IEC/TR 62453-503-1

Edition 1.0 2009-08

TECHNICAL REPORT

colour inside

Field device tool (FDT) interface specification – Part 503-1: Communication implementation for common object model – IEC 61784 CP 3/1 and CP 3/2

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub
The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub
Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv
If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:
Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

IEC/TR 62453-503-1

Edition 1.0 2009-08

TECHNICAL REPORT

Field device tool (FDT) interface specification – Part 503-1: Communication implementation for common object model – IEC 61784 CP 3/1 and CP 3/2

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE X

ICS 25.040.40; 35.100.05; 35.110

ISBN 978-2-88910-728-5

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 503-1: Communication implementation for common object model – IEC 61784 CP 3/1 and CP 3/2

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC/TR 62453-503-1, which is a technical report, has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation:

This part, in conjunction with the other parts of the first edition of the IEC 62453 series cancels and replaces IEC/PAS 62453-1, IEC/PAS 62453-2, IEC/PAS 62453-3, IEC/PAS 62453-4 and IEC/PAS 62453-5 published in 2006, and constitutes a technical revision.

Each part of the IEC/TR 62453-5xy series is intended to be read in conjunction with its corresponding part in the IEC 62453-3xy series.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
65E/67/DTR	65E/116/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all parts of the IEC 62453 series, under the general title *Field Device Tool (FDT) interface specification*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

This part of IEC 62453 is an interface specification for developers of FDT (Field Device Tool) components for function control and data access within a client/server architecture. The specification is a result of an analysis and design process to develop standard interfaces to facilitate the development of servers and clients by multiple vendors that need to interoperate seamlessly.

With the integration of fieldbusses into control systems, there are a few other tasks which need to be performed. In addition to fieldbus- and device-specific tools, there is a need to integrate these tools into higher-level system-wide planning- or engineering tools. In particular, for use in extensive and heterogeneous control systems, typically in the area of the process industry, the unambiguous definition of engineering interfaces that are easy to use for all those involved is of great importance.

A device-specific software component, called DTM (Device Type Manager), is supplied by the field device manufacturer with its device. The DTM is integrated into engineering tools via the FDT interfaces defined in this specification. The approach to integration is in general open for all kind of fieldbusses and thus meets the requirements for integrating different kinds of devices into heterogeneous control systems.

Figure 1 shows how IEC/TR 62453-503-1 is aligned in the structure of IEC 62453 series.

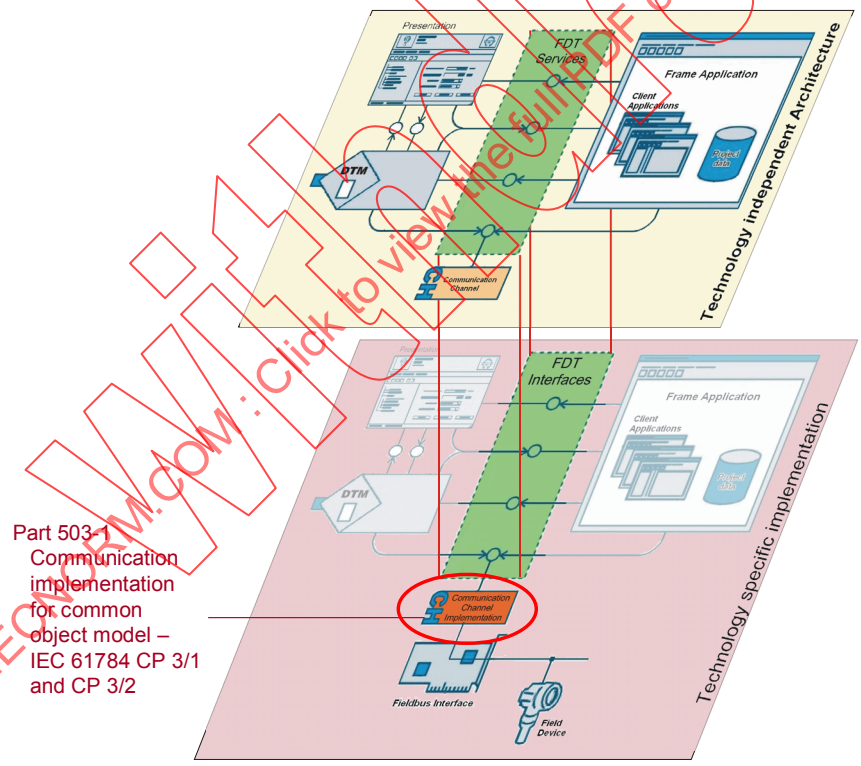

Figure 1 – Part 503-1 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 503-1: Communication implementation for common object model – IEC 61784 CP 3/1 and CP 3/2

1 Scope

IEC 62435-503-1, which is a technical report, provides information for integrating the PROFIBUS protocol into the FDT interface specification (IEC 62453-2).

This part of IEC 62453 specifies communication and other services.

This specification neither contains the FDT specification nor modifies it.

2 Normative references

The following referenced documents are indispensable for the application of this specification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61158 (all parts), *Industrial communication networks – Fieldbus specifications*

IEC 62453-1:2009, *Field Device Tool (FDT) interface specification – Part 1: Overview and guidance*

IEC 62453-2:2009, *Field Device Tool (FDT) interface specification – Part 2: Concepts and detailed description*

IEC/TR 62453-41:2009 *Field Device Tool (FDT) interface specification – Part 41: Object model integration profile – Common object model*

IEC 62453-303-1:2009 *Field Device Tool (FDT) interface specification – Part 303-1: Communication profile integration - IEC 61784 CP 3/1 and CP 3/2*

3 Terms, definitions, symbols, abbreviated terms and conventions

3.1 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC 62453-1 and IEC 62453-2 apply.

3.2 Symbols and abbreviated terms

For the purpose of this document, the symbols and abbreviations given in IEC 62453-1, IEC 62453-2 and the following apply.

UML **Unified Modelling Language** **[ISO/IEC 19501]**

3.3 Conventions

3.3.1 Data type names and references to data types

The conventions for naming and referencing of data types are explained in IEC 62453-2 Clause A.1

3.3.2 Vocabulary for requirements

The following expressions are used when specifying requirements.

Usage of “shall” or “Mandatory”	No exceptions allowed.
Usage of “should” or “Recommended”	Strong recommendation. It may make sense in special exceptional cases to differ from the described behavior.
Usage of “can’ or “Optional’	Function or behavior may be provided, depending on defined conditions.

4 Bus category

IEC 61784 CP 3/1 and CP3/2 protocols are identified in the attribute busCategory of BusCategory element by the identifiers, as specified in IEC 62453-303-1.

IEC 61784 CPF 3 protocols are using the identifiers in physicalLayer members within PhysicalLayer data type as specified in IEC 62453-303-1.

5 Access to instance and device data

Used at methods:

- IDtmParameter::GetParameters()
- IDtmParameter::SetParameters()

These methods shall provide access to at least to all parameters defined in IEC 62453-303-1.

6 Protocol specific behavior

6.1 General

A DTM shall deliver its GSD information via method IDtmInformation::GetInformation() and IDtmParameter::GetParameters(). GSD information is provided in the attribute <deviceTypeInformation>. Also it is required to provide a GSD file for each supported device type on the hard drive. The attribute <deviceTypeInformationPath> in the DTMParameter document specifies the location of the GSD file.

It is expected that a Profibus DTM in the attribute ‘deviceTypeInformation’ is exposing exactly the GSD file which is referenced by the attribute ‘deviceTypeInformationPath’.

If the GSD depends on bus settings, a DTM’s configuration or parameterization dialog could be used to change bus settings. Based on these settings, updated GSD information can be inserted in the information document. Here too the DTM has to call IFdtContainer::SaveRequest() and IDtmEvents::OnParameterChanged().

Notice that the internal device structure (<InternalTopology>) with its modules and channels has to be updated as well.

An example for documents of a DTM representing a remote I/O can be found in Annex A.

6.2 Representing modularity

6.2.1 Monolithic DTMs

Monolithic DTM's should always provide at least one <Module> element.

A monolithic DTM that represents a modular device shall provide the structure information as part of the <InternalTopology> element. The IO values of the device are represented by Process Channels, which are referenced by child elements of the <Module> elements. If any of the modules provides communication, the respective <Module> element shall reference a Communication Channel.

