

Unmasking the new XorDDoS controller and infrastructure

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- Cisco Talos observed an existing distributed denial-of-service (DDoS) malware known as XorDDoS, continuing to spread globally between November 2023 and February 2025.
- A significant finding shows that over 70 percent of attacks using XorDDoS targeted the United States from Nov. 2023 to Feb. 2025.
- The language settings of the multi-layer controller, XorDDoS builder and controller binding tool strongly suggest that the operators are Chinese-speaking individuals.
- Talos discovered the latest version of the XorDDoS controller, called the “VIP version,” and its corresponding central controller were used to build the DDoS bot network for more sophisticated and widespread attacks.
- Talos' analysis exposes the network connection between central controller, sub-controller and XorDDoS malware in order to highlight the XorDDoS trojan network pattern. This may help victims identify when they are targeted by these trojans.

Linux XorDDoS trojan trend and victimology

The XorDDoS trojan is a well-known DDoS malware that targets Linux machines, turning them into "zombie bots" that carry out attacks. First identified in [2014](#), its sub-controller was uncovered in [2015](#). Based on the simplified Chinese user interface and instructions of the XorDDoS controllers and builder, Talos assess with high confidence that the operators are Chinese-speaking individuals.

From 2020 to 2023, the XorDDoS trojan has increased significantly in prevalence. This trend is not only due to the [widespread global distribution](#) of the XorDDoS trojan but also an uptick in [malicious DNS requests](#) linked to its command-and-control (C2) infrastructure. In addition to targeting commonly exposed Linux machines, the trojan has expanded its reach to [Docker servers](#), converting infected hosts into bots. It employs a strategy of Secure Shell (SSH) brute-force attacks to gain remote access to target devices. Once it obtains valid SSH credentials, the attacker leverages root privileges to execute a script that downloads and installs XorDDoS on the compromised device.

Even though numerous security vendors have already provided solutions and detection methods to capture them, Talos continues to observe attempts to deliver XorDDoS malware.

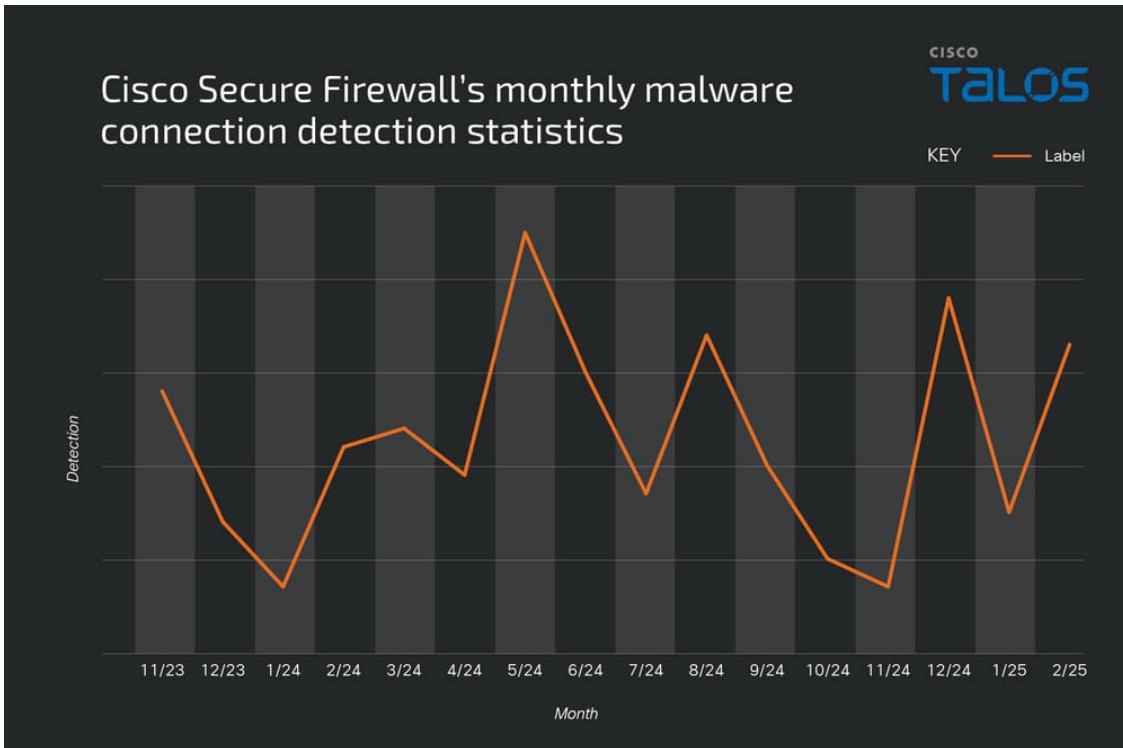


Figure 1. Cisco Secure Firewall's monthly malware connection detection statistics.

