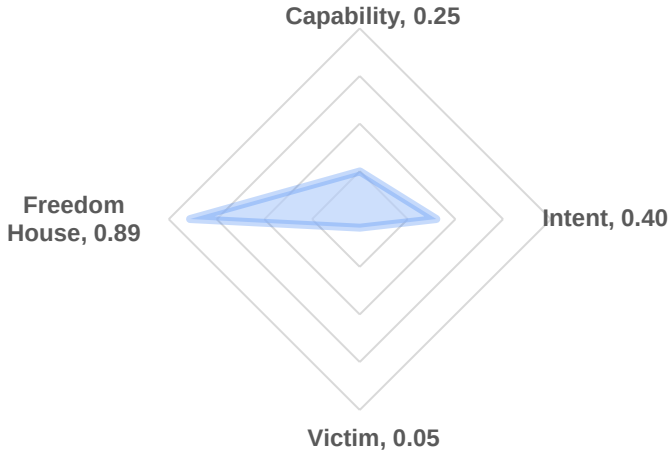
FREEDOM HOUSE
Free (0.89)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

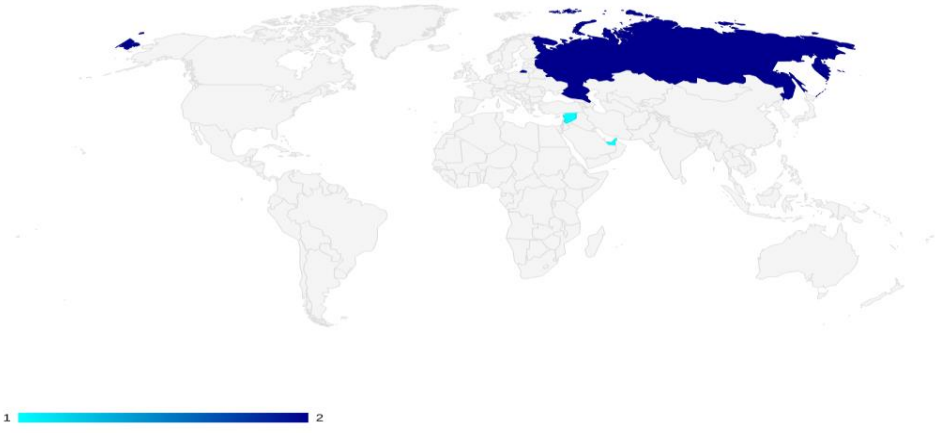
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NSO Group Sales to Latvia

FinFisher Sales to Latvia

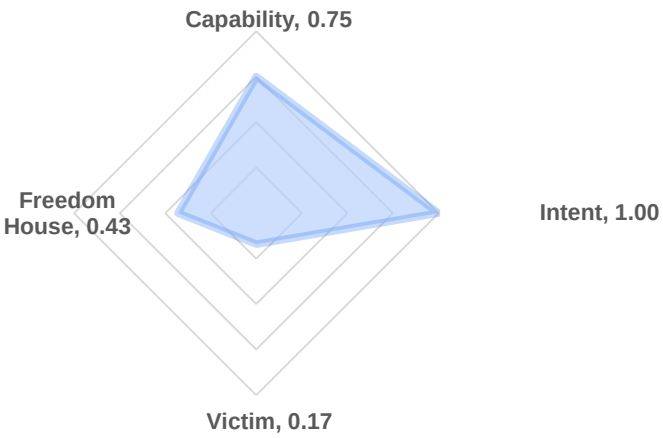
VICTIM PROFILE



LEBANON

COUNTRY PROFILE

Regional Contender



OFFENSIVE ACTIONS

State-Sponsored APTs (3)
Homegrown APTs (3)

CYBER TECH EXCHANGE

Purchases (2)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (2), Surveillance (1)

FREEDOM HOUSE

Partly Free (0.43)

VICTIM

Targeted in 15 documents

THREAT ACTORS

State-Sponsored (1)
APT Threat Actors (3)

PRIVATE VENDORS

No private providers found

THREAT ACTORS

Dark Caracal (2007)

Tempting Cedar Spyware (2015)

Volatile Cedar (2012)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

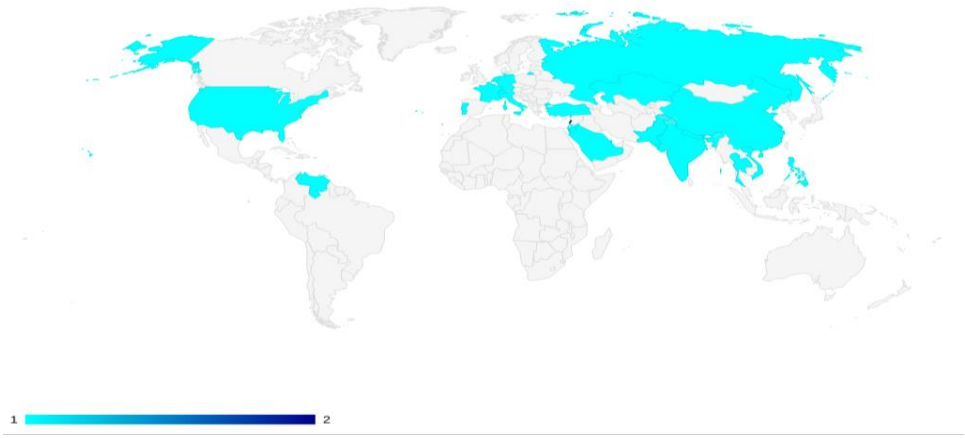
PURCHASED CAPABILITIES

FinFisher Sales to Lebanon (General Directorate of General Security)

FinFisher Sales to Lebanon - 2015

Hacking Team Sales to Lebanon (Lebanon Army Forces / Military) – 2015

TARGETING PROFILE



LIBYA

OFFENSIVE ACTIONS
Homegrown APTs (1)

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

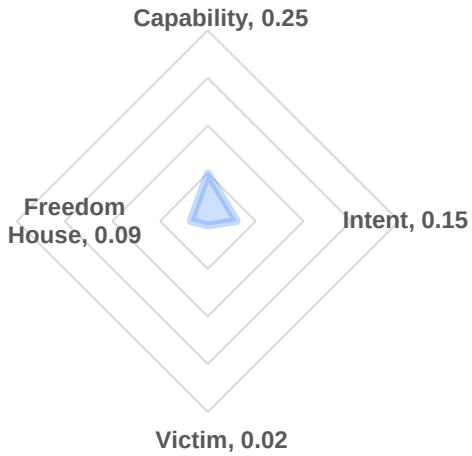
FREEDOM HOUSE
Not Free (0.09)

VICTIM
Targeted in 2 documents

THREAT ACTORS
APT Threat Actors (1)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

Libyan Scorpions (2015)

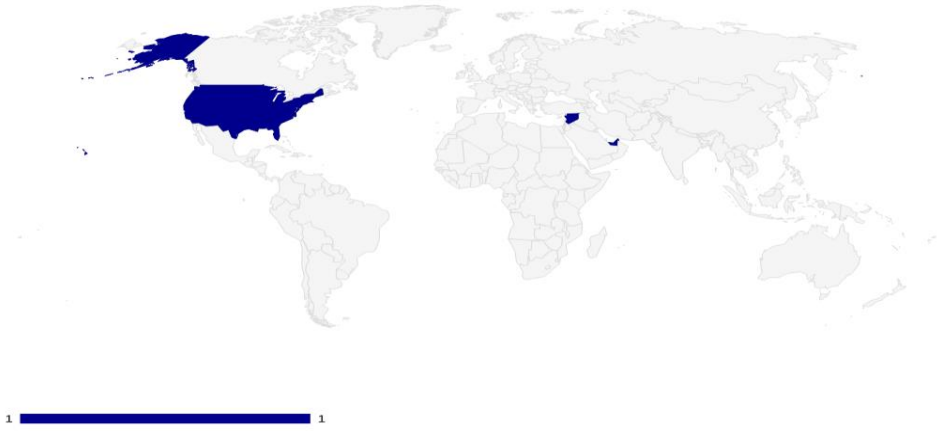
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Amesys Sales to Libya

VICTIM PROFILE



LITHUANIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

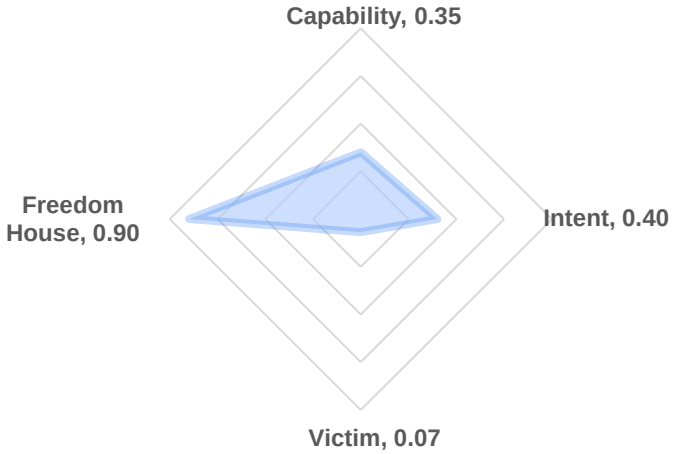
FREEDOM HOUSE
Free (0.9)

VICTIM
Targeted in 6 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 3 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

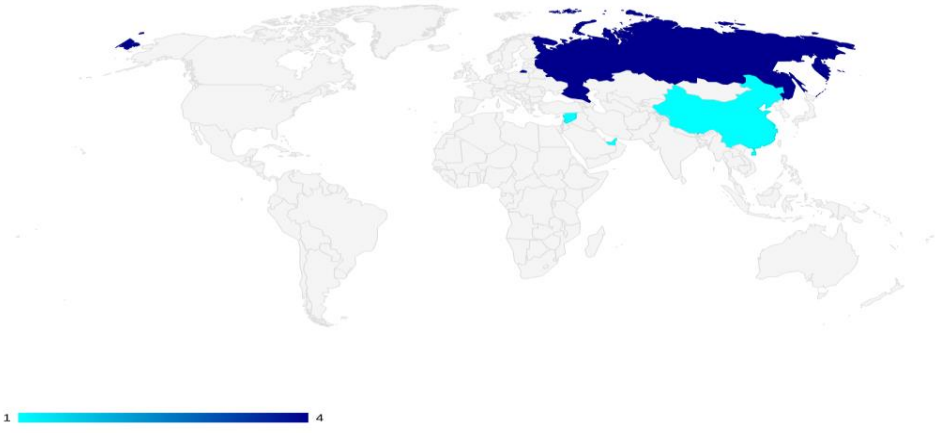
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Lithuania

Hacking Team Sales to Lithuania (Lituania Criminal Police / LEA) - 2014

VICTIM PROFILE



LUXEMBOURG

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

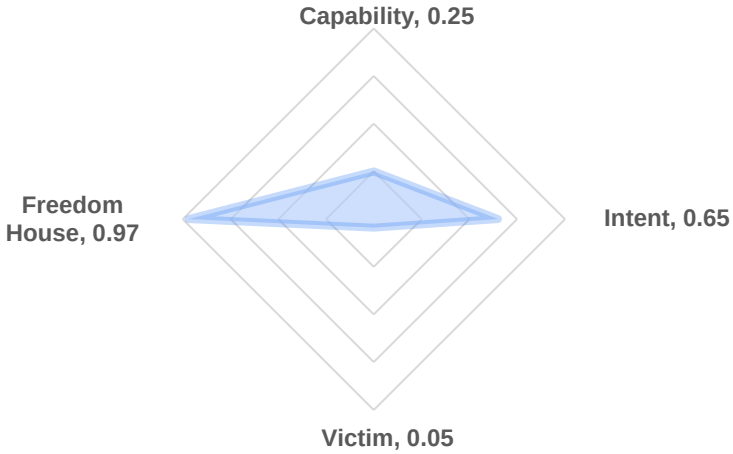
FREEDOM HOUSE
Free (0.97)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

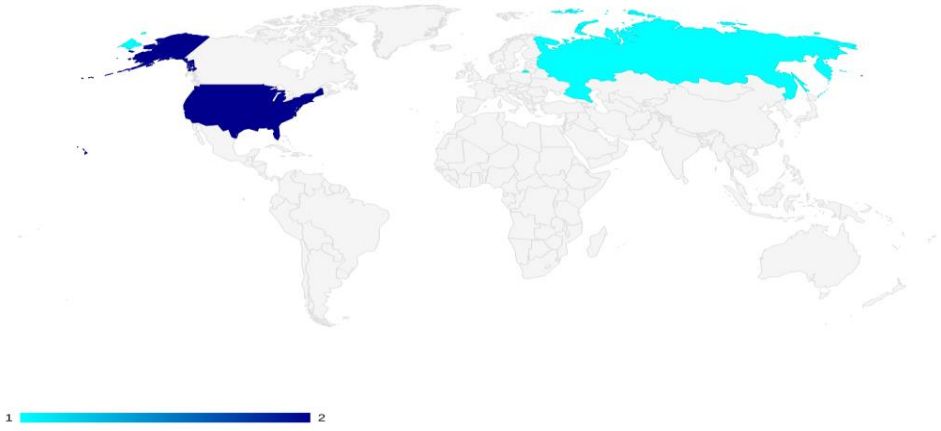
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Luxembourg (IR Authorities (Condor) / Civil) - 2012

Hacking Team Sales to Luxembourg (State security (Falcon) / Intelligence) - 2012

VICTIM PROFILE



NORTH MACEDONIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

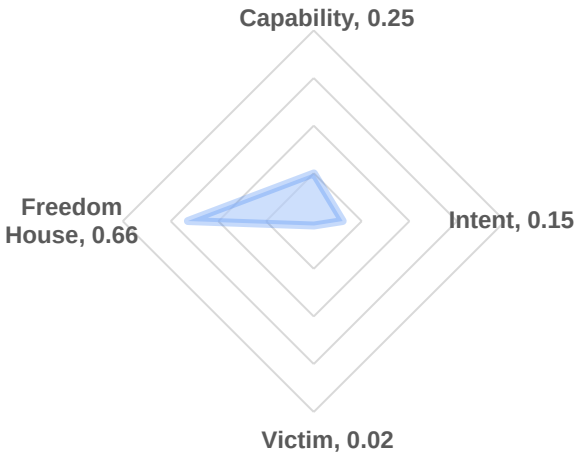
FREEDOM HOUSE
Partly Free (0.66)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

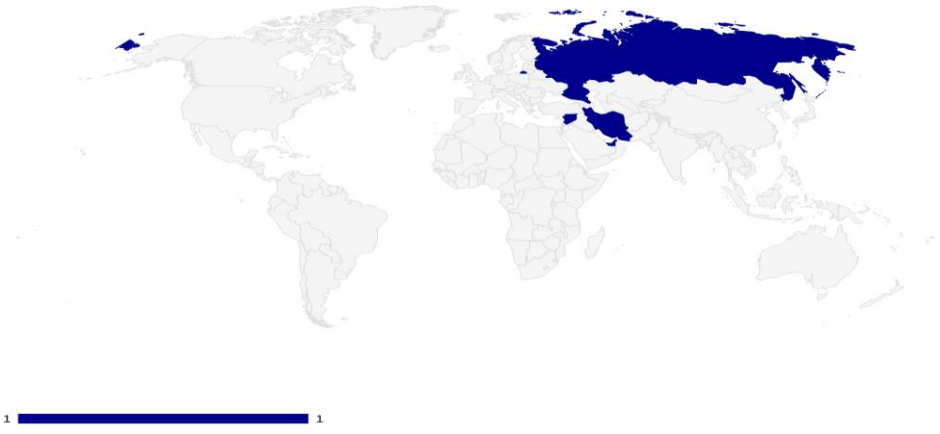
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Macedonia

VICTIM PROFILE



MALAYSIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

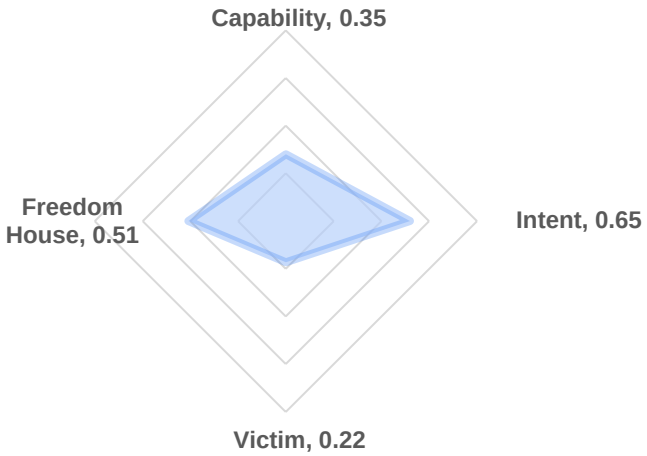
FREEDOM HOUSE
Partly Free (0.51)

VICTIM
Targeted in 19 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

Motec (Internet Monitoring, Intrusion, Phone Monitoring, Communications Monitoring)

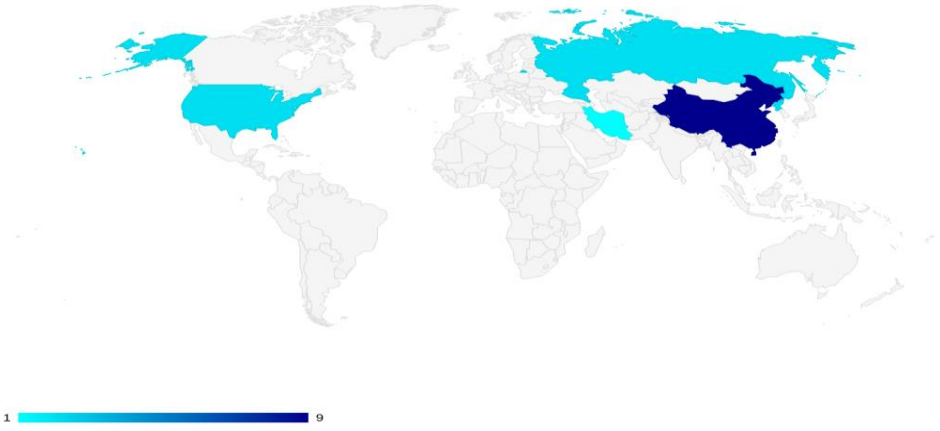
PURCHASED CAPABILITIES

Hacking Team Sales to Malaysia (Malysia K / Intelligence) - 2013

Malaysia Purchase of Intrusion software Techology - 2015

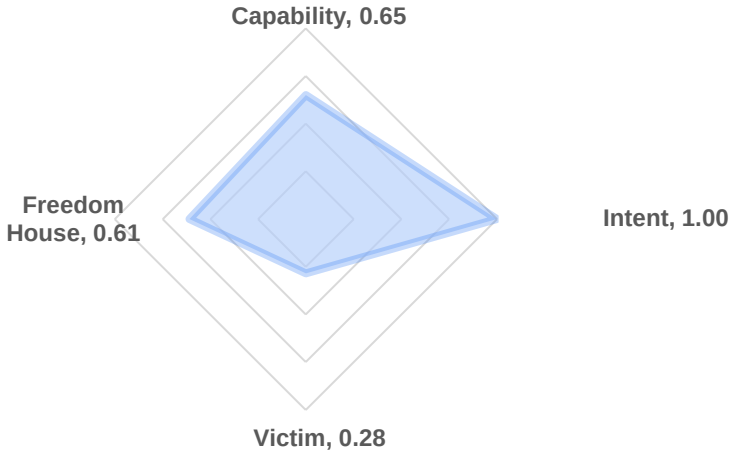
FinFisher Sales to Malaysia

VICTIM PROFILE



COUNTRY PROFILE

Local Player



MEXICO

OFFENSIVE ACTIONS

State-Sponsored APTs (8)
Homegrown APTs (6)

CYBER TECH EXCHANGE

Purchases (13)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (1), Surveillance (1)

FREEDOM HOUSE

Partly Free (0.61)

VICTIM

Targeted in 25 documents

THREAT ACTORS

APT Threat Actors (1)

THREAT ACTORS

leetMX (2016)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

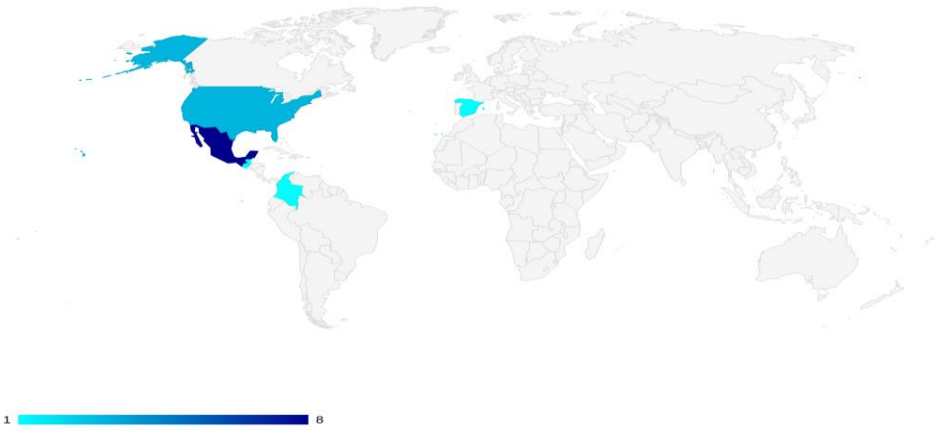
PURCHASED CAPABILITIES

Hacking Team Sales to Mexico (Jalisco Mexico / LEA) - 2014
NSO Group Sales to Mexico - 2013
FinFisher Sales to Mexico
Hacking Team Sales to Mexico (La Dependencia y/o Cisen / Intelligence) - 2010
Hacking Team Sales to Mexico (Estado del Mexico / LEA) - 2012
Hacking Team Sales to Mexico (Estado de Qeretaro / LEA) - 2013
Hacking Team Sales to Mexico (Governo de Puebla / LEA) - 2013
Hacking Team Sales to Mexico (Governo de Campeche / LEA) - 2013
Hacking Team Sales to Mexico (Mexico - pemx / LEA) - 2013
Hacking Team Sales to Mexico (Mex Taumalipas / Civil) - 2014
Hacking Team Sales to Mexico (Sec. De Planeacion y Finanzas / Civil) - 2014
Hacking Team Sales to Mexico (Mexico Yucatan / LEA) - 2014
Hacking Team Sales to Mexico (Mexico Durango / LEA) - 2014

