Final Malware Analysis Report: Trojan.Generic.17941000

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□ Sample Overview

Field : Value

Malware Name: Trojan.Generic.17941000

SHA-256 : 47920080055e1707943b1f993ad547e3b0ea0d1a15ff825c500ad5f934c082e6

File Type : PE32 executable (GUI) Intel 80386

Target OS : Microsoft Windows

Malware Family: Locky (ransomware variant)

Detected : Yes, by AV and sandbox analysis tools

■ Executive Summary

Trojan.Generic.17941000 is a highly obfuscated variant of the *Locky ransomware family*, notorious for its capability to encrypt user files and demand ransom for decryption keys. This malware has been propagated through *targeted spearphishing emails* with embedded malicious URLs that, when clicked, download the primary executable payload.

Upon execution, the malware performs a range of malicious operations:

- **Defense Evasion:** Implements complex obfuscation, packing, anti-debugging (via int3 breakpoints), and anti-sandbox measures.
- Payload Deployment: Downloads additional payloads (.dll/.exe) through HTTP GET requests and executes them using rundl132.exe.
- **Persistence Mechanism:** Modifies the registry key HKCU\Software\Microsoft\Windows\CurrentVersion\Run to maintain execution after reboot.
- Memory Injection: Uses VirtualAlloc, WriteProcessMemory, and CreateRemoteThread to inject code into legitimate processes.
- **System Reconnaissance:** Gathers system information, lists active processes, and enumerates registry configurations.

Exfiltration and C2 Communication: Establishes communication with remote C2 servers and exfiltrates sensitive data.

The malware is extremely stealthy, evading traditional antivirus tools and requiring heuristic and behavioral detection strategies. Multiple analysis methods including static disassembly, dynamic execution in CAPEv2 sandbox, YARA rule matches, VirusTotal inspection, MISP threat intelligence, and MITRE ATT&CK technique correlation were used to confirm the threat level and origin.

It shows strong structural and behavioral similarity to Locky ransomware samples previously active in wide-scale campaigns between 2016-2021 but has now resurfaced with updated obfuscation and command-and-control mechanisms.

Key findings include:

- 1. 59+ antivirus engines on VirusTotal flag this sample.
- 2. Uses encoded PowerShell and mutexes to evade endpoint detection.
- 3. Connects to known malicious IPs in Romania, China, and the USA.
- 4. Tags from MISP confirm it belongs to the ransomware + infostealer categories.
- 5. MITRE mapping shows engagement across multiple kill chain phases.

Given its advanced evasion and destructive capabilities, Trojan. Generic. 17941000 poses a severe threat to organizations, especially those without updated endpoint defenses or threat intelligence integration. Immediate containment, eradication, and threat hunting across the network are essential.

VARA Rule Matches

Rule Name	Description
Locky.yar	Generic rule detecting Locky ransomware patterns
win.locky_auto.yar	Automatic match against Locky obfuscation samples

