MAN1: Tracking the Crypter and the Actor

In the world of malware crypters and packers are often time considered throwaway by researchers, it's also fairly common to use them as training tools for junior personnel. In a way most obfuscations are treated as training, learning or for games like CTF(Capture The Flag). So it's probably not surprising that lots of researchers don't pay much attention to these layers. These layers can be used especially when you find some of the more sophisticated ones that tend to stick around for longer periods of time. While probably not as useful as tracking an actor to a backend system, these malware artifacts can provide valuable clues, serving as tools, techniques and procedures (TTPs) in tracking the ongoing operations of a specific threat actor across a wide range of operations and groups. In this case, we focus on MAN1, a sophisticated crypter dating back to 2014 that's still in use today.

The Actor

Associating an actor to a string of campaigns is never an easy task. Crimeware operates like an underground business -- multiple players may be involved in one project, pieces of an operation may be outsourced at any time, and elements can be handled by multiple groups over time. In these instances, it becomes harder to prove that the same criminal group is behind a string of malware campaigns stretching back two years.

However, subtle tricks and routines found in packers and crypters provide valuable clues for threat researchers. In some cases, it's possible to associate actors with their payloads, which allows threat researchers to track the movement of specific actors over time. Given the utility of these obfuscation techniques, actors often keep their tricks of the trade private and do not sell them to the masses on the underground.

One actor, or group, using such tricks is MAN1. We've associated MAN1 with Dyre, a trojan first used in large-scale campaigns targeting customers of major financial institutions and later used to target organizations in additional sectors that include technology, petrochemical and others. The MAN1 moniker comes from the binaries the Dyre malware downloads from compromised websites. These downloaded files usually included a man1.exe file, which was typically an older version of Dyre.

Tracking MAN1

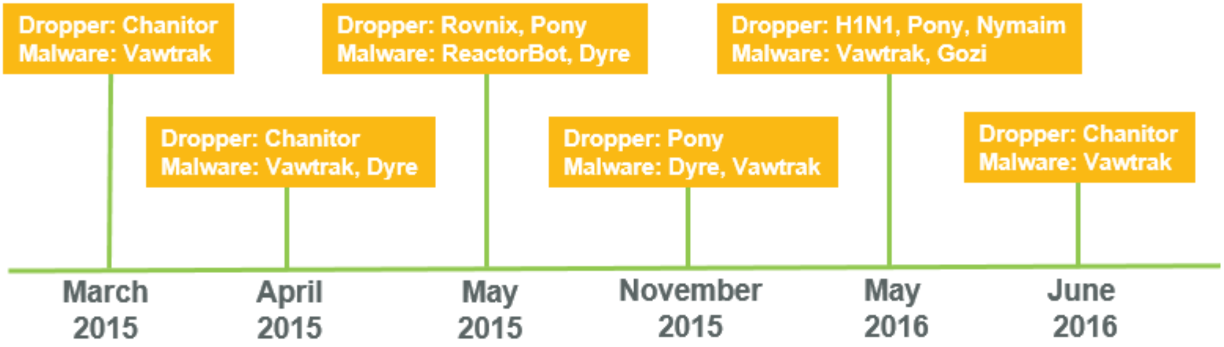
To link MAN1 to Dyre, we had to take a look at earlier campaigns. Before Dyre, these actors used Chanitor to download Vawtrak, a banking trojan. The server delivering Chanitor used "bulletproof hosting", which are hosting services permitting extreme leniency in their terms of service. Later, this actor gradually began delivering both Vawtrak and Dyre. Eventually, the actor began delivering Dyre exclusively. The servers used at the beginning of this transition hold an important clue to uncover the identity of the actor: These same few servers were also used to deliver Vawtrak using Chanitor.

As with most long-established actors, MAN1 exhibits distinct TTPs in performing their ongoing malicious activities. The crypter discussed here is one such tool used by this actor since its involvement in Vawtrak in 2014, and possibly earlier. While crypters are relatively common, really good crypters -- designed to prevent detection through various methods -- can sell for a lot of money on the underground, where they typically remain private and used for a very long time.

The uniqueness and complexity of the crypter, coupled with the other TTPs used by this group, provides another valuable clue and paints a clearer picture of the actor. Over time, the research community picked up on this actor's subtleties, such as its consistent use of ‘feedweb_data’ or ‘cached_data’ folders on compromised websites. These characteristics made it possible for researchers to track this actor's involvement across multiple malware families over two years’ time.

A Timeline of Exploits

Let's take a look at MAN1's activities beginning in March 2015.



March 2015: Chanitor, Vawtrak: By tracing the IP range by naming schemes and crypter usage, we find the actor's first involvement with Vawtrak, when it spammed out Chanitor as a flight confirmation (1) to deliver Vawtrak from 91.194.254.213/us/file.jpg.

April 2015: Chanitor -> Vawtrak, Dyre: In April 2015, we spotted a glaring association with this actor's involvement in both Dyre and the old Vawtrak in a spam campaign (2) that used a macro to download a text file that contained the url to the payload. This technique provides the actor flexibility, in that they can use the same spam campaign to deliver multiple payloads. This technique has one drawback: It needs to burn through extra compromised websites. This campaign had two payloads – one from 91.194.254.235/uss/file.exe using Chanitor (delivering Vawtrak) and one from 91.194.254.222/us2/file.exe delivering Dyre. The Dyre sample used in this campaign was named ‘man1’. This IP range used can be traced back further -- to Chanitor delivering old Vawtrak -- and was also used for testing the newer Vawtrak seen today.

