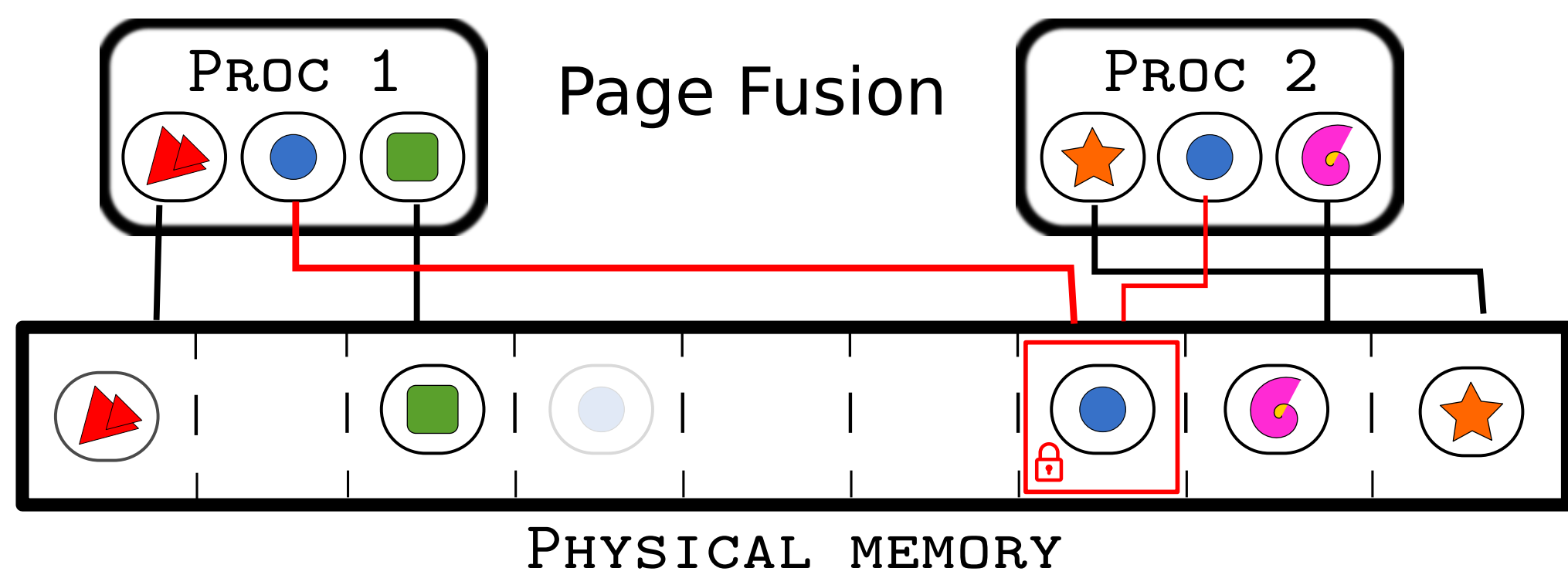


Problem

There are a lot of duplicate contents in Mobile, Desktop and Clouds...

