Operation (노스 스타) North Star A Job Offer That's Too Good to be True?

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31 MIN READ

Executive Summary

We are in the midst of an economic slump [1], with more candidates than there are jobs, something that has been leveraged by malicious actors to lure unwitting victims into opening documents laden with malware. While the prevalence of attacks during this unprecedented time has been largely carried out by low-level fraudsters, the more capable threat actors have also used this crisis as an opportunity to hide in plain sight.

One such example is a campaign that McAfee Advanced Threat Research (ATR) observed as an increase in malicious cyber activity targeting the Aerospace & Defense industry. In this 2020 campaign McAfee ATR discovered a series of malicious documents containing job postings taken from leading defense contractors to be used as lures, in a very targeted fashion. These malicious documents were intended to be sent to victims in order to install a data gathering implant. The victimology of these campaigns is not clear at this time, however based on the job descriptions, they appear to be targeting people with skills and experience relating to the content in the lure documents. The campaign appears to be similar to activity reported elsewhere by the industry, however upon further analysis the implants and lure documents in this campaign are distinctly different [2], thus we can conclude this research is part of a different activity set. This campaign is utilizing compromised infrastructure from multiple European countries to host its command and control infrastructure and distribute implants to the victims it targets.

This type of campaign has appeared before in 2017 and 2019 using similar methods with the goal of gathering intelligence surrounding key military and defense technologies [3]. The 2017 campaign also used lure documents with job postings from leading defense contractors; this operation was targeting individuals employed by defense contractors used in the lures. Based on some of the insight gained from spear phishing emails, the mission of that campaign was to gather data around certain projects being developed by their employers.

The Techniques, Tactics and Procedures (TTPs) of the 2020 activity are very similar to those previous campaigns operating under the same modus operandi that we observed in 2017 and 2019. From our analysis, this appears a continuation of the 2019 campaign, given numerous similarities observed. These similarities are present in both the Visual Basic code used to execute the implant and some of the core functionality that exists between the 2019 and 2020 implants.

Thus, the indicators from the 2020 campaign point to previous activity from 2017 and 2019 that was previously attributed to the threat actor group known as Hidden Cobra [4]. Hidden Cobra is an umbrella term used to refer to threat groups attributed to North Korea by the U.S Government [1]. Hidden Cobra consists of threat activity from groups the industry labels as Lazarus, Kimsuky, KONNI and APT37. The cyber offensive programs attributed to these groups, targeting organizations around the world, have been documented for years. Their goals have ranged from gathering data around military technologies to crypto currency theft from leading exchanges.

Our analysis indicates that one of the purposes of the activity in 2020 was to install data gathering implants on victims' machines. These DLL implants were intended to gather basic information from the victims' machines with the purpose of victim identification. The data collected from the target machine could be useful in classifying the value of the target. McAfee ATR noticed several different types of implants were used by the adversary in the 2020 campaigns.

These campaigns impact the security of South Korea and foreign nations with malicious cyber campaigns. In this blog McAfee ATR analyzes multiple campaigns conducted in the first part of 2020.

Finally, we see the adversary expanding the false job recruitment campaign to other sectors outside of defense and aerospace, such as a document masquerading as a finance position for a leading animation studio.

In this blog we will cover:

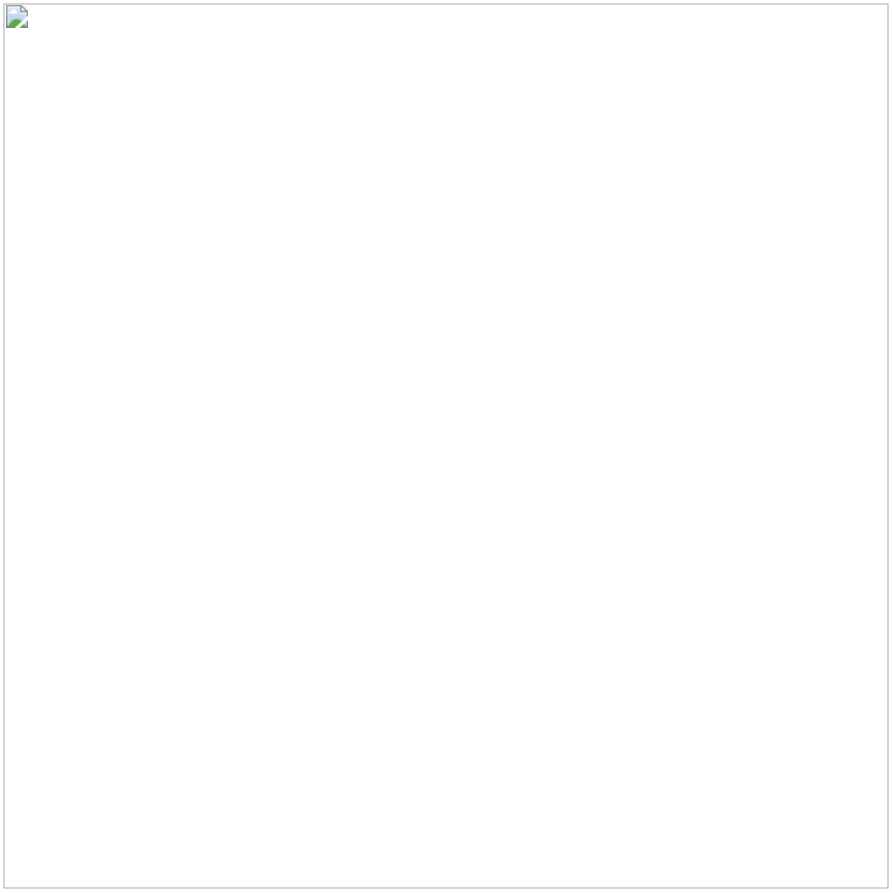
Target of Interest – Defense & Aerospace Campaign

This is not the first time that we have observed threat actors using the defense and aerospace industry as lures in malicious documents. In 2017 and 2019, there were efforts to send malicious documents to targets that contained job postings for positions at leading defense contractors[3]

The objective of these campaigns was to gather information on specific programs and technologies. Like the 2017 campaign, the 2020 campaign also utilized legitimate job postings from several leading defense and aerospace organizations. In the 2020 campaign that McAfee ATR observed, some of the same defense contractors from the 2017 operation were again used as lures in malicious documents.

This new activity noted in 2020 uses similar Techniques, Tactics and Procedures (TTPs) to those seen in a 2017 campaign that targeted individuals in the Defense Industrial Base(DIB). The 2017 activity was included in an indictment by the US government and attributed to the Hidden Cobra threat group[4]

Attack Overview



Phase One: Initial Contact

This recent campaign used malicious documents to install malware on the targeted system using a template injection attack. This technique allows a weaponized document to download an external Word template containing macros that will be executed. This is a known trick used to bypass static malicious document analysis, as well as detection, as the macros are embedded in the downloaded template.

Further, these malicious Word documents contained content related to legitimate jobs at these leading defense contractors. All three organizations have active defense contracts of varying size and scope with the US government.

The timeline for these documents, that were sent to an unknown number of targets, ran between 31 March and 18 May 2020.

Document creation timeline

Malign documents were the main entry point for introducing malicious code into the victim's environment. These documents contained job descriptions from defense, aerospace and other sectors as a lure. The objective would be to send these documents to a victim's email with the intention they open, view and ultimately execute the payload.

As we mentioned, the adversary used a technique called template injection. When a document contains the .docx extension, in our case, it means that we are dealing with the Open Office XML standard. A .docx file is a zip file containing multiple parts. Using the template injection technique, the adversary puts a link towards the template file in one of the .XML files, for example the link is in settings.xml.rels while the external oleobject load is in document.xml.rels. The link will load a template file (DOTM) from a remote server. This is a clever technique we observe being used by multiple adversaries [5] and is intended to make a document appear to be clean initially, only to subsequently load malware. Some of these template files are renamed as JPEG files when hosted on a remote server to avoid any suspicion and bypass detection. These template files contain Visual Basic macro code, that will load a DLL implant onto the victim's system. Current McAfee technologies currently protect against this threat.

We mentioned earlier that docx files (like xlsx and pptx) are part of the OOXML standard. The document defining this standard[6], describes the syntax and values that can be used as an example. An interesting file to look at is the 'settings.xml' file that can be discovered in the 'Word' container of the docx zip file. This file contains settings with regards to language, markup and more. First, we extracted all the data from the settings.xml files and started to compare. All the documents below contained the same language values:

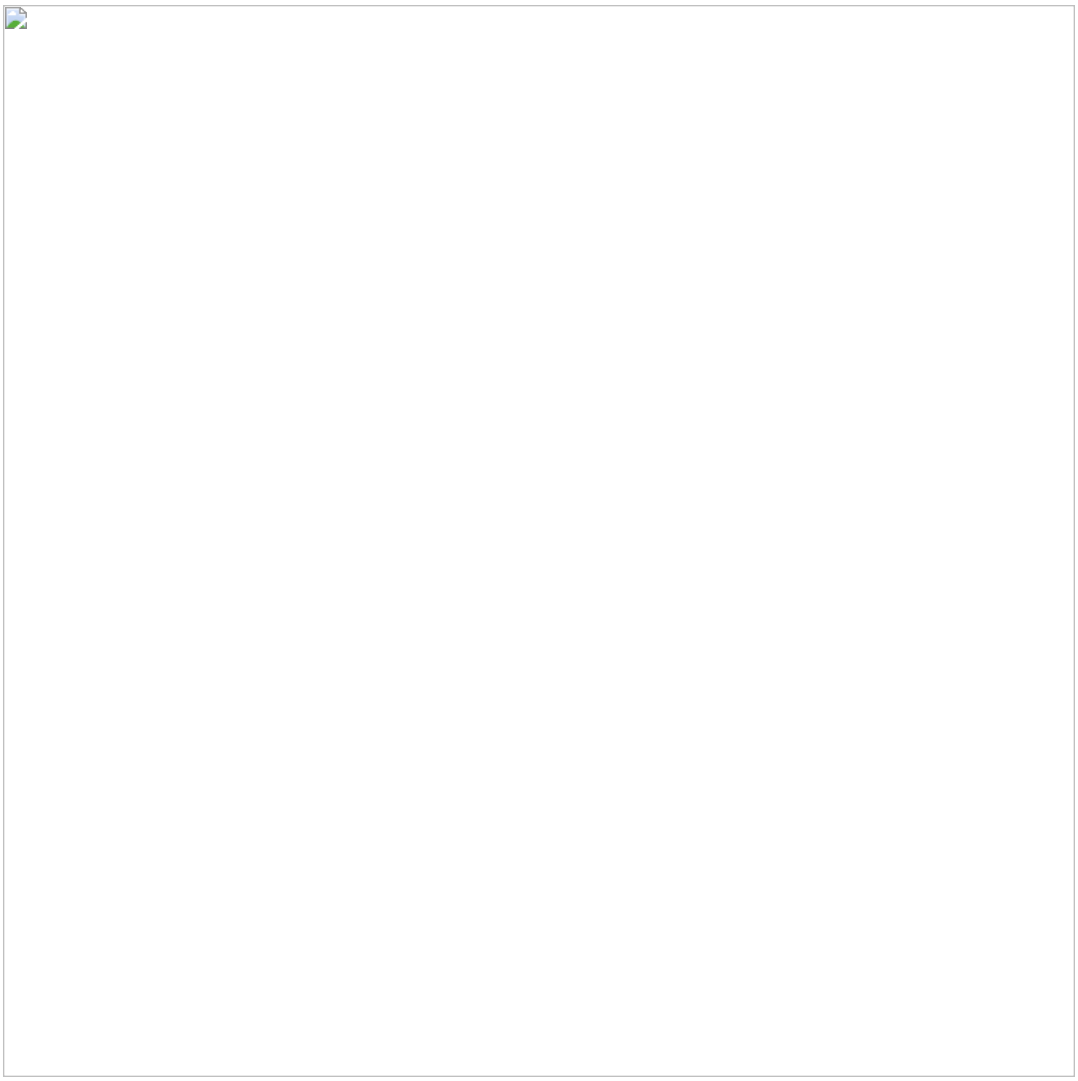
w:val="en-US"

w:eastAsia="ko-KR"

The XML file ends with a GUID value that starts with the value "w15".