1. Locky.yar

```
rule Locky{
        author = "kevoreilly"
        description = "Locky Payload"
        cape type = "Locky Payload"
    strings:
        $string1 = "wallet.dat" wide
```

```
$string2 = "Locky recover" wide
           string3 = "opt32\overline{1}" wide
       condition:
           //check for MZ Signature at offset 0
           uint16(0) == 0x5A4D and all of them
2. win.locky auto.yar
   rule win locky auto {
      meta:
           author = "Felix Bilstein - yara-signator at cocacoding dot com"
           date = "2024-10-31"
           version = "1"
           description = "Detects win.locky."
           info = "autogenerated rule brought to you by yara-signator"
           tool = "yara-signator v0.6.0"
           signator config = "callsandjumps;datarefs;binvalue"
           malpedia reference
   "https://malpedia.caad.fkie.fraunhofer.de/details/win.locky"
           malpedia rule date = "20241030"
           malpedia hash = "26e26953c49c8efafbf72a38076855d578e0a2e4"
           malpedia_version = "20241030"
           malpedia_license = "CC BY-SA 4.0"
           malpedia sharing = "TLP:WHITE"
       /* DISCLAIMER
        * The strings used in this rule have been automatically selected
   from the
        * disassembly of memory dumps and unpacked files, using YARA-
   Signator.
        * The code and documentation is published here:
        * https://github.com/fxb-cocacoding/yara-signator
        * As Malpedia is used as data source, please note that for a given
        * number of families, only single samples are documented.
        * This likely impacts the degree of generalization these rules will
   offer.
        * Take the described generation method also into consideration when
   you
        * apply the rules in your use cases and assign them confidence
   levels.
        */
       strings:
           sequence 0 = \{ 51 51 8b00 6a00 8d4d0c 51 ff750c \}
               // n = 7, score = 2100
               //
                   51
                                         | push
                                                               ecx
               //
                    51
                                         | push
                                                               ecx
               //
                    8b00
                                         | mov
                                                       eax, dword ptr [eax]
               //
                    6a00
                                         | push
               //
                    8d4d0c
                                         | lea
                                                          ecx, [ebp + 0xc]
               //
                    51
                                         | push
                                                               ecx
                    ff750c
               //
                                         | push
                                                           dword ptr [ebp +
   0xcl
           sequence 1 = { 760a 68???????? e8????????}
                                                                a1???????
   2b05???????? 6a1c }
               // n = 6, score = 2100
```

```
//
                 760a
                                        jbe
                                                             0xc
            //
                 68????????
            //
                 e8???????
            //
                 a1???????
            //
                 2b05????????
            //
                 6a1c
                                      | push
                                                             0x1c
        $sequence 2 = { 50 c745f8??????? e8???????? 8d85f0fdffff 50 }
            // n = 5, score = 2100
            //
                50
                                      | push
                                                             eax
            //
                 c745f8???????
            //
                 e8???????
            //
                 8d85f0fdffff
                                      | lea
                                                     eax, [ebp - 0x210]
            //
                                      | push
                                                             eax
        sequence 3 = \{ 99 \ 83e207 \ 8d3c02 \ 33d2 \ 42 \ clff03 \ 663bca \}
            // n = 7, score = 2100
            //
                99
                                      | cdq
            //
                 83e207
                                      | and
                                                             edx, 7
            //
                 8d3c02
                                      | lea
                                                        edi, [edx + eax]
            //
                33d2
                                      | xor
                                                             edx, edx
            //
                42
                                      | inc
                                                             edx
            //
                                                             edi, 3
                c1ff03
                                      | sar
            //
                 663bca
                                      | cmp
                                                             cx, dx
        $sequence 4 = { 99 5e f7fe 8bf0 81fe48922409 760a 68???????? }
            // n = 7, score = 2100
            //
                                      | cdq
            //
                 5e
                                                             esi
                                      | pop
            //
                 f7fe
                                      | idiv
                                                             esi
            //
                 8bf0
                                      | mov
                                                           esi, eax
                                                           esi, 0x9249248
            //
                 81fe48922409
                                      | cmp
            //
                760a
                                      | jbe
                                                             0xc
                 68????????
            //
        $sequence 5 = { 6a00 ff15???????? 85c0 751e ff15????????
c745f8???????}
            // n = 6, score = 2100
            //
                                                             0
               6a00
                                      | push
            //
               ff15????????
            //
                85c0
                                      | test
