

N-Chains Userguide

for nchains-0.0.1-pre-004

0.1 COPYRIGHT

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0.2 Introduction

Welcome to the N-Chains User Guide.

Back in the days of 1995, when I moved from my student apartment to a factory floor in Cologne, I found myself sitting in front of my old 386 trying to get something done with an old Samplitude. Just like Vienna, the sound font editor, Samplitude was an add-on included with the SoundBlaster AWE 32 card package. Although I didn't really have a clue of all the features of Samplitude much less of the workflows of sound editing in general, I felt the wish to be able to have influence on some features within the sound editing environment on my machine. To make it short, during the years I tried almost all kind of music editing programs on different systems, but what I was really looking for was an extendable environment. Because of several circumstances I came across Linux and the GNU build system, which gave me an idea of how to unfold. However, years passed by and I discovered Ecasound. I still wonder why I haven't found it earlier, but anyway, it turned out to be the thing that I had always had been looking for! Nowadays, I basically use Ecasound from command line embedded in a shell script, which works perfectly for me. The fact, that there is no real time control of effect parameters doesn't really hurt, in fact, it forces me to think twice about the meaning of a parameter change and instead concentrate on listening to the mixing sound. Anyway, there are still use cases left like, for instance, solo-ing a chain - which basically means to mute all other chains - that need little workaround or make some real-time control helpful: From within my shell script environment, setting a chain to solo means to comment out all the other lines that represent a chain. Not really a big deal, but it starts annoying you when doing this several times while working on a project with more than, say 4 chains. Well, there are other use cases as well, like recalculating snippet offsets or the like. I started thinking about a handy tool to compensate all these use cases, so this is why I decided to start developing N-Chains. Its featureset is totally driven by personal motivation and by no means perfect or even complete. I really came off with something like: *oh, lets have this and that and oh... yes, we could do this...and so on and let's see what it is going to be*. I chose the curses environment, because I like it and I like the thought of *using the machine for audio data processing when audio processing instead of image data processing when doing audio processing*. You might agree or not.

This book is intended to make you familiar with N-Chains for using it as a sound processing environment. If you like Ecasound or Linux or the terminal look-and-feel, this might be something for you. If you are a developer and interested in extending the functionality of N-Chains, please have a look at the README file that comes with the software package or go to <http://nchains.sourceforge.net> or contact me via e-mail or subscribe to the N-Chains mailing list to discuss your suggestion.

This book is still under contruction and is far from being perfect. If you would like to contribute, please go to <http://nchains.sourceforge.net> and read the infos within the documentation section.

Cologne 06.06.2009, Nils Doormann

0.3 About N-Chains

N-Chains is a console-based frontend to Kai Vehmanen's wonderful audio processing environment Ecasound¹. The development of N-Chains is intended to offer you some real-time and intuitive easy-to-use capabilities while following the concepts of Ecasound. It aims to be a slim application that can be controlled by simple keyboard shortcuts without the overhead of graphical representation.

To get an idea of what this means in practice, have a look at the following example. While a chain set up on command line would basically look like this:

```
-a:mychain -i:input.wav -o:alsa
```

the commands to change the input and output of a chain in N-Chains would be typing in "i", for specifying a new audio input for the current selected chain and "o" for a new audio output device respectively. To alter the chain name, one would type "a", because "-a" is the parameter specifier for the chain name in ecasound and so on.

Another idea behind N-Chains is purity. It is nothing more than it aims to be. Just type in "l" at your favourite position and it will be added to the locator list. Just say "P" for playat and type in your offset, "C" for select and "D" for the duration of your snippet and the typed in positions of the chain will be updated.

