



**PBCore**  
**Public Broadcasting**  
**Metadata Dictionary Project**

## **PBCORE XML SCHEMA**

Overview

17 April 2006

## Preface

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The Public Broadcasting Metadata Dictionary (PBCore) Version 1.0 is the product of a number of years of collaboration involving local and national television and radio organizations, numerous constituencies and related disciplines. It is intended as a common metadata and cataloging resource for public broadcasters and associated communities. PBCore Version 1.0, as published on the PBCore website on April 1, 2005, defines 48 metadata elements, and remains current and valid. (See <http://www.pbcore.org> for detailed information and extensive tutorials.)

There is a need to express the PBCore dictionary elements and definitions in a concise and structured manner to enable integration and interoperability across multiple systems. The PBCore XML Schema, proposed here, builds on the entire PBCore effort to date and takes this step. This document attempts to provide you background rationale and discussion, along with the complete PBCore XML Schema and an example PBCore asset document (record). Please refer to the PBCore website for details on providing your feedback, and further development activities.

The creation of the PBCore XML Schema results in the following modifications and developments.

### **PBCoreAsset**

There is now a top-level container called PBCoreAsset. Asset is the label for the collection of metadata that describes, or points to, a complete produced program, or self-contained segment, and all its metadata. Basically a complete PBCore record and all the essence it describes.

### **Element/modifiers and repeatability**

We encapsulate each element that had modifiers so that we can build in the logic to be able to repeat that element, and have the modifiers bound to that specific instance.

Be aware this may require changes to how certain fields are defined, and their current status as repeatable, and those changes have not yet been made to the PBCore Web site. (April 2006)

A rough example of this:

Without accommodating this encapsulation we get two entries where you can't keep the element and modifier logically linked and end up with entries that look like this:

```
<xsd:element name="contributor">
  <xsd:element name="contributorRole">
    <xsd:element name="contributor">
      <xsd:element name="contributorRole">
```

When what we need is this:

```
<xsd:complexType name="pbcoreContributor">
  <xsd:element name="contributor">
    <xsd:element name="contributorRole">
</xsd:complexType>
```

```
<xsd:complexType name="pbcoreContributor">
  <xsd:element name="contributor">
  <xsd:element name="contributorRole">
</xsd:complexType>
```

We have taken this same structural approach for elements that might not need to maintain this explicit relationship between data entries. The Audience information is one example of this.

```
<xsd:complexType name="pbcoreAudience">
  <xsd:element name="audienceLevel">
  <xsd:element name="audienceRating">
</xsd:complexType>
```

### **Instantiation**

The biggest issue facing implementers addresses a problem related to instantiation, and the ability to repeat all data elements related to a format. This requires the creation of an Instantiation container.

### **Data field numbering**

Making explicit which fields are nested or logically linked becomes important, and the numbering of data fields will need an update. Instantiation is the most difficult structural adjustment to accommodate. All elements except Instantiation can be handled in the following way.

What was:

- 1.01 title
- 1.02 titleType

Will now be:

- 1.00 PBCoreTitle
- 1.01 title
- 1.02 titleType
- etc.

### **Controlled Vocabularies**

We will build the controlled vocabularies in their entirety into the XSD (XML Schema) document so that you can validate data entered into fields where a controlled vocabulary dictates the entry options. For illustration purposes, these remain abbreviated at points in this document.

### **Versioning**

We have added the ability to attach a version to those controlled vocabularies.

We also facilitate versioning for all data elements, and this is something that requires discussion. It may also be acceptable to only reference the PBCore version, and thus the master versioning system is a function of the PBCore oversight organization.

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### Acknowledgements

The PBCore XML Schema provides a significant tool to support adoption and use of the Public Broadcasting Metadata Dictionary. It takes us the next step toward implementation of a common framework for the exchange and delivery of content and data across public media platforms. The document in your hand is largely the work of Alan Baker and Raffi Krikorian, who skillfully took on the task of representing PBCore 1.0 in XML. NCAM would also like to recognize the continued dedication of PBCore proponents and contributors across public broadcasting, and in particular Paul Burrows, Dennis Haarsager, James Steinbach, Marcia Brooks, Ann Wilkens, Dave MacCarn, Thom Shepard, Mary Ide and David Liroff for their guidance and support of our on-going efforts.

Gerry Field  
Project Director  
April, 2006

# Introduction

This is an overview document outlining all the sections of the PBCore XML schema document – each portion of the schema will be individually dissected and explained in the rest of this publication.

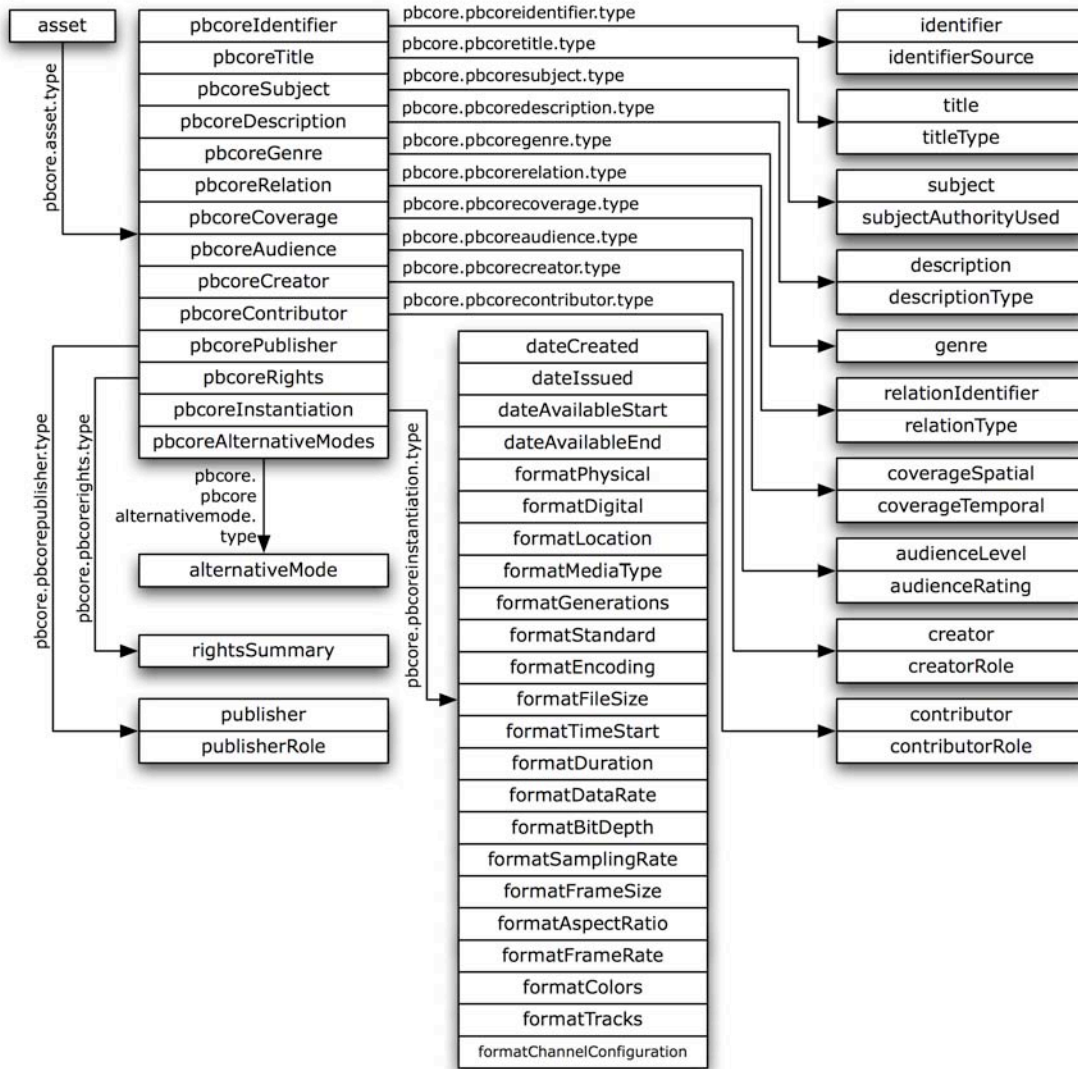


Figure 1: A block diagram of the PBCore XSD. This figure only illustrates the top-level “asset” tag along with the “asset” tag’s sub-tags. On each of the edges are all the names of the types for each of the objects.

## Schema Dissected

This section defines and describes each section of the PBCore XML schema. To see the schema without annotation, please refer to “Complete PBCore XML Schema”.

### DEFINING THE XML DOCUMENT

```
<?xml version="1.0"?>
<xsd:schema
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.utah.edu/cpbmetadata/2006"
  xmlns="http://www.utah.edu/cpbmetadata/2006"
  elementFormDefault="qualified">
```

This block simply sets up the XML schema and places it at <http://www.utah.edu/cpbmetadata/2006> as its URL namespace.

### THE TOP-LEVEL “ASSET”

```
<xsd:element name="asset" type="pbcore.asset.type"/>
<xsd:complexType name="pbcore.asset.type">
  <xsd:sequence>
    <xsd:element ref="pbcoreIdentifier" minOccurs="1" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreTitle" minOccurs="1" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreSubject" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreDescription" minOccurs="1" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreGenre" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreRelation" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreCoverage" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreAudience" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreCreator" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreContributor" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcorePublisher" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreRights" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element
      ref="pbcoreInstantiation"
      minOccurs="1" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreLanguage" minOccurs="0" maxOccurs="1"/>
    <xsd:element
      ref="pbcoreAlternativeModes"
      minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="pbcoreAnnotation" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="version" type="xsd:string"/>
</xsd:complexType>
```

The `xsd:element` up top, named “asset” defines the `<pbcore:asset>` tag, and is the top level container for a PBCore asset. It is of type `pbcore.asset.type` meaning that when the `<pbcore:asset>` tag appears in an XML document, it must follow the description laid out by the above `<xsd:complexType name="pbcore.asset.type">` tag.