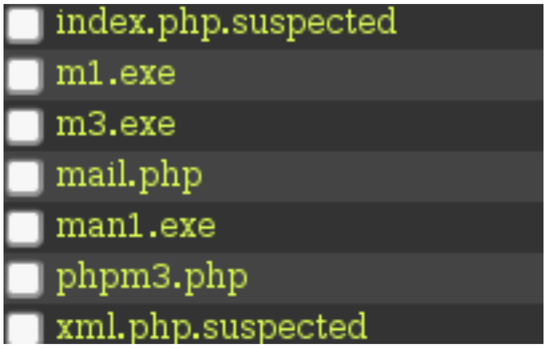
May 2015: Rovnix, Pony -> ReactorBot: This actor has shown interest in using the newest malware within the crimeware domain. In May 2015, a new banker emerged and was distributed using Rovnix as a dropper. The downloaded and loaded DLL was named ReactorDemo.dll, and was named ReactorBot (3). This actor was involved in a spam run delivering CVE-2014-1761 that exploited RTFs delivering Pony, which would then download ReactorBot from locations such as:

Encentivhealth[.]m/wp-content/plugins/cached_data/n1.exe

Also in May, we see this actor using a similar naming structure on compromised websites to deliver Dyre, which was identified as a MAN1 campaign within the research community, from macro docs downloading Pony. In this instance, we see one of the compromised website folder structures exhibit characteristics used by this actor:

Cyctechnology[.]com/wp-content/plugins/cached_data/m1.exe

The /cached_data/ structure is probably familiar to some from frequent Dyre spamming. Why use the same naming structure on compromised websites? Our guess is that it's an automated process as demonstrated when you examine the contents of that folder across multiple servers.



□ index.php.suspected
□ m1.exe
□ m3.exe
□ mail.php
□ man1.exe
□ phpm3.php
□ xml.php.suspected

November 2015: Dyre, Vawtrak: In early November 2015, we witnessed one of the Dyre actors transition from Dyre to the updated version of Vawtrak. This actor continued to deliver both Dyre and Vawtrak during multiple spam campaigns on November 2, 2015 (5, 6). The timing of this transition raises suspicions, as it corresponded with a Dyre takedown event later that same month (4). For the Dyre run, we see the /sliva/ structure for the Pony runs (cd445e52eb7d2ca7359a8513157dd0a9), which is still used today for campaigns delivering Vawtrak.

May 2016: H1N1 -> Pony, Vawtrak, Nymaim -> Gozi: Earlier, on May 25, 2016, researchers observed a spam campaign delivering Vawtrak and using similar techniques. But instead of Chanitor, the loader was H1N1 downloading Pony as pm.dll and Vawtrak as inst.exe.

Also of note is this actor's recent use of Nymaim from spammed out macro documents dropping Pony (7). These documents would download Nymaim from places such as:

elfielatorestaurante[.]com/wp-content/plugins/cached_data/print[.]exe

It would then deliver a Gozi/ISFB module targeting US entities*. This delivery was later coined GozNym due to the custom work linking the Gozi/ISFB module to Nymaim (8).

* A portion of these targets can be found toward the end of this post.

June 2016: H1N1, Chanitor/Hancitor -> Vawtrak: Recently, this actor pushed Vawtrak heavily using a variety of delivery methods. Two methods seen recently are H1N1 and a Chanitor variant (also called Hancitor). These campaigns are noteworthy for the aforementioned crypter and the tactics it uses. One such tactic involves delivering Pony separately from Vawtrak, even though Vawtrak comes with a stealer module component. This actor has also been observed using the same Pony gate structure of '/sl/gate.php' or '/zapoy/gate.php'. A recent campaign on June 7, 2016 utilized a Word document dropper using names that followed a pattern of 'report_\d{7}.doc' to deliver a Chanitor variant that would check-in to a gate with the uri '/sl/gate.php' and then download both Pony and Vawtrak.

