

New version of chinoxy backdoor using COVID19 alerts document lure

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Last year I've analyzed a chinoxy backdoor dropped by an royal road RTF targeting Vietnam.

<https://medium.com/@Sebdraven/winnti-uses-the-rtf-exploit-8-t-too-targets-vietnam-13300d432272>

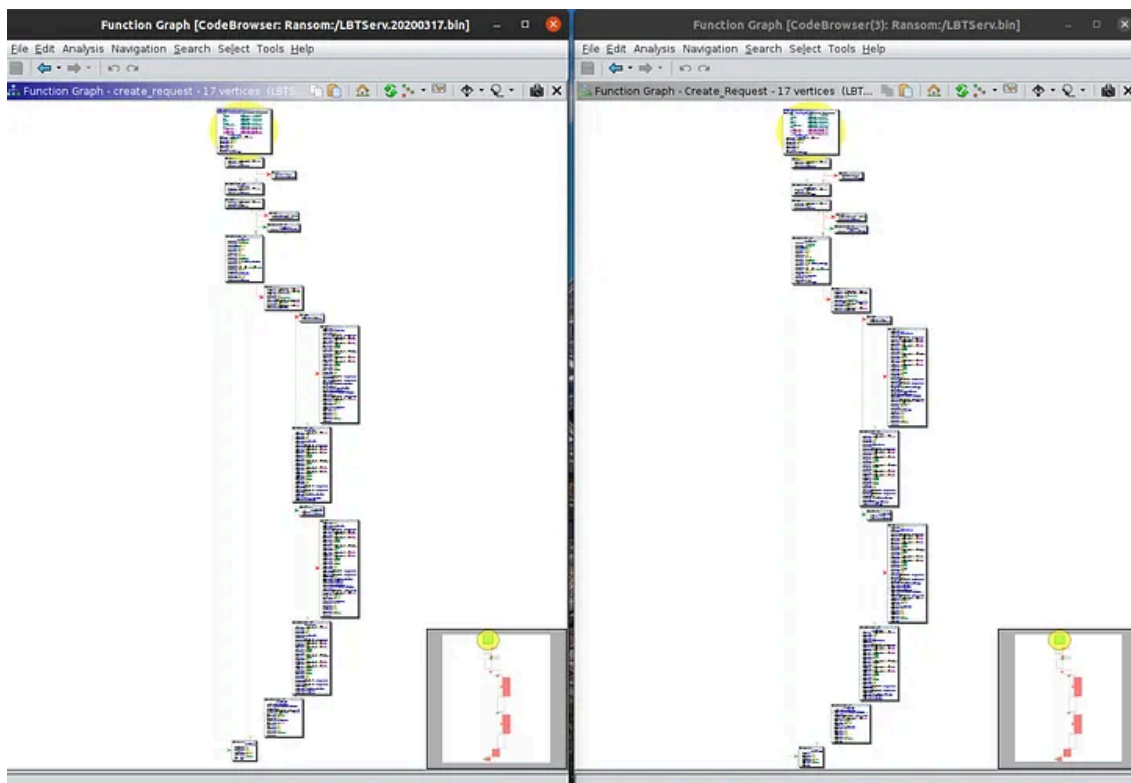
The 17 march 2019, a campaign using royal road RTF targetted the Kirghistan with a lure document COVID19 about financial consideration of the world Bank.

5 years of Chinoxy implementation

This backdoor is very similar with it used for the Vietnam.

