

1	Status	Final Text
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8	Correction Number CP-1520	
9	Log Summary: Real World Mapping in Abstract Multi-Dimensional Model	
10	Name of Standard	
11	PS3.19 2016a	
12	Rationale for Correction:	
13	There is an inconsistency between the normative table in PS3.19, which does not contain the Real World Mapping, and the RNG	
14	schema and the figure, which do.	
15	The Real World Mapping was removed from the normative table between PC and LB of Sup 118, so it is proposed that it be removed	
16	from the schema and the figure (rather than added back to the table).	
17	The intent is that the encoded data already be fully 'cooked' in the sense that it needs no further mapping to its specified Semantics	
18	and Units, and there is no need to provide alternative mappings.	
19	Correction Wording:	

Amend DICOM PS 3.19 Application Hosting A.2.6 Schema to remove the RealWordMapping (sic) and its contents, and then remove the trailing comma on the preceding Unit element:

## A.2.6 Schema

The Relax NG Compact schema for the Abstract Multi-Dimensional Image Model follows:

```
default namespace = "http://dicom.nema.org/PS3.19/models/AbstractImage"
```

```
start = AbstractImageDataSet
```

```
AbstractImageDataSet =
```

```
element AbstractImageDataSet {
```

```
element Component{
```

```
attribute idNumber { xsd:positiveInteger },
```

```
attribute datatype { ComponentDatatype },
```

```
attribute minValue { xsd:double }?,
```

```
attribute maxValue { xsd:double }?,
```

```
element Semantics { CodedTerm },
```

```
element Unit { CodedTerm };
```

```
element RealWordMapping {
```

```
attribute rescaleSlope { xsd:double },
```

```
attribute rescaleIntercept { xsd:double },
```

```
element Unit { CodedTerm },
```

```
element Semantics { CodedTerm }
```

```
};
```

```
};+
```

```
...
```

Amend DICOM PS 3.19 Application Hosting to replace the old Figure A.2.4-1:

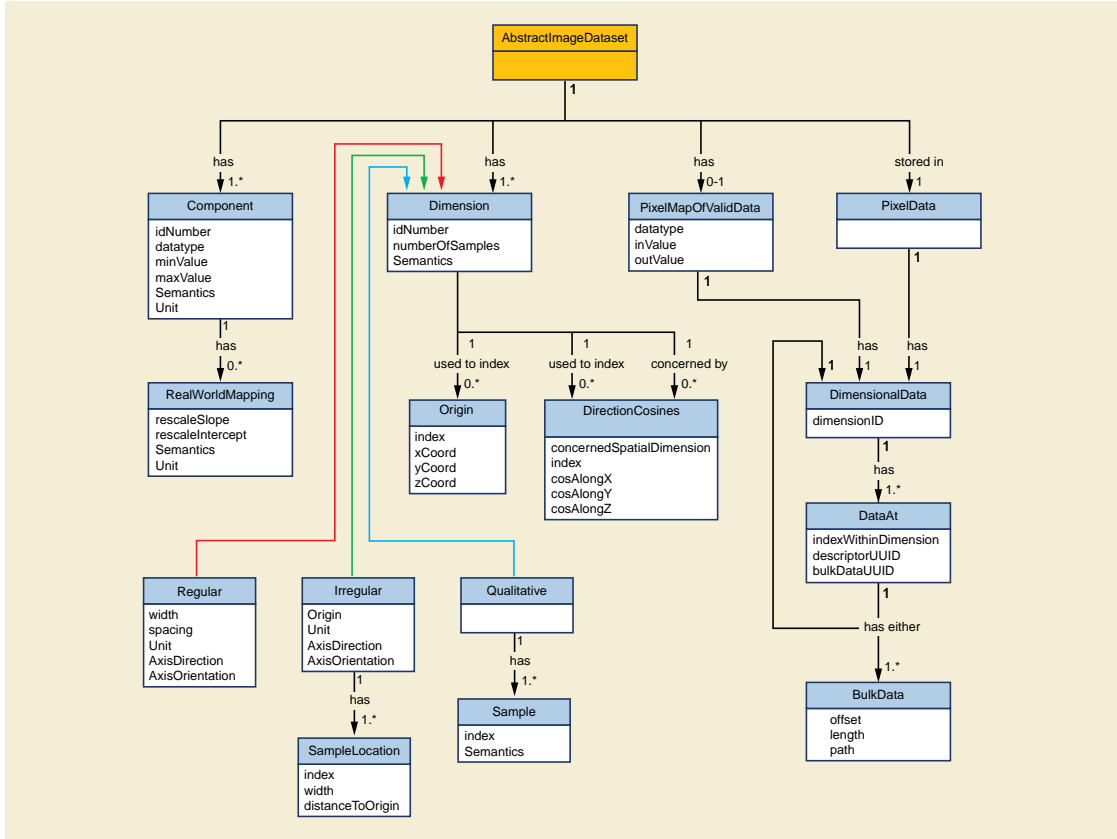


Figure A.2.4-1. Abstract Multi-Dimensional Image Model

with this new Figure A.2.4-1:

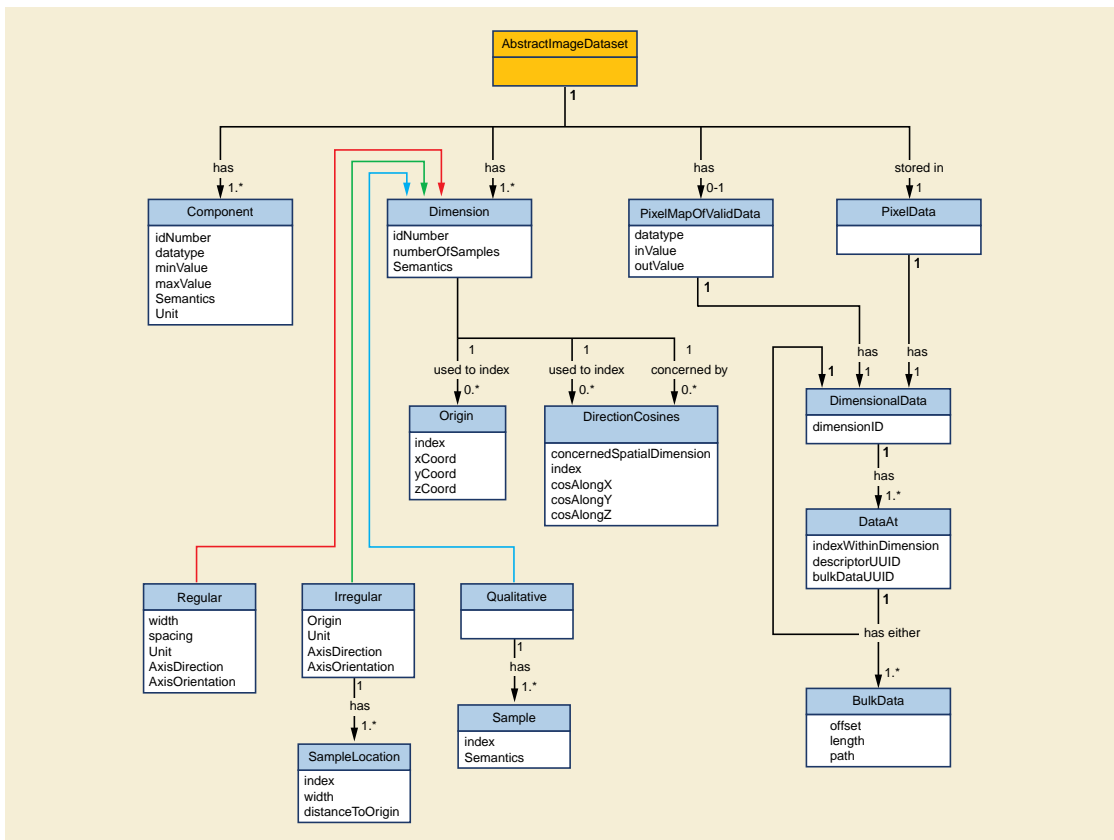


Figure A.2.4-1. Abstract Multi-Dimensional Image Model

For reference DICOM PS 3.19 Application Hosting, normative Abstract Image Model table without the Real World Mapping:

### A.2.5 Description

Table A.2.5-1. Abstract Image Model

Name	Optionality	Cardinality	Description
AbstractImageDataSet	R	1	The top level element required of all abstract image models, holding the entire abstract image Data Set.
>Component	R	1-n	Describes a component of the function output. If the output is a scalar, there is only one Component. Vector outputs require a Component for each position in the vector. When there are multiple components, the components appear in each value in the order defined by their respective idNumbers.
>>idNumber	R	A	Identifies this particular component, with numbering monotonically increasing from 1.

Name	Optionality	Cardinality	Description
>>datatype	R	A	Describes how this component value is represented. Enumerated values are: SIGNED_INT8 SIGNED_INT16 SIGNED_INT32 UNSIGNED_INT8 UNSIGNED_INT16 UNSIGNED_INT32 FLOAT32 FLOAT64
>>minValue	O	A	The minimum value that this component takes on. If this XML Attribute is missing, this is the minimum value that can be represented by the Datatype.
>>maxValue	O	A	The maximum value that this component takes on. If this XML Attribute is missing, this is the maximum value that can be represented by the Datatype.
>>Semantics	R	1	A coded value describing what this component represents.
>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7180 "Abstract Multi-dimensional Image Model ComponentSemantics".
>>Unit	R	1	A coded value describing what units this dimension is in.
>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7181 "Abstract Multi-dimensional Image Model ComponentUnits".
>Dimension	R	1-n	Describes a dimension.
>>idNumber	R	A	Identifies this particular dimension, with numbering starting from 1. Dimensions with a lower idNumber vary faster than those with a higher idNumber.
>>numberOfSamples	R	A	The number of samples in this dimension, for example:the number of columns along the X-axis,the number of rows along the Y-axis,the number of slices along the Z-axis,the number of qualitative descriptions.
>>Semantics	R	1	A coded value describing what this dimension represents.
>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7182 "Abstract Multi-dimensional Image Model DimensionSemantics"
>> Regular	C	1	Used to describe regularly spaced samples in this dimension. Required if neither Irregular nor Qualitative are present. Shall not be present otherwise.
>>>width	R	A	The sample width.
>>>spacing	R	A	The sample spacing.
>>>Unit	R	1	A coded value describing what units the sample width and spacing are in.
>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7183 "Abstract Multi-dimensional Image Model DimensionUnits".

Name	Optionality	Cardinality	Description
>>>AxisDirection	O	1	<p>The direction of the axis of this dimension.</p> <p><b>Note</b></p> <p>This XML Element might only be applicable to spatial dimensions, such as those dealing with linear displacement. Typically this is in relationship to the patient.</p>
>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7184 "Abstract Multi-dimensional Image Model AxisDirection"
>>>AxisOrientation	O	1	<p>The orientation of the axis of this dimension along which values are increasing.</p> <p><b>Note</b></p> <p>This XML Element might only be applicable to spatial dimensions, such as those dealing with linear displacement. Typically this is in relationship to the patient.</p>
>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7185 "Abstract Multi-dimensional Image Model AxisOrientation"
>>Irregular	C	1	Used to describe irregularly spaced samples in this dimension. Required if neither Regular nor Qualitative are present. Shall not be present otherwise.
>>>origin	R	A	The reference location from which each of the sample locations are measured.
>>>SampleLocation	R	1-n	Describes the locations of each sample as an offset from the origin. There shall be numberOfSamples SampleLocation XML Elements in this sequence.
>>>>index	R	A	The index value of this sample location, with numbering starting from 1 and incrementing to numberOfSamples.
>>>>width	R	A	The sample width.
>>>>distanceToOrigin	R	A	The distance of this sample location from the Origin location.
>>>Unit	R	1	A coded value describing what units the sample widths and locations are in.
>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7183 "Abstract Multi-dimensional Image Model DimensionUnits".
>>>AxisDirection	O	1	<p>The direction of the axis of this dimension.</p> <p><b>Note</b></p> <p>This XML Element might only be applicable to spatial dimensions, such as those dealing with linear displacement. Typically this is in relationship to the patient.</p>
>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7184 "Abstract Multi-dimensional Image Model AxisDirection"
>>>AxisOrientation	O	1	<p>The orientation of the axis of this dimension along which values are increasing.</p> <p><b>Note</b></p> <p>This XML Element might only be applicable to spatial dimensions, such as those dealing with linear displacement. Typically this is in relationship to the patient.</p>

