



How RAVENNA came to life [and survived COVID-19]

MolP Pavilion @ AES New York 2022

Andreas Hildebrand, ALC NetworX



RAVENNA

AES67 & ST 2110 built-in

It's good
to see you
again!

RAVENNA

~~10 YEAR ANNIVERSARY~~
12 YEAR

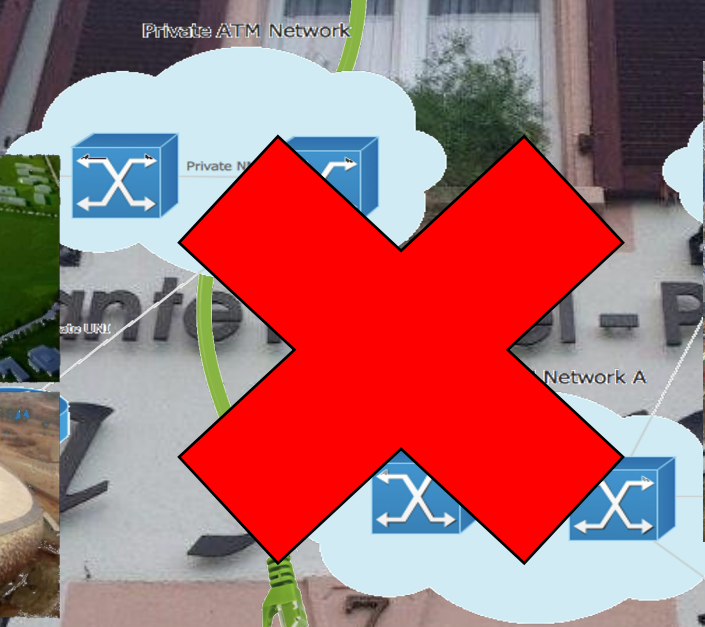


2007

The RAVENNA Timeline



The IP-based Real-Time Media Network



The IP-based Real-Time Media Network

2008

ALC NetworX* inaugurated in Munich



* Another Lawo Company

2008

ALC NetworX* inaugurated in Munich



Stefan



Ralf



Andreas



Marcel



Axel



Henry

* Another Lawo Company

The IP-based Real-Time Media Network



2008

R&D on a green meadow



2008

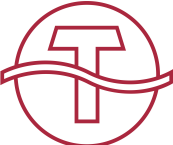
The „Conspiracy“ Session @ IBC



DirectOut
TECHNOLOGIES

GENELEC®



SCHOEPS
Mikrofone 

2009

The „Conspiracy“ Session @ IBC



The IP-based Real-Time Media Network



2009

Coming out @ IBC:

The IP-based Real-Time Media Network



2010

Coming out @ IBC:



RAVENNA
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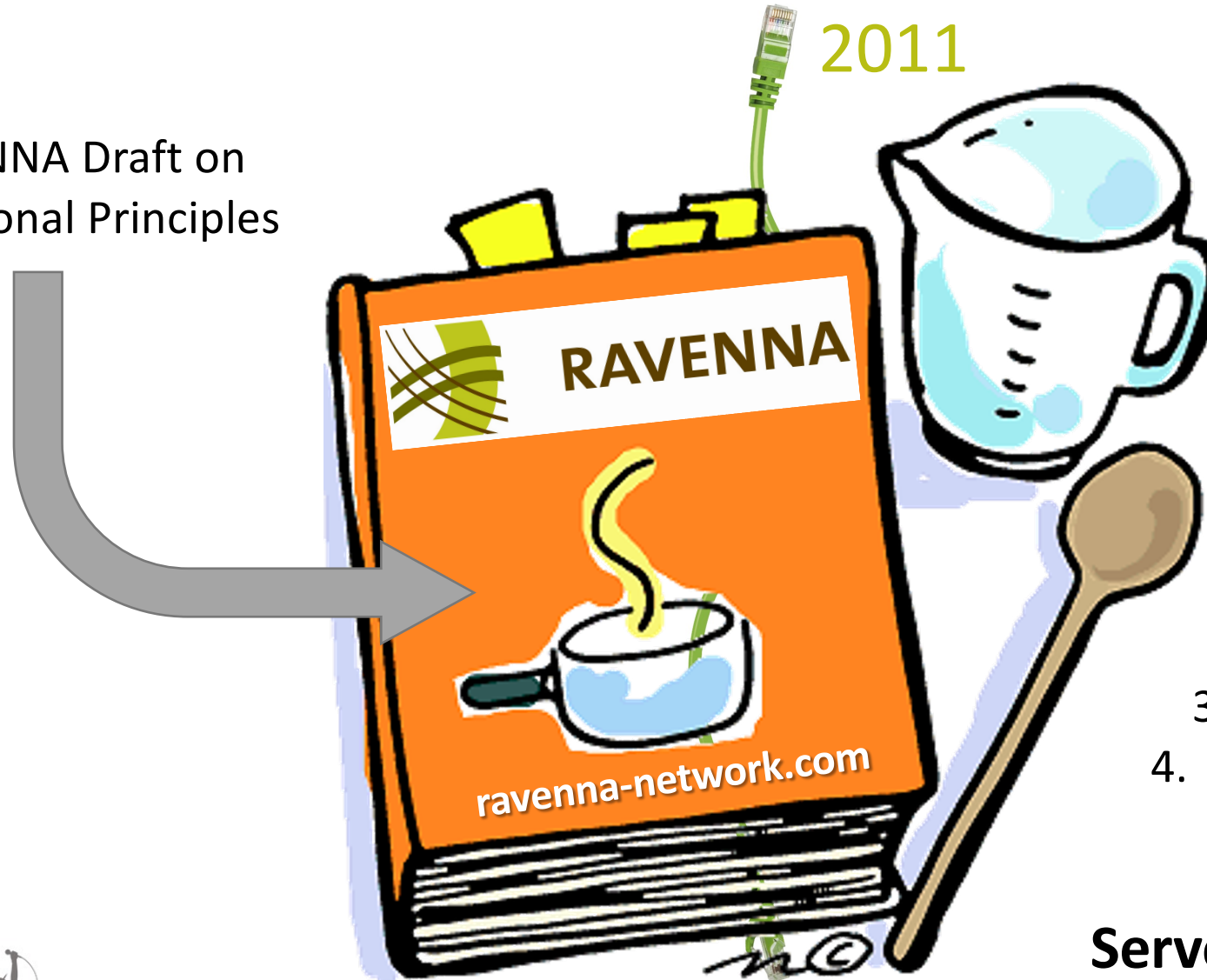