Example: w15:val="{932E534D-8C12-4996-B261-816995D50C69}"/></w:settings>

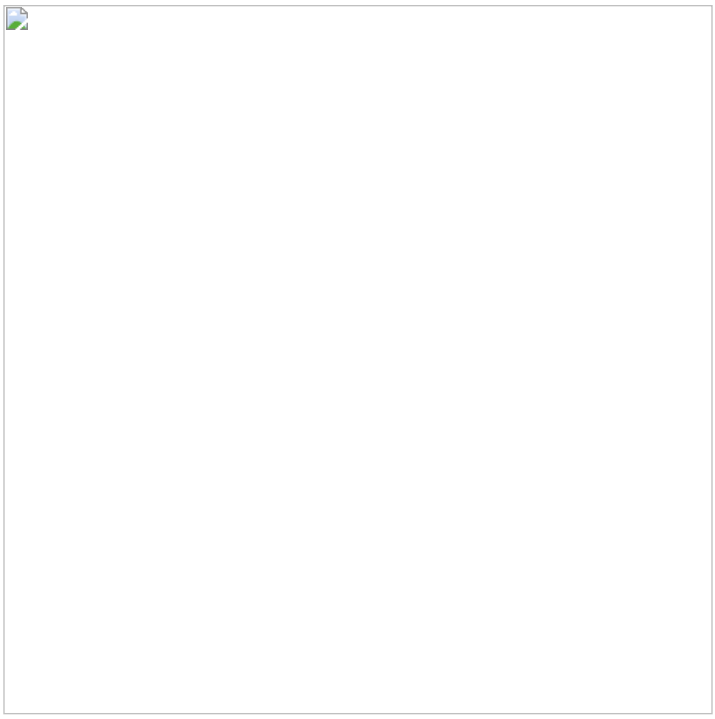
According to the Microsoft documentation, w15 defines the PersistentDocumentId Class. When the object is serialized out as xml, its qualified name is w15:docId. The 128-bit GUID is set as an ST_Guid attribute which, according to the Microsoft documentation, refers to a unique token. The used class generates a GUID for use as the DocID and generates the associated key. The client stores the GUID in that structure and persists in the doc file. If, for example, we would create a document and would "Save As", the w15:docId GUID would persist across to the newly created document. What would that mean for our list above? Documents with the same GUID value need to be placed in chronological order and then we can state the earliest document is the root for the rest, for example:



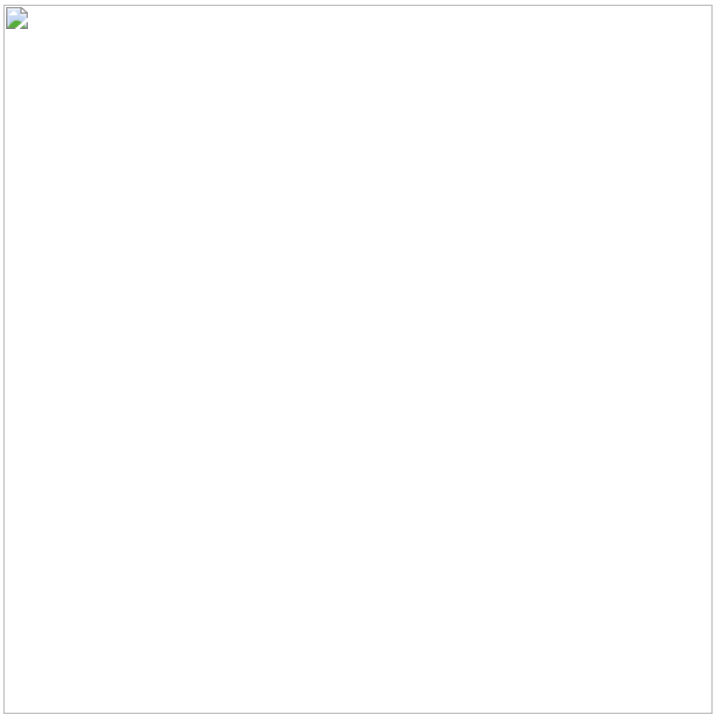
What we can say from above table is that '_IFG_536R.docx" was the first document we observed and that later documents with the same docID value were created from the same base document.

To add to this assertion; in the settings.xml file the value "rsid" (Revision Identifier for Style Definition) can be found. According to Microsoft's documentation: *"This element specifies a unique four-digit number which shall be used to determine the editing session in which this style definition was last modified. This value shall follow this following constraint: All document elements which specify the same rsid* values shall correspond to changes made during the same editing session. An editing session is defined as the period of editing which takes place between any two subsequent save actions."*

Let's start with the rsid element values from "*_IFG_536R.docx":

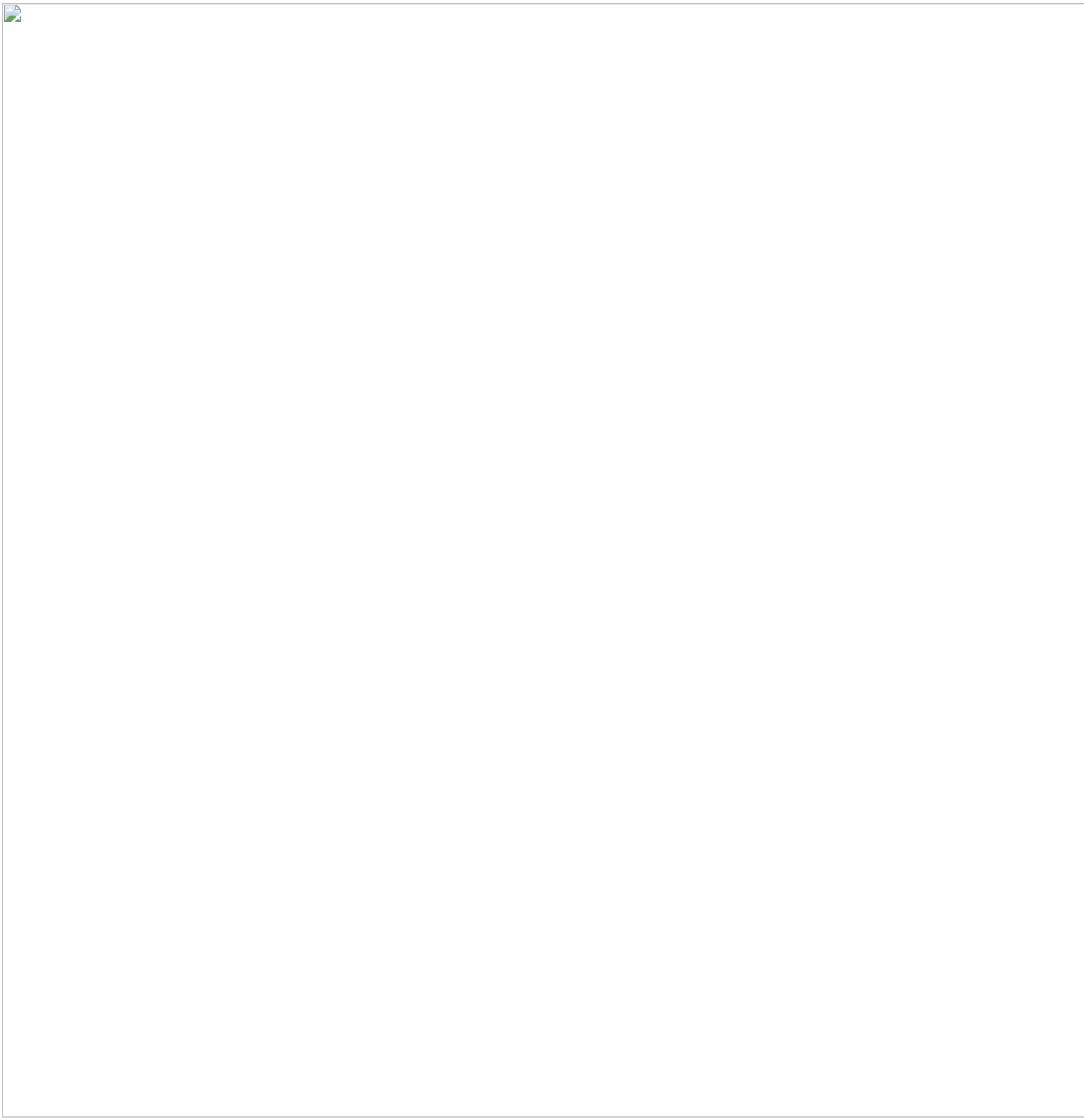


And compare with the rsid element values from “*_PMS.docx”:



The rsid elements are identical for the first four editing sessions for both documents. This indicates that these documents, although they are now separate, originated from the same document.

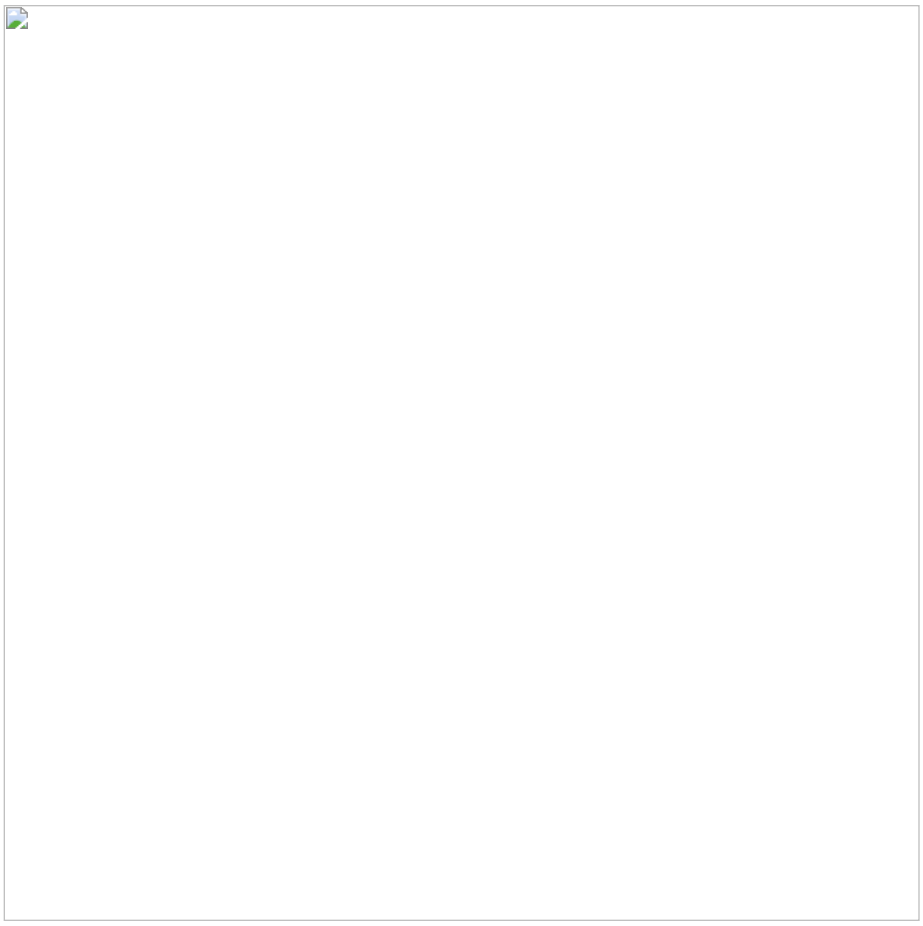
Digging into more values and metadata (we are aware they can be manipulated), we created the following overview in chronological order based on the creation date:

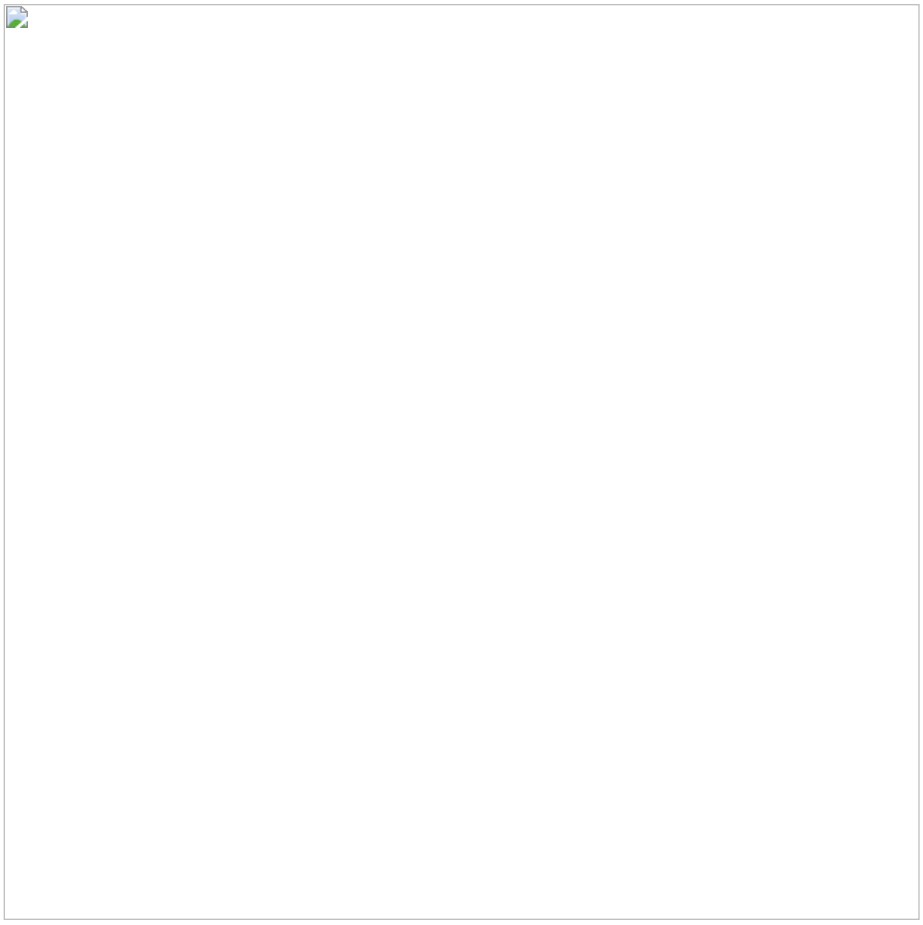


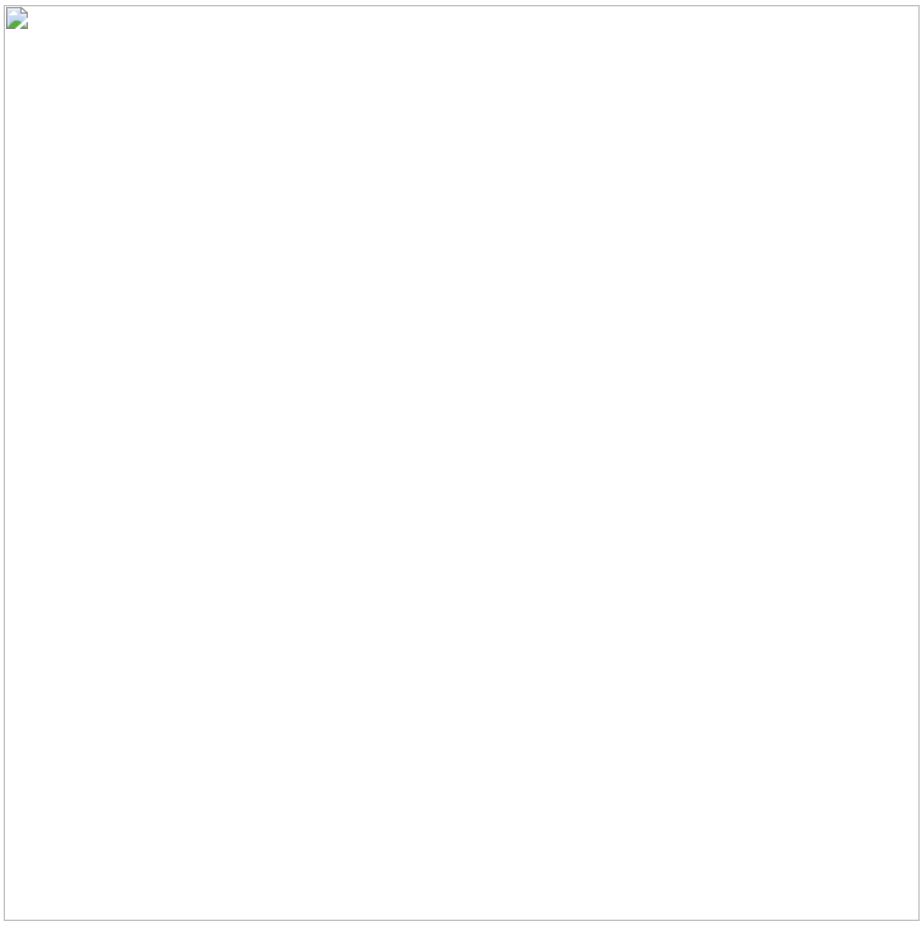
When we zoom in on the DocID “932E534d(..) we read the value of a template file in the XML code: “Single spaced (blank).dotx” – this template name seems to be used by multiple “Author” names. The revision number indicates the possible changes in the document.