Here, the `pbcore.asset.type` tag defines the tags that appear below this one, the number of times each tag repeats, and the ordering that they must appear. Each `<xsd:element>` tag underneath the

<xsd:complexType> tag refers to a sub-tag to appear, each named by the “ref” attribute. The number of times the object repeats is dictated by the “minOccurs” (the minimum times the tag must appear) and “maxOccurs” (the maximum times the tag is allowed to appear) attributes. Lastly, the order in which the tags must appear is dictated by the ordering of the references in the <xsd:sequence>. For example, the pbcoreIdentifier tag must appear before the pbcoreTitle tag.

To walk through a simple example: the second <xsd:element> underneath the <xsd:sequence> is a tag that refers to the pbcoreTitle. The “ref” attribute dictates that the name of this tag is pbcoreTitle, therefore in the XML document the tag will appear as <pbcoreTitle> or <pbcore:pbcoreTitle> if the namespace is not implicitly defined, and we are using pbcore as the namespace. As minOccurs=“1” and maxOccurs=“unbounded”, this tag must appear once, and may appear as many times as desired (the tag must appear at least once in this asset). Again, its position in the document is specified by its location in the <xsd:sequence>, because its particular <xsd:element> comes after the tag with the attribute ref=“pbcoreIdentifier” and before the tag with the attribute ref=“pbcoreSubject”, the <pbcoreTitle> tag in the final PBCore asset XML document must appear after the <pbcoreIdentifier> tag and before the <pbcoreSubject> tag.

To be explicit, the “ref” attribute dictates that elsewhere in the XSD there will be additional definitions about each tag.

## Tag types

```
<xsd:element name="pbcoreIdentifier" type="pbcore.pbcoreidentifier.type"/>
<xsd:element name="pbcoreTitle" type="pbcore.pbcoretitle.type"/>
<xsd:element name="pbcoreSubject" type="pbcore.pbcoresubject.type"/>
<xsd:element name="pbcoreDescription" type="pbcore.pbcoredescription.type"/>
<xsd:element name="pbcoreGenre" type="pbcore.pbcoregenre.type"/>
<xsd:element name="pbcoreRelation" type="pbcore.pbcorerelation.type"/>
<xsd:element name="pbcoreCoverage" type="pbcore.pbcorecoverage.type"/>
<xsd:element name="pbcoreAudience" type="pbcore.pbcoreaudience.type"/>
<xsd:element name="pbcoreCreator" type="pbcore.pbcorecreator.type"/>
<xsd:element name="pbcoreContributor" type="pbcore.pbcorecontributor.type"/>
<xsd:element name="pbcorePublisher" type="pbcore.pbcorepublisher.type"/>
<xsd:element name="pbcoreRights" type="pbcore.pbcorerights.type"/>
<xsd:element
  name="pbcoreInstantiation"
  type="pbcore.pbcoreinstantiation.type"/>
<xsd:element name="pbcoreLanguage" type="pbcore.pbcorelanguage.type"/>
<xsd:element
  name="pbcoreAlternativeModes"
  type="pbcore.pbcorealternativemodes.type"/>
<xsd:element name="pbcoreAnnotation" type="pbcore.pbcoreannotation.type"/>
```

This next block defines the type of each one of the tags defined in “The top-level “Asset””. The PBCore XML schema has been organized so that each one of the tags defined in the PBCore **asset** refer to this section for additional information. Here, the XML schema defines what type (the inherent and visible documentation for an object) each one of the **asset**’s subtags is.

For example, the line `<xsd:element ref="pbcoreTitle" minOccurs="1" maxOccurs="unbounded">` above refers to the second line in this block where it defines the `pbcoreTitle` object as being of type `pbcore.pbcoretitle.type`.

## BASE-TYPES

```
<xsd:complexType name="pbcore.string.type.base">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:complexType name="pbcore.number.type.base">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="version" type="xsd:nonNegativeInteger"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:complexType name="pbcore.date.type.base">
  <xsd:simpleContent>
    <xsd:extension base="xsd:dateTime">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
```

Before the schema delves into the details for the contents of each individual tag, the schema first defines a few base level types that are going to be used over and over again:

- `pbcore.string.type.base`
- `pbcore.number.type.base`
- `pbcore.date.type.base`

All these types are extensions of the XML schema types (`pbcore.string.type.base` is a `xsd:string` which is just a sequence of characters; a `pbcore.number.type.base` is a `xsd:nonNegativeInteger` which is a string that contains only digits; a `pbcore.date.type.base` is a `xsd:dateTime` which defines a standard format to contain a date). The extension to these types all involve the specification of an optional “version” attribute that can be used to mark what version of the PBCore definition is being used when this tag appears.

## SUB-TAG DEFINITIONS

The following blocks (which also encompass the rest of the XML schema), all define the data types for the sub-tags described in “The top-level “Asset””.

### **pbcoreIdentifier**

```
<xsd:complexType name="pbcore.pbcoreidentifier.type">
  <xsd:sequence>
```



```

    <xsd:element ref="identifier" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="identifierSource" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="identifier" type="pbcore.string.type.base"/>
<xsd:element name="identifierSource" type="pbcore.string.type.base"/>

```

By this definition, a `<pbcoreIdentifier>` tag in a PBCore asset document will contain two sub-tags, an `<identifier>` tag, and an `<identifierSource>` tag. Both tags must appear, and may only appear, once per `<pbcoreIdentifier>` tag. Both tags are of `pbcore.string.type.base`, meaning that they are simply strings with an optional “version” attribute.

### pbcoreTitle

```

<xsd:complexType name="pbcore.pbcoretitle.type">
  <xsd:sequence>
    <xsd:element ref="title" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="titleType" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="title" type="pbcore.string.type.base"/>
<xsd:element name="titleType" type="pbcore.string.type.base"/>

```

The `<pbcoreTitle>` tag is as conceptually simple as the `<pbcoreIdentifier>` tag. Here, there are two subtags defined: the `<title>` and the `<titleType>` tag. The `<title>` tag must appear, and may only appear once per `<pbcoreTitle>` tag; whereas the `<titleType>` tag may appear, however it may only appear once. Both of these tags are of `pbcore.string.type.base`.

### pbcoreSubject

```

<xsd:complexType name="pbcore.pbcoresubject.type">
  <xsd:sequence>
    <xsd:element ref="subject" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="subjectAuthorityUsed" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="subject" type="pbcore.string.type.base"/>
<xsd:element name="subjectAuthorityUsed" type="pbcore.string.type.base"/>

```

`<pbcoreSubject>` contains two sub-tags: `<subject>` and `<subjectAuthorityUsed>`. `<subject>` must appear once, and only once, per `<pbcoreSubject>`. `<subjectAuthorityUsed>`, however, is optional – if it does appear, it may only appear once. Both `<subject>` and `<subjectAuthorityUsed>` are of type `pbcore.string.type.base`.

### pbcoreDescription

```

<xsd:complexType name="pbcore.pbcoredescription.type">
  <xsd:sequence>
    <xsd:element ref="description" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="descriptionType" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="description" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.descriptiontype.type.base">

```

```

<xsd:restriction base="xsd:string">
  <xsd:enumeration value="Abstract" />
  <xsd:enumeration value="Table of Contents" />
  <xsd:enumeration value="Other" />
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.descriptiontype.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.descriptiontype.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="descriptionType" type="pbcore.descriptiontype.type" />

```

The `<pbcoreDescription>` tag is a bit more nuanced when compared to any tag that has appeared before. It contains a `<description>` sub-tag which must appear once, and only once – that tag is of `pbcore.string.type.base`. The `<descriptionType>` tag, is an optional tag that may only appear once if it appears at all.

The contents of that tag, however, are of a restricted vocabulary. As the schema currently dictates it<sup>1</sup>, the `<descriptionType>` tag can only contain the strings “Abstract”, “Table of Contents”, and “Other”. This vocabulary is defined in the `pbcore.descriptiontype.type.base` under the `<xsd:restriction>` tag. The `pbcore.descriptiontype.type.base` type is wrapped in a `pbcore.descriptiontype.type` that then adds a “version” attribute.

## pbcoreGenre

```

<xsd:complexType name="pbcore.pbcoregenre.type">
  <xsd:sequence>
    <xsd:element ref="genre" minOccurs="1" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="genre" type="pbcore.genre.type" />
<xsd:simpleType name="pbcore.genre.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Action" />
    <xsd:enumeration value="Actuality" />
    <xsd:enumeration value="Adults Only" />
    <xsd:enumeration value="Adventure" />
    <xsd:enumeration value="Advice" />
    <xsd:enumeration value="Agriculture" />
    <xsd:enumeration value="Animals" />
    <xsd:enumeration value="Animation" />
    <xsd:enumeration value="Anime" />
    <xsd:enumeration value="Anthology" />
    <xsd:enumeration value="Art" />
    <xsd:enumeration value="Artscrafts" />
    <xsd:enumeration value="Auction" />
  </xsd:restriction>

```

<sup>1</sup> The schema only contains a subset of what the restricted language can contain for brevity’s sake.

```

<xsd:enumeration value="Auto"/>
<xsd:enumeration value="Aviation"/>
<xsd:enumeration value="Awards"/>
<xsd:enumeration value="Bicycle"/>
<xsd:enumeration value="Biography"/>
<xsd:enumeration value="Boat"/>
<xsd:enumeration value="Business/Financial"/>
<xsd:enumeration value="Call-in"/>
<xsd:enumeration value="Children"/>
<xsd:enumeration value="Children-music"/>
<xsd:enumeration value="Children-special"/>
<xsd:enumeration value="Children-talk"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.genre.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.genre.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

```

Refer to 'pbcoreDescription' for a more detailed discussion on how this tag is setup. Here, we define a <pbcoreDescription> tag that must contain one, and only one <genre> tag. The vocabulary of the <genre> tag is restricted to<sup>2</sup>:

- Action
- Actuality
- Adults Only
- Adventure
- Advice
- Agriculture
- Animals
- Animation
- Anime
- Anthology
- Art
- Artscrafts
- Auction
- Auto
- Aviation
- Awards
- Bicycle
- Biography
- Boat
- Business/Financial
- Call-in

---

<sup>2</sup> Again, this vocabulary is simply a subset of what will appear in a final version of the schema. The list has been shorted for brevity's sake.

