FLM-X Data

CONTENTS

1 INTRODUCTION

This document provides field descriptions for the FLM-X message family.

1.1 Document Organization

This document is organized as follows:

1. Introduction—Provides background, scope and conventions
2. Data Summary—Describes overall data structures
3. General Encoding Rules – Rules for properly encoding XLM data elements and attributes
4. FLM Data—Provides detail on FLM-X encoding
5. Site List – Provides detail on messages that provide access to FLM data (TBS)

1.2 Document Notation and Conventions

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].

1.3 Normative References

[DCISystem] Digital Cinema Systems Specification, Version 1.2, March 07, 2008.

[RFC3629] Yergeau, F., et al, *RFC 3629, UTF-8, a transformation format of ISO 10646*, November, 2003. http://www.ietf.org/rfc/rfc3629.txt

[RFC5646] Philips, A, et al, *RFC 5646, Tags for Identifying Languages*, IETF, September, 2009. http://www.ietf.org/rfc/rfc5646.txt

[IANA-LANG] IANA Language Subtag Registry. http://www.iana.org/assignments/language-subtag-registry

[ISO3166-1] Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes, 2007.

[ISO3166-2] ISO 3166-2:2007Codes for the representation of names of countries and their subdivisions -- Part 2: Country subdivision code

[ISO8601] ISO 8601:2000 Second Edition, *Representation of dates and times, second edition*, 2000-12-15.

[SMPTE 428-3-2006] D-Cinema Distribution Master Audio Channel Mapping and Channel Labeling

[SMPTE430-7-2008] D-Cinema Operations – Facility List Message

[SMPTE 433-2008] D-Cinema — XML Data Types

1.4 Informative References

TBS

2 DATA SUMMARY

This section provides a summary of FLM-X data. Details on the structure can be found in Section 2.

The FLM-X is logically partitioned into the following categories:

- Circuit
- Facility(s)
- Auditorium(s)
  - Screen
  - Device Groups

To complete the FLM, there are also data associated with the FLM-X message itself.

In the following sections, items in *italics* are optional. Except where noted, FLM refers to an Facility List Message in FLM-X format.

2.1.1 Circuit

A Circuit is an organization that has one or more Facilities. Circuit is a mandatory element of the FLM and all Facilities are associated with a Circuit.

Circuits have one or more Facilities.

There are currently no registered identifiers associated with a Circuit, so they are tracked by name. Circuits are expected to use exactly the same string to identify themselves in all FLMs.

2.1.2 Facility

A Facility is physical structure containing one or more Auditoriums.

A Facility has the following characteristics:

- Facility ID – unique identifier for facility
- *Alternate Facility List* – used in corner cases (to be defined)
- Facility Name
- *Facility Time Zone* – Time information that will allow keys to issued that start at the correct time in Facility's time zone.
- Circuit
- *FLM Partial (true/false)* – Indicates whether FLM contains only partial information [This is recommended for deletion]
- *Contact List* – Points of contact
- Address List – one or more shipping, billing and/or physical addresses. [Structure does not dictate whether the one required address is Physical, Shipping or Billing.]

- *KDM Delivery Method List* – zero or more methods of delivery of KDMs. May be email, modem, network or physical. [This is optional because delivery might be at the Device level.]
- *DCP Delivery Method List* – Same as KDM (above) but for DCP.

2.1.3 Auditorium

An Auditorium is associated with a Facility and has one more Devices.

An Auditorium has the following characteristics:

- Auditorium Number – A unique number within the Facility that identifies the Auditorium
- *Auditorium Name* – A name for the auditorium (e.g., "Auditorium 3" and "Mann's Chinese")
- Supports35MM (true/false) – does this Auditorium support 35MM in addition to DCI?
- *Screen Aspect Ratio* – '1.85', '2.39', '1.66', '1.37' [recommend adding 'other']
- Adjustable Screen Mask Type – 'Top', 'Side', 'Both', 'None'
- *Audio Format* – Audio format such as, "5.1'. Need normative reference. *[encoding for discussion]*
- *Auditorium Install Date* – Date auditorium put into use. If in the future, it is anticipated date.
- *Large Format Type*
- *Digital 3D System*
  - IsActive
  - *Digital 3D Configuration – 'Real D' 'Dolby 3D'*
  - *Install Date*
  - *Screen Color* – 'Sliver' 'White' 'Other'
  - *Ghostbusting (true/false)*
  - *Ghostbusting Configuration [for discussion regarding potential deletion]*
- Device Group List

2.1.4 Device Groups

Devices may be organized into groups if they are connected; such as a server and a projector. Within each Device Group is one or more Devices.

