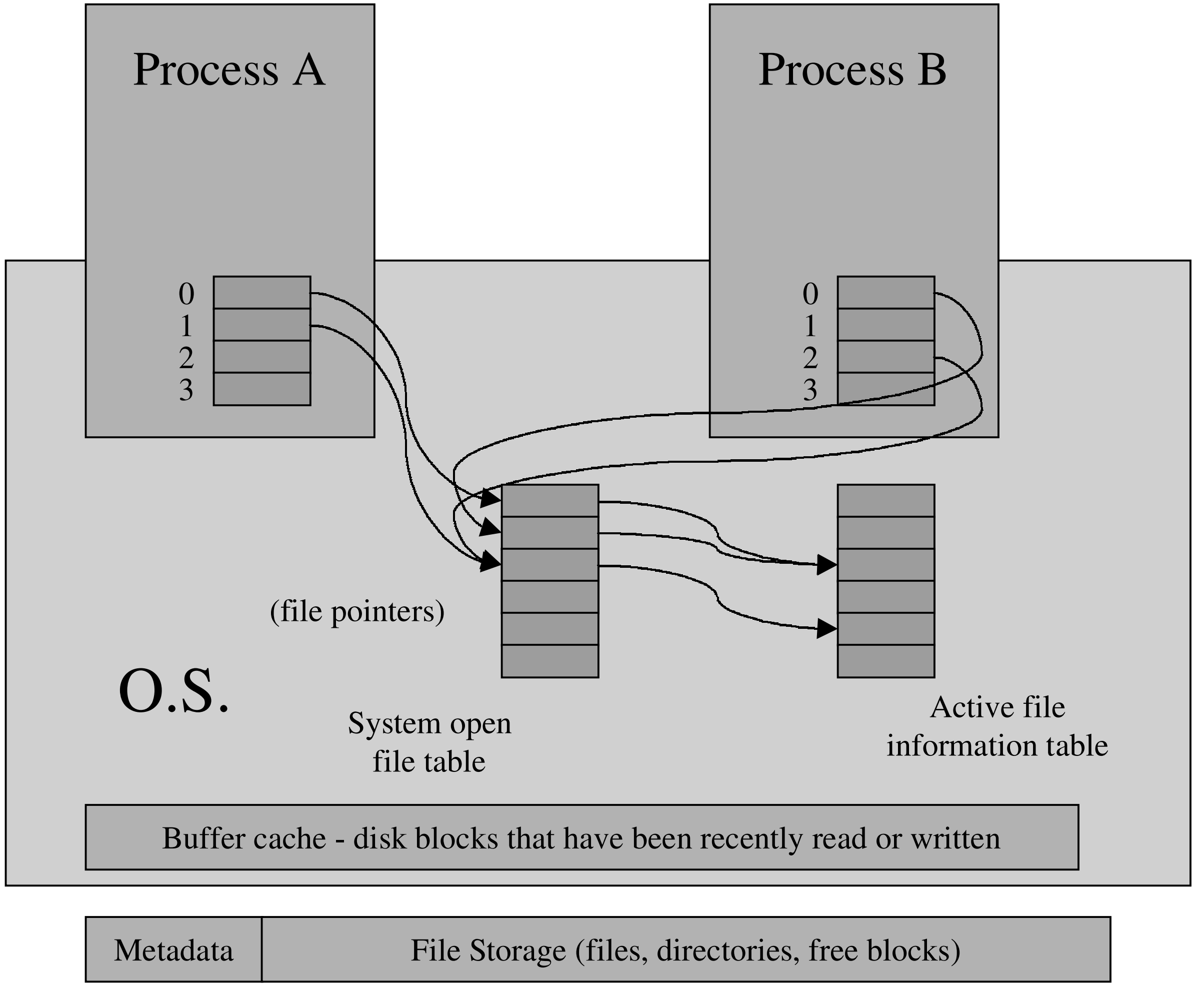
File Manager Implementation

Operating System Data Structures

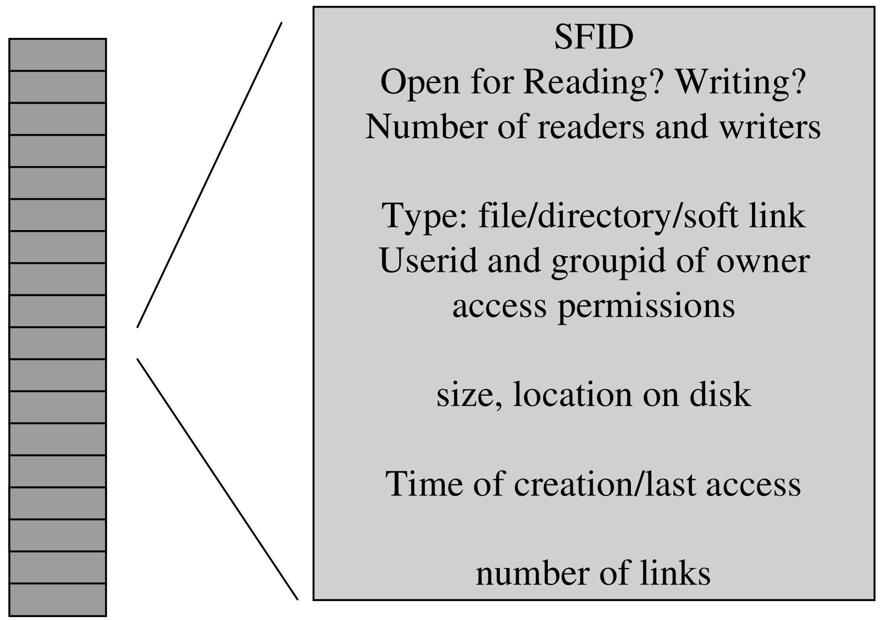
and

Operations

Operating System Data Structures



Active File Data Structure



(i.e. metadata plus)

File System Calls

create directory	pathname	done
read directory contents	pathname	list of entries
create file	pathname, permissions	UFID
open file	pathname, R|W	UFID
delete file	pathname	done
link	path1, path2	done
set access rights	path, rights	done
get access rights	path	list of rights
read	UFID, mem address,count	no. of bytes transferred
write	UFID, mem address,count	
close	UFID	done
position pointer	UFID, new position	done

`open("/usr/ar/timetable", O_RW)`
`create("/usr/ar/timetable.1", 0755)`

- Find Metadata for root directory
- read / directory to get SFID for /usr
- find Metadata for /usr directory
- read /usr directory to get SFID for ar
- find Metadata for /usr/ar directory
- read /usr/ar directory to get SFID for /usr/ar/timetable
- read /usr/ar/timetable Metadata into Active File Information table
- create System Open File table entry
- find free entry in per-process table
- return UFID

`read(4, &buf[0], 8192)`

- find System Open File table entry - get file offset
- find Active File Information table entry
- check permissions
- calculate first file block number(s)
- read file blocks into block cache
- copy required data into user space
- update *access* times in Active File Information table entry

`write(4, &buf[0], 93)`

- find System Open File table entry - get file offset
- find Active File Information table entry
- check permissions
- calculate first file block number(s)
- read file blocks into block cache if necessary *or*
- extend file (allocate new block from freelist, add to Active File Information table entry, change *size*)
- copy required data into user space
- update *modified* times in Active File Information table entry

`close(4)`

- release entry in per-process table
- release entry in System Open File table
- in Active File Information table:
  - if number of readers and writers is now zero,
    - » write Metadata back to disk
    - » release Active File Information table entry