The Role of Container Formats within Archive Workflows

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Introduction

- Introduction
- Archive Workflows
- Ingest Workflow
- Export Workflow
- Audio Properties
- Video Properties
- Summary

What is a media container format?

- It is basically a wrapper for video frames, audio samples and possibly more (timecode, subtitles).

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- It is basically a wrapper for video frames, audio samples and possibly more (timecode, subtitles).

Why are there so many different container formats?

- different manufacturers and standards organisations
- different use-cases (streaming, seeking, editing)

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Does it make sense to focus on lossless codecs?

- no generation loss when cutting ($\leftrightarrow$ MPEG long-GOP)
- more flexibility to do normalization (audio level, color curves)

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Key Questions:

- What format properties are useful when considering typical archive workflows?
- What can be learned from existing audio and video container formats?

Archive Workflows

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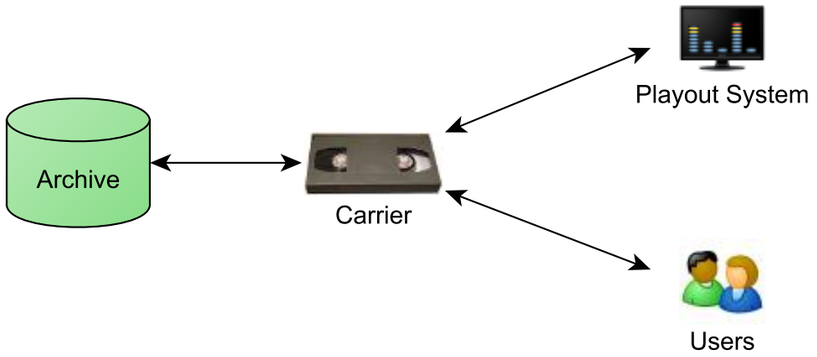
Analog Archive:



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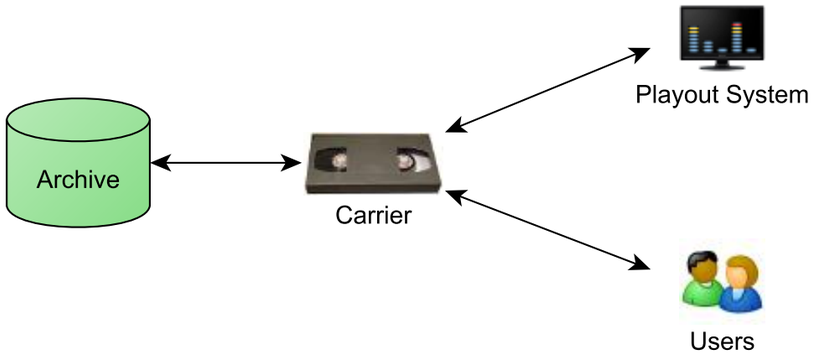
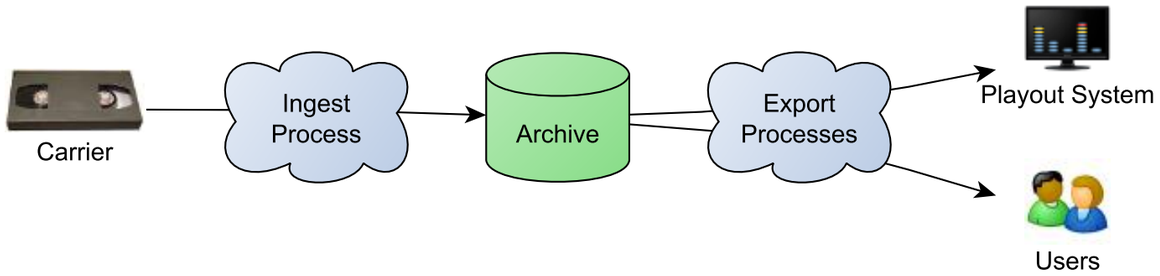


Digital Archive:



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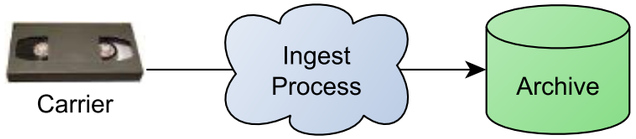

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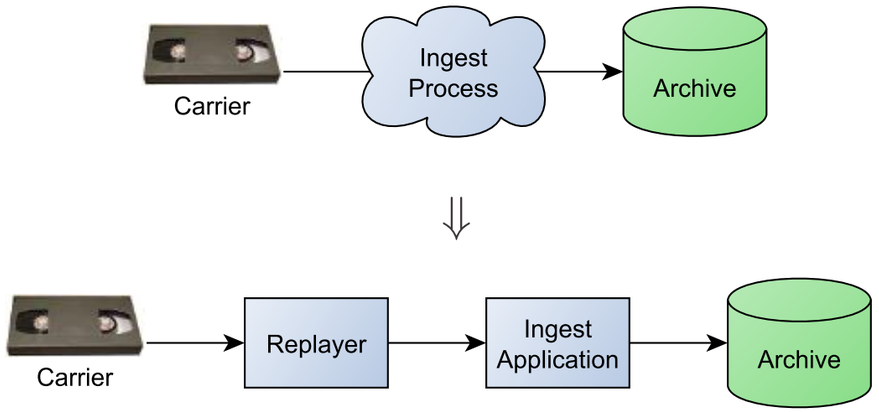

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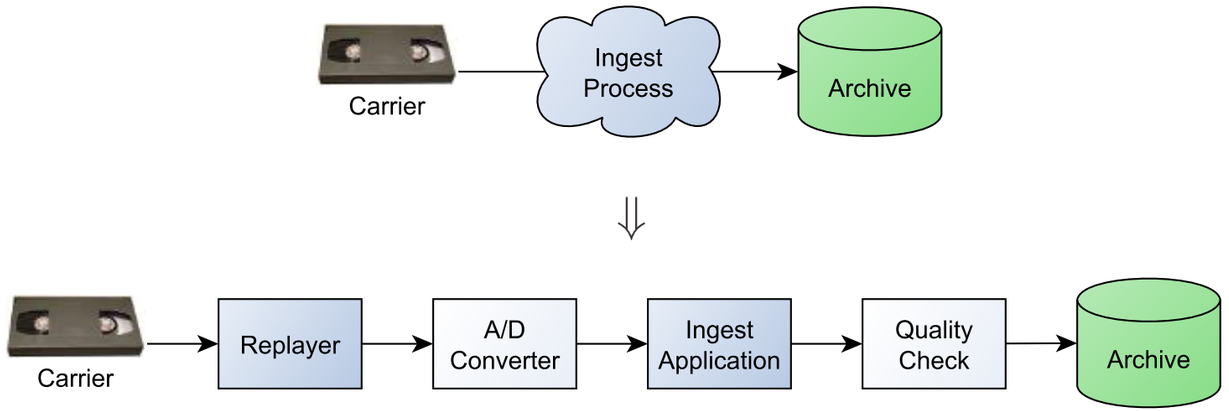