Devices have the following characteristics:

- Device Type ID (as per SMPTE 433-2008): DECE, LD, LE, NET, PLY, PR, SM, SMS, SPB, TMS, etc.
- Device Identifier – ID in accordance with Device Type ID

- *Device Serial* – serial number of Device
- *Manufacturer ID* – Unique ID per manufacturer
- Manufacturer Name – Name of manufacturer
- Model Number – Manufacturer assigned model number
- *Install Date* – Date Device was or will be usable in Auditorium
- IsActive (true/false) – Is Device currently active and available for use
- *Integrator – Entity who installed Device [for additional discussion]*
- *VPFFinanceEntity – Entity associated with Virtual Print Fee*
- *VPFStartDate – Start date associated with Virtual Print Fee*
- *IPAddressList* – IP address by which the Device can be contacted directly (future use?)
- *SoftwareList* – Installed versions of the Device. Although the term 'software' is used, this element addresses any versionable portion of the device.
  - *SoftwareKind* – (software, firmware or hardware)
  - *SoftwareProducer*
  - *Description*
  - *Version*
  - *File Name [recommended for deletion]*
  - *File Size [recommended for deletion]*
  - *File Date/Time [recommended for deletion]*
- *KeyInfoList*
- *WatermarkingList*
  - Watermark Manufacturer
  - *Watermark Model*
  - *Watermark Version*
- *KDMDeliveryMethodList* – Means for delivering KDMs. Must be included if not included for Facility.
- *DCPDeliveryMethodList* – Means for delivering DCPs. Must be included if not included for Facility.

2.1.5 Message information

There is also information in the FLM Message structure:

- Message ID
- Issue Date
- Annotation Text

2.2 Database

It is anticipated that all FLM-X data will be stored in a database.

2.3 Recommendations

2.3.1.1 Change Recommendations

The following items came up in FLM review. These will have to be discussed through ISDCF.

Remove FLMPartial

- All active Devices should be in the FLM. There is no reason to exclude active Auditoriums, or to include inactive ones (except planned).
- It is not used

Remove IPAddressList

- This is a local IP address on the theater network. Nobody can identify why this is useful.

Remove File size, name, dateTime from SoftwareType

- These are not meaningful data for version. The version number is sufficient to distinguish different versions.

Add "Other" to ScreenAspectRatio

- We cannot currently identify other aspect ratios, but if one were to be present it would be necessary to plug in an incorrect value (i.e., one of the existing). It is preferable to allow "other" until a new aspect ratio can be added to the allowed values.

Add optional "Planned" flag for future InstallDates

- When install dates are in the future, the actual date is not known. As there may be business implications associated with this date, we want to ensure the exhibitor proactively ensures the date is correct. This flag would allow the FLM data user to distinguish between confirmed dates and ones that have not been updated.
- How this is acted up is a business decision outside the scope of the FLM-X.

Extend Address (shipping, billing, etc.) to include a 2nd address line. Review for International addresses

- Addresses typically include two lines for street address. Modify structure accordingly
- Also, double-check for suitability for all international mailing addresses

2.3.2 Additional discussion

The following items require additional discussion prior to submission to ISDCF.

Can GhostbustingConfiguration be removed?

- This is unused as there is only one Ghostbusting mechanism from one vendor. For DCP generation, it is only necessary to know the 3D system and that ghostbusting is present.

Making Time Zone mandatory (do we rely on booking systems).

- Time Zone is currently not required and KDM generation depends on that information in booking systems. This means the FLM-X is missing a key piece of information needed for KDM generation

Audio format: Do we want definition in terms of channels (e.g., L/R/C/LS/RS/LFE) or profile (e.g., 5.1 7.1 5.1+hivi)?

- The most descriptive is channels and is consistent with new work from SMPTE.
- But, profile is simple and well-understood.

Policy for ID assignment (e.g., Manufacturer ID).

