
Playing with Instruments



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Why is performance so important?

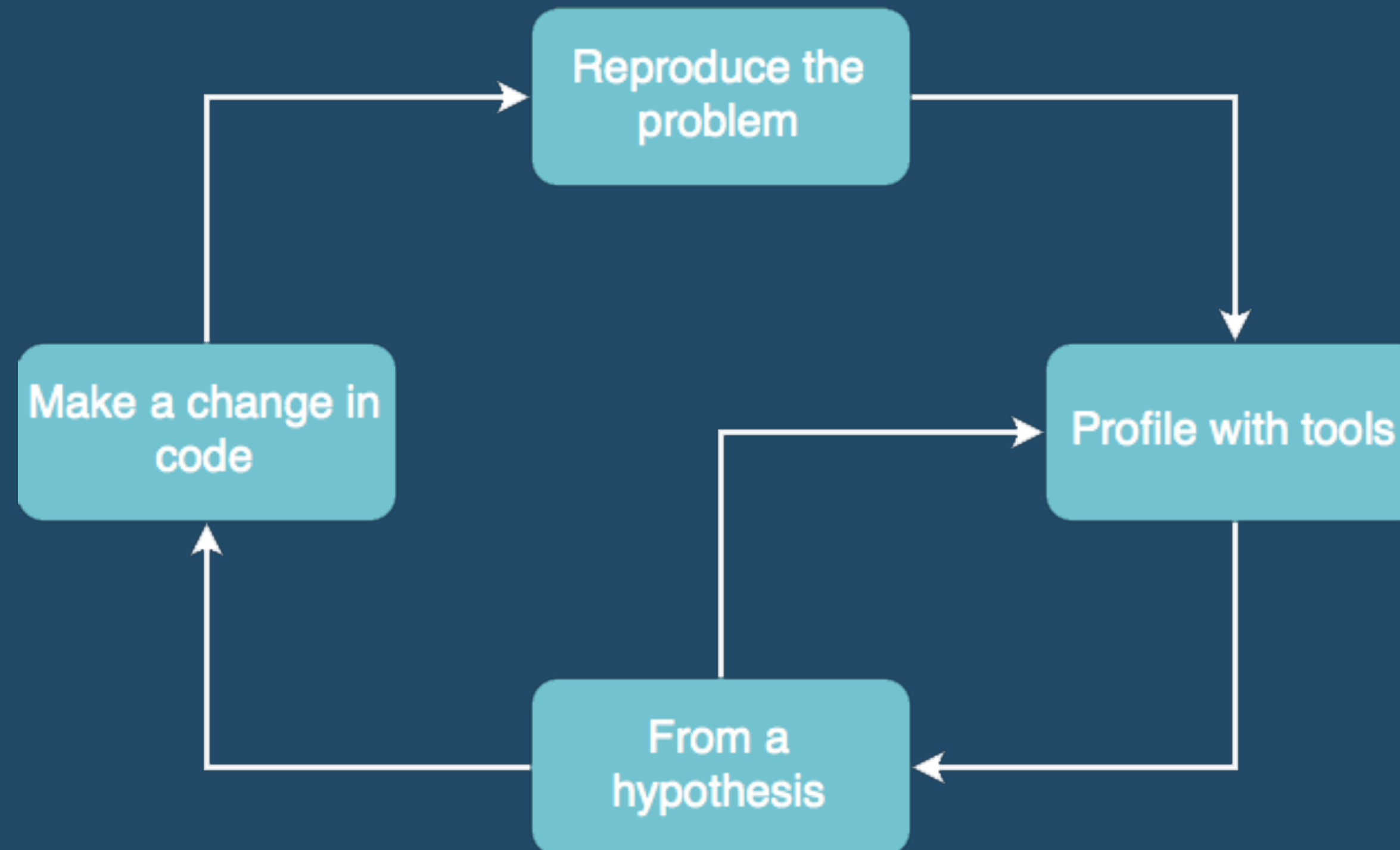
- Performance should be considered a feature
- Responsiveness delights and engages users
- Efficient apps extend battery life

How should you think about performance?