PRIVATE VENDORS

There is 1 private vendor

TARGETING PROFILE



MOLDOVA

OFFENSIVE ACTIONS
Homegrown APTs (2)

CYBER TECH EXCHANGE
No sales or purchases found

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

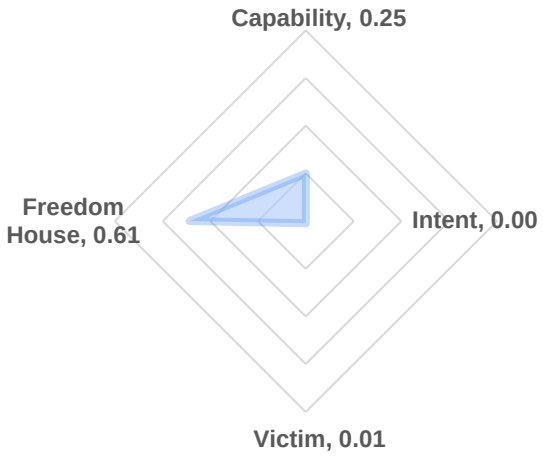
FREEDOM HOUSE
Partly Free (0.61)

VICTIM
Targeted in 1 document

THREAT ACTORS
APT Threat Actors (1)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

Bachosens (2017)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

VICTIM PROFILE

MONGOLIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

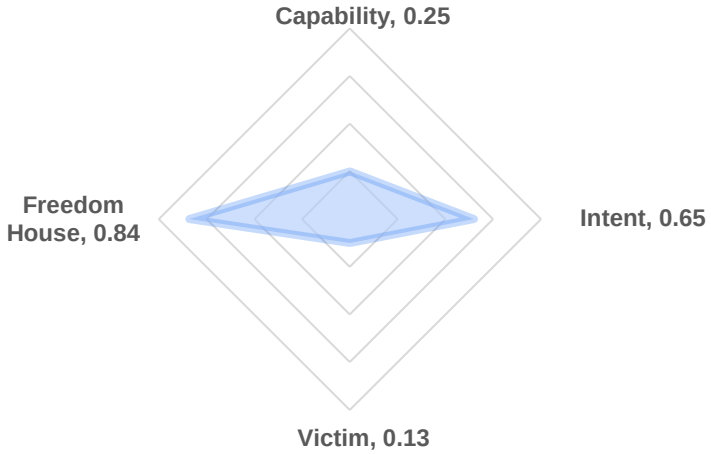
FREEDOM HOUSE
Free (0.84)

VICTIM
Targeted in 11 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

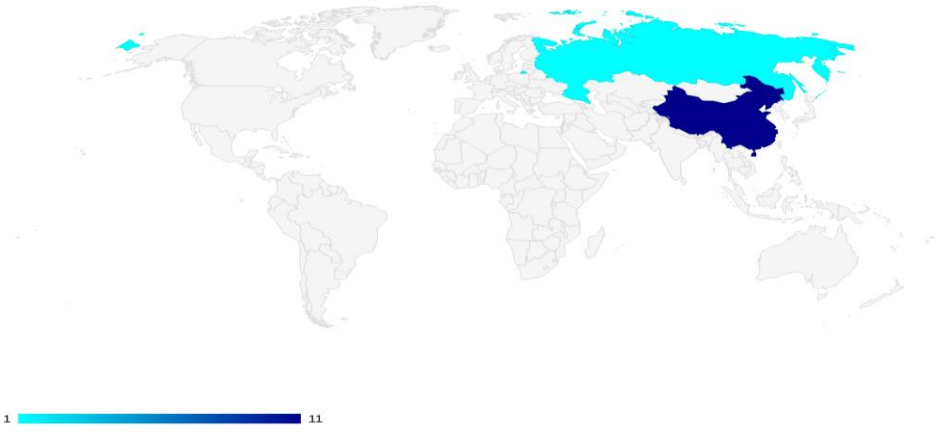
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Mongolia (AC Mongolia / Intelligence) - 2013

FinFisher Sales to Mongolia (Special State Security Department (SSSD) / Intelligence)

VICTIM PROFILE



MOROCCO

OFFENSIVE ACTIONS
State-Sponsored APTs (3)
Homegrown APTs (3)

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Surveillance (1)

FREEDOM HOUSE
Partly Free (0.37)

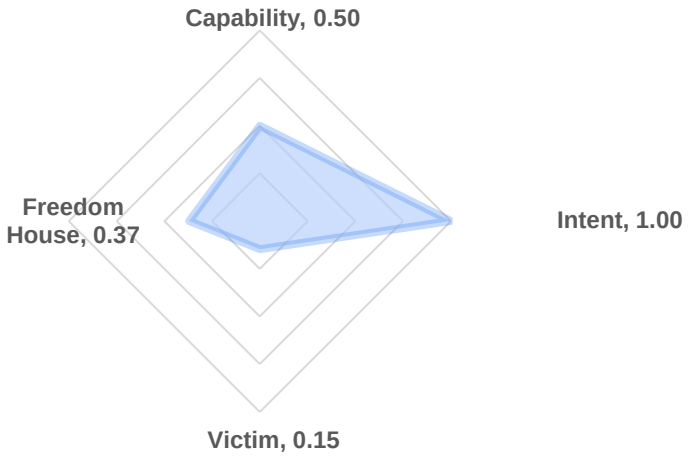
VICTIM
Targeted in 13 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Morocco (Morocco - DST / LEA) - 2012

NSO Group Sales to Morocco

FinFisher Sales to Morocco (Conseil Superieur De La Defense Nationale (CSDN))

TARGETING PROFILE

MOZAMBIQUE

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

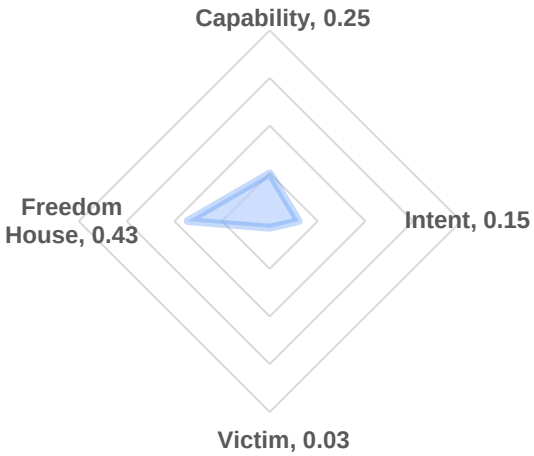
FREEDOM HOUSE
Partly Free (0.43)

VICTIM
Targeted in 3 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

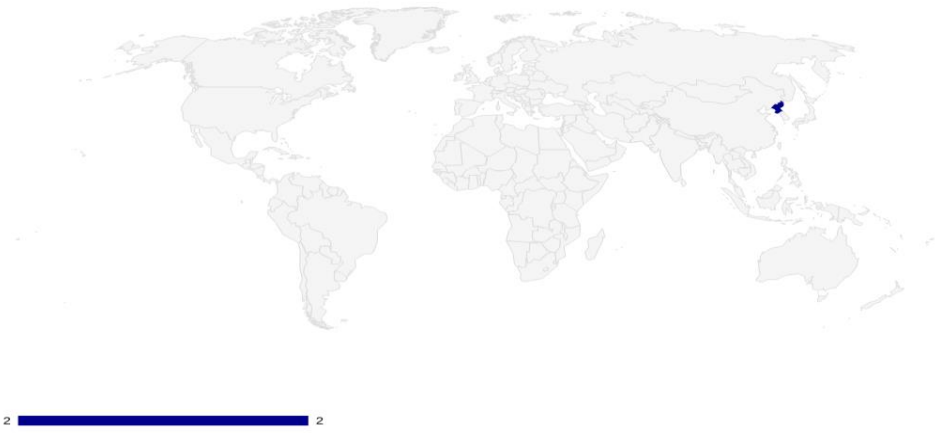
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NSO Group Sales to Mozambique

VICTIM PROFILE



NETHERLANDS

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (1)
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

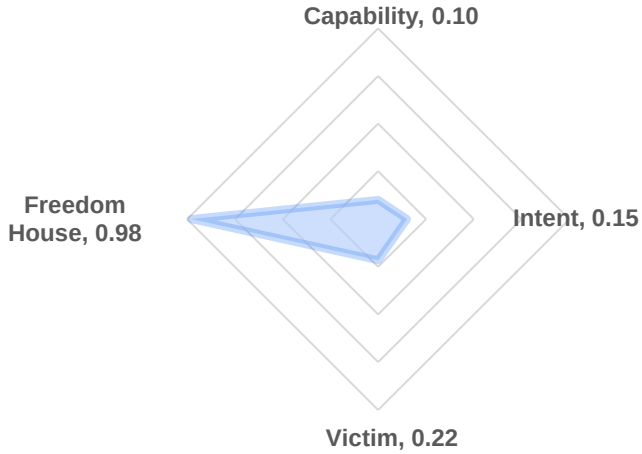
FREEDOM HOUSE
Free (0.98)

VICTIM
Targeted in 19 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 4 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

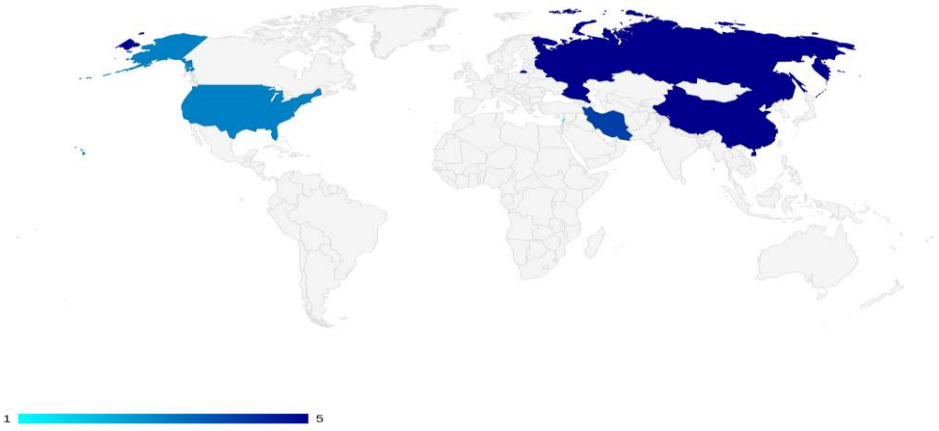
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Netherlands

VICTIM PROFILE



NEW ZEALAND

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (10)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

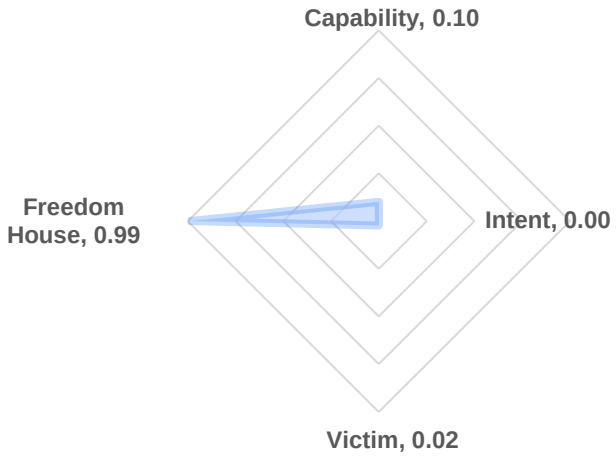
FREEDOM HOUSE
Free (0.99)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

VICTIM PROFILE

NIGERIA

OFFENSIVE ACTIONS
Homegrown APTs (10)

CYBER TECH EXCHANGE
Purchases (5)

AUTONOMY
Third-Party Capabilities

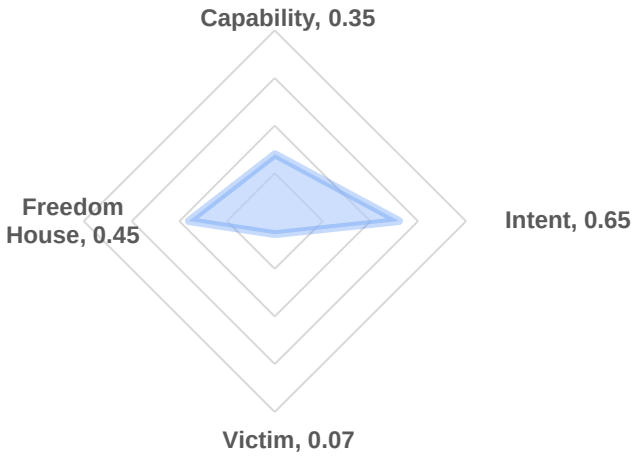
OBJECTIVES
No objectives found

FREEDOM HOUSE
Partly Free (0.45)

VICTIM
Targeted in 6 documents

THREAT ACTORS
APT Threat Actors (1)

COUNTRY PROFILE



THREAT ACTORS

SilverTerrier

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

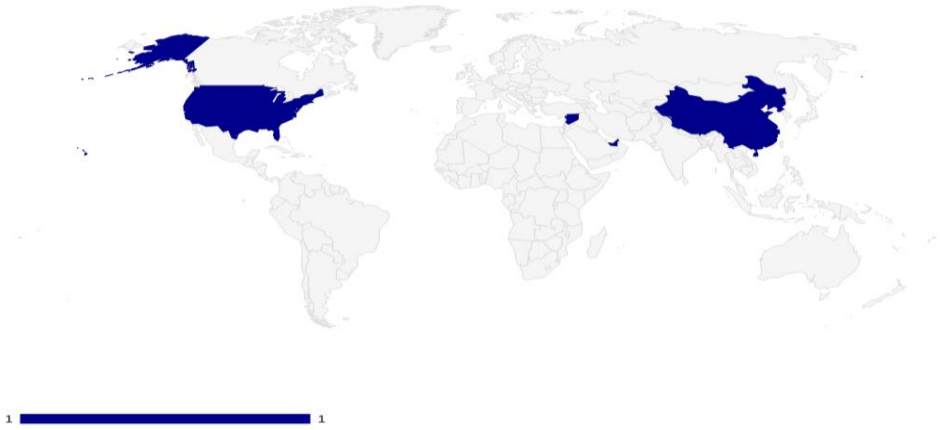
PURCHASED CAPABILITIES

Hacking Team Sales to Nigeria (Bayelsa State Government / Civil) - 2012
NICE Systems Sales to Nigeria (Bayelsa State Government / Civil) - 2012
Elbit Systems Sales to Nigeria (National Security Adviser / Intelligence)
FinFisher Sales to Nigeria (Unknown multiple entities / Civil)
NSO Group Sales to Nigeria (Rivers State, Delta State e Bayelsa State / LEA) – 2012

PRIVATE VENDORS

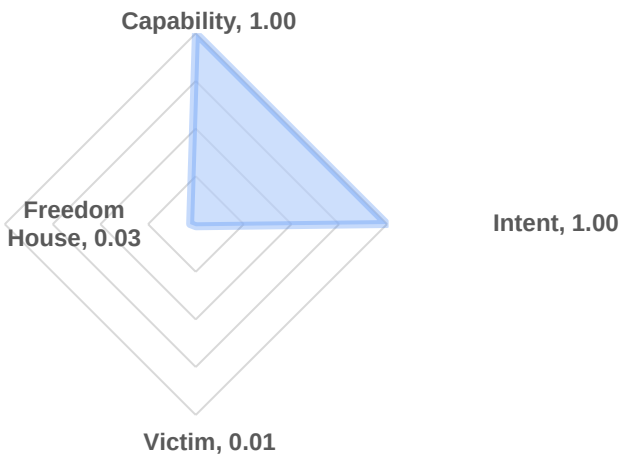
No private providers found

VICTIM PROFILE



COUNTRY PROFILE

Regional Contender



NORTH KOREA

OFFENSIVE ACTIONS

State-Sponsored APTs (32)
Homegrown APTs (42)

CYBER TECH EXCHANGE

No sales or purchases found

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (6), Kinetic (5), Crime (7)

FREEDOM HOUSE

Not Free (0.03)

VICTIM

Targeted in 1 document

THREAT ACTORS

Covellite (2017)
Kimsuky (2012)
Lazarus Group (2007)
Andariel (2014)
BeagleBoyz (2014)
Bluenoroff (2014)
Operation Earth Kitsune (2019)
Operation WizardOpium (2019)
Reaper (2012)
Wassonite (2018)
TEMP.Hermit
FASTCash (2016)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

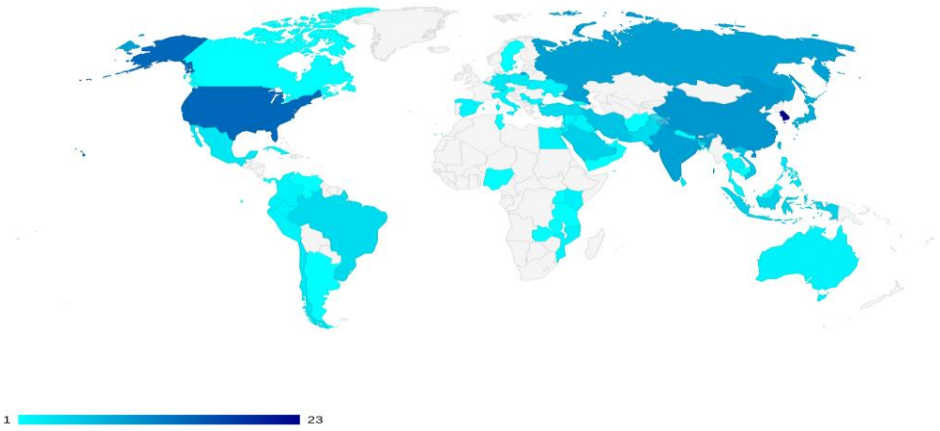
TARGETING PROFILE

THREAT ACTORS

State-Sponsored (4)
APT Threat Actors (12)

PRIVATE VENDORS

No private providers found



OMAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (5)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

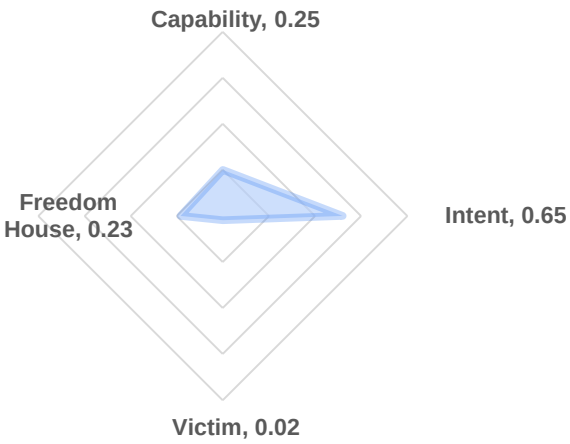
FREEDOM HOUSE
Not Free (0.23)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

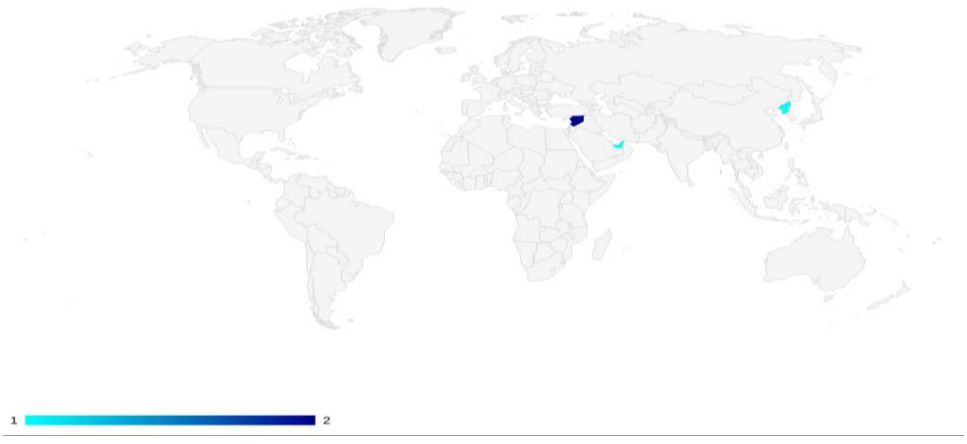
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

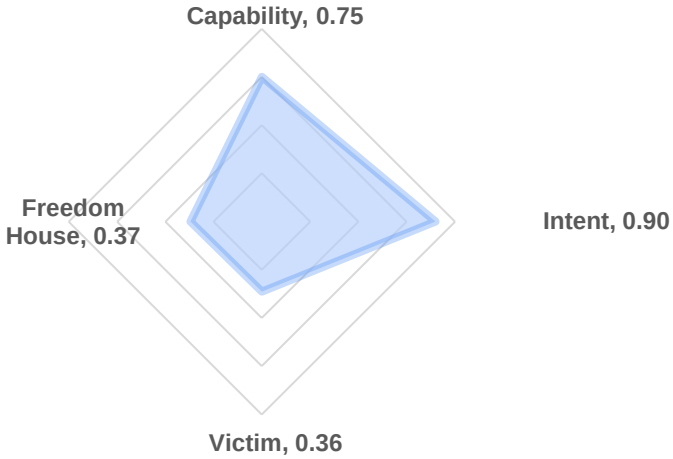
Hacking Team Sales to Oman (Oman - Intelligence / Intelligence) - 2011
Oman Purchase of Intrusion software Techology - 2015
Dreamlab Sales to Oman (Government of Oman / Civil) - 2010
Trovicor Sales to Oman
FinFisher Sales to Oman

VICTIM PROFILE



COUNTRY PROFILE

Regional Contender



PAKISTAN

OFFENSIVE ACTIONS

State-Sponsored APTs (8)
Homegrown APTs (19)

