Stantinko: A massive adware campaign operating covertly since 2012

welivesecurity.com/2017/07/20/stantinko-massive-adware-campaign-operating-covertly-since-2012/

July 20, 2017

Since the beginning of 2017, ESET has been conducting an investigation into a complex threat mainly targeting Russia and Ukraine. Stantinko has stood out.

Overview

Since the beginning of 2017, ESET researchers have been conducting an investigation into a complex threat mainly targeting Russia and Ukraine. Standing out because of its prevalence and its sophistication, Stantinko turned out to be quite a puzzle to solve. Slowly putting the pieces together, the global picture began to take shape, exposing a massive adware campaign affecting approximately half a million users.

Making heavy use of code encryption and rapidly adapting so as to avoid detection by anti-malware, Stantinko's operators managed to stay under the radar for at least the last five years, attracting very little attention to their operations.

To infect a system, they trick users looking for pirated software into downloading executable files sometimes disguised as torrents. FileTour, Stantinko's initial installation vector, then loudly installs a lot of software to distract the user while it covertly installs Stantinko's first service in the background. Video 1 shows a fictive user running the malicious executable.

Video 1. Video of a user downloading and running the malicious file

Watch Video At:

https://youtu.be/OYncoW7X5wA

Stantinko's operators control a huge botnet that they monetize mainly by installing malicious browser extensions that perform ad injection and click fraud. However, they don't stop there. The malicious Windows services they install enable them to execute *anything* on the infected host. We've seen them being used to send a fully featured backdoor, a bot performing massive searches on Google, and a tool performing brute-force attacks on Joomla and WordPress administrator panels in an attempt to compromise and potentially resell them.

Figure 1 shows the full Stantinko threat from the infection vector to the final persistent services and related plugins.

