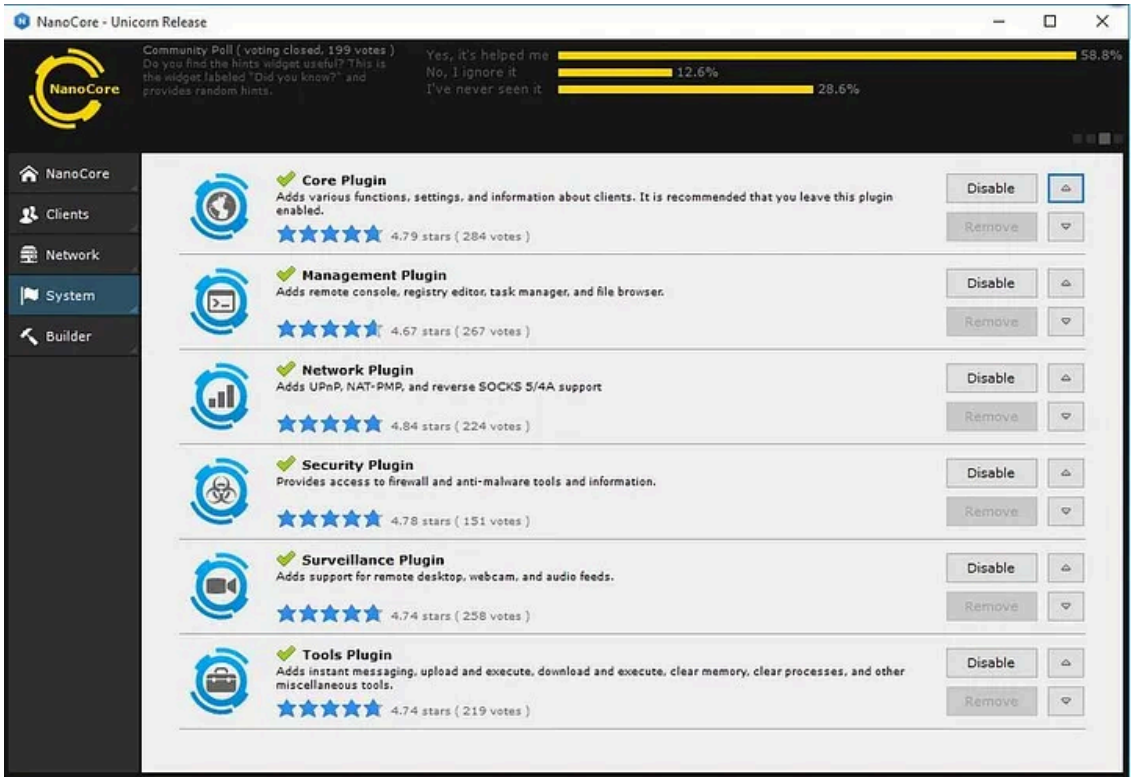
Decrypting NanoCore config and dump all plugins

By NexusFuzzy

Published: 2020-09-10 · Archived: 2026-04-05 14:41:03 UTC

Press enter or click to view image in full size



Even after the arresting of the developer NanoCore remains relevant due to its cracked versions

