操作系统原理与设计 第11章文件系统的实现2

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2009年09月01日



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Efficiency

• Efficiency dependent on:

- disk allocation and directory algorithms
- Various approaches
 - Inodes distribution
 - Variable cluster size
 - Types of data kept in file's directory entry
 - Large pointers provides larger file length, but cost more disk space

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Performance

• Performance

- disk cache separate section of main memory for frequently used blocks
- free-behind and read-ahead techniques to optimize sequential access
- improve PC performance by dedicating section of memory as virtual disk, or **RAM disk**

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Page Cache I

- A page cache caches pages rather than disk blocks using virtual memory techniques
- $\bullet\,$ Memory-mapped I/O uses a page cache
- Routine I/O through the file system uses the buffer (disk) cache
- This leads to the following figure
 - I/O Without a Unified Buffer Cache

Efficiency and Performance

Recovery Log Structured File Systems 小结和作业

Page Cache II



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Unified Buffer Cache

- A unified buffer cache uses the same page cache to cache both memory-mapped pages and ordinary file system I/O
- I/O Using a Unified Buffer Cache





- Consistency checking
 - compares data in directory structure with data blocks on disk, and tries to fix inconsistencies
- Backup & restore
 - Use system programs to back up data from disk to another storage device (floppy disk, magnetic tape, other magnetic disk, optical)
 - Recover lost file or disk by restoring data from backup

Log Structured File Systems

- Log structured (or journaling) file systems record each update to the file system as a transaction
- All transactions are written to a log
 - A transaction is considered committed once it is written to the log
 - However, the file system may not yet be updated
- The transactions in the log are **asynchronously** written to the file system
 - When the file system is modified, the transaction is removed from the log
- If the file system crashes, all remaining transactions in the log must still be performed





2 Recovery

3 Log Structured File Systems

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