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1 S100 Portrayal Model.

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1.1 Introduction.

The scope of this document is to propose a portrayal model for defining, organising symbols and portrayals rules necessary to portray S100 Product Features.

In this document, this portrayal model is named "S100 portrayal model".

This S100 portrayal model is a compromise between specificity of the current S52 presentation library and the recent models proposed in the revised 19117 (See References.).

This first version of "S100 portrayal model" doesn't not cover all portrayal aspect of S100 product series.

Illustrations of the document

The S100 portrayal model has been implemented as an XML application schema and populated in an XML file with the current S52 presentation library. Examples and illustrations supplied along this document are issued from XML files and generated by Altova XmlSpy and UModel.

Notes of the document :

All difference with the current S52 presentation library are noted as:

Delta S52 :

All difference with the model proposed by the last version of revised 19117 are noted as:

Delta Iso19117 :

1.2 References.

<u>Organism</u>	<u>Title</u>	<u>Version/Author</u>
DGIWG	Application Schemas for Portrayal and Symbol Registries	2005-09-09, D06, Ian Greasley
ISO TC211	19117 Geographic Information - Portrayal	2007-02-19, Draft
IHO-S52	S52 portrayal packages.	
OGC-FILTER		

1.3 Packages.

The S100 Portrayal Model is composed of

- A S100 Symbol Package that contains classes for defining and organising symbols.
- AS100 Portrayal Package that contains classes for defining and organising feature portrayal rules.

Each of these packages is defined respectively in the Annex A.1 and in Annex A.2.

1.4 The process for defining the S100 Portrayal Model.

This first version of the S100 portrayal model has been defined from different versions of revised ISO19117 and by taking account general portrayal aspect of the IHO-S52 standard.

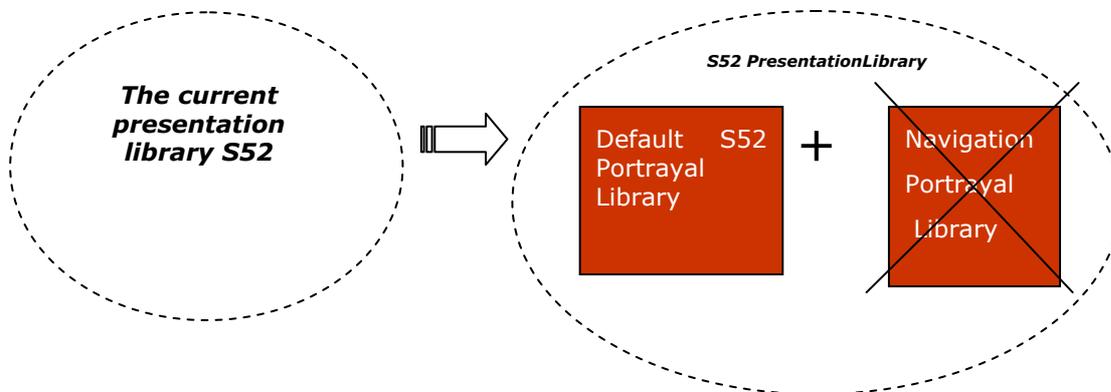
The intend was not to define a fulfil S52 ISO compliant model but to define, a more global portrayal model for S100 features. On the other hand, S52 is a mature portrayal standard and it is work to keeping in the S100 portrayal model, general S52 portrayal aspects.

In this way, this S52 portrayal aspect has been extracted from the current S52 presentation library by removing navigational aspects (specific conditional procedures, anti-grounding parameters).

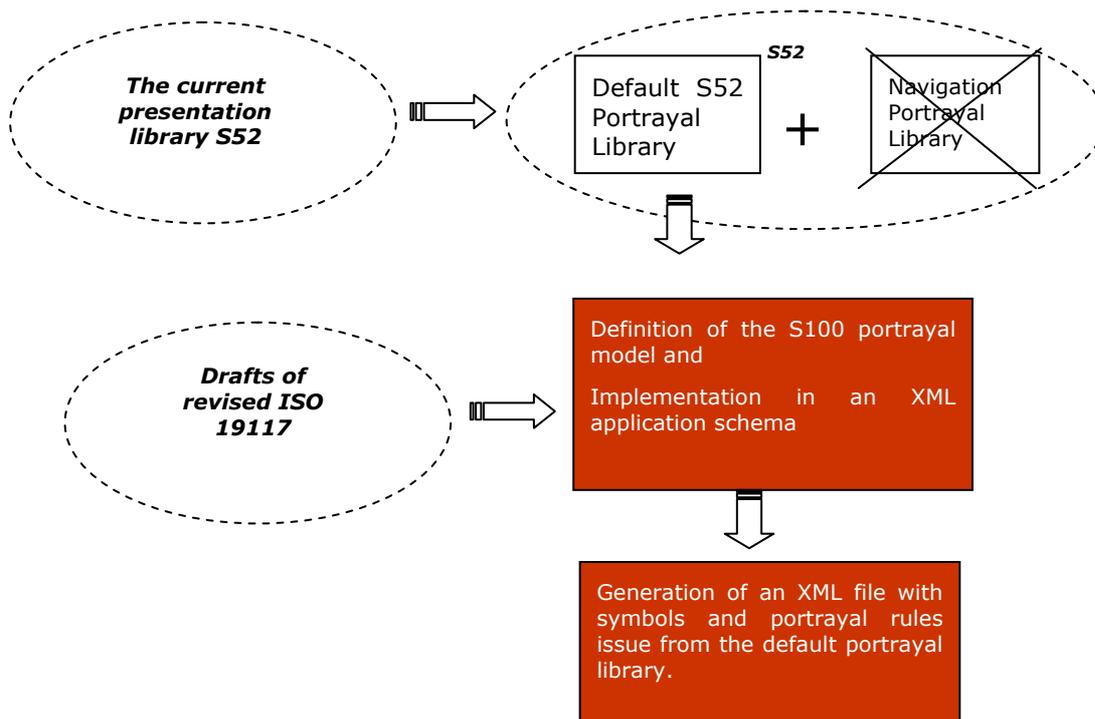
The aim is to initiate, in a first step, the process. Removing navigational context make this step easier. In future, more investigations are needed to extend the model of navigational context, especially to offer the possibility to define external functions.

Here the following steps based on the current S52 presentation library:

1. Remove, from the current PL, the **navigational** aspect (conditional procedures). The remaining part is designed as the "Default S52 Portrayal Library".



2. Define the "S100 portrayal model" by taking account of revised ISO 19117 draft versions and the default remaining part named as ""Default S52 Portrayal Library".



List of S52 presentation library navigational aspects.

- Anti Grounding portrayal instructions and Anti Grounding conditional procedures.
- Specific ship and navigational-purpose procedures (Overscaled Areas , Accuracy Boundaries).
- Overlay Radar categories.
- Over scale and navigation purpose symbolisation.

List of S52 presentation library aspects that need more investigations.

The remaining S52 presentation library aspects that have not translated in Iso19117 model:

- The symbolisation of soundings from geometry of sounding features or from the attribute "Value of Sounding". Only a reference to the conditional procedure "SNDFRM03" is made in these S100 mapping catalogue but no definitions of this external function is supplied.
- The labelling based on the attribute "Value of depth contour".
- "Dusk" and "Night" Colour tables.
- Display categories, Viewing groups organisation or library.
- Visibility parameters (Scale Minimum and Maximum, Dates of activation).

For these last points, needs more investigations.

1.5 Points that need more investigations.**1.5.1 “Dusk” and “Night” Color Tables.****1.5.2 Display Categories & Viewing Groups Library.****1.5.3 Visibility Parameters (Scale Minimum and Maximum, Dates of Activation).**

Annex A S100 Portrayal Package.

A.1.1 Introduction.

The S100 Portrayal Package contains classes for defining and organising feature portrayal rules.

The aim is to offer a model to manage and to use feature portrayal rules necessary to symbolise S100 product features.

In consequence all type of feature or type of attribute use in these rules must be referenced in a S100 product catalogue.

The S100 Portrayal Package is equivalent to ISO-19117 Portrayal Package:

- The S100 Portrayal Package realises the mapping from features to symbol.
- The S100 Portrayal Package implements rules to assign a symbol to a feature.
- The S100 Portrayal Package is dependant of the S100 Symbol Package as feature portrayal rules make reference to a symbol.

Delta Iso19117 : The portrayal feature rule define in S100 portrayal model is not exclusively based on type feature rule, as required by revised Iso19117 but may concern a group of features in which feature instance can reference more than one type feature (see **Erreur ! Signet non défini.** "generic rules").

A.1.2 Structure.

The S100 Portrayal Package has a hierarchical structure.

The root class of the S100 Portrayal Package is the S100 Portrayal Library class.

- A S100 Portrayal Library collects all portrayal catalogues for a specific hydrographic domain (Coastal Management Portrayal Library or Navigation Portrayal Library) and could concern more than on S100 product catalogue.

A S100 Portrayal Library is a collection of S100 Portrayal Mapping Catalogue.

- A S100 Portrayal Mapping Catalogue is automatically linked to a S100 Product Catalogue in a specific context. (Example: a S52 portrayal mapping could collect all the rules for portraying ENC features in a paper chart visualisation context.).

A S100 Portrayal Mapping Catalogue is a collection of S100 Portrayal Feature.

- A S100 Portrayal Feature gathers all the portrayal rules for a group of features. In most cases , a S100 Portrayal Feature is qualified as a Portrayal Feature Type and could gather for example all the portrayal rules of the "Wreck" feature type.

A S100 Portrayal Feature is a collection of S100 Portrayal Rule Set.

- A S100 Portrayal Feature Rule Set gathers all portrayal rules concerned by the same geometric delineation (Area Line Point or no specific geometric type). Example A S100 Portrayal Feature Rule Set could gather all portrayal rules for Area Wrecks.

A S100 Portrayal Rule Set is a collection of S100 Portrayal Rule.

- A S100 Portrayal Feature Rule Set is the kernel class of this model, as she makes the link between symbol and features. A S100 portrayal rule could be defined to portray an Area Wreck defined by its attributes as an "Historical Wreck".

Delta Iso19117 : The "S100 portrayal rule set" level doesn't exist in the last Revised Iso19117 version, but worth to be preserved as it is an efficient way to gather all the rules associated to a specific geometric delineation.

A.1.3 S100 Portrayal Library.

A.1.3.1 Semantics.

The S100 Portrayal Library is the root element of the S100 portrayal implementation and has no equivalent in the ISO-19117 Portrayal Model.

The S100 Portrayal Library registers (collects) portrayal mapping catalogues necessary or useful to portray different aspects of a hydrographic domain.