CYBER TECH EXCHANGE

Purchases (3)

AUTONOMY

Third-Party Capabilities

OBJECTIVES

Espionage (4), Crime (2)

FREEDOM HOUSE

Partly Free (0.37)

VICTIM

Targeted in 32 documents

THREAT ACTORS

State-Sponsored (1)
APT Threat Actors (4)

THREAT ACTORS

Gorgon Group (2017)
Transparent Tribe (2013)
Gnosticplayers (2019)
Stealth Mango and Tangelo

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

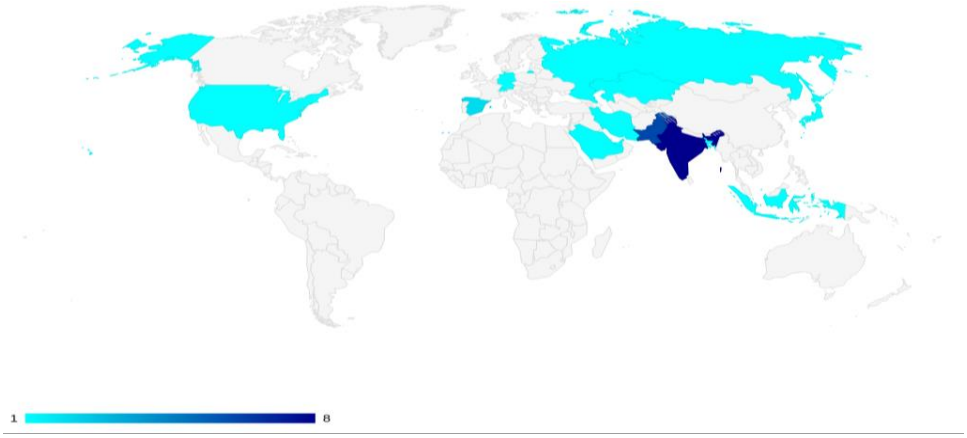
PURCHASED CAPABILITIES

Netsweeper systems Use in Pakistan
SS8 Sales to Pakistan (Ufone)
FinFisher Sales to Pakistan

PRIVATE VENDORS

No private providers found

TARGETING PROFILE



PALESTINIAN TERRITORY

OFFENSIVE ACTIONS
Homegrown APTs (21)

CYBER TECH EXCHANGE
No sales or purchases found

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

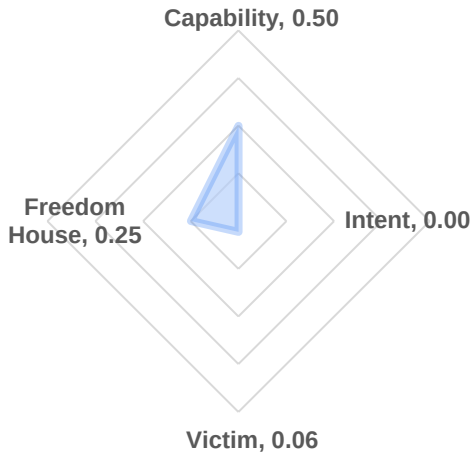
FREEDOM HOUSE
Not Free (0.25)

VICTIM
Targeted in 5 documents

THREAT ACTORS
State-Sponsored (1)
APT Threat Actors (3)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

Desert Falcons (2011)
Molerats (2012)
Operation Dustysky

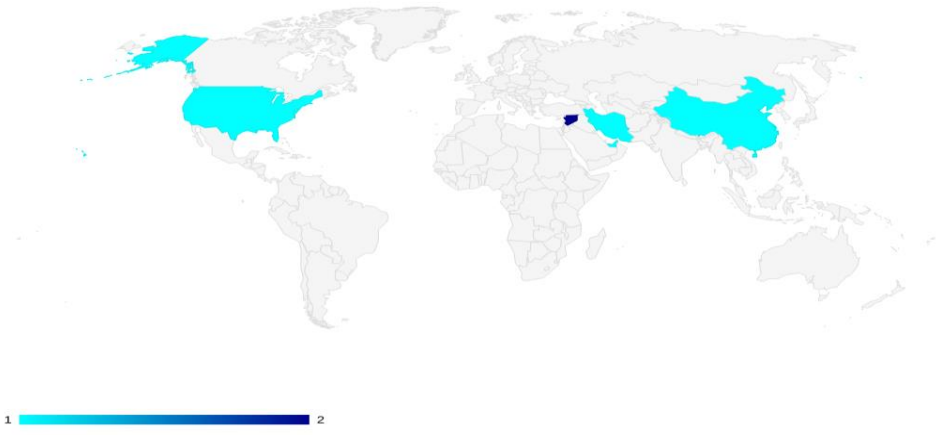
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

VICTIM PROFILE



PANAMA

OFFENSIVE ACTIONS
State-Sponsored APTs (1)
Homegrown APTs (1)

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Surveillance (1)

FREEDOM HOUSE
Free (0.83)

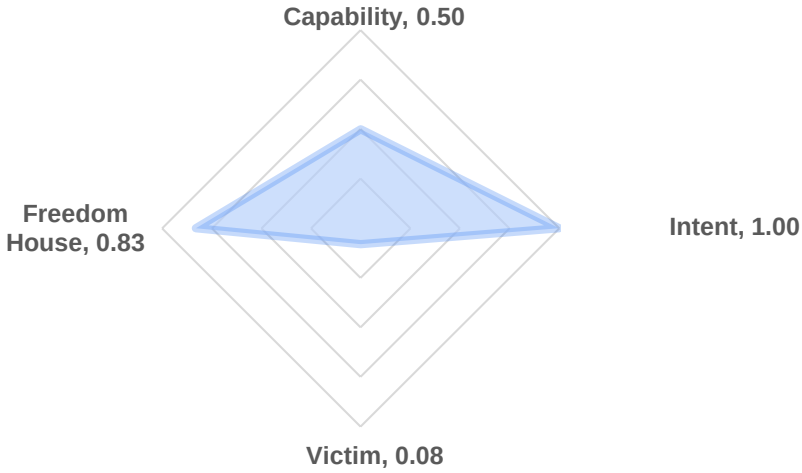
VICTIM
Targeted in 7 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

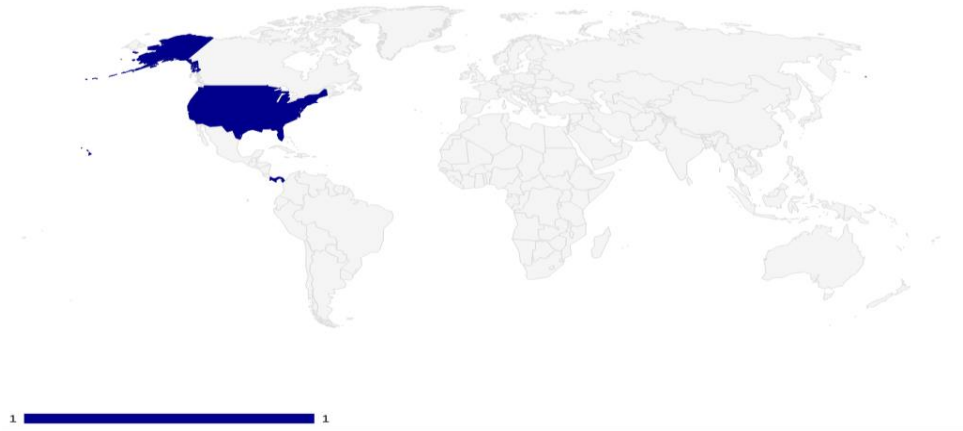
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Panama (President Security / Intelligence) - 2011
NSO Group Sales to Panama
FinFisher Sales to Panama (President Security / Intelligence) – 2009

TARGETING PROFILE



PARAGUAY

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

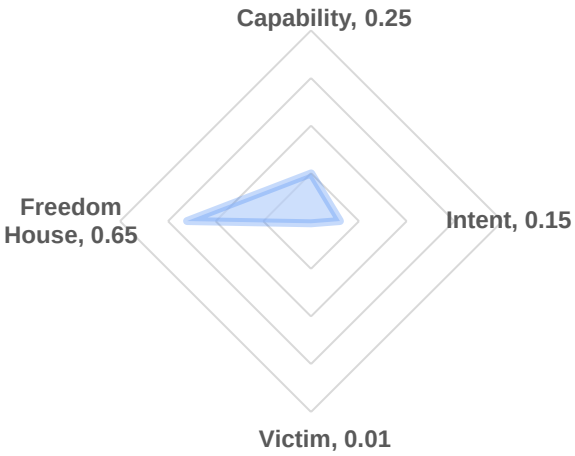
FREEDOM HOUSE
Partly Free (0.65)

VICTIM
Targeted in 1 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Paraguay

VICTIM PROFILE

PHILIPPINES

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
Espionage (1)

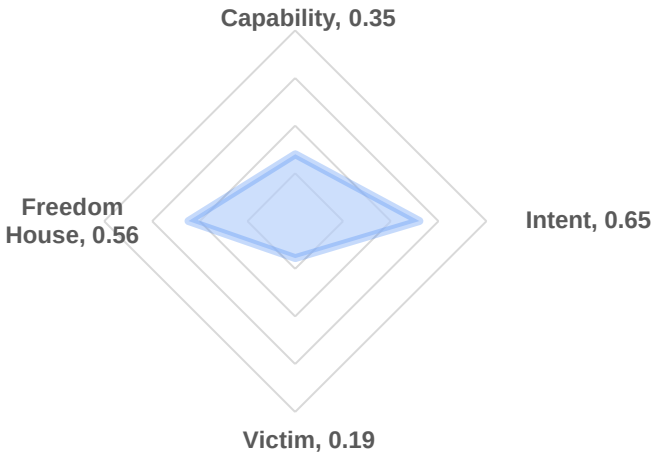
FREEDOM HOUSE
Partly Free (0.56)

VICTIM
Targeted in 17 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

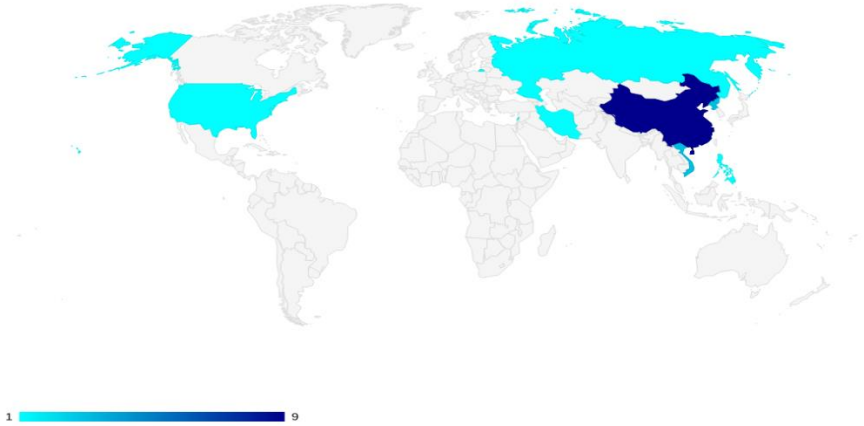
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Cyberbit Sales to Philippines (Philippine President's Malacañang Palace / Intelligence) - 2017

Philippines Purchase of Intrusion software Techology - 2015

VICTIM PROFILE



POLAND

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

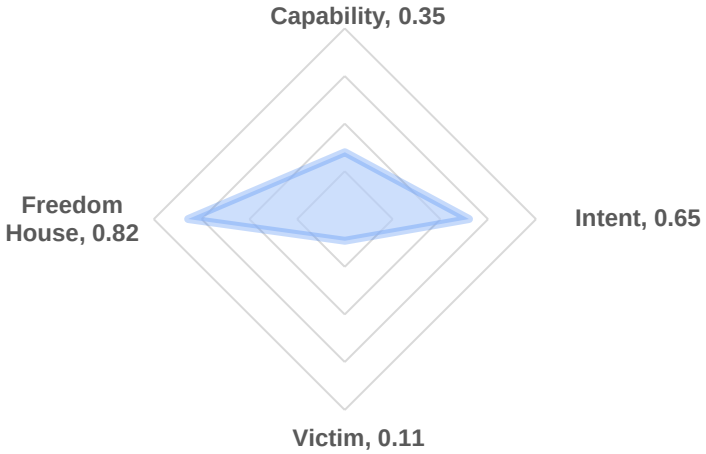
FREEDOM HOUSE
Free (0.82)

VICTIM
Targeted in 10 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 4 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

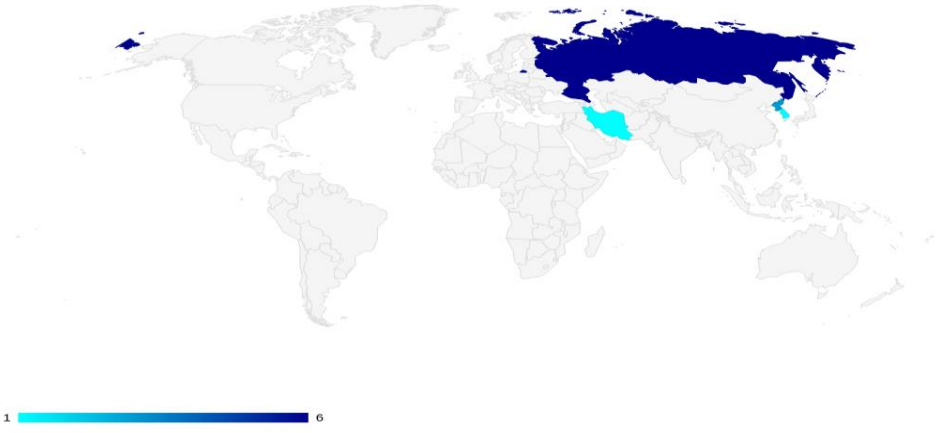
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Poland (CBA Poland / Intelligence) - 2012

NSO Group Sales to Poland

VICTIM PROFILE



QATAR

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

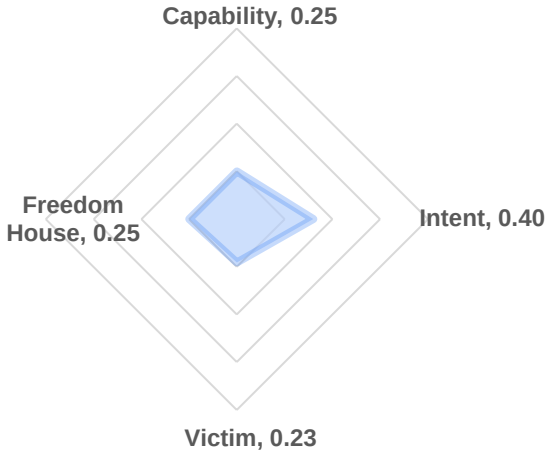
FREEDOM HOUSE
Not Free (0.25)

VICTIM
Targeted in 20 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

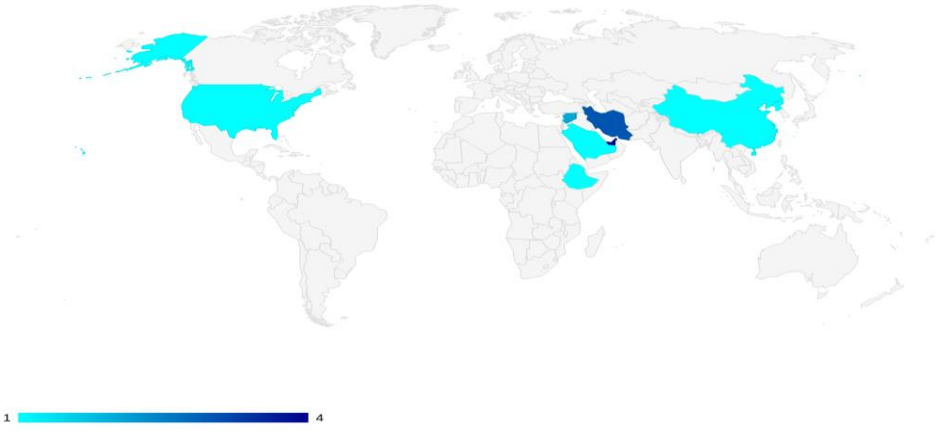
PURCHASED CAPABILITIES

Netsweeper systems Use in Qatar

Qatar Purchase of Intrusion software Techology - 2015

FinFisher Sales to Qatar

VICTIM PROFILE



ROMANIA

OFFENSIVE ACTIONS
Homegrown APTs (3)

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

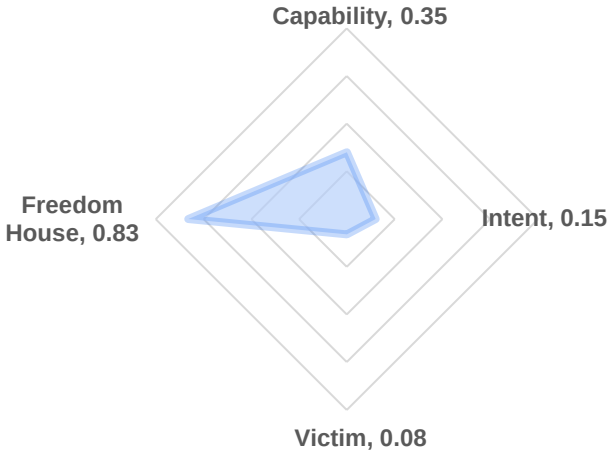
FREEDOM HOUSE
Free (0.83)

VICTIM
Targeted in 7 documents

THREAT ACTORS
APT Threat Actors (2)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

FIN4 (2013)

Outlaw Hacking Group (2018)

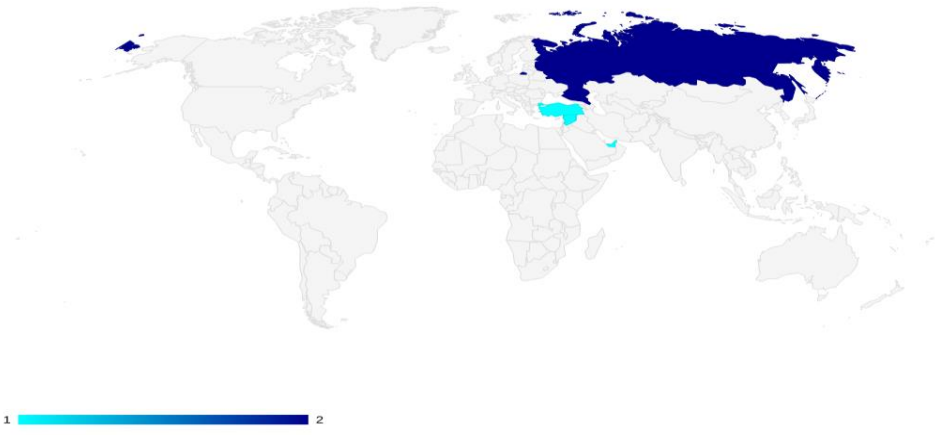
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Romania

VICTIM PROFILE



RUSSIA

OFFENSIVE ACTIONS

State-Sponsored APTs (48)
Homegrown APTs (180)

CYBER TECH EXCHANGE

Sales (4)
Purchases (1)

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (12), Kinetic (6), Disinformation (2), Crime (9)

FREEDOM HOUSE

Not Free (0.2)

VICTIM

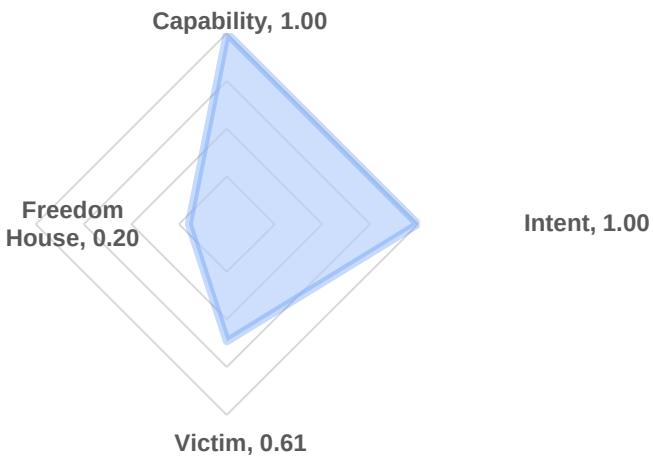
Targeted in 54 documents

THREAT ACTORS

State-Sponsored (10)
APT Threat Actors (47)

COUNTRY PROFILE

Global Power



THREAT ACTORS

APT 29 - 2008

Energetic Bear - 2010

Gamaredon Group (State-sponsored, FSB 16th & 18th Centers) - 2013

Hades - 2017

Sandworm Team - 2009

Fancy Bear (State-sponsored, two GRU units known as Unit 26165 and Unit 74455) - 2004

TeleBots - 2015

TEMP.Veles (State-sponsored, Central Scientific Research Institute of Chemistry and Mechanics) - 2014

Turla - 1996

UNC2452 - 2019

OFFENSIVE PRIVATE VENDORS

Elcomsoft (Analysis, Intrusion, Phone Monitoring)

NORSI TRANS (Analysis, Internet Monitoring, Intrusion, Monitoring Centre)

