

# KNX Association, XML Schema Documentation

## Document

|                      |                             |
|----------------------|-----------------------------|
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## Acronyms

|     |                         |
|-----|-------------------------|
| DEV | Development Companies   |
| KNX | KNX Association         |
| MT4 | KNX Manufacturer Tool 4 |

## Referenced documents

|       |  |
|-------|--|
| [XSD] | XML schema (KNX-Project-Schema-v10.xsd. part of KNX MT4) |
| [SDK] | eteC SDK documentation (eteCSDK.chm)                     |
| [DS]  | XML DSIG documentation (xmldsig-core-schema.xsd)         |

## List of Changes

| Version | Date<br>(DD-MM-YYYY) | Maturity<br>Draft/Valid | Author<br>(Name/Company) | Description  |
|---------|----------------------|-------------------------|--------------------------|--|
| 1.0     | 03.11.2010           | WD                      | A. Hänel; KNXA           | Initial public version, derived from KNX internal version 0.43 |
| 1.1     | 02.03.2011           | WD                      | A. Hänel; KNXA           | Updates due to export container description and references     |
| 1.2     | 24.06.2011           | WD                      | A. Hänel; KNXA           | Updates due to the KNX decision on ex/ import limitations      |

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## 1 Overview

With introduction of ETS4, the ETS4 ex/- import format for KNX projects and products changed to a standard XML based format (by ETS4 exported projects have the file extension \*.knxproj).

### 1.1 Document Purpose

This document describes all necessary elements, types and attributes of the KNX XML Schema [\[XSD\]](#) for an ETS4 created project. All other –for the project scope not relevant - elements/ attributes might be missing or simply only listed (but not described).

The main use case is to read in (import) ETS4 projects into external tools (e.g. visualizations), but another use case might be to create an ETS4 project from scratch and later import into ETS4 (import is however restricted).

The document **does not** describe how manufacturers create and define products (parameter and/or communication object dependencies and their visibility in correlation with download image creation) to compile valid device configurations outside ETS4. This task is exclusively handled by the KNX MT4.

### 1.2 Extended Import Restrictions

ETS4 will import projects only from a trusted source, which means

- A) the project originates (exported) from ETS4 itself
- B) the project originates from a **KNX member** (and only products of this member are contained in the project)

This is done via a dedicated project signature, in case B the KNX manufacturer shall obtain a unique signature. This implies that an “unreliable” project import - from a source not trusted by ETS4 - is not possible!

### 1.3 Extended Import Checks

ETS4 checks on import if a project is valid as regards conformance to the XML conformity (syntax check), i.e. the ETS4 checks if the project format is correct. ETS4 does not check if the saved data inside the file (normally a project/ installation) is a valid project/ installation configuration (semantic check), e.g. if such a project is semantically valid<sup>1</sup>.

Hence, it is expected that saved projects & configurations are valid as regards ETS project and installation data integrity.

### 1.4 Validity

This XML documentation refers to XML scheme V 1.0 (as currently implemented in ETS 4.0.3).

Extended import restrictions will be implemented in one of the next updates of ETS4, as a consequence the XML scheme version will updated to V 1.1.

## 2 Namespaces

The “targetNamespace” is defined as “<http://knx.org/xml/project/10>”; the prefix **knx** is used here.

The schema references the name spaces <http://www.w3.org/2001/XMLSchema> (prefix **xs**).

---

<sup>1</sup> This validity covers things such as *KNX project settings used and processed by ETS up to any manufacturer device configuration* (with its communication object/ parameter dependencies and visibilities).

### 3 XSD Schema File

A XML scheme is normally defined and described in a file with file extension \*.xsd. This file is not part of an ETS4 installation, but of MT4, (the MT4 purpose is to build/ compile valid KNX products and therefore it uses the XML scheme as a basis).

For valid owners of the MT4 (KNX members) it is allowed to use and distribute this \*.xsd file as part of their own tool chain without any legal restrictions. When this KNX schema is updated (resulting in a new XML scheme), it is the responsibility of the user to keep his own tool chains up to date (the information on scheme update will be provided by KNX a few month prior to the official availability of the scheme).

## 4 Elements, Types and Attributes

### 4.1 General

#### 4.1.1 Element KNX

|             |                                   |  |          |         |   |
|-------------|-----------------------------------|--|----------|---------|---|
| Description | Root element of the XML document. |  |          |         |   |
| Children    | Name                              | Description  |          |         |   |
|             | <b>MasterData</b>                 | Global data created and administered by the KNX Association. |          |         |   |
|             | <b>ManufacturerData</b>           | Data created and administered by the KNX manufacturers.      |          |         |   |
|             | <b>Project</b>                    | Any number of projects.                                      |          |         |   |
| Attributes  | Name                              | Type   | Use      | Default | Description   |
|             | CreatedBy                         | xs:string  | optional |         | The tool that created this XML file may include its name here. ETS will write "ETS4".   |
|             | ToolVersion                       | xs:string  | optional |         | The tool that created this XML file may include its version here. ETS4 will write "4.0.xxxx.zzzzz" (xxxx is the build number, zzzzz is the change set). |

#### 4.1.2 Enumerations & Types

##### 4.1.2.1 simpleType Access\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:string</b>   |
| Description | This enumeration encodes the rights for the ETS user to view and modify parameters. |
| Facets      | enumeration None<br>enumeration Read<br>enumeration ReadWrite                       |

##### 4.1.2.2 simpleType GroupAddressStyle\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:string</b>   |
| Description | This enumeration contains the different types of representations of group addresses in ETS4. 2-level and 3-level style are also available in ETS3, the free group address structure is new to ETS4. |
| Facets      | enumeration TwoLevel<br>enumeration ThreeLevel<br>enumeration Free  |

#### 4.1.2.3 simpleType BuildingPartType\_t

|             |  |
|-------------|--|
| Type        | restriction of <b>xs:string</b>  |
| Description | This enumeration contains the different types of build parts available in the ETS4.  |
| Facets      | enumeration Building<br>enumeration BuildingPart<br>enumeration Floor<br>enumeration Stairway<br>enumeration Room<br>enumeration Corridor<br>enumeration DistributionBoard |

#### 4.1.2.4 simpleType ComObjectPriority\_t

|             |  |
|-------------|--|
| Type        | restriction of <b>xs:string</b>  |
| Description | This enumeration lists the possible transmission priorities available in the KNX protocol. |
| Facets      | enumeration Low<br>enumeration High<br>enumeration Alert                                   |

#### 4.1.2.5 simpleType ComObjectSize\_t

|             |  |
|-------------|--|
| Type        | restriction of <b>xs:string</b>  |
| Description | This enumeration lists the possible data sizes for KNX group communication.  |
| Facets      | enumeration 1 Bit<br>enumeration 2 Bit<br>enumeration 3 Bit<br>enumeration 4 Bit<br>enumeration 5 Bit<br>enumeration 6 Bit<br>enumeration 7 Bit<br>enumeration 1 Byte<br>enumeration 2 Bytes |

|  |  |
|--|--|
|  | enumeration 3 Bytes<br>enumeration 4 Bytes<br>enumeration 5 Bytes<br>enumeration 6 Bytes<br>enumeration 7 Bytes<br>enumeration 8 Bytes<br>enumeration 9 Bytes<br>enumeration 10 Bytes<br>enumeration 11 Bytes<br>enumeration 12 Bytes<br>enumeration 14 Bytes<br>enumeration LegacyVarData |
|--|--|

#### 4.1.2.6 simpleType ToDoStatus\_t

|             |  |
|-------------|--|
| Type        | restriction of <b>xs:string</b>              |
| Description | ToDo status enumeration                      |
| Facets      | enumeration Open<br>enumeration Accomplished |

#### 4.1.2.7 simpleType CompletionStatus\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:string</b>   |
| Description | Several elements contain a completion status attribute which might have one of the following values:  |
| Facets      | enumeration Undefined<br>enumeration Editing<br>enumeration FinishedDesign<br>enumeration FinishedCommissioning<br>enumeration Tested<br>enumeration Accepted |

#### 4.1.2.8 simpleType Enable\_t

|      |                                 |
|------|---------------------------------|
| Type | restriction of <b>xs:string</b> |
|------|---------------------------------|



|             |   |
|-------------|---|
| Description | This enumeration is used for the group object communication flags.: |
| Facets      | enumeration Enabled<br>enumeration Disabled                         |

#### 4.1.2.9 simpleType ProjectTracingLevel\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:string</b>                                       |
| Description | ProjectTracingLevel enumeration                                       |
| Facets      | enumeration None<br>enumeration OperationUsed<br>enumeration Detailed |

#### 4.1.2.10 simpleType PropType\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:string</b>   |
| Description | List of interface object property types   |
| Facets      | enumeration PDT_CONTROL<br>enumeration PDT_CHAR<br>enumeration PDT_UNSIGNED_CHAR<br>enumeration PDT_INT<br>enumeration PDT_UNSIGNED_INT<br>enumeration PDT_KNX_FLOAT<br>enumeration PDT_DATE<br>enumeration PDT_TIME<br>enumeration PDT_LONG<br>enumeration PDT_UNSIGNED_LONG<br>enumeration PDT_FLOAT<br>enumeration PDT_DOUBLE<br>enumeration PDT_CHAR_BLOCK<br>enumeration PDT_POLL_GROUP_SETTINGS<br>enumeration PDT_SHORT_CHAR_BLOCK<br>enumeration PDT_DATE_TIME<br>enumeration PDT_VARIABLE_LENGTH |

```

enumeration PDT_GENERIC_01
enumeration PDT_GENERIC_02
enumeration PDT_GENERIC_03
enumeration PDT_GENERIC_04
enumeration PDT_GENERIC_05
enumeration PDT_GENERIC_06
enumeration PDT_GENERIC_07
enumeration PDT_GENERIC_08
enumeration PDT_GENERIC_09
enumeration PDT_GENERIC_10
enumeration PDT_GENERIC_11
enumeration PDT_GENERIC_12
enumeration PDT_GENERIC_13
enumeration PDT_GENERIC_14
enumeration PDT_GENERIC_15
enumeration PDT_GENERIC_16
enumeration PDT_GENERIC_17
enumeration PDT_GENERIC_18
enumeration PDT_GENERIC_19
enumeration PDT_GENERIC_20
enumeration PDT_UTF-8
enumeration PDT_VERSION
enumeration PDT_ALARM_INFO
enumeration PDT_BINARY_INFORMATION
enumeration PDT_BITSET8
enumeration PDT_BITSET16
enumeration PDT_ENUM8
enumeration PDT_SCALING
enumeration PDT_NE_VL
enumeration PDT_NE_FL
enumeration PDT_FUNCTION

```

#### 4.1.2.11 simpleType IDREF

| Type | xs:NCName |
|------|-----------|
|------|-----------|

|             |   |
|-------------|---|
| Description | This type is used for references to xs:ID. In contrast to the standard XML IDREF type, the referenced element need not be in the same XML file. |
|-------------|---|

#### 4.1.2.12 simpleType IDREFS

|             |  |
|-------------|--|
| Type        | <b>xs:list of knx:IDREF</b>  |
| Description | This type is used for multiple references to xs:ID, separated by space. In contrast to the standard XML IDREFS type, the referenced elements need not be in the same XML file. |

#### 4.1.2.13 simpleType String20\_t

|             |   |
|-------------|---|
| Type        | <b>xs:string</b>  |
| Description | Same as xs:string, but restricted to 20 unicode characters. |

#### 4.1.2.14 simpleType String50\_t

|             |   |
|-------------|---|
| Type        | <b>xs:string</b>  |
| Description | Same as xs:string, but restricted to 50 unicode characters. |

#### 4.1.2.15 simpleType String255\_t

|             |  |
|-------------|--|
| Type        | <b>xs:string</b>   |
| Description | Same as xs:string, but restricted to 255 unicode characters. |

#### 4.1.2.16 simpleType LanguageDependentString\_t

|             |  |
|-------------|--|
| Type        | <b>xs:string</b>   |
| Description | This type is used for texts in master or product data that may be translated to different languages. |

#### 4.1.2.17 simpleType LanguageDependentString50\_t

|             |   |
|-------------|---|
| Type        | <b>xs:LanguageDependentString_t</b>   |
| Description | Same as LanguageDependentString_t, but restricted to 50 unicode characters. |

#### 4.1.2.18 simpleType LanguageDependentString255\_t

|             |  |
|-------------|--|
| Type        | <b>xs:LanguageDependentString_t</b>  |
| Description | Same as LanguageDependentString_t, but restricted to 255 unicode characters. |

#### 4.1.2.19 simpleType AccessLevel\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:unsignedByte</b>   |
| Description | This type is for specifying the segment access level in <a href="#">LdCtrlDeclarePropDesc</a> . |
| Facets      | minInclusive 0<br>maxInclusive 15   |

#### 4.1.2.20 simpleType BitOffset\_t

|             |  |
|-------------|--|
| Type        | restriction of <b>xs:unsignedByte</b>  |
| Description | This type is for specifying the bit offset of parameters.<br>The bit offset is the distance of the most significant bit of the parameter from the most significant bit of the first octet in memory. |
| Facets      | minInclusive 0<br>maxInclusive 7   |

