Emotet resumes spam operations, switches to OneNote

blog.talosintelligence.com/emotet-switches-to-onenote/

Edmund Brumaghin March 22, 2023

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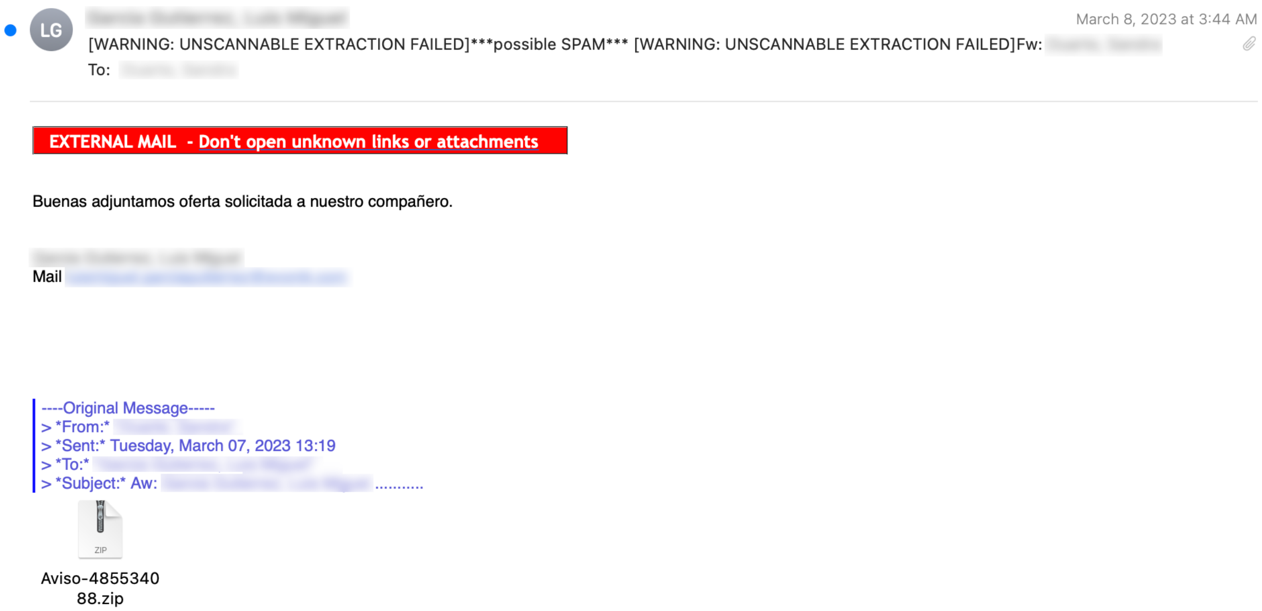
Threat Advisory Threats

- Emotet resumed spamming operations on March 7, 2023, after a months-long hiatus.
- Initially leveraging heavily padded Microsoft Word documents to attempt to evade sandbox analysis and endpoint protection, the botnets switched to distributing malicious OneNote documents on March 16.
- Since returning, Emotet has leveraged several distinct infection chains, indicating that they are modifying their approach based on their perceived success in infecting new systems.
- The initial emails delivered to victims are consistent with what has been observed from Emotet over the past several years.

Initial campaign

Following its initial return to spamming operations, Emotet was leveraging heavily padded Microsoft Word documents in an attempt to evade detection. By leveraging a large number of inconsequential bytes in their documents, they could increase the size of the documents to surpass the maximum file size restrictions that automated analysis platforms like sandboxes and anti-virus scanning engines enforce.

The initial emails were consistent with what has been commonly observed from Emotet in recent years. They typically contained an attached ZIP archive containing a Microsoft Word document. An example of one such email is shown below.



LG [redacted] March 8, 2023 at 3:44 AM

[WARNING: UNSCANNABLE EXTRACTION FAILED]***possible SPAM*** [WARNING: UNSCANNABLE EXTRACTION FAILED]Fw: [redacted]

To: [redacted]

EXTERNAL MAIL - Don't open unknown links or attachments

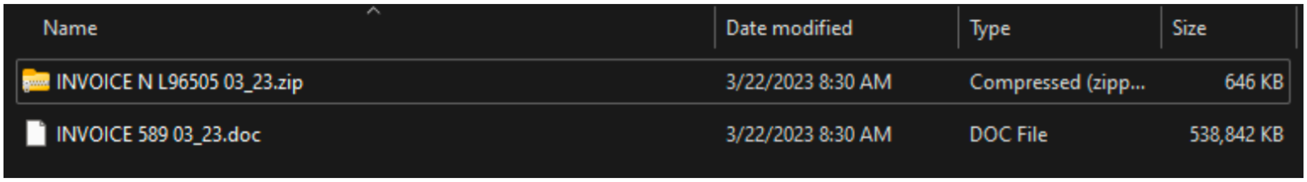
Buenas adjuntamos oferta solicitada a nuestro compañero.

[redacted]
Mail [redacted]

> ----Original Message-----
> \> *From:* [redacted]
> \> *Sent:* Tuesday, March 07, 2023 13:19
> \> *To:* [redacted]
> \> *Subject:* Aw: [redacted] ....

