

IMF Implementation

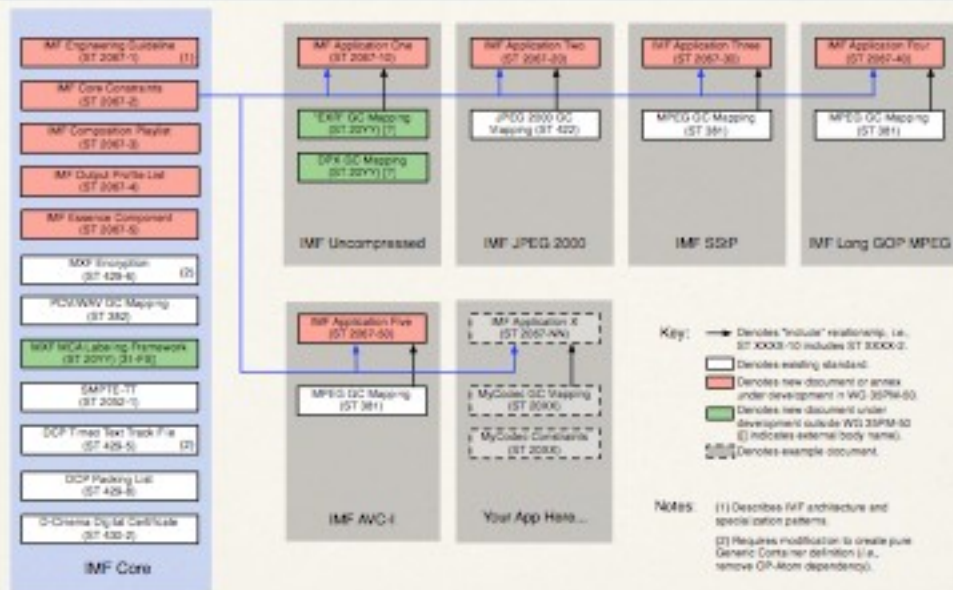
John Hurst
CineCert

15 February 2012

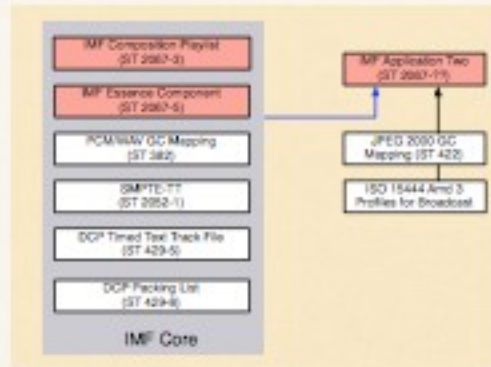
ouch, man

Proposed IMF Document Roadmap v1.4

- September 2011



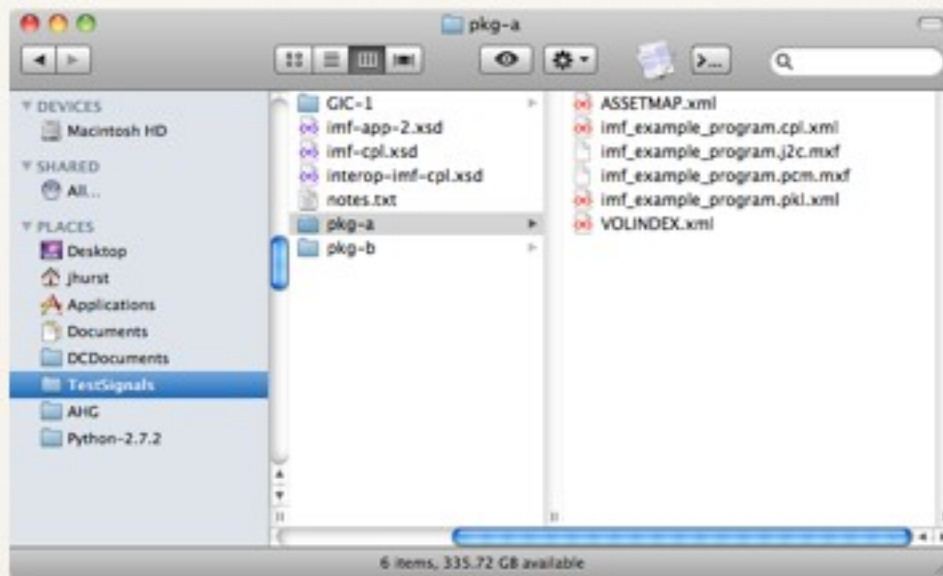
IMF Application 2 (JPEG 2000)



