

Proposal on revising S-100 Part 4c
Submitted by DQWG

SUMMARY

Executive Summary: This proposal proposes revisions of S-100 Part 4 to ensure that it is consistent with ISO 19157 and S-97.

Action to be taken: See Section 3

Related documents: Action DQWG 17/01

1. Background

Some texts in S-100 Part 4c refers to ISO 19138 Geographic Information - Data Quality Measurement, which has been withdrawn and revised by ISO 19157:2013 Geographic Information - Data Quality Standard. Therefore, S-100 Part 4c needs to be revised to maintain consistency with ISO 19157 and IHO S-97.

2. Recommendations

It is recommended to:

- a) Replace ISO 19138 with ISO 19157.
- b) Add the Public Attribute BiasOfPositions to DQ_AbsoluteExternalPositionalAccuracy. Also, Add texts to indicate which Public Attributes are only used for horizontal positional uncertainties and which Public Attributes are only used for vertical positional uncertainties.
- c) Rename the Public Attribute physicalStructureConflicts of DQ_FormatConsistency as physicalStructureConflictsNumber, and add a new Public Attribute physicalStructureConflicts to DQ_FormatConsistency.
- d) Change the Public Attribute temporalConsistencyStatement of DQ_TemporalConsistency to chronologicalOrder.
- e) Add DQ_Aggregation.

3. Action

The S-100WG is invited to:

- a. **Note** the information provided;

Annex A

Appendix 4c-C

Hydrographic Quality Metadata Attribute Definitions

DQ_AbsoluteExternalPositionalAccuracy

Closeness of reported coordinative values to values accepted as or being true. [Per ISO 19115]

Public Attributes:

meanValuePositionalUncertainties[0..1] : Real

Mean value of the positional uncertainties for a set of positions where the positional uncertainties are defined as the distance between a measured position and what is considered as the corresponding true position. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

BiasOfPositions[0..1] : Real

Bias of positions for a set of positions where the positional uncertainties are defined as the deviation between a measured position and what is considered as the corresponding true position. [Adapted from ISO 19157].

meanExcludingOutliers[0..1] : Real

Mean value of the positional uncertainties, excluding outliers. For a set of points where the distance does not exceed a defined threshold, the arithmetical average of distances between their measured positions and what is considered as the corresponding true positions. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

numberOfPositionalUncertaintiesAboveThreshold[0..1] : Integer

Number of positional uncertainties above a given threshold for a set of positions. The errors are defined as the distance between a measured position and what is considered as the corresponding true position. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

rateOfPositionalErrorsAboveThreshold[0..1] : Real

Number of positional uncertainties above a given threshold for a set of positions in relation to the total number of measured positions. The errors are defined as the distance between the measured position and what is considered as the corresponding true position. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

covarianceMatrix[0..1] : Real Matrix

Symmetrical square matrix with variances of point coordinates on the main diagonal and covariances between these coordinates as off diagonal elements. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

linearErrorProbable[0..1] : Real

Half length of the interval defined by an upper and lower limit in which the true value lies with probability 50%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

standardLinearError[0..1] : Real

Half length of the interval defined by an upper and lower limit in which the true value lies with probability 68.3%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

linearMapAccuracy2Sigma[0..1] : Real

Half length of the interval defined by an upper and lower limit in which the true value lies with probability 90%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

linearMapAccuracy3Sigma[0..1] : Real

Half length of the interval defined by an upper and lower limit in which the true value lies with probability 95%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

linearMapAccuracy4Sigma[0..1] : Real

Half length of the interval defined by an upper and lower limit in which the true value lies with probability 99%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

nearCertaintyLinearError[0..1] : Real

Half length of the interval defined by an upper and lower limit in which the true value lies with probability 99.8%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

RMSError[0..1] : Real

Standard deviation where the true value is not estimated from the observations but known apriori. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for vertical positional uncertainties.