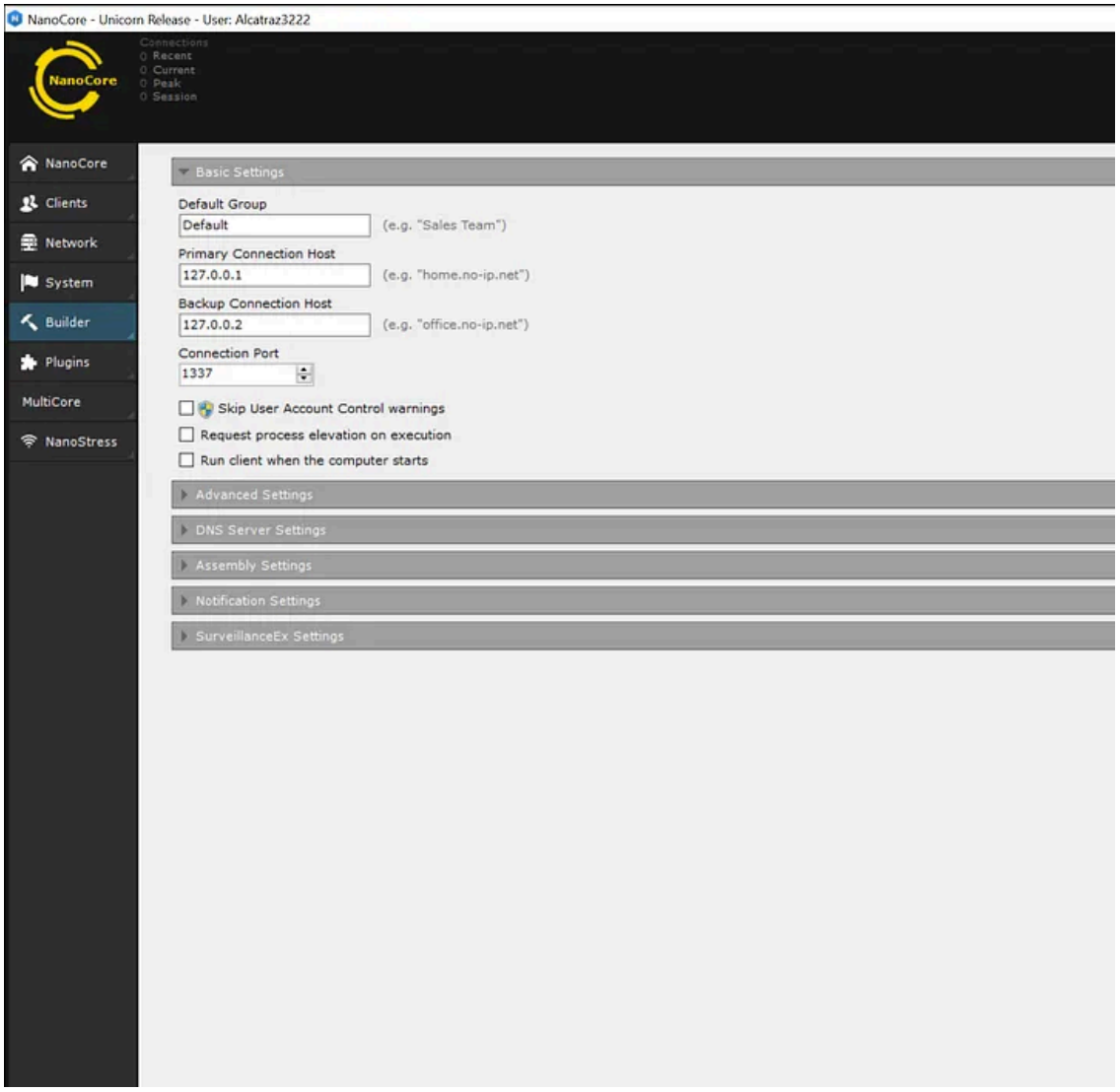
While the original author of NanoCore was arrested back in 2017 and plead guilty, pirated copies of his creation keep floating around the internet making it available to even the most amateurish “threat actors”.

As stated in my other article about AgentTesla, the main focus for an analyst should be to squeeze out the IOCs (Indicators of compromise) as fast as possible to be able to move on to more interesting threats. That’s why I created a decryptor for NanoCore which does not only dump the config but also all used plugins.

