

# Shifts in Underground Markets Past, Present, and Future

Mayra Rosario Fuentes





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**Appendix of Prices** 

This research paper presents a wide-ranging view of dark web marketplaces and underground cybercriminal forums. It delves into notable trends and market movements within these selling environments. The first section looks back, focusing on relevant data from Trend Micro's Cybercriminal Underground Economy Series (2015 -2016).<sup>1</sup> Then, we revisit those same spaces in 2019. Finally, we share predictions on the goods and services we expect to be on the rise in the next three years.

#### What changed?

In 2019, changes in the types of commodities being sold underground were in line with changes in the public market; for example, there was a proliferation of IoT botnets and a boom in fake news services. We also found an abundance of stolen account credentials, credit cards, and gaming-related goods. Aimbots, wallhacks, and skins services became popular offerings.

Methods of communication also changed. Sellers used to communicate through direct messages and Telegram. However, in 2019, Discord became the popular method of communication. Underground forums also began to move to private Discord channels for transactions.

Many sellers also shifted their selling platforms and began using e-commerce shops run by an underground forum administrator. Law enforcement agencies (LEA) shut down many popular dark web marketplaces that once dominated the underground landscape. User paranoia grew after new marketplaces closed within months after they were set up.

The current marketplace environment is still quite volatile. Trust has become such a critical issue that a search engine has been created to verify sellers on top dark web marketplaces. New dark web email businesses have also appeared to make sure communication is private and anonymous.

According to an academic study on the cybercrime economy, cybercrime (which includes ransomware, sales of counterfeit goods, data theft, and others) generates around US\$1.5 trillion in annual revenue.<sup>2</sup> This widespread business outpaces top global revenue earners like Apple (US\$260 billion in 2019),<sup>3</sup> Saudi Aramco (US\$356 billion in 2018),<sup>4</sup> and Amazon (US\$281 billion in 2019).<sup>5</sup>

English and Russian remain the dominant languages in the cybercrime market. And although many markets have been taken down by law enforcement agencies, we found that some popular hacking and cybercrime forums were still operating at the start of 2020, namely: Exploit[.]im (forum moves around and also uses Exploit[.]in), Hackforums, Nulled, Raid Forums and Joker's Stash. We also found that their membership numbers continued to increase.

The cybercriminal underground is not as separated by language as much as it was five years ago. We spotted overlapping posts and cross-market advertising in forums of different languages. Russian actors regularly participated in English and Arabic forums, while Spanish actors participated in English forums. It seems cybercriminals have adopted a more global view and found that advertising in multiple language forums is a must if they wanted to earn more money. Still, the cybercriminal underground economy remains diverse, and different markets carry unique goods and services for the country or region to which they cater.

Prices for different commodities have fluctuated since our 2015 reports on the Russian and English underground. In 2015, generic botnets started selling at around US\$200 in Russian underground forums. Generic botnet prices today cost around US\$5 a day, and prices for builders start at US\$100. United States credit cards were sold at US\$20 in 2015, but prices start at US\$1 in 2020. High-balance credit cards are selling for over US\$500 in 2020. Meanwhile, monthly crypting services dropped to around US\$20.

The cost of some services and goods remained relatively stable. Ransomware has not changed ransomware-as-service prices still start at US\$5. Crypterlocker, which has been around since 2013, continues to demand a high price (around \$100). Scanned document services, such as copies of driver's licenses, passports, and bill statements, still start at US\$5 — similar to the prices in 2015. Similarly, the price of remote access tools (RAT) did not change, starting at US\$2 for malware-as-a-service (MaaS). NJRat, which has been around since 2012, continues to be found in multiple language forums for free. Online account credentials are still priced at around US\$1. The price of spam services has not changed, but they are now sending SMS rather than emails.

One notable trend we observed is accessible MaaS services for RATS, crypters, botnets, and ransomware. The MaaS service model delivers a complete package: infrastructure, support, and updates. These services are also affordable, with some MaaS offerings starting at around US\$20 a month. There is virtually no pricing barrier, and the technical skills that buyers need to have to setup attacks have been greatly reduced.

# What does the Underground Market Offer?

Regular monitoring of the cybercriminal underground shows us that the range of available goods and services has not radically changed. Over ten years, underground market staples—stolen accounts, fake documents, credit card dumps, remote access tools, ransomware, and crypters—remain consistently available. Currently, the top offerings are stolen accounts (banking, social media, streaming services and music services), gaming-related content, and credit cards. Point of sale (POS) and ATM malware sales account for 6% of all the offerings.

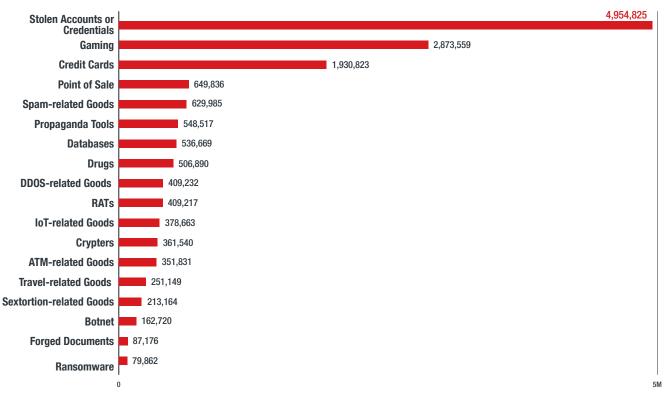


Figure 1. Popular underground goods and services

The above breakdown is based on the number of thread discussions in 600 forums across multiple languages. Every mention and thread reply related to the topic was included.

In this chart, "internet of things (IoT)" includes malicious goods or services affecting routers, doorbells, Nest devices, webcams, supervisory control and data acquisition (SCADA), industrial control systems (ICS), smart pumps, smart meters, Alexa devices, Google Home devices, smart lights, drones, and IoTbased botnets. "Travel-related goods" includes hotel tickets, airline tickets, food gift cards, Uber- and Lyft-related goods, and airline miles. "Gaming" includes stolen account sales, wallhacks, aimbots, gaming hacks, discussion about games, and skin sales.

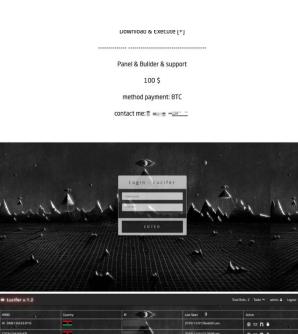
The sections below will go into greater detail about the goods and services offered in English, Russian, Spanish, and Arabic underground sites, highlighting the basic costs and notable offerings within the forums.

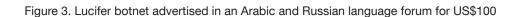
# Distributed-Denial-of-Service and Botnets (non-Mirai)

Many different botnet services are sold in the underground: cryptocurrency mining, click-fraud, IoT device attacks, spamming, and spreading banking trojans. In our Russian underground report from 2015,<sup>6</sup> botnet prices averaged around US\$200. Five years later, the most expensive non-Mirai botnets we found cost US\$1,500, and buyers can pay a daily, weekly, or monthly fee starting at US\$5. Aside from the Mirai-based botnets, Android botnets usually demand higher prices in the underground.



Figure 2. DDOS service from a Russian language forum starting at US\$50 a day





...

6.



Figure 4. DDOS-as-a-service starting at US\$50; the service includes 24/7 support, reseller services, and target monitoring

Botnet (non-Mirai) prices		
Generic Android botnet	Up to US\$1,500	
Generic DDOS botnet	US\$50 a day	
Panel/builder for a form grabber botnet	US\$100	
Botnet rentals	US\$5 and up	
Generic botnet builds	Free and up	

## **Remote Access Tools**

Remote access tools (RATs) allow cybercriminals to control a system remotely, and variations of these tools are commonly sold in underground forums and sites. Buyers can purchase RATs with additional features such as keylogging, downloading and executing commands, and capturing audio and video using microphones or webcams. The cost of RATs remains unchanged since 2015, with prices still starting at around US\$5. Source code for older RATs like NJRat and RevengeRAT are often found for free — likely because they have been around for many years — and security solutions are equipped to deal with them. Spynote, which has been around since 2016, continues to be sold for US\$2 and up. Generic RATs start at around US\$50 for a build.

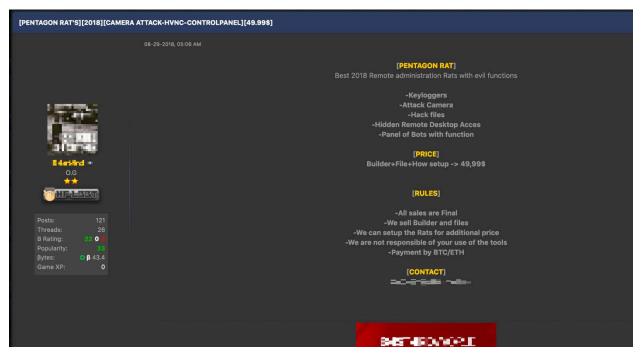


Figure 5. Pentagon RAT offered for US\$49.99 in an English language forum



Figure 6. A dark web marketplace offering AndroRat install for US\$1

	Revenge	RAT C # Client Fixed by	Share <		
al Ya	S. Potures B. Videos A. Computer G. Network Revenue-	RAT v0.3.exe Date modified: 12/9/2016 7:33 PM	Client every : 15 5- 5ec	January 8, 504 1,337 Kuwait github.com 0	
	!Hidden o	content is available for registered user			
	P	assword:			

Figure 7. Free RevengeRat offered in an Arabic language forum

RAT prices	
RevengeRAT/NjRAT	Free
Generic Android RATs	US\$1 and up
Source code for a generic RAT	US\$49 and up
Monthly RAT subscriptions	US\$5 and US\$25

#### Ransomware

In 2016, ransomware was estimated to have generated at least US\$1 billion in global revenues.<sup>7</sup> The affordability of ransomware during this period likely contributed to growth and earnings. In 2015, generic ransomware builds only cost around US\$5. And now, in early 2020, the cost for generic builds still starts at around US\$5. However, popular ransomware often mentioned in the news can cost more than US\$1,000.

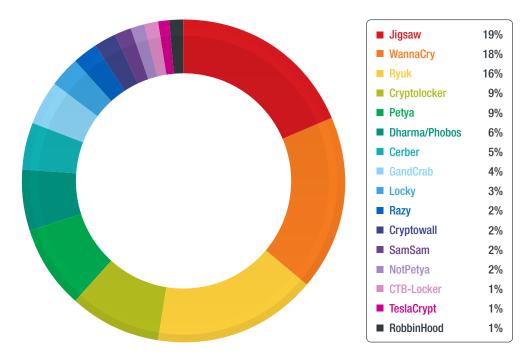


Figure 8. Top ransomware offerings

In 2019, ransomware prices varied depending on the family. Cryptolocker has been a pervasive threat since 2013 and continues to be one of the top five ransomware actively attacking victims. Builds for this variant can be found for US\$100 in Russian language forums. The Jigsaw ransomware family, which has been around since 2016, currently sells for US\$3,000 in English language forums. The Ranion ransomware-as-a-service has been around since 2017, with a yearly subscription that can cost up to US\$900. Wannacry is still available in the underground, but it's usually distributed for free.

	r [Offline Ver., Online Ver., C ++] w/29, 2019 - ③ cryptolocker   ransomware   cryptolocker
RANSOM RANSOM Market Anterna Market	* CRYPTOLOCKER : KPHITAOKEP STURK/BILIKE VER.) *
Auto Guarantor: 2 registration: May 29, 2019 Messages: 10 Reactions: 0	>> http://www.stand.com/www.stand.c
	Main sales:       [OTB]         Jabber       [OTB]         Message to PM. [PGP]       Message to PM. [PGP]         >> Setting through the guarants resvice:       >>         >> Not setting inexprintment <
	NOTE A FAST and EASY offline cryptoclocker build will provide you 100% PROFIT. Crypto - locker is a tool for fast and discretific encryption with a cryptographic algorithm with subsequent communication with the victim. The cryptoclocker performs all the declared functions perfectly: there is video work for all systems.
	Spaller: DESCRIPTION
	EROM YOU Your data: your name, list of extensions, text, BTC, claim amount, Jabber or E-mail.
	IN ADDITION There is a video of the operation of the cryptoclocker and decryption of the locked machine. I will explain all the nuances. Rebia (change: extensions, list of file types, text) - \$ 20
	PRICE FOR OFFLINE VERSION - \$ 100



