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Threat Level

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# THREAT ADVISORY

## ATTACK REPORT

# Auto-Color: The Stealthy Linux Malware Lurking in the Shadows


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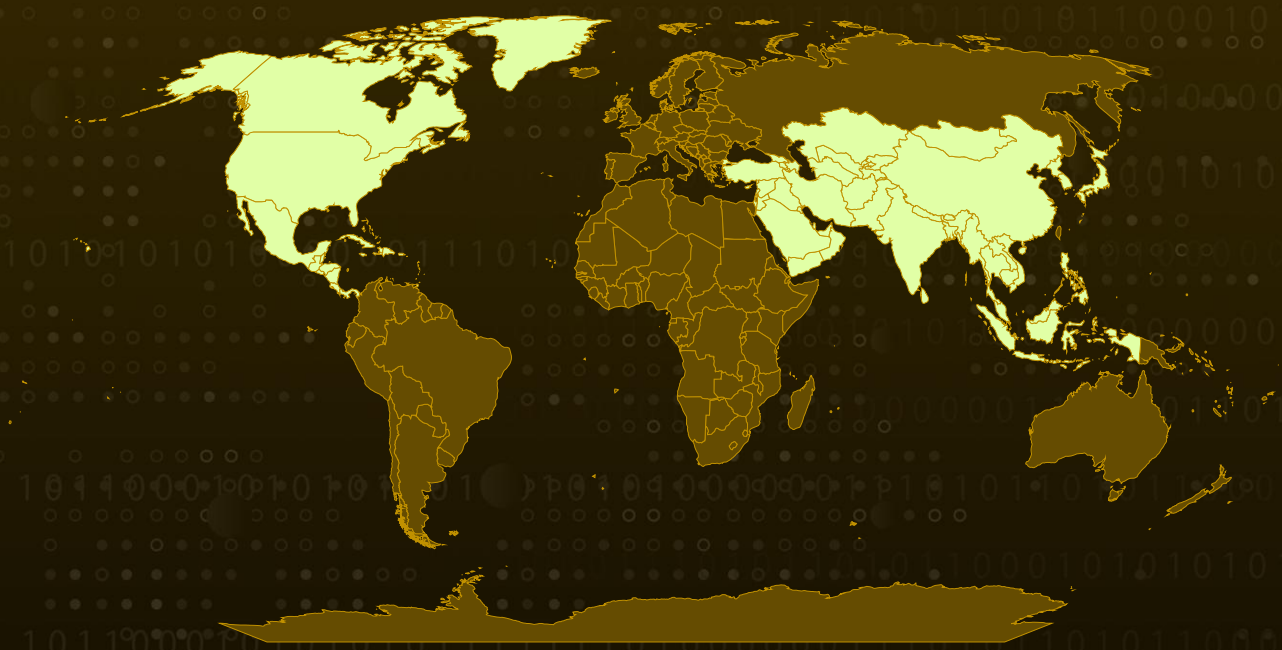
# Summary

**Attack Discovered:** November 5, 2024
**Targeted Countries:** North America and Asia
**Affected Industries:** Universities and Government Offices
**Affected Platform:** Linux
**Malware:** Auto-color
**Attack:** Between early November to December 2024, researchers uncovered a new Linux malware strain named Auto-color, derived from the filename it adopts after installation. This stealthy backdoor is being deployed against educational institutions and public sector organizations in the U.S. and Asia, enabling attackers to maintain persistent access while evading detection and removal. Once embedded, Auto-color grants threat actors' full remote control over compromised systems, making it exceptionally difficult to eliminate without specialized security tools. Its ability to blend into the system and resist deletion highlights the growing sophistication of Linux-targeted threats.

## Attack Regions



# Attack Details

**#1** A new Linux malware strain called Auto-color was uncovered, built to infiltrate systems while staying under the radar. This malware disguises itself with harmless-looking filenames, hides its communication with C2 servers, and uses custom encryption to avoid detection. Once installed, it grants attackers full remote access, making it incredibly difficult to remove without specialized tools. Each instance of the malware adopts a different filename to evade traditional security measures. Its execution depends on victims unknowingly running the malicious file, but the exact infection process remains unclear.

