Harbinger: Sonifying the mundane and mildly entertaining

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Introduction

- What if we could use familar interfaces to make music
- Some interfaces might have musical qualities

Lets Hijack Something

- Gnumeric

Gnumeric

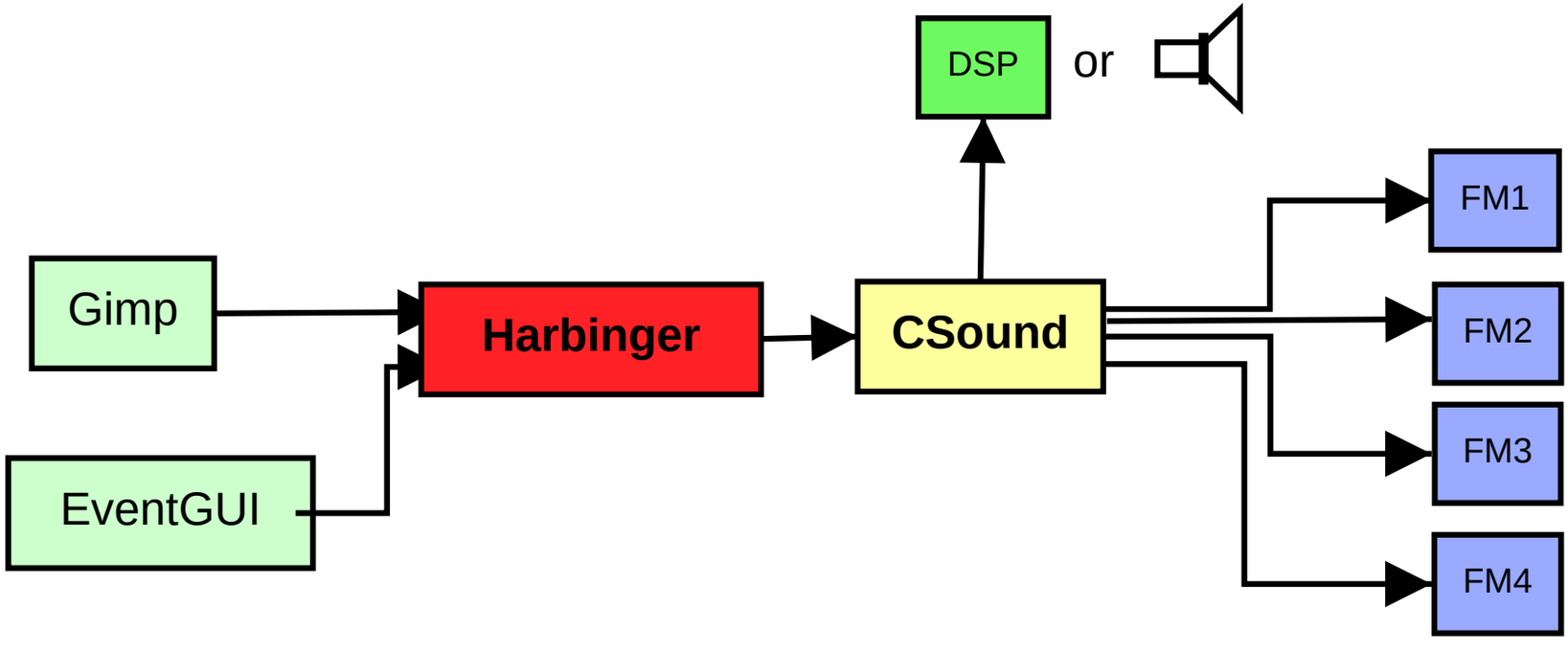
- Gnome Spreadsheet
- like Excel

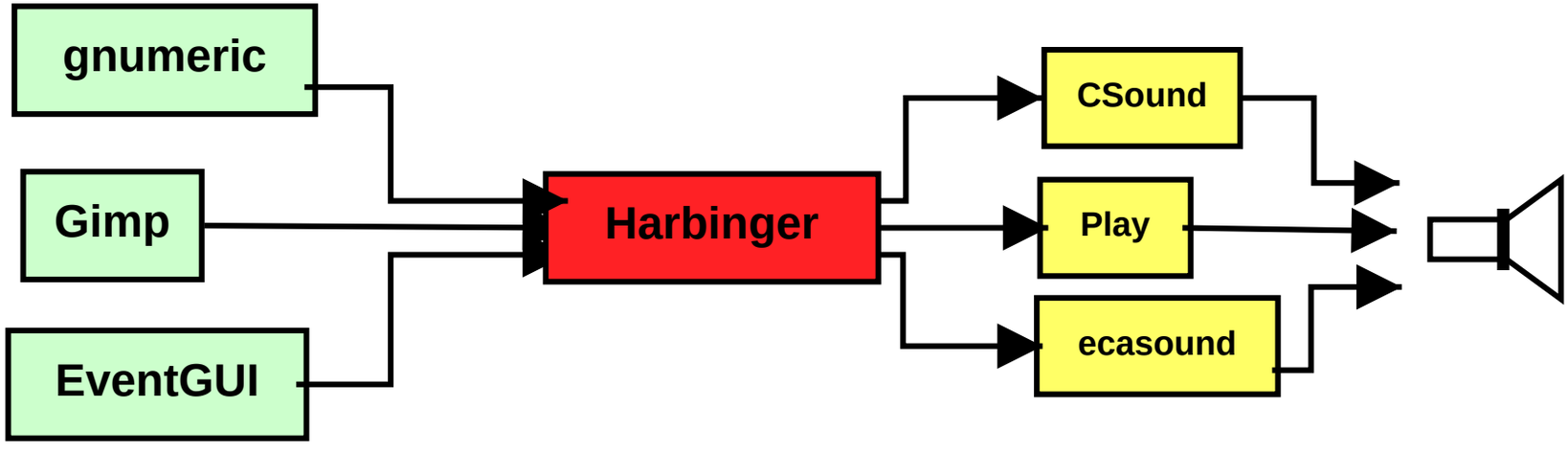
Gnumeric

- Instrument idea, send selected cell position and value events
- Convert them to music
- Use CSound to render the music

Ok.. but how do we communicate from Gnumeric?

- Harbinger!
  - C Library for sending messages
    - Just embed calls from within another program
  - A middle man
    - receives these messages
    - Delegates messages to other programs like CSound


DSP
or
Gimp
EventGUI
Harbinger
CSound
FM1
FM2
FM3
FM4


gnumeric
Gimp
EventGUI
Harbinger
CSound
Play
ecasound

Harbinger

- send connectionless messages encoded in plain text
  - UDP
- middle man routes these messages, and massages them
  - Add code to the middle man to filter messages
- middle man passes messages on to other programs

Why not OSC?

- OSC wasn’t around or popular the time
- This is very simple
- This is very easy
- I can do more than OSC
- No errors if there is no one receiving the message
- Reduce dependencies.

Gnumeric

- First configure and compile it
  - `./configure --prefix=whereuwant it`
  - `make && make install`

Gnumeric

- So we want to see when a cell is selected or when the current cell changes.
  - grep for select, cell, update, change
- Cells are parts of sheets maybe look for that too

Gnumeric

- Interesting procs
  - scg_object_select
  - scg_cursor_move
    - moves cursor down :(
    - but calls sv_cursor_set

Gnumeric Guts

- look for sv_cursor_set
  - src/sheet-view.c:sv_cursor_set
  - sv_cursor_set does place the cursor
    - sv_set_edit_pos looks interesting though
  - Lets change sv_cursor_set

Gnumeric Debugging

- added code to src/sheet-view.c
  - printed the view's current selection position
  - Good
  - This itself could be an instrument but I don't think it is enough

Gnumeric: Get a Cell

- lets get a Cell Value
- Look in sheet-view.h, there must be a spreadsheet in there