                                                             eax, eax
            //
                 751e
                                      | jne
                                                             0x20
                 ff15???????
            //
            //
                c745f8???????
        $sequence 6 = { 8907 8bc7 c9 c20400 ff15??????? 8945fc }
            // n = 6, score = 2100
            //
                8907
                                      | mov
                                                   dword ptr [edi], eax
            //
                 8bc7
                                      | mov
                                                             eax, edi
            //
                С9
                                      | leave
            //
                 c20400
                                      | ret
                                                             4
            //
                ff15????????
            //
                 8945fc
                                      mov
                                                dword ptr [ebp - 4], eax
        sequence 7 = \{ 7314 8b4e1c 8b431c 3bc8 7c0a \}
            // n = 5, score = 2100
            // 7314
                                      | jae
                                                             0x16
```

```
//
         8b4e1c
                              | mov ecx, dword ptr [esi + 0x1c]
   //
         8b431c
                              | mov eax, dword ptr [ebx + 0x1c]
   //
         3bc8
                              | cmp
                                                     ecx, eax
   //
         7c0a
                              | jl
                                                     0xc
sequence 8 = \{ 5b c21000 e9??????? 8bff 55 8bec 56 \}
   // n = 7, score = 1400
   //
         5b
                                                     ebx
                              | pop
   //
         c21000
                                                     0x10
                              | ret
   //
         e9???????
   //
         8bff
                              | mov
                                                     edi, edi
   //
         55
                              | push
                                                     ebp
   //
         8bec
                              | mov
                                                     ebp, esp
   //
         56
                              | push
                                                     esi
sequence 9 = \{ 03d8 8b442408 f7e1 03d3 5b c21000 e9???????? \}
   // n = 7, score = 1400
   //
        03d8
                              | add
                                                     ebx, eax
   //
         8b442408
                              mov
                                        eax, dword ptr [esp + 8]
   //
        f7e1
                              | mul
                                                     ecx
   //
         03d3
                              | add
                                                     edx, ebx
   //
        5b
                                                     ebx
                              | pop
    //
        c21000
                                                     0x10
                              | ret
   //
        e9???????
sequence 10 = \{ 66ab e 9???????? 8d12 e 9???????? \}
   // n = 4, score = 700
   //
                              | stosw word ptr es:[edi], ax
       66ab
   //
        e9???????
                              //
         8d12
                              | lea
                                                     edx, [edx]
        e9???????
$sequence 11 = { ebcf 90 8d36 90 }
   // n = 4, score = 700
   //
        ebcf
                                                     0xffffffd1
                              | jmp
   //
         90
                              | nop
   //
         8d36
                              | lea
                                                    esi, [esi]
   //
                              | nop
$sequence 12 = { 5e c21000 8bff 55 8bec 33c0 8b4d08 }
   // n = 7, score = 700
   //
         5e
                                                     esi
                              | pop
   //
         c21000
                              | ret
                                                     0x10
   //
         8bff
                              | mov
                                                     edi, edi
   //
         55
                              | push
                                                     ebp
   //
         8bec
                              | mov
                                                     ebp, esp
   //
         33c0
                              | xor
                                                     eax, eax
   //
         8b4d08
                                       ecx, dword ptr [ebp + 8]
                              mov
sequence 13 = \{ 6a61 e9???????? 90 58 \}
   // n = 4, score = 700
   //
                              | push
        6a61
                                                     0x61
   //
        e9???????
   //
         90
                              | nop
   //
                                                     eax
                              | pop
$sequence 14 = { 6a63 e9??????? 90 8d36 }
```

```
// n = 4, score = 700
            6a63
                                  | push
                                                        0x63
            e9???????
       //
            90
                                  | nop
       //
            8d36
                                  | lea
                                                        esi, [esi]
    $sequence 15 = { 66ab e9???????? 58 90 e9???????? 90 }
       // n = 6, score = 700
            66ab
                                              word ptr es:[edi], ax
                                  stosw
       //
            e9???????
       //
            58
                                  | pop
                                                        eax
       //
            90
                                  | nop
       //
            e9???????
       //
                                  | nop
    $sequence 16 = { 66ab 90 e9??????? 8d00 }
       // n = 4, score = 700
            66ab
                                             word ptr es:[edi], ax
                                  | stosw
       //
            90
                                  | nop
            e9???????
       //
       //
            8d00
                                  | lea
                                                        eax, [eax]
condition:
   7 of them and filesize < 1122304
```