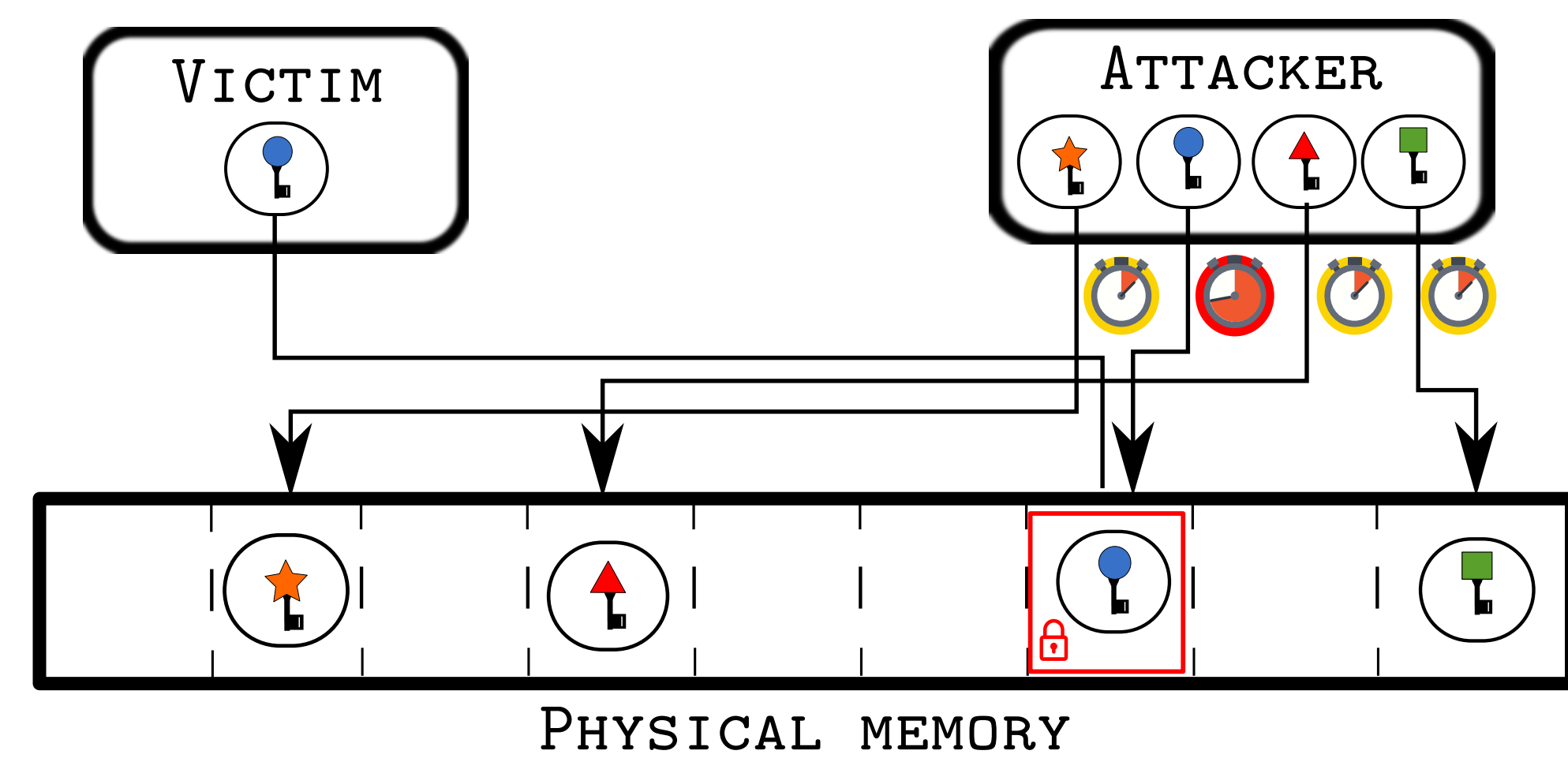


Fuse same-content to save memory

But current Page Fusion systems are prone to **Side-channel** and **Rowhammer** attacks.