Example 1:
A monolithic DTM for a PROFIBUS PA device will provide the information about instantiated modules in the <InternalTopology> element. – Each instantiated module will be represented as a <Module> element. (Be aware: it is necessary to define an <InternalChannel> element for each <Module> element.)
The IO values of the modules are represented as Process Channels, which are referenced by child elements of the <Module> elements. (see Figure 2)

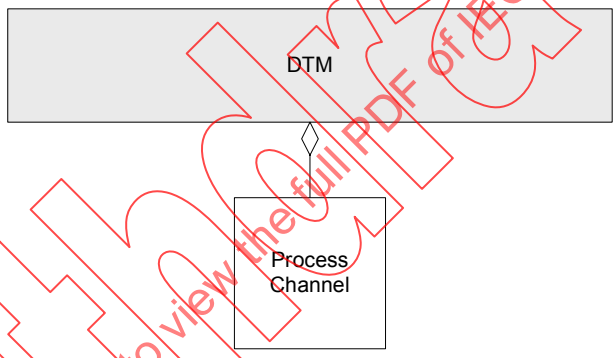

Figure 2 – Example: Device DTM

This means:

The DTM shall provide an internal topology in the parameter document to inform the frame about the internal structure of the device. The internal topology shall also include the module structure (element <Module>).

The DTM shall provide all channels in the channel collection based on the current configuration.

When the DTM changes the configuration of the process data or the module configuration the Process Channels shall be updated. This means Process Channels shall be removed/added and the parameter document shall be updated (e.g. by adding/removing <Module> elements) if necessary.

Each channel is represented by a channel reference that is child of a <Module> element in the parameter document.

Each channel object delivers a document based on the FDTProfibusChannelParameterSchema in IFdtChannel::GetChannelParameters() for the supported protocol.

Example 2:
A monolithic Gateway DTM for a remote I/O system, which requires PROFIBUS communication and has some

modules, which provide HART communication will provide Communication Channels for HART modules that are also Process Channels and “pure” Process Channels for non-HART modules. (see Figure 3)

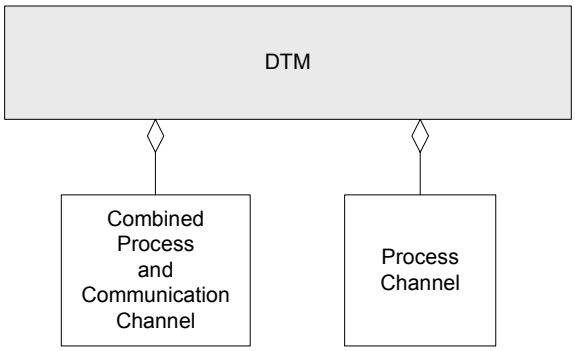

Figure 3 – Example: Gateway DTM

This means:

The DTM shall provide all channels in the channel collection based on the current configuration.

When the DTM changes the configuration of the process data or the module configuration the Process Channels shall be updated. This means Process Channels shall be removed/added and the parameter document shall be updated if necessary.

Communication Channel objects implements the interface IFdtCommunication.

Each channel is represented by a channel reference in the parameter document.

The DTM provides an internal topology in the parameter document to inform the frame about the internal structure of the device.

Each channel object delivers a document based on the FDTProfibusChannelParameterSchema in IFdtChannel::GetChannelParameters() for the supported protocol.

6.2.2 Modular DTMs

If a DTM is designed in a modular way, the BIM DTM provides Communication Channels for connecting the Module DTMs. These channels are not Process Channels.

Example 1:
A modular device will be represented by a Gateway DTM to represent the head station and a number of Module DTMs to represent the modules. The Module DTMs for the modules will provide Process Channels. (see Figure 4)

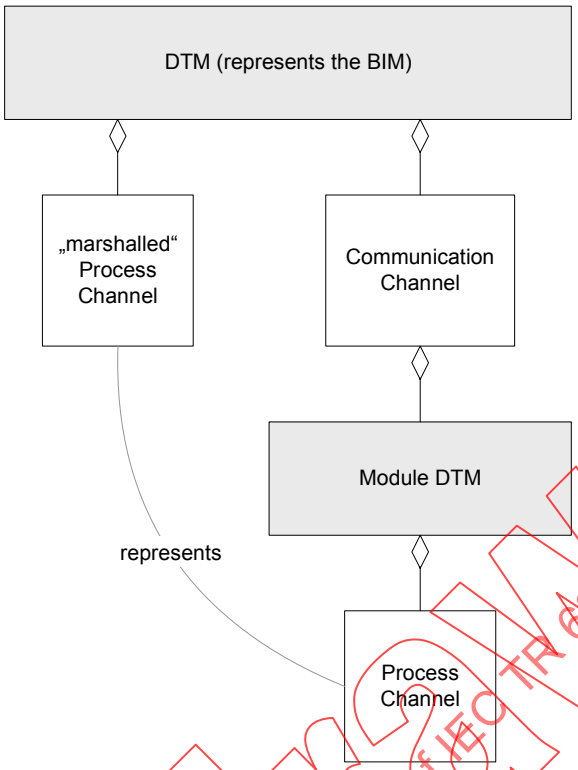

Figure 4 – Example: Modular DTM

Since the BIM DTM represents the PROFIBUS slave device from the communication point of view, it has to deliver the Process Channels of the complete device. This has the following consequences:

The BIM DTM shall provide the channel objects in the channel collection that represent its Communication Channels. These channel objects implement the interfaces IFdtCommunication.

The BIM DTM shall provide channel objects in the channel collection representing the Process Channels of the modules. The Process Channels are called “marshalled channel”. These channel objects do not implement the interfaces IFdtCommunication.

The BIM does not provide an internal topology because the project itself with the BIM and the Module DTMs represent the device structure.

The BIM DTM shall provide a channel reference in its parameter document for ALL the channels in the channel collection based on the current configuration.

Each Communication Channel of the BIM DTM delivers a document based on the BasicChannelParameterSchema when it receives IFdtChannel::GetChannelParameters() for any of its supported protocols.

Each marshalled channel of the BIM DTM delivers a document based on the FDTProfibusChannelParameterSchema when it receives IFdtChannel::GetChannelParameters() for any of its supported protocols.

A Module DTM has to deliver a channel reference in its parameter document for each channel.

Each channel of a Module DTM delivers a document based on the FDTProfibusChannelParameterSchema in IFdtChannel::GetChannelParameters() for the supported protocol.

Every time when a module changes the configuration so that the Process Channels (configuration or amount of Process Channels) changes the BIM shall update the Process Channels and the parameter document.

When a module is added or removed from the BIM the BIM has to add/remove the Process Channels of this module and update the parameter document.

Example 2:
When a modular I/O system as described by Example 1 also has some modules which provide HART communication, it will be represented by a Gateway DTM to represent the head station and a number of Module DTMs to represent the modules. The Module DTMs for the communication modules will provide Communication Channels. These channels represent also Process Channels.
Modules that are not used for communication will provide Process Channels only. (see Figure 5)

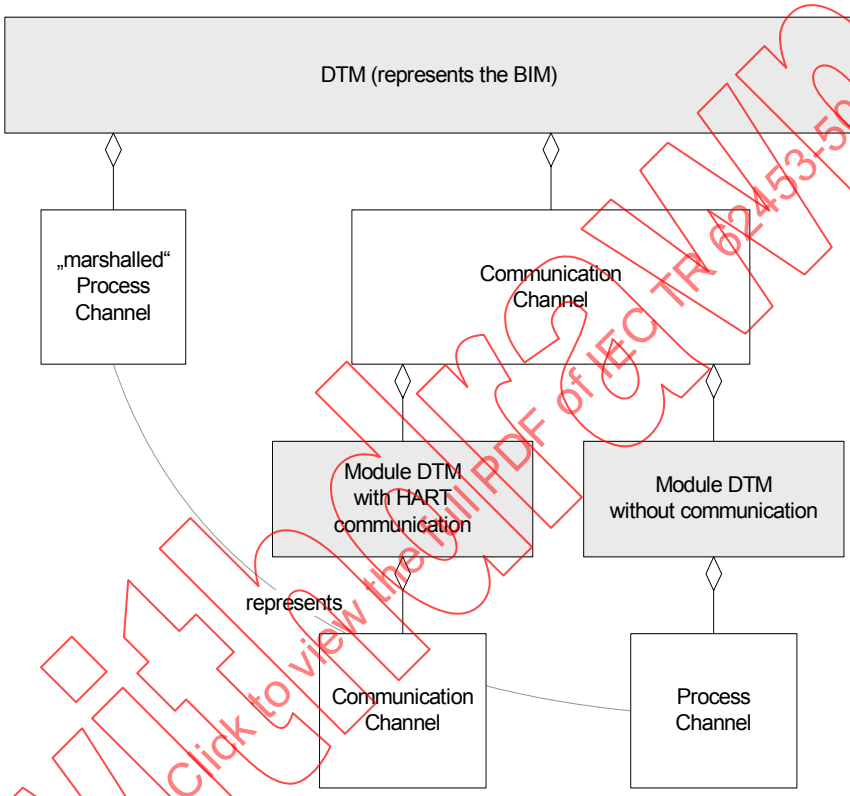

Figure 5 – Example: Modular Gateway DTM

Since the BIM represents the PROFIBUS slave device from the communication point of view, it has to deliver the Process Channels of the complete device. This has the following consequences:

The BIM DTM shall provide the channel objects in the channel collection that represent its Communication Channels. These channel objects implement the interfaces IFdtCommunication

The BIM DTM shall provide channel objects in the channel collection representing the Process Channels of the modules. The Process Channels are called “marshalled channel”. These channel objects do not implement the interfaces IFdtCommunication.

