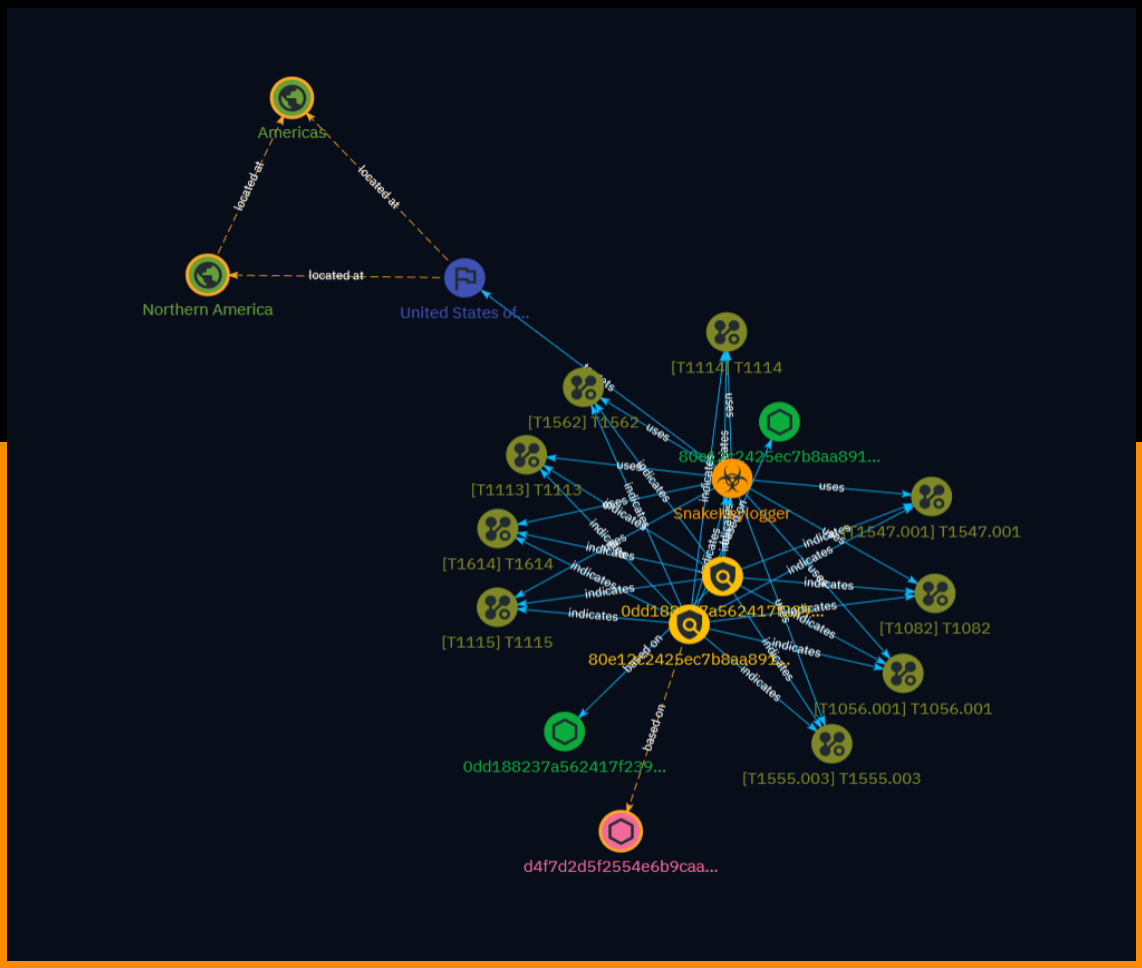
Mar 19 2024

NETMANAGEIT

# Intelligence Report

# Under the Hood of SnakeKeylogger: Analyzing its Loader and its Tactics, Techniques, and Procedures



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## Overview



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# Overview

## Description

Snake Keylogger is a Trojan Stealer that emerged in November 2020, showcasing credential theft and keylogging capabilities. It uses varied C2 servers and cryptors to evade detection. This blog provides insights into its loader, tactics, techniques, and procedures to aid defense.