#### 4.1.2.21 simpleType Value\_t

|             |  |
|-------------|--|
| Type        | <b>xs:string</b>   |
| Description | <p>This type is for storing parameter values. The different parameter types are encoded as follows:</p> <p>TypeNone      Always the empty string.</p> <p>TypeText      The text value, suitably escaped by character references (e.g. &amp;#x9; for the tab character) or entity references (e.g. &amp;lt; instead of &lt;). Note that all whitespace characters (newline, tab etc.) must be written as character references, otherwise input normalization would replace them by space characters.</p> <p>TypeNumber      The numeric value, formatted as decimal string.</p> <p>TypeFloat      The numeric value, formatted in scientific notation, with 16 significant digits and 3 exponent digits (regular expression: "-?\d\.\d{15}E[+-]\d{3}"). This corresponds to the conversion value.ToString("E15", CultureInfo.InvariantCulture) in C#.</p> <p>Note: if a Value_t attribute would ever be registration-relevant, care must be taken to ensure that this attribute is reproduced exactly on all data transformations, e.g. when importing the XML into an ETS 4 database and exporting it again.</p> <p>TypeRestriction      The Value attribute of the selected <a href="#">Enumeration</a> option.</p> <p>TypeTime      Same as TypeNumber</p> <p>TypeDate      yyyy-mm-dd</p> <p>TypeNetAddr      IPv4 addresses: decimal dotted notation</p> |

#### 4.1.2.22 simpleType Ipv4Address\_t

|      |                                 |
|------|---------------------------------|
| Type | restriction of <b>xs:string</b> |
|------|---------------------------------|

|             |   |
|-------------|---|
| Description | This type is for specifying IP v4 addresses, e.g. the IP routing multicast address.                                   |
| Facets      | pattern ((25[0-5] 2[0-4][0-9] 1[0-9][0-9] [1-9][0-9] [0-9])\.)\.{3}(25[0-5] 2[0-4][0-9] 1[0-9][0-9] [1-9][0-9] [0-9]) |

#### 4.1.2.23 simpleType RegistrationNumber\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:string</b>                                       |
| Description | This type is for specifying registration numbers in the format yyyy/n |
| Facets      | pattern \d{4}/\d+   |

#### 4.1.2.24 simpleType HardwareVersionNumber\_t

|             |   |
|-------------|---|
| Type        | restriction of <b>xs:unsignedShort</b>  |
| Description | This type is for specifying the VersionNumber of a hardware. Restricted to ensure compatibility with ETS3 |
| Facets      | minInclusive 0<br>maxInclusive 32767  |

## 4.2 Master Data

### 4.2.1 Element KNX/MasterData

|             |  |
|-------------|--|
| Description | Global data created and administered by the KNX Association. |
| Type        | <b><u>knx:MasterData_t</u></b>                               |

### 4.2.2 complexType MasterData\_t

|             |  |  |          |         |   |
|-------------|--|--|----------|---------|---|
| Description | Global data created and administered by the KNX Association. |  |          |         |   |
| Children    | Name   | Description                                |          |         |   |
|             | <b><u>DatapointTypes</u></b>                                 | Contains a list of datapoint types.        |          |         |   |
|             | <b><u>MediumTypes</u></b>                                    | Contains a list of KNX medium types.       |          |         |   |
|             | <b><u>MaskVersions</u></b>                                   | Contains a list of mask versions.          |          |         |   |
|             | <b><u>Manufacturers</u></b>                                  | Contains a list of KN manufacturers        |          |         |   |
|             | <b><u>Languages</u></b>                                      | Contains translation for MasterData texts. |          |         |   |
| Attributes  | Name   | Type                                       | Use      | Default | Description   |
|             | Version  | xs:unsignedInt                             | required |         | Master data version. It is ensured by organizational means at KNX that MasterData with higher versions contain all elements of earlier MasterData |
|             | Signature  | xs:base64Binary                            | required |         | KNX signature for master data elements  |

### 4.2.3 Datapoint types

#### 4.2.3.1 Element MasterData\_t/DatapointTypes

|             |                                     |   |
|-------------|-------------------------------------|---|
| Description | Contains a list of datapoint types. |   |
| Children    | Name                                | Description                               |
|             | <b><u>DatapointType</u></b>         | Any number of datapoint type descriptions |

#### 4.2.3.2 Element MasterData\_t/DatapointTypes/DatapointType

|             |   |                                       |
|-------------|---|---------------------------------------|
| Description | Information about a datapoint main type |                                       |
| Children    | Name                                    | Description                           |
|             | <b><u>DatapointSubtypes</u></b>         | Contains a list of datapoint subtypes |

| Attributes | Name      | Type                             | Use      | Default | Description  |
|------------|-----------|----------------------------------|----------|---------|--|
|            | Id        | xs:ID                            | required |         | Unique ID.<br>On export or conversion, this will be constructed as <b>DPT-number</b> where <i>number</i> is the Number, formatted as decimal number. |
|            | Number    | xs:unsignedInt                   | required |         | Main datapoint number  |
|            | Name      | knx:String255_t                  | required |         | Official name of the datapoint main type   |
|            | Text      | knx:LanguageDependentString255_t | optional |         | Name for display to the user   |
|            | SizeInBit | xs:unsignedInt                   | required |         | The data length in bit.  |

#### 4.2.3.3 Element MasterData\_t/DatapointTypes/DatapointType/DatapointSubtypes

| Description             | Contains a list of datapoint subtypes.   |      |             |                         |  |
|-------------------------|--|------|-------------|-------------------------|--|
| Children                | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b>DatapointSubtype</b></td><td>Any number of datapoint subtype descriptions</td></tr> </table> | Name | Description | <b>DatapointSubtype</b> | Any number of datapoint subtype descriptions |
| Name                    | Description  |      |             |                         |  |
| <b>DatapointSubtype</b> | Any number of datapoint subtype descriptions   |      |             |                         |  |

#### 4.2.3.4 Element MasterData\_t/DatapointTypes/DatapointType/DatapointSubtypes/DatapointSubtype

| Description | Information about a datapoint subtype |                                  |          |         |  |
|-------------|---------------------------------------|----------------------------------|----------|---------|--|
| Attributes  | Name                                  | Type                             | Use      | Default | Description  |
|             | Id                                    | xs:ID                            | required |         | Unique ID.<br>On export or conversion, this will be constructed as <b>DPST-maindpnumber-subdpnumber</b> where <i>maindpnumber</i> is the DatapointType Number, formatted as decimal number and <i>subdpnumber</i> is the DatapointSubtype Number, formatted as 3 decimal digits. |
|             | Number                                | xs:unsignedInt                   | required |         | Sub datapoint number   |
|             | Name                                  | knx:String255_t                  | required |         | Offical name of the datapoint subtype, e.g. "DPT_Switch"   |
|             | Text                                  | knx:LanguageDependentString255_t | optional |         | Name for display to the user   |

### 4.2.4 Medium Types

#### 4.2.4.1 Element MasterData\_t/MediumTypes

| Description       | Contains a list of KNX medium types.   |      |             |                   |                            |
|-------------------|--|------|-------------|-------------------|----------------------------|
| Children          | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b>MediumType</b></td><td>Any number of medium types</td></tr> </table> | Name | Description | <b>MediumType</b> | Any number of medium types |
| Name              | Description  |      |             |                   |                            |
| <b>MediumType</b> | Any number of medium types   |      |             |                   |                            |

#### 4.2.4.2 Element MasterData\_t/MediumTypes/MediumType

| Description |                     |                                 |          |         |   |
|-------------|---------------------|---------------------------------|----------|---------|---|
| Attributes  | Name                | Type                            | Use      | Default | Description   |
|             | Id                  | xs:ID                           | required |         | Unique ID.<br>On export or conversion, this will be constructed as <b>MT-number</b> where <i>number</i> is the Number, formatted as decimal number. |
|             | Number              | xs:unsignedInt                  | required |         | Medium type number  |
|             | Name                | knx:String20_t                  | required |         | Official name, e.g. "TP", "PL", "RF", "IP"  |
|             | Text                | knx:LanguageDependentString50_t | optional |         | Longer Name for display to the user   |
|             | DomainAddressLength | xs:short                        | required |         | For open media, length of the domain address in bit; otherwise 0.   |

### 4.2.5 Manufacturers

#### 4.2.5.1 Element MasterData\_t/

| Description | Contains a list of KNX manufacturers. |                              |
|-------------|---------------------------------------|------------------------------|
| Children    | Name                                  | Description                  |
|             | <b>Manufacturer</b>                   | A specific KNX manufacturer. |

#### 4.2.5.2 Element MasterData\_t/Manufacturer

| Description | Description of a KNX manufacturer  |  |          |         |  |
|-------------|------------------------------------|--|----------|---------|--|
| Children    | Name                               | Description  |          |         |  |
|             | <b>OrderNumberFormattingScript</b> | String that is used to format of the order numbers of the manufacturer correctly. Serialized as CDATA-Section. |          |         |  |
| Attributes  | Name                               | Type   | Use      | Default | Description  |
|             | Id                                 | xs:ID  | required |         | Unique ID.<br>On export or conversion, this will be constructed as <b>M-nnnn</b> , where:<br><i>nnnn</i> KnxManufacturerId, formatted as 4 hexadecimal digits                  |
|             | Name                               | knx:String255_t  | required |         | Manufacturer name  |
|             | KnxManufacturerId                  | xs:unsignedShort   | required |         | KNX allocated manufacturer ID  |
|             | DefaultLanguage                    | xs:language  | optional |         | Default language for product data.   |
|             | CompatibilityGroup                 | xs:unsignedShort   | optional |         | All manufacturers with the same value in CompatibilityGroup are compatible (application programs of one manufacturer may be downloaded into device from another manufacturer). |



|  |  |
|--|--|
|  | The value of CompatibilityGroup is allocated by KNX (e.g. as the manufacturer ID of one of the manufacturers). |
|--|--|

## 4.3 Manufacturer Data

### 4.3.1 Element KNX/ManufacturerData

|             |   |
|-------------|---|
| Description | Data created and administered by the KNX manufacturers. |
| Type        | <a href="#">ManufacturerData_t</a>                      |

### 4.3.2 complexType ManufacturerData\_t

| Description                | Data created and administered by the KNX manufacturers.   |      |             |                            |                                  |
|----------------------------|---|------|-------------|----------------------------|----------------------------------|
| Children                   | <table> <thead> <tr> <th>Name</th><th>Description</th></tr> </thead> <tbody> <tr> <td><b><u>Manufacturer</u></b></td><td>Any number of KNX manufacturers.</td></tr> </tbody> </table> | Name | Description | <b><u>Manufacturer</u></b> | Any number of KNX manufacturers. |
| Name                       | Description   |      |             |                            |                                  |
| <b><u>Manufacturer</u></b> | Any number of KNX manufacturers.  |      |             |                            |                                  |

### 4.3.3 General

#### 4.3.3.1 Element ManufacturerData\_t/Manufacturer

|             |                                   |           |   |         |  |
|-------------|-----------------------------------|-----------|---|---------|--|
| Description | A manufacturer                    |           |   |         |  |
| Children    | Name                              |           | Description                                     |         |  |
|             | <b><u>Catalog</u></b>             |           | Catalog data                                    |         |  |
|             | <b><u>ApplicationPrograms</u></b> |           | List of application programs                    |         |  |
|             | <b><u>Baggages</u></b>            |           | Baggage data (e.g. Plugins or Help files)       |         |  |
|             | <b><u>Hardware</u></b>            |           | Hardware, products and registration information |         |  |
|             | <b><u>Languages</u></b>           |           | Translations                                    |         |  |
| Attributes  | Name                              | Type      | Use   | Default | Description  |
|             | RefId                             | knx:IDREF | required  |         | References the <a href="#">Manufacturer</a> element. |

### 4.3.4 Application Program Data

#### 4.3.4.1 Element ApplicationProgramStatic\_t/Parameters/Parameter

|             |                                     |
|-------------|-------------------------------------|
| Description | Describes an application parameter. |
| Type        | <b><u>knx:Parameter t</u></b>       |