- Choosing technologies
- Taking measurements
- Setting goals

Profile process

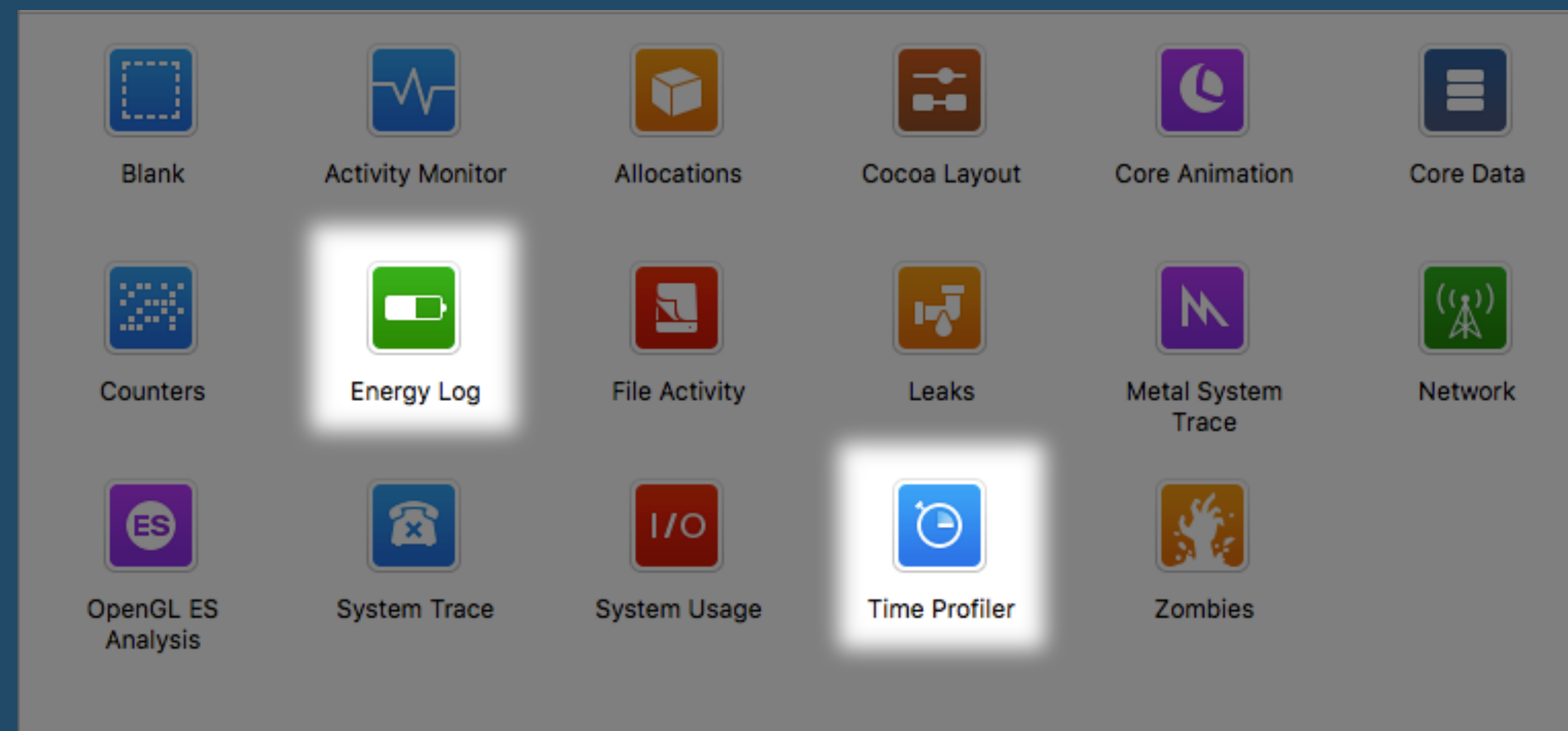
- Very similar to the debugging process



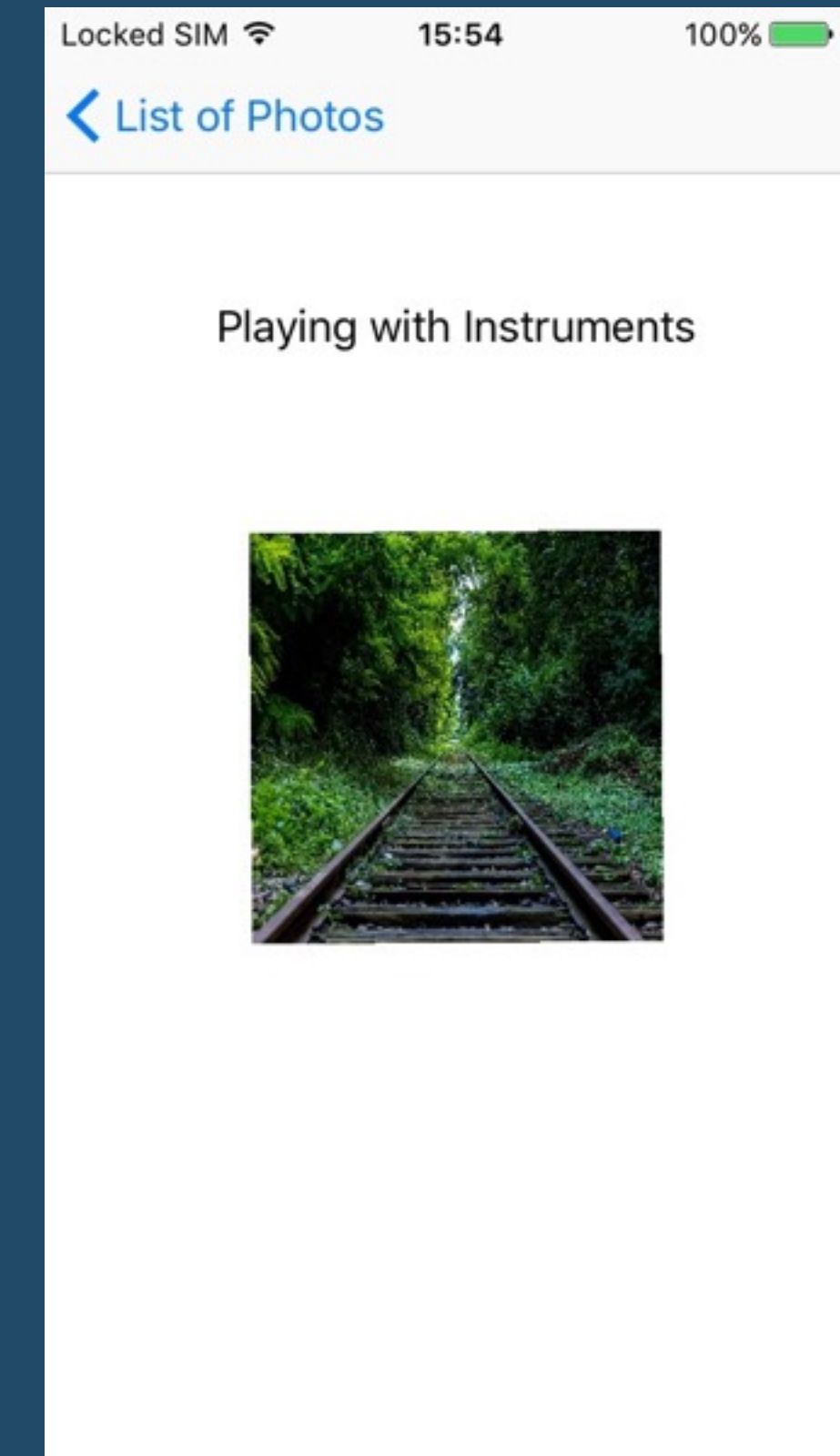
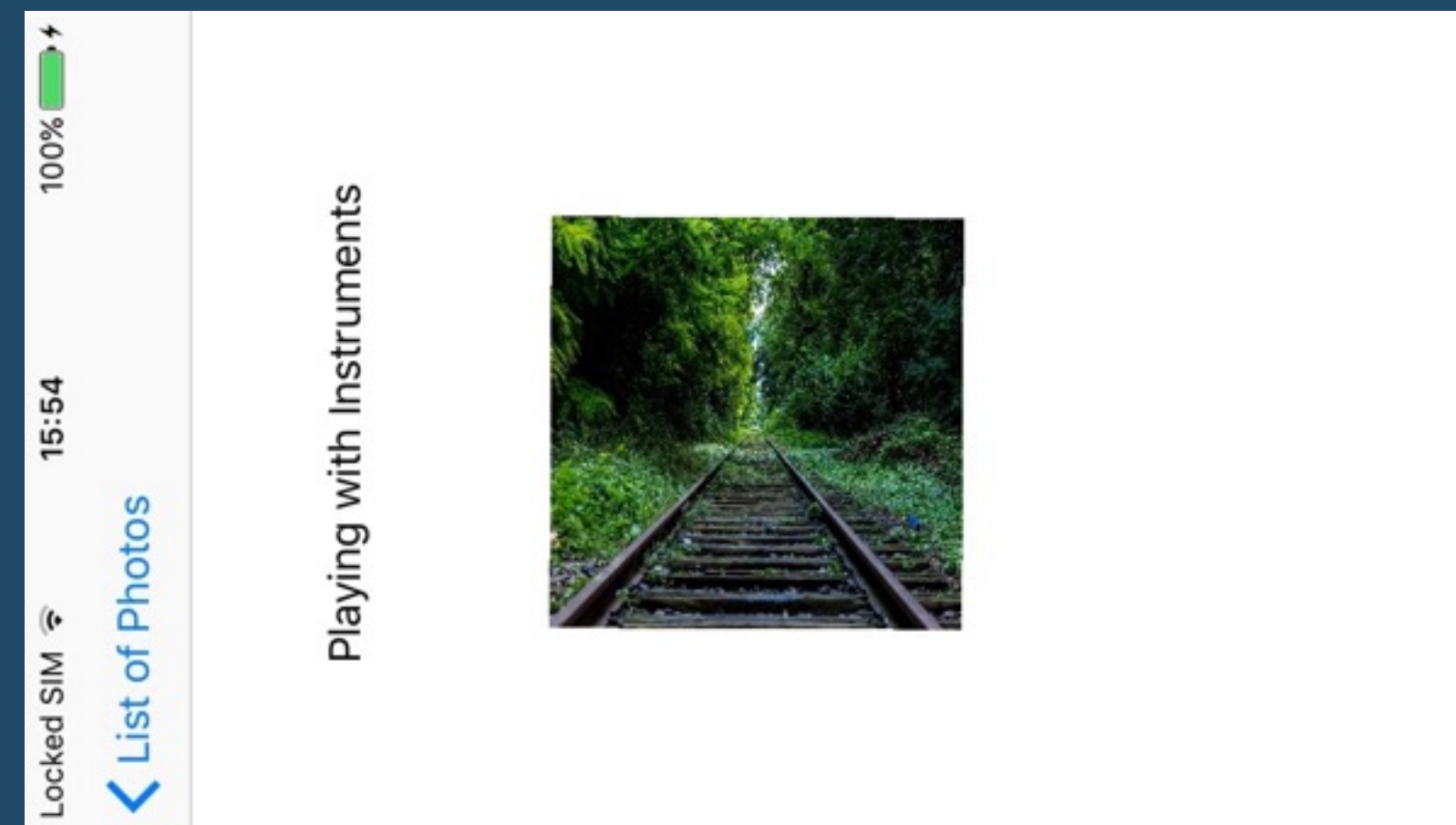
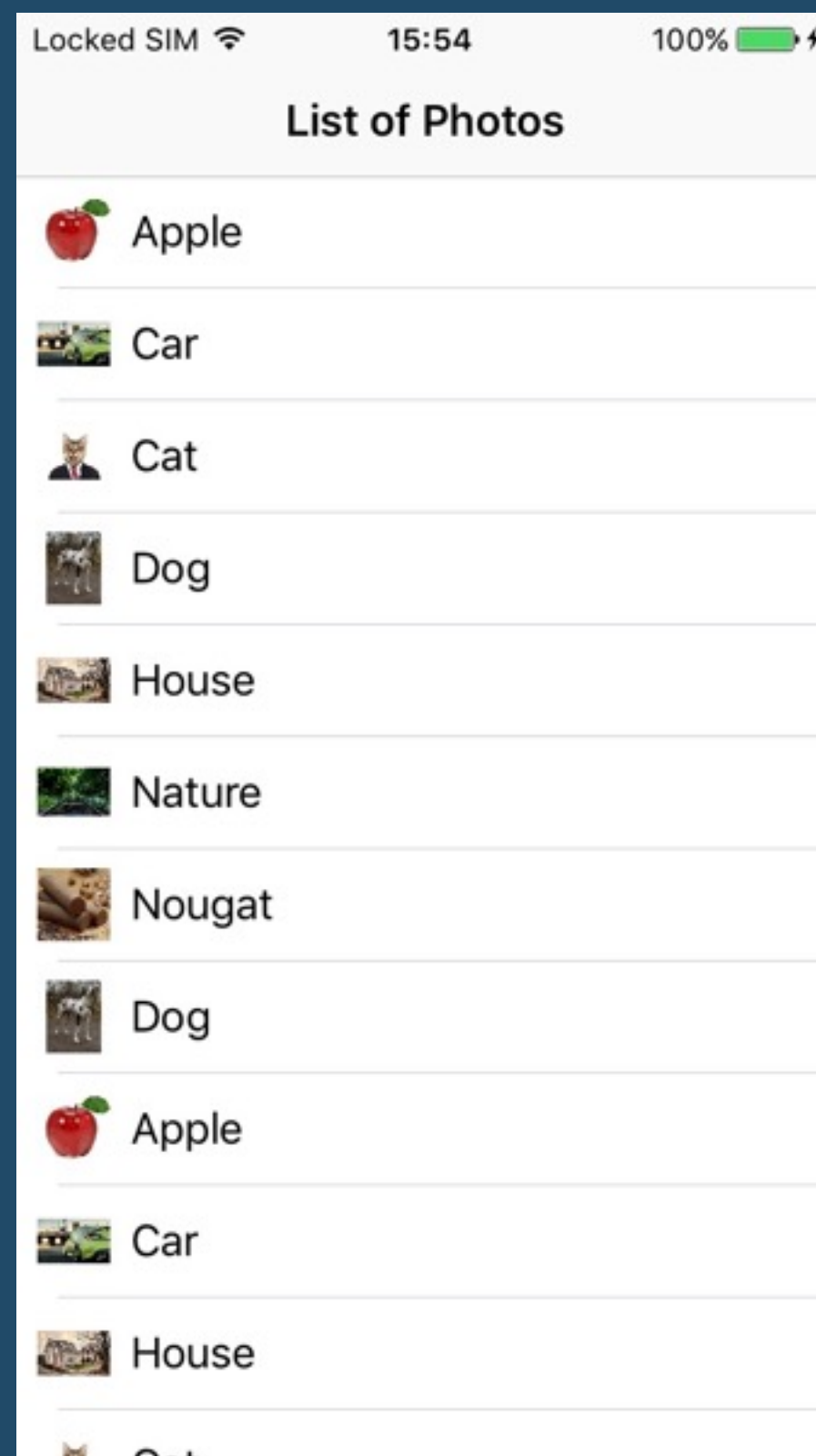
Instruments



