Version History

Date	Changes			Description
	Major	Minor	Small	
2014-11-05	0	1	0	First draft bases on previous GTC initiatives
2015-05-04	0	3	9	Working document until version 0.3.9
2015-05-13	0	4	0	Working document <order_code> and <product_id> in 3.11 package_assortment.xml description updated
2015-05-22	0	4	1	Working document Put the p21 file attributes in *italic,* and some minor sentence change
2015-05-29	0	4	2	Working document Remove <order_code> from assortment file
2015-06-01	1	1	0	Working document . Annex A added to clarify different product identifiers
2015-06-03	1	1	1	Working document Update on Annex A.
2015-06-04	2	0	0	**Set as First official release.**
2016-01-11	2	0	1	Working document. Updates as discussed in GTC workshop of November 2015: - Chapter 3.6: comprehensability of family drawing - Chapter 3.7: Levels update - Chapter 3.8: Icons example - Chapter 3.13: Remove <isLeaf> - Chapter 3.15 New graphic
2016-11-21	2	0	2	Adjustment of annotations in chapter 3.13
2017-05-01	2	1	0	**Set as Second official release.**
2018-04-23	2	1	1	Updates (small adjustments): - Chapter 1, 2, 3.9, 3.15: Use <ext> as a placeholder for a value from extension list: {".png", ".jpg", ".jpeg",".gif".} instead of a concrete value - Chapter 3.9: for product_brand_logos in chapter 3.9, plural is now applied consistently (titel and image) - Chapter 3.14: Internal version of GTC hierarchy version 1.8 is removed from text - Annex C: Complete Information - Chapter 3.13 and 3.14: Schema drawing replaced by new one

GTC Package Specification

1 Introduction

Generic Tool Catalog (GTC) is a format introduced as a complement to ISO 13399, with the purpose of facilitating cutting tool catalog exchange between cutting tool vendors, system vendors, end users, and other stakeholders.

This document specifies the GTC package format for delivering a catalog of cutting tool items described according to ISO13399, which includes the folder structure and general requirement for each folder and file. Every package created by a tool vendor will have this format, even if it contains only a small number of tools.

General notes:

- This package specification harmonizes previous GTC initiatives.
- A package will not include more than one catalog
- All file and directory names are case sensitive
- A file can be part of the GTC package or there could be a http web reference
- Global formats like dateTime format are specified in Annex C
- 'ext' is a placeholder for a value from extension list: {".png", ".jpg", ".jpeg",".gif".}

2 GTC Package Folder Structure

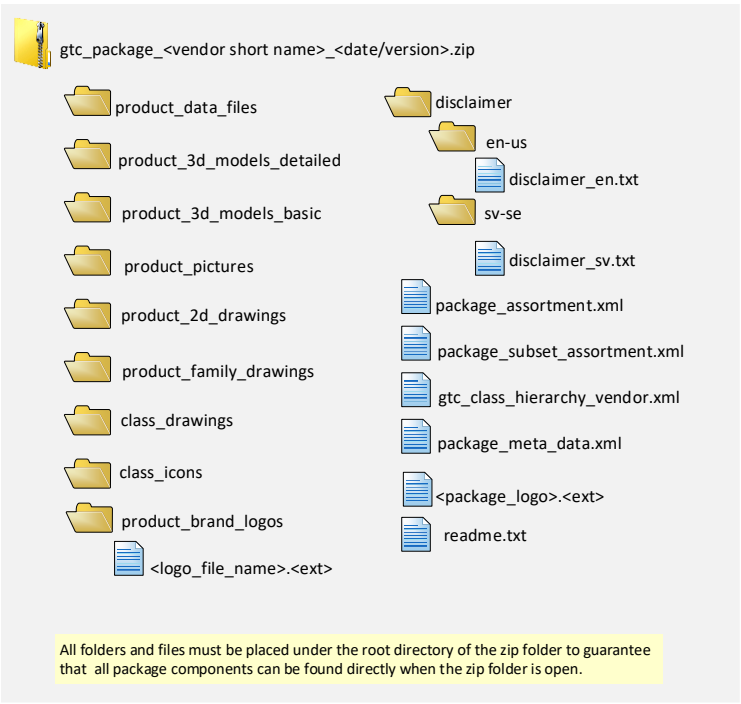


Figure 1: GTC package format

The GTC package typically includes information on both the GTC classification hierarchy and product data, however 3 cases are possible:

a provide a package only for the hierarchy

b provide a package only for the product data

c provide both hierarchy and product data in one package

The file "gtc_class_hierarchy_vendor.*" is an indicator that the class hierarchy is included in the package. The files "package_assortment.xml" or package_subset_assortment.xml indicate that product data is included in the package. It is mandatory that at least one of them is included in a GTC package.

Folder/File	GTC Hierachy Mandatory	Data Package Mandatory	Note
product_data_files	No	Yes	
product_3d_models_detailed	No	Yes	Folder can be empty
product_3d_models_basic	No	Yes	Folder can be empty
product_pictures	No	Yes	Folder can be empty
product_2d_drawings	No	Yes	Folder can be empty
product_family_drawings	No	Yes	Folder can be empty
class_drawings	Yes	No	Recommended
class_icons	Yes	No	Recommended
product_brand_logos	No	Yes	Folder can be empty
disclaimer	No	No	
package_assortment.xml	No	Yes	For all products in the package
package_subset_assortment.xml	No	No	Optional file as an add-on for vendor grouping of products
gtc_class_hierarchy_vendor.xml	Yes	No	
package_meta_data.xml	Yes	Yes	
package_logo.<ext>	No	No	For those who have a specific logo for the released catalog
readme.txt	Yes	Yes	Describes known issues with this package

3 Detailed specification for each folder

3.1 product_data_files

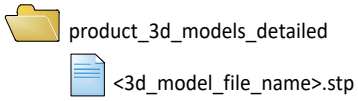

product_data_files


<product_data_file_id>.p21

- This folder contains product data files which describe cutting tool parameters. The product data file is a STEP file which uses EXPRESS schema defined in ISO 13399-1 Annex C, and the file format is defined in ISO 10303-21 (.p21).

