DDC-I

DEOS OPTIONAL COMPONENT

Deos Certifiable Fast File System

Deos contains a DO-178 DAL-A kernel file system, which is read-only in-flight use. The optional Certifiable Fast File System (CFFS) provides a rich feature set that permits read/write capability in-flight. Further, while CFFS can be employed in systems with large data storage needs, CFFS is also well suited for applications requiring low latency and very high transfer rates. Typical CFFS applications include Logging Aircraft Monitoring Data or Displays for Image and Graphic Data.

DO-178 DAL-A Reusable and Adaptable Module

CFFS was built from the ground up as a DO-178 high Design Assurance Level (DAL A) module. Designed with the goal of reuse of certification artifacts, CFFS is a user space application that's adaptable through XML configuration files to isolate change impact on the application during reuse. Additionally, the CFFS server is hardware agnostic via abstraction through its Media Abstraction Layer (MAL), which is independently used and/or modified for customer specific storage media.

High Performance Operation

- CFFS can scale to applications needing the utmost in throughput and low latency.
- Leverages CFFS's block oriented file structure and transfer data
- Designed from the ground up to meet extreme real-time performance demands.
- Uses DMA to transfer data to/from user applications and the storage device.
- Highly pipelined. A process can cue up many operations (reads, writes) on one or more files, invoke them all concurrently (non-blocking), then service the data as it arrives (ie, no waiting on I/O)

Partitioning

- Each user process can own one or more CFFS partitions. Each partition may contain one or more files.
- Only one user process that owns a given CFFS partition can modify files stored in that partition. Other user processes can be granted read permission to that partition, but cannot modify the files therein.

Journaling

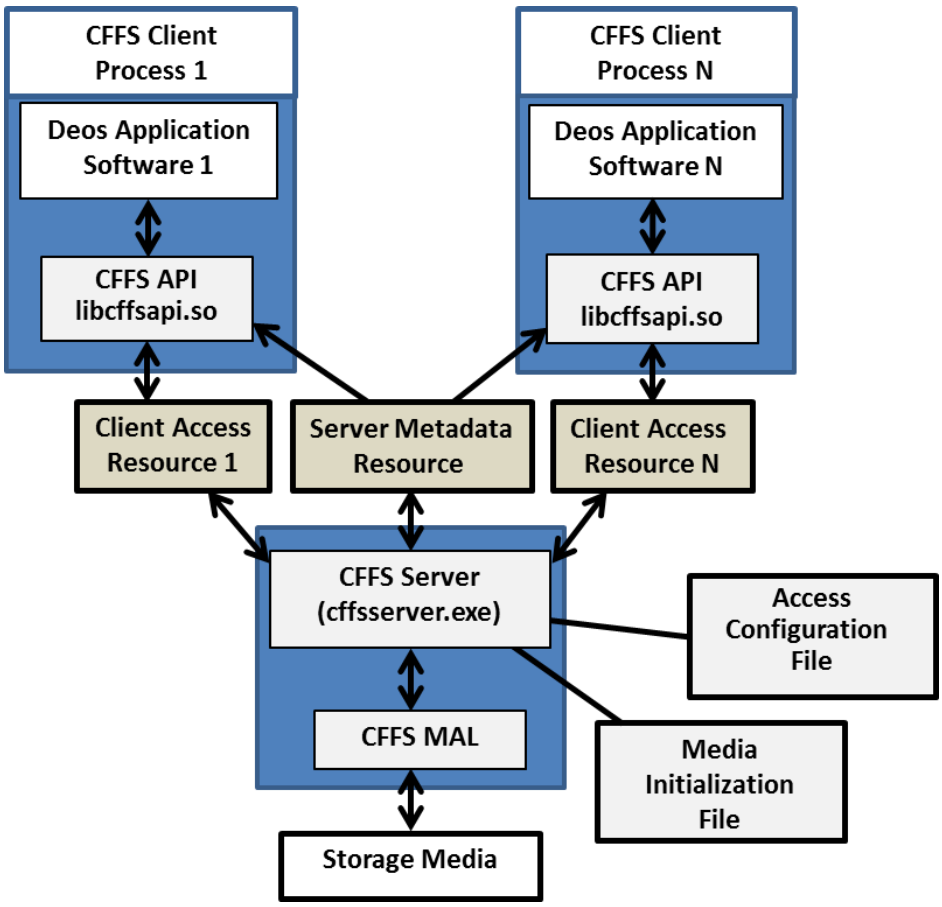
- File system data structures (metadata) are written to a temporary (but power cycle preserved) area before committing them to their proper location in the storage device.

Key Features Overview

- **Optional Deos DAL-A User Space Module**
- **Deos or Deos SafeMC (multicore) operation**
- **Supports ARM, PowerPC, and x86**
- **Flexible API**
  - **Block oriented API for high speed transfers**
  - **Optional ARINC-653 Part 2 API**
- **Portable, with binary & certification reuse:**
  - **Media Abstraction Interface (MAL) decouples media device specifics**
  - **XML configurable**
- **Supports mixed DAL applications**
- **High integrity operation**
  - **Protected against non-authorized writes**
  - **Power-fail-safe (journaled, transaction based)**
  - **Bad block management, wear leveling, and usage management**
- **High Performance**
  - **DMA operation**
  - **Highly Pipelined**
- **Multiple storage media options**
  - **RAM**
  - **NAND/NOR**
  - **SATA, CompactFLASH, and other mass storage devices**

Key Components Include:

- **CFFS Client Library**
  - This software provides User Processes with an interface to the underlying CFFS Server
  - Standards based ARINC-653 Part 2 file system interfaces to CFFS are available as an optional component with the ARINC 653 support package for Deos
- **CFFS Server**
  - The server manages and controls access to a single physical storage media.
  - The server uses high-speed DMA to move file data between the storage device and partitioned memory buffers where User Processes read/write that data.
  - The CFFS Configuration File describes:
    - The storage devices that the CFFS supports.
    - All file system partitions that will exist on a storage device (including partition name, size, number of files and number of journal blocks).
    - Data Transfers Per Period, Data Transfers Per Second and Maximum Transfer Size.
    - The system integrator can set priorities for each process that controls which process' requests the CFFS handles first.
    - Each process designer can set sub-priorities for the CFFS' handling of the different files owned by their process.
- **Media Abstraction Layer (MAL)**
  - CFFS server uses a MAL to abstract it from a particular physical storage media.
  - Persistent storage management, (e.g., wear-leveling, error-correction, and seek-time latency optimizations) for raw devices (NAND, and NOR Flash) are performed by the MAL.
  - Current MAL's support various media devices including: NOR, SATA , and IDE Flash Devices; RAM based file systems; and can be additionally ported to the interfaces of any specific customer hardware storage devices.



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