Maintaining Coherence of a Running Lisp

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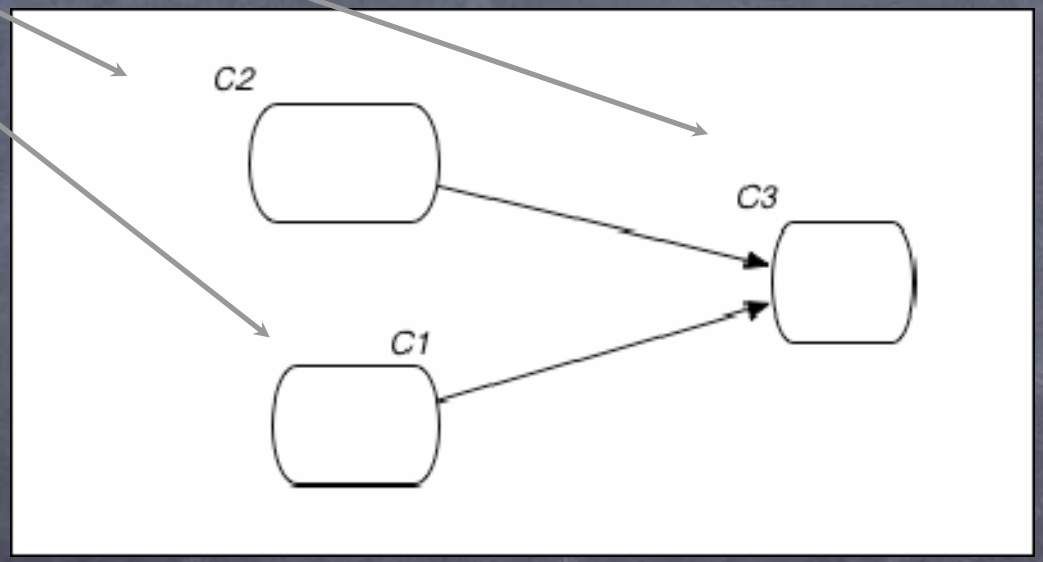
What is (In)coherence?

Suppose a table is created in one file, and added to in files loaded later.

If the original file is reloaded, we have lost **coherence.**

Basic Idea is Obvious

Chunks



C1 & C2 are the basis of C3,
which is their derivee.

C3 can be brought up to date when C1 and C2 are up to date.

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What is a Chunk?

- A piece of information, or a piece in a particular place or state, or....
- Generic function `derive` brings chunk up to date.
- Acyclic derivation graph
- Chunks are “big” (not spreadsheet cells)

Complexities

- There can be more than one chunk from which a higher chunk can be derived.
- Some bases are needed only for derivation to occur.
- Chunk derivers can alter the chunk network.

“Being Managed”

Chunk C is **managed**

=

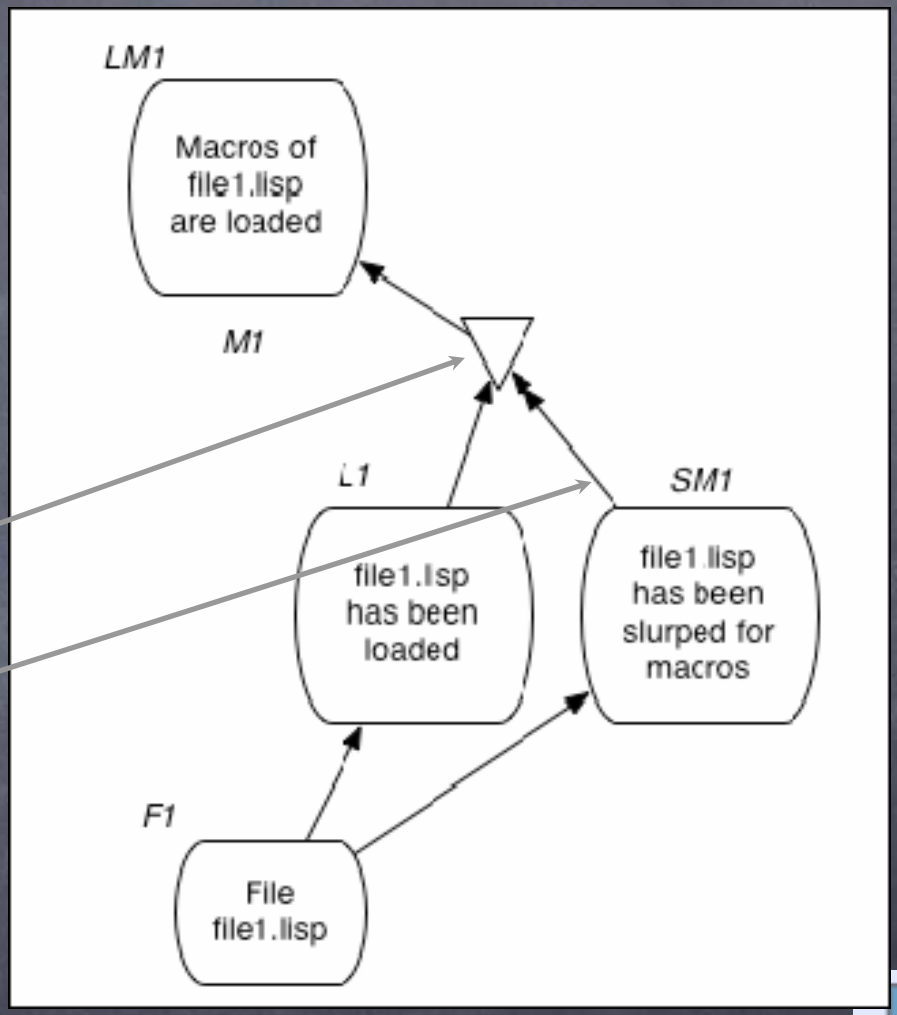
system commits to keeping C up to date.

