Content Delivery Requirements

CONTENTS

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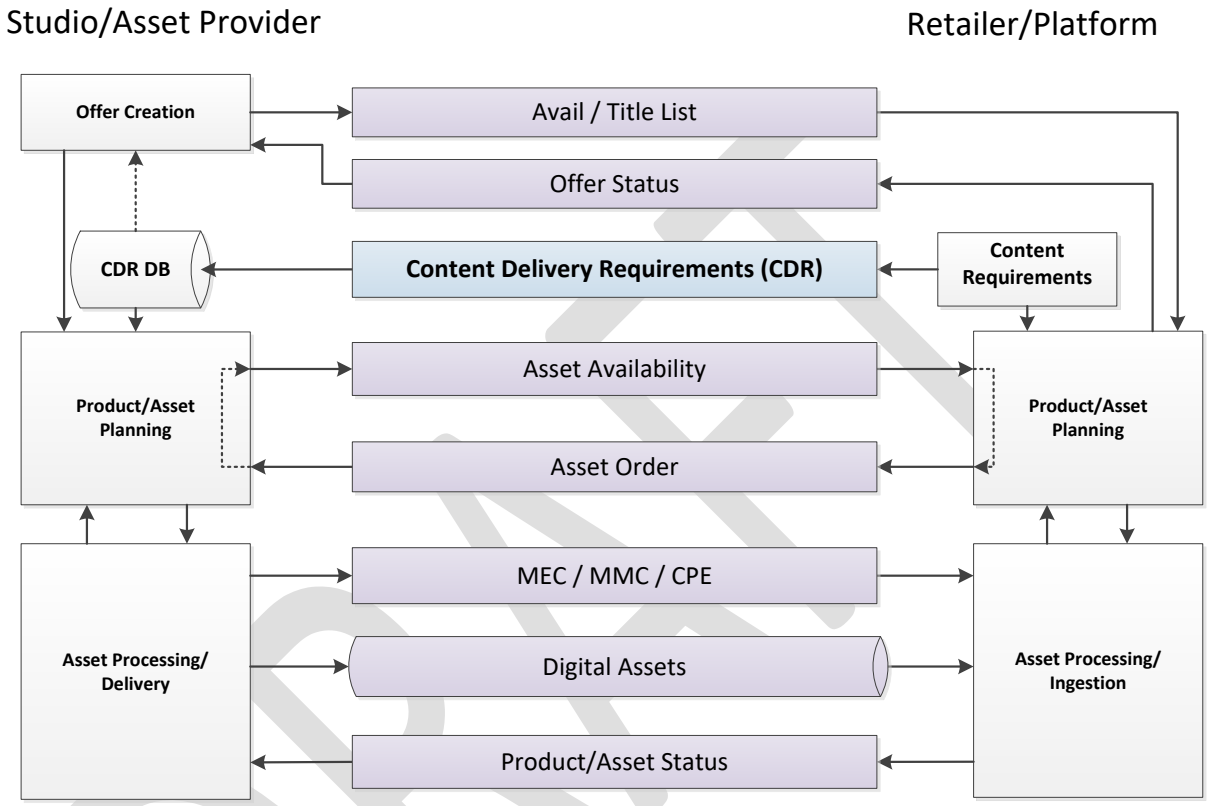
REVISION HISTORY

Version	Date	Description
1.0		Original Version

1 INTRODUCTION

This document defined data used to define details of content delivery requirements, within the MovieLabs Digital Distribution Framework (MDDF). The following illustration shows Content Delivery Requirements within the context of asset ordering and delivery.



This specification is designed to work with other MDDF specifications or with proprietary/legacy specifications.

1.1 Overview

Asset Planning determines what assets are delivered and when to meet obligations with partners. Asset policies are captured in "Content Delivery Requirements". Avail or title-specific requests are included in Avail Confirmations, Asset Orders, and Asset Availability.

1.2 Document Organization

This document is organized as follows:

1. Introduction—Provides background, scope and conventions
2. Content Delivery Requirements
3. Profiles

4. Technical Characteristics

1.3 Document Notation and Conventions

As a general guideline, the key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119]. That is:

- “MUST”, “REQUIRED” or “SHALL”, mean that the definition is an absolute requirement of the specification.
- “MUST NOT” or “SHALL NOT” means that the definition is an absolute prohibition of the specification.
- “SHOULD” or “RECOMMENDED” mean that there may be valid reasons to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- “SHOULD NOT” or “NOT RECOMMENDED” mean that there may be valid reasons when the particular behavior is acceptable, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
- “MAY” or “OPTIONAL” mean the item is truly optional, however a preferred implementation may be specified for OPTIONAL features to improve interoperability.

Terms defined to have a specific meaning within this specification will be capitalized, e.g. “Track”, and should be interpreted with their general meaning if not capitalized.

Normative key words are written in all caps, e.g. “SHALL”.

Normative requirements need not use the formal language above.

1.3.1 XML Conventions

XML is used extensively in this document to describe data. It does not necessarily imply that actual data exchanged will be in XML. For example, JSON may be used equivalently.

This document uses tables to define XML structure. These tables may combine multiple elements and attributes in a single table. Although this does not align with schema structure, it is much more readable and hence easier to review and to implement.

Although the tables are less exact than XSD, the tables should not conflict with the schema. Such contradictions should be noted as errors and corrected.

1.3.1.1 Naming Conventions

This section describes naming conventions for Common Metadata XML attributes, element and other named entities. The conventions are as follows:

- Names use initial caps, as in InitialCaps.

- Elements begin with a capital letter, as in InitialCapitalElement.
- Attributes begin with a lowercase letter, as in initiaLowercaseAttribute.
- XML structures are formatted as Courier New, such as `md:id-type`
- Names of both simple and complex types are followed with "-type"

1.3.1.2 Structure of Element Table

Each section begins with an information introduction. For example, "The Bin Element describes the unique case information assigned to the notice."

