

Rethinking the DAW paradigm

With i-score & the LibAudioStream

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Introduction

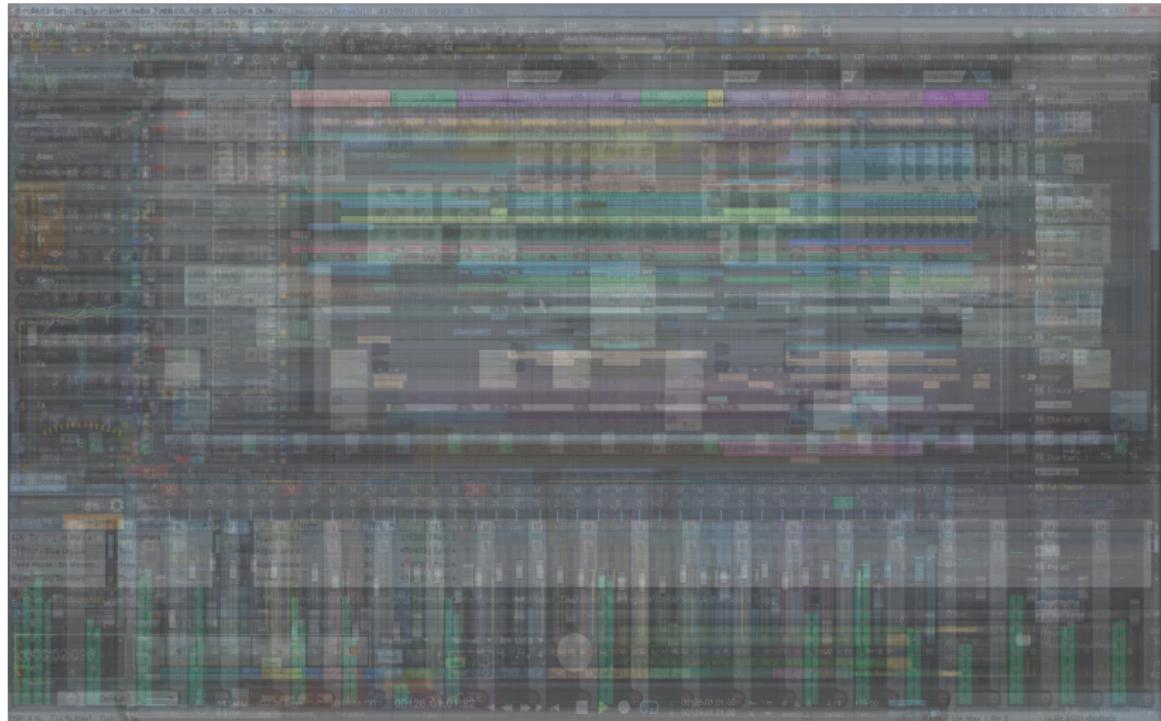
Description

 Audio processes

Method

Demo

DAWs



"Mixing"