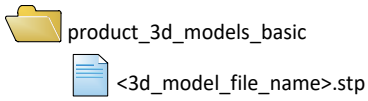
- File name must be unique.
- File name must be the same as the corresponding document name (case sensitive) stated in the assortment file (package_assortment.xml).
- One product data file is mandatory for each product.

3.2 product_3d_models_detailed



- This folder contains detailed 3D models of cutting tools. File format is defined in ISO 10303-21 (the same format as product data file, but use ".stp"extension for differentiation), and use EXPRESS schema defined in ISO 10303 part 203, or 214.(Note: part 242 is published on 2014-12-01 to revise part 203 and 214, but at the time when this document is written, the commercial implementation of part 242 is limited. Going forward, GTC will support 242 model instead of 203 and 214)
- ISO13399-80 defines needs/requirements for cutting tool 3D models. Part 80 is currently being revised, and GTC adopts the recommendation of the new revision. Examples can be found in released and upcoming ISO 13399 part 2xx, 3xx, 4xx.
- File name must be the same as the corresponding external document name (case sensitive) stated in the product data p21 file.
- *product_3d_model_detailed* is the document description that points to this file within the P21 file.
- The model detail level should be enough to produce tool assembly drawings for the shop floor use of assembling and measuring the tool assembly. This model may also be used by receiving applications to create a basic model.

3.3 product_3d_models_basic



- This folder contains basic 3D models of cutting tools. File format is defined in ISO 10303-21 (the same format as product data file, but use ".stp" extension for differentiation), and use EXPRESS schema defined in ISO 10303 part 203 or 214.(Note: part 242 is published on 2014-12-01 to revise part 203 and 214, but at the time when this document is written, the commercial implementation of part 242 is limited. Going forward, GTC will support 242 model instead of 203 and 214)
- ISO13399-80 defines needs/requirements for cutting tool 3D models. Part 80 is currently being revised, and GTC adopts the recommendation of the new revision.Examples can be found in ISO 13399 part 2xx, 3xx, 4xx.
- File name must be the same as the corresponding external document name (case sensitive) stated in the product data p21 file.
- *product_3d_model_basic* is the document description that points to this file within the P21 file.
- The model basic level should be enough for simulation and collision detection of the tool with the part or the machine tool.

3.4 product_pictures

product_pictures

<file_name>.jpg

- These folders contain pictures of cutting tools.
- File name must be the same as the corresponding external document name stated in the product data p21 file.
- *product_picture* is the document description that points to this file within the P21 file.
- Recommended bitmaps formats: ".jpeg", ".jpg", ".png", ".gif" (, ".bmp", ".tif". Data provider needs to check with data receiver which formats are actually supported.)
- Recommended bitmaps minimum size is 400x300 pixels.
- Aspect ratio is not restricted.

3.5 product_2d_drawings

product_2d_drawings

<2d_drawing_file_name>.dxf

- This folder contains the 2D drawings of cutting tools, which shows the tool to scale, in a side view defined in the standard ISO 13399-70.
- ".dxf" format.
- Needs and requirements are defined in ISO13399-70 (layers, colors, etc).
- File name must be the same as the corresponding external document name stated in the product data p21 file.
- *product_2d_drawing* is the document description that points to this file within the P21 file.
- The drawing detail level should be enough to produce tool assembly drawings for the shop floor use of assembling and measuring the tool assembly.

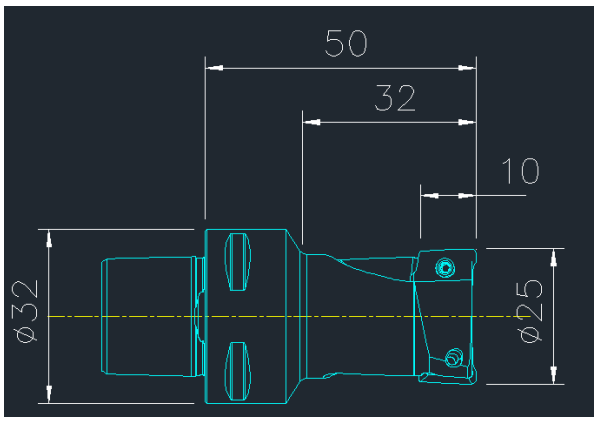


Figure 2: An example of product 2d drawing.

3.6 product_family_drawings


product_family_drawings


<file_name>.jpg

- This folder contains the descriptive drawings, which are not to scale as they are intended for display purposes only. These drawings can be assigned to a product or a group of products and may be helpful to interpret the meaning of the main properties.
- File name must be the same as the corresponding external document name stated in the product data p21 file.
- *product_family_drawing* is the document description that points to this file within the P21 file.
- Both bitmap and vector formats are accepted. Vector formats are preferred considering the pictures can be zoomed in for detail view. (Which formats are actually supported depends on the receiving systems, so it's suggested that data provider check with data receiver which formats will work on corresponding receiving systems.)
- Recommended vector formats: ".cgm", ".dwg", ".dxf", ".hpg", ".hpgl". (Data provider needs to check with data receiver which formats are actually supported.)
- Recommended bitmaps formats: ".gif", ".jpeg", ".jpg", ".png" (, ".bmp", ".tif". Data provider needs to check with data receiver which formats are actually supported.)
- Recommended minimum size of bitmaps drawings: 400x300 pixels.
- Recommended aspect ratio for bitmap drawings is 4:3, but other aspect ratios are accepted as well since tool shapes are various.