- It is essential that these IDs be unique and properly handled. We currently have no standards or registry.
- Options include
  - Continue ad hoc – no impact on encoding, but potential conflicts or ambiguity going forward.
  - Assign values – Little impact because we would start with existing values, but work to maintain over time
  - Policy (e.g., use the manufacturer's DNS domain) – simple and robust, but requires a change.
- Policy would be best if people are willing to accept the impact

Integrator and other business data.

- This is business data, but is somewhat of a misnomer. Indications are that this would include both integrator as well as some indication of deal structure, such as "Cinedigm 1" or "Cinedigm 2". What is the correct usage?
- There is open question of whether the structure contains all the necessary business data

3 GENERAL TYPES ENCODING

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.

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 Ariel Narrow, such as flm:DeviceType
- Names of both simple and complex types are followed with "Type"

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", ":ContactType"). In this example, if POC was to be defined by a complex type defined as flm:ContactType. 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.

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.

3.3 Language Encoding

Language shall be encoded in accordance with RFC 4646, *Tags for Identifying Languages* [RFC5646]. The subtags that are available for use with RFC 5646 are available from the Internet Assigned Numbers Authority (IANA) at [IANA-LANG] http://www.iana.org/assignments/language-subtag-registry.

Matching, if applicable, should be in accordance with RFC 4647, *Matching Language Tags*, [RFC4647].

The xs:language type shall be used for languages. Language should be as specific as possible; for example, 'ja-kata' is preferable to 'ja'.

3.4 Region encoding

Region coding shall use the ISO 3166-1 two-letter alpha-2 codes [ISO3166-1]. Informally described here: http://en.wikipedia.org/wiki/ISO_3166-1_alpha-2.

When subdivisions are required, ISO3166-2 shall be used [ISO3166-2]. Informally described here: http://en.wikipedia.org/wiki/ISO_3166-2.

3.5 Date and Time encoding

Date and time encoding shall use the XML rules. That is, where ISO 8601 [ISO8601] deviates from XML encoding, XML encoding shall apply.

3.5.1 Duration

Durations are represented using xs:duration. xs:time should not be used for duration.

3.5.2 Time

xs:time is used for a recurring time.

3.5.3 Dates and times

XML is fairly rigid in its date and time encoding rules. Specifically, it is difficult to have a single element where resolution may range from 'year' to 'date' to 'time'. In some instances such as air dates/time, resolution might be year (movie released in 1939), date (movie released on December 25, 2009), or date and time (episode aired November 6, 2001, or November 6, 2001 EST).

- Year encoding uses xs:gYear (Gregorian year)
- Date encoding (year, month and day) uses xs:date
- Date encoding that includes both date and time shall uses xs:dateTime

Time zone should be included with xs:dateTime elements to avoid ambiguity. If representing a single point in time with no relevant time zone, Coordinated Universal Time (UTC) should be used.

In some cases, there are options for including year, date and date-time. Optional elements should be included if known and relevant.

3.6 String encoding

String lengths are specified in characters (rather than bytes) unless otherwise stated. A string using double-byte Unicode characters can result in string elements whose actual size in bytes is larger than the stated length.

3.7 Phone Number

Phone numbers are encoded using international conventions, including "+1" for US and Canada numbers.

3.8 Currency

Currency shall be encoded using ISO 4217 Alphabetic Code [ISO4217].

http://www.iso.org/iso/currency_codes_list-1

4 FLM-X DATA

The following sections describe each field in the FLM-X schema. The normative structural information is in the XML Schema.

This schema uses the 'flm' namespace, currently "http://isdcf.com/2010/06/FLM"

4.1 FacilityListMessageType

Element	Attribute	Definition	Value	Card.
FacilityListMessageType				
MessageId		A globally unique identifier for this message.	flm:UUID	
IssueDate		Date and time message issued, UTC.	xs:dateTime	
AnnotationText		Same as SMPTE 430-7-2008. Descriptive text about the theater or theater circuit.	dcml:UserTextType	0..1
FacilityInfo		Details on the facility	flm:FacilityInfoType	
AuditoriumList		Details on the auditoriums in the facility.	flm:AuditoriumListType	

