



RAVENNA 2020 Webinar Series

Products & Applications: Virtual Sound Cards

Tue, July 28, 2020
15:00 h (CEST)

Jochen Richter & Johannes Freyberger, Lawo

Maurice Engler, Merging

Andreas Hildebrand, ALC NetworX



Andreas Hildebrand, RAVENNA Technology Evangelist

- more than 25 years in the professional audio / broadcasting industry
- graduate diploma in computer science
- R&D, project & product management experience
- member of AES67 TG and ST2110 DG

ALC NetworX GmbH, Munich / Germany



- established 2008
- R&D center
- developing & promoting RAVENNA
- Partnerships with > 40 manufacturers

RAVENNA



- IP media networking technology
- designed to meet requirements of professional audio / broadcasting applications
- open technology approach, license-free
- fully AES67-compliant (*built-in*)





Jochen Richter

Head of Sales, Radio

Lawo AG, Rastatt, Germany

Jochen.Richter@lawo.com



Johannes Freyberger

R&D

Lawo AG, Rastatt, Germany

Johannes.Freyberger@lawo.com



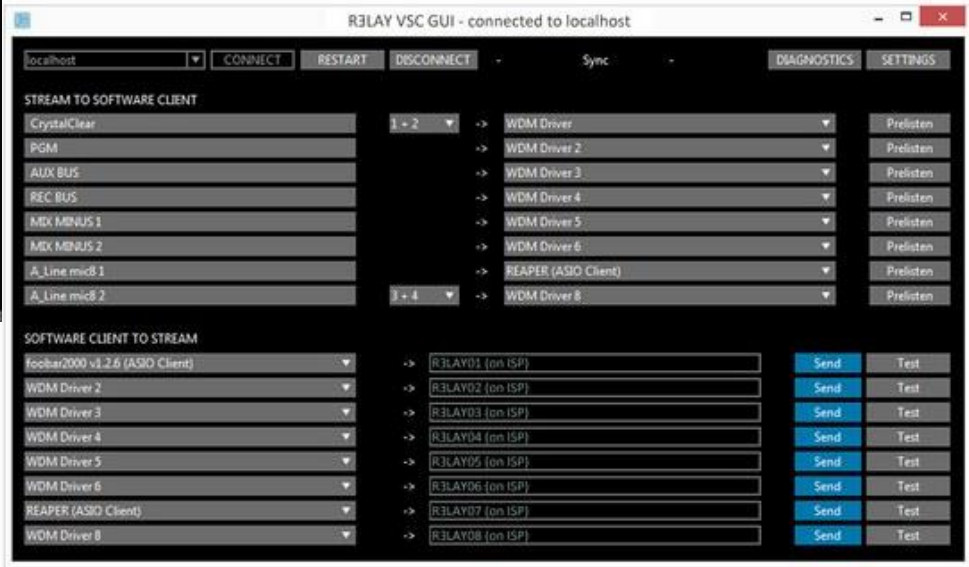
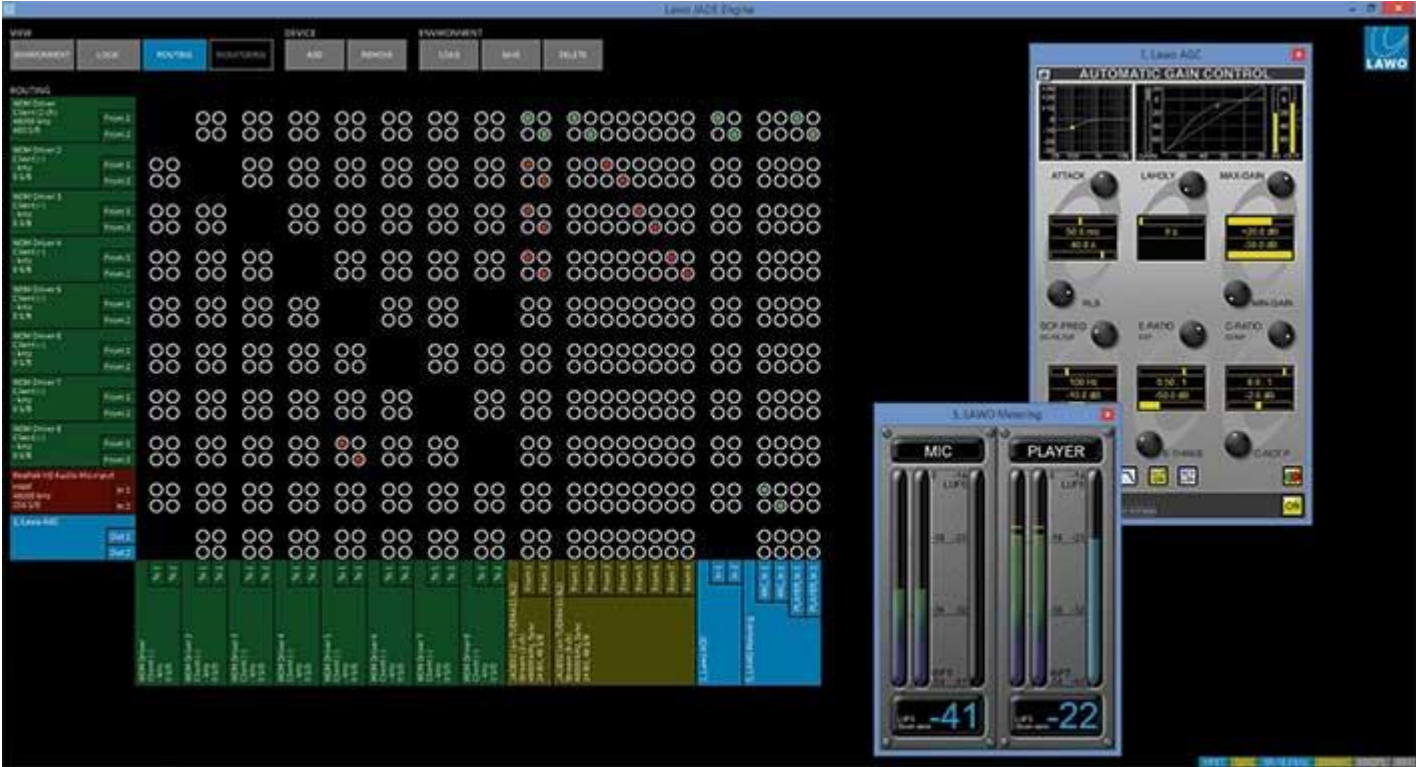
Maurice Engler

Product and Project Manager

Merging Technologies, Switzerland

mengler@merging.com





Welcome to
Broadcast 3.0

R3LAY VSC (virtual sound card)

New developments - Less CPU load,
new WDM driver support

Ravenna Seminar, Germany | 28th of July 2020, 15:00 pm CEST

Your LAWO - Team today:

50^{YEARS} ENGINEERING
THE FUTURE.



Johannes Freyberger

R & D, Radio / R3LAY

Jochen Richter

Head of Sales (Global), Radio

Presentation Agenda:

50^{YEARS}
ENGINEERING
THE FUTURE.



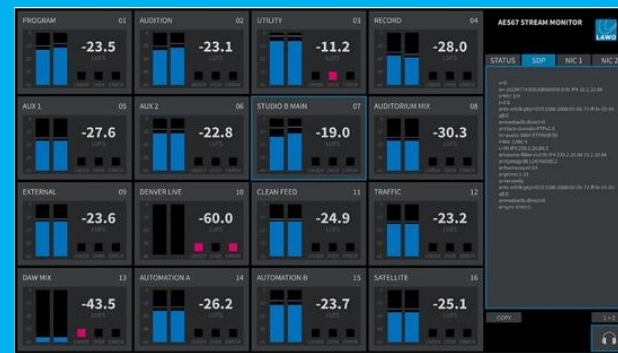
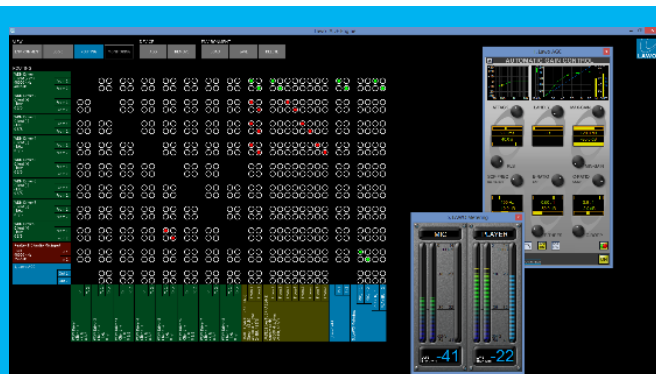
1. R3LAY Virtual Sound Card – Overview R3LAY Product Line
2. New R3LAY development - CPU load optimisations
3. New WDM driver
4. Impact on Radio Remote solutions, mobile use and data center installs
5. Questions and Answers

The R3LAY Products

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- R3LAY VSC - Virtual Sound Card RAVENNA/AES67 driver for Windows.
- R3LAY VPB - Virtual PatchBay Routing, soundcard control, RAVENNA/AES67 interface, VST host, processing.
- R3LAY VRX4 - Virtual Radio Mixer Software. 4 faders, 1 mix bus, native processing.
- R3LAY VRX8 - Virtual Radio Mixer Software. 8 faders, 2 mix buses, Automix, native processing.
- OnAir4 RAVENNA/AES67-based audio interface. Mic/lines, headphones, zero latency monitoring
- **NEW:** R3LAY AoIP Stream Monitor – Only SW based stream monitoring of up to 16 AES 67 streams (with multiple channels)
- **NEW:** R3LAY Configurator – Tool for easy config. management of R3LAY VRX consoles in a bigger network / environment
- 3rd party partner products available (eg. Orban sound processing SW (VST plugin...), e.g. Profanity Delay SW like Arse!, ...)



The new R3LAY developments:

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THE FUTURE.