IMF Application 2 (JPEG 2000)

- + HD and SD image rasters (Rec. 601, Rec. 709)
- + JPEG 2000 (ISO 15444 Amd. 3)
- + uncompressed PCM audio
- + captions
- + high-fidelity subtitles

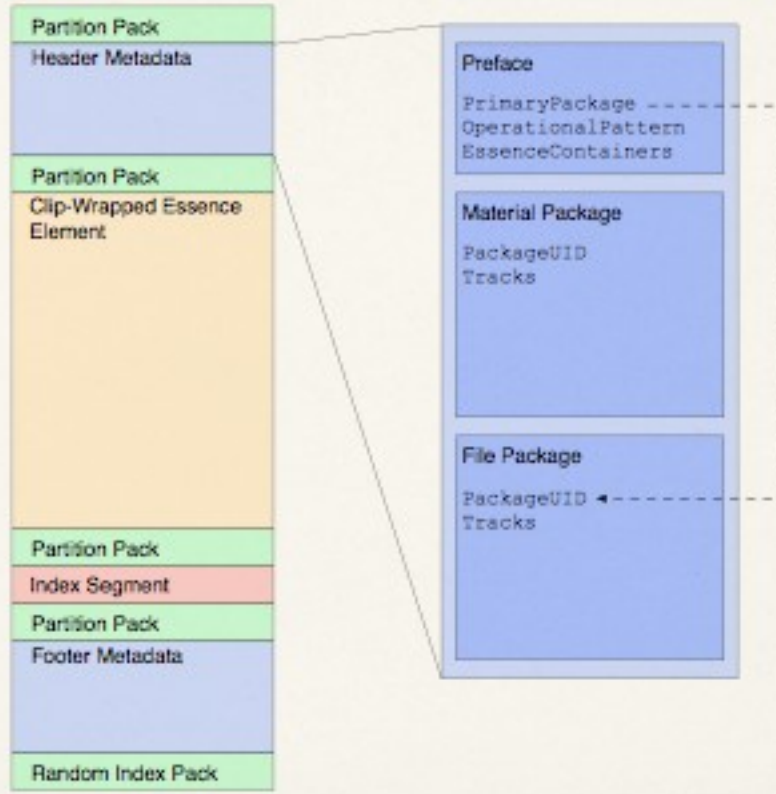
On-disk - Simple



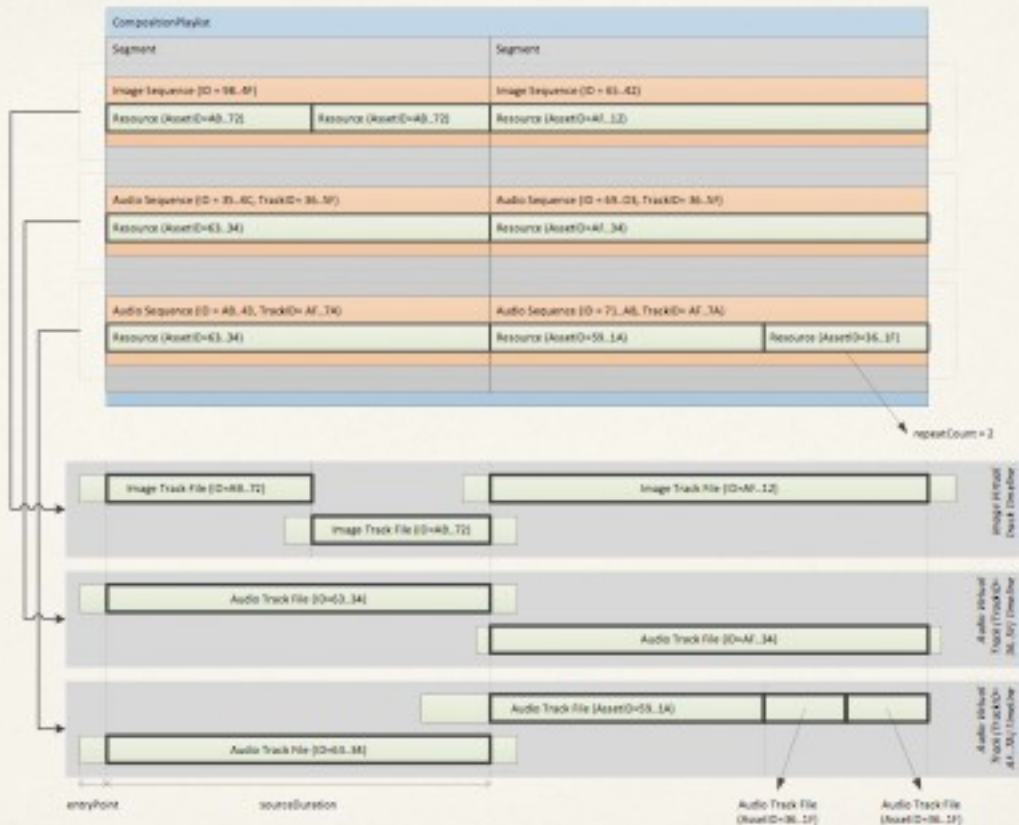
Embedded ID - CPL

```
<?xml version="1.0" encoding="UTF-8"?>
<CompositionPlaylist
  xmlns="http://www.smpte-ra.org/schemas/2067-3/XXXX"
  xmlns:app2="http://www.smpte-ra.org/schemas/2067-3/XXXX/EssenceSequence"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Id>urn:uuid:743394f0-634d-4785-801e-80ff35f185cd</Id>
  <IssueDate>2012-02-15T22:59:51+00:00</IssueDate>
  <ContentTitle>Tangled_ENG</ContentTitle>
```