DAWs



Presonus Studio One



Avid Pro Tools



Magix Samplitude



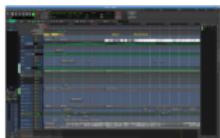
Steinberg Cubase



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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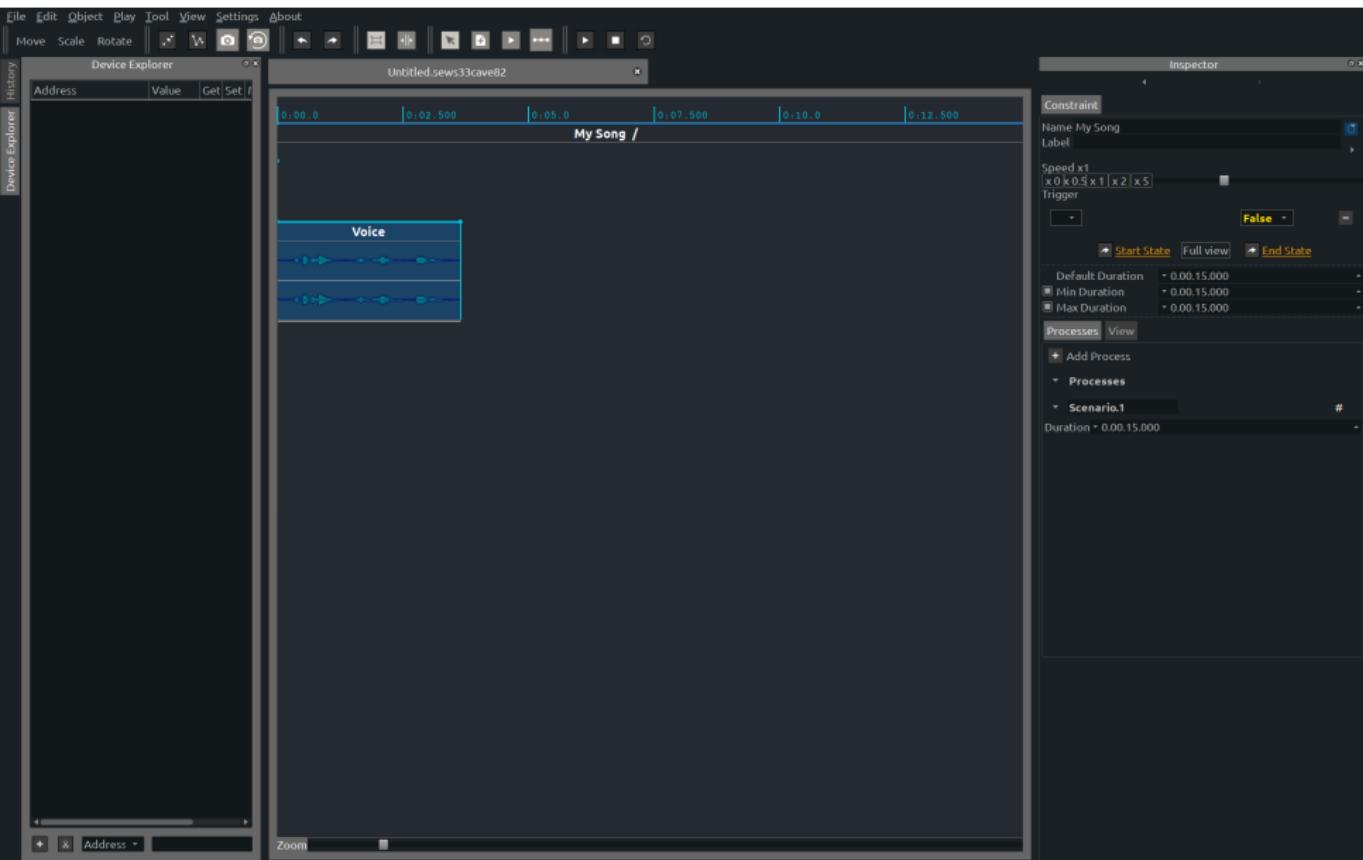
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What if...



File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

History

Device Explorer

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 digital audio workstation (DAW) interface. At the top, there's a menu bar with File, Edit, Object, Play, Tool, View, Settings, and About. Below the menu is a toolbar with various icons for file operations like Open, Save, and Import. On the left, there's a 'Device Explorer' panel with a history list and a 'Constraints' section. The main workspace is titled 'Untitled sews33cave82' and contains a timeline from 0.00.0 to 0.12.500. Three tracks are visible: 'Voice' (with two horizontal bars), 'Whoosh' (with three horizontal bars), and 'Dread' (with one horizontal bar). The 'Dread' track is currently selected. To the right of the timeline is the 'Inspector' panel, which shows a 'Constraint' for the song's name ('My Song'). It includes fields for Speed (set to x1, with options x0, x0.5, x1, x2, x5), Trigger (set to False), and states (Start State and End State). It also shows duration settings (Default Duration, Min Duration, Max Duration, all set to 0.00.15.000) and a 'Processes' section with an 'Add Process' button and a 'Processes' dropdown.

