

Advertise publicly, trade privately?

Analysing the Cybercrime-as-a-Service (CaaS) Offerings in Underground Forums

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Technical University of Delft*

Cyber Criminals Are Catching Up With Nation-state Hackers

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Cyber criminals are catching up to nation-states' hacking capabilities, and it's making attribution more difficult, according to the US National Security Council's senior director for cybersecurity policy.

"They're not five years behind nation-states anymore, because the tools have become more ubiquitous," said Grant Schneider, the US Federal CISO, speaking at the Security Through Innovation Summit last week.

"The actual sophistication of the tool ... is better with criminals than we saw in the past."

Speaking at the same event, Steve Grobman, the chief technology officer for McAfee, said that advanced crooks are behaving more corporately, which means they are able to proliferate higher-quality hacking tools.

"One of the things we're seeing on the business-model side is cyber criminals are starting to use innovative processes like franchises, affiliate groups where a cybercriminal will develop technology and make it available to other cybercriminals,"

Franchising the malware means that criminals can concentrate on improving in other areas, Grobman said. As a result, "what the cybercrime affiliates will do is they will focus on identifying phishing lists, other ways to break into networks to then actually launch the ransomware ... instead of having to build effective tools from scratch," he said. "They can put all of their investment into executing their attack."



HACKING Menu

ASK YOUR SERVER ABOUT OUR SPECIALS!

Hack Group

| | Bitcoin | USD |
|-------------------------------------------|---------|----------|
| Hacking Web Server (VPS or hosting) | 0.43 | \$266.52 |
| Setting up Keylogger | 0.25 | \$154.95 |
| Device Tracking (smartphone/PC) | 0.32 | \$198.34 |
| Hacking Personal Computer | 0.23 | \$142.56 |
| Spyware Creation | 0.35 | \$216.93 |
| Intelligence Report - Background Check | 0.23 | \$142.56 |
| Setting Up Your Own Botnet | 0.93 | \$567.42 |
| Logs from Zeus Malware, | | |
| 10 GB (Stolen CCs, PayPal, Bank Accounts) | 1.24 | \$768.56 |

Russia Hackers

| | Bitcoin | USD |
|--------------------------------|---------|------------|
| Custom Ransomware (CTB-Locker) | 2 | \$1,239.62 |

The Real Deal (TOR eBay-clone)

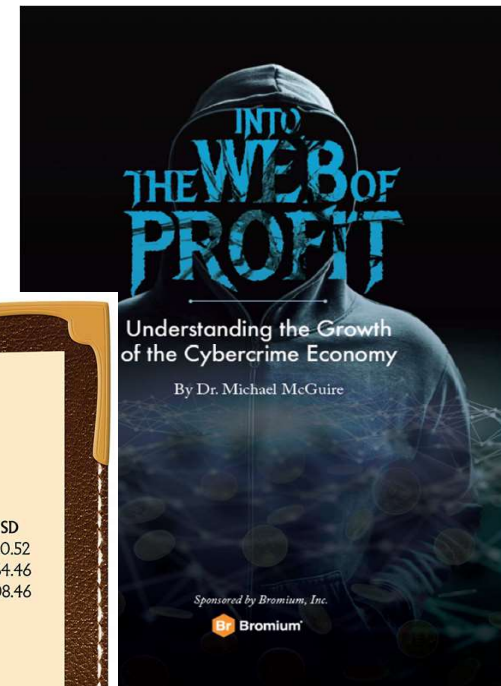
| | Bitcoin | USD |
|------------------------------------------|---------|------------|
| 24 Hour DDoS | 0.743 | \$460.52 |
| Social Media Hacking, Per Account | 0.104 | \$64.46 |
| Apple Enterprise Certificate Private Key | 14.8569 | \$9,208.46 |

