

10-20-2019, Beginners/Mac Basics SIG

32-Bit Apps – How to Find them

Note: This discussion is based on MacOS, 10.14.6 (Mojave). Some illustrations may differ when using other versions of macOS or OS X. Most illustrations are from screenshots on my iMac.

In this Mac Basics presentation, we'll discuss how to find 32-bit apps on your Mac. Why do this? Because if/when you decide to upgrade to macOS 10.15 (Catalina), this latest version of macOS will no longer support (run) them. Catalina will only support apps written for 64-bit processors. There are still a number of older Mac apps that are designed for 32-bit processors, and you may find a favorite or two among them.

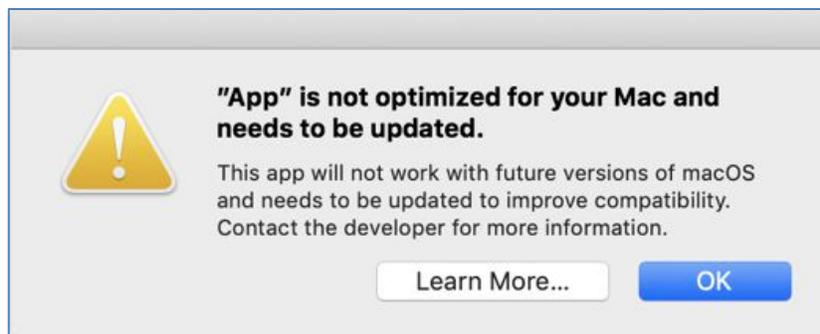
Apple has been working for several years with developers to transition their apps to 64-bit. In 2018, Apple informed developers (and users) that macOS Mojave would be the last version of macOS to run 32-bit apps.

32-Bit vs. 64-Bit. 32-bit processors are able to access 4 gigabytes (GB) of memory to run the calculations needed to complete a task, and the amount of memory a processor can access impacts the operating system's speed. A 64-bit processor can theoretically access 16 exabytes (EB) of memory.

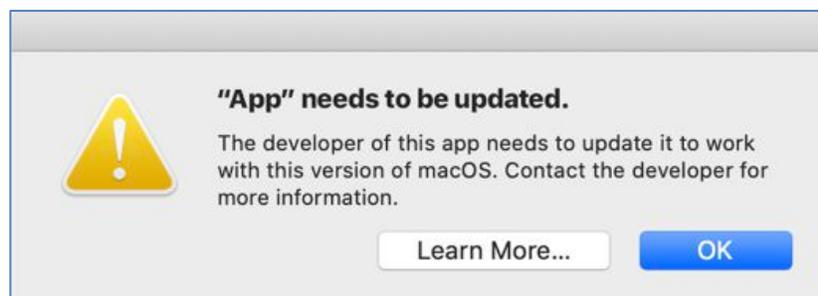
What's an Exabyte? An EB is 10^{18} bytes (one quintillion bytes) or one-thousand-million GB (a lot of GB!). Apple began using 64-bit processors in the early 2000s, and has been trying to phase out 32-bit apps for nearly a decade now.

Apple has been working with developers to transition their apps to 64-bit, and in 2018 informed them (and users) that macOS Mojave would be the last version of macOS to run 32-bit apps.

Opening 32-bit Apps. According to Apple Support, "When you attempt to open a 32-bit app, you will see an alert that the app is not optimized for your Mac, or that the developer needs to update it to work with this version of macOS."



macOS Mojave and macOS High Sierra



macOS Catalina

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So, how do you know which of the apps that you use are 32-bit and will no longer work under Catalina? Read on.

Finding 32-Bit Apps

There are several ways to determine which of your apps are 32-bit:

- Apple's System Information app
- EtreCheckPro app (Etresoft, Inc., version 6.1.3 as of this presentation)
- Go64 (St. Clair Software, version 1.0.5 as of this presentation)

System Information. This app is included in macOS. However, as one developer puts it: "it's not the most user-friendly, nor is it necessarily complete." The simplest way to open this app is to choose **About This Mac** from the **Apple Menu** (🍏 Menu) and then click the **System Report...** button:



About This Mac Window

Applications. Once that you're in the System Information app, go to the listing section (left side of the window). Then to the **Software** group (bottom of listing) and select the **Applications** category:



System Information App (Software Group > Applications Category)

In macOS Mojave and earlier, a window will then open to display a list of all your apps. The right-hand column in this list, labeled **64-bit Intel**, will indicate for each app whether it is 64-bit (**Yes**) or not (**No**). If the 64-Bit column displays a mixture of Yes and No entries, click on the column heading so that 32-bit apps (64-Bit: No) are displayed first. (See the illustration on the next page.)

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Note: Apparently in macOS Catalina, no 64-Bit Intel column is displayed, probably because only 64-bit apps can be run (and 32-bit apps have been quarantined and labeled).

Application Name	Version	Obtained from	Last Modified	64-Bit (Int... ^
ABBY FineReader for ScanSnap	5.0.2	Identified Developer	7/14/15, 4:11 PM	No
ABBY FineReader for ScanSnap	5.0.2	Identified Developer	7/14/15, 4:11 PM	No
Accessibility Inspector	1.1	Apple	12/10/07, 12:16 AM	No

System Information App (Software Section > Applications Category Listing)

As you can see in this excerpt for my iMac, the first app with **No** in the 64-Bit column is selected. (Two are shown since there is one on my iMac and one on my backup hard drive, and this more than doubles the scanning time for the report. Interestingly, my Time Machine drive apparently isn't scanned.)

