RAVENNA & AES67 & ST2110

- Andreas Hildebrand –

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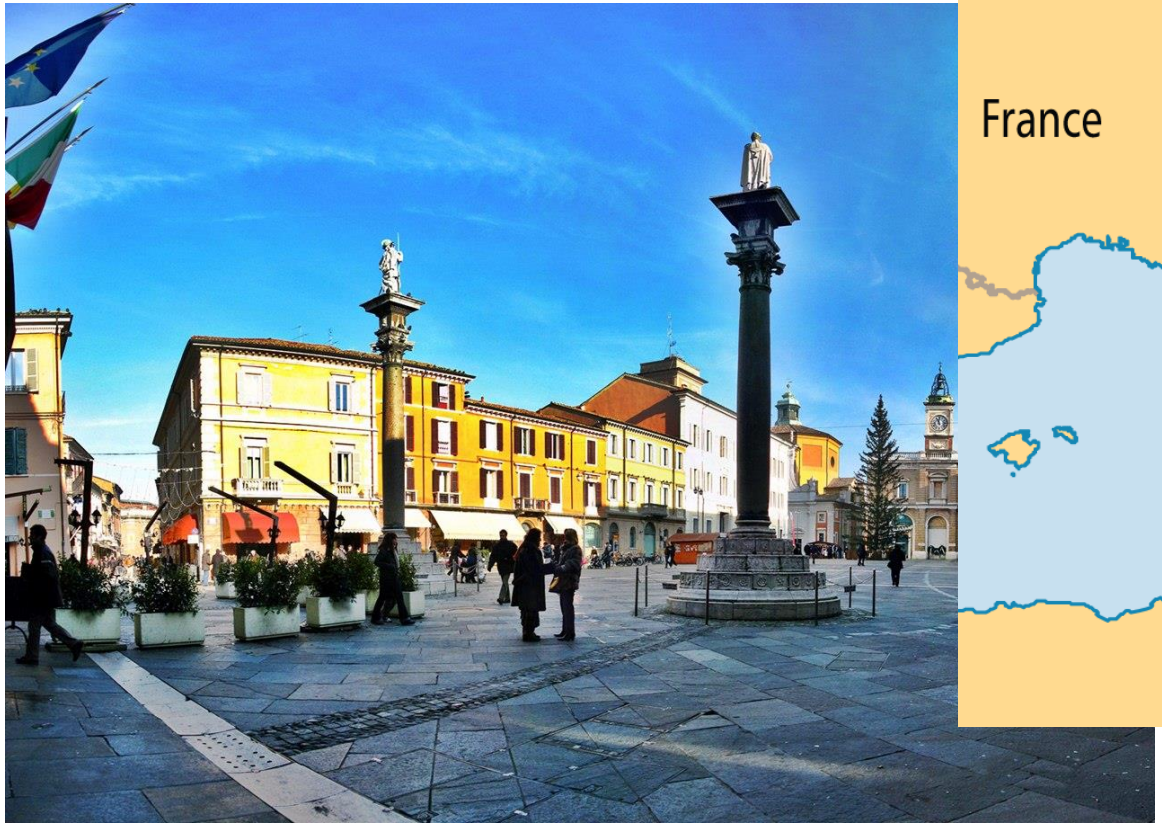
What is RAVENNA?



RAVENNA The IP-based Real-Time Media Network

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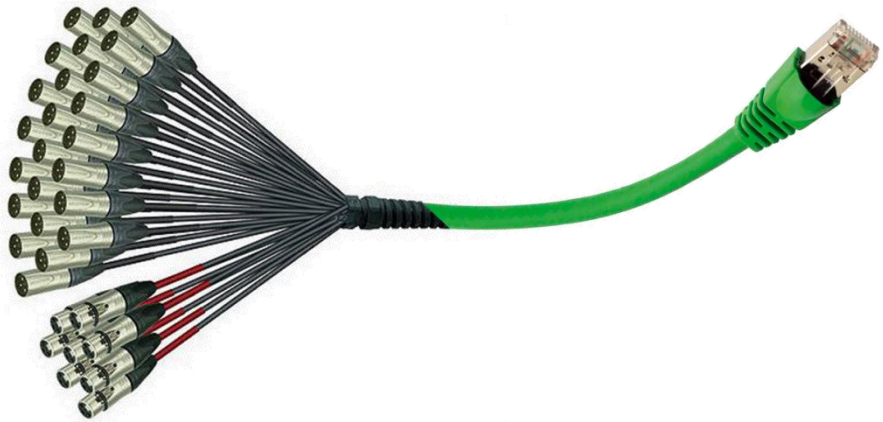


What is RAVENNA?