- Performance-analysis and testing tool
- Part of the Xcode tool set



PlayingWithInstruments.app

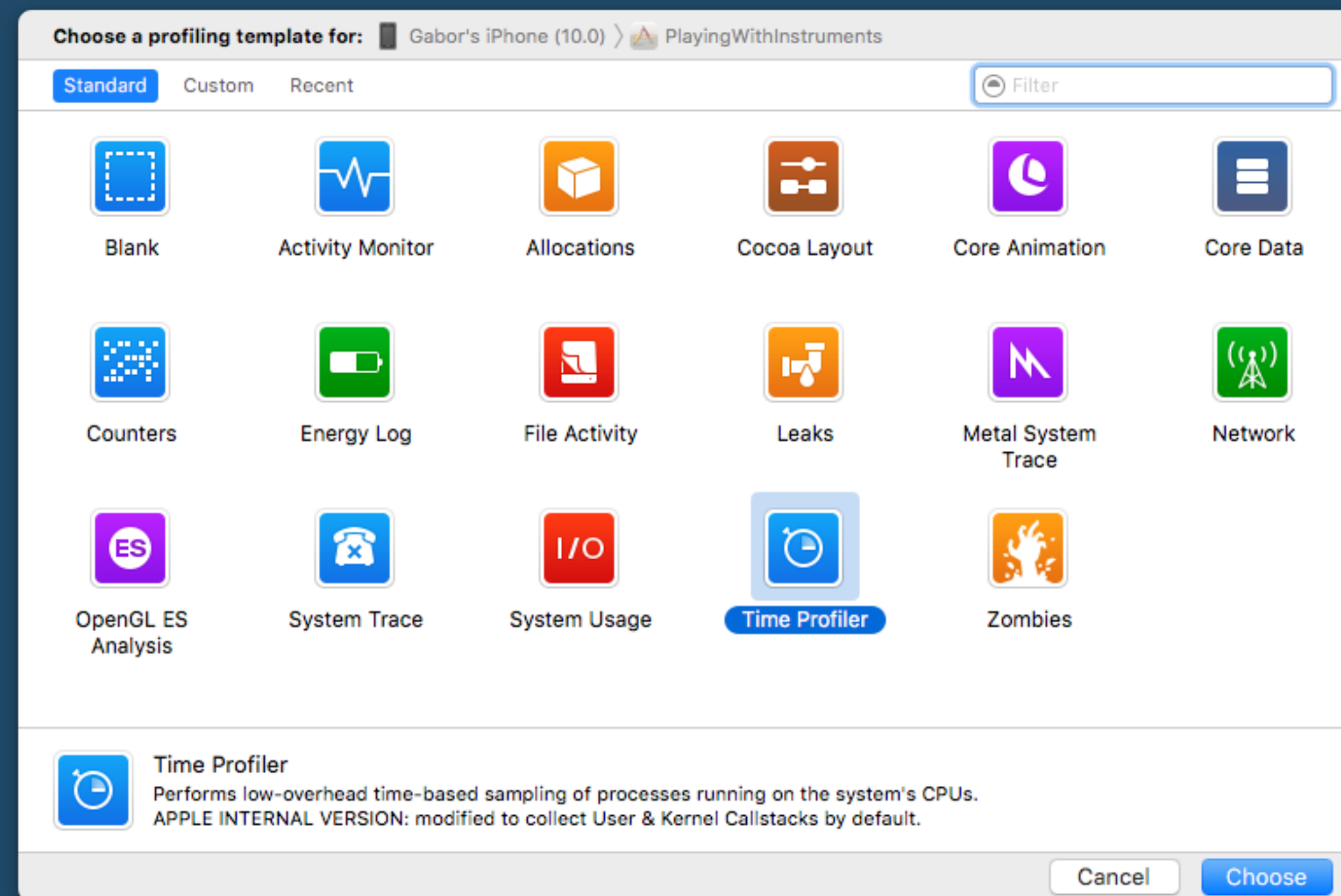


General advice

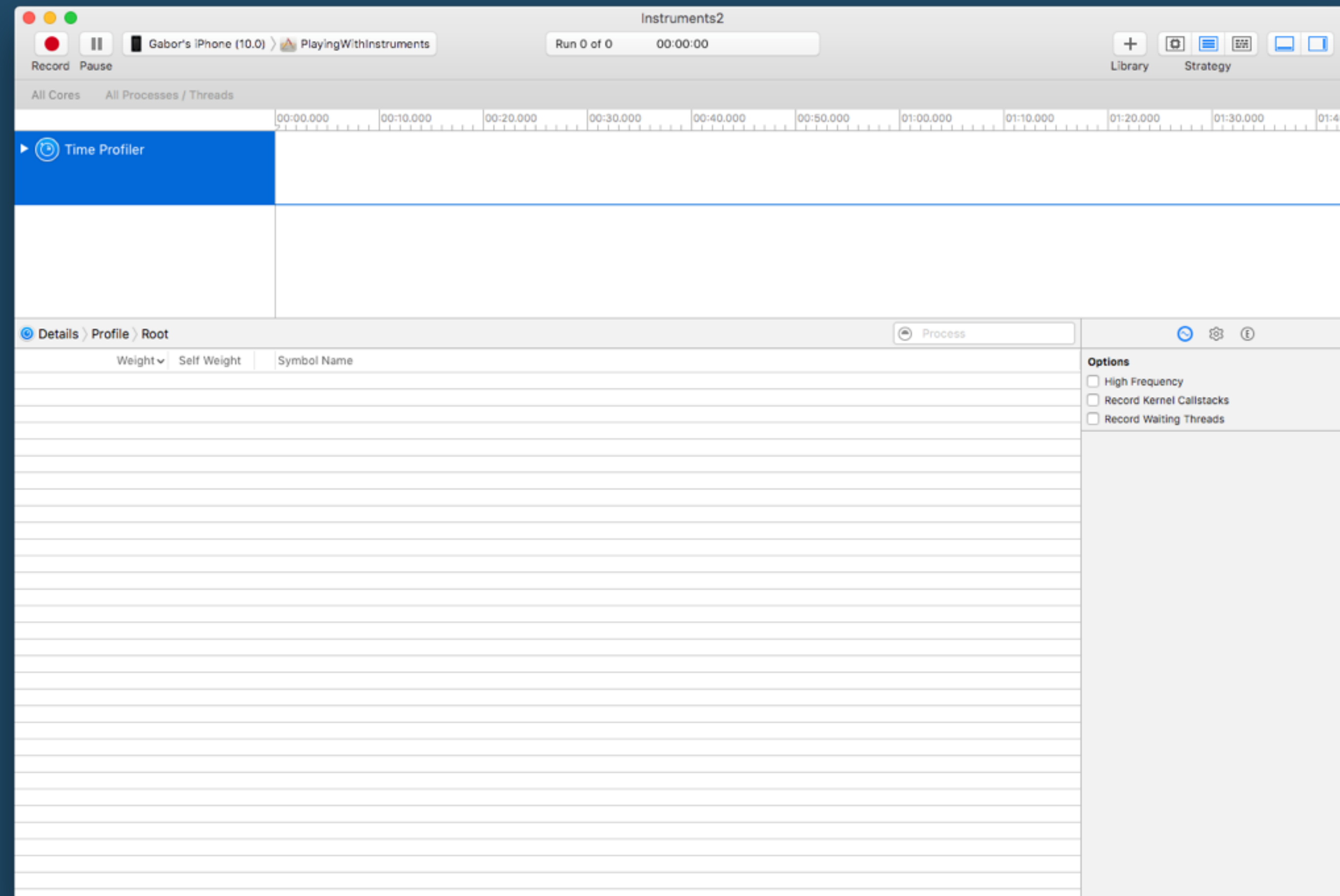
- Always profile in Release mode
- Always profile on a device
- Always profile on the lowest supported device