2010

RAVENNA published

RAVENNA Draft on
Operational Principles



2011

Ingredients:

20 ml PTPv2
500 g RTP
1 pkt multicast
1 pinch of Bonjour

Cooking order:

1. Stew PTP to order
2. Add RTP
3. Mingle with multicast
4. Add Bonjour on top

Serve hot and Enjoy!

2012

Telos Alliance joined RAVENNA



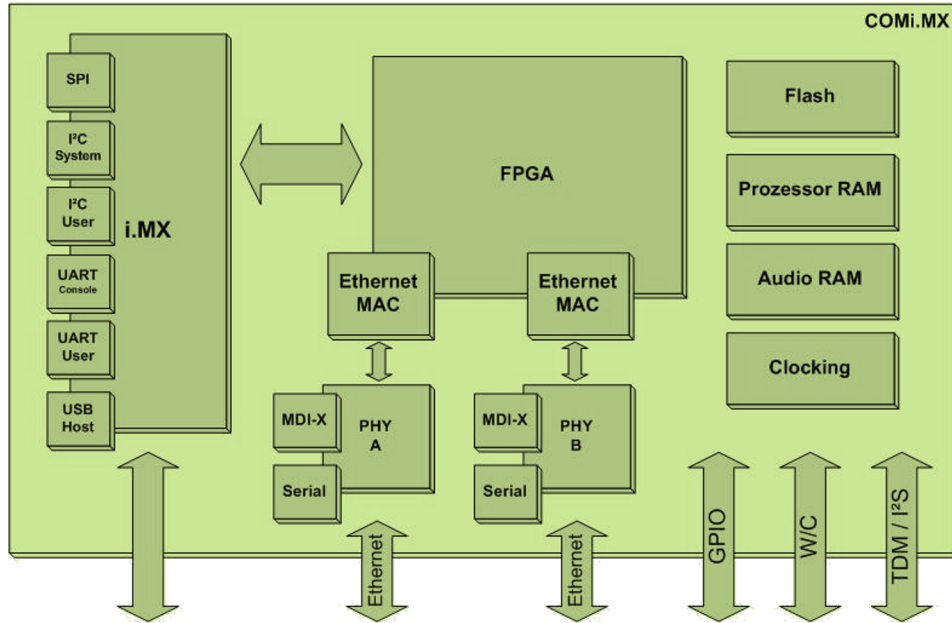
2012



Telos Alliance joined RAVENNA

- Axia xNodes RAVENNA-compliant
- Interoperability with legacy Livewire





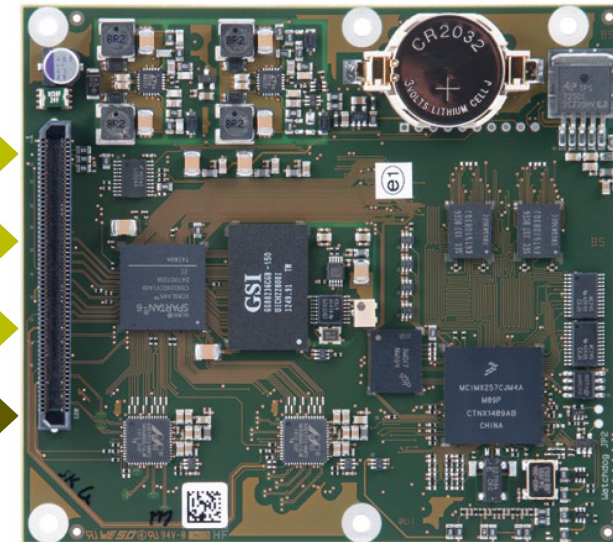
2012

ALC introduced 1st RAVENNA OEM SoM:

COMi.MX

High-Performance RAVENNA / AES67 SoM Board

- 64 ch MADI
- 64 ch TDM
- 8 ch I²S
- 2x GbE



STANDARDS AND INFORMATION DOCUMENTS

AES67-2013

2013

AES67 published



**AES standard for
audio applications of networks -
High-performance streaming
audio-over-IP interoperability**

Users of this standard are encouraged to determine if they are using the latest printing incorporating all current amendments and editorial corrections. Information on the latest status, edition, and printing of a standard can be found at:
<http://www.aes.org/standards>

AUDIO ENGINEERING SOCIETY, INC.
60 East 42nd Street, New York, New York 10165, US.