- Children
- Children-music
- Children-special
- Children-talk

## pbcoreRelation

```

<xsd:complexType name="pbcore.pbcorerelation.type">
  <xsd:sequence>
    <xsd:element ref="relationIdentifier" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="relationType" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="relationIdentifier" type="pbcore.string.type.base"/>

<xsd:element name="relationType" type="pbcore.relationtype.type"/>
<xsd:simpleType name="pbcore.relationtype.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Has Format"/>
    <xsd:enumeration value="Is Format Of"/>
    <xsd:enumeration value="Has Part"/>
    <xsd:enumeration value="Is Part Of"/>
    <xsd:enumeration value="Has Version"/>
    <xsd:enumeration value="Is Version Of"/>
    <xsd:enumeration value="References"/>
    <xsd:enumeration value="Is Referenced By"/>
    <xsd:enumeration value="Replaces"/>
    <xsd:enumeration value="Is Replaced By"/>
    <xsd:enumeration value="Requires"/>
    <xsd:enumeration value="Is Required By"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.relationtype.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.relationtype.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

```

Refer to 'pbcoreDescription' for a more detailed discussion on how this tag is setup.

The <pbcoreRelation> tag is defined to contain one, and only one <relationIdentifier> tag that is of a pbcore.string.type.base type. The <pbcoreRelation> tag must also contain a <relationType> tag (and it may only appear once) that has the following restricted vocabulary:

- Has Format
- Is Format Of
- Has Part
- Is Part Of

- Has Version
- Is Version Of
- References
- Is Referenced By
- Replaces
- Is Replaced By
- Requires
- Is Required By

### pbcoreCoverage

```

<xsd:complexType name="pbcore.pbcorecoverage.type">
  <xsd:sequence>
    <xsd:element ref="coverageSpatial" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="coverageTemporal" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="coverageSpatial" type="pbcore.string.type.base"/>
<xsd:element name="coverageTemporal" type="pbcore.string.type.base"/>

```

The <pbcoreCoverage> tag may contain either (or both) a <coverageSpatial> and/or a <coverageTemporal> tag. These tags may appear as many times as desired, and only the ordering that all the <coverageSpatial> tags must appear before the <coverageTemporal> tag is important. Both of these subtags are of pbcore.string.type.base.

### pbcoreAudience

```

<xsd:complexType name="pbcore.pbcoreaudience.type">
  <xsd:sequence>
    <xsd:element ref="audienceLevel" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="audienceRating" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:simpleType name="pbcore.audiencelevel.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="K-12 (general)"/>
    <xsd:enumeration value="Pre-school (kindergarten)"/>
    <xsd:enumeration value="Primary (grades 1-6)"/>
    <xsd:enumeration value="Intermediate (grades 7-9)"/>
    <xsd:enumeration value="High School (grades 10-12)"/>
    <xsd:enumeration value="College"/>
    <xsd:enumeration value="Post Graduate"/>
    <xsd:enumeration value="General Education"/>
    <xsd:enumeration value="Educator"/>
    <xsd:enumeration value="Vocational"/>
    <xsd:enumeration value="Adult"/>
    <xsd:enumeration value="Special Audiences"/>
    <xsd:enumeration value="General"/>
    <xsd:enumeration value="Male"/>
    <xsd:enumeration value="Female"/>
  </xsd:restriction>
</xsd:simpleType>

```

```

    <xsd:enumeration value="-" />
    <xsd:enumeration value="Other" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.audiencelevel.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.audiencelevel.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="audienceLevel" type="pbcore.audiencelevel.type" />

<xsd:simpleType name="pbcore.audienrating.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="TV-Y (all children)" />
    <xsd:enumeration value="TV-Y7 (children 7 and up)" />
    <xsd:enumeration value="TV-Y7-FV (fantasy violence)" />
    <xsd:enumeration value="TV-G (general audience)" />
    <xsd:enumeration value="TV-PG (parental guidance suggested)" />
    <xsd:enumeration value="TV-PG (V) (moderate violence)" />
    <xsd:enumeration value="TV-PG (S) (some sexual situations)" />
    <xsd:enumeration value="TV-PG (L) (infrequent coarse language)" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.audienrating.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.audienrating.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="audienceRating" type="pbcore.audienrating.type" />

```

Here, the schema defines the <pbcoreAudience> tag – this tag may contain an <audienceLevel> tag and an <audienceRating> tag. Both tags are optional, but both tags may also appear as many times as desired. The only thing enforced is that all the <audienceLevel> tags must appear before the <audienceRating> tags.

Both of these tags have a restricted vocabulary. The <audienceLevel> is restricted to<sup>3</sup>:

- K-12 (general)
- Pre-school (kindergarten)
- Primary (grades 1-6)
- Intermediate (grades 7-9)
- High School (grades 10-12)
- College
- Post Graduate
- General Education

---

<sup>3</sup> Condensed, in this XML schema, for brevity.

- Educator
- Vocational
- Adult
- Special Audiences
- General
- Male
- Female
- Other

<audienceRating>, on the other hand, is restricted to<sup>4</sup>:

- TV-Y (all children)
- TV-Y7 (children 7 and up)
- TV-Y7-FV (fantasy violence)
- TV-G (general audience)
- TV-PG (parental guidance suggested)
- TV-PG (V) (moderate violence)
- TV-PG (S) (some sexual situations)

### pbcoreCreator/pbcoreContributor/pbcorePublisher

```
<xsd:complexType name="pbcore.pbcorecreator.type">
  <xsd:sequence>
    <xsd:element ref="creator" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="creatorRole" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="creator" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.creatorrole.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Artist"/>
    <xsd:enumeration value="Associate Producer"/>
    <xsd:enumeration value="Cinematographer"/>
    <xsd:enumeration value="Composer"/>
    <xsd:enumeration value="Co-Producer"/>
    <xsd:enumeration value="Creator"/>
    <xsd:enumeration value="Director"/>
    <xsd:enumeration value="Editor"/>
    <xsd:enumeration value="Essayist"/>
    <xsd:enumeration value="Executive Producer"/>
    <xsd:enumeration value="Illustrator"/>
    <xsd:enumeration value="Other"/>
    <xsd:enumeration value="Photographer"/>
    <xsd:enumeration value="Producer"/>
    <xsd:enumeration value="Production Unit"/>
    <xsd:enumeration value="Writer"/>
  </xsd:restriction>
</xsd:simpleType>
```

<sup>4</sup> Again, condensed in this XML schema for brevity.

```

    <xsd:enumeration value="-" />
    <xsd:enumeration value="Other" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.creatorrole.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.creatorrole.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="creatorRole" type="pbcore.creatorrole.type" />

<xsd:complexType name="pbcore.pbcorecontributor.type">
  <xsd:sequence>
    <xsd:element ref="contributor" minOccurs="1" maxOccurs="1" />
    <xsd:element ref="contributorRole" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="contributor" type="pbcore.string.type.base" />

<xsd:simpleType name="pbcore.contributorrole.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Artist" />
    <xsd:enumeration value="Associate Producer" />
    <xsd:enumeration value="Cinematographer" />
    <xsd:enumeration value="Composer" />
    <xsd:enumeration value="Co-Producer" />
    <xsd:enumeration value="Creator" />
    <xsd:enumeration value="Director" />
    <xsd:enumeration value="Editor" />
    <xsd:enumeration value="Essayist" />
    <xsd:enumeration value="Executive Producer" />
    <xsd:enumeration value="Illustrator" />
    <xsd:enumeration value="Other" />
    <xsd:enumeration value="Photographer" />
    <xsd:enumeration value="Producer" />
    <xsd:enumeration value="Production Unit" />
    <xsd:enumeration value="Writer" />
    <xsd:enumeration value="-" />
    <xsd:enumeration value="Other" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.contributorrole.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.contributorrole.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>

```



```

</xsd:complexType>
<xsd:element name="contributorRole" type="pbcore.contributorrole.type"/>

<xsd:complexType name="pbcore.pbcorepublisher.type">
  <xsd:sequence>
    <xsd:element ref="publisher" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="publisherRole" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="publisher" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.publisherrole.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Copyright Holder"/>
    <xsd:enumeration value="Distributor"/>
    <xsd:enumeration value="Presenter"/>
    <xsd:enumeration value="Publisher"/>
    <xsd:enumeration value="Release Agent "/>
    <xsd:enumeration value="-"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.publisherrole.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.publisherrole.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="publisherRole" type="pbcore.publisherrole.type"/>

```

The <pbcoreCreator>, <pbcoreContributor>, and the <pbcorePublisher> tags are all very similar. They contain a <creator>, <contributor>, and a <publisher> tag respectively – and these tags must appear once and only once in their respective parent tags.

The tags then each have their own restricted languages for the <creatorRole>, <contributorRole>, and <publisherRole> respectfully. Each one of these role tags is optional per parent tag, but may only appear once if they do appear.

<creatorRole> is limited to<sup>5</sup>:

- Artist
- Associate Producer
- Cinematographer
- Composer
- Co-Producer
- Creator
- Director

---

<sup>5</sup> The XML schema has an abbreviated list compared to the final and master list.

