An analysis of i-node in Linux operating system

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**Abstract**: Linux has become a well-developed open-source operating system, which is widely being used in the world. The file system is a vital part of Linux operating system, and it is used to store and manage data. Since Linux supports many kinds of file systems, it is important to learn how the operating system accesses data stored in different file system. This article takes ext4-format file system as an example to describe how i-node works in file system and disk storage in Linux.

**Keywords**: i-node, Linux, file system

Linux is an operating system supporting many kinds of file system formats such as ext, vfat, ext2, ext3, ext4, sysv and so on.

1. **Constitution of file system in Linux**

In recent releases of Ubuntu, the default file system is ext4(the fourth extended file system). Ext4 divides the disk into four parts which contain super block, i-node table, boot block and data block. The boot block is used to boot the operating system. The superblock contains configuration of the file system, which includes the number of i-node, disk blocks, unused disk blocks and the location of i-node table, unused disk table and other useful information. I-node table also records much information. File size, user UID, user GID, the time when the file was changed and so on. Data block is used for storing file content.

1. **What is i-node**

I-node is short for index-node. It is a vital part of file system in Linux. Usually, the node is a 64-bytes or 128-bytes long table. The table contains the file’s information and disk address.

1. **The effect of i-node**

In Linux, there two ways, logical structure and physical structure, to constitute files. Logical structure is user-oriented and can be seen by users. For example, when users use the command “cat” to read a file content, they can see the logical structure of the file. Physical structure is the way how and where a file is stored in the disk. For users, all the files are complete and consistent. However, in fact, files may be stored separated in the disk. When users read or write a file, the file system will help user read all the blocks of the file in correct order and offer the logical structure to users. I-node is actually designed for the transition to logical structure from physical structure.

1. **Practical application of i-node**

node’s existence makes big sense for Linux. Since i-node contains much vital information related to files, it can be used to do many things

1. I-node can help restore data
2. I-node can be widely used in data credentials and digital evidence areas because it contains much information and it will record changed information when the file is changed.
3. I-node can be used to clean virus and trojan thoroughly.
4. **Summary**

I-node is of great significance for Linux. Learning how and the i-node works in Linux can bring much convenience for using and managing Linux.

**Reference**

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