Note: the documents in the table with “No DocID” were the “dotm” files containing the macros/payload.

All files were created with Word 2016 and had both the English and Korean languages installed. This analysis into the metadata indicates that there is a high confidence that the malicious documents were created from a common root document.



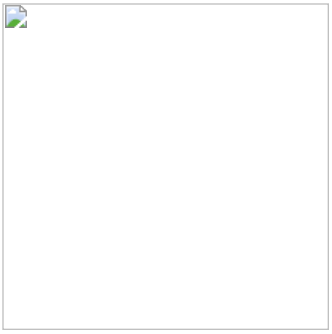


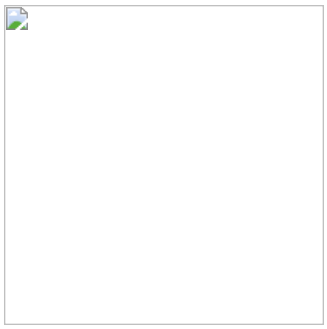


Document Templates

There were several documents flagged as non-malicious discovered during our investigation. At first glance they did not seem important or related at all, but deeper investigation revealed how they were connected. These documents played a role in building the final malicious documents that ultimately got sent to the victims. Further analysis of these documents, based on metadata information, indicated that they contained relationships to the primary documents created by the adversary.

Two PDF files (***_SPE_LEOS and ***_HPC_SE) with aerospace & defense industry themed images, created via the Microsoft Print to PDF service, were submitted along with ***_ECS_EPM.docx. The naming convention of these PDF files was very similar to the malicious documents used. The name includes abbreviations for positions at the defense contractor much like the malicious documents. The Microsoft Print to PDF service enables content from a Microsoft Word document be printed to PDF directly. In this case these two PDF files were generated from an original Microsoft Word document with the author 'HOME'. The author 'HOME' appeared in multiple malicious documents containing job descriptions related to aerospace, defense and the entertainment industry. The PDFs were discovered in an archive file indicating that LinkedIn may have been a possible vector utilized by the adversaries to target victims. This is a similar vector as to what has been observed in a campaign reported by industry[7], however as mentioned earlier the research covered in this blog is part of a different activity set.

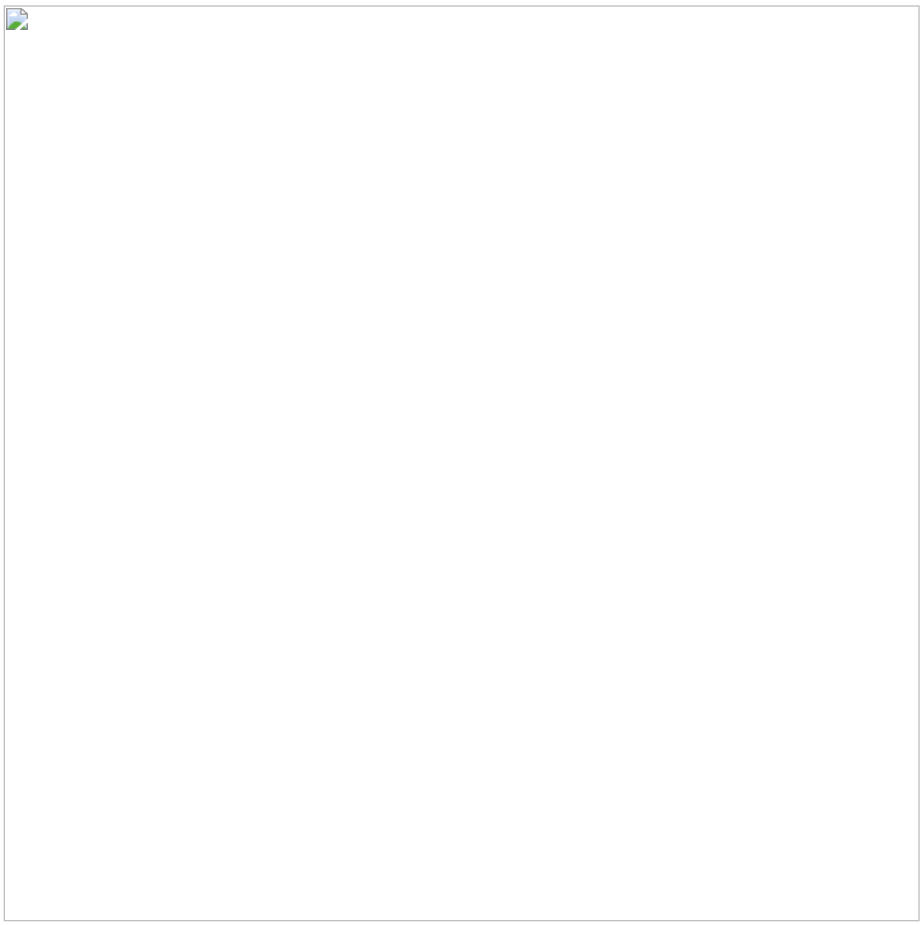




Metadata from PDF file submitted with ***_ECS_EPM.docx in archive with context fake LinkedIn

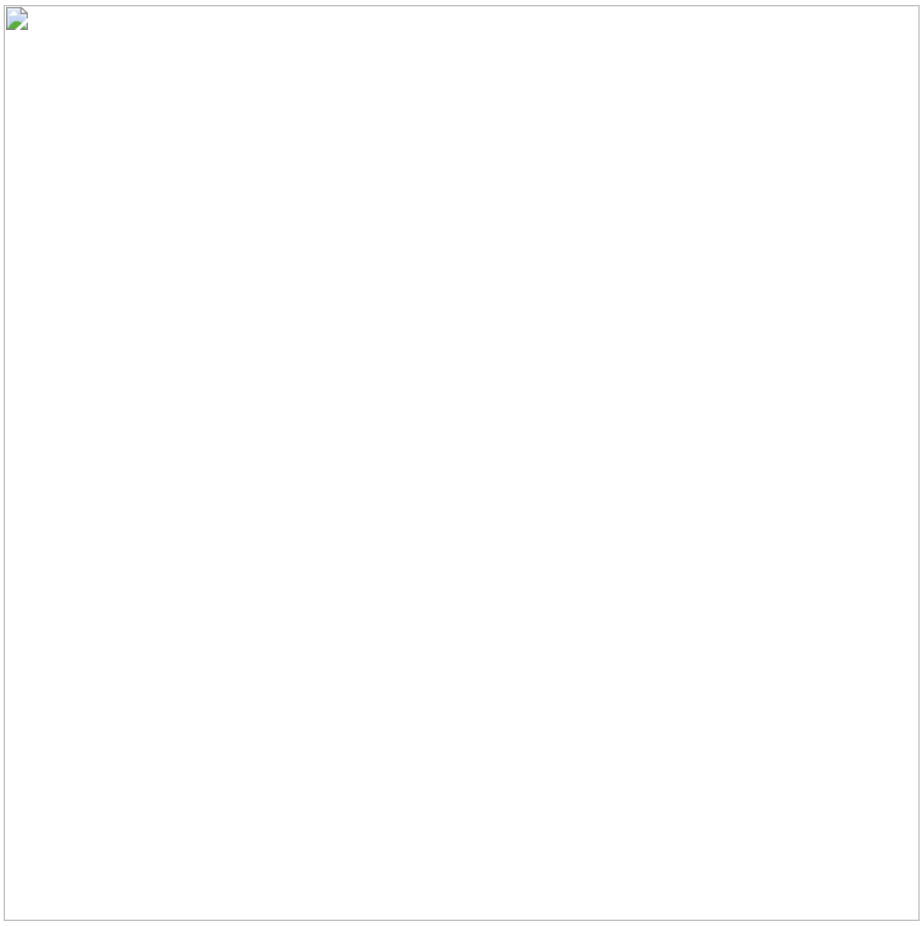
Visual Basic Macro Code

Digging into the remote template files reveals some additional insight concerning the structure of the macro code. The second stage remote document template files contain Visual Basic macro code designed to extract a double base64 encoded DLL implant. The content is all encoded in UserForm1 in the remote DOTM file that is extracted by the macro code.

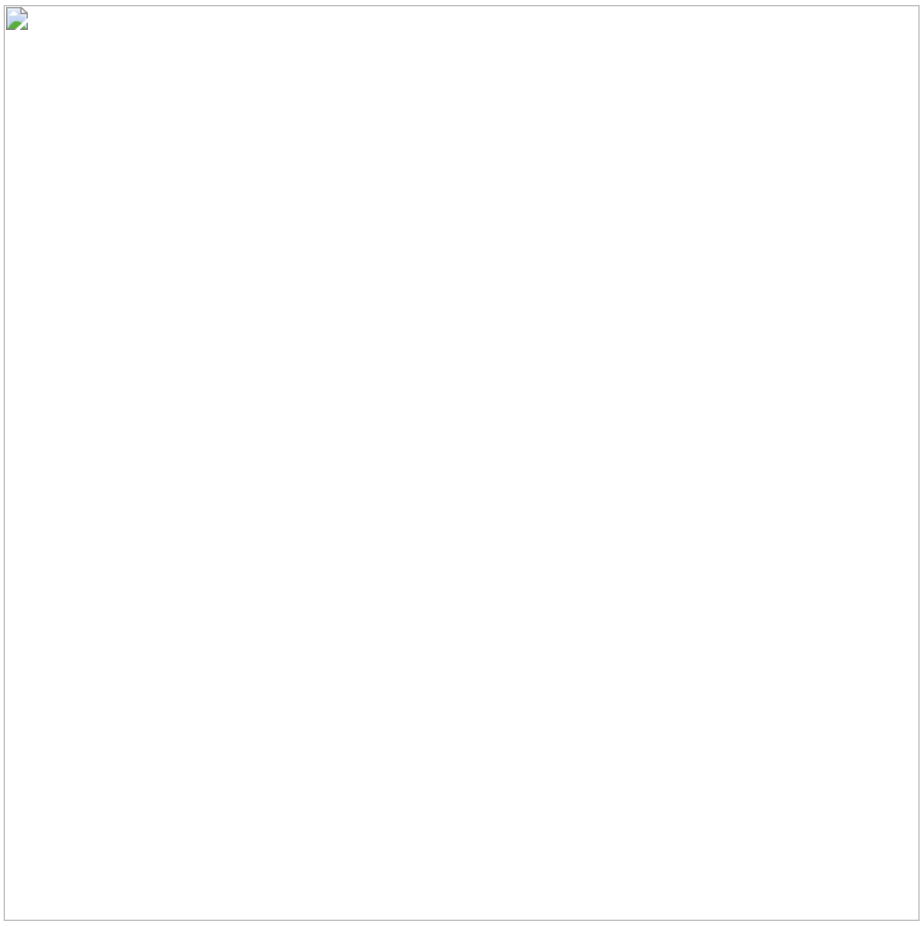


Macro code (17.dotm) for extracting embedded DLL

Further, the code will also extract the embedded decoy document (a clean document containing the job description) to display to the victim.