1. CPU load optimisations - New R3LAY development, ready Q3/2020
2. New WDM driver, made by LAWO, ready now

1. CPU load optimisation

CPU load optimisations - New R3LAY development, ready Q3/2020

What does that mean in practise:

- Customers can install R3LAY Software on less performant PCs
- With same PC performance more channels or processes can run in parallel
- Mobile applications (Remote studios) can run on standard PCs / notebooks

2. New WDM audio driver:

New WDM audio driver, optimised by LAWO, ready now

What is the impact of the new WDM driver:

- Audio Processing chain is optimised in terms of timing
- A triggered faderstart is faster now
- Buffer management is optimised – maximum output on same PC / config.
- We are in the process of further optimization of the entire process chain

3. Impact on customer installs:

Positive Impact on Radio Remote solutions, mobile use + data center installs

- Especially on Radio Remote Solutions the two new developments have a positive impact. Standard notebooks are sufficient now to drive R3LAY VSC and/or R3LAY VRX4/8 software-based mixer.
- Data Center or Cloud based installations need less CPU power now on virtualized platforms and are optimised in audio processing plus timing.

More technical details now !

Now I will hand over to my colleague Johannes for further technical, detailed information of the new features:

- Less CPU load
- Optimised WDM audio driver in terms of timing
- More infos on the Windows audio mixer in general

R3LAY

The R3LAY Radio in a Bag.

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Mic 1






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

Mic 2






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

Mic 3






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

Headset






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

Dig In






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

Audio Editor






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

Skype






+12
+6
0
-6
-12
-18
-24
-30
-48
-60
-∞
A+ 

PC Audio



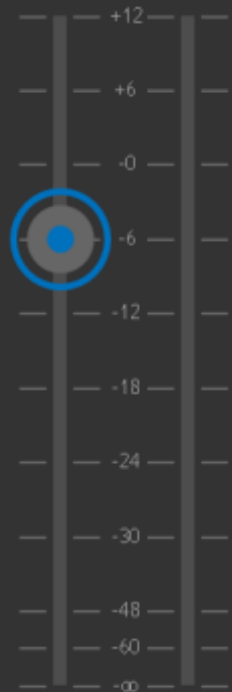



+12
+6
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A+ 



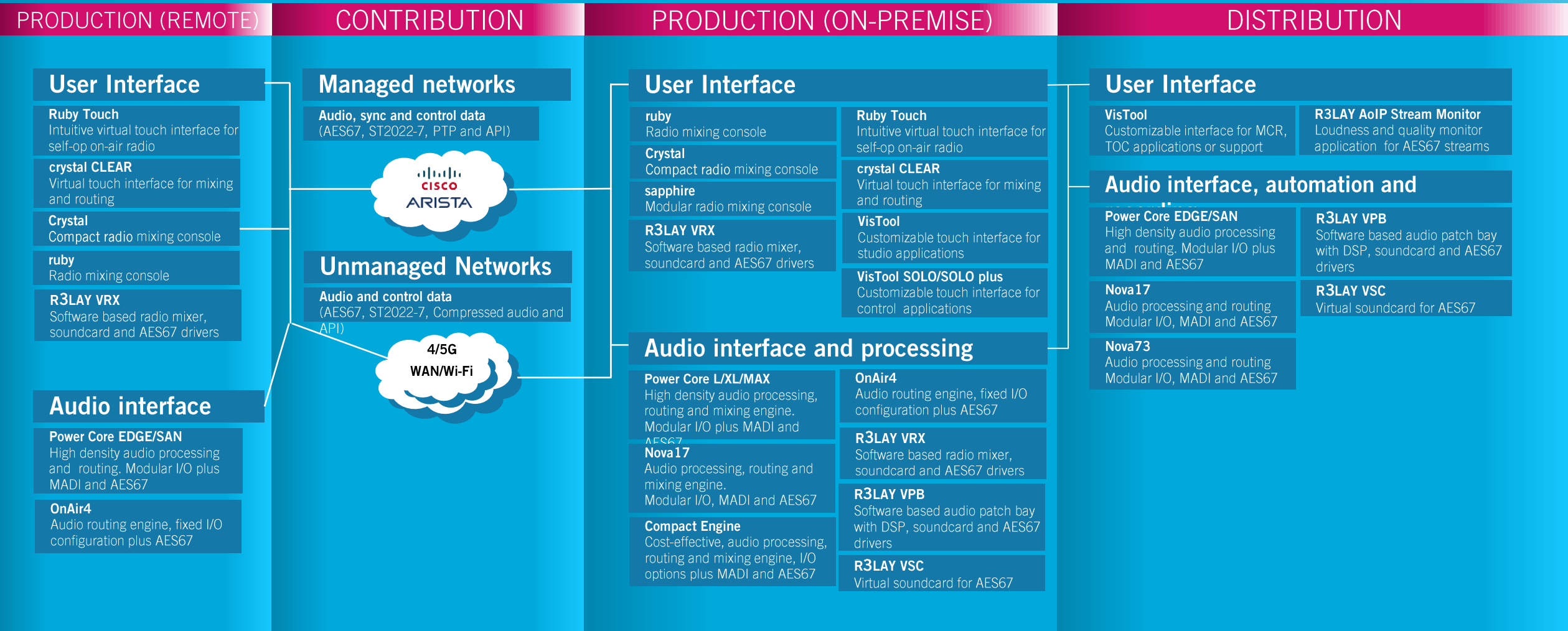





+12
+6
0
-6
-12
-18
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-48
-60
-∞




Radio Workflow Overview



Radio Remote Solutions Overview:



Impact on LAWO Radio Remote Solutions (all based on a VPN secured network connection):

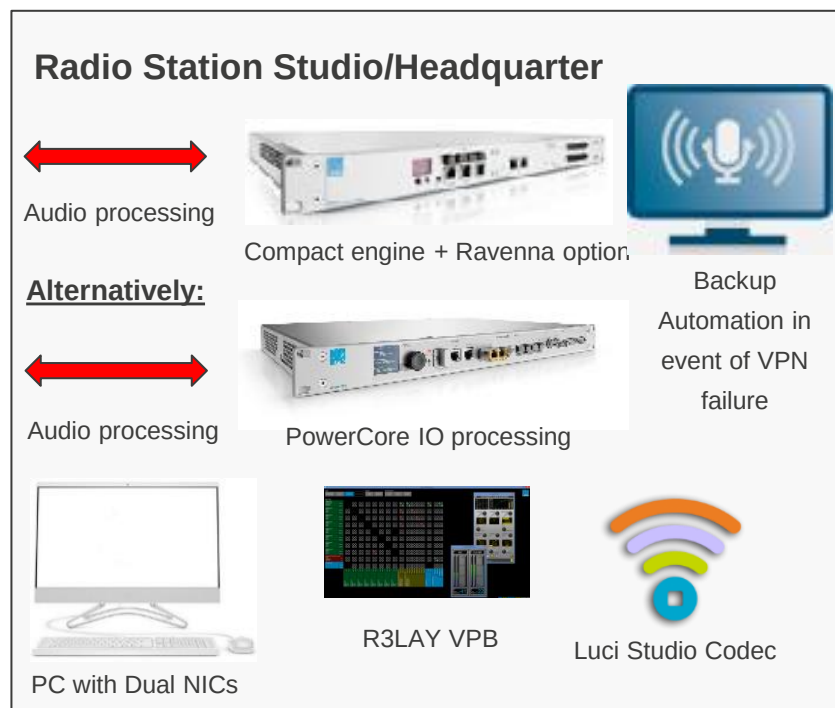
4. Remote journalists solution: „R3LAY VRX8 bundle“ (with „OnAir4“) at home / remote
 - IP audio connection to a „Compact engine“ (incl. Ravenna Option) at the Radio station / HQ
(this solution may not require a radio automation).

This solution Nr. 4 needs two network cards (2 NICs) as we have to have a connection to the internet (VPN) on the one hand and to the OnAir4 (AES 67 / Ravenna link) from the Laptop or Home Computer on the other hand.

Radio Remote Solutions (4):

4. - Remote journalists solution: „R3LAY VRX8 bundle“ (with „OnAir4“) at home / remote

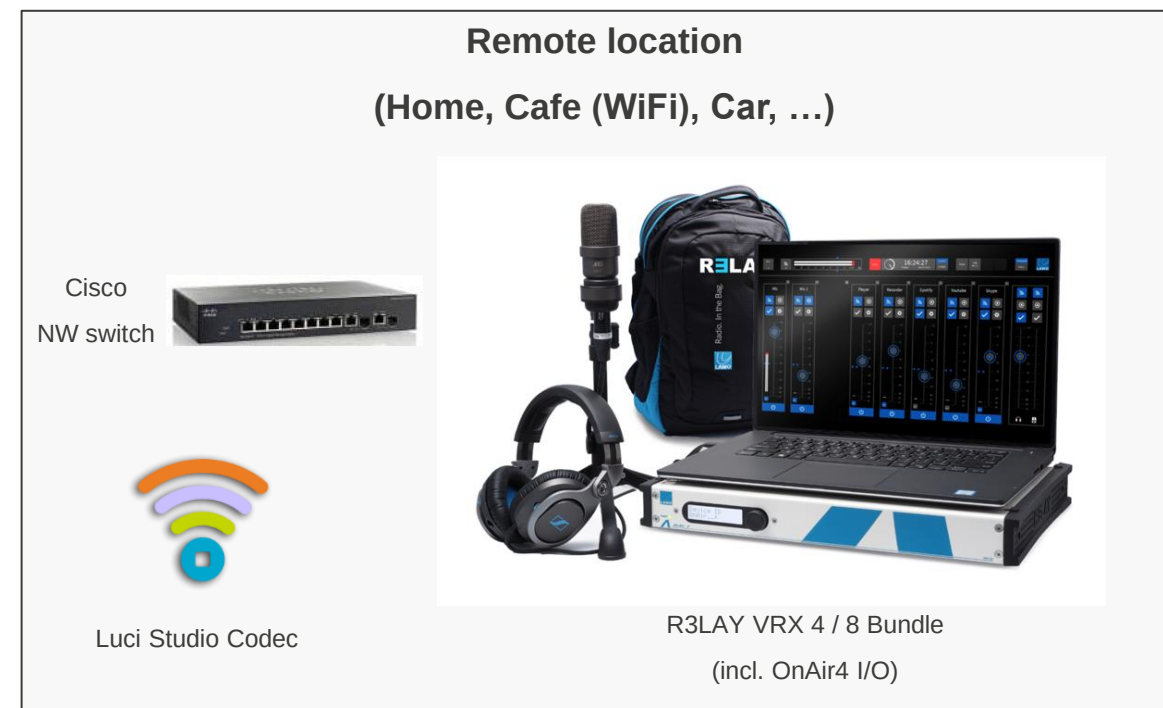
- IP audio connection to a „Compact engine“ (incl. Ravenna Option) or PowerCore at the Radio station Studio/ HQ



Reliable network connection,
VPN secured, minimum
2 MB/sec *

Luci Studio Codec for
transmitting
the Audiostream via the
Internet

* Use a test to ensure
the 2 MB network performance



This solution Nr. 4 needs two network cards (2 NICs) at the remote location as we have to have a connection to the internet (VPN) on the one hand and to the OnAir4 from the Notebook or Home Computer on the other hand.

