A File System for Laptops

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The Context

- When UNIX was almost 20 years old, there came Plan 9
- Computing environment was qualitatively different
  - Graphics, networks, workstations
- Plan 9 is now over 20 years old
- What's different?

What's Changed

Laptops

Why are Laptops so Different

- File Servers are good things
  - Centerpieces of good networks, and of Plan 9
  - Centralize state
  - (Mostly) Stateless workstations
- Laptops are anything but central
- Laptops must be stateful

The Usual Solutions

- tar, rsync, and friends
  - Laptop copy is the "real" one
  - File server is backup

The Answer

- Reverse the perspective
  - File server copy is the “real” one
  - Laptop is a cache

First Approach

- Oriented around files
- Effectively mapped one directory tree to another
- Spent a lot of time doing stats

New Approach

- Bi-directional tee for Styx messages
- Message oriented
- Write-through cache when connected
- Write-back cache when disconnected

When Connected

- All messages go to file server
- Most (ex. Tread, Tstat) also go to cache
- Rread and Rstat from the file server are changed into Twrite and Twstat for the cache
- Twalk is complicated
  - Walk on both the file server and the cache
  - Generate Tcreate for each path element missing from the cache

When Disconnected

- All messages go to the cache
- Most (ex. Tversion, Tauth, Tread, Tstat) are written to a log
- Log is played back to the file server when reconnected

Status

- Major parts implemented and working
  - Connected mode
  - Disconnected mode with untested write-back log
- Major parts not implemented
  - Testing write-back log
  - Log playback on reconnect