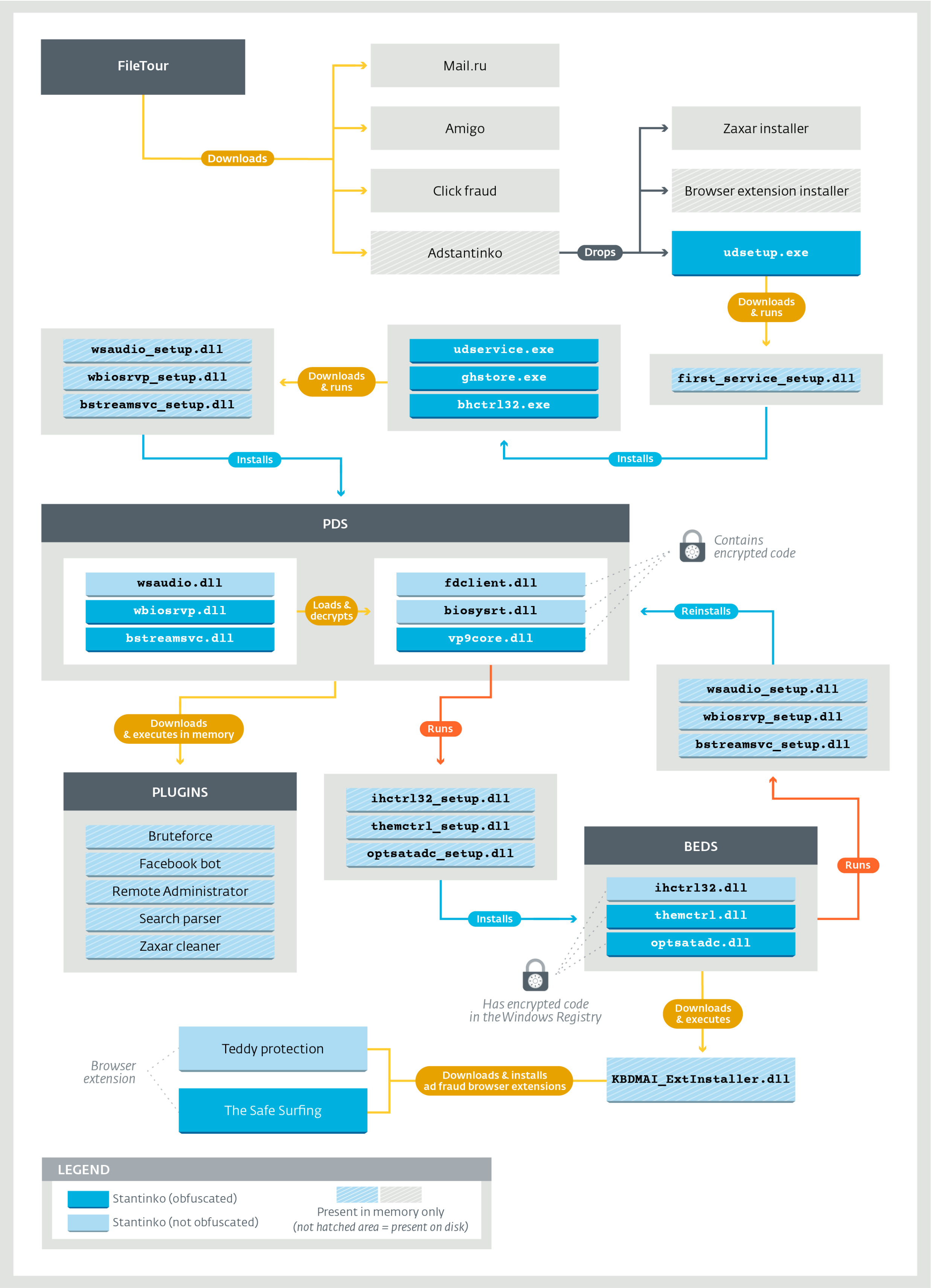


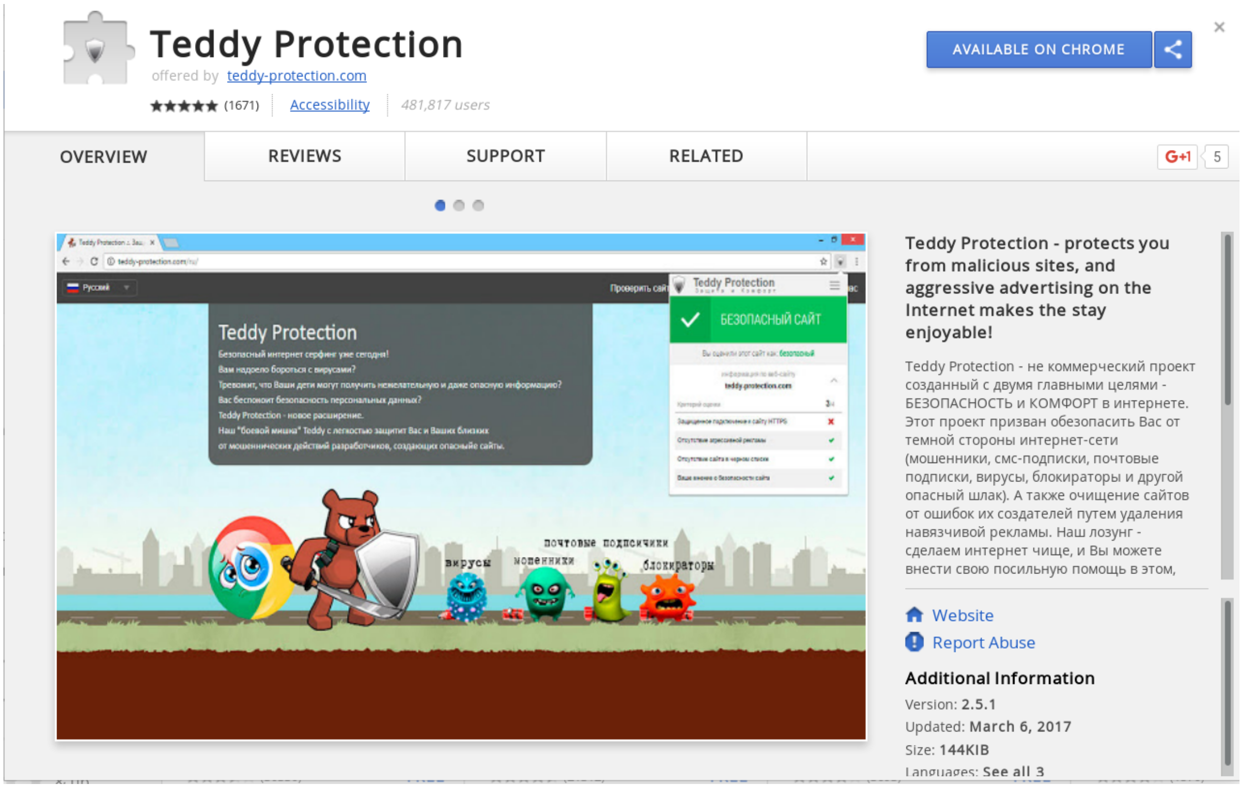
Figure 1 – Full diagram of the Stantinko threat

