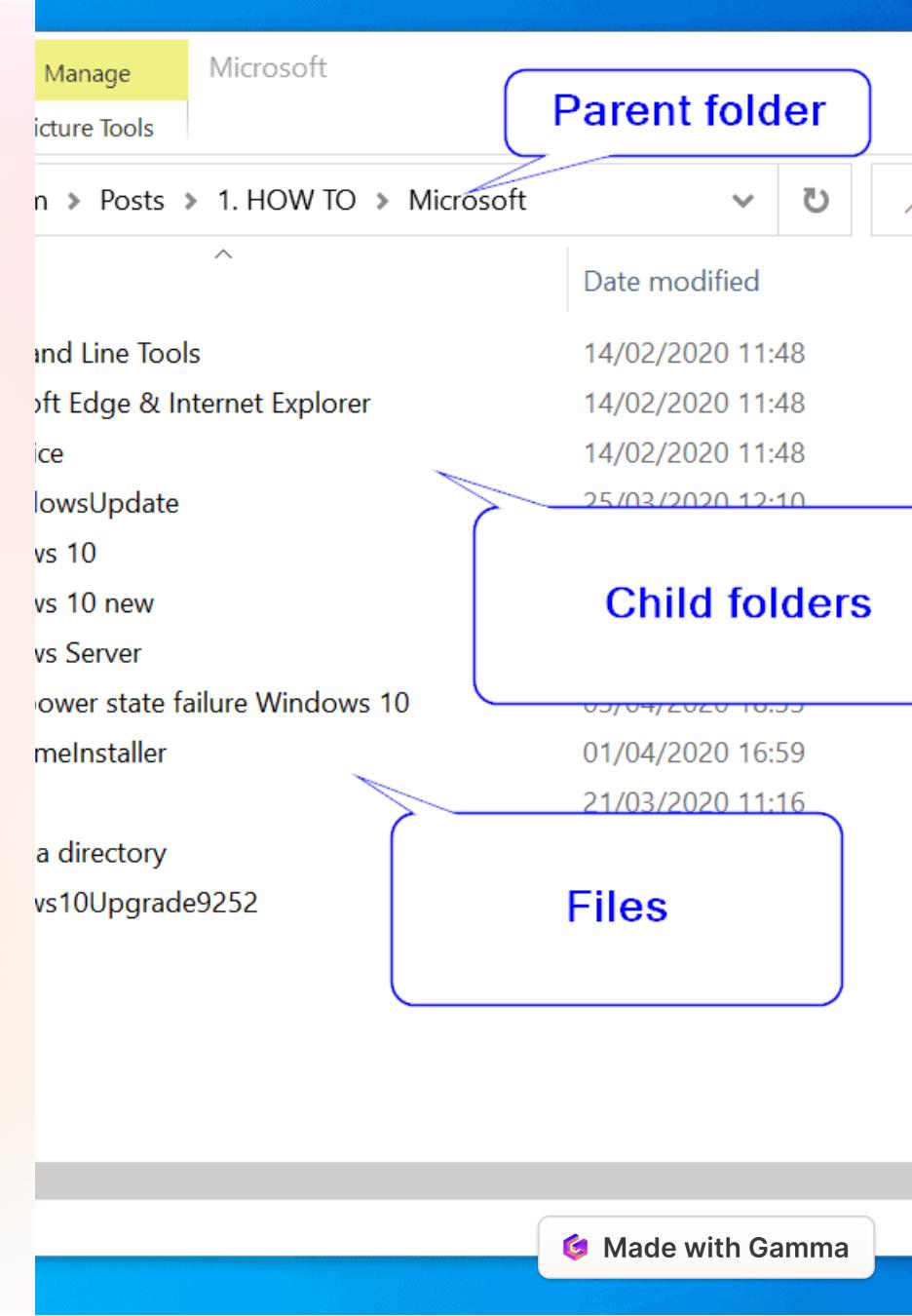


Files and Directories: Exploring the Basics

Welcome to the world of files and directories! Let's dive deep and understand the concepts, types, structure, and metadata of files. Discover how the kernel supports files and explore essential system calls for file I/O operations.



File Types Unveiled

Regular Files

The most common type of file that stores data in a specific format, such as text, images, or videos.

Directories

Special files that contain information and links to other files and directories.

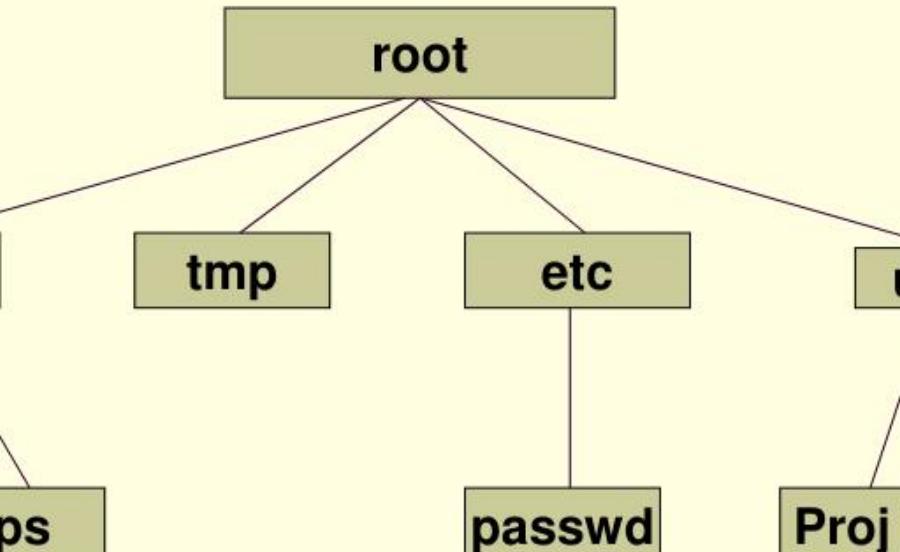
Symbolic Links

Files that act as shortcuts or pointers to another file or directory.