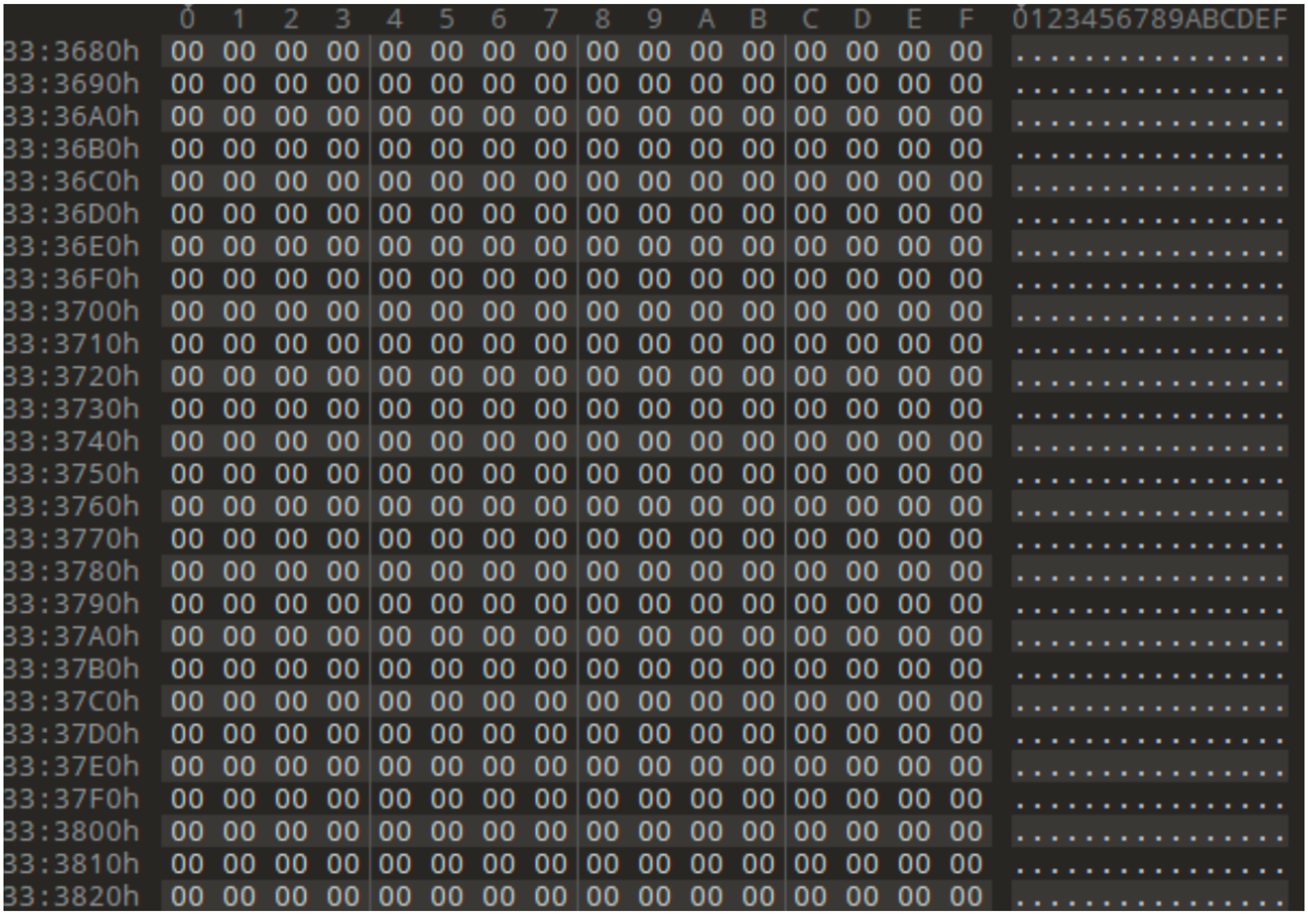
Aviso-4855340
88.zip

While the ZIP archives are often small, in some cases only ~646KB, the Microsoft Word document when fully extracted was ~500MB in size.



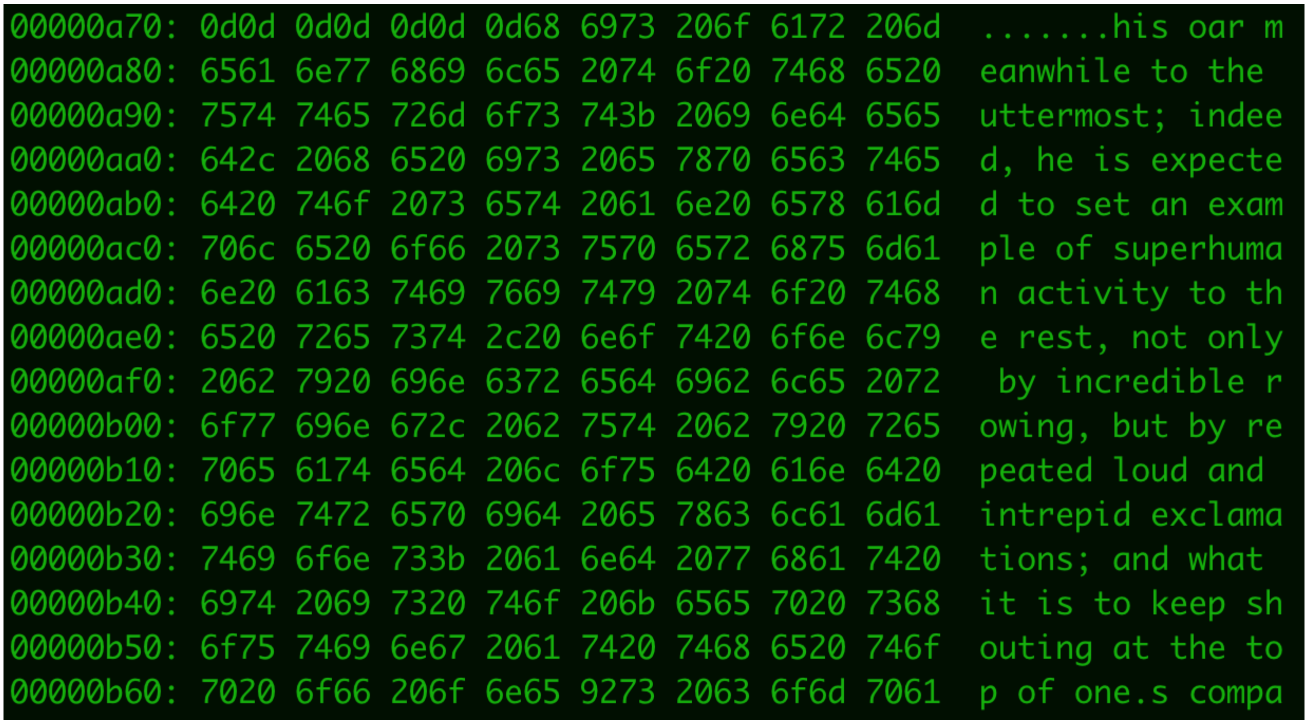
Name	Date modified	Type	Size
INVOICE N L96505 03_23.zip	3/22/2023 8:30 AM	Compressed (zipp...	646 KB
INVOICE 589 03_23.doc	3/22/2023 8:30 AM	DOC File	538,842 KB

