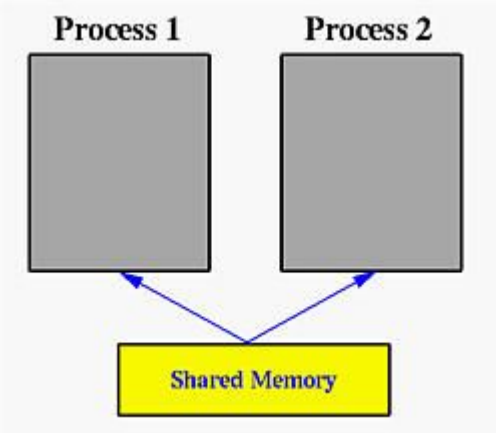
# sfork

A fork with flexible shared memory regions

Team: RPC

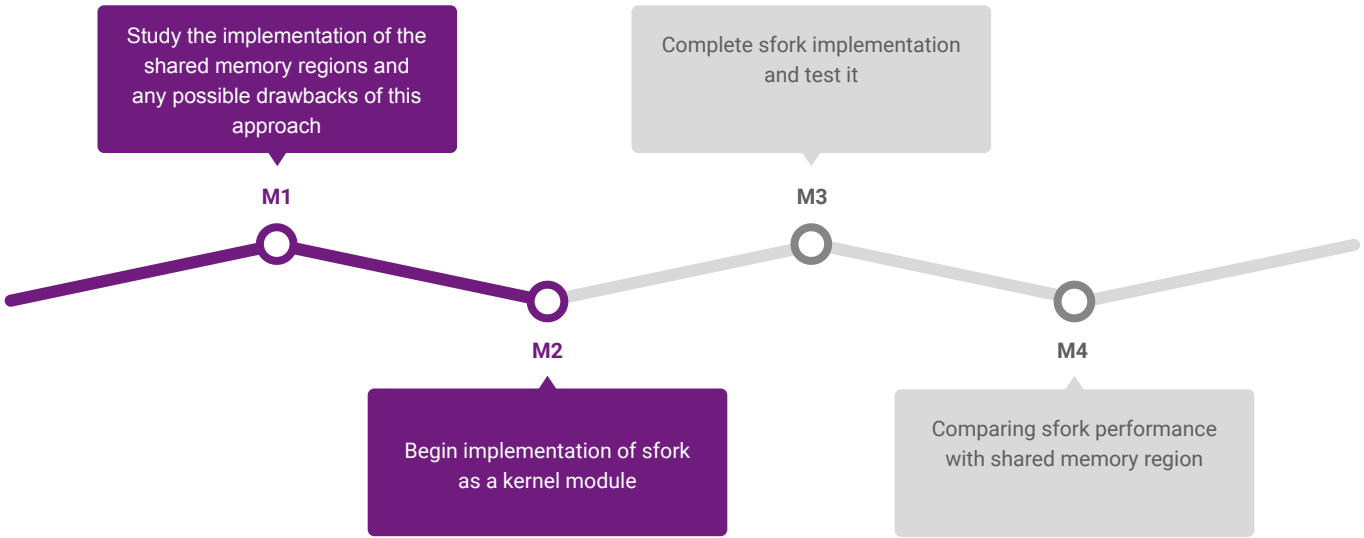
# Existing Methods

- Shared Memory segments are temporary files which are a part of tempfs of the system.
- Shared memory segments are inherited across fork.



# Problem Scope and Milestones

- We need to implement directional conversation between parent and child process.
- Analysis whether sfork is a more efficient method for communication when related processes need to communicate



# Current Progress

- Study into the implementation of shared memory regions and understand the need for sfork
- Initializing the kernel module for sfork
- Multiple design patterns for the implementation of sfork call

```
int sfork(size_t len, unsigned int flags, void *addr);
```

```
int main()
{
    void *addr;
    int pid = sfork(2 * PAGE_SIZE, BIDIRECTIONAL, &addr);
    if(pid)
    {
        // parent
    }
    else
    {
        //child
    }
}
```

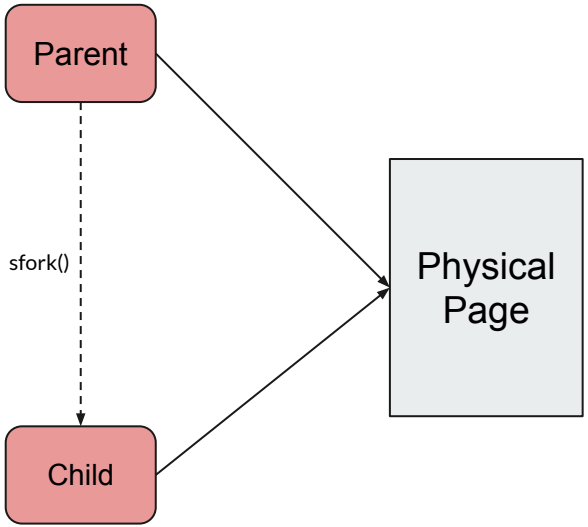
Syntax for sfork

# Design motivation

- Should be simpler than shared memory
- Only parent-child communication: keeps the design and user interface simple
- Should have minimum overhead over traditional fork()

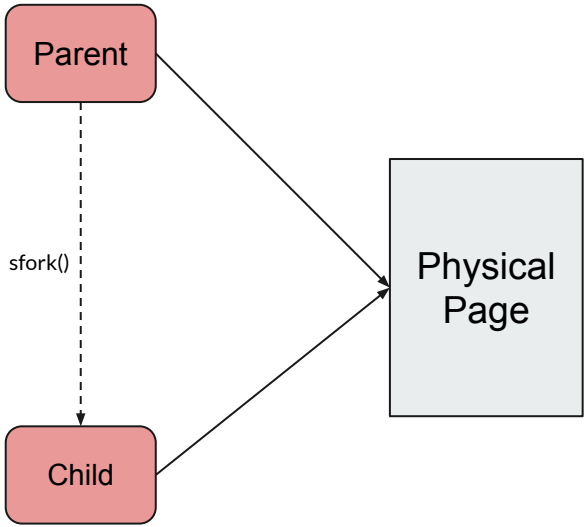
# Implementation 1

- Modify the **pagefault handler**
- Don’t do COW on modification of shared pages
- Modify the write bit in page table to manage permissions
- **Would support lazy allocation of pages**



# Implementation 2

- Allocate pages at the time of **sfork** call
- Bad if size of shared memory is large
- Prevent unnecessary pagefaults
- Can be used when **size** is small



# Future Milestones

- **Milestone 3 (12th April):**
  - Complete the implementation of sfork along with the testing
  - Creating in depth test cases to check for the correctness of the sfork program and making use of any Linux test-suite if any relevant test case can be modified to our required needs

- **Milestone 4 (26th April):**
  - Comparing the performance of sfork with shared memory region approach and analyse the bottleneck of both the approaches
  - Analysing the test cases favourable to each of the two approaches compared
  - Completing the report and the final project submission