Let's get started

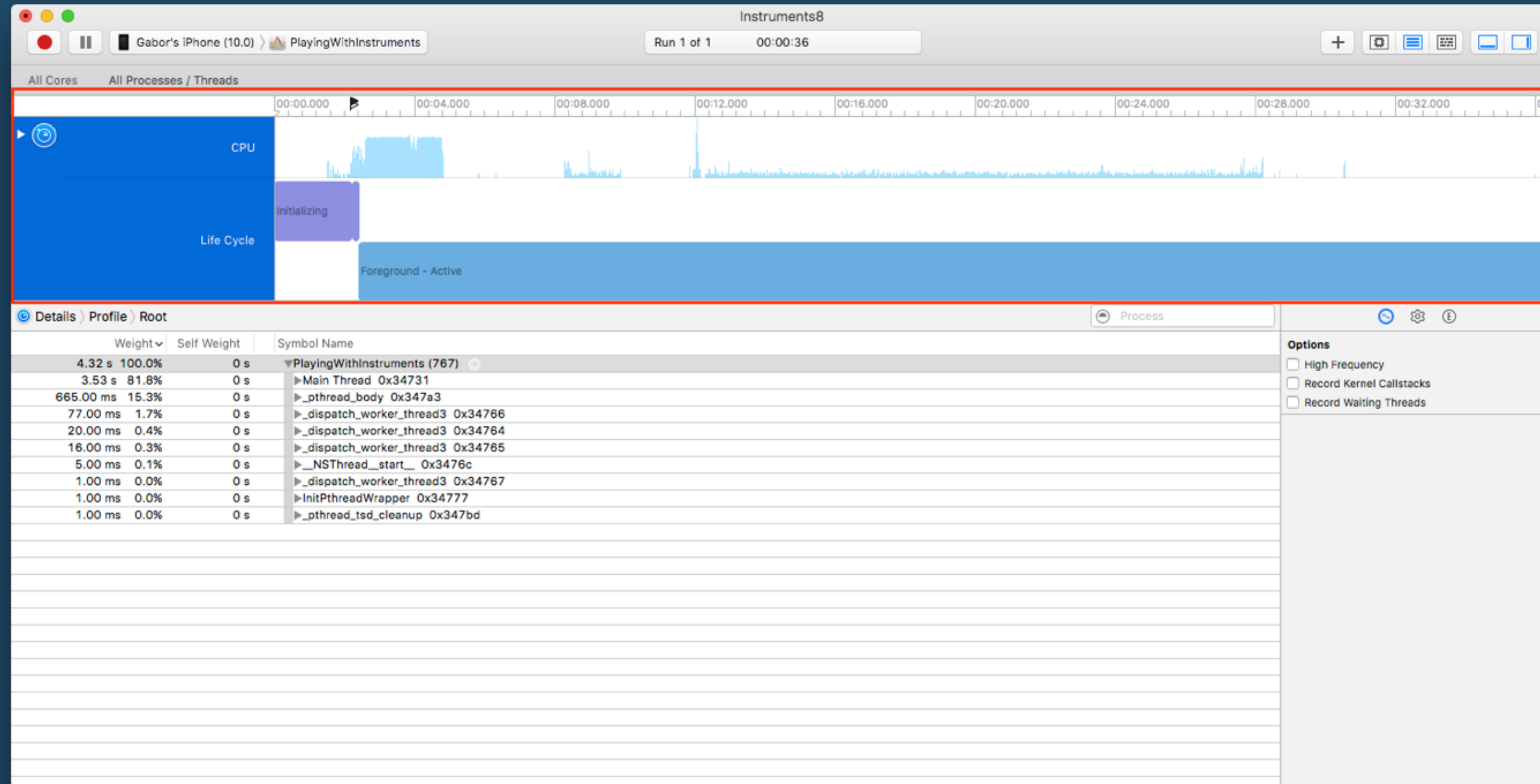
- Product → Profile



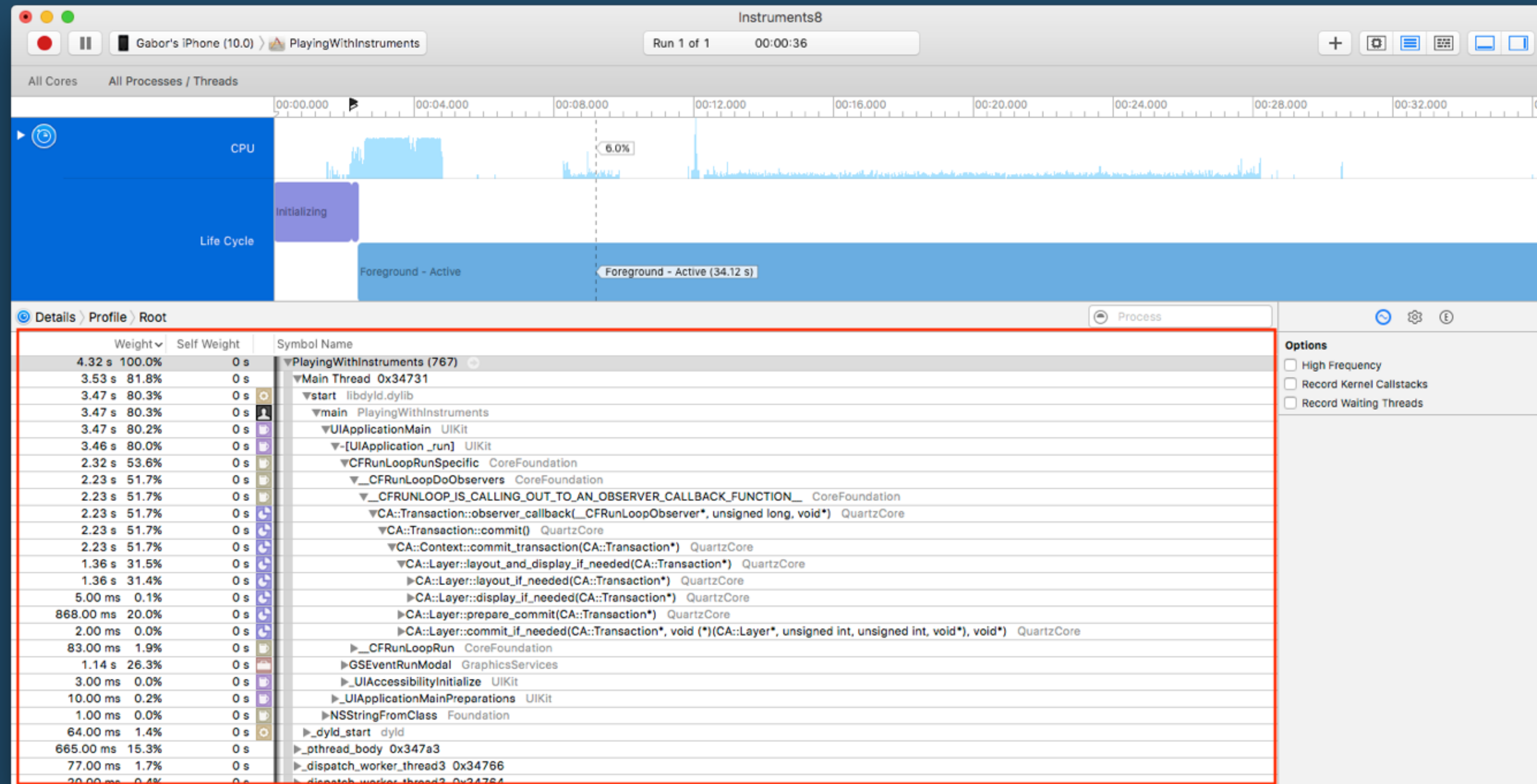
Time profiler



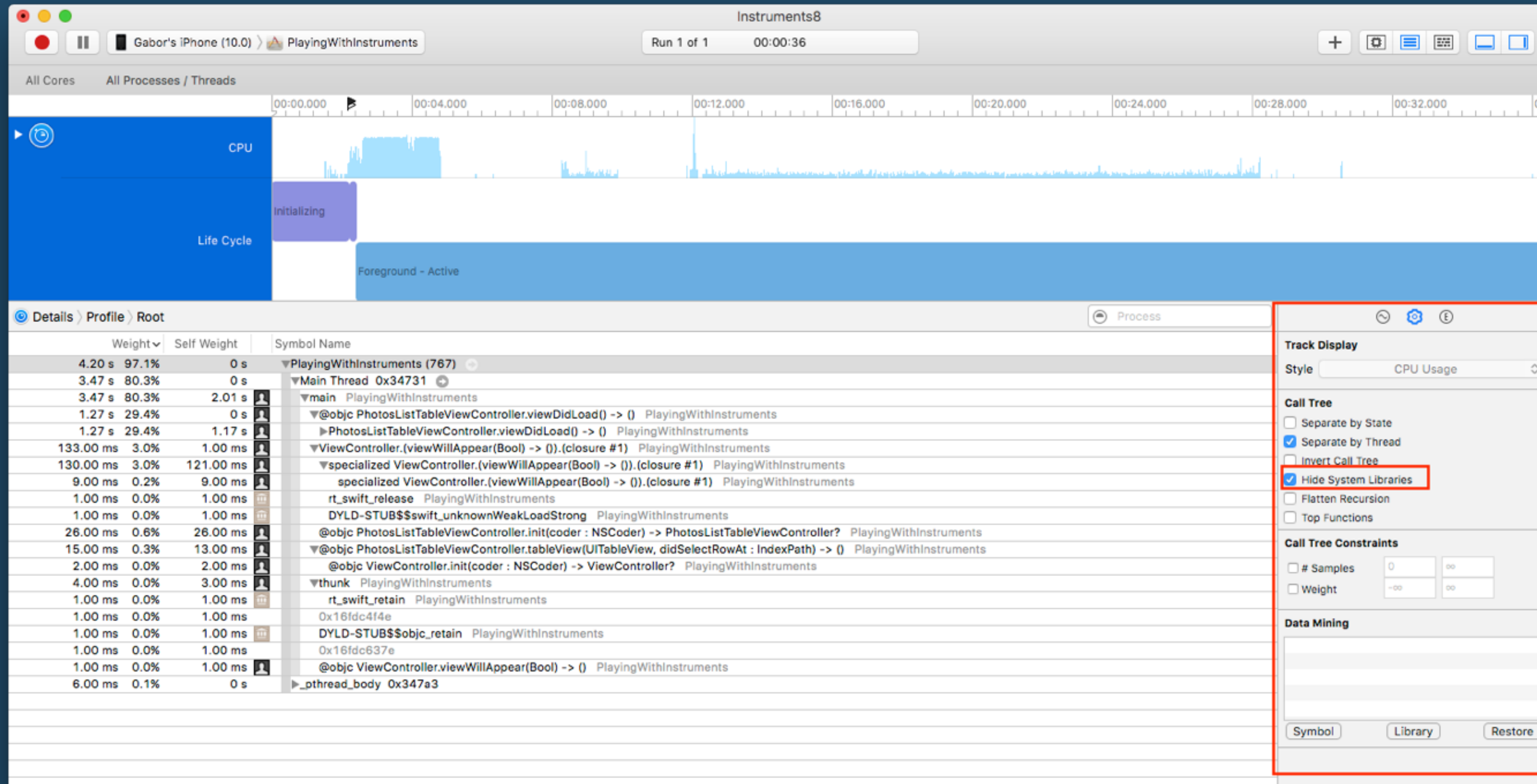
Time profiler



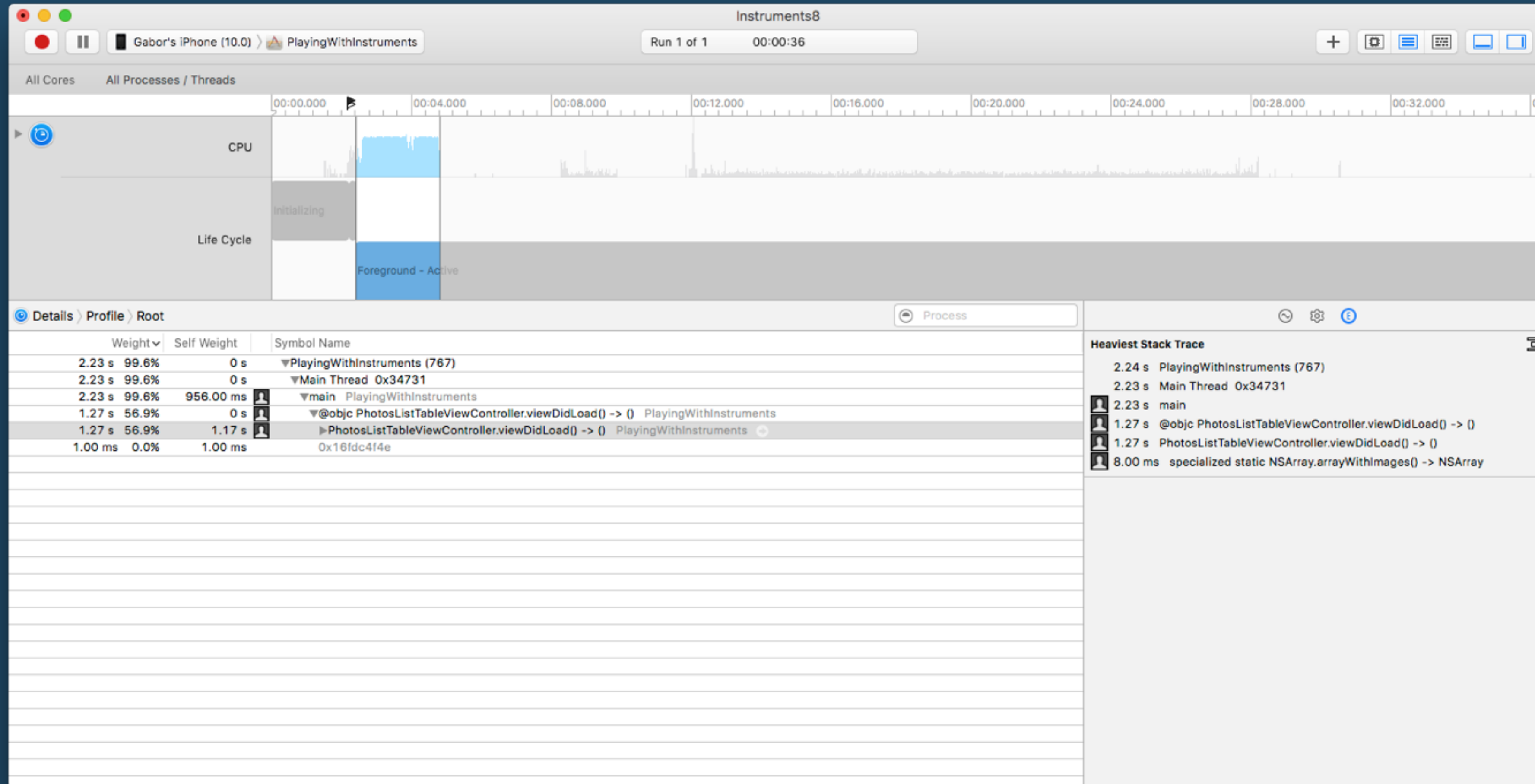
Time profiler



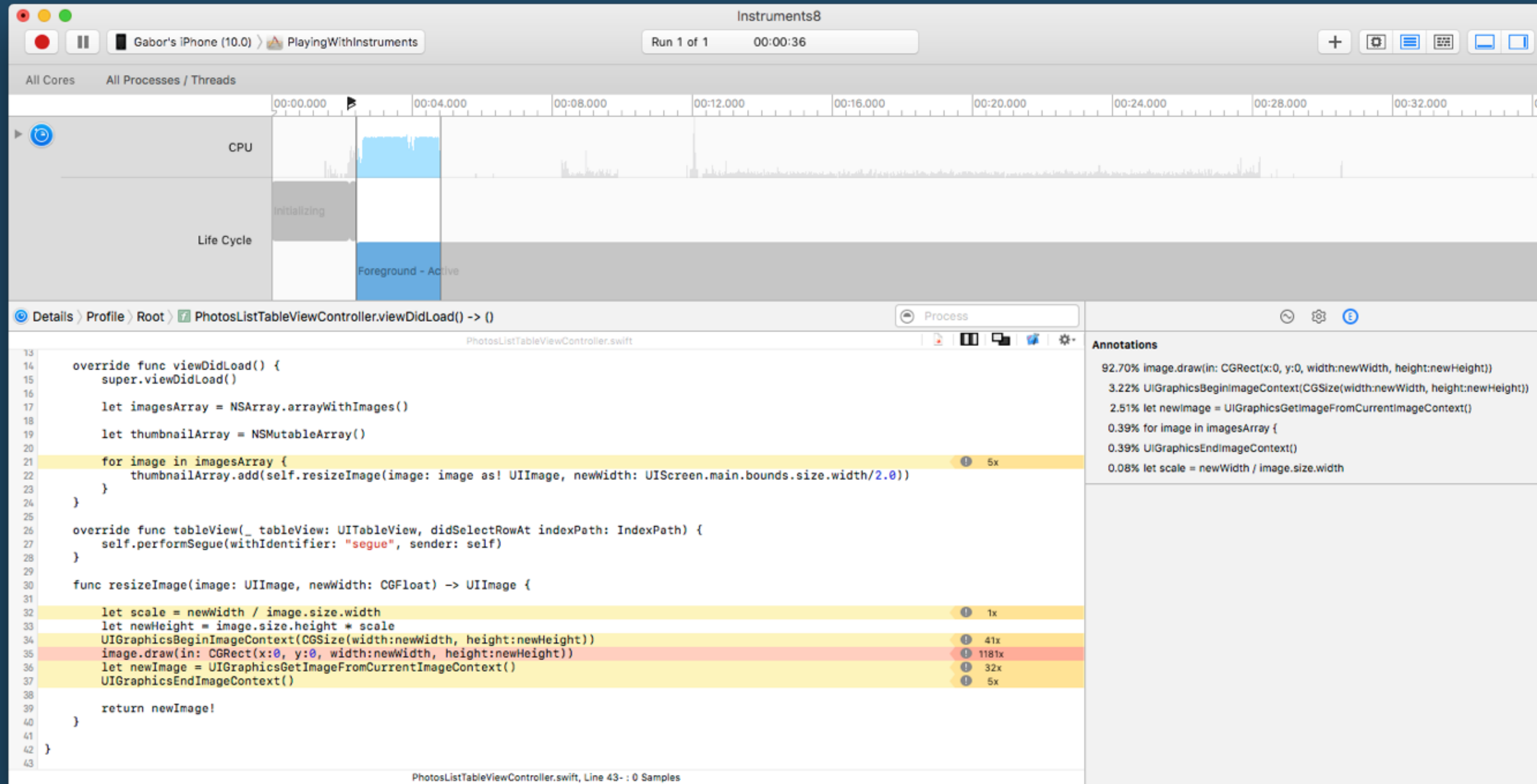
Time profiler