Key features

Stantinko stands out in the way it circumvents antivirus detection and thwarts reverse engineering efforts to determine if it exhibits malicious behavior. To do so, its authors make sure multiple parts are needed to conduct a complete analysis. There are always two components involved: a loader and an encrypted component. The malicious code is concealed in the encrypted component that resides either on the disk or in the Windows Registry. This code is loaded and decrypted by a benign-looking executable. The key to decrypt this code is generated on a per-infection basis. Some components use the bot identifier and others use the volume serial number from its victim PC’s hard drive. Making reliable detections based on the non-encrypted components is a very difficult task, since artifacts residing on the disk do not expose malicious behavior until they’re executed.

Moreover, Stantinko has a powerful resilience mechanism. After a successful compromise, the victim’s machine has two malicious Windows services installed, which are launched at system startup. Each service has the ability to reinstall the other in case one of them is deleted from the system. Thus, to successfully uninstall this threat, both services must be deleted at the same time. Otherwise, the C&C server can send a new version of the deleted service that isn’t detected yet or that contains a new configuration.

Stantinko’s main functionality is to install malicious browser extensions named *The Safe Surfing* and *Teddy Protection*. Both extensions were available on the Chrome Web Store during our analysis. At first sight, they look like legitimate browser extensions that block unwanted URLs. However, when installed by Stantinko, the extensions receive a different configuration containing rules to perform click fraud and ad injection. In Video 2, the *The Safe Surfing* extension is installed. The user is redirected when clicking a link on the Rambler search engine.



Teddy Protection

offered by teddy-protection.com

★★★★★ (1671) | Accessibility | 481,817 users

AVAILABLE ON CHROME

OVERVIEW | REVIEWS | SUPPORT | RELATED

G+1 5

Teddy Protection

Безопасный интернет серфинг уже сегодня!
Вам надоело бороться с вирусами?
Тревожит, что Ваши дети могут получить нежелательную и даже опасную информацию?
Вас беспокоит безопасность персональных данных?
Teddy Protection - новое расширение.
Наш "боевой мишка" Teddy с легкостью защитит Вас и Ваших близких
от мошеннических действий разработчиков, создающих опасныйе сайты.

Teddy Protection - protects you from malicious sites, and aggressive advertising on the Internet makes the stay enjoyable!

Teddy Protection - не коммерческий проект созданный с двумя главными целями - БЕЗОПАСНОСТЬ и КОМФОРТ в интернете. Этот проект призван обезопасить Вас от темной стороны интернет-сети (мошенники, смс-подписки, почтовые подписки, вирусы, блокираторы и другой опасный шлак). А также очищение сайтов от ошибок их создателей путем удаления навязчивой рекламы. Наш лозунг - сделаем интернет чище, и Вы можете внести свою посильную помощь в этом,

