

# Modular in the DAW

## Cardinal origins, tips and tricks

Filipe Coelho & Alexander Chalikiopoulos

FOSDEM, February 2026

# Who Are We?

# Who Are We?

- Filipe Coelho

- works at Darkglass Electronics
- develops Distrho Plugin Framework (DPF) and Carla plugin host
- maintains JACK and a few other open source audio projects

# Who Are We?

- Filipe Coelho

- works at Darkglass Electronics
- develops Distrho Plugin Framework (DPF) and Carla plugin host
- maintains JACK and a few other open source audio projects

- Alexander Chalikiopoulos

- works at Wasted Audio
- develops the Heavy Compiler Collection
- contributes to Plugdata

# About VCV Rack



# About VCV Rack

- Open-source project and company started by Andrew Belt in 2016
- Rack v0.x starts with BSD-3-clause license
- Gathers a sizeable community of developers and users

## About VCV Rack

- Open-source project and company started by Andrew Belt in 2016
- Rack v0.x starts with BSD-3-clause license
- Gathers a sizeable community of developers and users
- Proprietary/Commercial forks appear which doesn't go well with Rack authors
- Rack v1.x launches and changes license to GPLv3+
- Not open for code contribution (legal issues with the future plans)

## About VCV Rack

- Open-source project and company started by Andrew Belt in 2016
- Rack v0.x starts with BSD-3-clause license
- Gathers a sizeable community of developers and users
- Proprietary/Commercial forks appear which doesn't go well with Rack authors
- Rack v1.x launches and changes license to GPLv3+
- Not open for code contribution (legal issues with the future plans)
- Rack v2.x launches, Rack Pro as proprietary plugin version
- Cardinal publicly released as alternative open-source plugin version

## How It Started

- Cardinal started after Rack v2.x standalone codebase was released, checking if we could run it as a plugin (since we knew one existed)

## How It Started

- Cardinal started after Rack v2.x standalone codebase was released, checking if we could run it as a plugin (since we knew one existed)
- And yes! - <https://github.com/DISTRHO/Cardinal/issues/1>
- Some work in DPF was needed to support all Rack's features

## How It Started

- Cardinal started after Rack v2.x standalone codebase was released, checking if we could run it as a plugin (since we knew one existed)
- And yes! - <https://github.com/DISTRHO/Cardinal/issues/1>
- Some work in DPF was needed to support all Rack's features
- Around 4 months later the first Cardinal stable release!
- (intentional delay/padding for Rack v2.0 to go out first)
- As example due diligence:  
<https://github.com/DISTRHO/Cardinal/blob/main/docs/LICENSES.md>

## How It Started



## What Cardinal Really Is

- Modular eurorack software based on VCV Rack, loading modules and connecting cables to make sound.
- Contains 1382 modules from 84 vendors (26.01 release).

# What Cardinal Really Is

- Modular eurorack software based on VCV Rack, loading modules and connecting cables to make sound.
- Contains 1382 modules from 84 vendors (26.01 release).
- Free and open-source, available as
  - AUv2
  - CLAP
  - LV2
  - VST2
  - VST3
  - Soon: shared library with minimal API
- Plus standalones and a web version through emscripten & wasm.

# What Cardinal Really Is

- Modular eurorack software based on VCV Rack, loading modules and connecting cables to make sound.
- Contains 1382 modules from 84 vendors (26.01 release).
- Free and open-source, available as
  - AUv2
  - CLAP
  - LV2
  - VST2
  - VST3
  - Soon: shared library with minimal API
- Plus standalones and a web version through emscripten & wasm.
- Cross-platform, running on: FreeBSD, Linux, macOS, and Windows.
- Multi architecture: x86, x86\_64, ARM, ARM64, RISC-V

## Technical details and differences

- Fully self-contained, everything is built-in, no loading of external modules

## Technical details and differences

- Fully self-contained, everything is built-in, no loading of external modules
- Projects are portable (share patches!)

## Technical details and differences

- Fully self-contained, everything is built-in, no loading of external modules
- Projects are portable (share patches!)
- Single-threaded audio-processing, with module processing order based on graph setup

## Technical details and differences

- Fully self-contained, everything is built-in, no loading of external modules
- Projects are portable (share patches!)
- Single-threaded audio-processing, with module processing order based on graph setup
- Host modules are "terminals" and always run first and last