4.1.1 FacilityInfoType

Element	Attribute	Definition	Value	Card.
FacilityInfoType				
FacilityID		A unique facility Identifier (Universal Screen Identifier (xxx-xxx-xxx)). Same as SMPTE 430-7-2008	xs:anyURI	
AlternateFacilityList		Alternate IDs for the facility.	1..n sequences of flm:AlternateFacilityID	0..1
FacilityName		Facility Name in native language. Same as SMPTE 430-7-2008	dcml:UserTextType	
FacilityTimeZone		Time zone of the facility, including time	xs:string	0..1

		zone information.		
Circuit		Name of circuit. Must be consistent within a circuit.	dcml:UserTextType	
FLMPartial		Indicates whether information for all Auditoriums are included. Same as SMPTE 430-7-2008.	xs:boolean	0..1
ContactList		Information on how to contact personnel at the facility. Can be more than one contact. All are treated equivalently.	Sequence of 1..n of Contact of flm:ContactType	0..1
AddressList		How to locate the facility: Physical address (street location), shipping address and billing address.	Sequence of 1..n of Address of flm:AddressTypeType	
KDMDeliveryMethodList		Information on how and where to deliver KDMs. KDMs should be sent to both facility and device if listed.	flm:DeliveryMethodListType	0..1
DCPDeliveryMethodList		Information on how and where to deliver DCPs.	flm:DeliveryMethodListType	0..1

FacilityID must be unique and used consistently. This may ultimately transition to USI (for discussion), but may need a guarantee for uniqueness in the interim. Perhaps,

```
"FacilityID:"<FacilityIDType>":"<ID>
```

USI form would be

```
"FacilityID:USI:"<xxx>"-"<xxx>"-"<xxx>
```

AlternateFacilityList is reserved for special use. Definition TBD.

FacilityTimeZone needs to specify the local time zone, including information about daylights savings. This is use to generate KDMs for the correct start times at the location of the Device. Encoding is using the zoneinfo database format (also known as Olson database). http://www.twinsun.com/tz/tz-link.htm. Recommendation for use is in accordance with "Working with Time Zones, W3C Working Group Note 13 October 2005", http://www.w3.org/TR/timezone/.

ContactList should be listed in priority order of preferred contacts.

FLMPartial is the same as SMPTE 430-7. This is set to 'true' if one or more Auditoriums are missing from this message.

KDMDeliverMethodList and DCPDeliveryMethodList must be included if not included in Device.

4.1.2 AuditoriumListType

Element	Attribute	Definition	Value	Card.
AuditoriumListType				
Auditorium		Description of an auditorium (within this scope, AuditoriumNumber and AuditoriumName must be unique)	flm:AuditoriumType	1..n

4.1.3 AuditoriumType

Element	Attribute	Definition	Value	Card.
AuditoriumType				
AuditoriumNumber		A number identifying the auditorium. This number shall always correspond with the same auditorium. No two auditoriums may use the same number. Auditorium numbers need not be sequential.	xs:unsignedint	
AuditoriumName		Auditorium name. If there is no specific name, a form such as “Auditorium 1” is recommended.	xs:string	0..1
Supports35MM		‘TRUE’ if 35MM film is supported. Otherwise, this shall be “FALSE”	xs:boolean	
ScreenAspectRatio		Screen aspect ratio. Acceptable ratios are defined by enumeration.	flm:ScreenAspectRatioType	0..1
AdjustableScreenMask			flm:AdjustableScreenMaskType	0..1
AudioFormat		Audio format.	xs:string	0..1
AuditoriumInstallDate		Date the auditorium was first ready to book. If pre-opening, use estimated date.	xs:dateTime	0..1
LargeFormatType		Type, such as ‘IMAX’	xs:string	0..1

Digital3DSystem		If 3D digital is supported, information about the 3D digital system. If theater is 3D, then this is required.	(see Digital3DSystem)	0..1
DeviceGroupList		Information about each device in the auditorium.	(see DeviceGroup)	

AudioFormat needs normative reference. SMPTE 428-3-2006 defines channels, but not multi-channel nomenclature.

AuditoriumInstallDate is either the date the Auditorium was put into digital service (date in the past), or the date the Auditorium is expected to be put into digital service (date in the future). Note that for testing, KDMs may be issued for Auditoriums not yet in service. "Digital Service" is defined as ready for consumer viewing of digital projection.

LargeFormatType. Currently, the only option is 'IMAX'?