The document included a large number of 0x00 bytes, a technique commonly referred to as "padding."



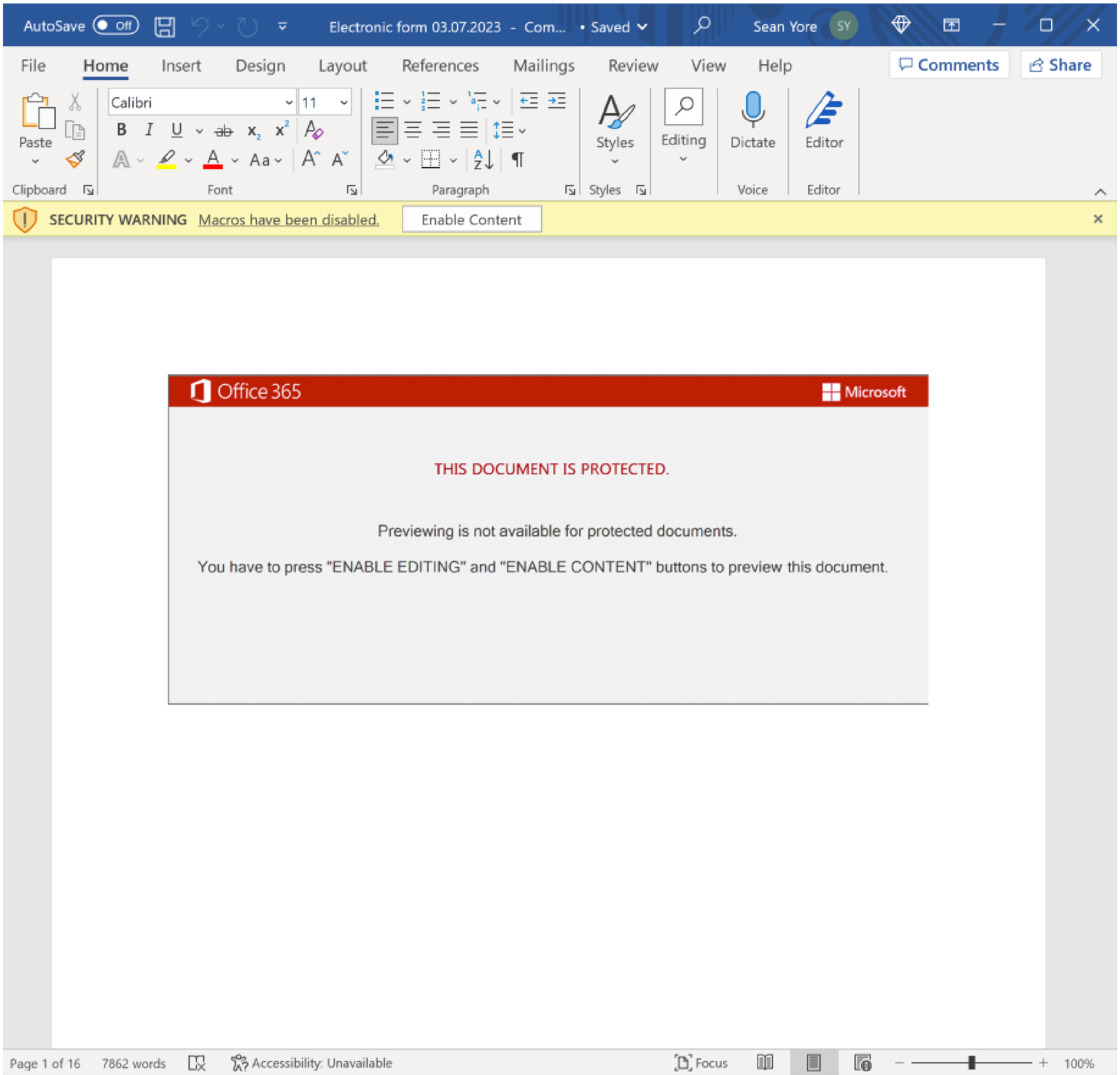
```
          0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F  0123456789ABCDEF
33:3680h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3690h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:36A0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:36B0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:36C0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:36D0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:36E0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:36F0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3700h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3710h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3720h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3730h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3740h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3750h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3760h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3770h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3780h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3790h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:37A0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:37B0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:37C0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:37D0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:37E0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:37F0h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3800h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3810h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
33:3820h  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
```