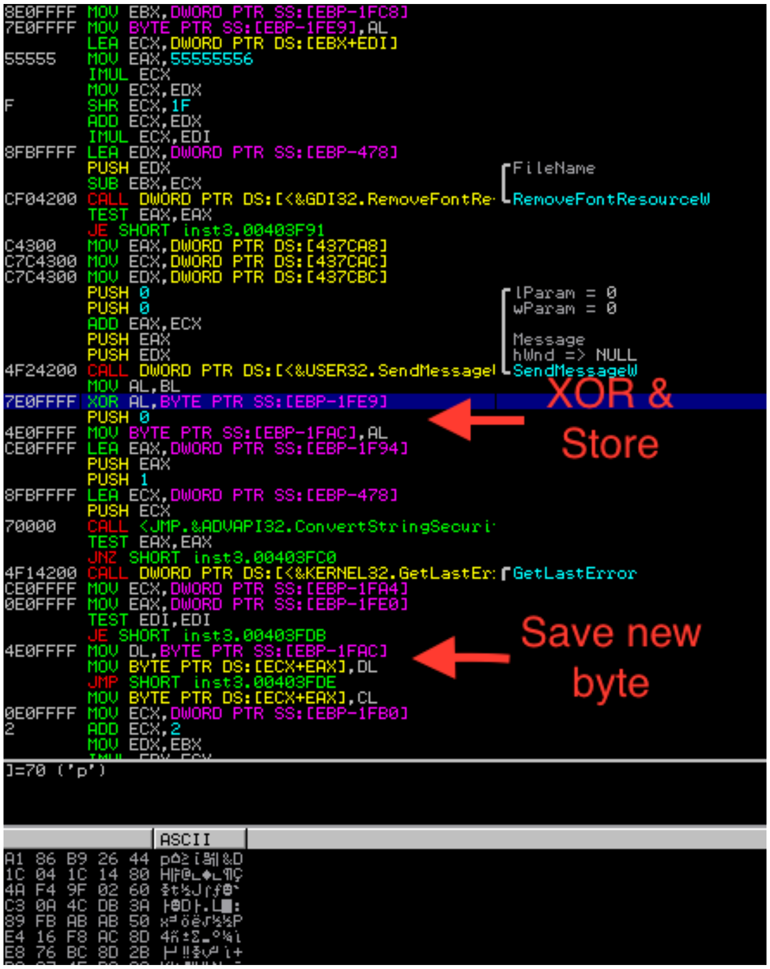
Also of note on these recent campaigns is the man1.exe file that may show up on compromised websites. This can be seen on a campaign from June 20, 2016, in which H1N1 delivered the usual Pony and Vawtrak malware. However, if we look a little closer at the website, it downloads Pony from ('crr-medvezonok[.]ru/about/pm.dll') and we find a number of other executables residing on that server in that same subfolder ('inst1.exe', 'inst2.exe', 'inst3.exe', 'man1.exe'). The executable man1.exe is actually an old unpacked Dyre malware sample -- further pointing to this actor's previous involvement in Dyre.

Latest: To date, the actor continues using the MAN1 crypter. The actor sticks to the same naming scheme for up to months at a time. These consistent TTPs could be due to a number of reasons: The actor may be using a toolkit or buying mass quantities of shelled servers from the same entity and going through them systematically. Either way, by identifying these key characteristics, we narrowed in on an actor's use of this custom crypter, which then made it possible for us to trace this actor's movement across multiple malware families over years. We've found other notable malware associated with this actor by following the crypter's evolution over time. This malware includes a P2P Gozi variant, CTB Locker and Andromeda.

Peeling Back the Layers of the Crypter

A crypter, in its basic form, is designed to obfuscate code. Researchers commonly have to break through layers of crypters or packers in order to get to the underlying malware code, it becomes instinctive for anyone who researchers malware for very long. Some crypters used for malware add functions, such as anti-virtualization or anti-sandboxing. The problem with most crypters is that they are a fire-and-forget tool used to bypass antivirus and sandbox detections. Some crypters employ a more drastic technique in which they use multiple layers that involve dynamically generated code. MAN1 is one such advanced crypter.

While it is often tempting to break through all the layers to get to the heart of the malware, our research supports the idea that sometimes these discarded layers can be used to bridge the gap and turn research into intelligence to help profile actors. The first layer is mostly just a bunch of deadcode with limited functionality, but it allows quite a bit of throwaway code to be added. This deadcode can be added for numerous reasons -- from throwing off sandbox reports, to messing with AV heuristics and generally making it a pain to signature off of. Eventually the code will decode the next layer, which is where most of the real work can begin. Usually, this first layer will be XOR decoded, but will be surrounded by a large amount of useless code operating on Windows or fonts that don't exist.



```
8E0FFFF MOV EBX,DWORD PTR SS:[EBP-1FC8]
7E0FFFF MOV BYTE PTR SS:[EBP-1FE9],AL
        LEA ECX,DWORD PTR DS:[EBX+EDI]
55555   MOV EAX,55555556
        IMUL ECX
        MOV ECX,EDX
F       SHR ECX,1F
        ADD ECX,EDX
        IMUL ECX,EDI
8FBFFFF LEA EDX,DWORD PTR SS:[EBP-478]
        PUSH EDX                                 ┌FileName
        SUB EBX,ECX                              │
CF04200 CALL DWORD PTR DS:[<&GDI32.RemoveFontRe· └RemoveFontResourceW
        TEST EAX,EAX
        JE SHORT inst3.00403F91
C4300   MOV EAX,DWORD PTR DS:[437CA8]
C7C4300 MOV ECX,DWORD PTR DS:[437CAC]
C7C4300 MOV EDX,DWORD PTR DS:[437CBC]
        PUSH 0                                   ┌lParam = 0
        PUSH 0                                   │wParam = 0
        ADD EAX,ECX                              │
        PUSH EAX                                 │Message
        PUSH EDX                                 │hWnd => NULL
4F24200 CALL DWORD PTR DS:[<&USER32.SendMessageW └SendMessageW
        MOV AL,BL
7E0FFFF XOR AL,BYTE PTR SS:[EBP-1FE9]
        PUSH 0
4E0FFFF MOV BYTE PTR SS:[EBP-1FAC],AL
CE0FFFF LEA EAX,DWORD PTR SS:[EBP-1F94]
        PUSH EAX
        PUSH 1
8FBFFFF LEA ECX,DWORD PTR SS:[EBP-478]
        PUSH ECX
70000   CALL <JMP.&ADVAPI32.ConvertStringSecuri·
        TEST EAX,EAX
        JNZ SHORT inst3.00403FC0
4F14200 CALL DWORD PTR DS:[<&KERNEL32.GetLastEr: ┌GetLastError
CE0FFFF MOV ECX,DWORD PTR SS:[EBP-1FA4]
0E0FFFF MOV EAX,DWORD PTR SS:[EBP-1FE0]
        TEST EDI,EDI
        JE SHORT inst3.00403FDB
4E0FFFF MOV DL,BYTE PTR SS:[EBP-1FAC]
        MOV BYTE PTR DS:[ECX+EAX],DL
        JMP SHORT inst3.00403FDE
        MOV BYTE PTR DS:[ECX+EAX],CL
0E0FFFF MOV ECX,DWORD PTR SS:[EBP-1FB0]
2       ADD ECX,2
        MOV EDX,EBX
]=70 ('p')
```

```
A1 86 B9 26 44 p⌂≥ï╣&D
1C 04 1C 14 80 H╟@∟♦∟¶Ç
4A F4 9F 02 60 ╪t½J⌠ƒ☻`
C3 0A 4C DB 3A ├◙D├.L█:
89 FB AB AB 50 ë√öë√½½P
E4 16 F8 AC 8D 4ñ±Σ▬°¼ì
E8 76 BC 8D 2B ┣‼╪v╝ì+
```