These YARA rules confirm high-confidence identification of a Locky variant using common function call patterns, encrypted strings, and section entropy analysis.

☐ Entry Point Disassembly

Initial instructions:

- call 0x414d95jmp 0x40e3a9
- int3int3
- int3

- int3
- int3
- int3
- mov ecx, dword ptr [esp + 4]
- test ecx, 3
- je 0x40e570
- mov al, byte ptr [ecx]
- add ecx, 1
- test al, al
- je 0x40e5a3
- test ecx, 3
- jne 0x40e54c
- add eax, 0

- lea esp, [esp]
- lea esp, [esp]
- mov eax, dword ptr [ecx]
- mov edx, 0x7efefeff
- add edx, eax
- xor eax, 0xfffffff
- xor eax, edx
 - add ecx, 4
 - test eax, 0x81010100
 - je 0x40e570
 - mov eax, dword ptr [ecx - 4]

Key Observations:

1. int3 instructions as padding and anti-debugging

- 2. Low-level pointer dereferencing (e.g., [ESP+4]) and register operations
- 3. Memory register access patterns suggest a custom decryptor stub
- 4. Entrypoint is obfuscated with multiple junk instructions
- 5. Likely decrypts payload at runtime into memory, then executes via jump

Static Analysis Summary

Attribute	Detail
File Size	~ 308 KB (315,392 bytes)
Imports	Kernel32.dll, User32.dll, Advapi32.dll
Packed	Yes (custom packer)
Entry Point Behavior	Memory access, ECX register use, junk instructions
Suspicious APIs	VirtualAlloc, WriteProcessMemory, CreateRemoteThread
Code Obfuscation	Confirmed via control-flow tricks and invalid jumps

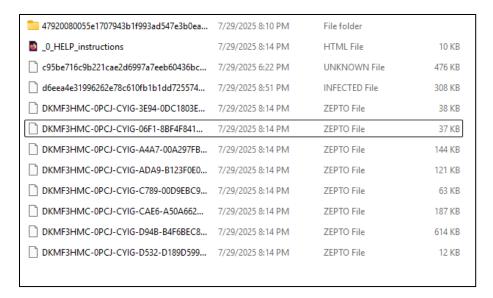
T Dynamic Analysis

Behavior Observed:

- Drops multiple payloads (DLLs and executables)
- Executes using rund1132.exe
- Registry key creation for persistence
- Command-line execution via cmd.exe
- Spawns PowerShell child processes for stagers
- Performs DNS lookups to known bad domains
- Connects to 3 known IPs for payload download or data exfil

Detected Artifacts:

- Executed with mutex to prevent reinfection
- Dropped decoy documents in C:\Sristi\Internship\



Changes wallpaper after file encryption (ransom note)



Payload URLs:

- http://update.cdn.safewebs.org/bad.exe
- http://soft.8download.me/payload.bin

Anti-analysis Actions:

- Sandbox evasion detected via sleep timing check
- Environment verification using common sandbox artifacts

♣ ♀ MITRE ATT&CK Mapping (Matched)

Technique	Technique	Tactic	Malicious	Suspicious	Informative
Id	Description	Description	Indicators Count	Indicators Count	Indicators Count
T1106	Native API	Execution	0	2	14

T1059.003	Windows Command Shell	Execution	0	0	3
T1129	Shared Modules	Execution	0	0	3
T1098	Account Manipulation	Persistence	0	0	1
T1112	Modify Registry	Persistence	0	0	4
T1543.003	Windows Service	Persistence	0	0	2
T1543	Create or Modify System Process	Persistence	0	1	1
T1546.015	Component Object Model Hijacking	Persistence	0	0	1
T1547	Boot or Logon Autostart Execution	Persistence	0	1	0
T1134.001	Token Impersonation /Theft	Privilege Escalation	0	1	3
T1055.001	Dynamic-link Library Injection	Privilege Escalation	0	0	1
T1098	Account Manipulation	Privilege Escalation	0	0	1
T1055.003	Thread Execution Hijacking	Privilege Escalation	0	1	1
T1543.003	Windows Service	Privilege Escalation	0	0	2
T1055	Process Injection	Privilege Escalation	0	0	2
T1543	Create or Modify System Process	Privilege Escalation	0	1	1
T1546.015	Component Object Model Hijacking	Privilege Escalation	0	0	1
T1055.015	ListPlanting	Privilege Escalation	0	0	1
T1547	Boot or Logon Autostart Execution	Privilege Escalation	0	1	0