### 4.3.4.2 complexType Parameter\_t

|             |   |  |          |           |  |
|-------------|---|--|----------|-----------|--|
| Description | Describes an application parameter.<br>For each Parameter, any number of <a href="#">ParameterRef</a> elements may exist.   |  |          |           |  |
| Children    | <p>Name Description</p> <p><b>Memory</b> Specifies the location for parameters mapped to memory</p> <p><b>Property</b> Specifies the location for parameters mapped to a property</p> <p>The child element Memory or Property determines if the parameter is written to memory or user memory or to an interface object property. If none of them is given, the parameter is not mapped to the device image at all (virtual parameter).</p> <p>Memory or Property Parameters must not overlap, i.e.</p> <ul style="list-style-type: none"> <li>for no two Memory Parameters with <math>\text{CodeSegment}_1 = \text{CodeSegment}_2</math>, the intervals <math>[8 \cdot \text{Offset}_1 + \text{BitOffset}_1, 8 \cdot \text{Offset}_1 + \text{BitOffset}_1 + \text{ParameterType}_1 \cdot \text{Size})</math> and <math>[8 \cdot \text{Offset}_2 + \text{BitOffset}_2, 8 \cdot \text{Offset}_2 + \text{BitOffset}_2 + \text{ParameterType}_2 \cdot \text{Size})</math> may overlap</li> <li>for no two Property Parameters with <math>\text{ObjectIndex}_1 = \text{ObjectIndex}_2</math> or <math>(\text{ObjectType}_1 = \text{ObjectType}_2 \text{ AND } \text{Occurrence}_1 = \text{Occurrence}_2)</math> the intervals <math>[8 \cdot \text{Offset}_1 + \text{BitOffset}_1, 8 \cdot \text{Offset}_1 + \text{BitOffset}_1 + \text{ParameterType}_1 \cdot \text{Size})</math> and <math>[8 \cdot \text{Offset}_2 + \text{BitOffset}_2, 8 \cdot \text{Offset}_2 + \text{BitOffset}_2 + \text{ParameterType}_2 \cdot \text{Size})</math> may overlap</li> </ul> <p>For such cases, the Union construct must be used.</p> |  |          |           |  |
| Attributes  | Name  | Type   | Use      | Default   | Description  |
|             | Id  | xs:ID  | required |           | Unique ID of the parameter.<br>This is constructed as<br><i>parid_P-number</i> , where:<br><i>parid</i> Id of the parent <a href="#">ApplicationProgram</a><br><i>number</i> Unique number of the parameter within the application program. For converted application programs, this corresponds to Parameter.UniqueNumber in the database schema. |
|             | Name  | knx:String50_t                                   | required |           | Name of the parameter (not visible to the ETS user)  |
|             | ParameterType   | knx:IDREF  | required |           | Reference to a <a href="#">ParameterType</a>   |
|             | Text  | <a href="#">knx:LanguageDependentString255_t</a> | required |           | Default parameter label for ETS (may be overridden e.g. in <a href="#">ParameterRef</a> )  |
|             | Access  | <a href="#">knx:Access_t</a>                     | optional | ReadWrite | Default access rights (may be overridden e.g. in <a href="#">ParameterRef</a> )  |
|             | Value   | <a href="#">knx:Value_t</a>                      | required |           | Default value; must be compatible with ParameterType.  |
|             | LegacyPatchAlways   | xs:boolean                                       | optional | false     | If true, the value is written also if the parameter is inactive (may be overridden in <a href="#">ParameterRef</a> ).  |

### 4.3.4.3 Element ApplicationProgramStatic\_t/Parameters/Union/Parameter

|             |   |
|-------------|---|
| Description | Describes a parameter within a union.       |
| Type        | <b><a href="#">knx:UnionParameter_t</a></b> |

### 4.3.4.4 complexType UnionParameter\_t

|             |                                       |
|-------------|---------------------------------------|
| Description | Describes a parameter within a union. |
|-------------|---------------------------------------|

| Attributes | Name                  | Type   | Use      | Default   | Description   |
|------------|-----------------------|--|----------|-----------|---|
|            | Id                    | xs:ID  | required |           | Unique ID of the parameter.<br>This is constructed as <i>parid_UP-number</i> , where:<br><i>parid</i> Id of the parent <a href="#">ApplicationProgram</a><br><i>number</i> Unique number of the union parameter within the application program. |
|            | Name                  | knx:String50_t                                   | required |           | Name of the union parameter (not visible to the ETS user)   |
|            | ParameterType         | knx:IDREF  | required |           | Reference to a <a href="#">ParameterType</a>  |
|            | Text                  | <a href="#">knx:LanguageDependentString255_t</a> | required |           | Default parameter label for ETS (may be overridden e.g. in <a href="#">ParameterRef</a> )   |
|            | Access                | <a href="#">knx:Access_t</a>                     | optional | ReadWrite | Default access rights (may be overridden e.g. in <a href="#">ParameterRef</a> )   |
|            | Value                 | <a href="#">knx:Value_t</a>                      | required |           | Default value; must be compatible with ParameterType.   |
|            | DefaultUnionParameter | xs:boolean                                       | optional | false     | Used during image creation  |
|            | Offset                | xs:unsignedInt                                   | required |           | Offset from the first octet of the union  |
|            | BitOffset             | knx:BitOffset_t                                  | required |           | Bit offset from the first bit of the addressed octet  |

#### 4.3.4.5 Element ApplicationProgramStatic\_t/ParameterRefs

|             |   |                                      |
|-------------|---|--------------------------------------|
| Description | Contains the parameter references that are used in the dynamic parameter structure. |                                      |
| Children    | Name  | Description                          |
|             | <a href="#">ParameterRef</a>  | Any number of ParameterRef elements. |

#### 4.3.4.6 Element ApplicationProgramStatic\_t/ParameterRefs/ParameterRef

|             |   |
|-------------|---|
| Description | Contains a parameter reference that is used in the dynamic parameter structure. |
| Type        | <a href="#">knx:ParameterRef_t</a>  |

#### 4.3.4.7 complexType ParameterRef\_t

|             |  |
|-------------|--|
| Description | <p>For each Parameter any number of ParameterRef elements can be present. These share the location in the device image and the parameter type. For the user they are however independent parameters each with a separate value and (optionally) a separate label in the parameter dialog.</p> <p>It is possible to define a Parameter without ParameterRef, but this will not be adjustable by the user (or a plugin) and thus always be written with its default value into the device image.</p> <p>If more than one ParameterRef refers to the same Parameter, at any time at most one of them may be <b>active</b> (otherwise the generated image will not be uniquely determined).</p> <p>A ParameterRef is active if at least one of the following ParameterRefRef elements referring to it is <b>active</b> or no such ParameterRefRef exists:</p> <ul style="list-style-type: none"> <li><a href="#">ParameterChoose_t/when/ParameterRefRef</a></li> <li><a href="#">ComObjectParameterChoose_t/when/ParameterRefRef</a></li> <li><a href="#">ParameterBlock_t/ParameterRefRef</a></li> <li><a href="#">ComObjectParameterBlock_t/ParameterRefRef</a></li> </ul> |
|-------------|--|

| Attributes | Name         | Type   | Use      | Default | Description  |
|------------|--------------|--|----------|---------|--|
|            | Id           | xs:ID  | required |         | Unique ID of the parameter.<br>This is constructed as <i>paramid_R-number</i> , where:<br><i>paramid</i> Same as RefId<br><i>number</i> Unique number of the parameter reference within all references to this parameter. For converted application programs, this corresponds to Parameter.UniqueNumber in the database schema. |
|            | RefId        | knx:IDREF  | required |         | Reference to the underlying <a href="#">Parameter</a> or <a href="#">Union/Parameter</a> .   |
|            | Name         | knx:String50_t                                   | optional |         | Name of the parameter (not visible to the ETS user)  |
|            | Text         | <a href="#">knx:LanguageDependentString255_t</a> | optional |         | Parameter label for ETS. If missing, the Text attribute of the underlying Parameter is used.   |
|            | Tag          | knx:String50_t                                   | optional |         | Generic tag for plug-in developers to store reference data (not visible to the ETS user).  |
|            | DisplayOrder | xs:int   | optional |         | Legacy: control the display order; if not present, the order within the XML file is relevant   |
|            | Access       | <a href="#">knx:Access_t</a>                     | optional |         | Access rights. If missing, the Access attribute of the underlying Parameter is used.   |
|            | Value        | <a href="#">knx:Value_t</a>                      | optional |         | Default value; must be compatible with ParameterType. If missing, the Value attribute of the underlying Parameter is used.   |

#### 4.3.4.8 Element ApplicationProgramStatic\_t/ComObjectTable/ComObject

|             |   |
|-------------|---|
| Description | Describes a group communication object. |
| Type        | <b><a href="#">knx:ComObject_t</a></b>  |

#### 4.3.4.9 complexType ComObject\_t

| Description | Describes a group communication object.<br>At this level, for each object index (ASAP index), only one ComObject is defined.<br>For each ComObject, any number of <a href="#">ComObjectRef</a> elements may exist.<br>If a certain object index is used differently depending on context (e.g. different types depending on a parameter value), these different options are defined in the ComObjectRefs. |   |          |         |  |
|-------------|---|---|----------|---------|--|
| Attributes  | Name  | Type  | Use      | Default | Description  |
|             | Id  | xs:ID   | required |         | Unique ID of the group communication object.<br>This is constructed as <i>parid_O-number</i> , where:<br><i>parid</i> Id of the parent <a href="#">ApplicationProgram</a><br><i>number</i> Number of the communication object. |
|             | Name  | knx:String50_t                                | required |         | Internal name of the communication object.   |
|             | Text  | knx:LanguageDependentString255_t              | required |         | User-visible name of the communication object. May be overridden in <a href="#">ComObjectRef</a> .   |
|             | Number  | xs:unsignedInt                                | required |         | Group Object Number (ASAP index)   |
|             | FunctionText  | knx:LanguageDependentString255_t              | required |         | User-visible Function text. May be overridden in <a href="#">ComObjectRef</a> .  |
|             | VisibleDescription  | <a href="#">knx:LanguageDependentString_t</a> | optional |         | User-visible description of the communication object. May be overridden in <a href="#">ComObjectRef</a> .  |
|             | Priority  | <a href="#">knx:ComObjectPriority_t</a>       | optional | Low     | Default Transmission priority. May be overridden in <a href="#">ComObjectRef</a> .   |

|                   |                                     |          |   |
|-------------------|-------------------------------------|----------|---|
| ObjectSize        | <a href="#">knx:ComObjectSize t</a> | required | Data size. May be overridden in <a href="#">ComObjectRef</a> . If more than one ComObjectRef refers to this ComObject, the size given here must be the maximum size of all these ComObjectRefs. |
| ReadFlag          | <a href="#">knx:Enable t</a>        | required | Default Read flag. May be overridden in <a href="#">ComObjectRef</a> .  |
| WriteFlag         | <a href="#">knx:Enable t</a>        | required | Default Write flag. May be overridden in <a href="#">ComObjectRef</a> .   |
| CommunicationFlag | <a href="#">knx:Enable t</a>        | required | Default Communication flag. May be overridden in <a href="#">ComObjectRef</a> .   |
| TransmitFlag      | <a href="#">knx:Enable t</a>        | required | Default Transmit flag. May be overridden in <a href="#">ComObjectRef</a> .  |
| UpdateFlag        | <a href="#">knx:Enable t</a>        | required | Default Update flag. May be overridden in <a href="#">ComObjectRef</a> .  |
| ReadOnInitFlag    | <a href="#">knx:Enable t</a>        | required | Default ReadOnInit flag. May be overridden in <a href="#">ComObjectRef</a> . Only relevant for Sytem B.   |
| DatapointType     | knx:IDREFS                          | optional | Optional datapoint type specification. One or more references to <a href="#">DatapointType</a> or <a href="#">DatapointSubtype</a> .  |

#### 4.3.4.10 Element ApplicationProgramStatic\_t/ComObjectRefs

|             |  |             |  |
|-------------|--|-------------|--|
| Description | Contains the group object references that are used in the dynamic parameter structure. |             |  |
| Children    | Name   | Description |  |
|             | <b><u>ComObjectRef</u></b>   |             |  |

#### 4.3.4.11 Element ApplicationProgramStatic\_t/ComObjectRefs/ComObjectRef

|             |  |  |  |
|-------------|--|--|--|
| Description | A group object reference for use in the dynamic parameter structure. |  |  |
| Type        | <b><u>knx:ComObjectRef t</u></b>                                     |  |  |

