

iPhone Performances and their Batteries

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Geekbench

- Benchmark application developed by Primate Labs
- Available for Android, iOS, and other platforms
- Provides an objective measure of performance
- Performance scores are calibrated against a baseline system
- Higher scores indicate higher performance

Geekbench Browser

- Cloud database of Geekbench benchmark results
- Geekbench uploads user results to the Geekbench Browser
- From 0.4 to 1.1 million results uploaded each month

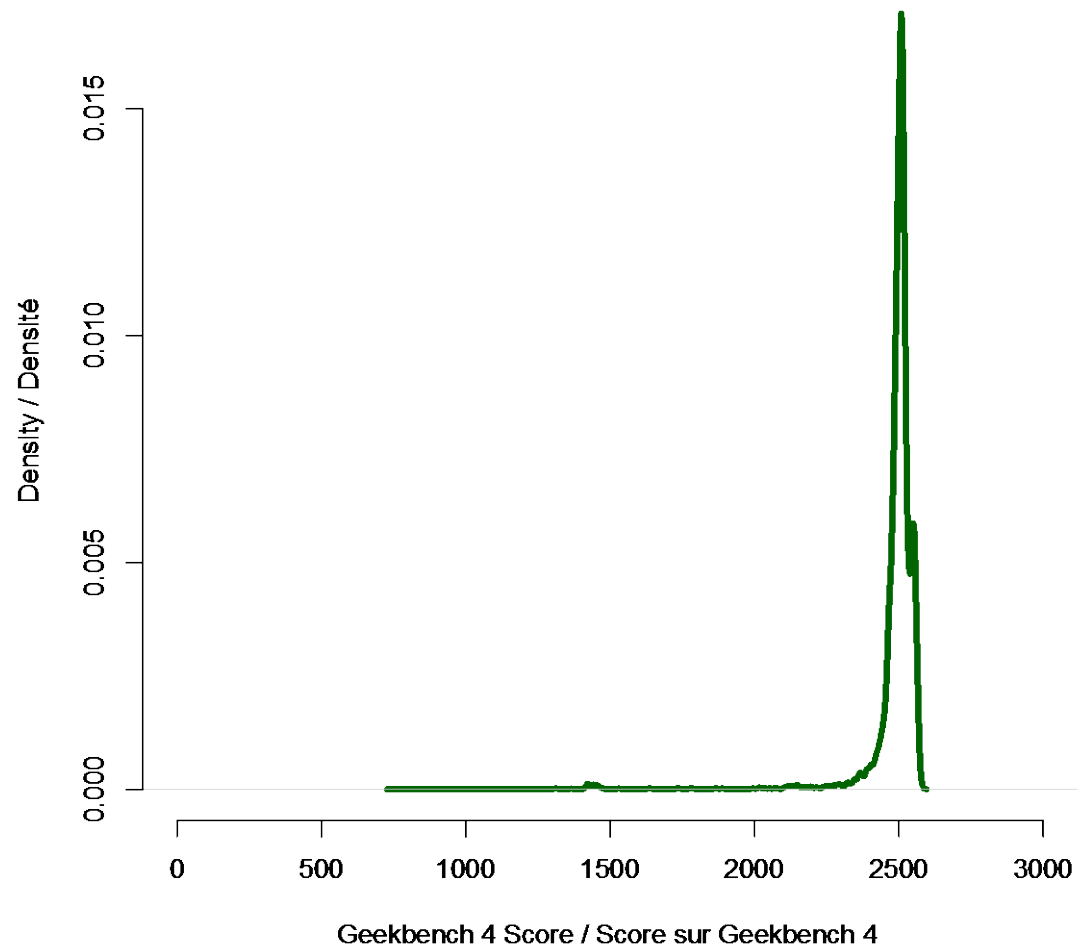
Timeline

- September 2017
 - Geekbench users complain of slow iPhones
 - No obvious cause, unable to reproduce
- December 2017
 - Reddit post, “PSA: iPhone slow? Try replacing your battery!”
 - <http://bit.ly/2sRsy6K>
 - “Apple slows down phones with low capacity batteries, replacing it makes them full speed again.”
 - Geekbench post, “iPhone Performance and Battery Age”
 - <http://bit.ly/2yUKpXX>