Code (17.dotm) to extract clean decoy document

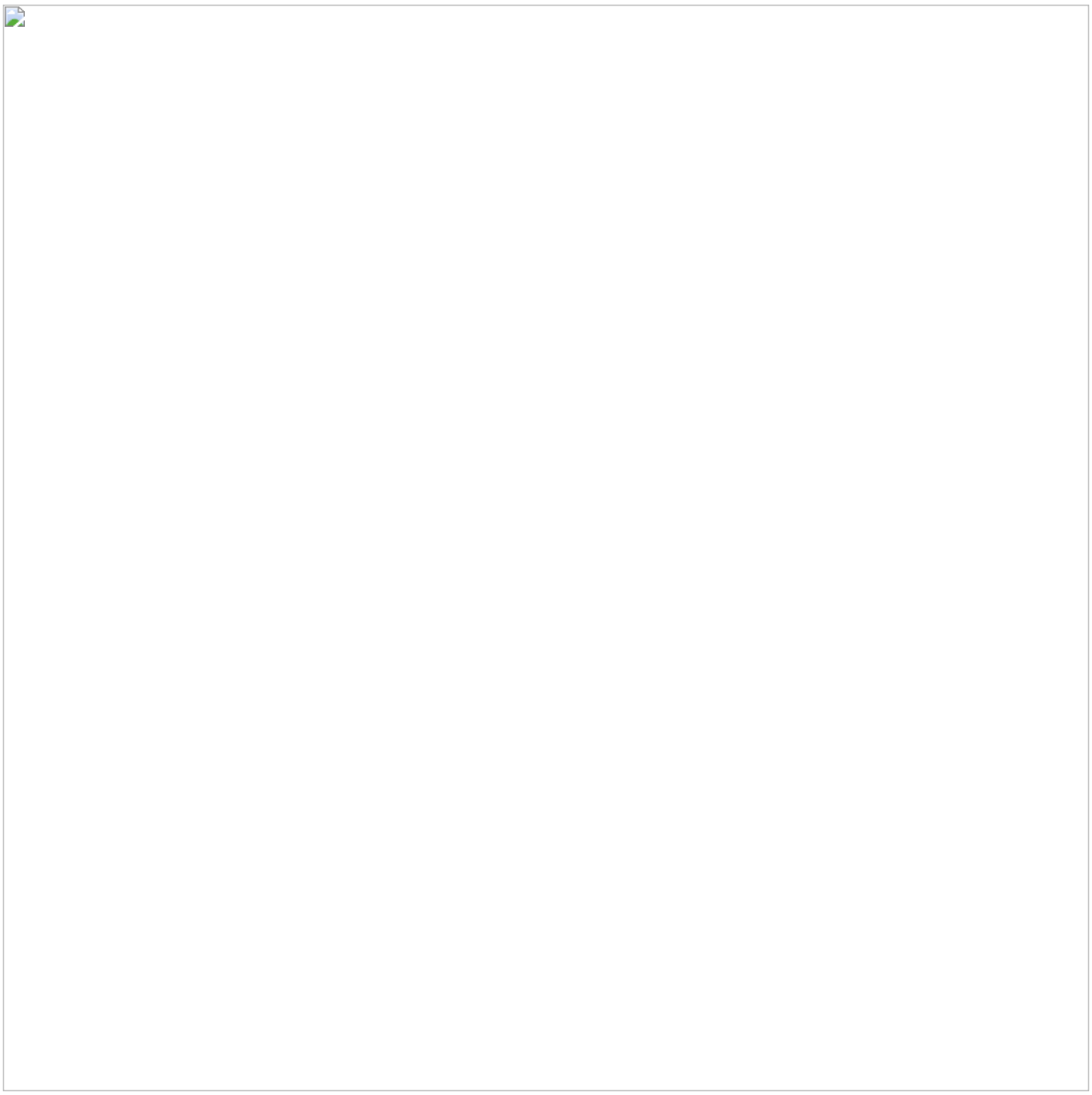


Macro code (******_dds_log.jpg) executed upon auto execution

Phase Two: Dropping Malicious DLLs

The adversary used malicious DLL files, delivered through stage 2 malicious documents, to spy on targets. Those malicious documents were designed to drop DLL implants on the victim's machine to collect initial intelligence. In this campaign the adversary was utilizing patched SQL Lite DLLs to gather basic information from its targets. These DLLs were modified to include malicious code to be executed on the victim's machine when they're invoked under certain circumstances. The purpose of these DLLs is/was to gather machine information from infected victims that could be used to further identify more interesting targets.

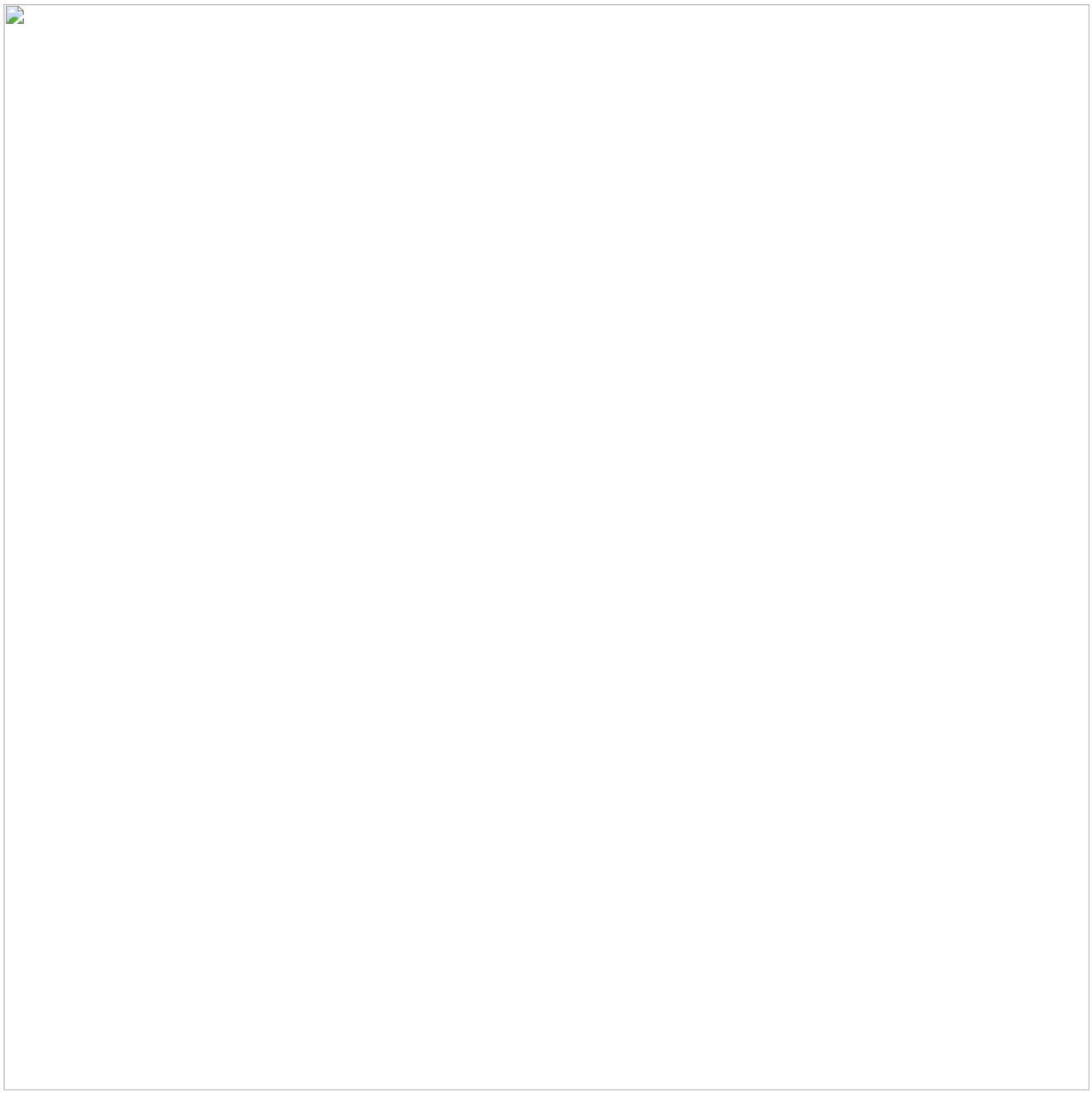
The first stage document sent to targeted victims contained an embedded link that downloaded the remote document template.



Embedded link contained within Word/_rels/settings.xml.rels

The DOTM (Office template filetype) files are responsible for loading the patched DLLs onto the victim's machine to collect and gather data. These DOTM files are created with DLL files encoded directly into the structure of the file. These DOTM files exist on remote servers compromised by the adversary; the first stage document contains an embedded link that refers to the location of this file. When the victim opens the document, the remote DOTM file that contains a Visual Basic macro code to load malicious DLLs, is loaded. Based on our analysis, these DLLs were first seen on 20 April 2020 and, to our knowledge based on age and prevalence data, these implants have been customized for this attack.

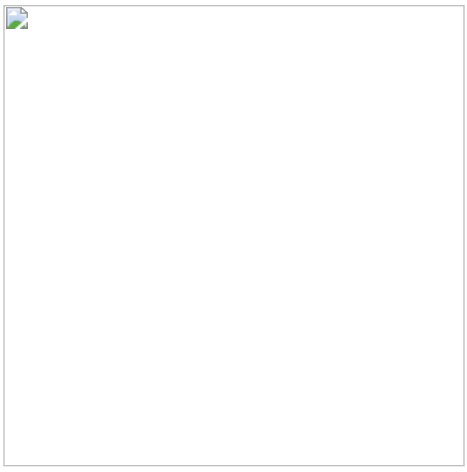
The workflow of the attack can be represented by the following image:



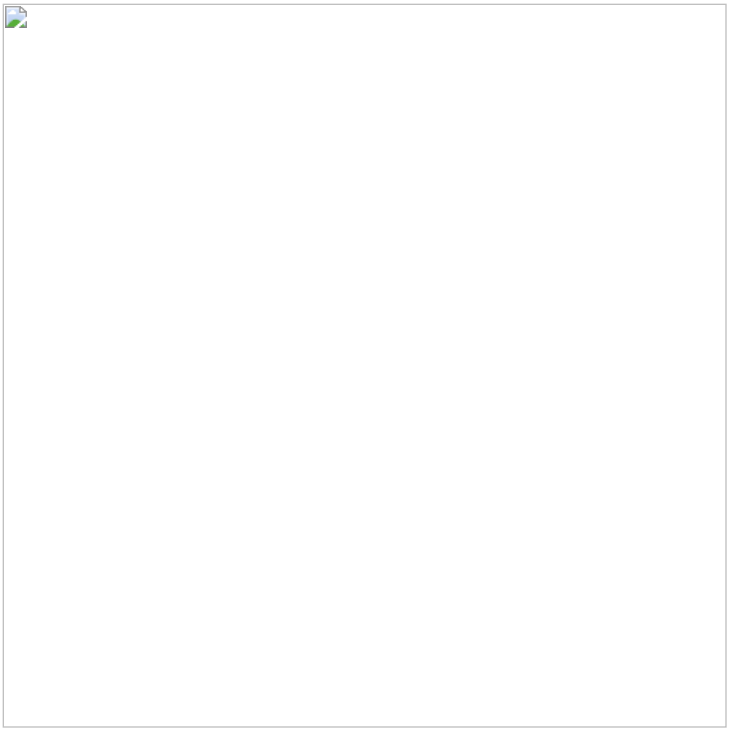
To identify the malicious DLLs that will load or download the final implant, we extracted from the Office files found in the triage phase, the following DLL files:

SHA256	Original File name	Compile Date
bff4d04caeaf8472283906765df34421d657bd631f5562c902e82a3a0177d114	wsuser.db	4/24/2020
b76b6bbda8703fa801898f843692ec1968e4b0c90dfae9764404c1a54abf650b	unknown	4/24/2020
37a3c01bb5eaf7ecbcfbfde1aab848956d782bb84445384c961edebe8d0e9969	onenote.db	4/01/2020
48b8486979973656a15ca902b7bb973ee5cde9a59e2f3da53c86102d48d7dad8	onenote.db	4/01/2020
bff4d04caeaf8472283906765df34421d657bd631f5562c902e82a3a0177d114	wsuser.db	4/24/2020

These DLL files are patched versions from goodware libraries, like the SQLITE library found in our analysis, and are loaded via a VBScript contained within the DOTM files that loads a double Base64 encoded DLL as described in this analysis. The DLL is encoded in UserForm1 (contained within the Microsoft Word macro) and the primary macro code is responsible for extracting and decoded the DLL implant.



DOTM Document Structure



Implant DLLs encoded in UserForm1

From our analysis, we could verify how the DLLs used in the third stage were legitimate software with a malicious implant inside that would be enabled every time a specific function was called with a set of parameters.

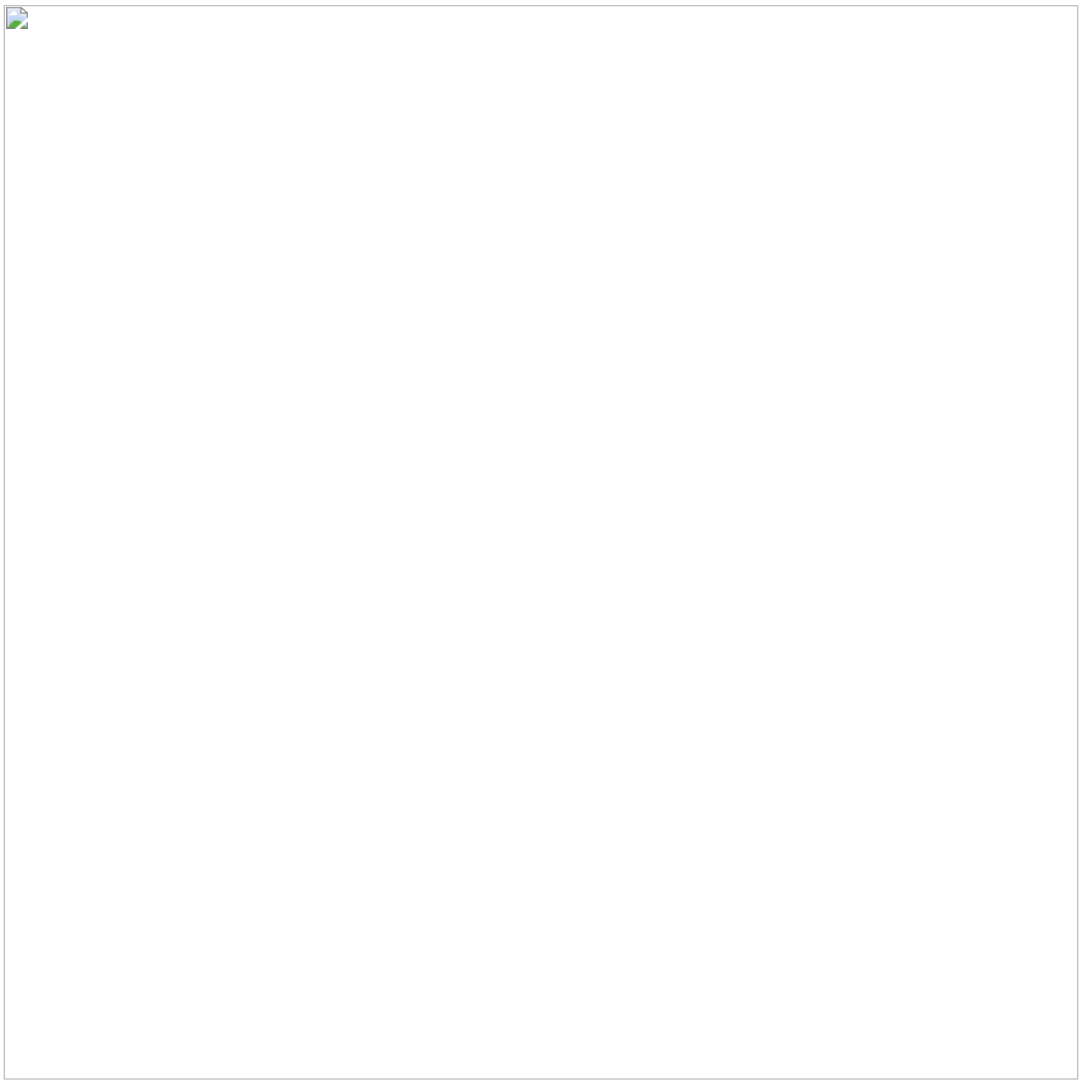
Analyzing the sample statically, it was possible to extract the legitimate software used to store the implant, for example, one of the DLL files extracted from the DOTM files was a patched SQLITE library. If we compare the original library within the extracted DLL, we can spot lot of similarities across the two samples:

Legitimate library to the left, malicious library to the right

As mentioned, the patched DLL and the original SQLITE library share a lot of code:

Both DLLs share a lot of code internally

The first DLL stage needs certain parameters in order to be enabled and launched in the system. The macro code of the Office files we analyzed, contained part of these parameters:



Information found in the pcode of the document

The data found in the VBA macro had the following details:

- 32-bit keys that mimic a Windows SID
  - The first parameter belongs to the decryption key used to start the malicious activity.
  - This could be chosen by the author to make the value more realistic
- Campaign ID

DLL Workflow

The analysis of the DLL extracted from the ‘docm’ files (the 2nd stage of the infection) revealed the existence of two types of operation for these DLLs:

DLL direct execution:

The DLL unpacks a new payload in the system.

