Who is AIMS and What is ST 2110?

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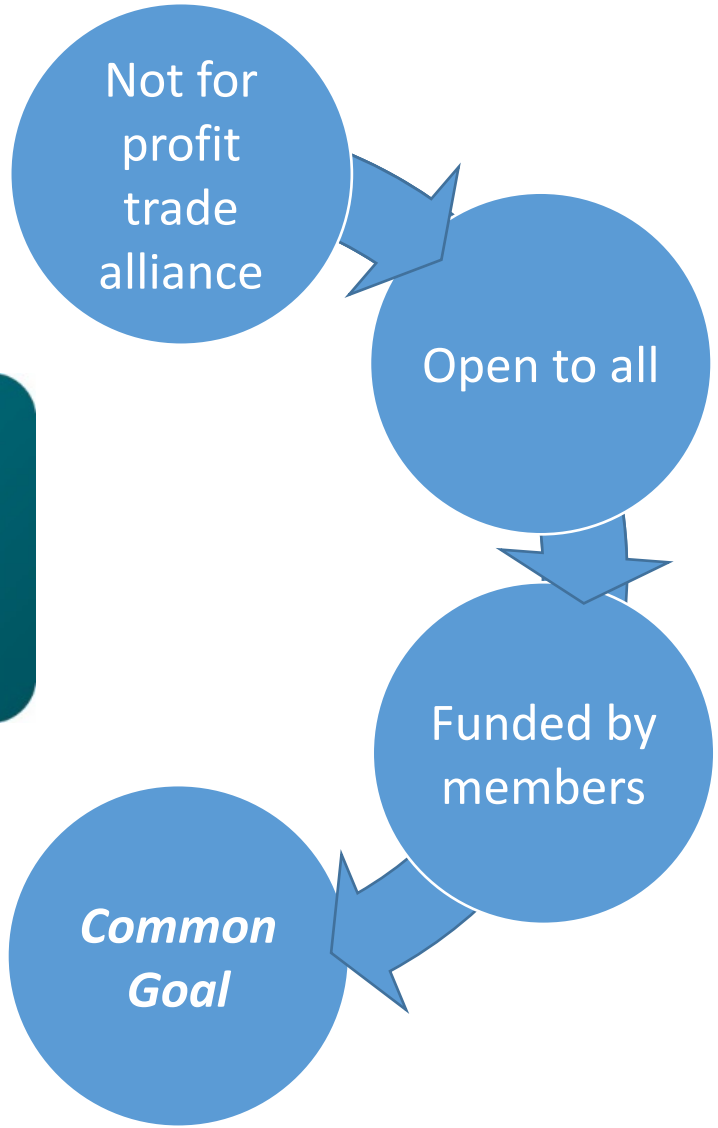
What is AIMS?

AIMS
Alliance for IP Media Solutions



Members List

98 Members

AIMS Alliance for IP Media Solutions

Building on a Strong Foundation for ***Market Adoption***

VSF
VIDEO SERVICES FORUM
AMWA
Technical Recommendations

SMPTE
EBU
AUDIO ES
Standards

SANDBOX+ LIVE IP
Implementation

JT-NM
SMPTE EBU VSF
JT-NM TESTED SMPTE ST 2110
Reference Architecture

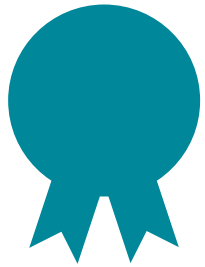
AIMS
Alliance for IP Media Solutions
Market Adoption

One common goal… Distinct roles… **Powerful Partnership**

Open Standard?