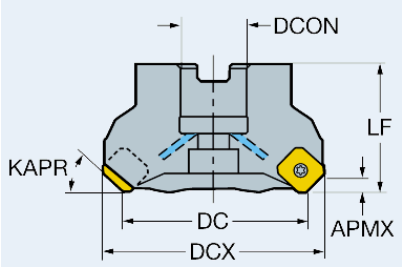
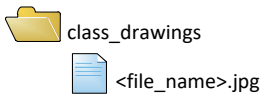


Figure 3. An example of product property descriptive drawing

3.7 class_drawings



- This folder contains drawings showing important properties in each GTC leaf node class or on higher levels. This can be one of the product property descriptive drawings selected to represent the general properties that are applicable to products which belong to the GTC class node.
- File name must be the same as the corresponding reference file name stated in gtc_class_hierarchy_vendor.xml
- Both bitmap and vector formats are accepted. Vector formats are preferred considering the pictures can be zoomed in for detail view. (Which formats are actually supported depends on the receiving systems, so it's suggested that data provider check with data receiver which formats will work on corresponding receiving systems.)
- Recommended vector formats: ".cgm", ".dwg", ".dxf", ".hpg", ".hpgl". (Data provider needs to check with data receiver which formats are actually supported.)
- Recommended bitmaps formats: ".gif", ".jpeg", ".jpg", ".png" (, ".bmp", ".tif". Data provider needs to check with data receiver which formats are actually supported.)
- Recommended minimum size of bitmaps drawings: 400x300 pixels.
- Recommended aspect ratio for bitmap drawings is 4:3, but other aspect ratios are accepted as well since tool shapes are various.

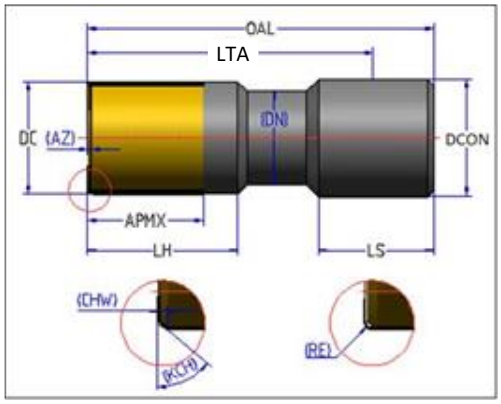
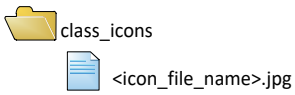


Figure 4. An example of class drawing.

3.8 class_icons



- This folder contains icon pictures of GTC class nodes.
- File name must be the same as the corresponding reference file name stated in gtc_class_hierarchy_vendor.xml.
- Recommended bitmaps formats: ".png", ".jpg", ".jpeg" and ".gif". (Data provider needs to check with data receiver which formats are actually supported.)
- Recommended icons should have square aspect ratio (1:1), but other aspect ratios are accepted as well since tool shape are various.
- Recommended pixel size : 128x128 pixels (Recommended min 32x32 pixels, max 300x300 pixels).

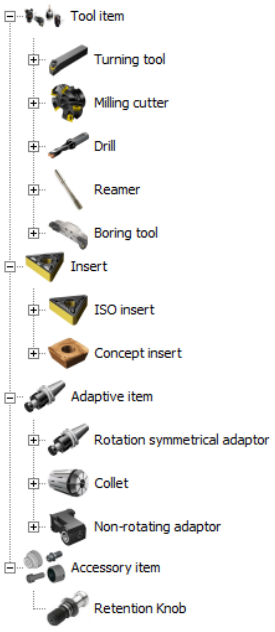
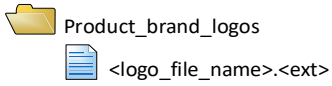


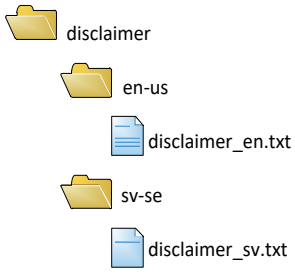
Figure 5: Examples of class_icons

3.9 product_brand_logos



- Brands under a tool vendor
- The tool supplier who owns the products in the catalog is considered as a vendor.
- Can be multiple pictures in case of more than one brands in the catalog.
- The file name must be the same as the brand name stated in the product P21 file.
- File name is: <logo_file_name>.<ext>.
- <ext> is a placeholder for a value from the list of recommended bitmat formats.
- List of recommended bitmap formats: { ".png", ".jpg", ".jpeg", ".gif".} (Data provider needs to check with data receiver which formats are actually supported.)
- Recommended pixel size is 400x200. But other sizes are accepted as well.
- Aspect ratio is not restricted.

3.10 disclaimer



- Disclaimers in different languages.
- Legal disclaimer.
- If disclaimer is provided, the application reading the package must display the disclaimer text and ask for user agreement. If the user declines, the catalog package is not read.