This is followed by a table with the following structure.

The headings are

- Element—the name of the element.
- Attribute—the name of the attribute
- Definition—a descriptive definition. The definition may define conditions of usage or other constraints.
- Value—the format of the attribute or element. Value may be an XML type (e.g., "string") or a reference to another element description (e.g., "See Bar Element"). Annotations for limits or enumerations may be included (e.g.," int [0..100]" to indicate an XML xs:int type with an accepted range from 1 to 100 inclusively)
- Card—cardinality of the element. If blank, then it is 1. Other typical values are 0..1 (optional), 1..n and 0..n.

The first row of the table after the header is the element being defined. This is immediately followed by attributes of this element, if any. Subsequent rows are child elements and their attributes. All child elements (i.e., those that are direct descendants) are included in the table. Simple child elements may be fully defined here (e.g., "Title", " ", "Title of work", "xs:string"), or described fully elsewhere ("POC", " ", "Person to contact in case there is a problem", "md:ContactInfo-type"). In this example, if POC was to be defined by a complex type defined as md:ContactInfo-type. Attributes immediately follow the containing element.

Accompanying the table is as much normative explanation as appropriate to fully define the element, and potentially examples for clarity. Examples and other informative descriptive text may follow. XML examples are included toward the end of the document and the referenced web sites.

1.3.2 General Notes

All required elements and attributes must be included.

When enumerations are provided in the form 'enumeration', the quotation marks ('') should not be included.

UTF-8 [RFC3629] encoding shall be used when ISO/IEC 10646 (Universal Character Set) encoding is required.

1.4 Normative References

[Delivery]	*Asset Ordering and Delivery*, TR-META-AOD, www.movielabs.com/md/delivery
[CM]	*Common Metadata*, TR-META-CM, http://www.movielabs.com/md/md
[Manifest]	*Common Media Manifest Metadata*, TR-META-MMM, http://www.movielabs.com/md/manifest
[MEC]	*Media Entertainment Core*, TR-META-MEC, http://www.movielabs.com/md/mec/
[EIDR]	Entertainment Identifier Registry (EIDR), http://eidr.org/resources/
[XML]	*XML Schema Part 1: Structures*, Henry S. Thompson, David Beech, Murray Maloney, Noah Mendelsohn, W3C Recommendation 28 October 2004, http://www.w3.org/TR/xmlschema-1/ and *XML Schema Part 2: Datatypes*, Paul Biron and Ashok Malhotra, W3C Recommendation 28 October 2004, http://www.w3.org/TR/xmlschema-2/

1.5 Informative References

[Avails]	*Content Availability Metadata*, TR-META-AVAIL, http://www.movielabs.com/md/avails
[QCVocab]	*Quality Control (QC) Vocabulary*, http://www.movielabs.com/md/qcvocabulary
[Ratings]	*Common Metadata Content Ratings*. www.movielabs.com/md/ratings. Note that a specific version is not referenced as it is intended that the latest version will be used. Referencing specifications may selection a specific version of the referenced document.

1.6 Status

This specification is not ready for implementation. As requirements evolve, we anticipate that the identification of additional use cases will motivate changes. Implementers should anticipate future revisions. Reasonable measures will be taken to ensure changes are backwards compatible.

1.7 Best Practices for Maximum Compatibility

Metadata typically evolves with the addition of new elements, attributes and vocabularies. Existing applications should be capable of accepting metadata, even though there might be more data than expected. Strict XML validation precludes an orderly evolution and can be counterproductive to the flexibility needed in real implementations.

Metadata specifications and schema updates are designed to support backwards compatibility. For example, element and attributes can be added, but required elements are not removed; or more generally ordinality of elements and attributes can be widened but not narrowed. Values are not changed in either syntax or semantics. Therefore, we strongly encourage implementations to either be diligent in tracking to the latest version, or follow the backwards compatibility rules provided here.

An XML document is considered compatible if its structure does not preclude the extraction of data from the document. For example, a document with additional elements and attributes do not preclude schema parsing and data extraction.

- Do not reject compatible XML documents, unless they fail schema validation against the definition for an exact version/namespace match.
- Extract data from compatible XML documents whenever possible
- It is allowable to ignore elements and attributes whose presence is not allowed in the specification and schema versions against which the implementation was built. For example, if the original schema allows one instance and three instances are found, the 2nd and 3rd instance may be ignored.

We will try to update metadata definitions such that following these rules work consistently over time. Sometimes, changes must be made that are not always backwards compatible, so we will do our best to note these.

2 CONTENT DELIVERY REQUIREMENTS

2.1 Requirements Structure

There are two parts to defining requirements: Scope (where the requirements apply) and Profiles (structured requirements).

2.1.1 Scope

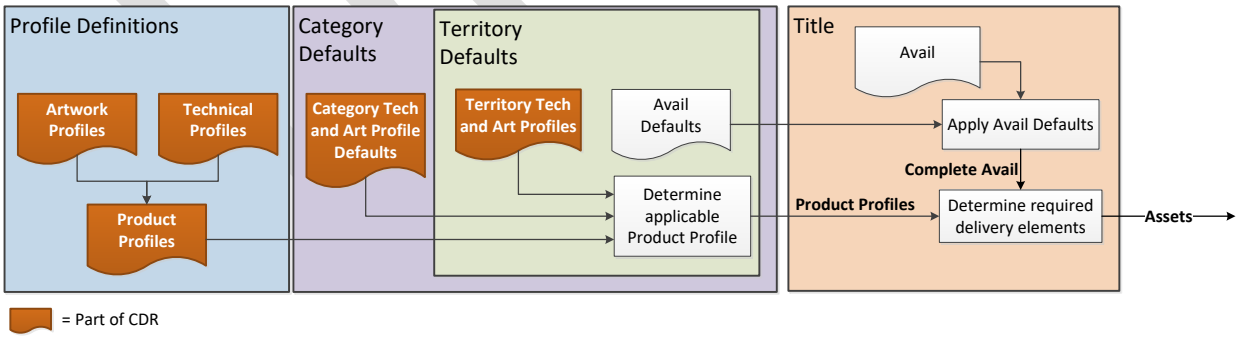
Scope defines where and when Profiles apply. Scope further divides into Territory and Category (TV, movies, etc.).

