

## DICOM Correction Item

Correction Number		CP-583
Log Summary: Concatenation numbering and attribute differences		
Type of Modification	Name of Standard	
Clarification	PS 3.3 2004	
<p>Rationale for Correction</p> <p>The concatenation mechanism introduced for enhanced CT and MR image objects includes in each instance that comprises the concatenation two attributes containing numbers that identify the instance within the concatenation and the offset of the frames within the concatenation. It is not specified whether these begin at 0 or 1.</p> <p>Accordingly, it is proposed to clarify that the number begins at 1 (consistent with other numeric indexes in DICOM), and the offset begins at 0.</p> <p>Also, the list of attributes that may vary in different instances of a concatenation is incomplete.</p>		
Sections of documents affected		
PS 3.3 C.7.6.16		
Correction Wording:		

### C.7.6.16 Multi-frame Functional Groups Module

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**Table C.7.6.16-1  
MULTI-FRAME FUNCTIONAL GROUPS MODULE ATTRIBUTES**

Attribute Name	Tag	Type	Attribute Description
...	...	...	...
Concatenation Frame Offset Number	(0020,9228)	1C	Offset of the first frame in a multi-frame image of a concatenation. Logical frame numbers in a concatenation can be used across all its SOP instances. This offset can be applied to the implicit frame number to find the logical frame number in a concatenation. <b><u>The offset is numbered from zero; i.e., the instance of a concatenation that begins with the first frame of the concatenation has a Concatenation Frame Offset Number (0020,9228) of zero.</u></b> Required if Concatenation UID (0020,9161) is present.
...	...	...	...
In-concatenation Number	(0020,9162)	1C	Identifier for one SOP Instance belonging to a concatenation. See C.7.6.16.2.2.4 for further specification. <b><u>The first instance in a concatenation (that with the lowest Concatenation Frame Offset Number</u></b>

			<p><b><u>(0020,9228) value shall have an In-concatenation Number (0020,9162) value of 1, and subsequent instances shall have values monotonically increasing by 1.</u></b></p> <p>Required if Concatenation UID (0020,9161) is present.</p>
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#### **C.7.6.16.2.2.4 Concatenations and Stacks**

Due to implementation specific reasons (such as maximum object size) the information of a multi-frame image may be split into more than one SOP Instance. These SOP Instances form together a Concatenation. This is a group of SOP Instances within a Series that is uniquely identified by the Concatenation UID (0020,9133).

The Dimension Index Sequence (0020,9222) for each SOP Instance with the same Concatenation UID (0020,9133) shall contain exactly the same tags and values.