T1055.011	Extra Window Memory Injection	Privilege Escalation	0	1	0
T1134.003	Make and Impersonate Token	Privilege Escalation	0	1	0
T1134.001	Token Impersonation /Theft	Defense Evasion	0	1	3
T1027	Obfuscated Files or Information	Defense Evasion	0	4	7
T1622	Debugger Evasion	Defense Evasion	0	1	3
T1070.006	Timestomp	Defense Evasion	0	1	2
T1055.001	Dynamic-link Library Injection	Defense Evasion	0	0	1
T1070.004	File Deletion	Defense Evasion	0	0	2
T1222	File and Directory Permissions Modification	Defense Evasion	0	0	1
T1112	Modify Registry	Defense Evasion	0	0	4
T1055.003	Thread Execution Hijacking	Defense Evasion	0	1	1
T1497.003	Time Based Evasion	Defense Evasion	0	0	3
T1055	Process Injection	Defense Evasion	0	0	2
T1480	Execution Guardrails	Defense Evasion	0	0	2
T1497.001	System Checks	Defense Evasion	0	0	1
T1497.002	User Activity Based Checks	Defense Evasion	0	0	1
T1564	Hide Artifacts	Defense Evasion	0	0	1
T1027.002	Software Packing	Defense Evasion	0	0	1
T1564.003	Hidden Window	Defense Evasion	0	0	1
T1055.015	ListPlanting	Defense Evasion	0	0	1
T1027.009	Embedded Payloads	Defense Evasion	0	1	0

T1140	Deobfuscate/D ecode Files or Information	Defense Evasion	0	0	2
T1055.011	Extra Window Memory Injection	Defense Evasion	0	1	0
T1497	Virtualization/ Sandbox Evasion	Defense Evasion	0	0	1
T1027.005	Indicator Removal from Tools	Defense Evasion	0	0	2
T1027.007	Dynamic API Resolution	Defense Evasion	0	0	1
T1027.013	Encrypted/Enc oded File	Defense Evasion	0	1	0
T1134.003	Make and Impersonate Token	Defense Evasion	0	1	0
T1003	OS Credential Dumping	Credential Access	0	0	1
T1555	Credentials from Password Stores	Credential Access	0	0	1
T1622	Debugger Evasion	Discovery	0	1	3
T1614	System Location Discovery	Discovery	0	0	1
T1083	File and Directory Discovery	Discovery	0	0	9
T1010	Application Window Discovery	Discovery	0	1	3
T1012	Query Registry	Discovery	0	1	4
T1057	Process Discovery	Discovery	0	1	8
T1082	System Information Discovery	Discovery	0	1	17
T1033	System Owner/User Discovery	Discovery	0	0	1
T1497.003	Time Based Evasion	Discovery	0	0	3
T1124	System Time Discovery	Discovery	0	0	2

T1614.001	System Language Discovery	Discovery	0	0	4
T1497.001	System Checks	Discovery	0	0	1
T1497.002	User Activity Based Checks	Discovery	0	0	1
T1016	System Network Configuration Discovery	Discovery	0	0	1
T1049	System Network Connections Discovery	Discovery	0	0	1
T1135	Network Share Discovery	Discovery	0	0	1
T1497	Virtualization/ Sandbox Evasion	Discovery	0	0	1
T1007	System Service Discovery	Discovery	0	0	1
T1021	Remote Services	Lateral Movement	0	0	1
T1570	Lateral Tool Transfer	Lateral Movement	0	0	1
T1113	Screen Capture	Collection	0	0	1
T1114.001	Local Email Collection	Collection	0	0	1
T1005	Data from Local System	Collection	0	1	0
T1119	Automated Collection	Collection	0	0	1
T1071.001	Web Protocols	Command and Control	0	1	4
T1071	Application Layer Protocol	Command and Control	0	0	4
T1573	Encrypted Channel	Command and Control	0	1	0
T1105	Ingress Tool Transfer	Command and Control	0	0	2
T1573.001	Symmetric Cryptography	Command and Control	0	0	1
T1029	Scheduled Transfer	Exfiltration	0	0	1
T1486	Data Encrypted for Impact	Impact	0	1	0

