

The following tests were done with VFX.
Similar results were obtained with SwiftForth and iForth.

I had cause to start testing the Quartz 2D, (Core Graphics) drawing in macOS 10.12 Sierra. The slow down of Quartz 2D drawing since 10.6 Snow Leopard is observed by many. But in Sierra I noticed lots of heavy Windowserver cpu usage in Activity Monitor. Much more than in previous OSX versions.

The Random Walk coco-vfx demo is suitable for testing. This is a simple line plotting Quartz 2D program. So a testing suite was build around the core program: run it for 4 seconds, check screen result and count how many iterations are executed. The screen buffer is flushed with 30 frames/second.

Results give stunning differences between OS versions:

VFX average #iterations per 4 seconds
10.6 10.10 10.12
877047 417400 049962

Drawing with Core Graphics takes a dramatic hit in Sierra. Activity Monitor shows heavy use of Windowserver in Sierra.

Not doing any flushing, doesn't matter at all. WindowServer stays high. In Snow Leopard and Yosemite, the Windowserver never goes beyond 8%. In contrast, it's around 30% peaking at 39% in Sierra.

I found the culprit, CGContextStrokePath, and a solution after trial and error. The improvement was huge! By synchronising CGContextStrokePath and some other Quartz calls with the 30 fps flushing the following metrics were obtained:

VFX average #iterations per 4 seconds
10.6 10.10 10.12
6542563 5603652 4346244 (yes those are millions of iterations!)

In all cases the screen was black after 4 seconds. The OS differences still exist, but much less dramatic. The Windowserver seldom exceeds 9% cpu usage.

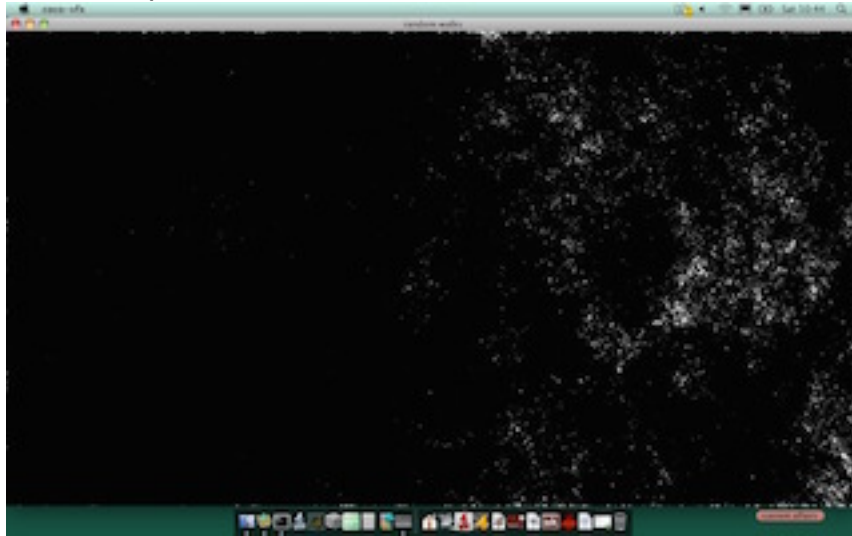
Conclusion, stay as short as possible in Quartz, severe penalty in Sierra :-)

BTW in hindsight the solution is obvious, but I never saw it mentioned in any doc or example code from Apple or others. It's only in Sierra that the issue showed up.

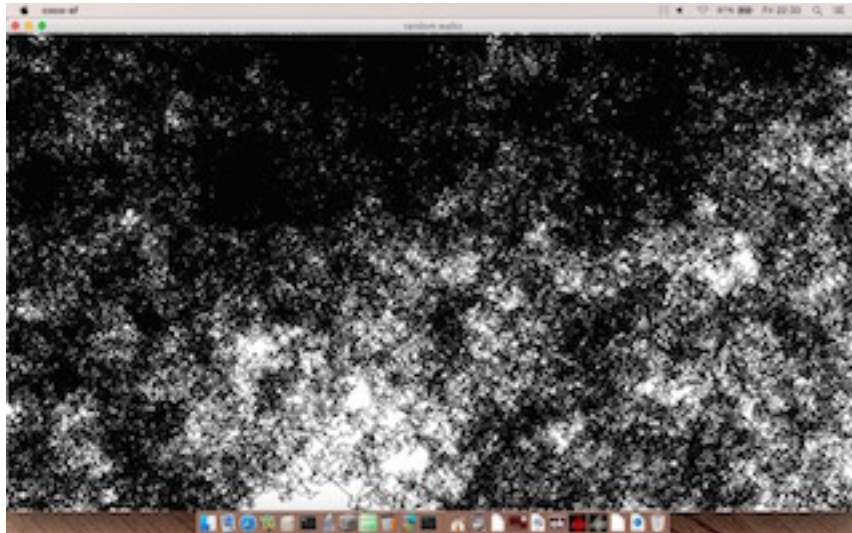
Particularly annoying examples are audiounits from GRM. After a while the fans start blazing, turning the Mac in to a jet engine. Hardly any complicated graphics, but the Windowserver makes overtime. Very inappropriate, but it can be solved by dragging the window up in to its title/drag bar. Hiding it from view, so no window updates are needed i.e. no work for Windowserver. Minimising to the Dock doesn't help. The CPU percentage spent on audio is similar to previous OS X versions, no problems encountered.

Eyeballing the original randwalk trails

Snow Leopard 10.6, after 4 seconds



Yosemite 10.10, after 4 seconds



Sierra 10.12, after 4 seconds