The dissection

NanoCore comes with a comfortable to use Server/Builder which doesn’t need any technical experience at all:

Press enter or click to view image in full size

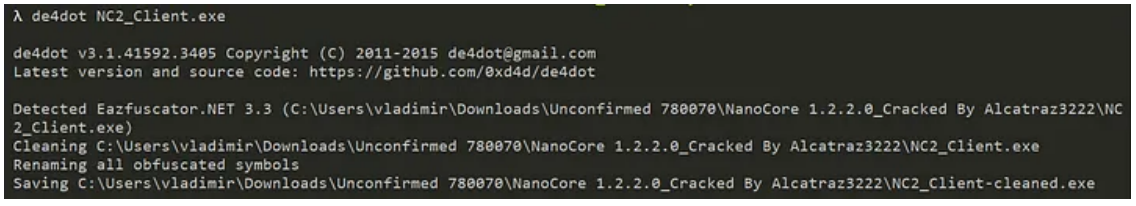


The builder for NanoCore

In cases of those builders, most of the time the “client” which gets distributed to victims remains the same, just the configuration gets embedded in one way or another so this is the first step in our process: Finding out how the plugins and config are getting embedded in the client.

For this reason, I built my own client and used de4dot to deobfuscate the created file:

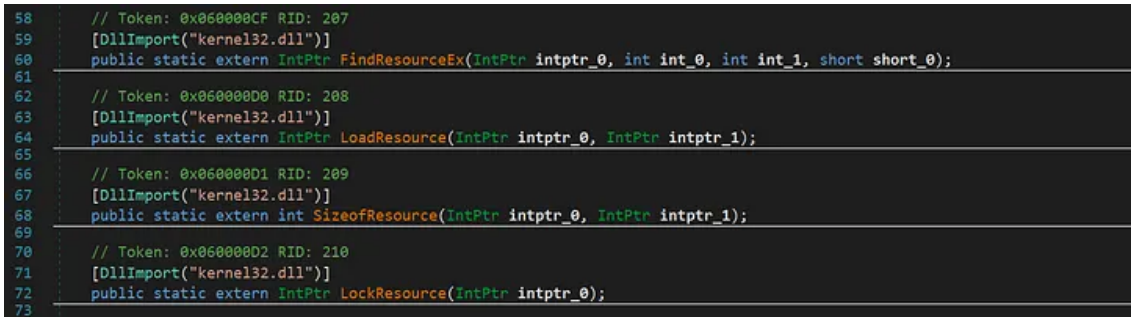
Press enter or click to view image in full size



As you may notice on the path I’m using one of the cracked versions of NanoCore

Afterwards you can open up the sample in dnSpy and begin reversing the sample as you normally would. During this process I found an interesting function:

Press enter or click to view image in full size



```
58    // Token: 0x060000CF RID: 207
59    [DllImport("kernel32.dll")]
60    public static extern IntPtr FindResourceEx(IntPtr intptr_0, int int_0, int int_1, short short_0);
61
62    // Token: 0x060000D0 RID: 208
63    [DllImport("kernel32.dll")]
64    public static extern IntPtr LoadResource(IntPtr intptr_0, IntPtr intptr_1);
65
66    // Token: 0x060000D1 RID: 209
67    [DllImport("kernel32.dll")]
68    public static extern int SizeofResource(IntPtr intptr_0, IntPtr intptr_1);
69
70    // Token: 0x060000D2 RID: 210
71    [DllImport("kernel32.dll")]
72    public static extern IntPtr LockResource(IntPtr intptr_0);
73
```

So what does this mean? Well, it's a strong indicator that the client is accessing its native resource(s) which could be the perfect place to embed a dynamic configuration. Let's dig deeper…

Get NexusFuzzy's stories in your inbox

Join Medium for free to get updates from this writer.

Remember me for faster sign in

After anaylizing where those functions are used I stumbled across this function:

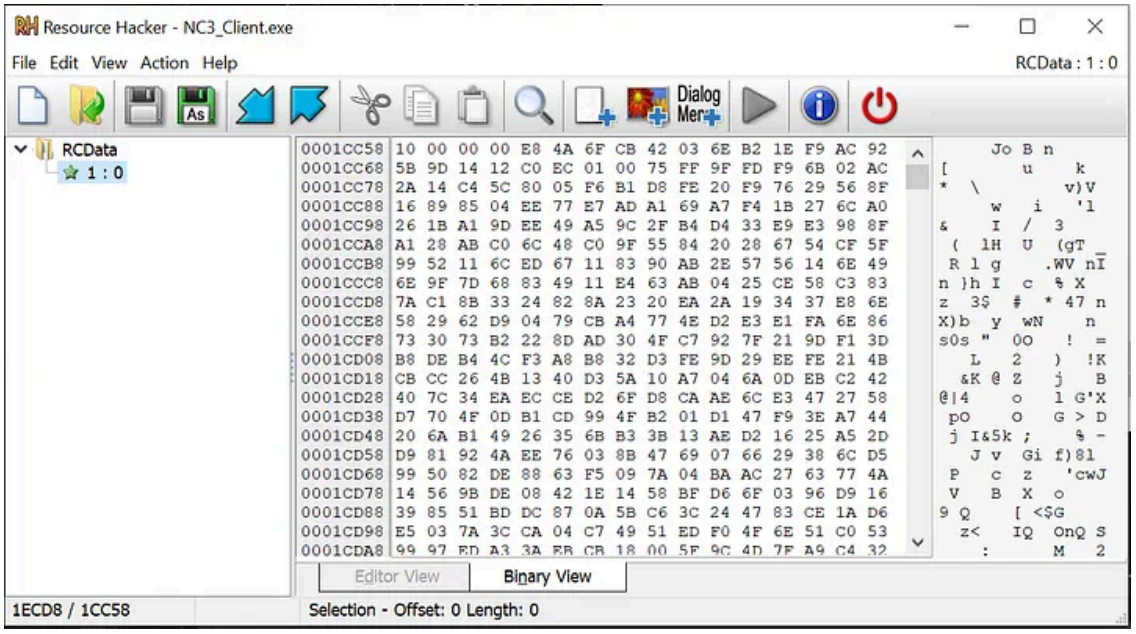
Press enter or click to view image in full size

```
429    // Token: 0x0600006D RID: 109
430    private static byte[] GetByteArrayFromResourceFile()
431    {
432        IntPtr intPtr = NativeFunctions.FindResourceEx(IntPtr.Zero, 10, 1, 0);
433        if (intPtr == IntPtr.Zero)
434        {
435            return null;
436        }
437        IntPtr intPtr2 = NativeFunctions.LoadResource(IntPtr.Zero, intPtr);
438        if (intPtr2 == IntPtr.Zero)
439        {
440            return null;
441        }
442        int num = NativeFunctions.SizeofResource(IntPtr.Zero, intPtr);
443        if (num == 0)
444        {
445            return null;
446        }
447        IntPtr intPtr3 = NativeFunctions.LockResource(intPtr2);
448        if (intPtr3 == IntPtr.Zero)
449        {
450            return null;
451        }
452        byte[] array = new byte[num - 1 + 1];
453        Marshal.Copy(intPtr3, array, 0, array.Length);
454        return array;
455    }
```

Looks like our assumption was right!

What this function does, is to find a resource by its number and afterwards loading its content into a byte array. Let's have a look at this resource with Resource Hacker, maybe we can find some clear text strings for a quick win:

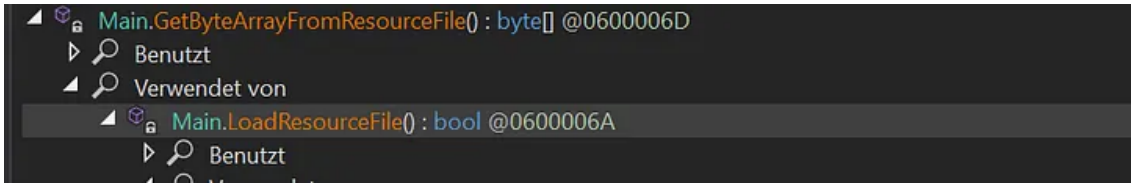
Press enter or click to view image in full size



Doesn’t look really readable to be honest

Could it be that the resource is encrypted? Let’s have a look! To see this we follow the rabbit hole and see where our function to load the resource is referenced:

Press enter or click to view image in full size



Don’t mind that my functions have other names than the original binary

If we open up this function we can see some interesting things:

Press enter or click to view image in full size

```
356     // Token: 0x0600006A RID: 106
357     private static bool LoadResourceFile()
358     {
359         byte[] byteArrayFromResourceFile = Main.GetByteArrayFromResourceFile();
360         if (byteArrayFromResourceFile != null)
361         {
362             MemoryStream input = new MemoryStream(byteArrayFromResourceFile);
363             BinaryReader binaryReader = new BinaryReader(input);
364             byte[] byte_ = binaryReader.ReadBytes(binaryReader.ReadInt32());
365             Guid guidAttribute = Main.GetGuidAttribute(Assembly.GetExecutingAssembly());
366             Main.DecryptionKey = Main.Decrypt(byte_, guidAttribute);
367             Class13.InitializeEncryptorDecryptor(Main.DecryptionKey);
368             byte[] byte_2 = binaryReader.ReadBytes(binaryReader.ReadInt32());
369             object[] array = Class13.smethod_2(byte_2);
370             int num;
371             object[] array2 = new object[(int)array[num] - 1 + 1];
372             num++;
373             Array.Copy(array, num, array2, 0, array2.Length);
374             num += array2.Length;
375             object[] array3 = new object[(int)array[num] - 1 + 1];
376             num++;
377             Array.Copy(array, num, array3, 0, array3.Length);
378             Main.SetBuilderSettings(array3);
379             Main.AddPlugins(array2);
380             return true;
381         }
382         return false;
383     }
```

Let’s examine the interesting parts:

First, it’s getting the Guid of itsself and passing this guid together with [4 byte integer] to some sort of decryption method:

Press enter or click to view image in full size

```
469     // Token: 0x06000070 RID: 112
470     private static byte[] Decrypt(byte[] byte_3, Guid guid_0)
471     {
472         Rfc2898DeriveBytes rfc2898DeriveBytes = new Rfc2898DeriveBytes(guid_0.ToByteArray(), guid_0.ToByteArray(), 8);
473         return new RijndaelManaged
474         {
475             IV = rfc2898DeriveBytes.GetBytes(16),
476             Key = rfc2898DeriveBytes.GetBytes(16)
477         }.CreateDecryptor().TransformFinalBlock(byte_3, 0, byte_3.Length);
478     }
```

The returning byte array is used to initialize a DES encryptor & decryptor using the byte array as Key and IV:

Press enter or click to view image in full size

```
45      // Token: 0x06000100 RID: 256
46      public static void InitializeEncryptorDecryptor(byte[] byte_0)
47      {
48          DESCryptoServiceProvider descryptoServiceProvider = new DESCryptoServiceProvider();
49          descryptoServiceProvider.BlockSize = 64;
50          descryptoServiceProvider.Key = byte_0;
51          descryptoServiceProvider.IV = byte_0;
52          Class13.Encryptor = descryptoServiceProvider.CreateEncryptor();
53          Class13.Decryptor = descryptoServiceProvider.CreateDecryptor();
54      }
```