circularStandardDeviation[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 39.4%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

circularErrorProbable[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 50%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

circularMapAccuracyStandard[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 90%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

circularError95[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 95%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

circularNearCertaintyError[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 99.8%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

RMSErrorPlanimetry[0..1] : Real

Radius of a circle around a given point in which the true value lies with true value P. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

CMASError[0..1] : Real

The absolute horizontal accuracy of the data's coordinates expressed in terms of circular error at 90% probability given that a bias is present, per the equation in table D.50 in ISO 19157 ISO 19138. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

ACE_CE90[0..1] : Real

The absolute horizontal accuracy of the data's coordinates expressed in terms of circular error at 90% probability given that a bias is present, per the equation in table D.51 in ISO 19157 ISO 19138. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

uncertaintyEllipse[0..1] : Record

A 2D ellipse with the two main axes indicating the direction and magnitude of the highest and lowest uncertainty of a 2D point. The data values are a record of real numbers corresponding to "phi" the bearing of the major semi-axis, and "a" and "b" the length of the two axes, per the equations in Table D.52 of ISO 19157 ISO 19138. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

confidenceEllipse[0..1] : Record

A 2D ellipse with the two main axes indicating the direction and magnitude of the highest and lowest uncertainty of a 2D point. The data values are a record of real numbers corresponding to "phi" the bearing of the major semi-axis, and "a" and "b" the length of the two axes, per the equations in Table D.53 of ISO 19157 ISO 19138 and a significance level parameter. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The Public Attribute is only used for horizontal positional uncertainties.

DQ_AccuracyOfATimeMeasurement

Correctness of the temporal references of an item (reporting of error in time measurement).
[Per ISO 19115]

Public Attributes:**attributeValueUncertaintyMean[0..1] : Real**

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 50%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

attributeValueUncertainty1Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 68.3%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

attributeValueUncertainty2Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 90%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

attributeValueUncertainty3Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 95%. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

attributeValueUncertainty4Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 99%. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

attributeValueUncertainty5Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 99.8%. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

DQ_CompletenessCommission

Excess data present in a data set. [Per ISO 19115]

Public Attributes:

excessItem[0..1] : Boolean

This data quality measure indicates that an item is incorrectly present in the data. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

This is a Boolean where TRUE indicates that the item is in excess.

numberOfExcessItems[0..1] : Integer

This data quality measure indicates the number of items in the dataset, that should not have been in the dataset. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

This is an INTEGER count of the number of excess items.

rateOfExcessItems[0..1] : Real

This data quality measure indicates the number of excess items in the dataset in relation to the number of items that should have been present. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 5 measured values and 4 valid values then the ratio is 5/4 and the reported rate = 1.25.

numberOfDuplicateFeatureInstances[0..1] : Integer

This data quality measure indicates the total number of exact duplications of feature instances within the data. This is a count of all items in the data that are incorrectly extracted with duplicate geometries. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

This is an integer representing the error count. S-100 Edition 5.0.0

DQ_CompletenessOmission

This data absent from a data set. [Per ISO 19115]

Public Attributes:

missingItem[0..1] : Boolean

This data quality measure is an indicator that shows that a specific item is missing in the data. ~~[Adapted from ISO 19138]~~ **[Adapted from ISO 19157]**.

This is a Boolean where TRUE indicates that an item is missing.

numberOfMissingItems[0..1] : Integer

This data quality measure indicates the count of all items that should have been in the dataset and are missing. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an INTEGER count of the number of missing items.

rateOfMissingItems[0..1] : Real

This data quality measure indicates the number of missing items in the dataset in relation to the number of items that should have been present. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 3 measured values and 5 values are required the ratio is 3/5 and the reported rate = 0.6.