Can we make a **Secure Page Fusion System?**

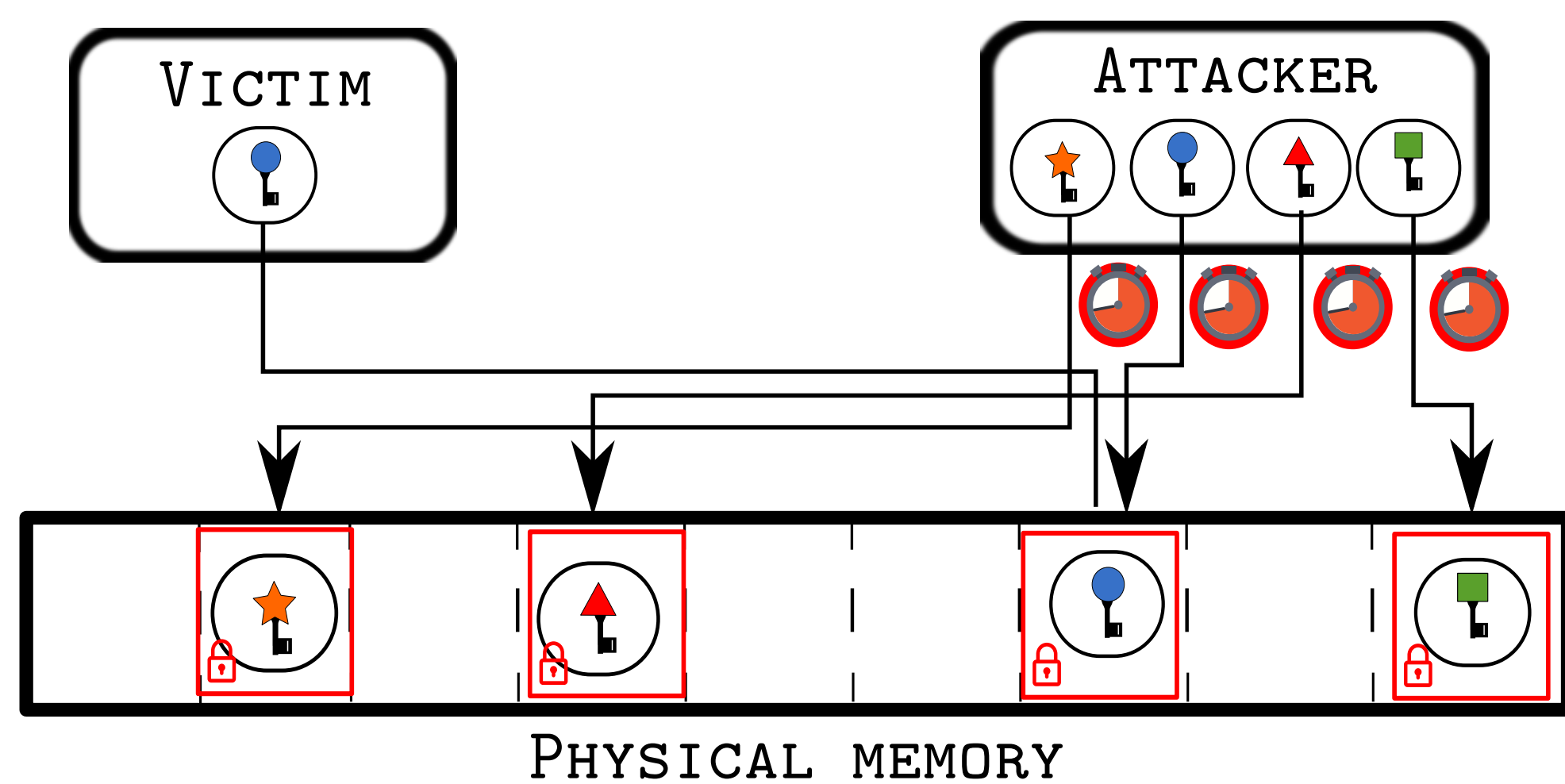
Side-channel Attacks



Slow copy-on-write leaks information during **writing**

Other attacks can also leak information by just **reading**

VUision: Same Behaviour



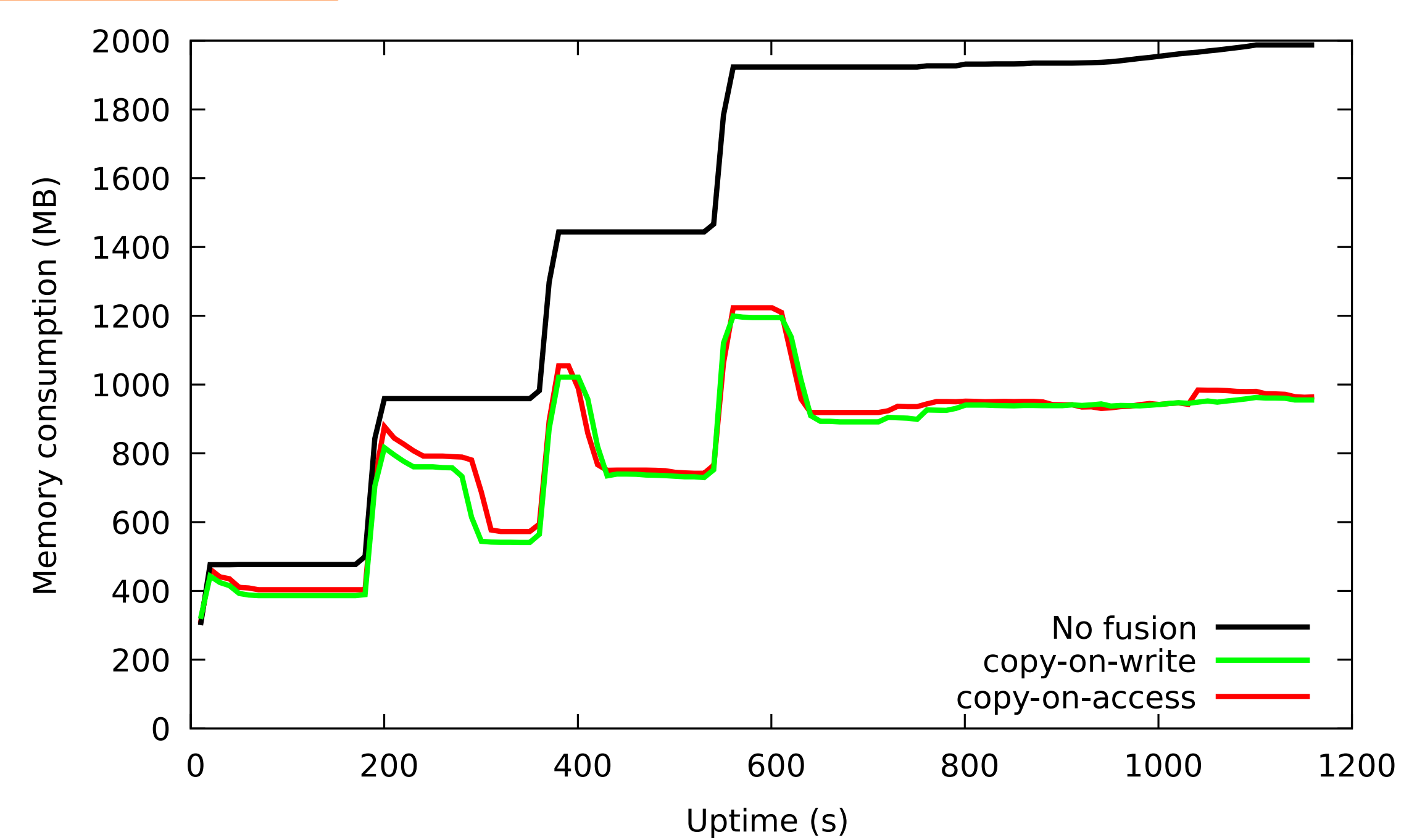
Fake Merging

