Executing Macros From a DOCX With Remote Template Injection

By BinaryFaultline

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The What:

In this post, I want to talk about and show off a code execution method which was shown to me a little while back. This method allows one to create a DOCX document which will load up and allow a user to execute macros using a remote DOTM template file. This attack has been seen in the wild, is partially included in open-source offensive security tools, as has been blogged about by Cisco Talos, but in the blog post and the open-source tool, it is only seen as a credential stealing attack typically over the SMB protocol. This blog post will detail how to use this method to download a macro-enabled template over HTTP(S) in a proxy-aware method into a DOCX document.

The Why:

The benefit of this attack versus a traditional macro enabled document is multidimensional. When executing a phishing attack against a target, you able to attach the .docx directly to the email and you are very unlikely to get blocked based on the file extension. Many organizations block .doc or .docm but allow .docx because they are not supposed to be able to contain macros.

Another reason this attack will likely land more often is because the attachment itself does not contain malicious code. The macro itself is not seen by any static email scanners so it is less likely to be blocked. In the event that your target uses a sandbox to detonate email attachments, you can use various sandbox evasion techniques such as modrewrite rules or IP limiting to prevent the sandbox from being able to pull down the malicious template. @bluescreenofjeff has a wonderful guide on creating modrewrite rules for this type of evasion in his Red Team Infrastructure Wiki.

The How:

To start this attack, we need to create two different files. The first will be the macro-enabled template, or .dotm file, which will contain a malicious VBA macro. The second will be the seemingly benign .docx file which contains no malicious code itself, only a target link which points to your malicious template file.

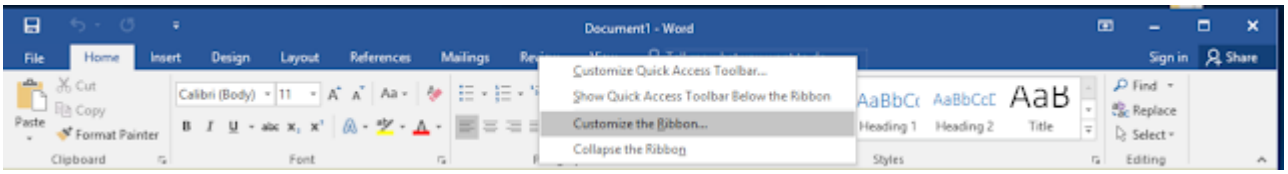
Getting Started:

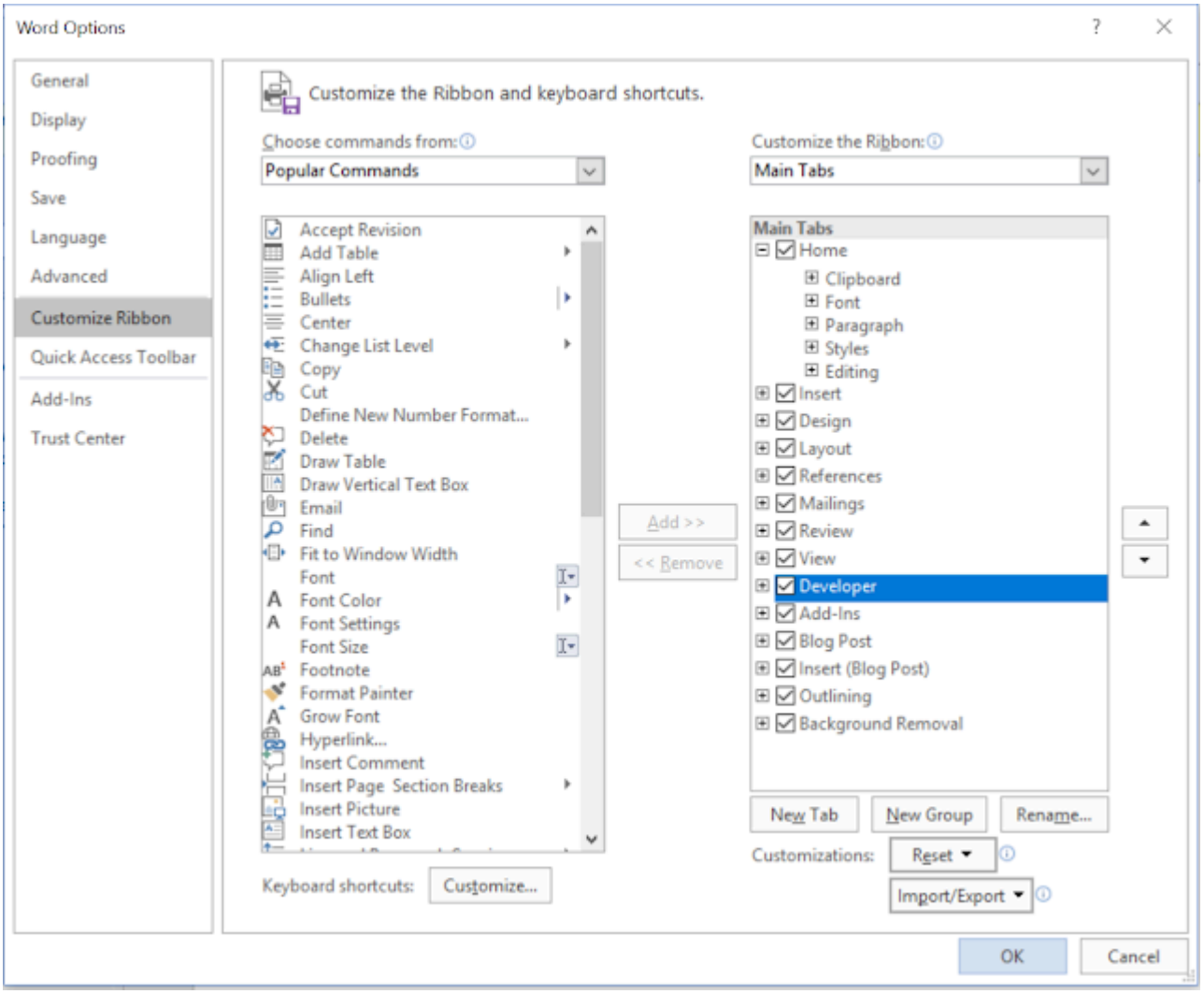
In my blog posts and trainings that I provide to others, I aim to show examples using free and open-source tools. I do this because I want anyone reading this blog to be able to try it on their own (always against their own systems or systems which they have permission to try it on) and do not want to force people into purchasing commercial tools. For this reason, I will walk through the steps for creating the remote template document to execute a

PowerShell Empire payload. To keep to the purpose of this post, I won't detail out how to create the listener or the macro for Empire here. There are many tutorials out there on how to do this already. I will just walk through creating the documents to execute the macro.

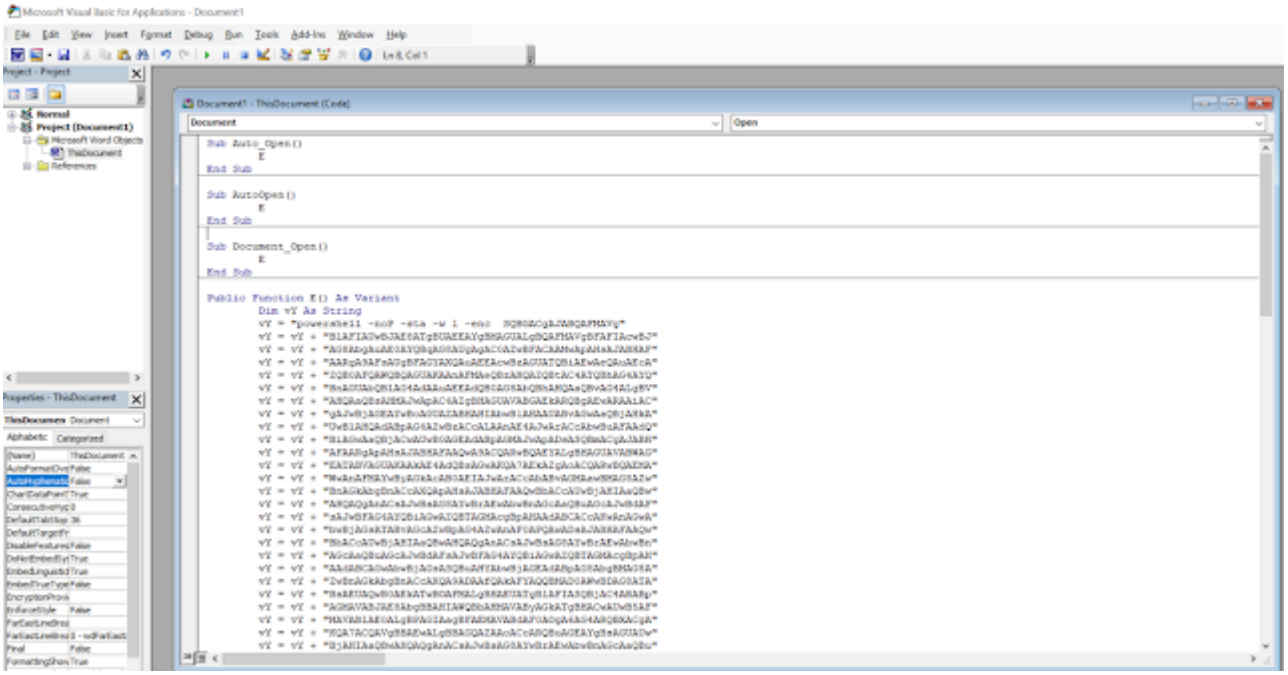
Creating the Macro-Enabled Template:

For this attack to work, we need to create a macro-enabled Word template (.dotm file extension) which contains our malicious Empire macro. Open up Word and make the Developer tab on the ribbon visible:

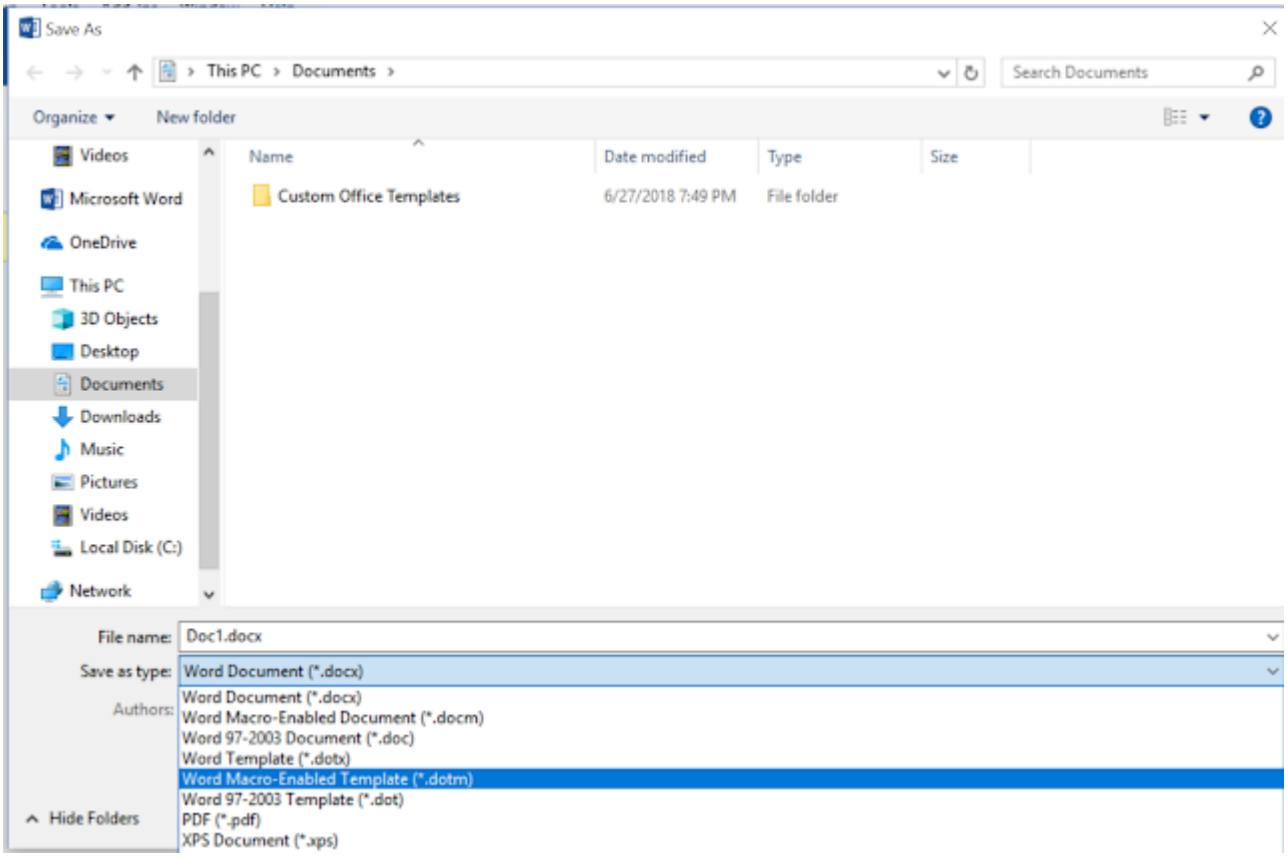




Then open up the Visual Basic editor from the Developer tab and double-click on ThisDocument under the current project to open up the code window. Paste in your macro code into this window:

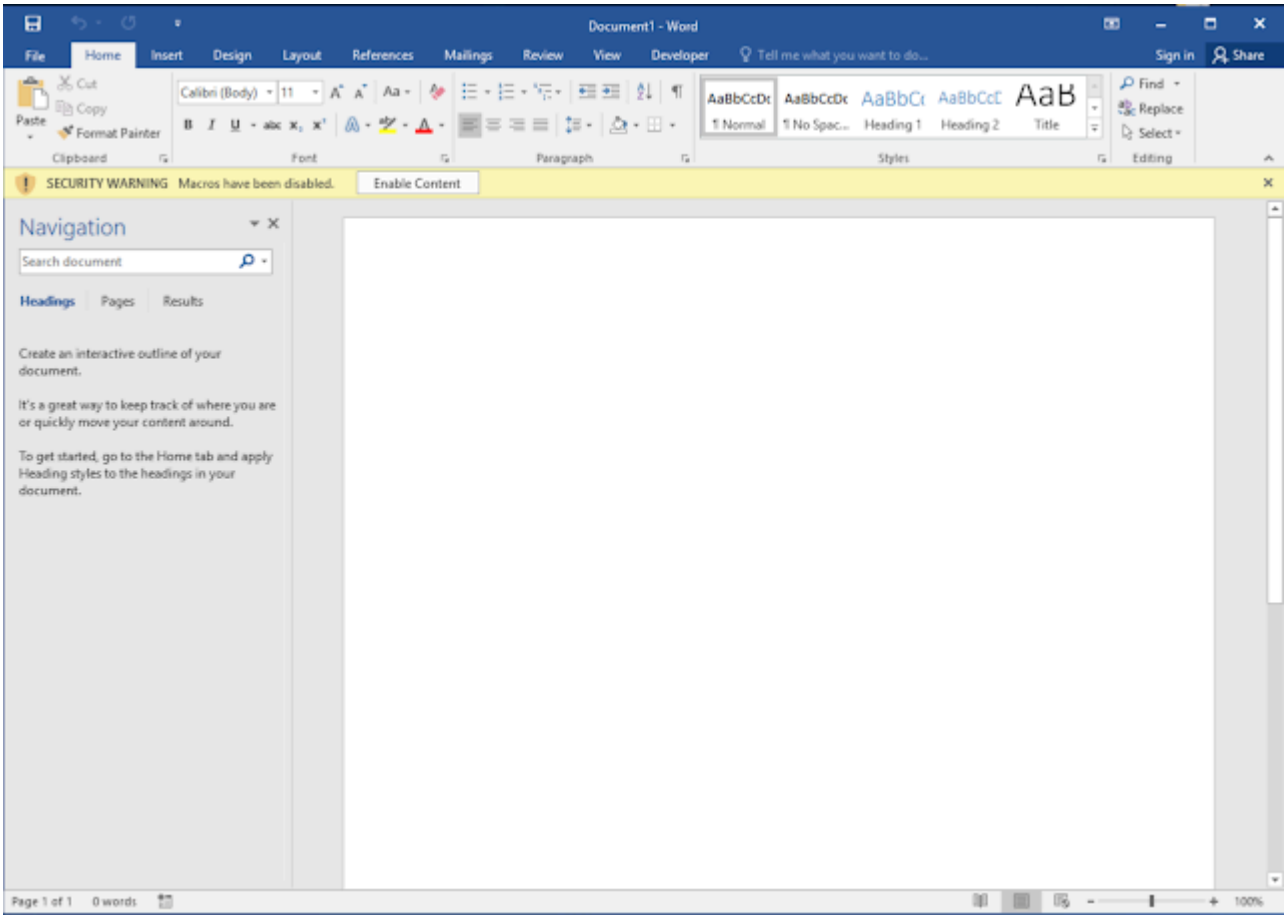


Give the template a name and save the file as a .dotm format. Please note that the name is usually briefly visible to the user, so I recommend something seemingly benign such as ‘InvoiceTemplate.dotm’:



Since I am just using the default macro from PowerShell Empire, it quickly is picked up by Windows Defender, so I am going to disable it for the demo. If your target uses Windows Defender, you will need to pick a different tool or perform obfuscation until you can get a working macro.

At this point, I tend to like to validate my template and macro by just double-clicking on the document and making sure that I get the ‘Enable Content’ button and that I get an agent when I click on it:

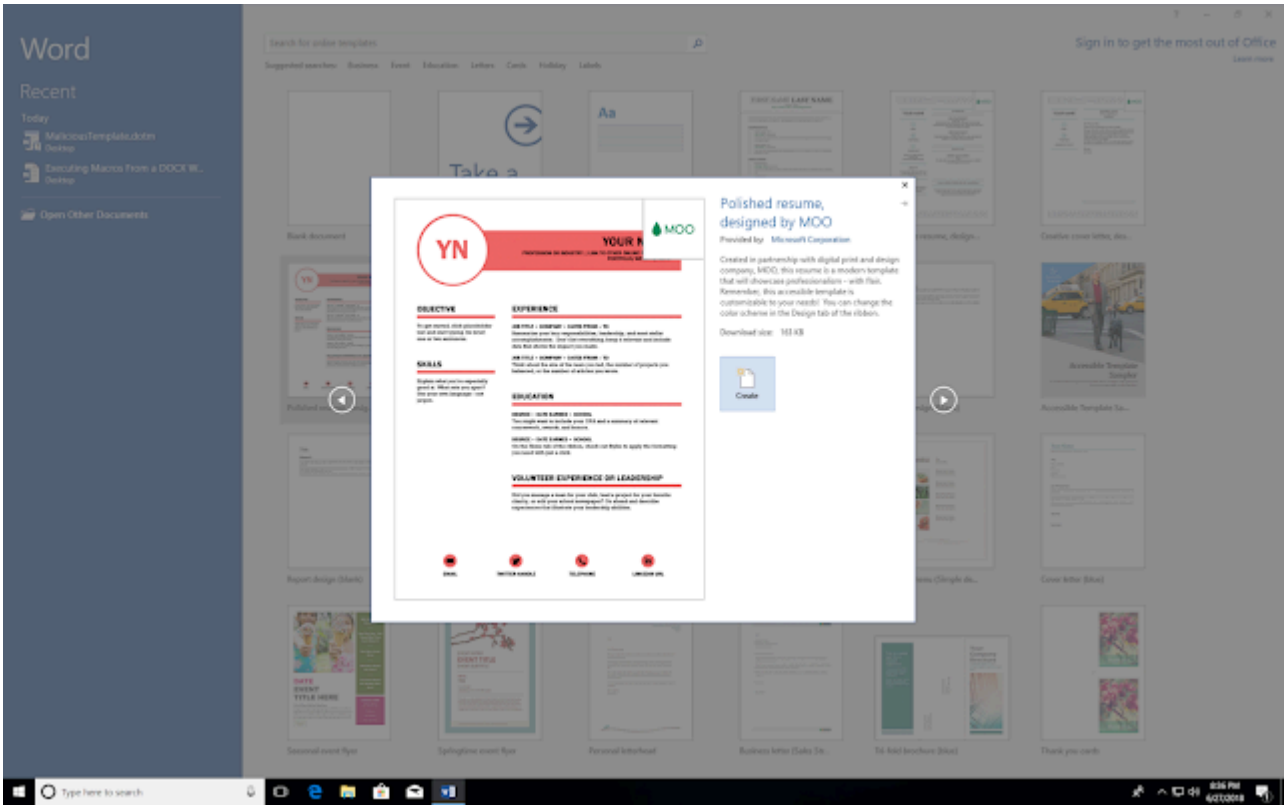



```
(Empire: listeners) > agents
[!] No agents currently registered
(Empire: agents) > [*] Sending POWERSHELL stager (stage 1) to 104.
[*] New agent 758MEX21 checked in
[+] Initial agent 758MEX21 from 104.         now active (Slack)
[*] Sending agent (stage 2) to 758MEX21 at 104

(Empire: agents) > agents

[*] Active agents:

 Name     La Internal IP     Machine Name     Username                Process      PID   Delay    Last Seen
 ----     -- -----------     ------------     --------                -------      ---   -----    ---------
 758MEX21 ps 172.16.179.140  DESKTOP-O2DBC02  DESKTOP-O2DBC02\admin   powershell   4332  5/0.0    2018-06-28 03:34:05

(Empire: agents) >
```