Drive-by DLLs:

The DLL downloads a new DLL implant from a remote server delivering an additional DLL payload into the system.

For both methods, the implant starts collecting the target information and then contacts the command and control (C2) server

We focused our analysis into the DLLs files that are unpacked into the system.

Implant Analysis

The DLL implant will be executed after the user interacts by opening the Office file. As we explained, the p-code of the VBA macro contains parts of the parameters needed to execute the implant into the system.

The new DLL implant file will be unpacked (depending of the campaign ID) inside a folder inside the AppData folder of the user in execution:

```
C:\Users\user\AppData\Local\Microsoft\Notice\wsdts.db
```

The DLL file, must be launched with 5 different parameters if we want to observe the malicious connection within the C2 domain; in our analysis we observed how the DLL was launched with the following command line:

```
C:\Windows\System32\rundll32.exe “C:\Users\user\AppData\Local\Microsoft\Notice\wsdts.db”, sqlite3_steps S-6-81-3811-75432205-060098-6872 0 0 61 1
```

The required parameters to launch the malicious implant are:

Parameter number	Description
1	Decryption key
2	Unused value, hardcoded in the DLL
3	Unused value, hardcoded in the DLL
4	Campaign identifier
5	Unused value, hardcoded in the DLL

As we explained, the implants are patched SQLITE files and that is why we could find additional functions that are used to launch the malicious implant, executing the binary with certain parameters. It is necessary to use a specific export ‘sqlite3_steps’ plus the parameters mentioned before.

Analyzing the code statically we could observe that the payload only checks 2 of these 5 parameters but all of them must be present in order to execute the implant:

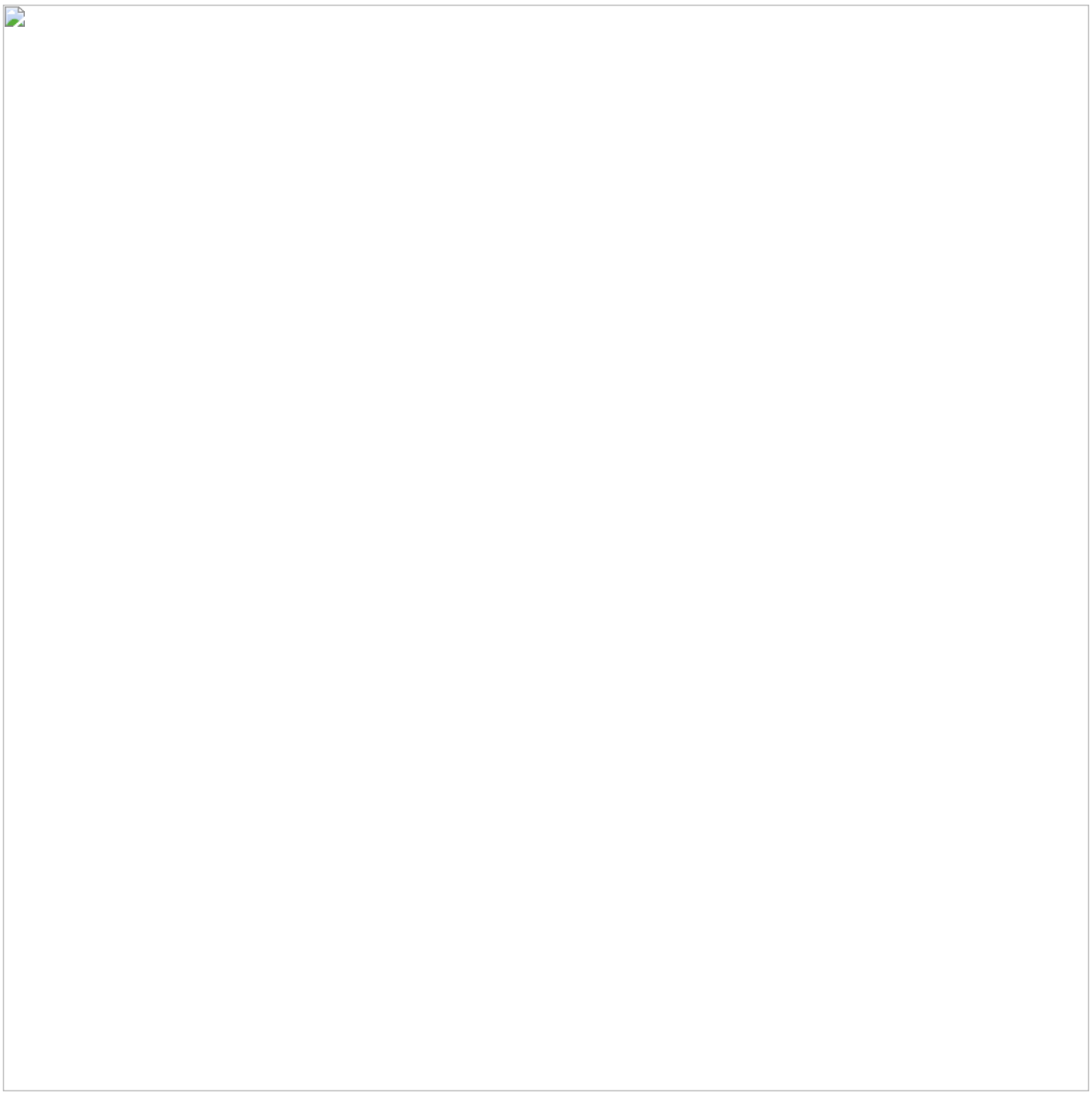
sqlite malicious function

Phase Three: Network Evasion Techniques

Attackers are always trying to remain undetected in their intrusions which is why it is common to observe techniques such as mimicking the same User-Agent that is present in the system, in order to remain under the radar. Using the same User-Agent string from the victim's web browser configurations, for example, will help avoid network-based detection systems from flagging outgoing traffic as suspicious. In this case, we observed how, through the use of the Windows API ObtainUserAgentString, the attacker obtained the User-Agent and used the value to connect to the command and control server:

If the implant cannot detect the User-Agent in the system, it will use the default Mozilla User-Agent instead:

Running the sample dynamically and intercepting the TLS traffic, we could see the connection to the command and control server:



Unfortunately, during our analysis, the C2 was not active which limited our ability for further analysis.

The data sent to the C2 channel contains the following information:

Parameter	Description
C2	C2 configured for that campaign
ned	Campaign identifier
key 1	AES key used to communicate with the C2
key 2	AES key used to communicate with the C2
sample identifier	Sample identifier sent to the C2 server
gl	Size value sent to the C2 server
hl	Unknown parameter always set to 0

We could find at least 5 different campaign IDs in our analysis, which suggests that the analysis in this document is merely the tip of the iceberg:

Dotx file	Campaign ID
61.dotm	0

17.dotm	17
43.dotm	43
83878C91171338902E0FE0FB97A8C47A.dotm	204
******_dds_log**	100

Phase Four: Persistence

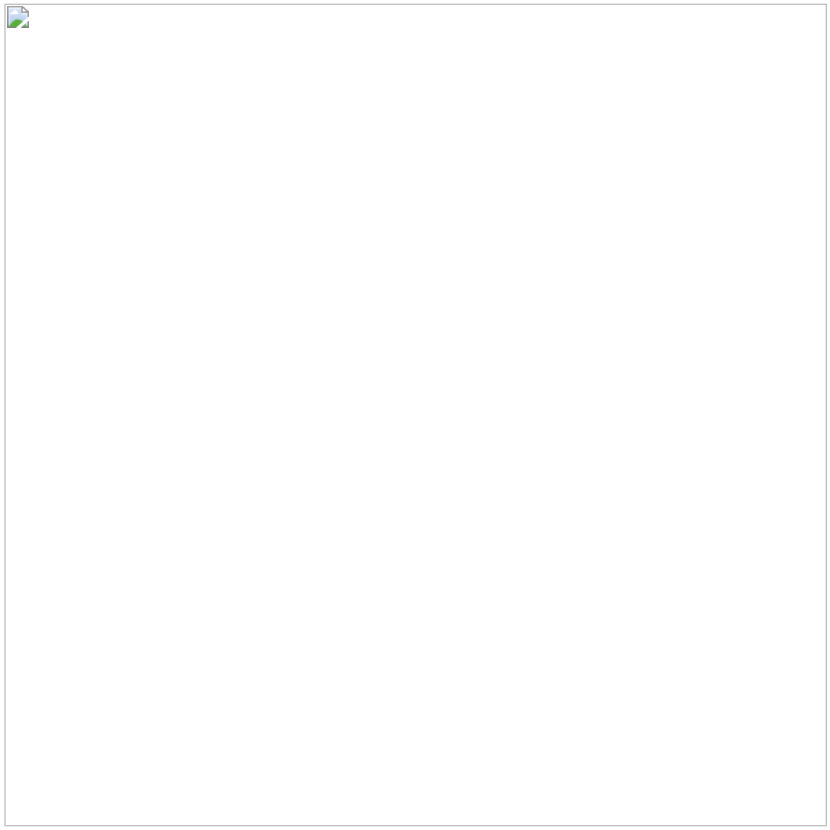
In our analysis we could observe how the adversary ensures persistence by delivering an LNK file into the startup folder

The value of this persistent LNK file is hardcoded inside every sample:

Dynamically, and through the Windows APIs NtCreateFile and NtWriteFile, the LNK is written in the startup folder. The LNK file contains the path to execute the DLL file with the required parameters.

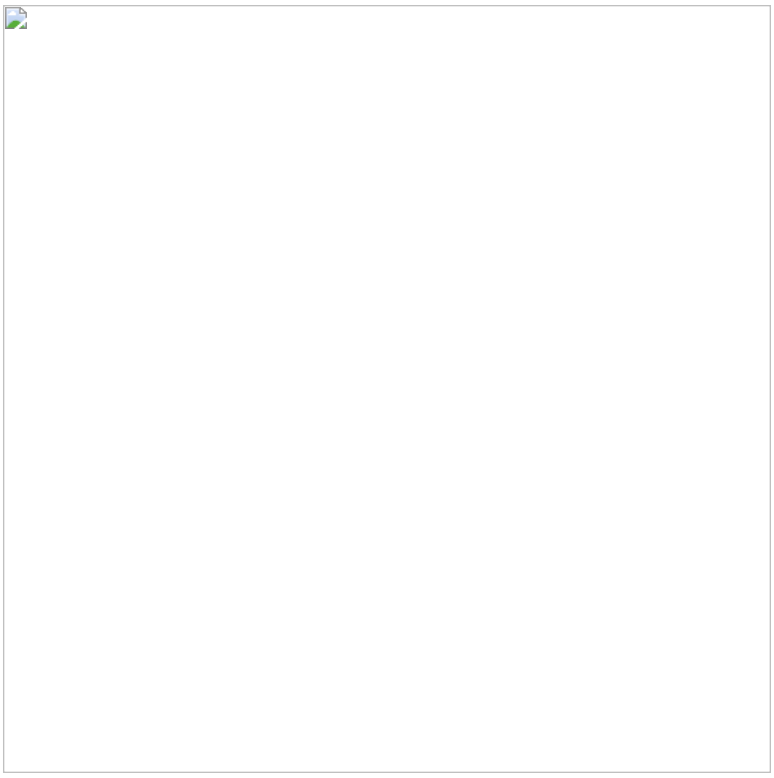
Additional Lures: Relationship to 2020 Diplomatic and Political Campaign

Further investigation into the 2020 campaign activity revealed additional links indicating the adversary was using domestic South Korean politics as lures. The adversary created several documents in the Korean language using the same techniques as the ones seen in the defense industry lures. One notable document, with the title ***US-ROK Relations and Diplomatic Security*** in both Korean and English, appeared on 6 April 2020 with the document author JangSY.