These are for my Fujitsu ScanSnap 1300i scanner. So, without updated apps, I won't be able to use this scanner when I upgrade to Catalina. Fortunately, Fujitsu has released a new software package, ScanSnap Home, that is 64-bit; so, I'll be able to continue using my scanner.

Clicking on an app results in additional information being displayed at the bottom of the window. (See the illustration below.) It confirms that the app is not 64-bit (**No**) and also provides other information about the app including the Location on your Mac.

ABBY FineReader for ScanSnap:

Version: 5.0.2
Obtained from: Identified Developer
Last Modified: 7/14/15, 4:11 PM
Kind: Intel
64-Bit (Intel): No
Signed by: Developer ID Application: ABBYY USA Software House Inc, Developer ID Certification Authority, Apple Root CA
Location: /Applications/ABBY FineReader for ScanSnap/ABBY FineReader for ScanSnap.app

System Information App (Software Section > Applications Category > Additional Info)

Saving a Report. Unfortunately, the System Information app doesn't appear to have an option to save results in a *useful format* such as a text file or spreadsheet format. It does have two options to save and review the results:

- Save. This saves a System Information report so you can review what was captured. Mine was called iMac.spx and was 7.2 MB in size. The report contains *all* the results that the app revealed for *every* category, not just the one that you selected such as Applications. When opened, the System Information app opens to display the report.
- Print (*Not recommended*)! Choosing this will allow you to print a copy of the report. Mine was 154 pages long! A better option would be to save the copy as a PDF. My PDF was 435 KB in size. At least you can edit the PDF to save the groups and categories that you want.

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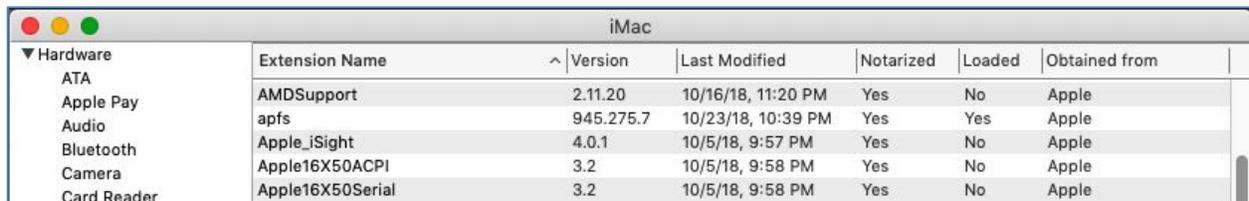
Legacy Software. This category lists only 32-bit apps, but the list is much smaller than the one found in the Applications category. My iMac's list had 16 apps listed here, but my Applications category had nearly 600! Perhaps this has something to do with the definition of exactly what is an "app." (More on this later.) Regardless, you can be certain that those listed in the Legacy category will not work under Catalina.

Note: There's little information about exactly what's included and defined in the various System Information app groups and categories. System Information Help takes you to Apple's System Information User Guide, but it provides only sparse detail. A quick internet search didn't provide much either.

Other Software Categories. As you look through the Software group of the System Information app, you'll see other software categories listed. Several of these (Extensions, Frameworks and Preference Panes in particular) also have information concerning whether or not they are 64-bit. Since these and other software types listed are associated with the macOS or apps, they should be updated by Apple and the developers. So, there's probably little value in checking for 64-bit compatibility.

Here are a couple of examples:

Extensions. Clicking on this category results in a listing without a 64-bit compatibility column:

A screenshot of the System Information app window titled "iMac". The "Hardware" section is expanded to show "Extensions". A table lists several extensions with columns for Extension Name, Version, Last Modified, Notarized, Loaded, and Obtained from. The "Apple_iSight" extension is highlighted in blue.

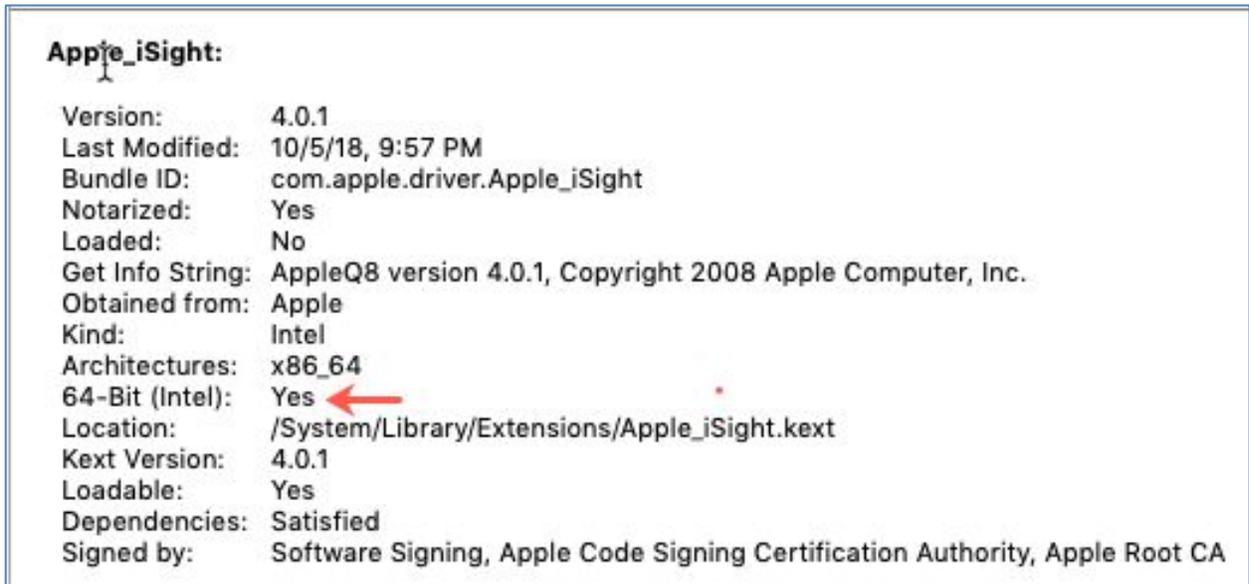
Extension Name	Version	Last Modified	Notarized	Loaded	Obtained from
AMDSupport	2.11.20	10/16/18, 11:20 PM	Yes	No	Apple
apfs	945.275.7	10/23/18, 10:39 PM	Yes	Yes	Apple
Apple_iSight	4.0.1	10/5/18, 9:57 PM	Yes	No	Apple
Apple16X50ACPI	3.2	10/5/18, 9:58 PM	Yes	No	Apple
Apple16X50Serial	3.2	10/5/18, 9:58 PM	Yes	No	Apple

