Syncronization Design:

- Lock for each inode
- Lock the block-bitmap

Path Validation Sequence command Execution:

Each element of the path will be traversed to determine the validity of the path. When going through directories, the lock of the new directory is acquired and the lock of the parent inode is released.

Generalized Procedure:

- Acquire the parent inode, in which the operation is being preformed
- Acquire the newInode/existingInode on which the operation will be preformed
- If there is allocations/deallocation of blocks, then acquire the block-bitmap
- If a new item is being created (ie mkdir, link, cp newFile), then acquire the Inode-bitmap
- Preform the operation
- Release all locks after the operation is complete

eg:

Mkdir:

- Bitmaps are acquired, so that we can securely allocate the next available inode and block(s).
- Parent inode remains acquired until the operation is complete
- Next available inode is also acquired in-order to ensure that the creation of the inode is not interrupted. The new inode remains acquired until the directory hasn't been initialized.

- Once the new directory has been initialized and the link counts have been updated release all locks