Cell Phone Hacking/ Phreaking

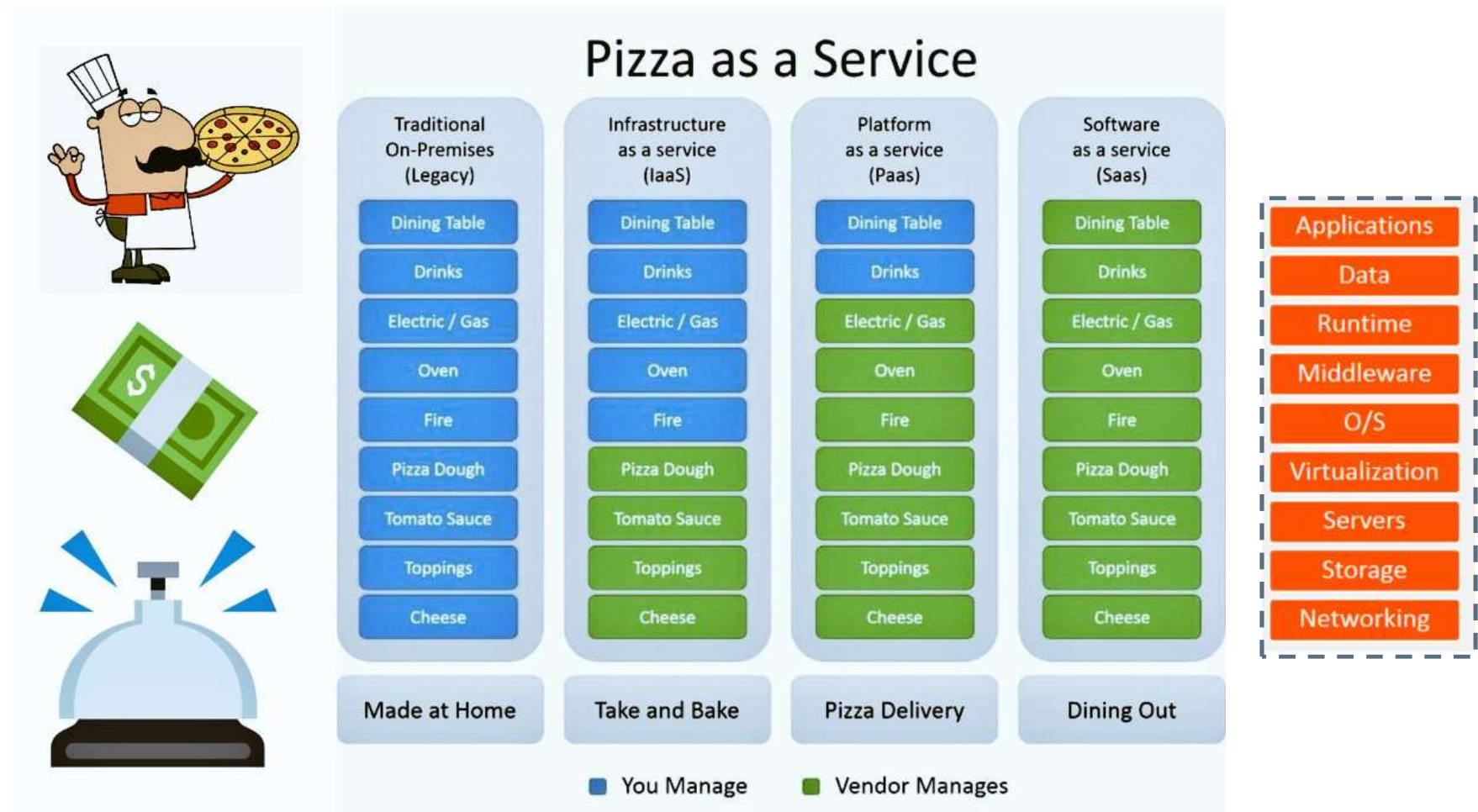
| | Bitcoin | USD |
|-------------------------------|---------|----------|
| SS7 API Access (1 Month) | 0.32 | \$200.00 |
| SMS / Call Spoofing (1 Month) | 0.03 | \$20.00 |

Rent-A-Hacker

| | Bitcoin | USD |
|-------------------|---------|----------|
| Small Jobs | 0.35 | \$221.14 |
| Medium-Large Jobs | 0.89 | \$552.85 |



'as-a-service' model



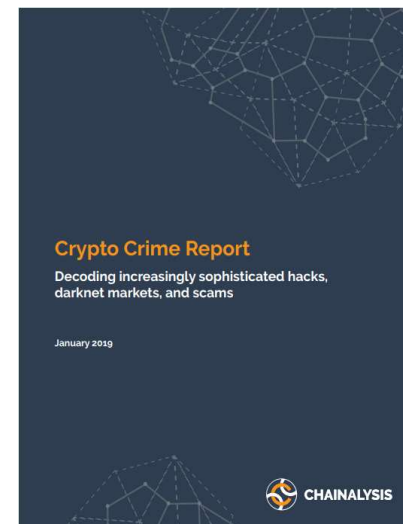
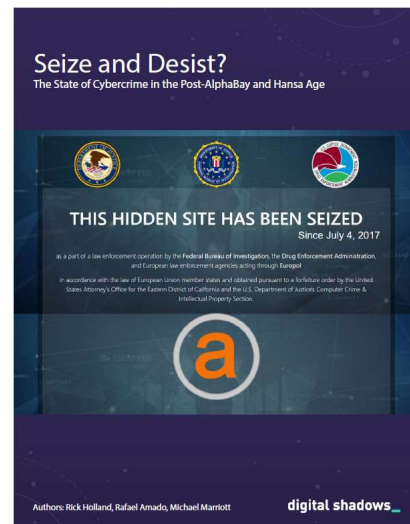
What CaaS provides?

1. Makes cybercrime easily accessible to novice criminals with limited technical skills
2. Enables specialization, commercialization and cooperation for advanced cyber criminals

“CaaS is a **blackbox**: The attacker can purchase the desired “service” through the dark/surface web **without a detailed understanding of what is involved in its execution.**”



Marketing shift to Forums

- Similar resources also tell that cybercriminals have increasingly taken to using specialist sites and **forums** to advertise their services, before conducting transactions on **private communication channels** like Telegram, Discord, Skype, Jabber, or IRC.
- This marketing shift is claimed to be a result of the **loss of trust to darknet marketplaces** after the seizure or closure of the underground markets (Alphabay, Hansa, Dream, Wall Street).



The World's Biggest Dark Net Market Has Shut – What Next?

Dream Market is due to close on the 30th of April, under mysterious circumstances. Is the game up for the big online drug bazaars?

