AES67 and ST2110-30 Interoperability in Real Life

Claudio Becker-Foss, CTO / CEO
DirectOut GmbH
What this session is about

• Brief introduction of AES67 and ST2110
• Closer look into AES67 mandatory and extended features
• What information do I need to configure my streams
• Tools for Stream Setup
• Tools for Troubleshooting
• AES67 and Dante
AES67-2018 Standard for Audio Applications of Networks: *High-performance Streaming Audio-over-IP Interoperability*

- Goal: Find a common ground to exchange audio (media) between devices of different brands with proprietary IP implementations
- Out of Scope: discovery and connection management
SMPTE ST2110

Professional Media Over Managed IP Networks
Suite

• -10 – System Timing and Synchronisation
• -20 / -21 – Video
• -30 / -31 – Audio
• -40 – Ancillary Data
• ...

DirectOut Technologies
ST2110 -30

• Audio Transport over IP
• Synchronised with Video via PTPv2
• Refers to AES67-2018 as format to transmit PCM audio
• A few constraints apply
  – See AIMS Whitepaper „AES67 / ST 2110 Commonalities and Constraints“
    https://www.aimsalliance.org/white-papers/
AES67 Recap

• What does the standard mandate?
• What has been implemented?
AES67 – What is mandatory?

- Samplerate: 48kHz
- Packet time: 1ms
- PTP v2 Synchronisation
- IGMP v2 (v3 for ST2110)
- QoS DSCP Markings
  - Clock: EF
  - Media: AF41
  - Anything else: DF (Best Effort)
- Audio Encoding: 16 and 24 Bit
- Channel Count: 1-8 Channels per stream
- Multicast and Unicast
- SDP
- SIP (Unicast)
AES67 – What else is possible?

• Samplerates: 96 kHz, 44.1 kHz
• Packet times: 125µs, 250µs, 333µs, 4ms
• More than 8 audio channels per stream (e.g. 64ch)
• IGMP v3 (automatic fall-back to v2)
• Discovery (RTSP, Bonjour, SAP) not scope of the standard but can be added on top of AES67
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<tr>
<th>Format, sampling rate</th>
<th>Packet time</th>
<th>Maximum channels per stream</th>
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<tbody>
<tr>
<td>L24, 48kHz</td>
<td>125 microseconds</td>
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<td>L16, 48kHz</td>
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<td>L24, 48kHz</td>
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<td>L24, 48kHz</td>
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AES67 – What do I need to set up a stream?

v=0
o=- 1 2832056294 IN IP4 192.168.1.210
s=AES67 1
t=0 0
m=audio 5004 RTP/AVP 97
i=Stream 1
c=IN IP4 239.69.0.1/128
a=rtpmap:97 L24/48000/8
a=sync-time:0
a=framecount:48
a=recvonly
a=mediack:direct=0
a=ts-refclk:ptp=IEEE1588-2008:00-1D-C1-FF-FE-0E-67-16:0
a=pttime:1
a=maxptime:1
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- Multicast IP: 239.69.0.1
- Destination Port: 5004
- Encoding: L24 (24 Bit)
- Samplerate: 48000 (48kHz)
- Channel Count: 8
- Packet time: 48
AES67 – How do I get the SDP into my device?

• Manually
• RTSP (e.g. RAVENNA)
• SAP (e.g. Dante)
  – Dante Controller does not provide means to manually enter stream information
• NMOS
RAV2SAP – SDP view
Troubleshooting – What, if it does not work?

• Check stream configuration
  – Is it really AES67 compliant?
  – If it is different from the mandatory set, does the device support it?
• Check Multicast IP
• Check Destination Port
• Check Payload ID
• Check Stream Delay
• If it still doesn’t work -> Wireshark!
PTP Troubleshooting

www.ptptrackhound.com
AES67 and Dante

- Multicast only (no Unicast)
- Restricted Multicast IP-Range: 239.p.x.x
  Default Prefix: 239.69.x.x
- Encoding: L24 (24 Bit)
- Packet time: 1ms TX / 1ms, 125µs, 250µs, 333µs RX
- Non-Standard DSCP Markings
- Dante Redundancy mode not available
Implementation dependent peculiarities and pitfalls

• SDP Distribution
• Multicast Prefix
• Dynamic Payload IDs
• DSCP Markings for QoS

Standard
Clock: EF
Media: AF41

Dante AES67
Clock: CS7
Media: EF
JT-NM Tested

• Program initiated by JT-NM, EBU and IRT
• To give documented insight into how vendor equipment aligns to ST2110
• Check out the JT-NM Tested Program on www.jt-nm.org and on the Show Floor
Thank You

Claudio Becker-Foss, DirectOut GmbH
aes67@directout.eu
www.directout.eu