

Proposal for RTFS - Real-Time FileSystem

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Introduction

This project will be carried out in context of the module IOT-CPP of the Informatics study at Fontys School of Technology Venlo (NL).

The purpose of this project is to meet the learning goals of the module which includes low-level C programming, memory management and real-time computations. All of these topics are included in this project.

File System

The goal of this project is to write a file system which can be loaded into a Linux kernel as a kernel module. Some examples of existing file systems are btrfs, ext4 or xfs.

Nevertheless, this project is not meant to ever produce a file system which can be used in production. The file system is meant for educational purposes only.

Structure

To optimize the access time of the file system, a balanced tree structure will be used internally to organize the file system.

More information about the structure of file systems and how this will be incorporated into our file system needs to be researched during the project.

The file system should make use of modern approaches as they are used in state-of-the-art file systems like ext4, btrfs or xfs.

Real-Time Component

To meet the real-time computation learning goal, the file system will support a special mount option which enables a memory write cache. This ensures a fast write on the file system while the real write will be done asynchronously at a later

point in time. Application which needs a real time performance on this file system can instantly continue working while the file system writes down the data in background.

This is of-course a very dangerous option. If the power supply fails before all data has been written to disks, data will be lost and possibly the file system will be in an inconsistent state.