늘 Ghoary Si	hap			Home FA	Pricing Buy Contact Us
	Subscription P	lans			
	1 MONTH	3 MONTHS	6 MONTHS	1 YEAR	
	\$99.99	\$249.99	\$399.99	\$699.99	
	Darknet Dashboard Unlimited Builds	Darknet Dashboard Unlimited Builds	Darknet Dashboard Unlimited Builds	Darknet Dashboard Unlimited Builds	
	Offline Encryption 24/7 Support	Offline Encryption Custom Disk Encryption	Offline Encryption Custom Disk Encryption	Offline Encryption Custom Disk Encryption	
		24/7 Support	Custom File Extensions 24/7 Support	Custom File Extensions 24/7 Support	

Figure 10. Ransomware subscription plan for Ghostly locker

G:\ZEPPELIN-1\\config\mag	ster.key - Zeppelin DevKit
<u>File S</u> ettings <u>K</u> eys <u>A</u> bout	
Main settings Ransom note	
IP logger Startup Delete backups Task-killer Auto-unlock busy files Melt UAC prompt	Commands Task list

Figure 11. Zeppelin ransomware advertised in a Russian language forum

🅫 🗮 Jigsaw Ransomware	V2 2019 Showing all post
see shake	Posted 07 April 2019 - 06:38 PM
entine	This Ransomware was outdated and useless so we took the source code and rewrote it.
	Now version 2 source code is available for sale as well as pre-configured already compiled version with many improvements:
	Interface.
	-Windows frame and icon in windows taskbar are now invisible, however you can still drag around the ransomware main window with the mouse to clear the browser visibility to make the payment,
16 19	-Instructions have now background transparency so the image of the ligsaw is never opaqued.
Rep Likes	-A copy to clipboard Bitcoin Address button has been added for convenience.
	-Links to both Bitcoin technology explanation and payment website address were added.
Junkie	-Cool Wellgaper changer.
a contract of the second	-Market BTC value is shown in real time in main interface.
	-A Skinned version of the project is also available so you can easily change the look and feel if you wish to do so.
🗣 Posts: 383	Payment system.
	-The payment engine has been rewritten to make use of Block.Io API interface (remember Block.Io is dead). The engine is able to correctly locate and calculate the coinbase bitcoin price in USD and the present balance of your account to determine if payment wa
E Threads: 17	- ne politicit agine tao desti demante num data da desa. seccessiti, de la media inte la dita de gring any emilia dades.
Joined: Aug 28, 2016	Security is enhanced.
Credits: 0	-The ransomware now disables the task manager (it is restored after payment) to prevent being killed from memory.
*	-The ransomware also sets itself as an un-killable process. In case the user manages to kill it, the whole windows will crash with a BSOD.
	-A doomsday counter is configurable. If the user kills the ransomware too many times, then its clear he won't pay so better erase the whole hard drive and kill boot sector.
Contraction of the second second second	-Available public jigsaw ransomware decrypters can not decrypt the files.
THREE YEARS REGISTERED	-Virus is totally FUD in the hard drive after processed by our method.
	-The virus does not relies on costura. fody to deploy its dli files because it is unreliable. Now the virus includes and deploys its own required dli files.
	-USB Stick Spreading
	-Network drive spreading.
	-Spreading through email attachment.
	-Autorum ensuer for terrovasic devices. - EternalBue Exolisis care, results are sent by email to the attacker.
	-cicmilabue cupins source, results are sent by emain to the attabute. -Windows defender is disability Carsh be turned back on easily and it will stay off after restart. Also AVG and MalwareBytes.
	-minume determine is usabled, call be turned back on easily and it will aday on aller result. Also Avo and mamanedytes. -Bot Killer added:
	-Hidden visits website feature. It will regularly visit any website of your choice using the victims connection. Can be used to increase visits counter as an example (won't work for monetzing links).
	-Windows explorer options modified so hidden files can not be seen (might not always work depending on 05 version or may require restart).
	-Anti sniffers code.
	-Windows Update Disabler.
	-System Restore Killer (might not work in all windows OS).
	-Disable UAC (no admin for victim).
	-Disable Regedit.
	-Disable CMD.
	-Windows Serial Number retrieval. Send back to attacker by email.
	-Second method for extensive password dump&retrieval (including browsers, ftp clients, email clients and other goodies).
	-New USB spreading technique not relying on autorun being turned on.
	-DoublePulsar Exploit implementation. It can upload a DLL file to vulnerable computer. Three DLL examples are provided: To add a admin user, to download and execute any file from a selected website, to reboot system.
	-Use the app as ransomware or as worm. Option to not encrypt any file and not request any ransom, only spread through different mechanisms and install rat or any other file of choice.
	-Change permissions of all files belonging to all the users in a server so they can now be encrypted.
	-Businesses and Enterprises databases encryption.

Figure 12. Jigsaw ransomware offered in an English language forum for US\$3,000

Ransomware prices		
Generic ransomware build	US\$5 and up	
Ranion ransomware	US\$900 a year	
Cryptolocker binary	US\$100-400	
Cryptolocker source code	US\$3,000	
Jigsaw ransomware source code	US\$3,000	
Dharma binary	US\$100	
Zeppelin builder	US\$2,000	

## **Crypting Services**

Our research paper on the North American Underground in 2015<sup>8</sup> found that monthly crypting services were being sold for up to US\$1,000 a month. The prices for these services have since become significantly lower. The average cost for crypting is around US\$100 a month, but some services can be found for as low as US\$20.

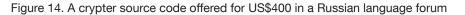
In the Russian underground, basic prices remain at around US\$20, the same as in 2015. More sophisticated crypters found in Russian language forums can sell for up to US\$2,000.

11/05/2019 🗠 🖓 🗍 #1
We present to your attention the ZEPPELIN offline cryptographic builder.
We took into account all feedbacks and wiehes, working with an affiliate program, implemented the planned bells and whistes in file encryption, combined with existing developments and received a completely new product with a universal data processing algorithm. After conducting serious tests, it was decided to build a builder so that everyone who bought a license for our software had a unique opportunity to work regardless of any affiliate program.
Screenshots of the main window of the builder: Some features of the builder:
Support for multiple master keys     Saving locker in .EXE, .DLL and .PS1 (PowerShell) formats     Qoins: LP togog/r Justicodal /start of the specified commands on the attacked machine (deleting recovery points) / termination of the processes on the list / auto-unlock of files that are not writable / self-deletion / request for rights / ransom request editor     Saving and resetting settings
A short list of features of the current implementation:
<ul> <li>A strong encryption algorithm that has established itself as extremely reliable and unbreakable (custom implementation of AES CBC, without CryptoAPI, its own RNG is used, brute force is impractical)</li> <li>Installation into the system under a randomly selected name, obtained on the basis of a list of processes running on the system under attack.</li> <li>Using multi-threaded asynchronous file search, where for each drive and network path are separate stream works</li> <li>Encryption of files with "bands", this guarantees the impossibility of even patial recovery of large files with databases and archives</li> <li>The ability to securite abiting: commands before starting the search and data encryption (deleting recovery points, etc.) // optional</li> <li>The completion of processes to the attacked machine according to the list // optional</li> <li>Automatic termination of processes to files if they are not available for encryption // optional</li> <li>All builds (EEE, LLL and PSI) function concerdly on the entire OS line from Windows XP to later</li> <li>Builds do not work on CIS systems</li> </ul>
Scope of delivery: builder + configs + manual.
Starting price for the builder: \$ 2000, global updates \$ 100, small fixes - free.

Figure 13. Zeppelin crypto builder offered at US\$2,000 in a Russian language forum

#### I will sell a virus encoder

п энтійде п Дек 6, 201	9- I crypto virus locker sale encryption
	Дек 6, 2019
2	Encrypts all files. Extensions you can specify yourself. After encrypting all the files, the text player displays information that you can specify yourself, a payment connection form, and also a change of wallpaper, decrypt form. It is easy to crypto, I can also provide this service for an additional fee. After encryption, it sends a unique key to your service.
ST 2 (3) Newbie registration :	It is possible to indicate your data: list of extensions, text, BTC, claim amount, E-mail. Link to the web panel host. For real buyers, I can record a video.
Dec 6, 2019 Messages : 1 Reactions : 0	Build cost 99 \$ Source \$ 400 Improvements at the request of the customer are evaluated separately, execution time.
	It is possible to work through a guarantor. Telegram contacts:



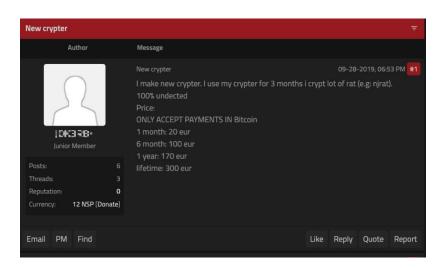


Figure 15. Crypter service from US\$25 a month in an English language forum

Crypter prices		
Generic crypter builders	US\$99 and up	
Crypter as a service	US\$20 and up	

#### **Banking Malware**

We have been observing the banking malware landscape for years, independently and in collaboration with Europol's European Cybercrime Centre (EC3). Our most recent report, Crimeware for Sale: The Commoditization of ATM Malware in the Cybercriminal Underground<sup>9</sup> was released in June 2019. Observing the landscape throughout 2019, we noted that the Cutlet Maker, Hello World, and WinPot banking malware variants continue to be found on Russian-speaking underground markets, priced at around US\$2,000.

The Kronos banking trojan, which first appeared in 2014 in Russian language forums, evolved into Osiris and offered for US\$3,000 in 2019. Android banking trojans continue to be popular in the underground for US\$300 and up. And even though multiple GozNym cybercriminals were arrested in mid-2019,<sup>10</sup> the malware itself is still highly valued. GozNym continues to be sold in the underground at US\$750.

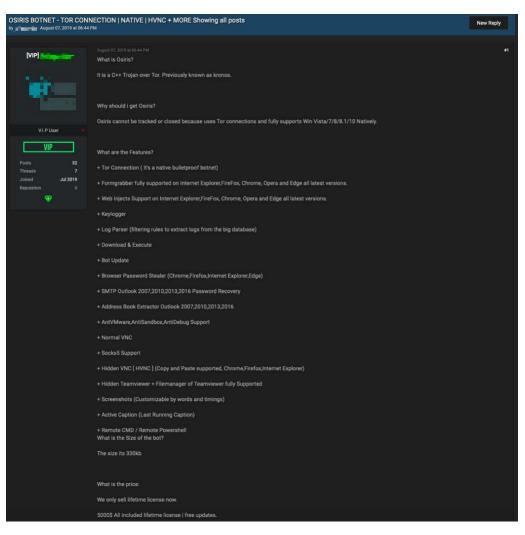


Figure 16. Osiris, a Kronos banking variant, was offered for US\$5,000 in the summer of 2019 and then for US\$3,000 in an English language forum later in the year

03.10.2019

MULTI-STAGE ANDROID BANKING MALWARE ON SALE

WHATS ON SALE? Original Multi-Stage Android Banking Malware BOTNET with FULL SOURCE CODE for the Web based C2 PANELS, The Trojan Dropper and Final Payload

PRICE: \$350 | ONLY ACCEPTING BTC

This is an original FUD Multi-stage Android trojan specially designed to target the USSD menu on Android phones

It has a Multi-Stage design, meaning it is divided into two parts, The Dropper and the actual Payload, making it extremely difficult to detect

Both the Dropper and Payload are FUD, easily slipping past Google Play Protect and other Security Solutions

The C2 panel is web based and the address can be dynamically updated on the bots as will be explained below, making the botnet resistant to Control panel take downs

Specifically made for android 9,8,7,6,5.1 Versions

Dropper Capabilities #Hide icon to hide presence on bot #Bind to any application of choice to use as a decoy during spreading #Download and install final payload #Gather preliminary data like Android version, Geo Location etc #Receive additional APK download links from C2 #Install any other APK of choice on infected bot #Delete payload files once installed #Add custom Install message from C2 when installing any APK[Useful for further Social Engineering]