Please use a small network switch here for OnAir4 and PC/notebook.

Question & Answers Session:

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THE FUTURE.



Any questions?

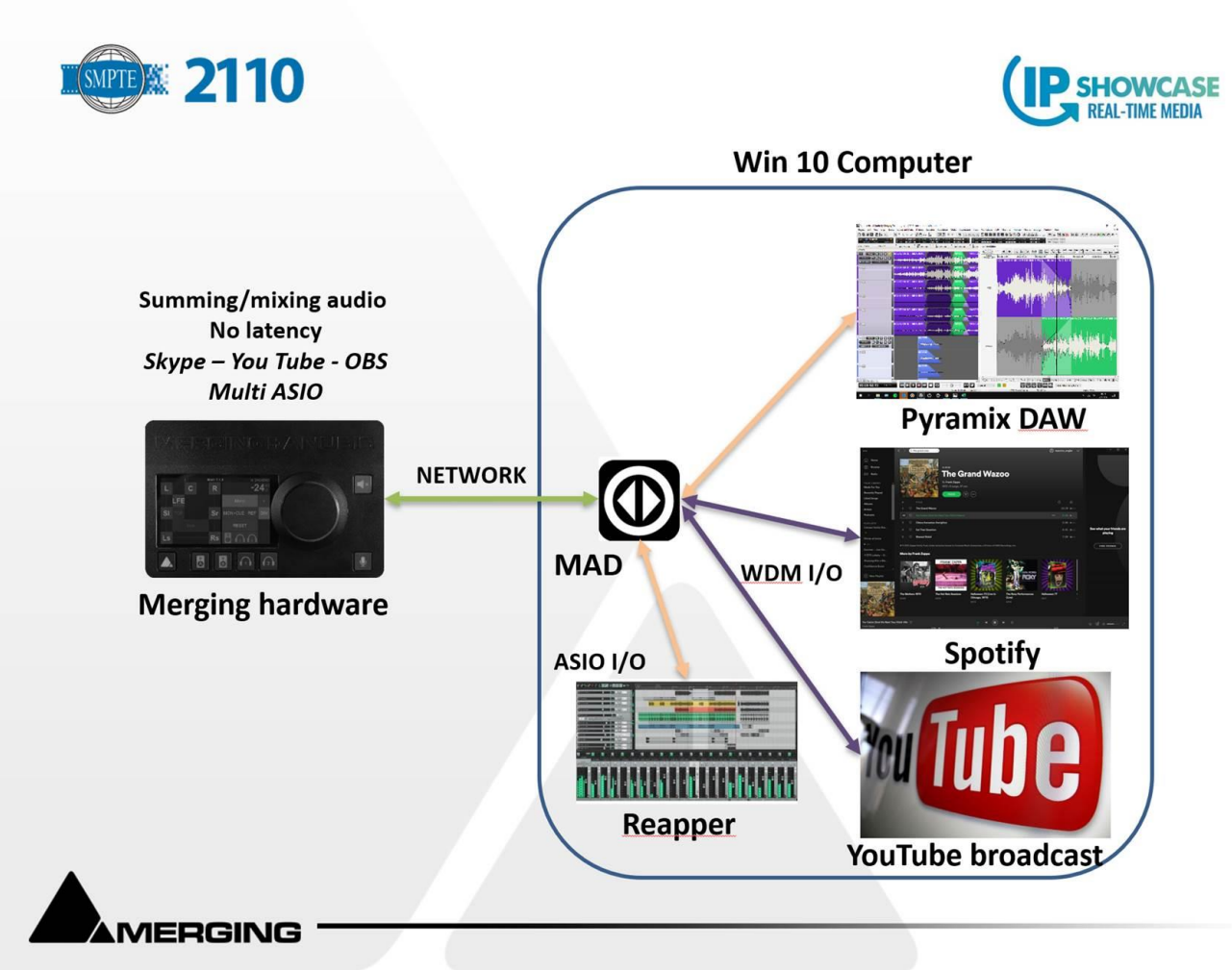
We are looking forward to your inputs and happy to help.

Thank you very much!



www.lawo.com





Merging Technologies

30 years of independence

www.merging.com



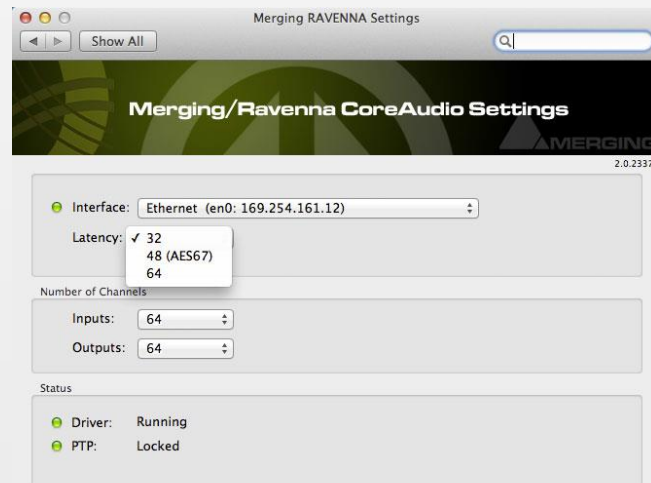
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TODAY's Merging Technologies virtual sound cards

CORE AUDIO IO COUNT

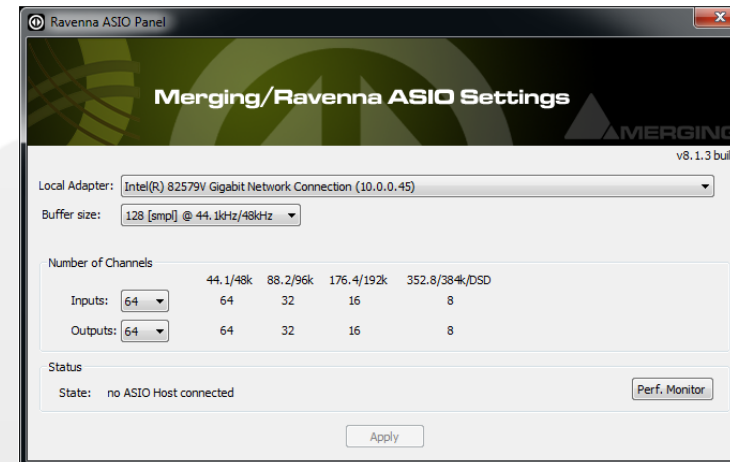
- 128 I/O @ 1fs (44.1kHz / 48kHz)
- 128 I/O @ 2fs (88.2 kHz / 96kHz)
- 128 I/O @ 4fs (176.4 kHz / 192 kHz)



certified on High Sierra, Mojave and Catalina up to 10.15.2

ASIO IO COUNT (Win 7 & 10)

- 128 I/O @ 1fs (44.1kHz / 48kHz)
- 64 I/O @ 2fs (88.2 kHz / 96kHz)
- 32 I/O @ 4fs (176.4 kHz / 192 kHz)
- 16 I/O @ 8fs (352.8 kHz / 384 kHz)



TODAY's Merging Technologies virtual sound cards

CORE AUDIO IO COUNT

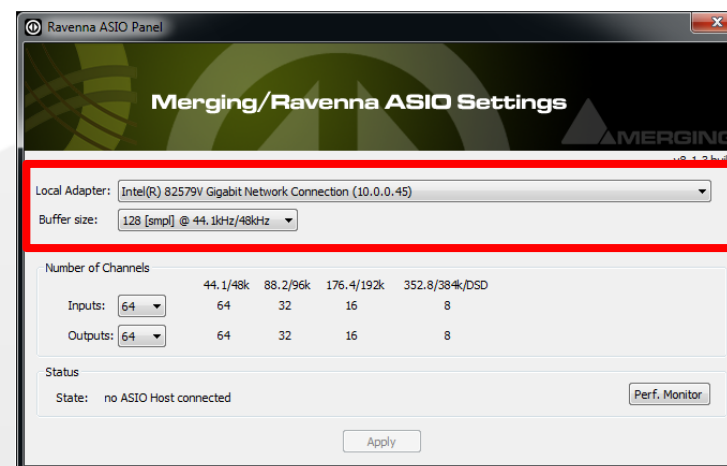
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- 16 I/O @ 8fs (352.8 kHz / 384 kHz)



LINUX driver (ALSA) also supported



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NEW Merging Audio Device (MAD)

- What is MAD ? What is changing ?

