

Rethinking the DAW paradigm

With i-score & the LibAudioStream

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LaBRI, Blue Yeti

Introduction

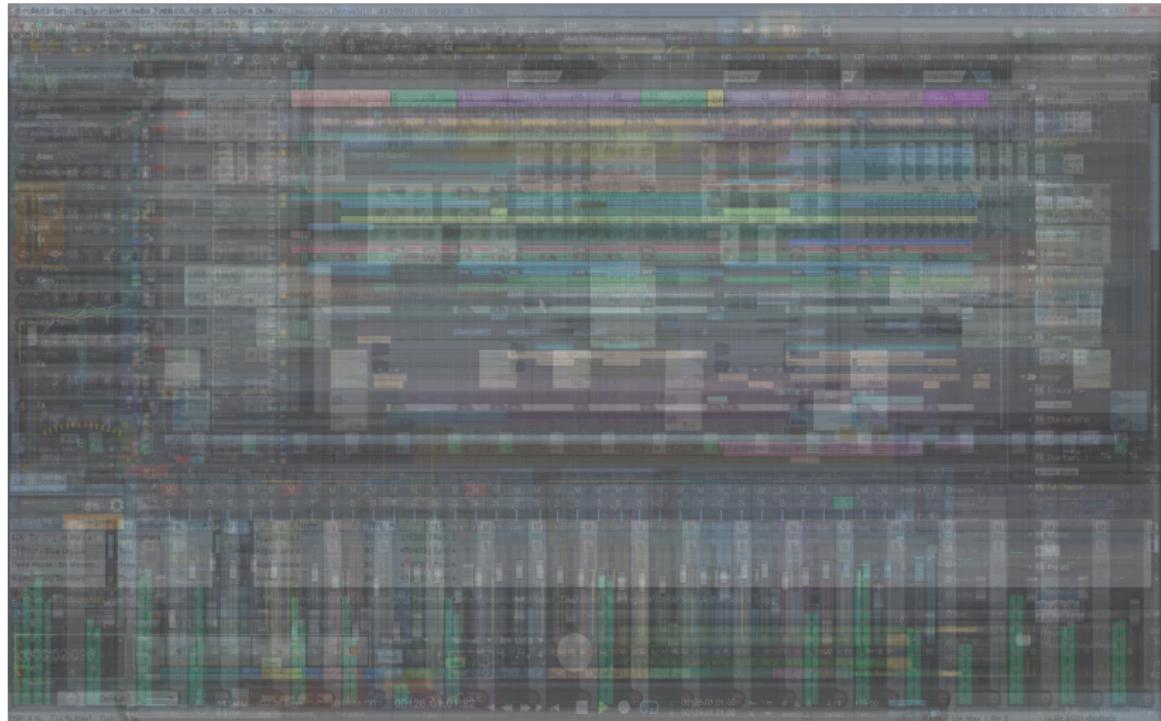
Description

 Audio processes

Method

Demo

DAWs



"Mixing"

DAWs



Presonus Studio One



Avid Pro Tools



Magix Samplitude



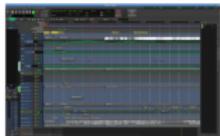
Steinberg Cubase



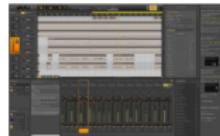
Ableton Live



Apple Logic



Tracktion T7



OhmForce Ohm Studio



Cockos Reaper

Pre-mix

Music software UIs

- ▶ Skeuomorphic (Most DAWs).
- ▶ Dataflows (**PureData, Max, OpenMusic, ...**)
- ▶ Text (**Csound, Chuck, SuperCol, Nyquist, ...**)
- ▶ Sometimes multiple possibilities
(Kyma, Antescofo, ...)
- ▶ Many others !
- ▶ Most are open for extensibility.