STANDARDS AND INFORMATION DOCUMENTS

AES67-2013

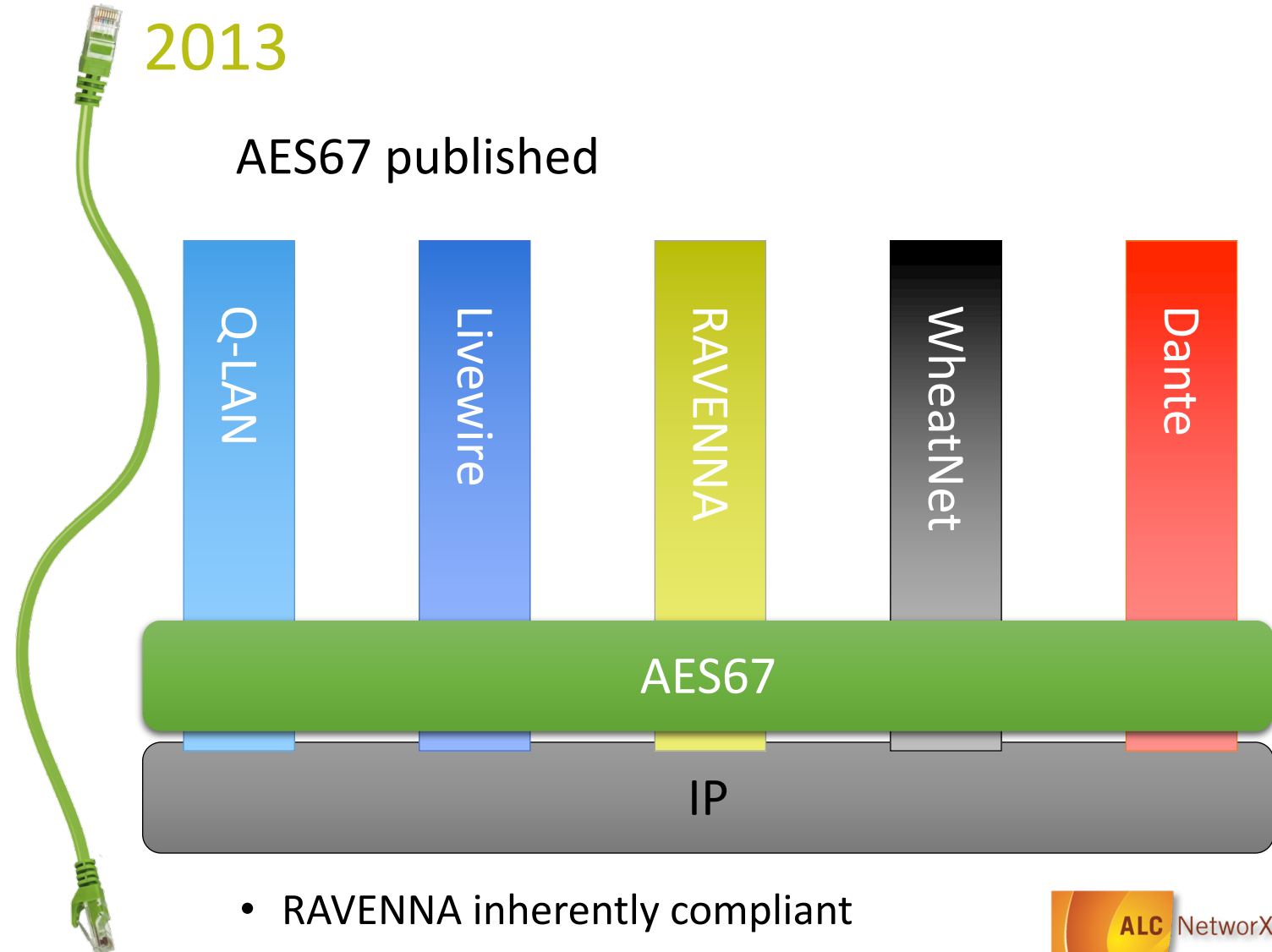


STANDARDS

**AES standard for
audio applications of networks -
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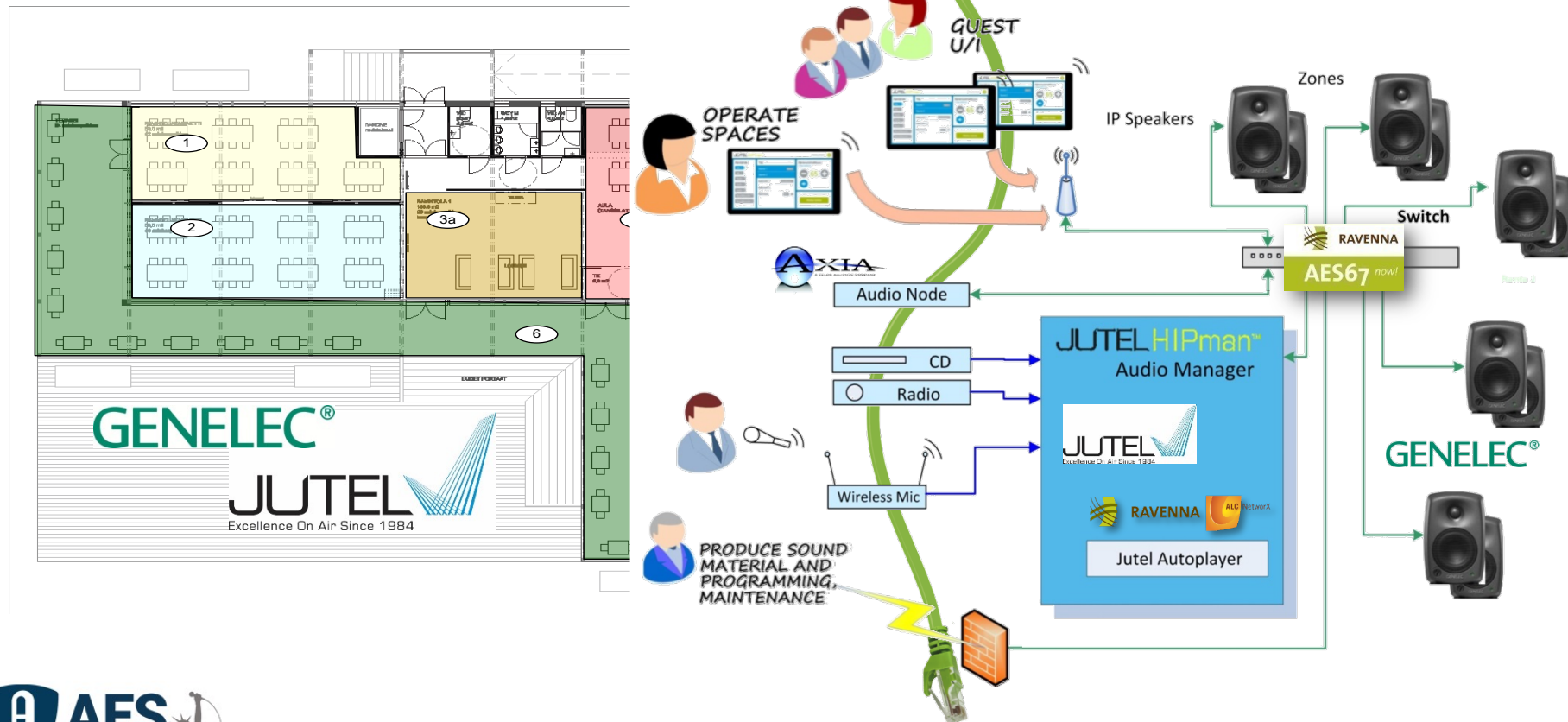
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2013