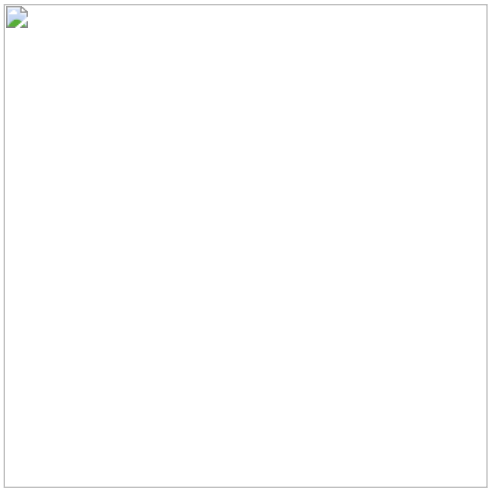


US-ROK Relation and Diplomatic Security

The document was hosted on the file sharing site ***hxxps://web.opendrive.com/api/v1/download/file.json/MzBfMjA1Njc0ODhf?inline=0*** and contained an embedded link referring to a remote DOTM file hosted on another file sharing site (od.lk). The BASE64 coded value MzBfMjA1Njc0ODhf is a unique identifier for the user associated with the file sharing platform od.lk.



A related document discovered with the title ***test.docx*** indicated that the adversary began testing these documents in early April 2020. This document contained the same content as the above but was designed to test the downloading of the remote template file by hosting it on a private IP address. The document that utilized pubmaterial.dotm for its remote template also made requests to the URL hxxp://saemaeul.mireene.com/skin/visit/basic/.



This domain (saemaeul.mireene.com) is connected to numerous other Korean language malicious documents that also appeared in 2020 including documents related to political or diplomatic relations. One such document (81249fe1b8869241374966335fd912c3e0e64827) was using the 21st National Assembly Election as part of the title, potentially indicating those interested in politics in South Korea were a target. For example, another document (16d421807502a0b2429160e0bd960fa57f37efc4) used the name of an individual, director Jae-chun Lee. It also shared the same metadata.

The original author of these documents was listed as Seong Jin Lee according to the embedded metadata information. However, the last modification author (Robot Karll) used by the adversary during document template creation is unique to this set of malicious documents. Further, these documents contain political lures pertaining to South Korean domestic policy that suggests that the targets of these documents also spoke Korean.

Relationship to 2019 Falsified Job Recruitment Campaign

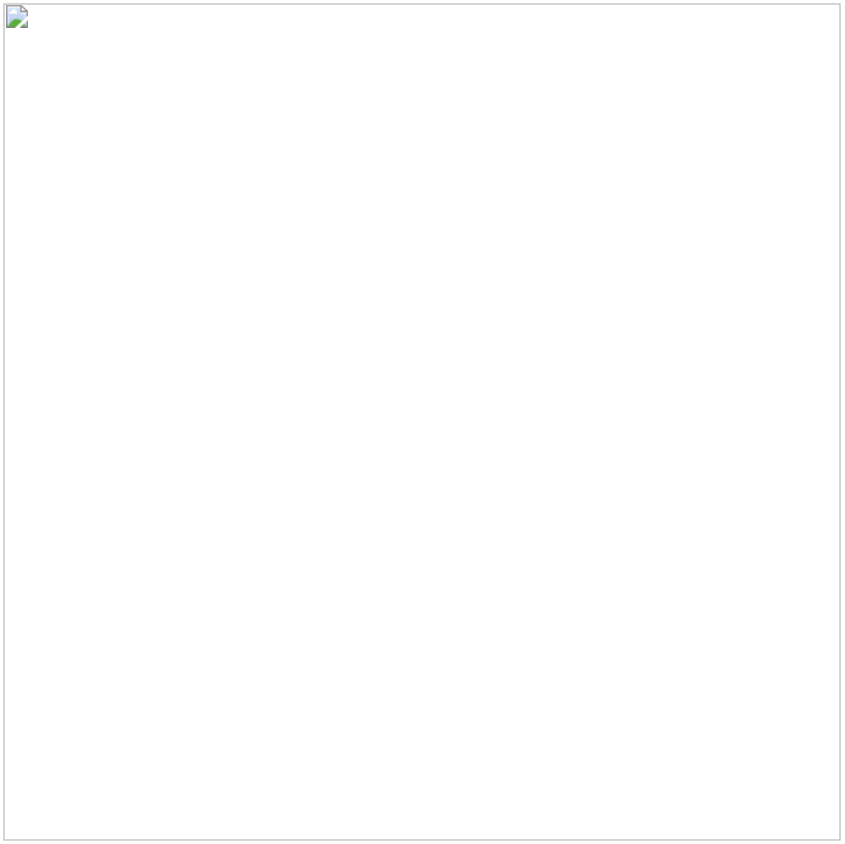
A short-lived campaign from 2019 using India's aerospace industry as a lure used what appears to be very similar methods to this latest campaign using the defense industry in 2020. Some of the TTPs from the 2020 campaign match that of the operation in late 2019. The activity from 2019 has also been attributed to Hidden Cobra by industry reporting.

The campaign from October 2019 also used aerospace and defense as a lure, using copies of legitimate jobs just like we observed with the 2020 campaign. However, this campaign was isolated to the Indian defense sector and from our knowledge did not expand beyond this. This document also contained a job posting for a leading aeronautics company in India; this company is focused on aerospace and defense systems. This targeting aligns with the 2020 operation and our analysis reveals that the DLLs used in this campaign were also modified SQL Lite DLLs.

Based on our analysis, several variants of the implant were created in the October 2019 timeframe, indicating the possibility of additional malicious documents.

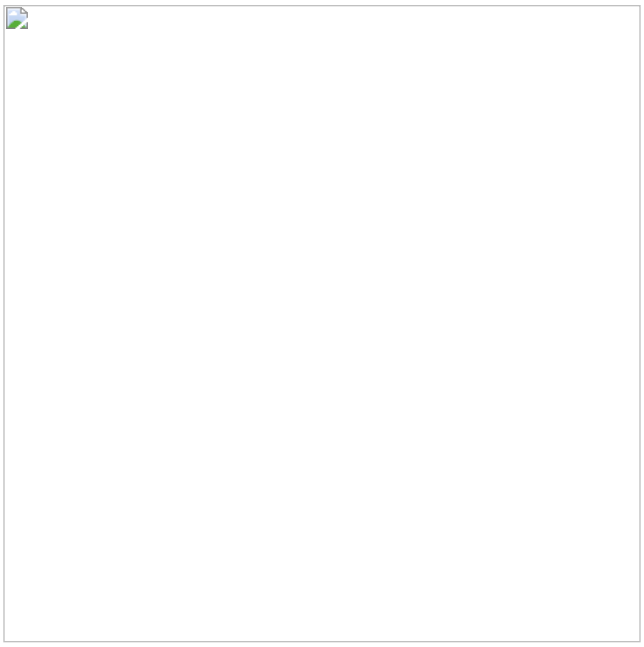
Sha1	Compile Date	File Name
f3847f5de342632f8f9e2901f16b7127472493ae	10/12/2019	MFC_dll.DLL
659c854bbdefe692ee8c52761e7a8c7ee35aa56c	10/12/2019	MFC_dll.DLL
35577959f79966b01f520e2f0283969155b8f8d7	10/12/2019	MFC_dll.DLL
975ae81997e6cd8c8a3901308d33c868f23e638f	10/12/2019	MFC_dll.DLL

One notable difference with the 2019 campaign is the main malicious document contained the implant payload, unlike the 2020 campaign that relied on the Microsoft Office remote template injection technique. Even though the technique is different, we did observe likenesses as we began to dissect the remote template document. There are some key similarities within the VBA code embedded in the documents. Below we see the 2019 (left) and 2020 (right) side-by-side comparison of two essential functions, that closely match each other, within the VBA code that extracts/drops/executes the payload.

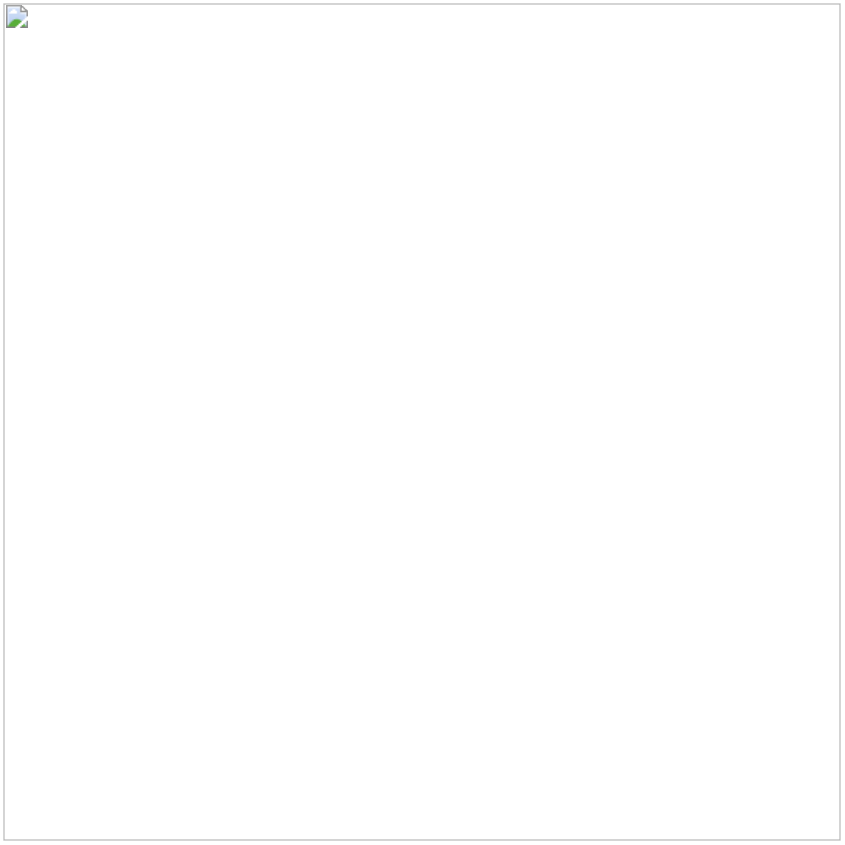


VBA code of *13c47e19182454efa60890656244ee11c76b4904 (left) and acefc63a2ddbbf24157fc102c6a11d6f27cc777d (right)*

The VBA macro drops the first payload of thumbnail.db at the filepath, which resembles the filepath used in 2020.



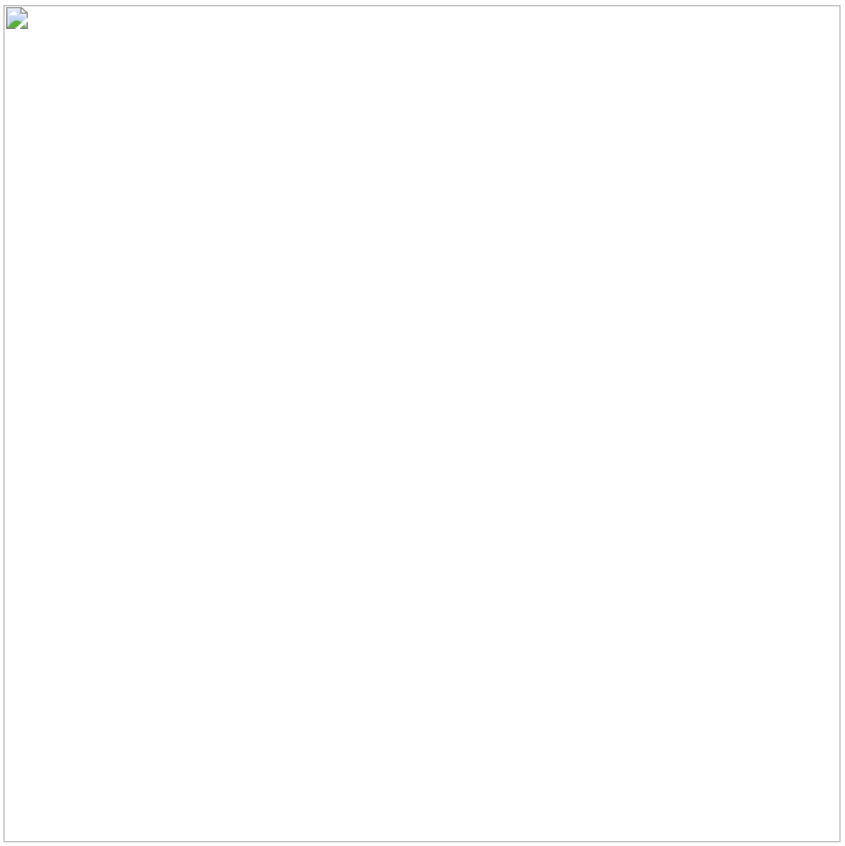
The VB code also passes the decryption key over to the DLL payload, thumbnail.db. Below you can see the code within thumbnail.db accepting those parameters.



Unpacked thumbnail.db bff1d06b9ef381166de55959d73ff93b

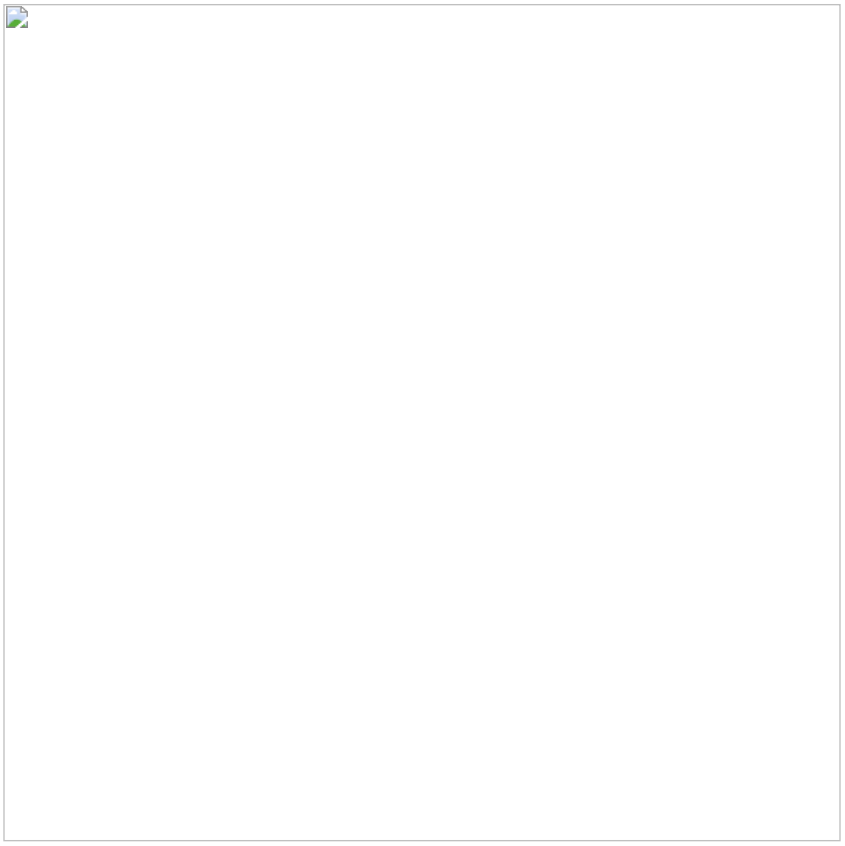
What is interesting is the structure in which this information is being passed over. This 2019 sample is identical to what we documented within the 2020 campaign.