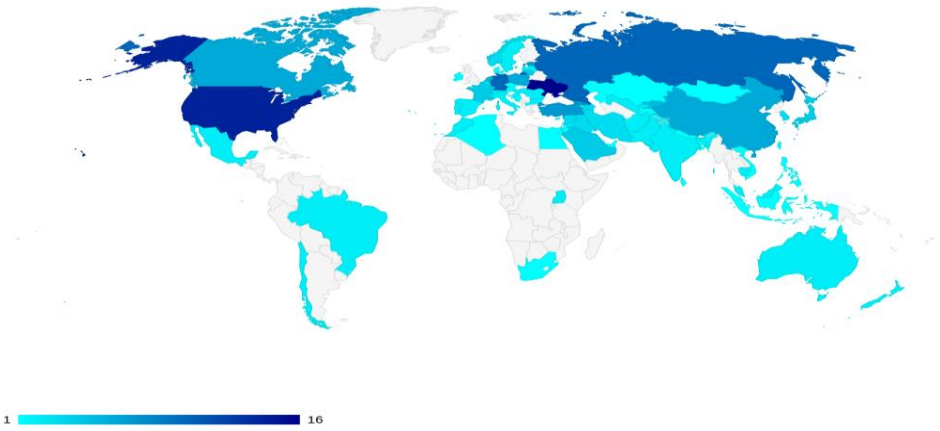
PURCHASED CAPABILITIES

Hacking Team Sales to Russia (Russia - KVANT / Civil) – 2012

TARGETING PROFILE

PRIVATE VENDORS

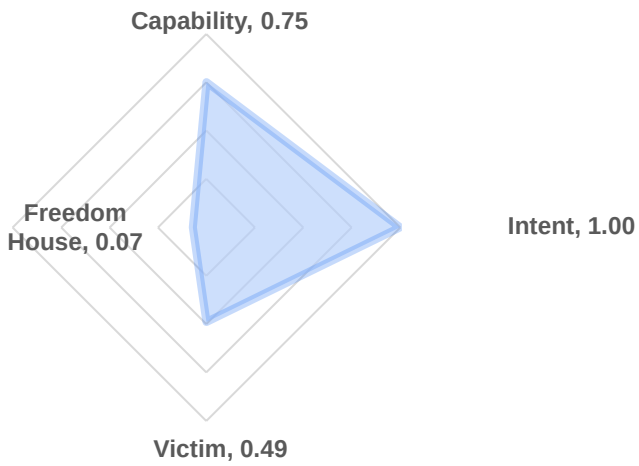
There are 12 private vendors



SAUDI ARABIA

COUNTRY PROFILE

Local Player



OFFENSIVE ACTIONS

State-Sponsored APTs (3)
Homegrown APTs (3)

CYBER TECH EXCHANGE

Purchases (6)

AUTONOMY

Third-Party Capabilities

OBJECTIVES

Espionage (1), Surveillance (1)

FREEDOM HOUSE

Not Free (0.07)

VICTIM

Targeted in 43 documents

THREAT ACTORS

APT Threat Actors (1)

THREAT ACTORS

OurMine (2016)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

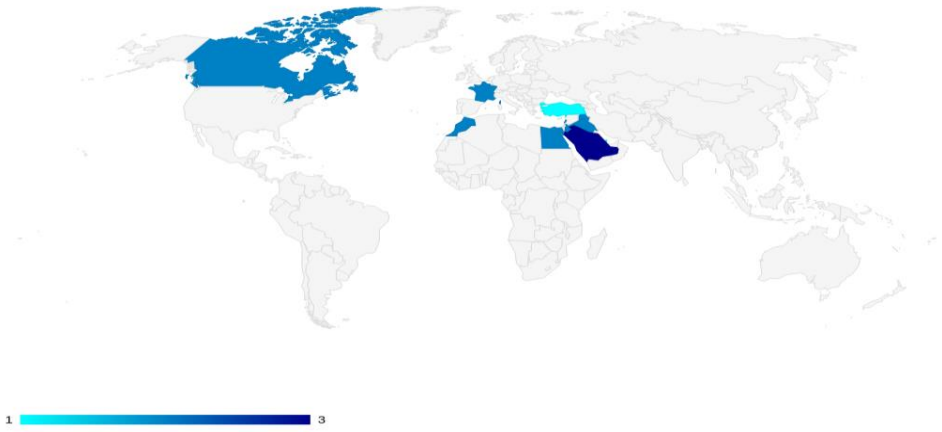
PURCHASED CAPABILITIES

Hacking Team Sales to Saudi Arabia (MOD Saudi / Military) - 2013
NSO Group Sales to Saudi Arabia
Saudi Arabia Purchase of Intrusion software Techology - 2015
FinFisher Sales to Saudi Arabia
Hacking Team Sales to Saudi Arabia (GIP Saudi / Intelligence) - 2013
Hacking Team Sales to Saudi Arabia (Saudi - GID / Intelligence) – 2013

PRIVATE VENDORS

No private providers found

TARGETING PROFILE



SERBIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

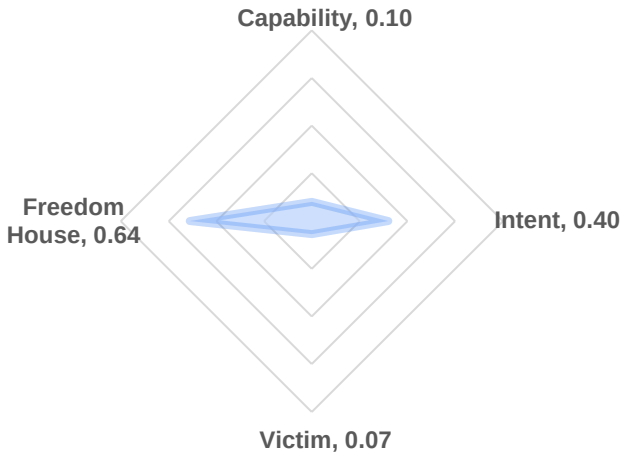
FREEDOM HOUSE
Partly Free (0.64)

VICTIM
Targeted in 6 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

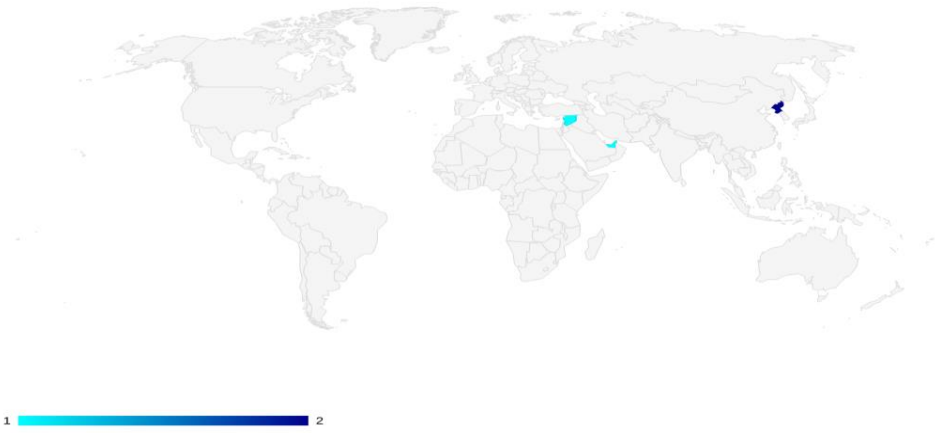
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Serbia (Security Information Agency (BIA) / Intelligence)

VICTIM PROFILE



SINGAPORE

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

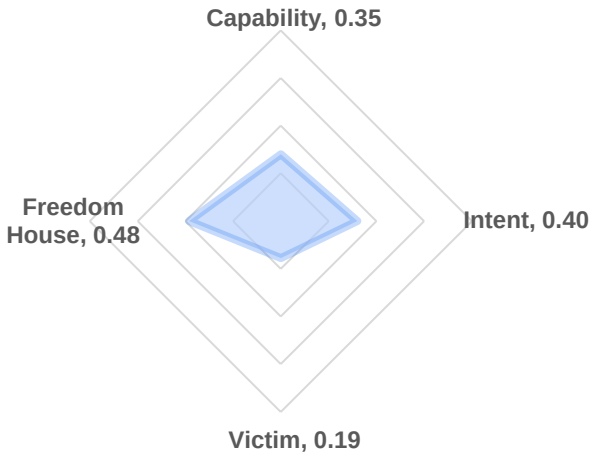
FREEDOM HOUSE
Partly Free (0.48)

VICTIM
Targeted in 17 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

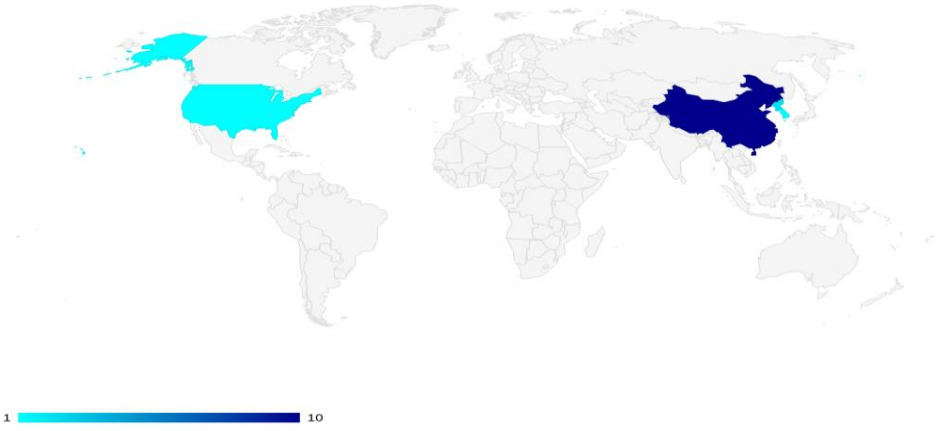
PURCHASED CAPABILITIES

Hacking Team Sales to Singapore (IDA SGP / Civil) - 2008

Singapore Purchase of Intrusion software Techology - 2015

FinFisher Sales to Singapore

VICTIM PROFILE



SLOVENIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (1)
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

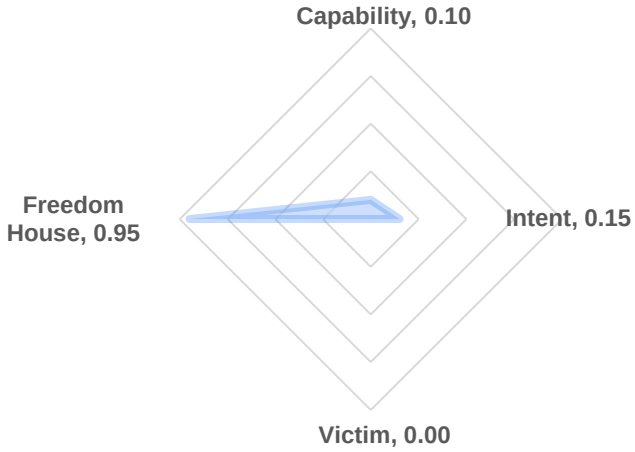
FREEDOM HOUSE
Free (0.95)

VICTIM
Targeted in 0 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 1 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Slovenia

VICTIM PROFILE

SOMALIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

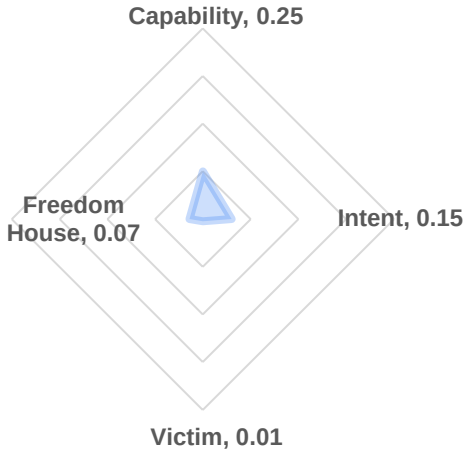
FREEDOM HOUSE
Not Free (0.07)

VICTIM
Targeted in 1 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

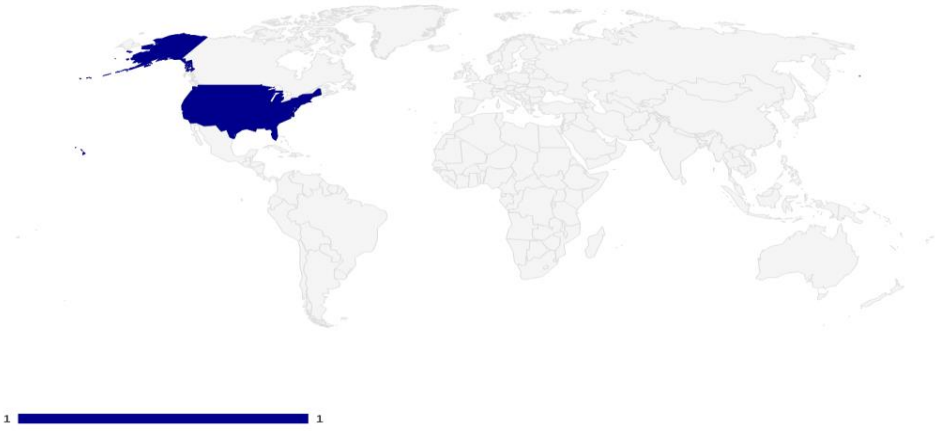
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Netsweeper systems Use in Somalia

VICTIM PROFILE



SOUTH AFRICA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (1)
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

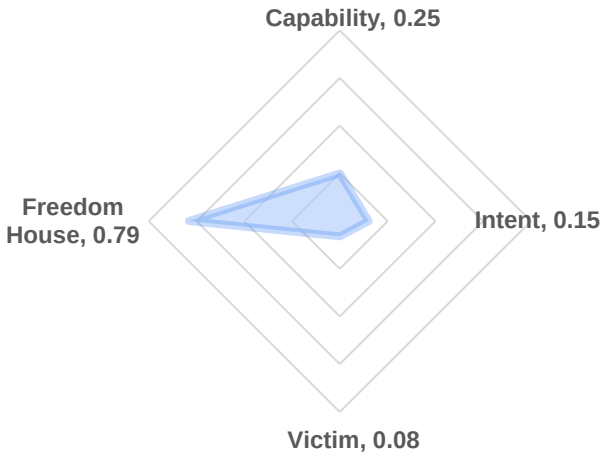
FREEDOM HOUSE
Free (0.79)

VICTIM
Targeted in 7 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 10 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

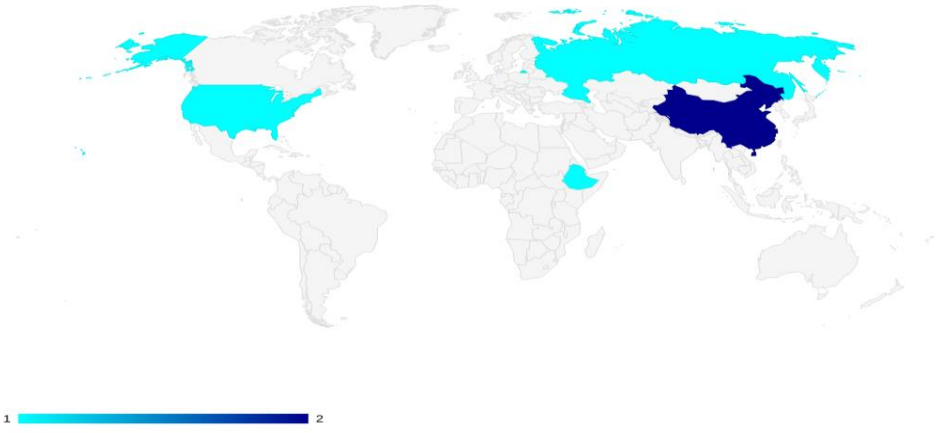
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to South Africa

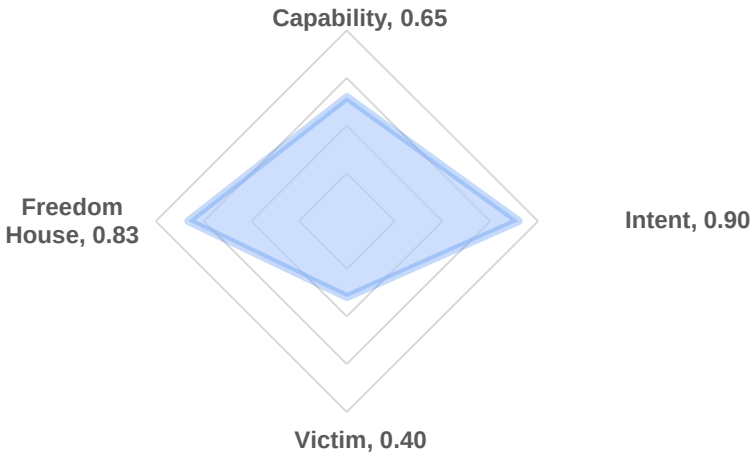
VICTIM PROFILE



SOUTH KOREA

COUNTRY PROFILE

Regional Contender



OFFENSIVE ACTIONS
State-Sponsored APTs (2)

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
Espionage (1)

FREEDOM HOUSE
Free (0.83)

VICTIM
Targeted in 35 documents

THREAT ACTORS
State-Sponsored (2)
APT Threat Actors (1)

PRIVATE VENDORS
There are 2 private vendors

THREAT ACTORS

DarkHotel (2007)

OnionDog (2013)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to South Korea (The 5163 Army Division / Military) - 2012

TARGETING PROFILE

SPAIN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

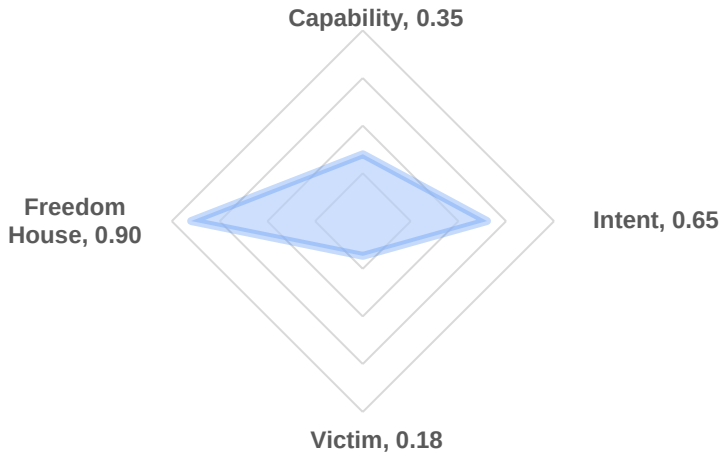
FREEDOM HOUSE
Free (0.9)

VICTIM
Targeted in 16 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 7 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

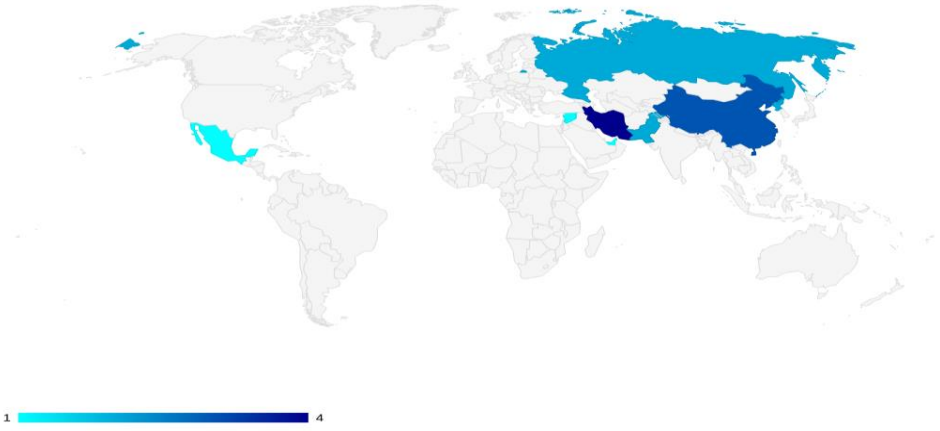
PURCHASED CAPABILITIES

Hacking Team Sales to Spain (CNI / Intelligence) - 2006

FinFisher Sales to Spain

Hacking Team Sales to Spain (CNI / Intelligence) - 2006

VICTIM PROFILE



SUDAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

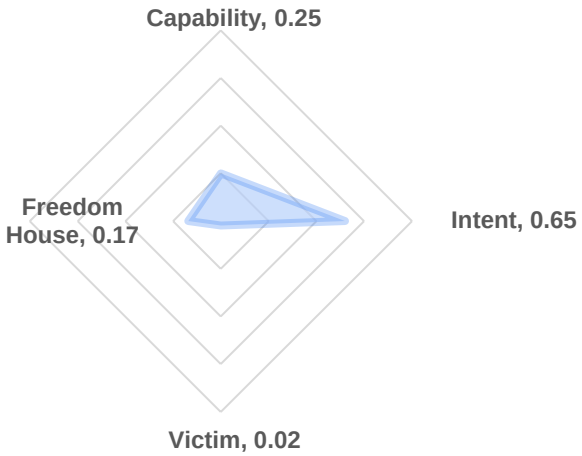
FREEDOM HOUSE
Not Free (0.17)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

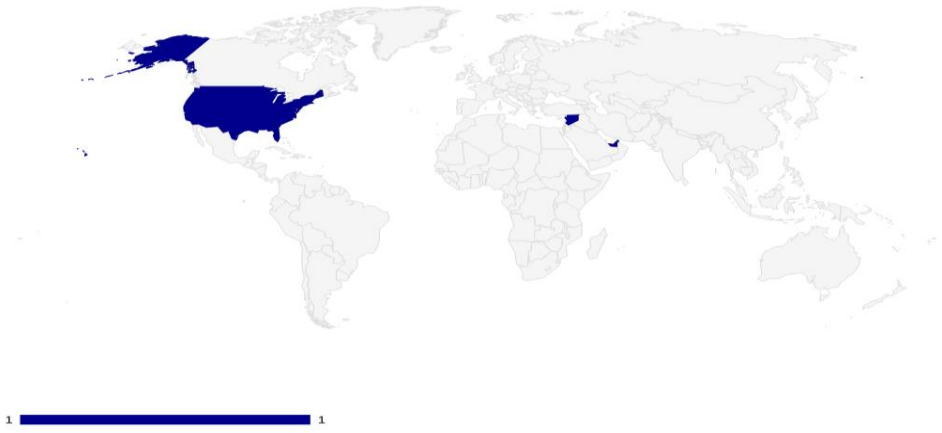
PURCHASED CAPABILITIES

Hacking Team Sales to Sudan (NISS - National Intelligence and Security Services / Intelligence) - 2012

Netsweeper systems Use in Sudan

Hacking Team Sales to Sudan (NISS - National Intelligence and Security Services / Intelligence) - 2012

VICTIM PROFILE



SWEDEN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (7)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