Between November 2023 and February 2025, Talos observed that the XorDDoS trojan continued to have a global impact, with nearly 50 percent of its successfully compromised victims located in the United States. Additionally, we noted that the compromised systems attempted to target and attack several countries, including Spain, the United States, Taiwan, Canada, Japan, Brazil, Paraguay, Argentina, the United Kingdom, the Netherlands, Italy, Ukraine, Germany, Thailand, China, India, Israel, Venezuela, Switzerland, Singapore, Finland, Australia, Saudi Arabia, France, Turkey, the United Arab Emirates and South Korea.

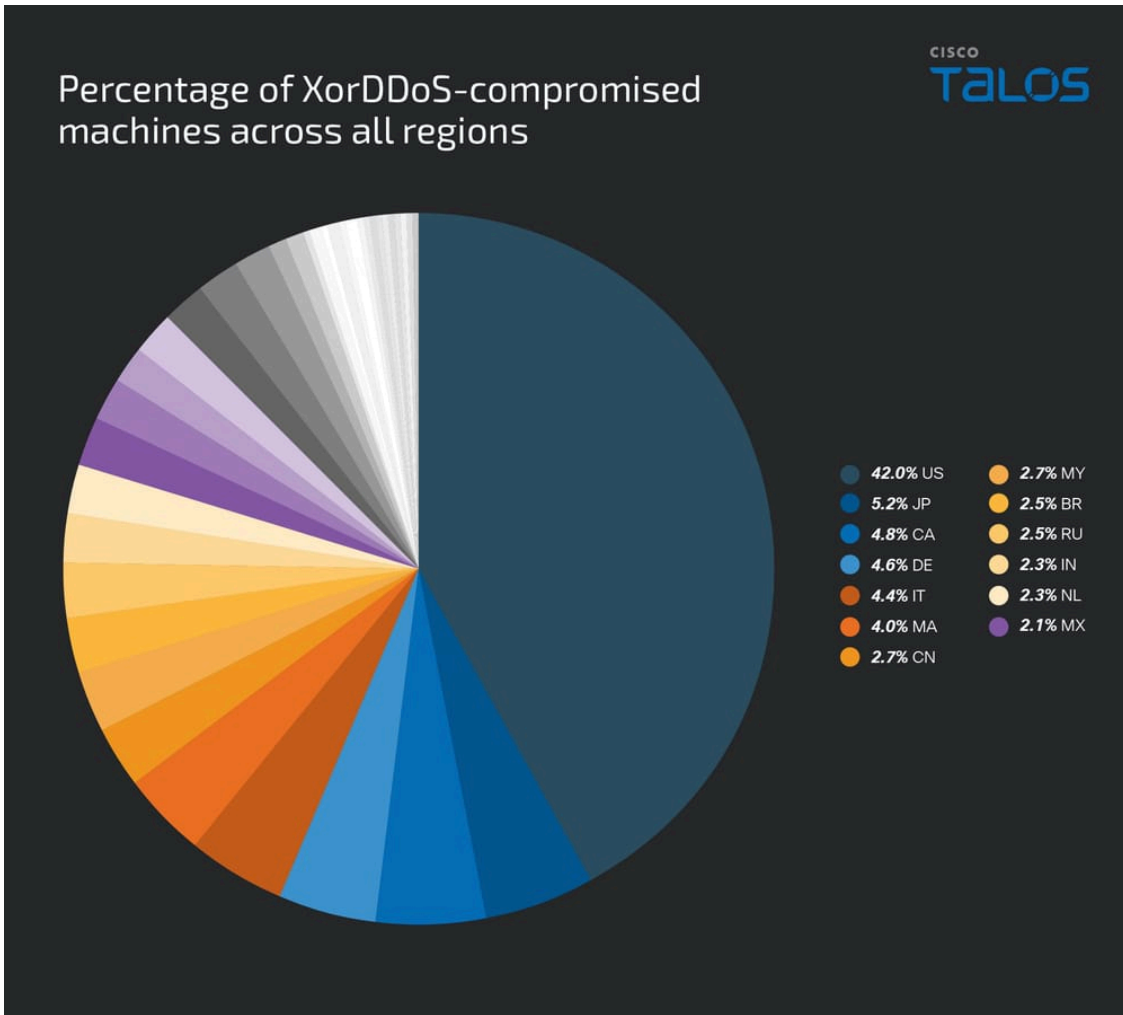


Figure 2. Percentage of XorDDoS successfully-compromised machines across all regions.

Talos also used our Cisco Secure Network/Cloud Analysis to observe actors using those compromised machines to launch DDoS attack and the attacks are globalized. Notably, we found that the United States accounted for over 70 percent of attempted attacks employing XorDDoS.