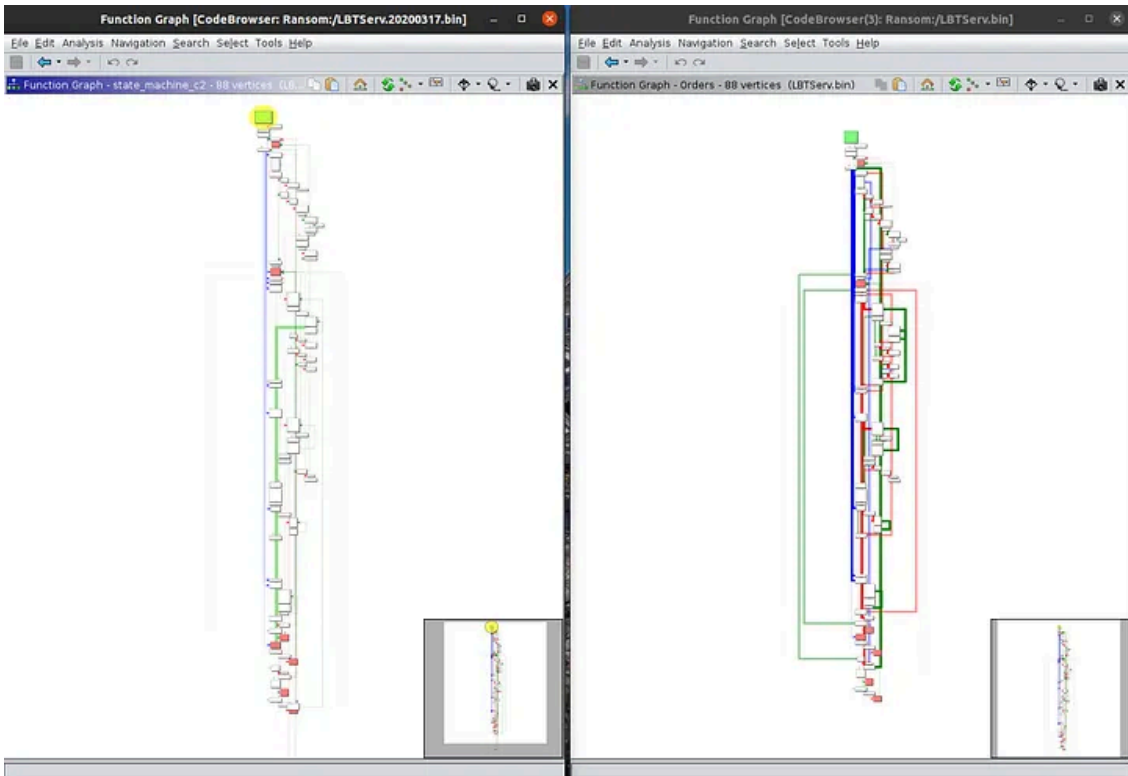
We have the same protocole HTTPs custom.

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The state machine of the backdoors are similare.

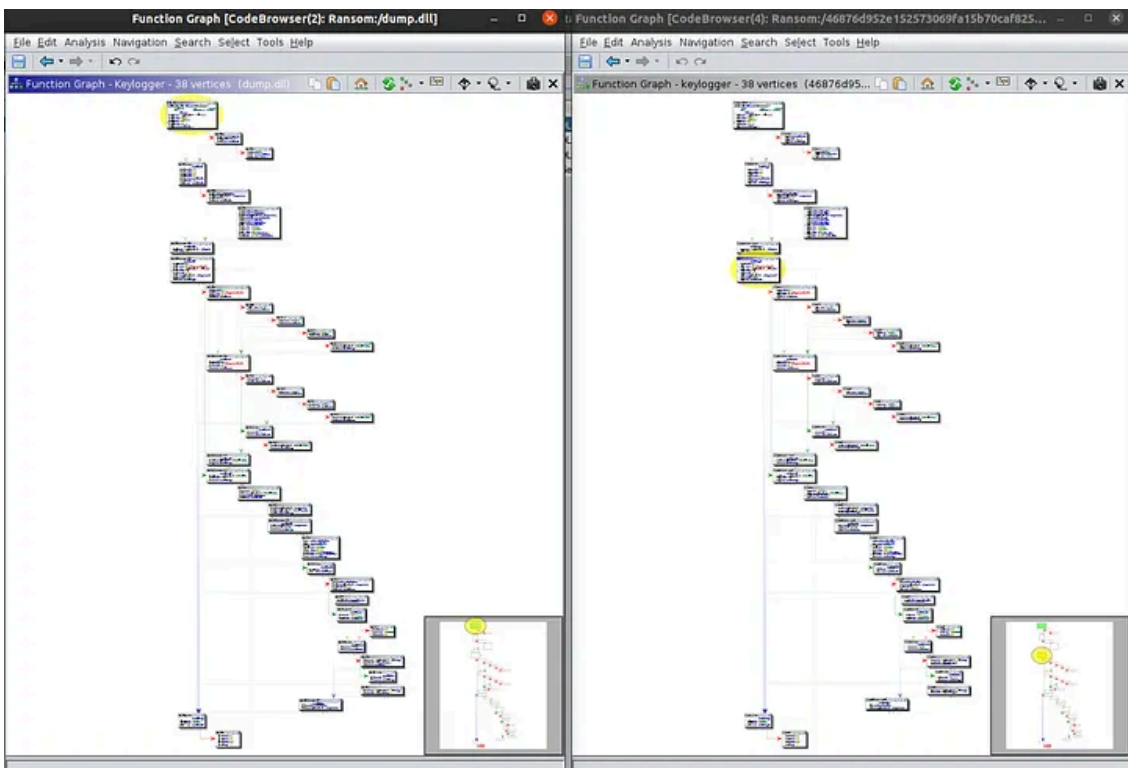
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But in the new version, we found a functionality coming for the 2014 version.