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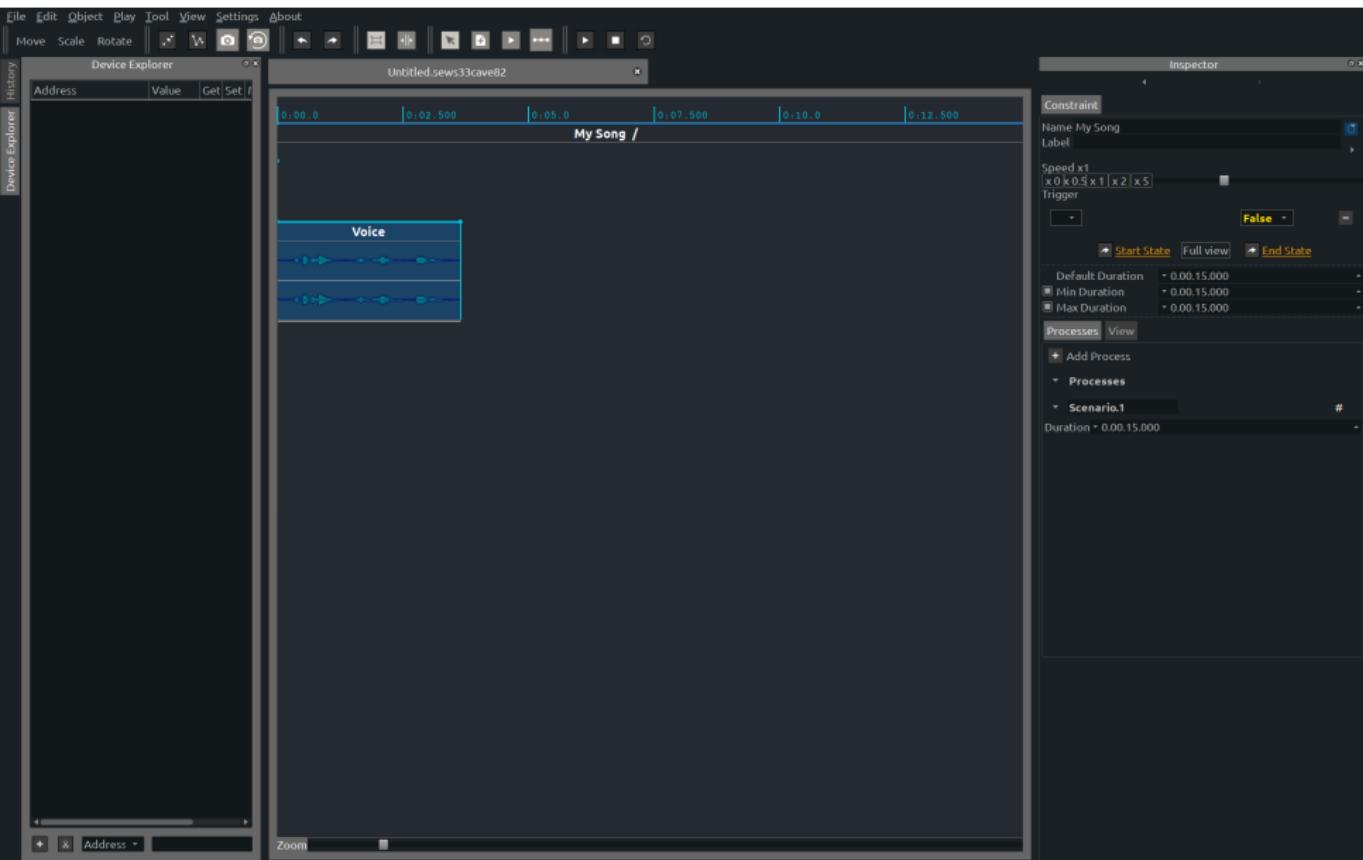
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What if...



File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

Untitled sews33cave82

My Song /

0.00.0 | 0.02.500 | 0.05.0 | 0.07.500 | 0.10.0 | 0.12.500

Voice Whoosh

Inspector

Constraint

Name My Song

Label

Speed x1
x0 x 0.5 x 1 x 2 x 5

Trigger False

Start State Full view End State

Default Duration 0.00.15.000

Min Duration 0.00.15.000

Max Duration 0.00.15.000

Processes View

Add Process Processes Scenario.1 Duration 0.00.15.000

Address Zoom

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

History

Untitled sews33cave82

My Song /

0.00.0 | 0.02.500 | 0.05.0 | 0.07.500 | 0.10.0 | 0.12.500

Voice Whoosh

Dread

Inspector

Constraint

Name My Song

Label

Speed x1
x0 x 0.5 x 1 x 2 x 5

Trigger False

Start State Full view End State

Default Duration 0.00.15.000

Min Duration 0.00.15.000

Max Duration 0.00.15.000

Processes View

Add Process Processes Scenario.1

Duration 0.00.15.000

The screenshot shows a DAW interface with a timeline from 0.00.0 to 0.12.500. There are three tracks: 'Voice', 'Whoosh', and 'Dread'. The 'Dread' track is currently selected. The 'Inspector' panel on the right shows a constraint for the song's name, set to 'My Song'. It includes fields for speed (x1), trigger (False), and duration (0.00.15.000). The 'Processes' section lists 'Processes' and 'Scenario.1'.