**#2** When executed, Auto-color checks whether its filename matches “Auto-color.” If not, it begins its installation process, embedding a hidden library implant within the executable. If the user lacks root privileges, the malware halts its installation to avoid detection. However, when executed with elevated privileges, it installs a malicious library named which mimics a legitimate system library to stay unnoticed. To establish persistence, the malware modifies a Linux configuration file that forces the system to load specific libraries before others. By doing so, it overrides core system functions and manipulates processes without raising alarms.

**#3** Auto-color’s malicious library is designed to intercept and manipulate system calls, especially those related to network activity and file access. It hooks into standard Linux functions to hide its operations, ensuring that security tools and administrators cannot easily detect its presence. When an attempt is made to inspect /proc/net/tcp, which logs active network connections, the malware returns fake data to conceal its communication with attackers. Additionally, it protects itself from removal by preventing any modifications to /etc/ld.preload, making cleanup efforts much more challenging.

**#4** To communicate with its operators, Auto-color decrypts an embedded list of remote C2 servers. It uses a custom encryption algorithm, dynamically generating keys to extract target addresses. Once a connection is established, the malware performs a handshake by sending a random 16-byte challenge and expecting the server to respond with the same value for verification. After authentication, Auto-color enters an ongoing command loop, waiting for further instructions from the remote server.

**#5** Auto-color is a highly evasive and persistent threat capable of maintaining long-term access to infected systems. By hooking into system libraries, disguising network activity, and preventing removal, it ensures attackers retain control over compromised machines. Its ability to establish reverse shell backdoors makes it a serious cyber espionage tool, allowing attackers to steal data, execute remote commands, and sustain access to high-value targets for extended periods.

# Recommendations

**Block Untrusted Programs from Running:** Configure Linux systems to prevent the execution of unknown or unverified files, particularly those from untrusted sources. Implement application whitelisting to ensure that only approved software can run, reducing the risk of malware infections.

**Enhance Endpoint Protection:** Deploy next-generation antivirus (NGAV) and endpoint detection & response (EDR) solutions to identify and block malware. Leverage behavioral analysis and machine learning-based detection to spot suspicious activity.

**Safeguard Critical System Files:** Continuously monitor /etc/ld.preload and other essential system configurations for unauthorized modifications. Deploy file integrity monitoring (FIM) tools to detect and alert on any unexpected changes, ensuring system security and integrity.

**Implement Least Privilege Access:** Restrict user accounts to the bare minimum permissions necessary for their tasks. Prevent non-administrative users from installing software or altering critical system files, reducing the risk of malware persistence and unauthorized changes.

## Potential MITRE ATT&CK TTPs

| | | | |
|---|---|---|---|
| TA0002<br>Execution | TA0003<br>Persistence | TA0005<br>Defense Evasion | TA0007<br>Discovery |
| TA0008<br>Lateral Movement | TA0009<br>Collection | TA0011<br>Command and Control | TA0040<br>Impact |
| T1082<br>System Information Discovery | T1057<br>Process Discovery | T1090<br>Proxy | T1027<br>Obfuscated Files or Information |
| T1036<br>Masquerading | T1083<br>File and Directory Discovery | T1070<br>Indicator Removal | T1070.004<br>File Deletion |
| T1071<br>Application Layer Protocol | T1071.001<br>Web Protocols | T1056<br>Input Capture | T1056.004<br>Credential API Hooking |

| | | | |
|---|---|---|---|
| **T1049** System Network Connections Discovery | **T1140** Deobfuscate/Decode Files or Information | **T1059** Command and Scripting Interpreter | **T1222** File and Directory Permissions Modification |
| **T1562** Impair Defenses | **T1562.012** Disable or Modify Linux Audit System | **T1543** Create or Modify System Process | **T1021** Remote Services |
| **T1485** Data Destruction | | | |