Nallikari restaurant complex, Oulu, Finland



1. Ravintolakabinetti 1
2. Ravintolakabinetti 2
- 3a. Ravintola lounge
 - 3b. Aularavintola
 - 3c. Ravintolasali
- 4a. Saunakabinetti 1
 - 4b. Sauna 1
- 5a. Saunakabinetti 2
 - 5b. Sauna 2
6. Terassi
7. Keittiö ja henkilökunta

Lisäksi orkesteri / lavallaitteet

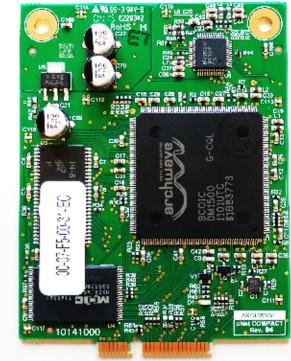
KILTA/NOIA OULU	KOTITIEHTÄ TOMMI/IRGO	YHDESKÄSITÄÄN ARKKITEHTIIN KOKO KOKO
PÄÄTÖSALUEKIRJE	PÄÄTÖSALUE LUOVUUSPERUSTUS	JULKAISU MÄÄRÄYKSIKÄN 1:100
KÄSITTEELLINEN NIMÄ JA OTO NALLIKARIN RANTARAVINTOLA		
ARKKITEHTI M2 OY / M2 ARCHITECTS LTD Keskustie 10, 00100 Helsinki Puhelin: +358 9 252 2000, faksi: +358 9 252 2001 E-mail: info@m2.fi		TYÖN NUMERO PÄÄTÖSALUEKIRJE
13.11.2012		
ARK 144		
102		



2014

More OEM solutions:

ARCHWAVE
 audio networking & streaming technologies



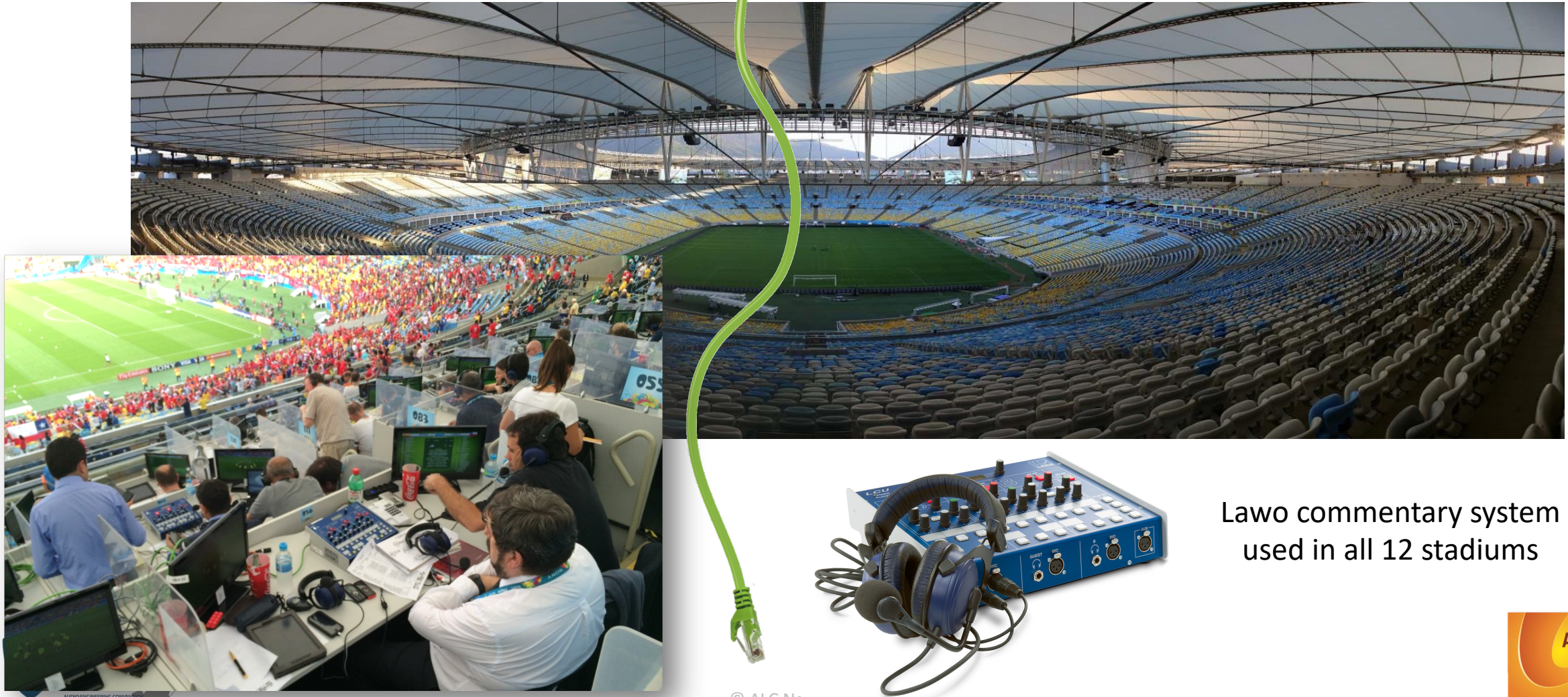
2014

More OEM solutions:



The IP-based Real-Time Media Network

2014 FIFA Soccer World Cup, Brasil

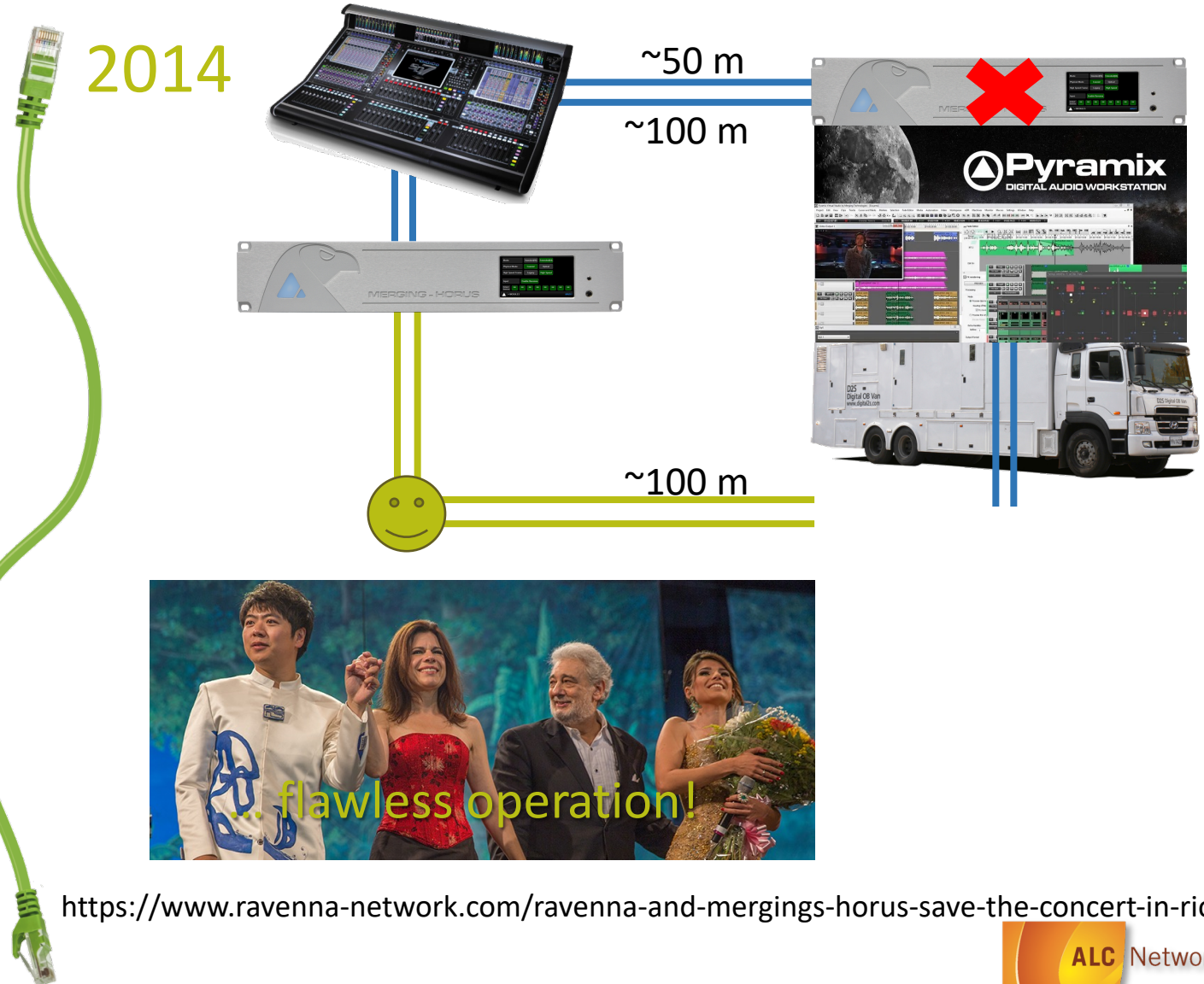


Lawo commentary system
used in all 12 stadiums

RAVENNA saved the concert!

- FIFA World Cup Concert w/ Plácido Domingo, Lang Lang, Ana María Martínez & Brazilian Symphony Orchestra to be broadcasted delayed-live to more than 50 countries.
- Plan: dual 96 kHz MADI-over-Coax to Horus in OB van ~50 m away from stage.
- When recording engineer arrived late on location, OB van had been moved by another 50 m due to Olympics 2016 (!) preparations.
- 100 m out of scope for standard MADI/Coax, no suitable cable available on short notice.
- Back-up plan: use 2nd Horus and dual CAT6e cables to run RAVENNA.
- Upon signal test: silence on MADI, but PTP lock & signal on RAVENNA and...

2014



<https://www.ravenna-network.com/ravenna-and-mergings-horus-save-the-concert-in-rio/>

1st Live Broadcast Production:



1st Live Broadcast Production:



2015

Eurovision Song Contest, Vienna



- 6600 audio signals

2015

1st Live Installation:

*40th Anniversary of Orchestre National de Lille, France
 on Bastille Day (July 17th)*



- 10 Neumann DMI-8
 (78 digital mics)



- 2 Lawo MC²56



- 1 Merging Pyramix



2015

1st DSD/DXD Recording:

3L, Norway



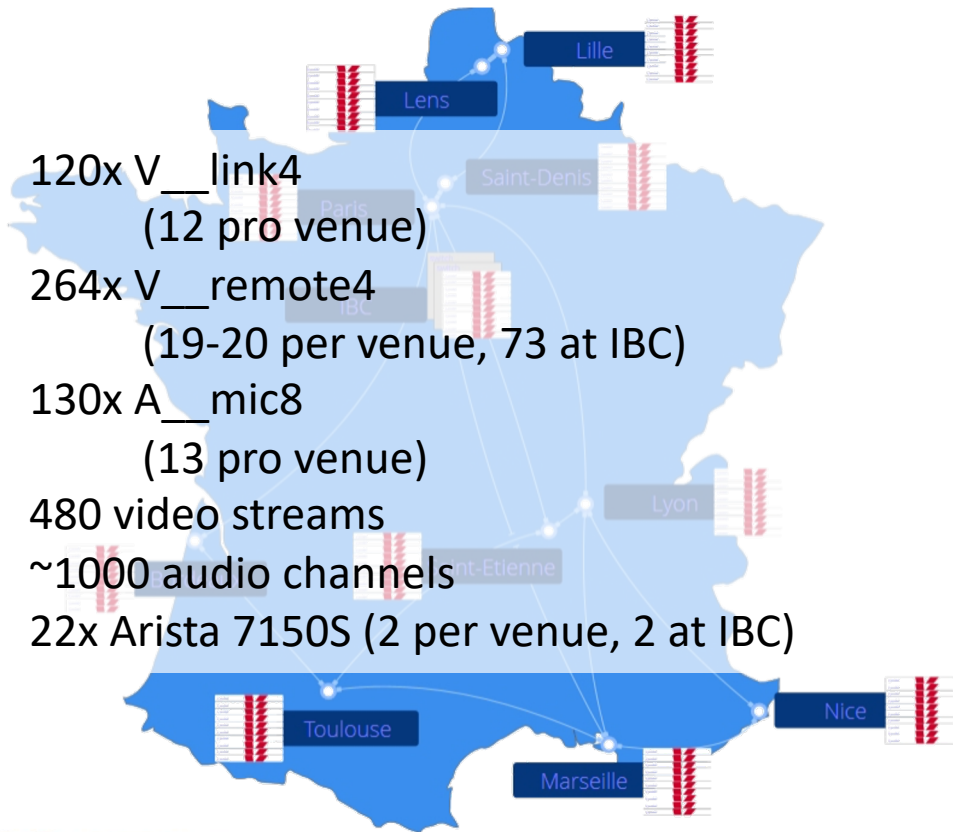
FIFA European Soccer Championship
France



FIFA European Soccer Championship France

2016

120x V__link4
 (12 pro venue)
 264x V__remote4
 (19-20 per venue, 73 at IBC)
 130x A__mic8
 (13 pro venue)
 480 video streams
 ~1000 audio channels
 22x Arista 7150S (2 per venue, 2 at IBC)

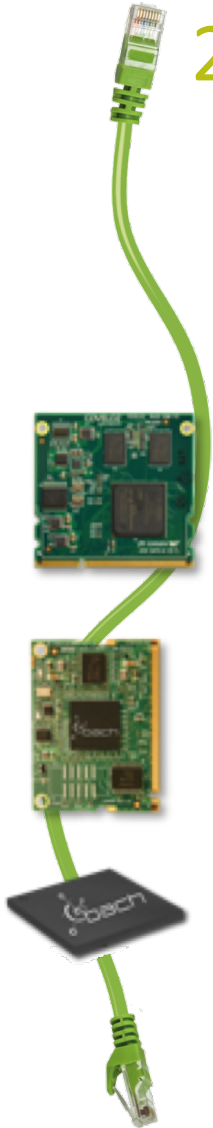




≤ 512 CHANNELS
 ≤128 STREAMS
 3 x GigE

64 CHANNELS
 NO H/W CHANGES

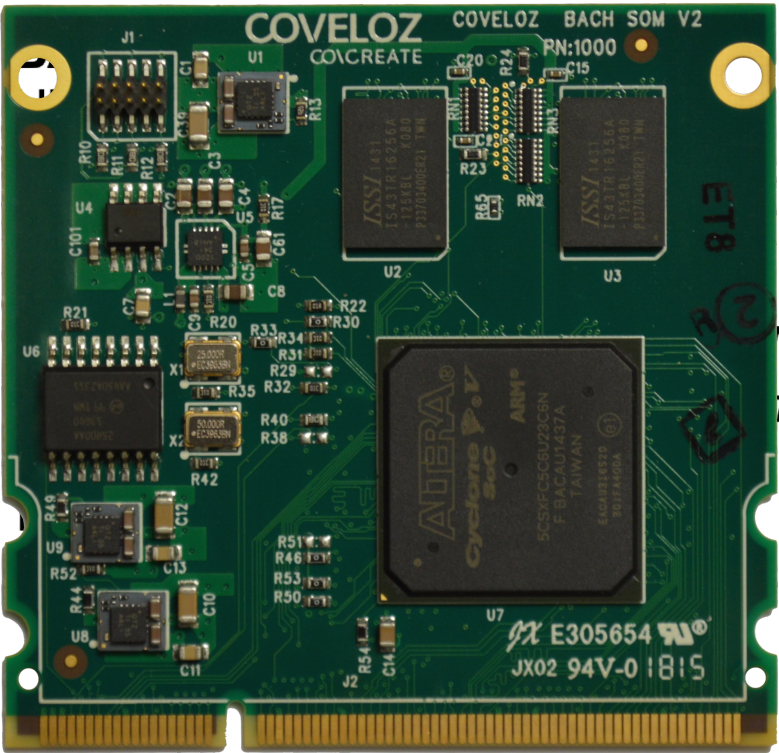
16 CHANNELS
 8 STREAMS



2016

Even more OEM solutions:

- CoveloZ Bach SoM



... alternative
 compliance today!