DQ_ConceptualConsistency

Adherence to the rules of a Conceptual Schema. [Per ISO 19115]

Public Attributes:

conceptualSchemaNonCompliance[0..1] : Boolean

This data quality measure is an indication that an item is not compliant to the rules of the relevant Conceptual Schema. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a Boolean where TRUE indicates that an item is not compliant with the rules of the Conceptual Schema.

conceptualSchemaCompliance[0..1] : Boolean

This data quality measure is an indication that an item complies with the rules of the relevant Conceptual Schema. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a Boolean where TRUE indicates that an item is in compliance with the rules of the Conceptual Schema.

numberOfNonCompliantItems[0..1] : Integer

This data quality measure is a count of all items in the dataset that are noncompliant to the rules of the Conceptual Schema. If the Conceptual Schema explicitly or implicitly describes rules, these rules have to be

followed. Violations against such rules, for example; can be invalid placement of features within a defined tolerance, duplication of features and invalid overlap of features. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

numberOfInvalidSurfaceOverlaps[0..1] : Integer

This data quality measure is a count of the total number of erroneous overlaps within the data. Which surfaces may overlap and which must not is application dependent. Not all overlapping surfaces are necessarily erroneous. When reporting this data quality measure the types of feature classes corresponding to the illegal overlapping surfaces have to be reported as well. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

The allowable topological levels are described in the IHO/DGIWG joint profile of ISO 19107 Geographic Information Spatial Schema. Which particular topological structure may be used with a specific dataset is defined in the Product Specification for that type of data product, for example "Chain Node Topology" for IHO S-101.

This is an error count.

nonComplianceRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are noncompliant to the rules of the Conceptual Schema in relation to the total number of these items that are expected to be in the dataset. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 5 items that are non-compliant and there are 100 of the items in the dataset then the ratio is 5/100 and the reported rate = 0.05.

complianceRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are in compliance with the rules of the Conceptual Schema in relation to the total number of these items that are expected to be in the dataset. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 95 items that are compliant and there are 100 of the items in the dataset then the ratio is 95/100 and the reported rate = 0.95.

DQ_DomainConsistency

Adherence of the values to the value domains. [Per ISO 19115]

Public Attributes:

valueDomainNonConformance[0..1] : Boolean

This data quality measure is an indication that an item is not in conformance with its value domain. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a Boolean where TRUE indicates that an item is not in conformance with its value domain.

valueDomainConformance [0..1] : Boolean

This data quality measure is an indication that an item is conforming to its value domain. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a Boolean where TRUE indicates that an item conforming to its value domain.

numberOfNonconformantItems[0..1] : Integer

This data quality measure is a count of all items in the dataset that are not in conformance with their value domain. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

valueDomainConformanceRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are in conformance with their value domain in relation to the total number of items in the dataset. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 95 items that are in conformance and there are 100 of the items in the dataset then the ratio is 95/100 and the reported rate = 0.95.

valueDomainNonConformanceRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are not in conformance with their value domain in relation to the total number of items in the dataset.-
[Adapted from ISO 19138]-[Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 5 items that are in conformance and there are 100 of the items in the dataset then the ratio is 5/100 and the reported rate = 0.05.

DQ_FormatConsistency

Degree to which data is stored in accordance with the physical structure of the data set. [Per ISO 19115]

Public Attributes:

physicalStructureConflicts [0..1] : Integer

This data quality measure is an indication that items are stored in conflict with the physical structure of the dataset. [Adapted from ISO 19157].

physicalStructureConflictsNumber [0..1] : Integer

This data quality measure is a count of all items in the dataset that are stored in conflict with the physical structure of the dataset.-[Adapted from ISO 19138]-[Adapted from ISO 19157].

This is an integer count.

physicalStructureConflictRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are stored in conflict with the physical structure of the dataset divided by the total number of items. –
[Adapted from ISO 19138]-[Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 3 items that are in conflict and there are 100 of the items in the dataset then the ratio is 3/100 and the reported rate = 0.03.