The second and third layers function roughly the same as the first, with the exception of decoding. The second layer decodes the output of the first layer and the third layer decodes the output of the second.

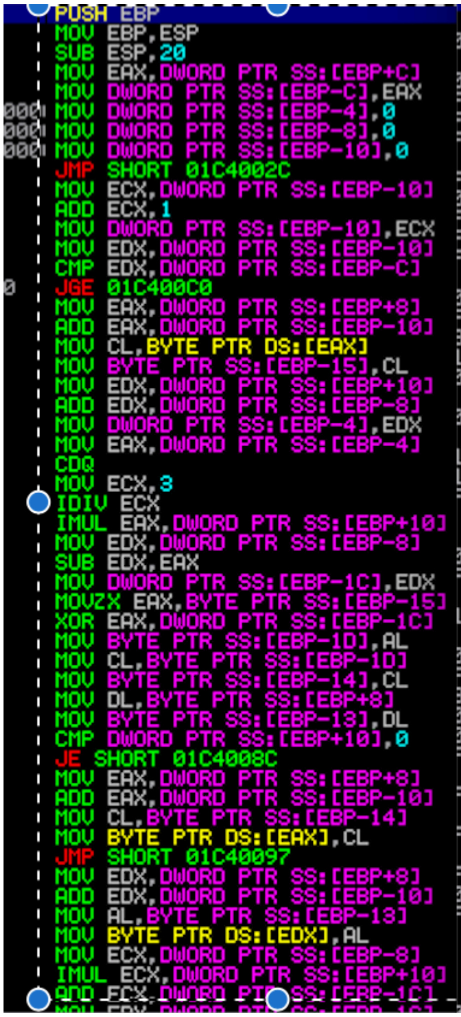
Each layer shares the following common characteristics:

- Is numbered
- Contains variable length, numbered chunks
- Each chunk may be compressed

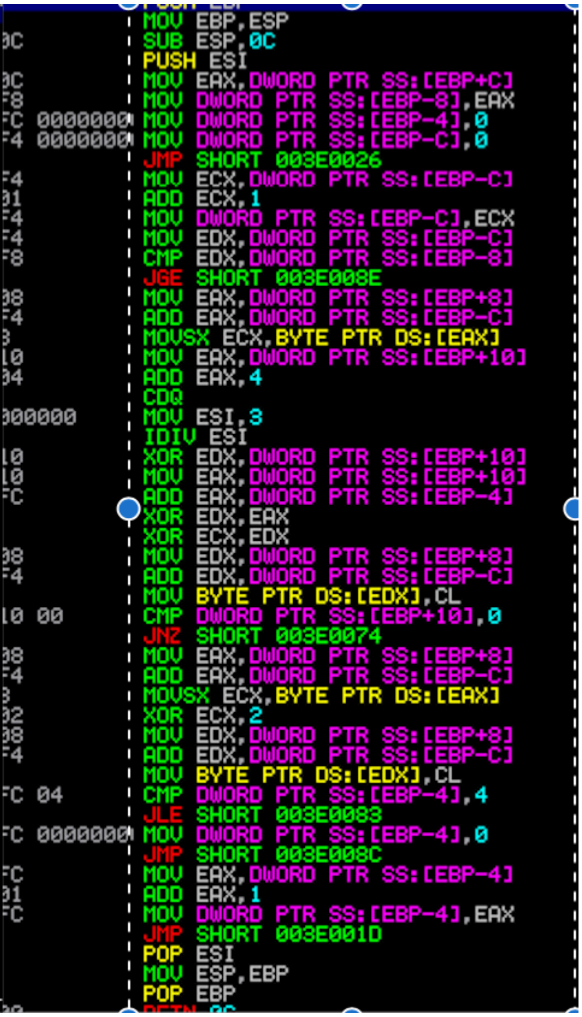
To accommodate this setup, each chunk has an attached header as shown in this mock up:

```
struct DataBlob {
  unsigned short CheckVal1;
  unsigned short CheckVal2;
  unsigned short CheckOffset;
  struct ChunkHeader {
    unsigned int SetNum;
    unsigned int length;
    unsigned int SetIndex;
    unsigned int check;
    unsigned int key;
    unsigned int compressedflag;
    unsigned int uncompressedSize;
  }chunk;
  char data[chunk.length];
}
```

As the layer performs its decoding routine, it utilizes shellcode that is decoded and reassembled for every chunk in the next layer. This shellcode is then used to decode the data in the found chunk. The same shellcode is used on all layers, but differs from sample to sample. This characteristic leads us to believe it is dynamically generated to perform various types of decoding operations and keys on the layers. By comparing this layer between two different samples delivered on the same day, we can see slight differences. This means the layer is generated when the crypt happens on the payload because it is required to encode the payload.

