

Goals

- Be able to write a (very) simple MIDI event filter in Lua for any LV2 Host
- And en route familiarize with:
 - LV2 and its atom event system
 - Lua scripting language



Itinerary

1 Overview and Tour

- Lua scripting language
- LV2 event system
- Inner workings of *Moony*
- Conducted tour through constructive example plugins

2 Hands-on experience by attendees



What is Moony?

- Programmable LV2 event plugin
- Event logic is scripted in Lua
- Lua is executed in real-time (not strictly necessary, but nice-to-have)
- Scripts can be updated on-the-fly
- Potentially runs in any LV2 host and on any platform
- Take your scripts to any host ...



What/whom is Moony meant for?

- Rapid prototyping
- Learning tool for LV2 atom event system
- Alternative event systems
- Algorithmic sequencing
- Algorithmic composition
- Advanced automation
- Live coding



Lua goals (architect's view)

- Portability
- Simplicity
- Small size
- Scripting



Moony prerequisites

- Non-functional language
- Fast compilation
- Fast execution
- Small overhead
- Flexibility
- Full control over memory
- Modular sandboxing



Where is Lua used?

- Games
- AI Research (Google DeepMind)
- Window manager (Awesome)
- DAW (Renoise, Ardour)



Types

- Nil (aka undefined)
- Boolean
- Integer (5.3)
- Number
- String (character + byte string)
- Table
- Function
- Userdata (interfacing to C)
- Thread (coroutines)



Table

- Only data structure, but extremely versatile
- Associative array (any type as key and value: string, number, table, ...)
- Can implement various structures (set, array, sparse matrix, list, ...)



Function

- First-class value
- Anonymous functions
- Nested functions with full lexical scoping



Peculiarities

- All integer indexing starts at 1
- 0 evaluates to true in conditions
- and, or operators return operands on success



Port types

Audio port *sequence of audio samples*

Control port *plugin parameters controlled by e.g. knobs and sliders*

Atom port *sequence of events, e.g. MIDI ← today's topic*

CV port *sequence of Control Voltage samples, rarely used)*

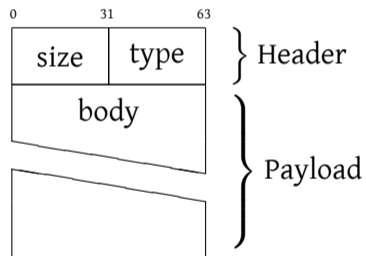


Why LV2?

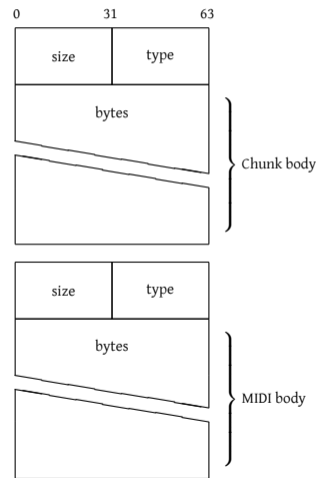
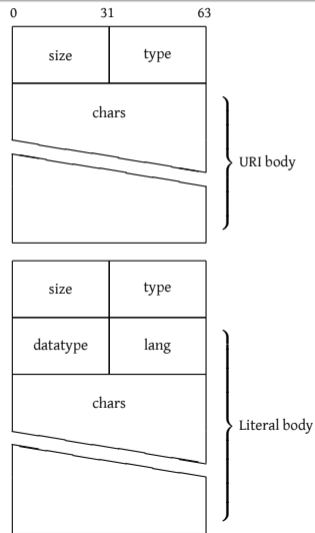
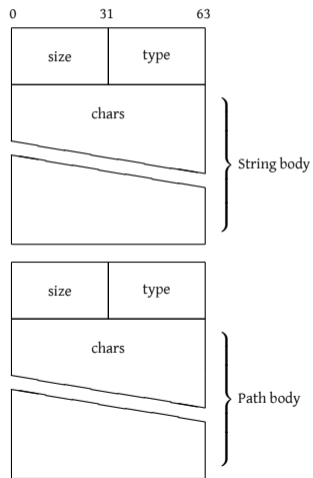
- Support for any kind of event (not only MIDI)
- Sample accurate events
- Awesome session management
- Presets are portable and easily shareable



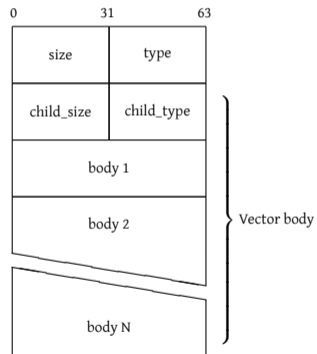
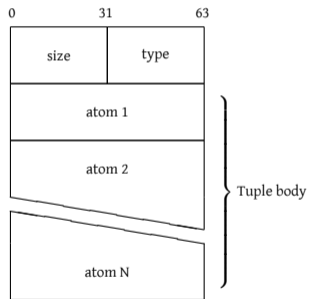
Atom prototype