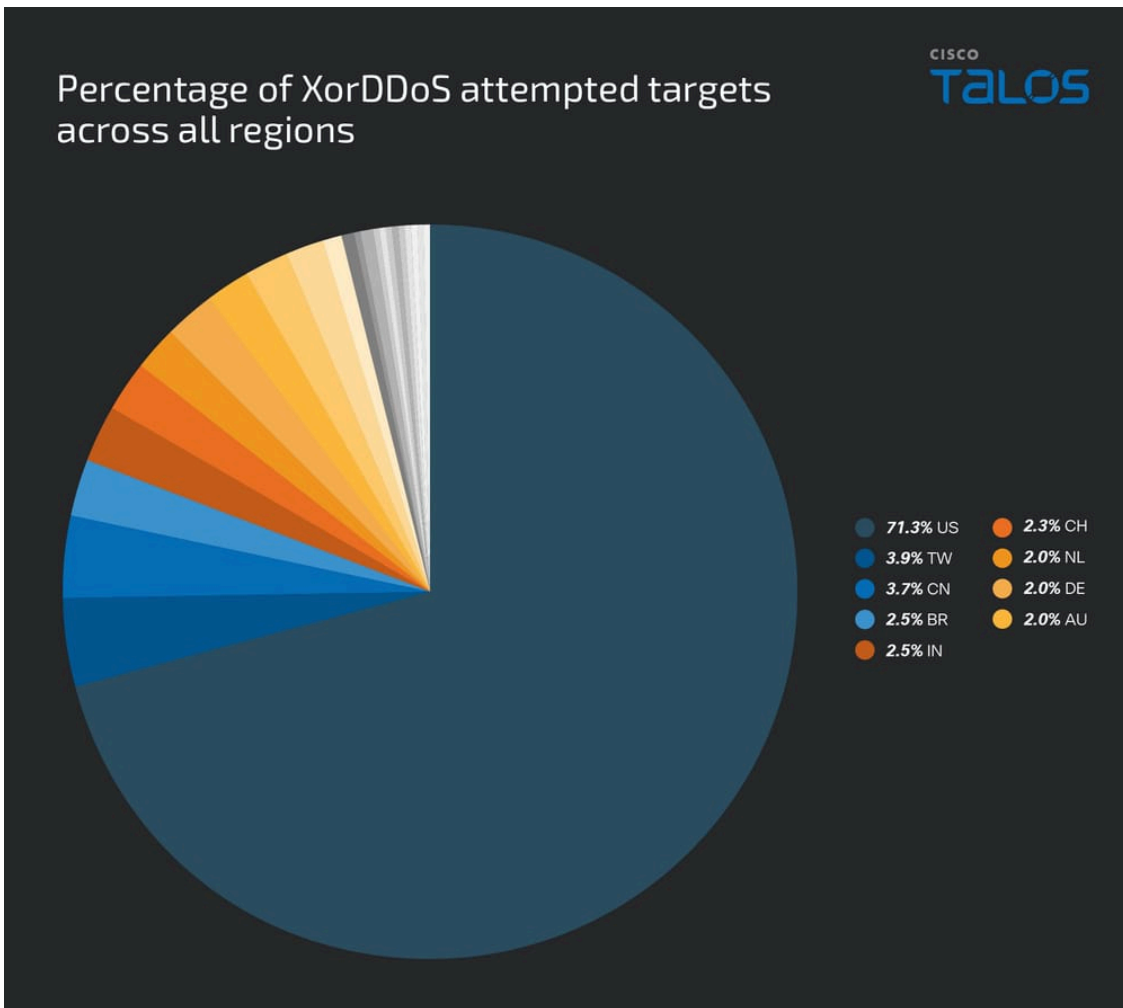


Figure 3. Percentage of XorDDoS attempted targets across all regions.

Infection chain

XorDDoS has long relied on SSH brute-force attacks to spread. It deploys a malicious shell script that attempts numerous root credential combinations across thousands of servers until it successfully accesses a target Linux device. Once inside the machine, XorDDoS implements persistence mechanisms to ensure it launches automatically at system startup, therefore evading detection and termination by security products. To maintain persistence, the malware installs an init script and a cron job script. These scripts are embedded within the malware and perform actions consistent with those outlined in [previous reports](#).

```

### BEGIN INIT INFO
# Provides:\t\t%s\n
# Required-Start:\t\n
# Required-Stop:\t\n
# Default-Start:\t1 2 3 4 5\n
# Default-Stop:\t\t\n
# Short-Description:\t%s\n
### END INIT INFO\n
case $1 in\n
start)\n
\t\t\n
\t;\n
stop)\n
\t;\n
*)\n
\t\t\n
\t;\n
esac\n",
v1,
v1,
v1,
a1,
a1);
s b_80567E0((int)filename, 1024, (int)"/etc/init.d/%s", v1);
sub_8048370(filename, newpath, strlen(newpath));
v2 = sub_80649E0(-aBinShPathBinSh);
s b_8048370("/etc/cron.hourly/gcc.sh", aBinShPathBinSh, v2); // '#!/bin/sh',0Ah
v = sub_8049F70(); // 'PATH=/bin:/sbin:/usr/bin:/usr/sbin:/usr/local/bin:/usr/local/sbin'
i ( !v5 ) // ':usr/X11R6/bin',0Ah
sub_8067880(filename, 0xAD147388, 0xAD147388); // 'for i in `cat /proc/net/dev|grep :|awk -F: {' ,27h,'print $1',27h,'}'
for ( i = 1; i != 6; ++i ) // ' do ifconfig $i up& done',0Ah
{ // 'cp /lib/libudev.so /lib/libudev.so.6',0Ah
sub_80654E0(newpath, 0, 4096); // '/lib/libudev.so.6',0Ah,0
sub_80567E0((int)newpath, 4096, (int)"/etc/rc.d/S90%s", i, v1);
sub_8067910(newpath);
sub_80678C0(filename, newpath);
if ( !v5 )
sub_8067880(filename, 0xAD147388, 0xAD147388);
}
LOBYTE(i) = 1;
do
{
sub_80654E0(newpath, 0, 4096);
sub_80567E0((int)newpath, 4096, (int)"/etc/rc.d/rc%d.S90%s", i, v1);
sub_8067910(newpath);
sub_80678C0(filename, newpath);
if ( !v5 )
sub_8067880(filename, 0xAD147388, 0xAD147388);
++i;
}
while ( i != 6 );
sub_8048520("chkconfig", (int)"--add", (int)v1);
sub_8048520("update-rc.d", (int)v1, (int)"defaults");
sub_8052980(
"sed -i '/\|etc\|cron.hourly\|gcc.sh/d' /etc/crontab && echo '*3 * * * root /etc/cron.hourly/gcc.sh' >> /etc/crontab");

