



# SMPTE Metadata Standardization

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# Overview

- Introduction
- What is SMPTE?
- SMPTE metadata standards
- Conclusion



# Content Creator Activities

- Content acquisition
- Content creation
- Post-production services
- Special effects
- Content sales
- Content distribution
- Content preservation and archiving
- Audiovisual technology
- Finance

**All of these activities have associated standards!**

# Why should I be aware of standards?

- To create, distribute, process, or sell great content!
  - Ensure descriptive needs are met
  - Ensure technical needs are met
  - Enable retrieval of documents or content
  - Enable inter-studio post-production
  - Ensure proper playback of content
  - Control content (DRM)
  - Ensure content interoperability across devices, software
  - User-driven distribution
  - Digital product “packaging”
  - Make it easy for retailers and DSPs to sell studio products
  - Reliably receive content from studios
  - Allow innovation



# SMPTE History



- Soc. of Motion Picture and Television Engineers
- International Standards Developing Organization
- Founded in 1916 as SMPE
- Timecode standards
- Digital Cinema standards
- MXF/BXF standards
- RP210 Metadata Dictionary

# SMPTE Profile



## **Society of Motion Picture and Television Engineers**

**Context:** Broad (content creation, distribution, archival, and playback)

**Participants:** Equipment manufacturers, software developers, major Hollywood studios, European broadcasters, other content creators (not just entertainment or scripted content)

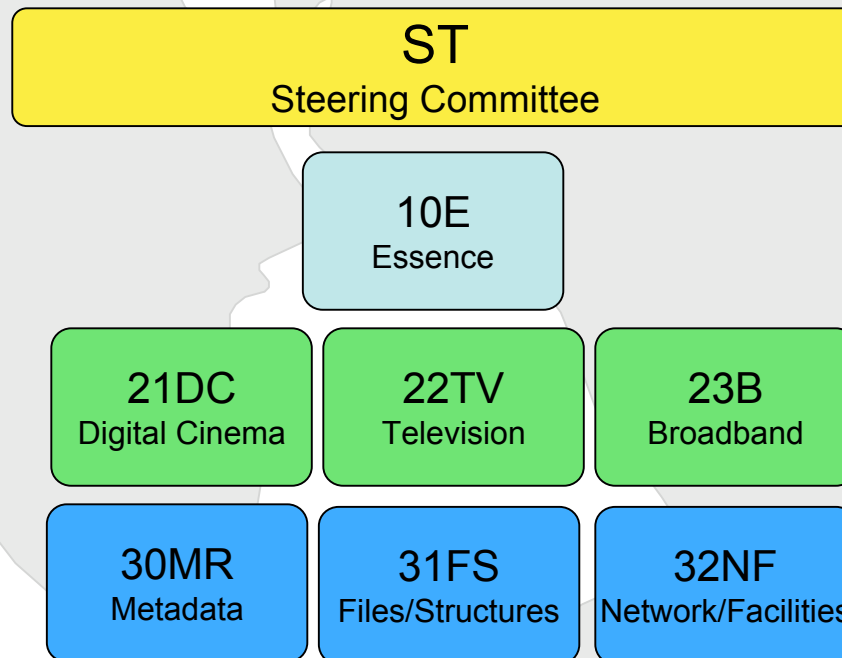
**Geography:** North America/Studios, Europe, Asia

**Limits:** Does not typically deal with consumer applications, EPG standards typically handled elsewhere

# SMPTE

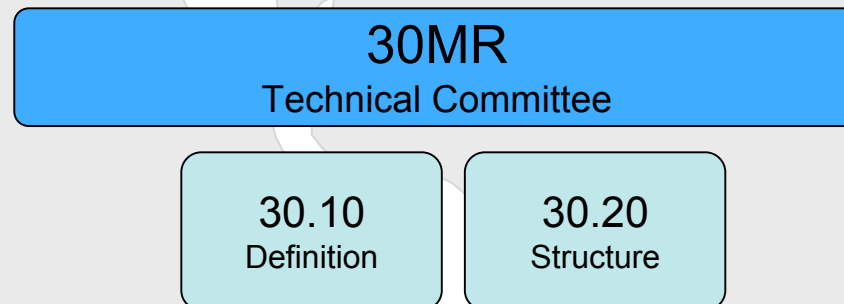


## Committee Structure



# Org Structure for Metadata

- Metadata and Registers committee (30MR)



- Considered an “infrastructure” committee, all other committees have input into this work





MXF



## Material Exchange Format

- Wraps audio, video, subtitles, and metadata into a single file
- Uses standardized class hierarchies and “operational patterns”
- Designed to work with a variety of digital file formats
- Can be used for
  - File Exchange
  - Distribution
  - Playout
  - Archive
- Format is used by Digital Cinema and other applications
- Integrates with AAF, Advanced Authoring Format
- Cameras can export MXF metadata today