Add custom Install message from C2 when Installing any APK[Useful for further Social Engineerin Payload Capabilities #Hide Icon to conceal Infection #Barber Job Info like Android Version, Location etc #Dail any USSD number from the bob #Special log: to bypass "im select" popup on double line phones #Keyfogger to capture any info typed into USSD window #Interact with USSD menu beyphying feedback from C2 in realtime #Interact with USSD menu beyphying feedback from C2 in realtime #Interact with USSD menu beyphying feedback from C2 in realtime #Interact with USSD menu beyphying feedback from C2 in realtime #Interact with USSD menu beyphying feedback from C2 in realtime #Interact with USSD menu beyphying feedback from C2 in realtime #Gain Administrator privileges to Lock bot, factory reset bot and resist uninstall attempts #Gain Administrator privileges to Lock bot, factory reset bot and resist uninstall attempts #Gain to to action at all times #Capture all SMS or specify specific numbers #Display Custom Alert Box on bot with Info from C2 #Franter bot to another C2 UFL #Franter bot to another C2 UFL #Franter bot #Geno Locked to specific countries i.e Only targeting bots from specific countries or regions\*\*\*\* #Works on Android 6.7.8.9 #Uninstall Resistance...even Antivirus cannot remove It \*\*\*\*

#### Figure 17. Android banking malware bot offered for US\$350 in a Russian language

Verified Seller : Positive Feedback : (100%) Member since : Oct 13, 2019 Last Login : Jan 01, 2020 Sales : 47 Orders : 0	Sold : 0 Times Origin Country : World Wide Ship to : World Wide Payment : Full Escrow Product class : Digital Goods Quantity : Unlimited Available
Sale Price : 2500.00 USD / 0.35067178 BTC           Sale Price : 2500.00 USD / 54.54480874 XMR           Sale Price : 2500.00 USD / 60.35731531 LTC           Shipping Options :           Default - 1 Day - 0.00 USD / 0.0000000           Quantity :         1	

Figure 18. ATM malware offered at US\$2,500 in a dark web marketplace

[50% OF	F} GozNym 2	0 Banking Bot		
200 + How ************************************	Number of the states         - 4 min           Mary Jose         <		Verified Seller : () / Trusted Seller : () Positive Feedback : (100%) Member since : Oct 13, 2019 Last Login : Jan 01, 2020 Sales : 47 Orders : 0	Sold : 0 Times Origin Country : World Wide Ship to : World Wide Payment : Full Escrow Product class : Digital Goods Quantity : Unlimited Available
n ar Allandia Allandia Allandia	In an original sector s		Sele Price : 750.00 USD / 0.10526153 BTC Sale Price : 750.00 USD / 16.39344262 XMR Sale Price : 750.00 USD / 18.10719459 LTC Shipping Options : Default - 1 Day - 0.00 USD / 0.00000000 BTC Quantity : 1 Purchase with BTC Purchase with XMR Purchase with LTC	
Product	Description	Refund Policy	Product Tags Feedback Public PGP Key	
Versio Ma Fo DM	ain functior ormgrabber (	Chrome, Firefox Chrome, Firefox	, IE, Tor-Browser (HTTP, SSL, SPDY))	

Figure 19. GozNym banking botnet sold in a dark web marketplace for US\$750

Banking malware prices			
Kronos based malware	US\$3,000 and up		
Generic Android banking malware	US\$100 and up		
ATM malware	US\$2,000 and up		
GozNym	US\$750		

## **Spamming Services**

The price for spam distribution tools has not changed significantly since 2015. Typical spam services can be found from US\$20 and up. We have observed more spam offerings geared toward SMS messages than email. The price of bulk mailer programs averages around US\$50.

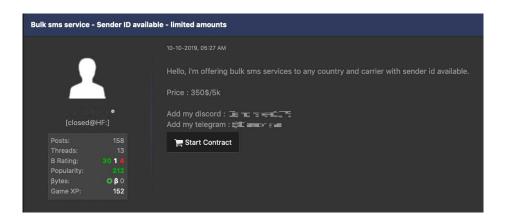


Figure 20. Bulk SMS service starting at US\$350 for 5,000 messages, advertised on an English language forum



Figure 21. Phone Flooder program sold for US\$50



#### SMS SENDER V3 [Bulk Call]

Figure 22. SMS Sender offered in an Arabic Forum for US\$499

Spamming Prices		
Phone flooder	US\$50 and up	
SMS bulk sender	US\$25 to US\$500	
SMS sender monthly	US\$2 and up	

## **Online Account Credentials**

Online account credentials for different services such as banking, food delivery, entertainment, and more, continue to be sold for low prices. Users can find available credentials for popular media services such as Netflix, Amazon, Hulu, and Spotify. The market is actually oversaturated—stolen accounts make up 32% of all underground offerings. Most accounts start from US\$1, with only a few high tier accounts demanding premium prices. Disney only launched their new streaming platform, Disney+, in November 2019, but available account credentials have already flooded the market.

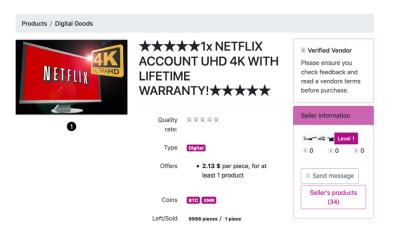


Figure 23. Netflix account sold in a dark web marketplace

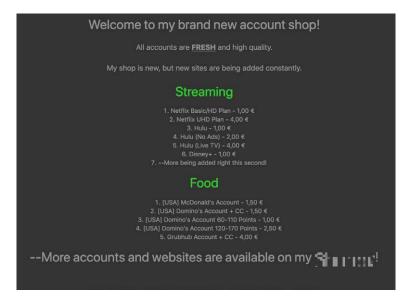


Figure 24. Streaming and food service account credentials for sale

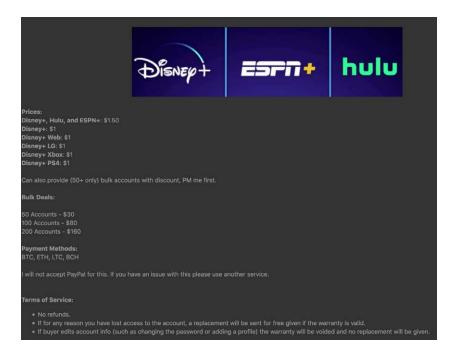


Figure 25. Disney+ account packages starting at US\$1

Name	Included	Last Upload 📴	Refund	Price
Bankofamerica.com	Login:Password only +1	2019-12-30 15:08:37	15 min.	5\$
Bankofamerica.com	Login:Password only +1	2019-12-30 15:03:32	15 min.	5\$
Bankofamerica.com	Login:Password only +1	2019-12-28 23:59:03	15 min.	5\$
Bankofamerica.com	Login:Password only +1	2019-12-20 20:17:22	15 min.	5\$

Figure 26. Banking credentials sold in a carding shop

Online accounts credentials prices			
Netflix	US\$2 and up		
Online banking accounts	US\$5 and up		
Spotify	US\$3 and up		
Disney +	US\$1 and up		
McDonalds	US\$1 and up		
Domino's	US\$1 and up		
Grubhub	US\$3 and up		

#### **Credit Card Credentials**

The price of stolen credit card numbers, clones, or copies of credit card statements have dropped significantly. This is likely because the underground market has been flooded with these services. Prices for stolen credit card numbers in 2015 started from US\$20 for U.S.-issued cards, but in 2020, most credit cards cost only US\$1. The majority of credit card services are sold in bulk. Premium credit cards that allow large purchases (above US\$5,000) and have been verified to work can cost as much as US\$500 per card.

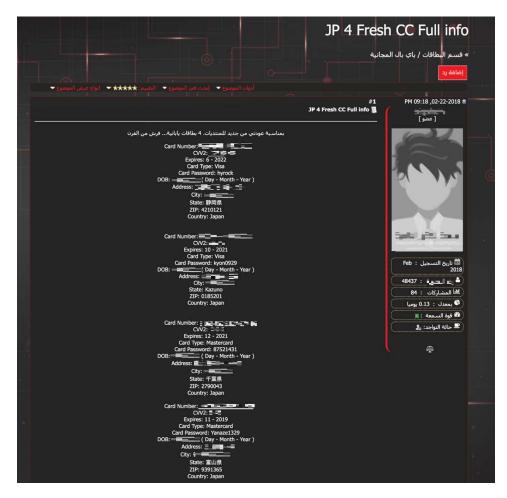


Figure 27. Japanese credit cards offered in an Arabic language forum

Name	Included	Country	Credit card	Last Upload 🕼	Refund	Price
Walmart.com	Online +1	Country: US	Credit card: VISA    🗨 🔳 👘	2019-12-03 16:06:51	15 min.	3\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:51	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card: MASTERCARD	2019-12-03 16:06:51	15 min.	3\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:50	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:50	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:50	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card: VISA	2019-12-03 16:06:50	15 min.	3\$
Walmart.com	Online +1	Country: US	Credit card: VISA    ==================================	2019-12-03 16:06:50	15 min.	3\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:50	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:49	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:49	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:49	15 min.	1.5\$
Walmart.com	Online +1	Country: US	Credit card:	2019-12-03 16:06:49	15 min.	1.5\$

Figure 28. Walmart credentials with credit card numbers for sale starting at US\$1.50 per account

=======SELLING FRESH VALID WITH GOOD HIGHLY BALANCE CREDIT CARD ALL COUNTRY======
I've labling for a good suptoments have ODEDIT OADD superior and lang term
<ul> <li>- I'm looking for a good customer to buy CREDIT CARD everyday and long-term</li> <li>- I will discount or bonus if you order bulk</li> </ul>
- My CVV is good and fresh live 100%
- All my CREDIT CARD are inspected before sale i will replace if CREDIT CARD DIE !
,,, _,
CREDIT CARD Us :
Us (visa/master) = \$10
Us (amex/disco) = \$12
Us (fullz info) = \$30
CREDIT CARD UK :
Uk (visa/master) = \$252
Uk (bin/dob) = $\$30$
Uk (fullz info) = \$35
CREDIT CARD Ca :
Ca (visa/master) = \$15
Ca (bin/dob) = \$22
Ca (fullz info) = \$35
CREDIT CARD Au :
Au (visa/master) = \$15
Au (bin/dob) = \$25
Au (fullz info) = \$35
CREDIT CARD Eu
France = \$20 (fullz info = \$40)
Germany = $$20$ (fullz info = $$40$ )
Italy = \$20 (fullz info = \$40) Sweden = \$20 (fullz info = \$40)
Spain = \$20 (fullz info = \$40)
Denmark = $\$25$ (fullz info = $\$40$ )
Ireland = \$20 (fullz info = \$40)
Mexico = \$15 (fullz info = \$35)
Asia = \$15 (fullz info = \$35)
* And many countries other in stock 95% valid rate and high balance * Let me know if have i will sell for you
Let the know it have I will sell for you

Figure 29. Worldwide credit cards from US\$10 each

======================================
- Bank Login : Username + Password Number (full info) - Account : Email Address + Password (full info) - Have all details for login and i can transfer balance to your account (Bank Login if you v
* Price for Bank Login !!!
- BankLogin US: (Bank of America, Chase, Wells Fargo)
\$200 = Balance \$3000
\$400 = Balance \$5000
\$600 = Balance \$9000
\$1000 = Balance \$15000
*Price for UK Bank login !!!
- Bank Login UK: (LLOYDS, TSB, BARCLAYS, Standard Chartered, HSBC)
\$250 = Balance 4000 GBP
\$400 = Balance 9000 GBP
\$500 = Balance 15000 GBP
\$8000 = Balance 20000 GBP

Figure 30. High balance credit cards offered from US\$200 and up

Credit card credential prices				
Store credentials with credit cards	US\$1.50 and up			
High balance credit cards	US\$100			
Bulk credit cards	US\$1 each			
Verified credit cards	US\$10 and up			

#### **Identity and Document Services**

Undocumented immigrants and criminals flock to underground forums in search of identity and document services. These include documents for supporting citizenship claims or other applications, obtaining lines of credit to put up a business, opening untraceable bank accounts, proving residence status, committing insurance fraud, purchasing illicit items, and others.

There have been no significant changes in pricing since 2015; scanned document services such as copies of driver licenses, passports, and bill statements continue to sell for US\$5 and up. Registered passport services cost around US\$2,500. Legitimate-looking counterfeit passports were popular in 2015, but the increase in the number of global immigrants<sup>11</sup> and the adoption of e-passports<sup>12</sup> have since affected the type of goods in demand. Underground services shifted to create "legal or registered" passports that can pass a series of authentication tests.

