

Paper for Consideration by S-100WG

Support files concept and clarification

Submitted by:	PRIMAR
Executive Summary:	Currently Support File types miss one additional concept clearly described in S-100 to be available for use in the product specifications, like S-101.
Related Documents:	S-100 5.1.0 S-101 1.2.0.
Related Projects:	

Introduction / Background

We believe the existing concept of support files in S-100 5.1.0 has some challenges, and there may be use cases supporting the need for dividing the concept into 2 different ones.

S-100 datasets may refer to a number of externally referenced, supporting resources for content. There are currently two ways (concepts) an external resource is related to a dataset:

- Concept 1: External resources defined in supportFileDiscoveryMetadata not being referenced in the dataset attribution (like for example Feature Catalogues, Portrayal Catalogues and Language packs), but instead those resources pointing to the datasets using them through the S100_SupportFileDiscoveryMetadata attribute supportedResource.
- Concept 2: Datasets hold a reference to the external resource of the type supportFile as an attribute value (E.g., TXT, TIFF files as we know from S-57).

This paper describes the use cases, seeks to clarify the two concepts and suggests a solution to resolve for the product specifications, distribution and end user system how to determine which concept a supported resource is.

Analysis/Discussion

Currently the type of an external resource is defined in the S100_SupportFileDiscoveryMetadata attribute resourcePurpose - Type S100_ResourcePurpose:

S100_SupportFileDiscoveryMetadata					
Role Name	Name	Description	Mult	Type	Remarks
Class	S100_SupportFileDiscoveryMetadata	Metadata about the individual support files in the Exchange Catalogue	-	-	-
Attribute	fileName	Name of the support file	1	URI	See Part1, clause 1-4.6
Attribute	revisionStatus	The purpose for which the support file has been issued	1	S100_SupportFileRevisionStatus	For example new, replacement, etc
Attribute	editionNumber	The Edition number of the support file	1	Integer	When a data set is initially created, the Edition number 1 is assigned to it. The Edition number is increased by 1 at each new Edition. Edition number remains the same for a re-issue
Attribute	issueDate	Date on which the data was made available by the Data Producer	0..1	Date	
Attribute	supportFileSpecification	The specification used to create this file	0..1	S100_SupportFileSpecification	
Attribute	dataType	The format of the support file	1	S100_SupportFileFormat	
Attribute	otherDataTypeDescription	Support file format other than those listed	0..1	CharacterString	
Attribute	comment	Optional comment	0..1	CharacterString	
Attribute	compressionFlag	Indicates if the resource is compressed	1	Boolean	<i>True</i> indicates a compressed resource <i>False</i> indicates an uncompressed resource
Attribute	digitalSignatureReference	Specifies the algorithm used to compute digitalSignatureValue	1	S100_SE_DigitalSignatureReference (see Part 15)	
Attribute	digitalSignatureValue	Value derived from the digital signature	1..*	S100_SE_DigitalSignature (see Part 15)	The value resulting from application of digitalSignatureReference Implemented as the digital signature format specified in Part 15
Attribute	defaultLocale	Default language and character set used in the support file	0..1	PT_Locale	In absence of defaultLocale the language is English in UTF-8 A support file is expected to use only one as locale. Additional support files can be created for other locales
Attribute	supportedResource	Identifier of the resource supported by this support file	0..*	CharacterString	Conventions for identifiers are detailed in S-100 Part 15. S-100 allows file URI, digital signature or cryptographic hash checksums to be used
Attribute	resourcePurpose	The purpose of the supporting resource	0..1	S100_ResourcePurpose	Identifies how the supporting resource is used

An external resource = supportFile is identified with code value 2 in the type S100_ResourcePurpose:

S100_ResourcePurpose				
Item	Name	Description	Code	Remarks
Enumeration	S100_ResourcePurpose	Defines the purpose of the supporting resource	-	-
Value	supportFile	A support file	1	
Value	ISOMetadata	Dataset metadata in ISO format	2	
Value	languagePack	A Language pack	3	
Value	GMLSchema	GML Application Schema	4	
Value	other	A type of resource not otherwise described	100	

There are two different concepts for support files, but at the moment the S-100 standard does not recognize both. This poses a problem for the S-101 product Specification that cannot at the moment utilize the support file as per concept 2.

Concept analysis:

Concept 1

External resources of the type supportFile not being referenced in the dataset attribution (like for example Feature Catalogues, Portrayal Catalogues and Language packs). These support files are not mentioned directly in the dataset's (product's) feature attributes, and are supplementary files. These files can be related to the datasets using them through the S100_SupportFileDiscoveryMetadata attribute supportedResource.

Concept 2

External resources of the type supportFile being referenced in the dataset attribution (E.g., TXT, TIFF files as we know from S-57). This support file type, not described in S-100 at this stage, is historically known as a support file for the S-57 ENCs.