The BIM shall deliver a channel reference in its parameter document for ALL the channels in the channel collection based on the current configuration

The BIM does not provide an internal topology because the project itself with the BIM and the Module DTMs represent the device structure.

The BIM DTM shall provide a channel reference in its parameter document for ALL the channels in the channel collection based on the current configuration

Each Communication Channel of the BIM DTM delivers a document based on the BasicChannelParameterSchema when it receives IFdtChannel::GetChannelParameters() for any of its supported protocols.

Each marshalled channel of the BIM DTM delivers a document based on the FDTProfibusChannelParameterSchema when it receives IFdtChannel::GetChannelParameters()for any of its supported protocols.

A Module DTM has to provide a channel reference in its parameter document for each channel (if applicable).

Each channel of a Module DTM delivers a document based on the Basic Channel Schema when it receives IFdtChannel::GetChannelParameters() for any of its supported or required protocols.

Every time when a module changes the configuration so that the Process Channels (configuration or amount of Process Channels) changes the BIM shall update the Process Channels and the parameter document.

When a module is added or removed from the BIM the BIM has to add/remove the process channels of this module and update the parameter document.

6.3 Interfaces and Information related to Bus Master Configuration

The following graphic (Figure 6) shows the interfaces and methods related to establishing DPV0 functionality in DCS environments. The interface IFdtTopology is required only for a modular DTM.

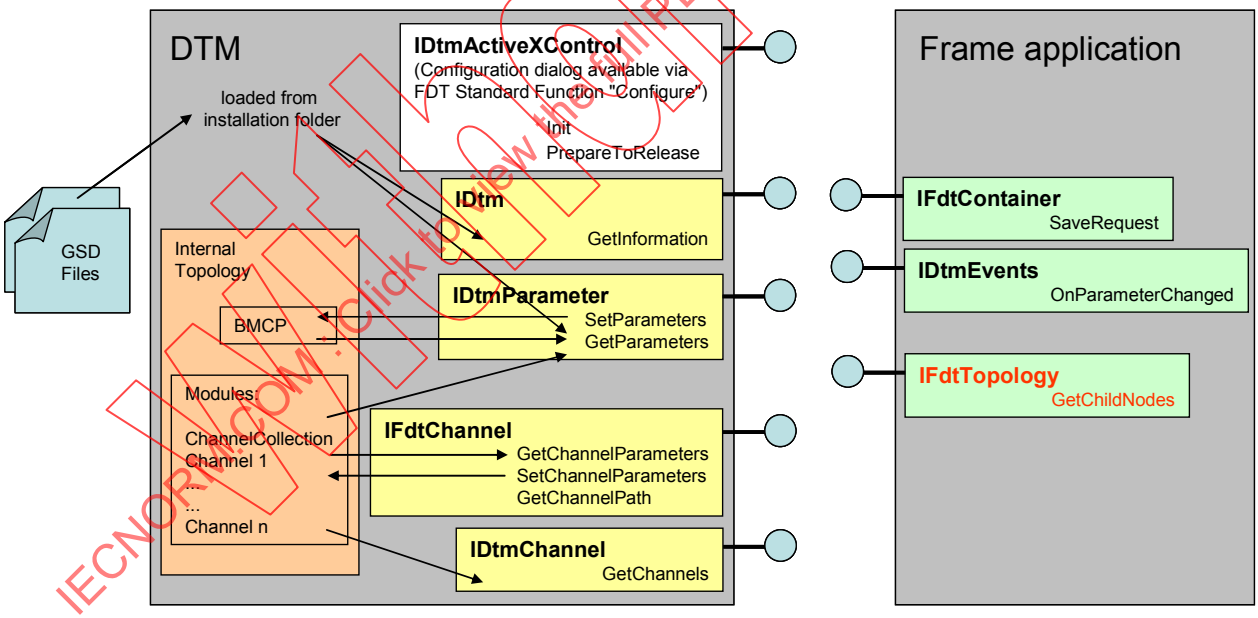

Figure 6 – Interfaces and information related to bus master configuration

NOTE The BMCP contains (besides other parts) two important parts called Prm_Data and Cfg_Data. Often these two parts are called Parameter-String and Config-String.

6.4 Configuration changes in a device

The sequence related to configuration changes is shown in Figure 7.

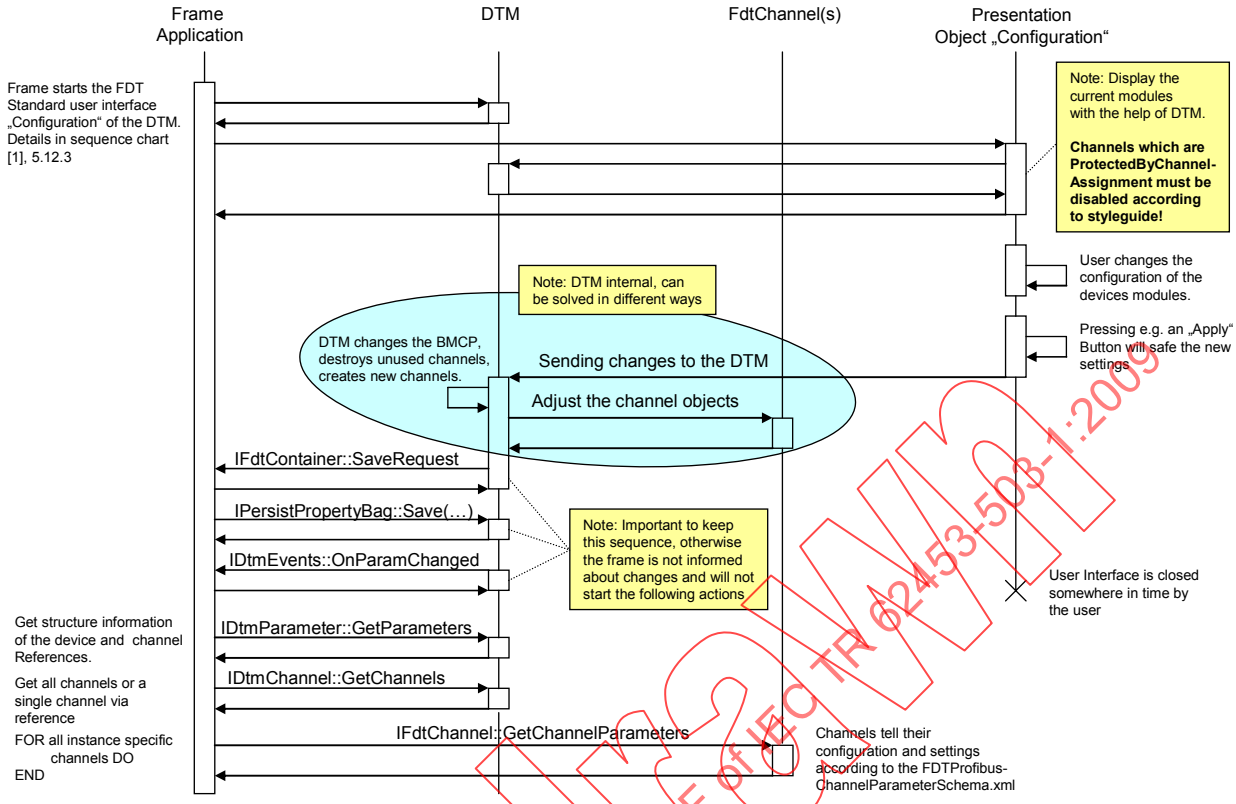

Figure 7 – User changes the configuration of a device in the DTMs user interface

6.5 Error behavior: DTM refuses new BMCP

A DTM is expected to check the BMPC and may refuse an incorrect BMCP (see Figure 8).

