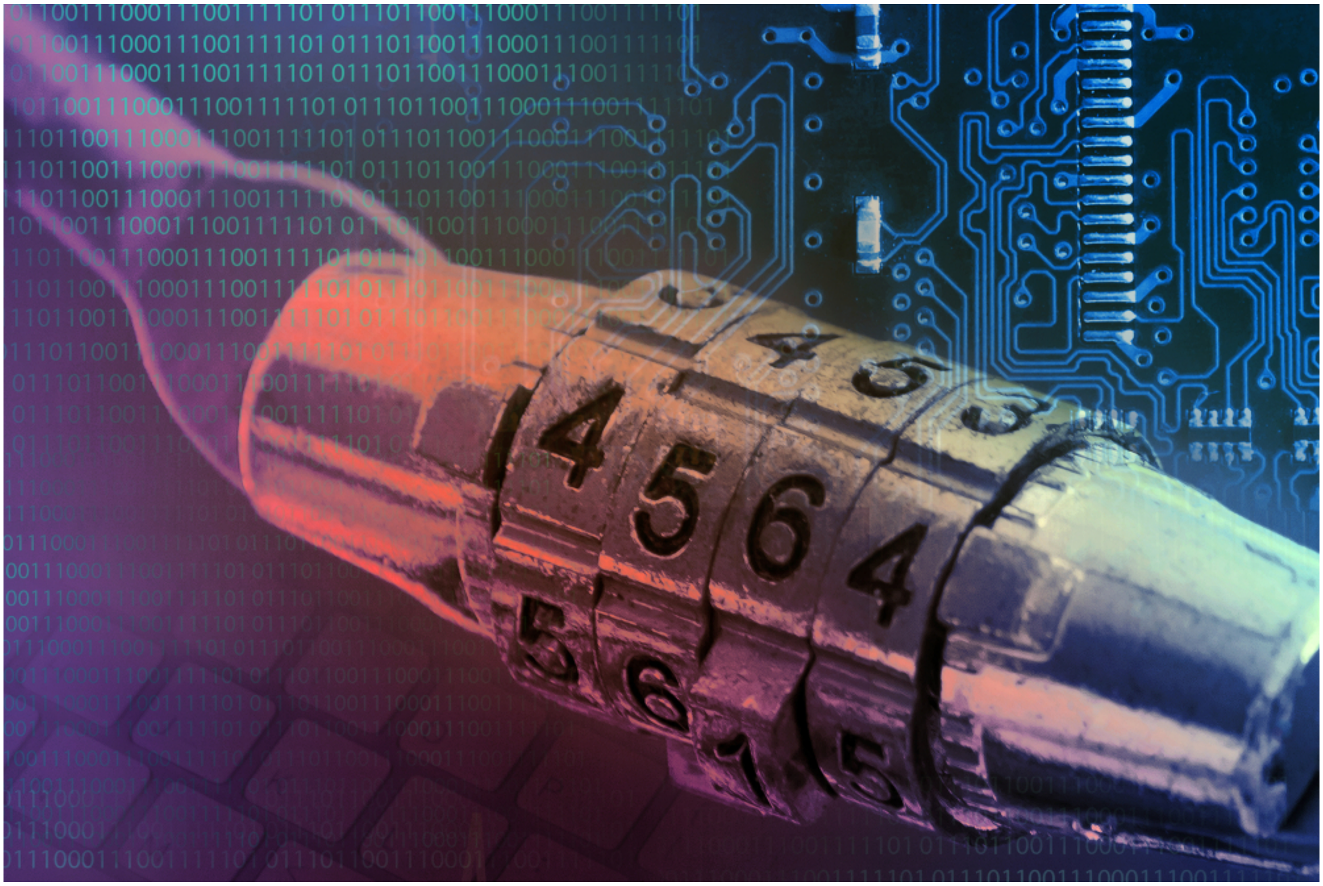
Certificates stolen from Taiwanese tech-companies misused in Plead malware campaign

welivesecurity.com/2018/07/09/certificates-stolen-taiwanese-tech-companies-plead-malware-campaign/

July 9, 2018



D-Link and Changing Information Technologies code-signing certificates stolen and abused by highly skilled cyberespionage group focused on East Asia, particularly Taiwan