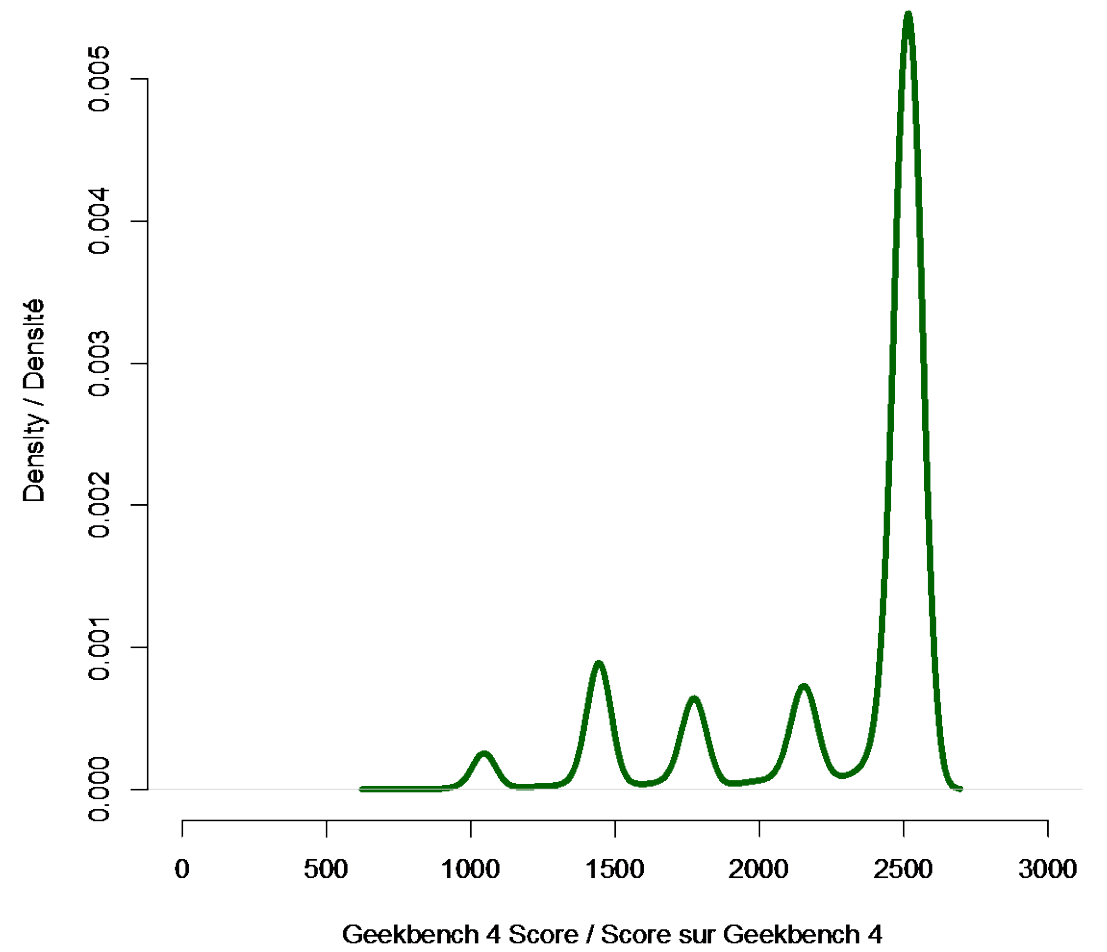
iPhone Performance and Battery Age

- Kernel density plots of Geekbench scores for several iOS versions
- Based on user benchmark data from Geekbench Browser
 - Approximately 120,000 iPhone 6s, iPhone 7 results

iPhone 6s – 10.2 – Global / Mondial



iPhone 6s – 10.2.1 – Global / Mondial



iPhone Performance and Battery Age

- iOS 10.2.0
 - Distribution appears unimodal
 - Single large peak around average score
- iOS 10.2.1
 - Distribution appears multimodal
 - Large peak around average score
 - Four smaller peaks around lower scores
- Dramatic difference suggests a change between versions