Open [oh-puh n]

Anyone can build any product from the standard



Standard [stan-derd]

An engineer can build a “correct” product (conforms to the standard)

The Nice Things Open Standards Bring Us

Dilemma

- Closed proprietary technologies
- Open standard approach

Open standards

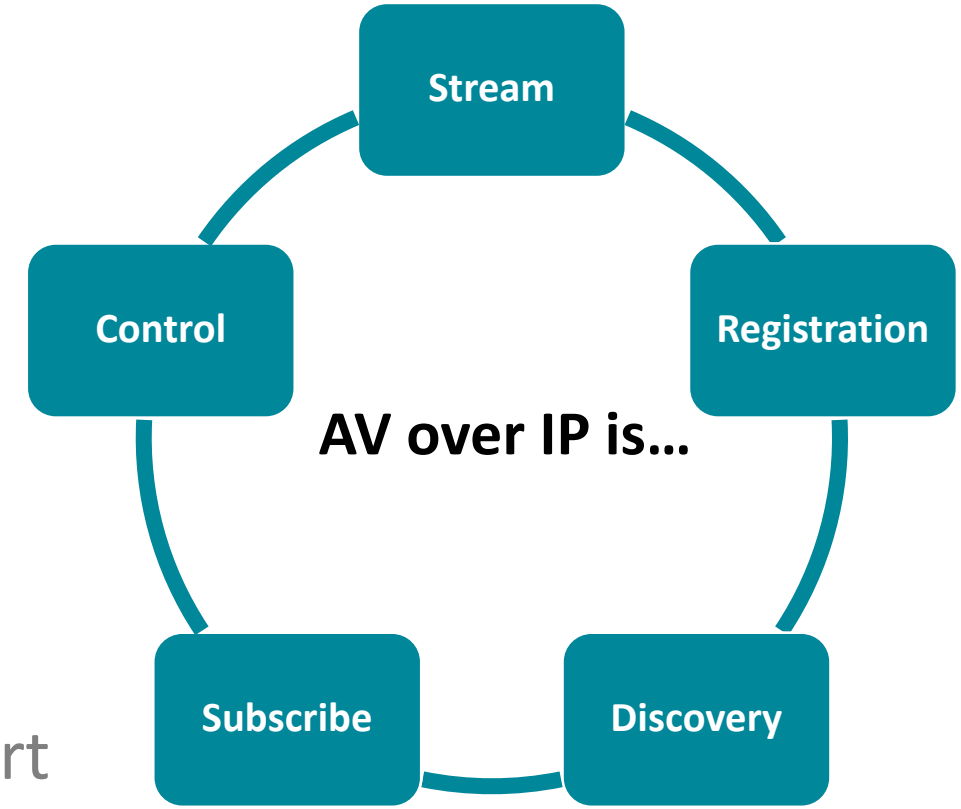
- Addresses current needs
- Future advancements

Scalability

- Agility and Flexibility
- Add capabilities without workflow rebuild
- Best-of-breed

What is Meant by AV over IP?

