EDCF White Paper

Recommendations for standards and preferences for Live and Streaming Events in Cinemas

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Introduction:

This whitepaper defines the standards and preferences for the reception of video and audio signals in a media broadcast or streaming setup to cinemas. The aim is to ensure the delivery of high-quality content that meets modern technical expectations for both video and audio playback.

Video Signal Specifications:

Resolution: The desired video resolutions are 1080p or 720p. The 'p' represents a progressive scan, which is required for the smooth portrayal of moving images, especially important for high-definition content. Interlaced scan types are not acceptable due to their lower visual quality and the flickering issues they can cause.
Frame Rate: The stream should be 25 fps or 50 fps. These frame rates are standard for European broadcasting and many international film and video formats, ensuring a broad compatibility. Important: Cinemas equipped with a series 1 projector will not be compatible with a 50 fps frame rate.
Display Compatibility: Video output should be optimized for flat high-definition televisions (HDTVs). It is specified that the video should not be "scope boxed," indicating a need for a signal that utilizes the full screen area of widescreen displays without letterboxing or pillarboxing.
Bitrate: A bitrate of 10 Mbps is preferred for the video stream. This is a high bitrate that would ensure the transmission of high-quality images with a good level of detail and minimal compression artifacts.

Audio Signal Specifications:

General Preference: While there are no specific requirements for the audio format, there is a preference for audio that is "fixed every second." This could imply a consistent and stable audio signal that may assist with synchronization and reduce audio artifacts.
Format Transparency: It must be clearly indicated beforehand whether the audio signal is encoded in AC3 (Dolby Digital) format or if it is in a stereo format. This clarity is necessary to prepare the appropriate decoding equipment and ensure compatibility with the end user's sound system.

Audio Levels: The inbound source signal must have audio levels that are suitable for cinema use. If the mixing is excessively loud or high, it will pose challenges for cinema staff to adjust on-site effectively.

Testing and Validation:

To ensure that the video and audio signals meet the above specifications, comprehensive testing and validation are required:

- **Resolution and Frame Rate Testing**: The video signal should be tested for clarity, smoothness of motion, and lack of interlacing artifacts at both 1080p and 720p resolutions at the given frame rates.
- **Display Testing**: The compatibility of the video signal with flat HDTV displays should be confirmed to ensure that the full display area is utilized without scope boxing.
- **Bitrate Testing**: The video stream's bitrate should be monitored to confirm it consistently stays at or near the preferred 10 Mbps.
- **Audio Stability Testing**: Audio should be checked for consistency and stability, with particular attention to the "fixed every second" preference, which may involve checking for synchronization issues or variations in audio quality.
- **Format Identification Testing**: Ensure that the audio format (AC3 or stereo) is accurately identified and communicated before transmission.
- **AC3 Testing:** It is essential to test for audio presence across all six channels and to verify that they are delivered in the correct sequence.
- **Audio level Testing**: The incoming audio signal should be tested at various cinemas with different audio systems. Cinemas must confirm that the signal is neither too loud nor too soft.

Communication and Marketing:

The content owner/distributor should provide sufficient materials to cinemas, which they can utilize in marketing the event. Additionally, it is also highly desirable to have a clear and well-structured running order which should be provided in a timely manner.

Conclusion:

Adhering to these specifications will result in the delivery of high-quality video and audio content. The testing and validation process will play a critical role in achieving these standards, ensuring that the end product is satisfactory for professional broadcasting to cinemas and provides the intended high-quality user experience.

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CINEMA

Introduction:

This whitepaper outlines the technical requirements and recommendations for internet connectivity and network infrastructure for cinema venues. These guidelines are designed to ensure a robust and reliable system that supports high-quality media streaming without interruptions or quality degradation.

Bandwidth Requirements:

The bandwidth must be **guaranteed** and calculated as follows: The number of streaming boxes (up to a maximum of four) should be multiplied by 15 Mbps, with an additional 15 Mbps added as a realistic buffer. This ensures that each streaming box has sufficient bandwidth to operate optimally, and the buffer accommodates any potential additional network traffic or fluctuations.