System Structure

UNIX file system is **structured hierarchically**, down treelike, so it starts with root and can have **any number** of files or subdirectories. A typical UNIX system contains files and directories, organized as the following:



Cracking the File System Structure

Unravel the mystery of file system structure, the organization of files and directories within a storage device. Explore how this structure affects the efficiency and reliability of file storage and retrieval.

Unveiling the Power of Inodes

1 Metadata Storage

Discover how inodes store essential metadata about each file, including file size, ownership, and access permissions.

2 Effective File Management

Learn how inodes enable efficient file allocation and utilization within the file system.

3 File Recovery

Understand how inodes play a vital role in recovering files from storage devices.

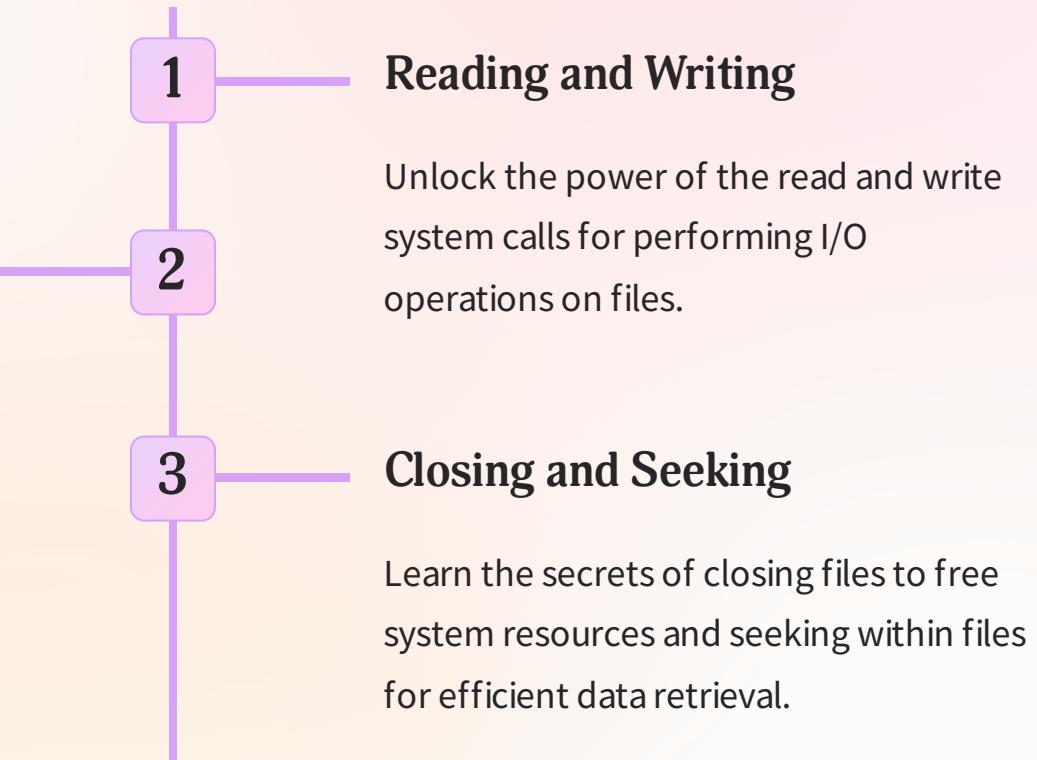
FILES

- Whenever a user executes a command, a process is created by the kernel to carry out the command execution
- ## Empowering Files: Kernel Support

- Each process has its own data structures:
Delve into the core of the operating system and explore the extensive support provided by the kernel for file descriptor table is one among them
- File descriptor table has OPEN_MAX entries, and it records all files opened by the process

Mastering File I/O System Calls

Opening and Creating
Discover how the open and create system calls enable file access and creation.



Reading and Writing

Unlock the power of the read and write system calls for performing I/O operations on files.

Closing and Seeking

Learn the secrets of closing files to free system resources and seeking within files for efficient data retrieval.



File Status Information

Discover the wealth of file status information available through the stat family of functions.

File and Record Locking

Unlock the power of file and record locking with the fcntl function.



Unleashing File Permissions and Ownership



MS Teams & SharePoint
Manage file permissions

File Permissions

Learn how to manage file access rights and permissions using chmod and fchmod.

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UNDERSTAND THE ROLE OF FILE OWNERSHIP AND PERMISSIONS IN LINUX

SUDO | CHOWN | CHMOD | UMASK | SU | CHGRP

- The sudo Command in Linux
- Dealing with File Permissions in Linux
- Dealing with File Ownership in Linux
- Understanding the umask command with examples
- The su Command in Linux
- The chgrp command in Linux

Understanding The Linux File Permissions

Column:	1	2	3	4
Directory/File/Link Information	-	rwx	rwx	rwx
		User Rights	Group Rights	Others Rights

While the first column defines a directory, file or link, the next 3 columns (2, 3, 4) define the permissions for the User, Group and Others (everyone else) groups.

Linux Permissions Made Easy

user	group	everyone
- rwx	rwx	rwx
4 2 1	4 2 1	4 2 1
7	7	7

Final calculated permissions

File Ownership

Explore the realm of file ownership and harness the potential of chown, lchown, and fchown.



Made with Gamma

Linking Files: The Ties That Bind

Soft Links

Discover the power of symbolic links (`symlink`) that create shortcuts pointing to a target file or directory.

Hard Links

Unleash the unique capabilities of hard links, creating multiple references to the same file or directory.