



CONTENT PACKAGING FOR DIGITAL CINEMA

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Content Packaging / Interchange For Digital Cinema

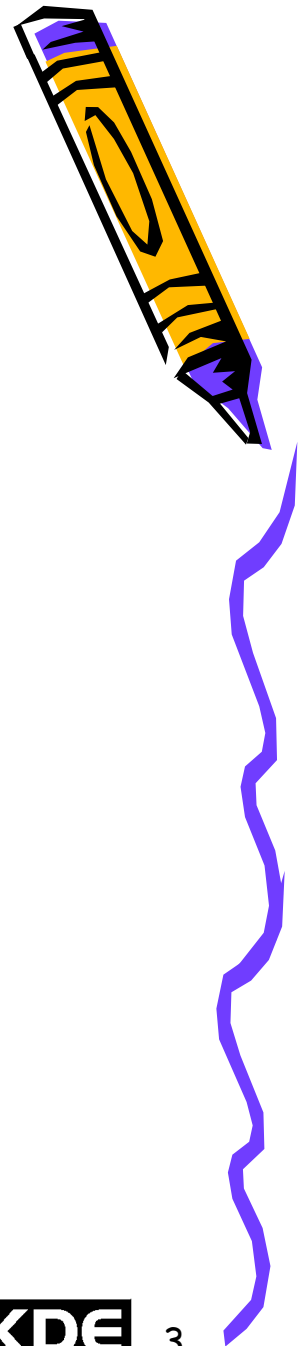


- Question: With GXF, MXF, AAF, and [your name here] available, why does digital cinema need a new packaging / interchange scheme?
- Answer: No one said it does. The plan is to understand what we need, and adapt what we can.



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The Tools Mastering Works With Today



- Mastering works with Scenes.
 - Scenes can be as short as 1 Frame.
- Scenes are organized into Reels.
 - Reels are fixed length.



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In The Projection Booth



- Reels are spliced onto Platters.
 - The entire show is on the Platter, including Trailers.
- It is not uncommon for Reels to be replaced just prior to opening.
 - This flexibility needs to be preserved.



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But Digital Isn't Film

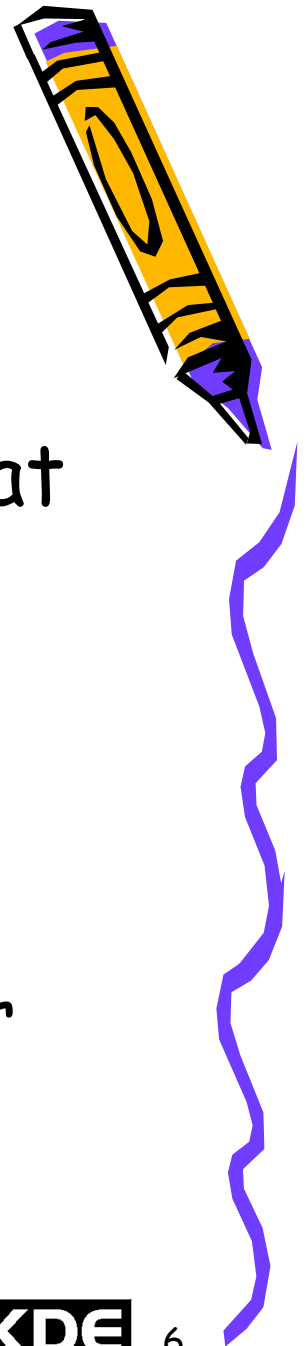


- For Film, Picture and Sound are (usually) on the same Medium.
- For Digital, Picture and Sound can be stored in different files.
 - Interleaved Picture and Sound are also possible, but separate files are generally preferred for Flexibility.



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And There's More To Digital



- Digital Content can have things that Film can't, such as:
 - Metadata
 - Closed Captioning
 - Queues
 - Do-dahs to trigger lasers, shake your chair, whatever turns you on...



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Don't Forget Security!



- Encryption: Desirable to NOT encrypt the entire file.
 - Got to leave something exposed for the machines to read.
- Digitally Signed Files and Hashes: Tools to identify if digital content is intact and not tampered with.



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Putting It All Together

- Digital Cinema Package Requirements
 - Can be organized into chunks similar to Reels. (for Mastering and Flexibility)
 - Supports non-interleaved files.
 - Supports Metadata and other forms of essence such as Closed Captioning.
 - Supports selective Encryption.
 - Supports Security Tools such as Hashes and Digital Signature.



