The apocryphal history of file system tunnelling

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One of the file system features you may find yourself surprised by is tunneling, wherein the creation timestamp and short/long names of a file are taken from a file that existed in the directory previously. In other words, if you delete some file “File with long name.txt” and then create a new file with the same name, that new file will have the same short name and the same creation time as the original file. You can read this KB article for details on what operations are sensitive to tunnelling.

Why does tunneling exist at all?

When you use a program to edit an existing file, then save it, you expect the original creation timestamp to be preserved, since you’re editing a file, not creating a new one. But internally, many programs save a file by performing a combination of save, delete, and rename operations (such as the ones listed in the linked article), and without tunneling, the creation time of the file would seem to change even though from the end user’s point of view, no file got created.

As another example of the importance of tunneling, consider that file “File with long name.txt”, whose short name is say “FILEWI~1.TXT”. You load this file into a program that is not long-filename-aware and save it. It deletes the old “FILEWI~1.TXT” and creates a new one with the same name. Without tunnelling, the associated long name of the file would be lost. Instead of a friendly long name, the file name got corrupted into this thing with squiggly marks. Not good.

But where did the name “tunneling” come from?

From quantum mechanics.

Consider the following analogy: You have two holes in the ground, and a particle is in the first hole (A) and doesn’t have enough energy to get out. It only has enough energy to get as high as the dotted line.

A B

You get distracted for a little while, maybe watch the Super Bowl halftime show, and when you come back, the particle somehow is now in hole B. This is impossible in classical mechanics, but thanks to the wacky world of quantum mechanics, it is not only possible, but **actually happens**. The phenomenon is known as tunneling, because it's as if the particle "dug a tunnel" between the two holes, thereby allowing it to get from one hole to another without ever going above the dotted line.

In the case of file system tunneling, it is information that appears to violate the laws of classical mechanics. The information was destroyed (by deleting or renaming the file), yet somehow managed to reconstruct itself on the other side of a temporal barrier.

The developer who was responsible for implementing tunneling on Windows 95 got kind of carried away with the quantum mechanics analogy: The fragments of information about recently-deleted or recently-renamed files are kept in data structures called "quarks".

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