Some of the documents also featured excerpts from the classic novel “Moby Dick,” another attempt to increase the size of the documents for evasion purposes.



```
00000a70: 0d0d 0d0d 0d0d 0d68 6973 206f 6172 206d  .......his oar m
00000a80: 6561 6e77 6869 6c65 2074 6f20 7468 6520  eanwhile to the 
00000a90: 7574 7465 726d 6f73 743b 2069 6e64 6565  uttermost; indee
00000aa0: 642c 2068 6520 6973 2065 7870 6563 7465  d, he is expecte
00000ab0: 6420 746f 2073 6574 2061 6e20 6578 616d  d to set an exam
00000ac0: 706c 6520 6f66 2073 7570 6572 6875 6d61  ple of superhuma
00000ad0: 6e20 6163 7469 7669 7479 2074 6f20 7468  n activity to th
00000ae0: 6520 7265 7374 2c20 6e6f 7420 6f6e 6c79  e rest, not only
00000af0: 2062 7920 696e 6372 6564 6962 6c65 2072   by incredible r
00000b00: 6f77 696e 672c 2062 7574 2062 7920 7265  owing, but by re
00000b10: 7065 6174 6564 206c 6f75 6420 616e 6420  peated loud and 
00000b20: 696e 7472 6570 6964 2065 7863 6c61 6d61  intrepid exclama
00000b30: 7469 6f6e 733b 2061 6e64 2077 6861 7420  tions; and what 
00000b40: 6974 2069 7320 746f 206b 6565 7020 7368  it is to keep sh
00000b50: 6f75 7469 6e67 2061 7420 7468 6520 746f  outing at the to
00000b60: 7020 6f66 206f 6e65 9273 2063 6f6d 7061  p of one.s compa
```

The Office documents featured templates consistent with those used by Emotet in the past, as shown below.



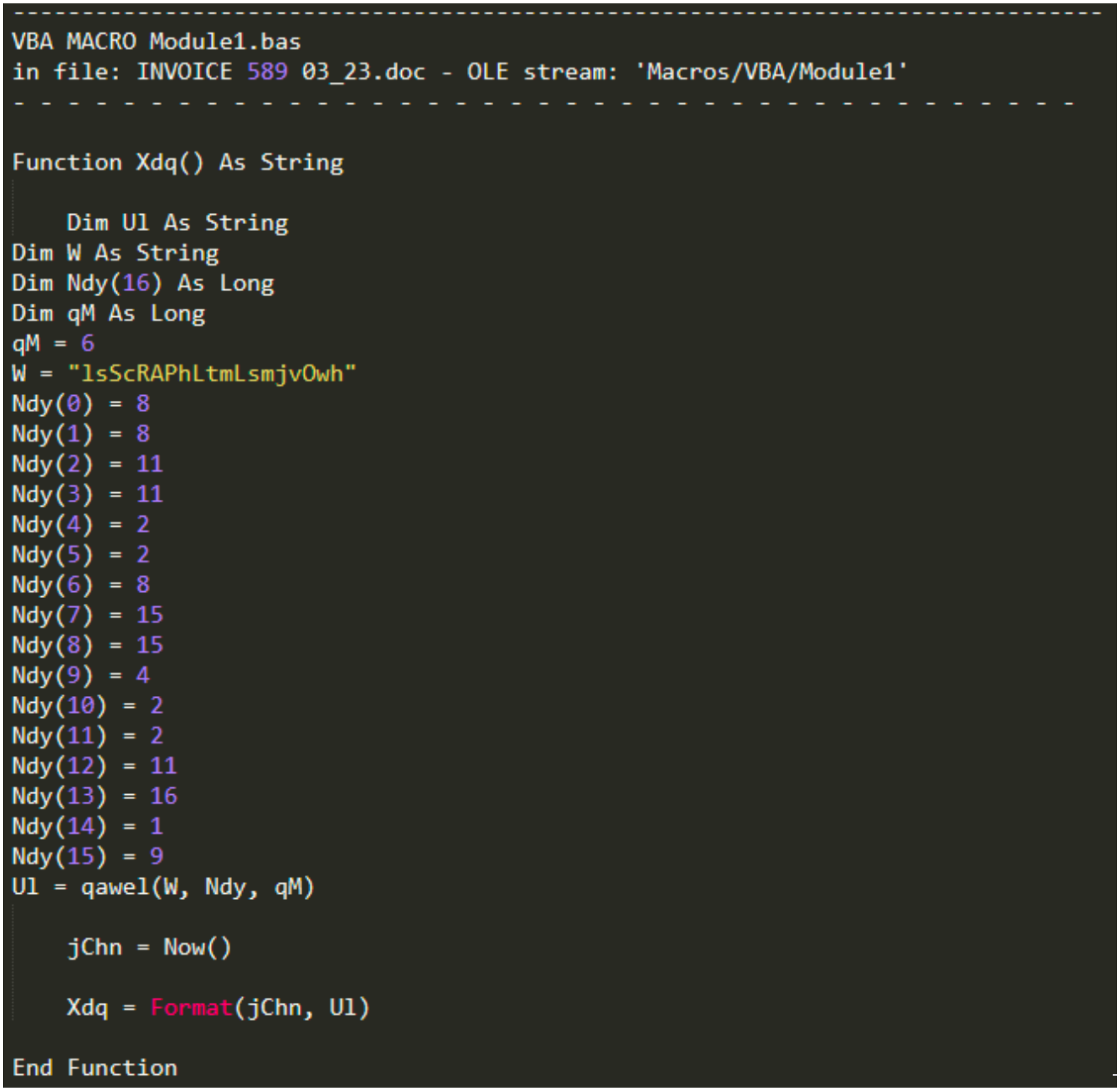
SECURITY WARNING Macros have been disabled.

THIS DOCUMENT IS PROTECTED.

Previewing is not available for protected documents.

You have to press "ENABLE EDITING" and "ENABLE CONTENT" buttons to preview this document.

The Word documents in this campaign contained malicious VBA macros that, when executed, functioned as a malware downloader, retrieving the Emotet payload from attacker-controlled distribution servers and infecting systems, thus adding them to the Emotet botnets.