```

Init script

Cron script

Auto-start services and run every three minutes

Figure 4. Inint script and cron script embedded in trojan.

The latest version of XorDDoS malware continues to use the same decryption function and the XOR key "BB2FA36AAA9541F0" to decrypt its embedded configuration. Once the URLs or IPs are decrypted, they are added to a remote list. This list is then used to establish communication and retrieve commands from the C2 server. Talos used [CyberChef](#) to successfully decrypt one of the examples.

The screenshot shows the CyberChef interface with the following details:

- Recipe:** From Hex
- Delimiter:** Auto
- XOR Key:** BB2FA36AAA9541F0 (UTF8)
- Scheme:** Standard
- Null preserving:** Unchecked
- Input:** Hexadecimal data: 32 32 42 68 39 4B 4E 20 35 20 4D 01 01 07 68 53 2D 2F 08 77 74 01 06 3D 36 36 4E 04 1A 56 21 57 23 36 53 32 75 06 00 6F 22 2E 54 0F 05 04 74 00 3E 32 42 36 6F 54 51 26 20 35 58 41 00 04 70 1E 21 2D 5F 7C 70 06 04 71 41 41 39 35 34 31 46 30 E2 9B 69 44 40 33 36 41 49 41 39 35 84 71 10 32 62 03 64 44 D1 72 60 43 41 03 6F 37 44 73 10 32 42 42 32 46 41 33 36 41 41 41 39 35 34 31 46 30 42 42 32 46 41 33 36 41
- Output:** ppp.xxxatat456.com:1520|www1.gggatat456.com:1520|ppp.gggatat456.com:1520 U[@V AV BV pBV

Figure 5. Talos CyberChef decryption.

XorDDoS new sub-controller and central controller

Although the sub-controller for XorDDoS was exposed in [2015](#), attacks have persisted over the last decade. The panel from 2015 was for version 1.4, the oldest version, which we believe is no longer in use by threat actors. In 2024, Talos discovered a new “VIP” version of the XorDDoS sub-controller, which can control the “[VIP version](#)” of the XorDDoS trojan, the first instance of which we traced back to 2017. With the newest version of the XorDDoS sub-controller and trojan builder, Talos believes that this collection is a product suite developed for sale.

Figure 6 shows translated screenshots of the XorDDoS trojan sub-controller and builder. The builder also contains new feature descriptions, which strengthens Talos’ assessment that this is a product meant to be sold. The VIP version of the XorDDoS trojan builder includes new feature descriptions. When translated, the description in Figure 7 reads, “Stable Anti-Kick, 100% Packet Sending, Fixes for Over Ten Thousand Online Without Lag. Supports Domain Online, IP Online, with New Packet Sending Code and Wall-Penetration Optimization. Can Send 1024 Packets with Resource Utilization Optimization.”

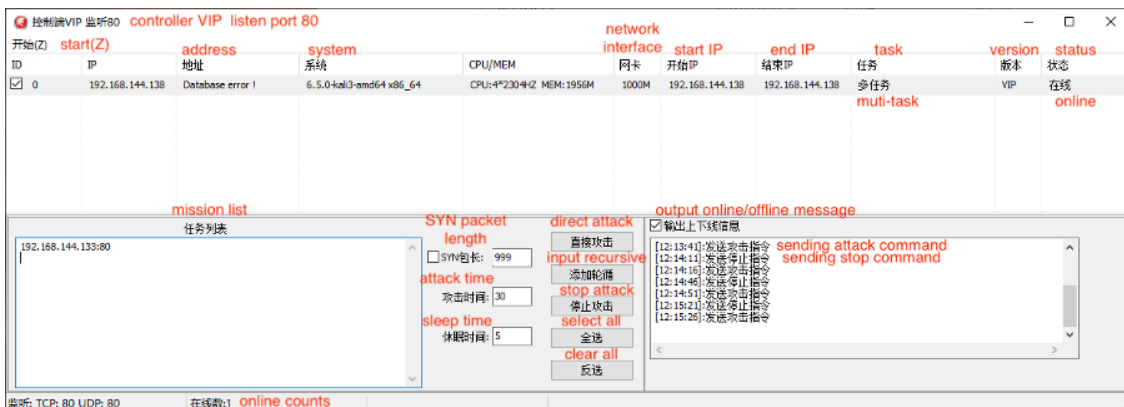


Figure 6. VIP version sub-controller.