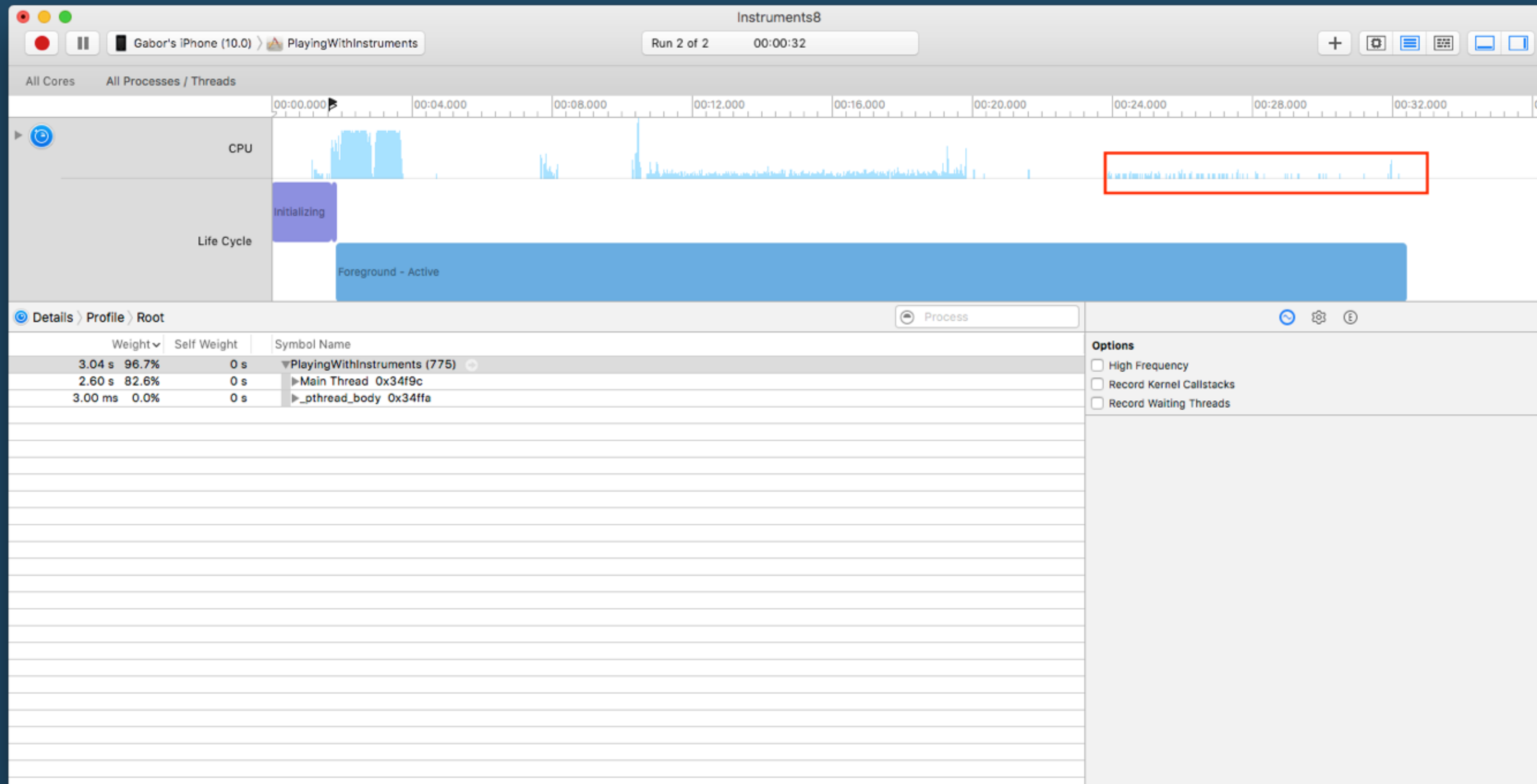
Time profiler



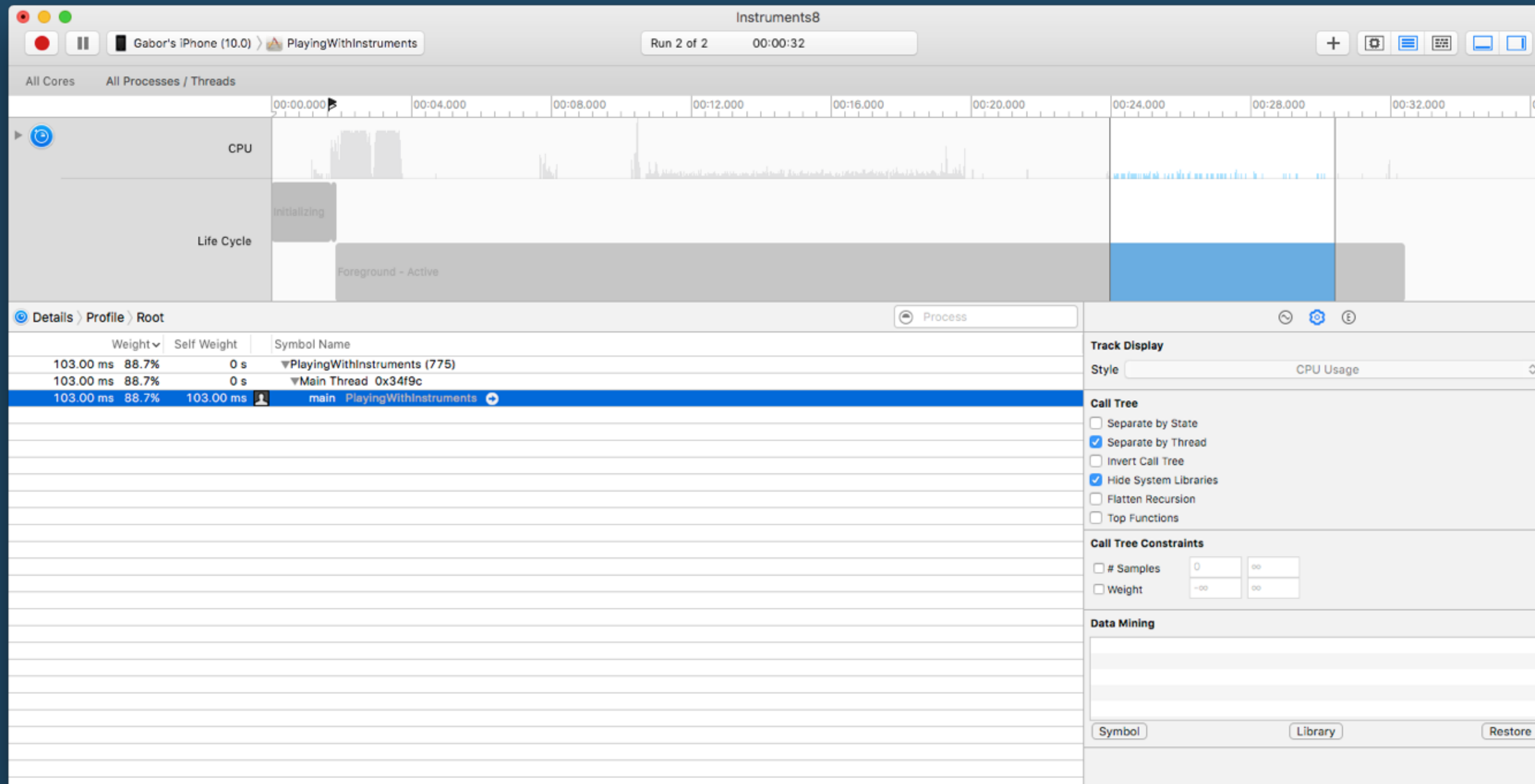
Time profiler



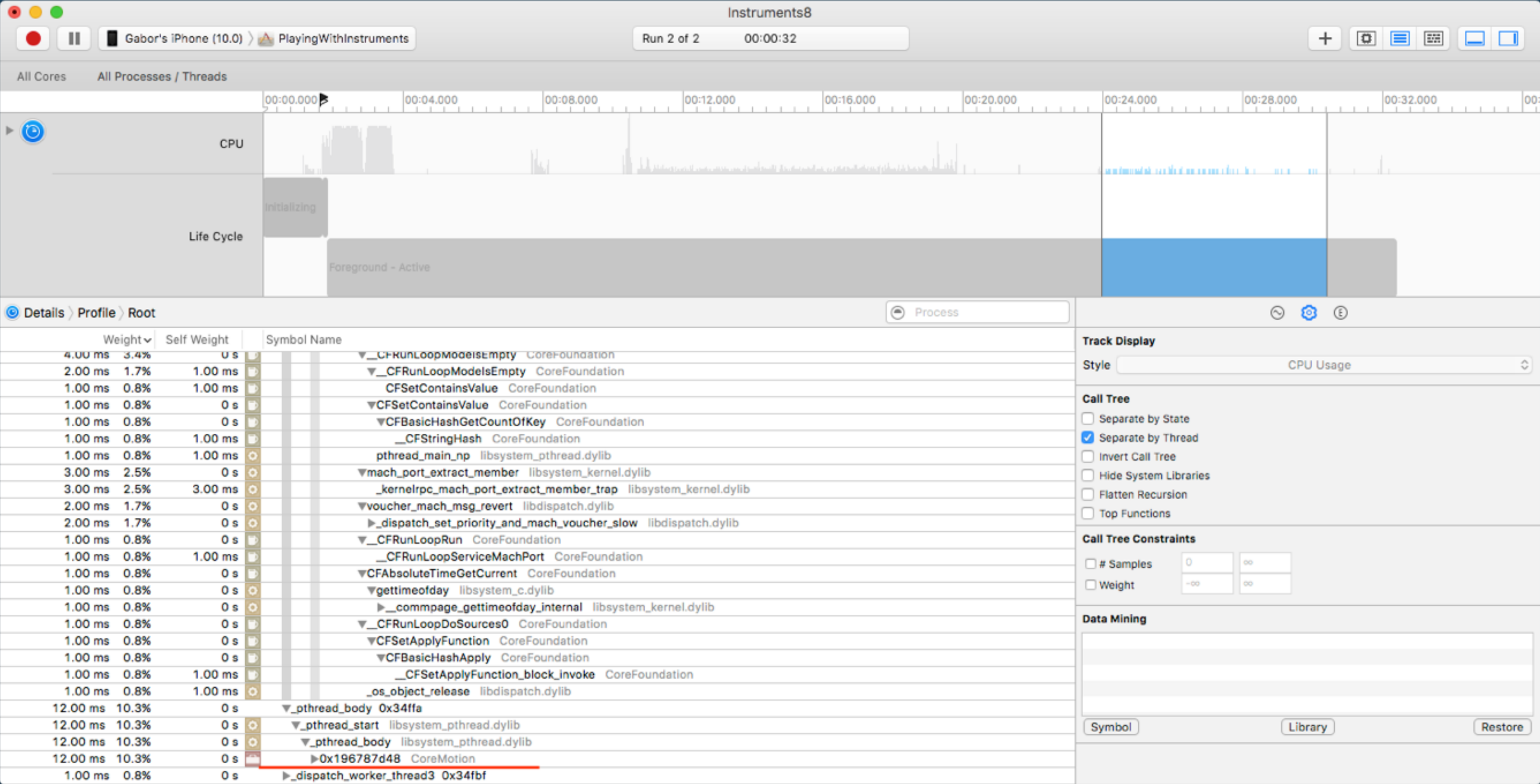
Time profiler



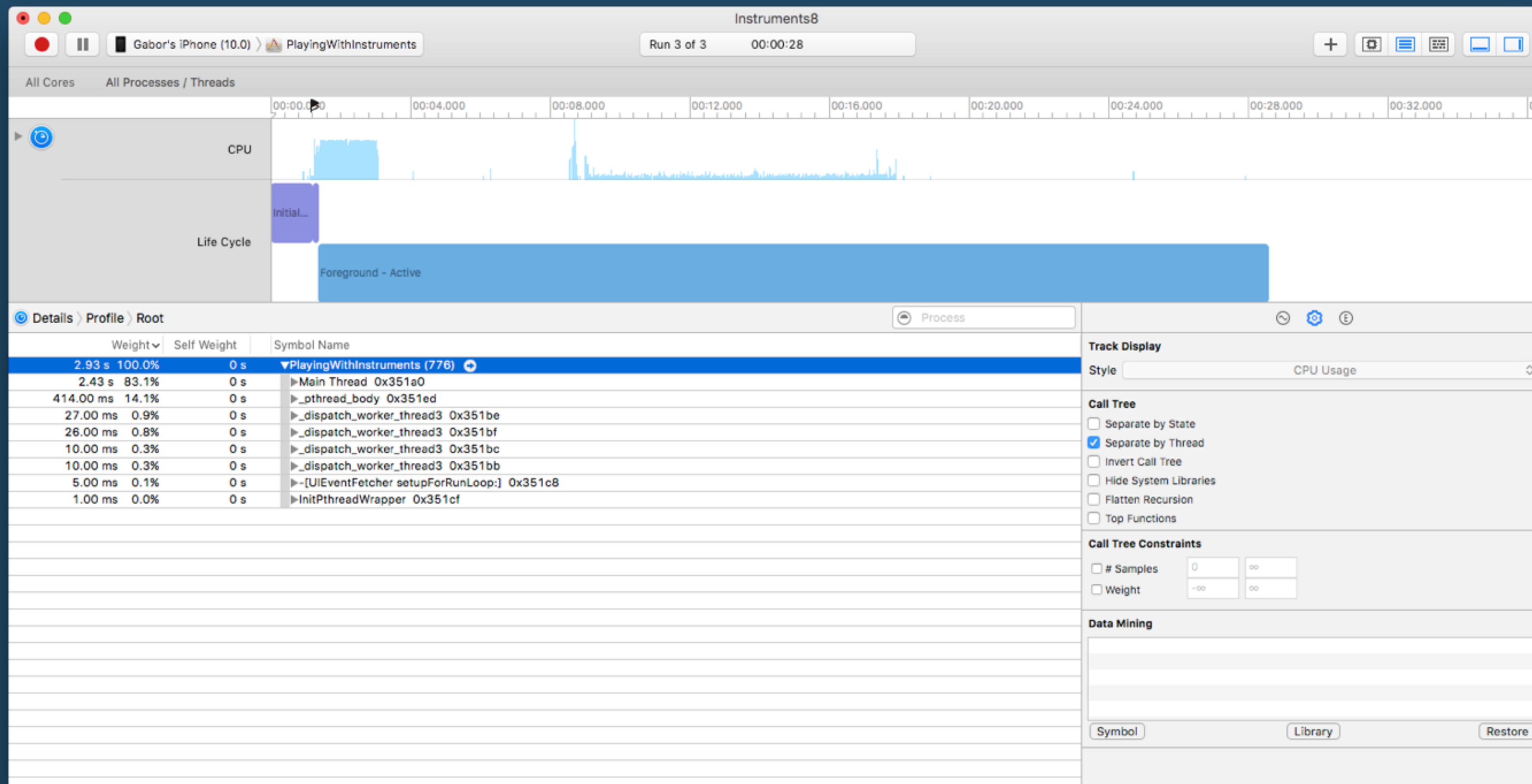
Time profiler



Time profiler



Time profiler



Review issue #1

- Found a spot that used a lot of CPU, zoomed in
