Exercise 3: FFS andNTFS

Started: Oct 14 at 2:01am

Quiz Instructions

Remember that these quizzes are "graded" for participation rather than correctness. Some of the questions in this exercise cannot be autograded, so won't get an official mark for these.

In these questions we will be comparing FFS and NTFS in terms of how much space they require for the metadata, how many disk accesses are needed for different operations, and the complexity of algorithms for different operations. These questions aren't very comprehensive, so they shouldn't be taken as and indication of which file system is "better". Rather, the questions are intended to get you thinking about the factors you might consider when evaluating the systems.

FFS uses inodes and indexed allocation to represent file system objects. Inodes are 128 bytes long, and when a file gets larger, additional blocks will be required for single indirect and possibly double and triple indirect block pointers. FFS uses Block Groups to ensure that files and directories that are logically related are located close to each other on disk, and to locate inodes and their associated data blocks closer together.

NTFS uses Master File Table records to repsent file system objects. MFT records are 1KiBi in size and use extent-based data block allocation. If an MFT record is too small to represent the whole file, it can link to another MFT record. In additional very small directories and very small files may be stored within the MFT record.

Assume disk blocks are 4KiB

Question 1   1 pts

Which of the two file systems requires the least amount of space to store a file containing10 bytes of data, including the amount of metadata space?

○ NTFS

○ FFS

Question 2   1 pts

Which of the two file systems requires the least amount of space to store a 40KiB file (10 data blocks)?

○ NTFS

○ FFS

Question 3   1 pts

Assuming that we know the inode number or the MFT record index and nothing else is cached in memory, how many disk blocks need to be read to read a 10-byte file?

FFS: [ ]

NTFS: [ ]

Question 4   1 pts

Assuming that we know the inode number or the MFT record index and nothing else is cached in memory, how many disk blocks need to be read to read a 400KiB file (100 data blocks)?

FFS: [   ]

NTFS: [   ]

Question 5   1 pts

Suppose we are accessing a large file sequentially. Which of the two file systems is likely to spend less time in disk seeks?

○ FFS

○ NTFS

Question 6   1 pts

Explain your answer to the previous question. What assumptions are you making for this to be true?

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