TurboCharge Your Notebook with aufs *(and optional flashcard)*

Mark Lord *(kernel hacker)*

Motivations

Slow notebook, old internal hard drive

Fragile for road use

Vulnerable to downloads

Difficult to try-and-revert some software

Solid State Drives

Highly recommended!

Nearly all are SATA only, though

- Not good for older notebooks

Expensive

Form factor limitations (1.8” models?)

Good SSDs

Intel (very expensive)

- Gold standard, in performance and cost

Indilinx ”barefoot” based, w/64MB caches

- Decent value, excellent performance

Newest Samsung-based, w/128MB caches

- As good as the Indilinx ones (?)

Alternatives

When an SSD is just not feasible

USB flash stick

CF / SD card on a ”carrier”


cira
acei
Transcend

USB Sticks

Fast enough on READs

Usually excruciatingly slow on WRITEs

Decent capacity, low cost, removable

They *stick* out, a breakage hazard

SD Card on Carrier

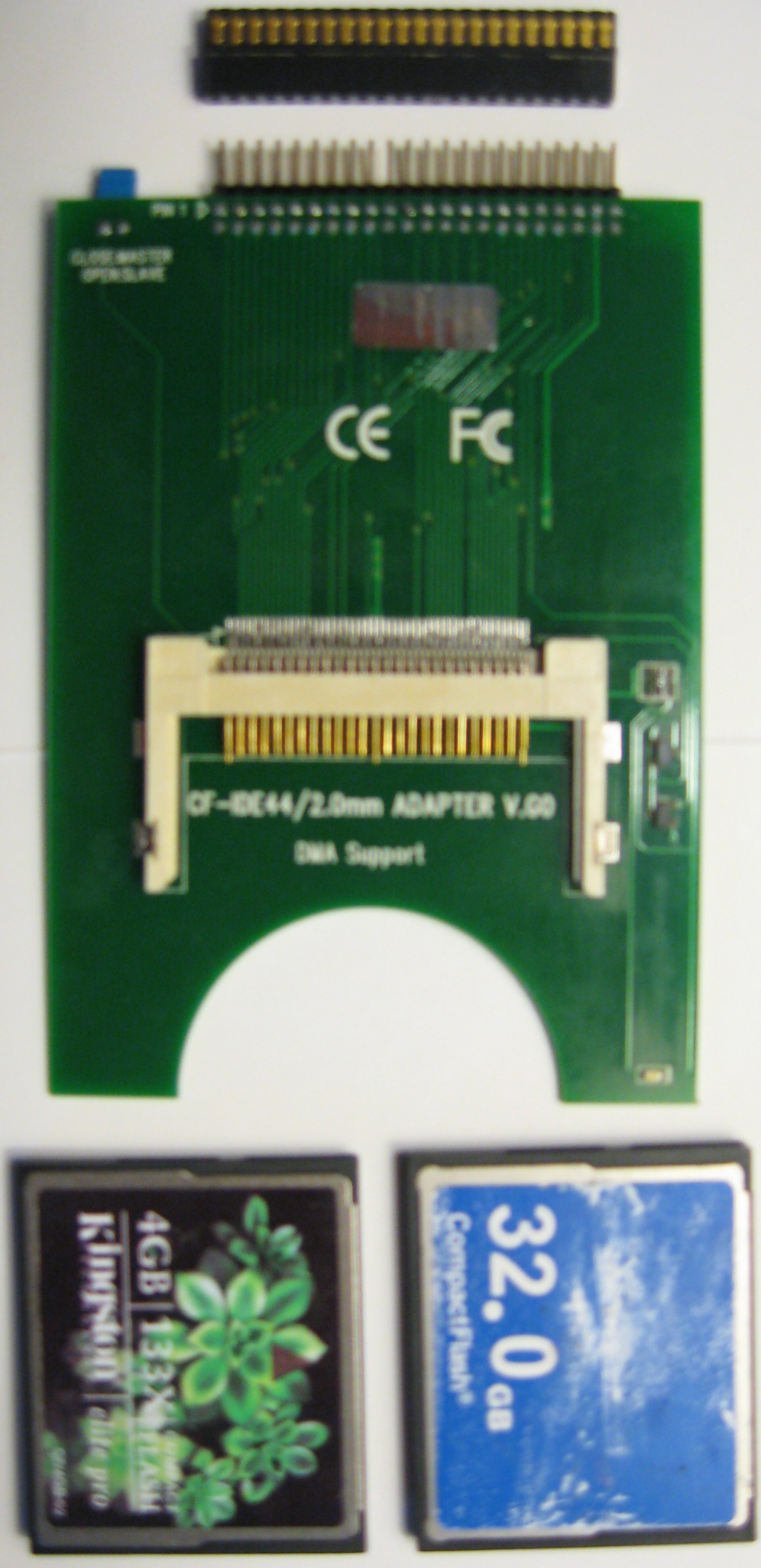
Cheap, lightweight

Internal install possible

- SD card slots seldom bootable

Moderate capacities

Moderate speeds


CF-IDE44/2.0mm ADAPTER V.00
DMA Support
4GB
32.0 GB

CF Card on Carrier

Internal installation

CompactFlash (CF):

- High capacities available
- High speeds available, including WRITEs
- Rugged
- PATA drive protocol/pin compatible
- UDMA5

Concerns with WRITEs

SLOW on most devices

- 2MB/sec to 7MB/sec is commonplace
- 18-25MB/sec is better, more expensive

Limited cycles before it dies

- Unknown wear-leveling capabilities

Solution: use a union fs

aufs or aufs2 is the leading contender

Fast, stable, widely used

”Live discs” commonly use it:

- tmpfs (rw) on top of squashfs (ro)
- Cannot make permanent changes

aufs2

Advanced multi-layered Unification FileSystem (version 2).

aufs: redesign and re-implementation of the Unionfs version 1.x series.

aufs2: latest version, for 2.6.27 and later.

Unionfs version 2.x ”begin taking some of the same approaches to aufs1's”.

http://aufs.sf.net/ Junjiro R. Okajima

Aufs for non-LiveCD use

Stack a tmpfs (rw) over a normal ext4 (ro)

READs come up from the ext4

WRITEs go only to the tmpfs (RAM)

Very fast operation

Safe to power off at any time

- Fast shutdowns!

Session Persistence?

None by default

But.. can optionally run rsync or mirrordir to push updated files down to the underlying ext4 filesystem.

remount,rw

Requirements

Kernel must have aufs support

- Built-in or loadable module is fine

Ubuntu kernels have it; Fedora doesn't

- (my apologies to other distros!)

Special ”init” to create the overlay

Some modified /etc/init.d/ scripts

Get the Package

Permanent home / download location:

http://rtr.ca/run_from_ram/

Un-tar **ram.tgz** at **/** (root) directory

- Creates **/ram/** subdirectory (nothing else!)

Try it (Ubuntu)

Reboot, and add this to GRUB kernel line:

init=/ram/init

That's all!

Commiting changes

Save entire session, or just a directory:

commit_session.sh

Always do a dry-run at first (new software!!)

(default mode)

Then use **--commit** to do it for real

An alternative: aubrysnc

Part of the aufs2-util package

- By Junjiro Okajima

Apparently works in a similar fashion:

- But also removes the pushed-down new files from the tmpfs afterward (good)
- I couldn't figure out how to use it, though

Demo Time

Lots of demos and explorations

The End.

Thanks!