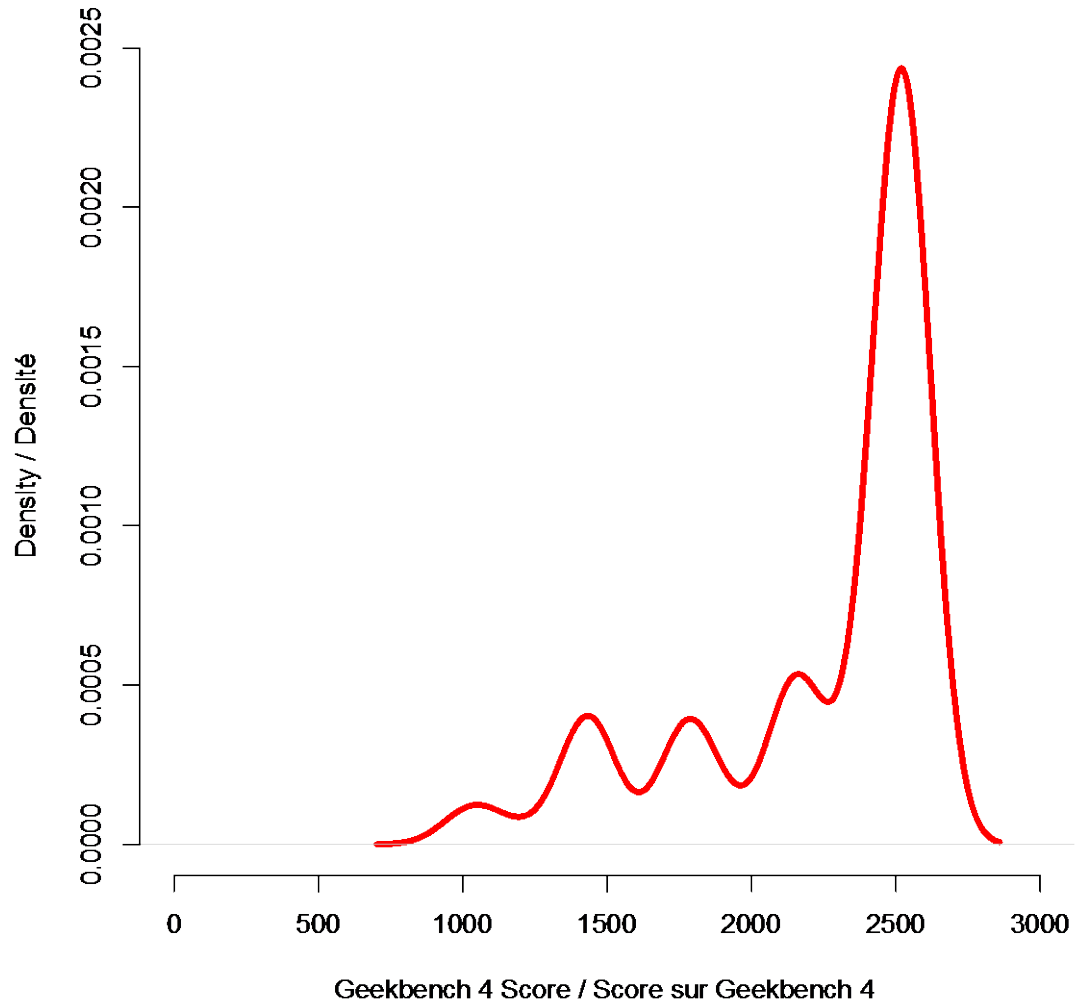
Apple Statements

- Apple confirmed reduced performance was due to software update
- Software change to work around hardware issue
- Sudden shutdown
 - Issue from December 2016
 - iPhone 6s would shut down with 30% battery remaining
- Processors use more power when operating at full performance
- Degraded batteries may not be able to provide enough power
- Workaround is to limit processor performance