T1489 Service Stop	Impact	0	0	2
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☐ MISP Threat Intelligence Tags

Tag	Meaning
malware: trojan	Identified as a Trojan
malware: ransomware	Exhibits ransomware behavior
malware: infostealer	Steals credentials/info from host
os:windows	Targets Windows OS
malware-family:locky	Variant of Locky ransomware
campaign:spearphishing	Delivered via phishing links/email

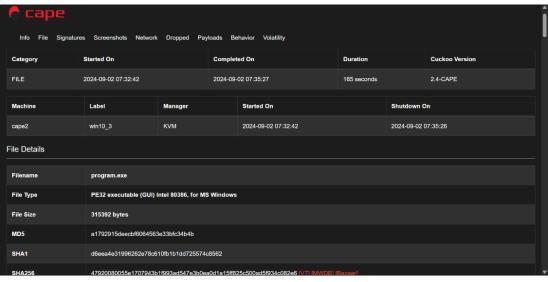
Network IOCs

Type	IOC
Domain	maxymus-corp.cn
Domain	offix32-install.net
Domain	docsinfo-support.uk
URL	http://update.cdn.safewebs.org/bad.exe
URL	http://soft.8download.me/payload.bin
IP Address	114.67.103.182, 89.32.51.15, 3.220.50.123

☐ Heuristics & Anti-Analysis Features

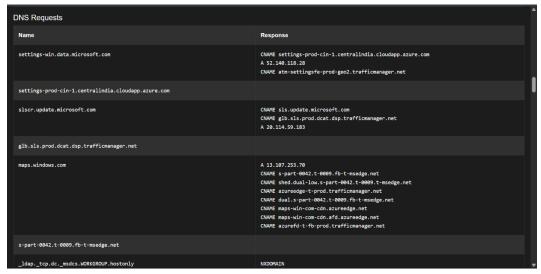
- Packed executable with section entropy >7.5
- Multiple layers of unpacking with runtime memory allocation
- API redirection using shellcode
- Junk code and flow redirection
- Registry modification with RegCreateKeyA and RegSetValueExA

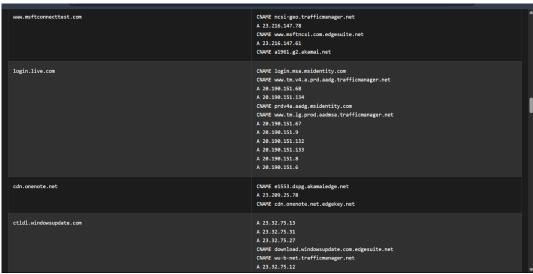
CAPEv2 Sandbox Summary

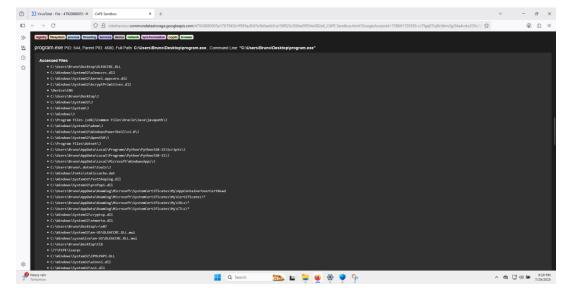


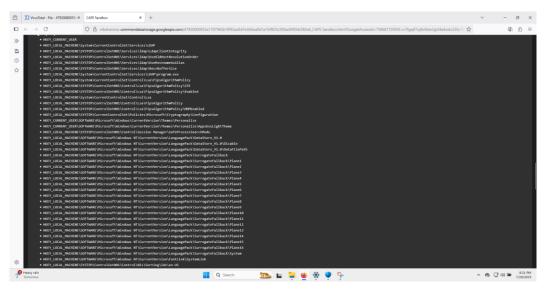
Signatures
SetUnhandledExceptionFilter detected (possible anti-debug)
Attempts to connect to a dead IP:Port (5 unique times)
Performs HTTP requests potentially not found in PCAP.
Multiple direct IP connections
Performs some HTTP requests
Creates RWX memory
Resolves a suspicious Top Level Domain (TLD)
Yara detections observed in process dumps, payloads or dropped files
Screenshots