It works!

Creating the Remote-Template-Loading Document:

With the template working, we now need to create a .docx file that will download and load in the template from a remote resource. The easiest way in which I have found to do this is to create a .docx document from one of the provided Word templates, then just modify the target:

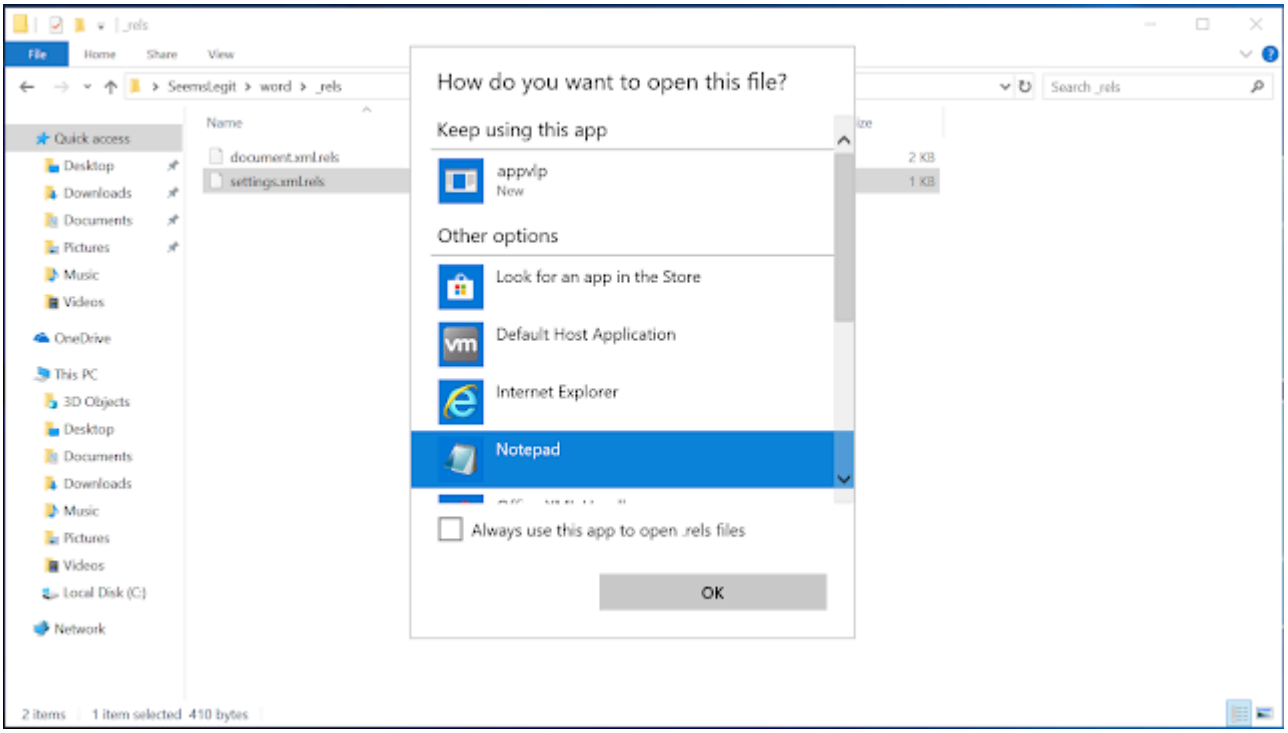


Modify the document as necessary to meet your phishing scenario in order to get your target user to click the ‘Enable Content’ button if it shows up for them. Save your document in the .docx format.