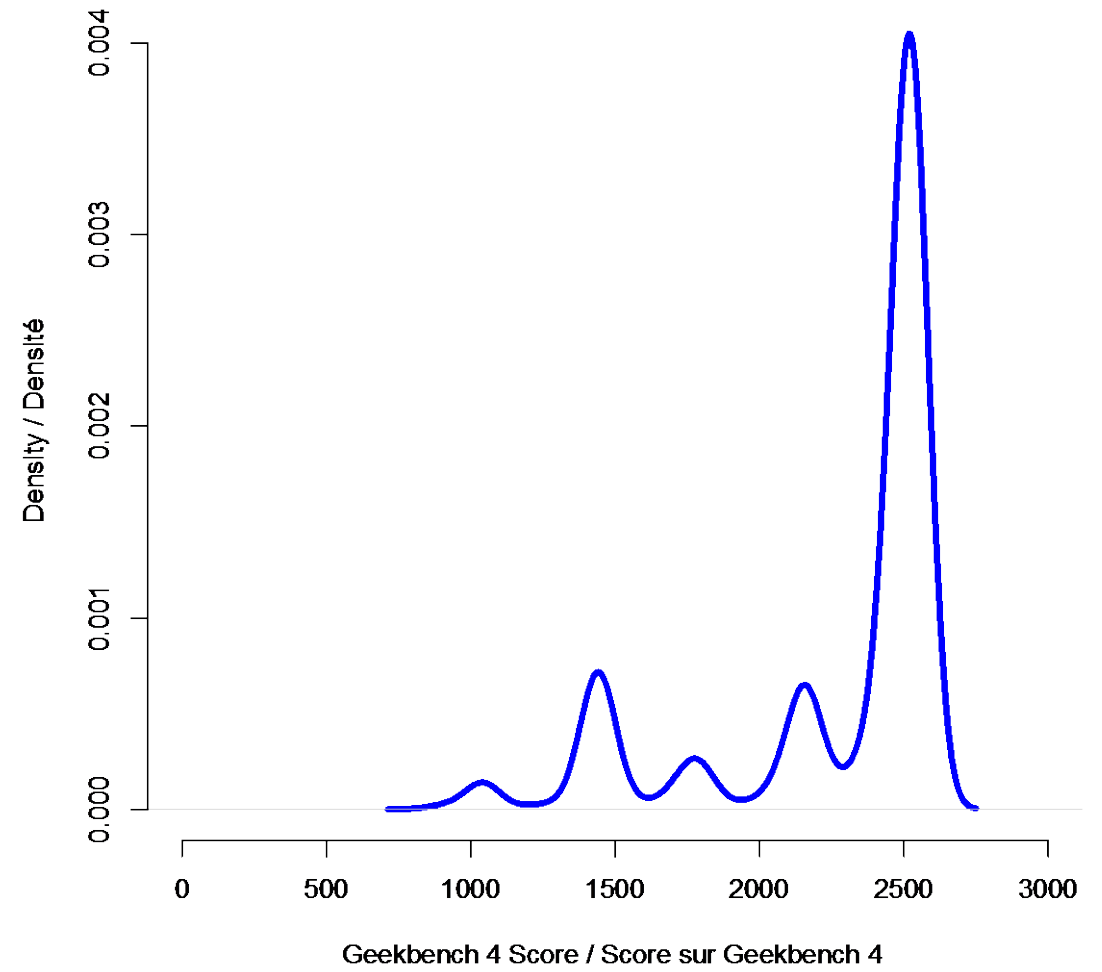
Canadian, American iPhones

- Does this issue affect Canadian, American iPhones differently?
- Plot results from iPhone 6s running iOS 11.2
 - 192 Canadian results
 - 1580 American results
- Classification based on location at benchmark runtime
 - Some phones may be misclassified (e.g., American phone in Canada)
 - Should not affect the majority of results

