**Notes (For S-100 Edition 5.0.0 - last updated April 26 2022)**

**Terms**

S-nnn An S-100-based product specification

**Schema server:**

The schemas are available on an Internet schema server at URL **https://schemas.s100dev.net**. This URL is used in the schemaLocation attribute of the S-100 5.0 schemas. Developers and distributors should use “XML catalogs” as described in the OASIS standard for XML catalogs (see #4 in “Additional notes” below) or other means such as configuring resolvers to resolve addresses to local substitute locations as needed, especially if access to Internet files is needed on board ship or in other conditions when real-time Internet access is unavailable, intermittent, or precluded by security considerations.

Ensure that your local firewall and networks allow access to **https://schemas.s100dev/net** and **https://schemas.isotc211.org** before using the schema server or downloaded schemas, or obtain the zip archive and configure an XML Catalog or resolver accordingly. If using the zip archive of ISO TC211 schemas, they access standards.iso.org and the XML Catalog or resolver must be configured accordingly.

**Folder and file names on the server are case-sensitive**. This means schemaLocation attributes and resolvers will need to use exactly the same folder and file name as on the server, including the extension. For example, retrieving S100\_ExchangeCatalogue.XSD may return an error (as would s100\_ExchangeCatalogue.xsd) because the file name is S100\_ExchangeCatalogue.xsd. The file names are listed in the site map viewable at the root of the schema server (https://schemas.s100dev.net/index.html).

**Folder Organization:**

Wherever local files are referenced in the XSD files and XML sample files, the references are based on this organization of folders. The S-100 schemas are subdivided into packages corresponding to different Editions and Parts of S-100.

* There is a root folder “S100” containing the S-100 generic schemas. Schemas for other products will have corresponding named folders at the same level - for example, S-104 will have an “S104” folder.
* Each Edition of S-100 is in a sub-folder named after the edition number.
* Each package is in a sub-folder under the Edition folder. A package corresponds to an individual Part of S-100.
* Each build of the package is in a sub-folder under the package folder. Builds under the same package folder correspond to the same Edition/Package.

For more information about namespaces and builds, see **Namespaces** and **Version numbering** later in this document.