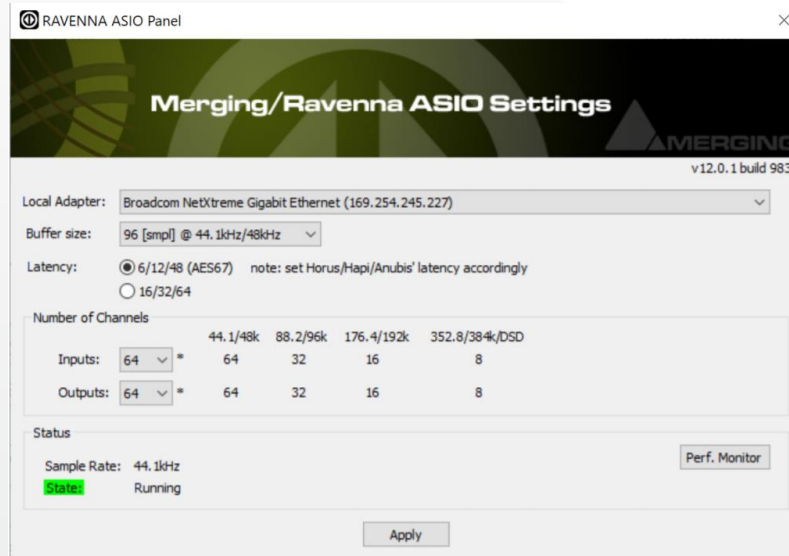
NEW Merging Audio Device (MAD)

- What is MAD ? What is changing ?
- Multi ASIO Support
- Bridging ASIO applications
- WDM (Windows Driver Model) support
- more optional features

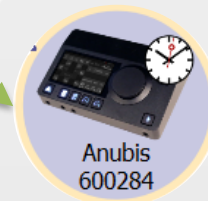
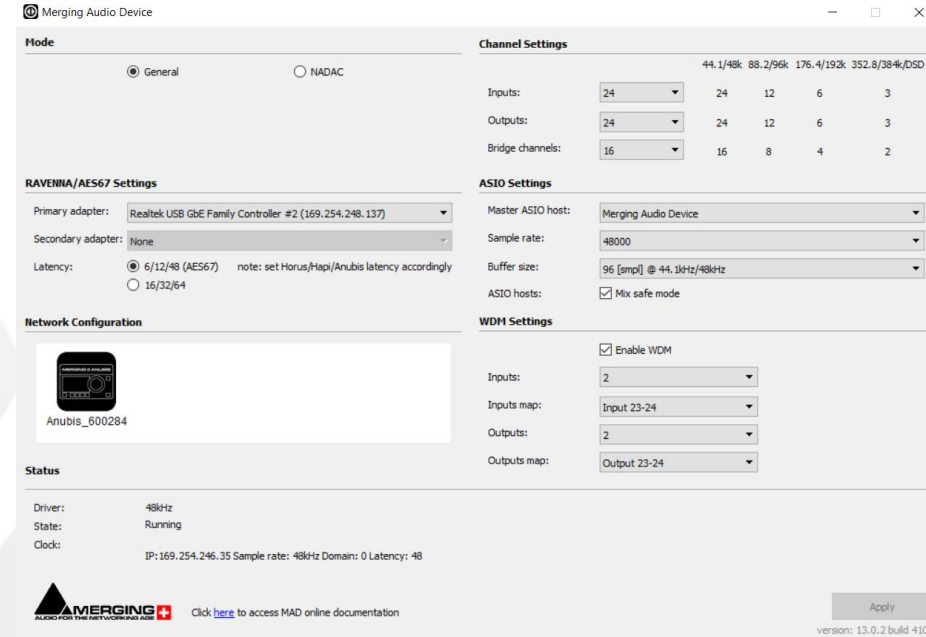
THE NEW WIN 10 AGGREGATOR

What is changing ?

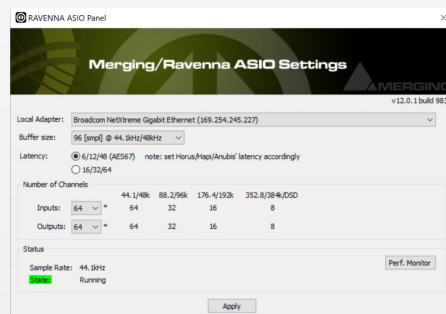
Up to today's ASIO driver



NEW Merging Audio Device



Merging hardware is mandatory



Merging Audio Device

Mode

☒ General ☐ NADAC

RAVENNA/AES67 Settings

Primary adapter: Realtek USB GbE Family Controller #2 (169.254.248.137)
 Secondary adapter: None
 Latency: ☒ 6/12/48 (AES67) note: set Horus/Hapi/Anubis latency accordingly
☐ 16/32/64

Network Configuration



Anubis_600284

Status

Driver: 48kHz
 State: Running
 Clock: IP: 169.254.246.35 Sample rate: 48kHz Domain: 0 Latency: 48



Click [here](#) to access MAD online documentation

Channel Settings

44.1/48k 88.2/96k 176.4/192k 352.8/384k/DSD

Inputs:	24	24	12	6	3
Outputs:	24	24	12	6	3
Bridge channels:	16	16	8	4	2

ASIO Settings

Master ASIO host: Merging Audio Device
 Sample rate: 48000
 Buffer size: 96 [smp] @ 44.1kHz/48kHz
 ASIO hosts: ☒ Mix safe mode

WDM Settings

☒ Enable WDM

Inputs:	2
Inputs map:	Input 23-24
Outputs:	2
Outputs map:	Output 23-24

Apply

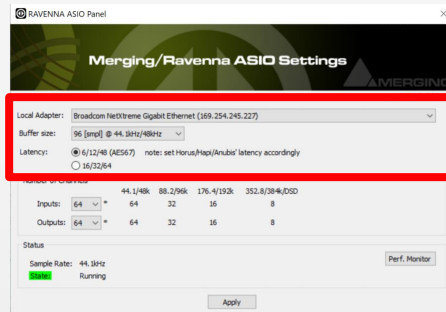
version: 13.0.2 build 4108



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RAVENNA
AES67 & ST 2110 built-in



Merging Audio Device

Mode: ☒ General ☐ NADAC

Channel Settings

	44.1/48k	88.2/96k	176.4/192k	352.8/384k/DSD
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RAVENNA/AES67 Settings

Primary adapter: Intel(R) Gigabit CT Desktop Adapter #2 (169.254.162.46)

Secondary adapter: Intel(R) Ethernet Connection (7) I219-V (10.0.0.76)

Latency: ☐ 6/12/48 (AES67) note: set Horus/Hapi/Anubis latency accordingly
☒ 16/32/64

ASIO Settings

Master ASIO host: Merging Audio Device

Sample rate: 48000

Buffer size: 96 [smpl] @ 44.1kHz/48kHz

ASIO hosts: ☒ Mix safe mode

WDM Settings

☒ Enable WDM

Inputs: 2

Inputs map: Input 23-24

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Network Configuration

Anubis_600284

Status

Driver: 48kHz

State: Running

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AMERGING AUDIO FOR THE NETWORKING AGE

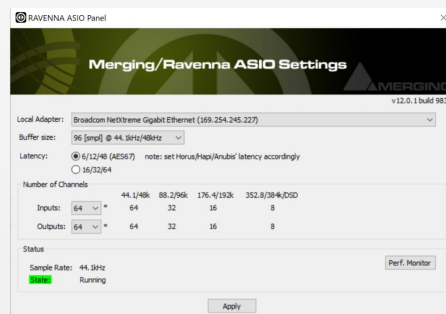
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Merging Audio Device



Merging Audio Device

Mode

☒ General
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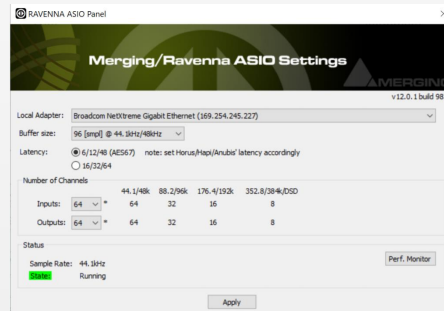

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Apply

version: 13.0.2 build 4108



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Merging Audio Device

Mode: ☒ General ☐ NADAC

RAVENNA/AES67 Settings

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Secondary adapter: None
Latency: ☒ 6/12/48 (AES67) note: set Horus/Hapi/Anubis latency accordingly
☐ 16/32/64

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AMERGING AUDIO FOR THE NETWORKING AGE Click [here](#) to access MAD online documentation

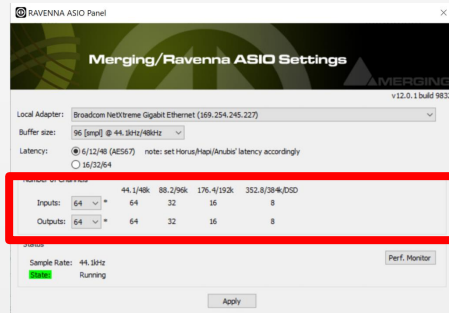
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① Merging Audio Device

Mode

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Apply

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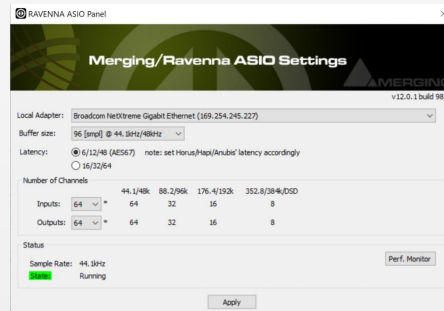
Merging Audio Device



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Merging Audio Device

Mode

☒ General

☐ NADAC

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Click [here](#) to access MAD online documentation

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Apply

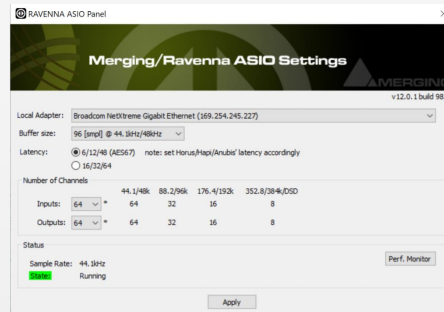
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Merging Audio Device