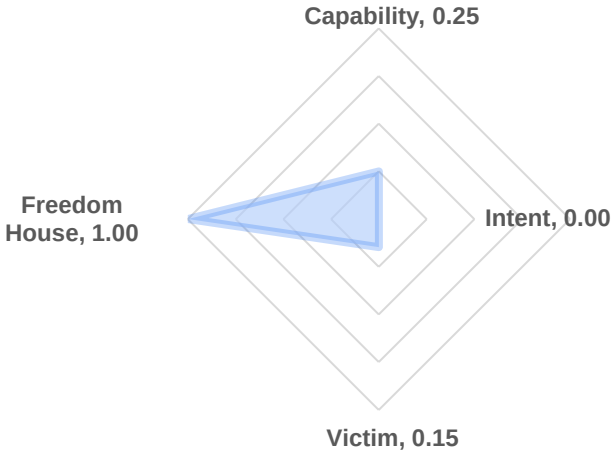
FREEDOM HOUSE
Free (1)

VICTIM
Targeted in 13 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
There are 10 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

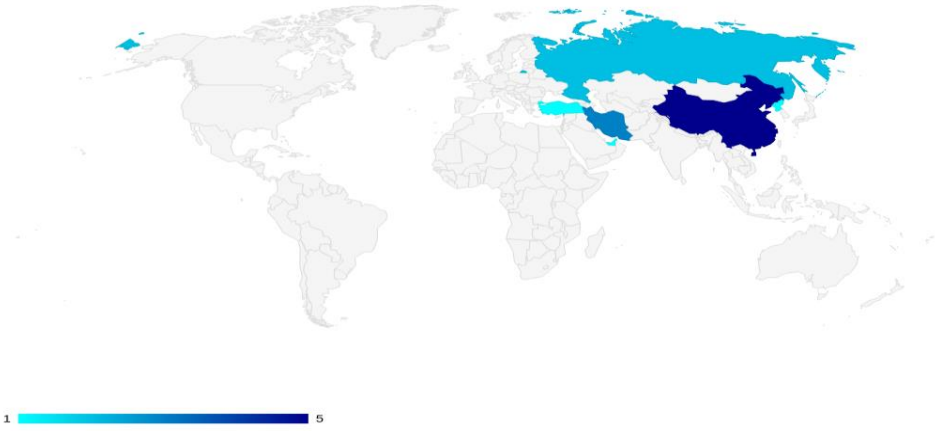
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

No purchases found

VICTIM PROFILE



SWITZERLAND

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Sales (42)
Purchases (2)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

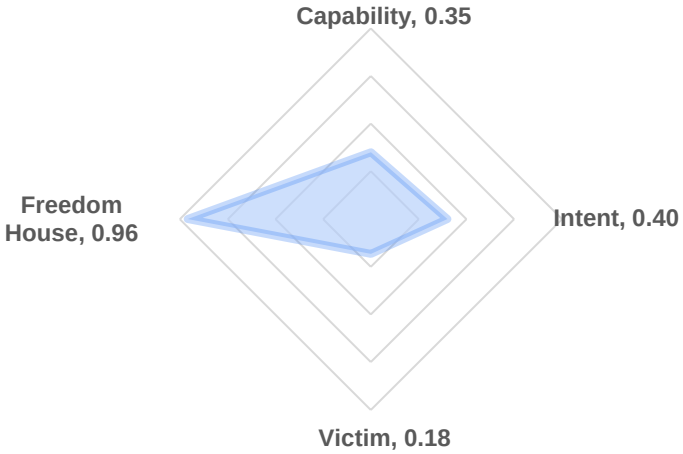
FREEDOM HOUSE
Free (0.96)

VICTIM
Targeted in 16 documents

THREAT ACTORS
APT Threat Actors (1)

PRIVATE VENDORS
There are 9 private vendors

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

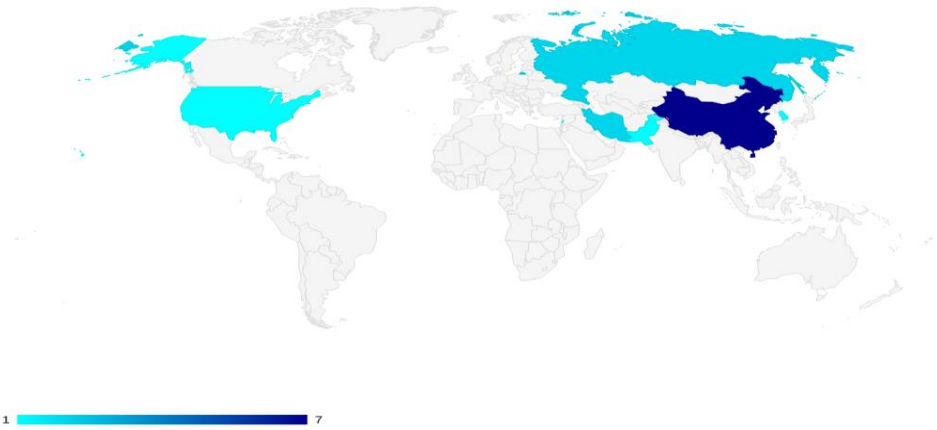
OFFENSIVE PRIVATE VENDORS

3i-MIND (Analysis)
Dreamlab Technologies AG (Lawful Interception, VOIP LI , Trojans)
ERA IT Solutions AG (Trojans)

PURCHASED CAPABILITIES

Hacking Team Sales to Switzerland (Kantonspolizei Zurich / LEA) - 2014
NSO Group Sales to Switzerland

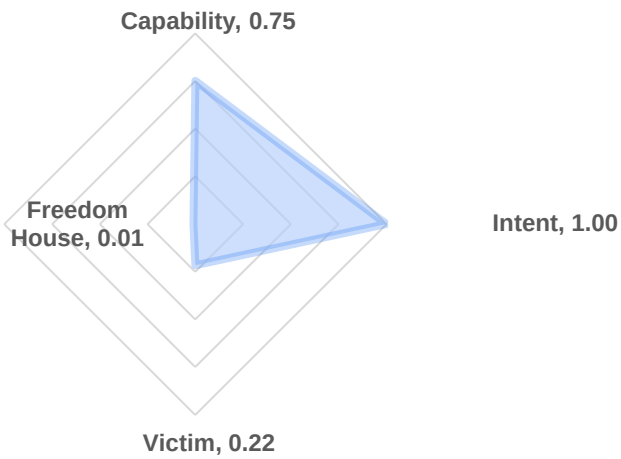
VICTIM PROFILE



COUNTRY PROFILE

Regional Contender

SYRIA



OFFENSIVE ACTIONS

State-Sponsored APTs (3)
Homegrown APTs (6)

CYBER TECH EXCHANGE

Purchases (3)

AUTONOMY

Third-Party Capabilities

OBJECTIVES

Surveillance (1)

FREEDOM HOUSE

Not Free (0.01)

VICTIM

Targeted in 19 documents

THREAT ACTORS

Syrian Electronic Army (2011)
Goldmouse (2014)
Pat Bear (2015)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Amesys Sales to Syria - 2007
Area SpA Sales to Syria (225, Syrian intelligence / Intelligence) - 2009
Trovicor Sales to Syria (Syriatel / Civil) – 2009

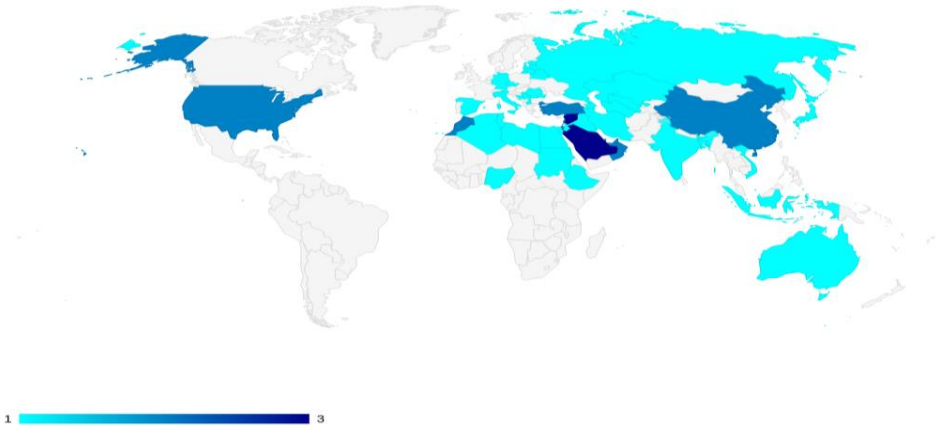
TARGETING PROFILE

THREAT ACTORS

State-Sponsored (2)
APT Threat Actors (3)

PRIVATE VENDORS

No private providers found



TAIWAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

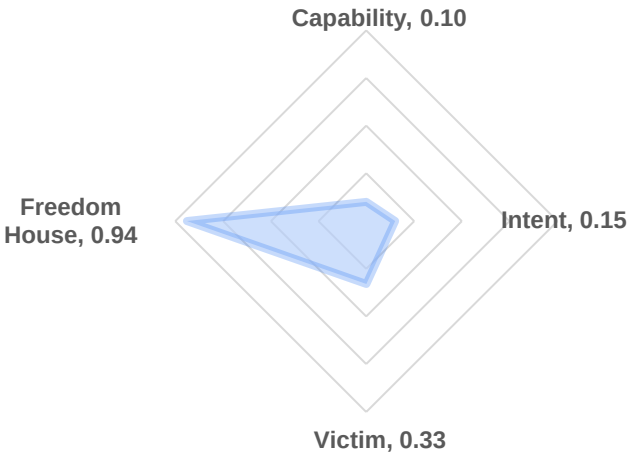
FREEDOM HOUSE
Free (0.94)

VICTIM
Targeted in 29 documents

THREAT ACTORS
APT Threat Actors (1)

PRIVATE VENDORS
There are 2 private vendors

COUNTRY PROFILE



THREAT ACTORS

APT-C-01 (2020)

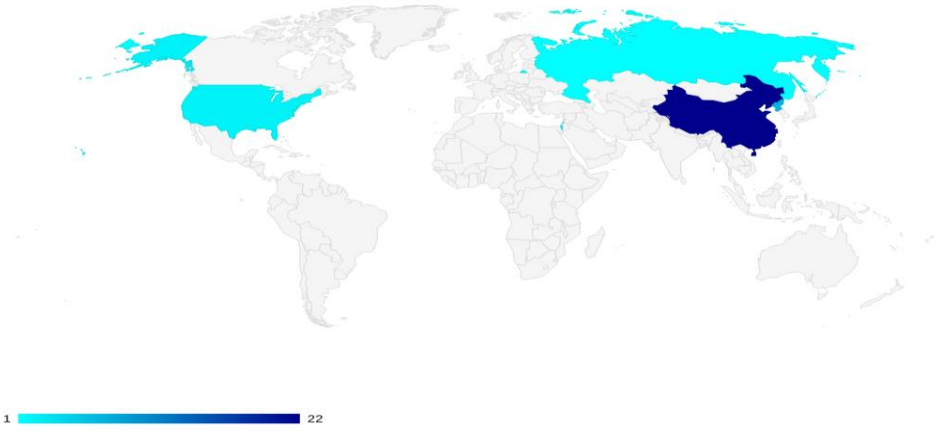
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Taiwan

VICTIM PROFILE



TAJIKISTAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

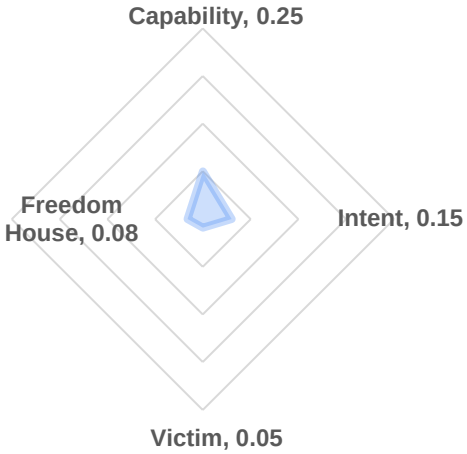
FREEDOM HOUSE
Not Free (0.08)

VICTIM
Targeted in 4 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

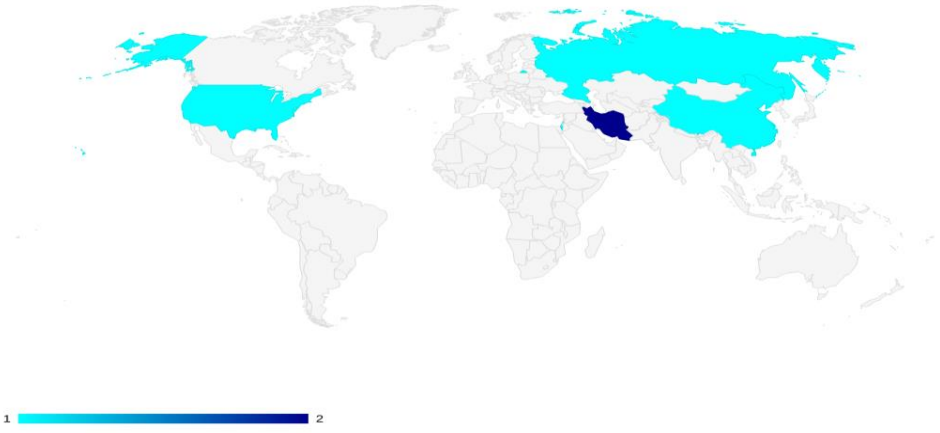
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Trovicor Sales to Tajikistan (Government of Tajikistan / Civil) - 2010

VICTIM PROFILE



THAILAND

OFFENSIVE ACTIONS
State-Sponsored APTs (1)
Homegrown APTs (1)

CYBER TECH EXCHANGE
Purchases (3)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Surveillance (1)

FREEDOM HOUSE
Not Free (0.3)

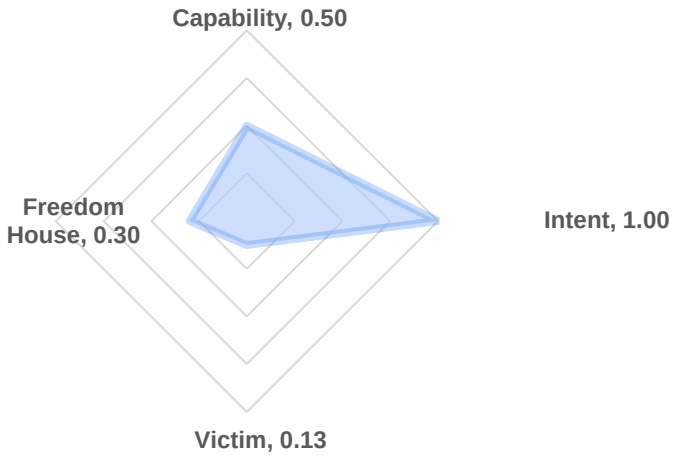
VICTIM
Targeted in 11 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

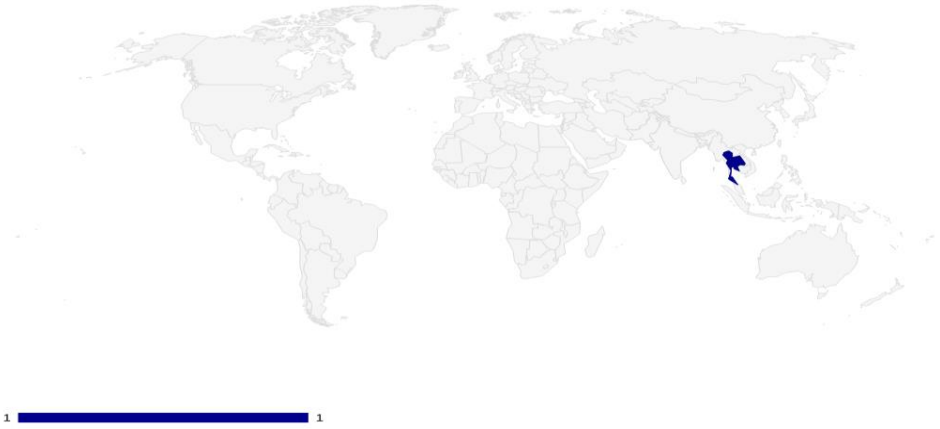
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Thailand (Royal Thai Army / Military) - 2014
Cyberbit Sales to Thailand (Royal Thai Army / Military) - 2017
Hacking Team Sales to Thailand (Dept. of Correction Thai Police / LEA) - 2014

TARGETING PROFILE



TOGO

OFFENSIVE ACTIONS
State-Sponsored APTs (1)

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Surveillance (1)

FREEDOM HOUSE
Partly Free (0.43)

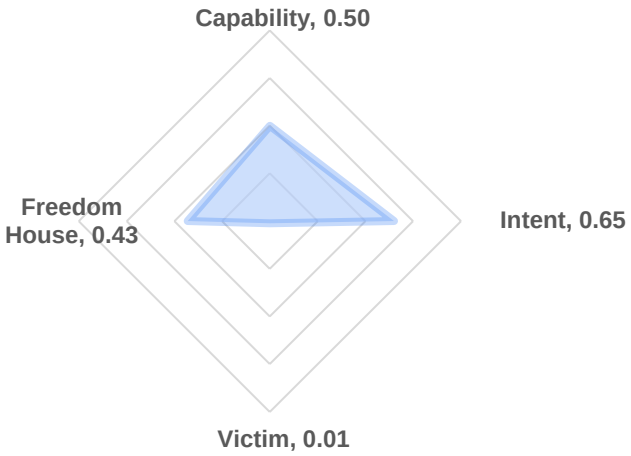
VICTIM
Targeted in 1 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NSO Group Sales to Togo

TARGETING PROFILE

TUNISIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

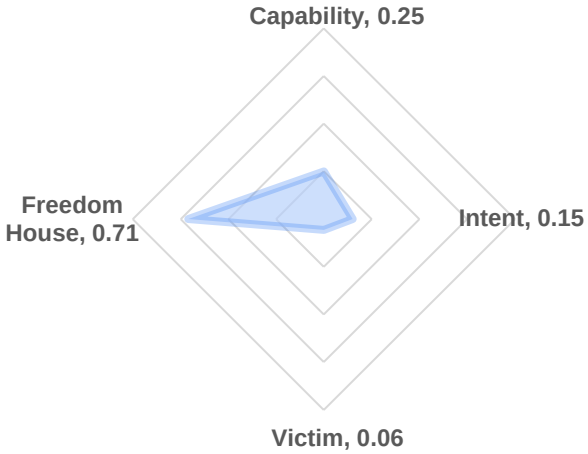
FREEDOM HOUSE
Free (0.71)

VICTIM
Targeted in 5 documents

THREAT ACTORS
APT Threat Actors (2)

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

Corsair Jackal

Rebel Jackal

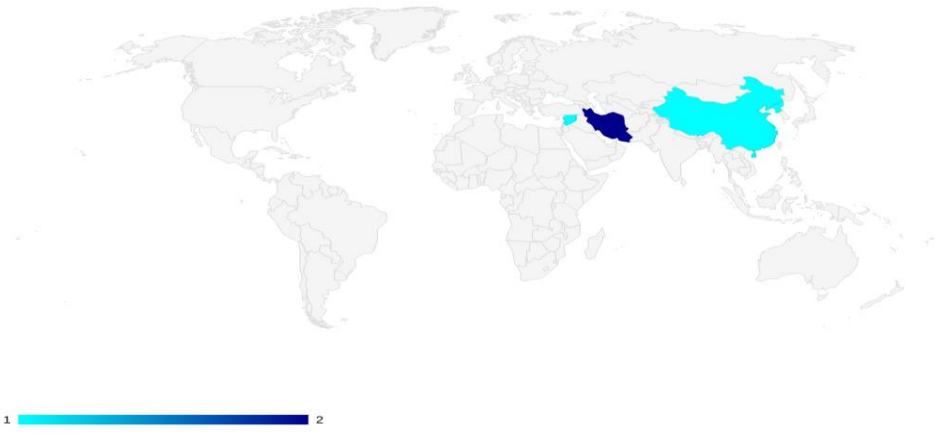
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

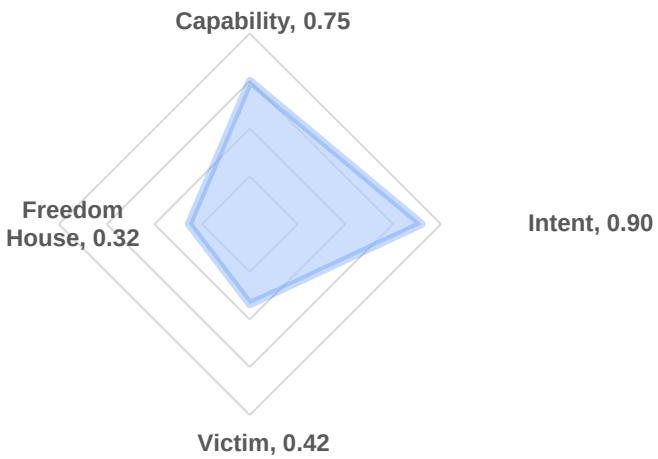
Trovicor Sales to Tunisia (Government of Tunisia / Civil)

VICTIM PROFILE



COUNTRY PROFILE

Regional Contender



TURKEY

OFFENSIVE ACTIONS

State-Sponsored APTs (5)
Homegrown APTs (6)

CYBER TECH EXCHANGE

Purchases (3)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (3), Crime (1)

FREEDOM HOUSE

Not Free (0.32)

VICTIM

Targeted in 37 documents

THREAT ACTORS

Neodymium (2016)
StrongPity (2012)
Sea Turtle (2017)
Vendetta (2020)
Sath-Ä± MÃ¼dafaa
Aslan Neferler Tim
AyyÄ±ldÄ±z Tim
TurkHackTeam
KingSqlZ

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Turkey (Turkish National Police / LEA) - 2011
Sandvine Use in Turkey (Türk Telekom's network / Civil)
FinFisher Sales to Turkey