Territory is pretty straightforward. If the scope is worldwide, requirements apply everywhere, except where territory requirements are specified. This is an object model, where territories inherit the properties of the world, except where exceptions exist. There are specific rules that dictate what is inherited and what is not.

Category defines what type of content, storefront, license model or other contextual parameter determines what rules apply. Like Region, Category is an object model where specifics inherit from their parent. For example, there could be a Category for TV and subcategory for Next-Day TV. Next-Day TV inherits most of its requirements (e.g., required artwork) from TV, but has different delivery timeframes.

Although inheritance can, at first, be daunting this is very much how people refer to content delivery requirements on paper.

This model is illustrated in the following figure. Profile Definitions define the Profiles for application within categories and territories. Category Defaults are the default profiles for the category. Territory Defaults are the defaults for profiles, *within* the Category. External to CDR are default Avail values (e.g., what languages are licensed by default within a territory). These Avail Defaults can be combined with an Avail for a Complete Avail (i.e., all the blanks filled in). Finally, all this information is combined to determine which assets apply.



Not shown in this illustration are *Administrative Profiles*.

Note that an earlier version of this specification included Language Profiles along with the others. It was determined that these are better handled in Avail Defaults. However, use cases might be discovered that will be best served by the inclusion of Language Profiles.

2.1.2 Profiles

A Profile describes requirements for some specific delivery. It takes several Profiles to fully describe a delivery.

Consider artwork for TV. It requires a collection of images with a particular aspect ratio and resolution; each with its own 'purpose'. These are called Artwork Profiles. However, each image must comply with technical requirements such as encoding (JPEG, GIF, PNG), color encoding, maximum file size, and so forth. As all artwork images comply with a relatively small number of image specs, we have we have Image Profiles. Artwork Profiles simply refer to the applicable Image Profile.

Profiles come in the following categories

- Admin Profiles – Administrative rules such as lead times
- Language Profiles – Rules about localization, subs and dubs, and other language requirements as they apply to a territory
- Artwork Profiles – Sets of artwork, including resolutions, purpose, etc.
- Product Profiles – Definition of product-related deliverables, such as features, trailers, artwork, and bonus
- Technical Profiles – Audio, video, image, subtitle, and other digital asset technical descriptions

2.1.2.1 Product Profiles

A Product Profile defines requirements for Feature (main feature), Promotional (ads, such as trailers) and Supplemental (bonus/extras/VAM). Each of these can have their own content requirements covering technical requirements, artwork, metadata and parameters specific to the type.

One would generally expect to have distinct Product Profiles for movies and TV. One could additionally have Product Profiles for deep catalog or tentpole titles. For example, deep catalog might have relaxed technical requirements. Tentpole titles might have additional expectations on artwork, trailers (Promotional) or bonus (Supplemental).

2.1.2.2 Admin Profiles

Admin profiles address logistics issues such as lead time and priority. This sets general rules about delivery.

2.1.2.3 Language Profiles

Language Profiles describe localization, including what artwork, metadata, audio, localized video, and other materials must be provided.

Language Profile is designed to provide defaults for information that would be found in EMA Avails [Avails]. Information in the Language Profile can be mapped directly to AllowedLanguages, AssetLanguage, LocalizationType, and RequiredFulfillmentLanguages.

2.1.2.4 Artwork Profiles

Each retail user interface has its own artwork requirements. Typically, there is a set of images for any given application. For example, movies might require 0.73 aspect ratio key art, while TV requires square key art. However, there can be more specific requirements, such as artwork for premium movies versus artwork for deep catalog movies.

Artwork Profiles are created for each set of images, each with a specific purpose (e.g., "cover1" or "hero2"). Purposes can correspond with MEC's LocalizedInfo/ArtReference/@purpose, so when artwork is delivered you know exactly what you're getting.

Image encoding (e.g., GIF/JPG/PNG, color space, etc.) is distinct from the Artwork Profile.

2.1.2.5 Technical Profiles

The following Technical Profiles are provided

- Audio
- Video
- Subtitle
- Image
- Cards
- Metadata
- Container

2.1.3 Profile Examples

2.1.3.1 Technical Profile

The following illustrates potential Technical Profiles. These profiles are described rather than encoded in XML. Many details are omitted for brevity.

Following are example video profiles:

Profile Name	Codec	Aspect Ratio	Color Space	Primaries	Sub-sampling	Bit depth	Frame Rate
HD ProRes	ProRes HQ	4:3, 1.66:1, 16:9, 1.85:1, 2:1, 2.20:1, 2.35:1, 2.39:1, 2.40:1	BT.709	BT.709	4:2:0 or 4:2:2	8-bit or 10-bit	23.976p, 24p, 25i, 25p, 29.97i, 29.97p, 30i, 30p, 60i
HD MPEG2	MPEG-2 Main or High	4:3, 1.66:1, 16:9, 1.85:1, 2:1, 2.20:1, 2.35:1, 2.39:1, 2.40:1	BT.709	BT.709	4:2:0 or 4:2:2	8-bit or 10-bit	23.976p, 24p, 25i, 25p, 29.97i, 29.97p, 30i, 30p, 60i