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

History

Untitled sews33cave82

My Song /

0.00.0 | 0.02.500 | 0.05.0 | 0.07.500 | 0.10.0 | 0.12.500

Voice Whoosh Dread

Constraint

Name My Song

Label

Speed x1
x0 x 0.5 x 1 x 2 x 5

Trigger False

Start State Full view End State

Default Duration 0.00.15.000

Min Duration 0.00.15.000

Max Duration 0.00.15.000

Processes View

Add Process Processes Scenario.1

Duration 0.00.15.000

Address Zoom

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

History

Untitled sews33cave82

My Song /

0.00.0 | 0.02.500 | 0.05.0 | 0.07.500 | 0.10.0 | 0.12.500

Voice Whoosh Noise

Dread

Inspector

Constraint

Name My Song

Label

Speed x1
x0 x 0.5 x 1 x 2 x 5

Trigger False

Start State Full view End State

Default Duration 0.00.15.000

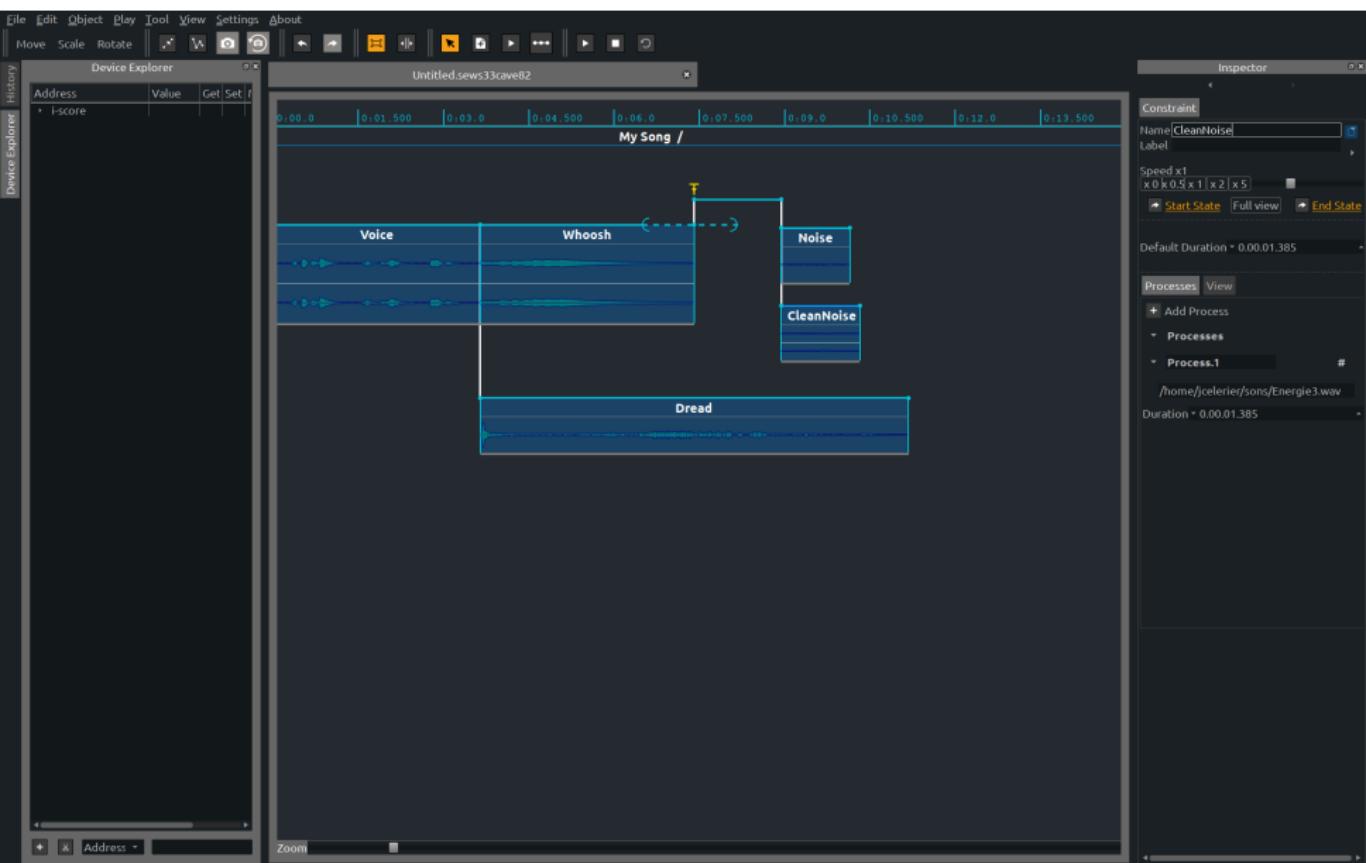
Min Duration 0.00.15.000

Max Duration 0.00.15.000

Processes View

Add Process Processes Scenario.1

Duration 0.00.15.000



File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

History

Device Explorer

Untitled.sews33cave82

My Song /

0:00.0 | 0:01.500 | 0:03.0 | 0:04.500 | 0:06.0 | 0:07.500 | 0:09.0 | 0:10.500 | 0:12.0 | 0:13.500

