



AIMS

Alliance for IP Media Solutions

IPMX introduction

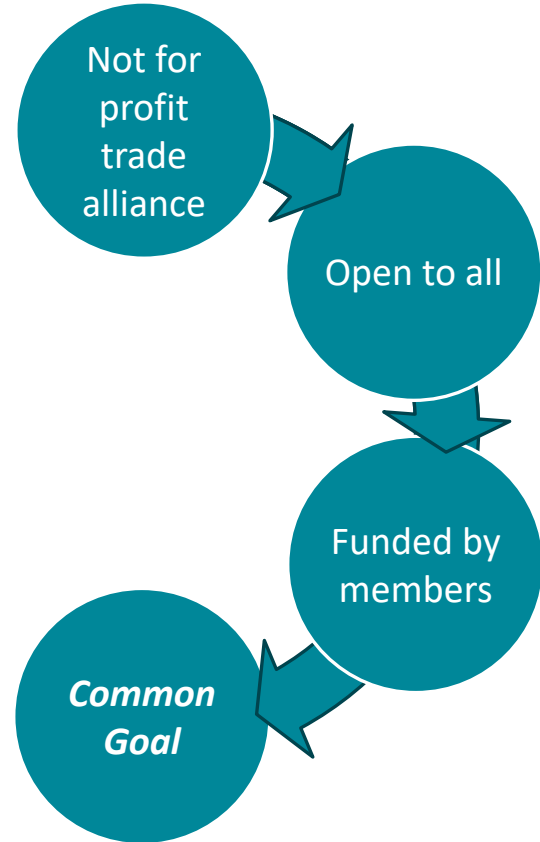
Who is AIMS and What is ST 2110?

Andre Testa, Manager of ASIC / FPGA engineering, Matrox Video

Integrated Systems Europe (ISE)

February, 11th 2020.

What is AIMS?

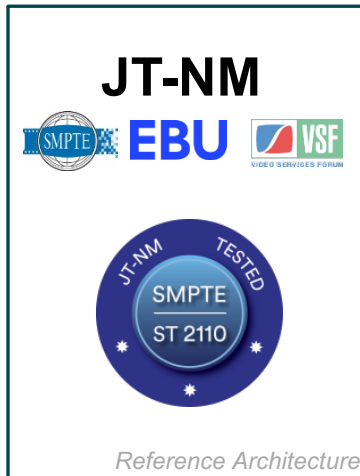
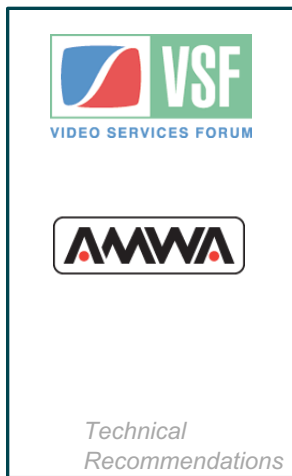


Members List

91 Members



Building on a Strong Foundation for *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