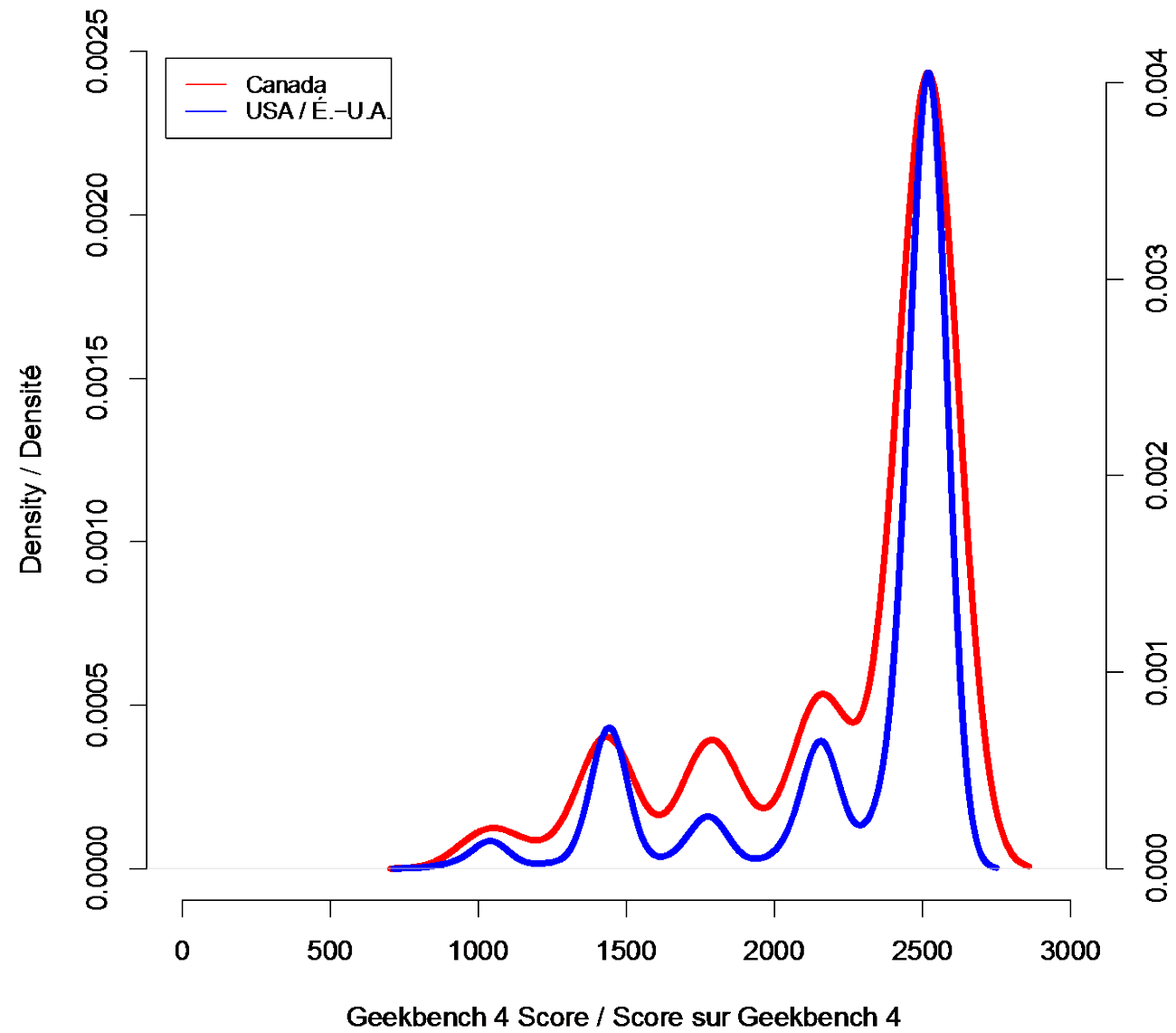
iPhone 6s – 11.2 – Canada



iPhone 6s – 11.2 – USA / É.-U.A.



iPhone 6s – 11.2 – Canada, USA / Canada, É.-U.A.



Canadian, American iPhones

- Similar score distribution between Canadian, American iPhones
- Suggests there's no difference in how this issue affects Canadians as compared to Americans