## Confidence

*This value represents the confidence in the correctness of the data contained within this report.*

100 / 100

# Content

N/A

# Indicator

**Name**

0dd188237a562417f239ff9be662f9336ec77a0906af62c26516a8e6f767f9f5

**Pattern Type**

stix

**Pattern**

[file:hashes.'SHA-256' = '0dd188237a562417f239ff9be662f9336ec77a0906af62c26516a8e6f767f9f5']

**Name**

80e12c2425ec7b8aa8913df82bd47c0c1a62f6539df22b6bf1ddab8b1694e3e8

**Description**

Created by VirusTotal connector as the positive count was >= 10

**Pattern Type**

stix

**Pattern**

```
[file:hashes.'SHA-256' =
'80e12c2425ec7b8aa8913df82bd47c0c1a62f6539df22b6bf1ddab8b1694e3e8']
```

# Malware

| Name |
| --- |
| SnakeKeylogger |

# Attack-Pattern

| Name |
| --- |
| T1614 |
| **ID** |
| T1614 |
| **Description** |
| Adversaries may gather information in an attempt to calculate the geographical location of a victim host. Adversaries may use the information from [System Location Discovery](https://attack.mitre.org/techniques/T1614) during automated discovery to shape follow-on behaviors, including whether or not the adversary fully infects the target and/or attempts specific actions. Adversaries may attempt to infer the location of a system using various system checks, such as time zone, keyboard layout, and/or language settings. (Citation: FBI Ragnar Locker 2020)(Citation: Sophos Geolocation 2016)(Citation: Bleepingcomputer RAT malware 2020) Windows API functions such as `GetLocaleInfoW` can also be used to determine the locale of the host.(Citation: FBI Ragnar Locker 2020) In cloud environments, an instance's availability zone may also be discovered by accessing the instance metadata service from the instance.(Citation: AWS Instance Identity Documents) (Citation: Microsoft Azure Instance Metadata 2021) Adversaries may also attempt to infer the location of a victim host using IP addressing, such as via online geolocation IP-lookup services.(Citation: Securelist Trasparent Tribe 2020)(Citation: Sophos Geolocation 2016) |
| **Name** |
| T1547.001 |

## ID

T1547.001

## Description

Adversaries may achieve persistence by adding a program to a startup folder or referencing it with a Registry run key. Adding an entry to the "run keys" in the Registry or startup folder will cause the program referenced to be executed when a user logs in. (Citation: Microsoft Run Key) These programs will be executed under the context of the user and will have the account's associated permissions level. The following run keys are created by default on Windows systems: * `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run` * `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunOnce` * `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Run` * `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunOnce` Run keys may exist under multiple hives.(Citation: Microsoft Wow6432Node 2018)(Citation: Malwarebytes Wow6432Node 2016) The `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunOnceEx` is also available but is not created by default on Windows Vista and newer. Registry run key entries can reference programs directly or list them as a dependency.(Citation: Microsoft Run Key) For example, it is possible to load a DLL at logon using a "Depend" key with RunOnceEx: `reg add HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\RunOnceEx\0001\Depend /v 1 /d "C:\temp\evil[.]dll"` (Citation: Oddvar Moe RunOnceEx Mar 2018) Placing a program within a startup folder will also cause that program to execute when a user logs in. There is a startup folder location for individual user accounts as well as a system-wide startup folder that will be checked regardless of which user account logs in. The startup folder path for the current user is `C:\Users\[Username]\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup`. The startup folder path for all users is `C:\ProgramData\Microsoft\Windows\Start Menu\Programs\StartUp`. The following Registry keys can be used to set startup folder items for persistence: * `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\User Shell Folders` * `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Shell Folders` * `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\Shell Folders` * `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\User Shell Folders` The following Registry keys can control automatic startup of services during boot: * `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServicesOnce` *

`HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunServicesOnce` * `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\RunServices` * `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\RunServices` Using policy settings to specify startup programs creates corresponding values in either of two Registry keys: * `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer\Run` * `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer\Run` Programs listed in the load value of the registry key `HKEY_CURRENT_USER\Software\Microsoft\Windows NT\CurrentVersion\Windows` run automatically for the currently logged-on user. By default, the multistring `BootExecute` value of the registry key `HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Session Manager` is set to `autocheck autochk *`. This value causes Windows, at startup, to check the file-system integrity of the hard disks if the system has been shut down abnormally. Adversaries can add other programs or processes to this registry value which will automatically launch at boot. Adversaries can use these configuration locations to execute malware, such as remote access tools, to maintain persistence through system reboots. Adversaries may also use [Masquerading](https://attack.mitre.org/techniques/T1036) to make the Registry entries look as if they are associated with legitimate programs.

**Name**

T1555.003

**ID**

T1555.003

**Description**

Adversaries may acquire credentials from web browsers by reading files specific to the target browser.(Citation: Talos Olympic Destroyer 2018) Web browsers commonly save credentials such as website usernames and passwords so that they do not need to be entered manually in the future. Web browsers typically store the credentials in an encrypted format within a credential store; however, methods exist to extract plaintext credentials from web browsers. For example, on Windows systems, encrypted credentials may be obtained from Google Chrome by reading a database file, `AppData\Local\Google\Chrome\User Data\Default\Login Data` and executing a SQL query: `SELECT action_url, username_value, password_value FROM logins;`. The plaintext password can then be obtained by passing the encrypted credentials to the Windows API

function `CryptUnprotectData`, which uses the victim's cached logon credentials as the decryption key.(Citation: Microsoft CryptUnprotectData April 2018) Adversaries have executed similar procedures for common web browsers such as FireFox, Safari, Edge, etc. (Citation: Proofpoint Vega Credential Stealer May 2018)(Citation: FireEye HawkEye Malware July 2017) Windows stores Internet Explorer and Microsoft Edge credentials in Credential Lockers managed by the [Windows Credential Manager](https://attack.mitre.org/techniques/T1555/004). Adversaries may also acquire credentials by searching web browser process memory for patterns that commonly match credentials.(Citation: GitHub Mimikittenz July 2016) After acquiring credentials from web browsers, adversaries may attempt to recycle the credentials across different systems and/or accounts in order to expand access. This can result in significantly furthering an adversary's objective in cases where credentials gained from web browsers overlap with privileged accounts (e.g. domain administrator).

**Name**

T1562

**ID**

T1562

**Description**

Adversaries may maliciously modify components of a victim environment in order to hinder or disable defensive mechanisms. This not only involves impairing preventative defenses, such as firewalls and anti-virus, but also detection capabilities that defenders can use to audit activity and identify malicious behavior. This may also span both native defenses as well as supplemental capabilities installed by users and administrators. Adversaries may also impair routine operations that contribute to defensive hygiene, such as blocking users from logging out of a computer or stopping it from being shut down. These restrictions can further enable malicious operations as well as the continued propagation of incidents.(Citation: Emotet shutdown) Adversaries could also target event aggregation and analysis mechanisms, or otherwise disrupt these procedures by altering other system components.

**Name**

T1082

**ID**

T1082

**Description**

An adversary may attempt to get detailed information about the operating system and hardware, including version, patches, hotfixes, service packs, and architecture. Adversaries may use the information from [System Information Discovery](https://attack.mitre.org/techniques/T1082) during automated discovery to shape follow-on behaviors, including whether or not the adversary fully infects the target and/or attempts specific actions. Tools such as [Systeminfo](https://attack.mitre.org/software/S0096) can be used to gather detailed system information. If running with privileged access, a breakdown of system data can be gathered through the `systemsetup` configuration tool on macOS. As an example, adversaries with user-level access can execute the `df -aH` command to obtain currently mounted disks and associated freely available space. Adversaries may also leverage a [Network Device CLI](https://attack.mitre.org/techniques/T1059/008) on network devices to gather detailed system information (e.g. `show version`).(Citation: US-CERT-TA18-106A) [System Information Discovery](https://attack.mitre.org/techniques/T1082) combined with information gathered from other forms of discovery and reconnaissance can drive payload development and concealment.(Citation: OSX.FairyTale)(Citation: 20 macOS Common Tools and Techniques) Infrastructure as a Service (IaaS) cloud providers such as AWS, GCP, and Azure allow access to instance and virtual machine information via APIs. Successful authenticated API calls can return data such as the operating system platform and status of a particular instance or the model view of a virtual machine.(Citation: Amazon Describe Instance)(Citation: Google Instances Resource)(Citation: Microsoft Virutal Machine API)