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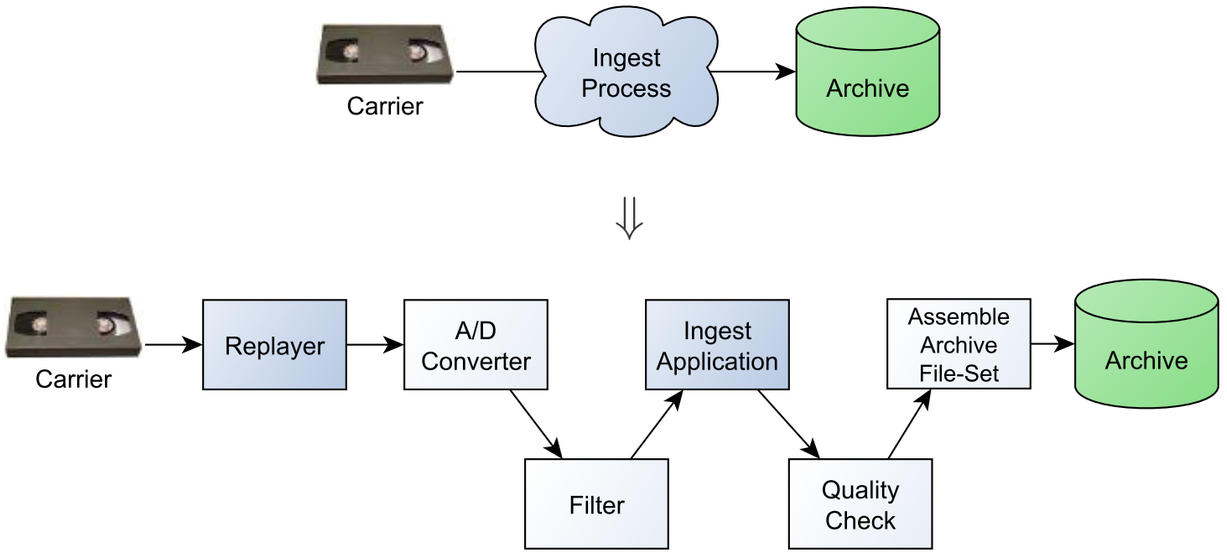

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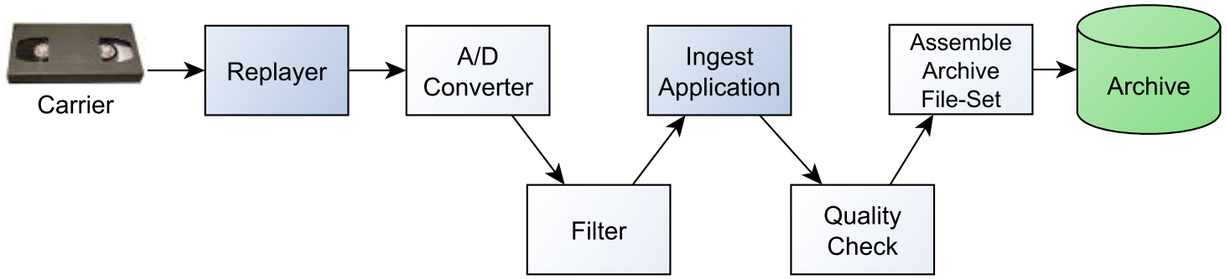

- we separate between mezzanine and archive format (low/high compression ratio)

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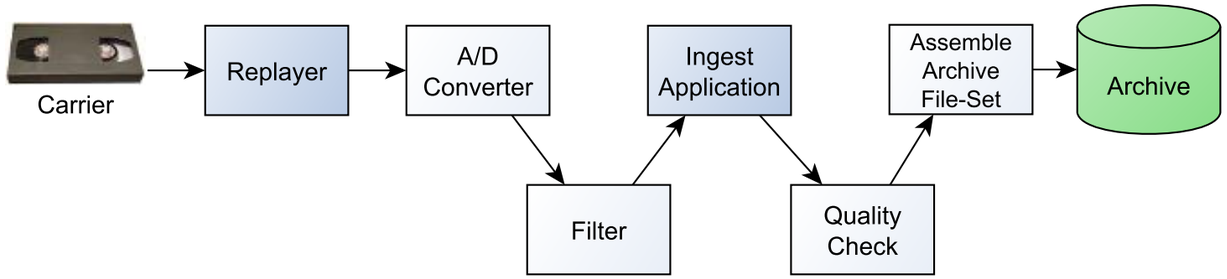