RAVENNA

The IP-based Real-Time Media Network

Real-time **A**udio & **V**ideo **E**nhanced

Next-Generation **N**etwork **A**rchitecture

Why RAVENNA?

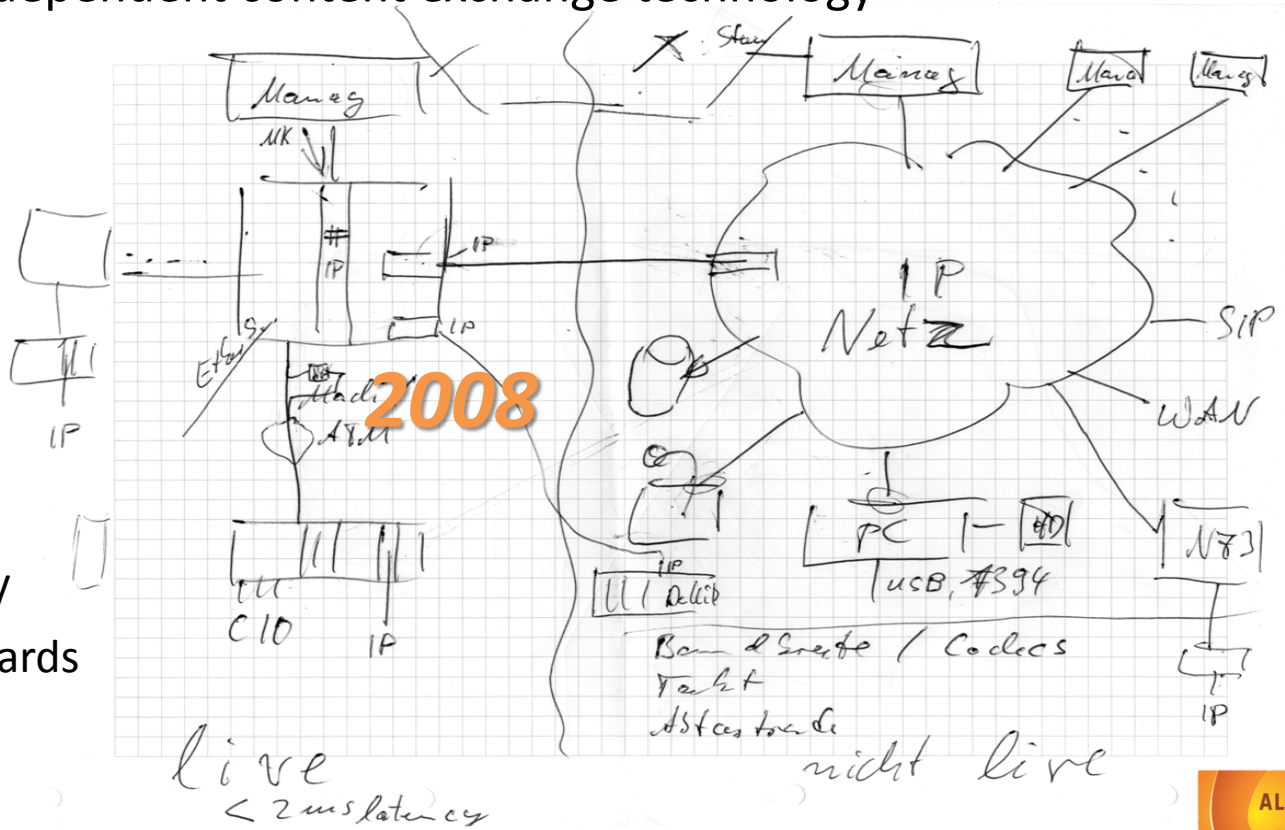
RAVENNA

The IP-based Real-Time Media Network

Vision: a platform-independent content exchange technology

Requirements:

- scalable
- fast
- shareable
- flexible
- reliable
- routable
- non-proprietary
- based on standards



Layer 1

Layer 2

AVB

Audio over IP

EtherSound

ACIP

Confusion

Layer 3

TCP

Livewire

Audio over Ethernet

Market Evaluation

A-Net

Technology Assessment

unicast

RTP

AES50

UDP

MADI

multicast

CobraNet

Media streaming

Dante

⇨ IP!

Why IP-based Networking?

- General advantages of networking: Reliability, flexibility, versatility, accessibility, scalability, cost advantage, maintenance efficiency, …
- Availability: IP-capable network equipment and infrastructure readily available and widely deployed
- Based on standards: IP standard protocols (the “internet protocols”) are widely supported (e.g. RTP/RTCP, RTSP, IGMP, SDP, DHCP, DNS etc.)
- Routing capability: content can be routed across campus networks and WAN connections without technology change
- Convergence: PCs can participate on the network without dedicated hardware
- Future-proof: IP-based services are growing into all areas of communication

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Take or Make?

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multicast

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⇨ IP!

Existing Audio-over-IP solutions / technologies / initiatives:

Technology	Purveyor	Date introduced	Technical requirements matched?	Open technology?
Livewire	Telos/Axia	2003	😐	😐
Wheatnet-IP	Wheatstone	2005	☹	☹
Dante	Audinate	2006	☺	☹
N/ACIP	EBU	2007	☹	☺
AVB	IEEE, AVnu	2005	☺😐☹	☺

Layer 1

ACIP

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Media streaming

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Layer 3

MAKE!

Take or Make?

⇨ IP!

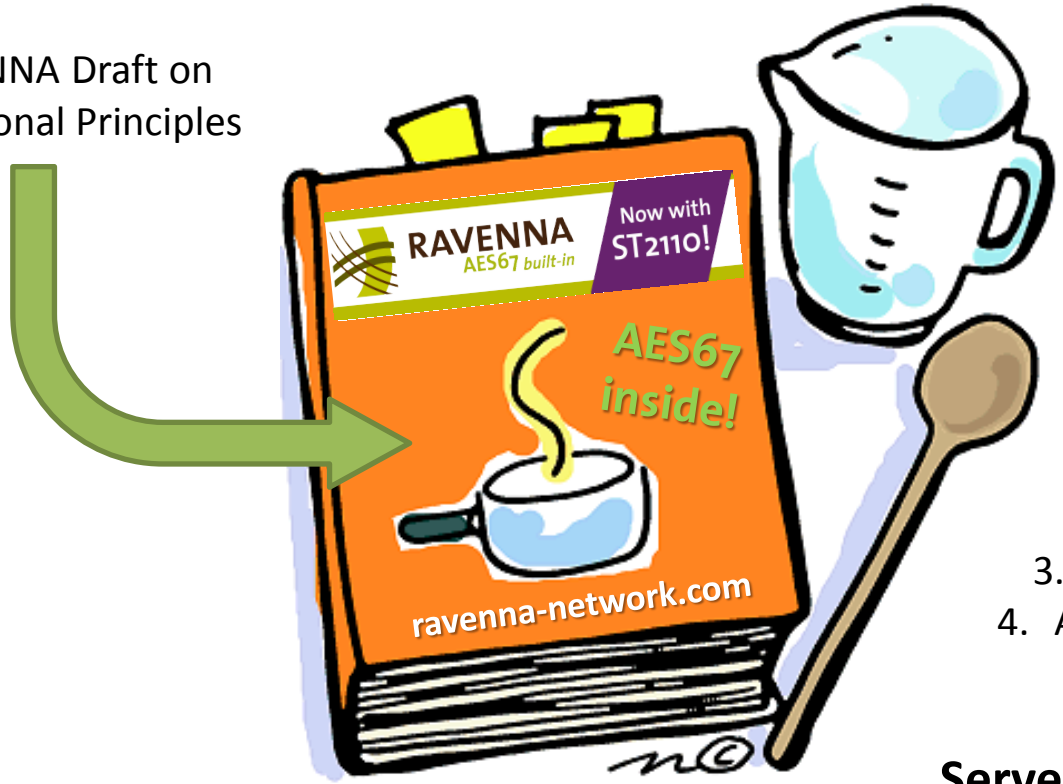
An "Open Technology" platform:

- Based on **technology** publicly **available**
  - ⇨ *No proprietary "black box" design*
- Utilizes **standard protocols**
  - ⇨ *Proven technology, widely supported*
- Designed to work on **existing networks**
  - ⇨ *No new network equipment required*
- **No** proprietary **licensing** policy
  - ⇨ No cost per channel, suits all performance needs

- Draft on operating principles **published** since June 10th, 2011

What is RAVENNA?

RAVENNA Draft on Operational Principles



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!

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- Draft on operating principles **published** since June 10th, 2011
  - ⇨ *Anybody can implement / support RAVENNA technology*
- **Supported** by renowned companies from the ProAudio industry
  - ⇨ *Broad market acceptance*

RAVENNA Partners (& AES67 Supporters):

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  - ⇨ *Broad market acceptance*
- Active participation in AES X192 standardization TG
  - ⇨ ***RAVENNA supports AES67 standard***

AES67

AES67-2018 Standard for Audio Applications of Networks:

High-performance Streaming Audio-over-IP Interoperability

published on September, 11th, 2013

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

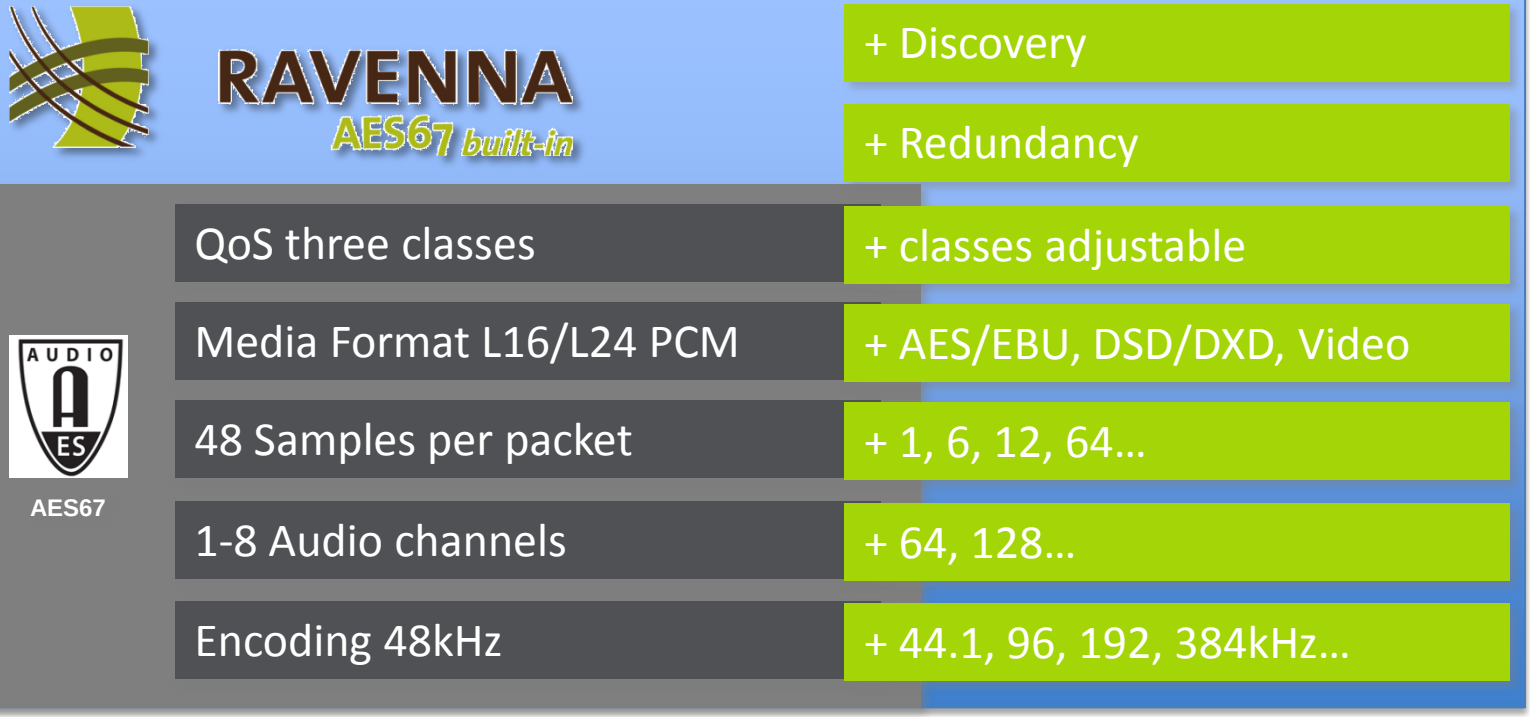
AES67

RAVENNA

AES67

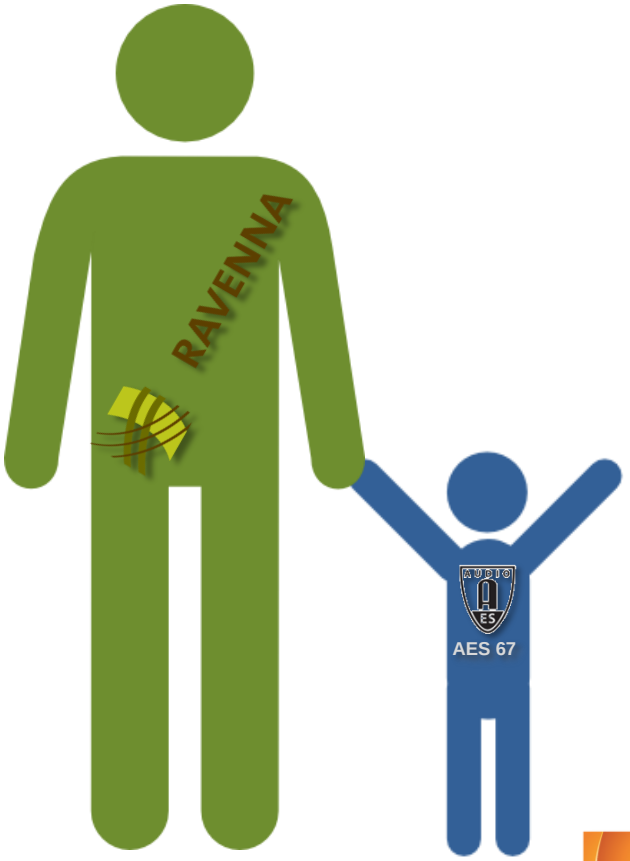
RAVENNA

AES67	RAVENNA
	+ Discovery
	+ Redundancy
QoS three classes	+ classes adjustable
Media Format L16/L24 PCM	+ AES/EBU, DSD/DXD, Video
48 Samples per packet	+ 1, 6, 12, 64…
1-8 Audio channels	+ 64, 128…
Encoding 48kHz	+ 44.1, 96, 192, 384kHz…