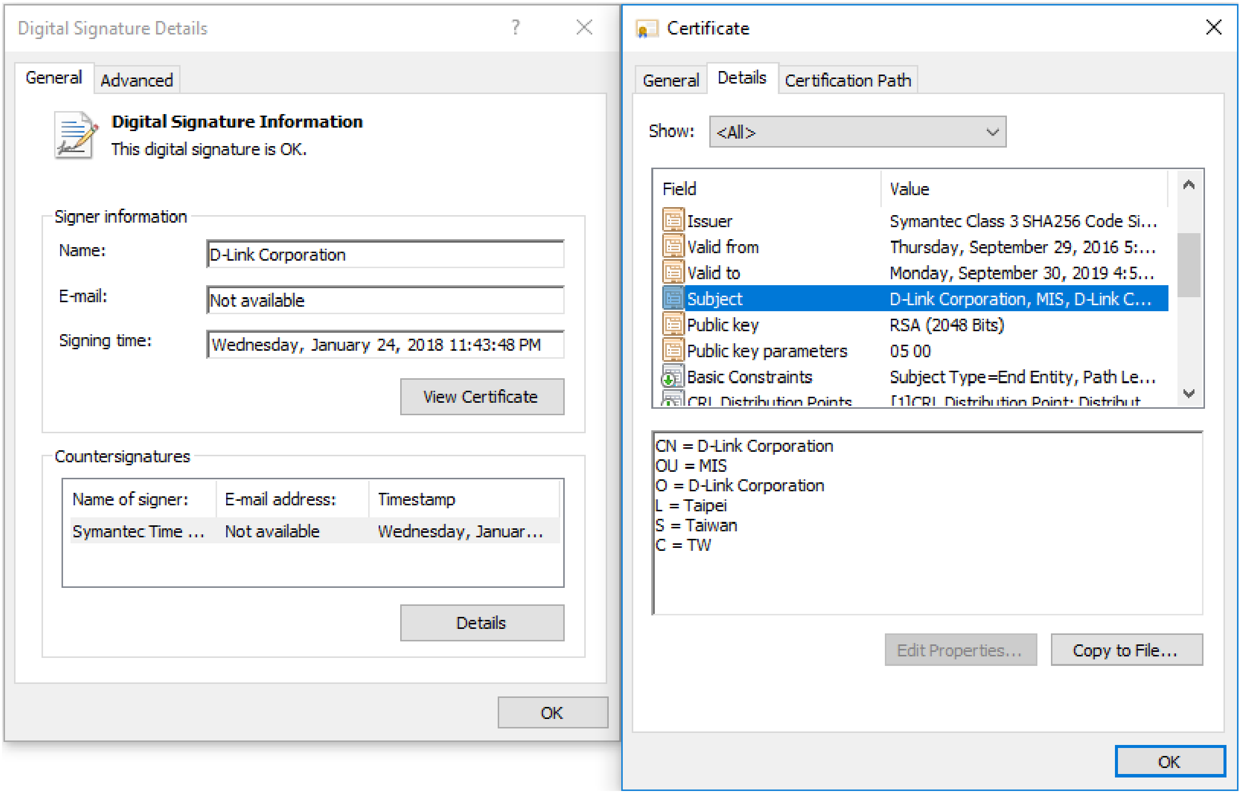
Anton Cherepanov
9 Jul 2018 - 12:28PM

D-Link and Changing Information Technologies code-signing certificates stolen and abused by highly skilled cyberespionage group focused on East Asia, particularly Taiwan

ESET researchers have discovered a new malware campaign misusing stolen digital certificates.

We spotted this malware campaign when our systems marked several files as suspicious. Interestingly, the flagged files were digitally signed using a valid D-Link Corporation code-signing certificate. The exact same certificate had been used to sign non-malicious D-Link software; therefore, the certificate was likely stolen.

Having confirmed the file's malicious nature, we notified D-Link, who launched their own investigation into the matter. As a result, the compromised digital certificate was revoked by D-Link on July 3, 2018.



Digital Signature Information
This digital signature is OK.

Signer information

Name:	D-Link Corporation
E-mail:	Not available
Signing time:	Wednesday, January 24, 2018 11:43:48 PM

Countersignatures

Name of signer:	E-mail address:	Timestamp
Symantec Time ...	Not available	Wednesday, Januar...