Another resemblance discovered was the position of the .dll implant existing in the exact same location for both 2019 and 2020 samples; “o” field under “UserForms1”.



“o” field of 13c47e19182454efa60890656244ee11c76b4904

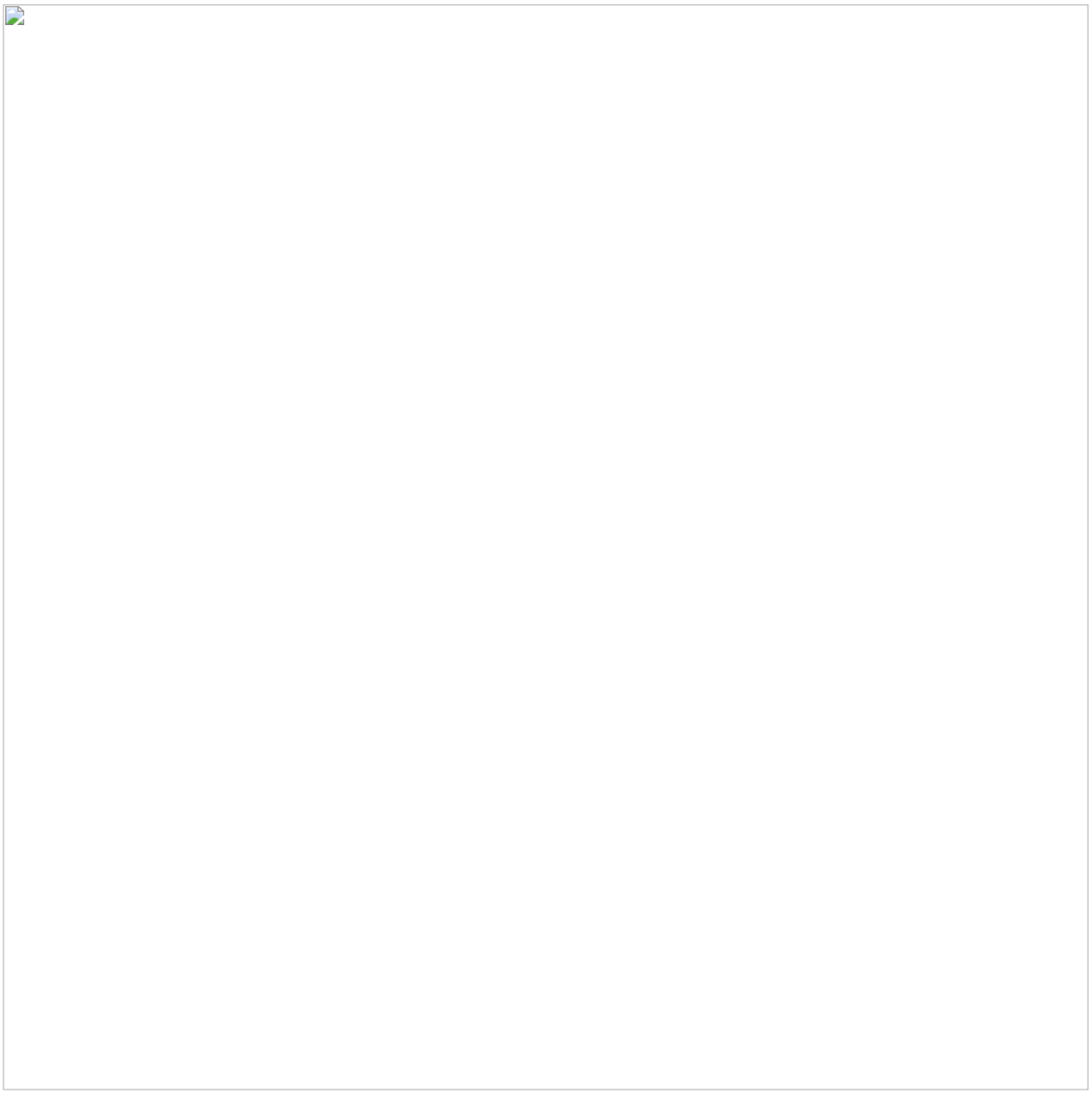
All 2020 .dotm IoCs contain the same .dll implant within the “o” field under “UserForms1”, however, to not overwhelm this write-up with separate screenshots, only one sample is depicted below. Here you can see the parallel between both 2019 and 2020 “o” sections.



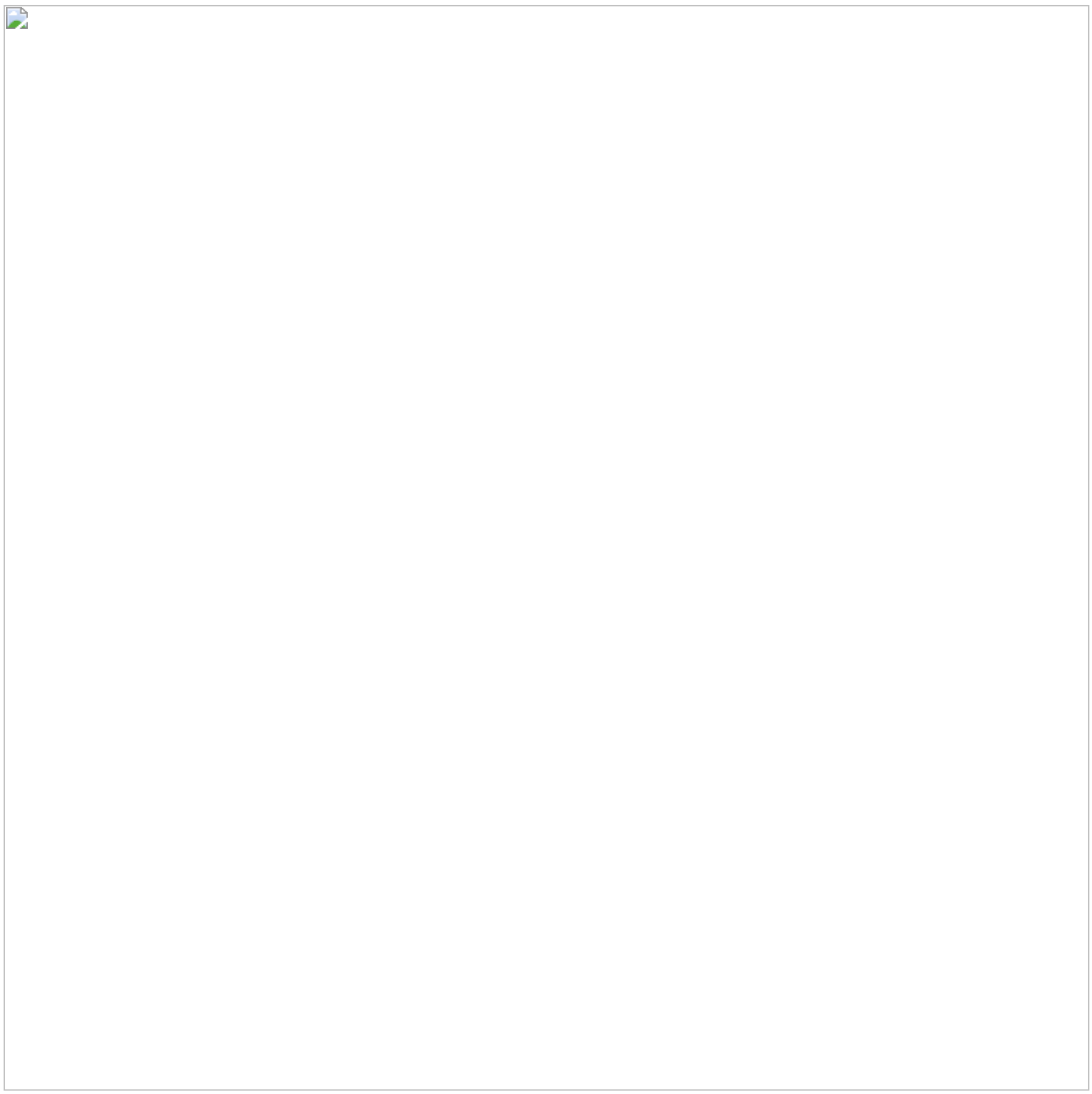
“o” field of acefc63a2ddbbf24157fc102c6a11d6f27cc777d

Another similarity is the encoding of double base64, though in the spirit of competing hypothesis, we did want to note that other adversaries may also use this type of encoding. However, when you couple these similarities with the same lure of an Indian defense contractor, the pendulum starts to lean more to one side of a possible common author between both campaigns. This may indicate another technique being added to the adversary’s arsenal of attack vectors.

One method to keep the campaign dynamic and more difficult to detect is hosting implant code remotely. There is one disadvantage of embedding an implant within a document sent to a victim; the implant code could be detected before the document even reaches the victim’s inbox. Hosting it remotely enables the implant to be easily switched out with new capabilities without running the risk of the document being classified as malicious.

