

# Efficient Synchronization of Linux Memory Regions over a Network: A Comparative Study and Implementation (Notes)

A user-friendly approach to application-agnostic state synchronization

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- Abstract: A comparative analysis and implementation of various methods for synchronizing Linux memory options over a network
- Introduction
  - Examining Linux's memory management and relevant APIs
  - Use cases for memory region synchronization
- Option 1: Handling page faults in userspace with userfaultfd
  - Introduction to userfaultfd
  - Implementing userfaultfd handlers and registration in Go
  - Transferring sockets between processes
  - Examples of handler and registration interfaces (byte slice, file, S3 object)
  - Performance assessment of this approach
- Option 2: Utilizing mmap for change notifications
  - Concept: mmap a memory region with MMAP\_SHARED to track changes in a file
  - Method 1 for detecting file changes: inotify
  - Limitations: mmap does not generate WRITE events
- Option 3: Hash-based change detection
  - Comparing hashes of local and remote mmaped regions