- Examined the call tree
- Made it faster
- Verified our change
- Saved the user's time

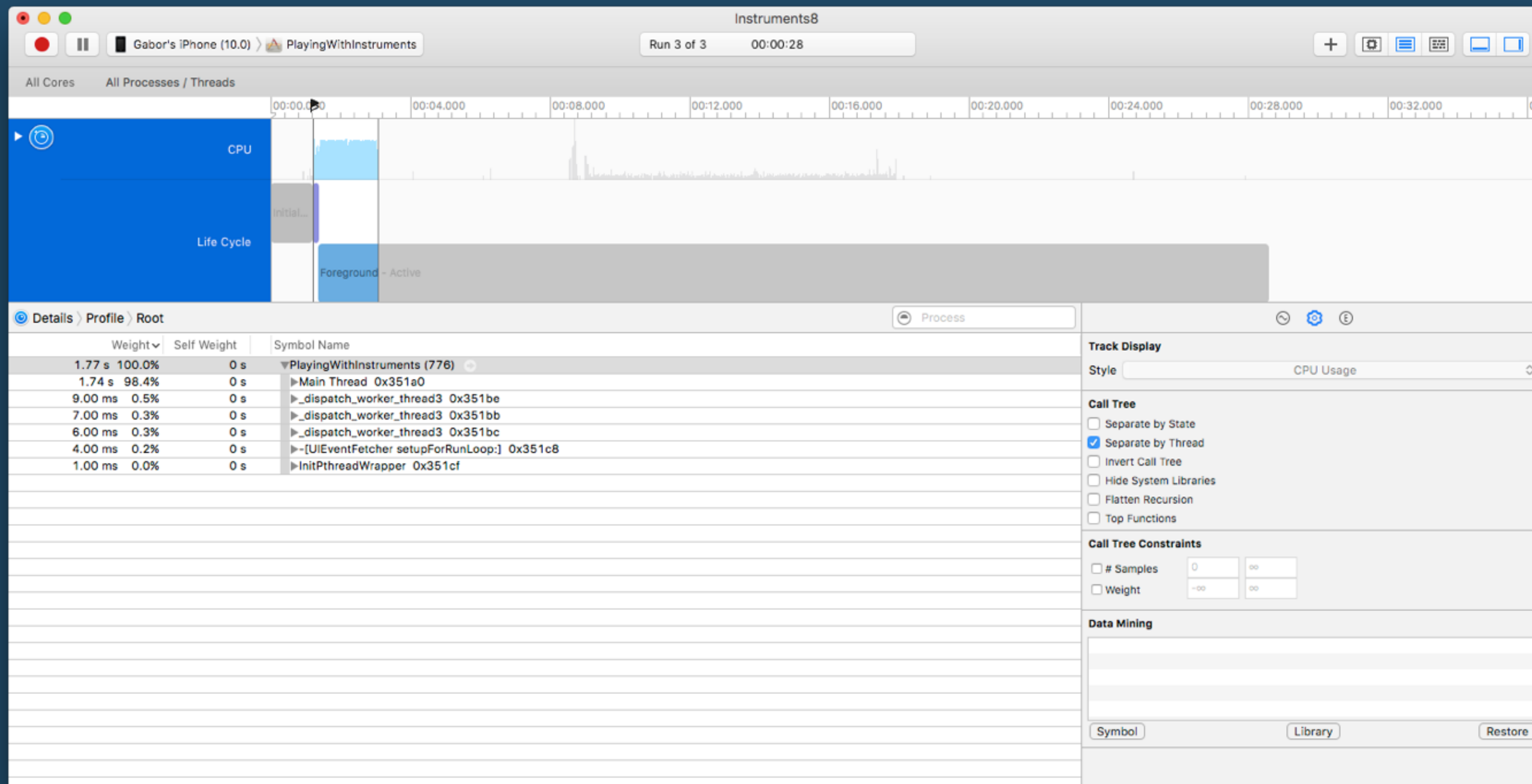
Review issue #2

- Focused on unexpected CPU usage
- Examined the call tree again
- Determined the involved frameworks
- Stopped doing that work
- Verified our change
- Saved battery life for the user