This support file (concept 2) is actually an integral part of an ENC product - an extension of an attribute. It is being used if there is not enough space to add the information in the dedicated attribute field, or it could be a picture which cannot be added directly into the ENC's 8211 encoding.

Currently, we believe S-100 is not describing concept 2 properly. There is a need for distinguishing support files defined as concept 1 from concept 2, to enable a proper application, discoverability, distribution and use in the S-101 Product Specification. In the current situation, some challenges are identified:

- Currently it is not accessible information in the discovery metadata which support files a dataset is referencing through attribution reference. This creates challenges in distribution services and end user systems to discover/understand if a product (e.g., ENC) is complete.
- Removal of support files from a dataset at the moment requires an update to the supportFileDiscoveryMetadata attribute supportedResource. The identifier of the dataset in supportedResource must be removed for the end user system to understand that this support file is no longer used by this dataset. If a producer wishes to remove a support file from a dataset, he can issue a dataset update removing the dataset attribute reference to the support file. To remove the reference from the supportFileDiscoveryMetadata attribute supportedResource, he also needs to include the support file with the dataset update. This is because CATALOG.XML only contains information about the products (datasets, support files, catalogues) accompanying the exchange set. So the challenge is the need for including the support file he wishes to remove in the dataset update - this should not be necessary.
- ENCs are distributed as encrypted files, which cannot be accessed for data discoverability reasons. This means information must be accessible in the dataset discovery metadata (in CATALOG.XML). As discussed above, concept 2 type support files can be considered as an integral part of an ENC product, and as such information about a concept 2 type support file should be available in S100_DatasetDiscoveryMetadata.

The following solutions are suggested to resolve the above described scenario:

1. To resolve the above described scenario for concept 2 type support files, they should be discoverable in the dataset discovery metadata. We suggest to extend the S100_DatasetDiscoveryMetadata with an attribute providing this information:

Role Name	Name	Description	Mult	Type	Remarks
Attribute	dataReplacement	Datasetname	0..*	CharacterString	A dataset may be replaced by 1 or more datasets See Note
Attribute	navigationPurpose	Classification of intended navigation purpose (for Catalogue indexing purposes)	0..3	S100_NavigationPurpose	If Product Specification is intended for creation of navigational products this attribute should be mandatory
Attribute	extensionFileReference	Reference to external resources (support files defined as extensionFile) being integral part of the dataset.	0..*	URI	See Part 1, clause 1-4.6 See Note
Role	resourceMaintenance	Information about the frequency of resource updates, and the scope of those updates	0..1	MD_MaintenanceInformation	S-100 restricts the multiplicity to 0..1 and adds specific restrictions on the ISO 19115 structure and content. See clause MD_MaintenanceInformation later in this Part Format: PnYnMnDtHnMnS (XML built-in type for ISO 8601 duration). See clause 17-4.9

NOTE: replacedData and dataReplacement: The intended use of the attributes replacedData and dataReplacement could be, for example, to provide a mechanism for service providers to build automation when providing replacement data sets to customers within existing subscription periods.

S100_NavigationPurpose

NOTE: extensionFileReference: The attribute extensionFileReference is mandatory if external resources defined as extensionFile exist in the dataset.

In accordance with S-100 Part 1 1-4.6, the proposed attribute should be of a URI attribute type, as it holds a reference to a file. It is also proposed to clarify that the population of extensionFileReference must be conditional mandatory, to be populated if support files defined as extensionFile exist in the dataset.

2. Furthermore, we suggest extending the S100_SupportFileDiscoveryMetadata attribute resourcePurpose - Type S100_ResourcePurpose with the new value extensionFile, and add an explanatory note:

Item	Name	Description	Code	Remarks
Enumeration	S100_ResourcePurpose	Defines the purpose of the supporting resource	-	-
Value	supportFile	A support file	1	For external resources not being referenced as an attribute in datasets.
Value	ISOMetadata	Dataset metadata in ISO format	2	
Value	languagePack	A Language pack	3	
Value	GMLSchema	GML Application Schema	4	
Value	extensionFile	Integral part of dataset	5	For external resources being referenced as an attribute in datasets. See Note
Value	other	A type of resource not otherwise described	100	

NOTE: For external resources being referenced as an attribute in datasets, the extensionFile value should be chosen.

This to be able to distinguish between external resources of type support file concept 1 and concept 2. The proposed name is extensionFile, which indicates these files being considered as an integral part of a dataset. The dataset is then actually a collection of files.