A keylogger is implemented

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The big difference with another versions, the configuration of the backdoor is in the resource named “NNKK”.

The malware reads the resource (Fun_10005c50) and decode the configuration. (FUN_10005bf0)

```
pHVar1 = FindResourceW(param_2,u_NNKK_100159fc,u_TYPELIB_1001a290);
if (pHVar1 != (HRSRC)0x0) {
hModule = LoadLibraryW(u_kernel32.dll_10019720);
local_b = 0x65;
local_5 = 0x65;
local_10 = 'L';
local_f = 0x6f;
local_e = 0x61;
local_d = 100;
local_c = 0x52;
local_a = 0x73;
local_9 = 0x6f;
local_8 = 0x75;
local_7 = 0x72;
local_6 = 99;
local_4 = (undefined4 *)((uint)local_4 & 0xffffffff00);
pFVar2 = GetProcAddress(hModule,&local_10);
hResData = (HGLOBAL)(*pFVar2)(param_2,pHVar1);
FreeLibrary(hModule);
if (hResData != (HGLOBAL)0x0) {
puVar4 = (undefined4 *)LockResource(hResData);
iVar3 = 0x4c0;
puVar5 = local_4;
while (iVar3 != 0) {
iVar3 = iVar3 + -1;
*puVar5 = *puVar4;
puVar4 = puVar4 + 1;
puVar5 = puVar5 + 1;
}
decode_resource((int)local_4,0x1300);
```

In decode_resource the algorithm is very simple:

In the DATA section there are two keys to decode the configuration: “22135987565” and “36969856569”

```
DAT_1001a278 XREF[1]: decode_resource:10005c14(R)
1001a278 32 undefined1 32h
s_2135987565_1001a279 XREF[1]: decode_resource:10005c14(R)
1001a279 32 31 33 ds “2135987565”
```

35 39 38
37 35 36

DAT_1001a284 XREF[1]: decode_ressource:10005c0e(R)
1001a284 33 undefined1 33h
s_6969856569_1001a285 XREF[1]: decode_ressource:10005c0e(R)
1001a285 36 39 36 ds "6969856569"
39 38 35
36 35 36

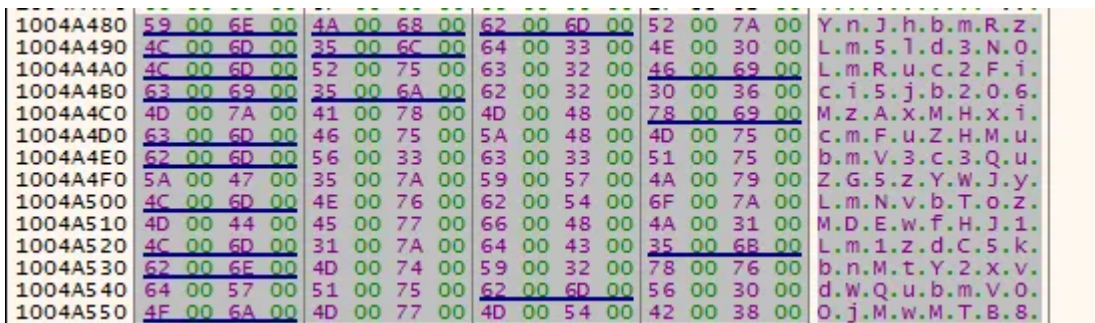
Each bytes of this keys are xored, a mask is applied with & 0x27 and there is a new xor with DAT_1001a284

This result is xored with each byte of the resource NNK.