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New Terminology

(Just to prove that we know what we're doing)



- Composition

- The collection of files that makes up a Movie, Trailer, Ad, whatever.

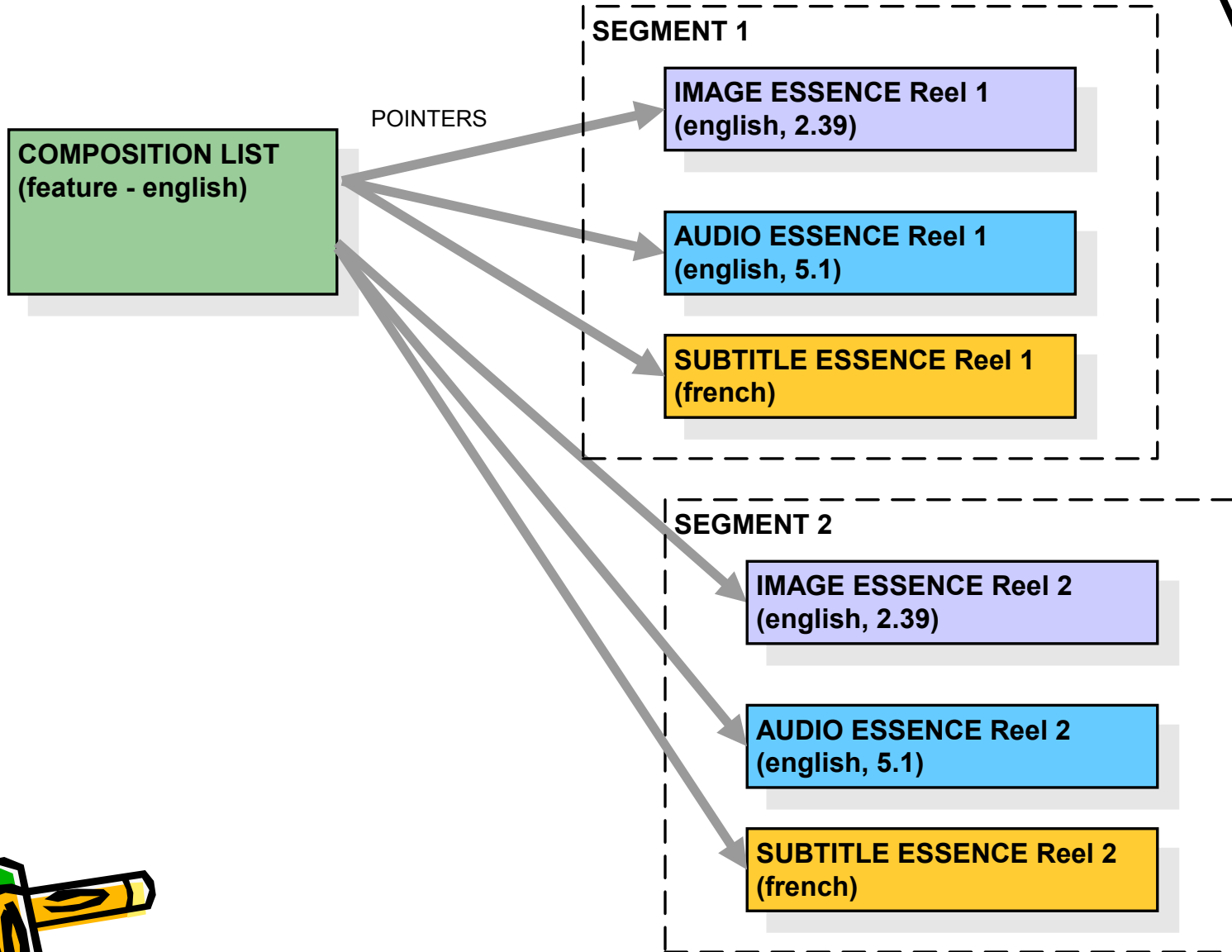
- Composition List

- An "index" of the files that make up the Composition. (Can also support Security features, etc.)



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Composition



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What's A Segment?



- Segment = "digital" Reel
 - A set of Essence, Data Essence, and Metadata files that together comprise a specific period of time in the Composition.
 - Segments are conceptual. They are not a logical element within the Package.



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Composition List & Flexibility



- The Composition List contains the hashes for each Composition file, so integrity can be checked.
- A Composition can be updated in the field, piecemeal fashion, by sending the revised Composition files with a new Composition List.