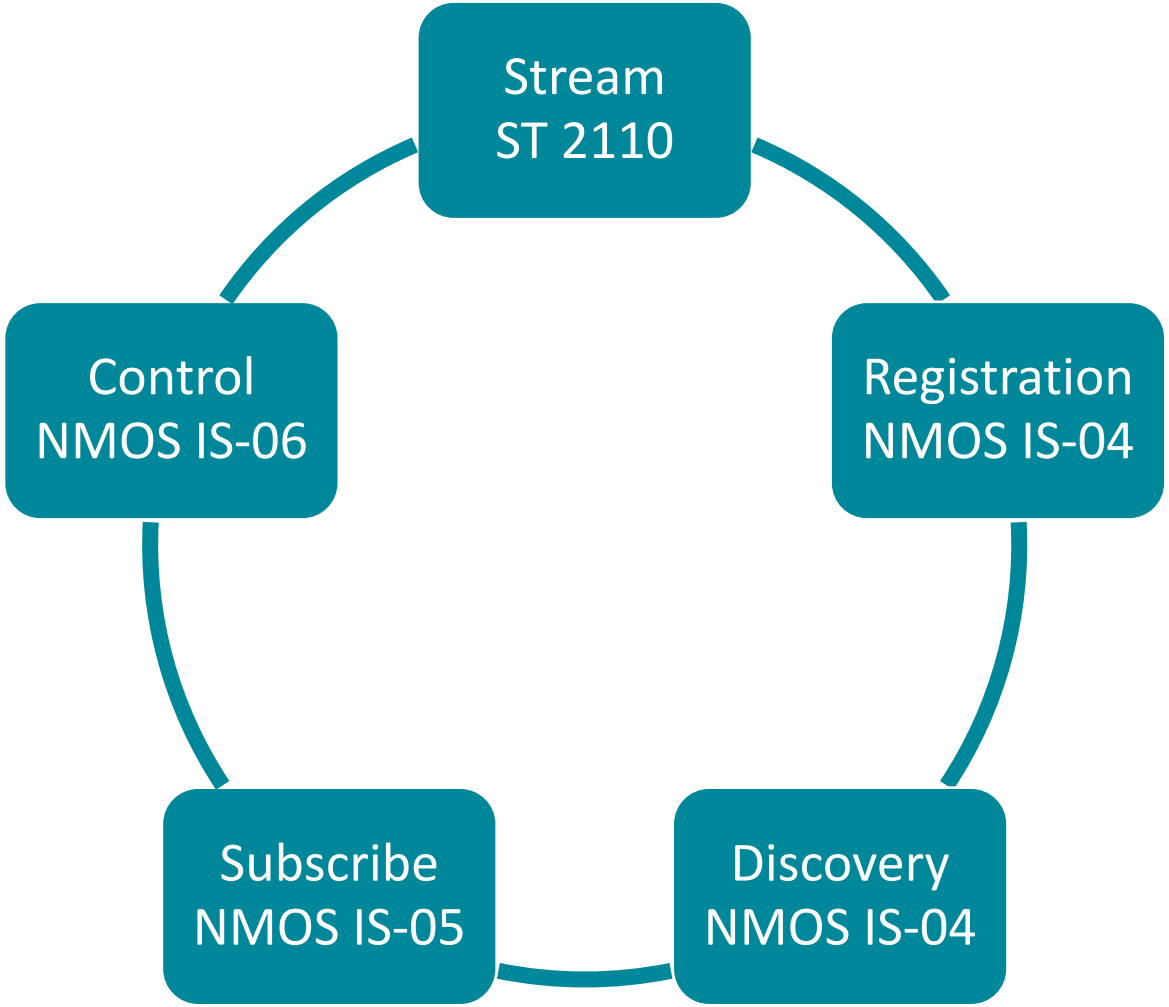
- Move streams (audio, video, ancillary, control) through an IP network
- Synchronized (A <-> V and also different sources)
- Low-Latency (<1 Frame)
- Publish, Discover, Subscribe, Stream and Control