#### 4.3.4.12 complexType ComObjectRef\_t

|             |   |       |          |         |   |
|-------------|---|-------|----------|---------|---|
| Description | <p>For each ComObject any number of ComObjectRef elements can be present. These share the number (ASAP index) in the group object table. For the user they are however independent communication objects.</p> <p>It is possible to define a ComObject without ComObjectRef, but this will never be visible to the user (or a plugin) and thus always be written with its default settings into the device image.</p> <p>If more than one ComObjectRef refers to the same ComObject, at any time at most one of them may be <b>active</b> (otherwise the generated image will not be uniquely determined).</p> <p>A ComObjectRef is active if at least one of the following ComObjectRefRef elements referring to it is <b>active</b> or no such ComObjectRefRef exists:</p> <ul style="list-style-type: none"> <li>• <a href="#">ComObjectParameterChoose_t/when/ComObjectRefRef</a></li> <li>• <a href="#">ApplicationProgramChannel_t/ComObjectRefRef</a></li> <li>• <a href="#">ComObjectParameterBlock_t/ComObjectRefRef</a></li> <li>• <a href="#">ChannelChoose_t/when/ComObjectRefRef</a></li> </ul> |       |          |         |   |
| Attributes  | Name  | Type  | Use      | Default | Description   |
|             | Id  | xs:ID | required |         | <p>Unique ID.</p> <p>This is constructed as <i>comobjid_R-number</i>, where:</p> <p><i>comobjid</i> Same as RefId</p> |

|                    |   |          |               |   |
|--------------------|---|----------|---------------|---|
|                    |   |          | <i>number</i> | Unique number of the ComObject reference within all references to this ComObject. For converted application programs, this is the same as CommunicationObject.UniqueNumber.   |
| RefId              | knx:IDREF                                     | required |               | References a <a href="#">ComObject</a> .  |
| Name               | knx:String50_t                                | optional |               | If missing, the attribute of the underlying ComObject is used.  |
| Text               | knx:LanguageDependentString255_t              | optional |               | If missing, the attribute of the underlying ComObject is used.  |
| Tag                | knx:String50_t                                | optional |               | Generic tag for plug-in developers to store reference data (not visible to the ETS user).   |
| FunctionText       | knx:LanguageDependentString255_t              | optional |               | User-visible Function text. If missing, the attribute of the underlying ComObject is used.  |
| VisibleDescription | <a href="#">knx:LanguageDependentString_t</a> | optional |               | User-visible description of the communication object. If missing, the attribute of the underlying ComObject is used.  |
| Priority           | <a href="#">knx:ComObjectPriority_t</a>       | optional |               | Transmission priority. If missing, the attribute of the underlying ComObject is used.   |
| ObjectSize         | <a href="#">knx:ComObjectSize_t</a>           | optional |               | Data size. If given, it must be equal or less then the ObjectSize given in the underlying ComObject element. If missing, the attribute of the underlying ComObject is used.   |
| ReadFlag           | knx:Enable_t                                  | optional |               | Read flag. If missing, the attribute of the underlying ComObject is used.   |
| WriteFlag          | knx:Enable_t                                  | optional |               | Write flag. If missing, the attribute of the underlying ComObject is used.  |
| CommunicationFlag  | knx:Enable_t                                  | optional |               | Communication flag. If missing, the attribute of the underlying ComObject is used.  |
| TransmitFlag       | knx:Enable_t                                  | optional |               | Transmit flag. If missing, the attribute of the underlying ComObject is used.   |
| UpdateFlag         | knx:Enable_t                                  | optional |               | Update flag. If missing, the attribute of the underlying ComObject is used.   |
| ReadOnInitFlag     | knx:Enable_t                                  | optional |               | ReadOnInit flag. If missing, the attribute of the underlying ComObject is used.   |
| DatapointType      | knx:IDREFS                                    | optional |               | One or more references to <a href="#">DatapointType</a> or <a href="#">DatapointSubType</a> . If missing, the attribute of the underlying ComObject is used if ObjectSize is also missing. If ObjectSize is given at the ComObjectRef level, ComObject.DatapointType is not used. |

#### 4.3.4.13 Element ApplicationProgramStatic\_t/BinaryData

|             |  |                  |  |
|-------------|--|------------------|--|
| Description | Contains arbitrary additional binary data. |                  |  |
| Children    | Name                                       | Description      |  |
|             | <b><u>BinaryData</u></b>                   | Any binary data. |  |

#### 4.3.4.14 element ApplicationProgramStatic\_t/BinaryData/BinaryData

|             |   |  |  |
|-------------|---|--|--|
| Description | Arbitrary binary data included in the application program. This is only for use by plugins. |  |  |
| Type        | <b><u>knx:BinaryData_t</u></b>  |  |  |

#### 4.3.4.15 complexType BinaryData\_t

|             |   |   |  |
|-------------|---|---|--|
| Description | Arbitrary binary data included in the application program. This is only for use by plugins. |   |  |
| Children    | Name  | Description   |  |
|             | <b><u>Data</u></b>  | The actual data, encoded as xs:base64Binary (optional). |  |

| Attributes | Name | Type           | Use      | Default | Description  |
|------------|------|----------------|----------|---------|--|
|            | Id   | xs:ID          | required |         | Unique ID.<br>On export or conversion, this will be constructed as <i>parid</i> <b>_BD-</b> <i>name</i> , where:<br><i>parid</i> ID of the parent ApplicationProgram<br><i>name</i> Name, with all characters except letters and digits escaped as described in <a href="#">ID naming schema</a> . |
|            | Name | knx:String50_t | required |         | Unique name of the binary data block   |

#### 4.3.4.16 element BinaryData\_t/Data

|             |                           |
|-------------|---------------------------|
| Description | The data; base64 encoded. |
| Type        | <b>xs:base64Binary</b>    |

### 4.3.5 Product Data

#### 4.3.5.1 Element Hardware\_t/Hardware2Programs

| Description                    | Contains a list of references to the application programs allowed for this hardware product, and KNX registration information. |      |             |                                |  |
|--------------------------------|--|------|-------------|--------------------------------|--|
| Children                       | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b><u>Hardware2Program</u></b></td><td></td></tr> </table>        | Name | Description | <b><u>Hardware2Program</u></b> |  |
| Name                           | Description  |      |             |                                |  |
| <b><u>Hardware2Program</u></b> |  |      |             |                                |  |

#### 4.3.5.2 Element Hardware\_t/Hardware2Programs/Hardware2Program

|             |   |
|-------------|---|
| Description | Specifies an application program allowed for this hardware product, and KNX registration information. |
| Type        | <b><u>knx:Hardware2Program t</u></b>  |

#### 4.3.5.3 complexType Hardware2Program\_t

| Description                         | Specifies an application program allowed for this hardware product, and KNX registration information.  |      |             |                                     |   |                                |                               |
|-------------------------------------|--|------|-------------|-------------------------------------|---|--------------------------------|-------------------------------|
| Children                            | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b><u>ApplicationProgramRef</u></b></td><td>Zero to 2 references to <a href="#">ApplicationPrograms</a>.<br/>If 1 reference, this must be of ProgramType "ApplicationProgram".<br/>If 2 references, the first one must be of ProgramType "ApplicationProgram", the second of ProgramType "PeiProgram".</td></tr> <tr> <td><b><u>RegistrationInfo</u></b></td><td>KNX registration information.</td></tr> </table> | Name | Description | <b><u>ApplicationProgramRef</u></b> | Zero to 2 references to <a href="#">ApplicationPrograms</a> .<br>If 1 reference, this must be of ProgramType "ApplicationProgram".<br>If 2 references, the first one must be of ProgramType "ApplicationProgram", the second of ProgramType "PeiProgram". | <b><u>RegistrationInfo</u></b> | KNX registration information. |
| Name                                | Description  |      |             |                                     |   |                                |                               |
| <b><u>ApplicationProgramRef</u></b> | Zero to 2 references to <a href="#">ApplicationPrograms</a> .<br>If 1 reference, this must be of ProgramType "ApplicationProgram".<br>If 2 references, the first one must be of ProgramType "ApplicationProgram", the second of ProgramType "PeiProgram".  |      |             |                                     |   |                                |                               |
| <b><u>RegistrationInfo</u></b>      | KNX registration information.  |      |             |                                     |   |                                |                               |



| Attributes | Name        | Type            | Use      | Default | Description  |
|------------|-------------|-----------------|----------|---------|--|
|            | Id          | xs:ID           | required |         | <p>Unique ID.</p> <p>On export or conversion, this will be constructed as<br/> <i>hwid_HP</i> if no ApplicationProgram is assigned<br/> <i>hwid_HP-nnnn-vv[-Ooooo]</i> if one ApplicationProgram is assigned<br/> <i>hwid_HP-nnnn-vv[-Ooooo]-nnnn-vv[-Ooooo]</i> if two ApplicationPrograms are assigned<br/>           where:<br/> <i>hwid</i> Id of the parent <a href="#">Hardware</a> element<br/> <i>nnnn-vv[-Ooooo]</i> see <a href="#">ApplicationProgram</a></p> |
|            | MediumTypes | knx:IDREFS      | optional |         | Reference to one or more <a href="#">MediumTypes</a>   |
|            | Hash        | xs:base64Binary | optional |         | This element contains the KNX registration relevant data hash for Hardware and ApplicationProgram. The extent of the signed data is the parent Hardware/@Id, all certification relevant attributes of Hardware, Hardware2Program/@Id, ApplicationProgramRef elements and the MediumTypes element.  |

#### 4.3.5.4 Element Hardware\_t/Products

|             |  |
|-------------|--|
| Description | List of product information for a hardware product.  |
| Children    | <p>Name Description</p> <p><b><u>Product</u></b></p> |

#### 4.3.5.5 Element Hardware\_t/Products/Product

| Description | Product information for a hardware product  |   |          |         |   |
|-------------|---|---|----------|---------|---|
| Children    | <p>Name Description</p> <p><b><u>Baggages</u></b> List of Baggage file references to be included with this product.</p> <p><b><u>Attributes</u></b></p> <p><b><u>RegistrationInfo</u></b></p> |   |          |         |   |
| Attributes  | Name  | Type  | Use      | Default | Description   |
|             | Id  | xs:ID   | required |         | <p>Unique ID of the product.</p> <p>On export or conversion, this will be constructed as<br/> <i>parid_P-orderno</i>, where:<br/> <i>parid</i> Id of the parent Manufacturer<br/> <i>orderno</i> OrderNumber, with all characters except letters and digits escaped as described in <a href="#">ID naming schema</a>.</p> |
|             | Text  | knx:LanguageDependentString255_t              | required |         | Name of the product as displayed to the user.   |
|             | OrderNumber   | knx:String50_t                                | required |         | Order number; must be unique within all products of one manufacturer  |
|             | IsRailMounted   | xs:boolean                                    | required |         | true if this a product for mounting on a distribution panel rail  |
|             | WidthInMillimeter   | xs:float                                      | optional |         | if IsRailMounted is true, this is the width of the product in mm.   |
|             | VisibleDescription  | <a href="#">knx:LanguageDependentString_t</a> | optional |         | Long description of the product   |

|  |                           |                  |            |  |
|--|---------------------------|------------------|------------|--|
|  | DefaultLanguage           | xs:language      | optional   | Default language for product data. If not present, the DefaultLanguage of the Manufacturer element is used.  |
|  | NonRegRelevantDataVersion | xs:unsignedShort | optional 0 | Version of all non-registration relevant data of this element and all its children. Import will ensure that older versions do not overwrite newer versions |
|  | Hash                      | xs:base64Binary  | optional   | KNX registration relevant data hash over the parent Hardware/@Id, Product/@Id and @OrderNumber.  |

## 4.4 Project Data

### 4.4.1 Element KNX/Project

|             |                             |
|-------------|-----------------------------|
| Description | Contains a project.         |
| Type        | <b><u>knx:Project t</u></b> |

### 4.4.2 complexType Project\_t

|             |                                  |   |          |         |   |
|-------------|----------------------------------|---|----------|---------|---|
| Description | Contains a project.              |   |          |         |   |
| Children    | Name                             | Description   |          |         |   |
|             | <b><u>ProjectInformation</u></b> | Contains general information about the project.   |          |         |   |
|             | <b><u>Installations</u></b>      | Contains the list of installations within the project.. Most project will just have one Installation. |          |         |   |
|             | <a href="#">AddInData</a>        | Contains project related data for AddIns  |          |         |   |
|             | UserFiles                        | Contains the user files that are appended to the project  |          |         |   |
| Attributes  | Name                             | Type  | Use      | Default | Description   |
|             | Id                               | xs:ID   | required |         | Unique ID of the project in the knxproj container.<br>On export or conversion, this will be constructed as <b>P-<i>nnnn</i></b> , where:<br><i>nnnn</i> Random 16Bit Identifier, formatted as 4 hexadecimal digits . Must be unique in the knxproj container. |

#### 4.4.2.1 Element Project\_t/UserFiles

|             |                               |
|-------------|-------------------------------|
| Description | Contains the Userfiles        |
| Type        | <b><u>knx:Userfiles t</u></b> |

#### 4.4.2.2 complexType UserFile\_t

|             |                            |                 |          |         |                             |
|-------------|----------------------------|-----------------|----------|---------|-----------------------------|
| Description | An element of the Userfile |                 |          |         |                             |
| Attributes  | Name                       | Type            | Use      | Default | Description                 |
|             | Filename                   | knx:string255_t | required |         | The name of the user file   |
|             | Comment                    | xs:string       | optional |         | A comment for the user file |

#### 4.4.2.3 element Project\_t/AddInData

|             |                   |
|-------------|-------------------|
| Description | List of AddInData |
|-------------|-------------------|

#### 4.4.2.4 complexType AddInData\_t

|             |                             |                        |          |         |                             |
|-------------|-----------------------------|------------------------|----------|---------|-----------------------------|
| Description | An element of the AddInData |                        |          |         |                             |
| Attributes  | Name                        | Type                   | Use      | Default | Description                 |
|             | Name                        | knx:String50_trequired |          |         | The name of the AddIn       |
|             | AddInId                     | xs:ID                  | required |         | The identifier of the AddIn |