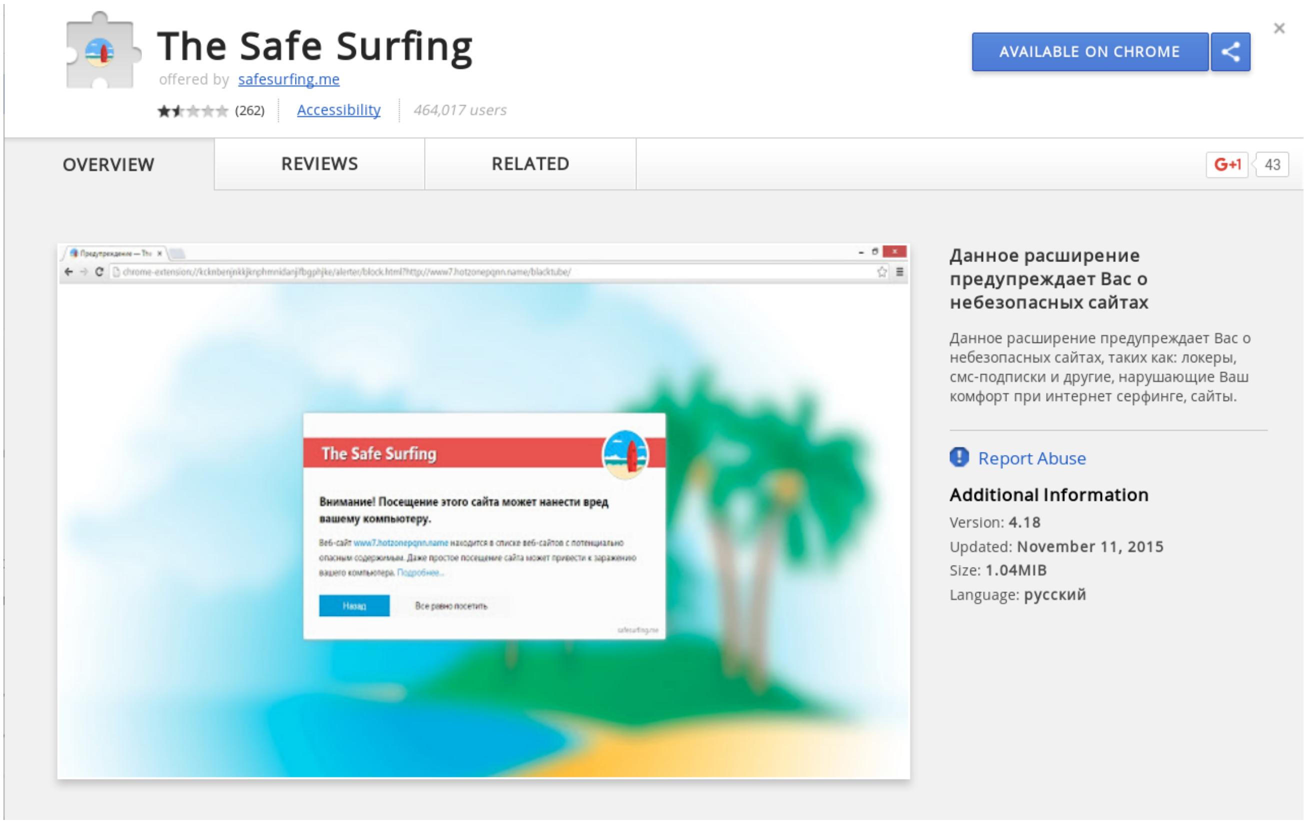
Website

Report Abuse

Additional Information

Version: 2.5.1
Updated: March 6, 2017
Size: 144KiB
Languages: See all 3

Figure 2 – Teddy Protection on the Chrome Web Store



The Safe Surfing

offered by safesurfing.me

★★☆☆☆ (262) | Accessibility | 464,017 users

AVAILABLE ON CHROME

OVERVIEW | REVIEWS | RELATED

G+1 43

Предупреждение — The
chrome-extension://kcknbenjnkkjlenphmnidanjfbgphjke/alerter/block.html?http://www7.hotzonepqnn.name/blacktube/
The Safe Surfing
safesurfing.me

Внимание! Посещение этого сайта может нанести вред вашему компьютеру.

Веб-сайт www7.hotzonepqnn.name находится в списке веб-сайтов с потенциально опасным содержимым. Даже простое посещение сайта может привести к заражению вашего компьютера. Подробнее...