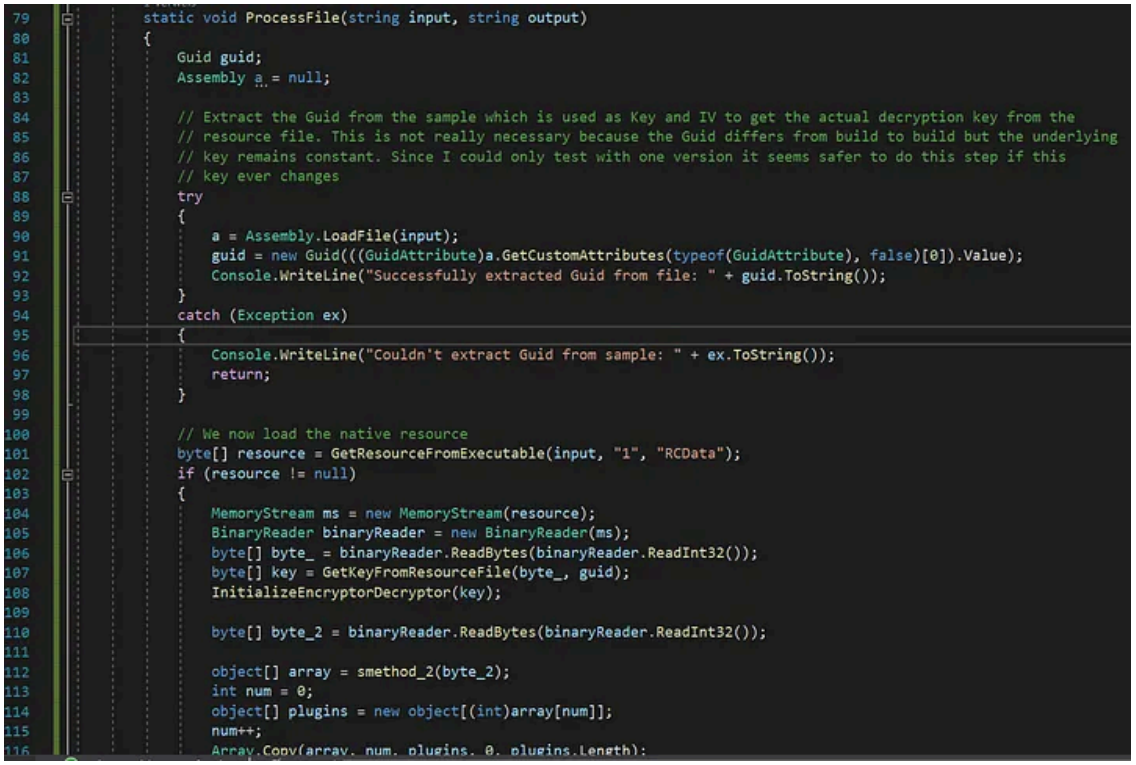
This decryptor is then used to decrypt the config and plugins.

Let’s summarize: First, it’s getting its guid and uses it to get the key itsself which was used to encrypt the resource file. The fact, that the Guid is created by the server randomly for every new client which is build lead me to the initial conclusion that you have to extract the Guid from the sample to dynamically dump the config — Well, I

was wrong. The guid changes but the key remains the same so you could skip this step but I left it in my tool since this may change from version to version and I would like to keep it dynamically.

After having realized how those steps are working together I was able to come up with a decryptor which you can find in [my GitHub repo called NanoDump](#).

Press enter or click to view image in full size



```
static void ProcessFile(string input, string output)
{
    Guid guid;
    Assembly a = null;

    // Extract the Guid from the sample which is used as Key and IV to get the actual decryption key from the
    // resource file. This is not really necessary because the Guid differs from build to build but the underlying
    // key remains constant. Since I could only test with one version it seems safer to do this step if this
    // key ever changes
    try
    {
        a = Assembly.LoadFile(input);
        guid = new Guid(((GuidAttribute)a.GetCustomAttributes(typeof(GuidAttribute), false)[0]).Value);
        Console.WriteLine("Successfully extracted Guid from file: " + guid.ToString());
    }
    catch (Exception ex)
    {
        Console.WriteLine("Couldn't extract Guid from sample: " + ex.ToString());
        return;
    }

    // We now load the native resource
    byte[] resource = GetResourceFromExecutable(input, "1", "RCData");
    if (resource != null)
    {
        MemoryStream ms = new MemoryStream(resource);
        BinaryReader binaryReader = new BinaryReader(ms);
        byte[] byte_ = binaryReader.ReadBytes(binaryReader.ReadInt32());
        byte[] key = GetKeyFromResourceFile(byte_, guid);
        InitializeEncryptorDecryptor(key);

        byte[] byte_2 = binaryReader.ReadBytes(binaryReader.ReadInt32());

        object[] array = smethod_2(byte_2);
        int num = 0;
        object[] plugins = new object[(int)array[num]];
        num++;
        Array.Copy(array, num, plugins, 0, plugins.Length);
```

Source of NanoDump

As you can see, I replicated the neccessary steps to reach the goal to decrypt and dump the details of NanoCore.

If you have any questions, feel free to drop me a [message on Twitter](#) or open a GitHub issue!