Disjunctive Basis

You don’t need to compile or load file1.lisp to extract macros from it.

OR

default



SM1 should be managed if L1 isn’t

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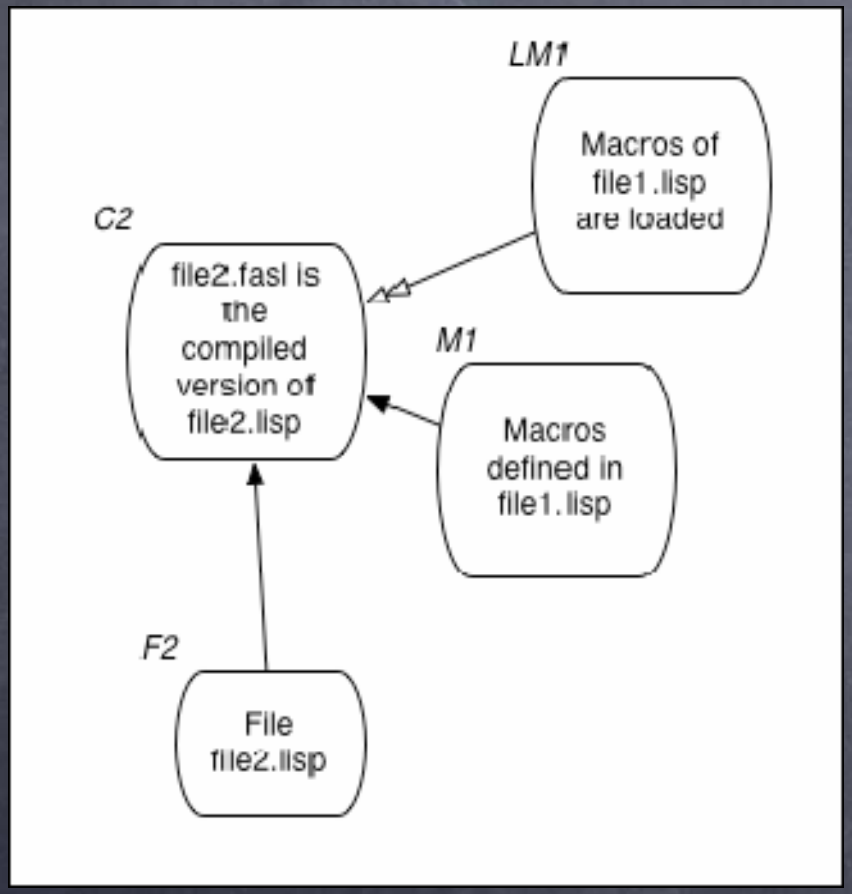
Derive Basis



Macros (LM1) don't have to be loaded for C2 to be up to date; they just have to be loaded for C2 to be **brought** up to date.