## Indicators of Compromise (IOCs)

| TYPE | VALUE |
|---|---|
| SHA256 | 270fc72074c697ba5921f7b61a6128b968ca6ccbf8906645e796cfc3072d4c43, 65a84f6a9b4ccddcdae812ab8783938e3f4c12cfba670131b1a80395710c6fb4, 83d50fcf97b0c1ec3de25b11684ca8db6f159c212f7ff50c92083ec5fbd3a633, a1b09720edcab4d396a53ec568fe6f4ab2851ad00c954255bf1a0c04a9d53d0a, bace40f886aac1bab03bf26f2f463ac418616bacc956ed97045b7c3072f02d6b, e1c86a578e8d0b272e2df2d6dd9033c842c7ab5b09cda72c588e0410dc3048f7, 85a77f08fd66aeabc887cb7d4eb8362259afa9c3699a70e3b81efac9042bb255, bf503b5eb456f74187a17bb8c08bccc9b3d91a7f0f6fd50110540b051510d1ca |
| IPv4:Port | 146[.]70[.]41[.]178[:]443, 216[.]245[.]184[.]214[:]443, 146[.]70[.]87[.]67[:]443, 65[.]38[.]121[.]64[:]443, 206[.]189[.]149[.]191[:]443 |

## References

https://unit42.paloaltonetworks.com/new-linux-backdoor-auto-color/

# What Next?

At **Hive Pro**, it is our mission to detect the most likely threats to your organization and to help you prevent them from happening.

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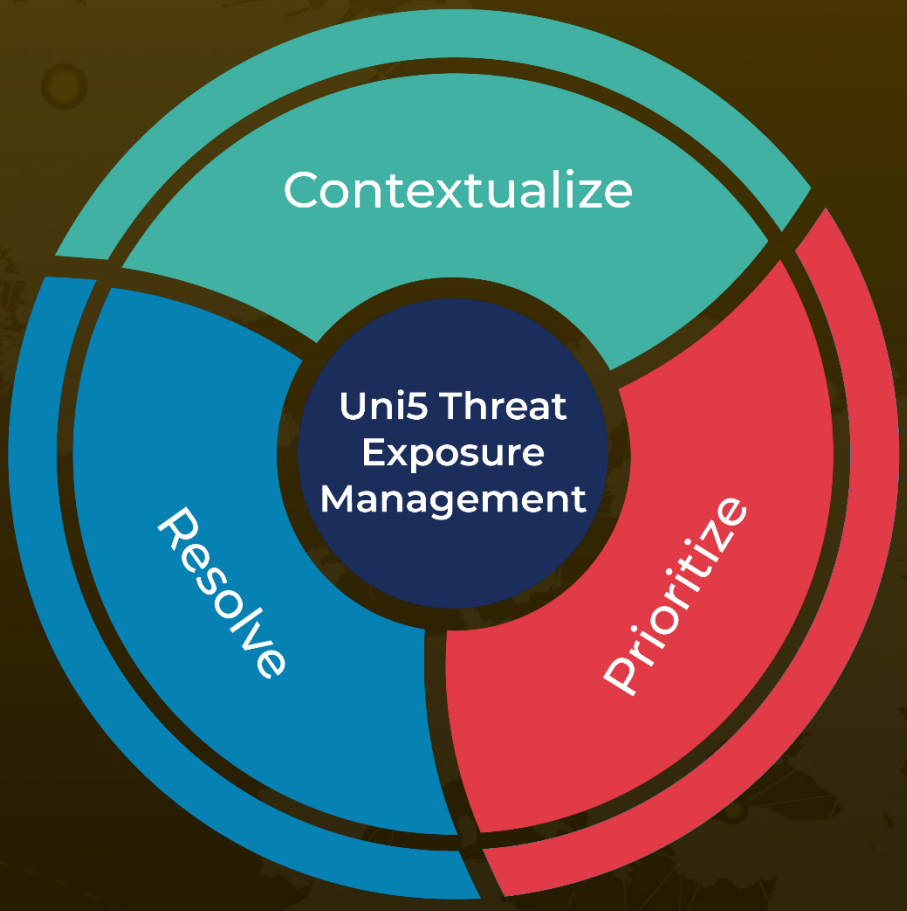


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