TimeNode

Name pill92cast78

Label

Default date 8 s 948 ms

Trigger

Add Trigger

Events

suds23bell90 #

neck29wail98 #

Name neck29wail98

Label

Parent Timenode

Condition

a/b S

State #

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

History

Device Explorer

Untitled.sews33cave82

My Song /

0:00.0 | 0:01.500 | 0:03.0 | 0:04.500 | 0:06.0 | 0:07.500 | 0:09.0 | 0:10.500 | 0:12.0 | 0:13.500

TimeNode

Name pill92cast78

Label

Default date 8 s 948 ms

Trigger

Add Trigger

Events

suds23bell90

Name suds23bell90

Label

Parent TimeNode

Condition

a/b

State

State

neck29wall98

Zoom

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set / History

Untitled.sews33caveB2

My Song /

Voice Whoosh Noise CleanNoise Dread Looping pattern

Inspector

Constraint

Name Looping Label

Speed x1
x0 x0.5 x1 x2 x5

Start State Full view End State

Default Duration ~ 0.00.04.116

Processes View

+ Add Process

Processes

Process.1

Name pattern Label

Speed x1
x0 x0.5 x1 x2 x5

Start State Full view End

Default Duration ~ 0.00.04.116

Processes View

+ Add Process

Processes

Process.1

Duration ~ 0.00.04.116

The screenshot displays a DAW interface with several panels:

- Device Explorer:** Shows a history of moves, scales, and rotations.
- Untitled.sews33caveB2:** The main workspace titled "My Song /". It contains four horizontal tracks:
 - Voice:** Contains two blue horizontal bars with arrows indicating playback direction.
 - Whoosh:** Contains a single blue horizontal bar with arrows.
 - Noise:** Contains a blue vertical bar.
 - CleanNoise:** Contains a blue vertical bar.
- Dread:** A blue horizontal bar with arrows.
- Looping:** A blue vertical bar containing a purple box labeled "pattern".

Inspector: On the right side, there are two sections for "Process.1":

- Constraint:** Includes fields for Name (Looping), Label, Speed (x1, x0, x0.5, x1, x2, x5), and Start State/End State buttons.
- Processes:** Includes fields for Name pattern (Label), Speed (x1, x0, x0.5, x1, x2, x5), and Start State/End buttons.

At the bottom, there are zoom controls and address fields.

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set History

Untitled.sews33caveB2

My Song /

Voice Whoosh Noise CleanNoise Dread Looping pattern Automating

Inspector

Constraint

Name: Automating

Label:

Speed x1
x0 x0.5 x1 x2 x5

Start State Full view End State

Default Duration ~ 0.00.04.326

Processes View

+ Add Process

Processes

Automation.1

Address

Tween □

Min ~ 0,00000

Max ~ 0,00000

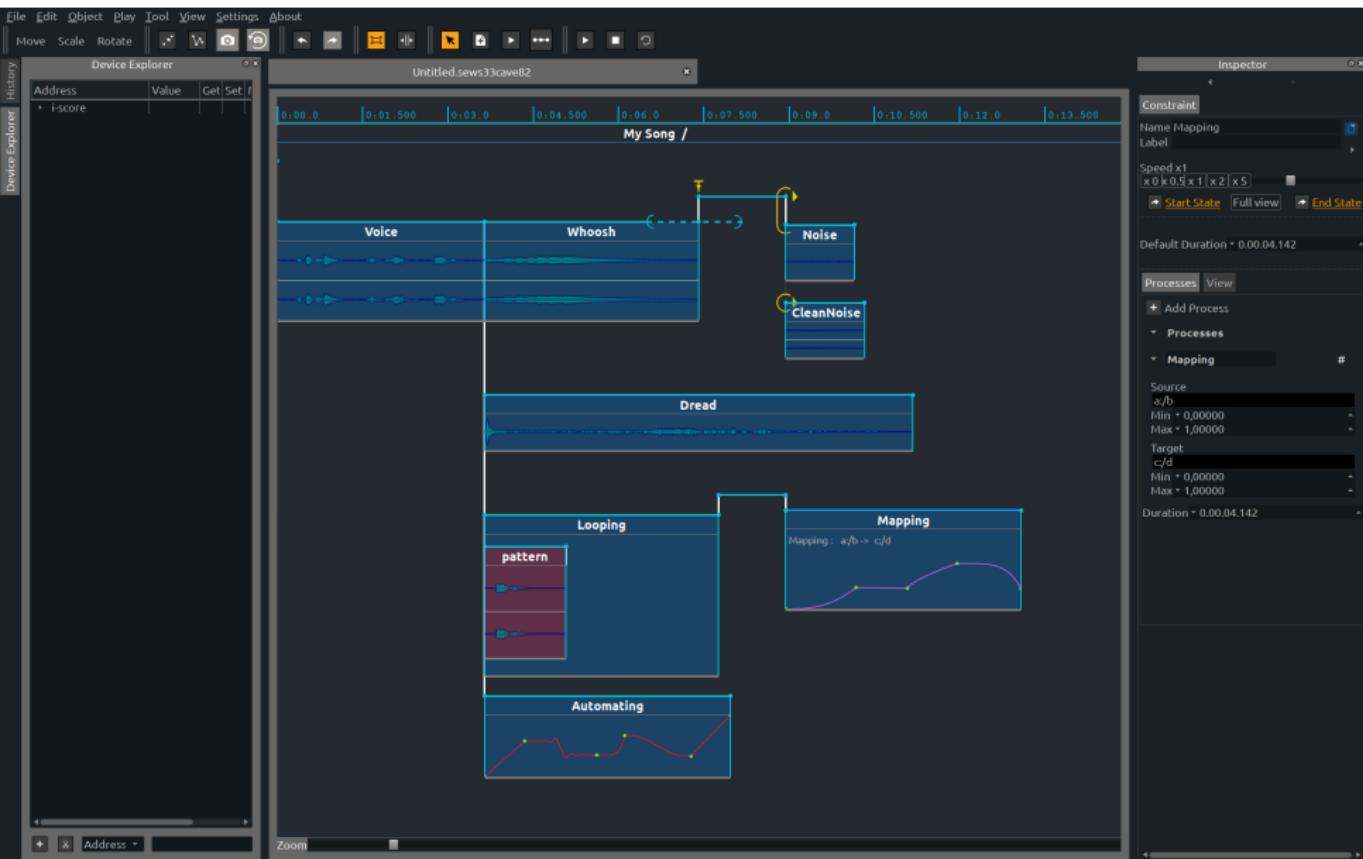
Start 0

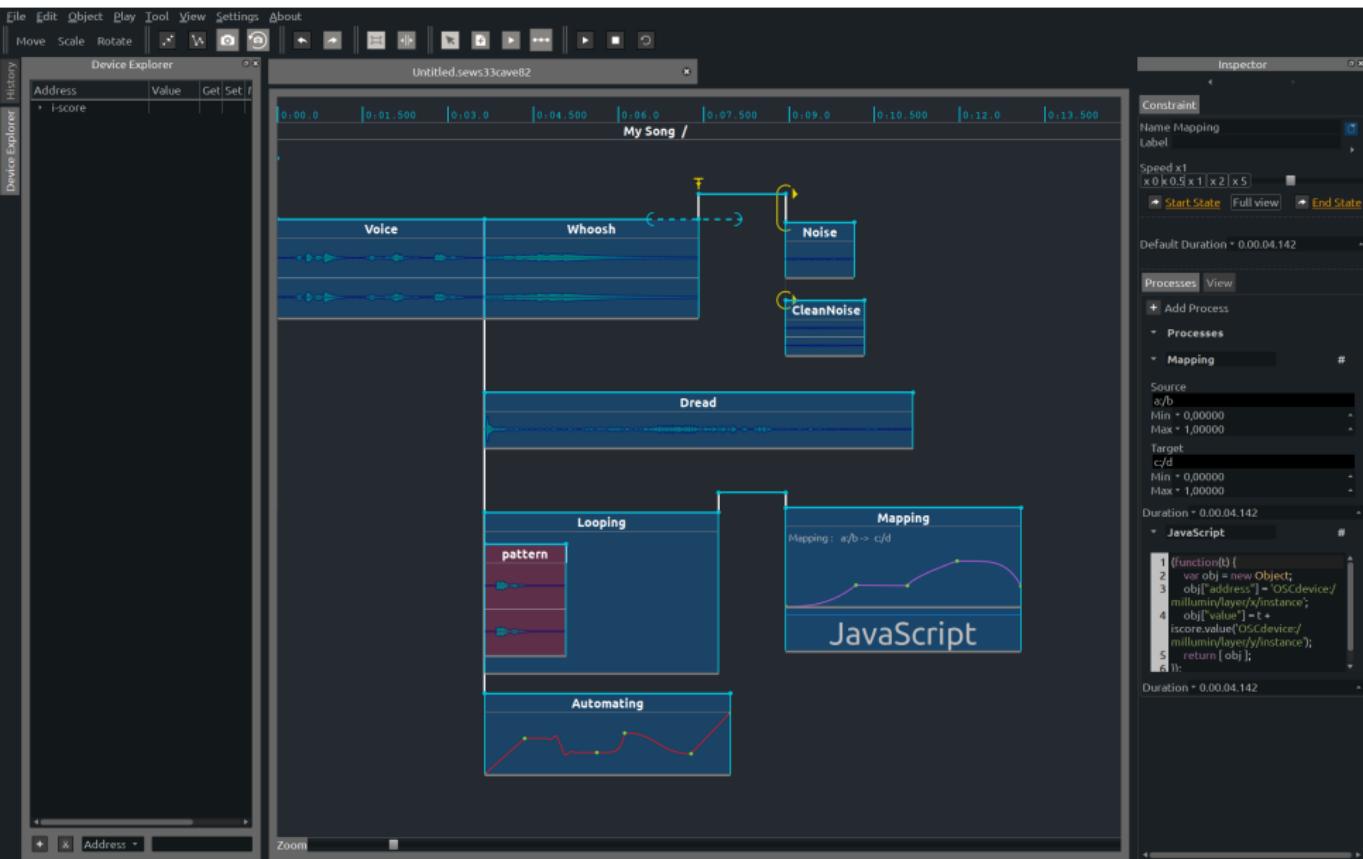
End 0

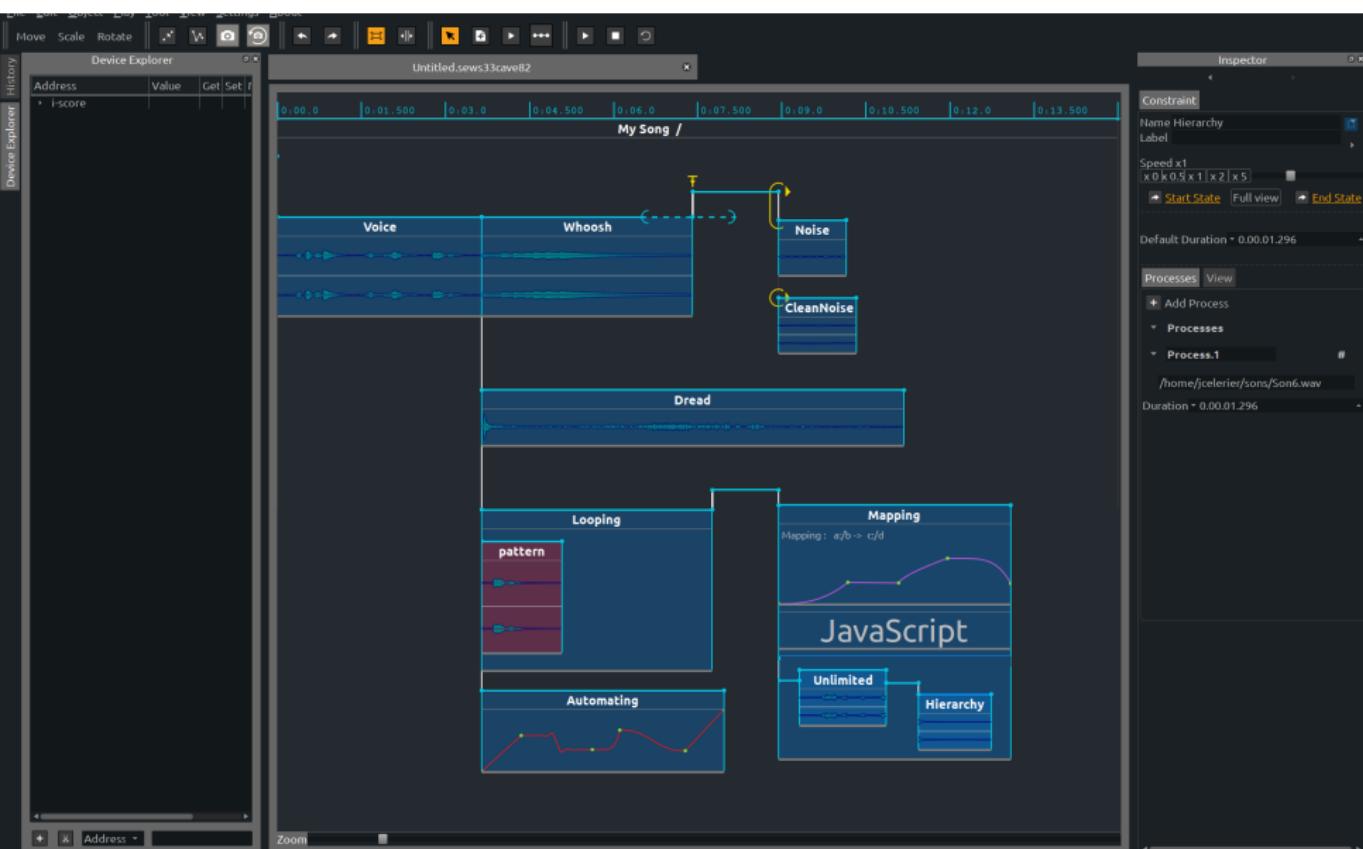
Duration ~ 0.00.04.326

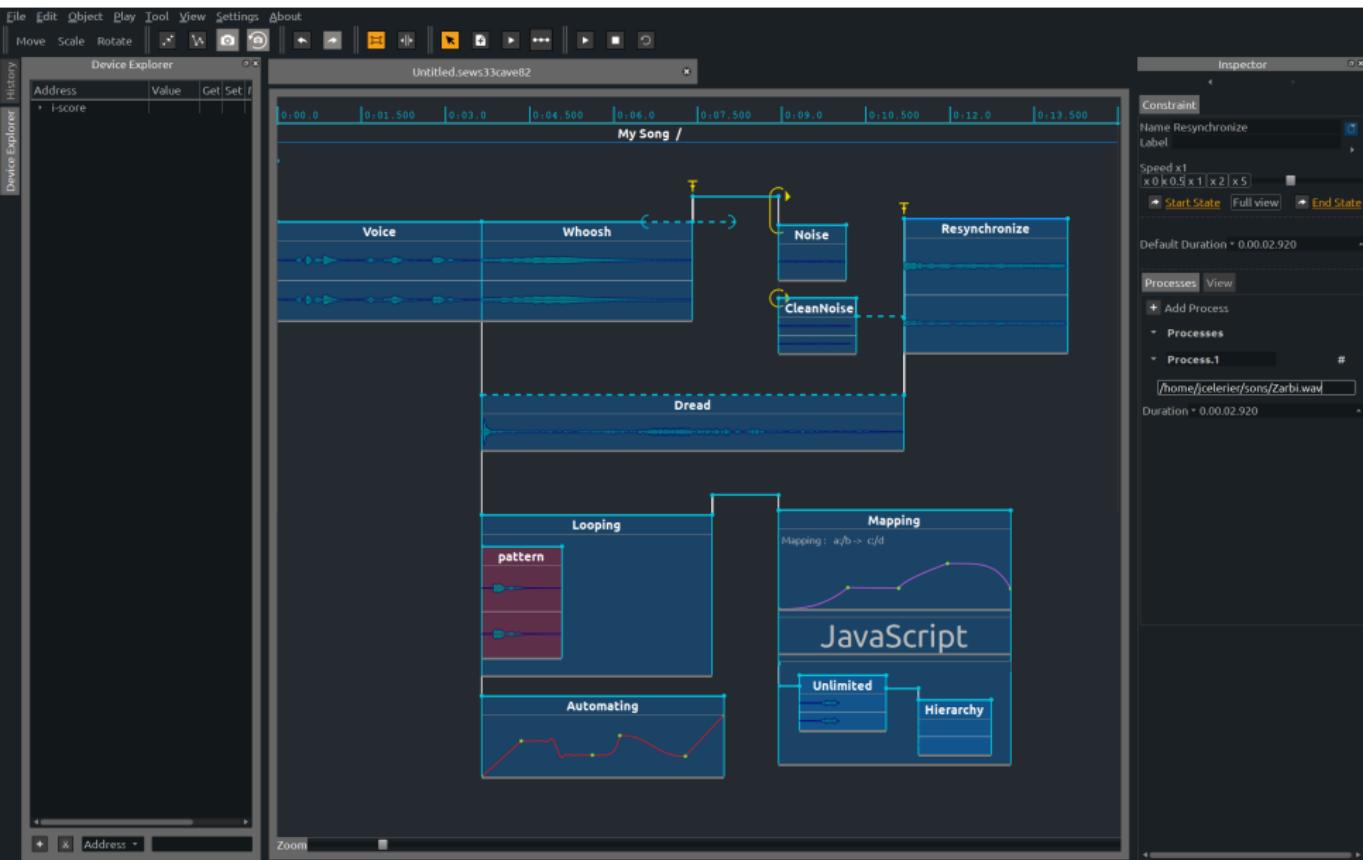
Address

Zoom









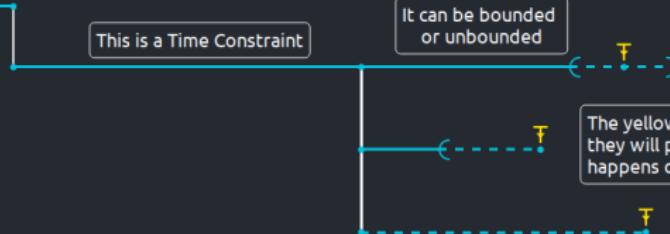
Origin

- ▶ **i-score**
i-score.org
→ software for interactive show control.
- ▶ **LibAudioStream**
github.com/sletz/libaudiostream
→ sequencer-as-a-library.
- ▶ **Audio plug-in** for i-score.

Vocabulary

0:00.0 | 0:01.500 | 0:03.0 | 0:04.500 | 0:06.0 | 0:07.500 | 0:09.0 | 0:10.500 | 0:12.0 | 0:13.500 | 0:15.0

example /



In white : a Time Event.
Events can carry conditions