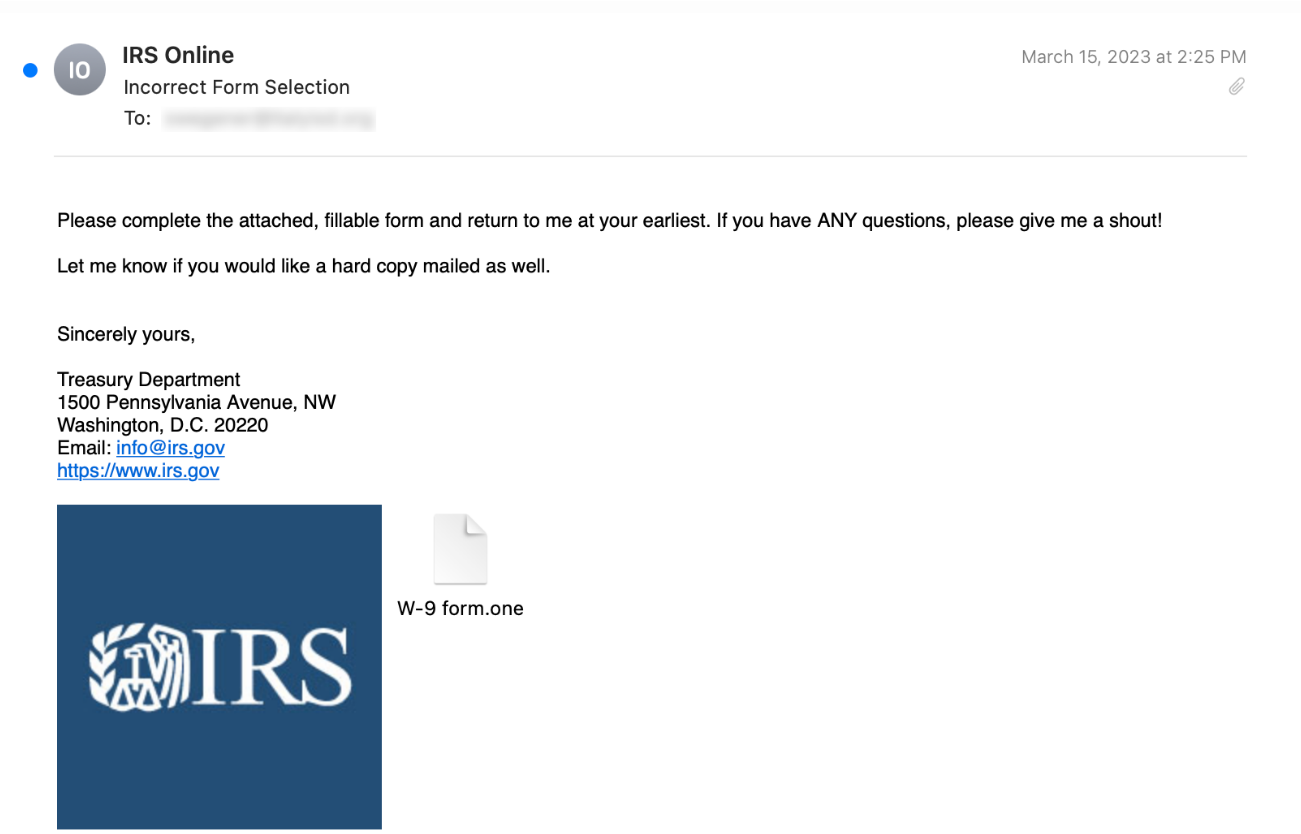


```
-------------------------------------------------------------------------------
VBA MACRO Module1.bas
in file: INVOICE 589 03_23.doc - OLE stream: 'Macros/VBA/Module1'
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Function Xdq() As String

    Dim Ul As String
Dim W As String
Dim Ndy(16) As Long
Dim qM As Long
qM = 6
W = "lsScRAPhLtmLsmjvOwh"
Ndy(0) = 8
Ndy(1) = 8
Ndy(2) = 11
Ndy(3) = 11
Ndy(4) = 2
Ndy(5) = 2
Ndy(6) = 8
Ndy(7) = 15
Ndy(8) = 15
Ndy(9) = 4
Ndy(10) = 2
Ndy(11) = 2
Ndy(12) = 11
Ndy(13) = 16
Ndy(14) = 1
Ndy(15) = 9
Ul = qawel(W, Ndy, qM)

    jChn = Now()

    Xdq = Format(jChn, Ul)

End Function
```

Emotet shifts to OneNote

Microsoft recently deployed new security mechanisms around protecting endpoints from macro-based malware infections, which resulted in various threat actors moving away from Office document-based malspam campaigns. In many cases, these malware distribution campaigns switched to distributing OneNote documents instead, likely as a result of decreased infections and lower success rates. Emotet is no different — shortly after their return to spamming operations on March 16, 2023, they began distributing OneNote files, as well.

In one example, the sender purported to be from the U.S. Internal Revenue Service (IRS) and requested that the recipient complete the attached form.



IRS Online

Incorrect Form Selection

To: [redacted]