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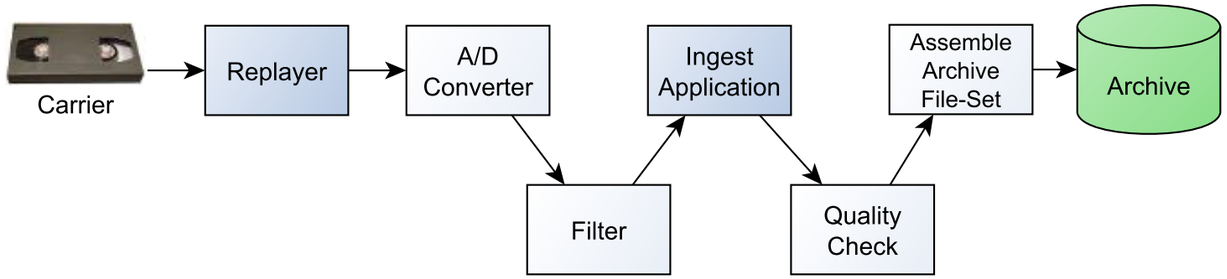

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- it needs to be documented what has been done ($\rightarrow$ BWF CodingHistory, Ingest Report XML)

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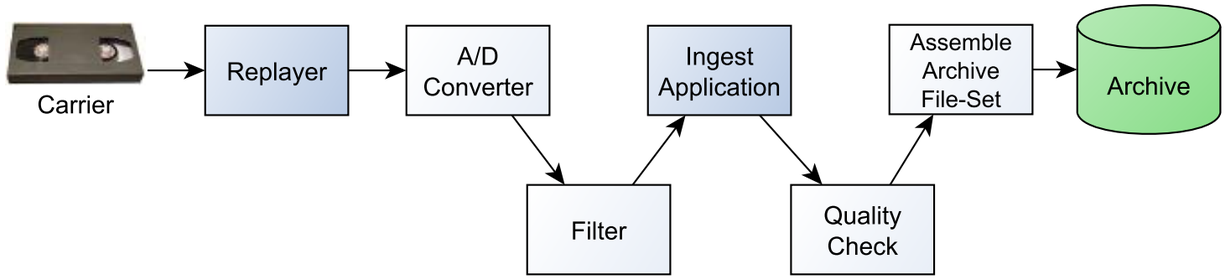

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- ingest flow needs special care as it is performed once, original carrier might be destroyed afterwards
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- checksums to verify integrity (FFV1 frame CRC, file hash)

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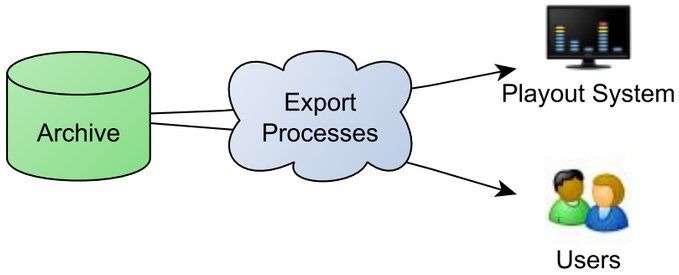

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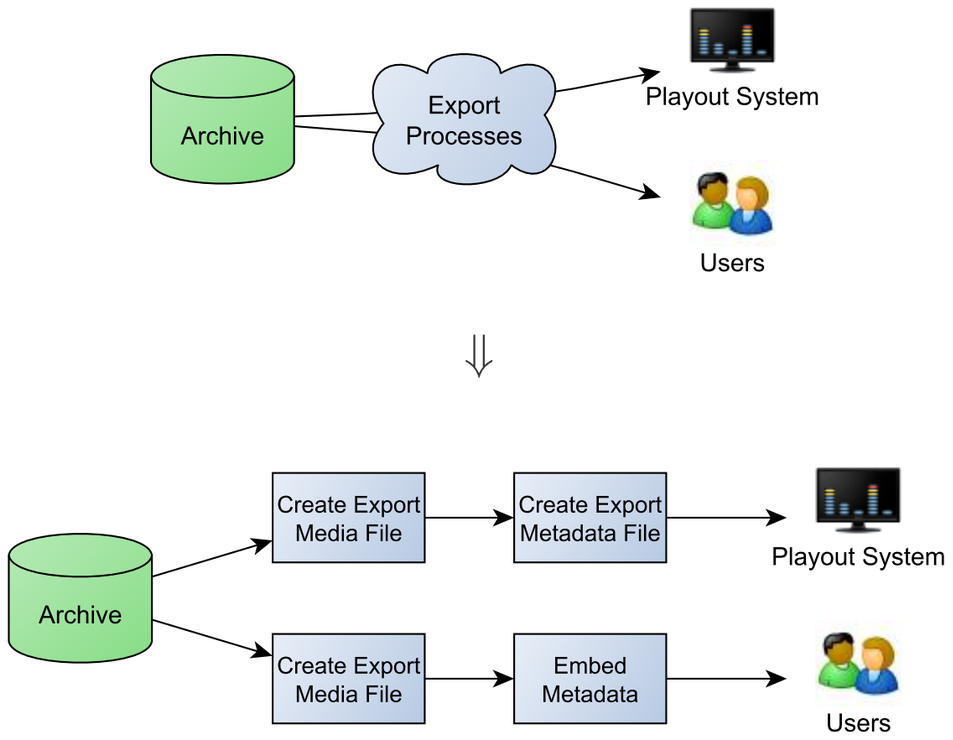