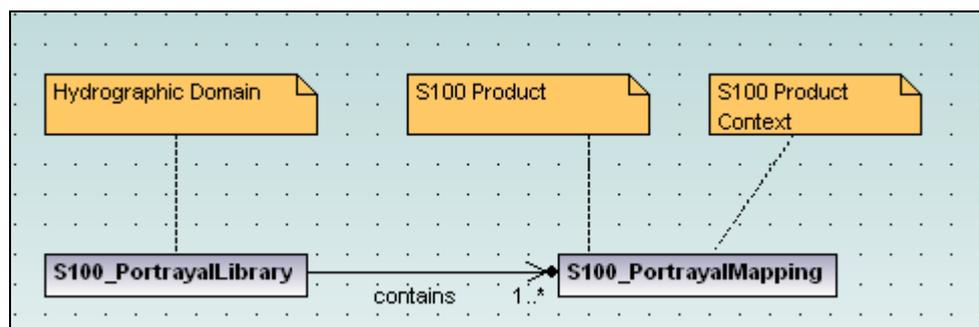
At least, one portrayal mapping catalogue is needed by S100 Product Feature Catalog.

More than one portrayal mapping catalogue is authorized taking account of different usage context and portrayal situations.

Example:

- The military domain defined in the "Recognised Environment Picture" relies (uses) more than one S100 Feature Product Catalog (AMLs).
- The navigation domain is defined by one S100 product but different mapping catalogues are needed taking account into the navigation conditions (bridge brightness or monitoring/ planning aspect).

Figure S100 Portrayal Library.



Note: The S100 portrayal library is not a candidate to be registered.

A.1.4 S100 Portrayal Mapping Catalog.

A.1.4.1 Semantics.

S100_PortrayalMapping is equivalent to the PF_PortrayalMapping interface defined in Iso19117 revised.

Definition of PF_PortrayalMapping from Revised Iso19117

A portrayal mapping defines a function which maps features to symbols. The mapping is not specific to a particular dataset but is specific to a feature catalogue, which defines feature types and their associated attributes. The mapping is rule based. Applying the mapping function to a feature, whose type and attributes are derived from the feature catalogue, will result in zero or more symbols.

A portrayal mapping is defined within a given context. A mapping may be defined for a particular scale, for a specific lighting condition, or for a particular thematic context. The context can be regarded as an attribute value valid for all features for a particular portrayal and in many systems is treated as such.

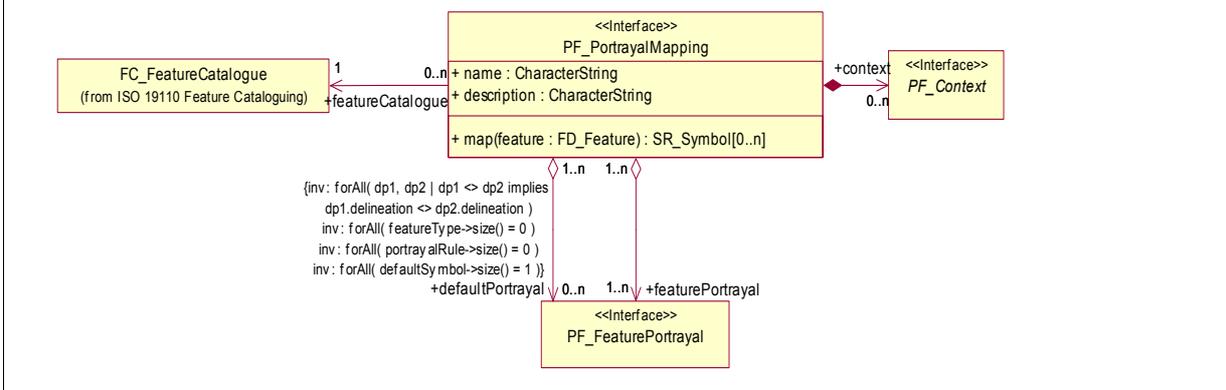
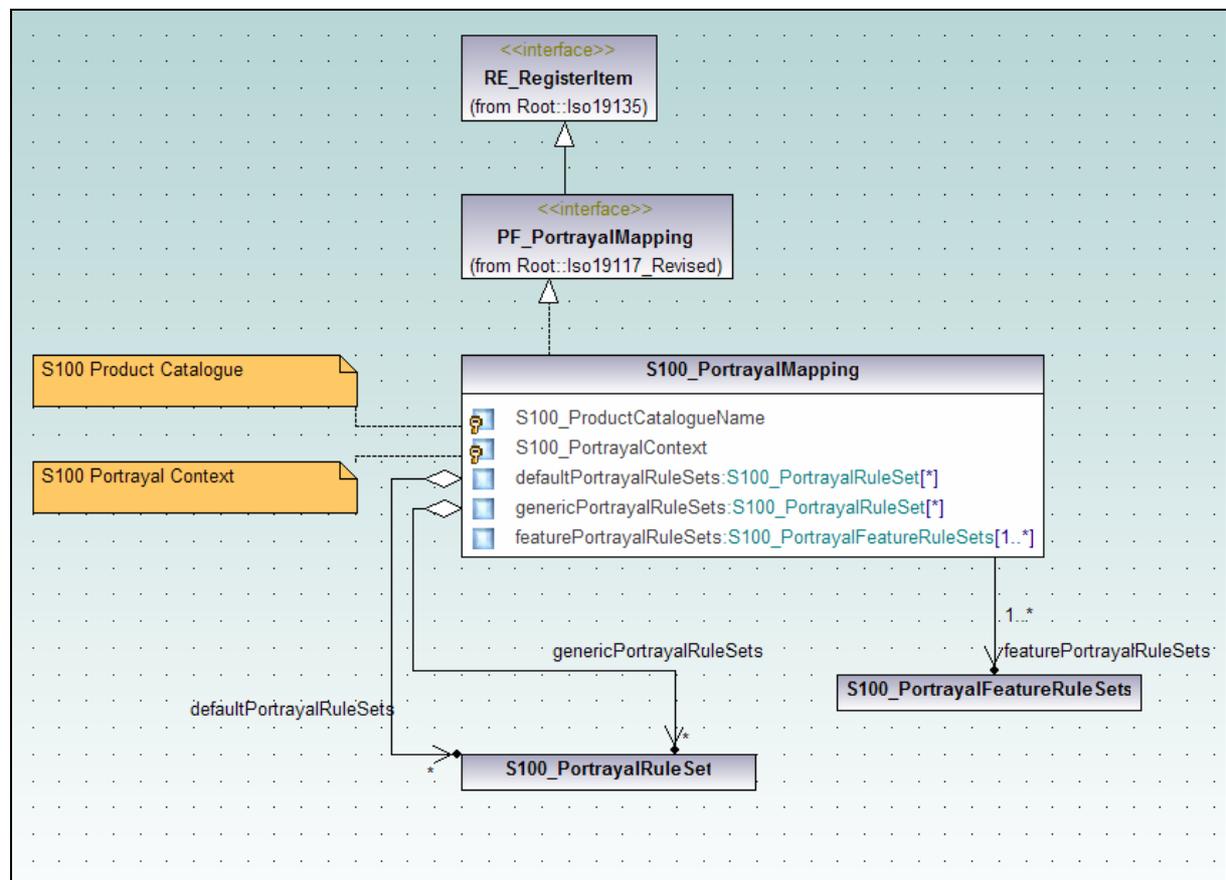


Figure S100 Portrayal Mapping.



The S100 portrayal mapping element is equivalent to the PF_PortrayalMapping interface :

- Collects feature portrayal rules to portray S100 features that are referenced in a S100 product catalogue. A S100 portrayal mapping is specific to a S100 product feature catalogue.
- Is associated to a specific usage context. The paper chart or simplified S52 options are considered as two separate contexts. The ENC S100 product portrayal rules has been implemented in two mapping catalogues taking account into two specific context: Day Paper chart and Day Simplified symbolisation context.
- Specialises also the "RE_RegisterItem" in order to be registered.

Delta Iso19117 :

The S100 portrayal mapping element doesn't collect portrayal rules uniquely through a tree of Feature Portrayals. But, in a S100 Portrayal Mapping Catalogue, S100 Portrayal Rules are collected and organised into three rule set trees :

1. The "**Feature Portrayal Rule Sets**" tree is designed to collect rules associated to feature types. All feature type must be defined in the feature catalogue. It is the main part of the catalogue and is a realization of PF_FeaturePortrayal tree from PF_PortrayalMapping.
2. The "**Default Portrayal Rule Sets**" tree is designed to collect default rules when no rules associated to a feature type are defined in the "Type Feature Portrayal Rule Sets" tree.
3. The "**Generic Portrayal Rule Sets**" tree is designed to collect rules associated to attribute types. All attributes must be defined in the feature catalogue.

Portrayal Rule Set Class has been retained to group portrayal rules in general by geometric delineation.

A.1.4.2 The S100 Portrayal Mapping Attributes.

A.1.4.2.1 The attribute "S100_ProductCatalogueName".

The "Feature Catalogue Name" attribute links the portrayal mapping catalogue to a specific S57 product feature catalogue. The current presentation library points to the ENC product feature catalogue.

A.1.4.2.2 The attribute "S100_PortrayalContext".

The "S100 Portrayal context" express through a pre-defined enumerated the different symbolization of a S57 product. S100 Portrayal context is a S100 realisation of PF_Context defined in Iso19117 revised.

A.1.4.2.3 The association role "Default Portrayal Rule Sets".

The Default Rules is used to collect "Portrayal Rule Set" to symbolized an unknown feature type. Logically there is one portrayal rule set for each geometric delineation (point, line, area, no specific geometry).

A.1.4.2.4 The association role "Generic Portrayal Rule Sets".

The Generic Rules is used to collect "Portrayal Rule Set" to symbolize any type of feature based on attribute expression. These portrayal rules are available for any feature type of the S57 product catalogue.

A.1.4.2.5 The association role "Feature Portrayal Rule Sets".

The Feature Rules collects "Feature Portrayal Rule " to symbolized feature depending on type.

1.5.3.1 Implementation of the S52 Context.

The S100 Portrayal context has been implemented as S52_context. The current presentation library offers to generate in an efficient way several usage contexts. The combination of look up tables and color tables offers to the navigator 12 symbolization contexts: Three color tables, Two Look up tables for point symbols and two look up tables for area symbols.

The original S52 "paper chart" symbolisation is composed of:

- Paper charts points look up table.
- Symbolised Boundaries loop up table.
- Lines look up table.

The original S52 "simplified" symbolisation is composed of:

- Simplified points look up table.
- Plain Boundaries loop up table.
- Lines look up table.

Delta S52 :

The S100 portrayal context equivalent to these different S52 symbolisation has been implemented in two S100 context :

DAY-PAPER CHARTS-SYMBOLISATION

DAY-SIMPLIFIED-SYMBOLISATION

Extension to the "Dusk" and "Night" colour table needs more investigations but the final aim is to extend S52 context code list with the following situation:

DUSK-PAPER CHARTS-SYMBOLISATION

DUSK-SIMPLIFIED-SYMBOLISATION

NIGHT-PAPER CHARTS-SYMBOLISATION

NIGHT-SIMPLIFIED-SYMBOLISATION

The principle to define symbol with a color token (not a real CIE/RGB definition) allows to apply automatically different color table and in this way generate new symbols.