# MXF Metadata



- Optimized for hardware and performance, not human readability
- MXF format is of special interest to archivists because it can be used to associate metadata with
  - An entire file
  - Components of that file
  - Individual clips
  - A single frame

Allows the annotation of any type of moving image with metadata, keywords, notes, or other historical information

- Metadata can be “dark” or “light”
- Custom and private metadata can travel with the file
- Can be used with or without essence (pure metadata)

# KLV Metadata

## KLV Triplet

Key	Length	Value
(ID)	“10”	“California”

- **Key** = SMPTE Universal Label
- **Length** = Bytes as defined by the individual metadata instance
- **Value** = The actual metadata
- The key, or SMPTE Universal Label, tells a machine what type of data is being sent.
- Unlike symbols used in XML element names, these keys are not optimized for humans.

# RP210 Metadata Element Dictionary



RP210 stores data element definitions and identifiers for:

- MXF
- Digital Cinema
- Other SMPTE standards and external standards

RP210 Structure

- Assigns Universal Labels (OIDs) to each SMPTE data element
- Primarily designed to serve KLV metadata
- Elements arranged in hierarchy

## Publishing Outlet

### Broadcast

Broadcast Organization Name  
Broadcast Organization Channel  
Broadcast Service Name  
Broadcast Medium Kind

# Custom Metadata Support in MXF



SMPTE Metadata Registration is flexible....

- Class 1-7 Metadata
  - Metadata registered to support SMPTE standards
  - All items are balloted
- Class 13 Metadata: Organizationally defined for public use
  - Requires registration of top-level node
  - Could be used to hold formats for metadata not standardized by SMPTE
  - Publication in SMPTE registers makes this data available to others
- Class 14 Metadata: Organizationally defined for private use
  - Metadata elements are not published
  - Requires addition of top-level node in the SMPTE register (fee)

# Misconceptions About RP210



- It is perfect.
  - Created over time
  - Redundancies
  - Ambiguities
- It is a metadata standard.
- You should map your data to it.
  - RP210 is a collection of data elements that have been generated in the development of a particular set of SMPTE standards
  - It is not a semantic guideline
  - It is not static

# Other SMPTE Registers



RP210 is related to other SMPTE registers

- **Types Register:** Register of data types used in SMPTE standards
- **Labels Register:** Register of enumerations relating to media formats and other data
- **Controlled Vocabulary Register:** Register of controlled terms that may be language-specific, require localization, or special handling as text

All of these registers also feature Class 13 and 14 space for organizational flexibility in registration

# DMS-1 Production Framework



- Provides a structured KLV data model for descriptive metadata
  - **Production:** Metadata in this section applies to the entire MXF file.
  - **Scene:** Contains metadata that describes actions and events within individual scenes.
  - **Clip:** Contains metadata that provides capture and creation information about the individual audiovisual clips in the file body.
- Uses the native ability of MXF to tie metadata to an essence timeline, not just a header





# BXF

- Broadcast Exchange Format
- XML format used for broadcast operations
  - Program Management
  - Traffic
  - Automation
  - Content Distribution
- Young standard, but integrated into commercial software
- Not a KLV format today
- First version recently published
- Revision and expansion planned

# Other SMPTE Metadata Work



- SMPTE Metadata Naming Guidelines
- SMPTE Controlled Vocabularies
  - Includes structure for localized term lists
  - Planned integration with elements and types registers
  - Allows for integration of custom data elements and vocabularies with standard frameworks
- Multichannel Audio: Improved flexibility in track config. and labels
- Digital Cinema Distribution Master: Audio, Video, and Subtitles
- Establishment of data-driven SMPTE RA



# Future

- More integration of MXF and XML structures
- Deeper population of registries, including controlled vocabularies
- More shared metadata structures across different committee work
- Tighter data definition
- Integration with third-party standards



# Participation

- Participation in SMPTE activities can be
  - Expensive
  - Time-consuming
  - Challenging
  - Long-term commitment
  - Frustrating/Rewarding
- Are there alternatives to direct participation?
  - Join SMPTE and participate in local meetings
  - Provide feedback via user groups or other organizations such as ETC@USC, ASC, AMIA, EMA, and other similar organizations
  - Contact SMPTE representatives from your company (or me!)
  - Establish a liaison with your organization
  - Consider registering your organizational metadata with SMPTE



# Conclusion

- SMPTE is working on many different metadata formats for professional use
- SMPTE has a wide variety of participants from content creators to broadcasters to manufacturers
- MXF is an important file exchange format allowing the use of standardized and custom metadata
- SMPTE standardization offers global perspective and helps ensure hardware and software compatibility for motion picture applications
- Thank you!