- Editor
- Essayist
- Executive Producer
- Illustrator
- Other
- Photographer
- Producer
- Production Unit
- Writer
- Other

<contributorRole> has a vocabulary which consists of<sup>6</sup>:

- Artist
- Associate Producer
- Cinematographer
- Composer
- Co-Producer
- Creator
- Director
- Editor
- Essayist
- Executive Producer
- Illustrator
- Other
- Photographer
- Producer
- Production Unit
- Writer
- Other

Lastly, <publisherRole> is limited to<sup>7</sup>:

- Copyright Holder
- Distributor
- Presenter
- Publisher
- Release Agent
- Other

### **pbcoreRights**

```
<xsd:complexType name="pbcore.pbcorerights.type">
  <xsd:sequence>
    <xsd:element ref="rightsSummary" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
```

---

<sup>6</sup> Again, abbreviated.

<sup>7</sup> Also abbreviated in the XML schema.

```

</xsd:complexType>
<xsd:element name="rightsSummary" type="pbcore.string.type.base"/>

```

The <pbcoreRights> tag must contain one, and only one, <rightsSummary> tag. That tag is of type pbcore.string.type.base.

### pbcoreInstantiation

```

<xsd:complexType name="pbcore.pbcoreinstantiation.type">
  <xsd:sequence>
    <xsd:element ref="dateCreated" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="dateIssued" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="dateAvailableStart" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="dateAvailableEnd" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatPhysical" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatDigital" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatLocation" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="formatMediaType" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatGenerations" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatStandard" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatEncoding" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatFileSize" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatTimeStart" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatDuration" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatDataRate" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatBitDepth" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatSamplingRate" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatFrameSize" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatAspectRatio" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatFrameRate" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatColors" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatTracks" minOccurs="0" maxOccurs="1"/>
    <xsd:element
      ref="formatChannelConfiguration"
      minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

```

The <pbcoreInstantiation> tag is the most complicated <asset> sub-tag. This block defines all the subtags to the <pbcoreInstantiation>, the names of all the tags, the ordering of the tags, and the number of times the tag must and can occur.

```

<xsd:element name="dateCreated" type="pbcore.date.type.base"/>
<xsd:element name="dateIssued" type="pbcore.date.type.base"/>
<xsd:element name="dateAvailableStart" type="pbcore.date.type.base"/>
<xsd:element name="dateAvailableEnd" type="pbcore.date.type.base"/>

```

Here the schema defines the <dateCreated>, the <dateIssued>, the <dateAvailableStart>, and the <dateAvailableEnd> tags as being of pbcore.date.type.base – they all contain dates.

```

<xsd:simpleType name="pbcore.formatphysical.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Film:8mm"/>
    <xsd:enumeration value="Film:16mm"/>
  </xsd:restriction>
</xsd:simpleType>

```

```

<xsd:enumeration value="Film:35mm"/>
<xsd:enumeration value="Film:70mm"/>
<xsd:enumeration value="8mm video"/>
<xsd:enumeration value="8mm: Hi8 Video"/>
<xsd:enumeration value="8mm: Digital-8"/>
<xsd:enumeration value="1/4 inch videotape:Akai"/>
<xsd:enumeration value="1/2 inch videotape:CV"/>
<xsd:enumeration value="1/2 inch videotape:EIAJ Type 1"/>
<xsd:enumeration value="1/2 inch videotape:VCR"/>
<xsd:enumeration value="1/2 inch videotape:V2000"/>
<xsd:enumeration value="1/2 inch video"/>
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatphysical.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatphysical.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatPhysical" type="pbcore.formatphysical.type"/>

```

The <formatPhysical> sub-tag has a restricted vocabulary that contains<sup>8</sup>:

- Film:8mm
- Film:16mm
- Film:35mm
- Film:70mm
- 8mm video
- 8mm: Hi8 Video
- 8mm: Digital-8
- 1/4 inch videotape:Akai
- 1/2 inch videotape:CV
- 1/2 inch videotape:EIAJ Type 1
- 1/2 inch videotape:VCR
- 1/2 inch videotape:V2000
- 1/2 inch video

```

<xsd:simpleType name="pbcore.formatdigital.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="application/astound"/>
    <xsd:enumeration value="application/ccv"/>
    <xsd:enumeration value="application/dca-rft"/>
    <xsd:enumeration value="application/dsssl"/>
    <xsd:enumeration value="application/envoy"/>
    <xsd:enumeration value="application/fastman "/>
    <xsd:enumeration value="application/font"/>
    <xsd:enumeration value="application/fractals"/>
    <xsd:enumeration value="application/futuresplash"/>
  </xsd:restriction>
</xsd:simpleType>

```

<sup>8</sup> Abbreviated in the XML schema.

```

    <xsd:enumeration value="application/hdf"/>
    <xsd:enumeration value="application/iges"/>
    <xsd:enumeration value="application/macbinary"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatdigital.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatdigital.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatDigital" type="pbcore.formatdigital.type"/>

```

Just like the <formatPhysical>, the <formatDigital> sub-type has a restricted sub-type<sup>9</sup>:

- application/astound
- application/ccv
- application/dca-rft
- application/dsssl
- application/envoy
- application/fastman
- application/font
- application/fractals
- application/futuresplash
- application/hdf
- application/iges
- application/macbinary

```

<xsd:element name="formatLocation" type="pbcore.string.type.base"/>

```

<formatLocation> is simply a string (of pbcore.string.type.base).

```

<xsd:simpleType name="pbcore.formatmediatype.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Animation"/>
    <xsd:enumeration value="Artifact"/>
    <xsd:enumeration value="Collection"/>
    <xsd:enumeration value="Dataset"/>
    <xsd:enumeration value="Event"/>
    <xsd:enumeration value="Interactive Resource"/>
    <xsd:enumeration value="Moving Image"/>
    <xsd:enumeration value="Physical Object"/>
    <xsd:enumeration value="Service"/>
    <xsd:enumeration value="Software"/>
    <xsd:enumeration value="Sound"/>
    <xsd:enumeration value="Static Image"/>
    <xsd:enumeration value="Text"/>
  </xsd:restriction>
</xsd:simpleType>

```

<sup>9</sup> Abbreviated in the XML Schema as this tag would contain the entirety of the MIME types.

```

<xsd:complexType name="pbcore.formatmediatype.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatmediatype.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatMediaType" type="pbcore.formatmediatype.type"/>

```

This sub-tag, the <formatMediaType> too has a restricted vocabulary<sup>10</sup>:

- Animation
- Artifact
- Collection
- Dataset
- Event
- Interactive Resource
- Moving Image
- Physical Object
- Service
- Software
- Sound
- Static Image
- Text

```

<xsd:simpleType name="pbcore.formatgenerations.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Artifact/Award"/>
    <xsd:enumeration value="Artifact/Book"/>
    <xsd:enumeration value="Artifact/Costume"/>
    <xsd:enumeration value="Artifact/Merchandise"/>
    <xsd:enumeration value="Artifact/Optical disk reader"/>
    <xsd:enumeration value="Artifact/SCSI Hard Drive"/>
    <xsd:enumeration value="Artifact/Sy-Quest drive"/>
    <xsd:enumeration value="Audio/Air track"/>
    <xsd:enumeration value="Audio/Audio dub"/>
    <xsd:enumeration value="Audio/Audio master (full mix)"/>
    <xsd:enumeration value="Audio/Master mix"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatgenerations.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatgenerations.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatGenerations" type="pbcore.formatgenerations.type"/>

```

Another restricted vocabulary applies for <formatGenerations><sup>11</sup>:

<sup>10</sup> Possibly in an abbreviated vocabulary.

- Artifact/Award
- Artifact/Book
- Artifact/Costume
- Artifact/Merchandise
- Artifact/Optical disk reader
- Artifact/SCSI Hard Drive
- Artifact/Sy-Quest drive
- Audio/Air track
- Audio/Audio dub
- Audio/Audio master (full mix)
- Audio/Master mix

```

<xsd:simpleType name="pbcore.formatstandard.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Film" />
    <xsd:enumeration value="MPEG video" />
    <xsd:enumeration value="NTSC video (interlaced)" />
    <xsd:enumeration value="NTSC video (progressive)" />
    <xsd:enumeration value="ATSC video (interlaced)" />
    <xsd:enumeration value="ATSC video (progressive) " />
    <xsd:enumeration value="PAL video" />
    <xsd:enumeration value="SECAM video" />
    <xsd:enumeration value="QuickTime" />
    <xsd:enumeration value="RealSystems" />
    <xsd:enumeration value="Windows Media" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatstandard.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatstandard.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatStandard" type="pbcore.formatstandard.type" />

```

This sub-tag describes the digital format that this instantiation may be in. The `<formatStandard>` tag has a restricted vocabulary that contains<sup>12</sup>:

- Film
- MPEG video
- NTSC video (interlaced)
- NTSC video (progressive)
- ATSC video (interlaced)
- ATSC video (progressive)
- PAL video

---

<sup>11</sup> Abbreviated in this schema.

<sup>12</sup> As always, this list is what appears in the schema, but may be abbreviated overall.