HD AVC	H.264 Hight	4:3, 1.66:1, 16:9, 1.85:1, 2:1, 2.20:1, 2.35:1, 2.39:1, 2.40:1	BT.709	BT.709	4:2:0 or 4:2:2	8-bit or 10-bit	23.976p, 24p, 25i, 25p, 29.97i, 29.97p, 30i, 30p, 60i
UHD	ProRes	4:3, 1.66:1, 16:9, 1.85:1, 2:1, 2.20:1, 2.35:1, 2.39:1, 2.40:1	BT.709	BT.709	4:2:2	10-bit	23.976, 24, 25, 29.97, 30, 60
UHDHDR	ProRes 422 HQ	4:3, 1.66:1, 16.9, 1.85:1, 2:1, 2.20:1, 2.35:1, 2.39:1, 2.40:1	BT.2100	P3	4:2:2	10-bit	23.976, 24, 25, 29.97, 30, 60

Following are example audio profiles

Profile Name	Codec	Channel Layout	Sample Rate	Bit Depth	Min Bitrate
PCM	PCM	'Mono', 'Mono, Mono', 'L,R' 'L,R,C,LFE,LS,RS', ' 'L,R,C,LFE,LS,RS,LRS,RRS'	48KHz	16, 24	
MPL2-S	MPEG-2 Layer II	'Mono', 'Mono, Mono', 'L,R'	48KHz	16, 24	384K
MPL2-MC	MPEG-2 Layer II	'L,R,C,LFE,LS,RS', ' 'L,R,C,LFE,LS,RS,LRS,RRS'	48KHz	16, 24	912K
AC-3-S	AC-3	'Mono', 'Mono, Mono', 'L,R'	48KHz	16, 24	192K
AC-3-MC	AC-3	'L,R,C,LFE,LS,RS', ' 'L,R,C,LFE,LS,RS,LRS,RRS'	48KHz	16, 24	448K
AAC-S	AAC	'Mono', 'Mono, Mono', 'L,R'	48KHz	16, 24	448K
AAC-MC	AAC	'L,R,C,LFE,LS,RS', ' 'L,R,C,LFE,LS,RS,LRS,RRS'	48KHz	16, 24	960K
Atmos	EAC3-Atmos				

Given these Audio and Video Profiles, a Technical Profile might look like the following. It references the other profiles. Note that an actual package definition would also reference subtitles.

Profile Name	Container	Video Profiles	Audio Profiles
MOV-HD	MOV	HD MPEG2, HD AVC	PCM, MPL2-S, MP2-MC, AC-3-S, AC-3-MC, AAC-S, AAC-MC
MOV-UHD	MOV	UHD, UHDHDR	PCM, MPL2-S, MP2-MC, AC-3-S, AC-3-MC, AAC-S, AAC-MC
ProRes-HD	ProRes	HD ProRes	PCM, AC-3-S, AC-3-MC, AAC-S, AAC-MC, Atmos
ProRes-UHD	ProRes	UHD, UHDHDR	PCM, AC-3-S, AC-3-MC, AAC-S, AAC-MC, Atmos

3 GENERAL TYPES ENCODING

This section describes types that are used throughout the Asset Ordering and Delivery Specification, generally in more than one type definition.

The consistent use of these definitions ensures consistency between objects. Usage applies to all uses unless otherwise stated.

3.1 Attribute Groups

3.1.1 RangeAttributes

The RangeAttributes-attr attribute group is used to define acceptable ranges. This

Attribute Group	Definition	Value	Card.
RangeAttributes-attr			
rangeCondition	Range Condition. See below.	xs:string	0..1
rangeRank	Relative ranking within equal rangteCondition, or if rangeCondition is unspecified. 0 is highest rank.	xs:nonNegativeInteger	0..1

RangeCondition defines the range of acceptable technical parameters. RangeCondition is an xs:string and typically an attribute (@rangeCondition).

When values are expressed,

Acceptable values for @rangeCondition are as follows

- ‘min’ – Represents minimum requirement. If numeric, lower values are not accepted.
- ‘max’ – Represents the maximum acceptable value. If numeric, higher values are not accepted.
- ‘preferred’ – Represents preferred condition or value.
- ‘acceptable’ – Represents a condition or value that is acceptable but not desired. There may be negative consequences of using this condition, such as lower quality.

4 DELIVERY REQUIREMENTS

4.1 DeliveryRequirement-type

DeliveryRequirements-type is the root definition of a ContentDeliveryRequirements element.

Element	Attribute	Definition	Value	Card.
ContentDeliveryRequirements-type				
	updateNum, workflow, updateDeliveryType, versionDescription	Common set of workflow attributes (defined in Common Metadata)	md:Workflow-attr	
Compatibility		Spec compatibility	manifest:Compatibility-type	
Source		Source of CRD	delivery:DeliveryPlatform-type	0..1
Destination		Recipient of CRD	delivery:DeliveryPublisher-type	0..1
CDRID		Identifier for set of content delivery rules	md:id-type	0..1
Description		Description of content delivery rules set.	xs:string	0..1
AdminProfile		Applicable Admin Profiles	delivery:DeliveryAdminProfile-type	0..n
Profiles		Applicable Product, Technical and Artwork Profiles	delivery:Profiles-type	0..1
CategoryRules		Rules by Category and then Territory	delivery:CategoryRules-type	0..1
Instructions		Handling instructions. Includes exception flag.	delivery:Instructions-type	0..1

4.2 CategoryRules-type

Category Rules define the rules for one or more categories (e.g., Movie, TV or Next Day TV), and within that Category Territory Rules.

The referenced Product Profile within this object defines the default Product Profile for all territories. This can be superseded by Product Profile references within a TerritoryRules object.

Element	Attribute	Definition	Value	Card.
DeliveryCategoryRules-type				
ContentyCategory		Content Category for rules defined in this object.	xs:string	0..1
ContentSubCategory		Additional specificity of Content Category for rules defined in this object.	xs:string	0..n
ProductProfileID		Reference to applicable Product Profile	md:id-type	0..1
TerritoryRules		Territory rules	delivery:TerritoryRules-type	0..1
Term		Additional terms that apply to this category and sub-category.	md:Terms-type	0..n

ContentCategory and ContentSubCategory define the scope of the CategoryRules object. When ContentDeliveryRequirements are used in conjunction with EMA Avails, ContentCategory values should correspond with Avails WorkType values. That allows an unambiguous linkage to Avails. ContentSubCategory can include values of WorkTypeDetail, values of EMA Avails LicenseTypeDescription (e.g., “Next Day TV” or “POD”), or other values that define handling (e.g., “Priority” and “Library”).