2017

SMPTE ST 2110 published

SMPTE OV 2110-0:2018

SMPTE OVERVIEW DOCUMENT

Professional Media over
Managed IP Networks

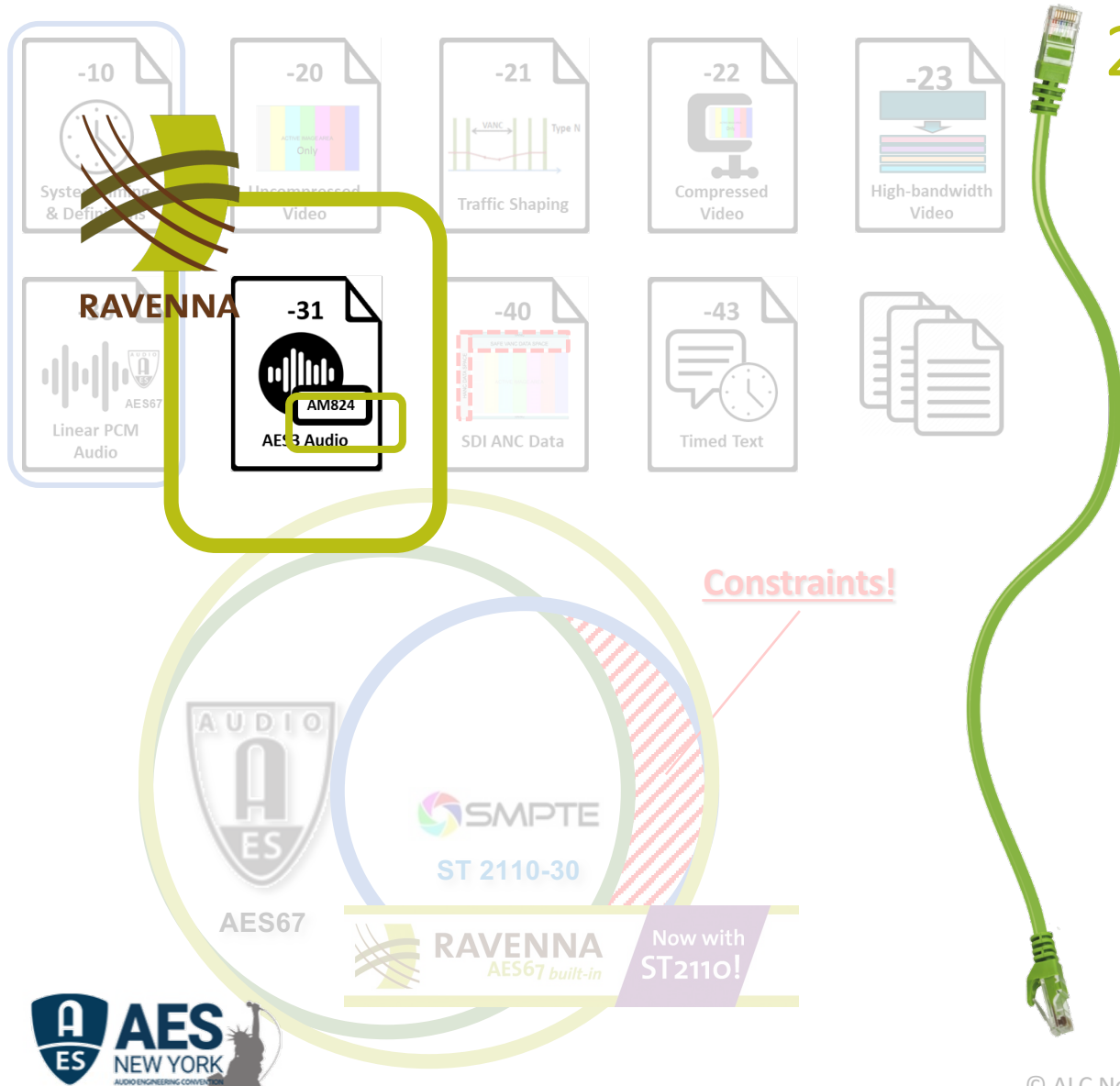
Roadmap for the 2110 Document Suite



Document Roadmap

The SMPTE 2110 suite of documents defines an extensible system of RTP-based essence streams referenced to a common reference clock, in a manner which specifies their timing relationships. This informative "roadmap" describes the documents in the SMPTE 2110 suite.

The diagram of Figure 1 illustrates a simplified 'essence mapping data flow' roadmap for the RTP-based essence streams as defined by the document suite.



2017

SMPTE ST 2110 published

SMPTE OV 2110-0:2018

SMPTE OVERVIEW DOCUMENT

Professional Media over
Managed IP Networks

Roadmap for the 2110 Document Suite



Document Roadmap

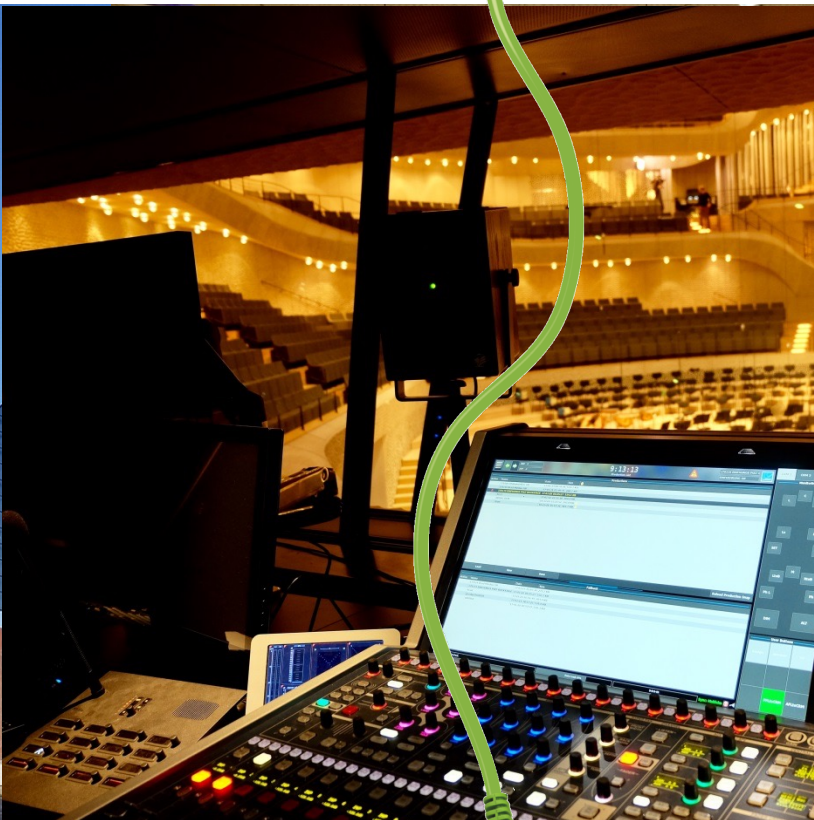
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2017