Embedded ID - MXF



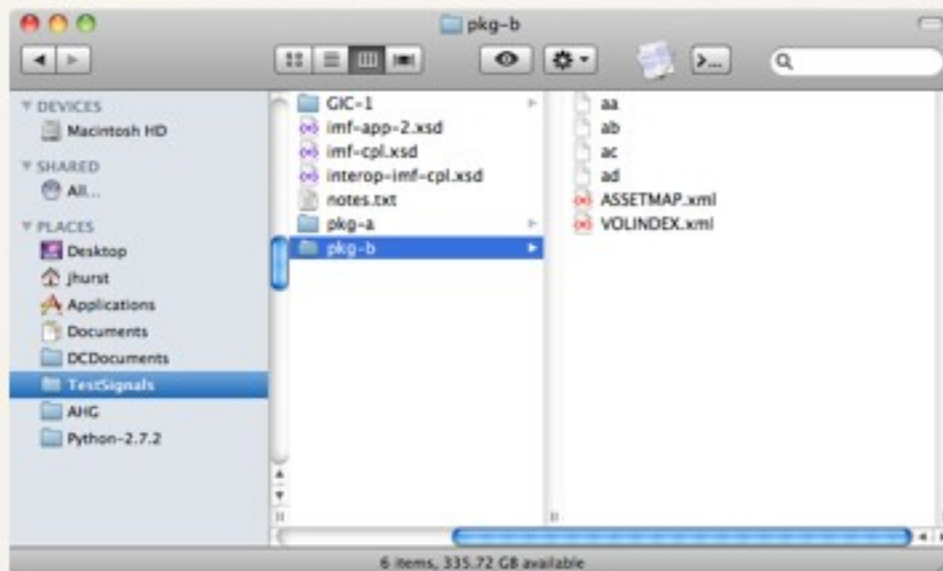
CPL Reference Model



Essence Linkage from CPL

```
<SegmentList>
  <Segment>
    <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
    <SequenceList>
      <app2:ImageSequence>
        <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
        <TrackId>urn:uuid:a6d70df0-e5fa-474b-af9c-418e42ba7bd4</TrackId>
        <ResourceList>
          <Resource xsi:type="TrackFileResourceType">
            <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
            <EditRate>24000 1001</EditRate>
            <IntrinsicDuration>2665</IntrinsicDuration>
            <EntryPoint>0</EntryPoint>
            <SourceDuration>2665</SourceDuration>
            <SourceEncoding>urn:uuid:9a57649b-5f17-4403-825b-56f25a67aaa1</SourceEncoding>
            <TrackFileId>urn:uuid:43292b3f-9726-42c4-b6cf-c975056fab45</TrackFileId>
          </Resource>
        </ResourceList>
      </app2:ImageSequence>
    </SequenceList>
  </Segment>
</SegmentList>
```