System Information App (Software Group – Extensions Category Listing)

Without a 64-bit compatibility column, the only way to check is by selecting each item and then examining the information displayed at the bottom of the window.

In the illustration on the next page, I selected the **Apple_iSight** extension. Here there is a 64-Bit (Intel) line item, and it shows that this extension is 64-bit,

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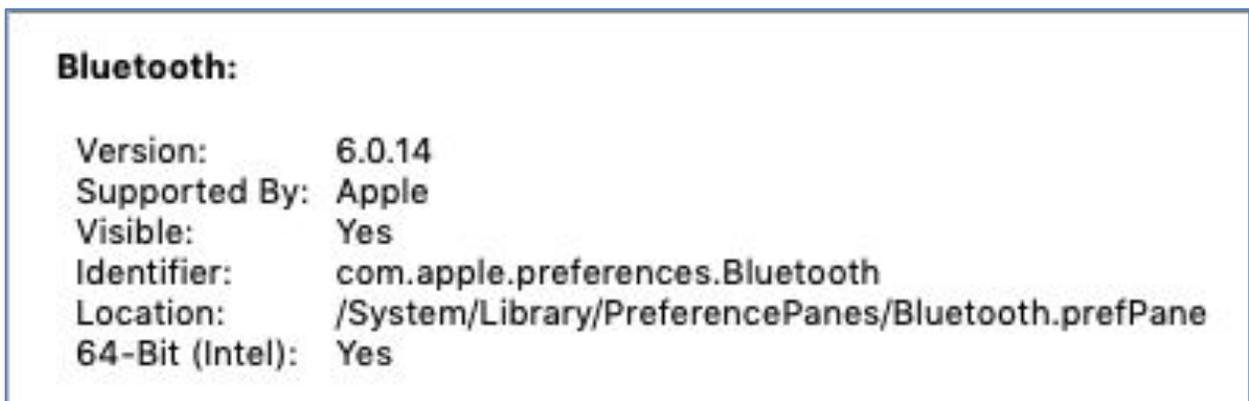


System Information App (Software Group – Extensions Category Listing > Item Detail)
Preference Panes. This category does have a listing with a 64-bit compatibility column:

iMac					
▼ Hardware	Name	Version	Supported By	Visible	64-Bit (Intel)
ATA	Accessibility	7.0	Apple	Yes	Yes
Apple Pay	Backblaze Backup	7.0.0.388	3rd Party	Yes	Yes
Audio	Bluetooth	6.0.14	Apple	Yes	Yes
Bluetooth	CDs & DVDs	1.7	Apple	No	Yes
Camera	Classroom	1.0	Apple	No	Yes
Card Reader	Date & Time	7.0	Apple	Yes	Yes
Controller					

System Information App (Software Section – Preference Panes Category Listing)

In the illustration below, I selected the **Bluetooth** preference pane. Here's what it shows, including that this extension is 64-bit:



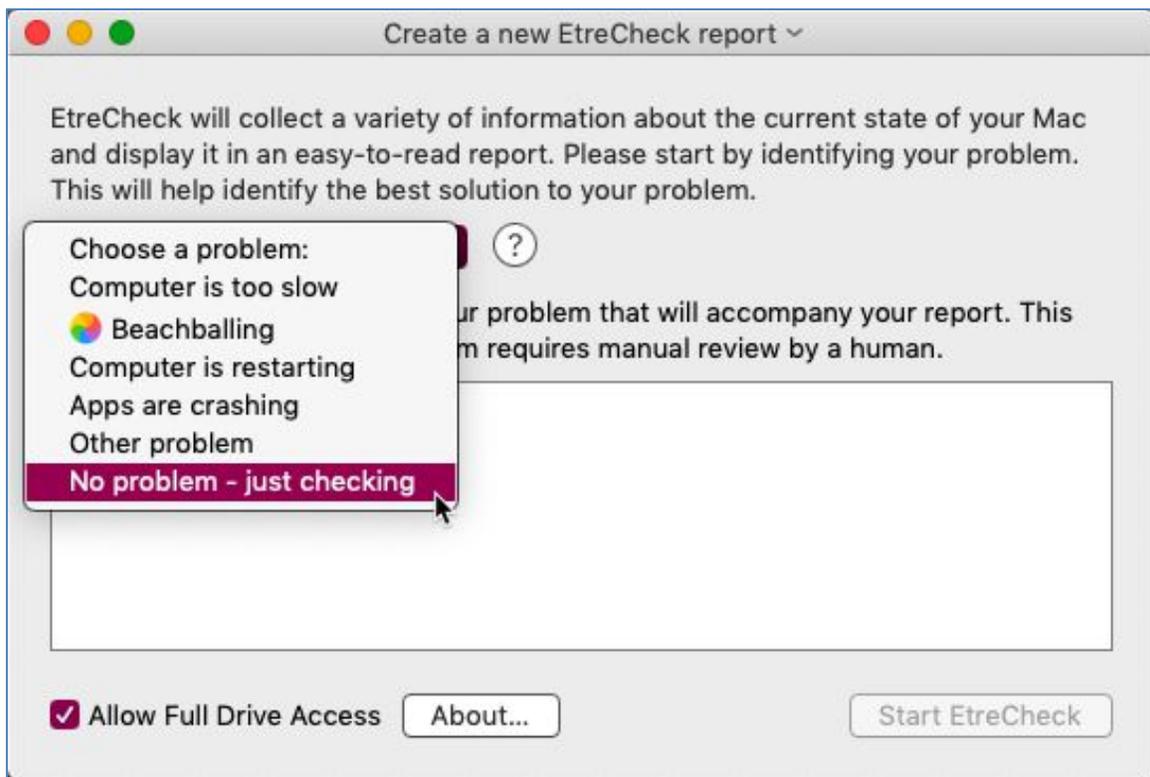
System Information App (Software Section – Preference Pane Category Listing > Item Detail)