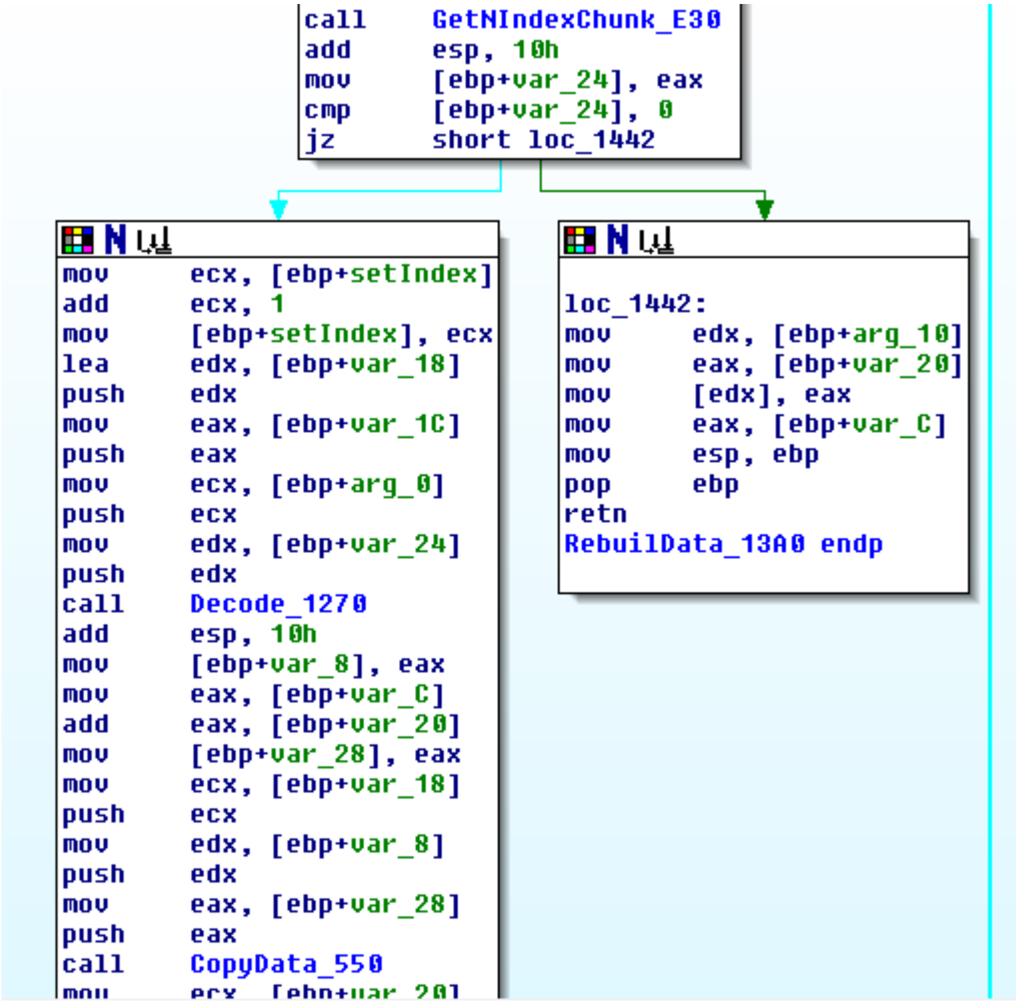


```
PUSH EBP
MOV EBP,ESP
SUB ESP,20
MOV EAX,DWORD PTR SS:[EBP+C]
MOV DWORD PTR SS:[EBP-C],EAX
MOV DWORD PTR SS:[EBP-4],0
MOV DWORD PTR SS:[EBP-8],0
MOV DWORD PTR SS:[EBP-10],0
JMP SHORT 01C4002C
MOV ECX,DWORD PTR SS:[EBP-10]
ADD ECX,1
MOV DWORD PTR SS:[EBP-10],ECX
MOV EDX,DWORD PTR SS:[EBP-10]
CMP EDX,DWORD PTR SS:[EBP-C]
JGE 01C400C0
MOV EAX,DWORD PTR SS:[EBP+8]
ADD EAX,DWORD PTR SS:[EBP-10]
MOV CL,BYTE PTR DS:[EAX]
MOV BYTE PTR SS:[EBP-15],CL
MOV EDX,DWORD PTR SS:[EBP+10]
ADD EDX,DWORD PTR SS:[EBP-8]
MOV DWORD PTR SS:[EBP-4],EDX
MOV EAX,DWORD PTR SS:[EBP-4]
CDQ
MOV ECX,3
IDIV ECX
IMUL EAX,DWORD PTR SS:[EBP+10]
MOV EDX,DWORD PTR SS:[EBP-8]
SUB EDX,EAX
MOV DWORD PTR SS:[EBP-1C],EDX
MOVZX EAX,BYTE PTR SS:[EBP-15]
XOR EAX,DWORD PTR SS:[EBP-1C]
MOV BYTE PTR SS:[EBP-1D],AL
MOV CL,BYTE PTR SS:[EBP-1D]
MOV BYTE PTR SS:[EBP-14],CL
MOV DL,BYTE PTR SS:[EBP+8]
MOV BYTE PTR SS:[EBP-13],DL
CMP DWORD PTR SS:[EBP+10],0
JE SHORT 01C4008C
MOV EAX,DWORD PTR SS:[EBP+8]
ADD EAX,DWORD PTR SS:[EBP-10]
MOV CL,BYTE PTR SS:[EBP-14]
MOV BYTE PTR DS:[EAX],CL
JMP SHORT 01C40097
MOV EDX,DWORD PTR SS:[EBP+8]
ADD EDX,DWORD PTR SS:[EBP-10]
MOV AL,BYTE PTR SS:[EBP-13]
MOV BYTE PTR DS:[EDX],AL
MOV ECX,DWORD PTR SS:[EBP-8]
IMUL ECX,DWORD PTR SS:[EBP+10]
ADD ECX,DWORD PTR SS:[EBP-1C]
```



```
MOV EBP,ESP
SUB ESP,0C
PUSH ESI
MOV EAX,DWORD PTR SS:[EBP+C]
MOV DWORD PTR SS:[EBP-8],EAX
MOV DWORD PTR SS:[EBP-4],0
MOV DWORD PTR SS:[EBP-C],0
JMP SHORT 003E0026
MOV ECX,DWORD PTR SS:[EBP-C]
ADD ECX,1
MOV DWORD PTR SS:[EBP-C],ECX
MOV EDX,DWORD PTR SS:[EBP-C]
CMP EDX,DWORD PTR SS:[EBP-8]
JGE SHORT 003E008E
MOV EAX,DWORD PTR SS:[EBP+8]
ADD EAX,DWORD PTR SS:[EBP-C]
MOVSX ECX,BYTE PTR DS:[EAX]
MOV EAX,DWORD PTR SS:[EBP+10]
ADD EAX,4
CDQ
MOV ESI,3
IDIV ESI
XOR EDX,DWORD PTR SS:[EBP+10]
MOV EAX,DWORD PTR SS:[EBP+10]
ADD EAX,DWORD PTR SS:[EBP-4]
XOR EDX,EAX
XOR ECX,EDX
MOV EDX,DWORD PTR SS:[EBP+8]
ADD EDX,DWORD PTR SS:[EBP-C]
MOV BYTE PTR DS:[EDX],CL
CMP DWORD PTR SS:[EBP+10],0
JNZ SHORT 003E0074
MOV EAX,DWORD PTR SS:[EBP+8]
ADD EAX,DWORD PTR SS:[EBP-C]
MOVSX ECX,BYTE PTR DS:[EAX]
XOR ECX,2
MOV EDX,DWORD PTR SS:[EBP+8]
ADD EDX,DWORD PTR SS:[EBP-C]
MOV BYTE PTR DS:[EDX],CL
CMP DWORD PTR SS:[EBP-4],4
JLE SHORT 003E0083
MOV DWORD PTR SS:[EBP-4],0
JMP SHORT 003E008C
MOV EAX,DWORD PTR SS:[EBP-4]
ADD EAX,1
MOV DWORD PTR SS:[EBP-4],EAX
JMP SHORT 003E001D
POP ESI
MOV ESP,EBP
POP EBP
```

