Psychic debugging: When I copy a file to the clipboard and then paste it, I get an old version of the file

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A customer reported the following strange problem:

> I tried to copy some text files from my computer to another computer on the network. After the copy completes, I looked at the network directory and found that while it did contain files with the same names as the ones I copied, they have completely wrong timestamps. Curious, I opened up the files and noticed that they don't even match the files I copied! Instead, they have yesterday's version of the files, not incorporating the changes that I made today. I still have both the source and destination folders open on my screen and can confirm that the files I copied really are the ones that I modified and not files from some backup directory.
>
> I tried copying it again but still an outdated version of the file gets copied. Curiously, the problem does not occur if I use drag/drop to copy the files. It happens only if I use Ctrl+C and Ctrl+V. Any ideas?

This was indeed quite puzzling. One possibility was that the customer was mistakenly copying out of a *Previous Versions* folder. Before we could develop some additional theories, the customer provided additional information.

> I've narrowed down the problem. I've found that this has something to do with a clipboard tool I've installed. Without the tool running, everything is fine. How is it that with the tool running, Explorer is copying files through some sort of time machine? Those old versions of the files no longer exist on my computer; where is Explorer getting them from?

Other people started investigation additional avenues, taking I/O trace logs, that sort of thing. Curiously, the I/O trace shows that while Explorer opened both the source and destination files and issued plenty of `WriteFile` calls to the destination, it never issued a `ReadFile` request against the source. An investigation of *Previous Versions* shows that there are no previous versions of the file recorded in the file system. It's as if the contents were being created from nothing. While the others were off doing their investigations, my head shuddered and I was sent into a trance state. A hollow voice emanated from my throat

as my psychic powers manifested themselves. Shortly thereafter, my eyes closed and I snapped back to reality, at which point I frantically typed up the following note while I still remembered what had happened:

> My psychic powers tell me that this clipboard program is "virtualizing" the clipboard contents (replacing whatever is on the clipboard with its own data) and then trying (and failing) to regurgitate the original contents when the Paste operation asks for the file on the clipboard.

A closer investigation of the clipboard enhancement utility showed that one of its features was the ability to record old clipboard contents and replay them (similar to the Microsoft Office Clipboard). Hidden inside the I/O operations was a query for the last-access time. And that's when things fell into place. Starting in Windows Vista, last access time is no longer updated by default. The program apparently saw that the file was never accessed and assumed that that meant that it also had never been modified, so it regenerated the file contents from its internal cache. (The quick fix for the program would be to switch to checking the last modified time instead of the last access time.)

Upon learning that my psychic powers once again were correct, I realized that my prize for being correct was actually a penalty: Now even more people will ask me to help debug their mysterious problems.

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