4.2.1 TerritoryRules-type

Territory rules apply across all categories within the territory, except when covered in category rules—category rules take precedence.

Element	Attribute	Definition	Value	Card.
DeliveryTerritoryRules-type				

Region		Region and Excluded Region define the territories where rules apply. They are encoded in accordance with Media Manifest [Manifest] Region and ExcludedRegion.	md:Region-type	(choice) 1..n
ExcludedRegion			md:Region-type	
TerritoryProductProfileID		Reference to the Product Profile that applies to territory or territories defined by Region and ExcludedRegion	md:id-type	0..1
LanguageRules		Rules for languages, including original language and localizations	delivery:DeliveryLanguageRules-type	0..1
RatingRules		Rules specific to content (parental control) ratings	delivery:DeliveryRatingRules-type	0..1
Terms		Additional terms	md:Terms-type	0..1

4.2.2 Language Rules

DeliveryLanguageRules-types defines requirements for assets and metadata in particular languages. This is used both in delivery requirements and in delivery orders.

For each language, this element defines which original or localized assets are required.

Any special requirement can be expressed through Terms.

Element	Attribute	Definition	Value	Card.
DeliveryLanguageRules-type				
Original		Rules for original language/original version (OV)	xs:language, delivery:DeliveryLanguageRules-attr attribute group	
Localization		Rules for localized languages	xs:language, delivery:DeliveryLanguageRules-attr attribute group	0..n
Terms		Additional terms	md:Terms-type	0..1

4.2.3 Rating Rules

DeliveryRatingRules-types defines requirements for delivery of ratings related to the content in question.

Element	Attribute	Definition	Value	Card.
DeliveryRatingRules-type				
RatingRequired		A rating is required for this territory	xs:boolean	0..1
MaxRating		Maximum allowable rating. Multiple entries can be provided to define maximum rating in multiple rating systems.	md:ContentRatingDetail-type	0..n
Terms		Additional terms	md:Terms-type	0..1

5 PROFILES

A Profile is a collection of requirements. Currently, we refer to

- Administrative Profile – Lead times, priorities, and special instructions
- Product Profiles – Set of Artwork Profiles and Technical Profiles that apply to product category/categories and territory/territories.
    - Artwork Profiles – Sets of artwork types, resolutions, aspect ratios, and other descriptors
    - Technical Profiles – Technical requirements about files tracks

Once defined, a Profile is used as shorthand for these requirements. For example, one might have a "Benelux" profile for language requirements for Benelux countries, and an "HDR" profile for minimum HDR requirements.

Profiles can be referenced both as requirements and as part of deliveries. That is, a Content Delivery Requirements (CDR) document might define an "HDR" profile, an MMC delivery might refer to the assets as fulfilling part of the "HDR" Profile; and, an Asset Availability might indicate the "HDR" Profile has not yet been delivered.

5.1 Administrative Profile

Element	Attribute	Definition	Value	Card.
DeliveryAdminProfile-type			Extension of delivery: DeliveryInstructions-type	
	AdminProfileID	ID for this profile	xs:string	

5.2 Product Profiles

Product Profiles are collections of Artwork and Technical Profiles. The Profiles-type complex type contains Product Profiles and their subordinate Artwork and Product Profiles. Only Product Profiles are referenced externally to the Profiles object.

5.2.1 Profiles-type

Element	Attribute	Definition	Value	Card.
Profiles-type				
ProductProfile		Product Profile definition	delivery:ProductProfile-type	1..n

ArtworkProfile		Artwork Profiles	Delivery:ArtworkProfile-type	0..1
TechnicalProfile		Technical Profiles	Delivery:TechnicalProfile-type	0..1

5.2.2 ProductProfile-type

This type defines a single Product Profile

Element	Attribute	Definition	Value	Card.
ProductProfile-type				
	productProfileID	Unique identifier for this Product Profile	md:id-type	0..1
	Default	Indicates whether this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
Feature		Feature characteristics	delivery:ProductProfileInfo-type	0..n
Promotional		Promotional material characteristics	delivery:ProductPromotional-type	0..n
Supplemental		Supplemental material characteristics	delivery:ProductSupplemental-type	0..n

5.2.3 ProductProfileInfo-type

This type is the base type for Product Profiles. It contains data that is in all Product Profiles.

Element	Attribute	Definition	Value	Card.
ProductProfile-type				
	purpose	Propose of profile	xs:string	0..n
TechProfileName		Name of Technical Profiles that apply to this Product Profile	xs:string	0..n
ArtworkProfileName		Name of Artwork Profiles that apply to this Product Profile	xs:string	0..n
LocalizedMetadata		Whether localized metadata required for this Profile. 'true' means yes.	xs:boolean	0..1

5.2.4 ProductPromotional-type

Product Profile information for promotional material, such as trailers and teasers.

Element	Attribute	Definition	Value	Card.
ProductPromotional-type		Base type for this element is default Product Profile data	delivery:ProductProfileInfo-type (by extension)	
IncludesTrailer		Indicates whether trailer is expected. 'true' means trailer is expected.	xs:boolean	0..1
LimitedAudience		Indicates limited audience promotional material is allowed (e.g., Red Band trailers)	xs:boolean	0..1

5.2.5 ProductSupplemental-type

Supplementary material is any audiovisual, gallery, game, app, or other content that supplements the feature. Also referred to as Bonus and VAM (value added material).