AV Award for Elbphilharmonie, Hamburg

Common infrastructure for live mixing and broadcast production
1 mc²66 + 5 mc²36 consoles, DALLIS I/O + Nova73 router
Common access to all sources w/ integrated access rights management
Uplink to OB van



NDR

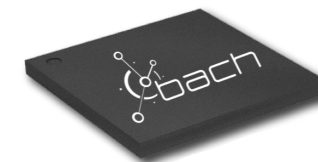
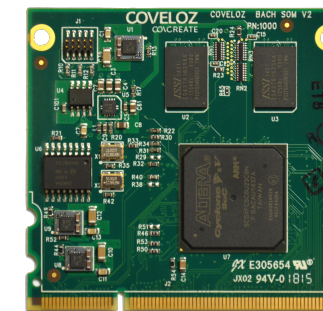
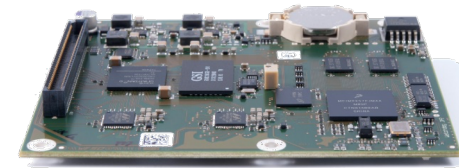
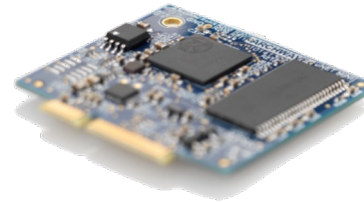
RAVENNA massively used during
PyeongChang Winter Olympics

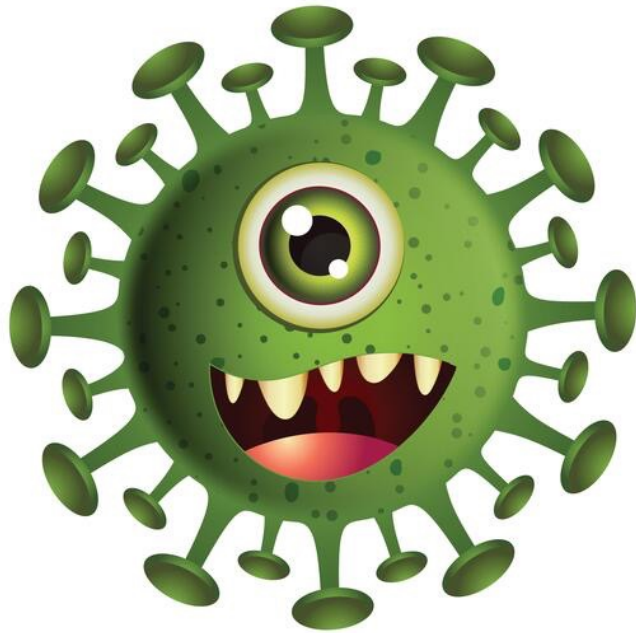
2018



10 different RAVENNA (OEM) modules
 from 6 different RAVENNA partners

2018





2019 RAVENNA 10th Anniversary!

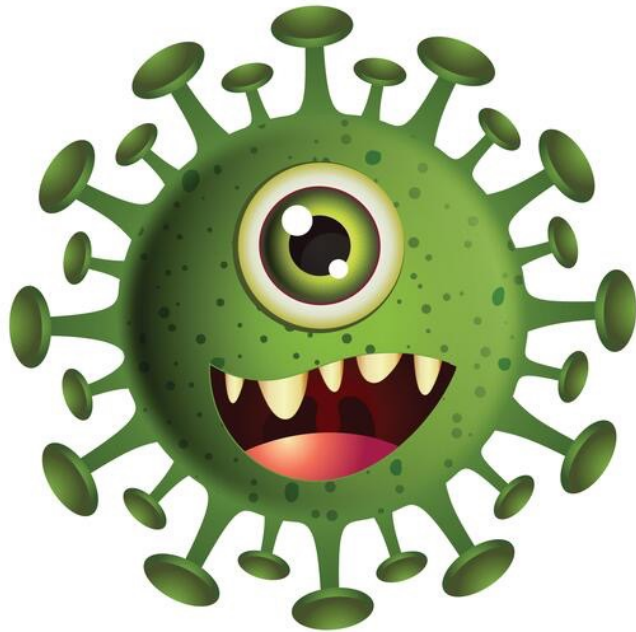


CELEBRATING **10 YEARS**

RAVENNA

AES67 & ST 2110 built-in





2020 RAVENNA received a TechEmmy Award!



EMMY[®]
AWARDS

“You are being honored for your work on
***Development of Synchronized Multi-Channel Uncompressed
Audio Transport Over IP Networks*** technology that showed
excellence in engineering creativity...”

TA THE TELOS ALLIANCE[®]

Audinate[®]

QSC[™]

Wheatstone







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2020

New RAVENNA Partners since IBC 2019:



Micromedia (2019, after IBC)

Logitek (2019, after IBC)

Ally8 (2019)

Weigl Control (2020)

EonArt (2020)

Nixer (2021)

Dream (2021)

Tieline (2021)

Holoplot (2021)

H7R (joined 2016, publ

RME (IBC 2022)

Glen sound (IBC 2022)



50+ RAVENNA Partners (& Supporters):





RAVENNA

AES67 & ST 2110 built-in

**Thank you for
your continued
commitment!**

Stay Safe!

It's good
to see you
again!

Contact information:

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ALC NetworX GmbH

ravenna@alcnetworx.de

RAVENNA

~~10 YEAR ANNIVERSARY~~
12 YEAR