### 4.4.3 General

#### 4.4.3.1 Element Project\_t/ProjectInformation

|             |   |   |          |           |  |
|-------------|---|---|----------|-----------|--|
| Description | Contains general information about the project. |   |          |           |  |
| Children    | Name  | Description                                   |          |           |  |
|             | <a href="#">HistoryEntries</a>                  | Contains history entries entered by the user. |          |           |  |
|             | <a href="#">ToDoItems</a>                       | Contains project related ToDo notes           |          |           |  |
|             | <a href="#">ProjectTraces</a>                   | Contains the ProjectTraces                    |          |           |  |
| Attributes  | Name  | Type  | Use      | Default   | Description  |
|             | Name  | knx:String50_t                                | required |           | Project Name   |
|             | GroupAddressStyle                               | <a href="#">knx:GroupAddressStyle_t</a>       | required |           | Representation of group addresses in this project  |
|             | ProjectNumber                                   | knx:String50_t                                | optional |           | Optional project number  |
|             | ContractNumber                                  | knx:String50_t                                | optional |           | Optional contract number   |
|             | LastModified                                    | xs:dateTime                                   | optional |           | Date and time of last modification (UTC)   |
|             | ProjectStart                                    | xs:dateTime                                   | optional |           | Date of project start (UTC)  |
|             | ProjectEnd                                      | xs:dateTime                                   | optional |           | Date of schedules project end (UTC)  |
|             | ProjectId                                       | xs:unsignedShort                              | optional |           | KNXnet/IP project ID [0 ... 4095]. Not used for other media.<br>See KNX standard, Volume 3, Part 8, Chapter 2.   |
|             | ProjectPassword                                 | knx:String20_t                                | optional |           | Project password. Note that the password is not encrypted in the XML file as password protected projects are stored in encrypted zip containers (see chapter 1.1.1). |
|             | Comment   | xs:string                                     | optional |           | Optional comment   |
|             | CompletionStatus                                | <a href="#">knx:CompletionStatus_t</a>        | optional | Undefined | Completion status  |
|             | ProjectTracingLevel                             | <a href="#">knx:ProjectTracingLevel_t</a>     | optional | None      | The Level for ProjectTraces  |
|             | Hide16BitGroupsFromLegacyPlugins                | xs:boolean                                    | optional | false     | If true, the project will not use 16 bit groups. This will prevent problems with older plugins that only support 15 bit groups.                                      |

#### 4.4.3.2 element Project\_t/ProjectInformation/HistoryEntries

|             |   |
|-------------|---|
| Description | List of history entries entered by the user |
|-------------|---|

|          |                            |             |
|----------|----------------------------|-------------|
| Children | Name                       | Description |
|          | <b><u>HistoryEntry</u></b> |             |

#### 4.4.3.3 element Project\_t/ProjectInformation/HistoryEntries/HistoryEntry

|             |                                     |                |          |         |  |
|-------------|-------------------------------------|----------------|----------|---------|--|
| Description | History entries entered by the user |                |          |         |  |
| Attributes  | Name                                | Type           | Use      | Default | Description                              |
|             | Date                                | xs:dateTime    | required |         | Date and time of the history entry (UTC) |
|             | User                                | knx:String50_t | optional |         | User name (optional)                     |
|             | Text                                | xs:string      | required |         | Text of the history entry                |
|             | Detail                              | xs:string      | optional |         | Detailed text for the entry              |

#### 4.4.3.4 element Project\_t/ProjectInformation/ProjectTraces

|             |                                   |
|-------------|-----------------------------------|
| Description | Contains the ProjectTraces        |
| Type        | <b><u>knx:ProjectTraces_t</u></b> |

#### 4.4.3.5 complexType ProjectTrace\_t

|             |                                |             |          |         |   |
|-------------|--------------------------------|-------------|----------|---------|---|
| Description | An element of the ProjectTrace |             |          |         |   |
| Attributes  | Name                           | Type        | Use      | Default | Description                               |
|             | Date                           | xs:dateTime | required |         | The date and time of the trace's creation |
|             | UserName                       | xs:string   | required |         | The name of the user                      |
|             | Comment                        | xs:string   | required |         | The text of the trace                     |

#### 4.4.3.6 element Project\_t/ProjectInformation/ToDoItems

|             |                               |
|-------------|-------------------------------|
| Description | Contains the ToDoItems        |
| Type        | <b><u>knx:ToDoItems_t</u></b> |

#### 4.4.3.7 complexType ToDoItem\_t

|             |                            |           |          |         |                             |
|-------------|----------------------------|-----------|----------|---------|-----------------------------|
| Description | An element of the ToDoItem |           |          |         |                             |
| Attributes  | Name                       | Type      | Use      | Default | Description                 |
|             | Description                | xs:string | required |         | The description of the item |

|            |                  |          |   |
|------------|------------------|----------|---|
| ObjectPath | xs:string        | optional | The path to the object                                      |
| Status     | knx:ToDoStatus_t | required | The status of the ToDoItem, either "Open" or "Accomplished" |

#### 4.4.3.8 complexType BusAccess\_t

|             |                                    |            |          |         |   |
|-------------|------------------------------------|------------|----------|---------|---|
| Description | The information for the bus access |            |          |         |   |
| Attributes  | Name                               | Type       | Use      | Default | Description                                 |
|             | Name                               | xs:string  | required |         | The name of the access                      |
|             | Edi                                | knx:Guid_t | required |         | The Guid of the access type                 |
|             | Parameterxs:string                 |            | required |         | The parameters necessary for the connection |

#### 4.4.3.9 element Project\_t/Installations

|             |  |                        |  |  |  |
|-------------|--|------------------------|--|--|--|
| Description | Contains the list of installations within the project. |                        |  |  |  |
| Children    | Name   | Description            |  |  |  |
|             | <a href="#">Installation</a>                           | Up to 15 installations |  |  |  |

#### 4.4.3.10 element Project\_t/Installations/Installation

|             |                                    |  |          |             |  |
|-------------|------------------------------------|--|----------|-------------|--|
| Description | Contains data for one installation |  |          |             |  |
| Children    | Name                               | Description  |          |             |  |
|             | <a href="#">Topology</a>           | Contains the topology structure and device data          |          |             |  |
|             | <a href="#">Buildings</a>          | Contains the building structure                          |          |             |  |
|             | <a href="#">GroupAddresses</a>     | Contains the group address structure                     |          |             |  |
|             | <a href="#">Trades</a>             | Contains the trades structure                            |          |             |  |
|             | <a href="#">BusAccess</a>          | Contains the bus access information for the installation |          |             |  |
| Attributes  | Name                               | Type   | Use      | Default     | Description  |
|             | Name                               | knx:String50_t   | required |             | Name of the installation. If the project contains just one installation, this can be set to an empty string    |
|             | InstallationId                     | xs:unsignedShort   | optional |             | KNXnet/IP installation ID [0...15]; not used for other media.<br>See KNX standard, Volume 3, Part 8, Chapter 2 |
|             | BCUKey                             | xs:unsignedLong  | optional | 4294967295  | The key used to lock devices supporting authentication.  |
|             | IPRoutingMulticastAddress          | <a href="#">knx:Ipv4Address_t</a>                        | optional | 224.0.23.12 | The multicast address for IP communication.  |
|             | DefaultLine                        | xs:string  | optional |             | The RefId of the default line.   |
|             | CompletionStatus                   | <a href="#">knx:CompletionStatus_t</a>                   | optional | Undefined   | Completion status  |

## 4.4.4 Topology

### 4.4.4.1 element Project\_t/Installations/Installation/Topology

|             |   |
|-------------|---|
| Description | Contains the topology structure and device data |
|-------------|---|

### 4.4.4.2 complexType Topology\_t

|             |   |  |  |
|-------------|---|--|--|
| Description | Contains the topology structure and device data |  |  |
| Children    | Name  | Description                            |  |
|             | <b>Area</b>                                     | Up to 16 Areas                         |  |
|             | <b>UnassignedDevices</b>                        | List of devices not assigned to a line |  |

### 4.4.4.3 element Topology\_t/Area

|             |                           |  |          |         |   |
|-------------|---------------------------|--|----------|---------|---|
| Description | Description of a KNX area |  |          |         |   |
| Children    | Name                      | Description                            |          |         |   |
|             | <b>Line</b>               | Up to 16 lines                         |          |         |   |
| Attributes  | Name                      | Type                                   | Use      | Default | Description   |
|             | Id                        | xs:ID                                  | optional |         | Unique ID.<br>On export or conversion, this will be constructed as <i>parid_A-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID separated with '-'<br><i>number</i> Unique number of the area within the project. This does not reflect the area address! For converted projects, this corresponds to Area.UniqueNumber in the database schema. |
|             | Name                      | knx:String255_t                        | required |         | Name of the area  |
|             | Address                   | xs:int                                 | required |         | Area address [0...15]   |
|             | Comment                   | xs:string                              | optional |         | User comment  |
|             | CompletionStatus          | <a href="#">knx:CompletionStatus_t</a> | optional |         | Completion status   |
|             | Description               | xs:string                              | optional |         | Description of the area   |

### 4.4.4.4 element Topology\_t/Area/Line

|             |                                 |   |  |
|-------------|---------------------------------|---|--|
| Description | Description of a KNX line       |   |  |
| Children    | Name                            | Description   |  |
|             | <b>DeviceInstance</b>           | List of devices assigned to the line.   |  |
|             | <b>AdditionalGroupAddresses</b> | List of additional group addresses that should be included in the filter table of this line's line coupler. |  |

|            |  |  |          |             |   |
|------------|--|--|----------|-------------|---|
|            | <a href="#">BusAccess</a> Contains the bus access information for the line |  |          |             |   |
| Attributes | Name   | Type                                   | Use      | Default     | Description   |
|            | Id   | xs:ID                                  | required |             | Unique ID.<br>On export or conversion, this will be constructed as <i>parid_L-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID separated with '-'<br><i>number</i> Unique number of the line within the project. This does not reflect the line address! For converted projects, this corresponds to Line.UniqueNumber in the database schema. |
|            | Name   | knx:String255_t                        | required |             | Name of the line  |
|            | Address  | xs:int                                 | required |             | Line address [0...15]   |
|            | MediumTypeRefId  | knx:IDREF                              | required |             | Medium type of the line, a reference to <a href="#">MediumType</a> .  |
|            | Comment  | xs:string                              | optional |             | User comment  |
|            | DomainAddress  | xs:unsignedLong                        | optional |             | For open media (PL, RF), the domain address   |
|            | DomainAddressIsChecked   | xs:boolean                             | optional | false       | true if it has been verified that the Domain Address is available for use.  |
|            | CompletionStatus   | <a href="#">knx:CompletionStatus_t</a> | optional |             | Completion status   |
|            | Description  | xs:string                              | optional |             | Description of the line   |
|            | IPRoutingMulticastAddress  | knx:Ipv4Address_t                      | optional | 224.0.23.12 | The multicast address of the IP line  |
|            | MulticastTTL   | xs:byte                                | optional | 16          | The time to live for multicast telegrams, i.e. the number of routers the telegram may pass before deletion.   |

#### 4.4.4.5 element Topology\_t/Area/Line/DeviceInstance

|             |   |
|-------------|---|
| Description | Represents a device in the project.         |
| Type        | <b><a href="#">knx:DeviceInstance_t</a></b> |

#### 4.4.4.6 element Topology\_t/Area/Line/AdditionalGroupAddresses

| Description                         | List of additional group addresses that should be included in the filter table of this line's line coupler.   |      |             |                                     |   |
|-------------------------------------|---|------|-------------|-------------------------------------|---|
| Children                            | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b><a href="#">GroupAddress</a></b></td><td>GroupAddress that is not necessarily contained in the project</td></tr> </table> | Name | Description | <b><a href="#">GroupAddress</a></b> | GroupAddress that is not necessarily contained in the project |
| Name                                | Description   |      |             |                                     |   |
| <b><a href="#">GroupAddress</a></b> | GroupAddress that is not necessarily contained in the project   |      |             |                                     |   |

#### 4.4.4.7 element Topology\_t/Area/Line/AdditionalGroupAddresses/GroupAddress

|             |         |                  |          |         |   |
|-------------|---------|------------------|----------|---------|---|
| Description |         |                  |          |         |   |
| Attributes  | Name    | Type             | Use      | Default | Description                                     |
|             | Address | xs:unsignedShort | required |         | The address of the <a href="#">GroupAddress</a> |



#### 4.4.4.8 element Topology\_t/UnassignedDevices

| Description           | List of devices not assigned to a line   |      |             |                       |                                      |
|-----------------------|--|------|-------------|-----------------------|--------------------------------------|
| Children              | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b>DeviceInstance</b></td><td>List of devices assigned to no line.</td></tr> </table> | Name | Description | <b>DeviceInstance</b> | List of devices assigned to no line. |
| Name                  | Description  |      |             |                       |                                      |
| <b>DeviceInstance</b> | List of devices assigned to no line.   |      |             |                       |                                      |

#### 4.4.4.9 element Topology\_t/UnassignedDevices/DeviceInstance

|             |                                     |
|-------------|-------------------------------------|
| Description | Represents a device in the project. |
| Type        | <b>knx:DeviceInstance t</b>         |