Назад | Все равно посетить

Данное расширение предупреждает Вас о небезопасных сайтах

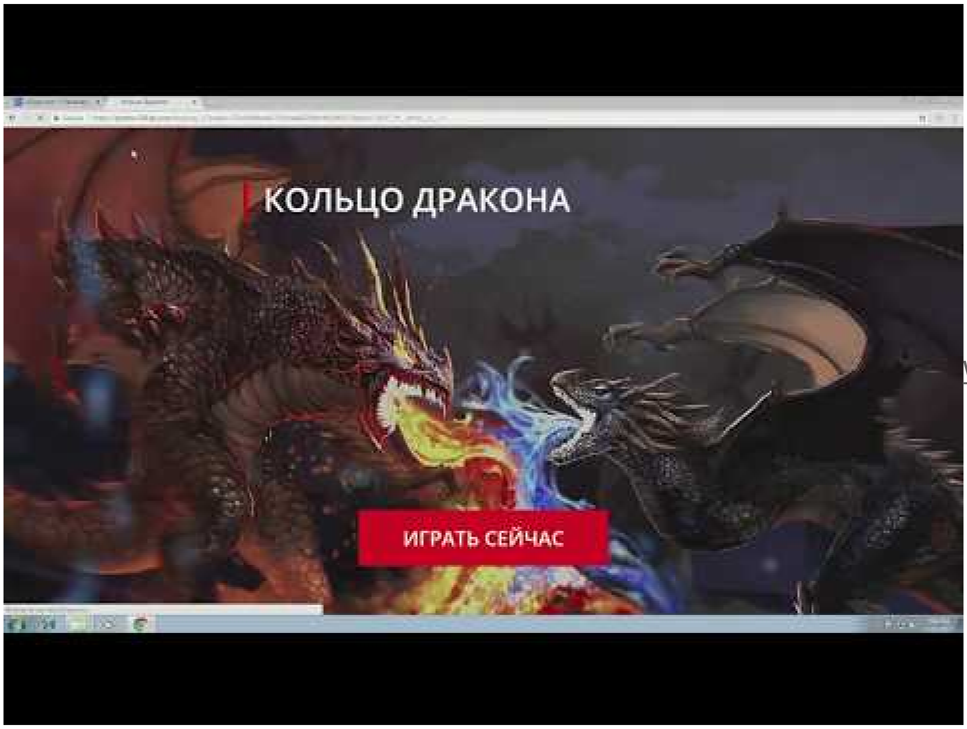
Данное расширение предупреждает Вас о небезопасных сайтах, таких как: локеры, смс-подписки и другие, нарушающие Ваш комфорт при интернет серфинге, сайты.

Report Abuse

Additional Information

Version: 4.18
Updated: November 11, 2015
Size: 1.04MiB
Language: русский

Video 2. Search traffic redirection on Rambler website



Watch Video At:

https://youtu.be/FirDn0O-PTY

Stantinko is a modular backdoor. Its components embed a loader allowing them to execute any Windows executable sent by the C&C server directly in memory. This feature is used as a very flexible plugin system allowing the operators to execute anything on an infected system. Table 1 is a description of known Stantinko plugins.

Table 1. Known Stantinko Plugins

Module Name	Analysis
Brute-force	Distributed dictionary-based attack on Joomla and WordPress administrative panels.
Search Parser	Performs massive distributed and anonymous searches on Google to find Joomla and WordPress websites. It uses compromised Joomla websites as C&C servers.
Remote Administrator	Backdoor that implements a full-range of actions from reconnaissance to data exfiltration.
Facebook Bot	Bot performing fraud on Facebook. Its capabilities include creating accounts, liking picture or pages, and adding friends.

Monetization

Although the developers of Stantinko use methods that are most often seen in APT campaigns, their final aim is to make money. Thus, they are present in one of the most profitable cybercrime markets.

First, these days click fraud is a major source of revenues in the cybercrime ecosystem. Research conducted by the firm White Ops and the Association of National Advertisers (US) has estimated the global cost of click fraud in 2017 will be $6.5 billion.