0.3.1 Implementation Concept

0.3.1.1 The Difference between Tracks and Chains

There exist no "tracks", because this isn't Cubase or Logic, but an Ecasound frontend, so what we deal with is "chains". This is important, because the main difference within an audio sequencing program like Cubase or similar is, that you can have more than one virtual audio input (or snippet) per track. This concept isn't true for Ecasound, because you always have one audio input and one audio output connected to a chain. Now, when implementing an ecasound client, you have to decide whether to

- create an object that maps several chains on a virtual "track", or
- simply extend chains to some sort of tracks with help of metadata
- implement some other sophisticated workaround

To me, all of the above seems doesn't seem very effective, so I decided to purly adopt the concept of dealing with chains Ecasound for N-Chains.

0.3.2 About this Book

This book is intended to make you familiar with the every-day usage of N-Chains in its current version. This document refers to release version **0.0.1-pre-004** of N-Chains,

¹Ecasound is available at <http://ecasound.sourceforge.net/ecasound/>

future releases of N-Chains will have improved functionality, so if you have another program version than the one this book refers to, you are strongly advised to get yourself an appropriate documentation release.

0.3.3 Obtaining Documetation

This book is part of the official N-Chains release, so you might find the appropriate documentation within the doc subdirectory of your downloaded nchains release package. If not, take a look at <http://nchains.sourceforge.net> for the correct version.

0.4 Download and Installation

0.4.1 Getting N-Chains

You can get the latest release from <http://sourceforge.net/projects/nchains> which is the N-Chains project homepage. Older releases might be available there as well.

If you are interested in getting a current development snapshot of N-Chains you should download via anonymous CVS:

```
cvs -z3 -d:pserver:anonymous@nchains.cvs.sourceforge.net:/cvsroot/nchains \
checkout -P nchains
```

0.4.2 Requirements

You need a working build system on your machine (like gcc and friends). You also need the ncurses installed. Audio libraries or similar features that can be enabled during compilation of ecasound such as alsa, oss, jack or whatever relate either to the Ecasound compilation process or usage of Ecasound and are not necessary to compile N-Chains.²

To run N-Chains as an Ecasound client, you will need Ecasound $\geq 2.6.0$. You can type `ecasound --version` in order to determine which version of ecasound you have.

0.4.3 Installation

In order to install N-Chains from source, download the latest package available from <http://nchains.sourceforge.net>. See section *Getting N-Chains* on the current page for details.

Unpack the downloaded package to a location of your choice as follows the usual way:

```
gunzip < nchains-0.0.1-pre-004.tar.gz |tar -xf -
```

Then, change into the nchains directory:

```
cd nchains-0.0.1-pre-004
```

Follow the instructions from the INSTALL file. The typical installation procedure would be:

```
./configure
make
su (to root)
make install
```

That should be it.

²In fact, even ecasound itself isn't necessary to compile N-Chains :o)

0.4.4 Problems during installation

If you encounter problems during the installation process, depending on the process state, either the console output or config.log file might give you information on what went wrong. `FIXME: INSTALL file?`

0.5 Invoking N-Chains

Ecasound offers the capability to run as a tcp server. N-Chains, on the other hand, acts as a client application to a running server instance of Ecasound. This implies that there must be an Ecasound server running that N-Chains can connect to, which can be achieved in several ways as described in the following paragraphs.

0.5.1 Ways to Start Up

You can either start an Ecasound server instance by hand on commandline and then let N-Chains connect to, or you can initialize a server startup during N-Chains startup. The latter is preferred while working on a local machine. However, we will show both startup methods. Since N-Chains version 0.0.1-pre-002, the initialization of Ecasound as a server through N-Chains is possible. In earlier versions you'll have to start the Ecasound server by hand.

To start an Ecasound server instance during N-Chains startup use the `-s` option of N-Chains:

```
nchains -s
```

To start Ecasound as a server by hand, type:

```
ecasound --server -K
```

Ecasound will now listen to connections on its default tcp port 2868. You can watch the server instance running with the command “netstat -tuneap”. It should output a line like this:

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	User	Inode	PID/Program Name
tcp	0	0	0.0.0.0:2868	0.0.0.0:*	LISTEN	1000	15447	4659/ecasound

As you can see, the Ecasound server uses the TCP protocol, it is in state LISTEN, which means, it waits for connections on port 2868 (Local Address column).