**Name**

T1115

**ID**

T1115

**Description**

Adversaries may collect data stored in the clipboard from users copying information within or between applications. For example, on Windows adversaries can access clipboard

data by using `clip.exe` or `Get-Clipboard`.(Citation: MSDN Clipboard)(Citation: clip_win_server)(Citation: CISA_AA21_200B) Additionally, adversaries may monitor then replace users' clipboard with their data (e.g., [Transmitted Data Manipulation](https://attack.mitre.org/techniques/T1565/002)).(Citation: mining_ruby_reversinglabs) macOS and Linux also have commands, such as `pbpaste`, to grab clipboard contents.(Citation: Operating with EmPyre)

**Name**

T1114

**ID**

T1114

**Description**

Adversaries may target user email to collect sensitive information. Emails may contain sensitive data, including trade secrets or personal information, that can prove valuable to adversaries. Adversaries can collect or forward email from mail servers or clients.

**Name**

T1056.001

**ID**

T1056.001

**Description**

Adversaries may log user keystrokes to intercept credentials as the user types them. Keylogging is likely to be used to acquire credentials for new access opportunities when [OS Credential Dumping](https://attack.mitre.org/techniques/T1003) efforts are not effective, and may require an adversary to intercept keystrokes on a system for a substantial period of time before credentials can be successfully captured. In order to increase the likelihood of capturing credentials quickly, an adversary may also perform actions such as clearing browser cookies to force users to reauthenticate to systems.

(Citation: Talos Kimsuky Nov 2021) Keylogging is the most prevalent type of input capture, with many different ways of intercepting keystrokes.(Citation: Adventures of a Keystroke) Some methods include: * Hooking API callbacks used for processing keystrokes. Unlike [Credential API Hooking](https://attack.mitre.org/techniques/T1056/004), this focuses solely on API functions intended for processing keystroke data. * Reading raw keystroke data from the hardware buffer. * Windows Registry modifications. * Custom drivers. * [Modify System Image](https://attack.mitre.org/techniques/T1601) may provide adversaries with hooks into the operating system of network devices to read raw keystrokes for login sessions.(Citation: Cisco Blog Legacy Device Attacks)

**Name**

T1113

**ID**

T1113

**Description**

Adversaries may attempt to take screen captures of the desktop to gather information over the course of an operation. Screen capturing functionality may be included as a feature of a remote access tool used in post-compromise operations. Taking a screenshot is also typically possible through native utilities or API calls, such as `CopyFromScreen`, `xwd`, or `screencapture`.(Citation: CopyFromScreen .NET)(Citation: Antiquated Mac Malware)

# Country

| Name |
| --- |
| United States of America |

# Region

| Name |
| --- |
| Northern America |

| Name |
| --- |
| Americas |

# StixFile

| Value |
| --- |
| 0dd188237a562417f239ff9be662f9336ec77a0906af62c26516a8e6f767f9f5 |
| 80e12c2425ec7b8aa8913df82bd47c0c1a62f6539df22b6bf1ddab8b1694e3e8 |

# Artifact

| Value |
| --- |
| d4f7d2d5f2554e6b9caae87002eaaf6d33a58609bed21468699f8f8317f508d1668269c05acb8f805ce7b1f967a66ca430206c8ca1f39e5adaa016a7191fdc56 |

# External References

- https://www.splunk.com/en_us/blog/security/under-the-hood-of-snakekeylogger-analyzing-its-loader-and-its-tactics-techniques-and-procedures.html
- https://otx.alienvault.com/pulse/65f80ec3fadf94f6a900f8dd