S100WG8-4.6

Paper for Consideration by S100WG

Interoperability between datasets. interoperabilityIdentifier

Submitted by:	IIC Technologies
Executive Summary:	Proposal to add a unifying identifier for cross-product relationships
Related Documents:	S-100
Related Projects:	NIPWG Phase 2 S-100 Products, S-98 Annex C

Introduction / Background

Although S-100 has an extensive structure for relationships/associations between features in datasets, there are currently no provisions for linking features between different datasets whether from the same product specification or different ones. There is, thus, also no provision in S-98 Annex C for S-100 ECDIS feature interrogation to extend to informing users where features in different products/datasets may be interrelated.

This was considered during the recent NIPWG8 meeting in the context of discussions on Maritime Resource Names (MRNs) and a proposal to use of a standardised identifier.

Analysis/Discussion

There are currently no provisions in S-100 for identifiers at an attribute level. S-100 contains the following statements in respect of the use of MRNs, however (which are reflected in S-97):

> **3-10 Instance Identifiers**
>
> Identifiers of instances should utilize the Maritime Resource Name (MRN) concept and namespace. The MRN namespace is administered by the International Association of Lighthouse Authorities (IALA) through the website http://mrnregistry.org, which also contains references to the full set of rules that apply to the MRN concept. The topmost namespace urn:mrn remains fixed, with subsequent name spaces separated by colons, and available through the application process explained on the website. Any organization wishing to issue MRN conformant identifiers should apply for a name space from IALA, or from an organization that already has a namespace registered.

No further guidance, nor expected ECDIS behaviour is documented anywhere else.

At a recent NIPWG meeting, the MRN subWG met and discussed various aspects of MRN usage and identifiers in general. It was noted that a general form of feature identifier would be a significant addition to the S-100 ECDIS functionality, which could use MRNs as they are implemented and rolled out by HOs. A significant number of data producers see a requirement for persistent, unique identifiers for certain classes of features.

There are two separate, (though linked) proposals:

1. A proposal to submit to the registry a concept, called **interoperabilityIdentifier** which can be used by multiple product specifications as required. It is conceived that multiple product specifications will use **interoperabilityIdentifier** (a textual simple attribute) with a multiplicity of 0..* in their feature catalogues. For a given feature in a dataset, **interoperabilityIdentifier** will contain an optional list of feature identifiers, potentially contained in different datasets, representing the same feature instance.
2. A proposal for S-98 Annex C for S-100 ECDIS to use **interoperabilityIdentifier** as an attribute which joins feature instances in one dataset with features within other dataset(s). In addition to the existing feature interrogation functionality (the “pick report”) for a particular feature the S-100 ECDIS will then also display feature information for any features in any dataset matching any of the individual **interoperabilityIdentifier** values.

Although implemented as a textual attribute, it is envisaged that individual product specifications may ultimately restrict the use of the attribute to MRNs as required, and as IHO evolves specific MRN guidance for data producers.

Interoperability Identifiers may be used as simple attributes within feature or information types and can thus be used as a cross-product association mechanism. S-98 Annex C will "hardwire" the attribute **interoperabilityIdentifier** to serve as the persistent, unique identifier joining features across different datasets.

Some examples of use cases for **interoperabilityIdentifier** are shown (these were drafted during the NIPWG8 meeting):

Example 1:

S-101 ENC contains a RestrictedArea feature and S-131 a HarbourAreaSection feature both with interoperabilityID=urn:mrn:iho:N004:s101:1234-5678 (its geometry was originally created for an S-101 ENC, and reused by S-131, whence "s101"). There is a Regulations info type associated to the S-131 feature. When interoperability is enabled, the pick report detects the common *interoperabilityID* and displays the content of the Regulations as being (also) connected to the S-101 RestrictedArea even though the S-101 ENC does not actually contain the Regulations info type.

Example 2:

Norwegian National Maritime Traffic Regulation Section 124 – 125. Interoperability ID: urn:mrn:iho:no:N004:NationalMarineTrafficReg:124125_20230914_1200 is displayed or linked whenever any feature that includes that MRN as an interoperabilityID is picked.

- The Halifax Port information guide describes waiting anchorages ("AnchorageArea" features) within port areas and provides specific port regulations for their use. The anchorages are also encoded in S-101 ENC. S-131 encodes none of the "AnchorageArea" feature attributes, because all S-131 needs is a geographic location to which the port-specific "Regulations" information type is attached. The S-131 feature references the original S-101 feature by referencing its MRN. This provides an audit trail that enables any revisions such as relocations to be tracked and applied to S-131 promptly.

Draft additions to S-98 Annex C (also defined during NIPWG8) are shown below:

S-98 Annex C clause 15-4: Add #11:

"When interoperability is enabled by the mariner, the pick report should combine information from different products when picked features include the common unique identifier "*interoperabilityIdentifier*". Note: the format of the "*interoperabilityIdentifier*" is MRN and multiplicity is [0..]."

Conclusions

The use of a single fixed named simple attribute **interoperabilityIdentifier** enables interoperability to be implemented within datasets. This would be optionally implemented by the product specification by including **interoperabilityIdentifier** in the relevant feature catalogue. Implementing in this way requires no changes to S-100, and can be achieved by specifying the correct S-100 ECDIS behaviour in S-98 Annex C. This would be a significant step forward for data producers who, in the NIPWG (phase 2 products) context, will frequently create features in different datasets representing the same real-world features. Implementing interoperability in this way

will also give the IHO the motivation to finalise much needed MRN guidance for data producers by providing a concrete use case and an implementation in the NIPWG phase 2 product specifications.

Recommendations

The implementation of **interoperabilityIdentifier** requires no changes, nor extensions to S-100 itself. It requires the ECDIS behaviour to be specified within S-98 Annex C. However, as its implementation potentially affects a number of product specifications, the S-100 WG is asked to approve the concept of the **interoperabiltiyIdentifier** and instruct the appropriate working groups (S-164/S-98 and individual S-100 Project Teams) to implement the concept as specified in this paper. S-100WG may also wish to clarify the existing guidelines on Instance/Object identifiers in S-100 Part 3 and IHO S-97. Separately, a small working group within NIPWG is exploring the merits of MRN as a whole. As the guidance produced by this subgroup matures MRN may become the default form of the interoperabilityIdentifiers, to be restricted by individual product specifications as appropriate.

Action Required of S-100WG

S-100WG is asked to:

1. Consider the background and content raised in this paper
2. Approve the concept of using a single attribute to represent interoperability between different datasets
3. Use of the **interoperabiltiyIdentifier** concept for its implementation
4. Invite relevant subgroups/working groups/project teams to implement interoperability according to the guidelines within this paper. This should include NIPWG, S-164/S-98, S-97 and Validation subgroups.
5. Consider whether the existing S-100 Part 3 guidance requires revision.