on the execution of
their successors.

In yellow, a condition

Both conditions will be evaluated
at the same time.

In dark gray : a Time Node.
It goes all the way up behind the Time Event.
Everything on a same Time Node is synchronized.

MyConstraint

Inside a Constraint,
can live multiple processes

Audio processes

- ▶ Soundfile reading.
- ▶ Real-time input.
- ▶ Effect chains (Faust, LV2 in-progress).
- ▶ Audiograph features
 - send and return from different points in the score.
- ▶ Mixing.

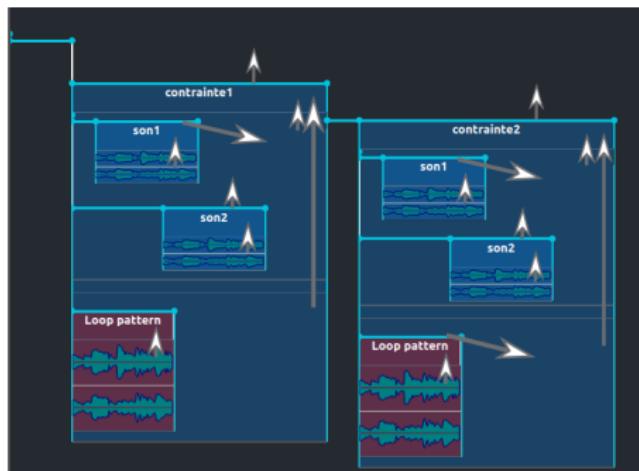
The i-score audio graph

- ▶ Audiostreams should be available for reading everywhere in the score :
→ **flowgraph**.
- ▶ Not shown: it is not the main use case but a tool. UI focus is on the **temporal** aspect.
- ▶ For now the graph creation is **static**.

The i-score audio graph : mixing