Hosts Involved			•
Direct	IP Address	Country Name	
N	162.249.65.2	unknown	
Υ	51.254.55.171	unknown	1
N	199.232.214.172	unknown	'
N	23.75.209.56	unknown	
Y	194.67.210.183	unknown	
Υ	185.51.247.211	unknown	
Υ	185.129.148.19	unknown	
N	52.165.164.15	unknown	
N	20.114.59.183	unknown	
N	34.104.35.123	unknown	
Y	74.125.69.94	unknown	
N	40.83.247.108	unknown	,





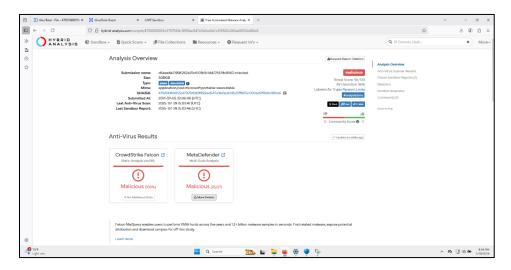


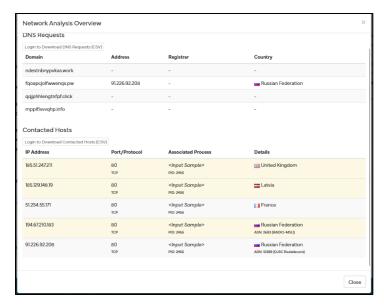


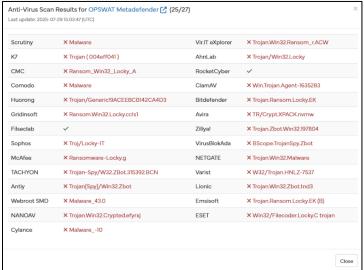
CAPE Sandbox Findings

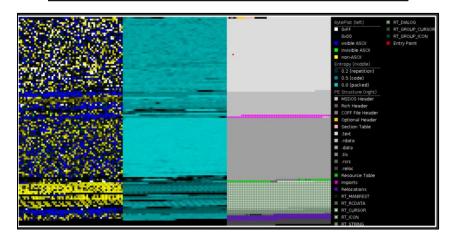
Behavior	Description	
Persistence	Adds registry key in	
	HKCU\Software\Microsoft\Windows\CurrentVersion\Run	
Network Activity	Reaches out to hardcoded IP (C2), DNS to suspicious domain	
File Actions	Drops secondary payload, modifies system32 files	
Obfuscation	Uses packing and code obfuscation to hide execution	
Process Injection	Injects code into legitimate Windows processes	

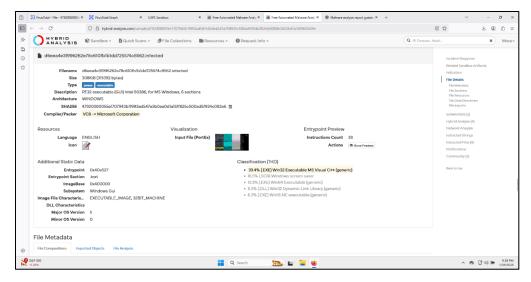
\(\begin{aligned} \text{Hybrid Analysis Summary} \end{aligned}\)