Show: <All>

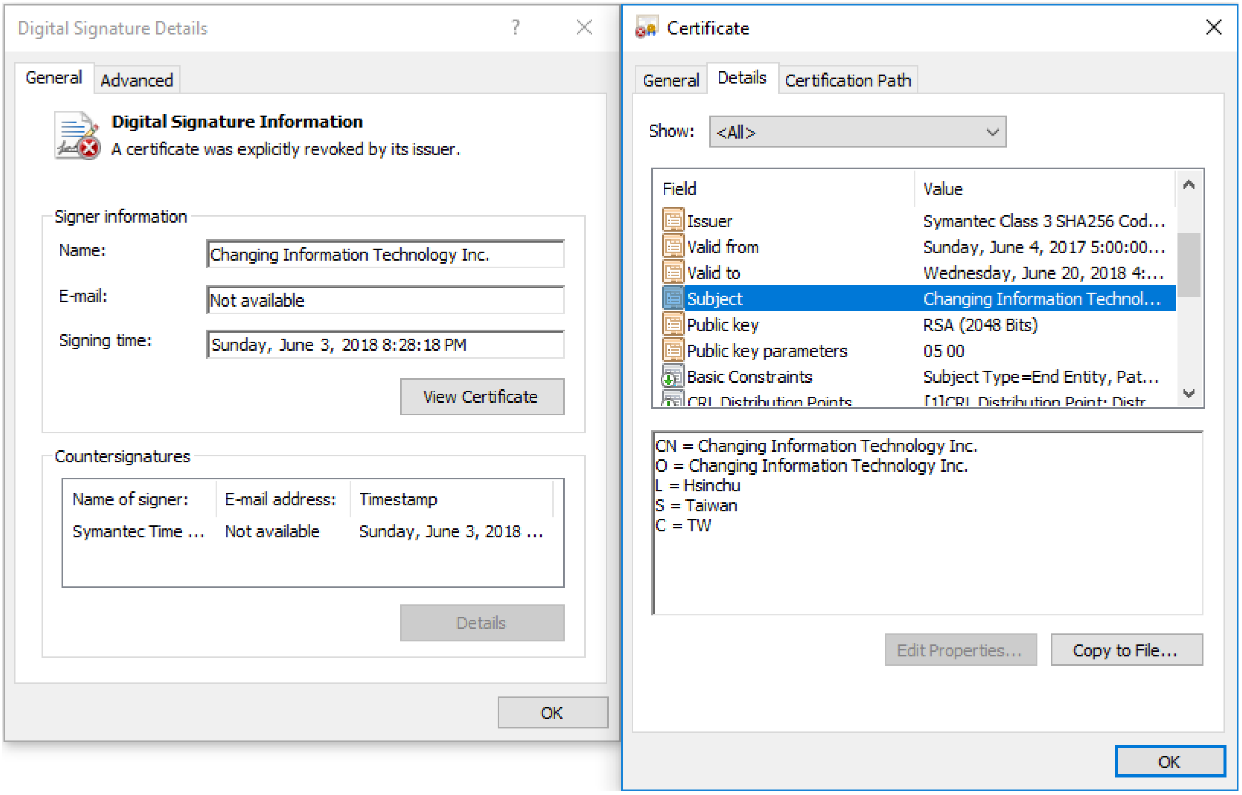
Field	Value
Issuer	Symantec Class 3 SHA256 Code Si...
Valid from	Thursday, September 29, 2016 5:...
Valid to	Monday, September 30, 2019 4:5...
Subject	D-Link Corporation, MIS, D-Link C...
Public key	RSA (2048 Bits)
Public key parameters	05 00
Basic Constraints	Subject Type=End Entity, Path Le...
CRL Distribution Points	[1]CRL Distribution Point: Distribut

CN = D-Link Corporation
OU = MIS
O = D-Link Corporation
L = Taipei
S = Taiwan
C = TW

Figure 1. The D-Link Corporation code signing certificate used to sign malware

The malware

Our analysis identified two different malware families that were misusing the stolen certificate – the Plead malware, a remotely controlled backdoor, and a related password stealer component. Recently, the JPCERT published a thorough analysis of the Plead backdoor, which, according to Trend Micro, is used by the cyberespionage group BlackTech.