Implementation of this model in an XML file.

Here a concrete implementation of this model with two portrayal mapping taking account into from the current presentation library

A.1.4.3 The Default Portrayal Rule Sets In details

The default portrayal rule sets is a collection of portrayal rule sets to define the symbolization in the case of a feature type has no entry in the feature type portrayal rule sets. The model "Portrayal Rule Set" is explained in

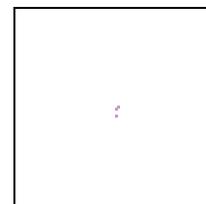
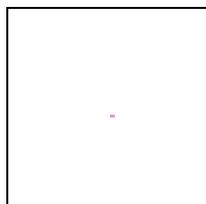
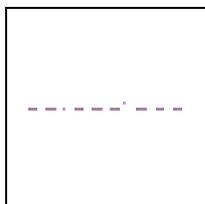
This default portrayal rule sets deals with "**unknown feature type**" from the ENC product catalogue taking account into all ENC feature type have an entry in the both ENC portrayal mapping catalogue (ENC paper_chart and ENC simplified).

Extract of the XML implementation.

pp:defaultPortrayalRuleSets					
pp:defaultPortrayalRuleSets					
pp:geometricDelineationPortrayalRuleSets (3)					
	= pp:ru...	= rg:itemIdentifier	= rg:name	= rg:description	pp:S100_PortrayalRule
1	Point	2000	UNKNOWN_P	Default Point Symbology For Unknown Object	pp:S100_PortrayalRule
2	Line	2001	UNKNOWN_L	Default Line Symbology For Unknown Object	pp:S100_PortrayalRule
3	Area	2002	UNKNOWN_A	Default Area Symbology For Unknown Object	pp:S100_PortrayalRule

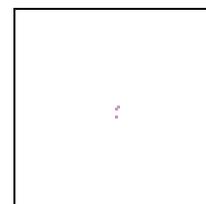
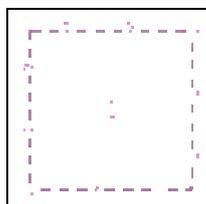
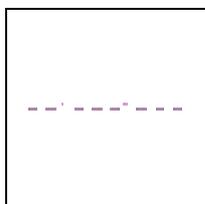
Default Portrayal Representation referenced in the ENC "day-simplified" Mapping catalogue.

Delineation **Line** **Area** **Point**



Default Portrayal Representation referenced in the ENC "day-paper chart" Mapping catalogue

Delineation **Line** **Area** **Point**



A.1.4.4 The Generic Portrayal Rule Sets in details.

Delta Iso19117: The generic portrayal rule sets are specific to the S100 portrayal model because these rule sets are not based on type feature but on attribute feature.

The aim is to associate, in an efficient way, a common symbolization for all feature instances that support the same attribute.

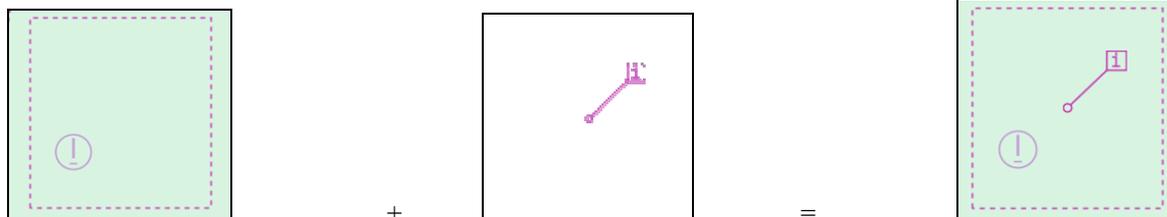
Three Generic Portrayal Rule Sets are defined in this first version for:

- Portrayal Rule Set for any feature type that supports the additional information attributes.
- Portrayal Rule Set for any feature type that supports the restriction attributes.
- Portrayal Rule for any feature type that support the value of sounding attributes.

Example: The point symbol instruction resulting to the generic rule "INFORM01" and added to the style line symbol instruction resulting to the classic feature portrayal rule :

These generic portrayal rules are used to adding symbol instructions to the list of symbol instructions resulting from the type feature portrayal rules.

Feature Type Symbolization + **Generic Inform Symbolization** = **Individual Symbolization**



Example of the INFORM01 generic rule Implementation in an XML form.

2	200	INFORM01	NoSpecific Geometry	Any Objects that support the attribut INFORM	pp:S100_PortrayalRule (1)																																
4					<table border="1"> <tr> <td>=</td> <td>pp:priority</td> <td>ft:AttributeExpression</td> <td>pp:S100_SymbolInstructions</td> </tr> <tr> <td>1</td> <td>1</td> <td>ft:AttributeExpression</td> <td>pp:S100_SymbolInstructions</td> </tr> <tr> <td></td> <td></td> <td>ft:Or</td> <td>sp:S100_SymbolShapeReference</td> </tr> <tr> <td></td> <td></td> <td>ft:PropertyIsList (3)</td> <td>= rg:n... S52.SH_INFORM01</td> </tr> <tr> <td></td> <td></td> <td>ft:PropertyName</td> <td>sp:S100_SymbolOrientedPivotPo</td> </tr> <tr> <td></td> <td></td> <td>1 Information</td> <td>= sp:S100_SymbolX 4</td> </tr> <tr> <td></td> <td></td> <td>2 Textual description</td> <td>= sp:S100_SymbolY 56</td> </tr> <tr> <td></td> <td></td> <td>3 Pictorial representation</td> <td></td> </tr> </table>	=	pp:priority	ft:AttributeExpression	pp:S100_SymbolInstructions	1	1	ft:AttributeExpression	pp:S100_SymbolInstructions			ft:Or	sp:S100_SymbolShapeReference			ft:PropertyIsList (3)	= rg:n... S52.SH_INFORM01			ft:PropertyName	sp:S100_SymbolOrientedPivotPo			1 Information	= sp:S100_SymbolX 4			2 Textual description	= sp:S100_SymbolY 56			3 Pictorial representation	
=	pp:priority	ft:AttributeExpression	pp:S100_SymbolInstructions																																		
1	1	ft:AttributeExpression	pp:S100_SymbolInstructions																																		
		ft:Or	sp:S100_SymbolShapeReference																																		
		ft:PropertyIsList (3)	= rg:n... S52.SH_INFORM01																																		
		ft:PropertyName	sp:S100_SymbolOrientedPivotPo																																		
		1 Information	= sp:S100_SymbolX 4																																		
		2 Textual description	= sp:S100_SymbolY 56																																		
		3 Pictorial representation																																			

This generic rule applies to any feature instance (from any feature type and any feature geometric type), as soon as its properties "Information, Textual Description and Pictorial Representation" have a not null value, the symbol instructions references => Call the Symbol Shape S52.SH_INFORM01

A.1.4.5 The Feature Portrayal Rule Sets in details

The Feature Portrayal Rule Set Tree collects portrayal rule sets defined to portray a feature type. The feature type itself must be defined in the S100 product feature catalogue associated to the S100_PortrayalMapping. Logically there is one portrayal rule set by geometric delineation possibility (area, line, point or no specific geometry) permitted by the feature type.

A.1.5 S100 Portrayal Feature Rule Sets.

The S100 Portrayal Mapping is mainly a collection of S100 Portrayal Feature Rule Sets, handles by its type feature portrayal rule sets association role.

A S100 portrayal feature rule sets is equivalent to the "PF_FeatureRule" interface defined in Iso19117 revised.

Definition of PF_FeatureRule from Revised Iso19117

A feature portrayal is a collection of portrayal rules that apply to a set of feature types. These feature types specialize a common parent and therefore share common attributes. In most cases only one feature type will be associated with a feature portrayal. Only those attributes that are common to the features in the set may be used in the rules that make up the feature portrayal.

A feature portrayal is delineation specific and maps to at most one symbol. The associated symbol is given the priority of the feature portrayal object relative to other symbols in the portrayal.

A feature portrayal may lack both rules and a default symbol and is therefore not portrayed.