4.1.3.1 Digital3DSystem

Element	Attribute	Definition	Value	Card.
Digital3DSystem				
IsActive		'TRUE' if 3D system is operational. Otherwise this shall be 'FALSE'.	xs:boolean	
Digital3DConfiguration		3D Digital Configuration e.g., "Real D", …	xs:string	0..1
InstallDate		Date 3D Device installed. Must be later than or equal to the Auditorium InstallDAte	xs:dateTime	0..1
ScreenColor		Screen color as enumerated	flm:ScreenTokenType	0..1
Ghostbusting		'TRUE' if ghostbusting is implemented. Otherwise this shall be 'FALSE'	xs:boolean	0..1
GhostbustingConfiguration		Configuration, possibly to be deleted.	xs:string	0..1

Digital3DConfiguration shall have one of the following values for the associated technology:

- "RealD"
- "Dolby 3D"
- "IMAX 3D"?
- "XpanD 3D"

- "MasterImage 3D"

InstallDate is the date the Auditorium was put in 3D service; the date the 3D system was available for consumer viewing.

GhostbustingConfiguration TBD.

4.1.3.2 DeviceGroupList

A Device Group List is a list of Device Groups. Devices in the same DeviceGroup must be associated; particularly Devices that are physically connected (e.g., Server and Projector). A TMS would not be part of a Device Group. DeviceGroups are a set of interconnected devices within an Auditorium. It must consist of a single Security Manager along with 0 or more auxiliary devices.

Element	Attribute	Definition	Value	Card.
DeviceGroup				
DeviceGroup		List of Device Groups.	flm:DeviceGroupType	1..n

4.1.3.2.1 DeviceGroupType

Contains one or more Devices that are grouped.

Element	Attribute	Definition	Value	Card.
DeviceGroupType				
Device		List of devices in a Device Group.	flm:DeviceGroupType	1..n

4.1.3.2.1.1 DeviceType

SMPTE 430-7-2008 defines DeviceDescription only thorough the schema.

Element	Attribute	Definition	Value	Card.
DeviceType				
DeviceTypeID		ID as per SMPTE 433-2008, Device Type Identifier Type (Section 5.11). In SMPTE 430-7-2008 schema.	dcml:deviceTypeType	

	scope	Scope of as per SMPTE 433-2008. Defaults to: http://www.smpte-ra.org/schemas/433/2008/dcmlTypes/#device-type-tokens. In SMPTE 430-7-2008 schema.	xs:anyURI	0..1
DeviceIdentifier		Device Identifier as per SMPTE 433-2008. In SMPTE 430-7-2008 schema.	dcml:deviceIdentifierPolyType	
	idtype	"DeviceID" or "CertThumbprint"	xs:token	
DeviceSerial		Manufacturer serial number from the device. In SMPTE 430-7-2008 schema.	xs:string	0..1
ManufacturerID		Unique identifier for the manufacturer. In SMPTE 430-7-2008 schema.	xs:anyURI	0..1
ManufacturerName		Name of manufacture. In SMPTE 430-7-2008 schema.	xs:string	
ModelNumber		Device's manufacturer model number. In SMPTE 430-7-2008 schema.	xs:string	
InstallDate		Date device installed in the auditorium.	xs:dateTime	0..1
IsActive		Is the device active or idle? 'TRUE' means active. Otherwise this shall be 'FALSE'	xs:boolean	
Integrator		Integrator who installing and maintain the device and data associated with that device.	xs:string	0..1
VPFFinanceEntity		Virtual Print Fee Finance (PFF) Finance Entity	xs:string	0..1
VPFStartDate		Virtual Print Fee (VPF) to pay off cost of DCI. First date any VPF deal went in effect.	xs:date	0..1
IPAddressList		Local IP Addresses associated with this Device. Candidate for removal.	Sequence of 1..n IPAddress of flm:IPAddressType	0..1
SoftwareList		List of software installed on the device, including version.	1..n sequences of Software of flm:SoftwareType	0..1
KeyInfoList		Information required to key the device; used in KDM generation.	1..n sequences of ds:KeyInfo	0..1
WatermarkingList		Information about watermark technology in the device.	1..n sequences of Watermarking	0..1

KDMDeliveryMethodList		Methods for delivering KDMs to the device.	Sequence of 1..n DeliveryMethod of type flm:DeliveryMethodType	0..1
DCPDeliveryMethodList		Methods for delivering DCPs to the device.	Sequence of 1..n DeliveryMethod of type flm:DeliveryMethodType	0..1

ManufacturerID must be unique across all manufacturers and used consistently by a manufacturer.