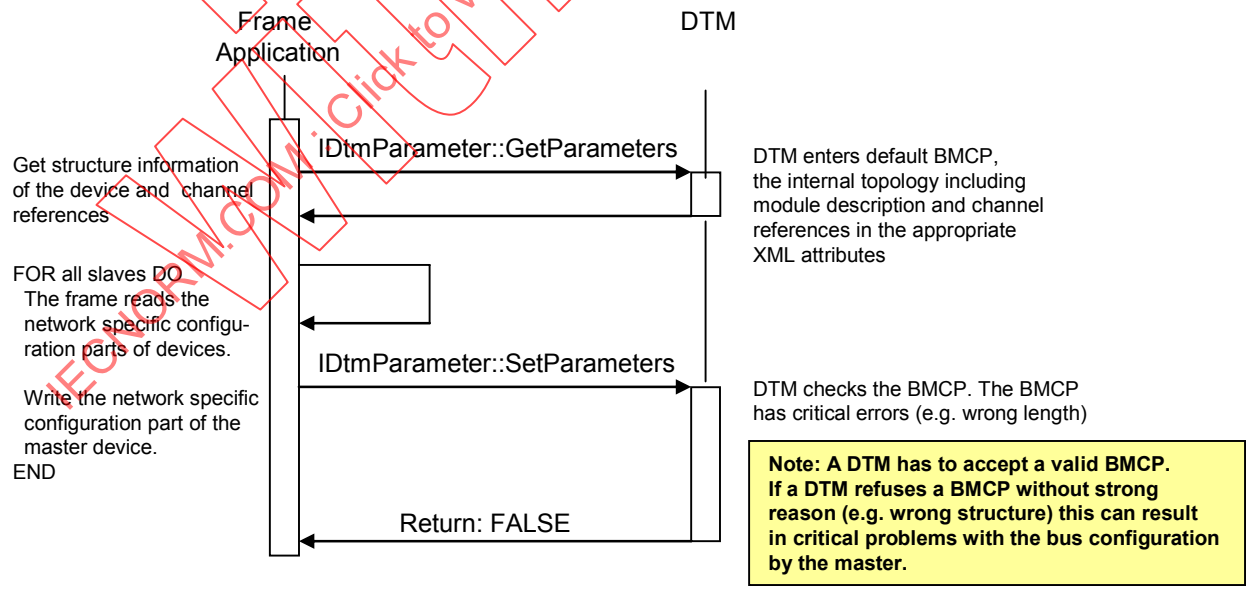

Figure 8 – Error case: DTM refuses the new BMCP from the frame

7 Protocol specific usage of general data types

Table 1 shows how general data types are used with IEC 61784 CP 3/1 and CP 3/2 devices.

Table 1 – Protocol specific usage of general data types

Attribute	Description for use
fdt:address	**All these attributes of the FDTDatatype schema are used as defined in IEC 62453-303-1.**
fdt:protocolId	
fdt:deviceTypeId	
fdt:deviceTypeInformation	
fdt:deviceTypeInformationPath	
fdt:manufacturerId	
fdt:semanticId	
fdt:applicationDomain	
fdt:tag	

8 Network management data types

8.1 General

The data types specified in this clause are used at following methods:

- IDtmParameter:GetParameters
- IDtmParameter:SetParameters

All parameters defined in EDS in ther [Params]-sectioon shall be exposed by these methods.

8.2 PROFIBUS device address

The address of a PROFIBUS device is available at the attribute <BusInformation/@masterSlaveAddress>.

8.3 Master-bus parameter set

The parameter set represents the content of the attribute busMasterConfigurationPart within the DTMParameterSchema for Profibus master device. This attribute has to be set for each Profibus master device according to the IEC 61158 series. For further details please refer to the sequence chart “Configuration of a Fieldbus Master” (IEC 62453-2), IEC 62453-303-1 and the IEC 61158 series.

8.4 Slave bus parameter set

The parameter set represents the content of the attribute busMasterConfigurationPart within the DTMParameterSchema for Profibus slave devices. This attribute has to be set for each Profibus slave device according to the IEC 61158 series. For further details please refer to the sequence chart “Configuration of a Fieldbus Master” (IEC 62453-2), IEC 62453-303-1 and the IEC 61158 series.

8.5 Module and channel data

Corresponding XML documents:

- DTM Parameters:

```
<?xml version=" 1.0"?>
<FDT xmlns="x-sch ema:DTMParameterSchema.xml" xm lns:fdt="x-schema:FDTDataTypesSchema.xml"
 fdt:storageState="persistant"  fdt:dataSetState="default">
    <fdt:DtmDeviceType>
        <fdt:VersionInformation name="LB 8101" vendor="RIO Manufacturer" version="1.0" date="2000-08”05"/>
        <fdt:SupportedLanguages>
```

```
            <fdt:LanguageId languageid""1"/>
        </fdt:SupportedLanguages>
        <fdt:BusCategories>
            <fdt:BusCategory busCategory="036D1497-387B-11D4-86E1-00E098727”B9"/>
            <fdt:BusCategory busCategory="036D1499-387B-11D4-86E1-00E098727”B9"/>
        </fdt:BusCategories>
    </fdt:DtmDeviceType>
    <DtmDevice fdt:tag="00PGH10EC”01">
        <InternalTopology>
            <InternalChannel>
                <Module moduleid="1" slot="1">
                    <fdt:VersionInformation name="LB/FB 1”03" vendor="RIO Manufacturer" versio="10" date"2000-
08”05" descriptor"Digital Input (Counter 4 Byte"/>
                    <fdt:ChannelReferences>
                        <fdt:ChannelReference idref"Count_”_0"/>
                    </fdt:ChannelReferences>
                </Module>
            </InternalChannel>
            <InternalChannel>
                <Module moduleid="8" slot="8">
                    <fdt:VersionInformation name"1DO / 2DI" vendor="Vendor name" version=”.0" date="2000-
08”05" descriptor="Valve Block LB/FB 2XXX 1Byte Input Output"/>
                    <fdt:ChannelReferences>
                        <fdt:ChannelReference idref="DI_8LFO”T0"/>
                        <fdt:ChannelReference idref="DI_”_1"/>
                        <fdt:ChannelReference idref="DI_8_”F1"/>
                        <fdt:ChannelReference idref="DI_”_2"/>
                        <fdt:ChannelReference idref="DI_8_”F2"/>
                        <fdt:ChannelReference idref="DO_”_0"/>
                    </fdt:ChannelReferences>
                </Module>
            </InternalChannel>
        </InternalTopology>
    </DtmDevice>
</FDT>
```

- FDT-Channel “Count_1_0”:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType>
        <fdt:VersionInformation name="Digital Input (Counter 4 Byte)" vendor="RIO Manufacturer" version="1.0"
date="2000-08”05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10EB001" fdt:id="Count_0_1" protectedByChannelAssignment="0" number="0"
fdt:dataType="int" fdt:signalType="input">
        <DpAddress bitPosition="0" bitLength=”32"/>
    </FDTChannel>
</FDT>
```

- FDT-Channel “DI_8_LFOUT0”:

```
<?xml version=”1.0”?>
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType statusChannel="1">
        <fdt:VersionInformation name="Digital Input Valve Block" vendor="RIO Manufacturer" version="1.0"
date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10FB001" fdt:id="DI_8LFOUT0" protectedByChannelAssignment="0"
number="10" fdt:dataType="binary" fdt:signalType="input">
        <DpAddress bitPosition="33" bitLength="1"/>
    </FDTChannel>
</FDT>
```

- FDT-Channel “DI_8_1”:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType>
        <fdt:VersionInformation name="Digital Input Valve Block" vendor="RIO Manufacturer" version="1.0"
date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10EB002" fdt:id="DI_8_1" protectedByChannelAssignment="0" number="1"
fdt:dataType="binary" fdt:signalType="input">
        <DpAddress bitPosition="34" bitLength="1"/>
        <StatusInformation logic="positive" invalidBit="35"/>
    </FDTChannel>
</FDT>
```