March 15, 2023 at 2:25 PM

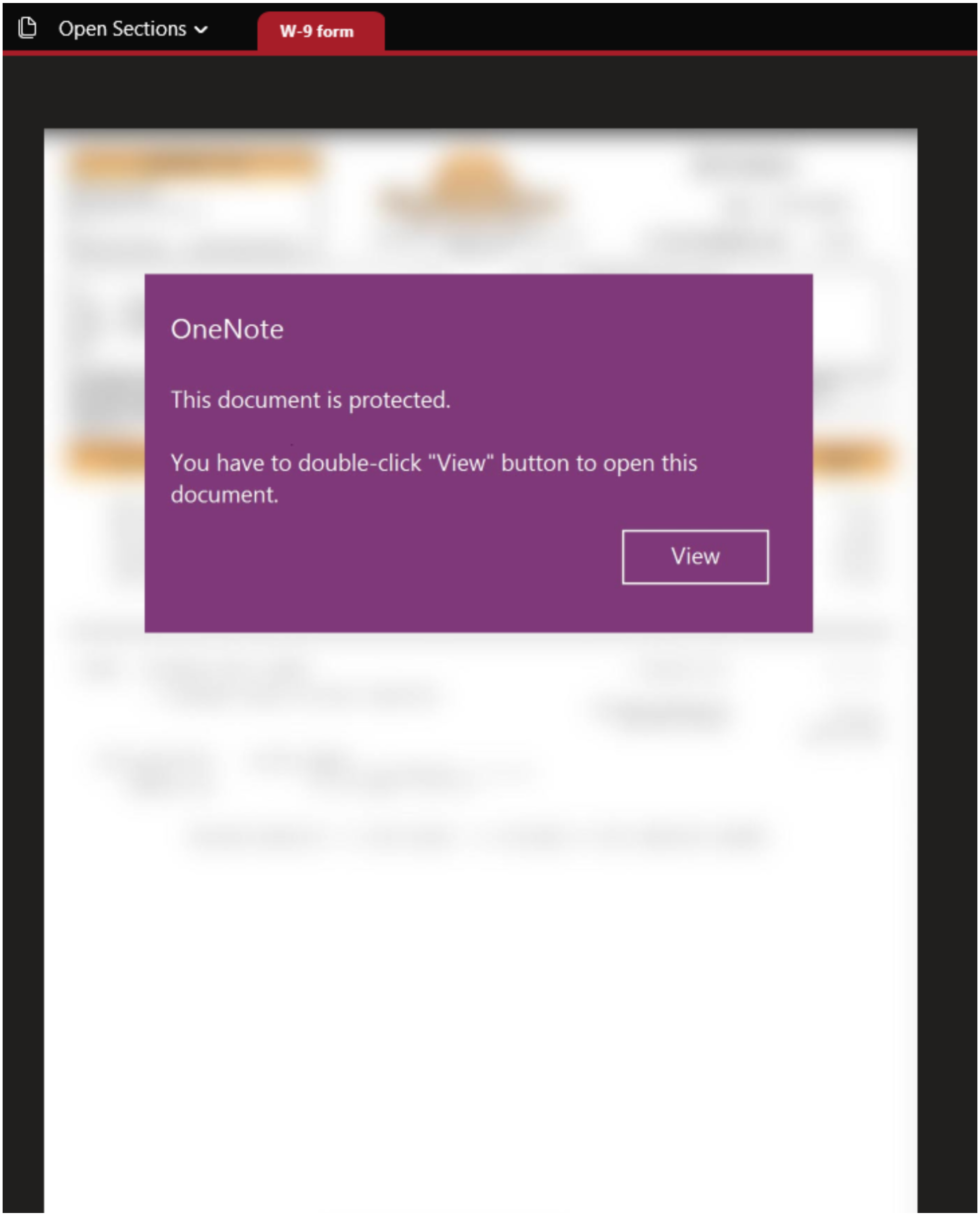
Please complete the attached, fillable form and return to me at your earliest. If you have ANY questions, please give me a shout!

Let me know if you would like a hard copy mailed as well.

Sincerely yours,

Treasury Department
1500 Pennsylvania Avenue, NW
Washington, D.C. 20220
Email: info@irs.gov
https://www.irs.gov

The attached OneNote document featured templates similar to what has been observed in other Office document formats over the past several years, prompting the user to click inside the document to view the file.

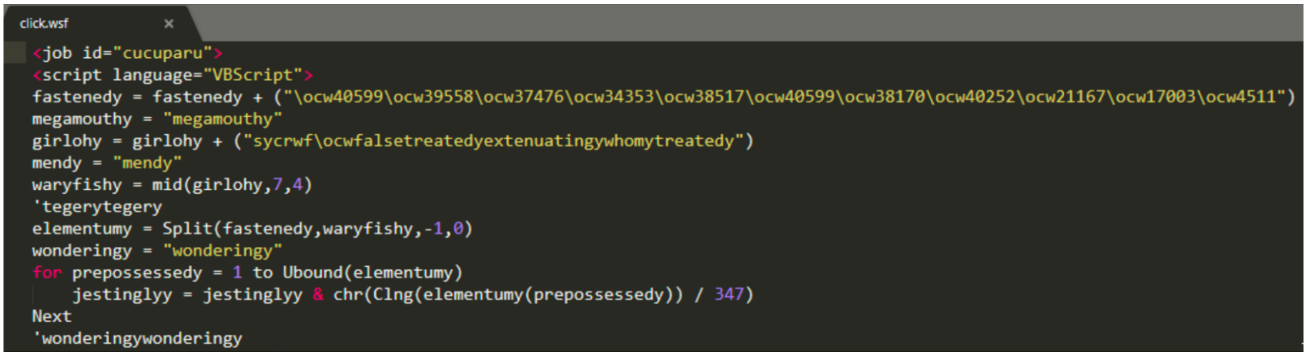


OneNote

This document is protected.

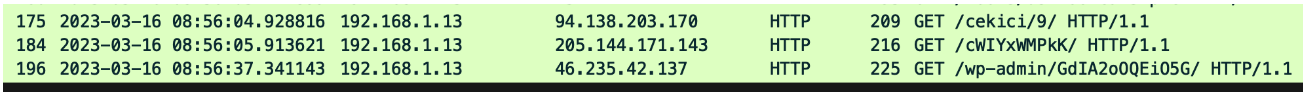
You have to double-click "View" button to open this document.

When clicked, an embedded WSF script linked behind the view button containing malicious VBScript code is executed.