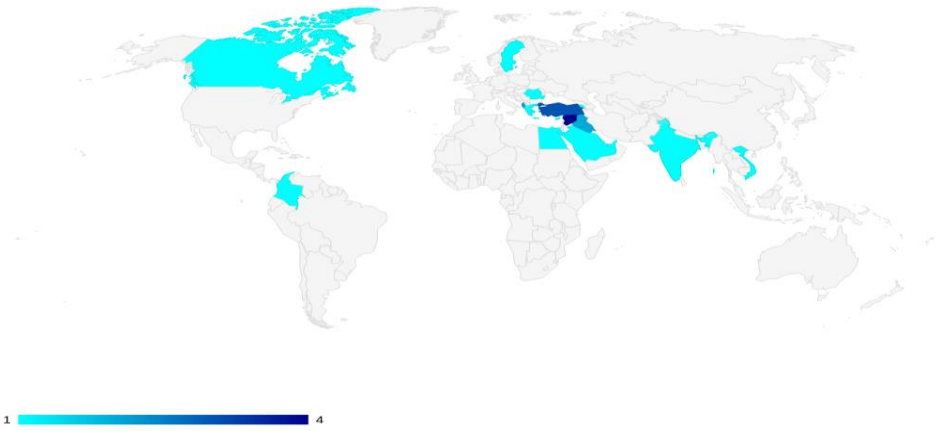
TARGETING PROFILE

THREAT ACTORS

State-Sponsored (2)
APT Threat Actors (9)

PRIVATE VENDORS

There are 6 private vendors



TURKMENISTAN

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

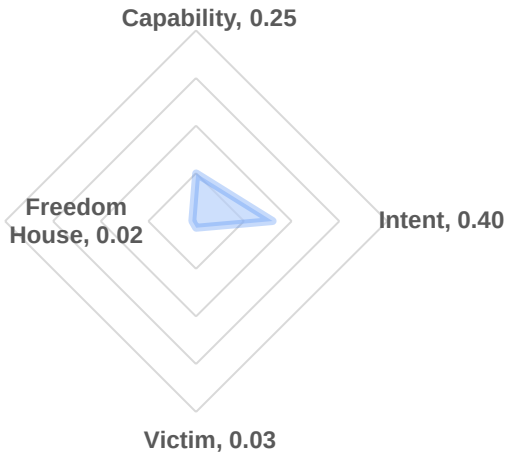
FREEDOM HOUSE
Not Free (0.02)

VICTIM
Targeted in 3 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Dreamlab Sales to Turkmenistan (Government of Turkmenistan / Civil) - 2010

FinFisher Sales to Turkmenistan (Ministry of Communications / Civil)

VICTIM PROFILE

UGANDA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

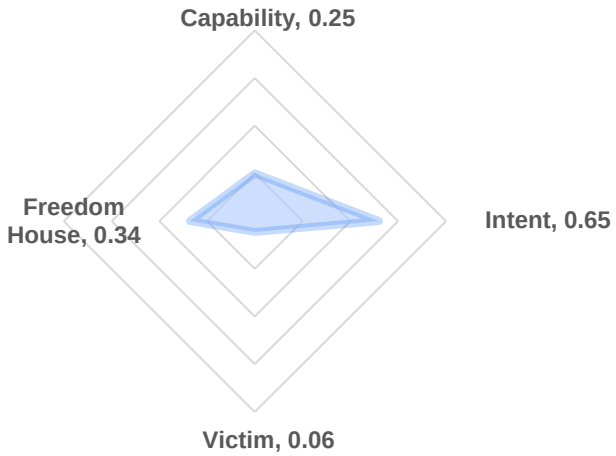
FREEDOM HOUSE
Not Free (0.34)

VICTIM
Targeted in 5 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

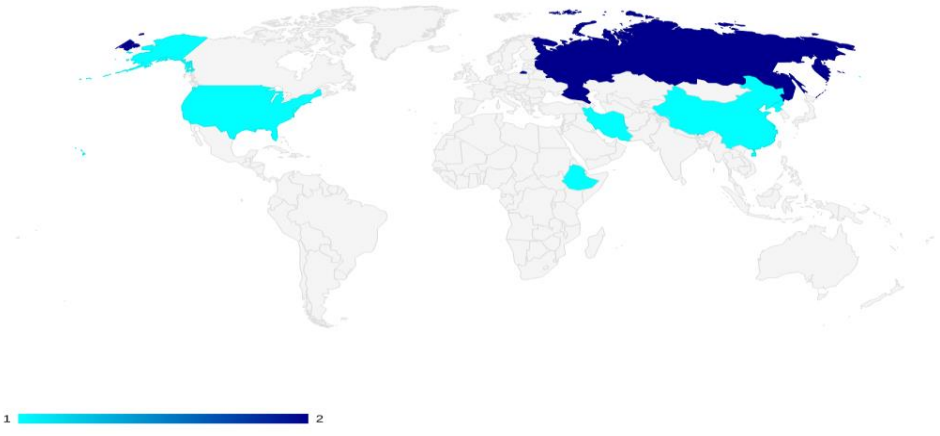
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NICE Systems Sales to Uganda (Chieftaincy of Military Intelligence, Special Forces Command Counter Intelligence / Intelligence) - 2015

FinFisher Sales to Uganda - 2012

VICTIM PROFILE



UKRAINE

OFFENSIVE ACTIONS
Homegrown APTs (5)

CYBER TECH EXCHANGE
No sales or purchases found

AUTONOMY
Some Indigenous Capabilities

OBJECTIVES
No objectives found

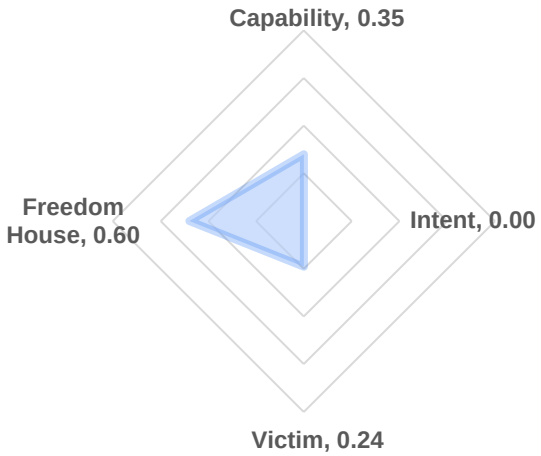
FREEDOM HOUSE
Partly Free (0.6)

VICTIM
Targeted in 21 documents

THREAT ACTORS
APT Threat Actors (4)

PRIVATE VENDORS
There are 4 private vendors

COUNTRY PROFILE



THREAT ACTORS

Carbanak (2013)
Operation Groundbait (2008)
Operation Poison Needles (2018)
Groundbait

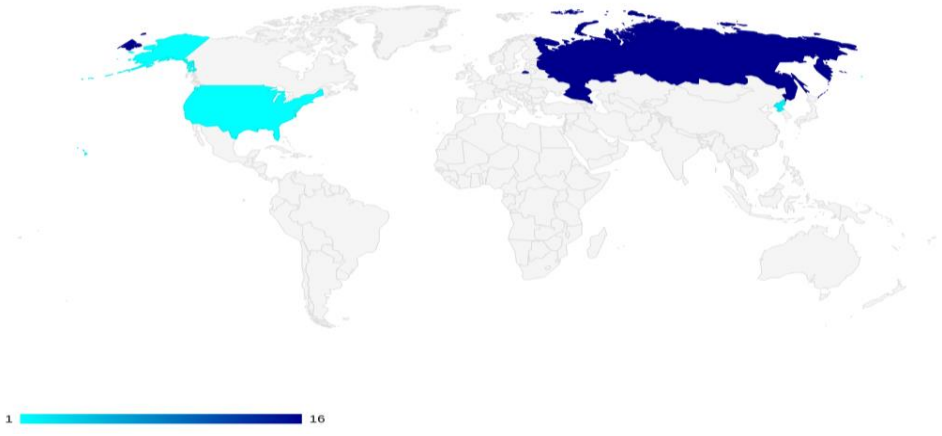
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

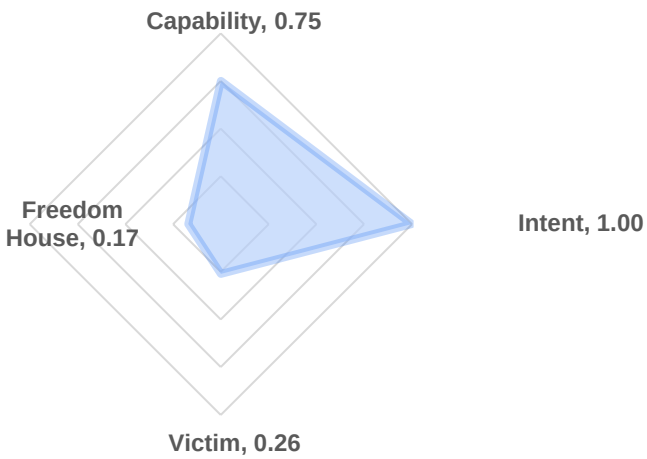
No purchases found

VICTIM PROFILE



COUNTRY PROFILE

Regional Contender



UNITED ARAB EMIRATES

OFFENSIVE ACTIONS

State-Sponsored APTs (4)
Homegrown APTs (7)

CYBER TECH EXCHANGE

Purchases (8)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (2), Surveillance (1)

FREEDOM HOUSE

Not Free (0.17)

VICTIM

Targeted in 23 documents

THREAT ACTORS

State-Sponsored (1)

THREAT ACTORS

Viking Jackal

Stealth Falcon (2012)

OFFENSIVE PRIVATE VENDORS

Stratign (Internet Monitoring, Phone Monitoring, Monitoring Centre, Analysis, Counter-Surveillance, Equipment, Intrusion, Monitoring Centres, Communications Monitoring)

PURCHASED CAPABILITIES

Hacking Team Sales to United Arab Emirates (UAE - Intelligence / Intelligence) - 2012

Netsweeper systems Use in UAE

NSO Group Sales to UAE

NSO Group Sales to United Arab Emirates

SS8 Sales to United Arab Emirates - 2009

UAE Purchase of Intrusion software Technology - 2015

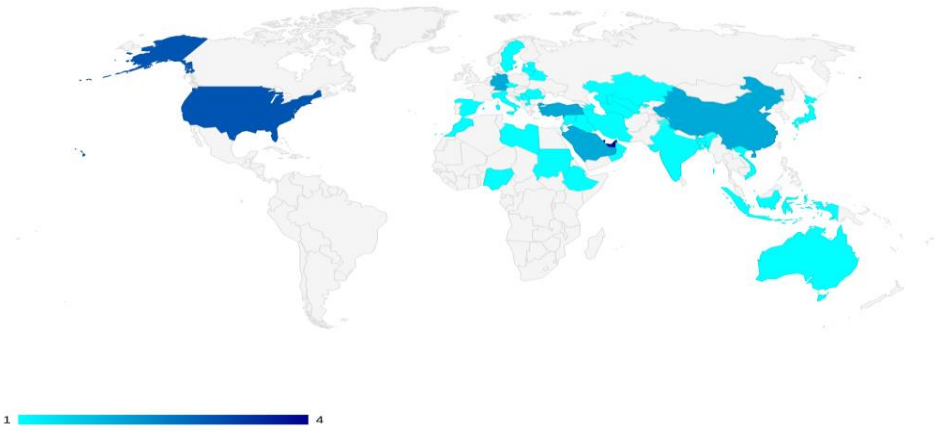
FinFisher Sales to United Arab Emirates

Hacking Team Sales to United Arab Emirates (UAE - MOI / Intelligence) - 2012

TARGETING PROFILE

PRIVATE VENDORS

There are 5 private vendors



UNITED KINGDOM

OFFENSIVE ACTIONS

State-Sponsored APTs (6)
Homegrown APTs (5)

CYBER TECH EXCHANGE

Sales (44)
Purchases (1)

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (5)

FREEDOM HOUSE

Free (0.93)

VICTIM

Targeted in 32 documents

THREAT ACTORS

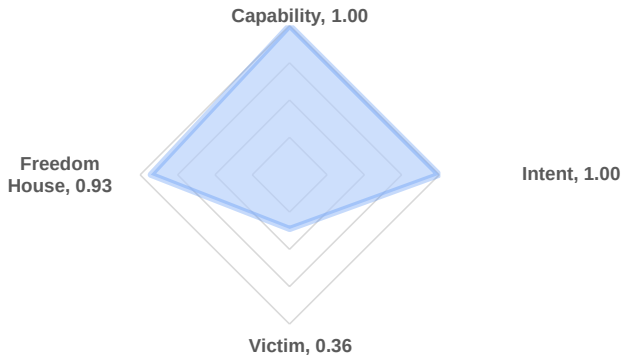
State-Sponsored (1)
APT Threat Actors (2)

PRIVATE VENDORS

There are 102 private vendors

COUNTRY PROFILE

Global Power



THREAT ACTORS

GCHQ (1919) – Equation Group

OFFENSIVE PRIVATE VENDORS

Gamma Group (Intrusion, Phone Monitoring, Internet Monitoring, Monitoring Centre, Analysis, Audio Surveillance, Video Surveillance, Counter-Surveillance, Equipment, Monitoring Centres, Communications Monitoring, Technical Surveillance)

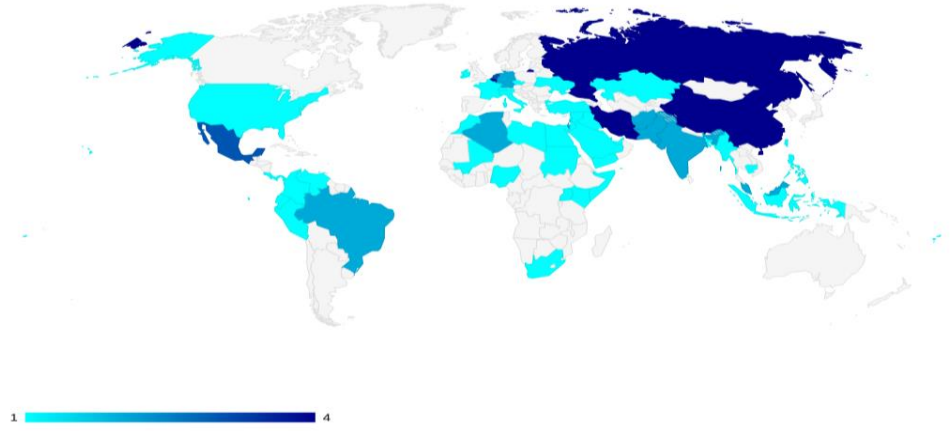
Roke Manor Research (Internet Monitoring, Monitoring Centre, Video Surveillance, Audio Surveillance, Equipment, Location Monitoring, Analysis, Counter-Surveillance, Intrusion, Monitoring Centres, Technical Surveillance)

Sure (Video Surveillance, Audio Surveillance, Phone Monitoring, Location Monitoring, Technical Surveillance, Intrusion)

PURCHASED CAPABILITIES

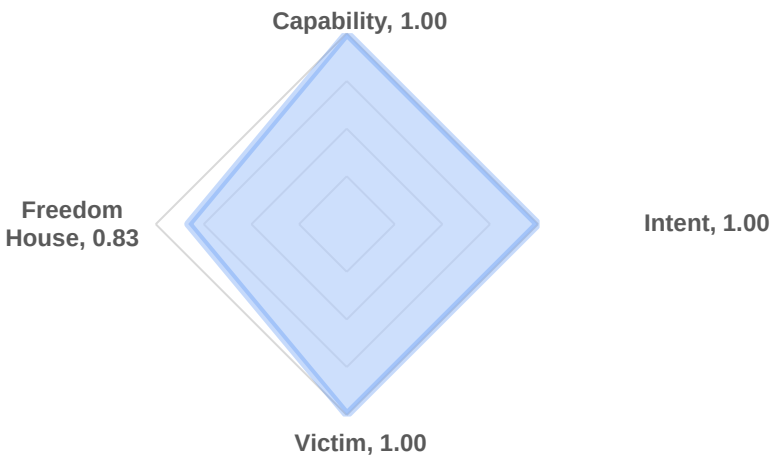
FinFisher Sales to United Kingdom

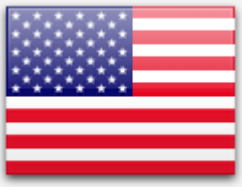
TARGETING PROFILE



COUNTRY PROFILE

Global Power





UNITED STATES

OFFENSIVE ACTIONS

State-Sponsored APTs (13)
Homegrown APTs (8)

CYBER TECH EXCHANGE

Sales (117)
Purchases (5)

AUTONOMY

State Indigenous Capabilities

OBJECTIVES

Espionage (6), Kinetic (1)

FREEDOM HOUSE

Free (0.83)

VICTIM

Targeted in 88 documents

THREAT ACTORS

State-Sponsored (6)
APT Threat Actors (10)

THREAT ACTORS

Longhorn (2009)

Equation Group (2001)

Operation Olympic Games (2007)

Strider (2011)

Shadow Brokers (2016)

Vault 7/8 (2017)

Pizzo Spider

OFFENSIVE PRIVATE VENDORS

BlueCoat (Intelligence Centers, Deep Packet Inspection, Internet Filtering)

Endgame Systems (Intrusion)

Harris (Phone Monitoring, Video Surveillance, Equipment, Intrusion)

SS8 Networks (Internet Monitoring, Phone Monitoring, Analysis, Intrusion)

TeleStrategies (Internet Monitoring, Location Monitoring, Analysis, Intrusion, Biometrics, Monitoring Centre, Communications Monitoring, Monitoring Centres)

Verint (Phone Monitoring, Monitoring Centre, Internet Monitoring, Video Surveillance, Analysis, Location Monitoring, Communications Monitoring)

PURCHASED CAPABILITIES

Hacking Team Sales to United States of America (Drug Enforcement Administration / LEA) - 2012

SS8 Sales to United States of America (Drug Enforcement Administration / LEA) - 2010

FinFisher Sales to United States of America

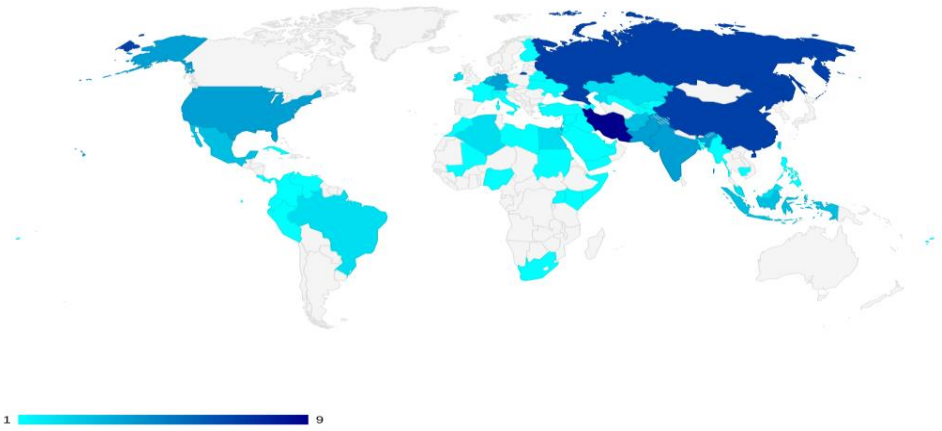
Hacking Team Sales to United States of America (DOD / Military) - 2011

Hacking Team Sales to United States of America (FBI / LEA) - 2011

TARGETING PROFILE

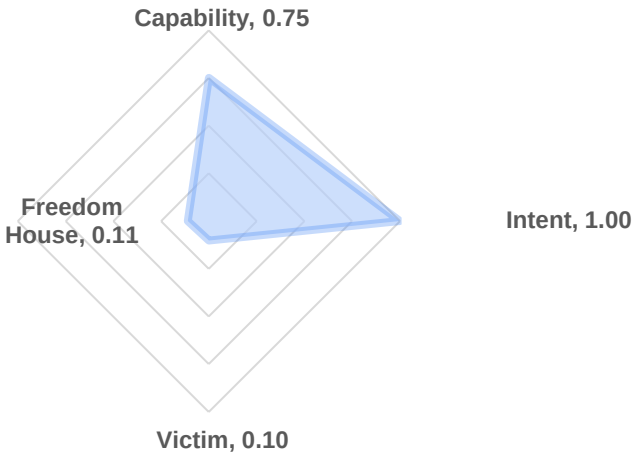
PRIVATE VENDORS

There are 126 private vendors



COUNTRY PROFILE

Local Player



UZBEKISTAN

OFFENSIVE ACTIONS

State-Sponsored APTs (2)
Homegrown APTs (3)

CYBER TECH EXCHANGE

Purchases (4)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (1), Surveillance (1)

FREEDOM HOUSE

Not Free (0.11)

VICTIM

Targeted in 9 documents

THREAT ACTORS

State-Sponsored (1)

THREAT ACTORS

SandCat (2018)

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Uzbekistan (NSS / Intelligence) - 2011

NICE Systems Sales to Uzbekistan (National Security Service (SNB) / Intelligence)

NSO Group Sales to Uzbekistan

Cyberbit Sales to Uzbekistan (Uzbekistan's National Security Service / Intelligence) – 2017

APT Threat Actors (1)

PRIVATE VENDORS

No private providers found

TARGETING PROFILE

VENEZUELA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (1)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
No objectives found

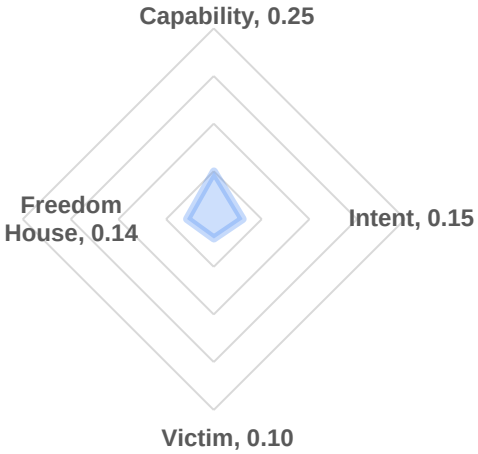
FREEDOM HOUSE
Not Free (0.14)