Now, we can start N-Chains without any parameters, because the default is to connect on port 2868 on localhost, the host and port our Ecasound server instance is currently running on. To start N-Chains, open another terminal window and type:

```
/usr/local/bin/nchains
```

which will start nchains with a default of 8 chains already set

Chain Name	i	o	M	S	c	vol	pan	(P)	layat	Sele(C)	t	(L)	length
Chain 0	0				X	100	50						
Chain 1	0				X	100	50						
Chain 2	0				X	100	50						
Chain 3	0				X	100	50						
Chain 4	0				X	100	50						
Chain 5	0				X	100	50						
Chain 6	0				X	100	50						
Chain 7	0				X	100	50						

0.000 / 0.000 (0.000)
N-Chains 0.01 Ready.

0.5.2 Startup Options

To get a list of all startup options available, type

```
/usr/local/bin/nchains -h
```

This will output a list of all commandline options available for N-Chains:

-c <cname>

Work on chain setup name *cname*. [nchains]

-d

Turn debugging on. [no]

-h

Display a short help message and exit.

-H <host>

The host name where the ecasound server runs on and nchains should connect to.

This option is ignored when -s is specified. [localhost]

-n <num>

Set the number of chains for the new project.

-p <port>

The port where nchains should connect to. [2868]

-s

Try starting ecasound server on local machine. [no]

0.6 The User Interface - An Overview

The user interface is divided into four main areas of information each of which is described in detail below:

1. The Header
2. The Chain List
3. The Info
4. The Footer

0.6.1 The Header

Chain Name	i	o	M	S	c	vol	pan	(P)	layat	Sele(C)t	(L)ength
FIDDLE	0			S	X	100	50				
GUITAR	0		M		X	100	50				
BODHRAN	0		M		X	100	50				

Chain Name: FIDDLE	Index: 000
Input: null (1)	Output: alsa (1)
0.000 / 0.000 (0.000)	
Solo-ing chain 0 (0)	

The red-marked area on the picture above is called *the Header*. Its main purpose is representing some sort of column headline. The meaning of each column field is described below, information about their specific usage can be found in the next subsection.

Chain Name The name of the chain in the chain field below (FIDDLE, GUITAR etc..)

i

The audio input. If a chain has an audio input attached to it, a yellow “I” will appear, similarly to the field right ahead, “o”, which stands for audio output.

o

The audio output. In the example above the green “O” indicates that there is an audio aoutput attached to each chain.

M

The chain muting state. A white “M” on red background (as above) indicates that the chain is muted indirectly, because of the Solo-State of the first chain (FIDDLE). If a chain is muted directly the field would show up a red M only.

S

The chain solo state.

c

Channel copy. If on (default, indicated by a blue “X”), the chain operator chcopy:1,2 is activated on the specific chain.

v

Volume setting, equals to -ea chain operator of Ecasound.

p

Panning. This value influences the Normal pan chain operator

Playat

This is the **play-at-time** value of the playat feature of an audio input³. Use this parameter for moving audio inputs on the timeline. See section *Playat, Select, Length* on page 17 for details on how these values are recalculated on manual changes.

Select

This is the **start-time** value of the select feature of an audio input⁴. See section *Playat, Select, Length* on page 17 for details on how these values are recalculated on manual changes.

Length

This is the **duration** value from the above said. See section *Playat, Select, Length* on page 17 for details on how these values are recalculated on manual changes.