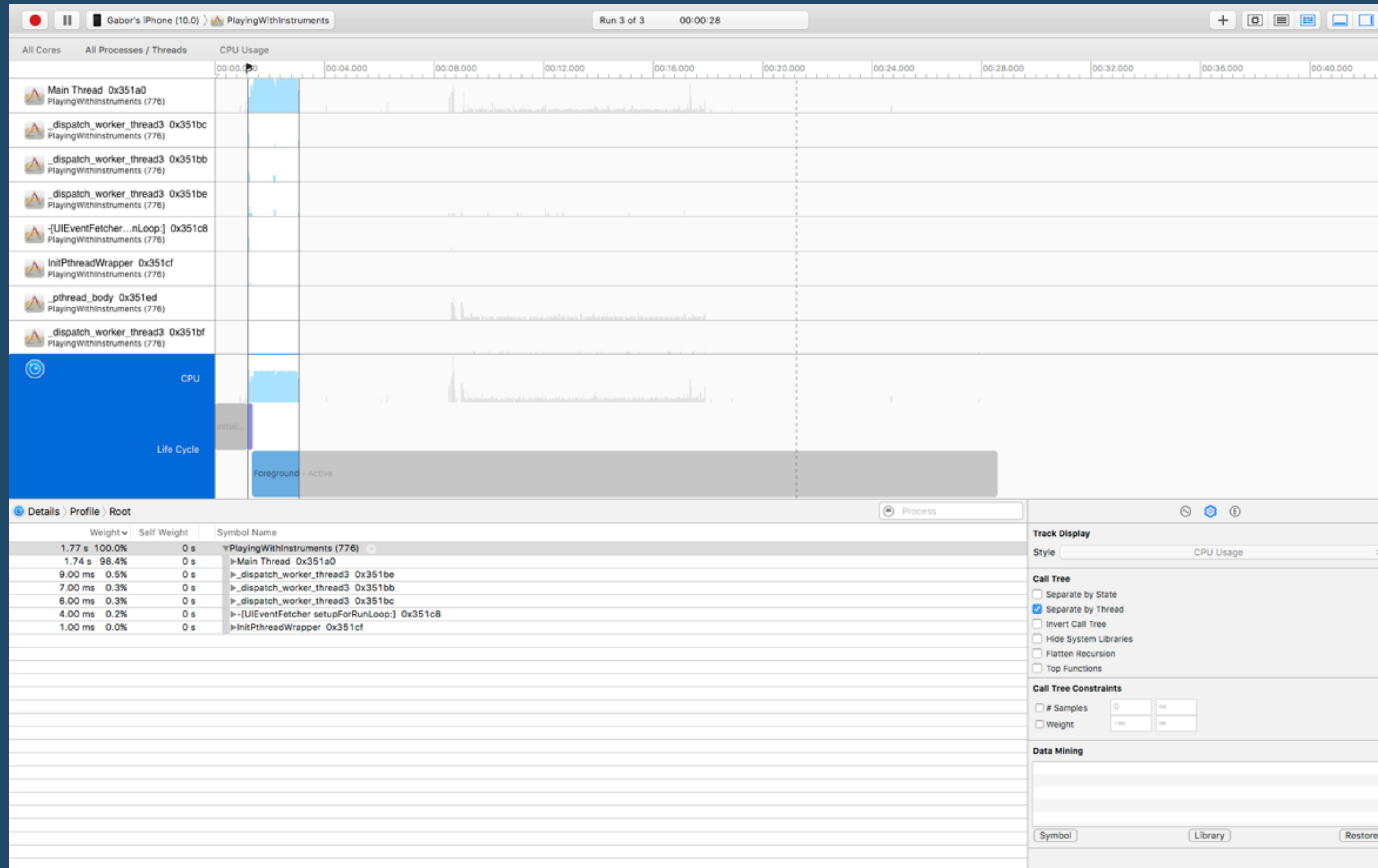
Responsiveness

- Main thread
- Move CPU intensive tasks to another thread

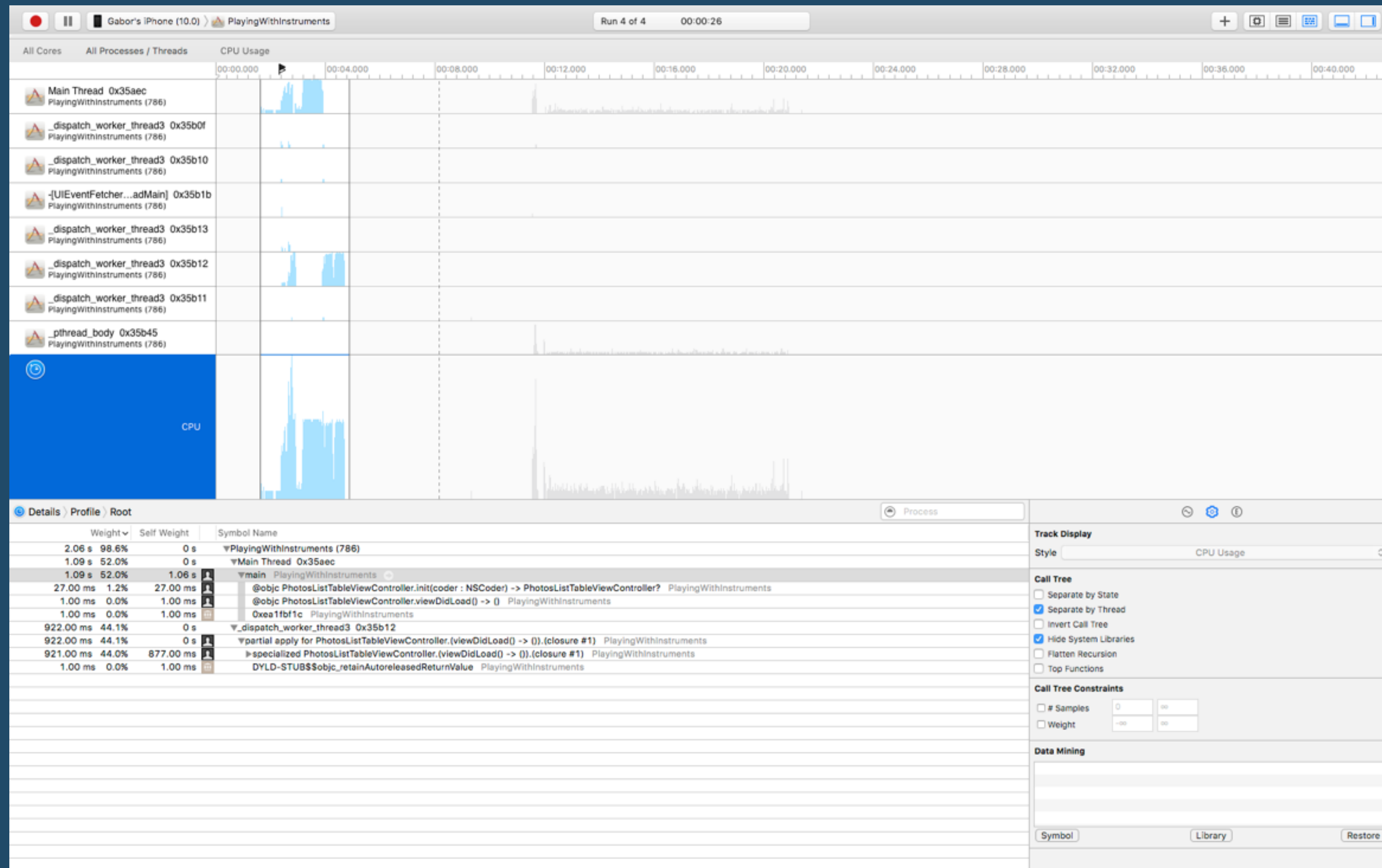
Time profiler



Time profiler



Time profiler



Review issue #3

- Examined a CPU spike
- Zoomed in, identified that non-UI related work
- Moved it from the main thread
- Verified our change
- Better user experience