On disk - Obfuscated



Essence Component Files

IMF Essence Component = AS-02 Essence Component

Essence Component - Audio

Linear PCM

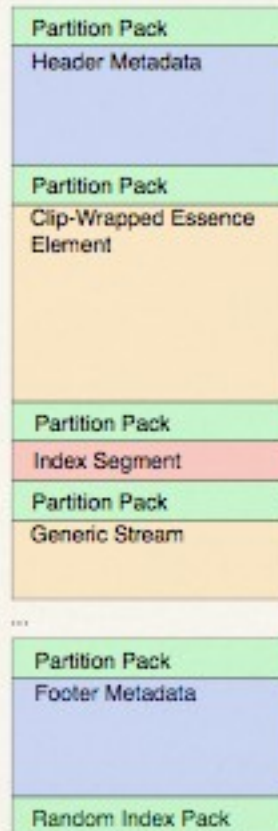
ST 382, ST 377-4



Essence Component - Data/Text

XML, OpenType, PNG

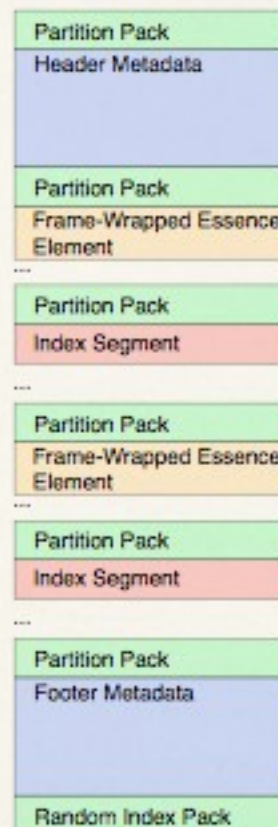
ST 2052, ST 428-7, ST 429-5



Essence Component - Image

JPEG 2000 / ISO 15444 Amd. 3
Profiles for Broadcast Applications

ST 422



Composition Playlist

- * Editorial and Synchronization
- * "Segment" editorial granularity similar to MXF Material Package
- * List of Segments supported
- * Essence Descriptors for convenience
- * Useful XML business object

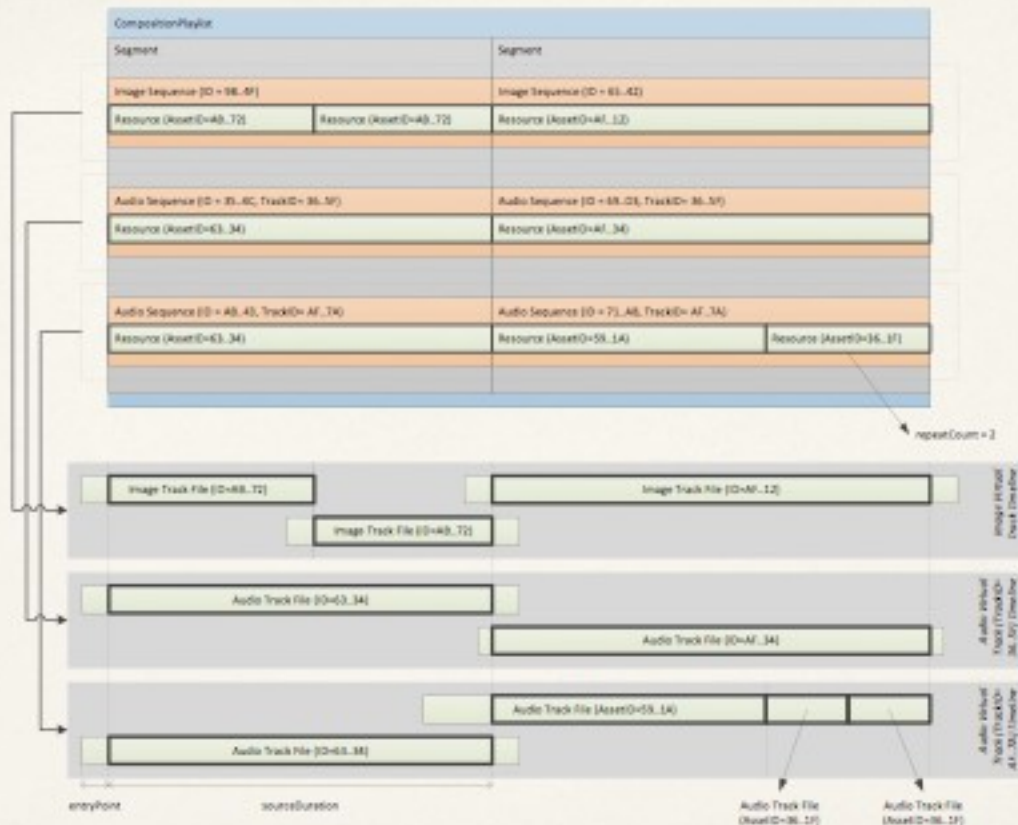
Composition Playlist

```
<?xml version="1.0" encoding="UTF-8"?>
<CompositionPlaylist
  xmlns="http://www.smpte-ra.org/schemas/2067-3/XXXX"
  xmlns:app2="http://www.smpte-ra.org/schemas/2067-3/XXXX/EssenceSequence"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <Id>urn:uuid:743394f0-634d-4785-801e-80ff35f185cd</Id>
  <IssueDate>2012-02-15T22:59:51+00:00</IssueDate>
  <ContentTitle>Tangled_ENG</ContentTitle>

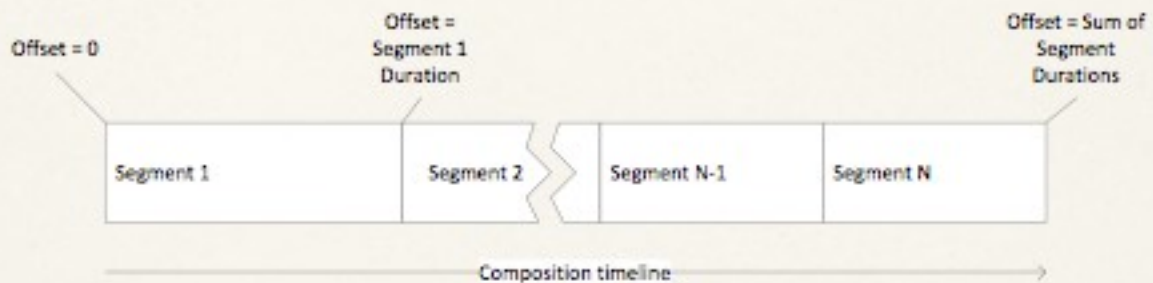
  <EssenceDescriptorList>
    <EssenceDescriptor xsi:type="app2:BasicDescriptorType">
      <Id>urn:uuid:8f4b4f3b-44bc-4eb4-92ad-0e9cab3e15ad</Id>
    </EssenceDescriptor>
  </EssenceDescriptorList>

  <EditRate>24000 1001</EditRate>
  <ExtensionProperties />
</CompositionPlaylist>
```