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Browse by category

- **Drugs** 40336
 - Barbiturates 43
 - Benzos 1947
 - Cannabis 10839
 - Dissociatives 1262
 - Ecstasy 6977
 - Opioids 3453
 - Prescription 1863
 - Psychedelics 3288
 - RCs 340
 - Steroids 986
 - Stimulants 6906
 - Weight loss 125
- Digital Goods 29781
- Drugs 40336
- Drugs Paraphernalia 525
- Services 2216
- Other 2038

Drugs (40351)

Filter


Ships to: Ships from: Escrow:

Price: Searchtext: Sort:

1 2 3 4 5 6 7 8


18 19 20 ... 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 →

3.5g Pure Cocaine Very High Quality 90-95%

 **\$0.3979**
hammerhome123 (2804)
(4.93★)
GB – GB, EU
Order

★25x180UG★Cali Blotter★

28g Mdma

 **\$0.551**
project-4 (1597) (4.91★)
GB – WW
Order

★100x100UG★The Beatles Blotter★

35

[OFFICIAL] Dream Market statement.

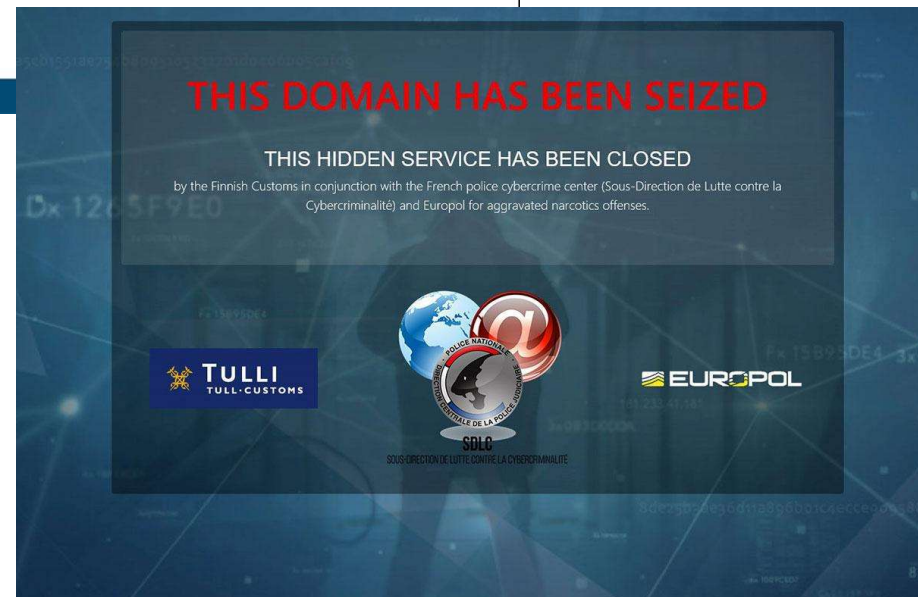
by /u/waterchain **Dream official staff** · 1 month ago in /d/DreamMarket

Hey everyone i am an official dream market moderator,
As you know already Dream Market is planning to shut down on 04/30/2019.
As we also stated that Dream Market will be transferred to a partner company, which will be a fair & honest company.

—
Dream Market has been being DDosed for the last 7 weeks by a user that wanted 400k in USD and we have denied that.
The problem with the DDos was a big issue for dream market, our tech team of Dream Market worked as hard as they could.
But the real problem about the Ddos attack is on the TOR browser side, so we had no power to resolve this error.



Two of the big dark web marketplaces have been taken down in simultaneous global operations, supported by Europol: the Wall Street Market and the Silkkitie (known as the Valhalla Marketplace), 3 May 2019





Know your enemy and know yourself and you
can fight a hundred battles without disaster.

(Sun Tzu)

To combat cybercrimes in an effective way, we not only need to develop technical solutions to protect against attacks but also need to **understand the business structure of underground cybercrime and its development.**



Plug and Prey? Measuring the Commoditization of Cybercrime via Online Anonymous Markets

Rolf van Wegberg and Samaneh Tajalizadehkhoob, *Delft University of Technology*;
Kyle Soska, *Carnegie Mellon University*; Ugur Akyazi, Carlos Hernandez Ganan,
and Bram Klievink, *Delft University of Technology*; Nicolas Christin, *Carnegie Mellon University*; Michel van Eeten, *Delft University of Technology*

<https://www.usenix.org/conference/usenixsecurity18/presentation/van-wegberg>

This paper is included in the Proceedings of the
27th USENIX Security Symposium.

August 15–17, 2018 • Baltimore, MD, USA

ISBN 978-1-931971-46-1

- Which parts of cybercrime value chains are successfully commoditized and which are not?
- What kind of revenue do these criminal business-to-business services generate and how fast are they growing?

In our previous paper :

- Analyzed the dataset of Soska and Christin (2015) on seven prominent online anonymous marketplaces (2011-2015) and AlphaBay (2014-2017).
- Implemented a Support Vector Machine (SVM) classifier to predict ten B2B and seven B2C product classes.