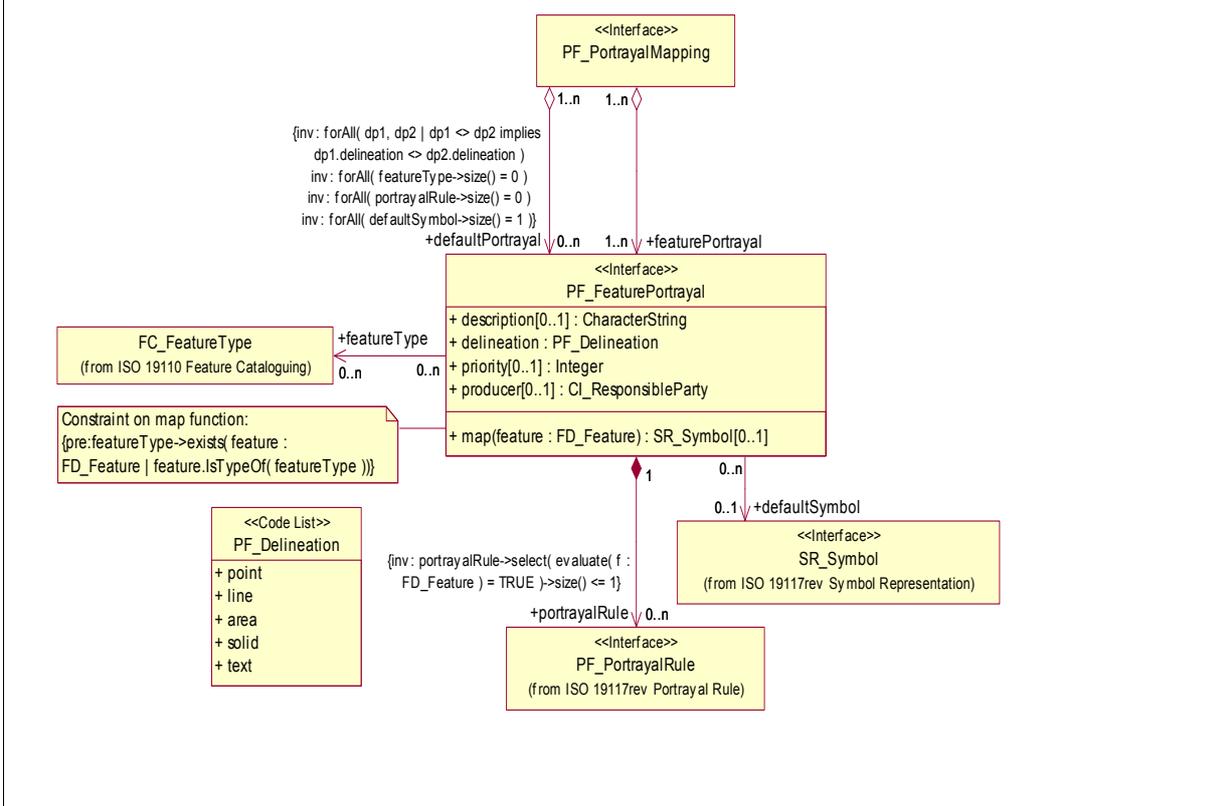
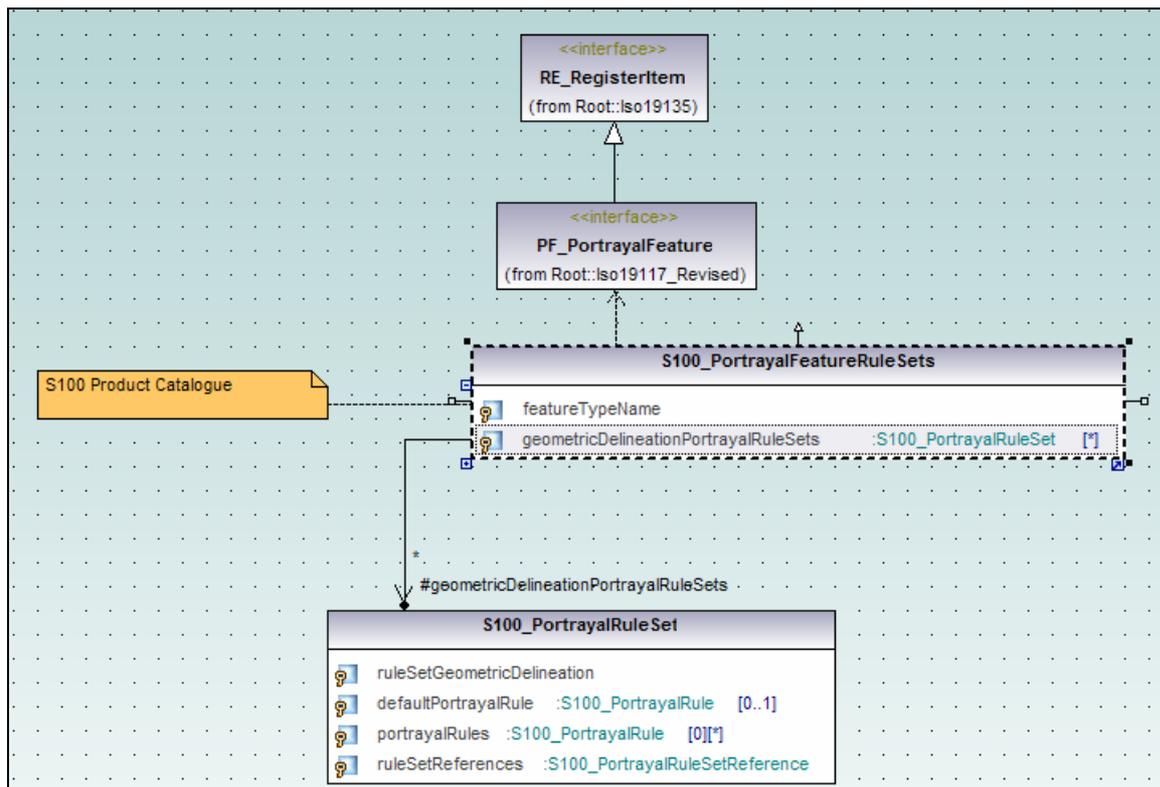


Figure S100 Feature Portrayal Rule Set.

As the PF_FeatureRule interface proposes, the S100 portrayal feature rule element:

- Collects portrayal rules associated to a S100 feature type.
- Is associated to a feature type that must be defined in the S100 product catalogue associated to S100 Portrayal Mapping.
- Specialises also the "RE_RegisterItem" in order to be registered.

Delta Iso19117 :

The S100 Feature Portrayal has no delineation attribute and groups all geometric delineation portrayal possibilities for a feature type. A S100 Feature Portrayal is a collection of S100 portrayal rule set. One portrayal rule set by geometric delineation authorized by the S100 product specification. S100 Portrayal Model introduces a supplementary level between the Feature Portrayal Level and Portrayal Rule Level. This level is Portrayal Rule Set Level.

S100 Feature Portrayal has no priority attribute. This attribute in the Revised Iso19117 specified the priority of the symbol returned by the evaluation operation.

Delta S52 :

The S100 Feature Rule Set doesn't support the display priority and the display category (viewing group) as the S52 portrayal feature rule do. This possibility to set a display priority or to set a display category has been moved at the S100 portrayal symbol instructions.

A.1.5.1 The S100 Portrayal Feature Rule Sets Attributes.

A.1.5.1.1 The attribute "feature type name"

The feature type contains the identifier name of the feature type in the S100 Product Catalogue.

Example of the Feature Type Name attribute Implementation in an XML form.

pp:S100_PortrayalMapping (2)			
r	rg.name	rg.owner	pp:featurePortrayalRuleSets
1	50	PaperChart S52	pp:featurePortrayalRuleSets (168)
itemIdentifier	rg.name	pp:S100_FeatureTypeName	pp:geometricDelineationPortrayalRuleSets
1	2006	ACHARE	Anchorage area
2	2009	ACHBRT	Anchor berth
3	2012	ADMARE	Administration Area (Named)
4	2014	AIRARE	Airport/airfield
5	2017	BCNCAR	Beacon, cardinal
6	2019	BCNISD	Beacon, isolated danger
7	2021	BCNLAT	Beacon, lateral
8	2023	BCNSAW	Beacon, safe water
9	2025	BCNSPP	Beacon, special purpose/general
10	2027	BERTHS	Berth
11	2031	BOYCAR	Buoy, cardinal
12	2033	BOYINB	Buoy, installation
13	2035	BOYISD	Buoy, isolated danger
14	2037	BOYLAT	Buoy, lateral
15	2039	BOYSAW	Buoy, safe water
16	2041	BOYSPP	Buoy, special purpose/general
17	2043	BRIDGE	Bridge
18	2047	BUAARE	Built-up area
19	2050	BUISGL	Building, single
20	2053	C_AGGR	Aggregation
21	2054	C_ASSO	Association
22	2055	CANALS	Canal
23	2058	CAUSWY	Causeway
24	2061	CBLARE	Cable area
25	2063	CBLDHD	Cable, overhead
26	2065	CBLSUB	Cable, submarine

A.1.5.1.2 The association role "geometric delineation portrayal rule sets".

This association role is implemented as a collection of portrayal rule set. Each portrayal rule set is specific to a geometric delineation (point, line, area). The possible geometric delineation for a feature type is defined in the S100 Product specification.

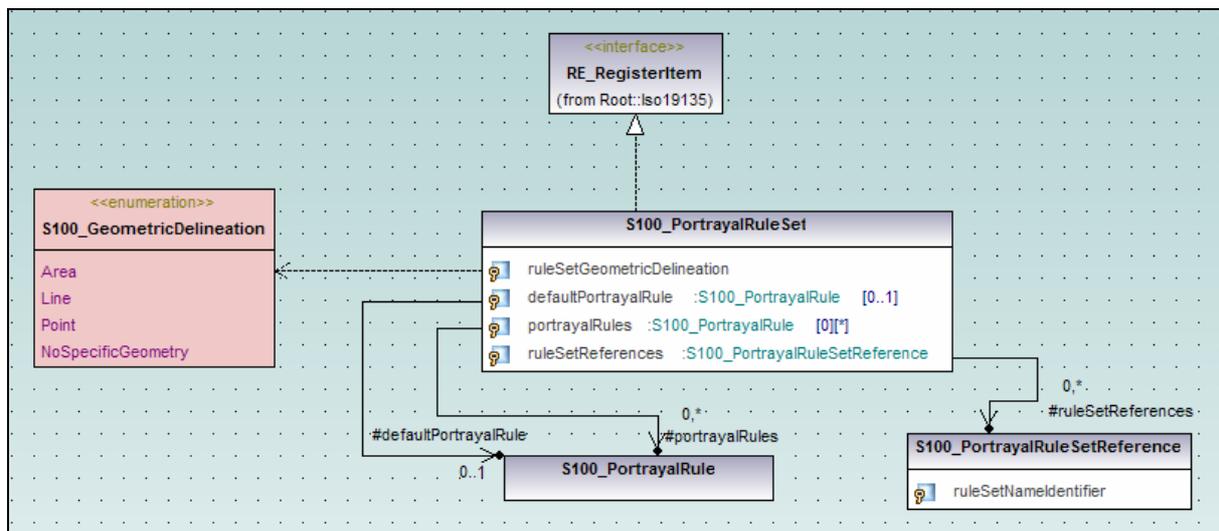
A.1.6 S100 Portrayal Rule Set.

A.1.6.1 Semantics

The S100 Portrayal Rule Set has no equivalent in the revised ISO19117 but implements the interface RE_RegisterItem in order to be registered in conformance with ISO19135.

This S100 portrayal element is useful to group portrayal rule taking account a geometric delineation type. A S100 Portrayal Rule Set is composed of two associations and one attribute (delineation). The association "portrayal rules" is a collection of S100 portrayal rules. Each of these rules is based on attributes expressions. The first association "default rule" is a S100 Portrayal Rule that must be considered for a feature instance that matches any preceding portrayal rules.

Figure S100 Portrayal Rule Set.



A.1.6.2 The S100 Portrayal Rule Set Attributes.

A.1.6.2.1 The rule set geometric delineation attribute.

This attribute associates the Portrayal Rule Set to a geometric type. The attribute is type of S100_Delineation that refers to a code list (Point, Line, Area or No Specific Geometry)

A.1.6.2.2 The "default Portrayal Rule" association.

The default Portrayal rule is the default symbolization to be applied to a feature in the case of no attribute expression portrayal rules matches the feature instance.

In general a default portrayal rule has no attribute conditions.

This rule must be considered as the equivalent zero rule priority in look up tables of the current presentation library.

Extract from the S52 current presentation library.

```

"BUIISGL", "", "AC(CHBRN);LS(SOLD,1,LANDF)", "4", "S", "OTHER", "32220" => The equivalent of the S100 default portrayal rule
"BUIISGL", "FUNCTN33CONVIS1", "AC(CHBRN);TX(OBJNAM,1,2,2, .....",
"BUIISGL", "FUNCTN33", "AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0 .....",
"BUIISGL", "CONVIS1", "AC(CHBRN);LS(SOLD,1,CHBLK)", "4", "S", "....."
  
```

A.1.6.3 The "portrayal Rules" association.

The portrayal rules association is a collection of S100 portrayal rule that correspond to the different symbolization taking account attribute expressions.

These rules must be applied to a feature instance taking account the priority rule associated to the rule. As soon as a rule (logical attribute expression) return true, the symbol referenced instructions must be retained and the process of evaluating portrayal rule instance must stop.

Extract from the S52 current presentation library.

```
"BUISGL","","AC(CHBRN);LS(SOLD,1,LANDF)","4","S","OTHER","32220"
"BUISGL","FUNCTN33CONVIS1","AC(CHBRN);TX(OBJNAM,1,2,2, .....
"BUISGL","FUNCTN33","AC(CHBRN);TX(OBJNAM,1,2,2,'15110',0,0 ....
"BUISGL","CONVIS1","AC(CHBRN);LS(SOLD,1,CHBLK)","4","S","....." } The equivalent of S100 attribute expression rules.
```

A.1.6.4 The "rule Set References" association.