Here we can see the main loop from one sample employing this technique:



```
call    GetNIndexChunk_E30
add     esp, 10h
mov     [ebp+var_24], eax
cmp     [ebp+var_24], 0
jz      short loc_1442
```

```
mov     ecx, [ebp+setIndex]
add     ecx, 1
mov     [ebp+setIndex], ecx
lea     edx, [ebp+var_18]
push    edx
mov     eax, [ebp+var_1C]
push    eax
mov     ecx, [ebp+arg_0]
push    ecx
mov     edx, [ebp+var_24]
push    edx
call    Decode_1270
add     esp, 10h
mov     [ebp+var_8], eax
mov     eax, [ebp+var_C]
add     eax, [ebp+var_20]
mov     [ebp+var_28], eax
mov     ecx, [ebp+var_18]
push    ecx
mov     edx, [ebp+var_8]
push    edx
mov     eax, [ebp+var_28]
push    eax
call    CopyData_550
mov     ecx, [ebp+var_20]
```

```
loc_1442:
mov     edx, [ebp+arg_10]
mov     eax, [ebp+var_20]
mov     [edx], eax
mov     eax, [ebp+var_C]
mov     esp, ebp
pop     ebp
retn
RebuilData_13A0 endp
```

Getting through the crypter is trivial. Breaking on kernel32!VirtualAlloc results in returning to the main loop of the layer as each calls VirtualAlloc every time it goes to reconstruct the shellcode layer. Adding a breakpoint to the end of that loop (the instruction just after kernel32!VirtualAlloc) presents the next layer. From there, execute 'till return' twice and then the next call will copy over the reconstructed code segment and a JMP.

Conclusion

Intimate knowledge of the crypter and other techniques have allowed us to tie numerous campaigns over the years to a single actor or group. We're aware that other researchers have identified some of these threads and our intention behind publishing this body of knowledge is to encourage others to recognize MAN1 and help build a fuller profile. The criminal landscape is vast, but there are often significant volumes of activity spanning campaigns and malware families that tie back to individual actors or groups.