Could be used in place of HDMI or DisplayPort

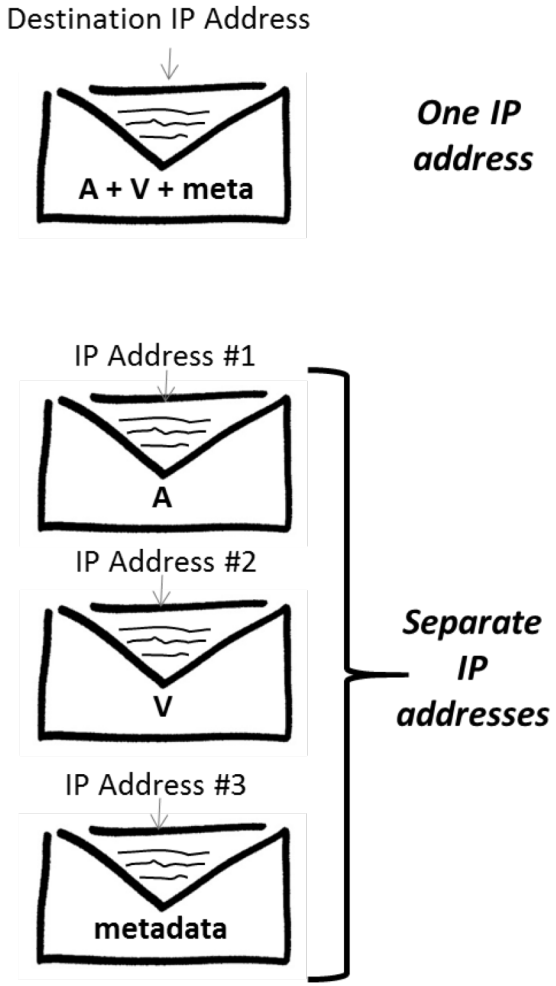
ST 2110 and NMOS

- SMPTE ST 2110 - Transport
  - Essence Streams
  - Timing
  - Description
- NMOS
  (Networked Media Open Specification)
  - Registration
  - Discovery
  - Subscribe
  - Control



Two Fundamental Approaches to IP Transport

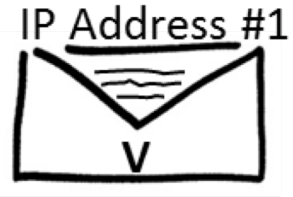
- **Bundled** (Audio, Video, Metadata together)
  - Audio/Video/Metadata/Sync travel ***coherently***
  - Requires extra work to “unpack” separate essences
- **Essence-based** (Audio, Video, Metadata separate)
  - Ideal for ***dedicated endpoint devices***
  - Individual essence kept in sync using PTP timing



The Essence-based Approach: SMPTE ST 2110

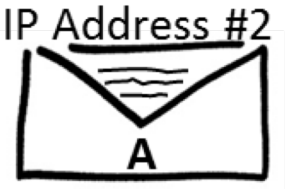
Active Video

IP Packetization of Active Video
Method: **SMPTE ST 2110-20**



Audio

IP Packetization of Audio Channels
Method: **SMPTE ST 2110-30**



Metadata

IP Packetization of ANC Data
Method: **SMPTE ST 2110-40**

Published beginning in 2017

The SMPTE ST 2110 Suite of Standards (1 of 2)

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System Timing and Definitions: SMPTE ST 2110-10

- Covers the system as a whole, the timing model, and common requirements across all essence types

Uncompressed Active Video: SMPTE ST 2110-20

- Documents the IP transport of uncompressed active video using an RTP format based on IETF RFC 4175

PCM Digital Audio: SMPTE ST 2110-30

- Documents and constrains the use of IP-encapsulated PCM audio in a manner ***based on and compatible with AES67***

Audio Engineering Society

The SMPTE ST 2110 Suite of Standards (2 of 2)

AIMS Alliance for IP Media Solutions

Ancillary Data: SMPTE ST 2110-40

- Documents the IP transport of SMPTE ST 291 ancillary data using an RTP mapping based on **IETF RFC 8331**

Traffic Shaping and Delivery Timing for Uncompressed Active Video: SMPTE ST 2110-21

- Specifies the traffic shaping model for senders and corresponding requirements on receivers of SMPTE ST 2110-20 (video) streams

AES3 Transparent Transport: SMPTE ST 2110-31

- Specifies the real-time, RTP-based transport of AES3 signals over IP networks, referenced to a network reference clock.