RAVENNA

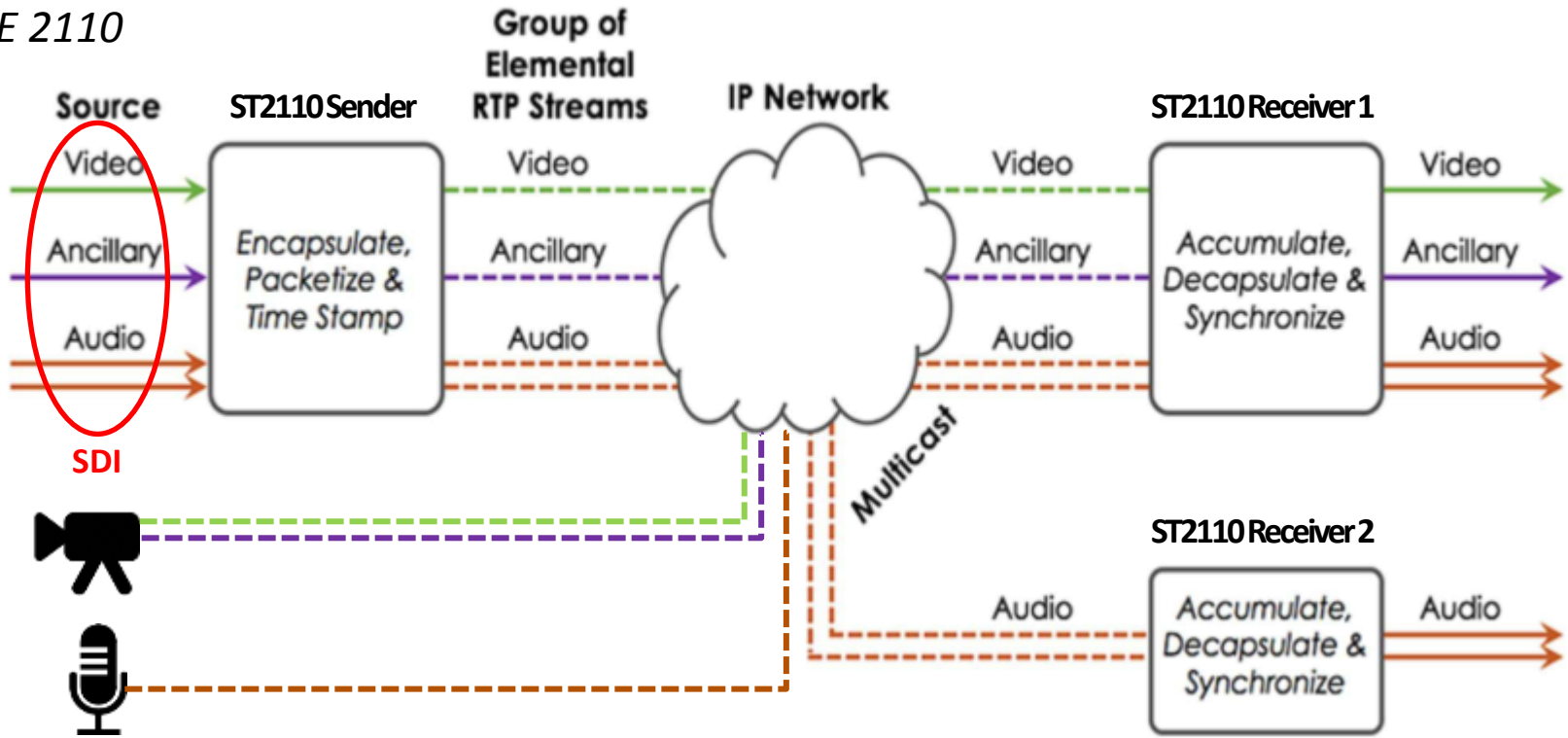
AES67 *built-in*



ST2110 - Professional Media over Managed IP Networks

- Defines transport and synchronization of elementary essence streams (video, audio, ancillary data)
- Primarily targeting at live production applications
- References / builds on existing standards:
  - Timing: SMPTE 2059 (SMPTE PTP Profile)
  - Video: RFC 4175 (RTP Payload Format for Uncompressed Video)
  - Audio: AES67 & RAVENNA
  - Ancillary data: RFC 8331 (RTP Payload for SMPTE ST 291-1 Ancillary Data)

SMPTE 2110



SMPTE 2110 - Professional Media over Managed IP Networks

Document structure (audio):

- 2110-**10**: System Timing & Definitions
  - defines transport layer and synchronization (SMPTE2059, clocks, RTP, SDP etc.)
- 2110-**30**: PCM Digital Audio
  - defines payload format for linear audio (AES67, constraints)
- 2110-**31**: AES3 Transparent Transport
  - defines payload format for non-linear audio (RAVENNA AM824)