The U.S. opioid crisis has also had an effect on underground goods and services. Opioid prescription has gone down,<sup>13</sup> thus making the drugs more difficult to obtain. This resulted in an increased demand for forged prescriptions pads. Medical professionals have also started to move to e-prescriptions, which may impact the market further.<sup>14</sup> Forged prescription labels continue to be found in dark web marketplaces for around US\$60.

		ed EU Passports, DL, and More	Verified Vendor     Please ensure you check     feedback and read a vendors
	Quality rate:		terms before purchase.
A.	Туре	Physical	Seller information
0	Offers	2500 \$ per units, for at least 1 product	2.500 Level 1 Vendor is on vacation
	Coins	втс	u o u o u o
	Left/Sold	15 units / 0 units	E Send message
			Seller's products (6)
	Delivery method:	Express - 7 days - 50 \$ (1 - 1 units )	
	Pay with Coin:	втс	
	Purchase type:	Normal Escrow	
	Amount:	1 C Add to cart	
Details	Payment rules	Feedback	Delivery
gistered EU Passports, DL, ID, Vis	sas, and More		
provide Registered and Authenti in a week or two.	c documentation for EU countries	now. This is a life changer, contact us imm	ediately and get your new document
sports			
er license			
ard k permit			
k permit Ith card			
manent resident			
idency permit			

Figure 31. Service that offer registered pasports sold in a dark web marketplace

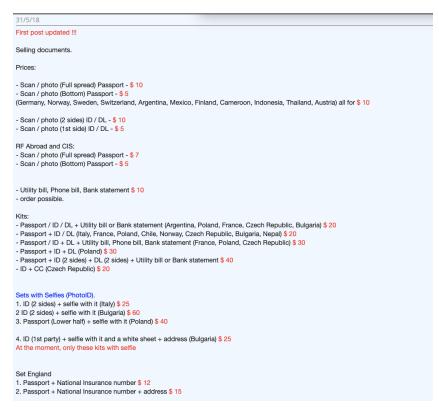
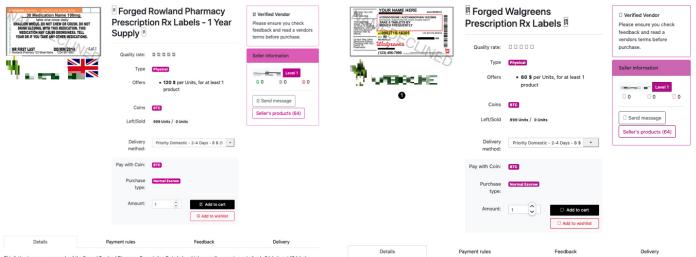


Figure 32. Russian-based forum selling identity kits



This listing is a one year supply of the Forged Rowland Pharmacy Prescription Rx Labels, This listing provides a bulk buy discount making it an excellent value amongst the offere ally come in a set of only 3 labels not 12 labels onast the offered force

PLEASE READ THIS ENTIRE LISTING BEFORE YOU ASK QUESTIONS OR ORDER
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 PROFERED THE SENTIRE LISTING BEFORE YOU ASK QUESTIONS OR ORDER
 PROFERED THE SENTIRE LISTING BEFORE YOU ASK QUESTIONS OR ORDER
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OF OTHER
 PROFERED THE LISTING BEFORE YOU ASK QUESTIONS OR ORDER
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OR ORDER
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OR ORDER
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OR ORDER
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OR ORDER
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OF THE LISTING AVE YOU PROFERED.
 PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OF THE LISTING AVE YOU PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OF THE LISTING AVE YOU PROFERED THE BEBORS AND AVE HEAPT OR DIVERSION OF YOUR CHORE WORY FRE.

-Description-PLEASE READ THIS ENTIRE LISTING BEFORE YOU ASK QUESTIONS OR ORDER -Description-PLEASE READ THIS ENTIRE LISTING BEFORE YOU ASK QUESTIONS OR ORDER This is a listing for forged Walgreens Pharmacy prescription labels. These are the label that is on the prescription bottle that your pills are in when you have a prescription filled. By law you can only have and carry prescription pills that you have a valid prescription for and must carry them in the prescription bottle as required by federal law. If you do not have a prescription or a bottle with valid label then you are committing a felory. If you obtain prescription drugs whether it be from an online anonymous marketplace, your dealer, a friend or other means you are committing a felory. This means il you are pulled over by police and you consent to a search, or they have probable cause to search you, once they find your prescription pills you will be arrested and charged with a felory. Another situation may be that you are drug tested for employment, drug tested for probation or parcle, or searched



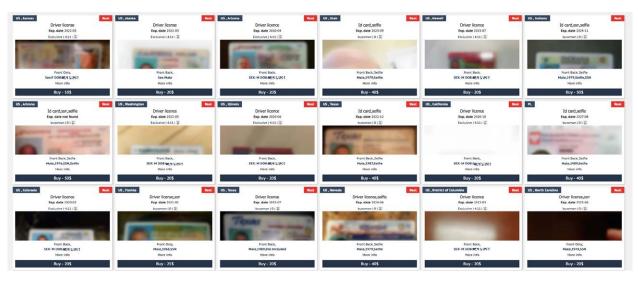


Figure 34. A dark web marketplace selling U.S. driver's license pictures from US\$10 and up

Fake Documents prices			
Fake credit card statement	US\$25		
Registered passport service	US\$2,500		
Scanned copies of real passports	US\$1 and up per copy		
Forged pharmacy Rx labels	US\$60 and up		
Identity kits	US\$20 and up		
Driver's license scans	US\$10 and up		

# The Present State of Underground Forums and Marketplaces

# Migration of Cybercrime E-commerce to Surface Web Platforms

Over the past 18 months, we noticed that cybercriminals are increasingly using surface e-commerce shopping platforms. Sellers on underground forums post links to their online digital goods stores. One platform in particular has online stores selling malicious digital tools from Arabic, Russian, and English language-based forums. Spanish and Brazilian language-based forums have not adopted this trend.

The specific online platform involved is an all-in-one payment processing and e-commerce solution registered to a company located in the Middle East. Anyone can sign up for an account to sell digital goods on the site. Also, the interface is easy to navigate and use fees are low. In December 2019, the site was ranked in the top 15,000 sites worldwide and 5,000 in the U.S., according to Alexa analytics. Alexa also showed that over half of traffic to the site came from cracked[.]to, a cybercriminal underground forum. The traffic data also showed a significant audience overlap with Nulled[.]to (another forum). This is unsurprising since the About information for Nulled[.]to refers users to the site, claiming that it is connected to one of the forum's administrators.

The e-commerce site's terms and agreements state that it should only be used for lawful purposes. This implies that stores hosted on the site should be banned from selling illegal material. However, when we checked underground forum posts that linked to stores on the site offering illegal goods and services, they were up and running. The fact that the owner participates in underground forums may signal to others in the underground that this particular e-commerce platform can be trusted more than its competitors, and it is likely the reason why bans are uncommon.

Forum users have mentioned being banned from e-commerce platforms for Digital Millennium Copyright Act issues brought on by major companies like Riot and Disney. Other notable e-commerce platforms are also used for cybercriminal transactions. While these platforms are legitimately registered businesses, cybercriminals also heavily use them.



Similar sites that share the same visitors and search keywords with this site.

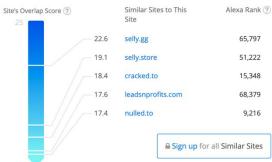


Figure 35. Overlap of visitors to the e-commerce site with two cybercriminal forums, Cracked[.]to and Nulled[.]to

The platform allows users to accept payments through PayPal or in digital currencies like Bitcoin, Ethereum, Stripe, and Litecoin. It offers two options for digital sellers: pay as you go without a monthly fee, or pay for an enterprise account. Items sold on the site are similar to goods and services offered in popular cybercriminal underground forums. However, the e-commerce platform is significantly more convenient for criminals because the seller can showcase various goods or services in one place instead of having to create multiple threads for each individual offering in an underground forum.

Our research found that stores on the site offered stolen accounts, databases, streaming services, carding, VPNs, crypters, banking malware, ransomware, and Mirai variants. The most expensive item we observed was a banking malware sold for US\$2,000. We also found rare limited edition Fortnite skin accounts being sold for US\$999.99.<sup>15</sup> Similar to underground forums, Mirai botnet setups on this platform start at US\$10. Online streaming accounts such as Hulu, HBO, Netflix can also be bought from US\$3 and up. Prices for Android-based RATs start at around US\$50.

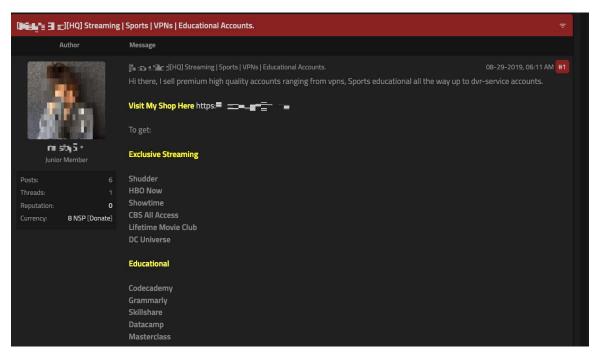


Figure 36. Forum post advertising a store for video streaming services

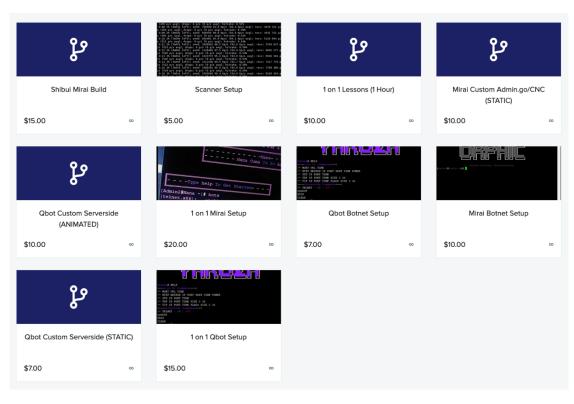


Figure 37. A store on the platform offering services for Qbot and Mirai variants

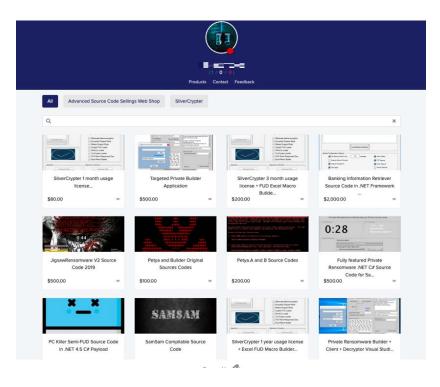
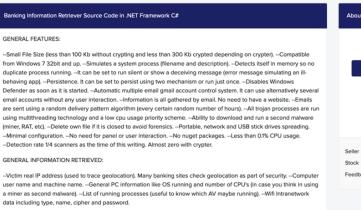


Figure 38. A store offering crypters and ransomware

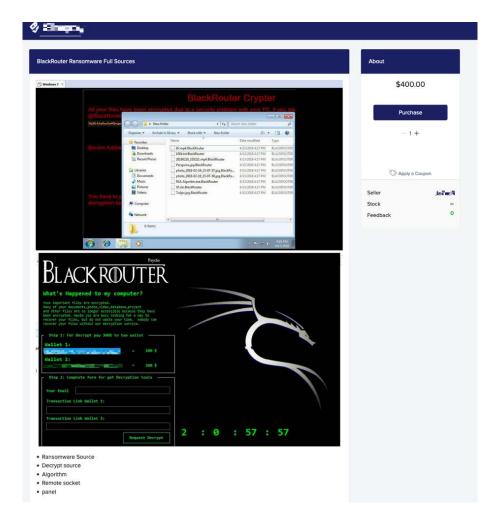


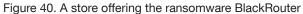
#### FINANCIAL INFORMATION:

--Banking sites url, login and password. --Crypto wallet sites url, login and password. --Individual wallets data files retrieved including full directory path. -Paypal url, login and password. --General websites requiring authentication url, login and password. --Full Cockles information including path, security, expiration and value. --Complete Auto-Fill Data including name and value. --Credit Cards data including number, billing name, expiration month and year.

Access to source code is instant when you send proof of payment.