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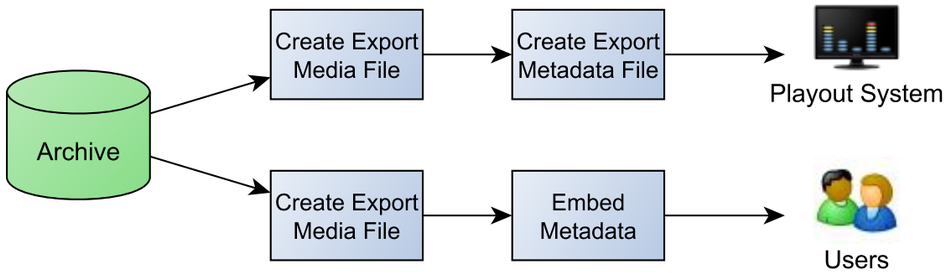

- often only a segment of the archived media file (song, sequence, scene, speech) is processed

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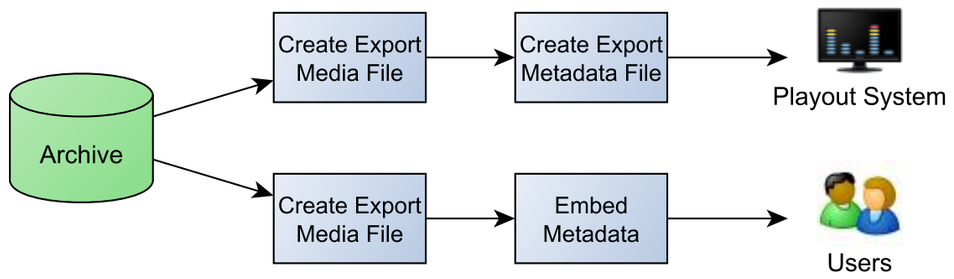

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- often together with metadata (separate XML file, embedded metadata)

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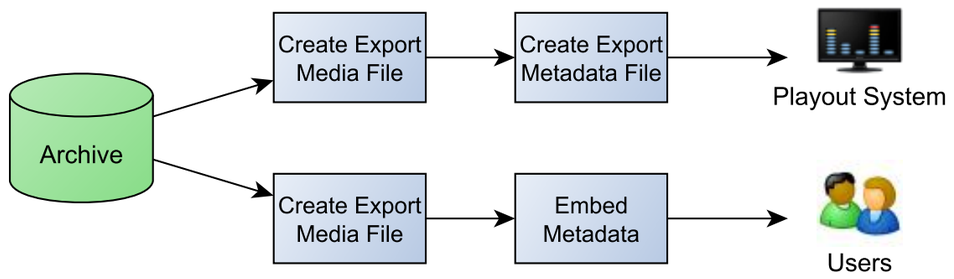

