Cells: A Virtual Mobile Smartphone Architecture

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Abstract

Cellphones are increasingly ubiquitous, so much so that many users are inconveniently forced to carry multiple cellphones to accommodate work, personal, and geographic mobility needs. We present *Cells*, a virtualization architecture for enabling multiple virtual smartphones to run simultaneously on the same physical cellphone device in a securely isolated manner. *Cells* introduces a usage model of having one foreground virtual phone and multiple background virtual phones. This model enables a new device namespace mechanism and novel device proxies that integrate with lightweight operating system virtualization to efficiently and securely multiplex phone hardware devices across multiple virtual phones while providing native hardware device performance to all applications. Virtual phone features include fully-accelerated graphics for gaming, complete power management features, and full telephony functionality with separately assignable telephone numbers and caller ID support. We have implemented a *Cells* prototype that supports multiple Android virtual phones on the same phone hardware. Our performance results demonstrate that *Cells* imposes only modest runtime and memory overhead, works seamlessly across multiple hardware devices including Google Nexus 1 and Nexus S phones and an NVIDIA tablet, and transparently runs all existing Android applications without any modifications.

1 Contact

Please contact the authors regarding full text of the paper.