Hello all,

Mac OS Extended (HFS+) was Apples default journaling file system for a long time until it was replaced with APFS (Apple File System). One major difference between these that I found interesting was that HFS+ was essentially the same code for Apples previous releases that ran on IBM processors, but this time the code was retrofitted to work on the new Intel processors instead. IBM was using big Endian while Intel was using little Endian, so the code had to be changed to reflect that. (Siracusa, 2019) This is interesting because APFS was written from the ground up and was actually designed to be ran on those processors in contrast to HFS+ being written for one type of processor(IBM) and then retrofitted for the next(Intel).

When it comes to the forensics there are a couple topics of discussion. Notoriously HFS+ was known for not supporting checksums. This is important in forensics because it proves data integrity of metadata. Another issue was that HFS+ did not originally support snapshots which was an obvious issue for digital forensics, not being able to get an imaged drive. Some other notable issues were that it had a limited date till February 6, 2040 and did not support nanoseconds. (Vigo, 2018)

Some advancements in digital forensics of APFS was the ability to allow checksums, snapshots, and multi-key encryption. It also prevented data encryption by storing data in a fresh location rather than over writing existing data which was more prone to corruption. (Vigo, 2018)

So in conclusion, HFS+ differs from APFS forensically in the fields of its abilities to take snapshots, provide checksums, ability to encrypt, time management, and data storage.

Thanks again!

-Eric WEBB

Siracusa, John (July 20, 2011). [*"Mac OS X 10.7 Lion: the Ars Technica review"*](https://arstechnica.com/apple/2011/07/mac-os-x-10-7/12/). Ars Technica. [*Archived*](https://web.archive.org/web/20161222061714/http:/arstechnica.com/apple/2011/07/mac-os-x-10-7/12/) from the original on 22 December 2016*. Retrieved 18 January 2017*. <https://web.archive.org/web/20161222061714/http://arstechnica.com/apple/2011/07/mac-os-x-10-7/12/>

Vigo, J. (2018, January 8). HFS v. APFS: Which Apple file system is better? Retrieved March 10, 2020, from https://www.techrepublic.com/article/apfs-vs-hfs-which-apple-filesystem-is-better/

**Pros of Apple's APFS**

* Allows for clones or multiple copies of the same file, with only changes stored as deltas, which reduces storage space when making revisions or copying files
* Can create point-in-time snapshots
* Full-disk encryption with single or multi-key encryption for added security
* Uses checksums for data integrity of metadata
* Metadata corruption prevention due to creating new records instead of overwriting existing ones, which can become corrupt due to system crashes
* Increases performance on some devices by eliminating the need to write changes twice compared to HFS+ Journaled file systems
* More efficient management of storage typically yields additional free space.

**Cons of Apple's APFS**

* Checksums are only for metadata integrity--not user data
* Compression is not available.
* Encrypted volumes can only be accessible by other computers running macOS High Sierra
* Does not support Fusion drives
* Cannot utilize [NVRAM](http://www.zdnet.com/article/will-nvram-replace-ssds-or-dram/) for data storage

HFS+ best for mechanical and hybrid drives best for older computers that need to talk with older macs.

* Concurrent access of the file system by a process is not allowed.
* No snapshots
* No support for dates beyond February 6, 2040
* Limited native file support for other file systems
* Timestamps do not use the nanosecond standard.
* Checksums for data integrity is missing.

https://www.howtogeek.com/331042/whats-the-difference-between-apfs-macos-extended-hfs-and-exfat/