3.11 package_assortment.xml

- List of all products in the delivered data package.
- This file states where a product fits in the GTC class hierarchy.
- <product_id> must be an unambigiously unique identifier for the product from the tool vendor to be used by the receiving system to uniquely indentify the product from the vendor in the system.
- <p21_value_change_timestamp> and <p21_structure_change_timestamp> provides timestamp information to enable updating.
- <effectivity_active_start_date> and < effectivity_active_end_date > specify a period when a produc is active.

	effectivity_active_start_date		**effectivity_active_end_date**		**Description**
	n/a		n/a		The product is *always* active
▲	<start_date>		n/a		The product will be active starting <start-date>
	<start_date>	▲	n/a		The product is active (since <start-date>)
	n/a	▲	<end_date>		The product will be discontinued starting <end-date>
	n/a		<end_date>	▲	The product is obsolete (since <end-date>)
▲	<start_date>		<end_date>		The product will be active starting <start-date>
	<start_date>	▲	<end_date>		The product is active but will be discontinued
	<start_date>		<end_date>	▲	The product is obsolete (since <end-date>)

▲ = **current_date**

- <replacement_product_id> indicates that there is a replacement product for this product if the current product is in process of being obsolete or is obsolete.
- <gtc_version> indicates the GTC hierarchy version number which the assortment is based on.
- Every product has a unit. <unit_system> indicates in which unit system (metric or imperial) the vendor intends the data to be presented to the user.

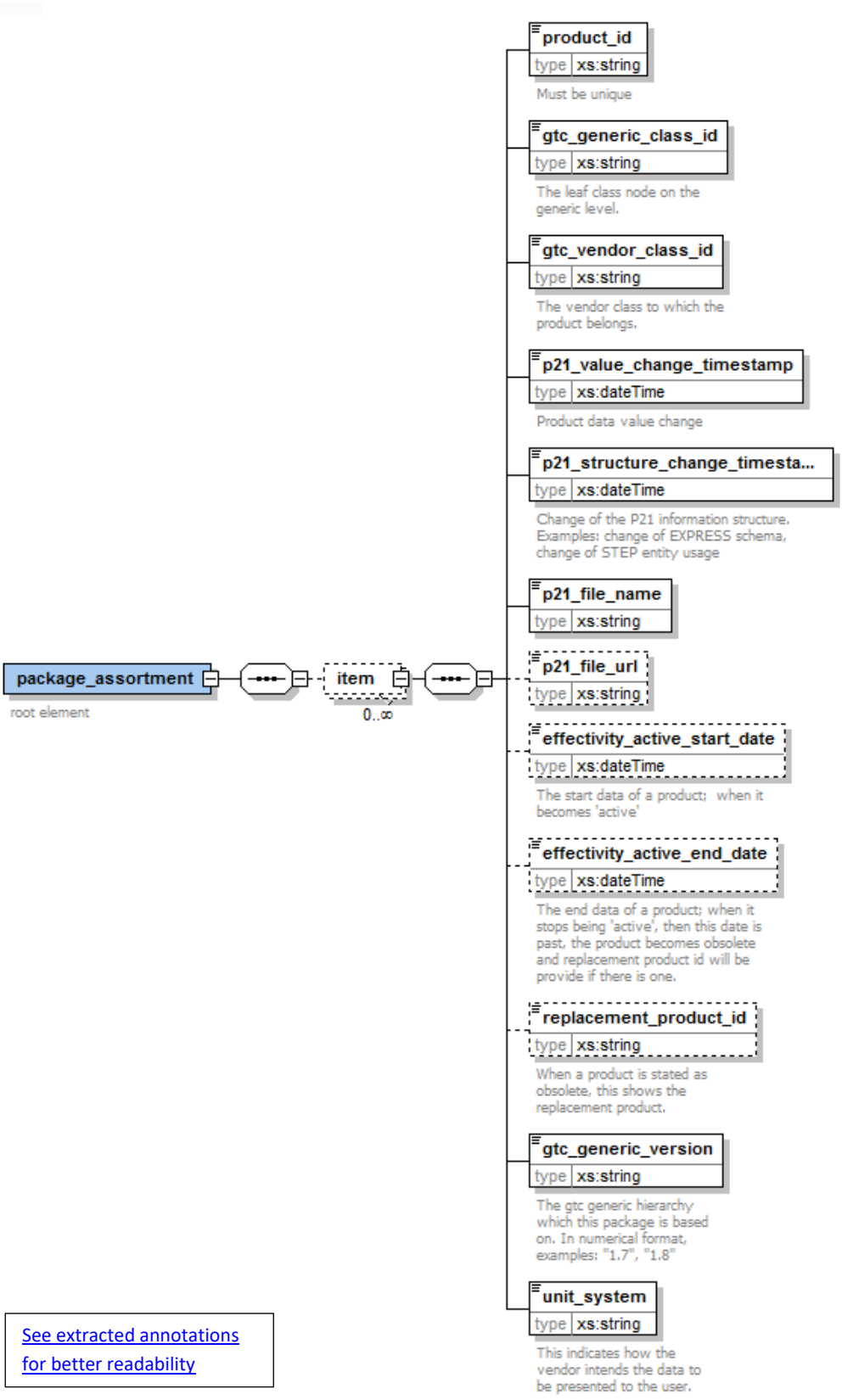


Figure 6. package_assortment XML schema

3.12 package_subset_assortment.xml

- This file is the assortment for a subset of products. (e.g. assortment for milling only, assortment for new products only). Assortment for all catalog product **is specified in section 3.11**
- The purpose of this file to make it easier for data receiver to import defined subsets of products in the provided package without retrieving the full assortment.
- The content of string_value is determined by cutting tool vendor.