  - Yep sheet is in in sheet-view
  - Lets look at sheet.h and see how to get a cell
    - `GnmCell *sheet_cell_get(Sheet const *sheet, int col, int row);`
    - This looks good..

Gnumeric: Cells

- Journey to gnumeric.h
  - Where is _GnmCell defined?
    - cell.h and cell.c
      - gnm_cell_get_rendered_text ?

Gnumeric: Cells

- Added `puts( gnm_cell_get_rendered_text( sheet_cell_get( sv->sheet,sv->edit_pos.col, sv->edit_pos.row)));`
- – Got `** (lt-gnumeric:5366): CRITICAL **: gnm_cell_get_rendered_text: assertion ‘cell != NULL’ failed ERROR`
  - – * Although it did print values if it had them
  - * Need to add a null check

Gnumeric: Harbinger

- Now lets use the Harbinger API
- Remember to compile with -LHarbinger

OpenArena

- Free datafiles
- IOQuake3 Engine

Quake 3/IOQuake3/OpenArena

- Not the easiest to modify
  - Contrary to existence of mods
- Useful events
  - Gun fire
  - Collisions
  - Moving
  - Rocket/Bullet Trails

What to look for

- Sound system events
- Collision events
- Ricochets

Quake 3 Arch notes

- Client and Server
- Game can be
  - Native Game Code
  - VM Code (QuakeC)
    - VM Code can’t call POSIX :(

Quake 3 Craziness

- To deal w/ the VM
  - Anything that crosses the control/environment boundary
    - calls a syscall
- iD overloaded syscall with their own assembler based implementation
  - wow

Quake 3

- Easiest for us to direct modify Quake3
- Compile to native code
- Ignore the VM

Run IOQuake with our mods

- ```
  make && \
  cd ./build/release-linux-x86_64/ && \
  ./ioquake3.x86_64 +set sv_pure 0 \
  +set vm_cgame 0 +set vm_game 0 \
  +set vm_ui 0 +set s_initsound 0
  ```
  ```

Other suggestions

- GIMP, paint programs have nice UIs with lots of inform and tools.
- Instant Messaging
- follow strace
- follow tcpdump
- preload lib hooks and wrap calls

Future Work

- Fish or Cut Bait?
  - Work on music
  - Work on tools?
  - Restrictions versus freedom
- Other UIs

Conclusions

- Take home:
  - leverage the UIs of other software to produce music
    - avoid wasting your time reinventing the wheel
  - Perl is the great glue that holds systems together
  - avoiding complication helps for development speed
    - Hurts for performance (sometimes)