Figure 7. Feature description in the VIP version of the XorDDoS trojan builder.

Talos observed a new version of the sub-controller, which we call the “central controller.” Specifically created for the XorDDoS trojan, the central controller enables threat actors to manage multiple XorDDoS controllers simultaneously. This updated central controller enhances cybercriminals’ ability to coordinate and execute attacks more efficiently, indicating an evolution in their tactics and capabilities.

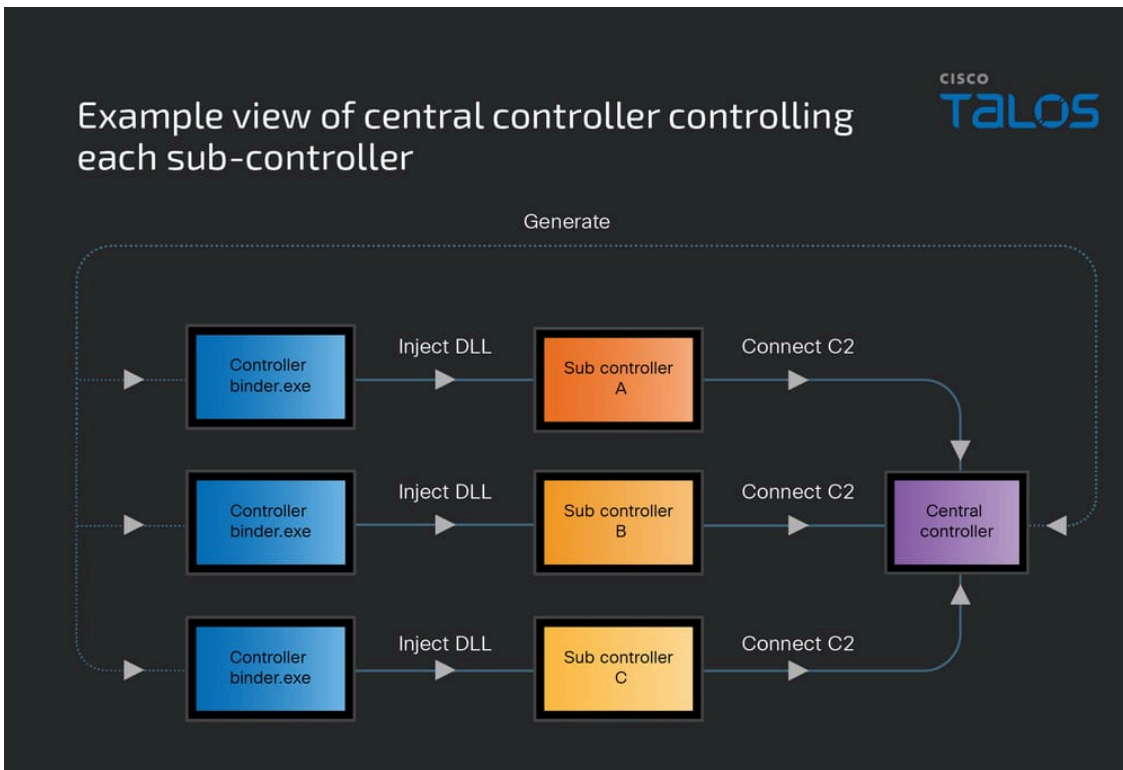


Figure 8. Example view of central controller controlling each sub-controller.

The central controller can generate a controller binder that will inject a DLL file to the XorDDoS controller to bind network connection and command operation to the sub-controller, allowing the central controller to fully remote control the sub-controllers.



Figure 9. Generator Setting

The controller binder will establish a connection with the central controller. When running the controller binder on the host, the actor can enter the controller's process name, allowing them to inject into the process and take control. This straightforward strategy allows the actor to send the DDoS commands to multiple controllers simultaneously. There are two notable facts Talos observed from this central controller. First, when the actor opens the central controller, there is a feature description in its mission list column that, when translated, includes the following:

- "Check the SYN packet length to make it a large packet, otherwise it will be a small packet.
- A round-robin attack is a task performed by all online hosts.
- Select the host and click the test mode, which means a single host sends a packet.
- Multiple measurement modes cannot be selected, only one at a time!
- The round-robin attack needs to be stopped manually.

- Supports 1024 packages but requires a corresponding sub-controller.
- The sub-controller of version 1.4 and 1.8 on the underground market cannot use the central controller to send 1024 packages."

Second, the controller's creator left their Tencent QQ instant message contact number and nickname on the central controller, while also mentioning other sub-controller versions available on the underground market. This further supports Talos' assessment that these tools are for sale.