- FDT-Channel “DI_8_LF1”:

```
<?xml version="1.0?">
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType statusChannel="1">
        <fdt:VersionInformation name="Digital Input Valve Block" vendor="RIO Manufacturer" version="1.0"
date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10FB002" fdt:id="DI_8_LF1" protectedByChannelAssignment="0" number="11"
fdt:dataType="binary" fdt:signalType="input">
        <DpAddress bitPosition="35" bitLength="1"/>
    </FDTChannel>
</FDT>
```

- FDT-Channel “DI_8_2”:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType>
        <fdt:VersionInformation name="Digital Input Valve Block" vendor="RIO Manufacturer" version="1.0"
date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10EB003" fdt:id="DI_8_2" protectedByChannelAssignment="0" number="2"
fdt:dataType="binary" fdt:signalType="input">
        <DpAddress bitPosition="36" bitLength="1"/>
        <StatusInformation logic="positive" invalidBit="37"/>
    </FDTChannel>
</FDT>
```

- FDT-Channel “DI_8_LF2”:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType statusChannel="1">
        <fdt:VersionInformation name="Digital Input Valve Block" vendor="RIO Manufacturer" version="1.0"
date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10FB003" fdt:id="DI_8_LF2" protectedByChannelAssignment="0" number="12"
fdt:dataType="binary" fdt:signalType="input">
        <DpAddress bitPosition="37" bitLength="1"/>
    </FDTChannel>
</FDT>
```

- FDT-Channel “DO_8_0”:

```
<?xml version="1.0"?>
```

```
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType>
        <fdt:VersionInformation name="Digital Output Valve Block" vendor="RIO Manufacturer" version="1.0"
date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="00PGH10EB004" fdt:id="DO_8_0" protectedByChannelAssignment="0" number="3"
fdt:dataType="binary" fdt:signalType="output">
        <DpAddress bitPosition="0" bitLength="1"/>
        <StatusInformation logic="positive" invalidBit="32"/>
    </FDTChannel>
</FDT>
```

9 Communication data types

9.1 General

The data types specified in this clause are used with the methods of IFdtCommunication.

9.2 DPV0 communication – FDTProfibusDPV0CommunicationSchema

The XML document contains the address information and the communication data needed for DP communication. The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

```
<Schema name="FDTProfibusDPV0CommunicationSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fdt="x-schema:FDTDataTypesSchema.xml">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <AttributeType name="busAddress" dt:type="ui1"/>
    <AttributeType name="errorCode" dt:type="bin.hex"/>
    <AttributeType name="communicationReference" dt:type="uuid"/>
    <AttributeType name="connectStatus" dt:type="enumeration" dt:values="masterConnectedOnly deviceAtLifeList
deviceInDataExchange "/>
    <AttributeType name="sequenceTime" dt:type="ui4"/>
    <AttributeType name="delayTime" dt:type="ui4"/>
    <!--Definition of Elements-->
    <ElementType name="ConnectRequest" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="busAddress" required="yes"/>
        <attribute type="fdt:systemTag" required="no"/>
    </ElementType>
    <ElementType name="ConnectResponse" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="busAddress" required="yes"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="connectStatus" required="yes"/>
    </ElementType>
    <ElementType name="DisconnectRequest" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="busAddress" required="yes"/>
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="DisconnectResponse" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="busAddress" required="yes"/>
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="ReadUserParameterRequest" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="ReadUserParameterResponse" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="errorCode" required="yes"/>
        <element type="fdt:CommunicationData" minOccurs="0" maxOccurs="1"/>
```

```
    </ElementType>
    <ElementType name="WriteUserParameterRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="WriteUserParameterResponse" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="errorCode" required="yes"/>
    </ElementType>
    <ElementType name="ReadOutputDataRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <element type="fdt:ChannelReference" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="ReadOutputDataResponse" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="errorCode" required="yes"/>
        <element type="fdt:CommunicationData" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="WriteOutputDataRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <element type="fdt:ChannelReference" minOccurs="1" maxOccurs="1"/>
        <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="WriteOutputDataResponse" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="errorCode" required="yes"/>
    </ElementType>
    <ElementType name="ReadInputDataRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <element type="fdt:ChannelReference" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="ReadInputDataResponse" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="errorCode" required="yes"/>
        <element type="fdt:CommunicationData" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="ReadDiagnosisDataRequest" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="ReadDiagnosisDataResponse" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="communicationReference" required="yes"/>
        <attribute type="errorCode" required="yes"/>
        <element type="fdt:CommunicationData" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="SequenceBegin" content="empty" model="closed">
        <attribute type="sequenceTime" required="no"/>
        <attribute type="delayTime" required="no"/>
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="SequenceEnd" content="empty" model="closed">
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="SequenceStart" content="empty" model="closed">
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="Abort" content="empty" model="closed">
<attribute type="communicationReference" required="no"/>
</ElementType>
    <ElementType name="FDT" content="eltOnly" model="closed">
        <attribute type="schemaVersion" required="no"/>
```

```
        <attribute type="fdt:nodeId" required="no"/>
        <group order="one">
            <element type="ConnectRequest"/>
            <element type="ConnectResponse"/>
            <element type="DisconnectRequest"/>
            <element type="DisconnectResponse"/>
            <element type="ReadUserParameterRequest"/>
            <element type="ReadUserParameterResponse"/>
            <element type="WriteUserParameterRequest"/>
            <element type="WriteUserParameterResponse"/>
            <element type="ReadOutputDataRequest"/>
            <element type="ReadOutputDataResponse"/>
            <element type="WriteOutputDataRequest"/>
            <element type="WriteOutputDataResponse"/>
            <element type="ReadInputDataRequest"/>
            <element type="ReadInputDataResponse"/>
            <element type="ReadDiagnosisDataRequest"/>
            <element type="ReadDiagnosisDataResponse"/>
            <element type="SequenceBegin"/>
            <element type="SequenceEnd"/>
            <element type="SequenceStart"/>
            <element type="Abort"/>
            <element type="fdt:CommunicationError"/>
        </group>
    </ElementType>
</Schema>
```

9.3 DPV1 communication – FDTProfibusDPV1CommunicationSchema

The XML document contains the address information and the communication data needed for MSAC2 communication. The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

Within a connect request a DTM of a Profibus redundant slave can provide additional redundant slave addresses, set within its parameter document. The busAddress attribute is to be used as preferred address; the addresses in the redundantAddresses element should be used in this order if an alternative address shall be used to connect to the redundant slave.

```
<Schema name="FDTProfibusDPV1CommunicationSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
xmlns:fdtparam="x-schema:DTMParameterSchema.xml">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <AttributeType name="api" dt:type="ui1"/>
    <AttributeType name="busAddress" dt:type="ui1"/>
    <AttributeType name="errorCode" dt:type="bin.hex"/>
    <AttributeType name="index" dt:type="ui1"/>
    <AttributeType name="communicationReference" dt:type="uuid"/>
    <AttributeType name="slot" dt:type="ui1"/>
    <AttributeType name="sequenceTime" dt:type="ui4"/>
    <AttributeType name="delayTime" dt:type="ui4"/>
    <AttributeType name="maxLenDataUnit" dt:type="ui1"/>
    <AttributeType name="scl" dt:type="ui1"/>
    <AttributeType name="networkMACAddress" dt:type="bin.hex"/>
    <!--Definition of Elements-->
    <ElementType name="redundantAddresses" content="eltOnly" model="closed">
        <element type="fdtparam:SlaveAddress" maxOccurs="*" minOccurs="1"/>
    </ElementType>

    <ElementType name="NetworkAddress" content="empty" model="closed">
        <attribute type ="api" required="yes"/>
        <attribute type ="scl" required="yes"/>
        <attribute type ="networkMACAddress" required="yes"/>
    </ElementType>
    <ElementType name="srcNetworkAddress" content="eltOnly" model="closed">
        <element type="NetworkAddress" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="destNetworkAddress" content="eltOnly" model="closed">
```

```
    <element type="NetworkAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="ConnectRequest" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="api" required="yes"/>
    <attribute type="busAddress" required="yes"/>
    <attribute type="fdt:systemTag" required="no"/>
        <element type="redundantAddresses" maxOccurs="1" minOccurs="0"/>
    <element type="srcNetworkAddress" minOccurs="0" maxOccurs="1"/>
    <element type="destNetworkAddress" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="ConnectResponse" content=" eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="api" required="yes"/>
    <attribute type="busAddress" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
    <attribute type="errorCode" required="yes"/>
    <attribute type="maxLenDataUnit" required="no"/>
        <element type="redundantAddresses" maxOccurs="1" minOccurs="0"/>
    <element type="srcNetworkAddress" minOccurs="0" maxOccurs="1"/>
    <element type="destNetworkAddress" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="DisconnectRequest" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="api" required="yes"/>
    <attribute type="busAddress" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
</ElementType>
<ElementType name="DisconnectResponse" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="api" required="yes"/>
    <attribute type="busAddress" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
    <attribute type="errorCode" required="yes"/>
</ElementType>
<ElementType name="ReadRequest" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="slot" required="yes"/>
    <attribute type="index" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
</ElementType>
<ElementType name="ReadResponse" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="slot" required="yes"/>
    <attribute type="index" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
    <attribute type="errorCode" required="yes"/>
    <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="WriteRequest" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="slot" required="yes"/>
    <attribute type="index" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
    <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="WriteResponse" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="slot" required="yes"/>
    <attribute type="index" required="yes"/>
    <attribute type="communicationReference" required="yes"/>
    <attribute type="errorCode" required="yes"/>
</ElementType>
<ElementType name="SequenceBegin" content="empty" model="closed">
    <attribute type="sequenceTime" required="no"/>
    <attribute type="delayTime" required="no"/>
    <attribute type="communicationReference" required="yes"/>
</ElementType>
<ElementType name="SequenceEnd" content="empty" model="closed">
    <attribute type="communicationReference" required="yes"/>
```

```
    </ElementType>
    <ElementType name="SequenceStart" content="empty" model="closed">
        <attribute type="communicationReference" required="yes"/>
    </ElementType>
    <ElementType name="Abort" content="empty" model="closed">
        <attribute type="communicationReference" required="no"/>
    </ElementType>
    <ElementType name="FDT" content="eltOnly" model="closed">
        <attribute type="schemaVersion" required="no"/>
        <attribute type="fdt:nodeId" required="no"/>
        <group order="one">
            <element type="ConnectRequest"/>
            <element type="ConnectResponse"/>
            <element type="DisconnectRequest"/>
            <element type="DisconnectResponse"/>
            <element type="ReadRequest"/>
            <element type="ReadResponse"/>
            <element type="WriteRequest"/>
            <element type="WriteResponse"/>
            <element type="SequenceBegin"/>
            <element type="SequenceEnd"/>
            <element type="SequenceStart"/>
            <element type="Abort"/>
            <element type="fdt:CommunicationError"/>
        </group>
    </ElementType>
</Schema>
```