3. All files covered by the S100_SupportFileDiscoveryMetadata encoding should encode the attribute resourcePurpose. Then an end user system would always know the purpose of a supporting resource, and act correctly accordingly. Therefore the attribute resourcePurpose (Type: S100_ResourcePurpose) must be made mandatory:

S100_SupportFileDiscoveryMetadata						
Role Name	Name	Description	Mult	Type	Remarks	
Class	S100_SupportFileDiscoveryMetadata	Metadata about the individual support files in the Exchange Catalogue	-	-	-	
Attribute	fileName	Name of the support file	1	URI	See Part1, clause 1-4.6	
Attribute	revisionStatus	The purpose for which the support file has been issued	1	S100_SupportFileRevisionStatus	For <u>example</u> new, replacement, etc.	
Attribute	editionNumber	The Edition number of the support file	1	Integer	When a data set is initially created, the Edition number 1 is assigned to it. The Edition number is increased by 1 at each new Edition. Edition number remains the same for a re-issue	
Attribute	issueDate	Date on which the data was made available by the Data Producer	0..1	Date		
Attribute	supportFileSpecification	The specification used to create this file	0..1	S100_SupportFileSpecification		
Attribute	dataType	The format of the support file	1	S100_SupportFileFormat		
Attribute	otherDataTypeDescription	Support file format other than those listed	0..1	CharacterString		
Attribute	comment	Optional comment	0..1	CharacterString		
Attribute	compressionFlag	Indicates if the resource is compressed	1	Boolean	True indicates a compressed resource False indicates an uncompressed resource	
Attribute	digitalSignatureReference	Specifies the algorithm used to compute digitalSignatureValue	1	S100_SE_DigitalSignatureReference (see Part 15)		
Attribute	digitalSignatureValue	Value derived from the digital signature	1..*	S100_SE_DigitalSignature (see Part 15)	The value resulting from application of digitalSignatureReference implemented as the digital signature format specified in Part 15	
Attribute	defaultLocale	Default language and character set used in the support file	0..1	PT Locale	In absence of defaultLocale the language is English in UTF-8 A support file is expected to use only one as locale. Additional support files can be created for other locales	
Attribute	supportedResource	Identifier of the resource supported by this support file	0..*	CharacterString	Conventions for identifiers are detailed in S-100 Part 15. S-100 allows file URI, digital signature or cryptographic hash checksums to be used	
Attribute	resourcePurpose	The purpose of the supporting resource	0..1	S100_ResourcePurpose	Identifies how the supporting resource is used	

4. It is suggested to provide explanatory text in S-100 Part 17-4.3. This to emphasize the two different concepts of external resources of type support files, and clarify that concept 2 type support files are considered as integral parts of a dataset.

17-4.3 Storage and Management of External Resources

S-100 datasets may refer to a number of externally referenced, supporting resources for content. This content may be textual or graphical and encoded in any of a number of formats (defined by the S100_SupportFileFormat enumeration in the Exchange Catalogue Schema). Datasets hold a reference to the external resource as an attribute value. This value may be updated as any other attribute and updates the reference to the external resource. External resources can support either datasets or Catalogues or can be standalone entities in the Exchange Set

There are several different types of external resources (defined by the S100_SupportFileDiscoveryMetadata Type: S100_ResourcePurpose in the Exchange Catalogue Schema). One of the types defined are support files. There is an important distinction between support files being referenced as an attribute in datasets, and support files not being referenced in dataset attributes.

Support files being referenced as an attribute in datasets should be considered as integral parts of a dataset. They are considered to be extension files of the dataset and should be discoverable from the S100_DatasetDiscoveryMetadata. Support files not referenced in dataset attribution are entities outside the dataset itself, and their relationship to a dataset is defined in the S100_SupportFileDiscoveryMetadata. They are not considered extension files of a dataset, rather supplementary files for usage together with the dataset.

The encoding of an extension file reference in S100_DatasetDiscoveryMetadata makes this distinction available for an end user system in data ingestion operations.

The S-100 Exchange Catalogue provides:

1. A normative definition of the location of each supporting resource. Where these are physical files this

5. As a consequence of the proposed changes, a review of S-100 support file/external resources descriptions in S-100 part 17 should eventually be undertaken.

Conclusions

- It is suggested to divide the existing external resource (supportFile) into two different concepts:
 - The existing S100_ResourcePurpose - supportFile continues to cover external resources not being referenced in dataset attribution (Concept 1).
 - Extend the S100_SupportFileDiscoveryMetadata attribute resourcePurpose - Type S100_ResourcePurpose with a new value called extensionFile (Concept 2) - and make the attribute resourcePurpose mandatory.
- Add to S100_DatasetDiscoveryMetadata the new attribute extensionFileReference of type URI.
- Add new clarifying text in S-100 Part 17-4.3 to explain the two different concepts of external resources of type support files, and clarify that concept 2 type support files are considered as integral parts of a dataset.
- A review of S-100 support file/external resources descriptions and apply the concepts accordingly.

Action Required of S-100WG5

The S-100WG is invited to:

- Note the paper and discuss the issues presented.
- Consider approving the accompanying change proposal to S-100.