SMPTE 2110 - Professional Media over Managed IP Networks

Document structure (linear PCM audio):

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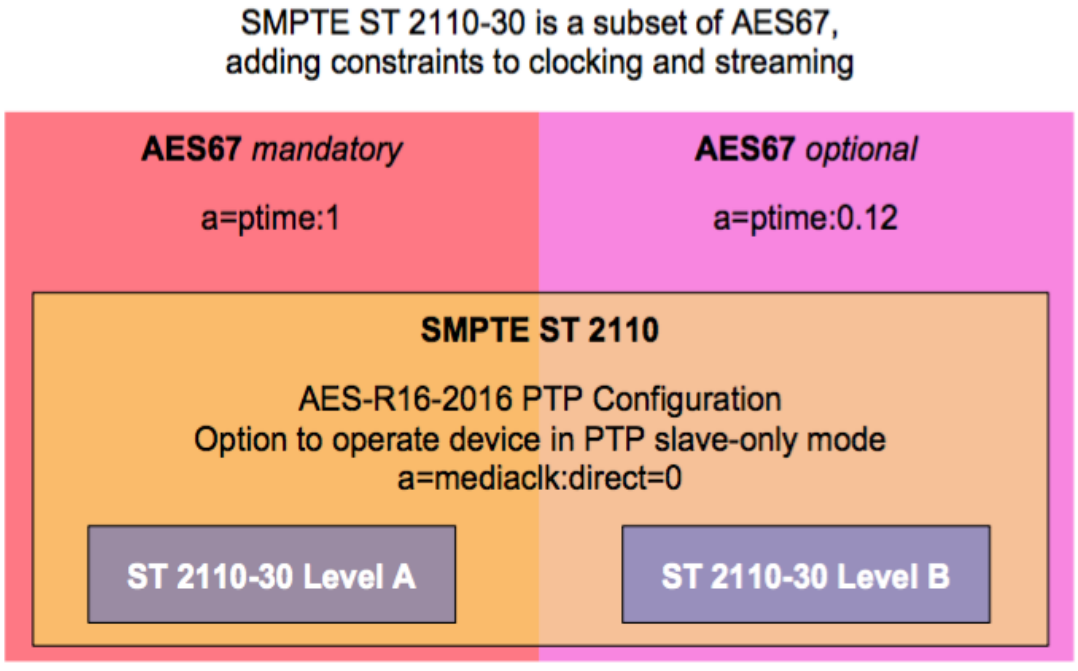
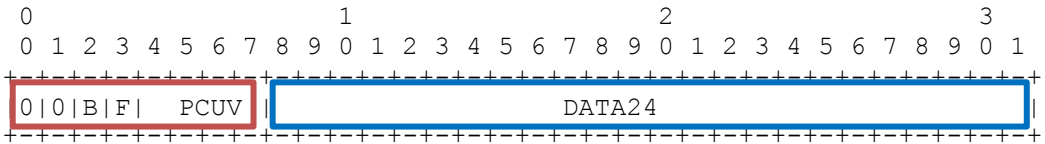
SMPTE 2110 - Professional Media over Managed IP Networks



SMPTE 2110 - Professional Media over Managed IP Networks

2110-31 – transparent transport of AES3 audio data

- Can transport any format which can be encapsulated in AES3
  - L24 PCM w/ AES3 subframe meta data (PCUV bits)
  - non-PCM audio and data formats as defined by SMPTE ST 337 / 338 (i.e. Dolby®E etc.)
- Builds on RAVENNA's AM824 (IEC 61883-6) payload definition:
  - retains AES67 definitions for synchronization and RTP usage
  - uses 3 bytes for PCM24 + 1 byte for AES3 meta data



  - RTP payload format signaled in SDP:

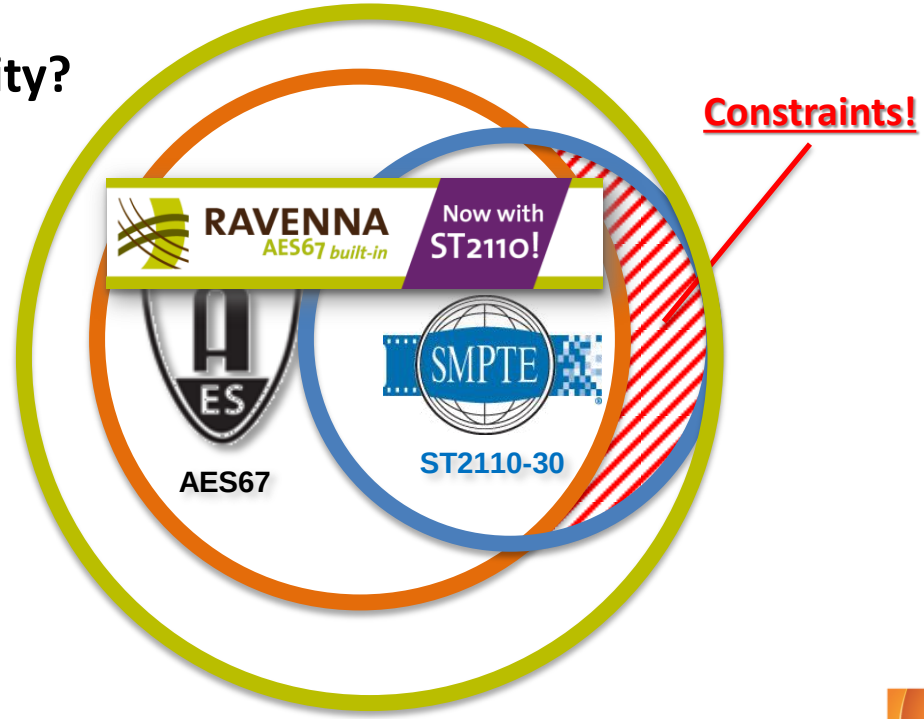
```
a=rtpmap:<pt> AM824/48000/<nchan>
```

  - retains all other SDP parms

SMPTE 2110 - Professional Media over Managed IP Networks

AES67 / ST2110 audio compatibility?

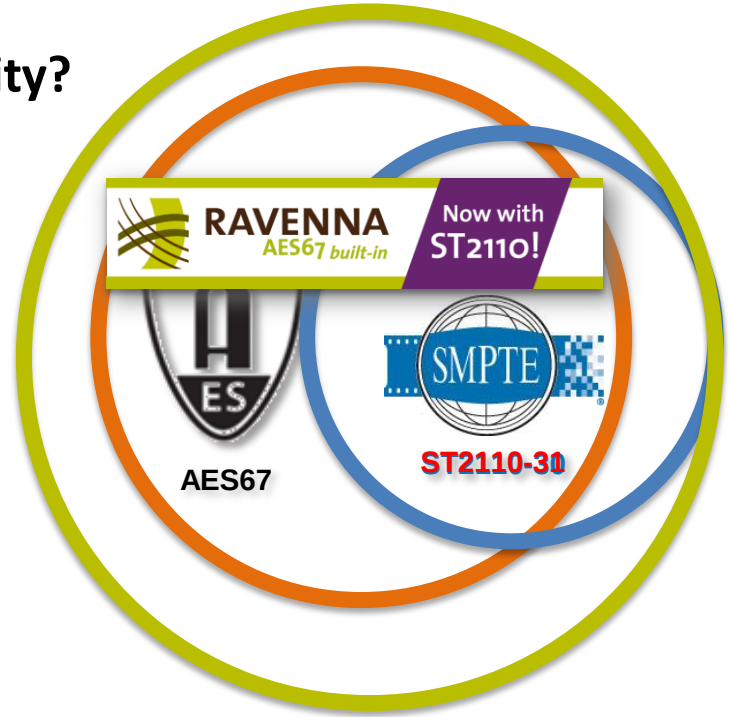
24-bit PCM audio



SMPTE 2110 - Professional Media over Managed IP Networks

AES67 / ST2110 audio compatibility?

AES3 audio



Thank you for your attention!

RAVENNA pod
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