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EtreCheckPro. (<https://etrecheck.com/>). **EtreCheckPro** is an app that performs a comprehensive analysis of the state of your Mac. It will test any Macintosh computer using an Intel processor and running OS X 10.9 “Mavericks” or later. EtreCheckPro is a free app and is obtained directly from the developer, EtreSoft, Inc.

Running EtreCheckPro generates an **EtreCheck Report**. The analysis performed for the report depends on what type of problem that you are examining. (See the illustration below where “No problem - Just checking” has been selected.)

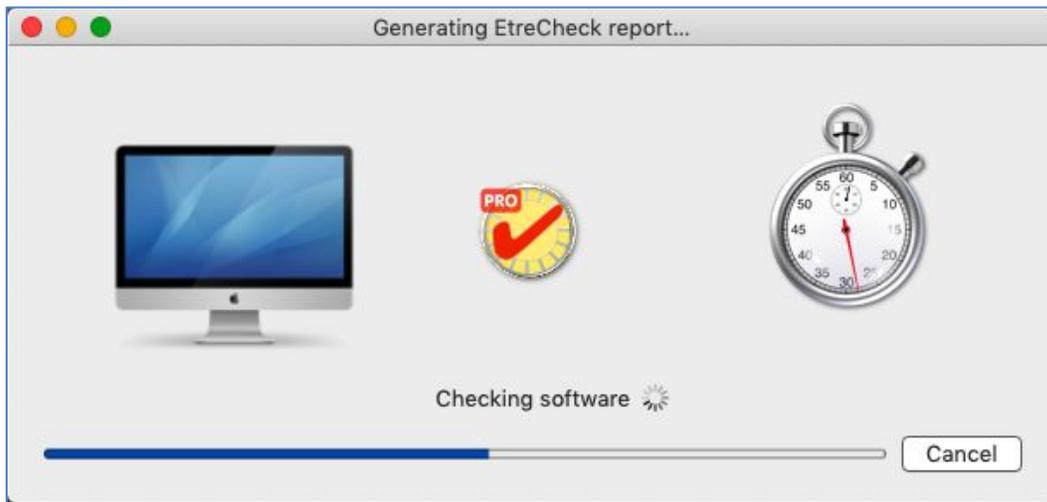
An indication about how comprehensive the report can be shows in its length. My report was 32 pages long.



Create a New EtreCheck Report

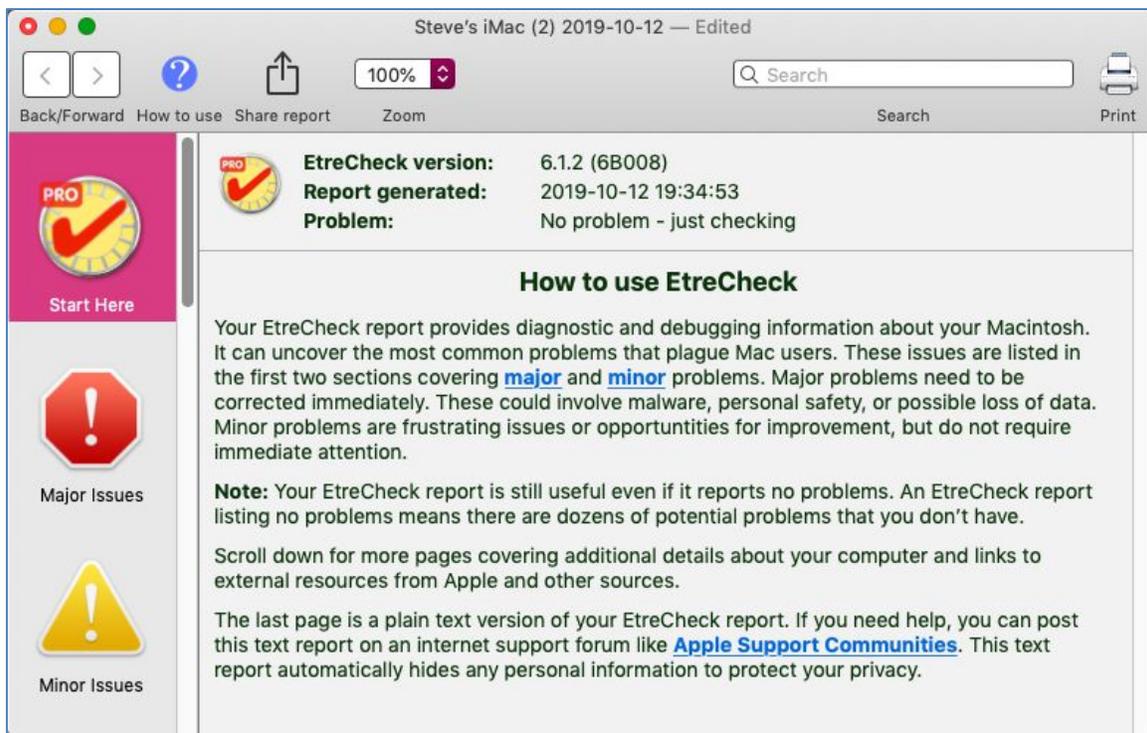
As the analysis is being run, a small window with an animation is displayed, showing the various steps in the analysis. (See the illustration on the next page.)