Figure 39. A store offering a banking trojan for US\$2,000







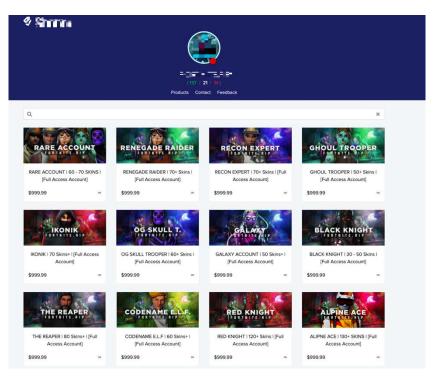
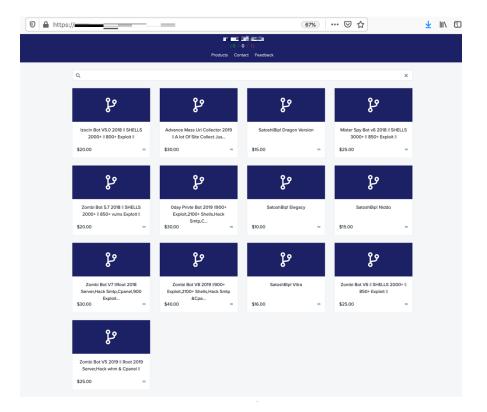
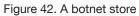


Figure 41. A store of rare Fortnite gaming accounts sold for US\$999.99 each





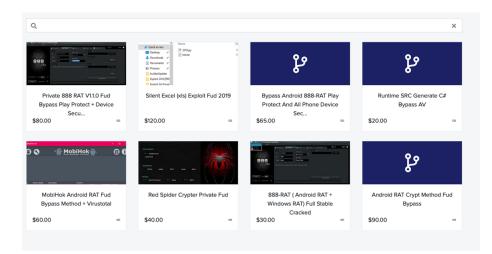


Figure 43. A store that specializes in RATs

Average Store Prices				
Service	Price			
Mirai botnet build	US\$10			
Ransomware	US\$400 and up			
Custom bank trojan	US\$2000 and up			
Crypters	US\$50			
RATs	US\$30			
Android-based RAT	US\$50			
Rare Fortnite gaming accounts	US\$999			
Botnet rentals	US\$10 and up			
Hulu Premium	US\$3			
Netflix	US\$5			
NordVPN/TunnelBear	US\$3			
Grammarly	US\$3			
Spotify Family	US\$3			
U.S. VISA/AMEX/Mastercard	US\$10			
Japan VISA/AMEX/Mastercard	US\$15			

## Fake News and Cyber Propaganda Tools Gain Popularity

In our 2017 paper, Fake News and Cyber Propaganda: The Use and Abuse of Social Media,<sup>16</sup> we discussed services that threat actors used to spread fake news and steer public opinion. These manipulations served various motives, ranging from personal and financial to political. In 2019, these services became more prominent in cybercriminal underground forums. They offer a cost-effective alternative to traditional advertising and promotional efforts, often by manipulating social networks.

Social media-related services, such as large scale social media promotions, the creation of fake comments, and crafting YouTube likes, are sold at very reasonable prices. For these manipulations, cybercriminals generally use autonomous bots, real people, or crowdsourcing programs. Prices start as low as US\$1 for 10,000 likes. The Russian underground maintains the lowest-priced fake news services among the other forums, and prices have remained steady since 2017.

In the era of fake news and cyber propaganda, outdated voter databases are often shared for free while more current databases are available for buyers. We noted an individual U.S. state database going for US\$9.99, while a 2019 Turkish voter database costs US\$400. One underground forum had over 300 database links containing 5 billion entries with information such as PII, credit card information, social security numbers, emails, and passwords. All this information came from data breaches that occurred between 2015 and 2019. Compromised voter databases combined with other data available in underground forums can help malicious actors create very effective cyber propaganda campaigns. For example, key data points can be used to create a target profile for a specific country's electorate.

Voter information is collected through various means, from outright hacking and stolen or lost devices, to unprotected or misconfigured servers, among others. The collected information is usually put up for sale in underground forums.

Several breaches have affected voters across the globe over the past few years. In 2017, an exposed and unsecured Amazon S3 storage server owned by the data analytics firm Deep Root Analytics was discovered by the security firm UpGuard. It contained 1.1 terabytes of data (birthdates, home addresses, telephone numbers, and political views) of nearly 62% of the entire U.S. population.<sup>17</sup> In March 2016, the Anonymous Philippines hacker collective and LulzSecPilipinas compromised the Philippines Commission on Elections (Comelec) database containing the information of 54.36 million registered voters for the 2016 elections. The compromised Philippine Comelec information and exposed Turkish 2016 voter databases are commonly found in cybercriminal underground forums.<sup>18</sup>

[GOD]	November 09, 2019 at 03:36 PM Contains various files, including voters lists, with phone numbers. Appears to be current data, 2019 or there about.
1000	Download:
100	
	Mirror:
GOD User 🔹	INIY UDS IU HAUE
GOD	Fresh data:
Posts 80	Afghanistan voter list (2019): \$400
Threads 18	Tunisia voter list (2019): \$400 Jordan phone numbers (2018,Sep-Oct 2019): \$400
Joined Jun 2019	
Reputation 234	XMPP: the set of the s
Ŵ	Email:

Figure 44. An English language forum selling voter databases for Afghanistan and Tunisia at US\$400 each



Figure 45. A dark web marketplace offering voter databases for US\$9.99 each (as of Nov 12, 2019) from a seller with 100% feedback

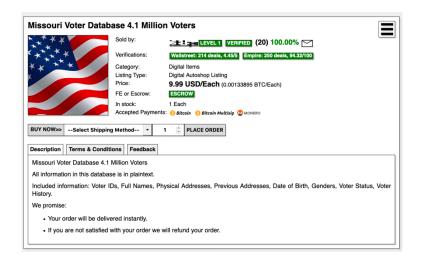


Figure 46. Details of the voter database contents, which includes dates of birth, voter history, addresses,

#### and voter IDs

Services for increasing social media likes are common in the underground, across all languages. Some of these services guarantee the quality of these manipulations and also specify the use of automated bots or humans. Most of these types of tools are used to drive political agendas, but they can also be used for social engineering.

We saw services that offer 1,000 Instagram likes for as low as 15 cents. We also saw offers for Facebook and Instagram likes that cost US\$3 for 1,000. Twitch likes start from 50 cents for 50 likes. Bot tools for increasing likes or visitors cost US\$25. In Arabic language-based forums, Russian actors occasionally post offerings for VkTarget projects. VkTarget is a service for people who want to make money through crowdsourcing. Users can advertise small tasks (like creating traffic for sites and liking social media accounts) for others to complete.

[\$50] INSTAGRAN	(\$50) INSTAGRAM LIKE APP EXPLOIT // UNLIMITED INSTAGRAM LIKES + FOLLOWERS		
-		04-02-2019, 11:04 PM (This post was last modified: 04-05-2018, 03-28 PM by the 📬 )	< #
		LIMITED SPOTS: I WILL ONLY BE SHOWING THE FIRST 5 PEOPLE HOW TO DO THIS.	
	2	I have an exploit to an Instagram Like App, and have had access to it for over a year now and haven't had any issues with it. It's pretty active, and is really simple to use. It both likes and followers.	
[closed@	PHF:]	I will teach you how to exploit it, which will allow you to give yourself likes and followers. I will also teach you how to add as many coins/fokens as you want to an account.	
Posts: Threads:	1,146 136	* I can provide a script that will allow you to send likes other profiles for an additional \$25.	
B Rating: Popularity: Bytes:	229 <b>Ο</b> β 0	The likes and followers are from real people. They aren't "unlimited" but you can get a decent amount of each picture without an issue.	
Game XP:	0	Prices, \$50: Exploit Tutorial + Teach you how to add likes to your pictures, and followers to your account.	
		+ \$25 (Script that allows you to send others likes) + \$50 (If you don't have IOS, I can sell you a PHP script that acts as an API and will allow you to send likes to any picture.)	
		To exploit the APP, you must have an iOS device. - YOU DO NOT HAVE TO BE JAIL-BROKEN.	
		l accept PayPal, and Bitcoin. PM for more information.	
		Fin for Hode Information	

Figure 47.Underground forum post advertising an exploit to increase Instagram likes



Figure 48. Advertisement selling Instagram likes

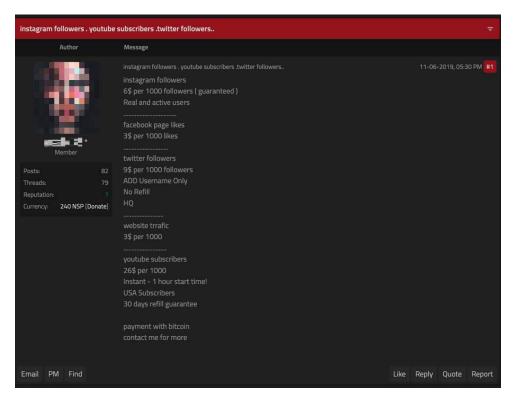


Figure 49. A forum post offering to purchase social media followers

81	AddmePoint V.1.4 -			
	netlice Uye Ol Kazan!			
regularitation and	AddmePoint V.1.4			
Web Hits	Youtube 3170			
رابط تحميل الأداة : رابط الأول				
Download 1 Link				
رابط تحميل الأداة : رابط الثاني Download 2 Link				

Figure 50. Free bot tool for adding likes to YouTube, Instagram, Twitter, and Facebook offered in an Arabic language forum

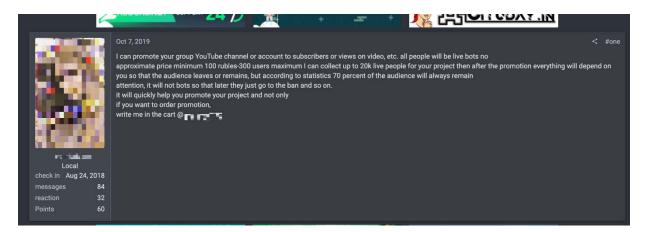


Figure 51. A Russian language forum post offering YouTube likes

Fake news and cyber propaganda prices				
Service	Price			
United States voter databases	Free to US\$9.99			
Non U.S.voter databases	US\$9.99-US\$400			
1,000 Facebook likes	US\$3 and up			
1,000 Instagram likes	US\$0.15 and up			
50 Twitch likes	US\$0.50 and up			
Social media bot	US\$25 and up			

Fake news and cyber	r propaganda prices
Service Price	
1,000 YouTube likes US\$26 and up	
20,000 New visitor hits	US\$5 and up

# Interest in Deepfake Scams Increase

Deepfake technology is an AI-generated technology that creates fake videos, images, or audio recordings that look and sound genuine. Users in underground forums have expressed interest in finding ways to monetize this technology. Deepfake services already exist in underground forums, but most posts involve inquires and exchanges of information. Forum users often discuss how AI technology can be used for "eWhoring," also known as sextortion, and for bypassing photo verification requirements on dating sites.

In the past, sextortion was mostly about social engineering and reputation attacks.<sup>19</sup> Criminals would send emails threatening to expose a damaging or embarrassing recording to friends or family and demanding money in exchange for keeping quiet.

People would be more likely to pay the extortion amount if cybercriminals started attaching or sending links of realistic Deepfake images of their victim. A real image or video would be unnecessary. Virtually blackmailing individuals is more efficient because cybercriminals wouldn't need to socially engineer someone into a compromising position. Deepfake videos can also be used to undermine the reputation of a political candidate or senior executive.

A new emerging threat we expect to take off is the use of Deepfakes for extortion-based ransomware. Here is a likely scenario: The attacker starts with an incriminating Deepfake video, created from videos of the victim's face and samples of their voice collected from social media accounts or publicly available websites. To further pressure the victim, the attacker could start a countdown clock (24-48 hours is common for ransomware) and include a link to a fake video. They would also likely include a Bitcoin address to receive payment. If the victim does not pay before the deadline, all contacts in their address books will receive the link. Although we have not seen this type of attack, it seems like a likely threat given the direction of Deepfake queries in underground forums.