DQ_GriddedDataPositionalAccuracy

Closeness of gridded data position values to values to values accepted as or being true. [Per ISO 19113]

Public Attributes:

circularStandardDeviation[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 39.4%. -
[Adapted from ISO 19138]-[Adapted from ISO 19157].

circularErrorProbable[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 50%. –
[Adapted from ISO 19138]-[Adapted from ISO 19157].

circularMapAccuracyStandard[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 90%. –
[Adapted from ISO 19138]-[Adapted from ISO 19157].

circularError95[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 95%. –
[Adapted from ISO 19138]-[Adapted from ISO 19157].

circularNearCertaintyError[0..1] : Real

Radius describing a circle in which the true point location lies with the probability of 99.8%. -
[Adapted from ISO 19138] [Adapted from ISO 19157].

RMSErrorPlanimetry[0..1] : Real

Radius of a circle around a given point in which the true value lies with true value P.-
[Adapted from ISO 19138] [Adapted from ISO 19157].

CMSError[0..1] : Real

The absolute horizontal accuracy of the data's coordinates expressed in terms of circular error at 90% probability given that a bias is present, per the equation in table D.48 in ISO 19138.-
[Adapted from ISO 19138] [Adapted from ISO 19157].

ACE_CE90[0..1] : Real

The absolute horizontal accuracy of the data's coordinates expressed in terms of circular error at 90% probability given that a bias is present, per the equation in table D.49 in ISO 19138. -
[Adapted from ISO 19138] [Adapted from ISO 19157].

uncertaintyEllipse[0..1] : Record

A 2D ellipse with the two main axes indicating the direction and magnitude of the highest and lowest uncertainty of a 2D point. The data values are a record of real numbers corresponding to "phi" the bearing of the major semi-axis, and "a" and "b" the length of the two axes, per the equations in Table D.50 of ISO 19138. [Adapted from ISO 19138] [Adapted from ISO 19157].

confidenceEllipse[0..1] : Record

A 2D ellipse with the two main axes indicating the direction and magnitude of the highest and lowest uncertainty of a 2D point. The data values are a record of real numbers corresponding to "phi" the bearing of the major semi-axis, and "a" and "b" the length of the two axes, per the equations in Table D.51 of ISO 19138 and a significance level parameter. [Adapted from ISO 19138] [Adapted from ISO 19157].

DQ_NonQuantitativeAttributeAccuracy

Correctness of non-quantitative attribute. [Per ISO 19115]

Public Attributes:

numberOfIncorrectAttributeValues[0..1] : Integer

This data quality measure is count of the total number of erroneous attribute values within the relevant part of the dataset. It is a count of all attribute values where the value is incorrect.-
[Adapted from ISO 19138] [Adapted from ISO 19157].

rateOfCorrectAttributeValues[0..1] : Real

This data quality measure indicates the number of correct attribute values in relation to the total number of attribute values. - [Adapted from ISO 19138] [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 97 correct attribute values and there are 100 attribute values in total in the dataset then the ratio is 97/100 and the reported rate = 0.97.

rateOfIncorrectAttributeValues[0..1] : Real

This data quality measure indicates the number of attribute values where incorrect values are assigned in relation to the total number of attribute values. [Adapted from ISO 19138]-
[Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 3 incorrect attribute values and there are 100 attribute values in total in the dataset then the ratio is 3/100 and the reported rate = 0.03

S100_QualityMetadata

DQ_QuantitativeAttributeAccuracy

Accuracy of a quantitative attribute. [Per ISO 19115]

Public Attributes:

attributeValueUncertaintyMean[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 50%. ~~–[Adapted from ISO 19138]~~ [\[Adapted from ISO 19157\]](#).

attributeValueUncertainty1Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 68.3%. ~~–[Adapted from ISO 19138]~~ [\[Adapted from ISO 19157\]](#).

attributeValueUncertainty2Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 90%. ~~–[Adapted from ISO 19138]~~ [\[Adapted from ISO 19157\]](#).

attributeValueUncertainty3Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 95%. ~~–[Adapted from ISO 19138]~~ [\[Adapted from ISO 19157\]](#).

attributeValueUncertainty4Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 99%. ~~–[Adapted from ISO 19138]~~ [\[Adapted from ISO 19157\]](#).

attributeValueUncertainty5Sigma[0..1] : Real

This data quality measure indicates the attribute value of uncertainty where half the length of the interval defined by an upper and lower limit in which the true value for the quantitative attribute lies with a probability of 99.8%. ~~–[Adapted from ISO 19138]~~ [\[Adapted from ISO 19157\]](#).