- SECAM video
- QuickTime
- RealSystems
- Windows Media

```
<xsd:element name="formatEncoding" type="pbcore.string.type.base"/>
```

The <formatEncoding> tag is a string.

```
<xsd:element name="formatFileSize" type="pbcore.number.type.base"/>
```

The <formatFileSize> contains a number.

```
<xsd:element name="formatTimeStart" type="pbcore.date.type.base"/>
```

```
<xsd:element name="formatDuration" type="pbcore.date.type.base"/>
```

Both the <formatTimeStart> and the <formatDuration> tags contain pbcore.date.type.base objects – which means that both contain dates.

```
<xsd:element name="formatDataRate" type="pbcore.string.type.base"/>
```

<formatDataRate> is a free-formed text string.

```
<xsd:simpleType name="pbcore.formatbitdepth.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="8 bit"/>
    <xsd:enumeration value="10 bit"/>
    <xsd:enumeration value="16 bit"/>
    <xsd:enumeration value="20 bit"/>
    <xsd:enumeration value="24 bit"/>
    <xsd:enumeration value="32 bit"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatbitdepth.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatbitdepth.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatBitDepth" type="pbcore.formatbitdepth.type"/>
```

To describe the bit-depth of a digital format, the <formatBitDepth> tag has a restricted vocabulary that contains:

- 8 bit
- 10 bit
- 16 bit
- 20 bit
- 24 bit
- 32 bit
- Other



```

<xsd:simpleType name="pbcore.formatsamplingrate.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="11 kHz" />
    <xsd:enumeration value="22.050 kHz" />
    <xsd:enumeration value="32 kHz" />
    <xsd:enumeration value="44.1 kHz" />
    <xsd:enumeration value="48 kHz" />
    <xsd:enumeration value="96 kHz" />
    <xsd:enumeration value="Other" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatsamplingrate.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatsamplingrate.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatSamplingRate" type="pbcore.formatsamplingrate.type"/>

```

<formatSamplingRate> contains the audio sampling rate used in the encoding. It too contains a limited vocabulary of:

- 11 kHz
- 22.050 kHz
- 32 kHz
- 44.1 kHz
- 48 kHz
- 96 kHz
- Other

```

<xsd:simpleType name="pbcore.formatframesize.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="352x240 (MPEG-1 NTSC)" />
    <xsd:enumeration value="352x288 (MPEG-1 PAL)" />
    <xsd:enumeration value="640x480" />
    <xsd:enumeration value="704x480" />
    <xsd:enumeration value="720x480 (MPEG-2 NTSC and DV)" />
    <xsd:enumeration value="720x576 (MPEG-2 PAL)" />
    <xsd:enumeration value="720x486 (D1)" />
    <xsd:enumeration value="1280x720" />
    <xsd:enumeration value="1920x1080" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatframesize.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatframesize.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

```

```
<xsd:element name="formatFrameSize" type="pbcore.formatframesize.type"/>
```

The sub-tag <formatFrameSize> has a restricted vocabulary of:

- 352x240 (MPEG-1 NTSC)
- 352x288 (MPEG-1 PAL)
- 640x480
- 704x480
- 720x480 (MPEG-2 NTSC and DV)
- 720x576 (MPEG-2 PAL)
- 720x486 (D1)
- 1280x720
- 1920x1080

```
<xsd:simpleType name="pbcore.formataspectratio.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="4:3"/>
    <xsd:enumeration value="4:3 (16:9 letterbox)"/>
    <xsd:enumeration value="4:3 (16:9 anamorphic)"/>
    <xsd:enumeration value="16:9"/>
    <xsd:enumeration value="5.5:3"/>
    <xsd:enumeration value="7:3 (Panavision or CinemaScope)"/>
    <xsd:enumeration value="2.35:1"/>
    <xsd:enumeration value="1.85:1"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formataspectratio.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formataspectratio.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element
  name="formatAspectRatio"
  type="pbcore.formataspectratio.type.base"/>
```

<formatAspectRatio> too has a restricted vocabulary of:

- 4:3
- 4:3 (16:9 letterbox)
- 4:3 (16:9 anamorphic)
- 16:9
- 5.5:3
- 7:3 (Panavision or CinemaScope)
- 2.35:1
- 1.85:1
- Other

```
<xsd:simpleType name="pbcore.formatframerate.type.base">
```

```

<xsd:restriction base="xsd:string">
  <xsd:enumeration value="60 fields/sec" />
  <xsd:enumeration value="30 fps" />
  <xsd:enumeration value="29.97 fps" />
  <xsd:enumeration value="25 fps" />
  <xsd:enumeration value="24 fps" />
  <xsd:enumeration value="15 fps" />
  <xsd:enumeration value="12 fps" />
  <xsd:enumeration value="10 fps" />
  <xsd:enumeration value="7 fps" />
  <xsd:enumeration value="5 fps" />
  <xsd:enumeration value="2 fps" />
  <xsd:enumeration value="1 fps" />
  <xsd:enumeration value="Other" />
</xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatframerate.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatframerate.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatFrameRate" type="pbcore.formatframerate.type" />

```

Another restricted vocabulary is used by <formatFrameRate>:

- 60 fields/sec
- 30 fps
- 29.97 fps
- 25 fps
- 24 fps
- 15 fps
- 12 fps
- 10 fps
- 7 fps
- 5 fps
- 2 fps
- 1 fps
- Other

```

<xsd:simpleType name="pbcore.formatcolors.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="B&W" />
    <xsd:enumeration value="Grayscale" />
    <xsd:enumeration value="Color" />
    <xsd:enumeration value="B&W with grayscale sequences" />
    <xsd:enumeration value="B&W with color sequences " />
    <xsd:enumeration value="Grayscale with B&W sequences" />
    <xsd:enumeration value="Grayscale with color sequences " />
    <xsd:enumeration value="Color with B&W sequences" />
  </xsd:restriction>
</xsd:simpleType>

```

```

    <xsd:enumeration value="Color with grayscale sequences" />
    <xsd:enumeration value="Other" />
  </xsd:restriction>
</xsd:simpleType>
<xsd:complexType name="pbcore.formatcolors.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatcolors.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>
<xsd:element name="formatColors" type="pbcore.formatcolors.type" />

```

<formatColor>'s accepted values include:

- B&W
- Grayscale
- Color
- B&W with grayscale sequences
- B&W with color sequences
- Grayscale with B&W sequences
- Grayscale with color sequences
- Color with B&W sequences
- Color with grayscale sequences
- Other

```

<xsd:element name="formatTracks" type="pbcore.string.type.base" />
<xsd:element
  name="formatChannelConfiguration"
  type="pbcore.string.type.base" />

```

Both <formatTracks> and <formatChannelConfiguration> can be simply described with a string (specifically of pbcore.string.type.base).

### pbcoreLanguage

```

<xsd:complexType name="pbcore.pbcorelanguage.type">
  <xsd:sequence>
    <xsd:element ref="language" minOccurs="1" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="language" type="pbcore.string.type.base" />

```

<pbcoreLanguage> tag is a subtag to the <asset> tag. It contains a <language> sub-tag that must occur once, and only once. That <language> is of pbcore.string.type.base, meaning it simply include a string.

### pbcoreAlternativeModes

```

<xsd:complexType name="pbcore.pbcorealternativemodes.type">
  <xsd:sequence>
    <xsd:element ref="alternativeMode" minOccurs="1" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>

```

```
<xsd:element name="alternativeMode" type="pbcore.string.type.base"/>
```

Another subtag to <asset> is the <pbcoreAlternativeModes> tag. This tag must contain one, and only one, <alternativeMode> tag, which in turn simply contains a string.

### **pbcoreAnnotation**

```
<xsd:complexType name="pbcore.pbcoreannotation.type">  
  <xsd:sequence>  
    <xsd:element ref="annotation" minOccurs="1" maxOccurs="1"/>  
  </xsd:sequence>  
</xsd:complexType>  
<xsd:element name="annotation" type="pbcore.string.type.base"/>
```

The final tag to consider is the <pbcoreAnnotation> tag – that tag is a subtag to <asset>, and it must contain one, and only one, <annotation> tag. The <annotation> tag may contain a freely formed string as its contents.

## Complete PBCore XML Schema

---

```
<?xml version="1.0"?>
<xsd:schema
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://www.utah.edu/cpbmetadata/2006"
  xmlns="http://www.utah.edu/cpbmetadata/2006"
  elementFormDefault="qualified">

  <!-- everything falls under an asset -->
  <xsd:element name="asset" type="pbcore.asset.type"/>

  <!-- the top level pbcore resource -->
  <xsd:complexType name="pbcore.asset.type">
    <xsd:sequence>
      <xsd:element ref="pbcoreIdentifier" minOccurs="1" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreTitle" minOccurs="1" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreSubject" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreDescription" minOccurs="1" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreGenre" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreRelation" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreCoverage" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreAudience" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreCreator" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreContributor" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcorePublisher" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreRights" minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element
        ref="pbcoreInstantiation"
        minOccurs="1" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreLanguage" minOccurs="0" maxOccurs="1"/>
      <xsd:element
        ref="pbcoreAlternativeModes"
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="pbcoreAnnotation" minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
    <xsd:attribute name="version" type="xsd:string"/>
  </xsd:complexType>

  <xsd:element name="pbcoreIdentifier" type="pbcore.pbcoreidentifier.type"/>
  <xsd:element name="pbcoreTitle" type="pbcore.pbcoretitle.type"/>
  <xsd:element name="pbcoreSubject" type="pbcore.pbcoresubject.type"/>
  <xsd:element name="pbcoreDescription" type="pbcore.pbcoredescription.type"/>
  <xsd:element name="pbcoreGenre" type="pbcore.pbcoregenre.type"/>
  <xsd:element name="pbcoreRelation" type="pbcore.pbcorerelation.type"/>
  <xsd:element name="pbcoreCoverage" type="pbcore.pbcorecoverage.type"/>
  <xsd:element name="pbcoreAudience" type="pbcore.pbcoreaudience.type"/>
  <xsd:element name="pbcoreCreator" type="pbcore.pbcorecreator.type"/>
  <xsd:element name="pbcoreContributor" type="pbcore.pbcorecontributor.type"/>
```

```

<xsd:element name="pbcorePublisher" type="pbcore.pbcorepublisher.type"/>
<xsd:element name="pbcoreRights" type="pbcore.pbcorerights.type"/>
<xsd:element
  name="pbcoreInstantiation"
  type="pbcore.pbcoreinstantiation.type"/>
<xsd:element name="pbcoreLanguage" type="pbcore.pbcorelanguage.type"/>
<xsd:element
  name="pbcoreAlternativeModes"
  type="pbcore.pbcorealternativemodes.type"/>
<xsd:element name="pbcoreAnnotation" type="pbcore.pbcoreannotation.type"/>

<!-- the string type that we are going to use for pbcore - one of
  the attributes that can be given to the string is the "version"
  -->
<xsd:complexType name="pbcore.string.type.base">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<!-- the number type that we are going to use for pbcore - one of
  the attributes that can be given to the string is the "version"
  -->
<xsd:complexType name="pbcore.number.type.base">
  <xsd:simpleContent>
    <xsd:extension base="xsd:string">
      <xsd:attribute name="version" type="xsd:nonNegativeInteger"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<!-- the datetime type that we are going to use for pbcore - one of
  the attributes that can be given this datetime is the
  "version" -->
<xsd:complexType name="pbcore.date.type.base">
  <xsd:simpleContent>
    <xsd:extension base="xsd:dateTime">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<!-- the pbcore identifier - this must occur at least once -->
<xsd:complexType name="pbcore.pbcoreidentifier.type">
  <xsd:sequence>
    <xsd:element ref="identifier" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="identifierSource" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>