In March 2019, an executive of an unnamed U.K.-based energy company conversed with on the phone with someone he thought was his boss (the CEO of the organization's parent company). This person asked him to urgently transfer €220,000 (US\$243,000) to a Hungarian supplier. It turned out that the executive was talking to a scammer that used Deepfake voice technology to impersonate his boss.<sup>20</sup>

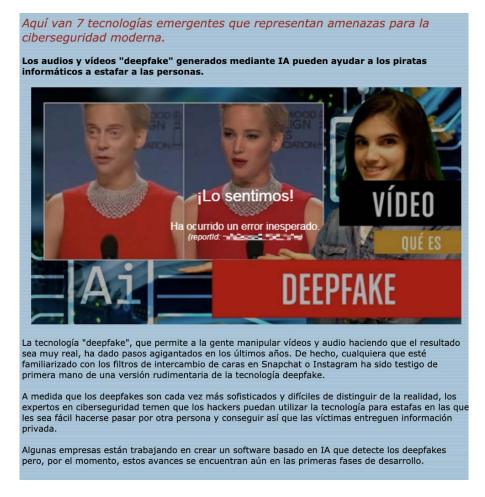


Figure 52. A Spanish underground forum discussing seven emerging threats in 2019 that includes a section on Deepfakes

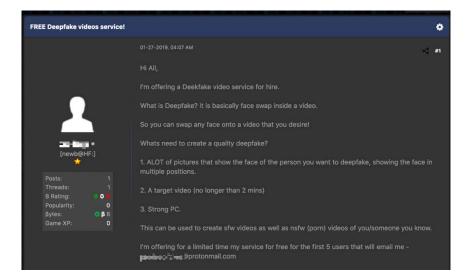


Figure 53. Seller offering five users free Deepfake video services to start their business

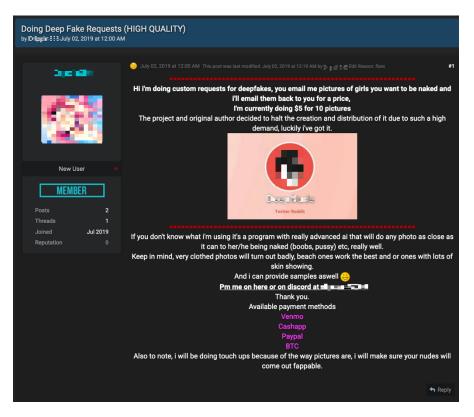


Figure 54. A Deepfake still image service

	e5969	OP 2 months ago			Follow	#1
1	<b>\$</b> \$	In this prog		mprove the quality of		
		DreamTime T We	elcome to private entertainment			
		- Nati				
	634					
REP	LIKES					
Con	tributor					
	ntributor					

Figure 55. Software to create nude Deepfake images by customizing the person's measurements and features

0	DEEPNUDES FOR SALE - DEEPFAKES SERVICE by /u/ The first 1 month ago in /d/F first 1 https://t.me/first 1 first 1 first 1 first 2 videos 1 first 1 first 2 videos 2 videos 2 comments
Comm	ents

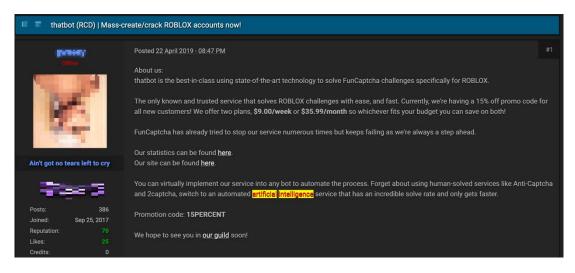
Figure 56. Deepfake services for nude pictures and videos offered through Dread

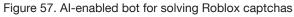
Deepfak	e prices
Service Price	
Deepfake videos	From US\$50
Deepfake still images	From US\$2.50 each
Software to create deepfakes	From US\$25

# Exploring Advanced AI and Using Current Services for Gambling

As AI capabilities become more powerful, we expect cybercriminals to use AI technology to increase targeting and improve malware infection rates in the future. However, the underground market discussions currently revolve around information and inquiries about the AI technology itself rather than actual criminal services. We found multiple listings of AI college books offered for sale and sometimes shared for free.

Most goods or services we encountered were related to the gambling sector. Advertisements for gambling bot services mentioned the use of "advanced AI engines" and start at around US\$80 for a basic onemonth subscription. One gambling bot, called Luckybot, uses AI to predict dice roll patterns. Another advertisement we observed was the use of AI to solve complex Roblox CAPTCHA.





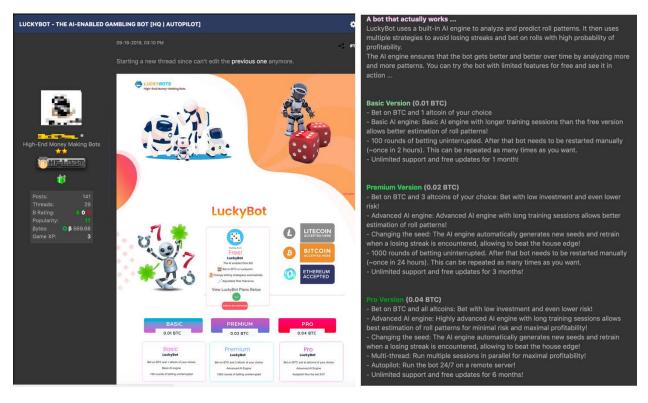
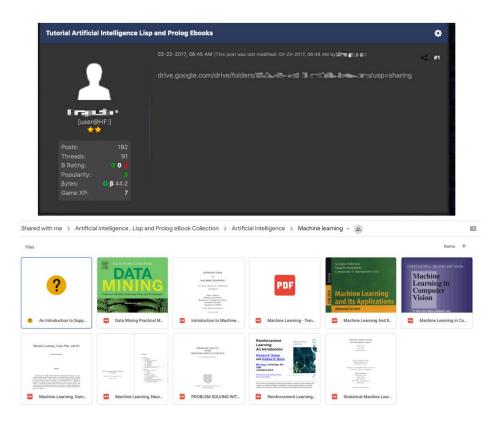
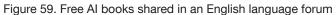


Figure 58. Al-enabled gambling tool for predicting dice roll patterns





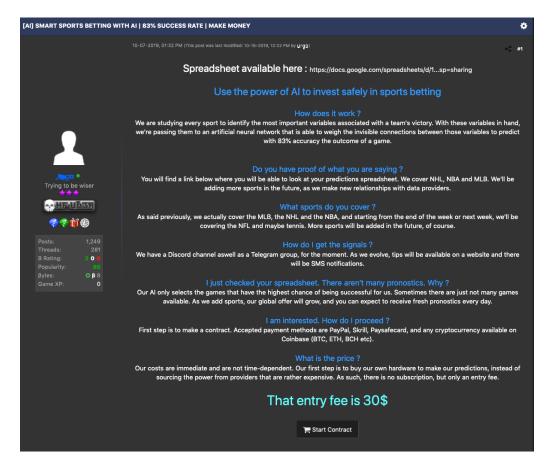


Figure 60. Sports betting service using AI

Al pric	es
Service	Price
Roblox	From US\$36
Gambling Bot	From US\$75
Sports Betting Al	From US\$30

# Access-as-a-Service Becomes Popular

Access-as-a-service has evolved from remote desktop protocol (RDP) offerings to selling access to hacked devices and corporate networks. While it has been around for years, there was an increase in offerings in the last year. Access to different organizations and companies were obtained through ransomware, credential-stealing malware, and botnets. We found multiple levels of access sold: executive-level credentials, remote desktop access, administrative panels, cloud storage, email accounts, and even full company network access.

Many of these offerings are found on the Russian forum Exploit[.]in. One actor was selling access to an American insurance company for US\$1,999, and a European software company for US\$2,999. Prices for Fortune 500 companies can reach up to US\$10,000. Some offerings include access with read and write privileges.

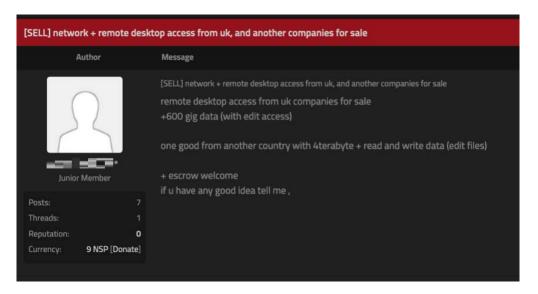


Figure 61. Network access to a U.K. company

#### Cloud Log Access (0/10)

e 😳 👘 👘 🕐 01/10/2020



Figure 62. Actor selling access to cloud logs

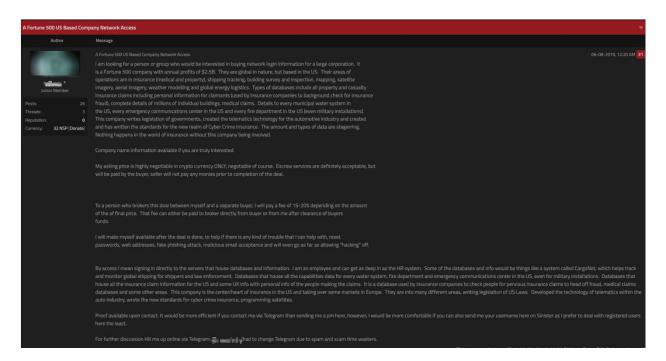


Figure 63. Selling Fortune 500 network access

ess to a large online store
Dec 7, 2019
I will sell a log with access to the admin panel of the online store on the shopify platform. Orders for \$ 10-20 thousand are made per day. The turnover for the last month is more than \$ 500k. Write suggestions in PM.

Figure 64. Advertisement for admin access to a profitable online store

# Wearable Trackers Targeted

In multiple English language-based forums, we found numerous advertisements for Fitbit user accounts and for the actual wearable device itself. Fitbits are priced in the U.S. between US\$69.95 to US\$279 and include a one-year warranty. Users can purchase an additional year of warranty for a fee. Fitbits sold in the EU can range from €79.97 to €299.95<sup>21</sup> and include a two-year warranty.<sup>22</sup> Underground prices for account information such as usernames and passwords are frequently available, but we have also found advertisements selling the devices' captured data such as steps and GPS locations.

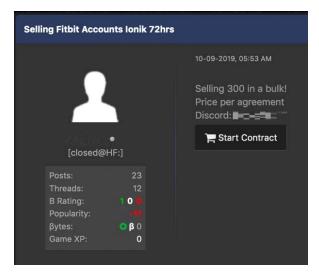
Cybercriminals who purchase Fitbit user accounts are usually running a warranty scam, where they modify the email and address and then request a replacement device under the one or two-year warranty. These Fitbits are then sold in underground forums for a large discount. The Fitbit Iconic goes for US\$249 in the U.S., but it can be purchased in the underground for US\$40. We cannot confirm what cybercriminals are using the captured step data for, but we speculate it may be used to receive the special offers and discounts given after a certain amount of step activity. We even found an advertisement offering a class on how to social engineer customer service to obtain a replacement Fitbit for US\$100 on an English language-based forum.

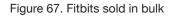
#### Fitbit email changed without my authorization ¢ < Previous 1 2 Next > M ... 04-19-2019 19:16 - last edited on 04-20-2019 11:02 by I received an email that my email address was changed. This email is not mine and I never made the change. I chatted online right away with a Fitbit support rep and he said he opened a ticket but after reading through other people's complaints about the same exact issue, I'm a bit concerned. I don't understand why this person, whoever Jogger they are, would hack my Fitbit data. It's of absolute no value to them! I just want access to my data again that I've **9** 4 **√** 0 **i** 1 accumulated for the last year! Does anyone know if I can expect to gain access to my account again? I've used the Flag Post same email since I got my Fitbit a year ago so this is just ridiculous if Fitbit can't fix this, they should've never Message 1 of 26 allowed the email change in the first place without me confirming it. Moderator edit: Removed personal info 🖒 1 Vote Reply

Figure 65. A Fitbit user complaining their account information was changed

9k Fitbit Accounts - Devi fatus- March 22, 2018 at 11:05 PM	ce Capture - Cracked [3/22/18]	Thread Closed
s (2): 1 2 Next »		
fatus .	March 22, 2018 at 11:05 PM Cracked all these accounts on my own.	
	:Sample:	
Banned	[Device - One] [Type - HADRON] [Battery - High] <u></u>	
Posts 232	記 mun th 語 調理Concast.net:World5500962 [Device - Alta HR] [Type - ATOM] [Battery - High]	
Threads 45		
Joined Oct 2017	E ∎ ∎K⊂same :@concast.net:Wondsex	
Reputation 264		
2 YEARS OF SERVICE	Enjoy.	

