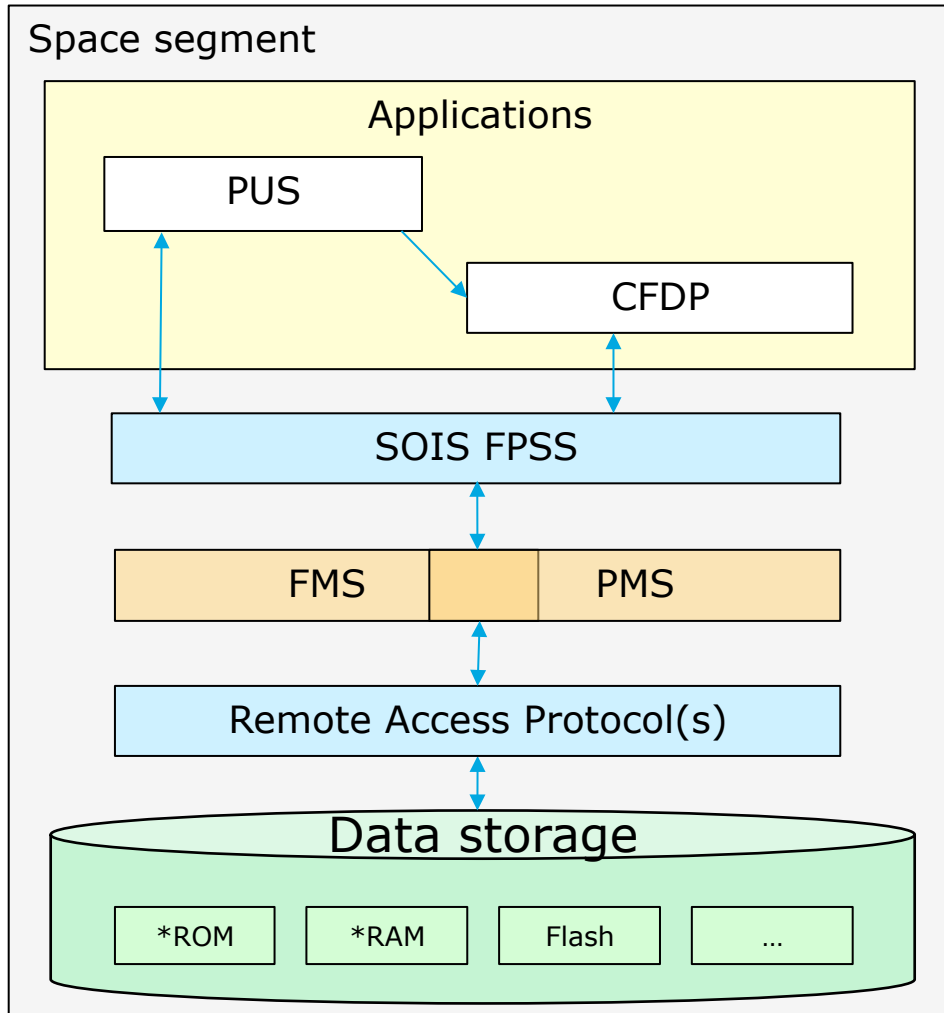


File systems for on-board mass memories

C. Honvault & F. Torelli
ESTEC
14/02/2014

References:

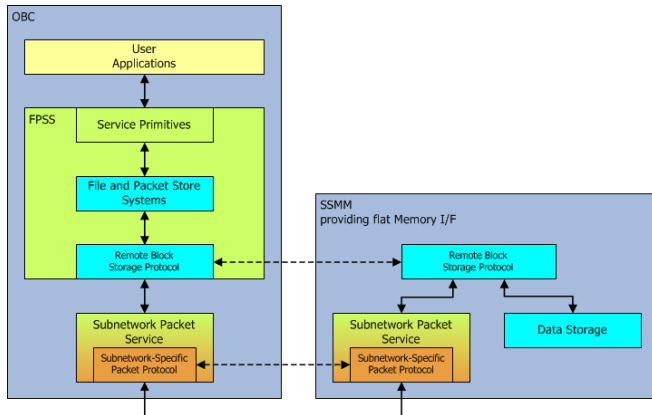
- SOIS Green Book, CCSDS 850.0-G-2
- File and Packet Store Services Magenta Book, CCSDS 873.0-M-1