Network Configuration:

1. **Whitelist Compliance:** The whitelist should be implemented (as delivered by the streaming provider), with the understanding that it may be subject to changes. This list likely includes approved domains and IP addresses that are necessary for the streaming boxes and associated services to function correctly. Please check the firewall settings to ensure that necessary traffic is not being blocked.
2. **Internal Network Setup**: The internal network should be well-organized, with the streaming boxes preferably on their own network or VLAN. Shared switches should be avoided, and a direct (outgoing) internet connection is preferred to minimize potential points of failure.
3. **Quality of Service (QoS)**: If a shared internet connection is used, QoS must be configured to prioritize media streaming traffic and ensure consistent quality during peak usage times.
4. **Dual Internet Connections**: If possible, it is advised that each cinema venue has two separate internet connections from different ISPs to provide redundancy. It is possible to set up an auto-failover system to switch from one line to the other in the event of an outage.
5. **IT Support**: In the event of internal network issues or internet problems, it is crucial to have access to your local IT support that can quickly address and resolve any disruptions.

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Hardware and Cabling:

1. **Streaming box Connection:** The streaming box must be connected to the router, following the provided wiring diagram, to ensure proper network configuration and security settings.
2. **Reliable Power Source**: All equipment must be connected to a reliable power source, preferably with an Uninterruptible Power Supply (UPS), to prevent outages and data loss during power fluctuations or failures.
3. **Availability of Documentation**: The streaming box manual should always be available for reference to troubleshoot issues and perform standard operations.
4. **Sound processors**: We recommend against using outdated sound processors, including the Dolby CP650 and its predecessors. However, it's important to note that a CP650 combined with an Integrated Media Server (IMS) can function properly when connected via HDMI.
5. **Local Hardware Configuration Reporting**: Cinemas are required to report their local hardware configuration to their Streaming provider for the auditoriums where they intend to play a live event. Using the provided hardware and codec overview (see below in this document), they must connect the streaming box either via HDMI or via SPDIF to their sound processor. The streaming provider will then ensure the live stream is sent with the correct codec to match the cinema's setup.

By mandating the reporting of local hardware configurations and adherence to specified connection methods, the streaming provider ensures that the cinema's equipment is compatible with their streaming technology, thus providing an optimal audiovisual experience during live events.

Support and Staffing:

1. **Streaming provider Support Registration**: It is required to be registered with the support platform of the Streaming provider, to receive timely assistance and updates.
2. **Trained Staff**: Staff present during events must be adequately trained and possess the necessary experience. They should have completed the Streaming box certification to ensure they are fully capable of managing the technical requirements of the event.
3. **Mandatory Certification for New Venues**: Cinemas that have not previously hosted live events using the streaming box are required to first follow the steps outlined in the Streaming provider's Playbook to obtain certification. The streaming provider will only make live streams available to the cinema after this certification has been achieved.

Training and testing:

The most important thing is that training is ongoing and testing is consistent. Additional or new training should be conducted, for instance, when there have been software updates or for new

staff. Testing should be done regularly, such as once a month for verification. Furthermore, testing must be conducted for every event: with the scheduled tests, and preferably also an extra time the day before and on the morning of the event. On the streaming box, tests are available that can be carried out 24/7 for this purpose.

Additional Recommendations:

We discourage the use of scalers, extractors, HDMI splitters, or switches due to their potential negative impact on signal quality.

Conclusion:

Following these specifications will facilitate a high-performance environment for media streaming in cinema venues. With proper setup, testing, and personnel training, a cinema can provide an uninterrupted, high-quality viewing experience to its customers.