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

Address

Zoom

File Edit Object Play Tool View Settings About

Move Scale Rotate

Device Explorer

Address Value Get Set

i-score

Untitled.sews33caveB2

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

Voice Whoosh Noise

CleanNoise

Dread

Device Explorer History

Inspector

Constraint

Name: CleanNoise

Label:

Speed x1
x0 x 0.5 x 1 x 2 x 5

Start State Full view End State

Default Duration 0.00.01.385

Processes View

+ Add Process

Processes

Process.1

/home/jcelerier/sons/Energie3.wav

Duration 0.00.01.385

The screenshot shows a DAW interface with a timeline at the top ranging from 0:00.0 to 0:13.500. Below the timeline is a node-based audio graph. The graph consists of several nodes: 'Voice' (blue), 'Whoosh' (yellow), 'Noise' (blue), 'CleanNoise' (blue), and 'Dread' (blue). The 'Whoosh' node is currently selected, indicated by a dashed selection box around it. A yellow handle is visible above the 'Whoosh' node, likely for adjusting its position or properties. The 'CleanNoise' node is positioned to the right of the 'Whoosh' node. The 'Dread' node is positioned below the 'Whoosh' node. The 'Voice' and 'Noise' nodes are positioned to the left of the 'Whoosh' node. The 'Inspector' panel on the right displays details for the selected 'CleanNoise' node, including its name, label, speed, start state, end state, default duration, and file path. The 'Processes' panel on the right shows a tree structure with 'Processes' and 'Process.1' expanded, and the file path '/home/jcelerier/sons/Energie3.wav' listed under 'Process.1'. The 'Device Explorer' and 'History' panels are also visible on the left side of the interface.

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 5

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

Device Explorer

Inspector

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

Address Value Get Set /

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

Zoom

File Edit Object Play Tool View Settings About

Move Scale Rotate History

Device Explorer

Untitled.sews33caveB2

My Song /

Address Value Get Set i-score

Device Explorer Inspector

Constraint

Name: Automating

Label:

Speed x1
x0 x 0.5 x 1 x 2 x 5

Start State Full view End State

Default Duration ~ 0.00.04.326

Processes View

+ Add Process

Processes

Automation.1

Address Tween □

Min ~ 0,00000

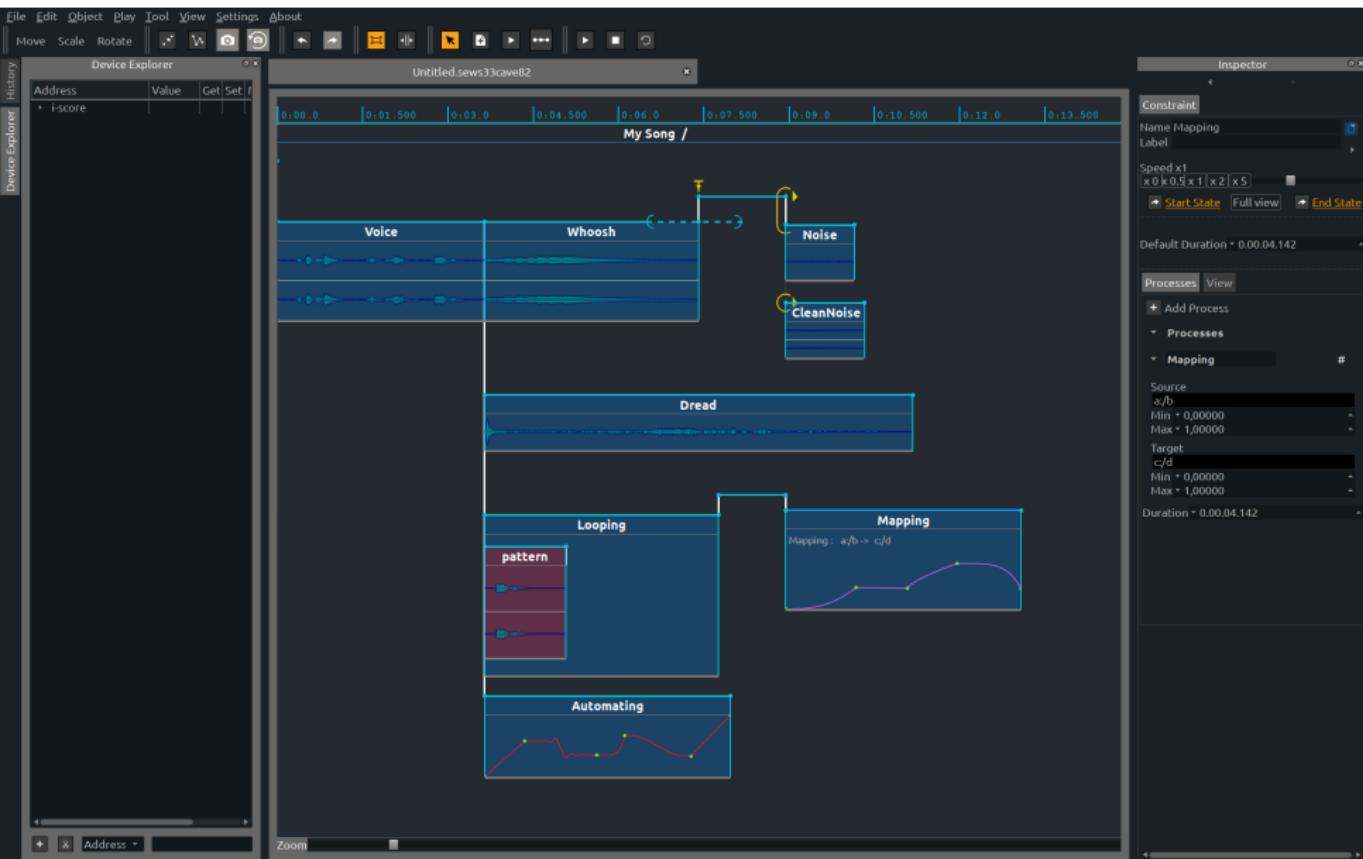
Max ~ 0,00000

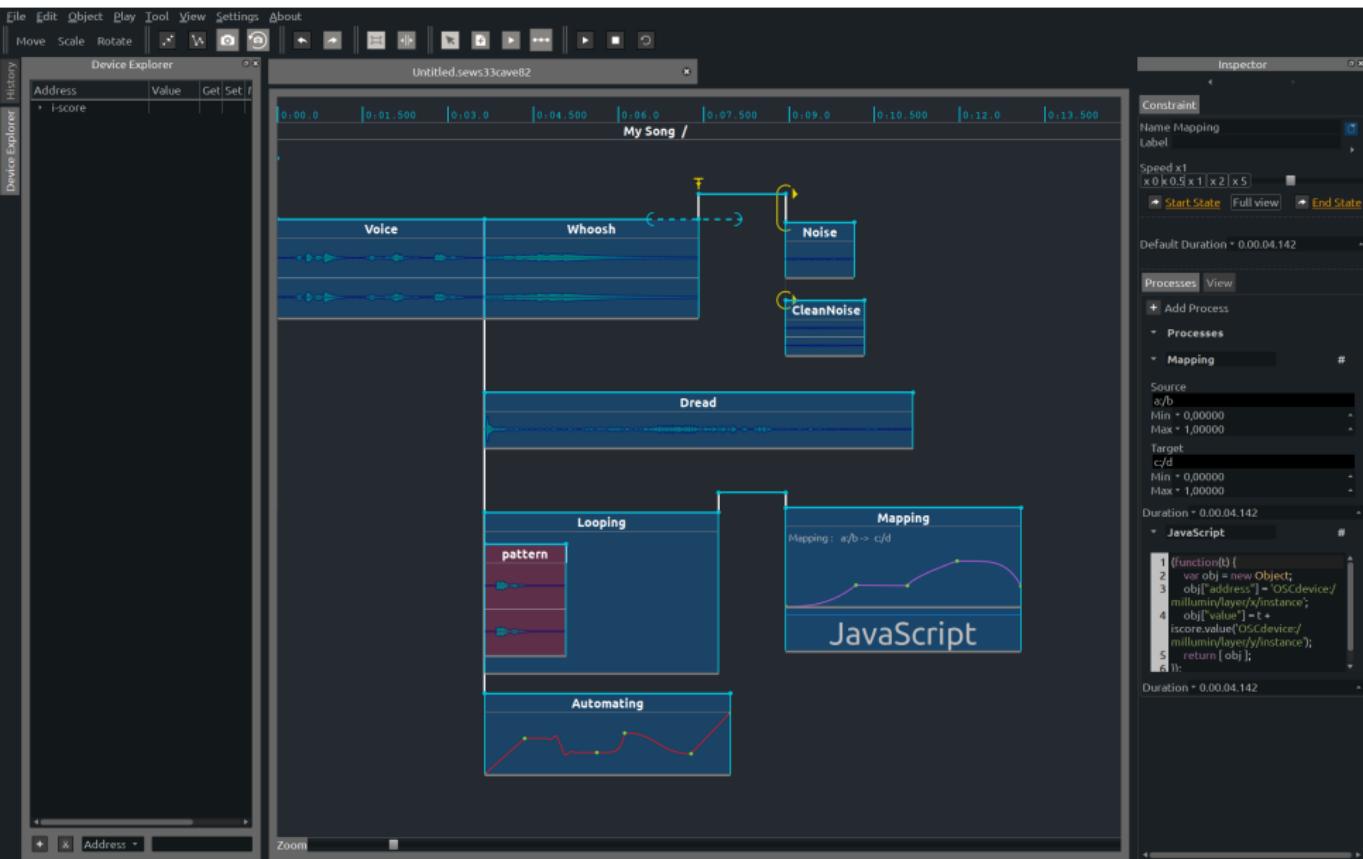
Start 0

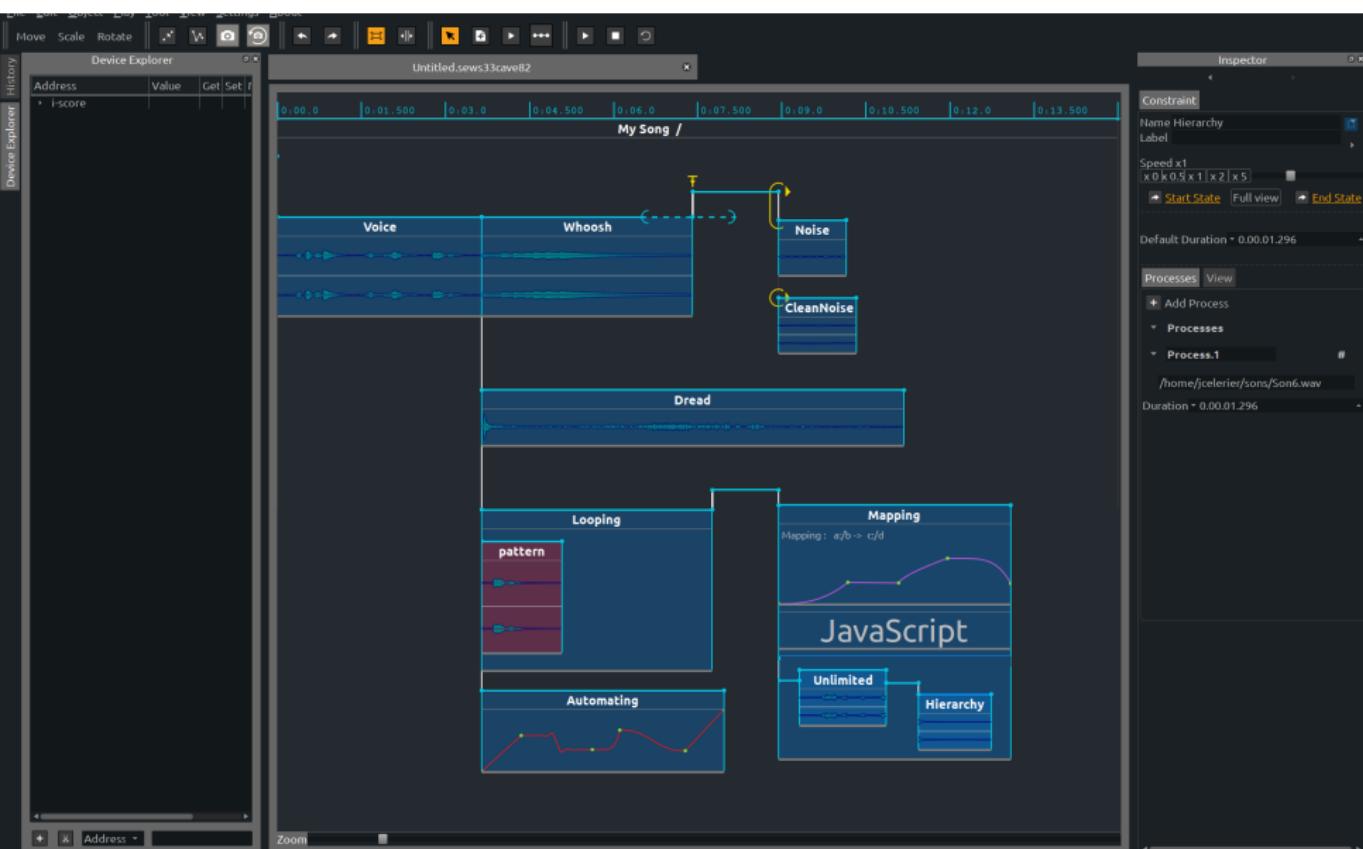
End 0

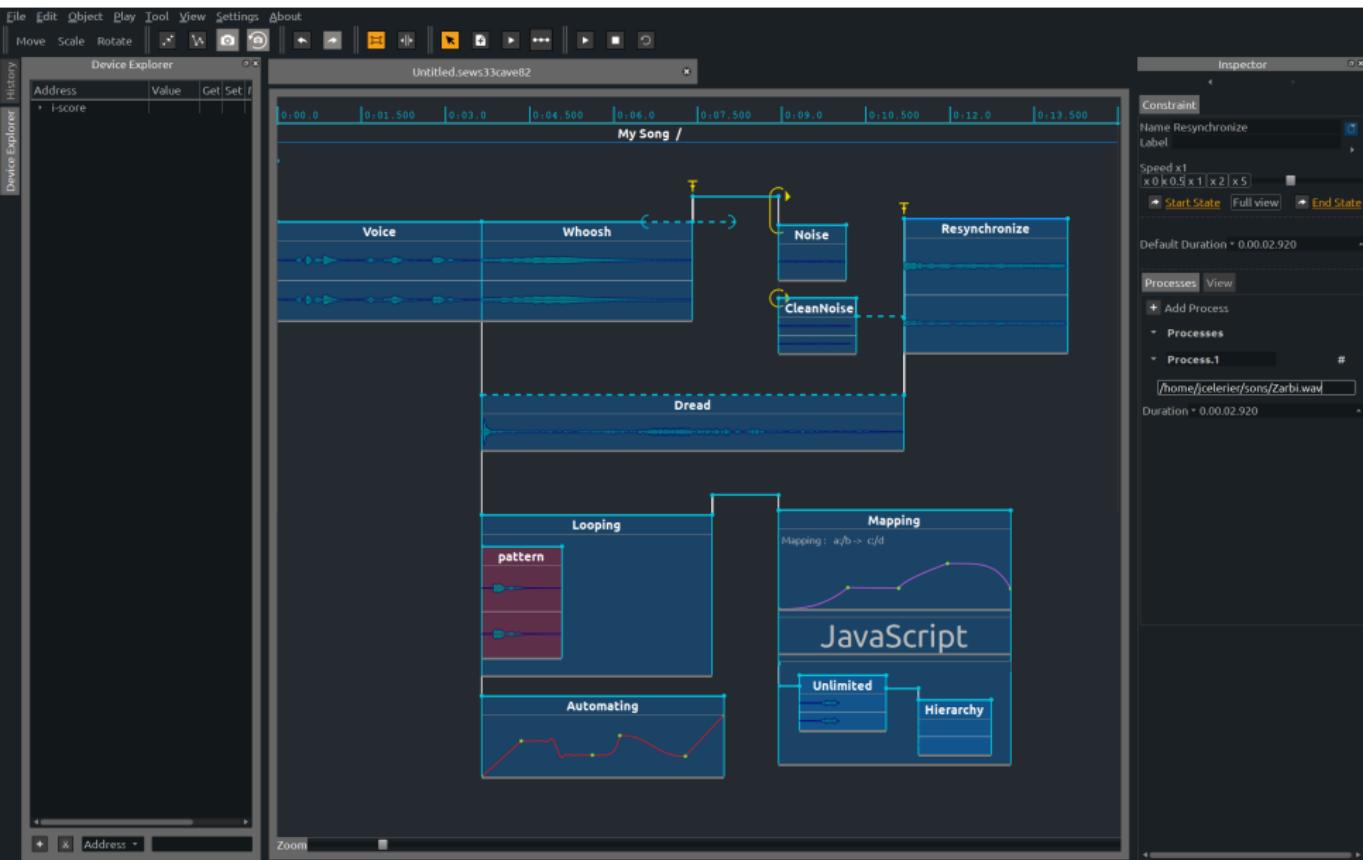
Duration ~ 0.00.04.326

The screenshot shows a DAW interface with a dark theme. At the top, there's