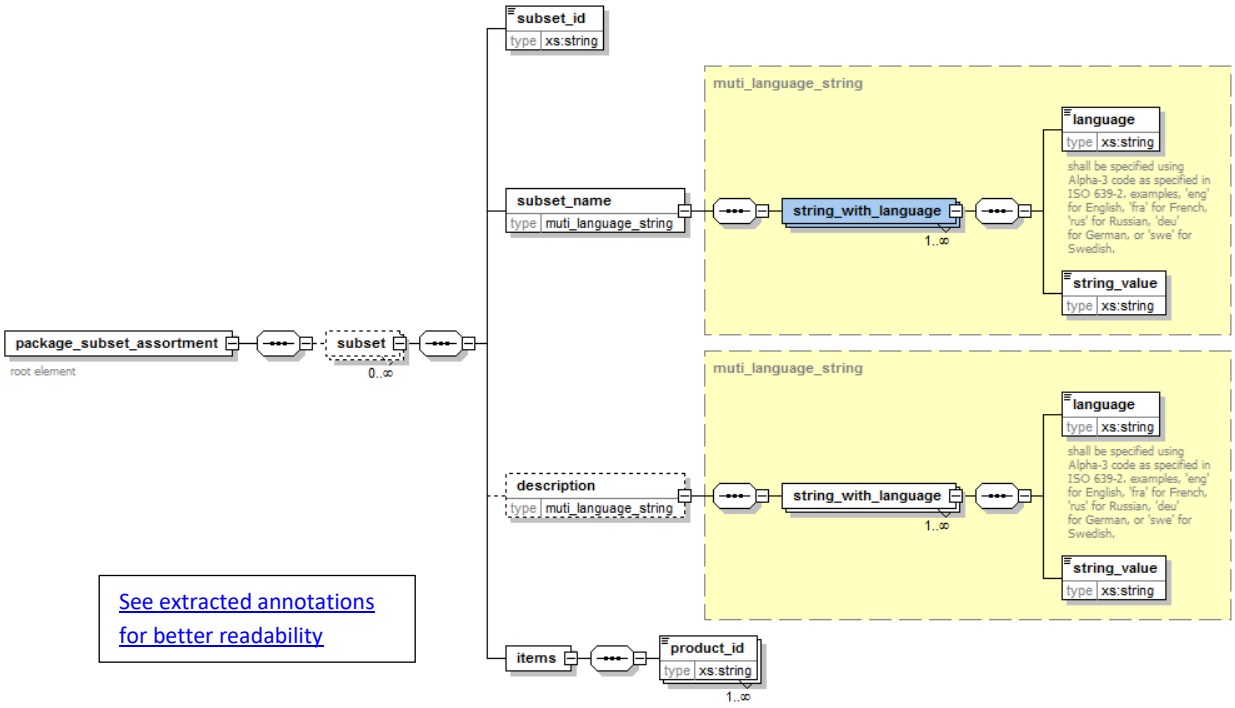


Figure 7. package_subset_assortment XML schema

3.13 gtc_class_hierarchy_vendor.xml

- This file is created based on the GTC generic hierarchy and the products the vendor has.
- The vendor hierarchy should include all the classes that the tool vendor has.
- GTC generic hierarchy is provided on the GTC website gtc-tools.com/gtc-current-working-documents, GTC Release.
- The file also includes rules for creating vendor level classes under each leaf-level generic class. The mapping rules are explained in document *GTC mapping rule specification* on the GTC website gtc-tools.com/gtc-current-working-documents, GTC Format Specification.
- The file *GTC package description* provides additional information and explication concerning data and meaning of this file. It is on the GTC website gtc-tools.com/gtc-current-working-documents, GTC Format Specification.