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EtreCheck Report Being Generated

The report that's generated provides an analysis for a number of categories (listed in the column on the left of the report):

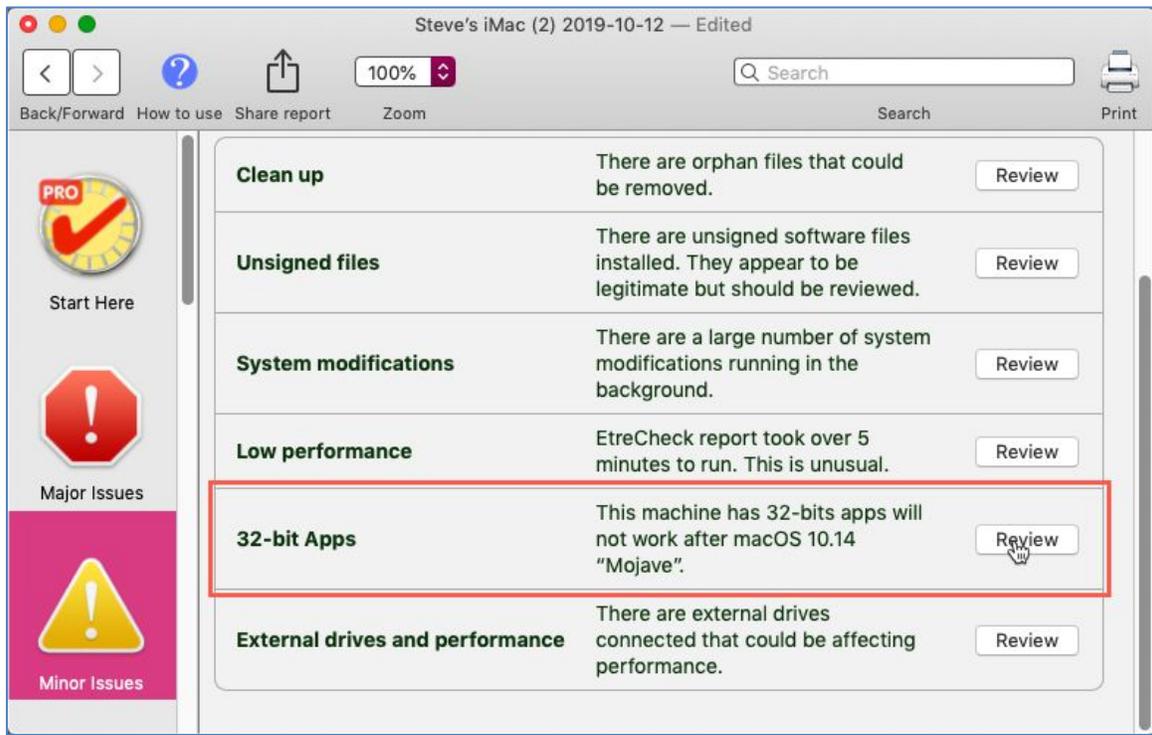


EtreCheck Report

Select the **Minor Issues** category and scroll through the results to the section labeled **32-bit Apps**. (See the illustration on the next page.)