³Taken from the ecasound (1) manpage:

*To play an audio object at a given moment in time, the -i:playat, **play-at-time**, file.ext, params can be used. This will play "file.ext" after position reaches "**play-at-time**". The time values should be given as seconds (e.g. "2.25", or as samples (e.g. "25000sa"). Parameters 2...N are passed as is to the child object.*

⁴Taken from the ecasound (1) manpage:

*To select and use only a specific segment of an audio object, the -i:select, start- time, **duration**, file.ext, params can be used. This will play "duration" of "file.ext", starting at "start-time". The time values should be given as seconds (e.g. "2.25", or as samples (e.g. "25000sa"). Parameters 4...N are passed as is to the child object.*

0.6.2 The Chain List

Chain Name	i	o	M	S	c	vol	pan	(P)layat	Sele(C)t	(L)ength
FIDDLE	0			S	X	100	50			
GUITAR	0	M			X	100	50			
BODHRAN	0	M			X	100	50			

Chain Name: FIDDLE	Index: 000
Input: null (1)	Output: alsa (1)
0.000 / 0.000 (0.000)	
Solo-ing chain 0 (0)	

The marked area on the picture above shows the chain list. We have three chains in our project, named FIDDLE, GUITAR and BODHRAN. The FIDDLE chain is set to solo, which is indicated by the yellowish “S” in the S-column, thus the other chains being muted.

0.6.3 The Info Area

The Info area follows the the chain list as you can see in the following picture:

Chain Name	i	o	M	S	c	vol	pan	(P)layat	Sele(C)t	(L)ength
FIDDLE	0			S	X	100	50			
GUITAR	0	M			X	100	50			
BODHRAN	0	M			X	100	50			

Chain Name: FIDDLE	Index: 000
Input: null (1)	Output: alsa (1)
0.000 / 0.000 (0.000)	
Solo-ing chain 0 (0)	

It displays various information on the current selected chain (chain FIDDLE, in this case) such as the chain name (FIDDLE), the attached audio input (null), the attached audio output (alsa) as well as its internal index (000). Also in this area, the current chain setup position and overall length in seconds is displayed.

0.6.4 The Footer

The last area of the view is called the Footer, which is sort of a status and message bar. It gives the user some feedback on his/her interaction. In our example the user has just pressed “S”, which is the shortcut for setting a chain to solo mode. If you look at the “F” of the word *FIDDLE* in the first chain, you see the cursor right on it, so the first chain (FIDDLE, internal named “chain_0”) is set to solo, and this is exactly, what the footer says:

```

Chain Name      |i|o|M|S|c|vol |pan |(P)layat|Sele(C)t|(L)ength
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
FIDDLE          0  0  0  S  X  100  50
GUITAR          0  0  0  M  X  100  50
BODHRAN         0  0  0  M  X  100  50
-----+-----+-----+-----+-----+-----+-----+

Chain Name: FIDDLE          Index: 000
Input: null (1)             Output: alsa (1)
0.000 / 0.000 (0.000)
Solo-ing chain 0 (0)

```

0.7 Using N-Chains

If you haven't started Ecasound in server mode somewhere and if you don't know how to start nchains, yet, read section *Invoking N-Chains* on page 9 first. Unless mentioned otherwise, we assume an Ecasound server running on localhost listening on the default port and N-Chains started with the -s option only.

When starting N-Chains, it creates a new chain setup called "nchains-YYYYMMDD-HHMMSS". Think of this chain setup as your work bench in within Ecasound. You can specify a different chain setup name on command line using the "-c" command line switch. By convention, N-Chains works on a single ecasound chain setup a time.

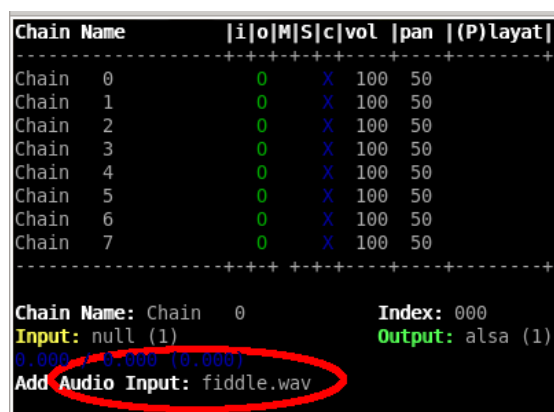
So, what can we do now?