Element	Attribute	Definition	Value	Card.
ProductSupplemental-type		Base type for this element is default Product Profile data	delivery:ProductProfileInfo-type (by extension)	
LocalizedBonus		Indicates whether supplemental material is expected to be localized to the territory. 'true' means supplemental material should be localized.	xs:boolean	0..1
IncludesBonus		Indicates whether supplemental material is expected. 'true' means supplemental material is expected.	xs:boolean	0..1

5.3 Artwork Profiles

This type defines a profile images each of which constitute artwork serving a 'purpose'. Typically, that purpose, defined in @purpose, corresponds with [CM] LocalizedInfo/ArtReference/@purpose.

An instance is included for each combination of @purpose and @imageProfileName. If @imageProfileName is absent, the default Image Profile is used. If there is only one TechImage-type/ImageProfile, it is the default. ImageProfile/@default = 'true', it is the default.

5.3.1 ArtworkProfile-type

When multiple instances of Aspect or Resolution are provided, each of those is required. Aspect should not be included for the same image.

Element	Attribute	Definition	Value	Card.
ArtworkProfile-type		Base type for this element is standard delivery parameters defined in DeliveryInstructions-type.	delivery:DeliveryInstructions-type (by extension)	
	ArtworkProfileID	Image profile name corresponding with ImageProfile in DeliveryImage-type	md:id-type	0..1
Image		Image with a given purpose that is part of this profile	Delivery:ArtworkImage-type	1..n

5.3.2 ArtworkImage-type

Element	Attribute	Definition	Value	Card.	
ArtworkImage-type					
	purpose	Image purpose	xs:string	0..1	
	imageProfileName	Unique image name. Note that @purpose could appear in multiple profiles.	xs:string	0..1	
ImageAspectRatio		Aspect ratio represented as a decimal number representing the ratio between the x-axis and y-axis dimensions. Note this definition is distinct from [CM] Picture/AspectRatio which is a string.	xs:decimal	1..n	Choice
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1	
Resolution		Resolution of image (fixed or minimum)	delivery:Artwork Resolution-type	1..n	
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1	
TextLocalization		Text localization constraints on images	xs:string	0..n	

TextLocalization indicates options for image text. Encoding includes

- 'textfree' – text is not allowed on the image
- 'localized' – text is allowed, but must be localized. 'textfree' images also accepted.
- 'original' – original version
- 'preferred – textfree, localize, or original available image is acceptable. Generally, in the order of preference is text free or localized, then original, and then other versions.
- 'any' – any image localization will do
- *[CHS: Are there other options? Is this complete? Should it be checkboxes?]*

5.3.2.1 PictureResolution-type

Defines the resolution for an artwork image or video picture in pixels. If resolution specifies a minimum (i.e. @absolute = 'false' or is absent), aspect ratio of width and height is fixed. That is, they both must scale together to maintain aspect ratio.

Element	Attribute	Definition	Value	Card.
PictureResolution-type				
Width		Width in pixels	x:integer	0..1
Height		Height in pixels	x:integer	0..1

5.4 Technical Profiles

The Technical Profiles is a collection of audio, video, subtitle, dub card, image, metadata and container profiles. Each component profile is defined independently so it can be reused across Technical Profiles.

The TechnicalProfiles-type defines a set of Technical Profiles (TechProfile). It relies on TechnicalAtttributes-type for the detailed component profiles (Audio, Video, etc.).

Element	Attribute	Definition	Value	Card.
DeliveryTechnicalProfile-type			Delivery:TechnicalAttributes-type (by extension)	
TechProfile		A Technical Profile.	delivery:TechnicalProfile-type	1..n

5.4.1 TechnicalProfile-type

TechProfile-type defines a single Technical Profile.

Technical Profiles are a collection of audio, video, subtitle, card, metadata, image, and container profiles. These other profiles are included by reference via their Profile names.

Each profile name can optionally include a RangeAttrtibutes to indicate whether the referenced profile requirements are hard requirements or desired condition. Interpretation of Range Attributes is defined in [Delivery], Section 2.1.1.

Element	Attribute	Definition	Value	Card.
DeliveryTechnicalProfile-type				
	TechProfileID	Unique identifier for this Technical Profile	md:id-type	1..n
AudioTechProfileName		Name of Audio Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1
VideoTechProfileName		Name of Video Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1
SubtitleTechProfileName		Name of Subtitle Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1
CardTechProfileName		Name of Card Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1
MetadataTechProfileName		Name of Metadata Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1
ImageTechProfileName		Name of Image Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1

MetadataTechProfileName		Name of Metadata Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1
ContainerTechProfileName		Name of Container Profile that applies to this Technical Profile	xs:string	0..n
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)		0..1

6 TECHNICAL CHARACTERISTICS

The TechCharacteristics-type defines a set of technical characteristics that can be used to define content characteristics or to refer to content by its characteristics.

Element	Attribute	Definition	Value	Card.
TechCharacteristics-type				
Audio		Parameters than define acceptable audio media delivery.	delivery:TechAudio-type	0..n
Video		Parameters than define acceptable video media delivery.	delivery:TechVideo-type	0..n
Subtitle		Parameters than define acceptable timed text media delivery.	delivery:TechSubtitle-type	0..n
Card		Parameters than define acceptable cards	delivery:TechCard-type	0..n
Image		Parameters that define acceptable image delivery, including artwork	delivery:TechImage-type	0..n
Metadata		Parameters than define acceptable metadata delivery.	delivery:TechMetadata-type	0..n
Container		Parameters than define acceptable containers.	delivery:TechContainer-type	0..n

6.1.1 Interpretation of terms within Technical Attributes

Technical Attributes contain parameters that correspond with technical characteristics of media files. Most of these correspond with technical values in Common Metadata [CM]. The full definitions are found in the referenced sections of Common Metadata.

When Type includes the note "Incl. @rangeCondition" then the type as defined in [CM] is extended to include an @rangeCondition attribute.