The portrayal rules reference is a collection of rule set identifier. The referenced rule set must be evaluated in addition to the default portrayal rule instance and portrayal rules. Portrayal rule set referenced are defined in the generic rule set list of the mapping catalogue.

Example of rule set references association.

pp:ruleSet...	rg:itemIde...	rg:name	pp:S100_D...	pp:S100_P...	pp:S100_PortrayalRuleSetReference
1	Point	ENC.ACHARE. Point	pp:S100_D...		pp:S100_PortrayalRuleSetReference (1) pp:ruleSetNameIdentifier 1 INFORM01
2	Area	ENC.ACHARE. Area	pp:S100_D...	pp:S100_P...	pp:S100_PortrayalRuleSetReference (2) pp:ruleSetNameIdentifier 1 RESTRN01 2 INFORM01

A.1.7 S100 Portrayal Rule.

A.1.7.1 Semantics

A S100 portrayal rule is a S100 realisation of "PF_PortrayalRule" from Iso19117 revised. This S100 element specifies the link between logical attribute expressions and symbol instructions.

Figure Iso19117 PF PortrayalRule

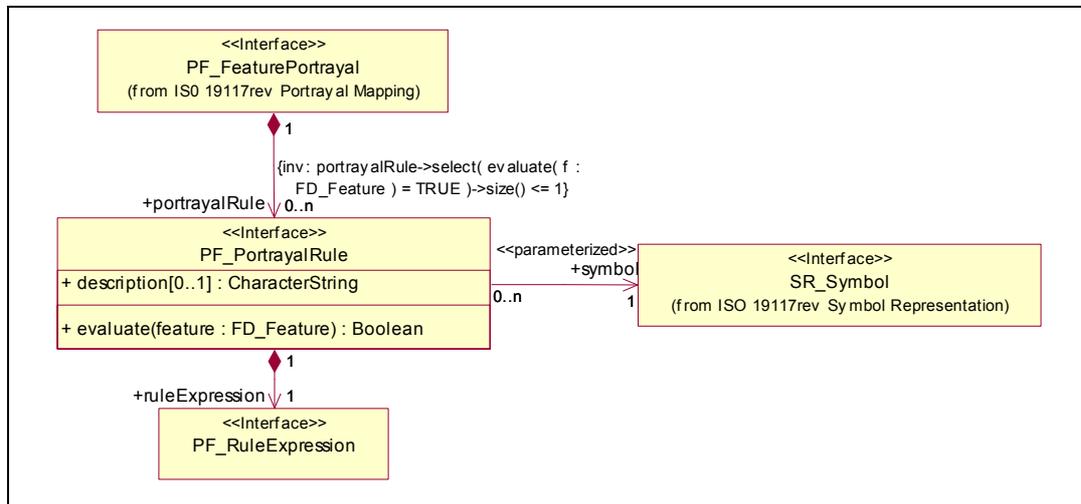
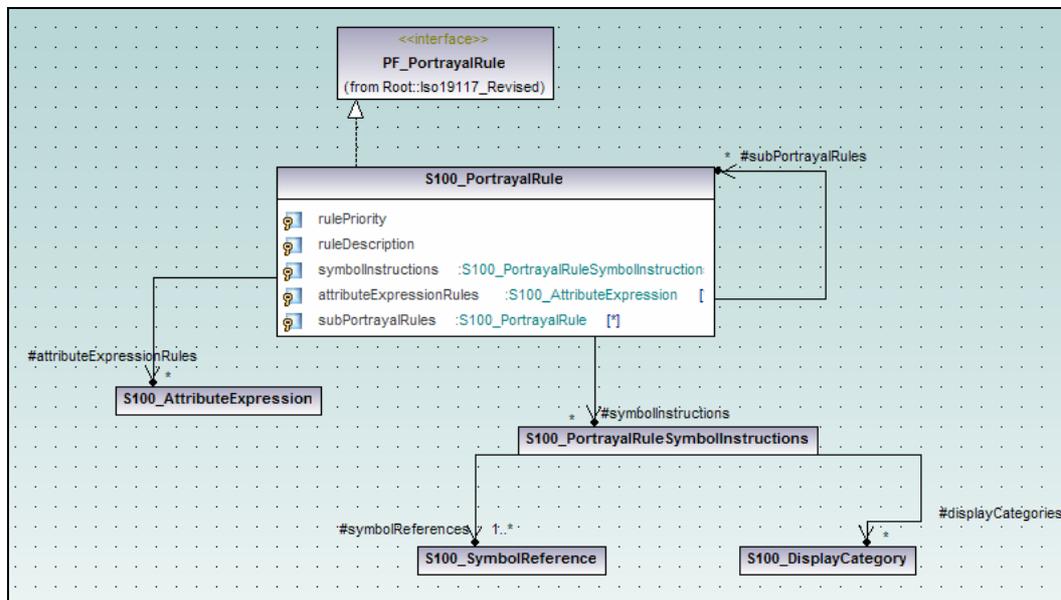


Figure S100 Portrayal Rule



Delta Iso19117 : The S100 Portrayal Rule may be implemented as collection of portrayal rules.

Delta Iso19117 : The S100 Portrayal Rule has a rule priority.

Delta Iso19117 : The S100 Portrayal Rule makes references to symbol sets though symbol instructions and not directly as defined in Iso19117.

A.1.7.2 The rule priority attribute.

The rule priority is the logical system order to execute a portrayal rule in a portrayal rule set and in consequences to select symbol instructions.

A.1.7.3 The rule description attribute.

The rule description is the description of the portrayal rule. This attribute help to understand the logical step of the current rule.

Examples of rule description and rule priority attributes.

pp:S100_PortrayalRule					
pp:S100_PortrayalRule (6)					
	pp:ruleDescription	pp:rulePriority	ft:AttributeExpression	sp:S100_SymbolShapeR...	pp:S100_PortrayalRule
1	Unknown Restriction	1	ft:AttributeExpression		
2	Entry Prohibited Or Restricted	2	ft:AttributeExpression		pp:S100_PortrayalRule (2)
3	Anchoring Prohibited Or Restricted	3	ft:AttributeExpression		pp:S100_PortrayalRule (2)
4	Fishing Prohibited Or Restricted	4	ft:AttributeExpression		pp:S100_PortrayalRule (2)
5	Own Ship Restriction	5	ft:AttributeExpression		pp:S100_PortrayalRule (1)
6	Restriction On Construction	6	ft:AttributeExpression	sp:S100_SymbolShapeR...	

A.1.7.4 The association "logical attribute expressions".

It is the logical attribute expression list to be evaluated by attributes values of a feature instance.

A.1.7.5 The association "symbolInstructions".

If the attribute expressions are evaluated to true, the symbol drawing instructions listed in the symbol reference list must be applied

A.1.7.6 The association "sub portrayal rules".

The S100 Portrayal Rules may contain sub portrayal rules to be tested if the current logical attribute expression is evaluated to true.

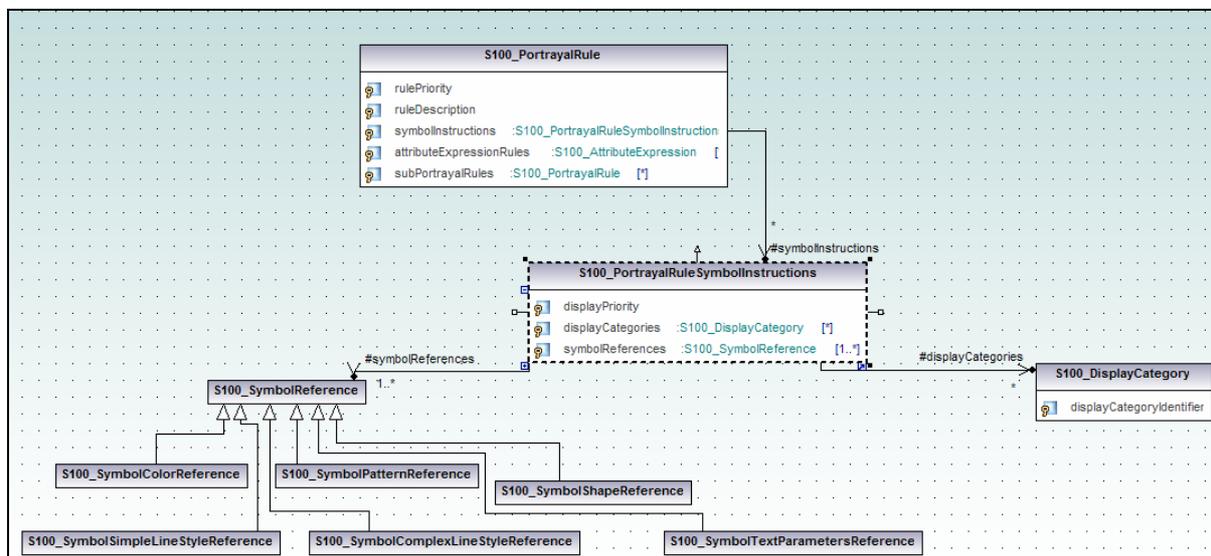
The best example is the implementation of the generic rule "RESTRNnn".

pp:S100_PortrayalRule					
pp:S100_PortrayalRule (6)					
	pp:ruleDes...	pp:rulePri...	ft:AttributeExpression	sp:S100_SymbolShapeReference	pp:subPortrayalRules
2003	RESTRN01		ft:AttributeExpression		pp:subPortrayalRules
		1	ft:AttributeExpression		pp:subPortrayalRules
		2	ft:AttributeExpression		pp:subPortrayalRules
		3	ft:AttributeExpression		pp:subPortrayalRules
		4	ft:AttributeExpression		pp:subPortrayalRules
		5	ft:AttributeExpression		pp:subPortrayalRules
		6	ft:AttributeExpression	sp:S100_SymbolShapeReference	pp:subPortrayalRules
2004	INFORM01				pp:S100_PortrayalRule (1)

A.1.8 S100 Portrayal Rule Symbol Instructions.

This specific S100 class has in charge to support the rendering aspect of a portrayal rule. A S100 Portrayal Rule Symbol Instruction groups a series of symbol references taking account the display priority and the display category series.

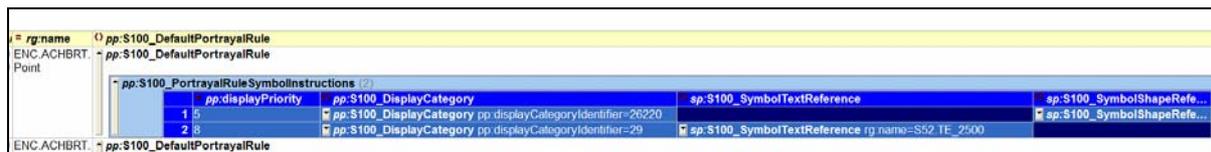
Figure S100 Portrayal Rule Symbol Instructions.