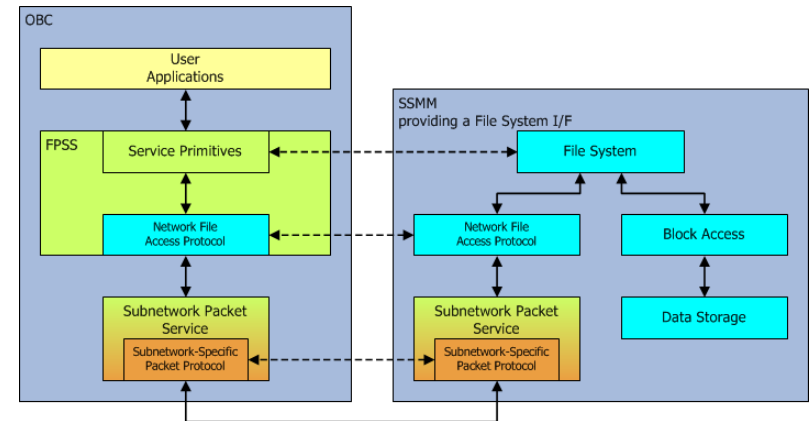
1. CFDP and PUS services rely on services provided by SOIS FPSS to support file accesses.
2. CFDP can initiate CFDP transactions.
3. SOIS Files and Packet Storage Services rely on FMS/PMS.
4. FMS/PMS provide interface and services to manage the data storage area.
5. Remote protocols (block/file) are used to access remote data storage
6. Data Storage shall support different technologies.

Mass Memory Layouts

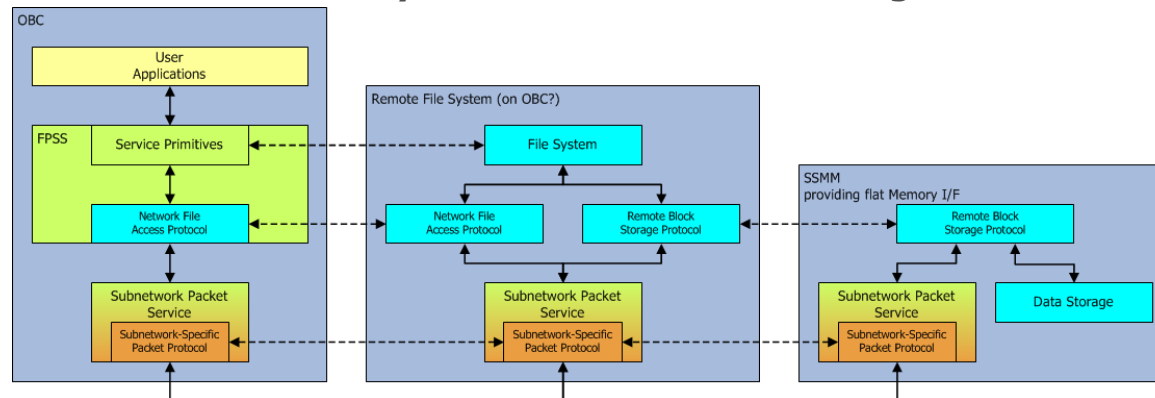
Local File System / Remote Data Storage



Remote File System + Data Storage



Remote File System / Remote Data Storage



Reference: CCSDS Recommended Practice For SOIS File And Packet Store Services, CCSDS 873.0-M-1, Sep. 2012

- Mapping of SOIS File Access Service onto POSIX
- Mapping of SOIS File Management Service onto POSIX
[Ref. FPSS CCSDS 873.0-M-1, Annex E]
- A mapping of SOIS Packet Store Services to standard API is available in a separate document.
- No mapping of PUS services (13?, 23, 24?) to SOIS FPSS primitives is suggested.
- Add a « Logical partition » level for which services are not addressed in the existing standards and standardisation of its access method (identifier, name, handle, ...).

- Protection against errors/failures during writing and FMS structures updates
 - File system with journal (e.g. ext2+, JFFS), File system structure replication (e.g. TFAT)
- Protection against communication errors/failures
 - Reliable sub-network protocol and bus/link
- Protection against memory SEE
 - EDAC (Reed-Solomon?) + scrubbing, RAID-1+
- Protection against memory latch-up
 - Spare memory components/modules, RAID-1+
- FMS shall support the loss of data storage units.
- Manage constraints and FDIR at lowest level whenever possible

- 1. Support of several on-Board CFDP entities (OBC, P/L)**
- 2. Network File Access, Network Packet Access and Remote Block Storage** Protocols not standardised at the moment. Remote Block Storage protocol, in principle, plays a role also in the communication between instruments and mass memory in the case of file-based operations.
- 3. Consolidation of an uniform on-board file system interface,** independent from the memory area
 - a. physical topology (memory modules, SGM, etc.)
 - b. logical topology (partitions)
 - c. Technology (*ROM, Flash, *RAM, etc.)
- 4. Mapping between SOIS FPSS and new PUS services** not standardised at the moment.
- 5. FDIR aspects**