Next, find the document and right-click and rename the extension on the document from .docx to .zip. Extract the contents of the zip file to a folder and browse to that folder.

Note: With the release of Office 2007, Microsoft introduced the formats that end in an ‘x’ character. Each of these formats are just zip files containing mostly .xml and .rel files. You can manually edit the document and its properties by changing these files then re-zipping the contents.

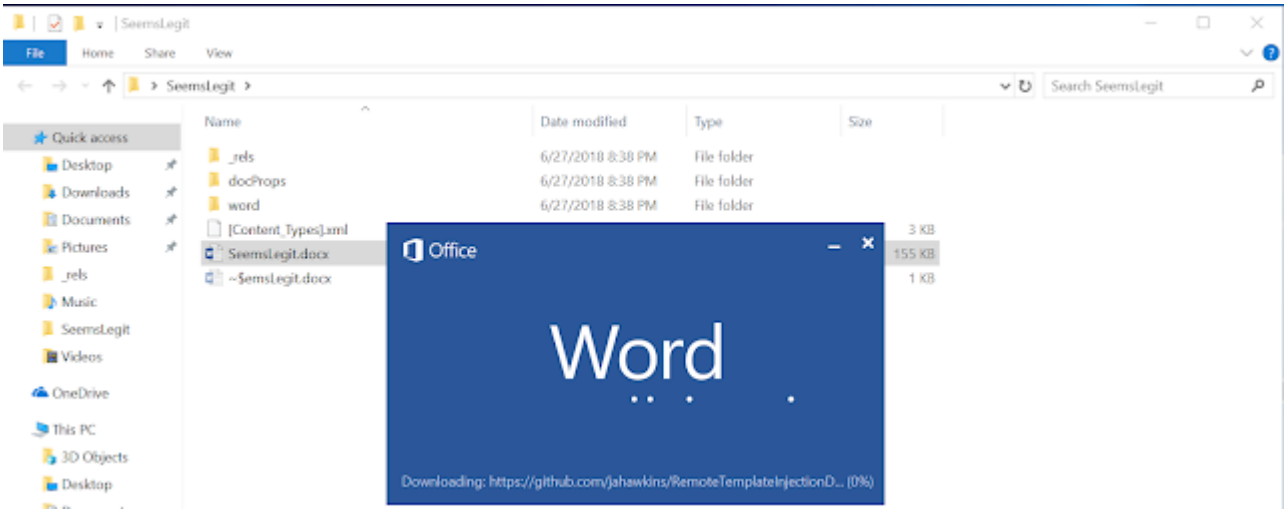
Navigate to the ‘.\word_rels\’ folder and open up the ‘settings.xml.rels’ file using a text editor such as Notepad:



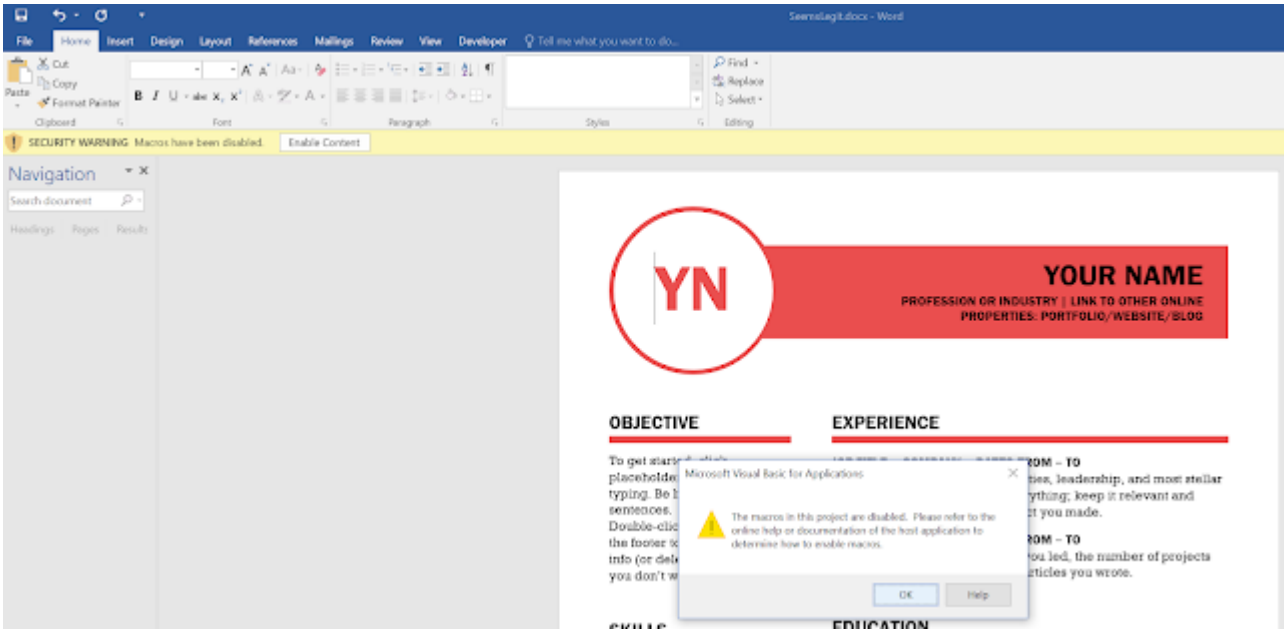
The Relationship tag containing a Type with attachedTemplate will be the setting that tells Word where to load in your template from when you open that .docx. Currently, this is loading in a template from the local file system:

The key is that this value will accept web URLs. We can modify the Target value to be a remote location. In this case, I host my macro-enabled template on GitHub:

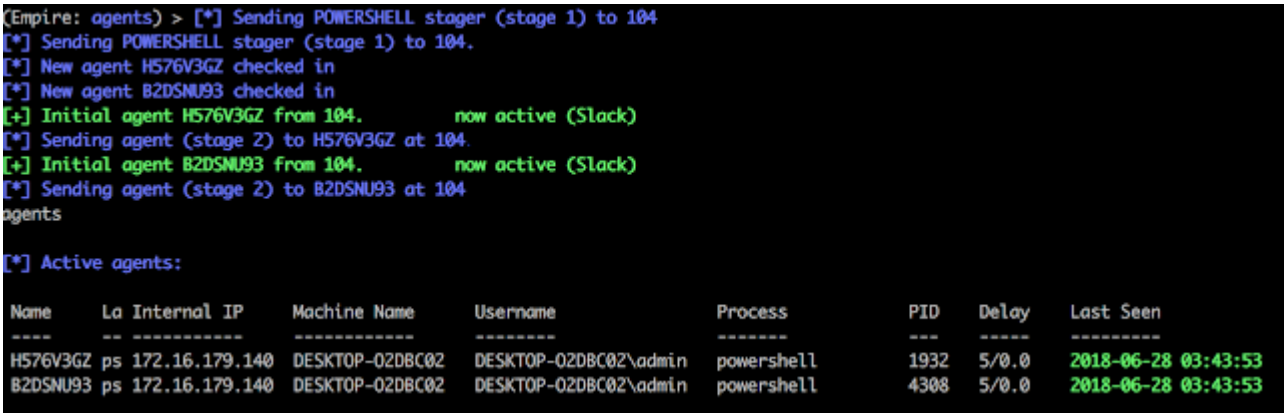
Once we save this file, we can zip the contents back up and rename the file back to a .docx. The next time that we open up our .docx, we can see that the file is reaching out over HTTPS to our hosting service to download the template:



And now our .docx file has a macro loaded in it and is allowed to run macros:



There is a new pop-up to the user, but it does not affect the payload. This is just due to the fact that .docx files are not intended to contain macros. If the user clicks ‘Enable Content’ or has macros set to run automatically, then we get our agents:



Now prep your phishing email, send the .docx to the user, and wait for the call backs!

Source: http://blog.redxorblue.com/2018/07/executing-macros-from-docx-with-remote.html