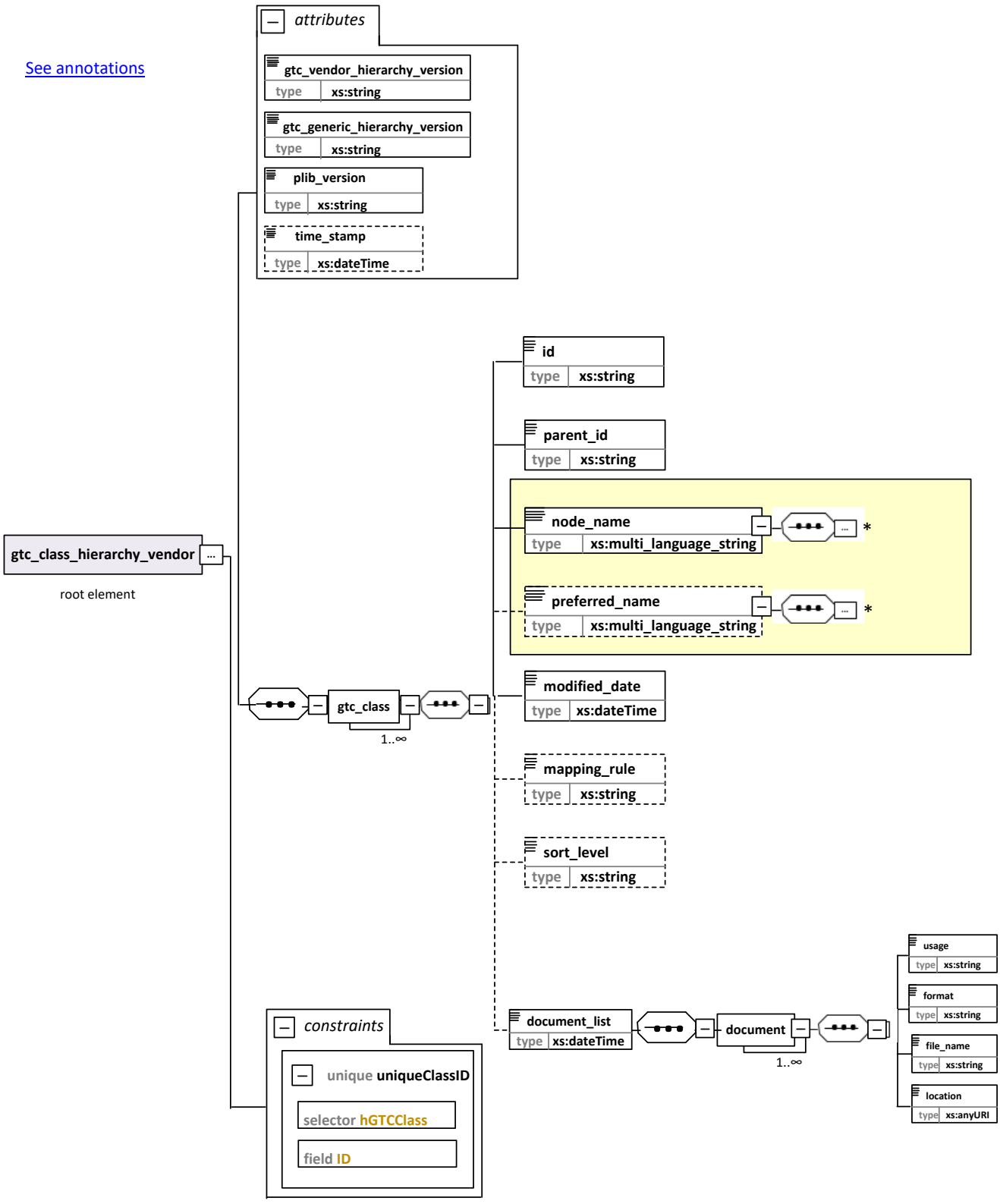


Figure 8: gtc_class_hierarchy_vendor XML schema

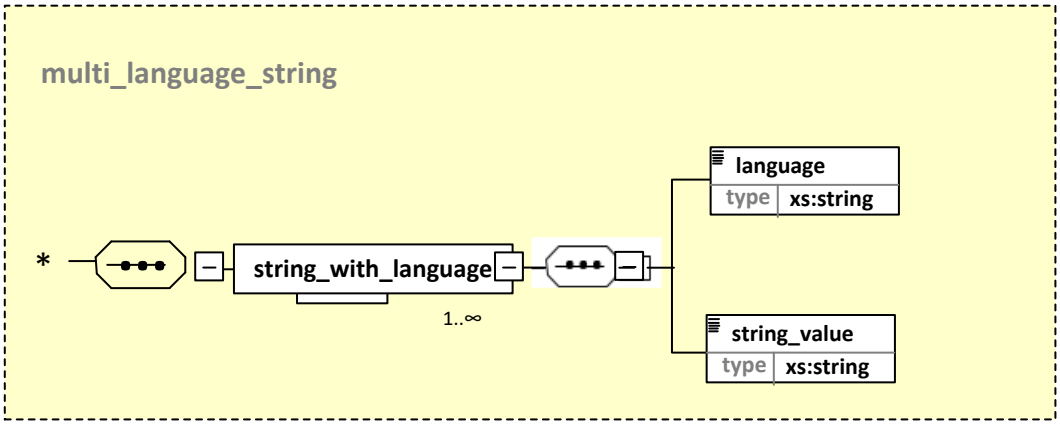


Figure 9: multi_language_string XML schema

The elements node_name and preferred_name include 1 or several string_with_language elements, which consist of a language and a string_value.

3.14 package_meta_data.xml

- This file describes the generic information on the package.
- Supported GTC generic versions include the generic version that the package is based on as well as all backward compatible generic versions. In case of multiple versions, version numbers should be devided by command, e.g. 1.7, 1.10
- Vendor hierarchy version that the package is based on (numeric format, e.g. 14.1), this number will be compared with the current version stored in the receiving system of the GTC vendor hierarchy version, if larger(in numeric order), the whole hierarchy will be re-read.
- Include vendor name and acronym.
- Include the package creation date, package ID, the version of the vendor system.
- Enable a short description, and optionally a long description in different languages.
- <online_connection_configuration> and <download_security> are optional and are used for online package only. <online_connection_configuration> points to an url address which can be seen as the entrance door for accessing to the online data. The url address can be the root address of the online package, or technical configuration file for online delivery interface.