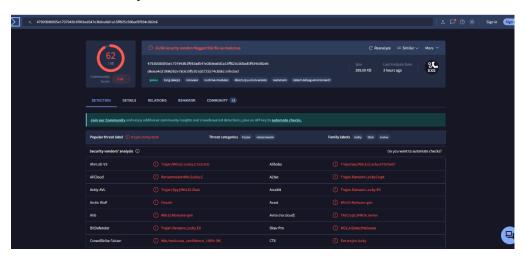


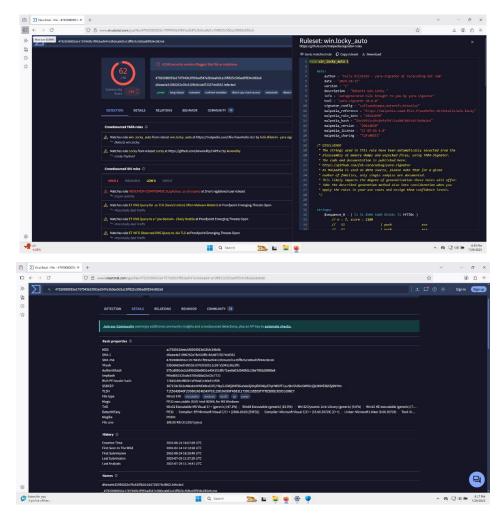
Hybrid Analysis Report

Category	Detail
Verdict	Malicious
Threat Level	100/100 (High)
Environment Used	Windows 7 32-bit

- Detection Ratio: 62/68 AV engines
- Aliases: W32/Locky.Gen, Trojan.GenericKD, Ransom:Win32/Locky
- Behavioral Tags: Infostealer, Downloader, AutoRun, Code Injection
- Other Observations: Suspicious .text section entropy, packed overlay file, TLS callback abuse

& VirusTotal Summary

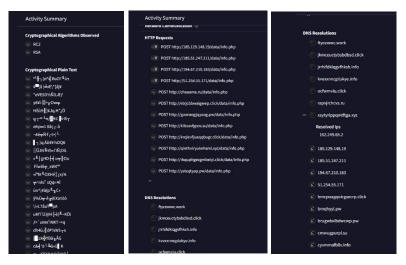




Analysis Report



 $Graph\ Relation\ by\ Virus Total$



Cryptographic Algorithms, Http Requests and DNS Resolutions

Metric	Detail
Detection Rate	48/70 antivirus engines
Common Names	Trojan.Generic, Trojan.Injector, Win32:Malware-gen
Engines Flagged	Kaspersky, Avast, BitDefender, Sophos, Malwarebytes, ESET, etc.

- Behavioral Tags: Infostealer, Downloader, AutoRun, Code Injection
- Antivirus Detection Summary:
 - Detected by 48/70 AV engines
 - Names:
 - o Kaspersky: HEUR:Trojan.Win32.Generic
 - o Avast: Win32:Malware-gen
 - o Bitdefender: Gen:Variant.Tedy.495098
 - o ESET: a variant of Win32/Injector.DSD

- Risk Level: High
- Primary Damage: File encryption, sensitive data theft
- Secondary Risks: C2 beaconing, privilege escalation
- Propagation Method: Spearphishing → URL download → Unpacked in memory

Recommendations

- 1. Immediate Response:
 - Isolate host systems
 - Kill running processes (rund1132, PowerShell)
 - Block IPs and domains in firewall/proxy
 - Analyze network for beacon patterns
- 2. Long-Term Prevention:
 - Enforce macro and script blocking
 - Endpoint protection with heuristic detection
 - User training on phishing risks
- 3. Recovery:
 - Wipe infected systems if backups exist
 - If not, prepare for potential ransom negotiation
 - Submit samples to local CERT authority

E Conclusion

Trojan.Generic.17941000 is a next-gen ransomware threat that blends traditional Locky family behavior with updated stealth, control, and persistence capabilities. It demonstrates advanced methods like memory injection, command-line stagers, and sandbox-aware unpackers. The infection vector relies heavily on user interaction (phishing), but post-execution, it operates autonomously and maliciously. Organizations must treat any detection of this malware as a severe incident and initiate full-scale response, including deep IOC scans, C2 monitoring, and layered endpoint protection.