References

1: https://techhelplist.com/spam-list/742-order-confirmation-for-flight-malware

2: https://techhelplist.com/spam-list/785-payment-confirmation-for-tax-refund-request-malware

3: http://www.kernelmode.info/forum/viewtopic.php?f=16&t=981&start=70#p25915

4: http://www.scmagazine.com/dyre-trojan-almost-dead-after-takedown-by-the-russians/article/472074/

5: https://techhelplist.com/spam-list/957-e-ticket-confirmation-aa-malware

6: https://myonlinesecurity.co.uk/american-airlines-e-ticket-confirmation-word-doc-malware/

7: https://techhelplist.com/spam-list/995-re-recipient-domain-name-sucks-malware

8: https://securityintelligence.com/meet-goznym-the-banking-malware-offspring-of-gozi-isfb-and-nymaim/

IOCs:

Chanitor:

o3qz25zwu4or5mak[.]tor2web[.]org/gate.php
xdndo2okt43cjx44[.]tor2web.blutmagie[.]de/gate.php
xdndo2okt43cjx44[.]tor2web[.]fi/gate.php
xdndo2okt43cjx44[.]tor2web[.]org/gate.php
um6fsdil5ecma5kf[.]tor2web.blutmagie[.]de/gate.php
mps23[.]ru/libraries/fof/controller/1304.exe
buloftoty[.]com/sl/gate.php
buloftoty[.]com/sl/gate.php
letatandone[.]ru/sl/gate.php
nkdoscqnp3myjiyr.onion[.]to/sl/gate.php
buzines24[.]ru/source/pm.dll
buzines24[.]ru/source/inst1.exe

95914f3cb47e2d200408456abc2fc277
63cc107d6f4464eb311324f950386b9f
db36c2f4db086a7f8e483187289e1c93
f5efd86c80538e104503c309e458efa9

Vawtrak:

hartwelstay[.]com/stats/00/counter/0000003A/56EB9C2B
weltfarystar[.]com/stats/00/counter/0000003A/56EB9C2B
rewdepehat[.]ru/stats/00/counter/0000003A/56EB9C2B

```
uldryledda[.]ru/stats/00/counter/0000003A/56EB9C2B
uldfiparevent[.]ru/stats/00/counter/0000003A/56EB9C2B
roldinglygo[.]ru/stats/00/counter/0000003A/56EB9C2B
perundmaheg[.]ru/stats/00/counter/0000003A/56EB9C2B
velyama[.]com/stats/00/counter/0000003A/56EB9C2B
shumines[.]com/stats/00/counter/0000003A/56EB9C2B
ceglolu[.]com/stats/00/counter/0000003A/56EB9C2B
ceglolu[.]com/stats/02/counter/0000003A/56EB9C2B
dunella[.]net/upd/58?id=1458281515&o=4&n=5
greatcountrygor[.]ru/stats/00/counter/0000006E/56EB9C2B
firstforestmonth[.]ru/stats/00/counter/0000006E/56EB9C2B
hornetwart[.]ru/stats/00/counter/0000006E/56EB9C2B
weronpalace[.]ru/stats/00/counter/0000006E/56EB9C2B
westnerthgom[.]ru/stats/00/counter/0000006E/56EB9C2B
dorthgornet[.]com/stats/00/counter/0000006E/56EB9C2B
andheduse[.]ru/stats/00/counter/0000006E/56EB9C2B
rinheca[.]ru/stats/00/counter/0000006E/56EB9C2B
etningand[.]ru/stats/00/counter/0000006E/56EB9C2B
termyen[.]ru/stats/00/counter/0000006E/56EB9C2B
haptalher[.]ru/stats/00/counter/0000006E/56EB9C2B
robonwas[.]ru/stats/00/counter/0000006E/56EB9C2B
wassinrat[.]ru/stats/00/counter/0000006E/56EB9C2B
parowheck[.]ru/stats/00/counter/0000006E/56EB9C2B
pergeca[.]ru/stats/00/counter/0000006E/56EB9C2B
astramanton[.]com/stats/00/counter/0000006E/56EB9C2B
haptedidti[.]ru/stats/00/counter/0000006E/56EB9C2B
betpeharrep[.]ru/stats/00/counter/0000006E/56EB9C2B
tothetinbu[.]ru/stats/00/counter/0000006E/56EB9C2B
wawronbonot[.]ru/stats/00/counter/0000006E/56EB9C2B
freeseathere[.]com/stats/00/counter/0000006E/56EB9C2B
gerbertdowen[.]com/stats/00/counter/0000006E/56EB9C2B
hertgotlitt[.]ru/stats/00/counter/0000006E/56EB9C2B
weasterd[.]com/stats/00/counter/0000006E/56EB9C2B
ronughmeligh[.]ru/stats/00/counter/0000006E/56EB9C2B
parwoonetons[.]ru/stats/00/counter/0000006E/56EB9C2B
sahissofreb[.]ru/stats/00/counter/0000006E/56EB9C2B
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Older man1.exe from 20Jun2016:
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dutcharchitects[.]info/wp-content/plugins/cached_data/aa_ticket_9017937910.zip
einkubator[.]com/wp-content/plugins/cached_data/aa_ticket_9017937910.zip
dnacomvisual[.]com[.]br/wp-content/plugins/cached_data/aa_ticket_8392051302.zip
dodoty[.]com/wp-content/plugins/cached_data/aa_ticket_8392051302.zip
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dugunorganizasyonu[.]co/wp-content/plugins/cached_data/aa_ticket_9017937910.zip
dymacorp[.]com/wp-content/plugins/cached_data/aa_ticket_9017937910.zip
djasad[.]co[.]uk/wp-content/plugins/cached_data/aa_ticket_8392051302.zip
dj-collision[.]com/wp-content/plugins/cached_data/aa_ticket_8392051302.zip
docitachocolates[.]com[.]br/wp-content/plugins/cached_data/aa_ticket_8392051302.zip
joetradeco[.]com/images/poultry/large/aa_ticket_8392051302.zip
drmuratcaglayan[.]com/wp-content/plugins/cached_data/aa_ticket_9017937910.zip

Dalexis:

ofigesvi[.]es:80/modules/history.jpg
pbescastell[.]es:80/pcss/history.jpg
onlinecomputer[.]at/wp-includes/history.jpg
artesanjuan[.]es/SpryAssets/history.jpg
mondoclinicsistem[.]ro/[.]htpasswds/history.jpg
www186[.]e1007[.]servidornet[.]com/wp-admin/history.jpg
pensiunea-lamuncel[.]ro/history.jpg
procosta[.]es/history.jpg
pensiunituristicebucovina[.]ro/pensiunea-lamuncel[.]ro/history.jpg

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CTB-Locker:

3fdzgtam4qk625n6[.]tor2web[.]blutmagie[.]de

cbde2e916ae7accb98bb247bb93846c9

ReactorBot:

rc7thuhy8agn43zzgi[.]biz
heckwassleftran[.]ru
heckwassleftran2[.]ru
heckwassleftran3[.]ru
zdnuohzdydlpx5kd[.]onion
heckwassleftran[.]ru/cgi-bin/050515/post[.]cgi
heckwassleftran[.]ru/host[.]dat
heckwassleftran[.]ru/101/list32[.]dat
heckwassleftran[.]ru/101/1880376902_32[.]dat
heckwassleftran[.]ru/101/3257F7F8
heckwassleftran[.]ru/101/EB4E2654
heckwassleftran[.]ru/101/B06139B1

eff29f0ba620760a42c1ac0514007bff
3f11c42687d09d4a56c715f671143a58

P2P Gozi variant:
4e3a0ce170d66eaea6d55a3d6c551653

Nymaim Gozi Module Targets:

https://*pib*[.]secure-banking[.]com/*
https://www[.]svbconnect[.]com/auth*
https://connect-ch*[.]ubs[.]com/workbench/*
https://clientlogin[.]ibb[.]ubs[.]com/login*
https://achieveaccess[.]citizenscommercialbanking[.]com/CitizensWebApplication/achieve/loginScreen*
https://onlinebusinessplus[.]vancity[.]com/business/default[.]jsp*
https://www[.]vancity[.]com/BusinessBanking*
https://cashmanageronline[.]bbt[.]com/auth/*