CPL Reference Model



List of Segments



Set of Sequences

Sequence 1



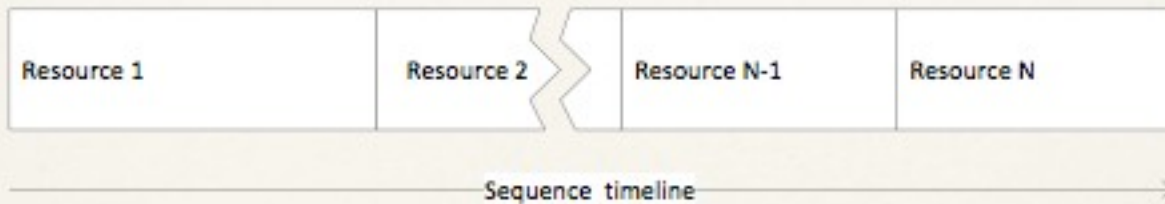
Sequence N - 1

Sequence N

— Segment Timeline —▶

```
<SegmentList>
  <Segment>
    <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
    <SequenceList>
      <app2:ImageSequence>
        <!-- ... -->
      </app2:ImageSequence>
      <app2:AudioSequence>
        <!-- ... -->
      </app2:AudioSequence>
    </SequenceList>
  </Segment>
  <!-- ... -->
</SegmentList>
```

of Resources



Essence Linkage from CPL

```
<SegmentList>
  <Segment>
    <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
    <SequenceList>
      <app2:ImageSequence>
        <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
        <TrackId>urn:uuid:a6d70df0-e5fa-474b-af9c-418e42ba7bd4</TrackId>
        <ResourceList>
          <Resource xsi:type="TrackFileResourceType">
            <Id>urn:uuid:9a57649b-5f17-4403-825b-56f25a67a01b</Id>
            <EditRate>24000 1001</EditRate>
            <IntrinsicDuration>2665</IntrinsicDuration>
            <EntryPoint>0</EntryPoint>
            <SourceDuration>2665</SourceDuration>
            <SourceEncoding>urn:uuid:9a57649b-5f17-4403-825b-56f25a67aaa1</SourceEncoding>
            <TrackFileId>urn:uuid:43292b3f-9726-42c4-b6cf-c975056fab45</TrackFileId>
          </Resource>
        </ResourceList>
      </app2:ImageSequence>
    </SequenceList>
  </Segment>
</SegmentList>
```

Security

- ✦ Digital Signature uses W3C
- ✦ Encryption apparently not required

Thank You

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