# Lustre Userspace Server Architecture

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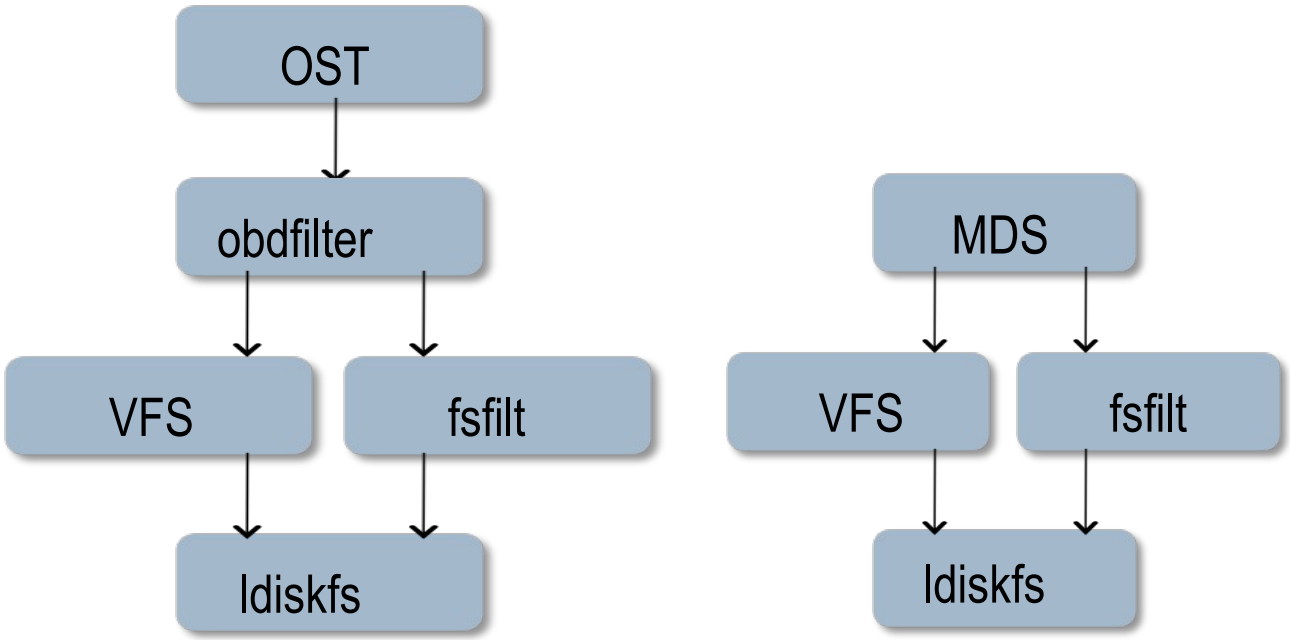
# Current architecture: 1.4 and 1.6



# VFS provides

- fs abstraction
- Data operations
- Metadata operations
- Cache (pagecache, icache, dcache)
- Permission checks
- Rename helpers

# fsfilt provides

- Transaction API
- Direct IO
- Extended attributes
- quota
- uuids/labels

# Problems with this architecture

- Not portable, depends on vfs, ldiskfs
- Lack of features
- Quality
- Amount of work unrelated to Lustre

# Quality

- Complex and unstable kernel API
- VFS doesn't suit our needs:
  fsfilt, tricks and lots of bugs
- Complicated debugging
- Complex automatic testing system
- Hard to find people

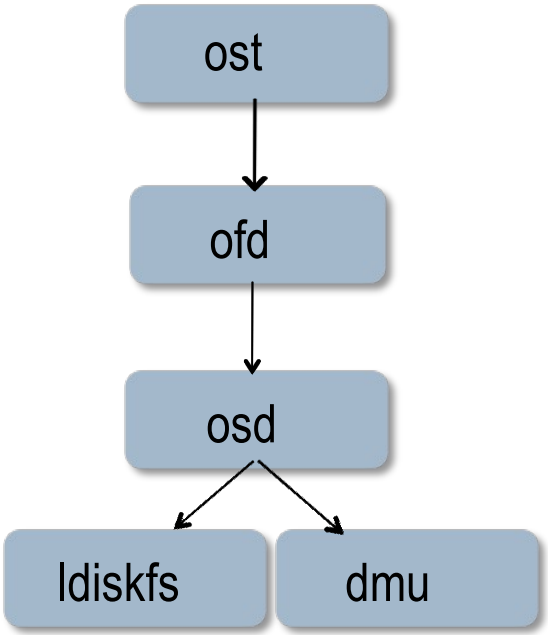
# Future Challenges

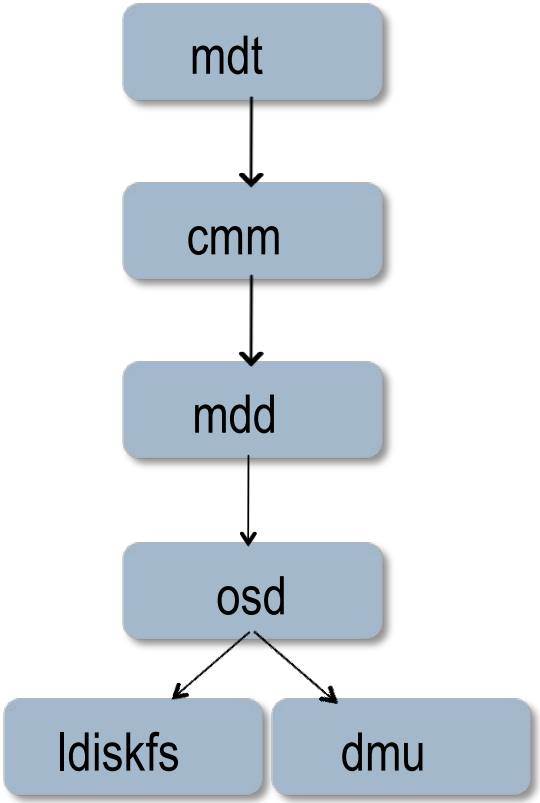
- CMD requires primitive operations
- Scalability
- Resistance to disk failures
- Features: snapshots,data cache
- Complexity of Lustre increases

# Requirement for new architecture

- Portability: more OS, more disk fs
- Quality:
  - Clean, stable and documented API
  - No tricks
  - Easy to test and debug
- Scalability
- Features
- Performance shouldn't suffer much

# New Architecture




- OSD replaces VFS and fsfilt:
  - > MDS/OSS don't depend on VFS anymore
  - > With proper OSD Lustre runs anywhere

# OSD provides

- Cluster-wide object ID – FID
- Set of primitives to operate on:
  - Data
  - Indexed lookup tables
  - Regular and extended attributes
- Transactions support
- All of this with clean and good API

# New architecture: DMU

- Very portable (POSIX)
- Satisfies most OSD needs
- Runs in user space
- Easier to develop and debug

# Work Still Needed

- There are number things to develop
- DMU needs some work
- New architecture needs testing

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