A new exploit for zero-day vulnerability CVE-2018-8589

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Research

Research

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minute read



Authors



Yesterday, Microsoft published its security bulletin, which patches a vulnerability discovered by our technologies. We reported it to Microsoft on October 17, 2018. The company confirmed the vulnerability and assigned it CVE-2018-8589.

Acknowledgements

Igor Soumenkov (2igosha) of Kaspersky Lab Boris Larin (Oct0xor) of Kaspersky Lab In October 2018, our Automatic Exploit Prevention (AEP) systems detected an attempt to exploit a vulnerability in Microsoft's Windows operating system. Further analysis revealed a zero-day vulnerability in win32k.sys. The exploit was executed by the first stage of a malware installer in order to gain the necessary privileges for persistence on the victim's system. So far, we have detected a very limited number of attacks using this vulnerability. The victims are located in the Middle East.

Kaspersky Lab products detected this exploit proactively using the following technologies:

- Behavioral Detection Engine and Automatic Exploit Prevention for endpoints
- Advanced Sandboxing and Anti-Malware Engine for Kaspersky Anti Targeted Attack Platform (KATA)

Kaspersky Lab verdicts for the artifacts in this campaign are:

- HEUR:Exploit.Win32.Generic
- HEUR:Trojan.Win32.Generic
- PDM:Exploit.Win32.Generic

More information about the attack is available to customers of Kaspersky Intelligence Reports. Contact: intelreports@kaspersky.com

Technical details

CVE-2018-8589 is a race condition present in win32k!xxxMoveWindow due to improper locking of messages sent synchronously between threads.

The exploit uses the vulnerability by creating two threads with a class and associated window and moves the window of the opposite thread inside the callback of a WM_NCCALCSIZE message in a window procedure that is common to both threads.

```
sub
        eax, ecx
                 14], eax
        [ebp+va
mov
                      38.bottom]
mov
        eax, [ebp+var
        [ebp+var_6C], ecx
ecx, [ebp+var_38.top]
mov
mov
sub
        eax, ecx
        [ebp+var_8], eax
eax, [ebp+Address]
mov
lea.
push
        eax
                        ; Address
                         ; UnicodeString
push
                          MbString
push
        [ebp+P]
push
mov
        [ebp+var_64], ecx
                       @16 ; WM_NCCALCSIZE msg
call
        dword ptr [ebx+4]
push
        mov
call.
test
        eax, eax
        loc_BF88C18A
jz
         🜃 🚄
                  short loc_BF88BEE3
```

WM_NCCALCSIZE message in win32k!xxxCalcValidRects

Termination of the opposite thread on the maximum level of recursion inside the WM_NCCALCSIZE callback will cause asynchronous copyin of the IParam structure controlled by the attacker.

```
9e303888 918f64ce win32klSfnINOUTNCCALCSIZE+0x263 <- (2) corrupt stack
9e30390c 9193c677 win32klxxxReceiveMessage+0x480
9e303960 9193c5cb win32klxxxRealSleepThread+0x90
9e30397c 918ecbac win32klxxxSleepThread+0x2d
9e3039f0 9192c3af win32klxxxInterSendMsgEx+0xb1c
9e303a40 9192c4f2 win32klxxxSendMessageTimeout+0x13b
9e303a68 918fbec1 win32klxxxSendMessage+0x28
9e303b2c 91910c1a win32klxxxCalcValidRects+0x462 <- (1) send WM_NCCALCSIZE
9e303b90 91911056 win32klxxxEndDeferWindowPosEx+0x126
9e303bb0 918b1f89 win32klxxxSetWindowPos+0xf6
9e303bdc 918b1ee1 win32klxxxMovleWindow+0x8a
```

Lack of proper message locking between win32k!xxxCalcValidRects and win32k!SfnINOUTNCCALCSIZE

The exploit populates IParam with pointers to the shellcode and after being successfully copyied to kernel inside win32k!SfnINOUTNCCALCSIZE, the kernel jumps to the user level. The exploit found in the wild only targeted 32-bit versions of Windows 7.

```
A problem has been detected and windows has been shut down to prevent damage to your computer.

PAGE_FAULT_IN_NONPAGED_AREA

If this is the first time you've seen this stop error screen, restart your computer. If this screen appears again, follow these steps:

Check to make sure any new hardware or software is properly installed. If this is a new installation, ask your hardware or software manufacturer for any windows updates you might need.

If problems continue, disable or remove any newly installed hardware or software. Disable BIOS memory options such as caching or shadowing. If you need to use Safe Mode to remove or disable components, restart your computer, press F8 to select Advanced Startup options, and then select Safe Mode.

Technical information:

*** STOP: 0x00000050 (0xC0C0C0C0,0x00000008,0xC0C0C0C0,0x00000000)

Collecting data for crash dump ...
Initializing disk for crash dump ...
Beginning dump of physical memory.
Dumping physical memory to disk: 15
```

BSOD on an up-to-date version of Windows 7 with our proof of concept

As always, we provided Microsoft with a proof of concept for this vulnerability along with well-written source code.

- Microsoft Windows
- Proof-of-Concept
- Vulnerabilities and exploits
- Zero-day vulnerabilities

Authors



• Expert <u>Vladislav Stolyarov</u>

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Lazarus Trojanized DeFi app for delivering malware

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MoonBounce: the dark side of UEFI firmware

At the end of 2021, we inspected UEFI firmware that was tampered with to embed a malicious code we dub MoonBounce. In this report we describe how the MoonBounce implant works and how it is connected to APT41.

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