When a term is absent, there are no constraints. For example, if MaxFileSize is not specified, there are no limits on size. If Compliance is absent, there are no additional Compliance constraints. Generally speaking, only constrained parameters should be included. This makes the profile shorter and less complicated.

When a term is present, interpretation depends on the value of @rangeCondition.

When @rangeCondition is 'preferred', that is a suggestion, not a hard requirement.

For numeric values, elements values can be provided with @rangeCondition of 'min' and/or 'max'. Values are inclusive. It is allowed to specify either or both of 'min' or 'max'. With both are specified, media characteristic must fall within that limit (inclusive). When only a 'min' value is included, there is a fixed minimum but no maximum. With only a 'max' value is provided there is a fixed maximum with no minimum. There can be at most one 'min' value and one 'max' value.

For numeric values, any value with @rangeCondition of 'preferred' must be <= a 'max' value and >= a 'min' value. 'min' values must be <= 'max' values. At most one 'min' and one 'max' may be included. There is no limit on 'preferred' values. For example, 48kHz and 44.1kHz may both be 'preferred' values.

Non-numeric values may not have @rangeCondition = 'max' or 'min'. This might be tempting for values such coded profiles, but it can sometimes be ambiguous.

6.1.2 TechAudio-type

References to Common Metadata types in this section refer to object in DigitalAssetImageData-type, as defined in [CM] section 5.2.3, with the same name.

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Element	Attribute	Definition	Value	Card.
TechAudio-type				
	audioTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1
	Default	This profile is the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of audio	xs:string	0..1
Codec		As defined in [CM]	Incl. RangeAttributes	0..1
CodecType		As defined in [CM]	Incl. RangeAttributes	0..n
BitrateMax		As defined in [CM]	Incl. RangeAttributes	0..n
VBR		As defined in [CM].	Incl. RangeAttributes	0..1
SampleRate		As defined in [CM]	Incl. RangeAttributes	0..n
SampleBitDepth		As defined in [CM]	Incl. RangeAttributes	0.n

Channels		As defined in [CM]	Incl. RangeAttributes	0.n
ChannelMapping		As defined in [CM]	Incl. RangeAttributes	0.n
Compliance		As defined in [CM]	Incl. RangeAttributes	0.n
Loudness		As defined in [CM]	Incl. RangeAttributes	0..1
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Language		Audio language. This does not apply to Content Delivery Requirements.	Md:DigitalAssetAudioLanguage-type	0..n
Term		Additional terms that apply to this Profile	md:Terms-type	0..n

6.1.3 TechVideo-type

References to Common Metadata types in this section refer to object in DigitalAssetVideoData-type, as defined in [CM] section 5.2.4, with the same name.

Element	Attribute	Definition	Value	Card.
TechVideo-type				
	videoTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1
	default	Is this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of video	xs:string	0..1
FrameCharacteristics		Frame constraints	delivery:TechVideoFrame-type	0..1
ColorCharacteristics		Color constraints	delivery:TechVideoColor-type	0..1
NextGenCharacteristics		Next Gen (i.e., HDR) characteristics	delivery:TechVideoNextGen-type	0..1

Type3D		As defined in [CM]	xs:string	0..1
MasterText		Defines the text allowed in the master	xs:string	0..1
	titles	Title text allowed. 'true' means allowed	xs:boolean	0..1
	credits	Credit text allowed. 'true' means allowed	xs:boolean	0..1
	scene	Scene setting text allowed, 'true' means allowed	xs:boolean	0..1
	forced	Force narrative text allowed. 'true' means allowed	xs:boolean	0..1
	textlessElements	Textless elements (i.e., video without text) provided in conjunction with texted video. 'true' means provided	xs:boolean	0..1
DiscreteCards		Indicates cards are delivered separately from video. If only certain cards are provided discretely, attributes indicate which ones are discrete. If cards are not discrete, they are appended to video and are part of the timeline.	xs:boolean	0..1
	dub	Dub cards are discrete	xs:boolean	0..1
	rating	Rating cards are discrete	xs:boolean	0..1
	territory	Territory-specific cards, such as anti-piracy and health cards, are discrete	xs:boolean	0..1
Compliance		As defined in [CM]	Incl. RangeAttributes	0.n
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Term		Additional terms that apply to this Profile	md:Terms-type	0..n

There are many definitions of terms like "semi-textless" based on what texted elements are allowed. The intent is to define what text elements are allowed in the video or need to be removed. For this purpose, we define text in terms of the following

- Titles – opening and closing
- Credits – opening and closing credits
- Scene Setting – Scene setting text such as location or time
- Forced narrative – Forced subtitles

- Photographic – Any text captured in a scene during production, such as billboards and street signs. Does not include VFX or animation-produced text. Production text is assumed to be part of the video, and is not considered in the context of texted or textless masters.

MasterText is encoded as follows. Note that most profiles prefer texted and/or semi-textless masters.

MasterText	Titles	Credits	Scene Setting	Forced Narrative	Additional
'Texted'	Allowed	Allowed	Allowed	Allowed	
'Semi-textless'	Allowed	Allowed	Allowed	Prohibited	
'Textless'	Prohibited	Prohibited	Prohibited	Prohibited	
'TextlessElements'	Allowed	Allowed	Allowed	Allowed	Textless elements are provided with texted master, typically appended
'Other'					Allowed text defined in attributes.

6.1.3.1 TechVideoFrame-type

References to Common Metadata types in this section refer to object in DigitalAssetVideoPicture-type, as defined in [CM] section 5.2.6, with the same name.