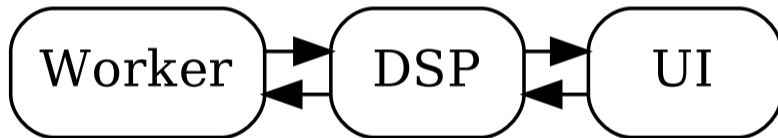
Atom primitives (2)



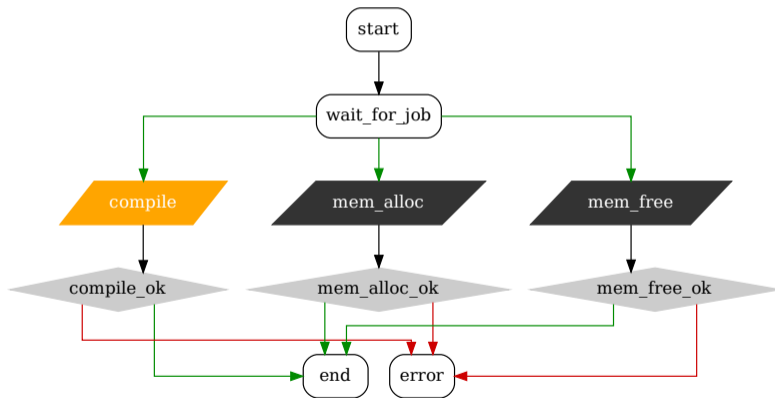
Atom containers (1)



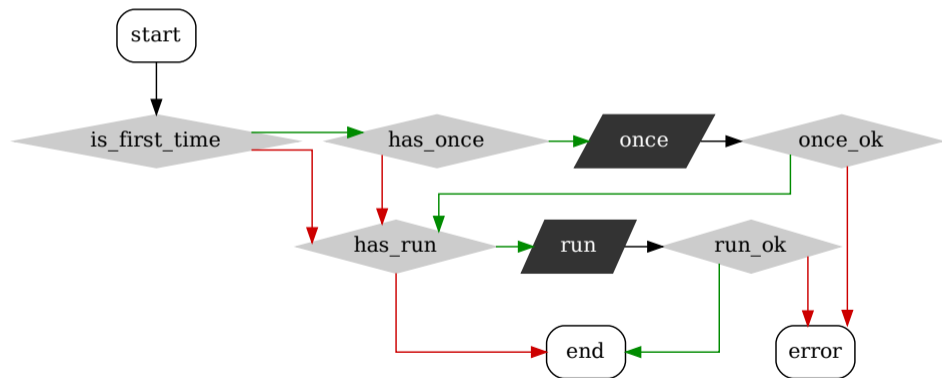
A typical LV2 plugin and its threads



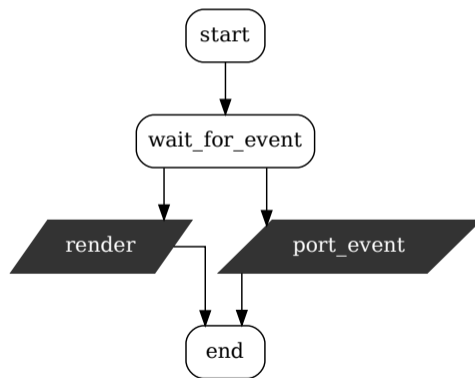
Worker thread



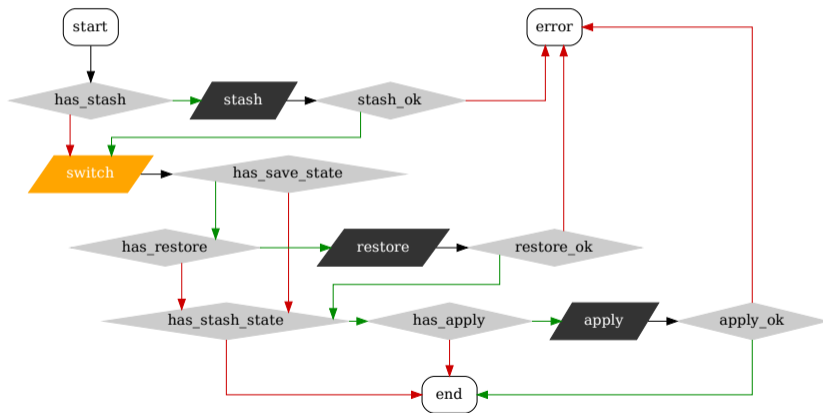
DSP thread



UI thread



Code replacement



Download / Install

- *download release (0.22.0) from*
 - `https://open-music-kontrollers.ch/lv2/moony`
- *install to*
 - `~/.lv2/moony.lv2`
- *work with presets*
 - study tutorials
 - modify templates
- *consult manuals*
 - `moony.lv2/manual.html`
 - `https://www.lua.org/manual/5.3`