- $(\text{byte } *) (\text{uVar1} + \text{param}_1) =$
 $\text{*(byte } *) (\text{uVar1} + \text{param}_1) \wedge$
 $((\&\text{DAT_1001a278})[\text{uVar3}] \wedge (\&\text{DAT_1001a284})[\text{uVar2}] \& 0x27 \wedge (\&\text{DAT_1001a284})[\text{uVar2}]);$

the result is the config of the c2 in base64

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The backdoor check it if the configuration is not stored in the registry in function FUN_10010e10.

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In fact the first version of chinoxy stored the configuration in the registration at the installation:

```
add_key((HKEY)&DAT_0042d708,&DStack12,
(LPDWORD)0x0,u_SYSTEM\CurrentControlSet\Service_00416214,
u_Group_004170c8);
DStack12 = 0x50;
add_key((HKEY)&DAT_0042d758,&DStack12,
(LPDWORD)0x0,u_SYSTEM\CurrentControlSet\Service_00416214,
```

```
u_Remark_004161e8);
DStack12 = 0x50;
add_key((HKEY)&DAT_0042d6b8,&DStack12,
(LPDWORD)0x0,u_SYSTEM\CurrentControlSet\Service_00416214,
u_PassWord_00417158);
DStack12 = 0x80;
add_key((HKEY)&DAT_0042d7a8,&DStack12,
(LPDWORD)0x0,u_SYSTEM\CurrentControlSet\Service_00416214,
u_Version_00417148);
```

We found the same the same keywords of the backdoor of vietnam in k.ini file

Group,Remark,Version,UID.

and in the new version:

```
u_Group_1001a754 XREF[2]: 1001135e(*), 1001214b(*)
1001a754 47 00 72 unicode u"Group"
00 6f 00
75 00 70
u_Remark_1001a760 XREF[2]: 100114ae(*), 100120e5(*)
1001a760 52 00 65 unicode u"Remark"
00 6d 00
61 00 72
1001a76e 00 ?? 00h
1001a76f 00 ?? 00h
u_System_1001a770 XREF[1]: 1001152c(*)
1001a770 53 00 79 unicode u"System"
00 73 00
74 00 65
1001a77e 00 ?? 00h
1001a77f 00 ?? 00h
```

The config in bas64 of the backdoor is decoded in FUN_100074c0.

This function calls many time FUN_100074a0 to decode the string encoded.

```
int __cdecl FUN_100074a0(uint param_1)
{
int iVar1;

iVar1 = 0;
do {
if ((param_1 & 0xffff) == (int)s_ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef_1001a440[iVar1]) {
return iVar1;
```

```
}  
iVar1 = iVar1 + 1;  
} while (iVar1 < 0x40);  
return 0;  
}
```

The result of this decoding function is:

```
018DDA4C 018DF780 L"brands.newst.dnsabr.com:3010|brands.newst.dnsabr.com:3010|ru.mst.dns-  
cloud.net:3010|"
```

so two domains.

The configuration is encoded, and split with '|' with the same technics of the backdoor used in Vietnam.

And to communicate with the C2, the malware uses raw socket and ws32_dll.

Threat Intelligence Consideration

Royal Road is massively used by Chinese Threat Actors. The backdoor chinoxy is used by too by this group.

So with a good confidence, this attack is driven by China against Kirghistan.

IOCs:

Royal Road RTF:

```
1527f7b9bdea7752f72ffcd8b0a97e9f05092fed2cb9909a463e5775e12bd2d6
```

```
backdoor: 30115717d20e469e7c4bf45489f6c6d8810f32b1b68b6aa4b0ffcb21764ea99c
```

backdoor 2014:

```
46876d952e152573069fa15b70caf825e4bf97ffb90c00f80d26890a9d92f05b
```

Domains:

```
brands.newst.dnsabr.com:3010
```

```
ru.mst.dns-cloud.net:3010
```

IPs:

```
45.76.218.232
```

Source: <https://medium.com/@Sebdraven/new-version-of-chinoxy-backdoor-using-covid19-document-lure-83fa294c0746>