Name	Optionality	Cardinality	Description
>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7185 "Abstract Multi-dimensional Image Model AxisOrientation"
>>Qualitative	C	1	Used to describe a qualitative dimension. Required if neither Regular nor Irregular are present. Shall not be present otherwise.
>>>Sample	R	1-n	Description of what each sample along this dimension represents. There shall be numberOfSamples Sample XML Elements in this sequence.
>>>>index	R	A	The index value of this sample, with numbering starting from 1 and increasing to numberOfSamples.
>>>>Semantics	R	1	A coded value describing what this sample represents.
>>>>>Include Table 10.1-1 "Coded Terminology Macro"			Defined CID 7186 "Abstract Multi-dimensional Image Model QualitativeDimension Sample Semantics"
>>Origin	O	0-n	Specifies the spatial position in the coordinate system of the Abstract Multi-Dimensional Image Model of the spatial frames or volumes of image data values. Different frames or volumes may either share an origin, or have a different origin for each frame or volume. If there is only a single Origin XML element within this Dimension, then this Origin applies to all samples along this Dimension. Otherwise, there shall be numberOfSamples Origin XML elements, one for each sample along this Dimension. Sample index values for Dimensions whose idNumbers are less than this Dimension's idNumber, are all equal to 1.
>>>index	R	A	Index of the sample to which this Origin applies. If this is a single Origin that applies to all samples along this Dimension, then index shall either be left out or given a value of "0" (zero). Otherwise, the value shall be the appropriate number between 1 and numberOfSamples.
>>>>xCoord	R	A	The X position of this Origin in the coordinate system of the Abstract Multi-Dimensional Image Model.
>>>>yCoord	R	A	The Y position of this Origin in the coordinate system of the Abstract Multi-Dimensional Image Model.
>>>>zCoord	R	A	The Z position of this Origin in the coordinate system of the Abstract Multi-Dimensional Image Model.
>>DirectionCosines	O	0-n	Specifies the direction in the coordinate system of the Abstract Multi-Dimensional Image Model of the Dimension whose idNumber is given in concernedSpatialDimension. The idNumber of the concernedSpatialDimension shall be less than the idNumber of this Dimension. If there is only a single DirectionCosines XML element within this Dimension XML element with a particular concernedSpatialDimension, then this Direction Cosine applies to all samples along this Dimension. Otherwise, there shall be numberOfSamples DirectionCosines XML elements with this particular concernedSpatialDimension, one for each sample along this Dimension.
>>>>concernedSpatialDimension	R	A	The idNumber of the particular Dimension for which this DirectionCosines XML element applies. The value of concernedSpatialDimension shall be less than the idNumber of this Dimension.
>>>>index	C	A	Index of this direction specification, with numbering starting from 1. If this is a single-valued DirectionCosines that applies to all samples along this Dimension then index shall either be left out or given a value of "0" (zero). Otherwise, the value of index refers to the DirectionCosines of a particular sample value along this Dimension.