Digital Signature Information
A certificate was explicitly revoked by its issuer.

Signer information

Name:	Changing Information Technology Inc.
E-mail:	Not available
Signing time:	Sunday, June 3, 2018 8:28:18 PM

Countersignatures

Name of signer:	E-mail address:	Timestamp
Symantec Time ...	Not available	Sunday, June 3, 2018 ...

Field	Value
Issuer	Symantec Class 3 SHA256 Cod...
Valid from	Sunday, June 4, 2017 5:00:00...
Valid to	Wednesday, June 20, 2018 4:...
Subject	Changing Information Technol...
Public key	RSA (2048 Bits)
Public key parameters	05 00
Basic Constraints	Subject Type=End Entity, Pat...
CRL Distribution Points	[1]CRL Distribution Point: Distr

CN = Changing Information Technology Inc.
O = Changing Information Technology Inc.
L = Hsinchu
S = Taiwan
C = TW

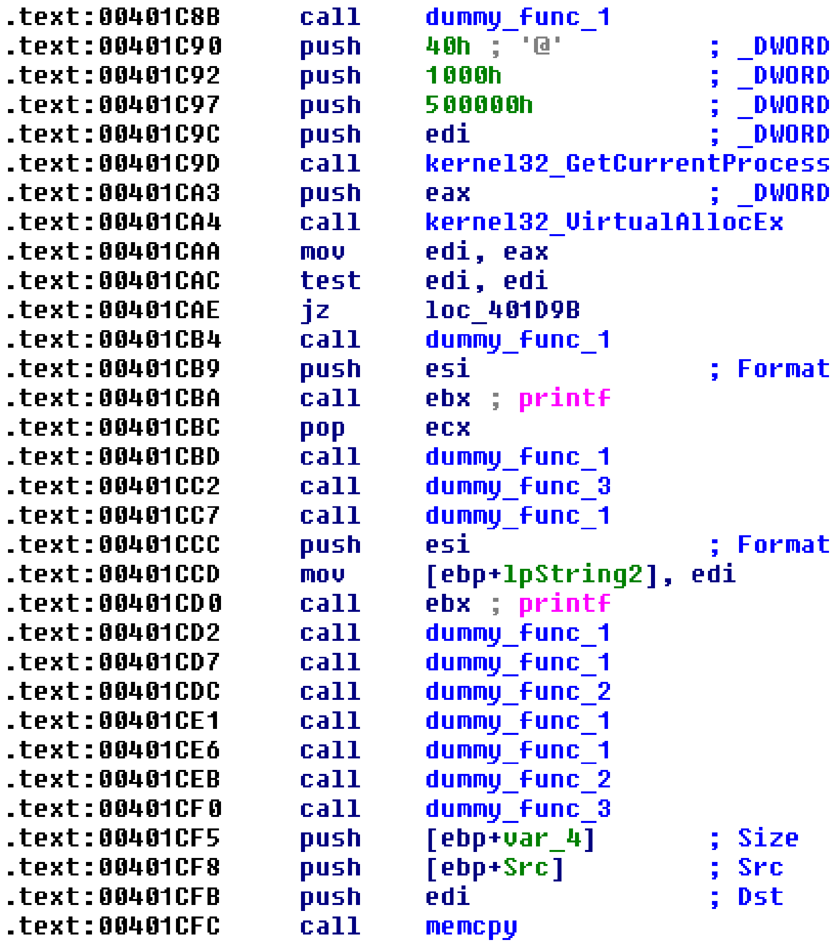
Figure 2. The Changing Information Technology Inc. code signing certificate used to sign malware

Along with the Plead samples signed with the D-Link certificate, ESET researchers have also identified samples signed using a certificate belonging to a Taiwanese security company named Changing Information Technology Inc.

Despite the fact that the Changing Information Technology Inc. certificate was revoked on July 4, 2017, the BlackTech group is still using it to sign their malicious tools.

The ability to compromise several Taiwan-based technology companies and reuse their code-signing certificates in future attacks shows that this group is highly skilled and focused on that region.