Delta S52 :

The S100 Portrayal Model proposes to associate to each symbol instruction a list of display categories. In comparison the current S52 sets one display category by portrayal rule.

Example:



A.1.9 Filter Attribute Expressions.

Annex B S100 Symbol Package

B.1.1 Introduction

The S100 symbol package contains classes for defining and organizing S100 feature portrayal symbols.

The S100 symbol package has been defined taking account into the Revised 19117 Symbol Model and the S52 presentation library.

The aim is to define the model to handle symbols and to supply necessary classes to reference symbols from S100 Portrayal Rules.

B.1.2 Structure

The S100 Symbol Package has a hierarchical structure.

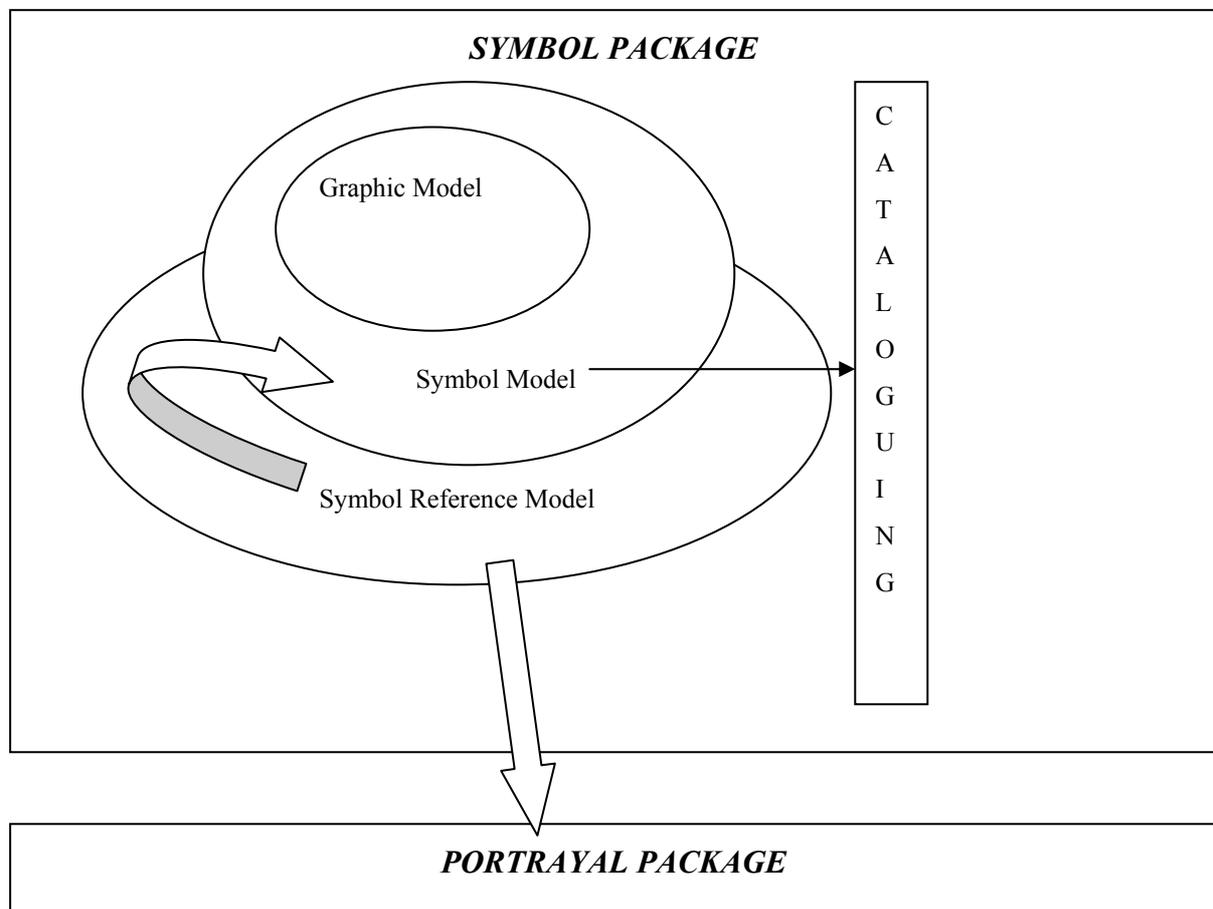
All S100 simple symbol catalogs are contained into a single compound symbol catalogue named as S100 Symbol Library:

- The root class of the S100 Symbol Package is the S100 Symbol Library class.
- A S100 Symbol Library collects S100 Symbol Catalogs. One symbol catalog by symbol type (Shape, Color, Simple Style, Complex Style, Text Parameters).
- A S100 Symbol Catalog collects S100 Symbol.
- A S100 Symbol is defined by S100 Graphic Series.

The S100 Symbol Reference Class is used to point a S100 Symbol through a S100 Portrayal Rule.

The S100 Symbol Reference Class is also used to aggregate S100 Symbol themselves.

Overview.



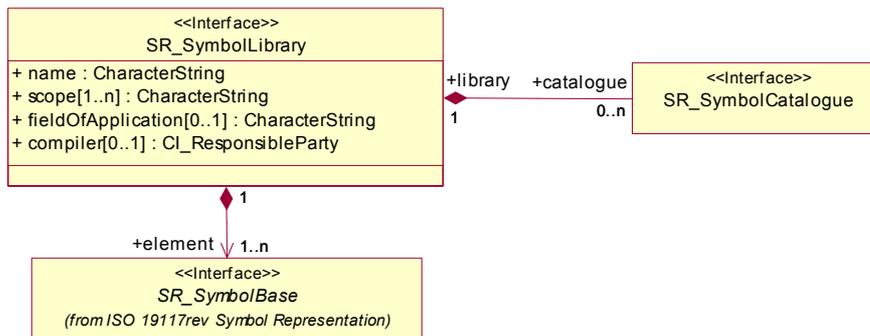
B.1.3 S100 Symbol Library

B.1.3.1 Semantics.

S100 Symbol Library is equivalent to SR_SymbolLibrary defined in Iso19117 revised.

Definition of SR SymbolLibrary from Revised Iso19117

A symbol library is a named collection of symbols and symbol elements. Symbols and symbol elements in a library are not shared with other libraries. If a symbol or symbol element exists in two separate libraries it does this as two separate copies of the same symbol or symbol element. The symbol library may be catalogued using varying criteria. A symbol library has a responsible party as the compiler and is developed with an intended scope and field of application.

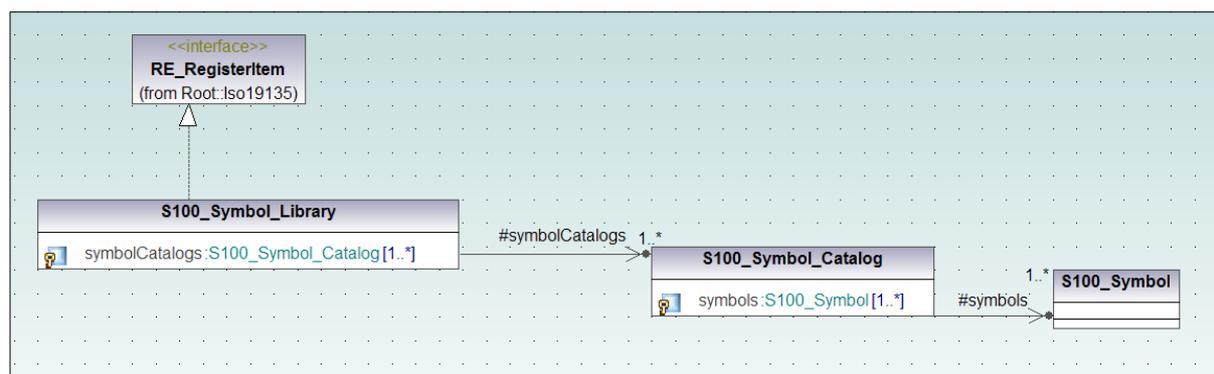


The S100 Symbol Library, in conformance with this ISO 19117 interface defined above,

- Is the root and master class for symbol collection.
- Is associated and developed for a field (hydrography level or navigation level)
- Specialises the "RE_RegisterItem" in order to be registered. In consequence a S100 Symbol Library herites all the register attributes (name, scope, ...)

Delta Iso19117 : The S100 Symbol Library element is not a direct collection of S100 symbol but is a collection of S100 Symbol Catalog that, in turn, is a collection of S100 Symbols.

Figure S100 Symbol Library.



B.1.4 S100 Symbol Catalogue.

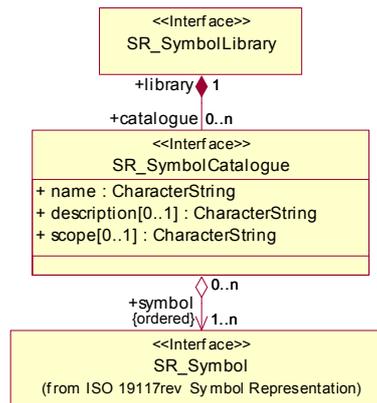
B.1.4.1 Semantics

The S100 Symbol Catalog is equivalent to SR_SymbolCatalogue defined in Iso19117 revised.

Definition of SR SymbolCatalogue from Revised Iso19117

A symbol catalogue organizes symbols in a symbol library according to specific criteria. A symbol catalogue organizes symbols similarly to how a catalogue in a conventional library organizes books by title, author,

subject, etc. The symbol catalogue only catalogues symbols and not symbol elements as it is only the symbols that are referenced when assembling a portrayal mapping.



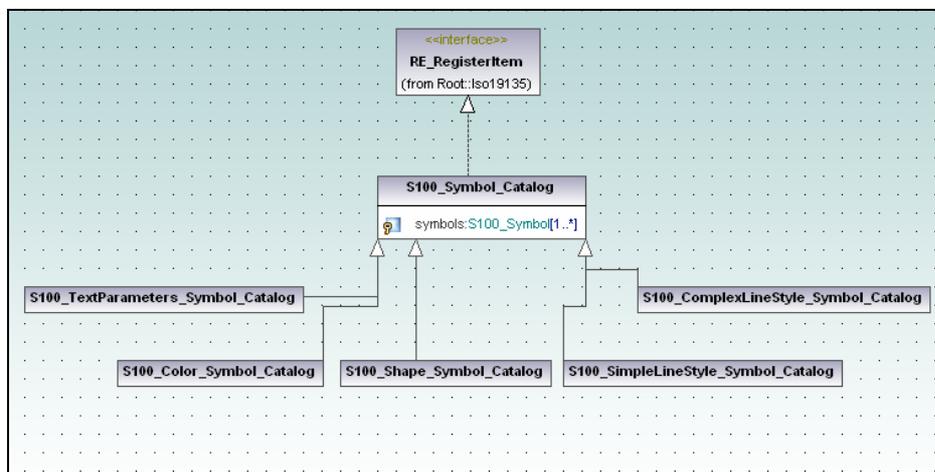
The S100 Symbol Catalog , in conformance with ,the S57 ISO-19117 SR_SymbolCatalogue interface organizes symbols according to a specific criteria.