```

```

</xsd:complexType>

<xsd:element name="identifier" type="pbcore.string.type.base"/>

<!-- FIXME 2006-03-23 <raffi@synthesisstudios.com> - this needs to
    be better constrained to ACR2 -->
<xsd:element name="identifierSource" type="pbcore.string.type.base"/>

<!-- the pbcore title - this element may occur as many times as
    desired, however if it does occur, then a title tag must appear
    internally (once). optionally, a titleType tag may appear -->
<xsd:complexType name="pbcore.pbcoretitle.type">
  <xsd:sequence>
    <xsd:element ref="title" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="titleType" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="title" type="pbcore.string.type.base"/>

<xsd:element name="titleType" type="pbcore.string.type.base"/>

<!-- the pbcore subject - this element may occur as many times as
    desired, however if it does occur, then a subject tag must
    appear (once). optionally, a subjectAuthorityUsed tag may
    appear -->
<xsd:complexType name="pbcore.pbcoresubject.type">
  <xsd:sequence>
    <xsd:element ref="subject" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="subjectAuthorityUsed" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="subject" type="pbcore.string.type.base"/>

<xsd:element name="subjectAuthorityUsed" type="pbcore.string.type.base"/>

<!-- the pbcore description - this element may occur as many times
    as desired, however if it does occur, then a description tag is
    required. optionally, the description type may appear - but
    it has a limited vocabulary -->
<xsd:complexType name="pbcore.pbcoredescription.type">
  <xsd:sequence>
    <xsd:element ref="description" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="descriptionType" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="description" type="pbcore.string.type.base"/>

```



```

<xsd:simpleType name="pbcore.descriptiontype.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Abstract" />
    <xsd:enumeration value="Table of Contents" />
    <xsd:enumeration value="Other" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.descriptiontype.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.descriptiontype.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="descriptionType" type="pbcore.descriptiontype.type"/>

<!-- the pbcore genre - this element may occur as many times as
      desired, however if it does occur, then the genre tag inside is
      required. that genre tag has a controlled vocabulary. -->
<xsd:complexType name="pbcore.pbcoregenre.type">
  <xsd:sequence>
    <xsd:element ref="genre" minOccurs="1" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="genre" type="pbcore.genre.type"/>

<xsd:simpleType name="pbcore.genre.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Action" />
    <xsd:enumeration value="Actuality" />
    <xsd:enumeration value="Adults Only" />
    <xsd:enumeration value="Adventure" />
    <xsd:enumeration value="Advice" />
    <xsd:enumeration value="Agriculture" />
    <xsd:enumeration value="Animals" />
    <xsd:enumeration value="Animation" />
    <xsd:enumeration value="Anime" />
    <xsd:enumeration value="Anthology" />
    <xsd:enumeration value="Art" />
    <xsd:enumeration value="Artscrafts" />
    <xsd:enumeration value="Auction" />
    <xsd:enumeration value="Auto" />
    <xsd:enumeration value="Aviation" />
    <xsd:enumeration value="Awards" />
    <xsd:enumeration value="Bicycle" />
    <xsd:enumeration value="Biography" />
    <xsd:enumeration value="Boat" />
  </xsd:restriction>
</xsd:simpleType>

```

```

    <xsd:enumeration value="Business/Financial" />
    <xsd:enumeration value="Call-in" />
    <xsd:enumeration value="Children" />
    <xsd:enumeration value="Children-music" />
    <xsd:enumeration value="Children-special" />
    <xsd:enumeration value="Children-talk" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.genre.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.genre.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<!-- the pbcore relation - this element may occur as many times as
      desired.  if it does occur, the relationIdentifier must appear,
      also the relationType must also appear -->
<xsd:complexType name="pbcore.pbcorerelation.type">
  <xsd:sequence>
    <xsd:element ref="relationIdentifier" minOccurs="1" maxOccurs="1" />
    <xsd:element ref="relationType" minOccurs="1" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="relationIdentifier" type="pbcore.string.type.base" />

<xsd:element name="relationType" type="pbcore.relationtype.type" />

<xsd:simpleType name="pbcore.relationtype.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Has Format" />
    <xsd:enumeration value="Is Format Of" />
    <xsd:enumeration value="Has Part" />
    <xsd:enumeration value="Is Part Of" />
    <xsd:enumeration value="Has Version" />
    <xsd:enumeration value="Is Version Of" />
    <xsd:enumeration value="References" />
    <xsd:enumeration value="Is Referenced By" />
    <xsd:enumeration value="Replaces" />
    <xsd:enumeration value="Is Replaced By" />
    <xsd:enumeration value="Requires" />
    <xsd:enumeration value="Is Required By" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.relationtype.type">
  <xsd:simpleContent>

```

```

    <xsd:extension base="pbcore.relationtype.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<!-- the pbcore coverage - this element may occur as many times as
      desired, and within it a coverageSpatial and a coverageTemporal
      may repeat and occur as many times as we wish -->
<xsd:complexType name="pbcore.pbcorecoverage.type">
  <xsd:sequence>
    <xsd:element ref="coverageSpatial" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="coverageTemporal" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="coverageSpatial" type="pbcore.string.type.base"/>

<xsd:element name="coverageTemporal" type="pbcore.string.type.base"/>

<!-- the pbcore audience - this may occur as many times as desired
      within the document, and within it the audienceLevel and
      audienceRating may repeat and occur as many times as we wish -->
<xsd:complexType name="pbcore.pbcoreaudience.type">
  <xsd:sequence>
    <xsd:element ref="audienceLevel" minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="audienceRating" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:simpleType name="pbcore.audiencelevel.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="K-12 (general)"/>
    <xsd:enumeration value="Pre-school (kindergarten)"/>
    <xsd:enumeration value="Primary (grades 1-6)"/>
    <xsd:enumeration value="Intermediate (grades 7-9)"/>
    <xsd:enumeration value="High School (grades 10-12)"/>
    <xsd:enumeration value="College"/>
    <xsd:enumeration value="Post Graduate"/>
    <xsd:enumeration value="General Education"/>
    <xsd:enumeration value="Educator"/>
    <xsd:enumeration value="Vocational"/>
    <xsd:enumeration value="Adult"/>
    <xsd:enumeration value="Special Audiences"/>
    <xsd:enumeration value="General"/>
    <xsd:enumeration value="Male"/>
    <xsd:enumeration value="Female"/>
    <xsd:enumeration value="-"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>

```

```

</xsd:simpleType>

<xsd:complexType name="pbcore.audiencelevel.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.audiencelevel.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="audienceLevel" type="pbcore.audiencelevel.type"/>

<xsd:simpleType name="pbcore.audienccerating.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="TV-Y (all children)"/>
    <xsd:enumeration value="TV-Y7 (children 7 and up)"/>
    <xsd:enumeration value="TV-Y7-FV (fantasy violence)"/>
    <xsd:enumeration value="TV-G (general audience)"/>
    <xsd:enumeration value="TV-PG (parental guidance suggested)"/>
    <xsd:enumeration value="TV-PG (V) (moderate violence)"/>
    <xsd:enumeration value="TV-PG (S) (some sexual situations)"/>
    <xsd:enumeration value="TV-PG (L) (infrequent coarse language)"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.audienccerating.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.audienccerating.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="audienceRating" type="pbcore.audienccerating.type"/>

<!-- the pbcore creator - again, may appear as many times as
     necessary, and the creator tag is necessary inside. the
     creatorRole tag is optional. -->
<xsd:complexType name="pbcore.pbcorecreator.type">
  <xsd:sequence>
    <xsd:element ref="creator" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="creatorRole" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="creator" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.creatorrole.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Artist"/>
  </xsd:restriction>
</xsd:simpleType>