Stops side channels via writes

Share XOR Fetch

Stops side channels via reads

Design Insights

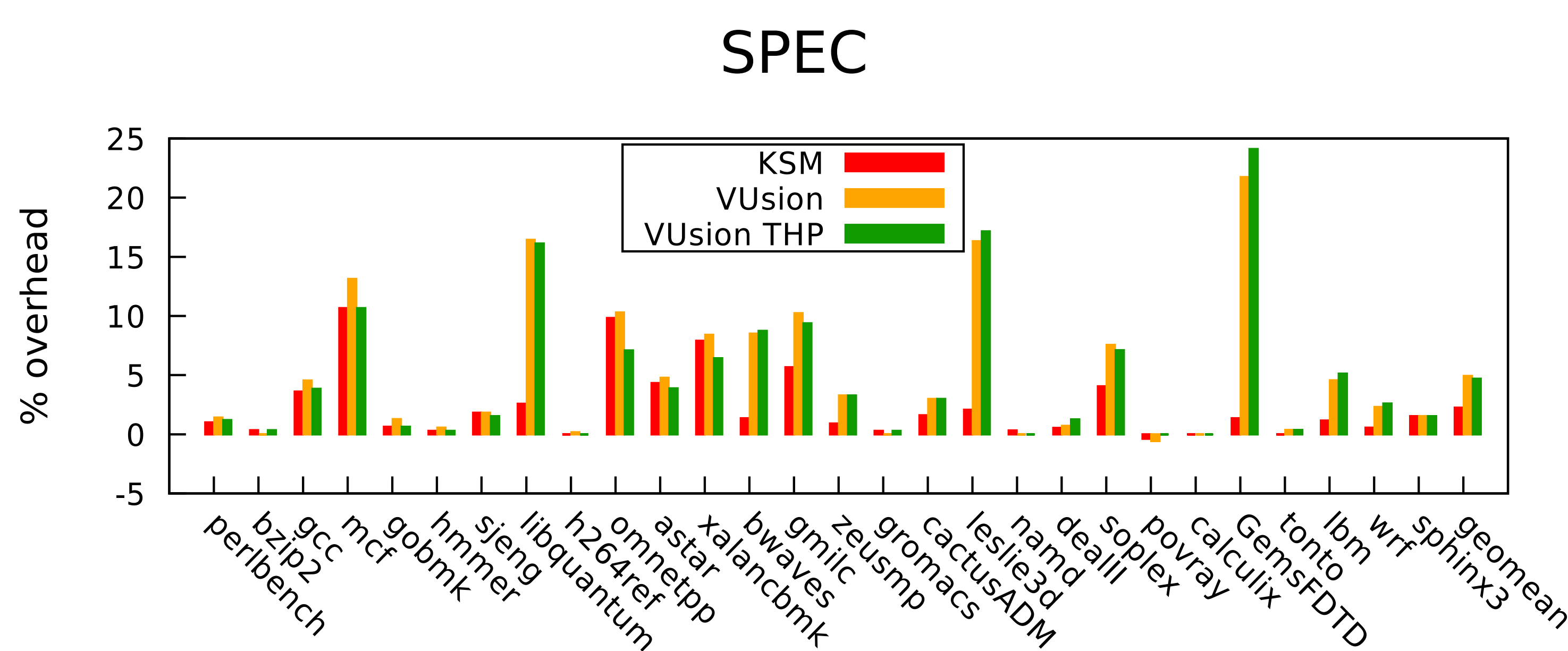


Copy-on-access marginally reduces fusion rates (**1%**)

Fusion benefits came from **idle** pages

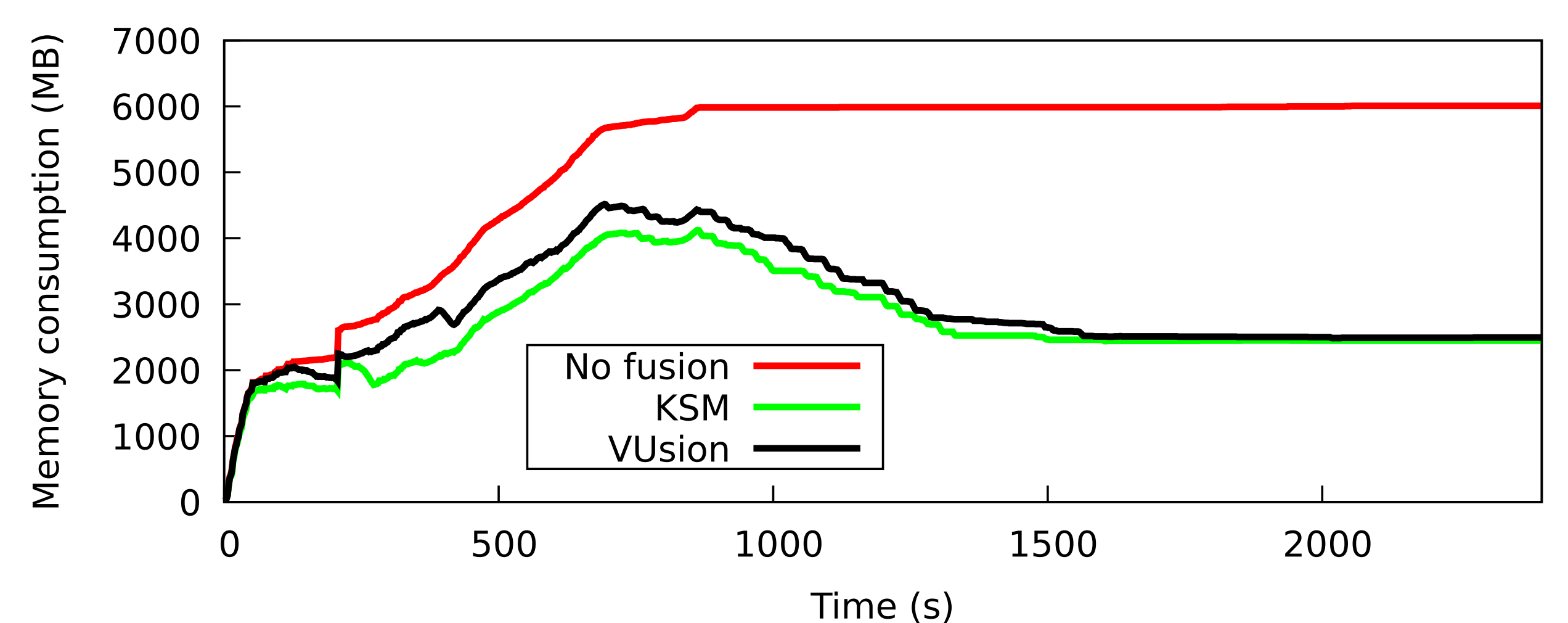
Take-away: VUision is surprisingly practical!

Performance and Fusion Rates



2.7% Overhead compared to KSM

Many Different VMs



Less than **1%** reduction in fusion rates

More information

Support for transparent huge pages

Protection against Rowhammer

More evaluation in the paper

<https://www.vusec.net/projects/VUision>