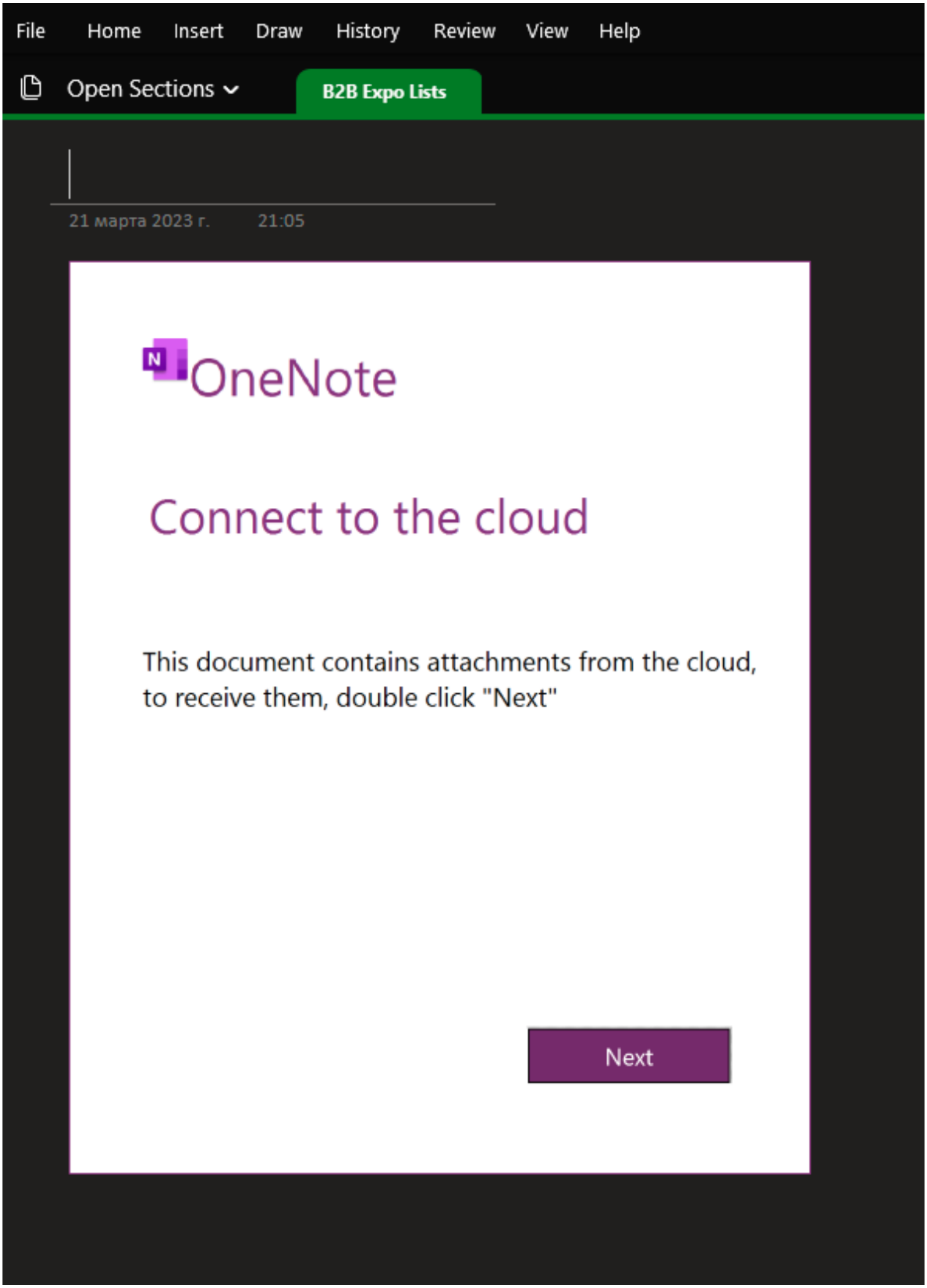
```
<job id="cucuparu">
<script language="VBScript">
fastenedy = fastenedy + ("\ocw40599\ocw39558\ocw37476\ocw34353\ocw38517\ocw40599\ocw38170\ocw40252\ocw21167\ocw17003\ocw4511")
megamouthy = "megamouthy"
girlohy = girlohy + ("sycrwf\ocwfalsetreatedyextenuatingywhomytreatedy")
mendy = "mendy"
waryfishy = mid(girlohy,7,4)
'tegerytegery
elementumy = Split(fastenedy,waryfishy,-1,0)
wonderingy = "wonderingy"
for prepossessedy = 1 to Ubound(elementumy)
    jestinglyy = jestinglyy & chr(Clng(elementumy(prepossessedy)) / 347)
Next
'wonderingywonderingy
```

This VBScript downloader is responsible for retrieving the Emotet malware payload from an attacker-controlled server and infecting the system.



```
175  2023-03-16 08:56:04.928816  192.168.1.13        94.138.203.170       HTTP      209  GET /cekici/9/ HTTP/1.1
184  2023-03-16 08:56:05.913621  192.168.1.13        205.144.171.143      HTTP      216  GET /cWIYxWMPkK/ HTTP/1.1
196  2023-03-16 08:56:37.341143  192.168.1.13        46.235.42.137        HTTP      225  GET /wp-admin/GdIA2oOQEiO5G/ HTTP/1.1
```

More recently, the embedded object inside of the OneNote files contained JavaScript instead of VBScript but offered the same functionality within the infection chain.



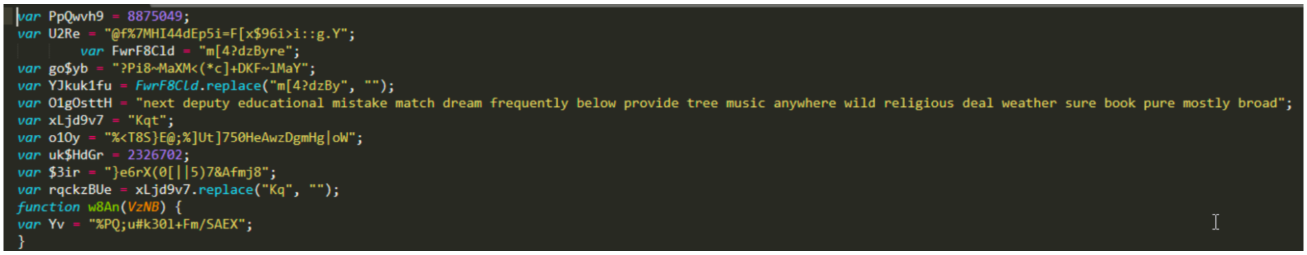
21 марта 2023 г. 21:05

Connect to the cloud

This document contains attachments from the cloud, to receive them, double click "Next"

Hovering over the next button indicates that an object called “Object1.js” will execute when the button is clicked. This is because the attacker has embedded a clickable object behind the lure image as shown below.