### 4.4.5 Device Data

#### 4.4.5.1 complexType DeviceInstance\_t

|             |                                     |   |          |         |  |
|-------------|-------------------------------------|---|----------|---------|--|
| Description | Represents a device in the project. |   |          |         |  |
| Children    | Name                                | Description   |          |         |  |
|             | <b><u>ParameterInstanceRefs</u></b> | List of parameter instances with non-default values |          |         |  |
|             | <b><u>ComObjectInstanceRefs</u></b> | List of group communication object instances        |          |         |  |
|             | <b><u>AdditionalAddresses</u></b>   | Additional individual addresses of the device       |          |         |  |
|             | <b><u>BinaryData</u></b>            | For use by plugins                                  |          |         |  |
|             | <b>IPConfig</b>                     | The IP configuration of the device                  |          |         |  |
| Attributes  | Name                                | Type  | Use      | Default | Description  |
|             | Id                                  | xs:ID   | required |         | Unique ID.<br>On export or conversion, this will be constructed as <i>parid_DI-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID separated with '-'<br><i>number</i> Unique number of the area within the project. This does not reflect the device address! For converted projects, this corresponds to DeviceInstance.UniqueNumber in the database schema. |
|             | Name                                | knx:String255_t                                     | required |         | Device name  |
|             | ProductRefId                        | knx:IDREF   | required |         | Reference to a <a href="#">Product</a> ; must be a child of the Hardware2Program element   |
|             | Hardware2ProgramRefId               | knx:IDREF   | optional |         | Reference to a <a href="#">Hardware2Program</a>  |
|             | Address                             | xs:int  | optional |         | Device address [0...255]   |
|             | Comment                             | xs:string   | optional |         | Device comment   |
|             | LastModified                        | xs:dateTime   | optional |         | Date/time of last modification (UTC)   |
|             | LastDownload                        | xs:dateTime   | optional |         | Date/time of last download (UTC)   |

|  |  |          |           |  |
|--|--|----------|-----------|--|
| InstallationHints                                | xs:string                              | optional |           | Installation hints, may be plain text or RTF text  |
| CompletionStatus                                 | <a href="#">knx:CompletionStatus_t</a> | optional | Undefined | Completion status  |
| IndividualAddressLoaded                          | xs:boolean                             | optional | false     | true if the IA has been programmed   |
| ApplicationProgramLoaded                         | xs:boolean                             | optional | false     | true if the application program has been programmed  |
| ParametersLoaded                                 | xs:boolean                             | optional | false     | true if the parameters has been programmed   |
| CommunicationPartLoaded                          | xs:boolean                             | optional | false     | true if the group communication part has been programmed   |
| MediumConfigLoaded                               | xs:boolean                             | optional | false     | true if the PL medium configuration has been programmed  |
| LoadedImage                                      | xs:base64Binary                        | optional |           | The image loaded into the device the last time (used with differential download)   |
| CheckSums  | xs:base64Binary                        | optional |           | Check sums read from the device the last time (used with differential download)  |
| Description                                      | xs:string                              | optional |           | Device description.  |
| <b>IsCommunicationObjectVisibilityCalculated</b> | xs:boolean                             | optional |           | If the <b>IsCommunicationObjectVisibilityCalculated</b> flag exists at the DeviceInstance and is "true", the activity for the ComObjectInstanceRefs of this DeviceInstance is already determined for the current DeviceInstance configuration. In this case, the IsActive flag exists at the active ComObjectInstanceRefs elements in the Xml. |

#### 4.4.5.2 complexType IPConfig\_t

|             |   |                                      |          |         |  |
|-------------|---|--------------------------------------|----------|---------|--|
| Description | IP configuration for the DeviceInstance |                                      |          |         |  |
| Attributes  | Name                                    | Type                                 | Use      | Default | Description  |
|             | Assign                                  | <a href="#">knx:IPConfigAssign_t</a> | optional | Auto    | If the value is 'Auto', the IP configuration is fetched from DHCP, if the value is 'Fixed', the IP configuration is performed manually |
|             | IPAddress                               | knx:Ipv4Address_t                    | optional |         | The IP address of the IP device  |
|             | SubnetMask                              | knx:Ipv4Address_t                    | optional |         | The subnet mask of the IP device   |
|             | DefaultGateway                          | knx:Ipv4Address_t                    | optional |         | The default gateway of the IP device   |
|             | MACAddress                              | knx:String50_t                       | optional |         | The MAC address of the IP device   |

#### 4.4.5.3 element DeviceInstance\_t/ParameterInstanceRefs

| Description                 | List of parameter instances with non-default values.<br>If a parameter has its default value, it needs not be listed here.                    |  |  |      |             |                             |  |
|-----------------------------|---|--|--|------|-------------|-----------------------------|--|
| Children                    | <table><thead><tr><th>Name</th><th>Description</th></tr></thead><tbody><tr><td><u>ParameterInstanceRef</u></td><td></td></tr></tbody></table> |  |  | Name | Description | <u>ParameterInstanceRef</u> |  |
| Name                        | Description   |  |  |      |             |                             |  |
| <u>ParameterInstanceRef</u> |   |  |  |      |             |                             |  |

#### 4.4.5.4 element DeviceInstance\_t/ParameterInstanceRefs/ParameterInstanceRef

|             |                    |       |          |         |   |
|-------------|--------------------|-------|----------|---------|---|
| Description | Parameter instance |       |          |         |   |
| Attributes  | Name               | Type  | Use      | Default | Description   |
|             | Id                 | xs:ID | optional |         | Might be set and used by Plugins. It is recommended to use one of the following methods for constructing the attribute value: |

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>a GUID (without enclosing braces)</li> <li><i>deviceid_paramrefid</i> where <i>deviceid</i> is the Id of the parent Device and <i>paramrefid</i> is the Id of the referenced ParameterRef</li> </ul> |
| RefId knx:IDREF required                   | Reference to a <a href="#">ParameterRef</a> .   |
| Value <a href="#">knx:Value_t</a> optional | The current value   |

#### 4.4.5.5 element DeviceInstance\_t/ComObjectInstanceRefs

|             |  |             |  |
|-------------|--|-------------|--|
| Description | List of group communication object instances.<br>If a communication object instance has all default settings and no associations, it needs not be listed here. |             |  |
| Children    | Name   | Description |  |
|             | <b><u>ComObjectInstanceRef</u></b>   |             |  |

#### 4.4.5.6 element DeviceInstance\_t/ComObjectInstanceRefs/ComObjectInstanceRef

|             |  |
|-------------|--|
| Description | Group communication object instance      |
| Type        | <b><u>knx:ComObjectInstanceRef_t</u></b> |

#### 4.4.5.7 complexType ComObjectInstanceRef\_t

|             |   |   |          |         |   |
|-------------|---|---|----------|---------|---|
| Description | Goup communication object instance                |   |          |         |   |
| Children    | Name  | Description                             |          |         |   |
|             | <b><u>Connectors</u></b> Assigned group addresses |   |          |         |   |
| Attributes  | Name  | Type                                    | Use      | Default | Description   |
|             | Id  | xs:ID                                   | optional |         | The identifier  |
|             | RefId   | knx:IDREF                               | required |         | Reference to a <a href="#">ComObjectRef</a>   |
|             | Text  | knx:String255_t                         | optional |         | Visible communication object name. If missing, the attribute of the underlying ComObjectRef or ComObject is used  |
|             | FunctionText                                      | knx:String255_t                         | optional |         | Visible communication object function name. If missing, the attribute of the underlying ComObjectRef or ComObject is used   |
|             | Priority  | <a href="#">knx:ComObjectPriority_t</a> | optional |         | Transmission priority. If missing, the attribute of the underlying ComObjectRef or ComObject is used.   |
|             | ReadFlag  | <a href="#">knx:Enable_t</a>            | optional |         | Read flag. If missing, the attribute of the underlying ComObjectRef or ComObject is used.   |
|             | WriteFlag   | <a href="#">knx:Enable_t</a>            | optional |         | Write flag. If missing, the attribute of the underlying ComObjectRef or ComObject is used.  |
|             | CommunicationFlag                                 | <a href="#">knx:Enable_t</a>            | optional |         | Communication flag. If missing, the attribute of the underlying ComObjectRef or ComObject is used.  |
|             | TransmitFlag                                      | <a href="#">knx:Enable_t</a>            | optional |         | Transmit flag. If missing, the attribute of the underlying ComObjectRef or ComObject is used.   |
|             | UpdateFlag  | <a href="#">knx:Enable_t</a>            | optional |         | Update flag. If missing, the attribute of the underlying ComObjectRef or ComObject is used.   |
|             | ReadOnInitFlag                                    | <a href="#">knx:Enable_t</a>            | optional |         | ReadOnInit flag. If missing, the attribute of the underlying ComObjectRef or ComObject is used.   |
|             | DatapointType                                     | knx:IDREFS                              | optional |         | May be a reference to (one or more) <a href="#">DatapointType</a> or <a href="#">DatapointSubtype</a> . If missing, the attribute of the underlying ComObjectRef or |

|             |            |          |   |                    |
|-------------|------------|----------|---|--------------------|
|             |            |          |   | ComObject is used. |
| Description | xs:string  | optional | Description   |                    |
| IsActive    | xs:boolean | optional | The IsActive flag is valid if the <b>IsCommunicationObjectVisibilityCalculated</b> flag exists at the DeviceInstance to which this ComObjectInstanceRef belongs and is set to "true". The IsActive flag of all ComObjectInstanceRefs for this DeviceInstance is then set appropriately and updates may only occur when a value of a ParameterInstanceReference changes. |                    |

#### 4.4.5.8 element ComObjectInstanceRef\_t/Connectors

|             |  |   |  |  |
|-------------|--|---|--|--|
| Description | Group addresses assigned to a ComObjectInstanceRef |   |  |  |
| Children    | Name   | Description                             |  |  |
|             | <b>Send</b>  | Sending group address                   |  |  |
|             | <b>Receive</b>                                     | Any number of receiving group addresses |  |  |

#### 4.4.5.9 element ComObjectInstanceRef\_t/Connectors/Send

|             |  |            |          |         |   |
|-------------|--|------------|----------|---------|---|
| Description | Group addresses assigned to a ComObjectInstanceRef for sending (and receiving) |            |          |         |   |
| Attributes  | Name   | Type       | Use      | Default | Description                                 |
|             | GroupAddressRefId  | knx:IDREF  | required |         | Reference to a <a href="#">GroupAddress</a> |
|             | Acknowledge  | xs:boolean | optional | false   | If true, an L2-Ack is produced on PL.       |

#### 4.4.5.10 element ComObjectInstanceRef\_t/Connectors/Receive

|             |  |            |          |         |   |
|-------------|--|------------|----------|---------|---|
| Description | Group addresses assigned to a ComObjectInstanceRef for receiving |            |          |         |   |
| Attributes  | Name   | Type       | Use      | Default | Description                                 |
|             | GroupAddressRefId  | knx:IDREF  | required |         | Reference to a <a href="#">GroupAddress</a> |
|             | Acknowledge  | xs:boolean | optional | false   | If true, an L2-Ack is produced on PL.       |

#### 4.4.5.11 element DeviceInstance\_t/AdditionalAddresses

|             |  |                |  |  |
|-------------|--|----------------|--|--|
| Description | Contains additional device addresses used by the device. |                |  |  |
| Children    | Name   | Description    |  |  |
|             | <b>Address</b>   | Device address |  |  |

#### 4.4.5.12 element DeviceInstance\_t/AdditionalAddresses/Address

|             |   |
|-------------|---|
| Description | Additional device address (individual address) used by the device |
|-------------|---|

|      |                  |
|------|------------------|
| type | xs:int [1...255] |
|------|------------------|

#### 4.4.5.13 element DeviceInstance\_t/BinaryData

|             |                          |             |  |
|-------------|--------------------------|-------------|--|
| Description | For use by plugins       |             |  |
| Children    | Name                     | Description |  |
|             | <b><u>BinaryData</u></b> |             |  |

#### 4.4.5.14 element DeviceInstance\_t/BinaryData/BinaryData

|             |                    |                     |          |         |   |
|-------------|--------------------|---------------------|----------|---------|---|
| Description | For use by plugins |                     |          |         |   |
| Children    | Name               | Description         |          |         |   |
|             | <u>Data</u>        | Any data (optional) |          |         |   |
| Attributes  | Name               | Type                | Use      | Default | Description   |
|             | Id                 | xs:string           | optional |         | Might be set and used by Plugins. It is recommended to use one of the following methods for constructing the attribute value: <ul style="list-style-type: none"><li>• a GUID (without enclosing braces)</li><li>• <i>deviceid_id</i> where <i>deviceid</i> is the Id of the parent Device and <i>id</i> is the Id of the referenced BinaryData or the suitably escaped name .</li></ul> |
|             | RefId              | knx:IDREF           | optional |         | Reference to a <a href="#">BinaryData</a> .   |
|             | Name               | knx:String50_t      | optional |         |   |

#### 4.4.5.15 element DeviceInstance\_t/BinaryData/BinaryData/Data

|             |                        |
|-------------|------------------------|
| Description |                        |
| Type        | <b>xs:base64Binary</b> |

### 4.4.6 Building Structure

#### 4.4.6.1 element Project\_t/Installations/Installation/Buildings

|             |                                 |             |  |
|-------------|---------------------------------|-------------|--|
| Description | Contains the building structure |             |  |
| Type        | <b><u>knx:Buildings_t</u></b>   |             |  |
| Children    | Name                            | Description |  |
|             | <b><u>BuildingPart</u></b>      |             |  |

#### 4.4.6.2 complexType Buildings\_t

|             |                                 |                         |  |
|-------------|---------------------------------|-------------------------|--|
| Description | Contains the building structure |                         |  |
| Children    | Name                            | Description             |  |
|             | <b>BuildingPart</b>             | Any number of buildings |  |

#### 4.4.6.3 element Buildings\_t/BuildingPart

|             |  |  |  |
|-------------|--|--|--|
| Description | A building.<br>BuildingPart elements directly below Buildings_t will normally have Type "Campus" or "Building" |  |  |
| Type        | <b>knx:BuildingPart_t</b>  |  |  |