```

```

<xsd:enumeration value="Associate Producer" />
<xsd:enumeration value="Cinematographer" />
<xsd:enumeration value="Composer" />
<xsd:enumeration value="Co-Producer" />
<xsd:enumeration value="Creator" />
<xsd:enumeration value="Director" />
<xsd:enumeration value="Editor" />
<xsd:enumeration value="Essayist" />
<xsd:enumeration value="Executive Producer" />
<xsd:enumeration value="Illustrator" />
<xsd:enumeration value="Other" />
<xsd:enumeration value="Photographer" />
<xsd:enumeration value="Producer" />
<xsd:enumeration value="Production Unit" />
<xsd:enumeration value="Writer" />
<xsd:enumeration value="-" />
<xsd:enumeration value="Other" />
</xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.creatorrole.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.creatorrole.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="creatorRole" type="pbcore.creatorrole.type" />

<!-- the pbcore contributor - this element may appear as many times
      as necessary, but when it does appear, the contributor tag must
      appear inside it. the contributor role is optional. -->
<xsd:complexType name="pbcore.pbcorecontributor.type">
  <xsd:sequence>
    <xsd:element ref="contributor" minOccurs="1" maxOccurs="1" />
    <xsd:element ref="contributorRole" minOccurs="0" maxOccurs="1" />
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="contributor" type="pbcore.string.type.base" />

<xsd:simpleType name="pbcore.contributorrole.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Artist" />
    <xsd:enumeration value="Associate Producer" />
    <xsd:enumeration value="Cinematographer" />
    <xsd:enumeration value="Composer" />
    <xsd:enumeration value="Co-Producer" />
    <xsd:enumeration value="Creator" />
  </xsd:restriction>
</xsd:simpleType>

```

```

<xsd:enumeration value="Director"/>
<xsd:enumeration value="Editor"/>
<xsd:enumeration value="Essayist"/>
<xsd:enumeration value="Executive Producer"/>
<xsd:enumeration value="Illustrator"/>
<xsd:enumeration value="Other"/>
<xsd:enumeration value="Photographer"/>
<xsd:enumeration value="Producer"/>
<xsd:enumeration value="Production Unit"/>
<xsd:enumeration value="Writer"/>
<xsd:enumeration value="-"/>
<xsd:enumeration value="Other"/>
</xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.contributorrole.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.contributorrole.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="contributorRole" type="pbcore.contributorrole.type"/>

<!-- the pbcore publisher - this follows the same guidelines as the
contributor and the creator. this may exist as many times as
we wish, but inside it there must be a publisher tag. a
publisherRole tag is optional. -->
<xsd:complexType name="pbcore.pbcorepublisher.type">
  <xsd:sequence>
    <xsd:element ref="publisher" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="publisherRole" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="publisher" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.publisherrole.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Copyright Holder"/>
    <xsd:enumeration value="Distributor"/>
    <xsd:enumeration value="Presenter"/>
    <xsd:enumeration value="Publisher"/>
    <xsd:enumeration value="Release Agent "/>
    <xsd:enumeration value="-"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>

```

```

<xsd:complexType name="pbcore.publisherrole.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.publisherrole.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="publisherRole" type="pbcore.publisherrole.type"/>

<!-- the pbcore rights - this may appear as many times as we want,
      but everytime it does appear, the rightsSummary tag must appear
      inside of it -->
<xsd:complexType name="pbcore.pbcorerights.type">
  <xsd:sequence>
    <xsd:element ref="rightsSummary" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="rightsSummary" type="pbcore.string.type.base"/>

<!-- the pbcore instantiation - this contains all the details on how
      the asset is actualized -->
<xsd:complexType name="pbcore.pbcoreinstantiation.type">
  <xsd:sequence>
    <xsd:element ref="dateCreated" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="dateIssued" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="dateAvailableStart" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="dateAvailableEnd" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatPhysical" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatDigital" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatLocation" minOccurs="1" maxOccurs="1"/>
    <xsd:element ref="formatMediaType" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatGenerations" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatStandard" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatEncoding" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatFileSize" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatTimeStart" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatDuration" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatDataRate" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatBitDepth" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatSamplingRate" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatFrameSize" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatAspectRatio" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatFrameRate" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatColors" minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="formatTracks" minOccurs="0" maxOccurs="1"/>
    <xsd:element
      ref="formatChannelConfiguration"
      minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

```

```

</xsd:sequence>
</xsd:complexType>

<xsd:element name="dateCreated" type="pbcore.date.type.base"/>

<xsd:element name="dateIssued" type="pbcore.date.type.base"/>

<xsd:element name="dateAvailableStart" type="pbcore.date.type.base"/>

<xsd:element name="dateAvailableEnd" type="pbcore.date.type.base"/>

<xsd:simpleType name="pbcore.formatphysical.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Film:8mm"/>
    <xsd:enumeration value="Film:16mm"/>
    <xsd:enumeration value="Film:35mm"/>
    <xsd:enumeration value="Film:70mm"/>
    <xsd:enumeration value="8mm video"/>
    <xsd:enumeration value="8mm: Hi8 Video"/>
    <xsd:enumeration value="8mm: Digital-8"/>
    <xsd:enumeration value="1/4 inch videotape:Akai"/>
    <xsd:enumeration value="1/2 inch videotape:CV"/>
    <xsd:enumeration value="1/2 inch videotape:EIAJ Type 1"/>
    <xsd:enumeration value="1/2 inch videotape:VCR"/>
    <xsd:enumeration value="1/2 inch videotape:V2000"/>
    <xsd:enumeration value="1/2 inch video"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatphysical.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatphysical.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatPhysical" type="pbcore.formatphysical.type"/>

<xsd:simpleType name="pbcore.formatdigital.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="application/astound"/>
    <xsd:enumeration value="application/ccv"/>
    <xsd:enumeration value="application/dca-rft"/>
    <xsd:enumeration value="application/dsssl"/>
    <xsd:enumeration value="application/envoy"/>
    <xsd:enumeration value="application/fastman "/>
    <xsd:enumeration value="application/font"/>
    <xsd:enumeration value="application/fractals"/>
    <xsd:enumeration value="application/futuresplash"/>
  </xsd:restriction>

```



```

    <xsd:enumeration value="application/hdf"/>
    <xsd:enumeration value="application/iges"/>
    <xsd:enumeration value="application/macbinary"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatdigital.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatdigital.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatDigital" type="pbcore.formatdigital.type"/>

<xsd:element name="formatLocation" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.formatmediatype.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Animation"/>
    <xsd:enumeration value="Artifact"/>
    <xsd:enumeration value="Collection"/>
    <xsd:enumeration value="Dataset"/>
    <xsd:enumeration value="Event"/>
    <xsd:enumeration value="Interactive Resource"/>
    <xsd:enumeration value="Moving Image"/>
    <xsd:enumeration value="Physical Object"/>
    <xsd:enumeration value="Service"/>
    <xsd:enumeration value="Software"/>
    <xsd:enumeration value="Sound"/>
    <xsd:enumeration value="Static Image"/>
    <xsd:enumeration value="Text"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatmediatype.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatmediatype.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatMediaType" type="pbcore.formatmediatype.type"/>

<xsd:simpleType name="pbcore.formatgenerations.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Artifact/Award"/>
    <xsd:enumeration value="Artifact/Book"/>
  </xsd:restriction>
</xsd:simpleType>

```

```

    <xsd:enumeration value="Artifact/Costume" />
    <xsd:enumeration value="Artifact/Merchandise" />
    <xsd:enumeration value="Artifact/Optical disk reader" />
    <xsd:enumeration value="Artifact/SCSI Hard Drive" />
    <xsd:enumeration value="Artifact/Sy-Quest drive" />
    <xsd:enumeration value="Audio/Air track" />
    <xsd:enumeration value="Audio/Audio dub" />
    <xsd:enumeration value="Audio/Audio master (full mix)" />
    <xsd:enumeration value="Audio/Master mix" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatgenerations.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatgenerations.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatGenerations" type="pbcore.formatgenerations.type" />

<xsd:simpleType name="pbcore.formatstandard.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Film" />
    <xsd:enumeration value="MPEG video" />
    <xsd:enumeration value="NTSC video (interlaced)" />
    <xsd:enumeration value="NTSC video (progressive)" />
    <xsd:enumeration value="ATSC video (interlaced)" />
    <xsd:enumeration value="ATSC video (progressive) " />
    <xsd:enumeration value="PAL video" />
    <xsd:enumeration value="SECAM video" />
    <xsd:enumeration value="QuickTime" />
    <xsd:enumeration value="RealSystems" />
    <xsd:enumeration value="Windows Media" />
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatstandard.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatstandard.type.base">
      <xsd:attribute name="version" type="xsd:string" />
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatStandard" type="pbcore.formatstandard.type" />

<xsd:element name="formatEncoding" type="pbcore.string.type.base" />

```

```

<xsd:element name="formatFileSize" type="pbcore.number.type.base"/>

<xsd:element name="formatTimeStart" type="pbcore.date.type.base"/>

<xsd:element name="formatDuration" type="pbcore.date.type.base"/>

<xsd:element name="formatDataRate" type="pbcore.string.type.base"/>

<xsd:simpleType name="pbcore.formatbitdepth.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="8 bit"/>
    <xsd:enumeration value="10 bit"/>
    <xsd:enumeration value="16 bit"/>
    <xsd:enumeration value="20 bit"/>
    <xsd:enumeration value="24 bit"/>
    <xsd:enumeration value="32 bit"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatbitdepth.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatbitdepth.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatBitDepth" type="pbcore.formatbitdepth.type"/>

<xsd:simpleType name="pbcore.formatsamplingrate.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="11 kHz"/>
    <xsd:enumeration value="22.050 kHz"/>
    <xsd:enumeration value="32 kHz"/>
    <xsd:enumeration value="44.1 kHz"/>
    <xsd:enumeration value="48 kHz"/>
    <xsd:enumeration value="96 kHz"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatsamplingrate.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatsamplingrate.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