InstallDate is the date the Device was available for use in the Auditorium. A date in the future is an expected install date.

Integrator. TBD.

4.1.3.2.1.1.1 Watermarking

Element	Attribute	Definition	Value	Card.
Watermarking				
WatermarkManufacturer		Manufacturer of watermark technology.	xs:string	
WatermarkModel		Manufacturer's model number for watermark technology.	xs:string	0..1
WatermarkVersion		Manufacturer's version number for watermark technology.	xs:string	0..1

4.1.3.2.1.1.2 SoftwareType

This element represents any updatable function within the device, including hardware, software and firmware.

Element	Attribute	Definition	Value	Card.
SoftwareType				
SoftwareKind		Kind of software (firmware, software, hardware)	fml:SoftwareKindToken	0..1
SoftwareProducer		Entity producing software.	xs:string	0..1
Description		Description of software	xs:string	

Version		Producer's version of the software.	xs:string	
FileName		File name associated with software	xs:string	0..1
FileSize		Size of file.	xs:unsignedint	0..1
FileDateTime		Date and time associated with file.	xs:dateTime	0..1

4.1.4 Simple Types

4.1.4.1 UUID

anyURI with the following pattern:

```
<xs:pattern value="urn:uuid:[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{4}-[0-9a-fA-F]{12}"/>
```

4.1.4.2 Token Types

All these are xs:token. Enumerations are shown

4.1.4.2.1 ScreenAspectRatioType

- '1.85'
- '2.39'
- '1.66'
- '1.37'

4.1.4.2.2 AdjustableScreenMaskType

xs:token with enumeration:

- 'Top' – mask covers top and/or bottom
- 'Side' – mask covers sides
- 'Both' – masks cover sides and top/bottom
- 'None' – no masking

4.1.4.2.3 SoftwareKindToken

- 'Firmware' – versioned function is in firmware
- 'Software' – versioned function is in software
- 'Hardware' – versioned function is in hardware (e.g., hardware module)

4.1.4.2.4 ScreenTypeToken

- 'Silver'
- 'White'
- 'Other'

4.1.4.3 ipAddress

All are xs:string.

IPAddress is a Union with MemberTypes of two xs:string elements with restrictions

- ipAddressV6:
  - `<xs:pattern value="([0-9a-fA-F]{0,4}:){0,7}[0-9a-fA-F]{0,4}"/>`
  - `<xs:pattern value="(([0-9a-fA-F]+:){7}[0-9a-fA-F]+)|(([0-9a-fA-F]+:)*[0-9a-fA-F]+)?::(([0-9a-fA-F]+:)*[0-9a-fA-F]+)?"/>`
- ipAddressV4:
  - `<xs:pattern value="((1?[0-9]?[0-9]|2[0-4][0-9]|25[0-5])\.){3}(1?[0-9]?[0-9]|2[0-4][0-9]|25[0-5])"/>`

4.1.5 Contact Types

4.1.5.1 IPAddressType

Element	Attribute	Definition	Value	Card.
IPAddressType		IP Address definition	flm:IPAddressType	1..n

Element	Attribute	Definition	Value	Card.
IPAddressType				
Address		IP Address	flm:IPAddress	
Host			xs:string	0..1

4.1.5.2 ContactType

Element	Attribute	Definition	Value	Card.
ContactType		Same as SMPTE 430-7-2008 ContactInfoType except for Type element		
Name		Name	dcml:UserTextType	
CountryCode		Country Code	xs:string	0..1
Phone1		Primary (using international calling conventions)	xs:string	0..1
Phone2		Alternate (using international calling conventions)	xs:string	0..1
Email		Email	flm:EmailAddressType	0..1
Type		Type	xs:string	0..1

4.1.5.3 AddressTypeType

This structure allows one address type at a time. As address element are generally repeated, multiple of any given type can be repeated; except where prohibited in this document.