Delta Iso19117 : The S100 Symbol Catalogue not only organizes but collects symbols.

The type of symbol is the unique criteria for cataloguing symbols. In consequence, the S100 Symbol Library handles the following type of S100 Symbol Catalog :

- S100 Color Symbol Catalog
- S100 Shape Symbol Catalog.
- S100 Simple Line Style Symbol Catalog
- S100 Complex Line Style Symbol Catalog.
- S100 Text Parameter Symbol Catalog.

Figure S100 Symbol Catalog.



B.1.5 S100 Symbol Representation Model.

Here are definitions (realization) of all classes at the symbol representation level. There are two level of hierarchical classes in this symbol model :

- S100 Symbol.
- S100 Reference Symbol.

The S100 symbol is an abstract class and group functionality for different type of symbols (mainly to be registered and associated to graphics).

The S100 symbol element inherits from S52 symbol base and is a dependent entity referenced in a S52 symbol for composition. A S52 Symbol Element could not be referenced directly from a symbol catalogue and from a portrayal rules.

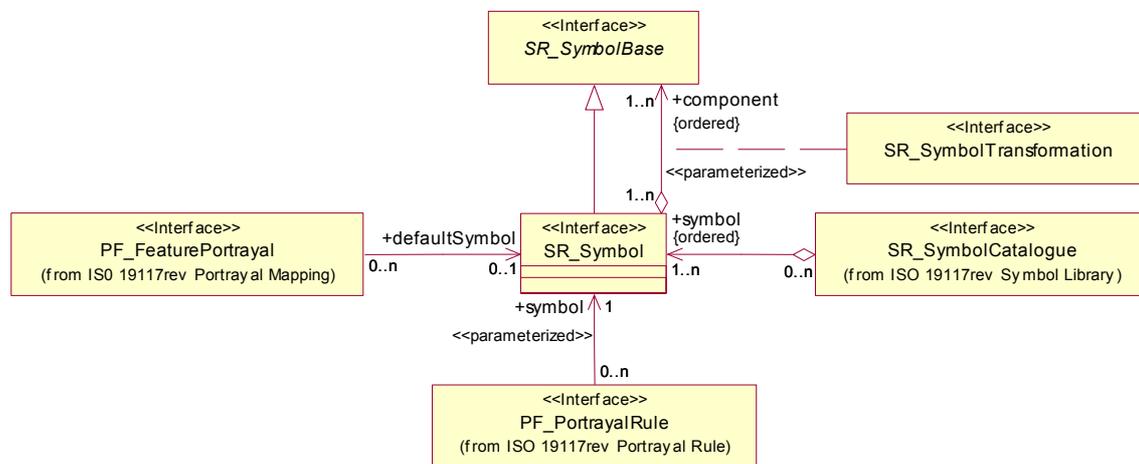
B.1.6 S100_Symbol

B.1.6.1 Semantics.

S100 Symbol is equivalent to SR_Symbol defined in Iso19117 revised.

Definition of SR Symbol from Revised Iso19117

The symbol interface defines a feature portrayal symbol. A symbol is a composition of other subordinate symbols and symbol elements. A symbol is an independent entity in a portrayal whereas a symbol element is not; it must always be part of a containing symbol. The simplest type of symbol is one that is made up of one symbol element, which in turn is made up of one symbol graphic. Each component of a symbol, both symbol elements and subordinate symbols, is placed in the symbol with a transformation which scales and positions each component.

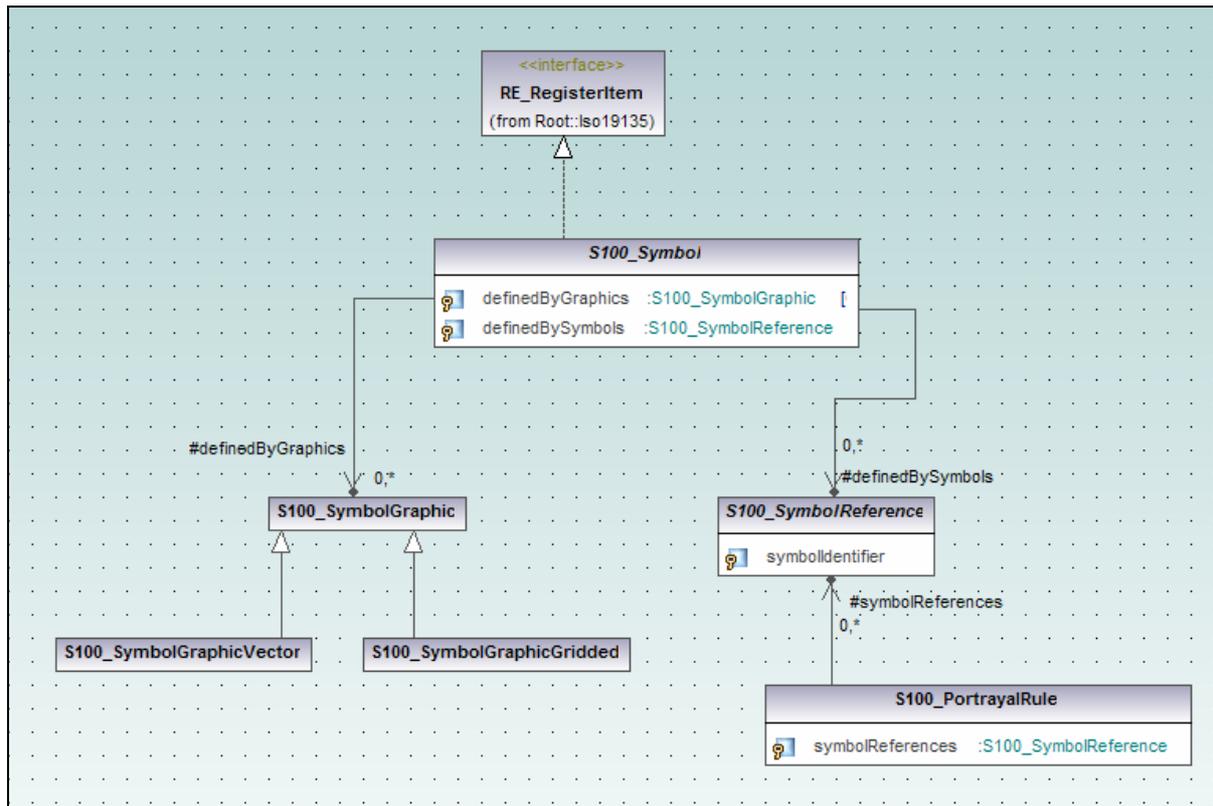


The S100 Symbol, in conformance with, the ISO-19117 SR_Symbol interface

- Defines a S100 feature portrayal symbol.
- Is handled by a S100_SymbolCatalog.
- Specialises also the "RE_RegisterItem" in order to be registered.
- Could be referenced in a definition of compound S100 symbols through S100 Symbol Reference (inspired to the SR_SymbolTransformation).
- Is defined by graphics (vector or gridded).

Delta Iso19117 : The S100 Symbol is not directly referenced by a portrayal rule but through a S100 Symbol Reference association.

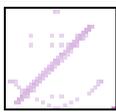
Delta Iso19117 : The S100 Symbol Base class level does not exist. A unique abstract S100 Symbol class is proposed to be referenced directly by portrayal rules or by a symbol itself.

Figure S100 Symbol.

- The S100 Graphic association role is for defining the symbol itself and general to re use it in rendering application. Vector and Gridded graphics formalism are authorized. The S100 Graphic Vector type is a list of graphic instructions taking account a specific graphic language (SVG, HPGL, ..). The S100 Gridded graphics is a raster format (PNG, GIF).
- The S100 Symbol Reference association role is also for defining the symbol itself by an aggregation of symbols. A common attributes for pointing a symbol is the symbol identifier name. The others parameters is according the symbol type (pivot point for a shape or transparency for a color).

Delta S52 : The S100 Symbol Model requires decomposing a compound symbol in subordinated symbols. The S52 symbols series must be decomposed in order to be divide in elementary symbols.

Examples of symbols composed of compound symbols and subordinate symbols.

Symbol Level	Subordinated Symbols		
			
			

S100_Symbol is an abstract class and is specialized in following entities:

- S100_SymbolShape.
- S100_SymbolComplexLineStyle.
- S100_SymbolSimpleLineStyle.
- S100_SymbolColor.

- S100_SymbolTextParameters.

B.1.7 S100_SymbolShape

B.1.7.1 Semantics

A S100 Symbol Shape specializes the abstract S100 Symbol Class to portray a feature point or to portray a line or a feature area as a point (centered point).

A S100 Symbol Shape is cataloguing in S100 Symbol Shape Catalog type.

A S100 Symbol Shape specializes the abstract S100 Symbol Class with no specific attributes.

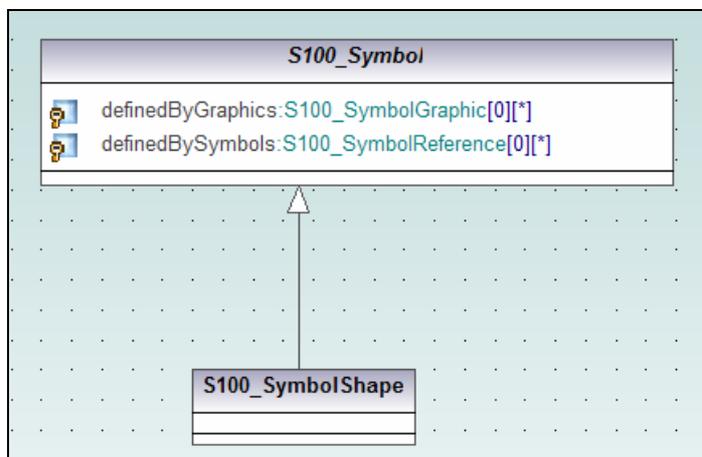
A S100 Symbol Shape must be referenced through a S100 Symbol Shape Reference in:

- Portrayal Rules to symbolize a S100 Feature as a point or to symbolize as a pattern symbolization.
- S100 Complex Line Style to define the base line style of the symbol.

A shape is in most case referenced from portrayal rules to portray a feature point or to portray a line or a feature area as a point (centered point) or through a S100 Symbol Pattern Reference to portray an area feature.

But a symbol shape could be also referenced as a subordinate symbol in compound symbols as line style (complex) symbols or as compound shape symbols. A S100 symbol shape must be referenced by setting its name identifier in a S100 Symbol Shape Reference Class and by optional setting its pivot point coordinate, its orientation and its scale.

Delta S52 : The pivot point is not an element of the shape definition but it's a parameter for referencing the shape.



Note : the S100 Symbol Shape restricts

- Possible symbol references to the shape, color or line style reference types.
- Possible graphics references to a graphic file type.