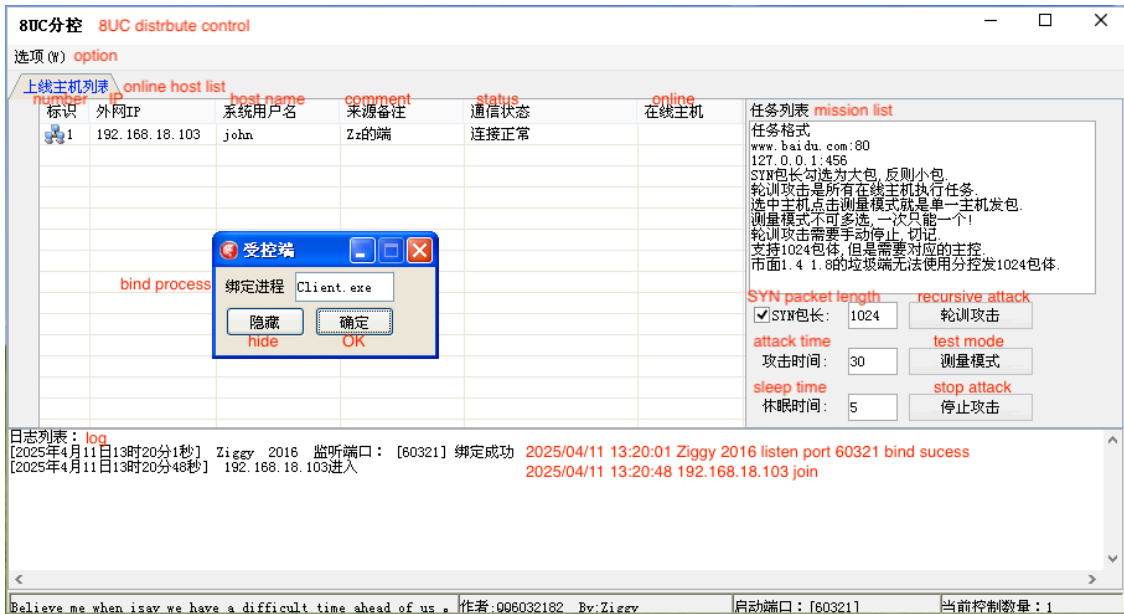


Figure 10. Central controller and controller binder.

Advanced XorDDoS traffic analysis

Talos' detailed analysis of these new tools suggests cybercriminals' continued investment in the development and deployment of the XorDDoS trojan, allowing for more sophisticated and widespread attacks. The entire control flow of these operations demonstrates the adaptability and resilience of these threat actors, emphasizing the ongoing challenge in combating this form of cybercrime. Talos completed a traffic analysis in our sandbox environment, first to analyze how the XorDDoS trojan is connected to the sub-controller, and then to understand how the central controller manages the sub-controller.