a menu bar with File, Edit, Object, Play, Tool, View, Settings, and About. Below the menu is a toolbar with icons for Move, Scale, Rotate, and History. On the left, there's a Device Explorer panel and a Inspector panel. The main workspace is titled "Untitled.sews33caveB2" and contains a score titled "My Song /". The score has several tracks: "Voice", "Whoosh", "Noise", "CleanNoise", "Dread", "Looping", and "Automating". The "Looping" track contains a "pattern" section. The "Automating" track features a red line with green dots representing automation data. A timeline at the top of the workspace shows time points from 0:00.0 to 0:13.500. The Inspector panel on the right displays a constraint for the "Automating" label, showing settings for speed (x1), start state, end state, and default duration (~ 0.00.04.326). The Processes panel shows an Automation.1 entry with fields for address, min, max, start, end, and duration.









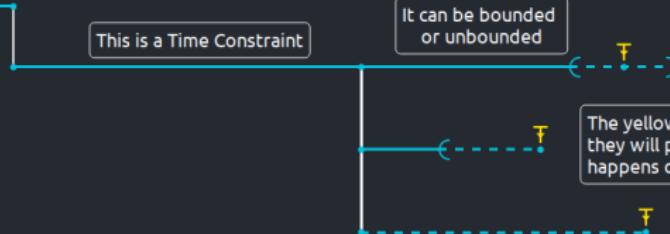
Origin

- ▶ **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.
- ▶ Audiograph features
 - send and return from different points in the score.
- ▶ Mixing.

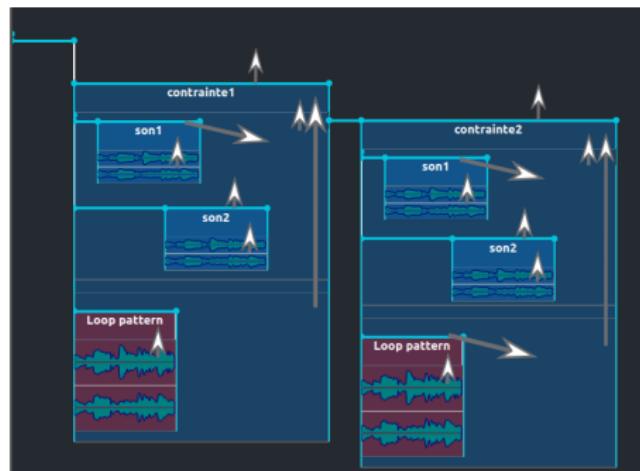
The i-score audio graph

- ▶ 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.
- ▶ Automatic temporal signatures support.

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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