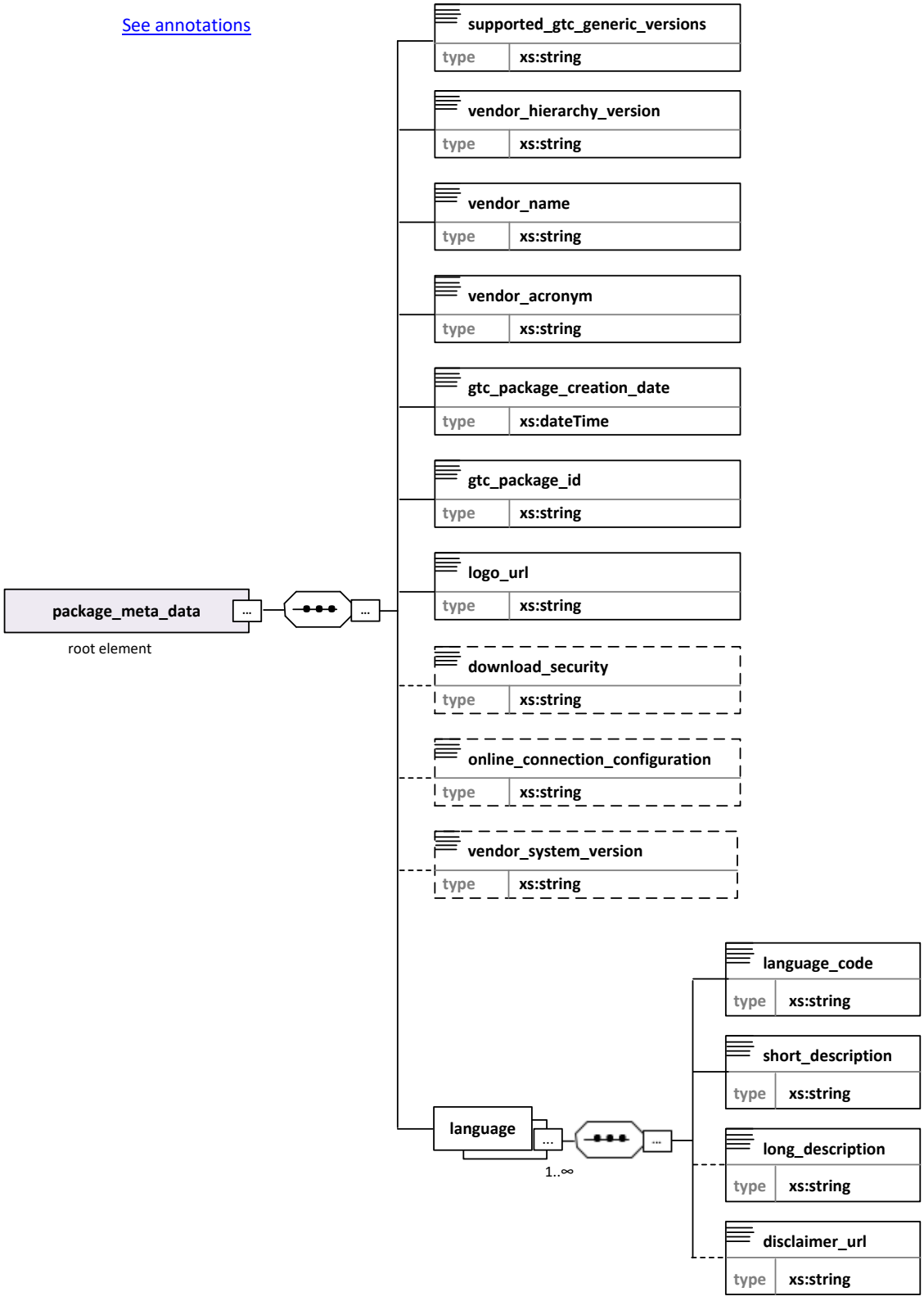


Figure 10: package_meta_data XML schema

3.15 package_logo.ext

- If there is a specific logo for the package being delivered. It is shown in the picture below in the colums "Icon"
- File name is: <package_logo>.<ext>.
- <ext> is a placeholder for a value from the list of supported bitmat formats.
- List of supported bitmap formats: { ".png", ".jpg", ".jpeg", ".gif".} (Data provider needs to check with data receiver which formats are actually supported.)
- Recommended maximum logo size is 300 x 110 pixels

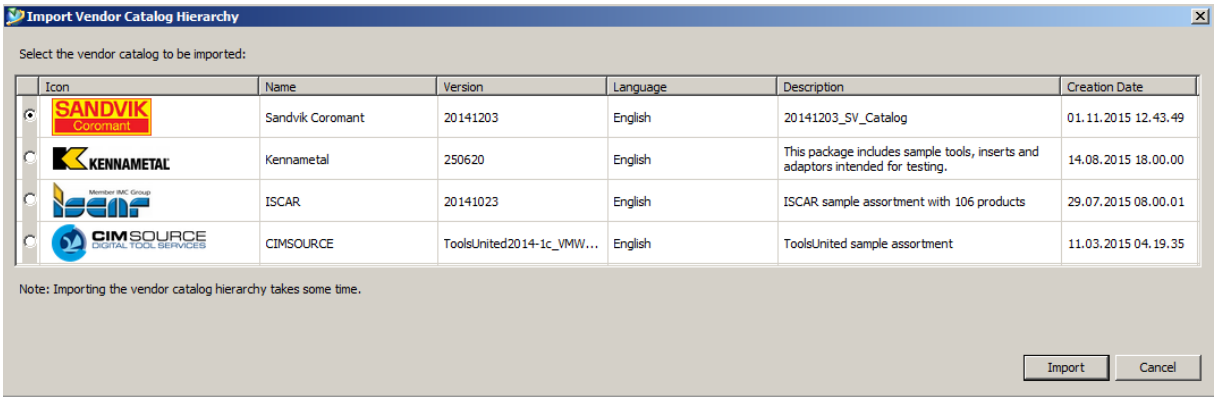


Figure 11: An Example of package logos

3.16 readme.txt

- Regular text file containing the list of known issues and other important information for the package deployment.

Annex A

Terminology to clarify difference of usable product identifiers.