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Compositions Can Be Efficient

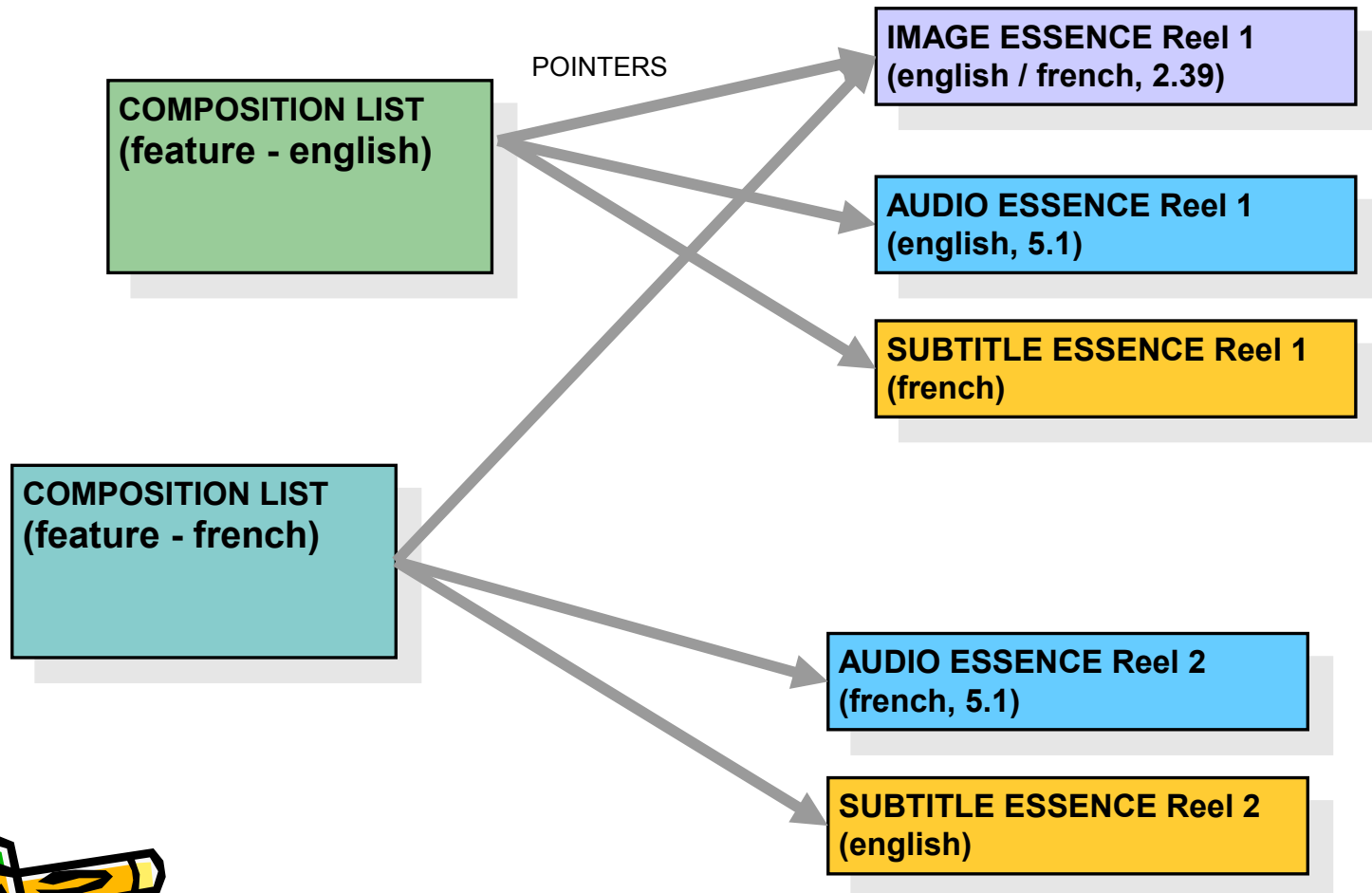


- A Composition can share files with other Compositions.
 - Can be useful for multiple languages or multiple versions.
 - Each new version (language or different cut) has its own Composition List.