Example:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusDPV1CommunicationSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <ReadResponse slot="1" index="1" communicationReference="13966300-d860-4d18-8bc3-f11f8c9d7597"
errorCode="0000000000">
        <fdt:CommunicationData byteArray="FF01"/>
    </ReadResponse>
</FDT>
```

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusDPV1CommunicationSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <ReadResponse slot="1" index="1" communicationReference="6B29FC40-CA47-1067-B31D-00DD010662DA"
errorCode="0">
        <fdt:CommunicationData byteArray="FF01"/>
    </ReadResponse>
</FDT>
```

Example for redundancy:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusDPV1CommunicationSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml" xmlns:fdtparam="x-schema:DTMParameterSchema.xml">
    <ConnectRequest api="4" busAddress="1">
        <redundantAddresses>
            <fdtparam:SlaveAddress slaveAddress="2"/>
            <fdtparam:SlaveAddress slaveAddress="3"/>
        </redundantAddresses>
    </ConnectRequest>
</FDT>
```

10 Channel parameter data types

The ChannelParameter XML document describes a how to access a channel via a Profibus DPV1 command or how to adress a channel within a Profibus DP frame for cyclic I/O. The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

The data types specified in this clause are used with the following methods:

- IFdtChannel::GetChannelParameters()
- IFdtChannel::SetChannelParameters()

```
<Schema name="FDTProfibusChannelParameterSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
xmlns:appId="x-schema:FDTApplicationIdSchema.xml">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <AttributeType name="api" dt:type="ui1"/>
    <AttributeType name="bitLength" dt:type="ui4"/>
    <AttributeType name="bitPosition" dt:type="ui4"/>
    <AttributeType name="frameApplicationTag" dt:type="string"/>
    <AttributeType name="gatewayBusCategory" dt:type="uuid"/>
    <AttributeType name="invalidBit" dt:type="ui4"/>
    <AttributeType name="index" dt:type="ui1"/>
    <AttributeType name="logic" dt:type="enumeration" dt:values="positive negative"/>
    <AttributeType name="number" dt:type="ui4"/>
    <AttributeType name="protectedByChannelAssignment" dt:type="boolean"/>
    <AttributeType name="simulationBit" dt:type="ui4"/>
    <AttributeType name="statusChannel" dt:type="boolean"/>
    <AttributeType name="substituteValueBit" dt:type="ui4"/>
    <AttributeType name="slotNumber" dt:type="ui1"/>
    <!--Definition of Elements-->
    <ElementType name="DpAddress" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="bitPosition" required="yes"/>
        <attribute type="bitLength" required="yes"/>
    </ElementType>
    <ElementType name="DpV1Address" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="api" required="yes"/>
        <attribute type="slotNumber" required="yes"/>
        <attribute type="index" required="yes"/>
        <attribute type="bitPosition" required="no"/>
        <attribute type="bitLength" required="no"/>
    </ElementType>
    <ElementType name="StatusInformation" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="logic" required="yes"/>
        <attribute type="invalidBit" required="no"/>
        <attribute type="simulationBit" required="no"/>
        <attribute type="substituteValueBit" required="no"/>
    </ElementType>
    <ElementType name="FDTChannel" content="eltOnly" model="closed" order="seq">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:tag" required="yes"/>
        <attribute type="fdt:id" required="yes"/>
        <attribute type="fdt:descriptor" required="no"/>
        <attribute type="protectedByChannelAssignment" required="yes"/>
        <attribute type="number" required="yes"/>
        <attribute type="fdt:dataType" required="yes"/>
        <attribute type="fdt:signalType" required="yes"/>
        <attribute type="frameApplicationTag" required="no"/>
        <attribute type="appId:applicationId" required="no"/>
        <element type="fdt:SemanticInformation" minOccurs="0" maxOccurs="*"/>
        <element type="fdt:BitEnumeratorEntries" minOccurs="0" maxOccurs="1"/>
```

```
        <element type="fdt:EnumeratorEntries" minOccurs="0" maxOccurs="1"/>
        <element type="fdt:Unit" minOccurs="0" maxOccurs="1"/>
        <element type="DpAddress" minOccurs="0" maxOccurs="1"/>
        <element type="DpV1Address" minOccurs="0" maxOccurs="1"/>
        <element type="StatusInformation" minOccurs="0" maxOccurs="1"/>
        <element type="fdt:Alarms" minOccurs="0" maxOccurs="1"/>
        <element type="fdt:Ranges" minOccurs="0" maxOccurs="1"/>
        <element type="fdt:Deadband" minOccurs="0" maxOccurs="1"/>
        <element type="fdt:SubstituteValue" minOccurs="0" maxOccurs="1"/>
        <element type="fdt:StructuredElements" minOccurs="0" maxOccurs="1"/>   <!--should be used if the data
type is structured-->
    </ElementType>
    <ElementType name="FDTChannelType" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <element type="fdt:VersionInformation" minOccurs="1" maxOccurs="1"/>
        <attribute type="gatewayBusCategory" required="no"/>
        <attribute type="statusChannel" required="no"/>
    </ElementType>
    <ElementType name="FDT" content="eltOnly" model="closed">
        <attribute type="schemaVersion" required="no"/>
        <attribute type="fdt:nodeId" required="no"/>
        <element type="FDTChannelType" minOccurs="1" maxOccurs="1"/>
        <element type="FDTChannel" minOccurs="1" maxOccurs="1"/>
    </ElementType>
</Schema>
```

Example:

```
<?xml version="1.0"?>
<FDT xmlns="x-schema:FDTProfibusChannelParameterSchema.xml" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml">
    <FDTChannelType>
        <fdt:VersionInformation name="myname" vendor="myVendor" version="1.0" date="2000-08-05"/>
    </FDTChannelType>
    <FDTChannel fdt:tag="myTag" fdt:id="PV" protectedByChannelAssignment="0" number="123"
fdt:dataType="float" fdt:signalType="output">
        <DpAddress bitPosition="17" bitLength="32"/>
        <DpV1Address api="1" slotNumber="1" index="1" bitPosition="0" bitLength="32"/>
        <StatusInformation logic="positive"/>
        <fdt:Alarms>
            <fdt:Alarm alarmType="lowAlarm">
                <fdt:StaticValue staticValue="25"/>
            </fdt:Alarm>
            <fdt:Alarm alarmType="highAlarm">
                <fdt:StaticValue staticValue="100"/>
            </fdt:Alarm>
        </fdt:Alarms>
        <fdt:Ranges>
            <fdt:Range>
                <fdt:LowerRange>
                    <fdt:ChannelReference idref="PV_LOWER_RANGE_VALUE"/>
                </fdt:LowerRange>
                <fdt:UpperRange>
                    <fdt:ChannelReference idref="PV_UPPER_RANGE_VALUE"/>
                </fdt:UpperRange>
                <fdt:Unit>
                    <fdt:ChannelReference idref="PV_RANGE_VALUES_UNITS_CODE"/>
                </fdt:Unit>
            </fdt:Range>
        </fdt:Ranges>
    </FDTChannel>
</FDT>
```

11 Device identification

11.1 Device type identification data types – FDTProfibusIdentSchema

The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

```
<Schema name="FDTProfibusIdentSchema" xmlns="urn:schemas-microsoft-com:xml-data" xmlns:dt="urn:schemas-microsoft-com:datatypes">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <AttributeType name="busProtocol" dt:type="enumeration" dt:values="protocol_DP protocol_IM  protocol_PA"/>
    <!--                              -->
    <!--            DP                -->
    <!--                              -->
    <AttributeType name="slaveAddress" dt:type="ui1"/>
    <!-- data source: live list provided by Profibus master - display decimal format -->
    <AttributeType name="identNumber" dt:type="bin.hex"/>
    <!-- Profile IDENT_NUMBER: 0x9700 ( 0x9700 to 0x9742) or Manufacturer specific IDENT_NUMBER -->
    <!-- Display format: 0xabcd -->
    <!--                              -->
    <!--             IM               -->
    <!--                              -->
    <AttributeType name="manufacturer_id" dt:type="ui2"/>
    <!--  I&M 0 Element 1Mapped to  PB.DEVICE_MAN_ID -->
    <AttributeType name="order_id" dt:type="string" dt:maxLength="20"/>
    <!--  I&M 0 Element 2 Mapped to PB.DEVICE_ID -->
    <AttributeType name="serialNumber" dt:type="string" dt:maxLength="16"/>
    <!--  I&M 0 Element 3 unique serial number - Mapped to PB.DEVICE_SER_NUM -->
    <AttributeType name="hardwareRevision" dt:type="string"/>
    <!-- I&M 0 Element 4 HARDWARE_REVISION - 2 Octets transformed  to string (to be consistent to PA_I&M) -->
    <!-- if PROFILE_ID is 0x9700 = device is PA device, HARDWARE_REVISION must be read from PA_I&M0 element 2 -->
    <AttributeType name="softwareRevision" dt:type="string"/>
    <!-- I&M 0 Element 5 SOFTWARE_REVISION - 4 Octets: 4 Octets – 1 char + 3 unsigned 8 , e.g.: V1.2.3 -->
    <!-- if PROFILE_ID is 0x9700 = device is PA device, SOFTWARE_REVISION must be read from PA_I&M0 element 3 -->
    <AttributeType name="profileID" dt:type="ui2"/>
    <!--I&M 0 Element 7  PROFILE_ID -->
    <AttributeType name="profileSpecificType" dt:type="ui2"/>
    <!--  I&M 0 Element 8 PROFILE_SPECIFIC_TYPE -  MSB = BLOCK_OBJECT, LSB = PARENT_CLASS -->
    <AttributeType name="imVersion" dt:type="float"/>
    <!--  I&M 0 Element 9 IM_VERSION - 2 Octets – unsigned 16; MSB major version xxx, LSB minor version yyy - convert to float xxx.yyy -->
    <!-- Frame Application and DTMs should split the float to major version and minor version for display -->
    <AttributeType name="imSupported" dt:type="ui2"/>
    <!--  I&M 0 Element 10 IM_SUPPORTED -->
    <AttributeType name="tagFunction" dt:type="string" dt:maxLength="32"/>
    <!-- I&M1 element 1 TAG_FUNCTION - mapped to semantic of IdTag -->
    <AttributeType name="tagLocation" dt:type="string" dt:maxLength="22"/>
    <!--  I&M1 element 2 TAG_LOCATION -->
    <!--                              -->
    <!--             PA               -->
    <!--                              -->
    <!-- AttributeType name="profile" dt:type="enumeration" dt:values="DP PA IM"/ -->
    <AttributeType name="profilePA" dt:type="ui2"/>
    <!-- Block structure of physical block - element 7:  OctetString - (Index 10 - size 2)  -->
    <AttributeType name="profileRevisionPA" dt:type="ui2"/>
    <!-- Block structure of physical block – element 8  Unsigned 16 - (Index 6)  -->
    <AttributeType name="device_man_id" dt:type="ui2"/>
    <!-- DEVICE_MAN_ID Physical Block - Index 10 - display format: decimal-->
    <AttributeType name="device_id" dt:type="string" dt:maxLength="16"/>
    <!-- DEVICE_ID´Physical Block - Index 11 - VisibleString 16  -->
    <AttributeType name="softwareRevisionPA" dt:type="string" dt:maxLength="16"/>
    <!-- SOFTWARE_REVISION Physical Block - Index 8 (VisibleString 16)  -->
    <AttributeType name="hardwareRevisionPA" dt:type="string" dt:maxLength="16"/>
    <!-- HARDWARE_REVISION Physical Block - Index 9 (VisibleString 16)  -->
    <!-- reused from I&M:
    <AttributeType name="serialNumber" dt:type="string" dt:maxLength="16"/>
```

```
        DEVICE_SER_Num Physical Block - Index 12 (VisibleString 16)
    -->
    <AttributeType name="deviceTAG" dt:type="string" dt:maxLength="16"/>
    <!-- TAG_DESC BO of PB - OctetString 32 -->
    <AttributeType name="profileSpecificTypePA" dt:type="ui2"/>
    <!-- block object PARENT_CLASS of first TransducerBlock -->
    <!--                                -->
    <!--              general     -->
    <!--                                -->
    <AttributeType name="idDTMSupportLevel" dt:type="enumeration" dt:values="genericSupport profileSupport
blockspecificProfileSupport specificSupport identSupport"/>
    <AttributeType name="manufacturerSpecificExtension" dt:type="string"/>
    <AttributeType name="match" dt:type="string"/>
    <AttributeType name="nomatch" dt:type="string"/>
    <ElementType name="RegExpr" content="empty" model="closed">
        <attribute type="match" required="no"/>
        <attribute type="nomatch" required="no"/>
    </ElementType>
</Schema>
```

11.2 Topology scan data types – DTMProfibusDeviceSchema

Used at IDtmEvents::OnScanResponse()

The XML document describes one entry in the list of scanned PROFIBUS-Devices. The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

```
<Schema name="DTMProfibusDeviceSchema" xmlns="urn:schemas-microsoft-com:xml-data" xmlns:fdt="x-
schema:FDTDataTypesSchema.xml" xmlns:dt="urn:schemas-microsoft-com:datatypes">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <AttributeType name="busAddress" dt:type="ui1"/>
    <!--Definition of Elements-->
    <ElementType name="ProfibusDevice" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="schemaVersion" required="no"/>
        <attribute type="busAddress" required="yes"/>
        <attribute type="fdt:deviceTypeId" required="yes"/>
        <attribute type="fdt:subDeviceType" required="no"/>
    </ElementType>
</Schema>
```

11.3 Scan identification data types – FDTProfibusScanIdentSchema

This schema defines the XML document provided by a scan response of a Profibus fieldbus. The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

```
<Schema name="FDTProfibusScanIdentSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:profibusident="x-schema:FDTProfibusIdentSchema.xml"
xmlns:fdt="x-schema:FDTDataTypesSchema.xml">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <AttributeType name="resultState" dt:type="enumeration" dt:values="provisional final error"/>
    <AttributeType name="configuredState" dt:type="enumeration" dt:values="configuredAndPhysicallyAvailable
configuredAndNotPhysicallyAvailable availableButNotConfigured notApplicable"/>
    <!--Definition of elements-->
    <ElementType name="IdAddress" content="empty" model="closed">
        <attribute type="profibusident:slaveAddress" required="yes"/>
    </ElementType>
    <ElementType name="IdBusProtocol" content="empty" model="closed">
        <attribute type="profibusident:busProtocol" required="yes"/>
    </ElementType>
    <ElementType name="IdTypeID" content="empty" model="closed">
        <attribute type="profibusident:identNumber" required="yes"/>
    </ElementType>
```