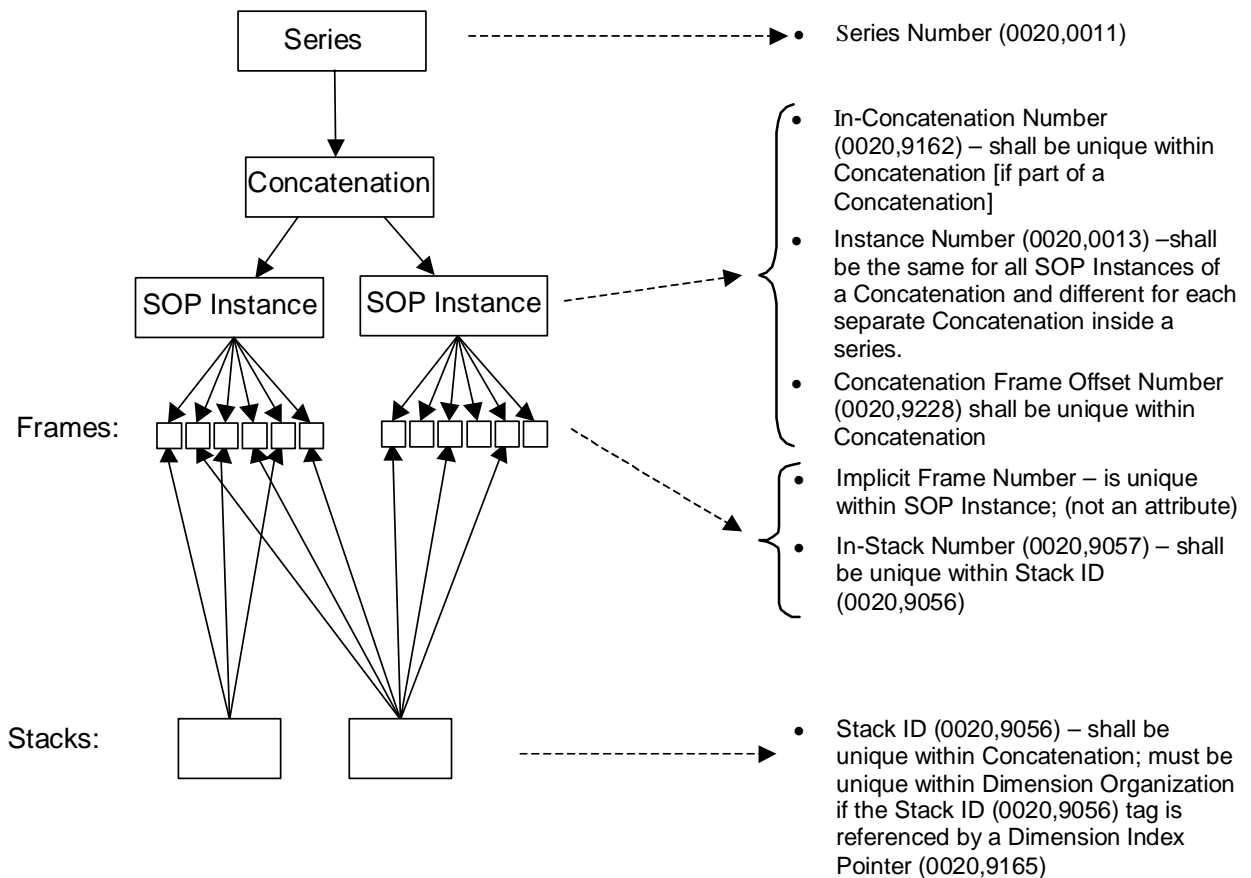
In a Concatenation the Dimension Index Sequence (0020,9222) items of the Shared Functional Groups (5200,9229) shall be identical and have the same values for all individual SOP Instances. The items of the Per-frame Functional Groups (5200,9230) shall be identical for all individual SOP Instances but the values may change per frame. For all other Attributes of all the Modules of the IOD, the same Attributes shall be present and the values shall be identical, with the exception of the following Attributes:

- Number of Frames (0028,0008)
- Concatenation Frame Offset Number (0020,9228)
- **In-concatenation Number (0020,9162)**
- **SOP Instance UID (0008,0016)**
- **Instance Creation Time (0008,0013)**

Note: The intent of Concatenations is to split what might have been encoded in a single SOP Instance into smaller fragments for more convenient storage or transmission. All the multiple SOP Instances of a Concatenation should be able to be assembled into a valid single SOP Instance. Hence it is not permitted to change such Attributes as Photometric Interpretation (0028,0004), Rows (0028,0010), Columns (0028,0011), etc.

Stacks describe application-specific groups of frames that have a geometric relationship. Stacks have a Stack ID (0020,9056) that contains a descriptive name that identifies the stack. A Stack ID (0020,9056) may be re-used in another SOP Instance even outside a concatenation. The value of Stack ID (0020,9056) is unique within the scope of a particular Dimension Organization UID (0020,9164) if present, otherwise it is unique within in the scope of a particular Concatenation UID (0020,9133). See Figure C7.6.16-3 for an example.

### Identifying Attributes and Scope



**Figure C.7.6.16-3**  
**Identifying attributes for Concatenation, SOP Instances, Frames and Stacks**