



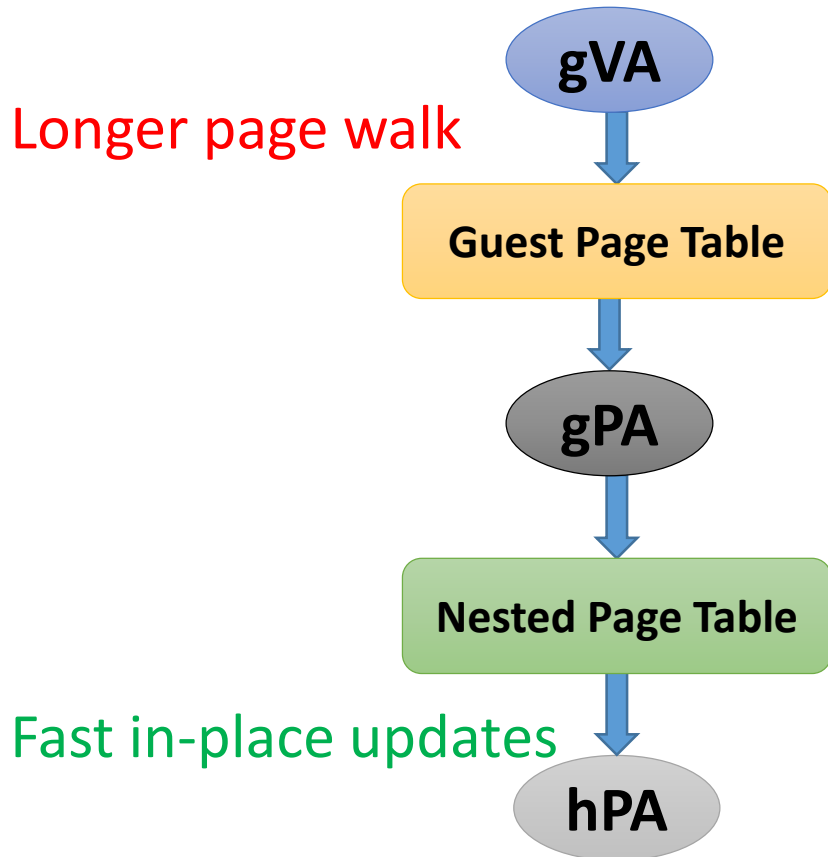
# Agile Paging:

Exceeding the Best of Nested and Shadow Paging

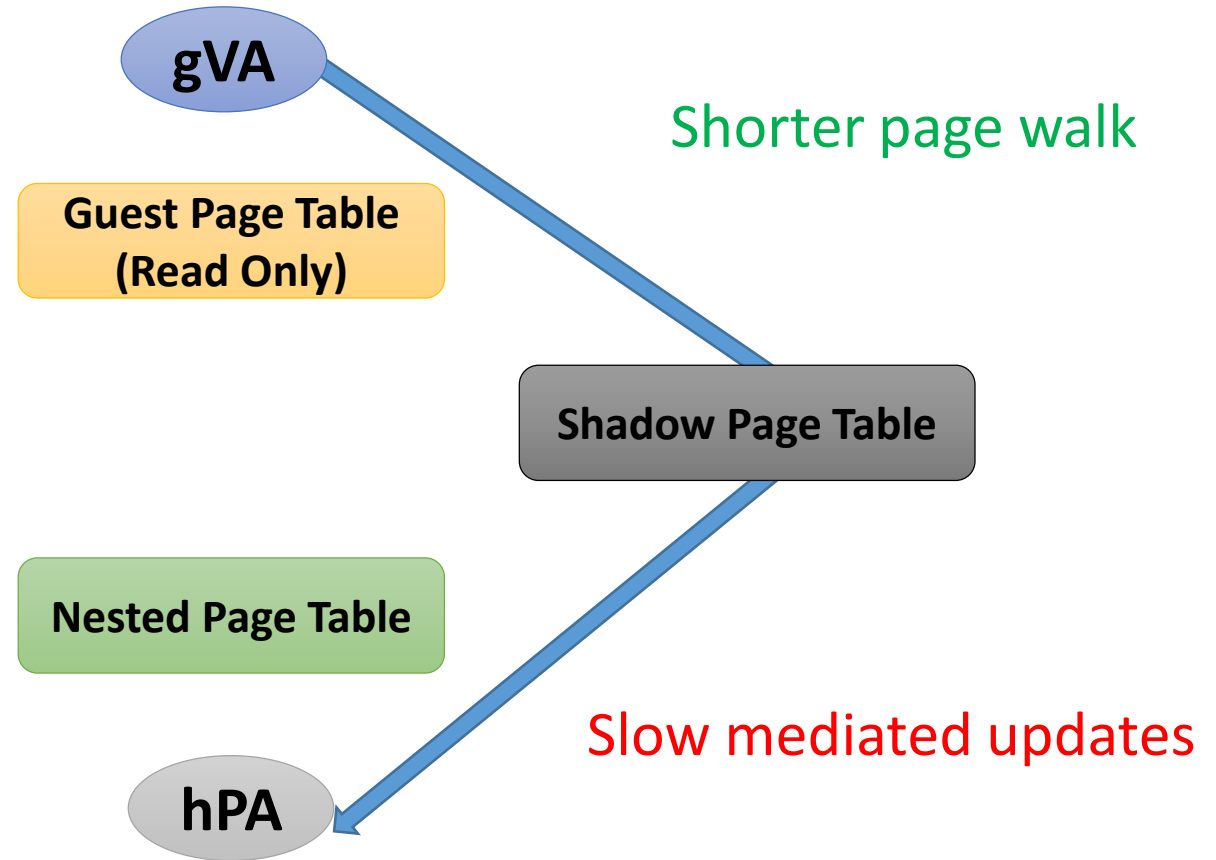
**Jayneel Gandhi, Mark D. Hill, Michael M. Swift**