```
https://onepass[.]regions[.]com/*
https://commerceconnections[.]commercebank[.]com/*
https://pfo[.]us[.]hsbc[.]com/*
https://*/fi*/bb/logon*
https://www8[.]comerica[.]com*
https://connect[.]bnymellon[.]com/ConnectLogin/login/LoginPage[.]jsp*
https://wellsoffice[.]wellsfargo[.]com/portal/signon/index[.]jsp*
https://*[.]ibanking-services[.]com/*
https://*LoginAdv[.]aspx*
https://*ebanking-services[.]com/EamWeb*
https://*/wcmfd/wcmpw/*
https://*phcp/servlet*
https://*[.]blilk[.]com/Core/Authentication/*
https://*1961/*1961[.]ashx*
https://*AOP/Password[.]aspx*
https://*ally[.]com*
https://*cm[.]netteller[.]com/login2008/Authentication*
https://securentrycorp*/Authentication/zbf/k/*
https://*/onlineserv/CM/*
https://*tob/live/usp-core/app/initialLogin*
https://*/CLKCCM/*/login[.]asp*
https://*/Authentication/Login[.]aspx*
https://*engine/login/logins*[.]asp*
https://*myebanking[.]net*
https://*hbloginv50*
https://*User/AccessSignin/*
https://drob[.]santanderbank[.]com/*
https://*bnymellonwealthmanagement[.]com*
*businessonline[.]tdbank[.]com/corporatebankingweb/core*
https://express[.]53[.]com/portal/auth/login/Login*
https://express[.]53[.]com/portal/auth/login/Login*
*/ibanking3/login[.]aspx*
https://trz[.]tranzact[.]org/LogonOTP[.]aspx
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https://access[.]jpmorgan[.]com/jpmalogon*
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https://jpmcsso[.]jpmorgan[.]com/sso/action/login*mdcommercial[.]jpmorgan[.]com*
https://cashproonline[.]bankofamerica[.]com/AuthenticationFrameworkWeb/cpo/login/public/loginMain[.]faces*
https://businessaccess[.]citibank[.]citigroup[.]com/cbusol/signon[.]do*
https://www[.]treasury[.]pncbank[.]com/idp/esec/login[.]ht*
https://singlepoint[.]usbank[.]com/cs70_banking/logon/sbuser*
```

https://*/cmserver/welcome/*
https://*engine/login/businesslogin[.]asp*
https://*/engine/login/businesslogins[.]asp*
https://*/pub/html/login[.]html*
https://ktt[.]key[.]com/ktt/cmd/logon*
https://*secure[.]fundsxpress[.]com/*
https://banamexusa[.]btbanking[.]com/onlineserv/CM/