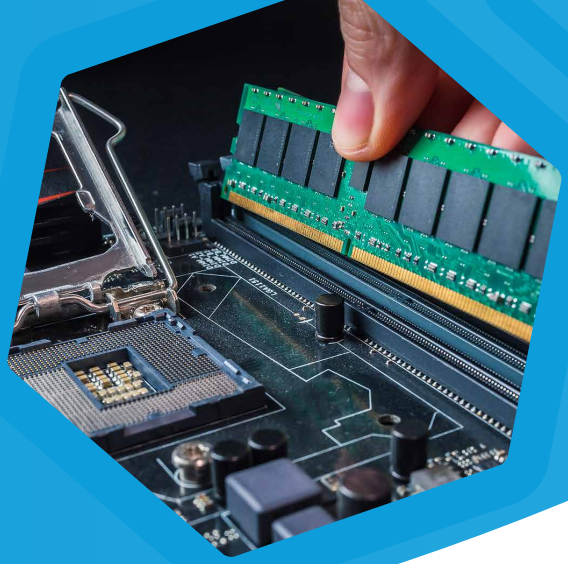

IT Fundamentals

Unit - Hardware

Lesson 3.2.2 - File System Features

IT Fundamentals Objectives (FC0-U61)
Objective 3.2 - Compare and contrast components of an operating system.

- Features
  - Compression
  - Encryption
  - Permissions
  - Journaling
  - Limitations
  - Naming rules

Grade Level(s)
8, 9

Cyber Connections

- Hardware & Software

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Teacher Notes:

File System Features

File Systems

There are many different features for file systems and they differ by the operating system and which file systems are used. This lesson focuses on the features laid out in the IT Fundamentals objectives. They are compression, encryption, permissions, journaling, limitations, and naming rules.

Compression is taking up less space on a drive by encoding the files differently (with less bits of data). While this sounds like a no-brainer to save space, this does slow down files when trying to open compressed files as they have to be un-compressed before opening. NTFS allows Windows' users to compress files by selecting the option in a file's attributes. HFS also supports compression for macOS users and Linux has chattr (change attribute) command to support compression.

Encryption is encoding a file when stored so unauthorized users cannot have access to a certain file. Unless permissions have been shared with other users, a user cannot see someone else's data because of the encryption. All file systems typically do this without the user knowing it is even happening.

Only allowing certain users to access or see a file is called ***permissions***. This is setting certain permissions for documents to certain users on a system or network. There are many different types of permissions that can be set on a file. Some of the most common permissions are the ability to view a file, the ability to edit a file, the ability to run (execute) a file, etc.

Journaling is keeping track of changes on a system before they are saved and/or executed. One of the main purposes for this is a loss of power. If someone has made a lot of changes to a file, but then their computer shuts off unexpectedly, journaling can help restore these changes. This is common in most file systems now a days.

In every file system, there are ***limitations*** on every file. Limitations include a maximum size of a file, maximum pathname length, maximum filename length, etc. One of the most common limitations is the naming rules of a file. This limits what characters can or cannot be used when naming a file and also the length of the file name. For example, NTFS files are case sensitive, cannot be Null (nothing there), has to be under 256 characters long, can use any UTF-16 characters except /, \, :, *, ?, <, >, and |.