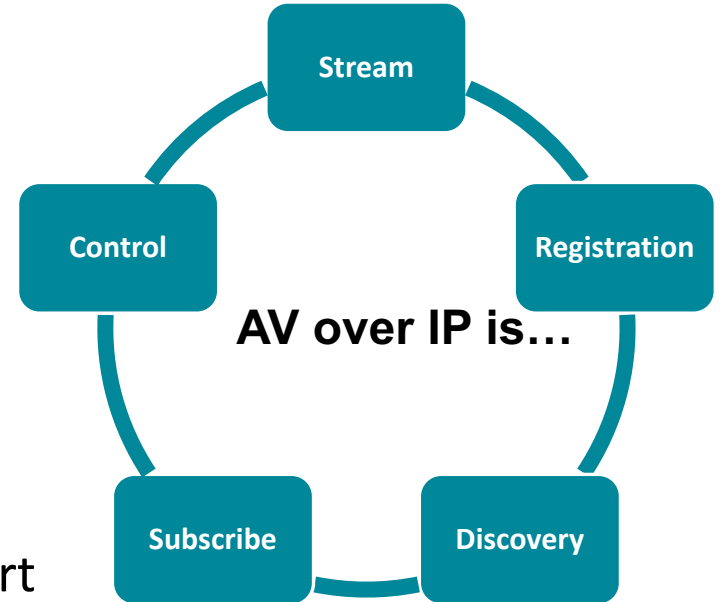
Scalability

- 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

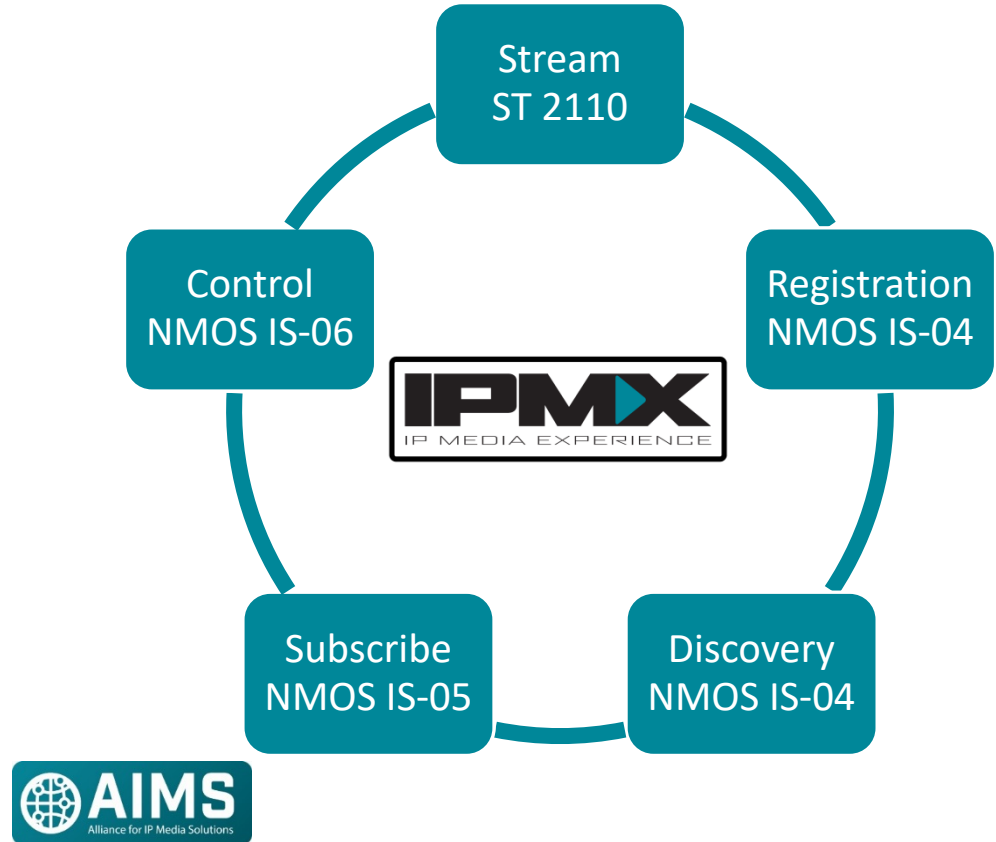
- SMPTE ST 2110 - Transport

- Essence Streams
- Timing
- Description

- NMOS

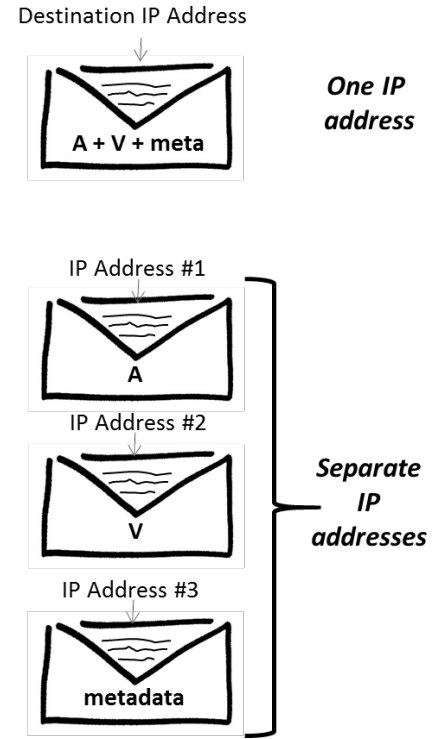
(Networked Media Open Specification)

- 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**

IP Address #1



Audio

IP Packetization of Audio Channels

Method: **SMPTE ST 2110-30**

IP Address #2



Metadata

IP Packetization of ANC Data

Method: **SMPTE ST 2110-40**

IP Address #3



.. The approach is extensible



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



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***



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



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



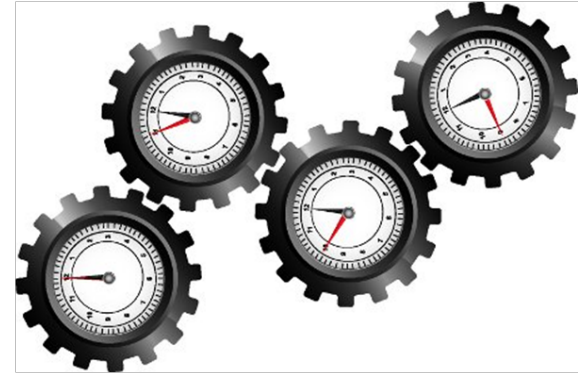
Payload-agnostic metadata: SMPTE ST 2110-41