Element	Attribute	Definition	Value	Card.
TechVideoFrame-type				
Resolution		As defined in [CM]	Incl. RangeAttributes	0..n
AspectRatio		As defined in [CM]	Incl. RangeAttributes	0..n
PixelAspect		As defined in [CM]	Incl. RangeAttributes	0..1
FrameRate		As defined in [CM]	Incl. RangeAttributes	0..n
Progressive		As defined in [CM]	Incl. RangeAttributes	0..n
LetterboxAccepted		Letterbox and Pillarbox video is accepted. If 'false', only active pixels should be provided.	xs:boolean	0..1

6.1.3.2 TechVideoColor-type

References to Common Metadata types in this section refer to object in DigitalAssetVideoPicture-type, as defined in [CM] section 5.2.6, with the same name.

Element	Attribute	Definition	Value	Card.
TechVideoColor-type				
Colorimetry		As defined in [CM]	Incl. RangeAttributes	0..n
ColorSubsampling		As defined in [CM]	Incl. RangeAttributes	0..n
MasteredColorVolume		As defined in [CM]	Incl. RangeAttributes	0..n
BitDepth		As defined in [CM]	Incl. RangeAttributes	0..n

6.1.3.3 TechVideoNextGen-type

References to Common Metadata types in this section refer to object in DigitalAssetVideoPicture-type, as defined in [CM] section 5.2.6, with the same name.

Element	Attribute	Definition	Value	Card.
TechVideoNextGen-type				
LightLevel		As defined in [CM]	Incl. RangeAttributes	0..n
ColorVolumeTransform		As defined in [CM]	Incl. RangeAttributes	0..n

6.1.4 TechSubtitle-type

References to Common Metadata types in this section refer to object in DigitalAssetSubtitleData-type, as defined in [CM] section 5.2.7, with the same name.

Element	Attribute	Definition	Value	Card.
TechSubtitle-type				
	subtitleTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1

	default	Is this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of timed text	xs:string	0..1
Type		As defined in [CM]	Incl. RangeAttributes	1..n
Format		As defined in [CM]	Incl. RangeAttributes	0..n
FormatType		As defined in [CM]	Incl. RangeAttributes	0..n
Compliance		As defined in [CM]	Incl. RangeAttributes	0..n
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Term		Additional terms that apply to this Profile	md:Terms-type	0..n

6.1.5 TechCard-type

Technical description for card, such as dub cards.

Element	Attribute	Definition	Value	Card.
TechCard-type				
	cardTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1
	default	Is this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of card	xs:string	0..1
DiscreteCards		Indicates whether Discrete Cards are required	xs:boolean	0..1
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)	xs:string	0..1
MustMatchVideo Encoding		Indicates whether cards must match video encoding	xs:boolean	0..1
MustMatchVideo DynamicRange		Indicates whether cards must match video dynamic range. For example, if video is HDR, must the cards be HDR.	xs:boolean	0..1

Compliance		Required compliance certifications. Encoded per definition in [CM], Section 3.17	md:Compliance-type	0..1
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Term		Additional terms that apply to this Profile	md:Terms-type	0..n

6.1.6 DeliveryImage-type

This object defines image technical characteristics. A set of image characteristics is called an Image Profile.

References to Common Metadata types in this section refer to object in DigitalAssetImageData-type, as defined in [CM] section 5.2.8, with the same name. Pixels are assumed to be square.

The image profile may be given a name in @imageProfileName. If this name is absent, it is assumed that all images will conform to this profile. Otherwise, artwork definitions must reference a named profile.

Element	Attribute	Definition	Value	Card.
DeliveryImage-type		Base type for this element is standard delivery parameters defined in DeliveryInstructions-type.	delivery:DeliveryInstructions-type (by extension)	
	imageTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1
	default	Is this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of image	xs:string	0..1
Encoding		As per Common Metadata definition. One for each acceptable encoding method.	xs:string	0..n
AlphaAllowed		Is alpha channel supported (i.e., transparency). 'true' means yes. This must be absent or 'false' for encoding types that do not support alpha.	xs:boolean	0..1
DynamicRangeProfile		As defined in [CM]	xs:string	0..1
ColorGamutProfile		As defined in [CM]	xs:string	0..1

Compliance		As defined in [CM]	md:Compliance-type	0..1
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Term		Additional terms that apply to this Profile	md:Terms-type	0..n

6.1.7 TechMetadata-type

Element	Attribute	Definition	Value	Card.
TechContainer-type		Base type for this element is standard delivery parameters defined in DeliveryInstructions-type.	delivery:DeliveryInstructions-type (by extension)	
	metadataTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1
	default	Is this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of metadata	xs:string	0..1
Encoding		What is the metadata schema.	xs:string	1..n
	minVersion	Minimum version	xs:string	0..1
	maxVersion	Maximum version	xs:string	
	RangeAttributes-attr	Range Attributes (See [Delivery] Section 2.11)	xs:string	0..1
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Term		Additional terms that apply to this Profile	md:Terms-type	0..n

Encoding is can be encoded with any value recognized by the recipient. However, Media Entertainment Core must be encoded as 'MEC'. minVersion and maxVersion indicate the version of that metadata type. For example, if any version of MEC 2.5 and beyond is acceptable, minVersion should be '2.5'.

6.1.8 TechContainer-type

References to Common Metadata types in this section refer to object in ContainerMetadataData-type, as defined in [CM] section 6.2, with the same name.

Element	Attribute	Definition	Value	Card.
TechContainer-type		Base type for this element is standard delivery parameters defined in DeliveryInstructions-type.	delivery:DeliveryInstructions-type (by extension)	
	containerTechProfileName	Unique name of technical profile. If there is only one profile of this type and @default='true', this need not be included.	md:id-type	0..1
	default	Is this the default profile. If 'true', it is. If absent or 'false' it is not default. At most one instance can be the default	xs:boolean	0..1
	purpose	Purpose of container	xs:string	0..1
ContainerType		As defined in [CM]	Incl. RangeAttributes	0..n
Compliance		As defined in [CM]	md:Compliance-type	0..1
MaxFileSize		Maximum file size in bytes for file of this type	xs:nonNegativeInteger	0..1
Term		Additional terms that apply to this Profile	md:Terms-type	0..n