Figure 66. Fitbit captured accounts for sale





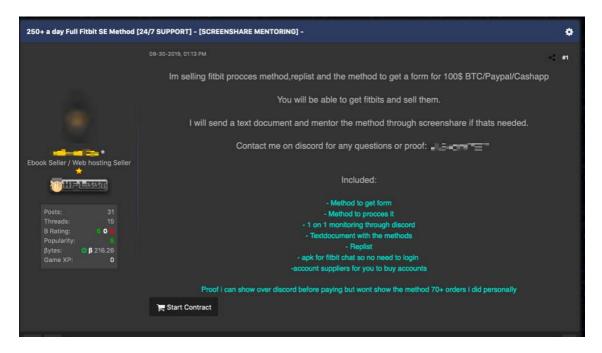


Figure 68. A class on social engineering, teaching others how to obtain Fitbits and sell them

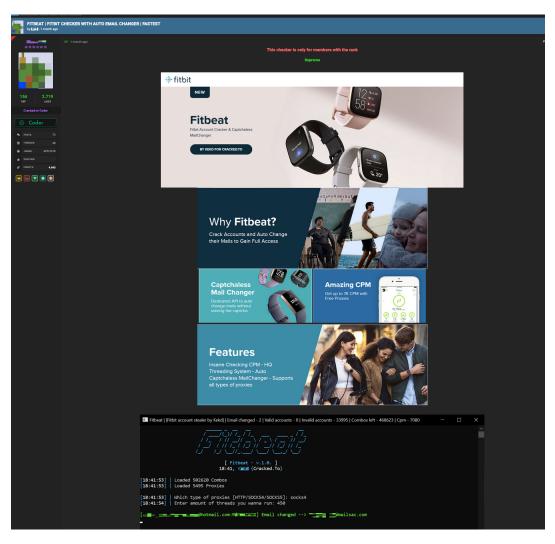


Figure 69. An advertisement for a Fitbit account validation service

Fitbit prices	
Service	Price
Fitbit social engineering course	From US\$100
Fitbit Ionic	From US\$40
Fitbit Versa	From US\$35

# IoT Botnets are the New Norm

IoT botnets are now commonly found across underground forums. As IoT device use becomes commonplace in households, enterprises, and the public sphere, Mirai and its variants continue to evolve and adapt. They remain the dominant IoT threat, particularly because of landscape changes like the adoption of 5G. Our recent IoT paper, The Internet of Things in the Criminal Underground,<sup>23</sup> covered data and active monetization schemes focused on consumer devices.

Most IoT botnets found in underground forums are either based on the same leaked source code from the Mirai malware, other similarly behaving malware, or a variant. We found multiple forum users asking for links to the original Mirai source code or information on how to troubleshoot their own Mirai code. Older Mirai variants are commonly shared for free. Newer undetected variants can go for up to US\$5,000 when first released.

Mirai botnet rentals start at just US\$10. Low-cost rentals mean that this type of botnet is readily available to all levels of cybercriminals, even those that may not have the skills to build and run their own botnets. We also noticed that some of these Mirai botnet rentals come with bulletproof hosting as part of the service. The predominant model for earning with these botnets is still distributed denial of service (DDOS), however, we do expect criminals to innovate more over time.

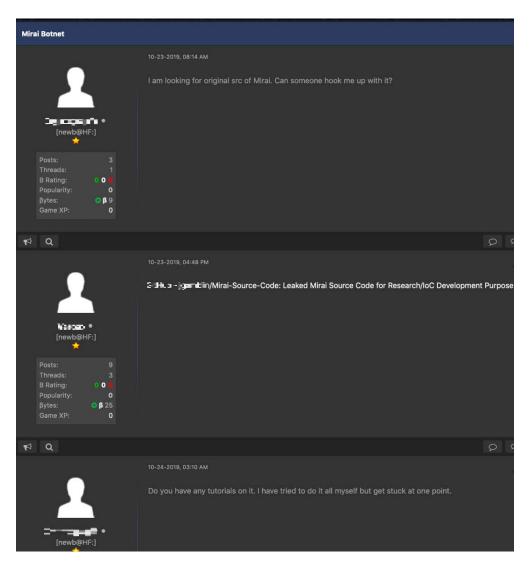
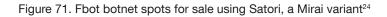


Figure 70. Forum user asking for the Mirai source code

📧 📰 Selling FBOT botnet s	pots (500Gbps+)
Her page 14	Posted 15 November 2019 - 02:52 AM
	Selling botnet spots starting at \$500 a week, the botnet is hitting around 500Gbps.
<u> </u>	This is not a mirai, it's FBOT ( <u>https://blog.netlabn-based-dns-en/</u> )
	Suspect Traffic
	490.7 Gbps
0 0	429.3 Gbps
Rep Likes	368.0 Gbps
	306.7 Gbps
Lurker	245.3 Gbps
VIP	184.0 Gbps
7.64	122.7 Gbps
Posts: 3	61.3 Gbps
Threads: 1	
🚔 Joined: Oct 02, 2019	If you wanna know more about it message @ <b>#CCLE</b> on Telegram.
Credits: 0	



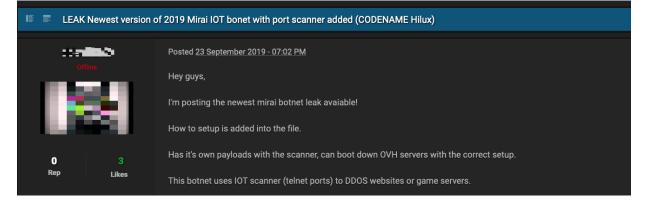


Figure 72. Free Hilux Mirai variant download



Figure 73. A Mirai botnet variant rental service starting at US\$250 a month

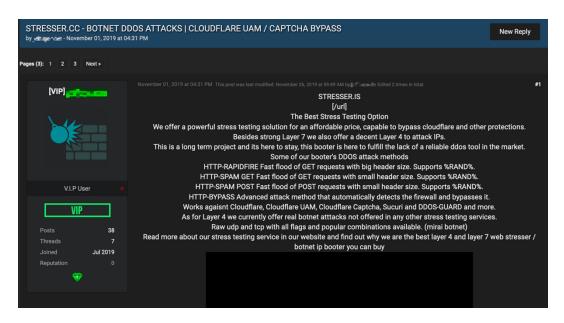


Figure 74. A Mirai botnet stressor service



Figure 75. IoT botnet setup service with Bulletproof servers

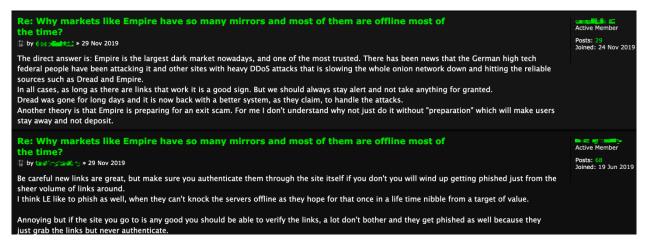
IOT Botnet pri	ices
Service	Price
Mirai botnet rentals	US\$10 and up
Original Mirai source code	Free
Mirai based stressor	US\$20 and up
Fbot Mirai variant rental	US\$500 a week

# Dark Web Marketplace Users Lose Trust

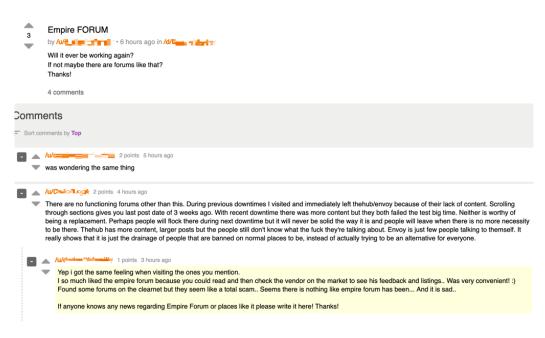
In March 2019, the dark web marketplace Dream Market announced that it was shutting down in April to transfer its services to a partner company. Shortly after, Wall Street Market, Valhalla, and DeepDotweb became part of the long list of marketplaces that law enforcement took down in May 2019. Wall Street Market administrators were planning an exit scam using money held in escrow for current transactions when law enforcement arrested them.<sup>25</sup>

After a major marketplace shuts down, the dark web community usually migrates to other coexisting markets. However, because of current volatility within the landscape, there is no dominant and stable marketplace.

We observed multiple chats on Dread discussing slow sales after the May 2019 takedowns. Users frequently posted about fears of exit scams and law enforcement involvement. Sites like Empire, which became one of the top markets in the wake of the takedowns, are consistently battling login problems and DDoS attacks. Forum users on Torum and Dread regularly express frustration at marketplaces because of these issues (Torum is a crypto-driven, multi-functional, self-governing forum). The source of the DDoS activity is rumored to be law enforcement. In November 2019, it was reported that the Berlusconi Market was taken down by the Italian police, which discouraged dark web users even more.<sup>26</sup>









WHO CAN YOU TRUST?! Post Reply		
WHO CAN YOU TRUST?!         If by all reactions and seems like you can't trust a damn soul on here. Why can't there be just ONE GOOD TRUSTWORRTHY MARKET real honest reviews and plenty of people to vouche. All anybody wants to do is take your damn money. Can someone please help find trustwe sites????		Member Posts: 23 Joined: 27 Nov 2019
Re: WHO CAN YOU TRUST?!	Quote	France 600 Active Member Posts: 66 Joined: 22 Feb 2019
Re: WHO CAN YOU TRUST?! Up y mini remember 1 + 27 Nov 2019 thats what i've been trying to do but i can't find any posts with multiple vouches its only one person recommending a site that one person be a scammer to for all i know its hard to trust people on here. especially after being scammed 3 damn times	Quote could	ning van kaarini   Member Posts: 23 Joined: 27 Nov 2019
Re: WHO CAN YOU TRUST?! Up Stark@ + 27 Nov 2019 what are you looking for? trust no marketplace man!!!	Quote	Senior Member Posts: 209 Joined: 30 Aug 2019
Re: WHO CAN YOU TRUST?!	Quote ing to	Member Posts: 23 Joined: 27 Nov 2019

Figure 78. Torum post discussing distrust in the marketplace community

3	
-	by /u/qaar ======= 6 months ago* in /d//
	with the problems over at empire about withdrawing (see post/129c79e32430e0e414f9) everything is coming to a head. even if they resolve it and its just a technical issue, this happens way too much.
	wsm got off with millions (until they got busted for being fuckin stupid), dream went balls up, this happens over and over and fucks over thousands of people. also, LE has shown they can penetrate these sites all the time and even with encryption can find people.
	then we got ddos bullshit happening all the fucking time
	whats the solution?
	<ol> <li>vendors want FE, but hard to trust only FE. many scammers around, and buyers like the safety of escrow, this isnt going to change</li> <li>nobody uses multisig, its not too difficult, but buyers already struggle to encrypt their addresses, let alone use multisig!</li> </ol>
	<ol> <li>centralized markets are a target. they can be ddos'd and make it impossible to use</li> <li>decentralized markets like openbazaar are trickier to use and the search feature is difficult to use</li> </ol>
	how do we fix this?
	some ideas:
	1. use an independent onion-based btc and monero / other alt-coin escrow service that is disconnected from the markets. can be used for any escrow service, not just drug markets.
	2. have third parties mediate disputes. mediators can get a percentage for helping and be assigned tickets randomly to prevent corruption. all vendors use tracking labels to confirm they shipped something. not perfect, but about the same level of trust as on the markets.

WE NEED TO STOP THIS CYCLE OF EXIT SCAMMING MARKETS

3. independent rating site for vendors. no sales happen on the site itself, low overhead, hard to DDOS (and ratings sites have little in the way of money, how can you blackmail that?). maybe some way to have escrow transactions rated when buyers marked it finalized and being able to import individual ones to the rating site? need to find a way to minimize fake transactions.

some ideas, i kno they need work. thoughts anyone?

Figure 79. Dread discussion on exit scams

The marketplace community has been looking for ways to build trust. A new site called DarkNet Trust was created to verify vendors' reputations by searching through usernames and PGP fingerprints. DarkNet Trust searches over 10,000 profiles from Dream, Empire, Nightmare, Berlusconi, Tochka, Cryptonia, Apollon, Grey Market, and Agora.