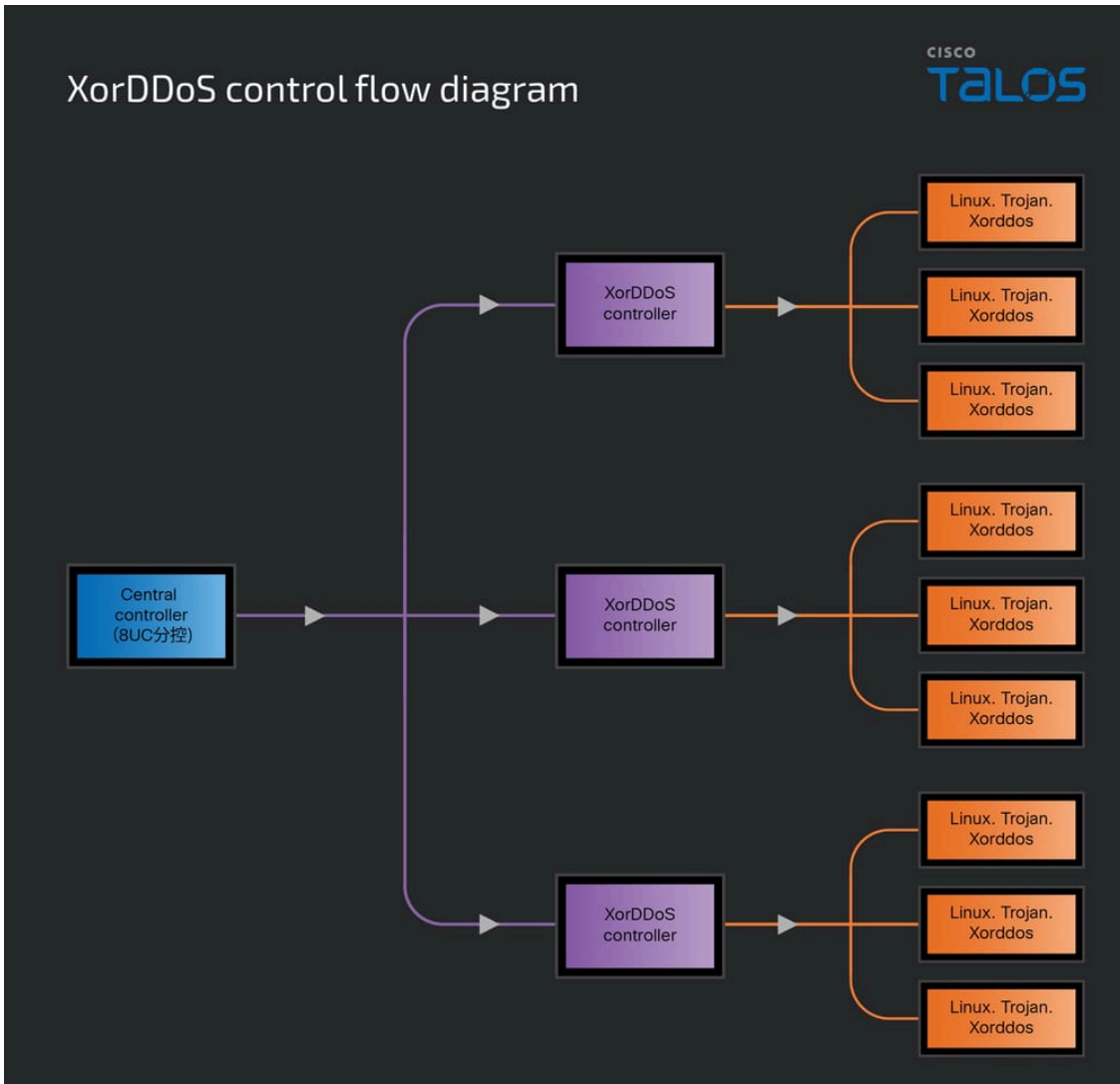


Figure 11. XorDDoS control flow diagram.

The connection between the sub-controller and DDoS trojan is the orange line in Figure 11. When the malware is successfully installed in the target system, it will attempt to send encrypted data, including "phone home," which consists of the CRC Header, uname string release, uname string machine, magic string and hardcoded version string. Talos used CyberChef to provide a decryptor function for this data.

sub-controller's machine information back to the central controller as a "phone home" beacon. This phone home data uses plaintext to send information, which includes the message number, packet size, IP address, hostname and connection port.

```
00000000 45 4d 53 47 30 30 31 31 47 00 00 00 00 00 00 00 EMSG0011 G.....
00000010 47 00 00 00 3c 4d 73 67 30 30 31 31 3e 35 30 3c G...<Msg 0011>50<
00000020 2f 4d 73 67 30 30 31 31 3e 47 7a 00 20 00 00 00 /Msg0011 >Gz. ...
00000030 78 9c 01 20 00 df ff b3 f5 ca bc b4 fa c2 eb 72 x.. .... ..r
00000040 30 73 65 5f 2f 2f 36 30 33 32 31 2f 2f c1 ac bd 0se_//60 321//...
00000050 d3 d5 fd b3 a3 2f 2f 24 c2 10 9e .....//$. ...
```

Figure 15. Network flow of the phone home connection.

