

File Systems

Operating Systems Student Presentations #1

Spring 2007, Dr. Gene B. Chase

General introduction to student presentations. There are two kinds of topics in Operating Systems: the easy kind, which students can learn on their own; and the hard kind, where a faculty member's help would be beneficial. I will be asking students to present the easy topics; I will present the harder ones.

Introduction to Presentation #1. A file system is a data structure. In the language of object-oriented programming, therefore, a file system has objects (called files) and methods (operations on those objects). A file system is typically stored in part of a hard drive (called a partition, hence conversely a partition is a physical part of a hard drive which has the same file system). Other devices besides hard drives can have file systems. For example, CDs have a standard file system.

Everything can of course be virtualized, like a Java Virtual Machine or a MIPS simulator do for a programming environment. Hence there are virtual file systems, although Java doesn't have any—it accesses files in the operating system in which it lives. File systems may be virtual because they exist in RAM only. File systems may be virtual because all the files are in fact on a hard drive, but are all inside a larger file in some other file system. (You could think roughly of a zip file which needs special methods to access the files in the zip file. This situation is another illustration of Microsoft's attempt to put everything in its Windows operating system, since now without benefit of WinZip or PKZIP under Windows XP, zipped files can be read.)

Typical operations on files are read, write, seek (position to write in middle of file), close, open, and permission-settings.

The purpose of this presentation is to tell the class about the data structure that your assigned file system is: its **shape**, and the **operations on it**.

Background reading for everyone.

Wikipedia on [file system](#) and on [comparison of file systems](#)

Silberschatz et al. Chapters 10, 11 (to p. 461)

Specific assignments.

Real file system, single machine

[FAT16](#) or FAT32 (for MS-DOS op sys)

[NTFS](#) (for WinXP op sys)

[HFS](#) (for OS X op sys)

[ISO 9660](#) (for CDs)

[efs2](#) or [efs3](#) (for Unix op sys)

[ReiserFS](#)

[Resier4](#) ([summary](#) of video of Hans Reiser mentioned there)

[WinFS](#) (dropped from Windows Vista op sys; avail. beta only)

Networked file system

[NFS](#) (for Unix, then WinXP)

[AFS](#) (for Unix, then WinXP)

[SMB](#) then [DFS](#) (for WinXP, then Unix)

[Google File System](#) (only available with Google's hardware)

Virtual file system

[VFS](#) (for Linux) sitting on top of some of the above file systems

[FUSE](#) (for Linux) and its children like [GmailFS](#)

___ Val Curd _____

___ Shanna Battaglia _____

___ Alan Cook _____

___ Danielle Books _____

___ Mike Frederick _____

___ Kevin Green _____

___ Cameron Hess _____

___ Ben Crouse _____

___ Steven Rosenshine _____

___ Josh Shannon _____