#### 4.4.6.4 complexType BuildingPart\_t

|             |                                      |  |          |           |   |
|-------------|--------------------------------------|--|----------|-----------|---|
| Description | An element of the building structure |  |          |           |   |
| Children    | Name                                 | Description                            |          |           |   |
|             | <b>BuildingPart</b>                  | Child building parts                   |          |           |   |
|             | <b>DeviceInstanceRef</b>             | List of devices in this building part. |          |           |   |
| Attributes  | Name                                 | Type                                   | Use      | Default   | Description   |
|             | Id                                   | xs:ID                                  | required |           | Unique ID.<br>On export or conversion, this will be constructed as <i>parid_BP-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID separated with '-'<br><i>number</i> Unique number of the building part within the project. |
|             | Name                                 | knx:String255_t                        | required |           | Name  |
|             | Type                                 | <a href="#">knx:BuildingPartType_t</a> | required |           | One of: "Campus", "Building", "BuildingPart", "Floor", "Room", "RoomPart", "DistributionBoard"  |
|             | Number                               | knx:String255_t                        | optional |           | Optional number   |
|             | Comment                              | xs:string                              | optional |           | Optional comment  |
|             | CompletionStatus                     | <a href="#">knx:CompletionStatus_t</a> | optional | Undefined | Completion status   |
|             | DefaultLine                          | xs:string                              | optional |           | The RefId of the line, to which devices will be added if added to the BuildingPart  |
|             | Description                          | xs:string                              | optional |           | Description   |

#### 4.4.6.5 element BuildingPart\_t/BuildingPart

|             |                           |  |  |
|-------------|---------------------------|--|--|
| Description | Child building part.      |  |  |
| Type        | <b>knx:BuildingPart_t</b> |  |  |

#### 4.4.6.6 element BuildingPart\_t/DeviceInstanceRef

|             |   |
|-------------|---|
| Description | References a device contained in a building part. |
| Type        | <b><u>knx:DeviceInstanceRef_t</u></b>             |

#### 4.4.6.7 complexType DeviceInstanceRef\_t

|             |       |           |          |         |   |
|-------------|-------|-----------|----------|---------|---|
| Description |       |           |          |         |   |
| Attributes  | Name  | Type      | Use      | Default | Description                                 |
|             | RefId | knx:IDREF | required |         | Reference to <a href="#">DeviceInstance</a> |

#### 4.4.6.8 complexType Trades\_t

|             |                               |                      |
|-------------|-------------------------------|----------------------|
| Description | Contains the trades structure |                      |
| Children    | Name                          | Description          |
|             | <b><u>Trade</u></b>           | Any number of trades |

#### 4.4.6.9 element Trades\_t/Trade

|             |                           |
|-------------|---------------------------|
| Description | A Trade.                  |
| Type        | <b><u>knx:Trade_t</u></b> |

#### 4.4.6.10 complexType Trade\_t

|             |                                    |                                |          |         |  |
|-------------|------------------------------------|--------------------------------|----------|---------|--|
| Description | An element of the trades structure |                                |          |         |  |
| Children    | Name                               | Description                    |          |         |  |
|             | <b><u>Trade</u></b>                | Child Trades                   |          |         |  |
|             | <b><u>DeviceInstanceRef</u></b>    | List of devices in this trade. |          |         |  |
| Attributes  | Name                               | Type                           | Use      | Default | Description  |
|             | Id                                 | xs:ID                          | optional |         | Unique ID.<br>On export or conversion, this will be constructed as <i>parid_T-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID sepearted with '-'<br><i>number</i> Unique number of the Trade within the project. |
|             | Name                               | knx:String255_t                | required |         | Name of the trade  |

|                  |  |          |                          |
|------------------|--|----------|--------------------------|
| Number           | knx:String255_t                        | optional | Optional number          |
| Comment          | xs:string                              | optional | Optional comment         |
| CompletionStatus | <a href="#">knx:CompletionStatus_t</a> | optional | Completion status        |
| Description      | xs:string                              | optional | Description of the trade |

#### 4.4.6.11 element Trade\_t/Trade

|             |                           |
|-------------|---------------------------|
| Description |                           |
| Type        | <b><u>knx:Trade_t</u></b> |

#### 4.4.6.12 element Trade\_t/DeviceInstanceRef

|             |   |
|-------------|---|
| Description | References a device contained in a trade. |
| Type        | <b><u>knx:DeviceInstanceRef_t</u></b>     |

### 4.4.7 Group Addresses

#### 4.4.7.1 element Project\_t/Installations/Installation/GroupAddresses

|             |                                      |
|-------------|--------------------------------------|
| Description | Contains the group address structure |
| Type        | <b><u>knx:GroupAddresses_t</u></b>   |

#### 4.4.7.2 complexType GroupAddresses\_t

| Description              | Contains the group address structure  |      |             |                          |                                    |
|--------------------------|---|------|-------------|--------------------------|------------------------------------|
| Children                 | <table> <tr> <th>Name</th><th>Description</th></tr> <tr> <td><b><u>GroupRange</u></b></td><td>List of named group address ranges</td></tr> </table> | Name | Description | <b><u>GroupRange</u></b> | List of named group address ranges |
| Name                     | Description   |      |             |                          |                                    |
| <b><u>GroupRange</u></b> | List of named group address ranges  |      |             |                          |                                    |

#### 4.4.7.3 element GroupRange\_t/GroupAddress

|             |                           |       |          |         |  |
|-------------|---------------------------|-------|----------|---------|--|
| Description | Describes a group address |       |          |         |  |
| Attributes  | Name                      | Type  | Use      | Default | Description  |
|             | Id                        | xs:ID | required |         | Unique ID.<br>On export or conversion, this will be constructed as <i>parid_GA-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID sepearted with '-'<br><i>number</i> Unique number of the group address within the project. This does not reflect the address value! For converted projects, this corresponds to |



|               |                 |          |       |  |
|---------------|-----------------|----------|-------|--|
|               |                 |          |       | GroupAddress.UniqueNumber in the database schema.  |
| Address       | xs:unsignedInt  | required |       | Group address [1...65535]  |
| Name          | knx:String255_t | required |       | Name   |
| Unfiltered    | xs:boolean      | optional | false | If true, the group addresses in the range will not be filtered by routers.<br>Note that if a group address is part of one or more GroupRanges with Unfiltered=true, it will not be filtered irrespective of the setting of Unfiltered in the GroupAddress.   |
| Central       | xs:boolean      | optional | false | If true, the group address will be treated as central address during copy operations.  |
| Global        | xs:boolean      | optional | false | If true, the group address will be used in all installations of the project.<br>Global groups must have the same address and type in all installations of a project.   |
| Description   | xs:string       | optional |       | Description  |
| Comment       | xs:string       | optional |       | Comment  |
| DatapointType | knx:IDREFS      | optional |       | Optional datapoint type specification. One or more references to <a href="#">DatapointType</a> or <a href="#">DatapointSubtype</a> .<br>If more than one is specified, the size of all must be identical.<br>If the group address is linked to any DeviceCommunicationObjects, the sizes must match. |

#### 4.4.7.4 element GroupAddresses\_t/GroupRanges/GroupRange

|             |                                      |
|-------------|--------------------------------------|
| Description | Top-level named group range          |
| Type        | extension of <b>knx:GroupRange_t</b> |

#### 4.4.7.5 complexType GroupRange\_t

|             |  |  |          |         |   |
|-------------|--|--|----------|---------|---|
| Description | Element of the group address structure |  |          |         |   |
| Children    | Name                                   | Description                                  |          |         |   |
|             | <b>GroupRange</b>                      | Child group ranges                           |          |         |   |
|             | <b>GroupAddress</b>                    | GroupAddresses located within the GroupRange |          |         |   |
| Attributes  | Name                                   | Type   | Use      | Default | Description   |
|             | Id                                     | xs:ID  | required |         | Unique ID.<br>On export or conversion, this will be constructed as<br><i>parid_A-number</i> , where:<br><i>parid</i> ID of the parent Project and InstallationID separated with '-'<br><i>number</i> Unique number of the group range within the project. |
|             | Name                                   | knx:String255_t                              | required |         | Name  |
|             | RangeStart                             | xs:unsignedShort                             | required |         | First possible group address in the range<br><b>3-level:</b><br>Main group 0 from 1...2047; main group 1 from 2048...4095; ...<br>Middle group 0/0 from 1... 255;<br>Middle group 0/1 from 256...511;   |

|  |             |                  |                |  |
|--|-------------|------------------|----------------|--|
|  |             |                  |                | Middle group 1/0 from 2048... 2305;<br><b>2-level:</b><br>same as 3-level main groups without middle group<br><b>Free-level:</b><br>User defined; several ranges |
|  | RangeEnd    | xs:unsignedShort | required       | Last possible group address in the range   |
|  | Unfiltered  | xs:boolean       | optional false | If true, all group addresses in the range will not be filtered by routers; irrespective of the individual setting of GroupAddress/@Unfiltered.                   |
|  | Description | xs:string        | optional       | Description  |
|  | Comment     | xs:string        | optional       | Comment  |

#### 4.4.7.6 element GroupRange\_t/GroupRange

|             |   |
|-------------|---|
| Description | Child named group address range             |
| Type        | extension of <u><b>knx:GroupRange_t</b></u> |

## 5 IDs and relations

### 5.1 ID naming schema

This section summarizes the naming rules for elements of the KNX XML schema. All these IDs are constructed so that they are globally unique. Detailed descriptions are included in the individual element descriptions. Note that many IDs of subordinate elements start with the ID of the parent element, then – separated by an underscore – additional specification. Often part of the constructed ID is a unique number. How this number is to be generated and which unique constraints apply for the given element is described in detail in the individual element descriptions.

Because IDs can contain only letters, digits, dot, hyphen and underscore characters (see XML Namespaces specification, production for NCName), and hyphen and underscore are already used as separators, all characters from strings that are not letters or digits have to be escaped: A character which is neither a letter nor a digit is represented as a dot, followed by 2 hexadecimal digits representing the UTF-8 encoding of the character. Example: a slash (/) is represented as ".2F", a german umlaut ä (Unicode code point U+00E4) as ".C3.A4".

## 5.1.1 MasterData

| Element Type                     | ID Naming  | Example     |
|----------------------------------|--|-------------|
| <a href="#">DatapointType</a>    | <DatapointType@Id> ::= <b>DPT</b> - <DatapointType@Number>                                 | "DPT-15"    |
| <a href="#">DatapointSubtype</a> | <DatapointSubtype@Id> ::= <b>DPST</b> - <DatapointType@Number> - <DatapointSubtype@Number> | "DPST-15-0" |
| <a href="#">MediumType</a>       | <MediumType@Id> ::= <b>MT</b> - <MediumType@Number>  | "MT-1"      |
| <a href="#">Manufacturer</a>     | <Manufacturer@Id> ::= <b>M</b> - <Manufacturer@KnxManufacturerId:X4>                       | "M-0001"    |

## 5.1.2 Manufacturer Data

| Element Type                       | ID Naming  | Example   |
|------------------------------------|--|---|
| <a href="#">ApplicationProgram</a> | <ApplicationProgram@Id> ::=<br><Manufacturer@Id> <b>_A</b> - <@ApplicationNumber:X4> - <@ApplicationVersion:X2>-<HashPart:X4>  <br><Manufacturer@Id> <b>_A</b> - <@ApplicationNumber:X4> - <@ApplicationVersion:X2>-<HashPart:X4> <b>-O</b> <@OriginalManufacturer>  | "M-0001_A-2419-01-BAF8"   |
| <a href="#">Parameter</a>          | <Parameter@Id> ::= <ApplicationProgram@Id> <b>_P</b> - UniqueNumber()  | "M-0001_A-2419-01-BAF8_P-107"   |
| <a href="#">UnionParameter</a>     | <UnionParameter@Id> ::= <ApplicationProgram@Id> <b>_UP</b> - UniqueNumber()  | "M-0001_A-2419-01-BAF8_UP-111"  |
| <a href="#">ParameterRef</a>       | <ParameterRef@Id> ::= <ParameterRef@RefId> <b>_P</b> - UniqueNumber()  | "M-0001_A-2419-01-BAF8_P-9_R-79"  |
| <a href="#">ComObject</a>          | <ComObject@Id> ::= <ApplicationProgram@Id> <b>_O</b> - UniqueNumber()  | "M-0001_A-2419-01-BAF8_O-7"   |
| <a href="#">ComObjectRef</a>       | <ComObjectRef@Id> ::= <ComObjectRef@RefId> <b>_R</b> - UniqueNumber()  | "M-0001_A-2419-01-BAF8_O-5_R-72"  |
| <a href="#">BinaryData</a>         | <BinaryData@Id> ::= <ApplicationProgram@Id> <b>_BD</b> - <BinaryData@Name>   |   |
| <a href="#">Hardware</a>           | <Hardware@Id> ::= <Manufacturer@Id> <b>_H</b> - <Hardware@SerialNumber> - <Hardware@VersionNumber>   | "M-0001_H-hp.5F00010-1"   |
| <a href="#">Hardware2Program</a>   | <Hardware2Program@Id> ::=<br><Hardware@Id> <b>_HP</b>  <br><Hardware@Id> <b>_HP</b> - <@ApplicationNumber:X4> - <@ApplicationVersion:X2>-<HashPart:X4> [ <b>-O</b> <@OriginalManufacturer>]  <br><Hardware@Id> <b>_HP</b> - <@ApplicationNumber:X4> - <@ApplicationVersion:X2>-<HashPart:X4> [ <b>-O</b> <@OriginalManufacturer>]<br>- <@ApplicationNumber:X4> - <@ApplicationVersion:X2>-<HashPart:X4> [ <b>-O</b> <@OriginalManufacturer>] | "M-0001_H-hp.5F00181-1_HP"<br>"M-0001_H-hp.5F00105-1_HP-9010-02-842D"<br>"M-0001_H-hp.5F00185-1_HP-8023-11-AB36-0053-01-48F3" |
| <a href="#">Product</a>            | <Product@Id> ::= <Hardware@Id> <b>_P</b> - <Product@OderNumber>  | "M-0001_H-hp.5F00185-1_P-5WG1.20141.2D4AB01.20.20"  |