Element	Attribute	Definition	Value	Card.
AddressAddressType				
Physical		Physical address	flm:AddressType	(choice)
Shipping		Shipping address	flm:AddressType	(choice)
Billing		Billing address	flm:AddressType	(choice)

4.1.5.3.1 AddressType

Element	Attribute	Definition	Value	Card.
AddressType				

Addressee		Person to whom it is addressed (Contact)	xs:string	0..1
StreetAddress		Street Address	dcml:AddressType	
City		City	flm:AddressType	
Province		Province, State or local equivalent	xs:string	
PostalCode		Postal Code, ZIP Code if applicable	xs:string	0..1
Country		Country	xs:string	

4.1.5.4 DeliveryMethodType

This contains details on how to deliver messages to Facilities or Devices.

In the future, KDMs and DCPs may be delivered directly to TMS or LMS; and this structure will need to be expanded.

Element	Attribute	Definition	Value	Card.
DeliveryMethodType				
Email		Email delivery information	flm:EmailType	(choice)
Modem		Modem delivery information	flm:ModemType	(choice)
Network		Network delivery information	flm:NetworkType	(choice)
Physical		Physical delivery information	flm:PhysicalType	(choice)

4.1.5.4.1 EmailType

Element	Attribute	Definition	Value	Card.
EmailType				
EmailName		Addressee's name	xs:string	0..1
EmailAddress		Addressee's email address	flm:EmailAddressType	

flm:EmailAddressType is an xs:string with the following pattern:

- <xs:pattern value="([a-zA-Z0-9_\-])([a-zA-Z0-9_\-\.\+]*)@(\[((25[0-5]|2[0-4][0-9]|1[0-9][0-9]|[1-9][0-9]|[0-9])\.){3}|((([a-zA-Z0-9\-]+)\.)+))([a-zA-Z]{2,}|(25[0-5]|2[0-4][0-9]|1[0-9][0-9]|[1-9][0-9]|[0-9])\])"/>

4.1.5.4.2 ModemType

Element	Attribute	Definition	Value	Card.
ModemType				
PhoneNumber		Modem phone number	xs:string	

PhoneNumber shall be defined in international format (e.g., US numbers should include "+1").

4.1.5.4.3 NetworkType

Element	Attribute	Definition	Value	Card.
NetworkType				
URL		Location of resource.	xs:anyURI	

4.1.5.4.4 PhysicalType

Element	Attribute	Definition	Value	Card.
PhysicalType				
MediaType		Media Type. TBD	xs:string	
Detail		TBD	xs:string	0..1

5 SITE LIST

A Site List provides a mechanism for listing available FLMs, generally in response to a query to a FLM server. Details on the REST interface to obtain Site Lists will be provided later (TBS).

The structure of the Facility element is essentially undefined by the schema, but by convention provides the following information (from http://flm.foxpico.com/flm-doc.html):

1. The FLM's FacilityID (We must assume a globally unique FacilityID has been adopted.)
2. A URL representing the FLM resource itself.
3. A UTC timestamp indicating when the FLM was last changed.

Using the HTTP GET If-Modified-Since mechanism, the SiteList element need not be downloaded unless it changed. However, the entire list is downloaded once there is a change. This mechanism will be reviewed for scalability as part of the larger system.

Site List uses the 'tns' namespace (http://isdcf.com/2010/04/SiteList). 'tns' uses Xlink (http://www.w3.org/1999/xlink).

5.1 SiteListType

The SiteListType defines the structure that contains all Facilities.

Element	Attribute	Definition	Value	Card.
SiteListType				
Originator		Site URL?	xs:anyURI	
SystemName		System generating SiteList	xs:string	
DateTimeCreated		Date and time this SiteList instance was created	xs:dateTime	
FacilityList		List of facilities that have FLM messages	tns:FacilityListType	0..n

5.1.1 FacilityListType

Element	Attribute	Definition	Value	Card.
FacilityListType				
Facility		Each record refers to a FLM	tns:FacilityType Constraint that 'id' attribute must be unique	0..n

5.1.1.1 FacilityType

The FacilityType is defined in a very broad

Element	Attribute	Definition	Value	Card.
FacilityType				
<any>		There is currently no defined use for the body of this element. Information is in the attributes.	anyType	0..n
any			any	0..n
	Id	Identifier for the FLM. This currently a number. TBD	string	
	xlink:href	Reference to FLM. This is an href so path can be relative to the REST URL.	href	
	xlink:type	TBD. Currently 'simple'	type	