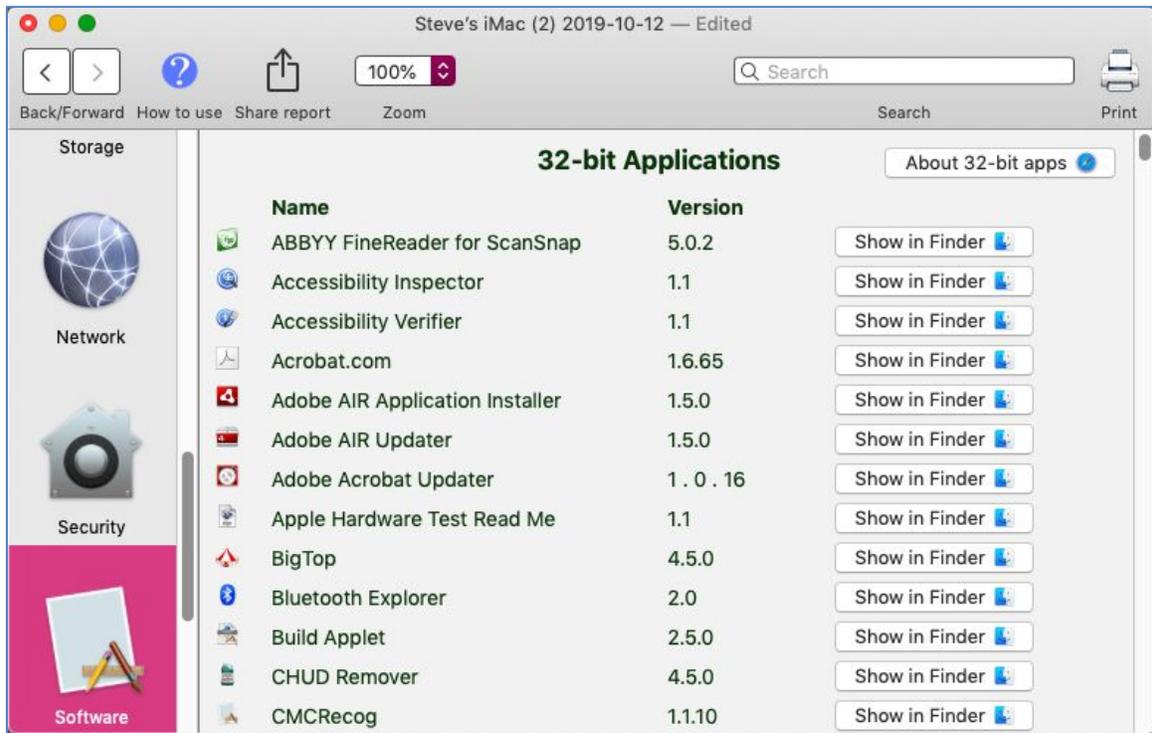
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EtreCheck Report – Minor Issues Section > 32-Bit Apps

Here's a sample result from an EtreCheckPro analysis on my iMac:



EtreCheck Report - 32-bit Applications

As shown in the illustration above, the report is displayed in an easy-to-read format, and each item can be located via a **Show in Finder** button.

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The report can be saved in EtreCheckPro format. It can also be printed and via the Print dialog box also be saved in PDF format. Here's an extract of my report:



32-bit Applications		
Name		Version
	ABBY FineReader for ScanSnap	5.0.2
	Accessibility Inspector	1.1
	Accessibility Verifier	1.1
	Acrobat.com	1.6.65
	Adobe AIR Application Installer	1.5.0
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Steve's iMac (2) 2019-10-12		
	Adobe AIR Updater	1.5.0
	Adobe Acrobat Updater	1.0.16
	Apple Hardware Test Read Me	1.1
	BigTop	4.5.0
	Bluetooth Explorer	2.0

EtreCheck Report - 32-bit Applications (PDF Version)

Go64. (<https://www.stclairsoft.com/Go64/>). **Go64** is a free app—donations accepted—to quickly “scan your disk for applications, see which ones are 32-bit, and find upgrade information with the click of a button.”

The developer has several other utilities including **Default Folder X**, which I use, that enhances Open and Save dialogs.

Go64 helps you to:

- “Take an inventory of the apps on your Mac and see which ones are still 32-bit.
- “Go to a developer's website or search the web for update or upgrade information.
- “Keep track of upgrade costs so you can plan your spending to get all the upgrades you need.”

Here's the opening window when Go64 is run (illustration on the next page):

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Go64 – Opening Window

An extract of the Go64 Report from my iMac is shown on the next page. Notice the similarity in content to the report generated by EtreCheckPro.

Application	Version	64 bit	Last Used	Company	Website	Upgrade Cost
ABBY FineReader for ScanSnap.app	5.0.2	No	--		http://abby.com	Set
Accessibility Inspector.app	1.1	No	--	Apple, Inc	http://apple.com	Set
Accessibility Verifier.app	1.1	No	--	Apple, Inc	http://apple.com	Set
Acrobat.com.app	1.6.65	No	--	Adobe Systems Incorporated	http://adobe.com	Set
Adobe AIR Application Installer.app	1.5.0	No	--	Adobe Systems Incorporated	http://adobe.com	Set
Adobe AIR Updater.app	1.5.0	No	--	Adobe Systems Incorporated	http://adobe.com	Set
Apple Hardware Test Read Me.app	1.1	No	--	Apple, Inc	http://apple.com	Set
AutoOnlineUpdater.app	2.0.80	⚠	10/8/19		http://fujitsu.com	Set
BigTop.app	4.5.0	No	--	Apple, Inc	http://apple.com	Set
Bluetooth Explorer.app	2.0	No	--	Apple, Inc	http://apple.com	Set
Bluetooth Regulatory Certification.app	1.0.3	No	--	Apple, Inc	http://apple.com	Set
Build Applet.app	2.5.0	⚠	--	Python Software Foundation	http://python.org	Set
Cardiris for ScanSnap.app	4.0.13	No	--		http://irislink.com	Set
CardMinder.app	5.3.60	No	2/16/19	ABBY. OCRABBY	http://fujitsu.com	Set

Go64 Report – 32-Bit Applications

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Right-click on an entry in the list to act on it (Launch App, Reveal in Finder, Move to Trash, Go to Website, Search the Web, and Rescan):



Go64 Report – App Selected (Right-Click for Actions)

Select an entry in the list and click the **Set** button to find information on Upgrade Cost and access to the developer’s website:



Go64 Report – App Selected > Set Button Results

My Choice? I like **Go64** the best with **EtreCheckPro** a close second. Feel free to give them all a try and decide which one(s) that you prefer.

Why So Many “Apps”?

Interestingly, Go64 found 164 32-bit apps on my iMac while EtreCheckPro, whose list I had to count manually, found 158. So, pretty close agreement.

However, the System Information report had over 600! Another example is seen when using the **Go64** app and specifying that it search for **All Executables**. (See the illustration on the next page.)