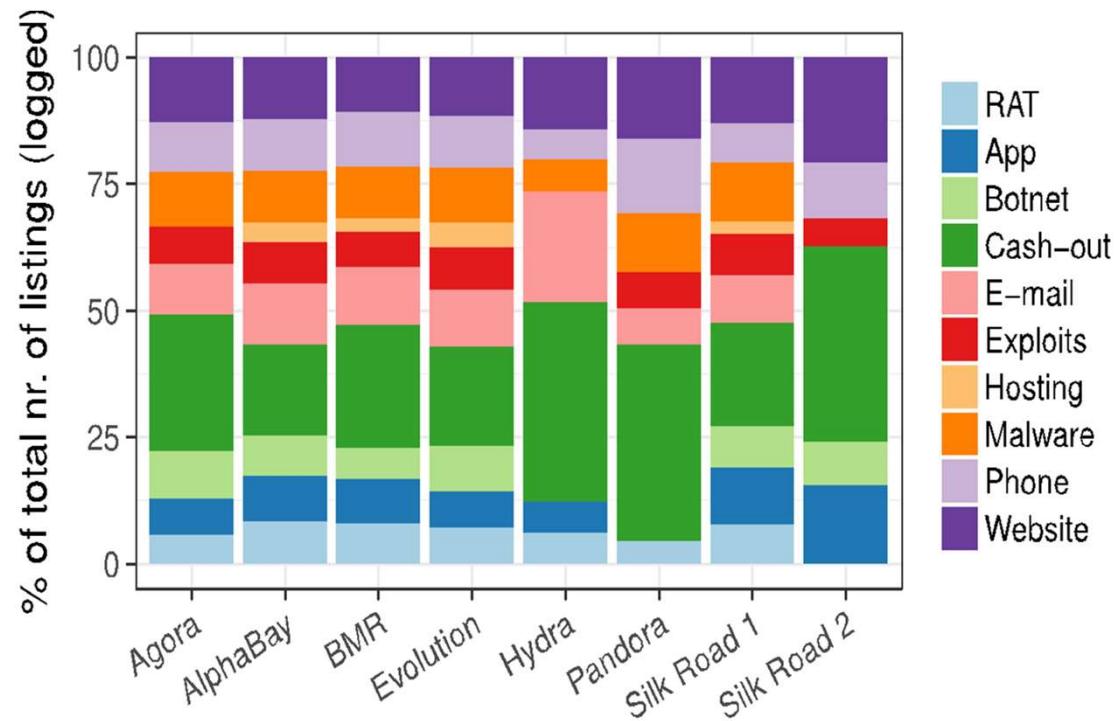


Table 4: **Listings per category.** The top half represents B2B listings, the bottom half, B2C.

| Category | # Listings | # Vendors | Total revenue |
|----------|------------|-----------|---------------|
| App | 144 | 75 | \$ 12,815 |
| Botnet | 125 | 79 | \$ 46,904 |
| Cash-out | 12,125 | 2,076 | \$ 7,864,318 |
| E-mail | 550 | 216 | \$ 97,280 |
| Exploit | 115 | 75 | \$ 17,603 |
| Hosting | 20 | 15 | \$ 1,182 |
| Malware | 310 | 162 | \$ 57,598 |
| Phone | 261 | 148 | \$ 74,587 |
| RAT | 105 | 65 | \$ 16,070 |
| Website | 664 | 293 | \$ 286,405 |
| Accounts | 3,759 | 577 | \$ 598,491 |
| Fake | 3,386 | 815 | \$ 2,877,184 |
| Guide | 5,049 | 1,020 | \$ 2,620,635 |
| Pirated | 1,420 | 338 | \$ 129,961 |
| Voucher | 1,293 | 386 | \$ 753,116 |
| Custom | 6,310 | 1,887 | \$ 5,793,064 |
| Other | 8,424 | 2,652 | \$ 7,749,788 |
| Total | 44,060 | 5,552 | \$ 28,997,006 |

Take-aways

- There is evidence of commoditization, but outsourcing options are restricted and transaction volume is often modest.
 - partial fulfillment of cybercriminal demand
- The scarcity of supply suggests potentially vulnerable components in criminal value chains. These choke points might be targeted by interventions to raise the transaction costs.

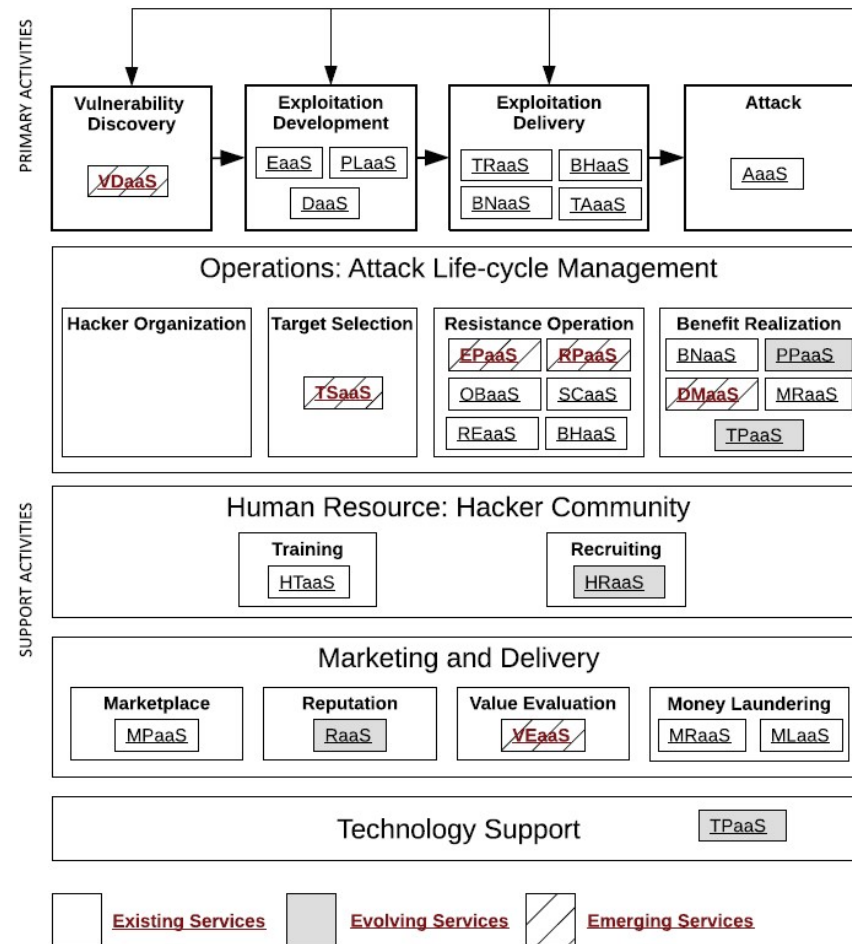
Research questions (work in progress)

- Which CaaS crimewares are demanded and supplied in underground forums? What is the volume and diversity of these advertisements and ratio of them to non-CaaS ones?
- How do the real CaaS transactions happen? Via the links to external trading platforms or private communication channels?

