First Sighting of GeoShred on Linux

CCRMA Open House 2022

Nick Porcaro
Dr. Julius O. Smith III
Pat Scandalis
GeoShred/Linux Standalone

10/21/2022
GeoShred/Linux running under Reaper
GeoShred/JUCE

- Chris Chafe kept bugging me about it for years so I finally did something about it!
- Portable: Linux/Windows/macOS via JUCE.
- Leverages Plugin GUI Magic for preset editing and UI editing.
- ValueTrees used extensively, thanks David Rowland.
  - Communicate across different objects.
  - Undo/Redo
  - Simplifies code.
- Each preset can have a totally flexible UI.
- Works as a VST3 plugin. Soon AUv3 and others as required.
Demo: 3D Guitar

• Latest from Julius
Demo: Naada Instruments

• Suthu from Bangalore India. Engineer, musician, GeoShred user.
• Studied Julius’ work and gave us a blow-away demo.
• Indian bowed strings, woodwinds and Veenas.
• Coming in the next GeoShred release.
Naada Instruments in the next GeoShred release
Demo: GeoShred standalone
Plugin GUI Magic

• Flex/Box grid based on CSS standards
• Works like a responsive website.
• Not perfect, but special cases can be encapsulated.
• Better to use code as opposed to a custom XML file format because special case handling creates redundant or complex XML.
• Grid was sufficient because the UI only needs to scale.
• Adapted for new preset editor and live layout editor.
Preset Format

• Attributed XML preset format - easy to edit
  • Each preset lives in it’s own folder
  • Easy to edit and add new presets.
Editors/Performance

- Preset Editor
  - Add new processors
  - See all parameters at once, drag to control surface.
  - MIDI learn/assign
- Control Surface Editor
  - Based on PluginGUIMagic - easy to make the preset look like anything
  - Video possible
- Keyboard
  - Rewrite of GeoShred keyboard in near future
  - Conventional MIDI keyboard from JUCE.
- GeoShred Control
  - Best controller for GeoShred is, uh, GeoShred!
  - Easy to connect from Mac.
  - Anybody want to try doing it from Linux?
Audio and MIDI processors

- Main audio callback iterates over processors. It’s all C++ little overhead.
- Greatly simplifies adding new processors - for audio and MIDI.
- Thanks Jatin for the idea!

```cpp
// Then run the result through the fx chain
for (MFAudioProcessorWrapper *processor : instruments) {
    for (int channel=0; channel<MIN(numOutputChannels,numInsChannels); channel++) {
        int startSample = 0;
        mixerBufferP->addFrom (channel,
            startSample,
            *instrumentBuffer,
            channel,
            startSample,
            numSamples);
    }
}

// Run result through the fx chain
// the amp is the last thing in the chain (enforced by GeoShred)
for (MFAudioProcessorWrapper *processor : effects) {
    processor->setNumOutputsLastProcessor(numChannelsRunning); // processing in-place => must provide this
    juce::AudioBuffer<float>* possiblyUpsampledBufferP = resampler->maybeResample(processor);
    processor->processBlock(*possiblyUpsampledBufferP, midiMessages);
}
```

Main Processing Loop
Development Environment:
macOS/Linux/Windows
on late 2013 MacBookPro

• Many thanks to Leigh Smith for showing this!
• Make boot drive from Ubuntu site.
• Get refin boot manager
• Partition disks - ext4 for Linux, FAT for Windows
• Install packages for development environment
• Tweak CMake for Linux/Windows
• Might need to debug on Linux/Windows
  • Some differences in compiler behavior, wrt warnings and perhaps worse.
Demo: Bach Fugue

- **1988 NeXT Computer Introduction demo**
- Reaper project -
  - Converted BachFugue.score to MIDI with a new program.
  - Intended for different instrument (plucked string) so more hand editing will be required.
- Naada Instruments running under GeoShred replace the plucked string
- Ambisonic rendering on the CCRMA Stage
Build System

• CMake build system
  • Easy to target multiple platforms
  • Thanks Eyal Amir for some great examples.
When will it be available?

• Not sure, we still need to figure out a distribution scheme. Stay tuned!
• In the meantime download GeoShred iOS!
  • Contact me for more information:
  • nick@ccrma.stanford.edu or nick@moforte.com