Let's assume we want to do some mixing. Let's further assume that we have already recorded some input wave files, *fiddle.wav*, *guitar.wav* and *bodhran.wav* for that. Now, what we should first come up with is to add these files to our N-Chains project.

0.7.1 Adding Audio Input to a Chain

To add an audio input to a chain, use the curor keys to move the cursor somewhere over the desired chain and type "i" (for *input*):

The Footer will prompt you for the input name within the Info field, which can be any of the input names that Ecasound's command *ai-add* understands⁵. You can now directly type the audio input, for example *fiddle.wav*:



```

Chain Name      |i|o|M|S|c|vol |pan |(P)layat|S
-----+-----+-----+-----+-----+-----+-----+-----+-----+
Chain 0         |0| | | | |X| 100 50
Chain 1         |0| | | | |X| 100 50
Chain 2         |0| | | | |X| 100 50
Chain 3         |0| | | | |X| 100 50
Chain 4         |0| | | | |X| 100 50
Chain 5         |0| | | | |X| 100 50
Chain 6         |0| | | | |X| 100 50
Chain 7         |0| | | | |X| 100 50
-----+-----+-----+-----+-----+-----+-----+
Chain Name: Chain 0      Index: 000
Input: null (1)          Output: alsa (1)
0.000 / 0.000 (0.000)
Add Audio Input: fiddle.wav
  
```

After pressing the return key, N-Chains tries to add the audio input. If everything worked, the N-Chains interface with the newly added audio input would look like this:

⁵See the description of the ecasound interactive mode (iam) commands in: *man ecasound-iam(3)*

Chain Name	[i]	[o]	[M]	[S]	[c]	[vol]	[pan]	[(P)]	layat	Sele(C)t	(L)length
Chain 0	I	0			X	100	50	0.000	0.000		337.340
Chain 1		0			X	100	50				
Chain 2		0			X	100	50				
Chain 3		0			X	100	50				
Chain 4		0			X	100	50				
Chain 5		0			X	100	50				
Chain 6		0			X	100	50				
Chain 7		0			X	100	50				

Chain Name: Chain 0	Index: 000
Input: fiddle.wav (2)	Output: alsa (1)
0.000 / 337.340 (337.340)	
Add Audio Input: fiddle.wav	

As you can see, the audio input *fiddle.wav* has been added to the first chain of the chain list, *Chain 0*. Chain 0 has an audio input attached to it, which is indicated by the yellowish “I” in the *i* column of the Header. The Info field also shows the audio input name *fiddle.wav*.

But something else has happened: If you look at the *Length* column, you see that N-Chains automatically recalculated Chain 0’s duration to 337.340. Also, the current values of *Playat* (0.000) and *Select* (0.000) are displayed.

Furthermore, the transport information (the blue line right above the Footer) has been updated. It shows now the current position 0.000 and the new chain setup length, which is 337.340, being equivalent to Chain 0’s duration because of our single audio input.

Now that the audio input is being added, it sure would be nice to see a descriptive name for the chain instead of Chain 0. This leads us to the next use case of

0.7.2 Setting the Chain Name

In Ecasound, setting the name of a chain is done with the “-a” option. So a good choice would be to just type “a” to change a chain’s name from within N-Chains. Well folks, this is exactly the way it is done:

Chain Name	[i]	[o]	[M]	[S]	[c]	[vol]	[pan]	[(P)]	layat	Sele(C)t	(L)length
Chain 0	I	0			X	100	50	0.000	0.000		337.340
Chain 1		0			X	100	50				
Chain 2		0			X	100	50				
Chain 3		0			X	100	50				
Chain 4		0			X	100	50				
Chain 5		0			X	100	50				
Chain 6		0			X	100	50				
Chain 7		0			X	100	50				