Energy consumption

- Battery usage screen introduced in iOS 8



4 aspects of energy consumption

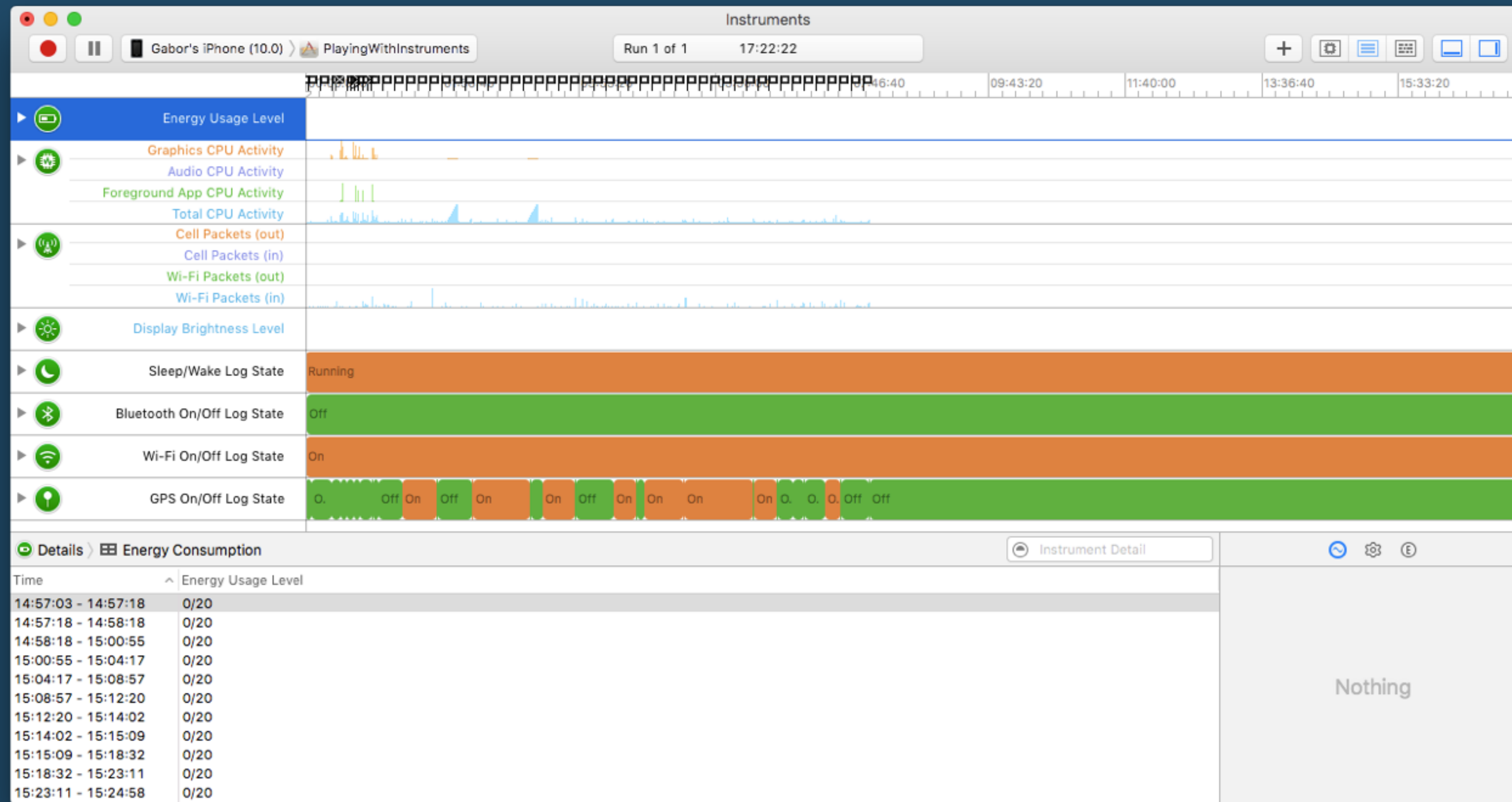
- The four aspects are: CPU, Location, Networking, Background
- What can you do about it?
- Do it never/Do it less
- Do it at a better time
- Do it efficiently

Record energy usage on device

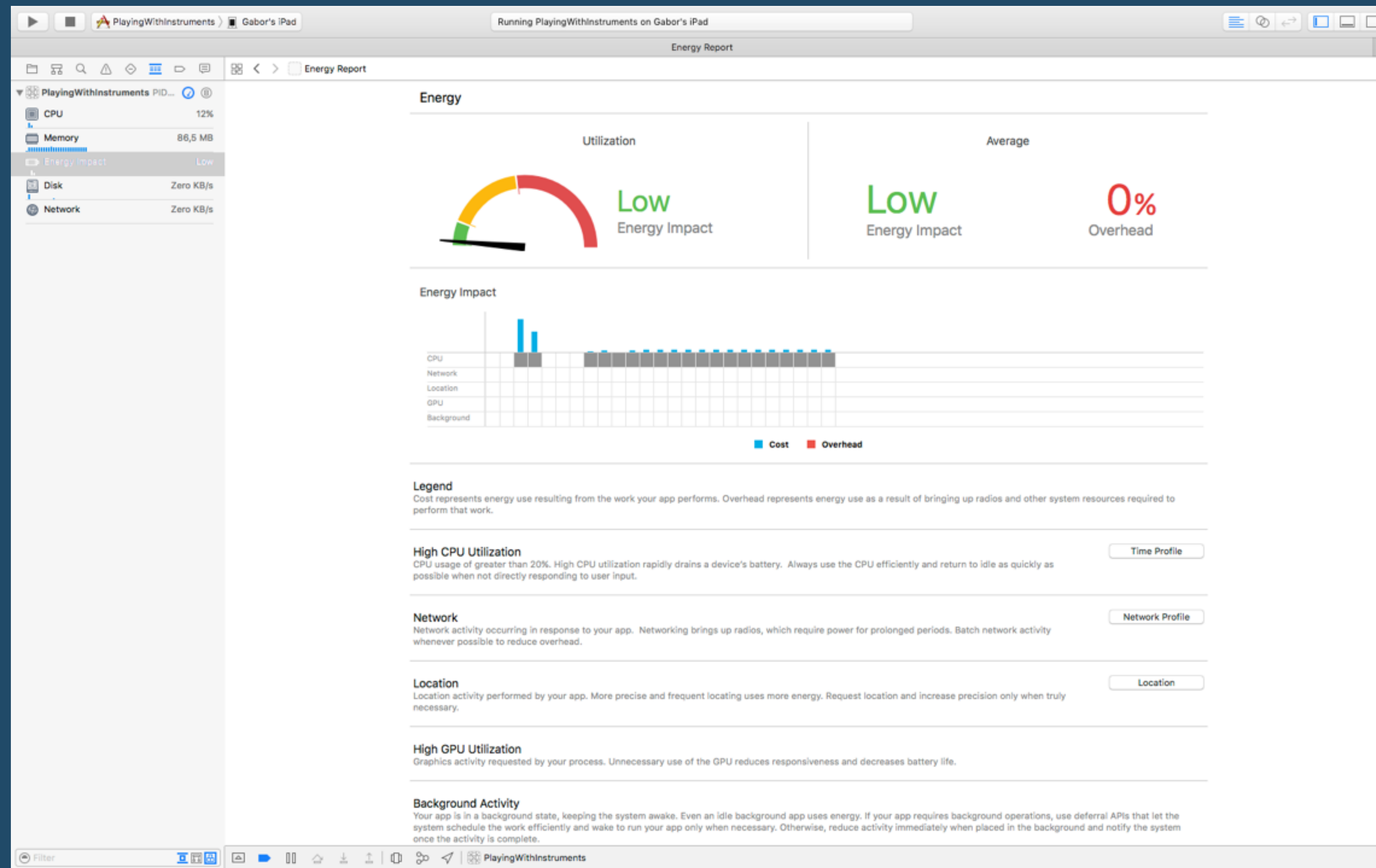
- Settings > Developer > Logging



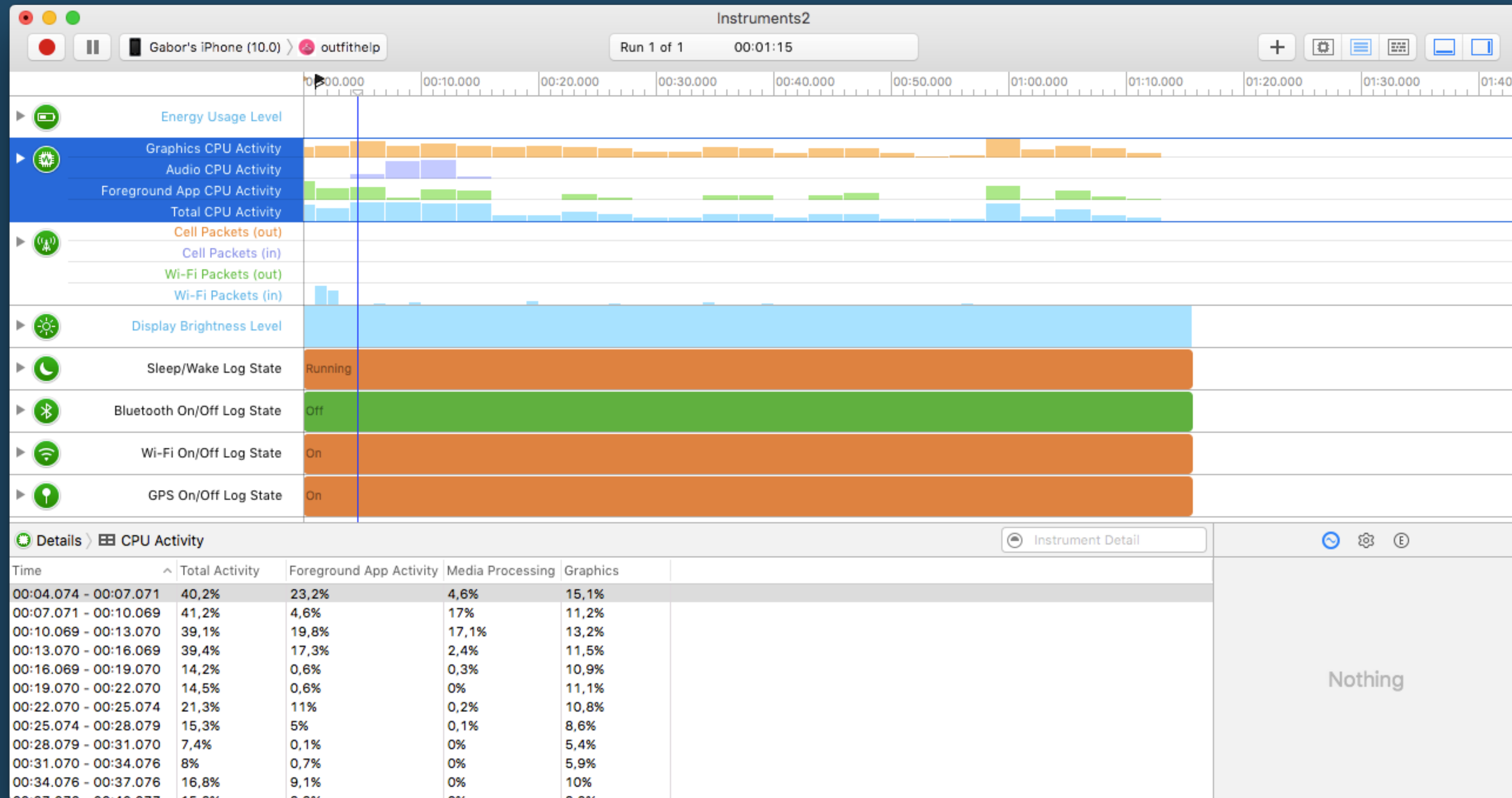
Review energy usage in Instruments



Review energy usage in Xcode



Debugging energy issues



Resources

- [Instruments User Guide](#)
- [Learning Instruments](#)
- [Performance on iOS and watchOS](#)
- [Improving Your App with Instruments](#)
- [Profiling in Depth](#)
- [Optimizing Swift Performance](#)
- [Using Time Profiler in Instruments](#)
- [Debugging Energy Issues](#)
- [Energy Efficiency Guide for iOS Apps](#)