VICTIM
Targeted in 9 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

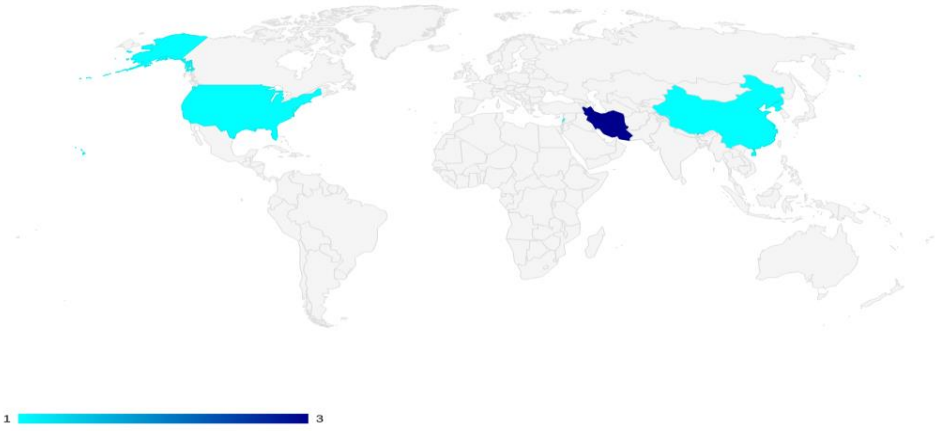
OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

FinFisher Sales to Venezuela

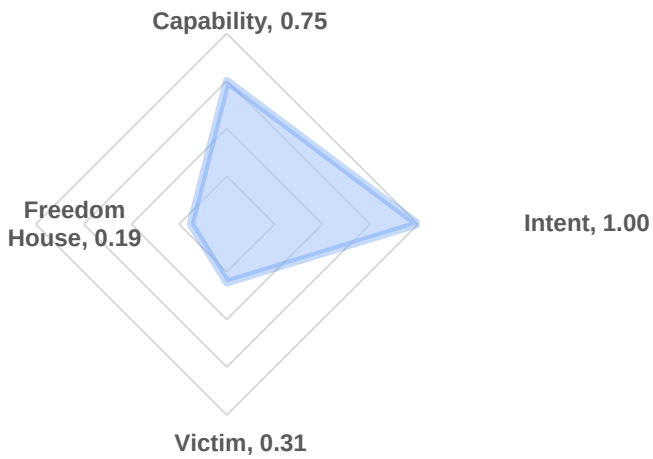
VICTIM PROFILE



VIET NAM

COUNTRY PROFILE

Regional Contender



OFFENSIVE ACTIONS

State-Sponsored APTs (5)
Homegrown APTs (14)

CYBER TECH EXCHANGE

Purchases (2)

AUTONOMY

Some Indigenous Capabilities

OBJECTIVES

Espionage (1), Surveillance (1)

FREEDOM HOUSE

Not Free (0.19)

VICTIM

Targeted in 27 documents

THREAT ACTORS

State-Sponsored (1)
APT Threat Actors (2)

PRIVATE VENDORS

No private providers found

THREAT ACTORS

APT 32 (2013)

Bismuth (2012)

OFFENSIVE PRIVATE VENDORS

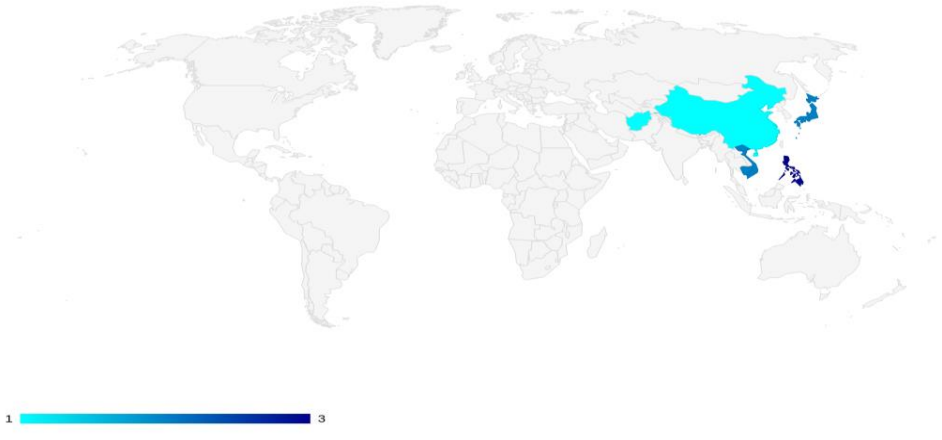
No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Hacking Team Sales to Vietnam (Vietnam GD1 / Intelligence) - 2015

FinFisher Sales to Vietnam

TARGETING PROFILE



YEMEN

OFFENSIVE ACTIONS
State-Sponsored APTs (2)

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Surveillance (2)

FREEDOM HOUSE
Not Free (0.11)

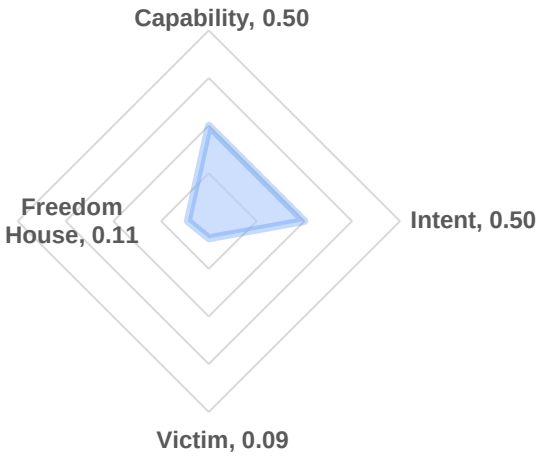
VICTIM
Targeted in 8 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE

Local Player



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

Netsweeper systems Use in Yemen

Trovicor Sales to Yemen - 2009

TARGETING PROFILE

ZAMBIA

OFFENSIVE ACTIONS
No offensive actions found

CYBER TECH EXCHANGE
Purchases (2)

AUTONOMY
Third-Party Capabilities

OBJECTIVES
Espionage (1)

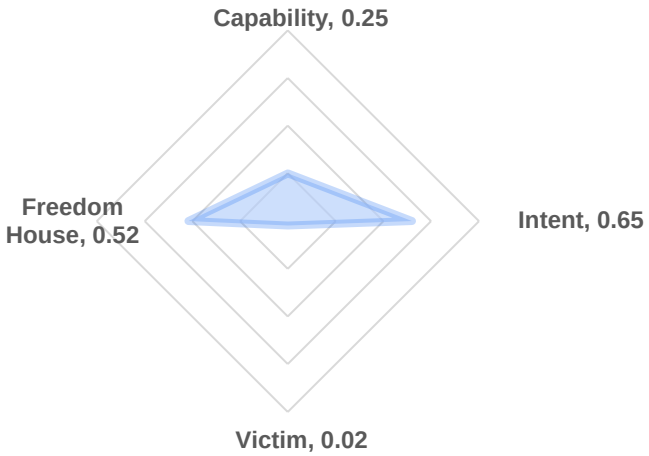
FREEDOM HOUSE
Partly Free (0.52)

VICTIM
Targeted in 2 documents

THREAT ACTORS
No threat-actors found

PRIVATE VENDORS
No private providers found

COUNTRY PROFILE



THREAT ACTORS

No threat-actors found

OFFENSIVE PRIVATE VENDORS

No cyber offensive capabilities private vendors found

PURCHASED CAPABILITIES

NSO Group Sales to Zambia

Cyberbit Sales to Zambia (Zambia's Financial Intelligence Centre / Intelligence) - 2017

TARGETING PROFILE

APPENDIX D - DICTIONARIES

Aeroespacial	aeb
Aeroespacial	aeronautical
Aeroespacial	aerospace
Aeroespacial	astronomy
Aeroespacial	avionic
Aeroespacial	ballistic
Aeroespacial	blue origin
Aeroespacial	european space agency
Aeroespacial	geostationary
Aeroespacial	isro
Aeroespacial	nasa
Aeroespacial	orbit
Aeroespacial	pockocmoc
Aeroespacial	roskosmos
Aeroespacial	satellite
Aeroespacial	space program
Aeroespacial	space travel
Aeroespacial	spacecraft
Aeroespacial	spaceflight
Aeroespacial	spacex
Aeroespacial	terrestrial
Aeroespacial	unmanned
Aeroespacial	virgin galactic
Aviação	aeroplane
Aviação	airbus
Aviação	aircraft
Aviação	airline
Aviação	airplane
Aviação	airport
Aviação	aviation
Aviação	bae systems
Aviação	boeing
Aviação	bombardier
Aviação	embraer
Aviação	jet
Aviação	jetliner
Aviação	lockheed martin
Aviação	northrop group
Aviação	plane
Aviação	qantas
Aviação	raytheon
Aviação	safran
Aviação	travel ban
Financeiro	Agricultural Bank of China
Financeiro	atm jackpot
Financeiro	atm malware
Financeiro	Banco do Brasil
Financeiro	Banco Inter
Financeiro	Banco Safra
Financeiro	Banco Santander
Financeiro	Bank of America
Financeiro	Bank of China
Financeiro	Bank of Communications
Financeiro	banking companies
Financeiro	banking instituitions
Financeiro	Banrisul
Financeiro	Barclays
Financeiro	BBVA
Financeiro	Bilbao Vizcaya
Financeiro	BMG
Financeiro	BNP Paribas
Financeiro	BPI
Financeiro	Bradesco
Financeiro	BTG
Financeiro	Caixa Economica
Financeiro	Caixa Geral
Financeiro	cash-out scheme
Financeiro	central bank
Financeiro	Cetelem
Financeiro	China Construction Bank
Financeiro	China Merchants Bank
Financeiro	Citibank
Financeiro	Citigroup Inc.
Financeiro	Crédit Agricole
Financeiro	Deutsche Bank
Financeiro	ebanx

Financeiro	electronic debit
Financeiro	exchange currency
Financeiro	Febraban
Financeiro	finance sector
Financeiro	financial
Financeiro	financial entities
Financeiro	financial industries
Financeiro	financial industry
Financeiro	financial instituitions
Financeiro	financial sector
Financeiro	financial services
Financeiro	fintech
Financeiro	Groupe BPCE
Financeiro	HSBC
Financeiro	Industrial and Commercial Bank of China
Financeiro	ING Group
Financeiro	insurance
Financeiro	investment
Financeiro	Itau
Financeiro	Japan Post Bank
Financeiro	JP Morgan
Financeiro	Lloyds Banking Group
Financeiro	loans
Financeiro	Mitsubishi UFJ Financial Group
Financeiro	Mizuho Financial Group
Financeiro	mortgage
Financeiro	Postal Savings Bank of China
Financeiro	Royal Bank of Canada
Financeiro	Santander
Financeiro	Scotiabank
Financeiro	Sicoob
Financeiro	Sicredi
Financeiro	Société Générale
Financeiro	Sofisa
Financeiro	stocks
Financeiro	Sumitomo Mitsui Financial Group
Financeiro	Toronto-Dominion Bank
Financeiro	Unibanco
Financeiro	Wells Fargo
Alvos Políticos	activist
Alvos Políticos	civil society
Alvos Políticos	clashes
Alvos Políticos	crackdown
Alvos Políticos	demonstrator
Alvos Políticos	dissident
Alvos Políticos	extremist
Alvos Políticos	human rights
Alvos Políticos	labor unions
Alvos Políticos	militant
Alvos Políticos	nationalist
Alvos Políticos	ngo
Alvos Políticos	non-governmental organization
Alvos Políticos	opposition
Alvos Políticos	political organization
Alvos Políticos	political party
Alvos Políticos	pro-democracy
Alvos Políticos	protest
Alvos Políticos	rebels
Alvos Políticos	refugee
Alvos Políticos	revolt
Alvos Políticos	riot
Alvos Políticos	separatist
Alvos Políticos	unrest
Alvos Políticos	uprising
Diplomacia	ambassador
Diplomacia	asean
Diplomacia	consul
Diplomacia	diplomacy
Diplomacia	diplomat
Diplomacia	embassy
Diplomacia	envoy
Diplomacia	Food and Agriculture Organization
Diplomacia	foreign affairs
Diplomacia	humanitarian
Diplomacia	ICAO

Diplomacia IMF

Diplomacia International Labour Organization

Diplomacia International Maritime Organization

Diplomacia international organization

Diplomacia international political groups

Diplomacia International Telecommunication Union

Diplomacia Joint United Nations Programme on HIV

Diplomacia monitary fund

Diplomacia multilateral

Diplomacia multinational

Diplomacia oas

Diplomacia ocde

Diplomacia peacekeepers

Diplomacia peacekeeping

Diplomacia trade bodies

Diplomacia UNESCO

Diplomacia UNHRC

Diplomacia UNICEF

Diplomacia UNISDR

Diplomacia united nations

Diplomacia United Nations Capital Development Fund

Diplomacia United Nations Development Programme

Diplomacia United Nations Educational

Diplomacia United Nations Environment Programme

Diplomacia United Nations Human Settlements Programme

Diplomacia United Nations Industrial Development Organization

Diplomacia Universal Postal Union

Diplomacia UNODC

Diplomacia world bank

Diplomacia World Food Programme

Diplomacia World Health Organization (WHO)

Diplomacia World Intellectual Property Organization

Diplomacia World Meteorological Organization

Diplomacia World Tourism Organization

Diplomacia WTO

Educação academia

Educação academic

Educação college

Educação curriculum

Educação education

Educação faculty

Educação graduate

Educação Harvard

Educação higher education

Educação humanities

Educação Instituto Federal

Educação MIT

Educação Princeton

Educação professors

Educação scholarship

Educação school

Educação Stamford

Educação student

Educação undergraduate

Educação Universidade Federal

Educação university

Energia blackouts

Energia brownouts

Energia Cemig

Energia Copel

Energia CPFL

Energia disruptions

Energia EDP

Energia electric

Energia electric corporation

Energia electric power

Energia electric utility

Energia electrical

Energia electrical power

Energia electricity

Energia electricity distribution

Energia ENEL

Energia	Energisa
Energia	energy
Energia	energy sector
Energia	hydro plant
Energia	Itaipu
Energia	Neoenergia
Energia	outage
Energia	power grid
Energia	power outages
Energia	renewable
Energia	shortages
Energia	solarpower
Energia	surge
Alimentação	agribusiness
Alimentação	Ambev
Alimentação	aquaculture
Alimentação	BASF
Alimentação	Bayer
Alimentação	biodiversity
Alimentação	Bunge
Alimentação	Cargill
Alimentação	Coamo
Alimentação	Cocamar
Alimentação	crop
Alimentação	cultivation
Alimentação	dairy
Alimentação	DuPont
Alimentação	Embrapa
Alimentação	fisheries
Alimentação	food crops
Alimentação	forestry
Alimentação	horticulture
Alimentação	husbandry
Alimentação	iFood
Alimentação	JBS
Alimentação	live stock
Alimentação	livestock
Alimentação	Maggi
Alimentação	Monsanto
Alimentação	Piracanjuba
Alimentação	Rappi
Alimentação	Syngenta
Governo	citizen
Governo	constitution
Governo	democracy
Governo	dictator
Governo	executive branch
Governo	executive order
Governo agencies	government
Governo agency	government
Governo departments	government
Governo entities	government
Governo institutions	government
Governo interests	government
Governo	government office
Governo official	government
Governo target	government
Governo agency	intelligence
Governo	judicial
Governo	jurisdiction
Governo	law enforcement
Governo	legislative
Governo	ministry
Governo	municipal
Governo	municipality
Governo	municipio
Governo	political figure
Governo	prime minister
Governo	provincia
Governo	secretaria
Governo	security actors
Governo	Senate
Governo	the president
Saúde	biomedical
Saúde	Capemisa
Saúde	clinic
Saúde	Corona
Saúde	Covid
Saúde	Covid-19

Saúde	doctor
Saúde	exams
Saúde	Golden Cross
Saúde	health
Saúde	health care
Saúde	healthcare
Saúde	hospital
Saúde	Johns Hopkins
Saúde	Mapfre
Saúde	medical
Saúde	medical records
Saúde	medication
Saúde	medicine
Saúde	nursing
Saúde	oncology
Saúde	Outbreak
Saúde	patient
Saúde	pediatric
Saúde	pharmaceutical
Saúde	physician
Saúde	Santa Casa
Saúde	surgical
Saúde	therapy
Saúde	treatment
Saúde	Unimed
Turismo	accommodation
Turismo	accorhotels
Turismo	agoda
Turismo	airbnb
Turismo	aman resorts
Turismo	apa group
Turismo	ascott
Turismo	avari
Turismo	avid hotel
Turismo	banyan tree
Turismo	barriere
Turismo	belmond
Turismo	best western
Turismo	blackstone
Turismo	booking
Turismo	booking.com
Turismo	BTG Homeinn
Turismo	candlewood
Turismo	Centara
Turismo	China Lodging
Turismo	Choice Hotels
Turismo	crowne plaza
Turismo	dalata
Turismo	dorchester
Turismo	drury
Turismo	dusti thani
Turismo	elite hotel
Turismo	expedia
Turismo	extended stay
Turismo	First Hotels
Turismo	formule 1
Turismo	four seasons
Turismo	general hotel
Turismo	greentree
Turismo	hilton
Turismo	holiday inn
Turismo	holiday inn express
Turismo	hoshino
Turismo	hospitality
Turismo	hotel
Turismo	hotel indigo
Turismo	hotels.com
Turismo	hualuxe
Turismo	Huazhu Hotels
Turismo	hyatt
Turismo	indian hotels
Turismo	intercontinental hotel
Turismo	jinjian international
Turismo	Jumeirah
Turismo	Kempinski
Turismo	kimpton
Turismo	Langham
Turismo	ligula
Turismo	lodging
Turismo	Loews Hotels
Turismo	lotte
Turismo	louvre hotels

Turismo	magnuson	Turismo	shillo inn	Indústria	textile
Turismo	marriott	Turismo	soneva	Indústria	Usiminas
Turismo	melia	Turismo	starwood	Indústria	Votorantim
Turismo	motel	Turismo	tokyu hotel	Mídia	broadsheet
Turismo	nh hotel	Turismo	tourism	Mídia	columnist
Turismo	nordic choice	Turismo	tourist	Mídia	commentator
Turismo	novo hotel	Turismo	toyoko	Mídia	correspondent
Turismo	oberoi	Turismo	travel	Mídia	critic
Turismo	okura	Turismo	travelocity	Mídia	editorial
Turismo	omni	Turismo	travelodge	Mídia	headlines
Turismo	oyo	Turismo	treebo	Mídia	investigative
Turismo	pan pacific	Turismo	vacation	Mídia	journalism
Turismo	premier inn	Turismo	voco	Mídia	journalist
Turismo	prince hotel	Turismo	warwick hotel	Mídia	media companies
Turismo	principal hotel	Turismo	westgate	Mídia	media organizations
Turismo	radisson	Turismo	wyndham	Mídia	media outlets
Turismo	red lion	Indústria	Alunorte	Mídia	national media
Turismo	red roof	Indústria	Bosch	Mídia	news organization
Turismo	regent hotel	Indústria	Braskem	Mídia	newspaper
Turismo	ritz carlton	Indústria	factory	Mídia	public relations
Turismo	riu hotel	Indústria	Gerdau	Mídia	publishing
Turismo	rocco forte	Indústria	heavy industry	Mídia	reporter
Turismo	room_number	Indústria	heavyindustry	Mídia	Sony
Turismo	rosewood	Indústria	industrial	Mídia	tabloid
Turismo	scandic hotel	Indústria	Klabin	Militar	armed
Turismo	shahpura	Indústria	machinery	Militar	artillery
Turismo	shangri-la hotel	Indústria	manufacture	Militar	battalion
Turismo	sheraton	Indústria	steel	Militar	combat

Militar	corps
Militar	defence
Militar	defense
Militar	defense contractor
Militar	defense force
Militar	defense industrial base
Militar	defense industries
Militar	defense industry
Militar	defense supply chain
Militar	infantry
Militar	marines
Militar	military
Militar	military entities
Militar	military institutions
Militar	military officials
Militar	military target
Militar	nato
Militar	squadron
Militar	troop
Militar	weaponry
Mineração	alcoa
Mineração	Anglo American plc
Mineração	BHP Billiton
Mineração	China Coal Energy
Mineração	China Shenhua Energy
Mineração	Coal India
Mineração	digging
Mineração	diging
Mineração	enerald
Mineração	excavate
Mineração	Glencore
Mineração	mineral
Mineração	quarry
Mineração	Rio Tinto
Mineração	Shaanxi Coal
Mineração	smelting
Mineração	trenching
Mineração	vale do rio doce
Mineração	vale sa
Mineração	Vattenfal
Mineração	Yanzhou Coal
Mineração	Zijin Mining
Pesquisa e Desenvolvimento	cryptography
Pesquisa e Desenvolvimento	futuristic
Pesquisa e Desenvolvimento	high tech
Pesquisa e Desenvolvimento	high-tech
Pesquisa e Desenvolvimento	intelectual property
Pesquisa e Desenvolvimento	propulsion
Pesquisa e Desenvolvimento	prototype
Pesquisa e Desenvolvimento	quantum computing
Pesquisa e Desenvolvimento	quantum research
Pesquisa e Desenvolvimento	research & development
Pesquisa e Desenvolvimento	research and development
Pesquisa e Desenvolvimento	research lab
Pesquisa e Desenvolvimento	scientific research
Pesquisa e Desenvolvimento	technological
Pesquisa e Desenvolvimento	think tanks
Varejo	Atacadão
Varejo	Bompreço
Varejo	carrefour
Varejo	Casas Bahia
Varejo	costco
Varejo	department store
Varejo	grocery
Varejo	Maxxi
Varejo	Mercadorama
Varejo	merchandising
Varejo	Pão de Açúcar
Varejo	Ponto Frio
Varejo	retail
Varejo	RicardoEletro
Varejo	Sam's Club

