Abstract: Software side channel attacks have become a serious concern with the recent rash of attacks on speculative processor architectures. Most attacks that have been demonstrated exploit the cache tag state as their exfiltration channel. While many existing defense mechanisms that can be implemented solely in software have been proposed, these mechanisms appear to patch specific attacks, and can be circumvented. We propose minimal modifications to hardware to defend against a broad class of attacks, including those based on speculation, with the goal of eliminating the entire attack surface associated with the cache state covert channel. These modifications are layered on top of the Sanctum secure processor architecture that offers strong provable isolation of software modules running concurrently and sharing resources.

Joint work with Ilia Lebedev, Vladimir Kiriansky, Saman Amarasinghe and Joel Emer

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