Additional ST 2110 Standards in Development

Constant Bit-Rate Compressed Video: SMPTE ST 2110-22

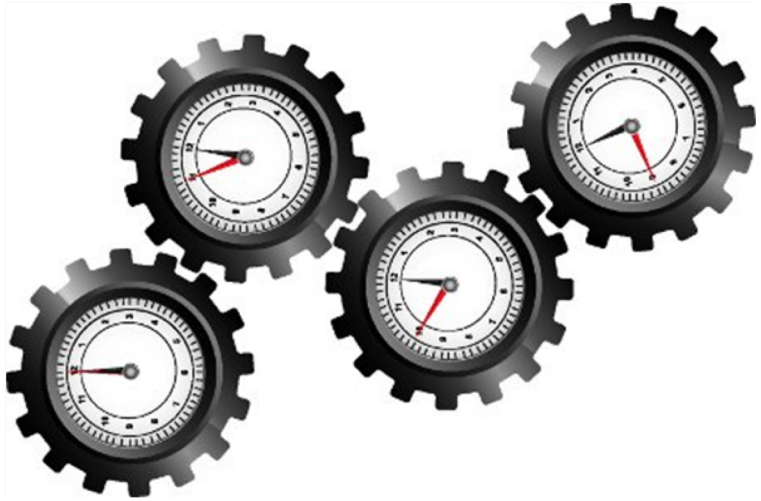
- Specifies parameters for the real-time, RTP-based transport of constant bit-rate compressed video over IP networks, referenced to a common reference clock. It also defines a SMPTE Registry for the approved compressed video payloads

Payload-agnostic metadata: SMPTE ST 2110-41

- Documents a payload-agnostic method for carriage of various types of metadata that can be synchronized with an ST 2110 essence stream through the same mechanisms as other 2110 streams

Synchronization and Alignment in ST 2110

- **P**recision **T**ime **P**rotocol
- A ***proven*** technology used in multiple industries (IEEE 1588)
- A method for distributing precise, GPS referenced time stamps over an IP network for ***synchronization*** and ***alignment*** of signals