Table 1. File and folder organization

|  |  |  |
| --- | --- | --- |
| ***S-100 schemas and other files*** | | |
| **schemas/** | This folder. Contains the S-100 and S-nnn schemas. In the 5.0.0 distribution, may contain the ISO schemas referenced by the S-100 schemas. | |
| **ephemera/** | Miscellaneous transient files. For examples, updates to ISO Schematron files for newer versions of the ISO schemas. | |
| **S100/** | S-100 schemas | |
| **5.0.0/** | Edition 5.0.0 schemas container | |
| **S100CSL** | Container for types defined in Part 1 of S-100 (**C**onceptual **S**chema **L**anguage). | |
| **20220331/** | Build 20220331 of the types. | |
| **S100Catalog/** | Exchange catalogue schema package container. Corresponds to Part 17. | |
| **20220331/** | Build 20220331 of the exchange catalogue schemas. | |
| *(Files in build***)** | **S100\_ExchangeCatalogue.xsd** | XML schema for S-100 exchange catalogue |
| **s100mds.xsd** | container file for S-100 extensions to service identification metadata |
| **serviceIdentification.xsd** | S-100 extensions to service identification metadata |
| **ISOTS19139A1Constraints\_v1.4.sch** | Schematron ISO 19139 constraints |
| **mmi.xsd**  **maintenance.xsd** | Profile of ISO 19115-1 maintenance metadata, used in the exchange catalogue. |
| **S100\_XC.sch** | Schematron file with S-100-specific validation checks for exchange catalogues |
| **S100SE/** | Signatures/Data encryption schema container. Formerly S100DE in the Edition 4.0.0 schemas. | |
| **20220331/** | Build 20220331 of the signatures and encryption XML schema. Corresponds to Part 15. | |
| **S100FC/** | Feature catalogue schema container | |
| **20220331/** | Build 20220331 of the feature catalogue schemas. Corresponds to Part 17. | |
| **S100GML/** | GML profile container | |
| **20220331/** | Build 20220331 of the GML profile. Corresponds to Part 10b. | |
| **S100PC/** | Container for S-100 portrayal schemas. Corresponds to Part 9. Formerly S100XSLTPR, renamed because these portrayal schemas are not dependent on XSLT portrayal. | |
| **20220331/** | Container for 20220331 build of portrayal schemas. | |
| **resources/** | Container for resource files | |
| **Codelists/** | Container for S-100 codelists (see the next table) | |
| **XMLCatalogs/** | Container for XML catalogs. Currently empty, reserved for developer-provided XML catalogs. | |
| **w3c/** | (folder hierarchy with W3C XLink schema) | |
| ***ISO schemas and other files*** | | |
| **standards.iso.org/** | Folder with ISO TC211 schemas. These are a snapshot of the “working versions” from the ISO TC211 GitHub site but should be the same as the stable versions which have since been uploaded to the ISO schema distribution site https://standards.iso.org/iso/. (Distribution held pending clarification of permissions.) Retained for backward compatibility. The references to ISO schemas in the S-100 5.0 distribution have been updated to use the “new” ISO TC211 schema site https://schemas.isotc211.org.  Note: in the 5.0.0 distribution, this may be provided as a zip archive which must be unpacked to conform to this folder structure, for local Internet-independent installation. If using the local installation, the resolver or XML catalog must be updated accordingly, since this zip archive still references the older ISO site standards.iso.org | |
| **19110/**  **19115/**  **19135/**  **19139/**  **19157/** | ISO schemas. The names and organizations are the same as in the ISO distribution. Note that the ISO web site places them under an “iso” sub-directory, e.g., https://standards.iso.org/iso/19115/... for the ISO 19115 schemas.  Edition 5.0: As mentioned above, references in the Edition 5.0 S-100 schemas have been updated to use the new ISO site https://schemas.isotc211.org.  Edition 4.0 note: Several S-100 schemas currently reference locally installed ISO schemas instead of the ISO web site, e.g., using schemaLocation="../../../../standards.iso.org/19115/-3/cit/2.0/cit.xsd". This means you must either install the standards.iso.org folder as part of the S-100 distribution, or use an XML Catalog or resolver to substitute the local address.  **NOTE**: Some ISO schema files import other schema files from the ISO site, so without an implementation based on XML catalogs, resolvers, or other solution to location resolution, those imports will access the ISO Internet site files. | |
| ***Schemas for product specifications*** | | |
| **S98/**  **S101/**  **S104/**  **S111/**  **etc.** | Folders for schemas for individual product specifications, including metadata/exchange catalogue schemas extending the S-100 generic schemas and Schematron files implementing product-specific restrictions on metadata. (Except for S-98 draft schemas, these are not included in the 5.0 distribution because they will have to be updated for S-100 Edition 5. Note also that the S-98 schemas have still to be updated to reference S-100 Edition 5.) | |
| ***Samples*** | | |
| **samples/** | Samples folder | |
| **S100\_5\_0/** | Folder with S-100 4.0 generic samples | |
| **PartX/** | Each PartX folder contains a sample for the relevant Part. For example, Part 5 contains a sample feature catalogue.  The samples many not correspond to actual datasets. | |

Table 2. Codelists

|  |  |
| --- | --- |
| ***S-100 Codelist locations*** | |
| **schemas/S100/5.0.0/resources/Codelists/** | Container for S-100 codelist folders |
| **cat/codelists.xml** | Comprehensive ISO codelists file. IHO S-100 codelists in ISO catalog format. Supplements the ISO codelists file by defining two codelists not defined in that file (language and character set codes).  Also includes a codelist for the data encoding format described in S-100 Part 10c, for use by specifications which encode that in metadata files. |
| **cat/codelists.html** | Human-readable list of codelists and codes. |
| **gml/\*.xml** | IHO S-100 codelists in GML dictionary format (currently none) |
| ***ISO Codelist locations (in ISO zip archive)*** | |
| **standards.iso.org/19115/resources/Codelists/** | Container for ISO codelist folders |
| **cat/codelists.xml** | Comprehensive ISO codelists file. ISO TC211 codelists in a single file in ISO catalog format. |
| **gml/\*.xml** | Codelists in separate files in GML dictionary format. Currently has more codelists than the ISO "cat" codelists.xml |
| **standards.iso.org/191xx/.../codelists.xml** | Additional locations for the codelists for individual specifications as separate files. The ISO TC211 distribution includes these files for convenience. However, to minimize the chances of conflicts, S-100 implementations must treat these files as fallbacks, i.e., use these files only if the codelist is not specified in the ISO 19115 comprehensive codelists file or the S-100 comprehensive codelists file. |
| ***Product-specific codelist locations*** | |
| **<Snnn>/<version>/resources/Codelists/...** | Codelists specific to S-nnn products.  The “codelists.html” files present them in reader-friendly HTML format. |

**Updates**

**During the Edition 5.0 pre-publication review**: For corrections to the draft schemas before finalization of S-100 Edition 5.0:

* the namespace will be stable (i.e., the 5.0 namespace will be retained);
* the version attribute in the *<schema>* tag will be updated (see **Version Numbering** below);
* the new schema will be in a new build folder;
* older build folders may be removed, depending on the nature of the change.