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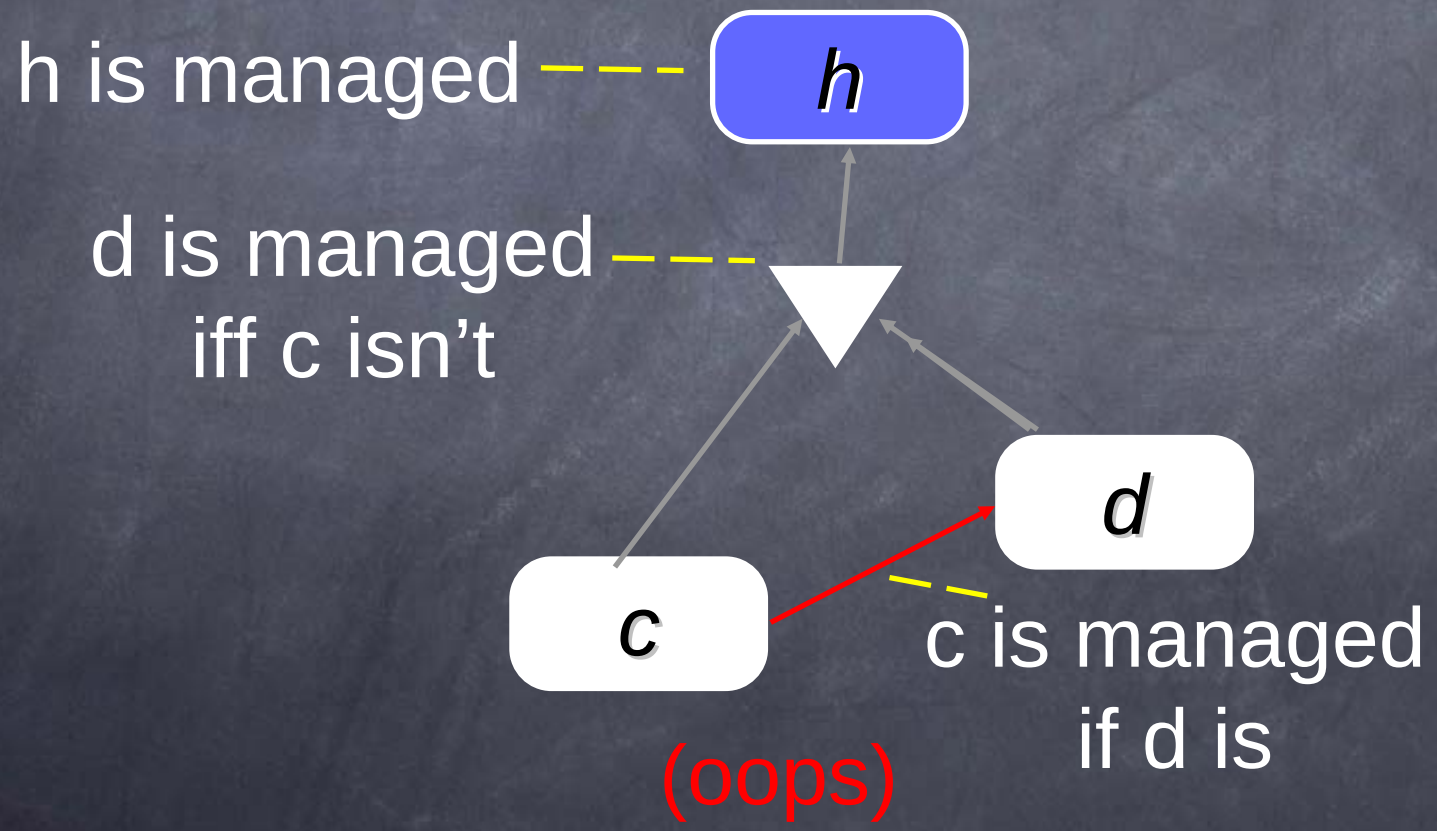
Chunks Changing Chunk Network

YTools File Manager (YTFM) reads file headers to get dependencies:

```
(depends-on %hacks/ fileseg)
```

changes derivees of `fileseg` chunk

Alg.1: Manage/Unmanage



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Alg. 2: chunks-update

- The basic idea is what you would expect: find supporters and derivants of chunks, and call their derivers if they are out of date.
- But there are a lot of complexities . . . . .

Complexities

- If a chunk must be updated, its update-basis must be temporarily managed (alg. 1 called during alg. 2).
- If a “rogue” chunks-update occurs, we restart the current one.
- Saving grace: A given chunk’s deriver is called at most once, even across restarts.

But it’s hard to guarantee (or define) correctness

Conclusions

- YTFM completely rewritten (after years of kludgy patches) using chunk system. Now it works.
- The system has the “right” tool set --- lots of ramifications to explore.
- Available (well, soon), from
  http://www.cs.yale.edu/homes/dvm
  Look for YTools 2.0