- often only a segment of the archived media file (song, sequence, scene, speech) is processed
- often together with metadata (separate XML file, embedded metadata)
- export flow processed multiple times per archived media file

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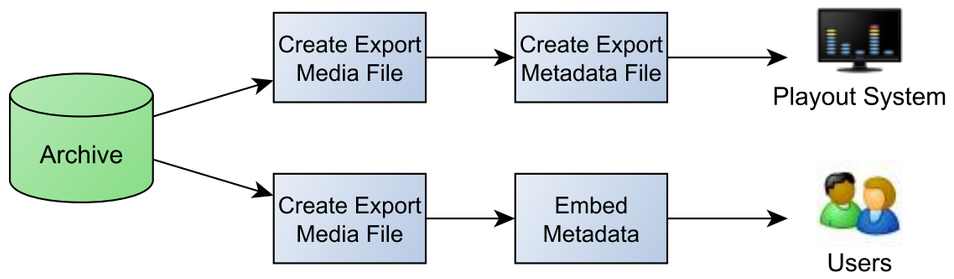

- often only a segment of the archived media file (song, sequence, scene, speech) is processed
- often together with metadata (separate XML file, embedded metadata)
- export flow processed multiple times per archived media file
- possible transcoding into target media format (e.g. MP2, IMX50, XDCAM-HD)

Media Format – Audio Properties

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Encoding: PCM, MP2, MP3, AAC, WMA

SampleRate: 44100, 48000, 88200, 96000

ChannelCount: 1, 2, 4, 8

BitWidth: 16, 24, 32

BitRate: 128000, 196000, 256000

AudioRoles:

```
1.Left|1.Right
en.Left|en.Right|de.Left|de.Right
1.*|1.*|1.*|1.*|1.*|1.*|1.*|1.*
1.*|2.*|3.*|4.*|5.*|6.*|7.*|8.*
```

Media Format – Audio Roles Examples

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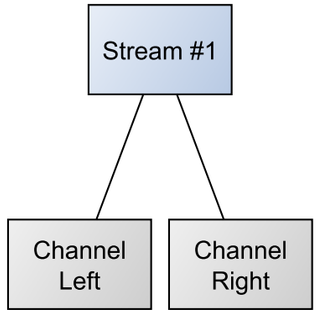
Stereo:



`1.Left|1.Right`

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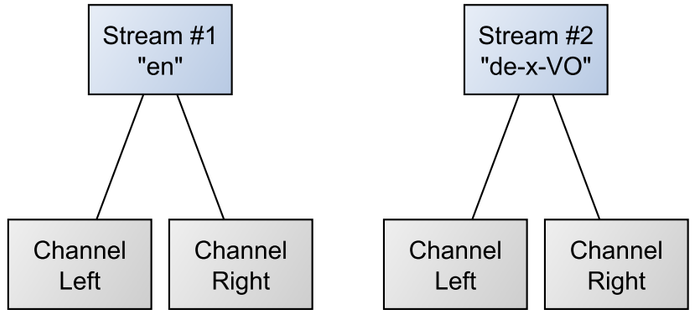
2×Stereo:



`en.Left|en.Right|de-x-VO.Left|de-x-VO.Right`

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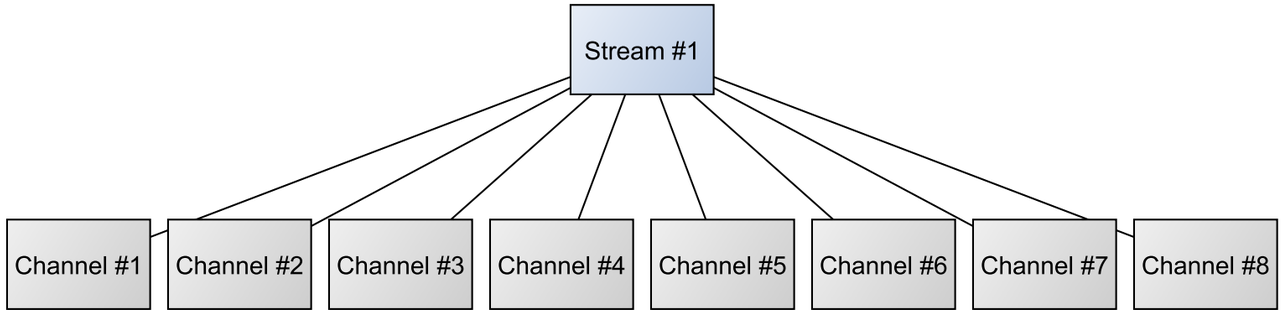
1×8 Channels:



`1.*|1.*|1.*|1.*|1.*|1.*|1.*|1.*`

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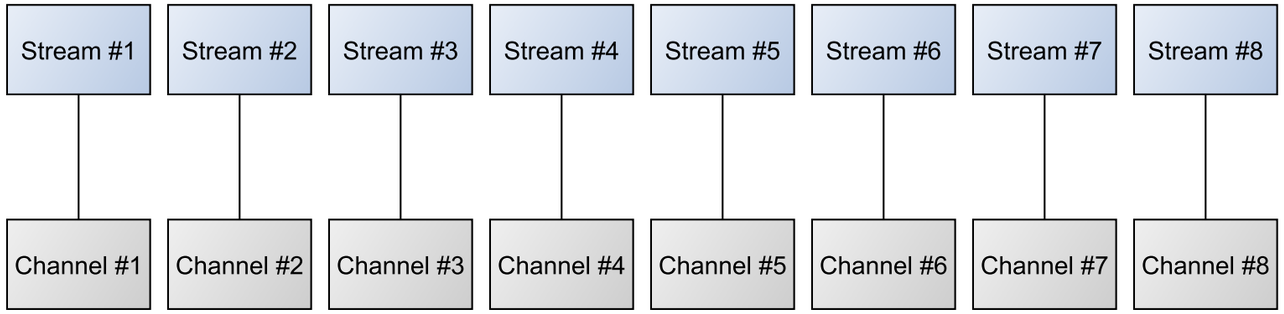
8×1 Channel:



1.*|2.*|3.*|4.*|5.*|6.*|7.*|8.*

Media Format – Video Properties

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Encoding: MPEG-2, DV, FFVHuff, FFV1, WMV

FrameRate: 25, 29.97, 50

FrameSize: 720x486, 720x576, 720x608, 1920x1080

FieldOrder: Progressive, TopFieldFirst, BottomFieldFirst

BitDepth: 8, 10, 16

BitRate: 550k, 30M, 50M

ColorFormat: YCbCr, RGB

ColorMatrix: BT601, BT709, BT2020, FCC

ChromaSubsampling: 4:4:4, 4:2:2, 4:2:0

DisplayAspectRatio: 4:3, 16:9, 2.35

DisplayAlignment: BottomCenter H=576px

ActiveImageArea: 16:9 Letterbox

Media Format – Display Alignment Example

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Frame Area:

FrameSize = 720x608

Display Area:

DisplayAspectRatio = 16:9

DisplayAlignment = BottomCenter H=576px

Media Format – Active Image Area Examples

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Frame Area:

FrameSize = 720x576

Display Area:

DisplayAspectRatio = 4:3

DisplayAlignment =

Active Image Area:

ActiveImageArea = 16:9 Letterbox

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Frame Area:

FrameSize = 720x608

Display Area:

DisplayAspectRatio = 4:3

DisplayAlignment = BottomCenter H=576px

Active Image Area:

ActiveImageArea = 16:9 Letterbox

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Requirement	BWF	AVI	MKV
Ingest Report	Yes	No	No?
Metadata Tagging	some	No	Yes
Partial File Retrieve	-	Yes	No
Audio Stream Name	No	No	Yes
Audio Channel Position	Yes	Yes	No
Video Display Alignment	-	No	Yes
Video Active Image Area	-	No	No
Video Field Order	-	No	Yes
Video Color Matrix	-	No	Yes?

Thanks for listening.

Questions?

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