DQ_RelativeInternalPositionalAccuracy

Closeness of the relative positions of features in a dataset to their respective relative positions accepted as or being true. [Per ISO 19115]

Public Attributes:

relativeVerticalError[0..1] : Real

An evaluation of the random errors of one relief feature to another in the same data set or on the same map/chart. It is a function of the random errors in the two elevations with respect to a common vertical datum. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

relativeHorizontalError[0..1] : Real

An evaluation of the random errors in the horizontal position of one feature to another in the same data set or on the same map/chart. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

DQ_TemporalConsistency

Correctness of ordered events or sequences, if reported. [Per ISO 19115]

Public Attributes:

chronologicalOrder[0..1] : Boolean

This data quality measure indicates that an event is incorrectly ordered against the other events.

This is a Boolean where TRUE indicates that the event is incorrectly ordered. [Adapted from ISO 19157].

~~**temporalConsistencyStatement[0..1] : CharacterString**~~

~~This is a qualitative statement of the consistency of the time measurement.~~

~~There is no qualitative measure provided for this data quality sub-element. ~~–[Adapted from ISO 19138]~~~~

DQ_TemporalValidity

Validity of data with respect to time. [Per ISO 19115]

Public Attributes:

valueDomainNonConformance[0..1] : Boolean

This data quality measure is an indication that an item is not in conformance with its value domain. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a Boolean where TRUE indicates that an item is not in conformance with its value domain.

valueDomainConformance[0..1] : Boolean

This data quality measure is an indication that an item is conforming to its value domain. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a Boolean where TRUE indicates that an item is conforming to its value domain.

numberOfNonConformantItems[0..1] : Integer

This data quality measure is a count of all items in the dataset that are not in conformance with their value domain. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

valueDomainConformanceRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are in conformance with their value domain in relation to the total number of items in the dataset. ~~–[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

valueDomainNonConformanceRate[0..1] : Real

This data quality measure indicates the number of items in the dataset that are not in conformance with their value domain in relation to the total number of items in the dataset. -
[Adapted from ISO 19138] [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 5 items that are in conformance and there are 100 of the items in the dataset then the ratio is 5/100 and the reported rate = 0.05.

DQ_ThematicClassificationCorrectness

Comparison of the classes assigned to features or their attributes to a universe of discourse.

[Per ISO 19113]

For example, ground truth or reference dataset.

Public Attributes:

numberOfIncorrectlyClassifiedItems[0..1] : Integer

This data quality measure is a count of the number of incorrectly classified features. –

[Adapted from ISO 19138] [Adapted from ISO 19157].

This is an integer count.

miscalculationRate[0..1] : Real

This data quality measure indicates the number of incorrectly classified features in relation to the number of features that are supposed to be there. [Adapted from ISO 19138] [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 1 items that are classified incorrectly and there are 100 of the items in the dataset then the ratio is 1/100 and the reported rate = 0.01.

misclassificationMatrix[0..1] : Integer Matrix

This data quality measure is a matrix of integer numbers that indicates the number of items of class (i) classified as class (j). The misclassification matrix is a quadratic matrix with n columns and n rows where n denotes the number of classes under consideration. $MCM(i,j) =$ (# items of class (i) classified as class (j)). The diagonal elements of the misclassified matrix contain the correctly classified items, and the off diagonal items contain the number of misclassified errors. [Adapted from ISO 19138] [Adapted from ISO 19157].