As explained above, Stantinko installs two browser extensions, *The Safe Surfing* and *Teddy Protection,* which inject advertisements or redirect the user. It allows the Stantinko operators to be paid for the traffic they provide to advertisers. Figure 4 is a summary of the redirection process.

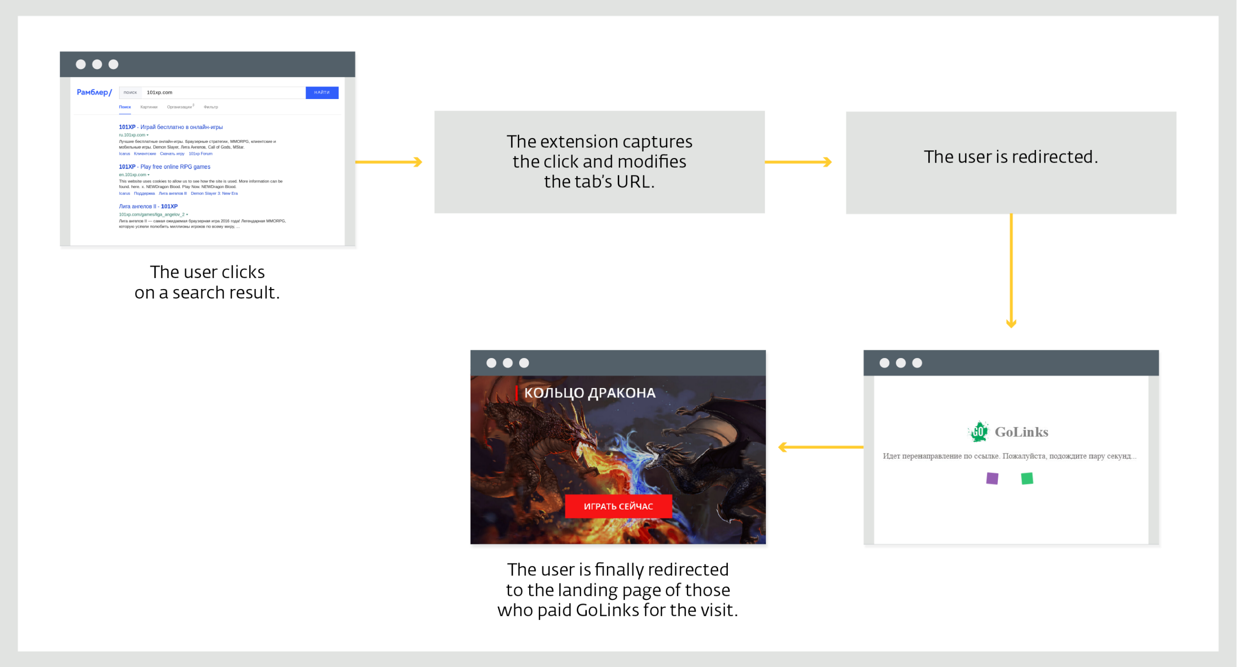

Рамблер/
101xp.com
101XP - Играй бесплатно в онлайн-игры
101XP - Play free online RPG games
Лига ангелов II - 101XP
The user clicks on a search result.
The extension captures the click and modifies the tab's URL.
The user is redirected.
GoLinks
Идет перенаправление по ссылке. Пожалуйста, подождите пару секунд...
КОЛЬЦО ДРАКОНА
ИГРАТЬ СЕЙЧАС
The user is finally redirected to the landing page of those who paid GoLinks for the visit.