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Ⓜ Merging Audio Device

Mode

☒ General

☐ NADAC

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Network Configuration



Anubis_600284

Status

Driver: 48kHz

State: Running

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AMERGING

AUDIO FOR THE NETWORKING AGE

[Click here](#) to access MAD online documentation

Apply

version: 13.0.2 build 4108

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ASIO hosts: ☒ Mix safe mode

WDM Settings

☒ Enable WDM

Inputs: 2

Inputs map: Input 23-24

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Outputs map: Output 23-24

Merging Audio Device



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MAD count

ASIO IO COUNT

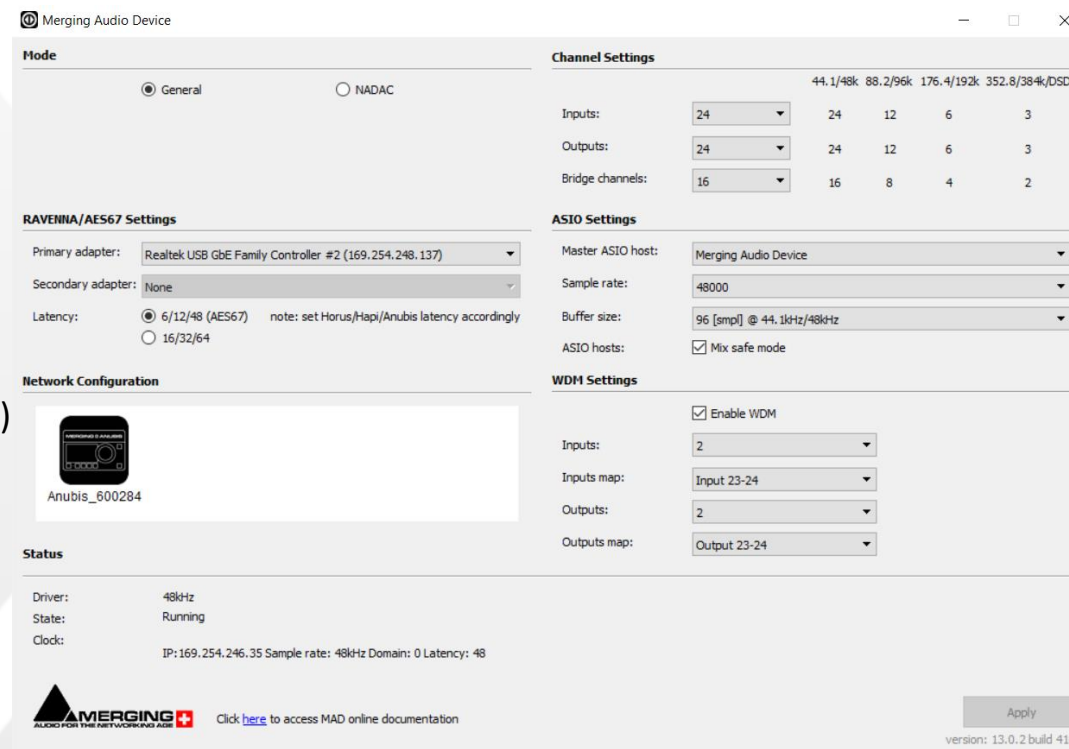
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- 16 I/O @ 8fs (352.8 kHz / 384 kHz)

WDM IO COUNT

- 8* I/O @ 1fs to 4fs (* could officially change)

MULTI ASIO BRIDGE IO COUNT

- 128 I/O @ 1fs (44.1kHz / 48kHz)
- 64 I/O @ 2fs (88.2 kHz / 96kHz)
- 32 I/O @ 4fs (176.4 kHz / 192 kHz)
- 16 I/O @ 8fs (352.8 kHz / 384 kHz)



Note: The number of I/Os can be configured to less if the application does not support these numbers.



MAD optional infrastructure functionalities

Deployable in VM environments

Support of ST 2022-7

Support of NMOS IS-04 and IS-05



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practical cases

- For DAW('s) users with multi ASIO (multiple audio App)
- WDM (Windows Driver Model) integration
- ST 2022-7 support perfect combination with ANUBIS SPS
- VM (Virtual Machines) support
- Broadcast remote production as combo with Anubis = no latency

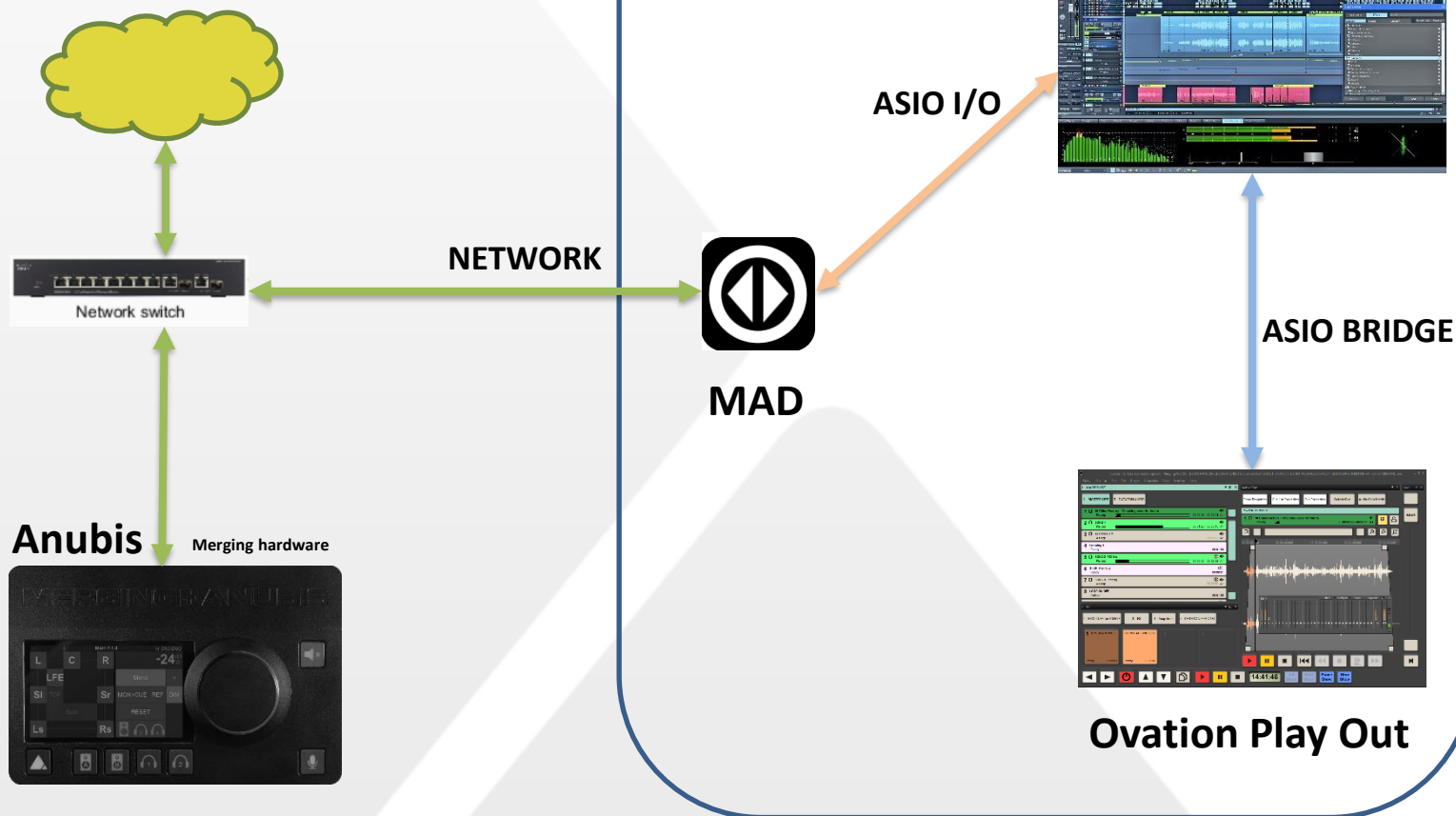


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ASIO bridge



Win 10 Computer



Merging Audio Device



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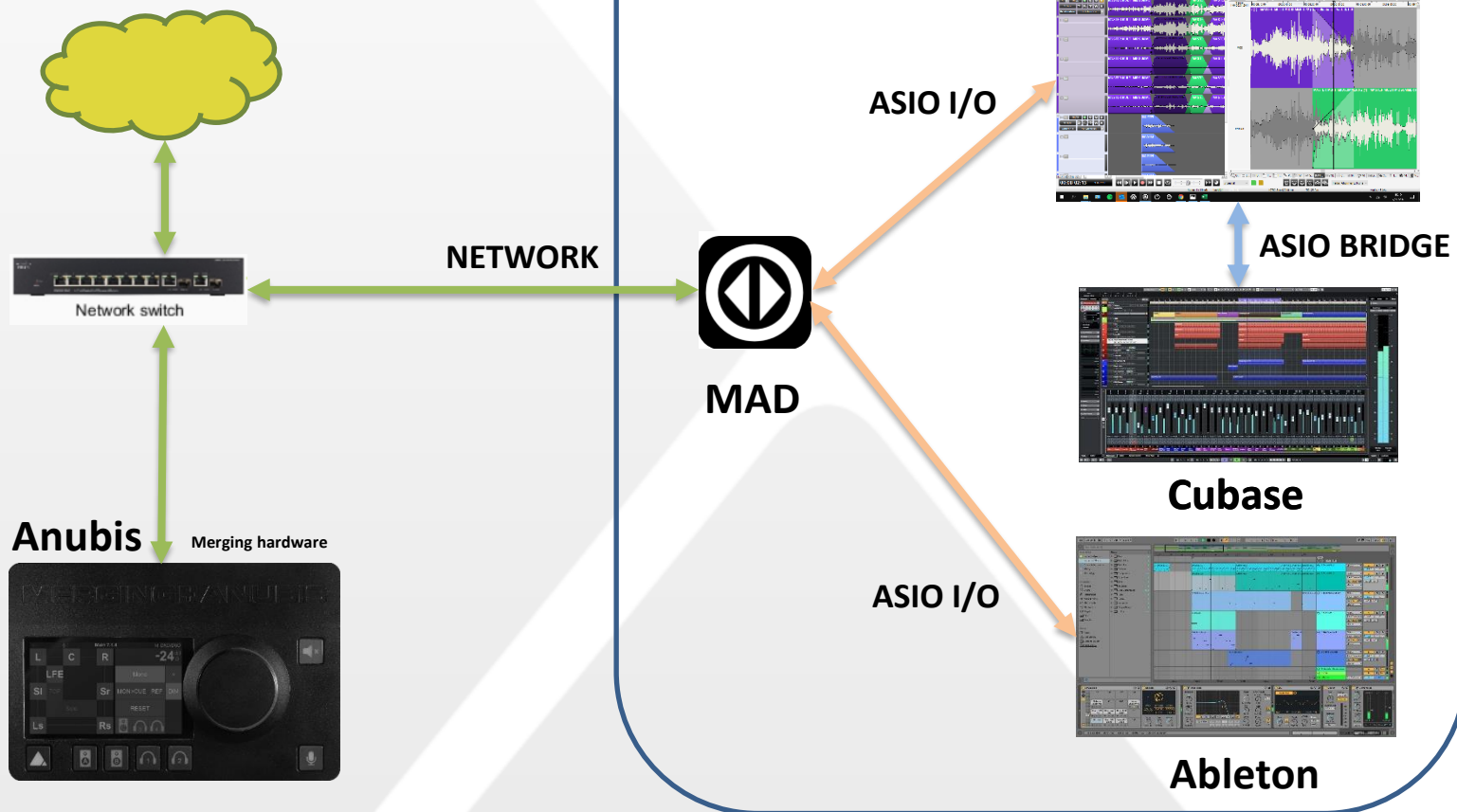
ASIO bridge
+ multi ASIO