relativeMiscalculationMatrix[0..1] : Real Matrix

This data quality measure is a matrix of real numbers that indicates the number of items of class (i) classified as class (j) divided by the number of items of class (i) * 100 represented as a percentage. The misclassification matrix has n columns and n rows where n denotes the number of classes under consideration. $RMCM(i,j) =$ (# items of class (i) classified as class (j) / number of items of class (i)) * 100. – [Adapted from ISO 19138] [Adapted from ISO 19157].

kappaCoefficient[0..1] : Real

This data quality measure is real number coefficient to quantify the proportion of agreement of assignments to classes by removing misclassifications. – [Adapted from ISO 19138] [Adapted from ISO 19157].

DQ_TopologicalConsistency

Measures of the topological consistency of geometric representations of features. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

Note: in ISO 19115, this is “Correctness of the explicitly encoded topological characteristics of a dataset”, but **ISO 19157** ~~ISO 19138~~ states that the measures “will not serve as measures of the consistency of explicit descriptions of topology using the topological objects specified in ISO 19107”, and S-100 does not explicitly encode geometry.

Public Attributes:

numberOffFaultyPointCurveConnections[0..1] : Integer

This data quality measure is a count of the number of faulty point-curve connections in the dataset. A point curve connection exists where different curves touch. These curves have an intrinsic topological relationship that has to reflect the true constellation. For example, two point-curve connections exist when there should only be one. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count. S-100 Edition 5.0.0

rateOffFaultyPointCurveConnections[0..1] : Real

This data quality measure indicates the number of faulty link-node connections in relation to the number of supposed link-node connections.

This data quality measure gives the erroneous point-curve connections in relation to the total number of point-curve connections. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is a RATE which is a ratio, and is expressed as a REAL number representing the rational fraction corresponding to the numerator and denominator of the ratio.

For example, if there are 2 items that are faulty link-node connections and there are 100 of the connections in the dataset then the ratio is 2/100 and the reported rate = 0.02.

numberOfMissingConnectionsUndershoots[0..1] : Integer

This data quality measure is a count of items in the dataset within the parameter tolerance that are mismatched due to undershoots. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

numberOfMissingConnectionsOvershoots[0..1] : Integer

This data quality measure is a count of items in the dataset within the parameter tolerance that are mismatched due to overshoots. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

numberOfInvalidSlivers[0..1] : Integer

This data quality measure is a count of all items in the dataset that are invalid sliver surfaces. A sliver is an unintended area that occurs when adjacent surfaces are not digitized properly. The borders of the adjacent surfaces may unintentionally gap or overlap to cause a topological error. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

numberOfInvalidSelfIntersects[0..1] : Integer

This data quality measure is a count of all items in the dataset that illegally intersect with themselves. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

numberOfInvalidSelfOverlaps[0..1] : Integer

This data quality measure is a count of all items in the dataset that illegally self-overlap. – ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].

This is an integer count.

DQ_Aggregation

Several requirements are set up for a product to conform to the specification. [Adapted from ISO 19157]

Public Attributes:

dataProductSpecificationPassed[O..1]: Boolean

This data quality measure indicates that all requirements in the referred data product specification are fulfilled. [Adapted from ISO 19157].

dataProductSpecificationFailCount[O..1]: Integer

This data quality measure indicates that the number of data product specification requirements that are not fulfilled by the current product/dataset. [Adapted from ISO 19157].

dataProductSpecificationPassCount[O..1]: Integer

This data quality measure indicates that the number of data product specification requirements that are fulfilled by the current product/dataset. [Adapted from ISO 19157].

dataProductSpecificationFailRate[O..1]: Real

This data quality measure indicates that the number of data product specification requirements that are not fulfilled by the current product/dataset in relation to the total number of data product specification requirements. [Adapted from ISO 19157].

dataProductSpecificationPassRate[O..1]: Real

This data quality measure indicates that the number of data product specification requirements that are fulfilled by the current product/dataset in relation to the total number of data product specification requirements. [Adapted from ISO 19157].