## 5.1.3 Project Data

| Element Type                   | ID Naming  | Example         |
|--------------------------------|--|-----------------|
| <a href="#">Project</a>        | <Project@Id> ::= <b>P</b> - UniqueNumber():X4  | "P-3AD2"        |
| <a href="#">Area</a>           | <Area@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_A</b> - UniqueNumber()            | "P-3AD2-1_A-3"  |
| <a href="#">Line</a>           | <Line@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_L</b> - UniqueNumber()            | "P-3AD2-1_L-57" |
| <a href="#">BuildingPart</a>   | <BuildingPart@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_BP</b> - UniqueNumber()   | "P-3AD2-1_BP-3" |
| <a href="#">Trade</a>          | <Trade@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_T</b> - UniqueNumber()           | "P-3AD2-1_T-1"  |
| <a href="#">DeviceInstance</a> | <DeviceInstance@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_DI</b> - UniqueNumber() | "P-3AD2-1_DI-3" |
| <a href="#">GroupRange</a>     | <GroupRange@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_GR</b> - UniqueNumber()     | "P-3AD2-1_GR-1" |
| <a href="#">GroupAddress</a>   | <GroupAddress@Id> ::= <Project@Id> - <Installation@InstallationId> <b>_GA</b> - UniqueNumber()   | "P-3AD2-1_GA-1" |

## 5.2 Reference Summary

This section summarizes the IDREF – ID relations between the elements. The last column contains an X if the referenced ID may be in another XML file.

### 5.2.1 Manufacturer Data → Manufacturer Data

| From                 | Attribute            | To   |   |
|----------------------|----------------------|--|---|
| ApplicationProgram_t | OriginalManufacturer | <a href="#">Manufacturer</a>                                 | X |
| ParameterRef_t       | RefId                | <a href="#">Parameter</a> or <a href="#">Union/Parameter</a> |   |
| ComObjectRef_t       | RefId                | <a href="#">ComObject</a>                                    |   |
| BinaryDataRef_t      | RefId                | <a href="#">BinaryData</a>                                   |   |
| Hardware_t           | OriginalManufacturer | <a href="#">Manufacturer</a>                                 | X |

### 5.2.2 Project Data → Master Data

| From   | Attribute       | To  |   |
|--|-----------------|---|---|
| Topology_t/Area/Line   | MediumTypeRefId | <a href="#">MediumType</a>  | X |
| DeviceInstance_t/ComObjectInstanceRefs /ComObjectInstanceRef_t | DatapointType   | <a href="#">DatapointType</a> or <a href="#">DatapointSubtype</a> | X |
| GroupAddresses_t/GroupAddress/DatapointType                    | DatapointType   | <a href="#">DatapointType</a> or <a href="#">DatapointSubtype</a> | X |

### 5.2.3 Project Data → Manufacturer Data

| From   | Attribute             | To                               |   |
|--|-----------------------|----------------------------------|---|
| DeviceInstance_t   | ProductRefId          | <a href="#">Product</a>          | X |
| DeviceInstance_t   | Hardware2ProgramRefId | <a href="#">Hardware2Program</a> | X |
| DeviceInstance_t/ParameterInstanceRefs/ParameterInstanceRef_t  | RefId                 | <a href="#">ParameterRef</a>     | X |
| DeviceInstance_t/ComObjectInstanceRefs /ComObjectInstanceRef_t | RefId                 | <a href="#">ComObjectRef</a>     | X |
| DeviceInstance_t/BinaryData/BinaryData                         | RefId                 | <a href="#">BinaryData</a>       | X |

### 5.2.4 Project Data → Project Data

| From  | Attribute         | To                             |  |
|---|-------------------|--------------------------------|--|
| Topology_t/Area/Line/AdditionalGroupAddresses/GroupAddressRef | RefId             | <a href="#">GroupAddress</a>   |  |
| ComObjectInstanceRef_t/Connectors/Send                        | GroupAddressRefId | <a href="#">GroupAddress</a>   |  |
| ComObjectInstanceRef_t/Connectors/Receive                     | GroupAddressRefId | <a href="#">GroupAddress</a>   |  |
| DeviceInstanceRef_t   | RefId             | <a href="#">DeviceInstance</a> |  |

## 6 Transfer files

For export and import scenarios, the generated XML file(s) will be packed into a ZIP archive. This has the following advantages:

- *By compression, the files have a manageable size*
- *Not everything needs to be in a single XML. This is important since current XML parsers and XPath implementations do not work well or do not work at all on huge XML files.*

The “knx:IDREF” need not resolve within each individual XML file within the archive, but within the whole archive. For import, the individual XML files may also be present unzipped, but in the same file system directory.

### 6.1 File extensions

As file extension, the following is used:

|             |  |
|-------------|--|
| *.knxmaster | If just master data is included                          |
| *.knxprod   | If just master and manufacturer product data is included |
| *.knxproj   | If master, product and project data is included.         |

### 6.2 File content

#### 6.2.1 Non-XML files

The following data is not stores within the XML files but as external files

- Baggage data
- BinaryData and BinarydaraRef data
- UserFile data

The corresponding XML elements omit the Data child element.

#### 6.2.2 Distribution to partial XML files

When distributing the data to different XML files, the following restrictions apply:

- All **MasterData** is in one XML file.
- Together with an **ApplicationProgram** element, all child elements must be in the same XML file.
- Together with a **Project** element, all child elements must be in the same XML file.

Logically, the files can be thought of as a merged XML file.

In principle, starting from the KNX element, the files are merged recursively, with the following rules:

- The following elements will be identified (within a recursion level); they must have identical attributes in each partial XML.
  - Elements with same tag and same "Id"
  - Elements with same tag without "Id" (this is for the container-type elements like e.g. "ManufacturerData").
  - Language elements with same "Identifier"
  - Language/Translation elements with same "RefId"
  - Language/Translation/Translation elements with same "AttributeName"

- Exception: **Project** is never merged (two projects even with the same name will stay two distinct projects)
- Below **ApplicationProgram** no merging is required; here everything must be identical.

The converter will produce the partial XML files according to the following rules:

- Each ApplicationProgram element will be written to a separate XML file
- Each Baggage element will be written to a separate XML file
- Each Project element will be written to a separate XML file

### 6.2.3 Naming convention

To avoid name conflicts between the individual XML files within the archive, the following naming convention should be obeyed:

|                      |  |
|----------------------|--|
| index.xml            | See below  |
| knx_master.xml       | Created by KNX; contains only master data.   |
| M- <i>iiii</i> _.xml | Created by manufacturer <i>iiii</i> (manufacturer ID, formatted as 4 hex digits); contains product data. |
| *.xml                | Created by user; contains project data (* should not contain – and _ characters).                        |

## 6.3 ETS4 Container Structure

The converter creates \*.knxprod files containing the ETS4 product data and \*.knxproj files containing ETS4 project data. Both file formats are renamed zip files that contain several xml files following the KNX-XML schema.

### 6.3.1 ETS4 Product Structure

ETS4 uses for project the extension \*.knxprod; the container contains the following files:

- The root of the zip container contains one file, the knx\_master.xml, which contains all KnxMasterData.
- For every manufacturer, a subfolder is created, to which all files from that manufacturer are written. The name of the folder is the <Manufacturer.RefId> (e.g. "M-0001").
- A single file is written for each ApplicationProgram element. This file is located in the manufacturer folder. The name of the ApplicationProgram file is "<ApplicationProgramId>.xml" (e.g. "M-0001\_A-0002-21-25A6.xml"). This xml file not only contains the application program element with all its child elements but also all the translation units referencing this application program element.
- The data from Manufacturer\Catalog is written to "Catalog.xml" and is also located in the manufacturer folder, the catalog belongs to. Similar to the application program XML this file also contains all the translation units referencing translations for catalog sections and catalog items.
- All hardware data is written to "Hardware.xml", also located in the manufacturer folder. Again this file contains all the translation units referencing hardware product element translations.
- If at least one baggage from the current manufacturer exists, a subfolder named "Baggages" is created and the information for the baggages is written to "Baggages.xml". The baggage data itself is not included in this file but are stored in the "Baggages" subfolder as separate files, according to their TargetPath and Name. (e.g. for a baggage with TargetPath = "TMw" and Name = "010\_TMwPlugIn\_0407.chm", the baggage data is stored in the file "M-0001\Baggages\TMw\010\_TMwPlugIn\_0407.chm")
- To ensure integrity of all the product data in the different manufacturer folders, each folder is hashed/ signed in an external signature file named <FolderName>.signature. This signature file is located in the root of the zip container. Without a valid signature file it is impossible to import product data from the corresponding manufacturer's folder.

Example of folder and file structure for a \*.knxprod container (not all baggage's are listed):

```
---\knx_master.xml
---\M-0002.signature
---\M-0002\Catalog.xml
---\M-0002\Hardware.xml
---\M-0002\Baggages.xml
---\M-0002\M-0002_A-A00E-16-98A2.xml
---\M-0002\Baggages\ABB_RC01PlugIn0407.loc
---\M-0002\Baggages\RC010022\RC010409.TXT
```



### 6.3.2 ETS4 Project Structure

ETS4 uses for project the extension \*.knxprod ; the container contains the following files:

- For every used manufacturer in project (means its devices) the **ETS4 Product Structure** section as described above
- For the project folder (e.g. P-3D5F),
  - The project folder hashed/ signed by ETS4 on export in an external signature file named <FolderName>.signature. This signature file is located in the root of the zip container.
  - The <FolderName>\Project.xml contains project organizational data (under the Project ID)
    - ProjectInformation
    - HistoryEntries
    - ProjectTraces
    - UserFiles
  - The <FolderName>\0.xml contains the project topology (under the Project ID)
    - <number>.xml → 0...15 is the preparation for “installations” with up to 16 projects, currently not used

Example of folder and file structure for a \*.knxproj container:

```
---\knx_master.xml
---\M-0001.signature
---\M-0002.signature
---\P-3D5F.signature
:
:
---\P-3D5F\Project.xml
---\P-3D5F\0.xml
---\P-3D5F\UserFiles\887190.txt
```

### 6.3.3 Password-protected projects

ETS4, like ETS3, allows password protection for ETS project data. Due to the new format of persisted data, the mechanism for password protection in ETS4 differs from ETS3.

#### ***Password-protected projects in older ETS versions***

In older ETS versions (ETS1, ETS2, ETS3), password-protection of project data was merely an internal property, and did not affect the format of exported file data (\*.prx, \*.pr1, \*.pr2, \*.pr3, \*.pr4, \*.pr5). This was not necessary, as the file format was cryptic anyway.

The password became relevant only when a user wanted to open a project inside the UI: On password protection, the UI then asked for the password before letting the user view or edit the data of the project in question.

#### ***Password-protected projects in ETS4***

ETS4 however uses a completely different persistence format. Project data are persisted as \*.knxproj files. Each \*.knxproj file is an ordinary unprotected ZIP archive, which may contain various XML files, subfolders, and possibly additional baggage files. In particular, project data in the narrower sense normally reside in a separate subfolders named "P-\*".

For password-protected projects, the files normally contained in the "P-\*" subfolder are put in an extra, password-protected ZIP-file named "P-\*.zip", which then replaces the subfolder "P-\*" of this project.

#### ***Example***

The following example illustrates schematically the difference between the contents of a \*.knxproj file with and without password protection, respectively.

| Without password  | With password   | Comment                           |
|---|---|-----------------------------------|
| knx_master.xml  | knx_master.xml  | <i>KNX master data</i>            |
| M-000B\Hardware.xml<br>M-000B\M-000B_A-1151-10-12C6.xml | M-000B\Hardware.xml<br>M-000B\M-000B_A-1151-10-12C6.xml | <i>Manufacturer-specific data</i> |
| P-01A0\0.xml<br>P-01A0\project.xml                      | P-01A0.zip (password-protected)                         | <i>Project-specific data</i>      |

### 6.3.4 Password protection

When exporting a password-protected project, the proj\_\*.xml file may optionally be ZIP encoded with the project password.

**Note that there is no way to recover or reset a lost ZIP password!**