Methodology

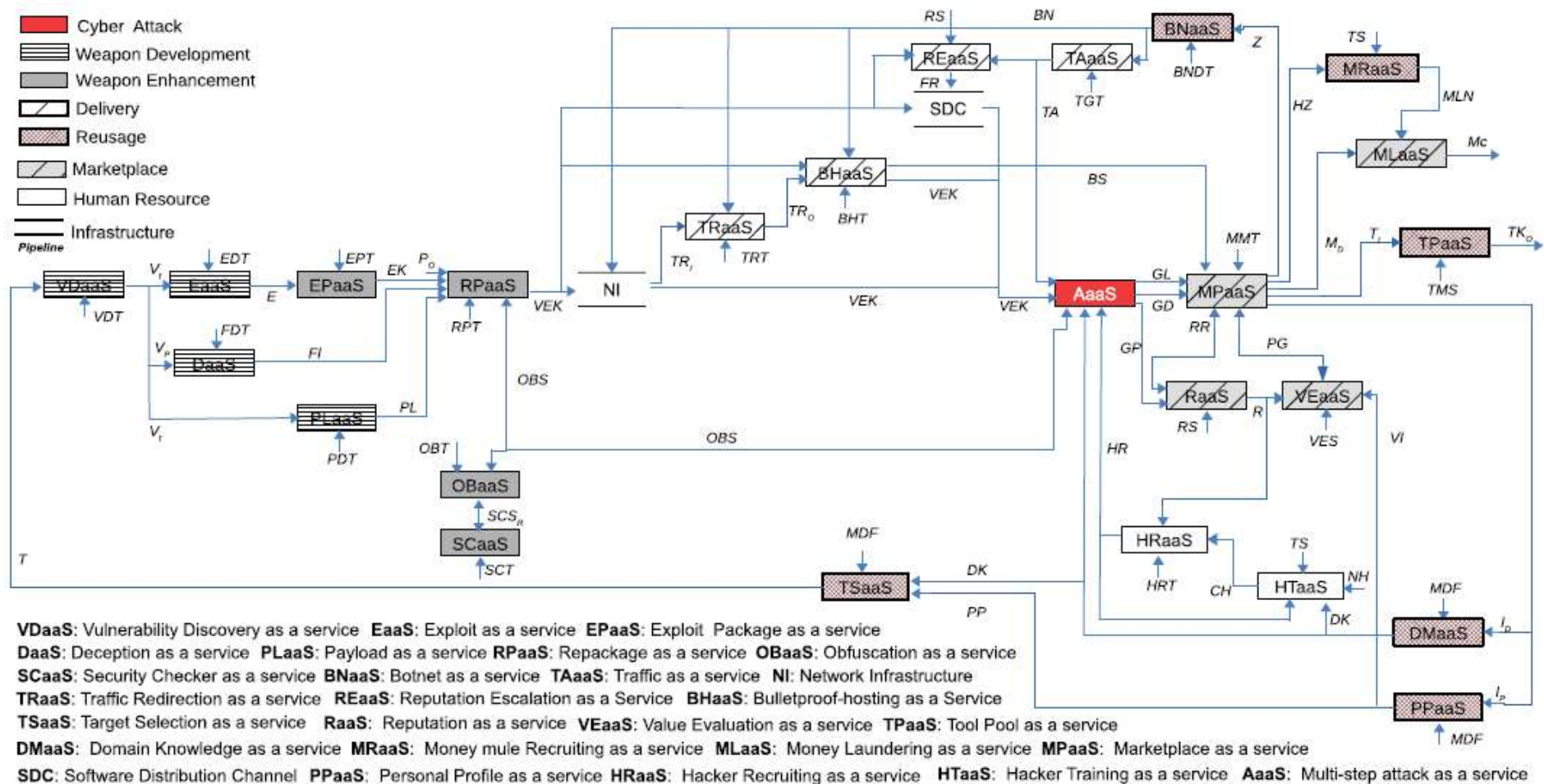
1. Conceptualize the framework of CaaS ecosystem within the cybercrime value chain model,
2. Compile dataset of underground forums and preprocess the data,
3. Create and annotate the 'ground-truth' listings manually to train and test the ML classifier,
4. Develop the ML classifier (w/o decision rules) to map the cybercrime products/services, buy/sell, contact, external links,
5. Analyze the dynamics of CaaS in the fora.