# Virtualizing memory

## 1. Nested Paging

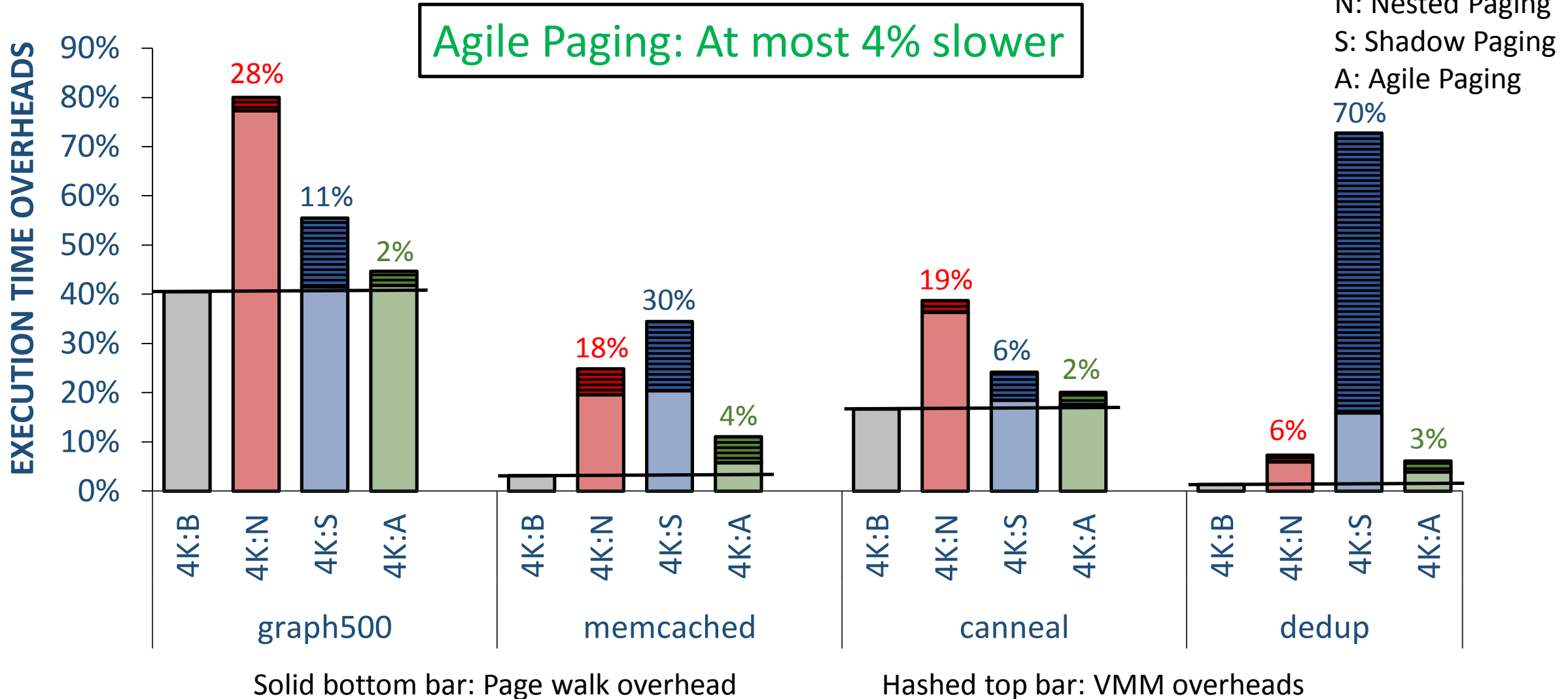


## 2. Shadow Paging





# Performance Overheads



# Agile Paging

**Best of both within same address space and same page walk**

- Start page walk in shadow mode → Achieving fast TLB misses
- Optionally switch to nested mode → Allowing fast in-place updates
- Modest hardware change & straightforward VMM support

Session 10B – Wednesday @ 11:50am  
In Crystal Ballroom (B-side)