B.1.8 S100_SymbolSimpleLineStyle.

B.1.8.1 Semantics

A S100 Symbol Simple Line Style specializes the abstract class S100 Symbol to portray limits of area or line features.

A S100 Symbol Simple Line Style is cataloguing in S100 Symbol Simple Line Style Catalog type.

A S100 Symbol Simple Line Style specializes the S100 Symbol by setting type, color and width attributes of the line style.

A S100 Symbol Simple Line Style must be referenced through a S100 Symbol Line Style Reference in:

- Portrayal Rules to symbolize a S100 Feature.
- S100 Shape symbol to define the line style of the symbol.
- S100 Complex Line Style to define the base line style of the symbol.

B.1.8.2 S100_StrokeType Attribute.

The type of this attribute is a list composed of the following string values:

{**"SOLD"**, **"DOTT"**, **"DASH"**}

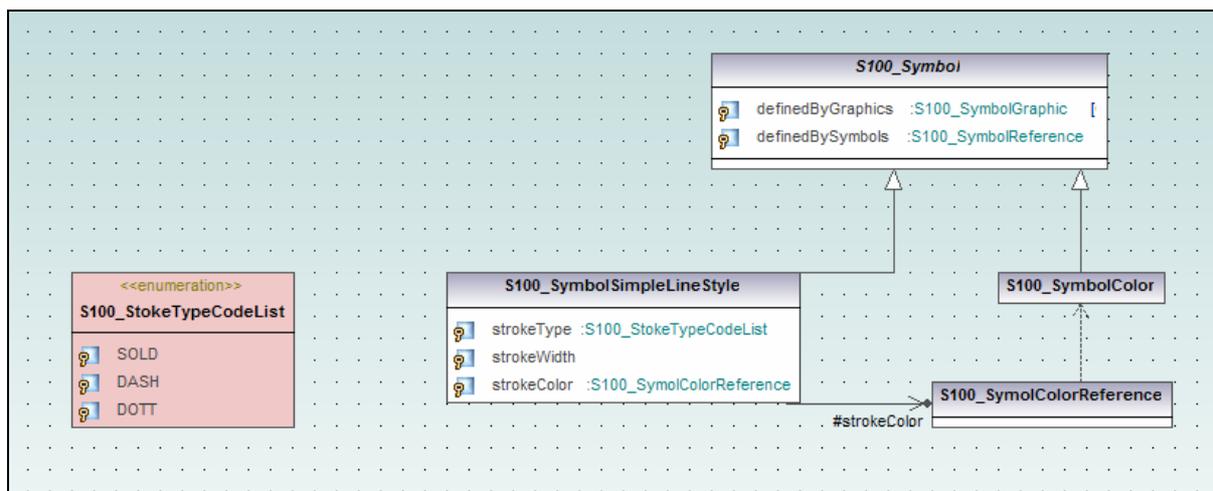
B.1.8.3 S100_StrokeWidth Attribute.

This attribute specifies the width of the line in millimeter.

B.1.8.4 S100_StrokeColor Attribute.

The attribute “Stroke Color” is a S100 Symbol Color Reference.

Figure S100 SymbolSimpleLineStyle.



B.1.9 S100_SymbolComplexLineStyle.

B.1.9.1 Semantics.

A S100 Symbol Complex Line Style specializes the abstract class S100 Symbol to portray limits of area or line features with a sequence of a S100 Symbol. This sequence is composed of S100 Shape Symbol and or S100 Simple Line Style Symbol called the adequate Symbol Reference Type.

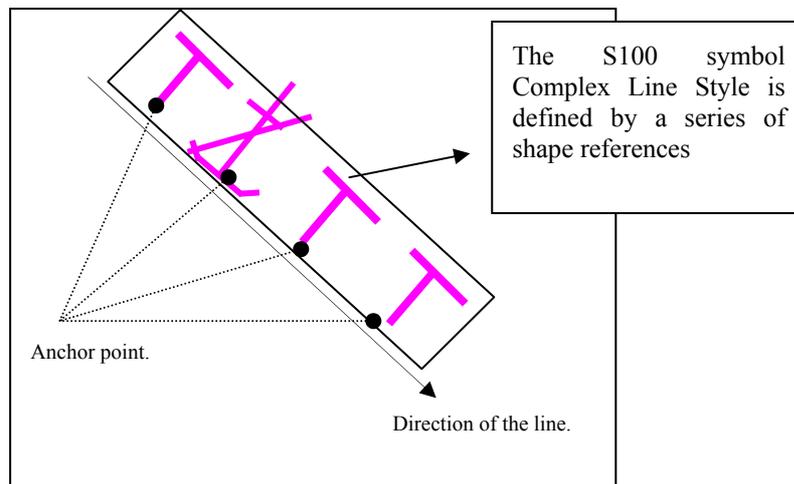
A S100 Symbol Complex Line Style is cataloguing in S100 Symbol Complex Line Style Catalog type.

A S100 Symbol Complex Line Style specializes the S100 Symbol with no specific attributes.

A S100 Symbol Complex Line Style must be referenced through a S100 Symbol Complex Style Reference in:

- Portrayal Rules to symbolize a S100 Feature.

Example of a complex line style.



B.1.10 S100_SymbolParametersText.

B.1.10.1 Semantics

A S100 Symbol Text Parameters specializes the abstract class S100 Symbol to portray any geometric feature type as a text.

A S100 Symbol Text Parameters is cataloguing in S100 Symbol Text Parameters Catalog type.

A S100 Symbol Text Parameters specializes the S100 Symbol with specific text color , text size , text style and text font attributes.

A S100 Symbol Text Parameters must be referenced through a S100 Symbol Text Parameters Reference in:

- Portrayal Rules to symbolize a S100 Feature.

B.1.10.2 Text Color Token Attribute

The attribute “Stroke Color” is a S100 Symbol Color Reference.

B.1.10.3 Text Size Attribute

The text size attribute indicates the size

B.1.10.4 Text Style Attribute

The text size attribute indicates the style

B.1.10.5 Text Font Attribute

The text size attribute indicates the font

B.1.11 S100 Symbol Graphics model.

The S100 Symbol Graphics model defines classes for defining base elementary graphic instructions. All these instructions are used to define base symbols for rendering in a map service application.

S100 Symbol Graphic Instructions must be expressed taking account in conformance with a graphic language as SVG or CSS.

Here are definitions (realization) of all classes at the graphic level. There is three hierarchical classes in this graphic model :

- S100 Graphic

- S100 Graphic File
 - S100 Gridded Graphic File and S100 Vector Graphic File.

B.1.12 S100 Graphic.

The S100 graphic class is the abstract root class for graphic instructions.

B.1.12.1 Graphic Definition Language Attribute.

The attribute identifies the language used to describe the graphic instructions (SVG/PNG/HPGL)

B.1.13 S100 Graphic File.

B.1.13.1 On Line Resource Attribute.

The online resource attribute specifies the address of the graphic file .The one line resource role is used to define the path of the graphic through a graphic file reference that use the on line resource Xlink Attributes possibility.

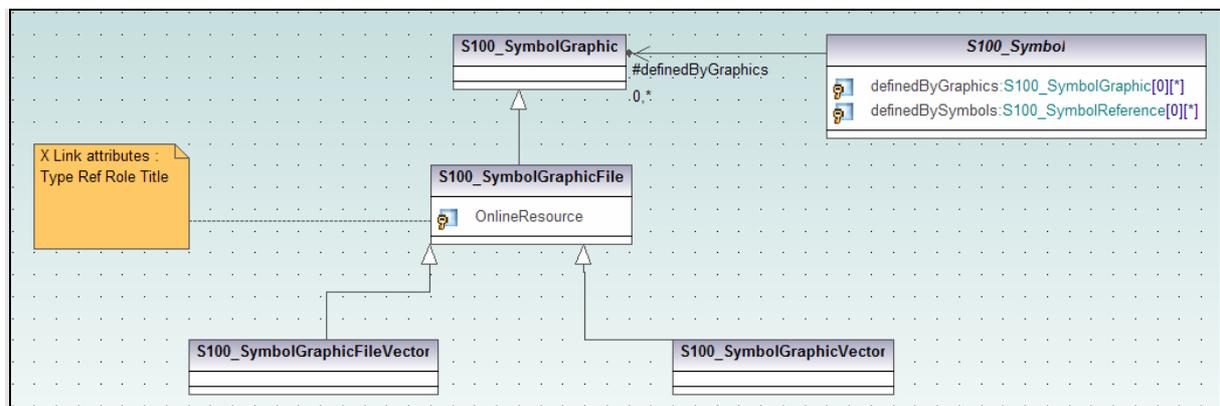
B.1.13.2 S100 Graphic File Vector.

A S100 Vector Graphic Graphic File is an abstract class to define graphic through a series of graphic instructions. These instructions could be in conformance with a graphic language as SVG or CSS.

B.1.13.3 S100 Graphic File Gridded.

A S100 Gridded Graphic File is a generic class and is used to define graphics by a raster file.

Figure S100 Graphic Model.



B.1.14 S100 Symbol Reference Model.

Here are definitions of all classes necessary to reference different types of symbol. Reference a symbol is needed from Portrayal Rule Model in order to realize the mapping between feature and symbol and from Symbol Model in order to realize compound symbols.

Here classes to achieve this aim:

- The base class S100 Symbol Reference is the abstract class for all symbol types :
 - S100 Symbol Color Reference.
 - S100 Symbol Shape Reference.
 - S100 Symbol Pattern Reference.

- S100 Symbol Simple Line Style Reference.
- S100 Symbol Complex Line Style Reference.
- S100 Symbol Text Parameters Reference.

B.1.15 S100 Symbol Color Reference.

The symbol color reference allows referencing a color by setting its transparency. The symbol color reference is called directly from S100 Portrayal Rule to associate a color (tint) to a S100 Area Feature or in symbol definitions (line styles, shapes, text parameters).

Note: only full color are registered in a S100 Symbol Color Table.

B.1.16 S100 Symbol Shape Reference.

The symbol shape reference allows referencing a shape by setting its anchor point, the orientation and the scale. The symbol shape reference is called directly from S100 Portrayal Rule to associate a shape or a pattern to a S100 Feature or in symbol definitions (complex line styles, shapes).

B.1.17 S100 Symbol Pattern Reference.

The symbol pattern reference allows referencing a shape by setting its anchor point, the orientation and the scale and the delta x and delta y pattern space. The symbol pattern reference is called directly from S100 Area Portrayal Rule.

B.1.18 S100 Symbol Simple and Complex Line Style Reference.

The symbol line style reference allows referencing a line style from S100 Area or Line Portrayal Rule. The Simple Line Style reference is also used for defining symbols. Simple and complex Line Style Reference has no specific attributes.

B.1.19 S100 Symbol Text Parameters.

The symbol text parameters reference allows referencing a text style by setting the text, the oriented anchor point, the vertical and horizontal justification. A Symbol text parameters reference is called from any S100 Portrayal Rule.

Annex C

C.1