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Win 10 Computer



Merging Audio Device



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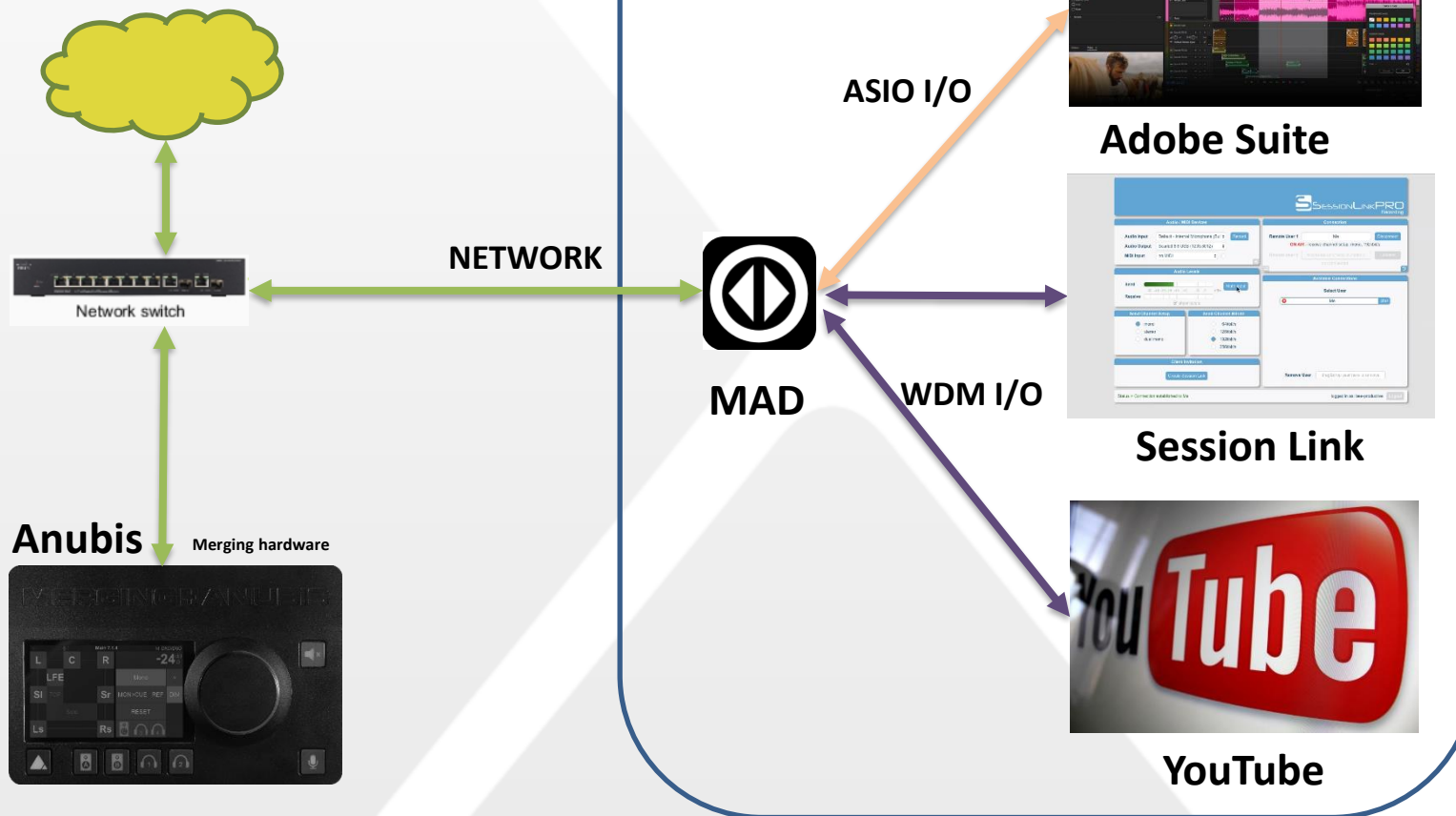
*ASIO bridge
+ multi ASIO
+ WDM*



CELEBRATING 10 YEARS
RAVENNA
AES67 & ST 2110 built-in



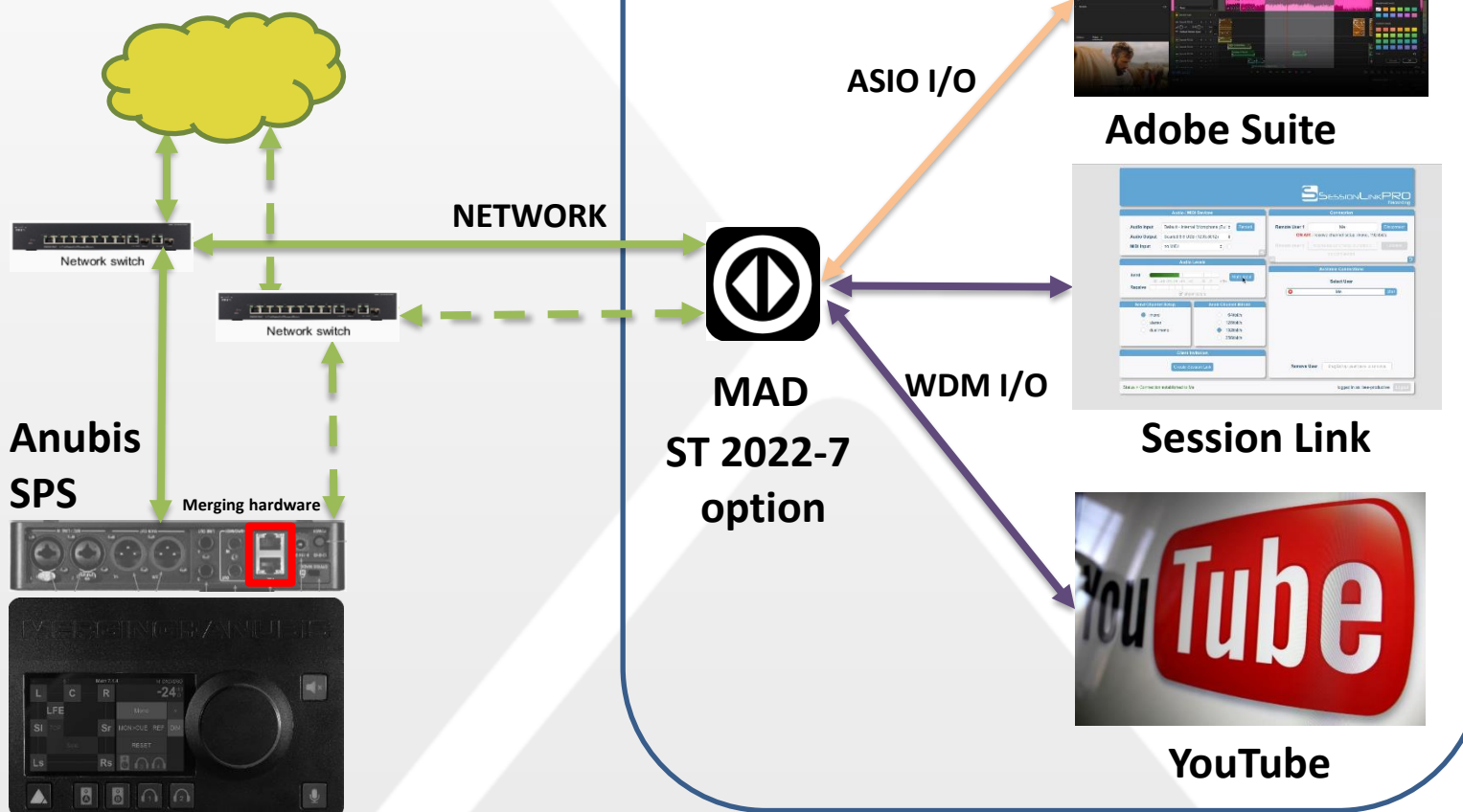
Win 10 Computer





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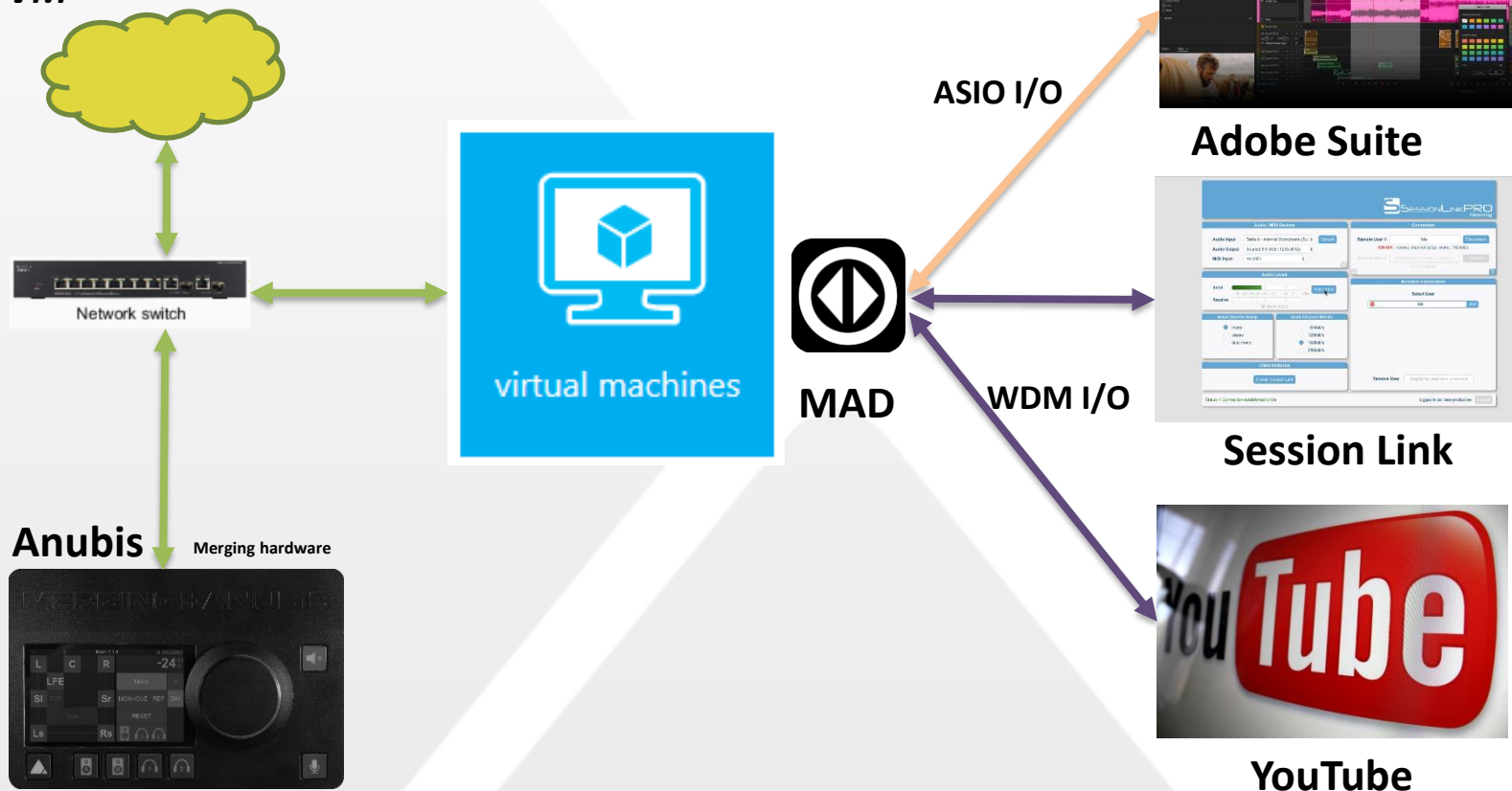
ASIO bridge
+ multi ASIO
+ WDM
+ ST 2022-7