The signed Plead malware samples are highly obfuscated with junk code, but the purpose of the malware is similar in all samples: it downloads from a remote server or opens from the local disk a small encrypted binary blob. This binary blob contains encrypted shellcode, which downloads the final Plead backdoor module.



```
.text:00401C8B     call    dummy_func_1
.text:00401C90     push    40h ; '@'          ; _DWORD
.text:00401C92     push    1000h              ; _DWORD
.text:00401C97     push    500000h            ; _DWORD
.text:00401C9C     push    edi                ; _DWORD
.text:00401C9D     call    kernel32_GetCurrentProcess
.text:00401CA3     push    eax                ; _DWORD
.text:00401CA4     call    kernel32_VirtualAllocEx
.text:00401CAA     mov     edi, eax
.text:00401CAC     test    edi, edi
.text:00401CAE     jz      loc_401D9B
.text:00401CB4     call    dummy_func_1
.text:00401CB9     push    esi                ; Format
.text:00401CBA     call    ebx ; printf
.text:00401CBC     pop     ecx
.text:00401CBD     call    dummy_func_1
.text:00401CC2     call    dummy_func_3
.text:00401CC7     call    dummy_func_1
.text:00401CCC     push    esi                ; Format
.text:00401CCD     mov     [ebp+lpString2], edi
.text:00401CD0     call    ebx ; printf
.text:00401CD2     call    dummy_func_1
.text:00401CD7     call    dummy_func_1
.text:00401CDC     call    dummy_func_2
.text:00401CE1     call    dummy_func_1
.text:00401CE6     call    dummy_func_1
.text:00401CEB     call    dummy_func_2
.text:00401CF0     call    dummy_func_3
.text:00401CF5     push    [ebp+var_4]        ; Size
.text:00401CF8     push    [ebp+Src]          ; Src
.text:00401CFB     push    edi                ; Dst
.text:00401CFC     call    memcpy
```

Figure 3. Obfuscated code of the Plead malware

The password stealer tool is used to collect saved passwords from the following applications:

- Google Chrome
- Microsoft Internet Explorer
- Microsoft Outlook
- Mozilla Firefox

Why steal digital certificates?

Misusing digital certificates is one of the many ways cybercriminals try to mask their malicious intentions – as the stolen certificates let malware appear like legitimate applications, the malware has a greater chance of sneaking past security measures without raising suspicion.

Probably the most infamous malware known to have used several stolen digital certificates is the Stuxnet worm, discovered in 2010 and the malware behind the very first cyberattack to target critical infrastructure. Stuxnet used digital certificates stolen from RealTek and one from JMicron, two well-known technology companies based in Taiwan.

However, the tactic is not exclusive to high-profile incidents like Stuxnet, as evidenced by this recent discovery.

IoCs

ESET detection names
Win32/PSW.Agent.OES trojan
Win32/Plead.L trojan
Win32/Plead.S trojan
Win32/Plead.T trojan
Win32/Plead.U trojan
Win32/Plead.V trojan
Win32/Plead.X trojan
Win32/Plead.Y trojan
Win32/Plead.Z trojan

Unsigned samples (SHA-1)
80AE7B26AC04C93AD693A2D816E8742B906CC0E3
62A693F5E4F92CCB5A2821239EFBE5BD792A46CD
B01D8501F1EEAF423AA1C14FCC816FAB81AC8ED8
11A5D1A965A3E1391E840B11705FFC02759618F8
239786038B9619F9C22401B110CF0AF433E0CEAD
Signed samples (SHA-1)
1DB4650A89BC7C810953160C6E41A36547E8CF0B
CA160884AE90CFE6BEC5722FAC5B908BF77D9EEF
9C4F8358462FAFD83DF51459DBE4CD8E5E7F2039
13D064741B801E421E3B53BC5DABFA7031C98DD9

C&C servers

C&C servers
amazon.panasocin[.]com
office.panasocin[.]com
okinawas.ssl443[.]org

Code signing certificates serial numbers	
D-Link Corporation:	13:03:03:e4:57:0c:27:29:09:e2:65:dd:b8:59:de:ef
Changing Information Technology Inc:	73:65:ed:e7:f8:fb:b1:47:67:02:d2:93:08:39:6f:51
	1e:50:cc:3d:d3:9b:4a:cc:5e:83:98:cc:d0:dd:53:ea

9 Jul 2018 - 12:28PM

Sign up to receive an email update whenever a new article is published in our Ukraine Crisis – Digital Security Resource Center

Newsletter

Discussion