GTC definition	Purpose	P21 Attributes
Product ID	**Unique Data Base id** in the tool vendor data base and the application data base. In some tool vendors this is equivalent to the Material ID in SAP.–May not be visible to the user.	ITEM.ID
Order Code	Is the code to be used by the user **to order** this product.Can be identical to the Product ID. Includes grade value. This is the identifier for e-commerce or automatic systems.	(ext ref. library) ORDCODE

Product designation	Descriptive code to be **displayed to the user** to help identifying the product **geometry** when browsing a catalog or in a result of a search. Used for looking for additional catalog information which is not exchanged between the tool vendor and the application. Can be identical to Order code. May or may not include the grade.	ITEM.NAME
Grade	Identification for the material (substance) from which a cutting item (e.g. insert, solid tools) is made	GRADE

Annex B

Annotations for XML Schema elements and attributes

1. package_assortment.xml

Field name	Annotation
product_id	Must be unique
gtc_generic_class_id	The leaf class node on the generic level.
gtc_vendor_class_id	The vendor class to which the product belongs
p21_value_change_timestamp	Product data value change
p21_structure_change_timestamp	Change of the P21 information structure. Examples: change of EXPRESS schema, change of STEP entity usage
effectivity_active_start_date	The start data of a product; when it becomes 'active'
effectivity_active_end_date	The end data of a product; when it stops being 'active', then this date is past, the product becomes obsolete and replacement product id will be provide if there is one.
replacement_product_id	When a product is stated as obsolete, this shows the replacement product.
gtc_generic_version	The gtc generic hierarchy which this package is based on. In numerical format, examples: "1.7", "1.10"
unit_system	This indicates how the vendor intends the data to be presented to the user.

2. package_subset_assortment

Field name	Annotation
subset_name ... language	shall be specified using Alpha-3 code as specified in ISO 639-2. examples, 'eng' for English, 'fra' for French, 'rus' for Russian, 'deu' for German, or 'swe' for Swedish.
description ... language	shall be specified using Alpha-3 code as specified in ISO 639-2. examples, 'eng' for English, 'fra' for French, 'rus' for Russian, 'deu'

	for German, or 'swe' for Swedish.

3. gtc_class_hierarchy_vendor.xml

Attributes	
gtc_vendor_hierarchy_version	Vendor specific versioning. Numerical format only, (e.g. '14.2', '14.3.1'). Larger number = newer version
gtc_generic_herarchy_version	The GTC generic hierarchy version used as a base for this GTC vendor hierarchy. Numerical format only, (e.g. '1.7', '1.10').
plib_version	Plib version used as a base for plib classes in the GTC package (product files). Example: 0112/1///13399_002
time_stamp	The time when the hierarchy file is created. Format: https://www.w3.org/TR/xmlschema-2/#dateTime. (e.g. 2016-11-16T14:58:00. (see also Annex C)
GTC class	
id	Matches the GTC_vendor_id in file GTC_generic_hierarchy.
parent_id	Matches GTC_vendor_parent_id in file GTC_generic_hierarchy. The parent of root class id is defined as 'GTC-root'.
node_name	Matches GTC_vendor_node_name in file GTC_generic_hierarchy.
node_name ... language	Use alpha-3 code as specified in ISO 639-2 (e.g. 'eng' for English, 'swe' for Swedish).
preferred_name	Matches GTC_vendor_preferred_name in file GTC_generic_hierarchy.
preferred_name ... language	Use alpha-3 code as specified in ISO 639-2 (e.g. 'eng' for English, 'swe' for Swedish).
modified_date	The latest modified date.
mapping_rule	Can be used to support the mapping of products to GTC node.
sort_level	To specify the order of children for each parent. Classes with smaller numbers are presented before classes with larger numbers.
document list	
document	
usage	The usage of the document: valid entries are 'class_icon' or 'class_drawing'
format	File extension for this document. Recommended formats: see chapters for class_icon and class_drawing.
file_name	Simple file name. Examples: CTL.png or ADPRS_MHSK_WZYL.jpg
location	URI providing full path. Example: http://documents.toolvendor.com/images/ADPRS_MHSK_WZYL.jpg

4. package_meta_data.xml

supported_gtc_generic_versions	the gtc generic version which this package is based on + all backward compatible generic versions, examples: 1.7, 1.10
vendor_hierarchy_version	vendor hierarchy version in numeric format, example: 14.2
vendor_name	
vendor_acronym	Must be unique, max. 5 characters following rules described in ISO 13399-60, all in capital letters.

gtc_package_id	Must be unique
logo_url	Link to package_logo.ext file in the root directory.
download_security	For online package only, this element states if the tool vendor would like to set a control on package data release or not. specified value set {"yes", "no"}
online_connection_configuration	This element is optional and is used for online data download only. It refers to a technical configuration file (a url address) that is provided by data sender who supports online data download.
Language ... language_code	shall be specified using Alpha-3 code as specified in ISO 639-2.examples, 'eng' for English, 'fra' for French, 'rus' for Russian, 'deu' for German, or 'swe' for Swedish.

Annex C

DateTime Format

Support **date and time formats** based on the standard ISO 8601.

"If a date and a time value are stored together in a single data field, then ISO 8601 suggests that they should be separated by a Latin capital letter **T**, as in 19951231**T**235959."

The standard supports two different syntaxes:

Format 1: "YYYY-MM-DDThh:mm:ss" example: "2015-01-26T16:14:49"

Format 2: "YYYYMMDDThhmmss" example: "20150126T161449"

Note for Format 2: "The hyphens can be omitted if compactness of the representation is more important than human readability. "

Support UTC (Coordinated Universal Time) **time zones**:

Optionally a postfix can define a time-zone e.g., "±hh:mm" or "20150128T134500+01:00".

This UTC postfix can be in one of 4 formats: "±hh:mm", "±hhmm", "±hh" or "Z" (for GMT or UTC+0)

To be flexible we should support a combination of all these formats:

"*YYYY*[-]*MM*[-]*DD***T***hh*[[:]*mm*[[:]*ss*]][±*hh*[[:]*mm*]|[Z]] "

Valid examples for date and time according to ISO 8601:

Date:	**2017-11-06**
Combined date and time in UTC:	**2017-11-06T15:30:07+00:00** **2017-11-06T15:30:07Z** **20171106T153007Z**