- 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

IN PROGRESS

Synchronization and Alignment in IPMX

- Precision Time Protocol
- 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



AIMS Roadmap – October 2019

SDI over IP Baseline	Audio over IP	Standardized Transport of Audio, Video, & ANC Elements	System Environment & Device Behaviors
SMPTE ST 2022-6 SDI Over IP	AES67 Audio Over IP	SMPTE ST 2110-10 Timing & Definitions SMPTE ST 2110-20 Uncompressed Video SMPTE ST 2110-21 Packet Pacing SMPTE ST 2110-30 AES67 Audio SMPTE ST 2110-31 AES3 Compressed Audio SMPTE ST 2110-40	PTP, DHCP, LLDP, DNS-SD Network Environment AMWA NMOS IS-04 Discovery & Registration AMWA NMOS IS-05 Connection Management System Resource Critical System Parameters

**SMPTE
ST 2022-6**

AES67

SMPTE ST 2110

JT-NM TR-1001-1

IPMX draft Roadmap proposal – February 2020

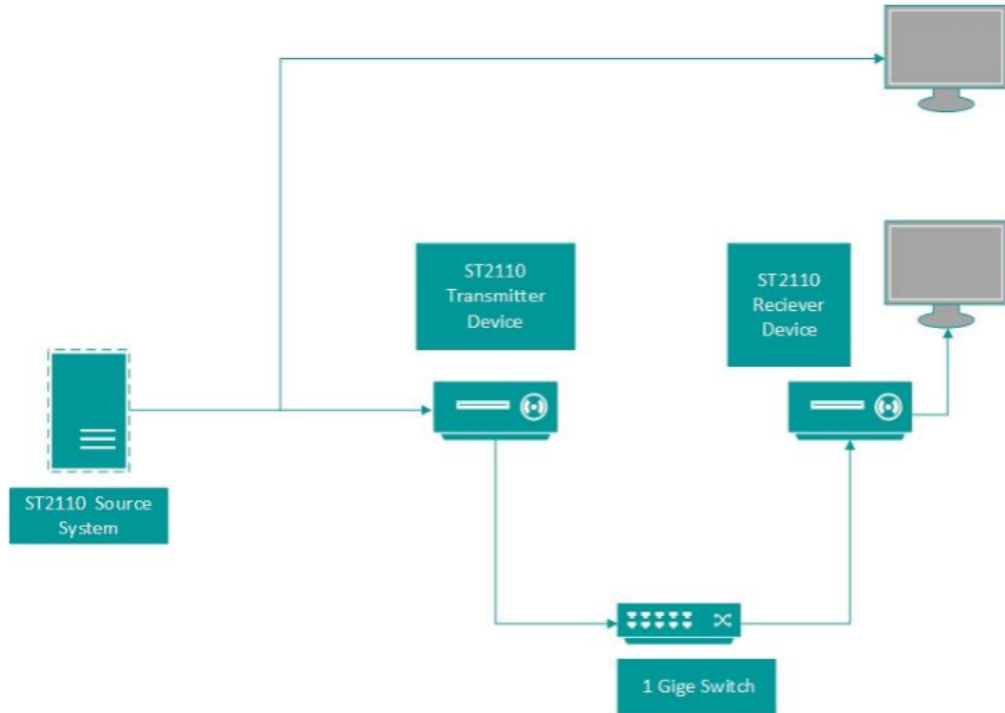
Audio over IP	Standardized Transport of Audio, Video, & ANC Elements	ProAV Standards & Specifications	
<p>AES67 Audio Over IP</p>	<p>SMPTE ST 2110-10 Timing & Definitions</p> <p>SMPTE ST 2110-20 Uncompressed Video</p> <p>SMPTE ST 2110-21 Packet Pacing</p> <p>SMPTE ST 2110-30 AES67 Audio</p> <p>SMPTE ST 2110-31 AES3 Audio Transport</p> <p>SMPTE ST 2110-40 Ancillary Data</p>	<p>SMPTE ST 2110-22 <i>CBR Compression in ST 2110</i></p> <p>ISO/IEC 21122 <i>JPEG XS Codec</i></p> <p>NMOS IS-04 & IS-05 <i>Discovery, registration & connection management</i></p> <p>EDID / DisplayID / HPD Support*</p>	<p>HDCP* <i>Copy protection</i></p> <p>General Purpose I/O* IR Remotes, GPIO, USB, RS232 over IP</p> <p>NMOS IS-08* Audio channel mapping</p> <p>IPv6* Network addressing</p> <p>Security* Authentication, Encryption</p>
<p>AES67</p>	<p>SMPTE ST 2110</p>	<p>“IPMX”</p>	

