Flash File Systems (whiteboard lecture)

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Learning outcomes

- Understand the properties of Flash memory and their impact on FS design.

- Understand key ideas and data structures used in the UBIFS file system

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Flash memory

- Fast reads
- Slow writes
- Fast random access
- Erase-before-write discipline
- Erase is slow and occurs in large blocks
- Limited number of erase cycles per block

Flash-based storage devices

- Two ways to use Flash in a computer system
  - Implement a Flash Translation Layer (FTL) to make Flash memory look like a regular block device.
    - Conventional disk file systems can then be used on top
    - FTL is also responsible for weal levelling and caching
  - Use Flash memory directly through a Flash-specific FS, e.g., UBIFS or JFFS.

UBIFS

- See: Adrian Hunter, A Brief Introduction to the Design of UBIFS
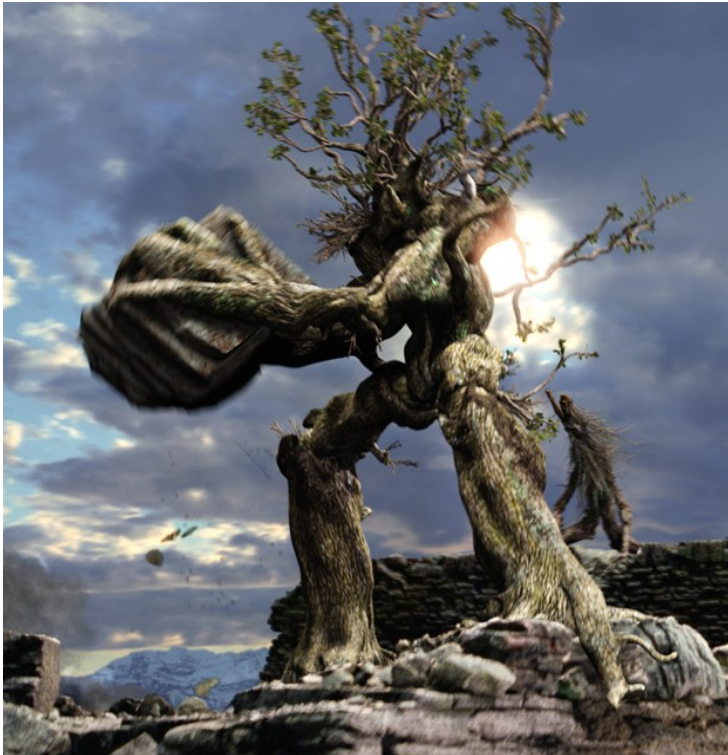
UBIFS is based on the **Wandering Tree** data structure