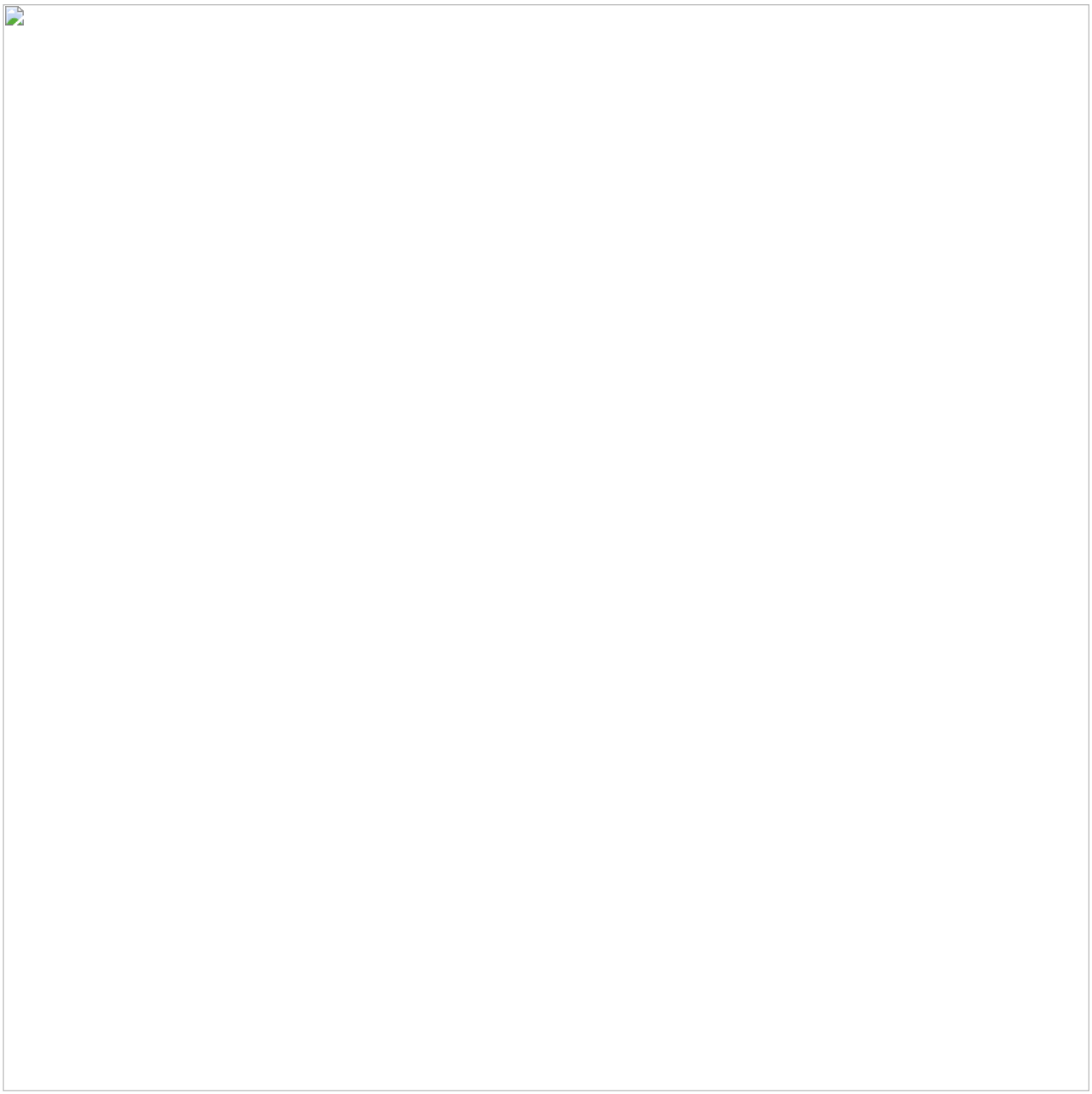


**-HAL-MANAGER.doc UserForm1 with double base64 encoded DLL

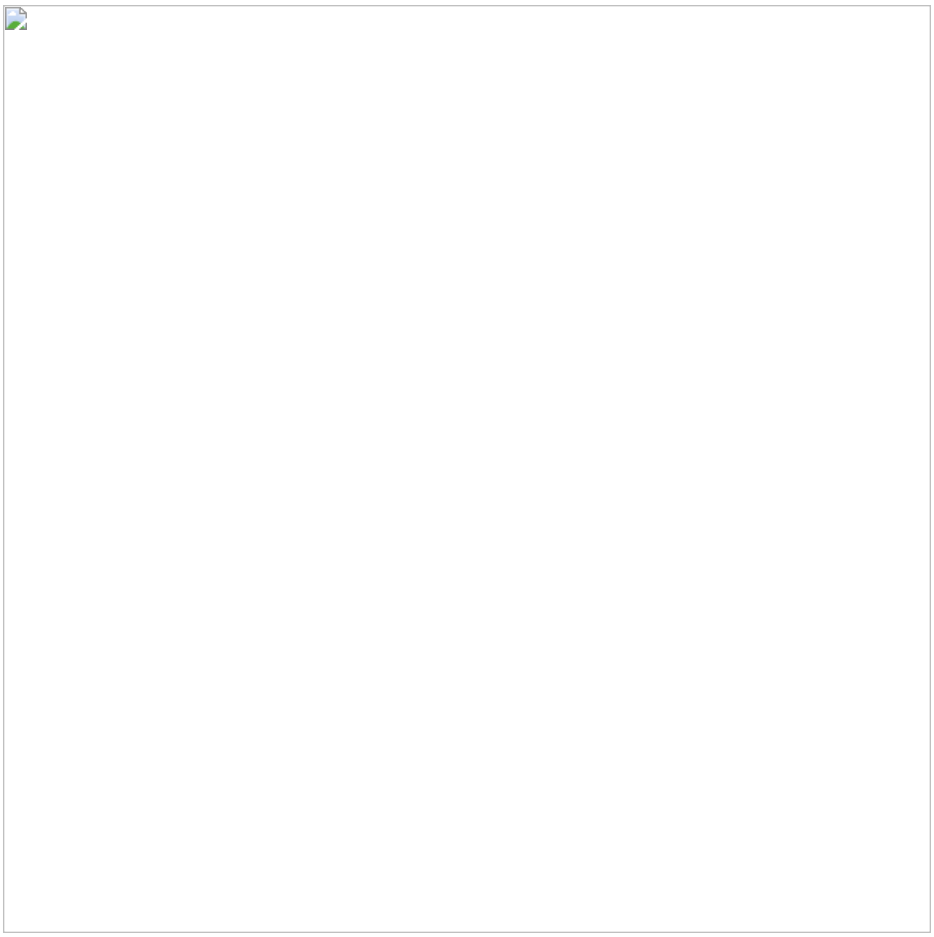


17.DOTM UserForm1 with double base64 encoded DLL from ******_DSS_SE.docx

According to a code similarity analysis, the implant embedded in **-HAL-Manager.doc contains some similarities to the implants from the 2020 campaign. However, we believe that the implant utilized in the 2019 campaign associated with **-Hal-Manager.doc may be another component. First, besides the evident similarities in the Visual Basic macro code and the method for encoding (double base64) there are some functional level similarities. The DLL file is run in a way with similar parameters.



DLL execution code **-Hal-Manager.doc implant



DLL execution code 2020 implant

Campaign Context: Victimology

The victimology is not exactly known due to the lack of spear phishing emails uncovered; however, we can obtain some insight from the analysis of telemetry information and lure document context. The lure documents contained job descriptions for engineering and project management positions in relationship to active defense contracts. The individuals receiving these documents in a targeted spear phishing campaign were likely to have an interest in the content within these lure documents, as we have observed in previous campaigns, as well as some knowledge or relationship to the defense industry.

Infrastructure Insights

Our analysis of the 2019 and 2020 campaigns reveals some interesting insight into the command and control infrastructure behind them, including domains hosted in Italy and the United States. During our investigation we observed a pattern of using legitimate domains to host command and control code. This is beneficial to the adversary as most organizations do not block trusted websites, which allows for the potential bypass of security controls. The adversary took the effort to compromise the domains prior to launching the actual campaign. Further, both 2019 and 2020 job recruitment campaigns shared the same command and control server hosted at elite4print.com.

The domain mireene.com with its various sub-domains have been used by Hidden Cobra in 2020. The domains identified to be used in various operations in 2020 falling under the domain mireene.com are:

- saemaeul.mireene.com
- orblog.mireene.com
- sgmedia.mireene.com
- vnext.mireene.com
- nhpurumy.mireene.com
- jmable.mireene.com
- jmdesign.mireene.com
- all200.mireene.com

Some of these campaigns use similar methods as the 2020 defense industry campaign:

- Malicious document with the title ***European External Action Service*** [8]
- Document with Korean language title ***비건 미국무부 부장관 서신doc*** (U.S. Department of State Secretary of State Correspondence 20200302.doc).

Techniques, Tactics and Procedures (TTPS)

The TTPs of this campaign align with those of previous Hidden Cobra operations from 2017 using the same defense contractors as lures. The 2017 campaign also utilized malicious Microsoft Word documents containing job postings relating to certain technologies such as job descriptions for engineering and project management positions involving aerospace and military surveillance programs. These job descriptions are legitimate and taken directly from the defense contractor's website. The exploitation method used in this campaign relies upon a remote Office template injection method, a technique that we have seen state actors use recently.

However, it is not uncommon to use tools such as EvilClippy to manipulate the behavior of Microsoft Office documents. For example, threat actors can use pre-built kits to manipulate clean documents and embed malicious elements; this saves time and effort. This method will generate a consistent format that can be used throughout campaigns. As a result, we have observed a consistency with how some of the malicious elements are embedded into the documents (i.e. double base64 encoded payload). Further mapping these techniques across the MITRE ATT&CK framework enables us to visualize different techniques the adversary used to exploit their victims.

MITRE ATT&CK mapping for malicious documents

These Microsoft Office templates are hosted on a command and control server and the downloaded link is embedded in the first stage malicious document.

The job postings from these lure documents are positions for work with specific US defense programs and groups:

- F-22 Fighter Jet Program
- Defense, Space and Security (DSS)
- Photovoltaics for space solar cells
- Aeronautics Integrated Fighter Group

- Military aircraft modernization programs

Like previous operations, the adversary is using these lures to target individuals, likely posing as a recruiter or someone involved in recruitment. Some of the job postings we have observed:

- Senior Design Engineer
- System Engineer

Professional networks such as LinkedIn could be a place used to deliver these types of job descriptions.

Defensive Architecture Recommendations

Defeating the tactics, techniques and procedures utilized in this campaign requires a defense in depth security architecture that can prevent or detect the attack in the early stages. The key controls in this case would include the following:

1. **Threat Intelligence Research and Response Program**. Its critical to keep up with the latest Adversary Campaigns targeting your specific vertical. A robust threat response process can then ensure that controls are adaptable to the TTPs and, in this case, create heightened awareness
2. **Security Awareness and Readiness Program.** The attackers leveraged spear-phishing with well-crafted lures that would be very difficult to detect initially by protective technology. Well-trained and ready users, informed with the latest threat intelligence on adversary activity, are the first line of defense.
3. **End User Device Security.** Adaptable endpoint security is critical to stopping this type of attack early, especially for users working from home and not behind the enterprise web proxy or other layered defensive capability. Stopping or detecting the first two stages of infection requires an endpoint security capability of identifying file-less malware, particularly malicious Office documents and persistence techniques that leverage start-up folder modification.
4. **Web Proxy.** A secure web gateway is an essential part of enterprise security architecture and, in this scenario, can restrict access to malicious web sites and block access to the command and control sites.
5. **Sec Ops –** Endpoint Detection and Response (EDR) can be used to detect techniques most likely in stages 1, 2 or 4. Additionally, EDR can be used to search for the initial documents and other indicators provided through threat analysis.

For further information on how McAfee Endpoint Protection and EDR can prevent or detect some of the techniques used in this campaign, especially use of malicious Office documents, please refer to these previous blogs and webinar:

https://www.mcafee.com/blogs/other-blogs/mcafee-labs/ens-10-7-rolls-back-the-curtain-on-ransomware/
https://www.mcafee.com/blogs/other-blogs/mcafee-labs/how-to-use-mcafee-atp-to-protect-against-emotet-lemonduck-and-powerminer/
https://www.mcafee.com/enterprise/en-us/forms/gated-form.html?docID=video-6157567326001

Indicators of Compromise

SHA256	File Name
322aa22163954ff3ff017014e357b756942a2a762f1c55455c83fd594e844fdd	******_DSS_SE.docx
a3eca35d14b0e020444186a5faaba5997994a47af08580521f808b1bb83d6063	******_PMS.docx
d1e2a9367338d185ef477acc4d91ad45f5e6a7d11936c3eb4be463ae0b119185	***_JD_2020.docx
ecbe46ca324096fd5e35729f39fa3bda9226bbefd6286d53e61b1be56a36de5b	***_2020_JD_SDE.docx
40fbac7a241bea412734134394ca81c0090698cf0689f2b67c54aa66b7e04670	83878C91171338902E0FE0FB97A8C47A.dotm
6a3446b8a47f0ab4f536015218b22653fff8b18c595fbc5b0c09d857eba7c7a1	******_AERO_GS.docx
df5536c254a5d9ac626dbff7525de8301729807433d377db807ce3d8bc7c3ffe	**_IFG_536R.docx
1b0c82e71a53300c969da61b085c8ce623202722cf3fa2d79160dac16642303f	43.dotm
d7ef8935437d61c975feb2bd826d018373df099047c33ad7305585774a272625	17.dotm
49724ee7a6baf421ac5a2a3c93d32e796e2a33d7d75bbfc02239fc9f4e3a41e0	Senior_Design_Engineer.docx
66e5371c3da7dc9a80fb4c0fabfa23a30d82650c434eec86a95b6e239eccab88	61.dotm
7933716892e0d6053057f5f2df0ccadf5b06dc739fea79ee533dd0cec98ca971	******_spectrolab.docx
43b6b0af744124da5147aba81a98bc7188718d5d205acf929affab016407d592	***_ECS_EPM.docx
70f66e3131cfbda4d2b82ce9325fed79e1b3c7186bdbb5478f8cbd49b965a120	******_dds_log.jpg

adcdbec0b92da0a39377f5ab95ffe9b6da9682faaa210abcaaa5bd51c827a9e1	**21대 국회의원 선거 관련.docx**
dbbdcc944c4bf4baea92d1c1108e055a7ba119e97ed97f7459278f1491721d02	**외교문서 관련(이재춘국장).docx**

URLs

hxxps://www.anca-aste.it/uploads/form/02E319AF73A33547343B71D5CB1064BC.dotm
hxxp://www.elite4print.com/admin/order/batchPdfs.asp
hxxps://www.sanlorenzoyacht.com/newsl/uploads/docs/43.dotm
hxxps://www.astedams.it/uploads/template/17.dotm
hxxps://www.sanlorenzoyacht.com/newsl/uploads/docs/1.dotm
hxxps://www.anca-aste.it/uploads/form/******_jd_t034519.jpg
hxxp://saemaeul.mireene.com/skin/board/basic/bin
hxxp://saemaeul.mireene.com/skin/visit/basic/log
hxxps://web.opendrive.com/api/v1/download/file.json/MzBfMjA1Njc0ODhf?inline=0
hxxps://od.lk/d/MzBfMjA1Njc0ODdf/pubmaterial.dotm
hxxps://www.ne-ba.org/files/gallery/images/83878C91171338902E0FE0FB97A8C47A.dotm

Conclusion

In summary, ATR has been tracking a targeted campaign focusing on the aerospace and defense industries using false job descriptions. This campaign looks very similar, based on shared TTPs, with a campaign that occurred in 2017 that also targeted some of the same industry. This campaign began early April 2020 with the latest activity in mid-June. The campaign's objective is to collect information from individuals connected to the industries in the job descriptions.

Additionally, our forensic research into the malicious documents show they were created by the same adversary, using Korean and English language systems. Further, discovery of legitimate template files used to build these documents also sheds light on some of the initial research put into the development of this campaign. While McAfee ATR has observed these techniques before, in previous campaigns in 2017 and 2019 using the same TTPs, we can conclude there has been an increase in activity in 2020.

McAfee detects these threats as

- Trojan-FRVP!2373982CDABA
- Generic Dropper.aou
- Trojan-FSGY!3C6009D4D7B2
- Trojan-FRVP!CEE70135CBB1
- W97M/Downloader.cxu
- Trojan-FRVP!63178C414AF9
- Exploit-cve2017-0199.ch
- Trojan-FRVP!AF83AD63D2E3
- RDN/Generic Downloader.x
- W97M/Downloader.bjp
- W97M/MacroLess.y

NSP customers will have new signatures added to the "HTTP: Microsoft Office OLE Arbitrary Code Execution Vulnerability (CVE-2017-0199)" attack name. The updated attack is part of our latest NSP sigset release: sigset 10.8.11.9 released on 28th July 2020.The KB details can be found here: KB55446

[1] https://www.bbc.co.uk/news/business-53026175

[2] https://www.welivesecurity.com/2020/06/17/operation-interception-aerospace-military-companies-cyberspies/

[3] https://www.justice.gov/opa/pr/north-korean-regime-backed-programmer-charged-conspiracy-conduct-multiple-cyber-attacks-and

[4] https://www.justice.gov/opa/pr/north-korean-regime-backed-programmer-charged-conspiracy-conduct-multiple-cyber-attacks-and

5 https://www.us-cert.gov/northkorea

[5] https://www.virustotal.com/gui/file/4a08c391f91cc72de7a78b5fd5e7f74adfecd77075e191685311fa598e07d806/detection – Gamaredon Group

[6] https://docs.microsoft.com/en-us/openspecs/office_standards/ms-docx/550efe71-4f40-4438-ac89-23ec1c1d2182

[7] https://www.welivesecurity.com/2020/06/17/operation-interception-aerospace-military-companies-cyberspies/

[8] https://otx.alienvault.com/pulse/5e8619b52e480b485e58259a

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