Chain Name: Chain 0	Index: 000
Input: fiddle.wav (2)	Output: alsa (1)
0.000 / 337.340 (337.340)	
Renaming chain "Chain 0"	

After having pressed the “a”-key, you will be prompted for the new chain name as indicated by the red arrow. Write down the new name and press <Return>:

Chain Name	i o M S c vol	pan	(P)layat	Sele(C)t	(L)ength
-----+-----+-----+-----+-----+-----					
FIDDLE	I 0 X 100 50	0.000	0.000	337.340	
Chain 1	0 X 100 50				
Chain 2	0 X 100 50				
Chain 3	0 X 100 50				
Chain 4	0 X 100 50				
Chain 5	0 X 100 50				
Chain 6	0 X 100 50				
Chain 7	0 X 100 50				
-----+-----+-----+-----+-----+-----					
Chain Name: FIDDLE			Index: 000		
Input: fiddle.wav (2)			Output: alsa (1)		
0.000 / 337.340 (337.340)					
Renaming chain "Chain 0"					

A chain name can be up to 20 characters in N-Chains.

0.7.3 Playat, Select, Length

Playat, Select, Length and their usage and description of recalculation

0.8 Shortcuts

Shortcuts of the main interface

Action	Key	Comment
Set visual chain name	a	
Add or set the audio input for the current chain	i	
Add or set the audio output for the current chain	o	
Toggle muting state for the current chain	m	
Toggle solo state for the current chain	s	
Toggle channel copy mode for the current chain	c	
Set chain volume	v	Corresponds to ecasound chain operator ea. Keys: up/down, 1..0, <ENTER> to commit
Set chain panning	p	Corresponds to ecasound chain operator epp. Keys: left/right, l, r, c, 1..0, <ENTER> to commit
Set playat position	P	Numerical value, in sec.ms ex: 35.574, ESC to abort
Set select offset	C	Numerical value, in sec.ms ex: 35.574, ESC to abort
Set input length	L	Numerical value, in sec.ms ex: 35.574, ESC to abort
Quit N-Chains	q	At present, quits without any question

N-Chains Internals

0.9 How N-Chains talks to Ecasound

This chapter is a pure list of too technical issues that are interesting but not necessary for the user guide chapter.

Note, that the chain names used by N-Chains are virtual chain names which do not correspond to the chain names used by ecasound. Internally, the chains used within the ecasound session are named `chain_0`, `chain_1` .. `chain_N`.

Around N-Chains

0.10 Release Version Cycle

0.10.1 Release Versions

The naming of N-Chains release versions follow certain conventions which are described in this chapter. The several fields of a release package give you information of the state of the software package distributed with the current release. The following release versions exist within the cycle:

1. Optional Pre-Unstable Releases
 - a) nchains-A.B.C-pre-NNN, with $C \neq 0$ and $N \geq 1$ ascending.
2. Unstable
 - a) nchains-A.B.C, with $C \neq 0$
3. Optional Release Candidates
 - a) nchains-A.B.C-rc-NNN, with $C == 0$ and $N \geq 1$ ascending
4. Stable
 - a) nchains-A.B.C-stable with $C == 0$

0.10.2 Version Numbering

The version numbers A, B and C as well as NNN of the distribution packages are incremented as follows:

A Major release number, incremented upon basic changes within

- data structure
- the application structure
- the look and feel
- etc, for example possible major ecasound changes

B The minor release number is incremented, when it is time for a stable release and a reasonable number of bugs have been fixed and features have been implemented.

C is the revision release number, which is incremented on every unstable release.

NNN If any of the optional releases occur, either pre-releases for the next unstable release or rc-releases for the next stable release, they will be appended a revision release incrementor.

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