Value Chain Model



* Keman Huang, Michael Siegel, and Stuart Madnick. 2018. Systematically Understanding the Cyber Attack Business: A Survey. ACM Computing Surveys. 51, 4, Article 70 (July 2018), 36 pages. <https://doi.org/10.1145/3199674>

Cybercriminal Service Ecosystem Framework



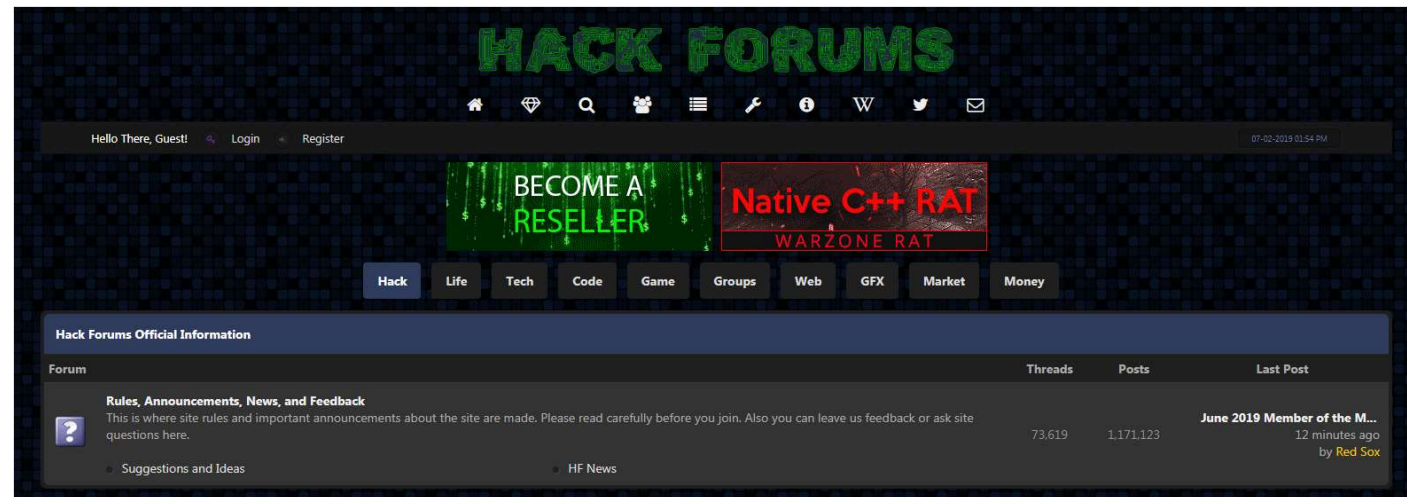
| | Status | Pricing Model | Example Case | Estimated Price |
|--------------|----------|-----------------|-------------------------------------------|----------------------------------------|
| EaaS | Existing | License | Exploit Trading [36] | up to more than \$250, 000 |
| | | Subscription | Up-to-date Zero-day Exploits [74] | \$150, 000 per month |
| PLaaS | Existing | Pay-per-install | Payload Renting [10, 15] | \$0.02–0.10 per install |
| | | Commission | | 40% |
| DaaS | Existing | Subscription | Phishing Service [72] | \$85–\$115 per month |
| | | Commission | Fake Anti-virus [49] | 40% |
| OBaaS | Existing | Subscription | Obfuscation Platform [31] | \$50–\$150 per month |
| SCaaS | Existing | Subscription | Scan4you [39] | \$25 per month |
| TRaaS | Existing | Pay-per-click | Traffic Redirection [31] | \$7–\$15 per 1, 000 visitors |
| BNaaS | Existing | Subscription | Botnet Shops [72] | \$40 per month |
| BHaaS | Existing | Subscription | Cloud Bulletproof Servers [52] | \$300 per month |
| TAaaS | Existing | Subscription | DDoS Attack Service [67] | \$999 per month |
| REaaS | Existing | Pay-per-record | Reputation Escalation Markets [87] | \$0.4–\$0.7 per record |
| MPaaS | Existing | License | Market Framework [24] | \$4, 500 per licence |
| | | Commission | Marketplace [23] | 2%–10% |
| MRaaS | Existing | License | Money Laundering Recruitment Package [51] | \$1, 700 per licence |
| MLaaS | Existing | Commission | Money Laundering Service [62] | 2%–30% |
| HTaaS | Existing | License | Hacker Training Courses [69] | \$250–\$800 per person |
| PPaaS | Evolving | License | Personal Profile Investigator [33] | \$4–\$20 per record |
| TPaaS | Evolving | Subscription | “One-stop-shop” Platform [1, 42] | \$4, 000 per month |
| RaaS | Evolving | Subscription | Smart Contract [43] | / |
| HRaaS | Evolving | Subscription | Online Hacker Recruiting Market [54] | / |
| VDaaS | Emerging | Subscription | Bug Bounty Program [64] | \$542.04–\$1, 810.31 per vulnerability |
| TSaaS | Emerging | Subscription | Targets Ranking based on Value [53] | / |
| EPaaS, RPaaS | Emerging | Subscription | Repackaging Platform [71, 74] | \$4, 000 per month |
| DMAaaS | Emerging | Subscription | “How-to” Knowledge Systems [19] | / |
| VEaaS | Emerging | Subscription | Comparison “Shopping” Service [32] | / |