Mixing unit : the temporal constraint.

- ▶ Constraints mixes themselves in their parent process.
- ▶ Processes mixes themselves in their parent constraint.



Objects mix themselves together following the arrows

Demo

Future

- ▶ Integrated input recording.
- ▶ Real-time audio input delaying and reuse.
- ▶ Deep MIDI integration, piano roll, etc.
- ▶ Hierarchic temporal signatures.
- ▶ Spatialisation ?

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P. Baltazar, T. de la Hogue, and M. Desainte-Catherine, "i-score, an interactive sequencer for the intermedia arts," in *Proceedings of the ICMC - SMC 2014 Joint Conference*, 2014.

S. Letz *et al.*, "The libaudiostream library, 2012."

J.-M. Celerier, P. Baltazar, C. Bossut, N. Vuaille, J.-M. Couturier, and M. Desainte-Catherine, "Ossia : Towards a unified interface for scoring time and interaction," in *TENOR: First International Conference on Technologies for Music Notation and Representation, Paris, France*, 2015.

J. Arias, M. Desainte-Catherine, and S. Dubnov, "Automatic construction of interactive machine improvisation scenarios from audio recordings," in *The Fourth International Workshop on Musical Metacreation (MUME 2016)*, 2016.

T. De La Hogue, J.-M. Celerier, and P. Baltazar, "Présentation d'un formalisme graphique pour l'écriture de scénarios interactifs," in *Journées d'Informatique Musicale*, 2016.

Sounds attribution (CC) : patchen, John Lavine

Links

- ▶ **Audio extension (Mac, Linux, soon Windows) :**
github.com/OSSIA/iscore-addon-audio
- ▶ **i-score :**
i-score.org

Thanks ! Questions ?

Uses the Beamer 'simple' theme, Facundo Muñoz; and Mozilla's Fira font family