Both AES67 and SMPTE ST 2110 use PTP

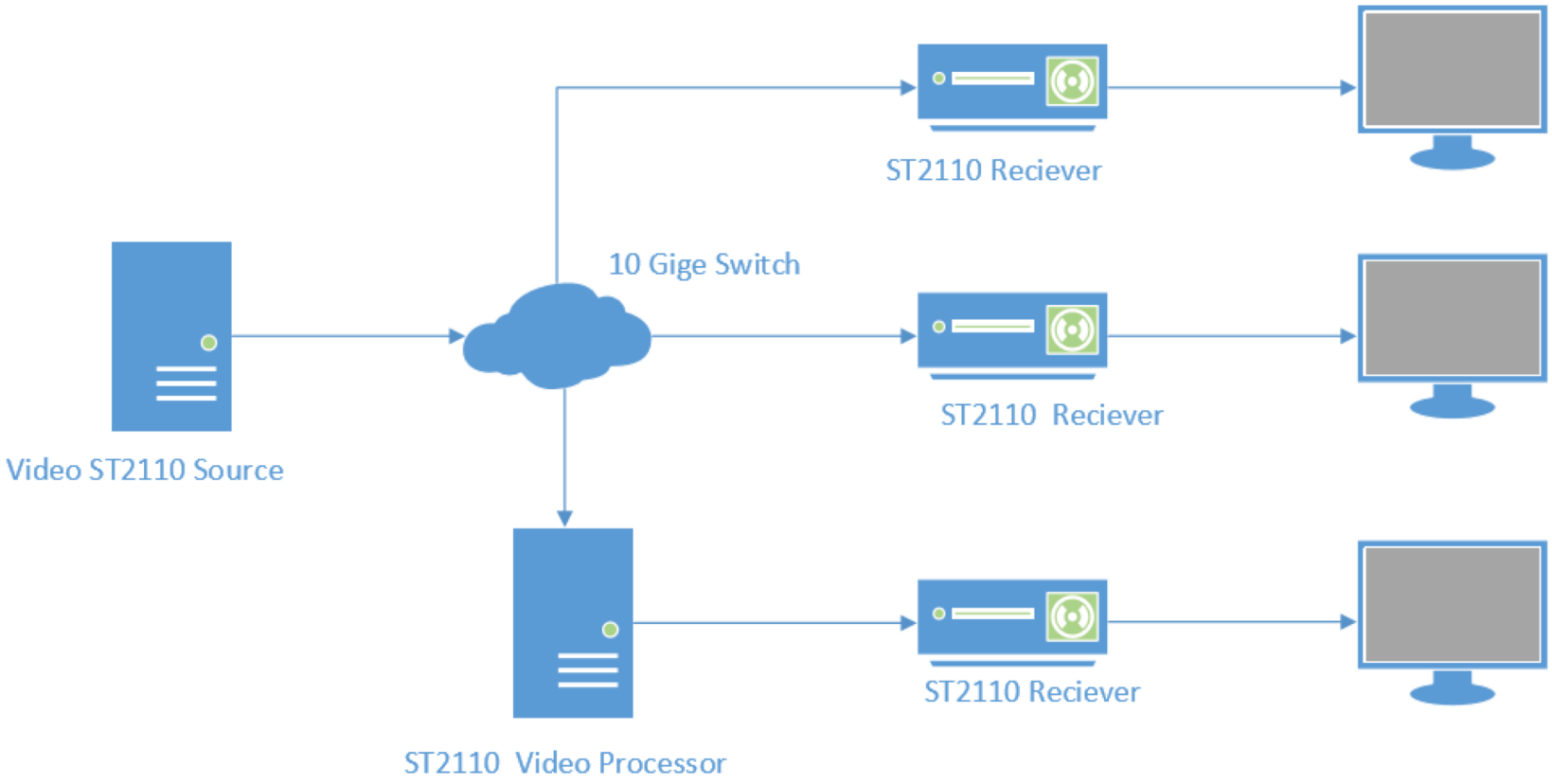
Standards !
SMPTE ST 2110 Suite

Standard	Description	Status
SMPTE ST 2110 - 10	System - RTP, PTP and SDP	Approved
SMPTE ST 2110 - 20	Video - Uncompressed	**Approved**
SMPTE ST 2110 - 21	Video - Performance of Transmitters (Packet Pacing, Bursts and Gaps)	**Approved**
SMPTE ST 2110 - 22	Video - Compressed	In Progress
SMPTE ST 2110 - 30	Audio - Uncompressed (PCM)	**Approved**
SMPTE ST 2110 - 31	Audio - Compressed (non-PCM, AES3, Guard-band aware and Stereo)	**Approved**
SMPTE ST 2110 - 40	Data - Ancillary	**Approved**
SMPTE ST 2110 - 41	Payload-agnostic metadata	**In Progress**

Standards ?
Technical Recommendations

Standard	Description
NMOS IS - 04	Device Discovery and Registration (Specification by AMWA)
NMOS IS - 05	**Connection Management (Specification by AMWA)**
NMOS IS - 06	**Network Control (Specification by AMWA)**
NMOS IS - 07	**Event & Tally (Specification by AMWA)**
NMOS IS - 08	**Audio Channel Bundling (Specification by AMWA)**
NMOS IS - xy	**Flow Grouping, ID & Timing, Scalability, Security & more (future Specification by AMWA)**
SMPTE ST RDD 34	**Sony LLVC compression (Registered Disclosure Document by SMPTE)**
SMPTE ST RDD 35	**IntoPIX TICO compression (Registered Disclosure Document by SMPTE)**
JT-NM TR-1001-1	**System Environment and Device Behaviors for SMPTE ST 2110 Media Nodes in Engineered Networks (Technical Recommendation by JT-NM)**