Varejo	tesco
Varejo	walmart
Varejo	warehouse
Transporte	bus
Transporte	bus terminal
Transporte	cabify
Transporte	commuter
Transporte	highway
Transporte	highways
Transporte	Infraero
Transporte	intercity
Transporte	road
Transporte	streetcar
Transporte	Uber
Petróleo e Gas	aramco
Petróleo e Gas	Bharat Petroleum
Petróleo e Gas	british petroleum
Petróleo e Gas	Centrica
Petróleo e Gas	CEPSA
Petróleo e Gas	Chevron
Petróleo e Gas	China National Offshore Oil
Petróleo e Gas	China National Petroleum
Petróleo e Gas	ConocoPhillips
Petróleo e Gas	deepwater
Petróleo e Gas	Ecopetrol
Petróleo e Gas	Engie
Petróleo e Gas	Enterprise Products
Petróleo e Gas	Equinor
Petróleo e Gas	Exxon Mobil
Petróleo e Gas	fuel
Petróleo e Gas	gasoline
Petróleo e Gas	Gazprom
Petróleo e Gas	GS Caltex
Petróleo e Gas	Hellenic Petroleum
Petróleo e Gas	Hindustan Petroleum
Petróleo e Gas	hydrocarbon
Petróleo e Gas	Idemitsu Kosan
Petróleo e Gas	Indian Oil
Petróleo e Gas	JX Holdings
Petróleo e Gas	Kuwait Petroleum
Petróleo e Gas	Lukoil
Petróleo e Gas	Marathon Petroleum
Petróleo e Gas	MOL
Petróleo e Gas	Motor Oil Hellas
Petróleo e Gas	National Iranian Oil
Petróleo e Gas	nonrenewable
Petróleo e Gas	oil
Petróleo e Gas	oil & gas
Petróleo e Gas	oil and gas
Petróleo e Gas	oil companies
Petróleo e Gas	oil company
Petróleo e Gas	oil/gas
Petróleo e Gas	oil&gas
Petróleo e Gas	oilfield
Petróleo e Gas	oilwell
Petróleo e Gas	OMV Group
Petróleo e Gas	ONGC
Petróleo e Gas	opep
Petróleo e Gas	PDVSA
Petróleo e Gas	Pemex
Petróleo e Gas	Pertamina
Petróleo e Gas	petro
Petróleo e Gas	Petrobras
Petróleo e Gas	petrochemical
Petróleo e Gas	petroleum
Petróleo e Gas	petrolium
Petróleo e Gas	Petronas
Petróleo e Gas	Phillips 66
Petróleo e Gas	PKN Orlen
Petróleo e Gas	PTT
Petróleo e Gas	refinery
Petróleo e Gas	Reliance Industries
Petróleo e Gas	Repsol
Petróleo e Gas	Rosneft
Petróleo e Gas	Royal Dutch Shell
Petróleo e Gas	Saudi Aramco
Petróleo e Gas	Schlumberger
Petróleo e Gas	SOCAR

Petróleo e Gas	Sonatrach
Petróleo e Gas	Suncor Energy
Petróleo e Gas	Total SA
Petróleo e Gas	Valero Energy
Telecom	5g
Telecom	A1 Telekom
Telecom	Advanced Info Service
Telecom	América Móvil
Telecom	AT&T
Telecom	BCE
Telecom	Bharti Airtel
Telecom	Brasil Telecom
Telecom	BT Group
Telecom	Cable One
Telecom	CenturyLink
Telecom	Charter Communications
Telecom	China Communications Services
Telecom	China Telecom
Telecom	China Unicom
Telecom	Chunghwa Telecom
Telecom	Cincinnati Bell
Telecom	claro
Telecom	Comcast
Telecom	Cox Communications
Telecom	critical information infrastructures
Telecom	Crown Castle International
Telecom	Dataprev
Telecom	Deutsche Telekom
Telecom	digital infrastructure
Telecom	digital services
Telecom	Eir
Telecom	Etisalat
Telecom	Frontier Communications
Telecom	Granite Telecommunications
Telecom	GTT Communications
Telecom	IDT Corporation
Telecom	internet exchange point
Telecom	internet infrastructure
Telecom	Jio
Telecom	KDDI
Telecom	KPN
Telecom	KT Corporation
Telecom	LG Uplus
Telecom	Maxis Communications
Telecom	Mediacom
Telecom	MegaFon
Telecom	Millicom
Telecom	Mobile TeleSystems
Telecom	MTN Group
Telecom	Nippon Telegraph and Telephone
Telecom	Oi Telecom
Telecom	Ooredoo
Telecom	Optus
Telecom	Orange
Telecom	OTE
Telecom	PLDT
Telecom	Proximus
Telecom	RCS&RDS
Telecom	Rogers Communications
Telecom	satellite communication
Telecom	Saudi Telecom
Telecom	Serpro
Telecom	SingTel
Telecom	SK Telecom
Telecom	Softbank
Telecom	Sprint
Telecom	Swisscom
Telecom	Taiwan Mobile
Telecom	Tata Communications
Telecom	Telecom Argentina

Telecom	telecom company
Telecom	Telecom Italia
Telecom	telecom provider
Telecom	telecommunication provider
Telecom	Telefónica
Telecom	Telemar
Telecom	Telenor
Telecom	Telephone and Data Systems
Telecom	Telia Company
Telecom	Telkom Indonesia
Telecom	Telstra
Telecom	Telus
Telecom	Turk Telekom
Telecom	Turkcell
Telecom	United Internet
Telecom	Verizon Communications
Telecom	VimpelCom
Telecom	Virgin Media
Telecom	Vivendi
Telecom	Vivo
Telecom	Vocus Group
Telecom	Vodafone
Telecom	Vonage
Telecom	Windstream Holdings
Telecom	Zain
Telecom	Zayo Group
Automotivo	audi
Automotivo	automobile
Automotivo	automotive
Automotivo	BAIC
Automotivo	bmw
Automotivo	Changan
Automotivo	chevrolet
Automotivo	chrysler
Automotivo	citroen
Automotivo	Daimler
Automotivo	Dongfeng Motor
Automotivo	electric car
Automotivo	FCA
Automotivo	ford
Automotivo	Geely
Automotivo	General Motors
Automotivo	Groupe PSA
Automotivo	Honda
Automotivo	Hyundai
Automotivo	mazda
Automotivo	mitsubishi
Automotivo	motor
Automotivo	nissan
Automotivo	peugeot
Automotivo	renault
Automotivo	SAIC
Automotivo	smart car
Automotivo	subaru
Automotivo	suzuki
Automotivo	tesla
Automotivo	toyota
Automotivo	volkswagen
Transporte Ferroviário	freight
Transporte Ferroviário	locomotive
Transporte Ferroviário	railway
Transporte Ferroviário	terminus
Transporte Ferroviário	train
Transporte Ferroviário	train station
Transporte Ferroviário	tram
Transporte Ferroviário	tramway
Transporte Ferroviário	viaduct
Água	Aegea
Água	Cedae
Água	contaminated
Água	Copasa
Água	drain
Água	effluent
Água	groundwater
Água	irrigation
Água	landfill
Água	pond
Água	potable
Água	rainwater
Água	reservoir

Água	sabesp
Água	Saneago
Água	Sanepar
Água	sediment
Água	septic
Água	stormwater
Água	sump
Água	wastewater
Água	water dam
Água	water treatment
Esportes	athletic
Esportes	baseball
Esportes	basket
Esportes	basketball
Esportes	championship
Esportes	football
Esportes	gymnastics
Esportes	handball
Esportes	hockey
Esportes	lacrosse
Esportes	nba
Esportes	ncaa
Esportes	nfl
Esportes	olympic
Esportes	olympics
Esportes	pan-american
Esportes	rugby
Esportes	soccer
Esportes	softball
Esportes	tennis
Esportes	volleyball
Esportes	world cup
Esportes	wrestling
Eleição	ballot
Eleição	candidate
Eleição	caucus
Eleição	democratic
Eleição	democratic national committee
Eleição	democratic party
Eleição	elected
Eleição	election
Eleição	electoral
Eleição	polling
Eleição	polls
Eleição	primaries
Eleição	reelection
Eleição	referendum
Eleição	republican
Eleição	vote
Eleição	voting poll
Nuclear	atomic
Nuclear	beryllium
Nuclear	cesium
Nuclear	deuterium
Nuclear	fissile
Nuclear	fission
Nuclear	isotope
Nuclear	neutron
Nuclear	nuclar energy
Nuclear	nuclear
Nuclear	nuclear plant
Nuclear	nuclear power
Nuclear	nuclear reactor
Nuclear	plutonium
Nuclear	radioactive
Nuclear	radionuclides
Nuclear	reactor
Nuclear	thermonuclear
Nuclear	thorium
Nuclear	tritium
Nuclear	uranium
Nuclear	warhead
Nuclear	yellow cake
Criptomoedas	bitcoin
Criptomoedas	bitcoin-cash
Criptomoedas	bnktothefuture
Criptomoedas	btc
Criptomoedas	cashless
Criptomoedas	crypto trader
Criptomoedas	crypto wallet
Criptomoedas	cryptocurrency
Criptomoedas	cryptocurrency companies

Criptomoedas	cryptocurrency exchanges
Criptomoedas	dash
Criptomoedas	eth
Criptomoedas	ethereum
Criptomoedas	foxbit
Criptomoedas	keepkey
Criptomoedas	ledger
Criptomoedas	litecoin
Criptomoedas	mercado bitcoin
Criptomoedas	micropayments
Criptomoedas	monero
Criptomoedas	padlock
Criptomoedas	stash
Criptomoedas	trezor
Criptomoedas	wallet
Criptomoedas	xmr
Criptomoedas	zcash

Ataque Estatal	government-affiliated
Ataque Estatal	state-sponsored
Ataque Estatal	state sponsored
Ataque Estatal	nation-state
Ataque Estatal	state-directed
Ataque Estatal	state directed

Vitimas attacked

Vitimas number of attacks

Vitimas attacks per user

Vitimas targeted

Vitimas victim

Vitimas victims

Vitimas target

Vitimas targets

Campanhas	1.Php Group
Campanhas	Agent.Btz
Campanhas	Aided Frame Aided Direction
Campanhas	Anthem Hack
Campanhas	Anunak
Campanhas	APT1
Campanhas	APT12
Campanhas	APT17
Campanhas	APT2
Campanhas	APT28
Campanhas	APT29
Campanhas	APT3
Campanhas	APT30
Campanhas	APT Anunak
Campanhas	APT Banechant
Campanhas	APT Blue Termite
Campanhas	APT Case RUAG
Campanhas	APT Etso
Campanhas	APT Farm
Campanhas	APT Hellsing
Campanhas	APT Icefog
Campanhas	APT Inception
Campanhas	APT Naikon
Campanhas	APT Pacifier
Campanhas	APT ProjectSauron
Campanhas	APT Seinup
Campanhas	APT TOCS
Campanhas	APT Turla
Campanhas	Arachnophobia
Campanhas	Arid Viper
Campanhas	Armageddon
Campanhas	Asruex
Campanhas	Aurora
Campanhas	Axiom
Campanhas	Backdoor Cadelspy and Remexi
Campanhas	Banechant
Campanhas	BBSRAT
Campanhas	Beebus
Campanhas	Belling the BEAR
Campanhas	Bigboss and Sillygoose
Campanhas	BLACKCOFFEE
Campanhas	Blackenergy
Campanhas	BlackEnergy
Campanhas	Blackfly
Campanhas	BlackGear
Campanhas	Black Vine

Campanhas Black Vine Group
Campanhas Blockbuster
Campanhas Blue Termite
Campanhas Bookworm Trojan
Campanhas Buckeye
Campanhas Buckeye Group
Campanhas Bugdrop
Campanhas Butterfly
Campanhas Byebye Shell
Campanhas Cadelspy
Campanhas Carbanak
Campanhas Careto
Campanhas Case RUAG
Campanhas CC Blog Malware
Campanhas ChChes
Campanhas Chinastrats
Campanhas Clandestine Fox
Campanhas Clandestine Wolf
Campanhas Cleaver
Campanhas Cloud Atlas
Campanhas CloudyOmega
Campanhas C-Major
Campanhas Cmstar Downloader
Campanhas Comfoo
Campanhas Comment Crew
Campanhas Comment Group
Campanhas Comment Panda
Campanhas CopyKitten
Campanhas Cozy Bear
Campanhas Cozycar
Campanhas Cozyduke
Campanhas Crouching Tiger
Campanhas Crude Faux
Campanhas Dances of White Elephant
Campanhas Darkcomet
Campanhas DarkHotel
Campanhas DarkSeoul
Campanhas DeathClick
Campanhas Deception Project
Campanhas Deep Panda
Campanhas Deputydog
Campanhas Derusbi
Campanhas Desert Falcons
Campanhas Dino
Campanhas DNC Intrusion
Campanhas Double Tap
Campanhas Dragonfly
Campanhas DragonOK
Campanhas Dropping Elephant
Campanhas Dukes
Campanhas Duqu
Campanhas Duqu 2.0
Campanhas Duststorm
Campanhas Dusty Sky
Campanhas DynCalc
Campanhas Elderwood Project
Campanhas Electric Powder
Campanhas Elirks Variants
Campanhas Emissary Panda
Campanhas Emissary Trojan
Campanhas Energetic Bear
Campanhas Ephemeral Hydra
Campanhas Equation
Campanhas Equationdrug
Campanhas Equation Group
Campanhas Etso
Campanhas Etumbot
Campanhas Evil Bunny
Campanhas Fakem RAT
Campanhas Fancy Bear
Campanhas Farm
Campanhas Fin4
Campanhas FIN7
Campanhas FinFisher
Campanhas Flamer
Campanhas Flying Kitten
Campanhas Four Element Sword Engagement Group
Campanhas Gamaredon Group
Campanhas Gauss
Campanhas Gaza Cybergang Group

Campanhas Georbot
Campanhas Georbot Botnet
Campanhas Gh0st RAT
Campanhas Gholee
Campanhas Ghost Dragon
Campanhas Ghostnet
Campanhas GlassRAT
Campanhas Gothic Panda
Campanhas Grabit
Campanhas Greedywonk
Campanhas Grizzly Steppe
Campanhas Groundbait
Campanhas Group-3390
Campanhas Group5
Campanhas Group 72
Campanhas Group Nitro
Campanhas Group Wekby
Campanhas HackingTeam
Campanhas Hammertoss
Campanhas Hangover
Campanhas Havex Trojan
Campanhas Heartbeat
Campanhas Hellsing
Campanhas Hidden Dragon
Campanhas Hidden Lynx
Campanhas Hikit
Campanhas Hong Kong Attacks
Campanhas Hopscotch
Campanhas Hopscotch And Legspin
Campanhas Houdini
Campanhas Htran
Campanhas Hunting Libyan Scorpions
Campanhas Hunting The Shadows
Campanhas Hydraq
Campanhas Icefog
Campanhas IDF Phishing
Campanhas Iexpl0Re
Campanhas IHEATE
Campanhas Inception
Campanhas Inception Framework
Campanhas INOCNATION
Campanhas Iranian Threat Agent
Campanhas Iron Dome
Campanhas Irongate
Campanhas Iron Twilight
Campanhas Ixeshe
Campanhas Ke3chang
Campanhas KeyBoy
Campanhas Kimsuky
Campanhas KingSlayer
Campanhas Kittens
Campanhas Korean Maldoc
Campanhas Korplug
Campanhas Kraken
Campanhas KungFu
Campanhas Lazarus
Campanhas Legspin
Campanhas Linux Moose
Campanhas Lotusblossom
Campanhas Lotus Blossom
Campanhas Luckycat
Campanhas Lurid Downloader
Campanhas Mac A4
Campanhas Machete
Campanhas Madi Infostealers
Campanhas Magic Hound
Campanhas Manul
Campanhas Mask
Campanhas Maudi
Campanhas MBR Destruction
Campanhas menuPass
Campanhas Miniduke
Campanhas Mirage
Campanhas Mirage Campaign
Campanhas Moafee
Campanhas Modified Binaries Tor
Campanhas Mofang
Campanhas Molerats
Campanhas Monju Incident

Campanhas Moonlight
Campanhas Moonsoon
Campanhas Msnmm
Campanhas Msnmm Campaigns
Campanhas MSUpdater
Campanhas Msupdater Trojan
Campanhas Naikon
Campanhas Neodymium
Campanhas NetTraveler
Campanhas New MoonWind
Campanhas Night Dragon
Campanhas njRAT
Campanhas NSO Group
Campanhas Numbered Panda
Campanhas Oceanlotus
Campanhas Oil Tanker
Campanhas Operation Arachnophobia
Campanhas Operation Arid Viper
Campanhas Operation Armageddon
Campanhas Operation Aurora
Campanhas Operation Beebus
Campanhas Operation Blockbuster
Campanhas Operation Bugdrop
Campanhas Operation Clandestine Fox
Campanhas Operation Clandestine Wolf
Campanhas Operation Cleaver
Campanhas Operation CloudyOmega
Campanhas Operation C-Major
Campanhas Operation DeathClick
Campanhas Operation Deputydog
Campanhas Operation Double Tap
Campanhas Operation Duststorm
Campanhas Operation Electric Powder
Campanhas Operation Ephemeral Hydra
Campanhas Operation Greedywonk
Campanhas Operation Groundbait
Campanhas Operation Hangover
Campanhas Operation Ke3chang
Campanhas Operation Ke3Chang
Campanhas Operation Kimsuky
Campanhas Operation Lotus Blossom
Campanhas Operation Manul
Campanhas Operation Maudi
Campanhas Operation Oil Tanker
Campanhas Operation Poisoned Handover
Campanhas Operation Poisoned Helmand
Campanhas Operation Poisoned Hurricane
Campanhas Operation Potao Express
Campanhas Operation Quantum Entanglement
Campanhas Operation Russiandoll
Campanhas Operation Saffron Rose
Campanhas Operation Snowman
Campanhas Operation Stteam
Campanhas Operation Toohash
Campanhas Operation Tropic Trooper
Campanhas OrcaRAT
Campanhas Pacifier
Campanhas Packrat
Campanhas Patchwork
Campanhas Pawn Storm
Campanhas Penquin
Campanhas PinkPanther
Campanhas Pirpi
Campanhas Pitty Tiger

Campanhas Platinum
Campanhas Plugx
Campanhas Handover Poisoned
Campanhas Helmand Poisoned
Campanhas Hurricane Poisoned
Campanhas Poison Ivy
Campanhas Poseidon Group
Campanhas Potao Express
Campanhas Prince of Persia
Campanhas Camerashy Project
Campanhas Project Cobra
Campanhas ProjectSauron
Campanhas Promethium
Campanhas Neodymium Promethium and
Campanhas PupyRAT
Campanhas Putter Panda
Campanhas Entanglement Quantum
Campanhas Quedagh
Campanhas Rat In A Jar
Campanhas Red October
Campanhas Regin
Campanhas Regin Plataform
Campanhas Remexi
Campanhas Roaming Tiger
Campanhas Rocket Kitten
Campanhas Rotten Tomato
Campanhas Response RSA Incident
Campanhas RUAG
Campanhas Russiandoll
Campanhas SafeNet
Campanhas Saffron Rose
Campanhas Sakula
Campanhas Sakula Malware
Campanhas Sakula Reloaded
Campanhas Sandworm
Campanhas SBDH Toolkit
Campanhas Scanbox
Campanhas Scarab
Campanhas ScarCruft Group
Campanhas Scarlet Mimic
Campanhas Sednit
Campanhas Seinup
Campanhas Dagger Seven Pointed
Campanhas Cloud Shadows In The
Campanhas Shady RAT
Campanhas Shamoon
Campanhas Shell Crew
Campanhas Shiqiang Gang
Campanhas Elephants Shooting
Campanhas Sidewinder
Campanhas Siesta
Campanhas Sin Digoo Affair
Campanhas Skeleton Key
Campanhas Sk Hack
Campanhas Skywiper
Campanhas SMB Worm
Campanhas SMB Worm Tool
Campanhas Snake Campaign
Campanhas Trojan Sneakernet
Campanhas Snowman
Campanhas Sofacy
Campanhas Stealth Falcon
Campanhas StrongPity
Campanhas STRONTIUM
Campanhas Stteam
Campanhas Stuxnet
Campanhas Suckfly
Campanhas Campaign Sunshop
Campanhas Surtr
Campanhas Syrian Malware
Campanhas T9000
Campanhas Taidoor Trojan
Campanhas Teamspy Story
Campanhas Terminator RAT
Campanhas Terracotta VPN
Campanhas TG-0110
Campanhas TG-2889

Campanhas	TG-4127	Campanhas	Trochilus	Campanhas	WebMasters
Campanhas	Thamar Reservoir	Campanhas	Trochilus and New MoonWind RAT	Campanhas	Wekby
Campanhas 0110	Threat Group-	Campanhas	Tropic Trooper	Campanhas Mac A4	Whitepaper APT
Campanhas 2889	Threat Group	Campanhas	Tsar Team	Campanhas	Wicked Rose
Campanhas 4127	Threat Group-	Campanhas	Turla	Campanhas	Wild Neutron
Campanhas	Tibetan Attacks	Campanhas	UPS Team	Campanhas	Winnti
Campanhas	TOCS	Campanhas	Uroburos	Campanhas	Wiper Malware
Campanhas	Toohash	Campanhas	Vinself	Campanhas	WitchCoven
Campanhas and SLServer	Tracking UP007	Campanhas	Voho	Campanhas	Xslcmd Backdoor
Campanhas	Transparent Tribe	Campanhas	Voho Campaign	Campanhas	XtremeRat
Campanhas	Travnet	Campanhas	Volatile Cedar	Campanhas	Zombie Zero
		Campanhas	Waterbug	Campanhas	Zoxpng
		Campanhas	Waterbug Group	Campanhas	Zxshell

APPENDIX E - REFERENCED TECHNICAL REPORTS

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