New encrypted email services like Sonar and Elude have also suddenly appeared. Former favorite Protonmail was accused of helping law enforcement in the past, prompting dark web users to look for alternative email services.<sup>27</sup>

Administrators of new marketplaces are also adding new security features, for example: walletless markets, multisignatures on BTC and Monero, and no-javascript policies. Grey Market and BitBazaar are new walletless markets. Monopoly is a walletless market where payment is directly made between buyer to vendor, and the market gets a monthly commission as opposed to transaction fees. The Cryptonia marketplace uses multisignature wallets for transactions.

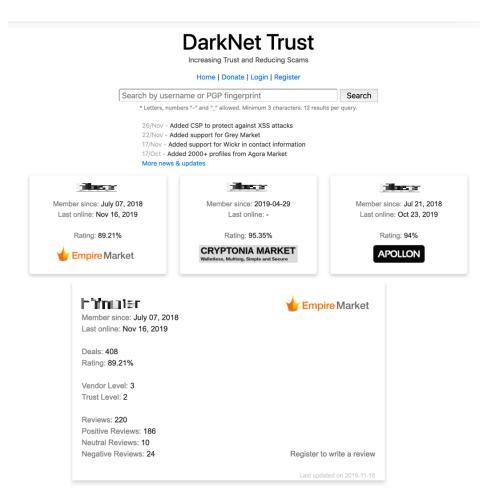


Figure 80. A DarkNet Trust search for a specific underground vendor



Easily encrypt all your messages Login · Register

#### About

No logs, no javascript, no tracking, no email, no clearnet.

Sonar is the most secure and private web messaging system available in the Darknet.

Easily encrypt ALL your messages.

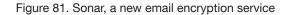
#### Comparison Table

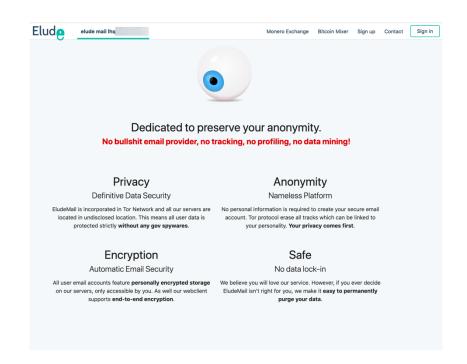
Here you can compare the security and privacy features of several messaging systems.

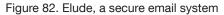
Website	Remove own messages	Remove peer messages	Allows auto-encrypt	Self destruction	Plain text disabled
Empire	x	x	x	x	x
Sonar	Yes	Yes	Yes	In progress	Yes
Dread	Yes	Yes	x	x	x
Apollon	Yes	x	x	Yes	x
Cryptonia	Yes	x	Yes	x	x
Tochka	x	x	x	x	x
Cannazon	x	x	x	x	x
Dream Alt	x	x	x	x	x
Nightmare	x	x	Yes	x	x

#### Features

Sonar uses Public-key cryptography in order to encrypt every message before it is stored in the server. A private key and public key are generated for every user upon registration.







Users on dark web forums also suggested that blockchain technology could host decentralized marketplaces. Sites that are hosted on blockchain are perceived to be less susceptible to law enforcement takedowns and surveillance. One such decentralized blockchain DNS service is Blockchain-DNS, or BDNS, which can access domains such as .bit, .bazar, .coin, .emc, as well as other domain name extensions used by OpenNIC. (This echoes a prediction we made in 2013 that .bit domains are advantageous to cybercriminals and could eventually be used for malicious activity.<sup>28</sup>) However, the idea of using these types of markets hasn't particularly caught on. Some dark web forum users say decentralized markets are not easy to use, and it is harder to search for products.

So far, a few organizations have experimented with different structures and new features. We noted that a popular carding site, Jokers Stash, moved to a blockchain DNS to avoid law enforcement surveillance. OpenBazaar, an open-source, decentralized P2P market, has an Android and iOS app that allows users to chat privately. It has experienced steady growth over the last three years but has yet to become a top marketplace. Utopia is another new marketplace that was launched in late 2019. It is advertised as a marketplace that can bypass online censorship, firewalls, and surveillance with its built-in use of encrypted text, email, and messages.

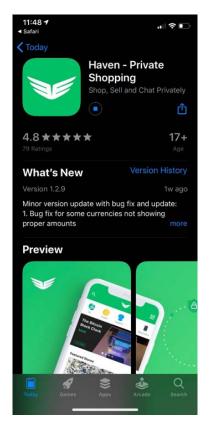


Figure 83. OpenBazaar iOS app

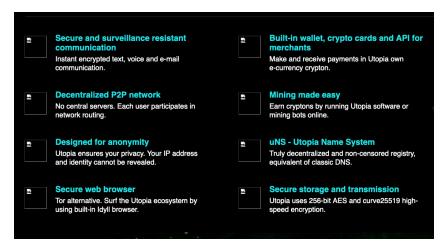


Figure 84. Utopia's security features for gaining the user's trust

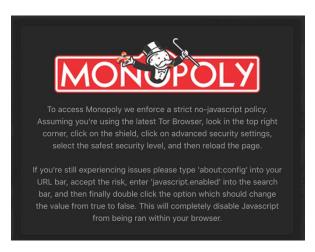


Figure 85. Monopoly's strict no javascript policy

# **Discord Used for Direct Messaging and Sales**

Two years ago, we saw that many cybercriminals used the Telegram messaging app to facilitate their malicious activity. In 2019, cybercriminals moved to Discord, a popular communication platform with more than 250 million users as of May 2019. The platform is viewed as a safe place that allows users some degree of anonymity.

Underground forums and dark web marketplaces have created their own Discord servers. While these channels are not as busy as the forums themselves, we have observed the same goods and services being offered for the same prices.



Figure 86. Discord group for sellers



Figure 87. French underground forum Piratologie Discord channel



Figure 88. Discord channel for OG forum

# African Cybercrime Increases

In our 2017 research paper on the West African underground market<sup>29</sup> we predicted that West African cybercriminals would shift to more elaborate crimes, complex operations, and business models. BEC and tax fraud are examples of such activities.

Internet and mobile users have increased in Africa over the last two years, and more people are using online banking, online bill payments, and social media accounts. This, of course, is a ripe environment for cybercriminals. Several hacking groups have already emerged. In 2017, members of the Forkbombo group were arrested for exploiting banking infrastructure loopholes to steal millions from Kenyan banks. SilentCards, a group that supposedly spawned from Forkumbo, reportedly continues to siphon ATMs and target banks.<sup>30, 31</sup> In West Africa, the group Silent Starling successfully infiltrated more than 500 organizations worldwide with BEC attacks in 2019. The group first started with romance scams.<sup>32</sup>

# SIM Card Services Popular but Prices Remain Private

SIM swapping and SIM-jacking will be a growing threat that takes advantage of remote employees and everyday users. Since mobile devices are used for enterprise authentication, hijacked SIM cards can give hackers access to a user's enterprise email account as the hardware is "trusted." This means that they will be able to access all manner of corporate data covertly.<sup>33</sup>

Underground offerings vary from free tutorials to region-specific SIM card services. Many of the services are offered in Russian language forums. In forums of other languages, they were not so visible. Prices for these services are commonly unlisted and only available through private messages.

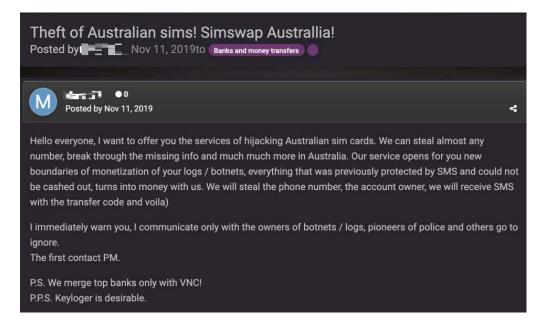


Figure 89. Russian language forum offering SIM swaps in Australia

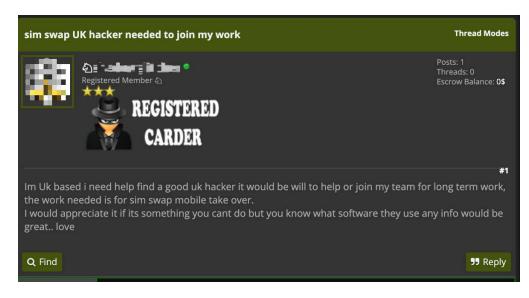


Figure 90. Russian language forum asking for SIM swap hackers

# The Future of Seller Spaces

Predicting how underground markets and forums will evolve is complicated, but we can reasonably anticipate certain issues with sufficient data and insight. We have identified several scenarios we expect to see in the cybercriminal underground economy within the next three years.

**Deepfake ransomware will be the evolution of sextortion.** Deepfakes will move away from creating fake celebrity pornographic videos, and veer into manipulating company employees and teenagers. These tools will demand a higher price than non-sextortion ransomware builds.

**More cybercrime will hit Africa in the next three to five years.** As more citizens use online platforms for banking and transactions, cybercriminals will develop tools and schemes to take advantage of them. Established hacking groups are already attacking financial institutions, and we predict more will follow.

Cybercriminals will find a scalable business model that takes advantage of the IoT's wide attack surface. Cybercriminals will move away from simple DDoS to data interception or using the machines as long-term infected proxies to make botnets harder to map out. Cybercriminals will hone in on IoT devices for espionage and extortion.

We will see smart contracts in escrow offered in underground forums. Replacing escrow with a blockchain for trust could help guarantee that both parties get what they want out of the deal, without the need to establish trust through reputation.

**SIM card hijacking will increase and target high-level executives.** Underground forums currently offer services involving the use of social engineering on telecommunication companies to swap SIMs. Many offerings exist for SIM card swaps, usually from a company insider. Gaining access to your account allows hackers to pass 2-step verification process in various platforms.

# **Appendix of Prices**

### Past

Generic Android botnet		
	Up to US\$1,500	
Generic DDOS botnet	US\$50 a day	
Panel/builder for a form grabber botnet	US\$100	
Botnet rentals	US\$5 and up	
Generic botnet builds	Free and up	
RevengeRAT/NjRAT	Free	
Generic Android RATS	US\$1 and up	
Source code for a generic RAT	US\$49 and up	
Monthly RAT subscriptions	US\$5 and US\$25	
Generic ransomware build	US\$5 and up	
Ranion ransomware	US\$900 a year	
Cryptolocker ransomware	US\$100	
Jigsaw ransomware	US\$3,000	
Dharma ransomware	US\$100	
Generic crypterbuilders	US\$99 and up	
Crypteras a service	US\$20 and up	
Kronos-based malware	US\$3,000 and up	
Generic Android banking malware	US\$100 and up	
ATM Malware	US\$2,000 and up	
GozNym malware	US\$750	
Phone Flooder	US\$50 and up	
SMS bulk sender	US\$25 to US\$500	
SMS sender monthly	US\$2 and up	
Netflix accounts	US\$2 and up	
Banking credentials	US\$5 and up	
Spotify accounts	US\$3 and up	
Disney+ accounts	US\$1 and up	
McDonald's accounts	US\$1 and up	
Domino's accounts	US\$1 and up	
Grubhub accounts	US\$3 and up	
Store credentials with credit cards	US\$1.50 and up	
High balance credit cards	US\$100	
Bulk credit cards	US\$1 each	

Verified credit cards	US\$10 and up	
Fake credit card statement	US\$25	
Registered passport service	US\$2,500	
Scan copies of real passports	US\$1 and up per copy	
Forged Pharmacy Rx labels	US\$60 and up	
Identity kits	US\$20 and up	
Driver's license scans	US\$10 and up	

### Present

United States Voter databases	Free to US\$9.99	
Non-U.S. Voter databases	US\$9.99-US\$400	
1,000 Facebook likes	US\$3 and up	
1,000 Instagram likes	US\$0.15 and up	
50 Twitch likes	US\$0.50 and up	
Social media bot	US\$25 and up	
1,000 YouTube likes	US\$26 and up	
20,000 new visitor hits	US\$5 and up	
Deepfake videos	From US\$50	
Deepfake still images	From US\$2.50 each	
Software to create deepfakes	From US\$25	
Roblox	From US\$36	
Gambling bot	From US\$75	
Sports Betting Al	From US\$30	
Fitbit Social Engineering course	From US\$100	
Fitbit Ionic	From US\$40	
Fitbit Versa	From US\$35	
Mirai botnet rentals	US\$10 and up	
Original Mirai source code	Free	
Mirai based stresser	US\$20 and up	
FbotMirai variant rental	US\$500 a week	

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