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Application	Version	64 bit	Kind	Last Used	Company	Website	Upgrade Cost
ABBY FineReader for ScanSnap.app	5.0.2	No	Application	--		http://abby.com	Set
Accessibility Inspector.app	1.1	No	Application	--	Apple, Inc	http://apple.com	Set
Accessibility Verifier.app	1.1	No	Application	--	Apple, Inc	http://apple.com	Set
Acrobat.com.app	1.6.65	No	Application	--	Adobe Systems Incorporated	http://adobe.com	Set
ADAPI.framework	1.0	No	Framework	--		http://sandisk.cor	Set
add_body_record		No	Terminal Document	--			Set
add_key_index_record		No	Terminal Document	--			Set

Go64 Report – All Executables (32-Bit Only)

This list is much longer than what's found in the report for 32-bit apps. It includes items such as apps, frameworks, preference files, etc. On my iMac, this report found 704 of them! Recall that when searching for just 32-bit apps only, the result was 164. So, there's more to an "app" than meets the eye.

What's going on here?

Explanation. So, why are there so many apps listed in these 32-bit checks? Actually, there are many more files that are 32-bit.

Howard Oakley, a macOS "guru" and developer, discusses what's behind this at his website, <https://eclecticlight.co>, in the support notes for his own 32-bit-checking app, interestingly called 32-bitCheck. It's a little technical, so I've edited an excerpt from it below:

"Apple provides easy ways of checking for this [32-bit apps], in the Applications and Legacy Software sections of System Information. However, their lists are incomplete, includes both apps and some other software but not bundles more generally, nor other executable code such as command tools"

His app checks for "three types of item on any storage accessible from your Mac:

- **bundles**, which are special types of folder with set contents and structure
- **applications**, which are bundles whose name ends in the extension .app
- **Mach-O executable code**, single files not in bundles which contain code, such as command tools and dynamic libraries (dylibs)"

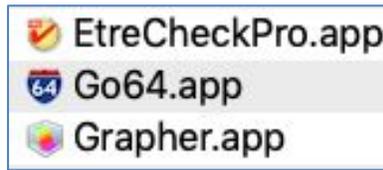
Put another way, what you see in the Finder when you look at the icon of an app is likely comprised of many items and may well contain more than a single application and support files including some in system support libraries.

All these items when combined together present the **illusion** of a single app and all its functions.

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As an example of what's really behind a Finder icon, consider the Go64 app. In the Finder, it looks like this:



Go64 App – Icon

Right-click on the icon (works on any icon in the Finder), and select **Show Package Contents** from the pop-up menu:



Go64 App – Show Package Contents

Note: According to Wikipedia: "In the Apple macOS operating system, a **package** is a file system directory that is normally displayed to the user by the Finder as if it were a single file."

In addition, Wikipedia notes: "A **package** that has a standardized structure for storing executable code and its associated resources, is called a **bundle**." (Emphasis added.)

A folder labeled **Contents** will be displayed. When opened, the result is a listing of all the sub-folders and files. (See the illustration on the next page.)

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Name	Date Modified	Size	Kind
▼ Contents	10/7/19	--	Folder
CodeResources	10/7/19	2 KB	TextEdit.app Document
▼ MacOS	10/7/19	--	Folder
Go64	10/7/19	228 KB	Unix executable
Go64Search	10/7/19	34 KB	Unix executable
embedded.provisionprofile	10/7/19	8 KB	Provision Profile
▼ _CodeSignature	10/7/19	--	Folder
CodeResources	10/7/19	19 KB	TextEdit.app Document
Info.plist	10/7/19	2 KB	property list
PkgInfo	10/7/19	8 bytes	TextEdit.app Document
▼ Resources	10/7/19	--	Folder
Assets.car	10/7/19	338 KB	Document
▶ Base.lproj	10/7/19	--	Folder
▶ fr.lproj	10/7/19	--	Folder
Applcon.icns	10/7/19	408 KB	Apple icon image
alert.png	10/7/19	60 KB	PNG image
alertdimmed.png	10/7/19	60 KB	PNG image
at_icon_large.png	10/7/19	188 KB	PNG image
Defaults.plist	10/7/19	387 bytes	property list
Developers.plist	10/7/19	3 KB	property list
dfx_icon_large.png	10/7/19	11 KB	PNG image
Domains.plist	10/7/19	792 bytes	property list
globe.png	10/7/19	6 KB	PNG image
google.png	10/7/19	73 KB	PNG image
hh_icon_large.png	10/7/19	128 KB	PNG image
jtsn_icon.png	10/7/19	20 KB	PNG image
launch.png	10/7/19	3 KB	PNG image
refresh-fat.png	10/7/19	2 KB	PNG image
refresh.png	10/7/19	925 bytes	PNG image
reveal.png	10/7/19	2 KB	PNG image
search.png	10/7/19	9 KB	PNG image
TopLevelDomains.plist	10/7/19	40 KB	property list
trash.png	10/7/19	1 KB	PNG image
WebURLs.plist	10/7/19	3 KB	property list
▼ Frameworks	10/7/19	--	Folder
▼ Sparkle.framework	10/11/19	--	Folder
▼ Versions	10/11/19	--	Folder
Current	10/11/19	1 byte	Alias
▶ A	10/7/19	--	Folder
Sparkle	10/11/19	24 bytes	Alias
Resources	10/11/19	26 bytes	Alias

Go64 App – Contents Folder

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Notice all the items inside the Contents folder (text documents, property lists (.plist), Unix executables, PNG images, Frameworks, etc.). Expanding the various sub-folders revealed over 200 items! Many of which are likely localization information for different countries.