Talos used the central controller to establish a connection with the sub-controller to monitor network traffic. During this process, we observed that the MSG number in the packets increases with each command sent to either the client controller or back to the central controller. As shown in Figure 16, Talos used the central controller to issue commands to start a SYN DDoS attack, stop the attack, and target specific IPs or domains. For every command sent, the MSG number increments. Similarly, each received packet also sees an increase in its MSG number. However, it's important to note that the MSG numbers for sent packets and received packets are not directly related to each other.

```
00000000 45 4d 53 47 30 30 31 31 44 00 00 00 00 00 00 00 EMSG0011 D.....
00000010 44 00 00 00 3c 4d 73 67 30 30 31 31 3e 34 37 3c D...<Msg 0011>47<
00000020 2f 4d 73 67 30 30 31 31 3e 47 7a 00 1d 00 00 00 /Msg0011 >Gz.....
00000030 78 9c 01 1d 00 e2 ff b3 f5 ca bc b4 fa c2 eb 42 x..q... Kw..1..C
00000040 49 54 2f 2f 38 30 38 30 2f 2f c1 ac bd d3 d5 fd +.....C.#..C..S.
00000050 b3 a3 2f 2f f6 7e 0f 78 .....//$. P...

00000000 45 4d 53 47 30 30 36 40 00 00 00 00 00 00 00 00 EMSG0006 @.....
00000010 40 00 00 00 3c 4d 73 67 30 30 36 3e 34 33 3c @...<Msg 0006>43<
00000020 2f 4d 73 67 30 30 36 3e 47 7a 00 1f 00 00 00 /Msg0006 >Gz.....
00000030 78 9c bb b6 71 ef e5 9d 4b 77 7f af 31 d1 03 43 x..q... Kw..1..C
00000040 2b 0b 83 1a c3 1a 43 03 23 93 1a 63 83 1a 53 00 +.....C.#..C..S.
00000050 ee 33 0c 20 .....

00000058 45 4d 53 47 30 30 31 32 3b 00 00 00 00 00 00 00 EMSG0012 ;.....
00000068 3b 00 00 00 3c 4d 73 67 30 30 31 32 3e 33 38 3c ;...<Msg 0012>38<
00000078 2f 4d 73 67 30 30 31 32 3e 47 7a 00 1b 00 00 00 /Msg0012 >Gz.....
00000088 78 9c bb b6 e5 c2 85 cd 27 77 2e bb 06 a5 15 a2 x.....'w.....
00000098 0f 5d bb b8 f5 c8 e2 53 7b 63 01 13 50 12 ef .].....S'f'P...

00000054 45 4d 53 47 30 30 37 40 00 00 00 00 00 00 00 00 EMSG0007 @.....
00000064 40 00 00 00 3c 4d 73 67 30 30 37 3e 34 33 3c @...<Msg 0007>43<
00000074 2f 4d 73 67 30 30 37 3e 47 7a 00 1f 00 00 00 /Msg0007 >Gz.....
00000084 78 9c bb b6 71 ef e5 9d 4b 77 7f af 31 d1 03 43 x..q... Kw..1..C
00000094 2b 0b 83 1a c3 1a 43 03 23 93 1a 63 83 1a 53 00 +.....C.#..C..S.
000000A4 ee 33 0c 20 .....

000000A7 45 4d 53 47 30 30 31 33 3b 00 00 00 00 00 00 00 EMSG0013 ;.....
000000B7 3b 00 00 00 3c 4d 73 67 30 30 31 33 3e 33 38 3c ;...<Msg 0013>38<
000000C7 2f 4d 73 67 30 30 31 33 3e 47 7a 00 1b 00 00 00 /Msg0013 >Gz.....
000000D7 78 9c bb b6 e5 c2 85 cd 27 77 2e bb 06 a5 15 a2 x.....'w.....
000000E7 0f 5d bb b8 f5 c8 e2 53 7b 63 01 13 50 12 ef .].....S'f'P...

000000A8 45 4d 53 47 30 30 38 2d 00 00 00 00 00 00 00 00 EMSG0008 -.....
000000B8 2d 00 00 00 3c 4d 73 67 30 30 38 3e 32 34 3c -...<Msg 0008>24<
000000C8 2f 4d 73 67 30 30 38 3e 47 7a 00 08 00 00 00 /Msg0008 >Gz.....
000000D8 78 9c 3b bb f8 da ce 9d 4b 77 7f 07 00 1a c6 06 x.j.....Kw.....
000000E8 18 .....

000000F6 45 4d 53 47 30 30 31 34 2f 00 00 00 00 00 00 00 EMSG0014 /.....
00000106 2f 00 00 00 3c 4d 73 67 30 30 31 34 3e 32 36 3c /...<Msg 0014>26<
00000116 2f 4d 73 67 30 30 31 34 3e 47 7a 00 10 00 00 00 /Msg0014 >Gz.....
00000126 78 9c 3b bb f8 da ce 6b 5b 2e 5c 38 0b a5 01 68 x.j.....k [\0...h
00000136 1c 0c 53 .....5
```

hardcode stings
packet size
control panel name
control panel port

Figure 16. Network flow of central controller sending the command to sub-controller.

Coverage

Extended Detection and Response: Cisco XDR	Multi-Factor Authentication: Cisco Duo	Endpoint: Cisco Secure Endpoint
✓	N/A	✓
Email: Cisco Secure Email Threat Defense	Network security: Cisco Secure Firewall	Multi-Cloud Security: Cisco MultiCloud Defense
N/A	✓	N/A
Secure Internet Gateway: Cisco Umbrella	Analytics: Cisco Secure Network Analytics	Security Service Edge (SSE): Cisco Secure Access
✓	N/A	N/A

[Cisco Secure Endpoint](#) (formerly AMP for Endpoints) is ideally suited to prevent the execution of the malware detailed in this post. Try Secure Endpoint for free [here](#).

[Cisco Secure Web Appliance](#) web scanning prevents access to malicious websites and detects malware used in these attacks.

[Cisco Secure Email](#) (formerly Cisco Email Security) can block malicious emails sent by threat actors as part of their campaign. You can try Secure Email for free [here](#).

[Cisco Secure Firewall](#) (formerly Next-Generation Firewall and Firepower NGFW) appliances such as [Threat Defense Virtual](#), [Adaptive Security Appliance](#) and [Meraki MX](#) can detect malicious activity associated with this threat.

[Cisco Secure Malware Analytics](#) (Threat Grid) identifies malicious binaries and builds protection into all Cisco Secure products.

[Umbrella](#), Cisco's secure internet gateway (SIG), blocks users from connecting to malicious domains, IPs and URLs, whether users are on or off the corporate network. Sign up for a free trial of Umbrella [here](#).

[Cisco Secure Web Appliance](#) (formerly Web Security Appliance) automatically blocks potentially dangerous sites and tests suspicious sites before users access them. Additional protections with context to your specific environment and threat data are available from the [Firewall Management Center](#).

[Cisco Duo](#) provides multi-factor authentication for users to ensure only those authorized are accessing your network.

Open-source Snort Subscriber Rule Set customers can stay up to date by downloading the latest rule pack available for purchase on [Snort.org](#). Snort SIDs for this threat are 64669, 64668 and 64667.

ClamAV detections are also available for this threat: Unix.Dropper.Xor-ddos::in07.talos

Indicators of Compromise

IOCs for this threat can be found in our GitHub repository [here](#).