Name	Optionality	Cardinality	Description
>>>cosAlongX	R	A	The direction cosine along the X axis of the coordinate system of the Abstract Multi-Dimensional Image Model for this concernedSpatialDimension.
>>>cosAlongY	R	A	The direction cosine along the Y axis of the coordinate system of the Abstract Multi-Dimensional Image Model for this concernedSpatialDimension.
>>>cosAlongZ	R	A	The direction cosine along the Z axis of the coordinate system of the Abstract Multi-Dimensional Image Model for this concernedSpatialDimension.
>PixelData	R	1	Structure that defines where the pixel data is located, organized along dimensional lines.
<i>&gt;&gt;Include Table A.2.5-2 "Dimensional Data Macro"</i>			
>PixelMapOfValidData	O	0-1	A pixel map that identifies which pixels either belong in or out of the Data Set. The dimensions of the pixel map match the dimensions of the image data, i.e., there is a one-to-one correspondence between samples in the image data and samples in the pixel map. The pointers to the pixel map data are included in one of the Dimension XML elements.
>>datatype	R	A	Describes how samples in the pixel map are encoded. Enumerated values are:  BIT1  UNSIGNED_INT8  For BIT1, the bit ordering starts from the least significant bit going to the most significant bit within an UNSIGNED_INT8 (i.e., 8 bit) byte. The bits are zero-padded to make a full 8-bit byte at the end of the most rapidly changing dimension (i.e., the Dimension whose idNumber is 1).
>>inValue	C	A	The value within the pixel map that indicates that this sample shall be considered as part of the Data Set. All samples whose pixel map values do not match inValue shall not be considered as part of the Data Set. Required if outValue is not present. Shall not be present if outValue is present.
>>outValue	C	A	The value within the pixel map that indicates that this sample shall not be considered as part of the Data Set. All samples whose pixel map values do not match outValue shall be considered as part of the Data Set. Required if inValue is not present. Shall not be present if inValue is present.
<i>&gt;&gt;Include Table A.2.5-2 "Dimensional Data Macro"</i>			

**Table A.2.5-2. Dimensional Data Macro**

>dimensionID	R	A	The idNumber of the Dimension in this AbstractImageDataSet to which this DimensionalData refers.
--------------	---	---	--



1 2 3 4 5 6 7 8 9	>DataAt	O	1-n	<p>References to where the image data is located. Only one Dimension XML Element within this AbstractImageDataSet shall have UUIDs for bulk pixel data (i.e., all bulk data references are at the same dimensional level).</p> <p><b>Note</b></p> <p>If the source of the data, as part of the model preparation, creates a single file for pixel data from multiple smaller native objects, then in order to provide the descriptorUUID XML Attributes the source may need to create multiple bulkDataUUIDs referring to different offsets within that single pixel data file.</p>
10 11	>>indexWithinDimension	R	A	The ordinal position (e.g., index number) of this sample point in the array of data at this level. Numbering starts from 1.
12 13 14 15	>>descriptorUUID	C	A	<p>A UUID that refers to the ObjectDescriptor from which this data is drawn, formatted in the hexadecimal representation defined by ITU-T Recommendation X.667.</p> <p>Required at the level of the nested tree structure where the source added the data from the descriptorUUID into the Abstract Multi-Dimensional Image Model.</p>
16 17 18 19 20	>>bulkDataUUID	C	A	<p>The identifier that the recipient of the data may use in a getData() call to gain access to the bulk pixel data formatted as a UUID using the hexadecimal representation defined in ITU-T Recommendation X.667.</p> <p>Required if the Dimensional Data Macro is not present at this level of the nested tree structure. Shall not be present otherwise.</p>
21 22 23 24	>>Conditionally include Table A.2.5-2 "Dimensional Data Macro"			Only one of bulkDataUUID or Dimensional Data shall be included at each level. If Dimensional Data is included, it shall be the next lower level of the nested tree structure, that is the Dimension with an idNumber one less than the Dimension referred to by the enclosing DimensionalData.