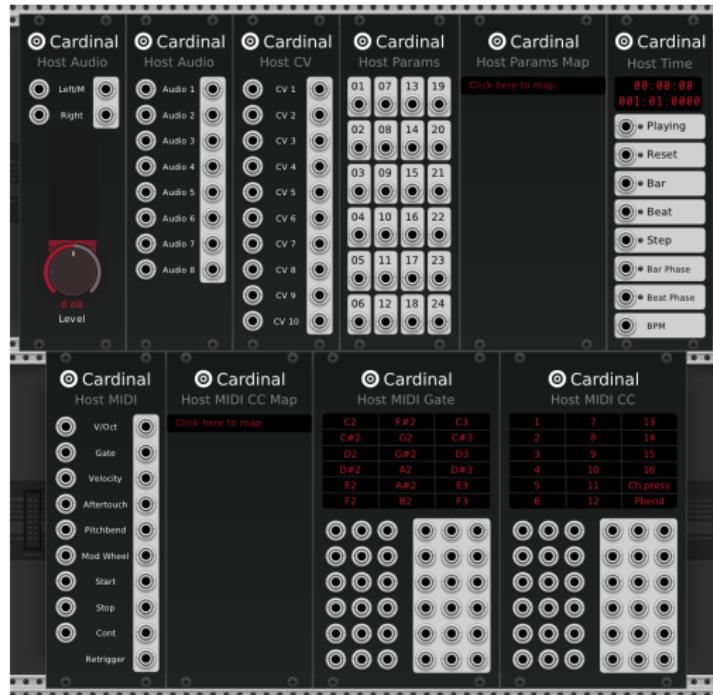
## Technical details and differences

- Fully self-contained, everything is built-in, no loading of external modules
- Projects are portable (share patches!)
- Single-threaded audio-processing, with module processing order based on graph setup
- Host modules are "terminals" and always run first and last
- UI is tied to host event-loop, dialogs run async

# Integration Tricks

- Custom host integration modules

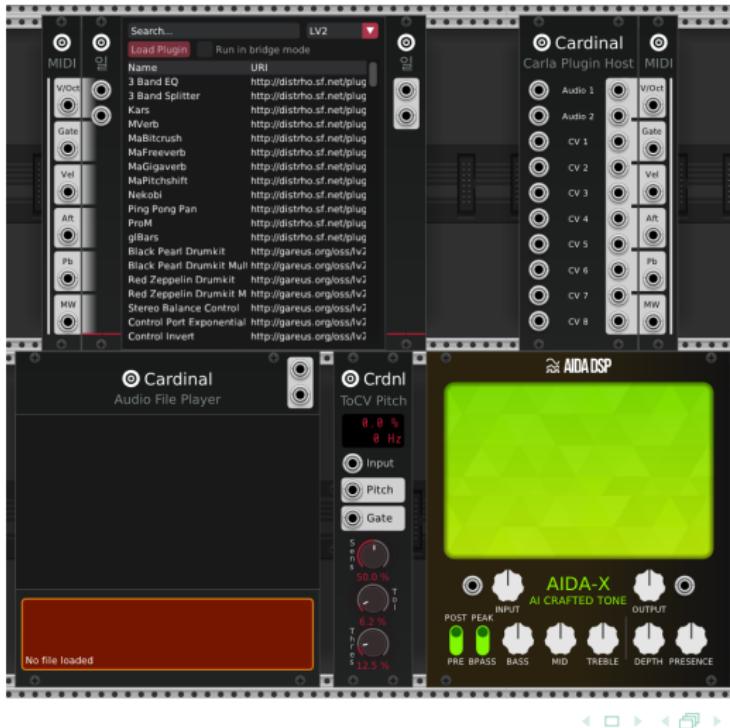
# Integration Tricks



# Integration Tricks

- Custom host integration modules
- Hosting other plugins! ("vendored" Carla plugin host)

# Integration Tricks



# Integration Tricks

- Custom host integration modules
- Hosting other plugins! ("vendored" Carla plugin host)
- DEMO: JACK and LV2 CV ports

# Integration Tricks

## Cardinal CV Ports

# Advanced Usage

- DEMO: Remote control over OSC!

# Advanced Usage

## Remote Control Over OSC



# Advanced Usage



# Advanced Usage

- DEMO: OSC remote control!
- Embed usage. Available on MOD devices using LV2

# Advanced Usage



# Advanced Usage

- DEMO: OSC remote control!
- Embed usage. Available on MOD devices using LV2
- Web version can load patch files using an argument ?patchurl=<url>
- <https://minicardinal.kx.studio>

# Contributing

- CC-0 example patches, either as base template or showing off something specific

# Contributing

- CC-0 example patches, either as base template or showing off something specific
- Adding modules, within tight limits

# Contributing

- CC-0 example patches, either as base template or showing off something specific
- Adding modules, within tight limits
- Updating modules (sometimes needing to patch/fix the modules)

# Contributing

- CC-0 example patches, either as base template or showing off something specific
- Adding modules, within tight limits
- Updating modules (sometimes needing to patch/fix the modules)
- Community guidance? (just us 2 are not enough to lead a community)

# Thank You

- VCV and Rack dev community
- Users posting their work on patchstorage.com
- You! for listening

<https://cardinal.kx.studio>