Transparent partial page migration between CPU and GPU

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Problems & Ideas

- Problems of Full Page Migration applying a large page size
  - large load-to-use interval for on-demand requests
  - bandwidth waste and subsequent requests stall
- Ideas: Partial Page Migration
  - migrate only the requested portion of a page on demand
  - two implementations: (a) single valid range, (b) multiple valid ranges

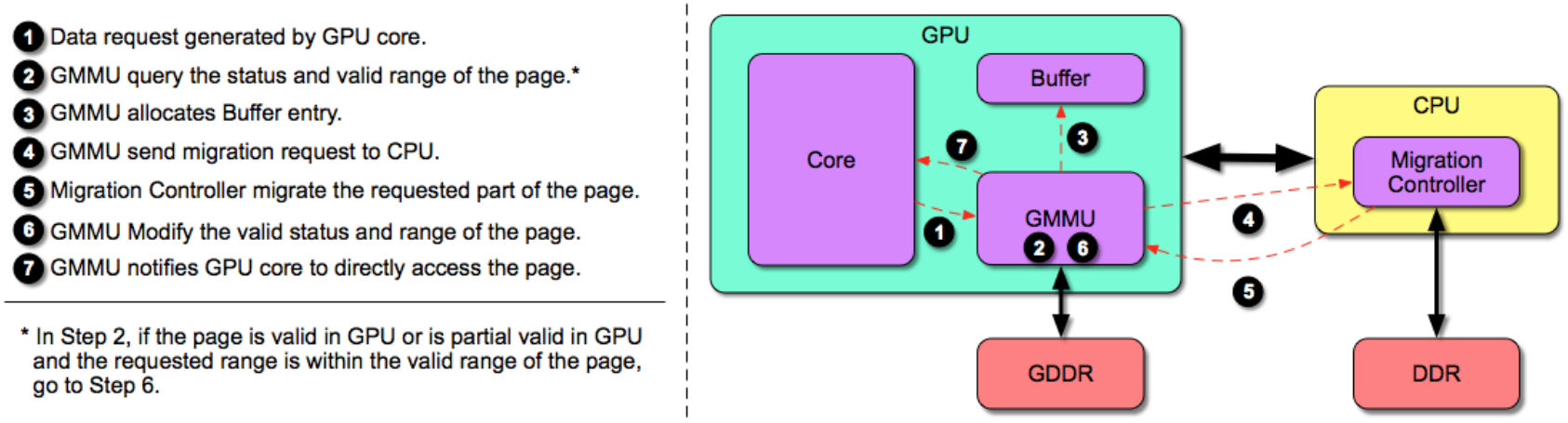


Figure 1. Architectural view of processing transparent partial page migration.

Main Contributions

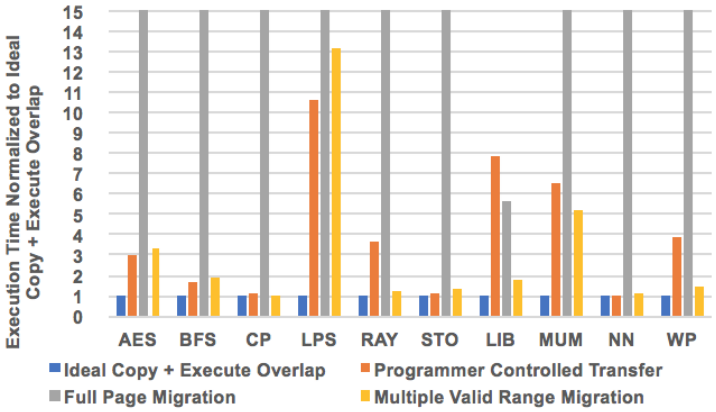
- **Contributions**

– propose a transparent partial page migration mechanism and two implementations: (a) single valid range, (b) multiple valid ranges

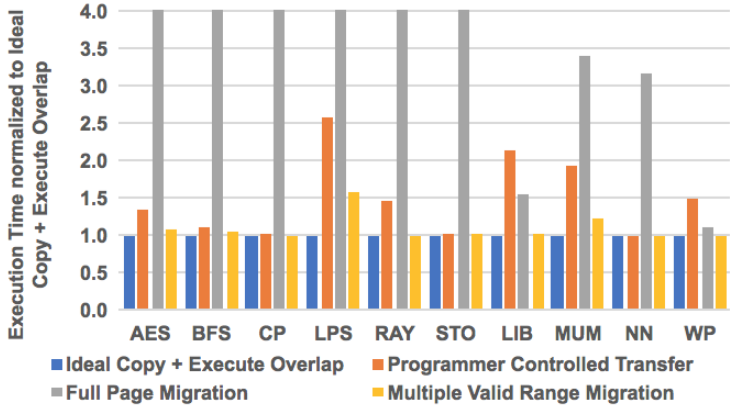
– evaluate the performance sensitivity of partial page migration to interconnection bandwidth and migration unit size

– experimental results show that partial page migration improved from full page migration's 72.72× deceleration to 1.29× acceleration compared to programmer controlled transfers under 16GB/sec bandwidth, and from 18.85× deceleration to 1.37× acceleration under 96GB/sec bandwidth.

- **Performance comparison**



(a) interconnection bandwidth = 16GB/sec



(b) interconnection bandwidth = 96GB/sec

Figure 2. Performance comparison.