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ASIO bridge
+ multi ASIO
+ WDM
+ ST 2022-7
+ VM

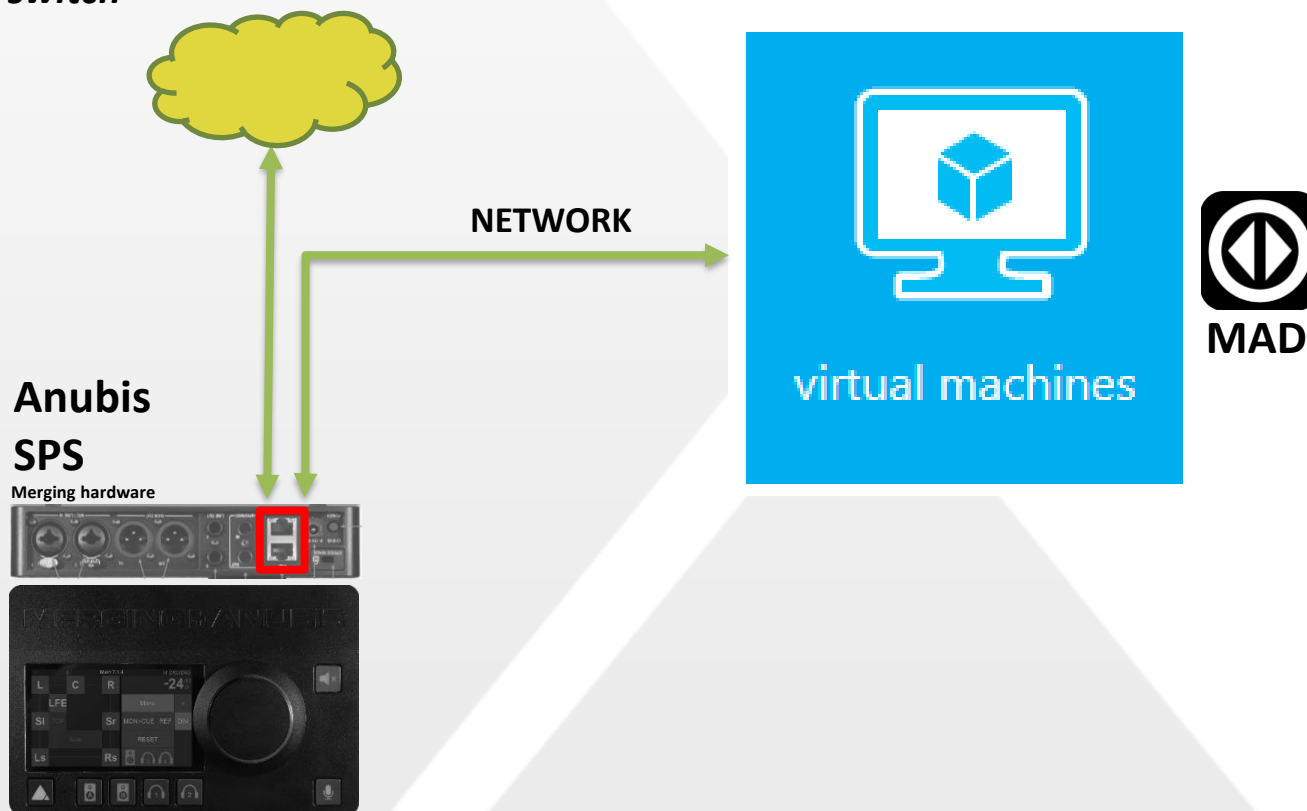


Merging Audio Device



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- ASIO bridge*
- + multi ASIO*
- + WDM*
- + ST 2022-7*
- + VM*
- + switch*

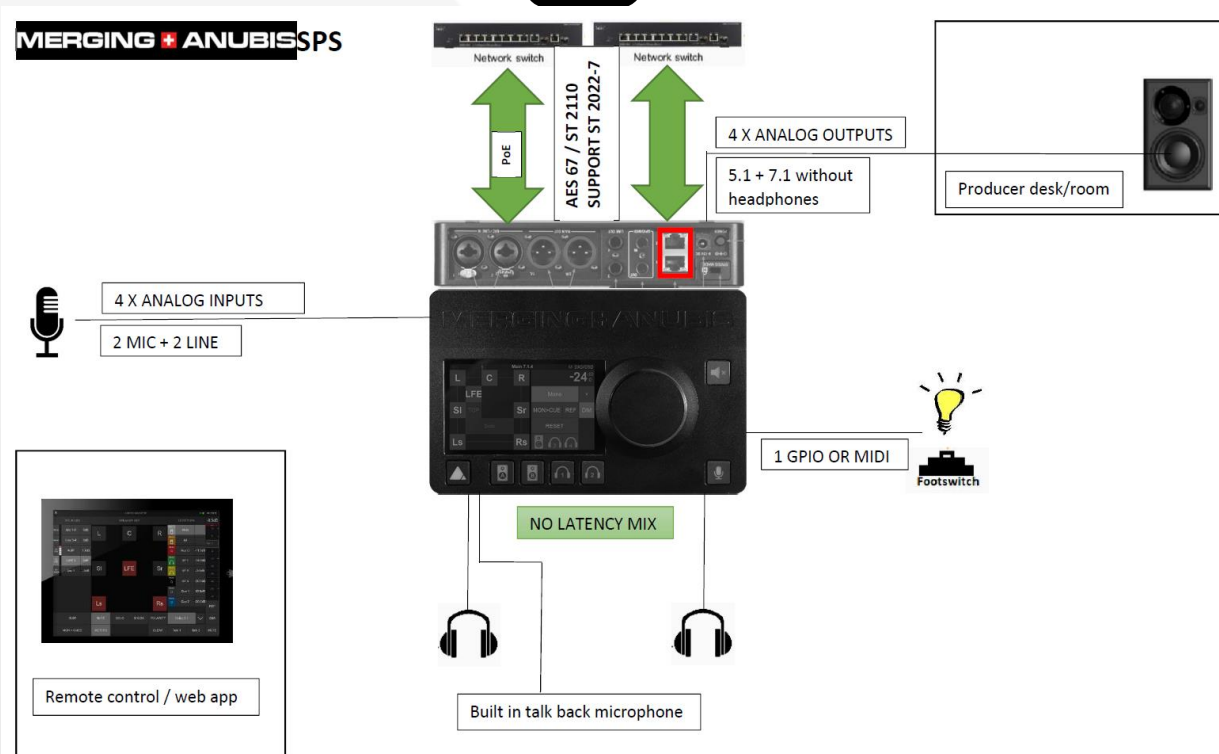
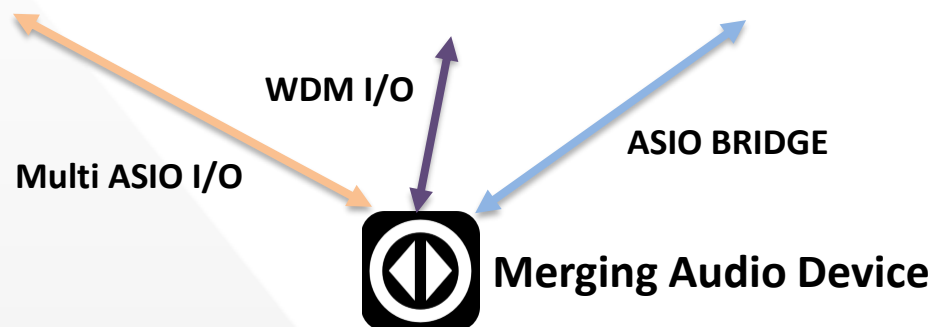




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*Remote broadcast
production with
NO latency*