**After finalization of S-100 Edition 5.0**: After publication of S-100 Edition 5.0:

* the namespace will be updated if and only if the old and new schemas do not cross-validate (see Namespaces below);
* the version attribute in the *<schema>* tag will be updated (see **Version Numbering** below);
* the new schema will be in a new build folder;
* older schema build folders will be retained for the sake of implementation continuity.

**Namespaces**

The namespace for a package includes the S-100 edition number (or product edition number for product-specific schemas).

New builds **that do not allow cross-validation with the previous build** will get a new namespace (with the exception noted below), by either:

* changing the edition number in the namespace (if derived from a new revision of S-100 or the relevant product specification), or
* suffixing the build number to the namespace (if not derived from a new revision of S-100 or the relevant product specification).

The exception is a correction of a discrepancy between the schema and the corresponding S-100 Part (or Product Specification). This will be in a new build folder but the namespace will not be updated.

Note that the cross-compatibility requirement above means that even backward-compatible schemas will get a new namespace unless both the following are true:

* The old schema validates all files that conform to the new schema.
* The new schema validates all files that conform to the old schema.

This is to ensure that attempts to validate a new-format XML file with an old schema will raise a namespace discrepancy flag.

Each S-100 schema has a version number in the root “schema” tag. See **Version numbering** below.

Note: The GML profile schema in the S100GML (Part 10b) package (*gmlProfile.xsd),* being a subset of the official GML schema(s), must use the GML namespace and will therefore not have its namespace updated for succeeding revisions, if any (because revisions must continue to use the GML namespace). The S-100 extensions schema *gmlbase.xsd* in the same package has an S-100 namespace which will be updated as described earlier.

**Version numbering:**

Both S-100 and S-nnn schemas have the version number in the <schema> root element’s “version” attribute. The format is N1.N2.N3-YYYYMMDD where:

* N1, N2, and N3 are the major version, revision, and clarification number respectively of the S-100 edition
* YYYYMMDD the build date of the schema.

Example: <schema . . . version="5.0.0-20220331"> indicates build 20220331 of the schemas for S-100 Edition 5.0.0.

Clarifications to the S-100 standard may or may not result in an update of the XSD files. If an update does result, it will be a "non-substantive change" and will not change the structure of the schema, but may correct grammatical and spelling errors (including element definitions); or amend or update cross references. If the schemas are updated, the build date will also be updated.

Corrections to XSD files which are due to errors or amendments to the XSD files themselves and not caused by changes in S-100 will result in a new version of the schema files which has the same S-100 edition component but a different build date from the previous version of the schemas.

Dependency on particular versions of the schemas should be checked by comparing at least the N1.N2 and YYYYMMDD portions of the schema version. This means that the schema build date may have to be included where there is a dependency on XML schema structure (including the presence of enumerates, upper and lower bounds on multiplicity, etc.)

Namespaces will be updated according to a different regime depending on the effects of the change on schema validation (see **Namespaces** above). The regimes are designed so the numbering components in the version attribute and namespace stay harmonized for substantive changes to the relevant S-100 Part while allowing non-substantive changes that do not affect cross-validation with previous versions to retain the same namespace.

**Additional notes:**

1. ISO-provided Schematron files for validation are now included in the folders for the revised schemas and are also on the ISO’s web site. There are additional or substitute Schematron validation files where needed, for example, cit.sch is provided in the folder standards.iso.org/19115/-3/cit/1.0/. The older versions generally DO NOT work for the newer versions (due to namespace mismatches). ISO may update them; meanwhile, the “ephemera” folder contains updated versions for use with S-100 (only for two files – contact us if more are needed).
2. XML catalogs describe mappings between external references and locally cached equivalents. They allow software tools and applications to resolve references to external entities (e.g., in schemaLocation attributes) in terms of locally cached files.

(See "XML Catalogs - OASIS Standard V1.1, 7 October 2005" URI: <https://www.oasis-open.org/committees/download.php/14810/xml-catalogs.pdf>.) The development of XML catalogs for S-100 is not planned at present. This folder is reserved for depositing XML catalogs that may be prepared by developers.

**Updates and changes**

Please do not change locations, namespaces, or file names in the schemas and samples in this package without consulting me (Raphael), or unless you are an XML expert and have checked the side-effects.

Any changes to the schemas on the official IHO distribution should get a new build date and an update in the file history at the beginning of the file describing the change and identifying the author. This README document should also be updated accordingly.

Bug reports and questions should be sent to Julia Powell (S-100 WG Chair) with a copy to Raphael Malyankar (author).

After publication of S-100 Edition 5, requests for revisions should be submitted to the IHO S-100 WG Chair through the regular S-100 maintenance proposal process.