GraphPIM: Enabling Instruction-Level PIM Offloading in Graph Computing Frameworks

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**What** is the main **benefit** of PIM offloading for **graph**?  
**How** to enable PIM for graph in a **practical** way?
Benefits of PIM Offloading

- Known PIM benefits:
  - Bandwidth Saving
  - Extra Computation
  - Latency Saving

- GraphPIM explores:
  - Atomic Overhead

Data Ordering | Cache Operation | RMW
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Avoided by PIM offloading

Atomic Instruction
GraphPIM: **PIM**-enabled Graph Framework

User Application ➔ Graph Framework

Graph API ➔ Middleware

Graph Data Management ➔ OS

Hardware Architecture

**No** user application change

**One-line** code change: `malloc() → pmr_malloc()`

**Minor** framework change

**Minor** architecture change

Talk at Tuesday 2:50pm (Session 7A)