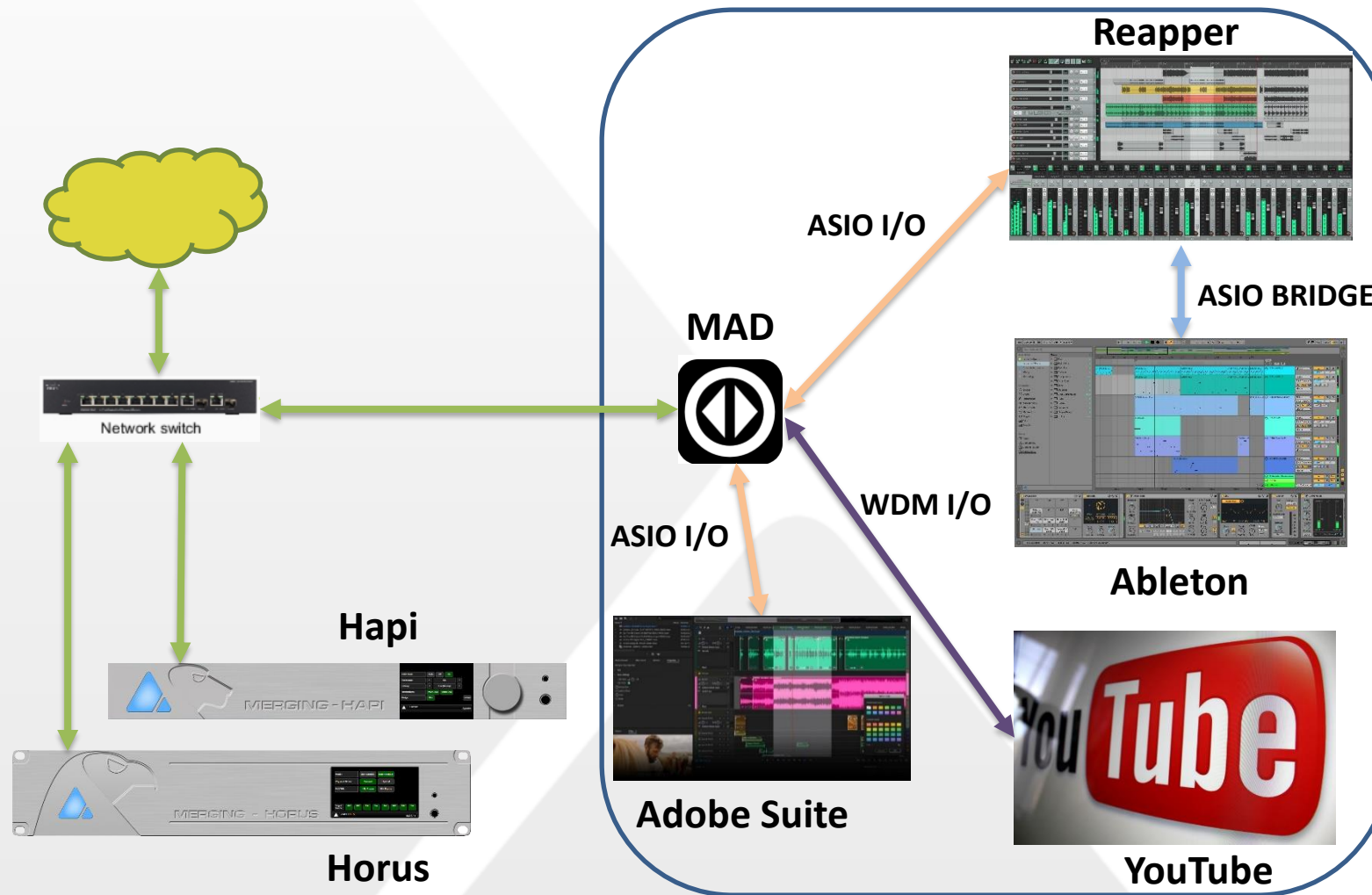
Merging Audio Device



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Win 10 Computer



Merging Audio Device



- ASIO bridge**
- + multi ASIO**
- + WDM**
- + ST 2022-7 ***
- + VM ***
- + NMOS IS04-IS05 ***

*** OPTIONAL**

 Merging Audio Device

Mode

☒ General
☐ NADAC

RAVENNA/AES67 Settings

Primary adapter: Realtek USB GbE Family Controller #2 (169.254.248.137)

Secondary adapter: None

Latency:
☒ 6/12/48 (AES67)
note: set Horus/Hapi/Anubis latency accordingly
☐ 16/32/64

Network Configuration



Anubis_600284

Status

Driver: 48kHz

State: Running

Clock: IP: 169.254.246.35 Sample rate: 48kHz Domain: 0 Latency: 48

Channel Settings

44.1/48k 88.2/96k 176.4/192k 352.8/384k/DSD

Inputs:	24	24	12	6	3
Outputs:	24	24	12	6	3
Bridge channels:	16	16	8	4	2

ASIO Settings

Master ASIO host: Merging Audio Device

Sample rate: 48000

Buffer size: 96 [smp] @ 44.1kHz/48kHz

ASIO hosts: ☒ Mix safe mode

WDM Settings

☒ Enable WDM

Inputs:	2
Inputs map:	Input 23-24
Outputs:	2
Outputs map:	Output 23-24



Click [here](#) to access MAD online documentation

Apply

version: 13.0.2 build 4108



Merging Audio Device



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Merging Audio Device

ASIO bridge
+ multi ASIO
+ WDM
+ ST 2022-7 *
+ VM *
+ NMOS IS04-IS05 *

* OPTIONAL

Comes with every
Anubis, Hapi or Horus

① Merging Audio Device

Mode: ☒ General ☐ NADAC

RAVENNA/AES67 Settings

Primary adapter: Realtek USB GbE Family Controller #2 (169.254.248.137)
Secondary adapter: None
Latency: ☒ 6/12/48 (AES67) note: set Horus/Hapi/Anubis latency accordingly
☐ 16/32/64

Network Configuration


Anubis_600284

Status

Driver: 48kHz
State: Running
Clock: IP: 169.254.246.35 Sample rate: 48kHz Domain: 0 Latency: 48

Channel Settings

44.1/48k 88.2/96k 176.4/192k 352.8/384k/DSD

Inputs:	24	24	12	6	3
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Bridge channels:	16	16	8	4	2

ASIO Settings

Master ASIO host: Merging Audio Device
Sample rate: 48000
Buffer size: 96 [smp] @ 44.1kHz/48kHz
ASIO hosts: ☒ Mix safe mode

WDM Settings

☒ Enable WDM

Inputs:	2
Inputs map:	Input 23-24
Outputs:	2
Outputs map:	Output 23-24

 Click [here](#) to access MAD online documentation

Apply
version: 13.0.2 build 4108





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Merging Audio Device

ASIO bridge
+ multi ASIO
+ WDM
+ ST 2022-7 *
+ VM *
+ NMOS IS04-IS05 *

* OPTIONAL

Comes with every
Anubis, Hapi or Horus

More info Thank you

Ⓜ Merging Audio Device

Mode: ☒ General ☐ NADAC

RAVENNA/AES67 Settings

Primary adapter: Realtek USB GbE Family Controller #2 (169.254.248.137)
Secondary adapter: None
Latency: ☒ 6/12/48 (AES67) note: set Horus/Hapi/Anubis latency accordingly
☐ 16/32/64

Network Configuration


Anubis_600284

Status

Driver: 48kHz
State: Running
Clock: IP: 169.254.246.35 Sample rate: 48kHz Domain: 0 Latency: 48

Channel Settings

44.1/48k 88.2/96k 176.4/192k 352.8/384k/DSD

Inputs:	24	24	12	6	3
Outputs:	24	24	12	6	3
Bridge channels:	16	16	8	4	2

ASIO Settings

Master ASIO host: Merging Audio Device
Sample rate: 48000
Buffer size: 96 [smp] @ 44.1kHz/48kHz
ASIO hosts: ☒ Mix safe mode

WDM Settings

☒ Enable WDM

Inputs:	2
Inputs map:	Input 23-24
Outputs:	2
Outputs map:	Output 23-24

 **MERGING**  Click [here](#) to access MAD online documentation

Apply
version: 13.0.2 build 4108



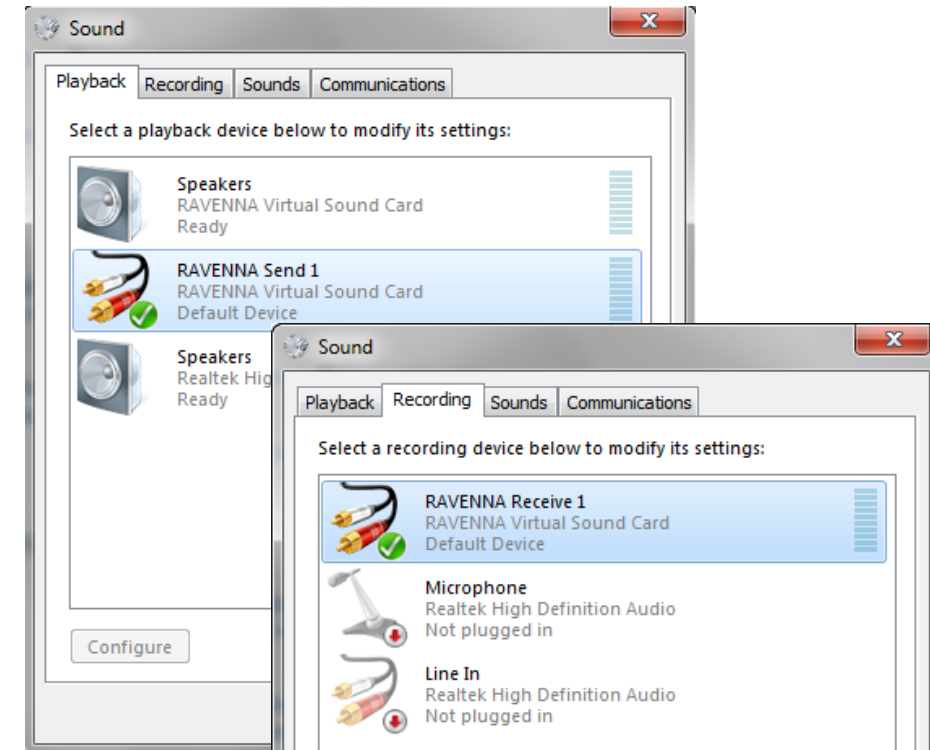
Merging Audio Device



RAVENNA / AES67 Virtual Sound Card (RVSC)

RVSC – RAVENNA Virtual Sound Card for Windows

- Operates under Windows 7 & 8 & 10
- Supports WDM driver model
- Typ. processing latency: ~ 10 ms
- PTP HW support, **requires selected Intel NICs**
- AES67 / ST 2110-compatible (multicast-only)
- **Free version** w/ 2 playback & 1 record WDM device
- **! No commercial support**
- Download at: www.ravenna-network.com/resources



Questions?



More answers...



RAVENNA / AES67 / SMPTE ST 2110 Resources:



www.ravenna-network.com/resources



RAVENNA 2020 Webinar Series

...to be continued this fall...

Watch out for announcements on Twitter, LinkedIn, ...

Subscribe to our RAVENNA newsletter: RAVENNA-network.com



You've made it!



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