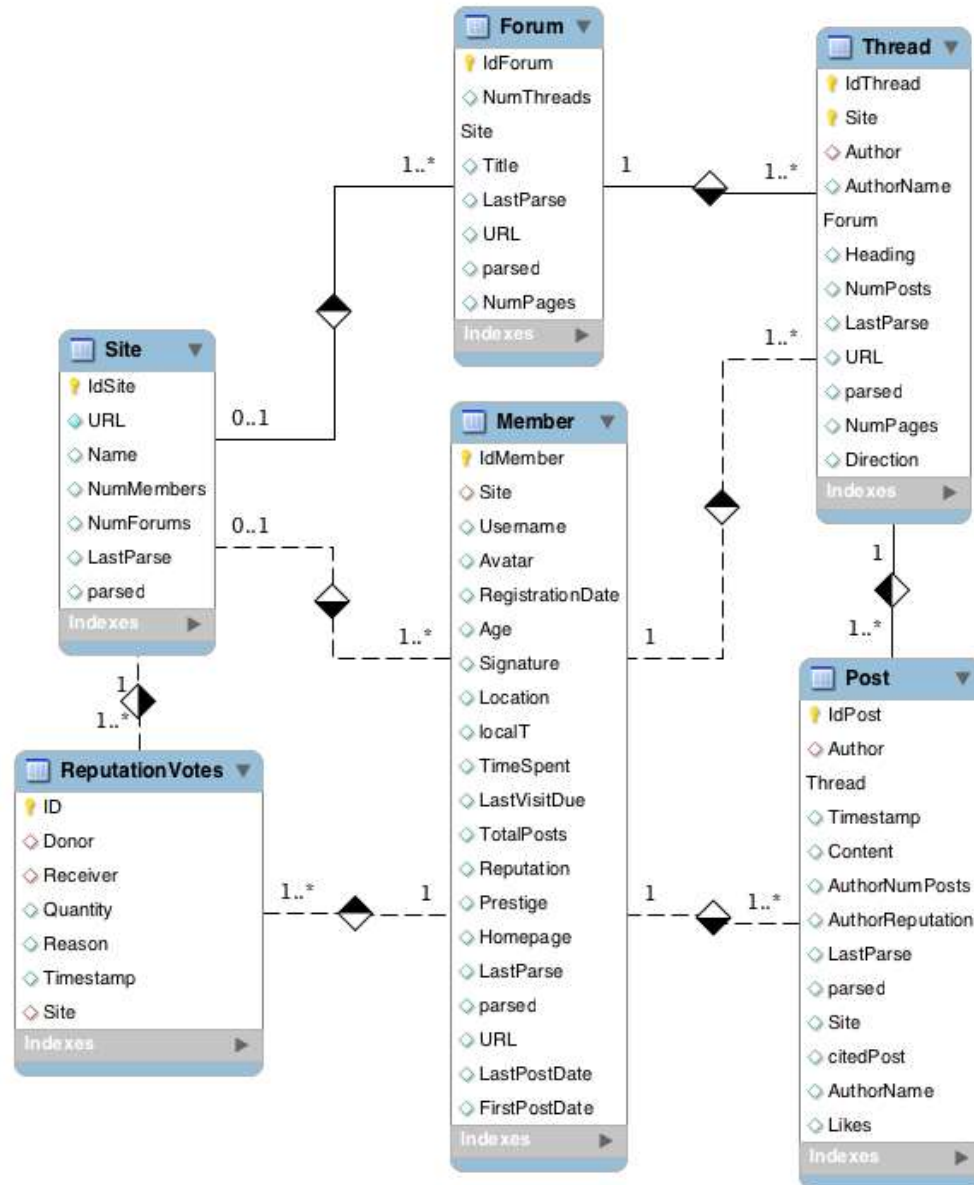
More CaaS

- CAPTCHA solvers
- Phone/SMS verification
- Password cracking
- E-whoring
- Networking and hosting
 - Proxies
 - Remote Desktop Protocol (RDP) service

CrimeBB Dataset of Cambridge Cybercrime Centre

| Forum | Lan. | Boards | Members | Threads | Posts | Oldest |
|--------------------------|------|--------|---------|-----------|------------|--------|
| Hackforums | EN | 175 | 573 925 | 3 856 143 | 40 196 641 | 01/07 |
| Kernelmode | EN | 16 | 1 441 | 3 144 | 25 024 | 03/10 |
| Offensive Community | EN | 63 | 10 593 | 18 436 | 58 779 | 06/12 |
| Multiplayer Game Hacking | EN | 699 | 452 186 | 739 527 | 8 907 938 | 12/05 |
| Stresserforums | EN | 22 | 764 | 708 | 7 069 | 04/17 |
| Greysec | EN | 30 | 440 | 1 239 | 6 969 | 06/15 |
| Garage4Hackers | EN | 35 | 872 | 2 096 | 7 697 | 07/10 |
| SafeSkyHacks | EN | 50 | 7 378 | 12 892 | 26 842 | 03/13 |
| Antichat | RU | 64 | 77 865 | 242 408 | 2 449 221 | 05/02 |
| RaidForums | EN | 75 | 43 278 | 33 100 | 124 776 | 03/15 |





| Marketplace | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|---------------------------------------------------------------------------|
| Forum | Threads | Posts | Last Post |
| Marketplace Discussions This is to be used for rules, policies, feedback, and general discussions about the HF Marketplace. Please read the stickies in this section before conducting business here. <ul style="list-style-type: none"> Promotional Advertising Appraisals and Pricing Free Services and Giveaways Deal Disputes | 228,458 | 3,100,446 | Lavish Living selling pub... 14 minutes ago by duplex |
| Premium Sellers Section This area is only for upgraded member sales threads. <ul style="list-style-type: none"> Premium Tools and Programs Hash Bounties Cryptography and Encryption Market | 96,143 | 1,802,004 | BOTCAMP - Twitch Viewer B... Less than 1 minute ago by Req4K |
| Secondary Sellers Market This is a sellers section open to all members. We advise extreme caution in all deals here. Sales threads must follow the policies of HF and we expect you to read them in the help documents. <ul style="list-style-type: none"> Virtual Game Items Member Auctions | 241,858 | 1,481,557 | \$0.99 DigitalOcean EDU co... 38 minutes ago by leonsnow |

- “All the trades on Hack Forums should be made in the **Marketplace** section, regardless of content.
- A seven-day posting ban and a warning is the penalty for posting marketplace threads outside of the Market tab.”

