DCMTK - Conformance #961

Add support for CP-2023: Clarify missing numeric measurement value in SR–

2021-01-26 21:41 - Jörg Riesmeier

Status:	Closed	**Start date:**	2021-01-26
Priority:	Normal	**Due date:**	
Assignee:	Jörg Riesmeier	**% Done:**	100%
Category:	Library	**Estimated time:**	4:00 hours
Target version:	3.6.7		
Module:	dcmsr	**Compiler:**	
Operating System:			

Description

Rationale for Correction:–
Unlike all other SR Content Items, the value of the NUM (the Measured Value Sequence) is Type 2, i.e., allowed to be empty.–
This was intentional, to allow for the presence of the Content Item when the value was "unknown", although in practice, this is rarely,–
if ever, encountered.–
It is not clear what the intent of the Mandatory presence of the Content Item in a Template is, however, with respect to the presence–
or absence of the DS value. Taken literally, the Content Item is required to always be present, but the Measured Value Sequence–
may be zero length at any time.–
The purpose of being empty was clarified in CP 260, which added an optional Numeric Value Qualifier Code Sequence to communicate–
the reason for the absence, whihc included both being unknown as well as various arithmetic and measurement device failure–
reasons. One scenario that the CP did not consider was the use of a an SR instance full of "empty" values as a "fill in the blanks"–
form, but that has not proven to be a practical use (and there is no reason why NUM Content Items should be different from other–
Content Items like TEXT and CODE in that respect).–
When the Measured Value Sequence is empty, the units encoded in Measurement Units Code Sequence within Measured Value–
Sequence cannot be sent either. This gives rise to uncertainty about the implications of mandatory UNITS specified in the Value Set–
Constraint column of a Template. Specifically, does a requirement to use a particular unit imply that the units (and hence the numeric–
value itself) must be sent? That was not the intent; rather, the units should be used IFF there is a numeric value sent.–
Despite all the foregoing, it is not clear that permitting the numeric value (and its accompanying units) to be empty if unknown was–
a good idea in the first place, nor that template designers understand that this feature exists and hence their use of M for a Content–
Item may not be as "mandatory" as they think it is. Further, one could argue that whether or not to allow an empty value should be–
explicitly controlled at the template level. I.e., there should be two "flavors" of M for NUM, analagous to the difference between Type–
1 and 2 in P3.3.–
Since the DS VR that encodes the Numeric Value cannot represent some valid failure conditions (e.g., IEEE NAN, +/-infinity, etc),–
one cannot simply make its presence with a non-zero length mandatory at this stage without significant installed base impact. I.e.,–
we cannot change Measured Value Sequence from Type 2 to Type 1.–
No changes are needed related to the Content Item Macro used in worklists and acquisition context protocols, since it uses a Type–
1 Numeric Value that is not nested within a Measured Value Sequence, and hence is never permitted to be empty (nor for those use–
cases, would a value ever be unknown or unavailable due to failure).–
It is proposed to clarify that the presence of a UNITS constraint does not mean that the value and units have to be sent.–
It is proposed to clarify that the existing M means that the value and units are required unless there is a valid arithmetic or failure–
reason for them to be absent, as opposed to merely being nominally unknown. Leave all current uses of NUM in Templates with

a–
requirement of M (i.e., a value is now required). Though by narrowing the current definition of M, this is theoretically a breaking–
change, in practice it is extraordinarily unusual to encounter a zero length Measured Value Sequence, so this is thought to have no–
impact on the installed base.–
It is proposed to change the requirement for a Numeric Value Qualifier Code Sequence from Type 3 to Type 1C, to require its–
presence if the Measured Value Sequence is zero length. Though this is theoretically a breaking change, in practice it is extraordinarily–
unusual to encounter a zero length Measured Value Sequence, so this is thought to have no impact on the installed base.–

See: ftp://medical.nema.org/medical/dicom/final/cp2023_ft_ClarifyUnknownNumericMeasurementValueInSR.pdf

History

#1 - 2021-03-04 18:56 - Jörg Riesmeier

- Status changed from New to Closed

- % Done changed from 0 to 100

- Estimated time set to 4:00 h

Closed by commit ddbddf30c.