* not ratified yet by AIMS, and therefore proposed roadmap additions

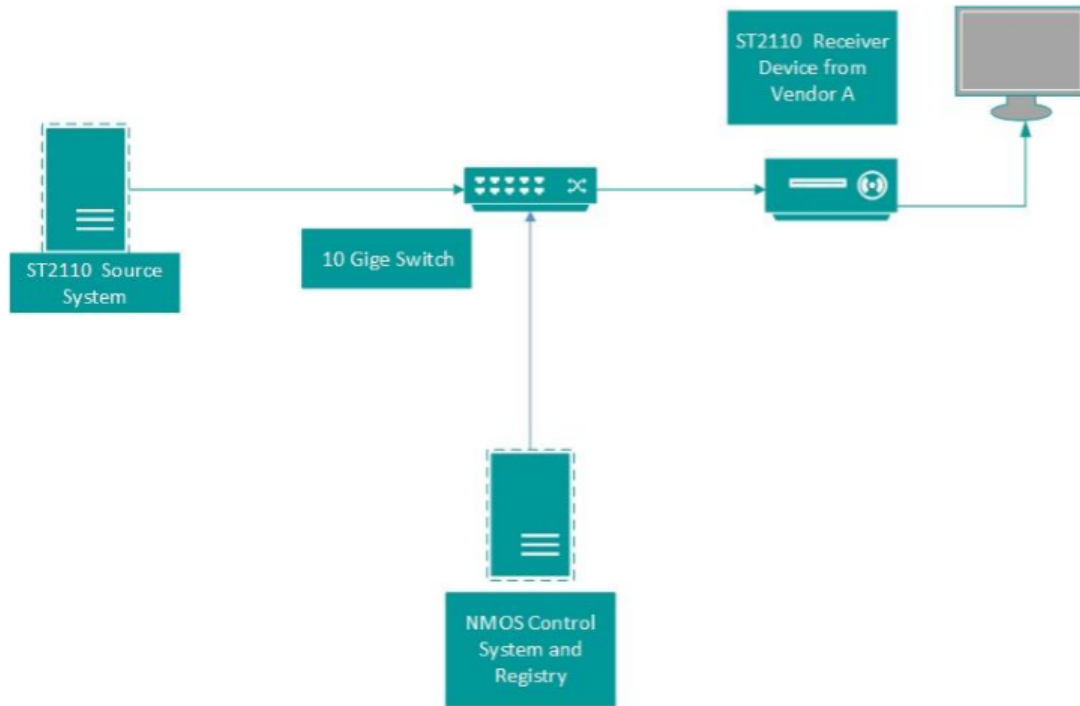
Required

Optional

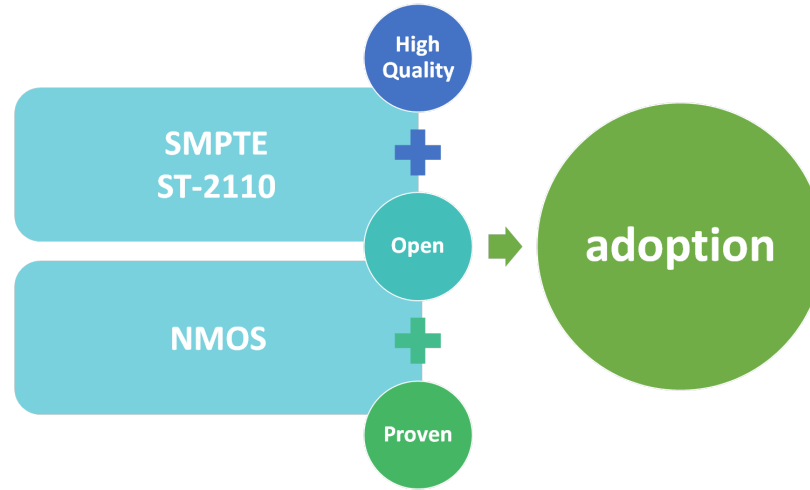
IPMX in action – Demo #1



IPMX in action – Demo #2



Our Goal





AIMS

Alliance for IP Media Solutions

Thank you

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