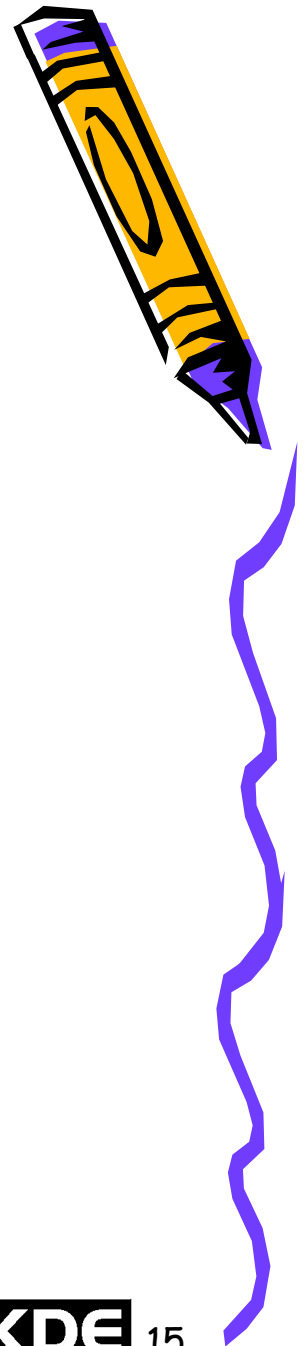
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Composition Efficiency



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There's More To The Packaging Story



- We need to Distribute the Composition, or possibly a Partial Composition.
 - Requires a PACKING LIST
- We also need to play multiple Compositions in the Theatre
 - Requires SHOW Assembly



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The Business-Side Has Some Requirements, Too

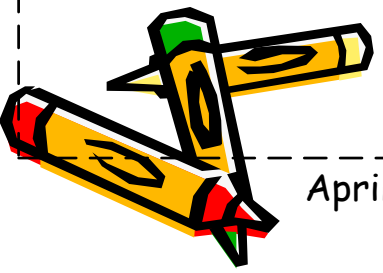
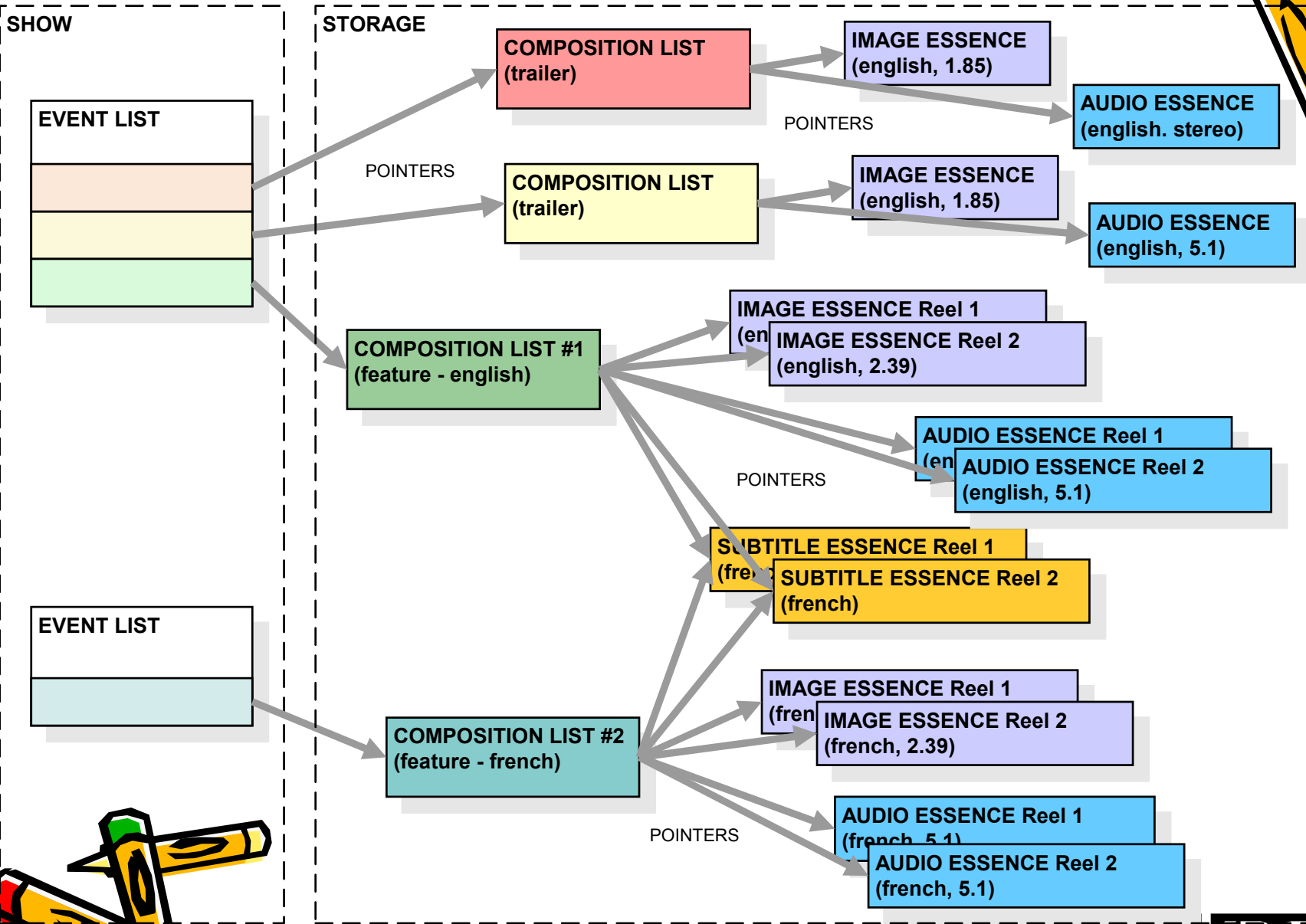