Data preparation

- posts in 'Marketplace' section = 9,795,204
- First post of each thread is a supply/demand offering = 1,104,046
- Random 'ground-truth' items $\approx 1\%$ = 10,000
- Labelling manually

Types of CaaS offerings

1. Renting the infrastructure or/and the platform,
2. Selling the service of committing the crime,
3. Selling the product but continuing to provide some required services remotely after sale,
4. Selling the product but giving customer support when necessary,

...others are not CaaS but only products.

| idpost | product/service category | buy/sell | contact | external trading link | thread_heading | content | threadurl |
|----------|--------------------------|----------|---------|-----------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 41555128 | other | buy | no | no | Auto Pilot Method? | I'm going on holiday tomorrow for 1 week and won't have access to HF. Therefore I was hoping there could be a method in which I can put the rest of today's effort into and whilst on holiday, let the money pour in. | https://hackforums.net/showthread.php? |
| 45520028 | obfuscation as_a_service | sell | skype | no | Crypting Service FUD .net 1.5\$ | hello I offer fouth encryption service for \$ 1.5 in .net touch skype: rayku_ | https://hackforums.net/showthread.php? |
| 57692150 | hacker as_a_service | buy | no | no | partner from usa/canada i guarantee you 500usd today | as stated im looking for someone in usa or canada , if you are i guarantee you from today 500usd even up to 1000 , i need assistance , no this is not blackhat . So dont jump to conclusions. If you are serious and interested let me know ill get you paid today. | https://hackforums.net/showthread.php? |
| 45655440 | game utulity | buy | pm | no | WTB Glock-18 Water Elemental Pay with BTC 5.10 \$ | I wanna buy Glock-18 Water Elemental Minimal Wear for 97 % of market i pay with btc if some have it pm me thanks. | https://hackforums.net/showthread.php? |

- Product/service category
- Buy/sell or other
- Contact
- External trading link

So far..

- **Products:** RAT, currency exchange, account, game account, game utility, cryptominer, malware
- **As-a-services:** phone verification, reputation escalation, hacker, obfuscation, password cracking, DDoS, exploit, e-whoring, money laundering, RDP
- **Other**

| | | |
|---------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| phone verification as_a_service | Need phone verification | Would anyone be able to verify that craigslist shit for me please ? If it can be done right now , I'll pay a dollar . Thanks in advance |
| | | Dear HF. I'm currently looking for someone who can deliver a lot (and consistent) YouTube views every week. I'm looking for atleast 100k views a month. Please let me know if you can do this, I don't care if it's high retention or anything as long as they show up it's fine. I can offer a long time Graphics deal in exchange or might share my income later on which I'll possibly earn from this. |
| reputation escalation as_a_service | Any type of YouTube views. | Plz PM if you can do this. |
| | | Hello guys, Is anyone able to steal/hack a Facebook Account? Can anyone manage doing that? Please, it's just 1 account. I play League of Legends, and I can even give you my main account (9 Champs not Owned, 61 Skins, 2 Ultimate Skins and much more) just for 1 Facebook Account. Please. If anyone is able to do that, I'd be really grateful. I'd do anything! I'm broke when it comes to money. But I can do ANYTHING. Just ANYTHING you want to pay it back. Just 1 Facebook Account (Just a plain & simple personal Facebook Account, legit reason. The main owner asked me to do this, which is my cousin. That is all.) Please PM me or contact me via Skype if you'd like! Skype-Name: The2Hunters |
| hacker as_a_service | Hack a Facebook Account | Huge Thanks! <3 |

| | | |
|-----------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| password cracking as_a_service | IPB hash & salt decryption | Hash: f0627c41d3e96ffb94e545f7ff61260 Salt: "p-S? Thanks ! Can you please PM me the password ? Thanks ! Bump, anyone? Really need this. |
| DDoS as_a_service | Buying a active HostBooter Account | Hello, i am interested in buying a host booter account, cheaper then what they sell on their website (***LINK*** http://www.hostbooter.com [http://www.hostbooter.com])**LINK**). If anyone would like to sell me one please reply here or PM me. |
| exploit as_a_service | \$340 LR | Basically, I bought \$340LR for \$400+ to buy Autumn, which turned out to have a start-up problem etc etc. I'm looking for either a HTTP/IRC bot with a rootkit/injection/botkiller/ruskill or a exploit pack with %30+ rates. If anyone has a link to a different forum with a exploit pack or decent bot PM me. Also considering renting an exploit pack, again, PM me |
| money laundering as_a_service | [Easy \$\$\$] Need people from the USA - Earn \$500+ day! | I need people from the states who are trusted 18+, who can get GreenDot cards. You can potentially earn up to \$500 per day, depending on how dedicated you are. Gota be trusted or put money into escrow! PM me if your interested. |

Conclusion

- to better understand the risks to businesses and consumers,
- to support designing better disruption strategies against cybercrime business models,

We aim to disclose how cybercriminals are adapting to new trading and communication processes.

Questions?
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