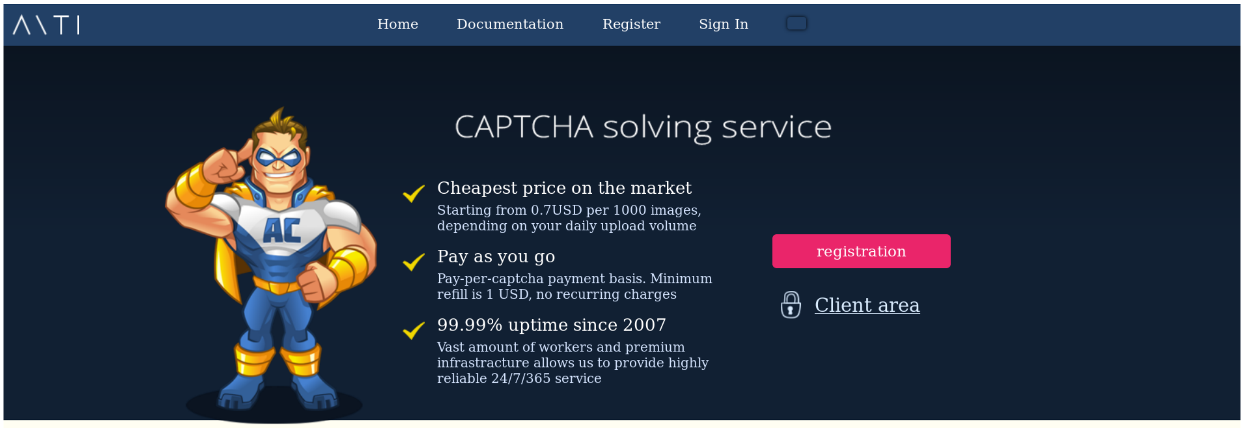
Figure 4 – Click fraud redirection process

Our study also shows that they are really close to the advertisers. In some cases, including the example in Figure 4, the user will reach the advertiser's website directly after the Stantinko-owned ad network. On the other hand, traditional click-fraud malware relies on a series of redirections between several ad networks to launder their malicious traffic. This shows that not only are the Stantinko operators able to develop highly stealthy malware, but they are also able to abuse the traditional ad-serving economy without getting caught.

Second, they are also trying to gain fraudulent access to the administrative accounts of Joomla and WordPress websites. Their attack relies on a brute-force attack using a list of credentials. The aim is to guess the password by trying tens of thousands of different credentials. Once compromised, these accounts can be resold on the underground market. Then, they could be used to redirect site visitors to exploit kits elsewhere or to host malicious content.

Third, our study also shows how Stantinko perpetrates social network fraud. This type of fraud has already been described by ESET researchers in the Dissecting Linux/Moose white paper. It is really profitable as, for instance, prices are around $15 per 1000 Facebook likes even though they are actually generated by fake accounts controlled by a botnet.

The Stantinko operators developed a plugin that can interact with Facebook. It is able, among other things, to create accounts, 'like' a page or add a friend. To bypass Facebook's CAPTCHA, it relies on an online anti-CAPTCHA service pictured in Figure 5. The size of the Stantinko botnet is an advantage as it allows its operators to distribute the queries among all the bots. Thus, it is more difficult for Facebook to detect this type of fraud.



CAPTCHA solving service

✓ Cheapest price on the market
Starting from 0.7USD per 1000 images, depending on your daily upload volume

✓ Pay as you go
Pay-per-captcha payment basis. Minimum refill is 1 USD, no recurring charges

✓ 99.99% uptime since 2007
Vast amount of workers and premium infrastructure allows us to provide highly reliable 24/7/365 service

Figure 5 – Anti-CAPTCHA service used by Stantinko

Conclusion

Stantinko is a botnet mostly dedicated to ad-related fraud. Using advanced techniques such as code encryption and storing code in the Windows Registry, its operators were able to stay under the radar for the past five years. This led to a botnet of approximately 500,000 infected machines.

They were also able to publish their two ad injection browser extensions on the Chrome Web Store. One of them was first released on the Chrome Web Store in November, 2015.

Even though it isn't noticeable to the user, due to the absence of CPU intensive tasks, Stantinko is a major threat, as it provides a large source of fraudulent revenue to cybercriminals. Moreover, the presence of a fully featured backdoor allows the operators to spy on all the victimized machines.

For a comprehensive technical analysis of Stantinko, refer to our white paper. The Indicators of Compromise are provided on our GitHub account. For any inquiries, or to make sample submissions related to the subject, contact us at: threatintel@eset.com.

20 Jul 2017 - 03:00PM

Sign up to receive an email update whenever a new article is published in our Ukraine Crisis – Digital Security Resource Center

Newsletter

Discussion