Reducing Mobile Throttling from Temperature by Offloading Apps

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Abstract

Mobile phone processors are becoming increasingly powerful. However, this greater power has come at the cost of greatly increased heat production. This is problematic because mobile phones are generally only passively cooled. Running apps for long periods or even briefly running computationally intensive apps causes very high CPU temperatures, forcing phones to throttle their CPUs by reducing core frequency to prevent damage. Reducing the frequency of cores reduces global performance, which in turn can negatively impact user experience. For example, in one benchmark, the performance (measured in FPS) of the new HTC One M9 with an eight core Qualcomm 810 chipset dropped below the performance of the four core Nexus 5, released in 2013, after only a few seconds. This indicates that temperature can pose a significant problem in mobile devices. In addition, high device temperatures increase power loss, reducing battery life [2]. We propose a new mobile cooling mechanism: offloading, or running apps on local servers. While offloading to improve single-app performance has been well studied [1], offloading has never been used to manage phone temperatures. We found that by identifying and offloading computationally intensive apps, we could greatly reduce phone temperatures, preventing throttling and increasing overall performance. This global performance gain benefits other apps running concurrently on phones.

Body

Offload intensive apps from phones to avoid high temperatures that cause throttling and reduce global performance.

References

- [1] Mark S Gordon, Davoud Anoushe Jamshidi, Scott A Mahlke, Zhuoqing Morley Mao, and Xu Chen. Comet: Code offload by migrating execution transparently. In *OSDI*, pages 93–106, 2012.
- [2] Krishna Sekar. Power and thermal challenges in mobile devices. In *MobiCom*, pages 363–368. ACM, 2013.