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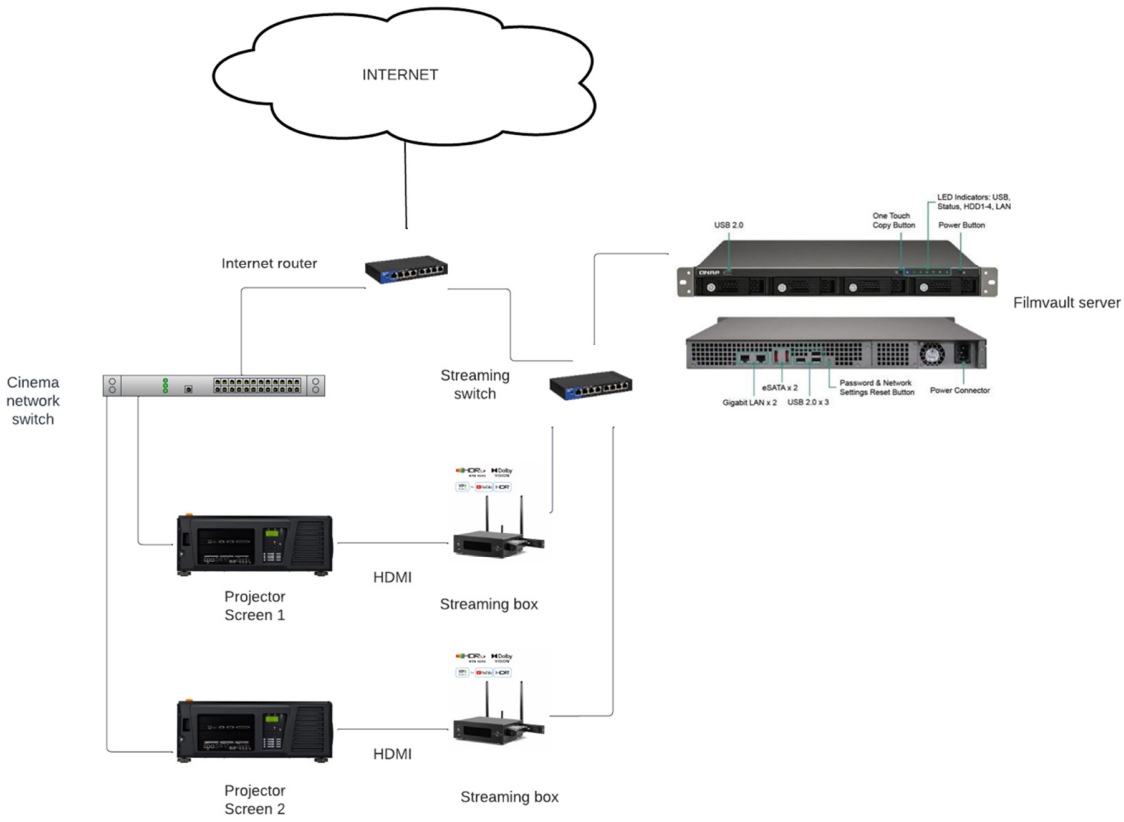
(PROPOSED) WIRING DIAGRAM:



Recommendation:
Create a separate network for the streaming devices

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HARDWARE & CODEC OVERVIEW:

AUDIO PROCESSOR/DEVICE	HDMI	SPDIF	OUTPUT MODE	CODEC	AUDIO TYPE
BARCO ICMP	v		BITSTREAM	AAC	5.1
DOREMI IMB	v		BITSTREAM	AAC	5.1
DATASAT AP20	v		BITSTREAM	AC3	5.1
DATASAT AP20		v	BITSTREAM	AC3	5.1
DATASAT AP25	v		BITSTREAM	AC3	5.1
DATASAT AP25		v	BITSTREAM	AC3	5.1
GDC SR-1000	v		DECODED	AAC	5.1
DOLBY DMA8 PLUS		v	BITSTREAM	AC3	5.1
DOLBY CAT745	v		BITSTREAM	AC3	5.1
DOLBY CP750		v	BITSTREAM	AC3	5.1
DOLBY CP850	v		BITSTREAM	AC3	5.1
DOLBY CP850		v	BITSTREAM	AC3	5.1
DOLBY CP950	v		BITSTREAM	AAC	5.1
DOLBY IMS1000	v		BITSTREAM	AAC	5.1
DOLBY IMS2000	v		BITSTREAM	AAC	5.1
DOLBY IMS3000	v		BITSTREAM	AAC	5.1
QSC DPM 100H	v		<WAITING FOR TEST RESULTS>		
TRINNOV OVATION2		v	<WAITING FOR TEST RESULTS>		