```

```

<xsd:element name="formatSamplingRate" type="pbcore.formatsamplingrate.type"/>

<xsd:simpleType name="pbcore.formatframesize.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="352x240 (MPEG-1 NTSC)"/>
    <xsd:enumeration value="352x288 (MPEG-1 PAL)"/>
    <xsd:enumeration value="640x480"/>
    <xsd:enumeration value="704x480"/>
    <xsd:enumeration value="720x480 (MPEG-2 NTSC and DV)"/>
    <xsd:enumeration value="720x576 (MPEG-2 PAL)"/>
    <xsd:enumeration value="720x486 (D1)"/>
    <xsd:enumeration value="1280x720"/>
    <xsd:enumeration value="1920x1080"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatframesize.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatframesize.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatFrameSize" type="pbcore.formatframesize.type"/>

<xsd:simpleType name="pbcore.formataspectratio.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="4:3"/>
    <xsd:enumeration value="4:3 (16:9 letterbox)"/>
    <xsd:enumeration value="4:3 (16:9 anamorphic)"/>
    <xsd:enumeration value="16:9"/>
    <xsd:enumeration value="5.5:3"/>
    <xsd:enumeration value="7:3 (Panavision or CinemaScope)"/>
    <xsd:enumeration value="2.35:1"/>
    <xsd:enumeration value="1.85:1"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formataspectratio.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formataspectratio.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element
  name="formatAspectRatio"

```

```

type="pbcore.formataspectratio.type.base"/>

<xsd:simpleType name="pbcore.formatframerate.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="60 fields/sec"/>
    <xsd:enumeration value="30 fps"/>
    <xsd:enumeration value="29.97 fps"/>
    <xsd:enumeration value="25 fps"/>
    <xsd:enumeration value="24 fps"/>
    <xsd:enumeration value="15 fps"/>
    <xsd:enumeration value="12 fps"/>
    <xsd:enumeration value="10 fps"/>
    <xsd:enumeration value="7 fps"/>
    <xsd:enumeration value="5 fps"/>
    <xsd:enumeration value="2 fps"/>
    <xsd:enumeration value="1 fps"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatframerate.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatframerate.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatFrameRate" type="pbcore.formatframerate.type"/>

<xsd:simpleType name="pbcore.formatcolors.type.base">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="B&W"/>
    <xsd:enumeration value="Grayscale"/>
    <xsd:enumeration value="Color"/>
    <xsd:enumeration value="B&W with grayscale sequences"/>
    <xsd:enumeration value="B&W with color sequences "/>
    <xsd:enumeration value="Grayscale with B&W sequences"/>
    <xsd:enumeration value="Grayscale with color sequences "/>
    <xsd:enumeration value="Color with B&W sequences"/>
    <xsd:enumeration value="Color with grayscale sequences"/>
    <xsd:enumeration value="Other"/>
  </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="pbcore.formatcolors.type">
  <xsd:simpleContent>
    <xsd:extension base="pbcore.formatcolors.type.base">
      <xsd:attribute name="version" type="xsd:string"/>
    </xsd:extension>
  </xsd:simpleContent>
</xsd:complexType>

```

```

</xsd:simpleContent>
</xsd:complexType>

<xsd:element name="formatColors" type="pbcore.formatcolors.type"/>

<xsd:element name="formatTracks" type="pbcore.string.type.base"/>

<xsd:element
  name="formatChannelConfiguration"
  type="pbcore.string.type.base"/>

<!-- the pbcore language -->
<xsd:complexType name="pbcore.pbcorelanguage.type">
  <xsd:sequence>
    <xsd:element ref="language" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<!-- FIXME 2006-03-23 <raffi@synthesisstudios.com> - this needs to
  be better constrained to the two letter language abbreviations -->
<xsd:element name="language" type="pbcore.string.type.base"/>

<!-- the pbcore alternative modes -->
<xsd:complexType name="pbcore.pbcorealternativemodes.type">
  <xsd:sequence>
    <xsd:element ref="alternativeMode" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="alternativeMode" type="pbcore.string.type.base"/>

<!-- the pbcore annotation -->
<xsd:complexType name="pbcore.pbcoreannotation.type">
  <xsd:sequence>
    <xsd:element ref="annotation" minOccurs="1" maxOccurs="1"/>
  </xsd:sequence>
</xsd:complexType>

<xsd:element name="annotation" type="pbcore.string.type.base"/>

</xsd:schema>

```

## Example PBCore asset document

The following is a valid PBCore XML document (as validated against the schema listed in “Complete PBCore XML Schema”). It describes a fictitious asset that has a subset of its attributes listed in Table 1.

Meta-data type	Value
Identifier	1234567
Identifier source	Source
Title	The Geography of Utah
Title type	Project
Subject	National Parks. Natural Bridges. Delicate Arch. Arches National Park. Grand County. Utah.
Subject authority	<a href="http://www.lub.lu.se/metadata/subject-help.html">http://www.lub.lu.se/metadata/subject-help.html</a>
Description	Program Eighteen of the Geography of Utah series is a video tour of Utah's spectacular national parks and recreation areas. Zion National Park, Bryce National Park, Capitol Reef, Canyonlands, Arches National Park, Flaming Gorge National Recreation Area, Dinosaur National Monument, and the Glen Canyon National Recreation Area are all visited. The controversy of land use and environmental preservation is considered in interviews with San Juan County Commissioner Cal Black and Benjamin Zerbey of the National Park Service. Rainbow Bridge National Monument and Canyonlands National Park are only two examples of the land use debate.
Description type	Table of Contents
Genre	Adventure

**Table 1: A subset of the asset’s description that is to be encoded into the PBCore XML document.**

```
<pbcore:asset xmlns:pbcore="http://www.utah.edu/cpbmetadata/2006" version="1.0">
  <pbcore:pbcoreIdentifier>
    <pbcore:identifier>1234567</pbcore:identifier>
    <pbcore:identifierSource>source</pbcore:identifierSource>
  </pbcore:pbcoreIdentifier>
  <pbcore:pbcoreTitle>
    <pbcore:title>Geography of Utah, The</pbcore:title>
    <pbcore:titleType>Project</pbcore:titleType>
  </pbcore:pbcoreTitle>
  <pbcore:pbcoreSubject>
    <pbcore:subject>
      National Parks. Natural Bridges. Delicate Arch. Arches National
      Park. Grand County. Utah.
    </pbcore:subject>
    <pbcore:subjectAuthorityUsed>
      http://www.lub.lu.se/metadata/subject-help.html
    </pbcore:subjectAuthorityUsed>
  </pbcore:pbcoreSubject>
</pbcore:asset>
```

```

</pbcore:pbcoreSubject>
<pbcore:pbcoreDescription>
  <pbcore:description>
    Program Eighteen of the Geography of Utah series is a video tour
    of Utah's spectacular national parks and recreation areas. Zion
    National Park, Bryce National Park, Capitol Reef, Canyonlands,
    Arches National Park, Flaming Gorge National Recreation Area,
    Dinosaur National Monument, and the Glen Canyon National
    Recreation Area are all visited. The controversy of land use and
    environmental preservation is considered in interviews with San
    Juan County Commissioner Cal Black and Benjamin Zerbey of the
    National Park Service. Rainbow Bridge National Monument and
    Canyonlands National Park are only two examples of the land use
    debate.
  </pbcore:description>
  <pbcore:descriptionType>Table of Contents</pbcore:descriptionType>
</pbcore:pbcoreDescription>
<pbcore:pbcoreGenre>
  <pbcore:genre>Adventure</pbcore:genre>
</pbcore:pbcoreGenre>
<pbcore:pbcoreRelation>
  <pbcore:relationIdentifier>ISBN 0-07-135026-8</pbcore:relationIdentifier>
  <pbcore:relationType>Has Format</pbcore:relationType>
</pbcore:pbcoreRelation>
<pbcore:pbcoreCoverage>
  <pbcore:coverageSpatial>
    Arches National Park. Delicate Arch. Grand County. Utah.
  </pbcore:coverageSpatial>
  <pbcore:coverageTemporal>
    US Civil War Era; 1861-1865
  </pbcore:coverageTemporal>
</pbcore:pbcoreCoverage>
<pbcore:pbcoreAudience>
  <pbcore:audienceLevel>General Education</pbcore:audienceLevel>
  <pbcore:audienceRating>TV-Y (all children)</pbcore:audienceRating>
</pbcore:pbcoreAudience>
<pbcore:pbcoreCreator>
  <pbcore:creator>State of Utah. Film Commission</pbcore:creator>
  <pbcore:creatorRole>Cinematographer</pbcore:creatorRole>
</pbcore:pbcoreCreator>
<pbcore:pbcoreContributor>
  <pbcore:contributor>White Mountain Films</pbcore:contributor>
  <pbcore:contributorRole>Director</pbcore:contributorRole>
</pbcore:pbcoreContributor>
<pbcore:pbcorePublisher>
  <pbcore:publisher>KUED-TV</pbcore:publisher>
  <pbcore:publisherRole>Distributor</pbcore:publisherRole>
</pbcore:pbcorePublisher>
<pbcore:pbcoreRights>
  <pbcore:rightsSummary>Non-profit, educational use</pbcore:rightsSummary>

```



```
</pbcore:pbcoreRights>
<pbcore:pbcoreInstantiation>
  <pbcore:dateCreated>1997-07-16T19:20:00+01:00</pbcore:dateCreated>
  <pbcore:dateIssued>1997-07-16T19:20:00+01:00</pbcore:dateIssued>
  <pbcore:dateAvailableStart>1997-07-
16T19:20:00+01:00</pbcore:dateAvailableStart>
  <pbcore:dateAvailableEnd>1998-07-16T19:20:00+01:00</pbcore:dateAvailableEnd>
  <pbcore:formatDigital>application/macbinary</pbcore:formatDigital>
  <pbcore:formatLocation>New York, NY</pbcore:formatLocation>
  <pbcore:formatFileSize>1029384756</pbcore:formatFileSize>
</pbcore:pbcoreInstantiation>
</pbcore:asset>
```

## Contact

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PBCore Website: <http://www.pbc.org>  
Be sure to check the PBCore website for latest developments.