This object is a heavily obfuscated JavaScript downloader responsible for retrieving and executing the Emotet payload on the system. A snippet from the obfuscated downloader is shown below.



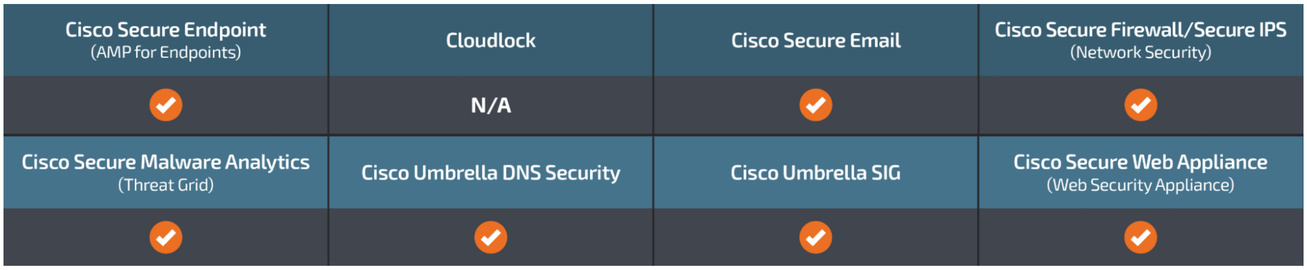
```
var PpQwvh9 = 8875049;
var U2Re = "@f%7MHI44dEp5i=F[x$96i>i::g.Y";
        var FwrF8Cld = "m[4?dzByre";
var go$yb = "?Pi8~MaXM<(*c]+DKF~1MaY";
var YJkuk1fu = FwrF8Cld.replace("m[4?dzBy", "");
var O1gOsttH = "next deputy educational mistake match dream frequently below provide tree music anywhere wild religious deal weather sure book pure mostly broad";
var xLjd9v7 = "Kqt";
var o1Oy = "%<T8S}E@;%]Ut]750HeAwzDgmHg|oW";
var uk$HdGr = 2326702;
var $3ir = "}e6rX(0[||5)7&Afmj8";
var rqckzBUe = xLjd9v7.replace("Kq", "");
function w8An(VzNB) {
var Yv = "%PQ;u#k301+Fm/SAEX";
}
```

In a relatively short period, Emotet has modified its infection chain several times to maximize the likelihood of successfully infecting victims.

Indicators of Compromise

Indicators of compromise (IOCs) associated with ongoing Emotet campaigns can be found here.

Coverage



Cisco Secure Endpoint (AMP for Endpoints)	Cloudlock	Cisco Secure Email	Cisco Secure Firewall/Secure IPS (Network Security)
✓	N/A	✓	✓
Cisco Secure Malware Analytics (Threat Grid)	**Cisco Umbrella DNS Security**	**Cisco Umbrella SIG**	**Cisco Secure Web Appliance (Web Security Appliance)**
✓	✓	✓	✓

Cisco Secure Endpoint (formerly AMP for Endpoints) is ideally suited to prevent the execution of the malware detailed in this post. Try Secure Endpoint for free here.

Cisco Secure Email (formerly Cisco Email Security) can block malicious emails sent by threat actors as part of their campaign. You can try Secure Email for free here.

Cisco Secure Firewall (formerly Next-Generation Firewall and Firepower NGFW) appliances such as Threat Defense Virtual, Adaptive Security Appliance and Meraki MX can detect malicious activity associated with this threat.

Cisco Secure Network/Cloud Analytics (Stealthwatch/Stealthwatch Cloud) analyzes network traffic automatically and alerts users of potentially unwanted activity on every connected device.

Cisco Secure Malware Analytics (Threat Grid) identifies malicious binaries and builds protection into all Cisco Secure products.

Umbrella, Cisco's secure internet gateway (SIG), blocks users from connecting to malicious domains, IPs and URLs, whether users are on or off the corporate network. Sign up for a free trial of Umbrella here.

Cisco Secure Web Appliance (formerly Web Security Appliance) automatically blocks potentially dangerous sites and tests suspicious sites before users access them.

Additional protections with context to your specific environment and threat data are available from the Firewall Management Center.

Cisco Duo provides multi-factor authentication for users to ensure only those authorized are accessing your network.

Open-source Snort Subscriber Rule Set customers can stay up to date by downloading the latest rule pack available for purchase on Snort.org.

Talos created the following coverage for this threat.

Snort SIDs:

51967-51971, 43890-43892, 44559, 44560, 47327, 47616, 47617, 48402, 49888, 49889, 52029, 53108, 53353-53360, 53770, 53771, 54804, 54805, 54900, 54901, 54924, 54925, 55253, 55254, 55591, 55592, 55781, 55782, 55787, 55788, 55869, 55870, 55873, 55874, 55929-55931, 56003, 56046, 56047, 56170, 56171, 56528, 56529, 56535, 56536, 56620, 56621, 56656, 56657, 56713, 56714, 56906, 56907, 56924, 56925, 56969, 56970, 56983, 56984, 57901, 58943

ClamAV Rules:

Onenote.Dropper.Emotet-9993911-1

Onenote.Dropper.CodPhish-Emotet-9993220-1

Onenote.Trojan.Agent-9987935-0