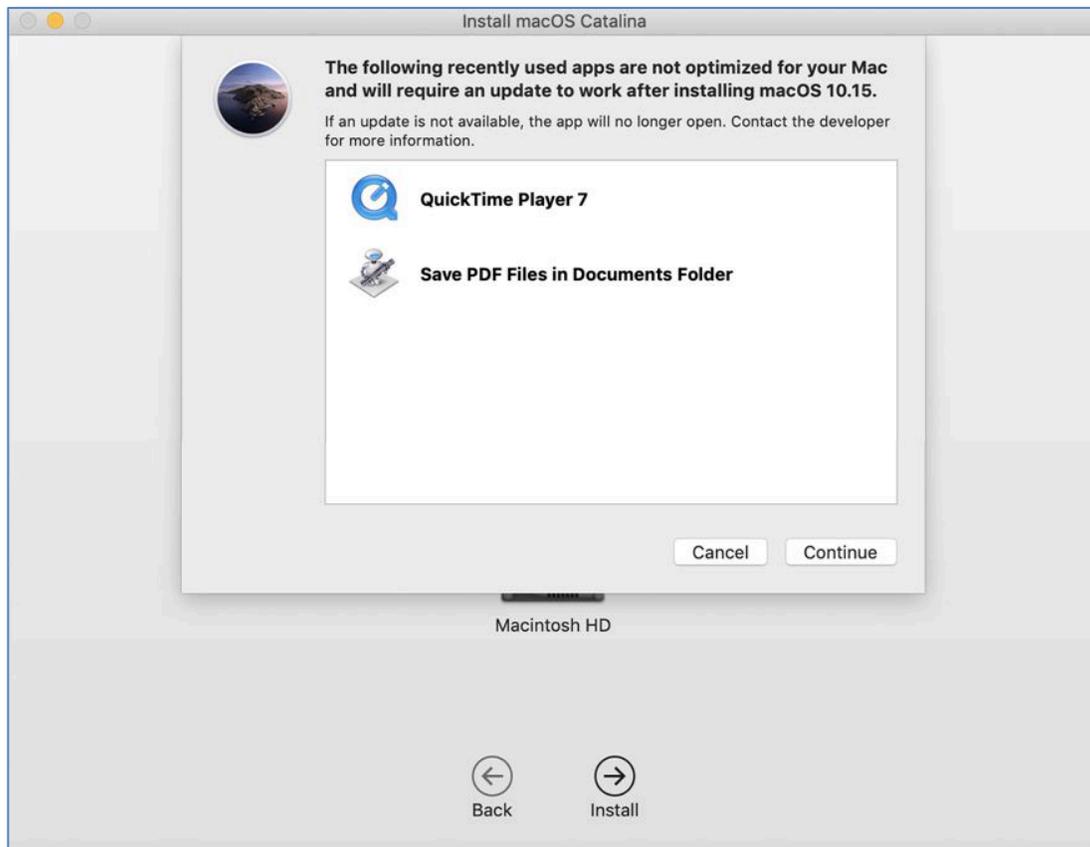
The MacOS sub-folder shows two items labeled **Unix executable**, and these contain the Unix-based code that is run (executed), calling on various resources, for the app to function.

Understanding the need for all these items and how they work together is why I have great respect for app developers!

Good News/Bad News. The good news is that as developers update their apps (and all the support files for them), the 32-bit issue will be addressed. The bad news is that some developers won't be updating their apps, so they'll no longer work under macOS 10.15 Catalina. I have a favorite text app, Tex-Edit Plus, that I have used for years that won't work under Catalina, and I'm searching for a replacement.

32-Bit Apps Under Catalina

According to Apple Support: "When upgrading to macOS Catalina, the installer shows a list of recently used apps that are 32-bit. You can review this list before choosing whether to cancel or continue the installation."



macOS Catalina Installer – 32-Bit Notice

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In addition, “macOS Catalina also shows a prohibitory symbol (🚫) over the icon of each 32-bit app in the Finder, letting you know that the app will not open.”

Known Apps That Are Incompatible With macOS Catalina.

A Google search turned up several websites with information about this. At the iDropNews website (idropnews.com):

“As reported on his blog, [The Tape Drive](#), iOS developer Steve Moser recently discovered a hidden file in the latest macOS Catalina beta called IncompatibleAppsList.bundle that explicitly lists 235 apps that are incompatible with Catalina

“As Moser notes, the list is designed to be used by the Catalina installation process so that apps with known incompatibilities can be flagged during an upgrade from a previous version of macOS. Many of the apps are actually just older versions that have long since been updated — and in some cases really old versions.”

This listing will be posted on the Double Click website:

<http://double-click.org/archives.html>.

Another website that’s been helpful in the past in determining macOS compatibility is roaringapps.com.

Summary

- Apple has been warning for several years that apps written for 32-bit processors would become obsolete in a future version of the macOS. It then notified that macOS Mojave would be the last version of macOS to run 32-bit apps.

With macOS Catalina, that has now become true, and 32-bit apps will no longer run.

- All three utilities reviewed (Apple’s System Information, EtreCheckPro, and Go64) will provide information about the 32-bit apps on your Mac although I find that System Information is a bit clumsy to use.

Next Presentation

For the next presentation, we’ll take a look another macOS feature.

Have a favorite Mac Tip or utility? Please feel free to pass it along, and I’ll see if I can work it into a future presentation.

If you have any suggestions for presentation topics, including macOS utilities, please contact me at slp4668@gmail.com.

–Steve Parker

Credit: Referenced in the presentation