- Distributors want to Identify the Trailers to be played with a Movie, along with their Play Order.
 - This information is placed in an Event List.
(We like to avoid Play List as it has different meanings to different folks.)



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A Show With Event Lists



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So How Do We Do All Of This?

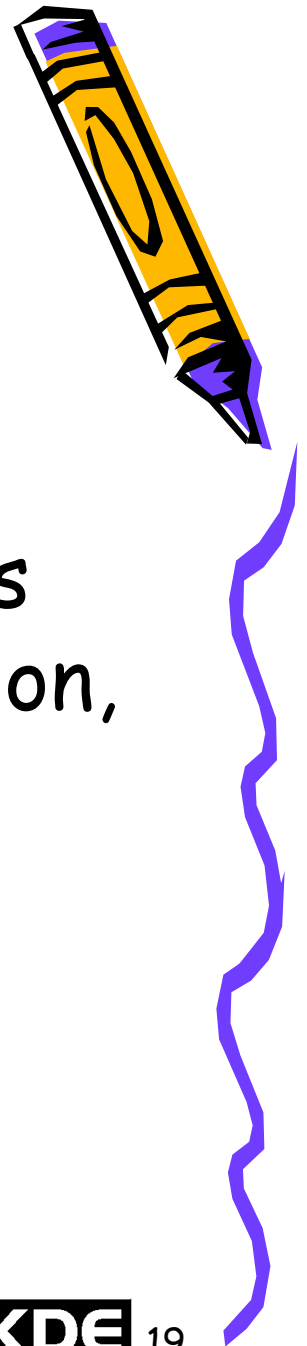


- TBD
 - Want to incorporate existing standards wherever possible.
- Technical issues to be addressed:
 - Essence synchronization.
 - Decryption key synchronization.
 - We didn't talk about Key Epoch!



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Summary

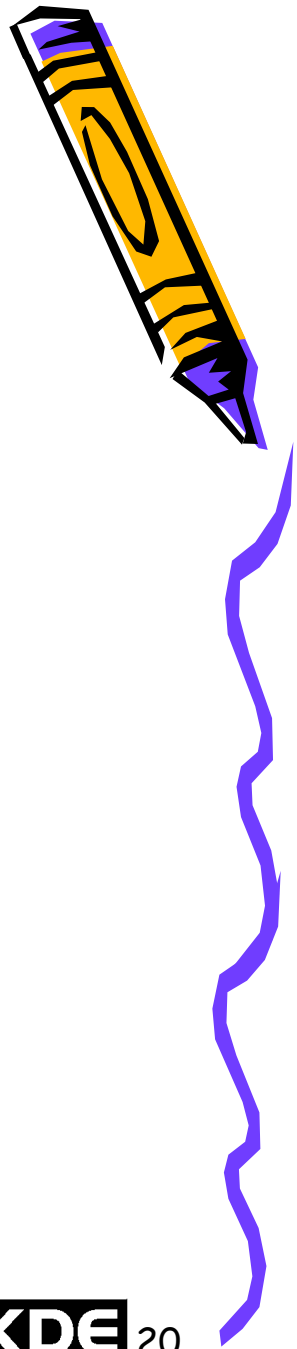


- Digital Cinema needs a Packaging / Interchange Scheme that supports the needs of Mastering, Distribution, and Exhibition.
- Don't do this at home.



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Thanks for listening!



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