ST-2110 in action



ST 2110 / NMOS in Pro AV

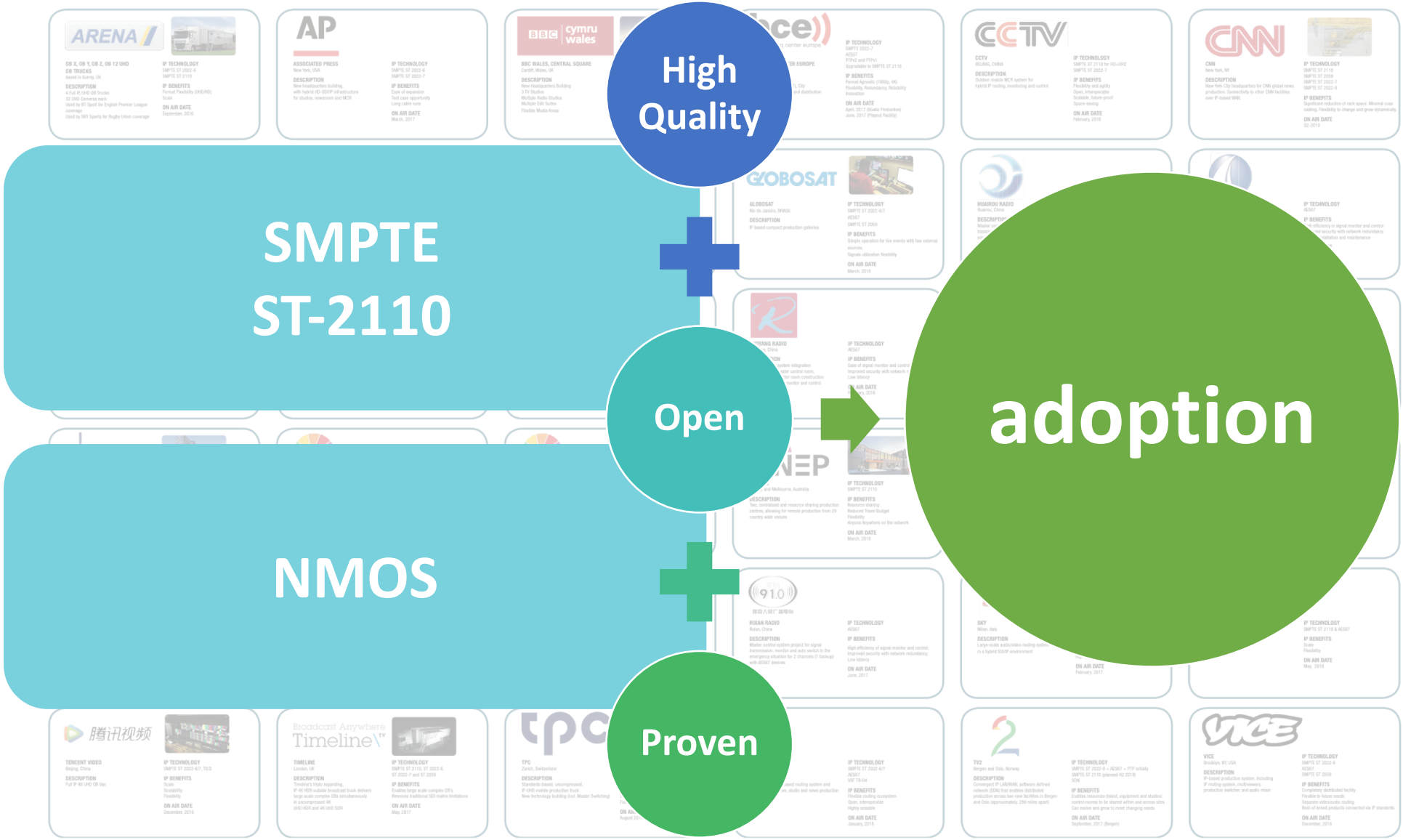
- How Can we continue to evolve for Pro AV?

Pro AV Working group

- security
- HDCP
- compression
- IO expansion
- etc..

- Seamless transport of Video, Audio, and Data
- Compressed and uncompressed streams
- Control, management, and real-time applications
- Secure and ultra-low latency

Our Goal



Thank you