```
<!--                              -->
<!--              IM              -->
<!--                              -->
<ElementType name="Manufacturer_id" content="empty" model="closed">
    <attribute type="profibusident:manufacturer_id" required="yes"/>
</ElementType>
<ElementType name="Order_id" content="empty" model="closed">
    <attribute type="profibusident:order_id" required="yes"/>
</ElementType>
<ElementType name="IdSerialNumber" content="empty" model="closed">
    <attribute type="profibusident:serialNumber" required="yes"/>
</ElementType>
<ElementType name="IdHardwareRevision" content="empty" model="closed">
    <attribute type="profibusident:hardwareRevision" required="yes"/>
</ElementType>
<ElementType name="IdSoftwareRevision" content="empty" model="closed">
    <attribute type="profibusident:softwareRevision" required="yes"/>
</ElementType>
<ElementType name="IdTag" content="empty" model="closed">
    <attribute type="profibusident:deviceTAG" required="yes"/>
</ElementType>
<ElementType name="ProfileID" content="empty" model="closed">
    <attribute type="profibusident:profileID" required="yes"/>
</ElementType>
<ElementType name="ProfileSpecificType" content="empty" model="closed">
    <attribute type="profibusident:profileSpecificType" required="yes"/>
</ElementType>
<ElementType name="ImVersion" content="empty" model="closed">
    <attribute type="profibusident:imVersion" required="yes"/>
</ElementType>
<ElementType name="TagFunction" content="empty" model="closed">
    <attribute type="profibusident:tagFunction" required="yes"/>
</ElementType>
<ElementType name="TagLocation" content="empty" model="closed">
    <attribute type="profibusident:tagLocation" required="yes"/>
</ElementType>
<ElementType name="ImSupported" content="empty" model="closed">
    <attribute type="profibusident:imSupported" required="yes"/>
</ElementType>
<!--          -->
<!--   PA   -->
<!--              -->
<ElementType name="IdSoftwareRevisionPA" content="empty" model="closed">
    <attribute type="profibusident:softwareRevisionPA" required="yes"/>
</ElementType>
<ElementType name="IdHardwareRevisionPA" content="empty" model="closed">
    <attribute type="profibusident:hardwareRevisionPA" required="yes"/>
</ElementType>
<ElementType name="ProfileRevisionPA" content="empty" model="closed">
    <attribute type="profibusident:profileRevisionPA" required="yes"/>
</ElementType>
<ElementType name="Device_man_id" content="empty" model="closed">
    <attribute type="profibusident:device_man_id" required="yes"/>
</ElementType>
<ElementType name="Device_id" content="empty" model="closed">
    <attribute type="profibusident:device_id" required="yes"/>
</ElementType>
<ElementType name="ProfileSpecificTypePA" content="empty" model="closed">
    <attribute type="profibusident:profileSpecificTypePA" required="yes"/>
</ElementType>
<!-- reuse element from I&M
<ElementType name="IdSerialNumber" content="empty" model="closed">
    <attribute type="profibusident:serialNumber" required="yes"/>
</ElementType>
<ElementType name="IdTag" content="empty" model="closed">
    <attribute type="profibusident:deviceTAG" required="yes"/>
</ElementType>
-->
<!--          -->
<!--         -->
```

```
    <!--                -->
    <ElementType name="ManufacturerSpecificExtension" content="empty" model="closed">
        <attribute type="profibusident:manufacturerSpecificExtension" required="yes"/>
    </ElementType>
    <ElementType name="ScanIdentification_DP" content="eltOnly" model="closed">
        <attribute type="configuredState" required="no"/>
        <!--    attributes with semantic meaning: -->
        <element type="fdt:CommunicationError" minOccurs="0" maxOccurs="1"/>
        <element type="IdAddress" minOccurs="1" maxOccurs="1"/>
        <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
        <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
        <!--    manufacturer specific extension, added in manufacturer specific identification -->
        <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="ScanIdentification_IM" content="eltOnly" model="closed">
        <attribute type="configuredState" required="no"/>
        <!--    attributes with semantic meaning: -->
        <element type="fdt:CommunicationError" minOccurs="0" maxOccurs="1"/>
        <element type="IdAddress" minOccurs="1" maxOccurs="1"/>
        <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
        <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
        <element type="Manufacturer_id" minOccurs="1" maxOccurs="1"/>
        <element type="Order_id" minOccurs="1" maxOccurs="1"/>
        <element type="IdHardwareRevision" minOccurs="1" maxOccurs="1"/>
        <element type="IdSoftwareRevision" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileID" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileSpecificType" minOccurs="1" maxOccurs="1"/>
        <element type="IdSerialNumber" minOccurs="1" maxOccurs="1"/>
        <element type="ImVersion" minOccurs="1" maxOccurs="1"/>
        <element type="TagFunction" minOccurs="1" maxOccurs="1"/>
        <element type="TagLocation" minOccurs="1" maxOccurs="1"/>
        <!-- TagFunction to be transformed to IdTag -->
        <element type="ImSupported" minOccurs="1" maxOccurs="1"/>
        <!--    manufacturer specific extension, added in manufacturer specific identification -->
        <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="ScanIdentification_PA" content="eltOnly" model="closed">
        <attribute type="configuredState" required="no"/>
        <!--    attributes with semantic meaning: -->
        <element type="fdt:CommunicationError" minOccurs="0" maxOccurs="1"/>
        <element type="IdAddress" minOccurs="1" maxOccurs="1"/>
        <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
        <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
        <element type="IdSoftwareRevisionPA" minOccurs="1" maxOccurs="1"/>
        <element type="IdHardwareRevisionPA" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileRevisionPA" minOccurs="1" maxOccurs="1"/>
        <element type="Device_man_id" minOccurs="1" maxOccurs="1"/>
        <element type="Device_id" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileSpecificTypePA" minOccurs="1" maxOccurs="1"/>
        <element type="IdSerialNumber" minOccurs="1" maxOccurs="1"/>
        <element type="IdTag" minOccurs="1" maxOccurs="1"/>
        <!--    manufacturer specific extension, added in manufacturer specific identification -->
        <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="ScanIdentifications" content="eltOnly" model="closed">
        <attribute type="fdt:busCategory" required="yes"/>
        <attribute type="resultState" required="yes"/>
        <group order="one" minOccurs="1" maxOccurs="*">
            <element type="ScanIdentification_DP" minOccurs="0" maxOccurs="*"/>
            <element type="ScanIdentification_IM" minOccurs="0" maxOccurs="*"/>
            <element type="ScanIdentification_PA" minOccurs="0" maxOccurs="*"/>
        </group>
    </ElementType>
    <ElementType name="FDT" content="eltOnly" model="closed">
        <element type="ScanIdentifications" minOccurs="1" maxOccurs="1"/>
    </ElementType>
</Schema>
```

11.4 Device type identification data types – FDTProfibusDeviceIdentSchema

This clause describes the schema for device type identification. The definition of the attributes and elements follows the data type definition as defined in IEC 62453-303-1.

```
<Schema name="FDTProfibusDeviceIdentSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:profibusident="x-schema:FDTProfibusIdentSchema.xml"
xmlns:fdt="x-schema:FDTDataTypesSchema.xml">
    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="number" default="1.21"/>
    <ElementType name="IdBusProtocol" content="eltOnly" model="closed">
        <attribute type="profibusident:busProtocol" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="IdTypeID" content="eltOnly" model="closed">
        <attribute type="profibusident:identNumber" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <!--          -->
    <!--  IM      -->
    <!--          -->
    <ElementType name="Manufacturer_id" content="eltOnly" model="closed">
        <attribute type="profibusident:manufacturer_id" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="Order_id" content="eltOnly" model="closed">
        <attribute type="profibusident:order_id" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="IdHardwareRevision" content="eltOnly" model="closed">
        <attribute type="profibusident:hardwareRevision" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="IdSoftwareRevision" content="eltOnly" model="closed">
        <attribute type="profibusident:softwareRevision" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="ProfileID" content="eltOnly" model="closed">
        <attribute type="profibusident:profileID" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="ProfileSpecificType" content="eltOnly" model="closed">
        <attribute type="profibusident:profileSpecificType" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="ImVersion" content="eltOnly" model="closed">
        <attribute type="profibusident:imVersion" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="ImSupported" content="eltOnly" model="closed">
        <attribute type="profibusident:imSupported" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <!--          -->
    <!--  PA      -->
    <!--          -->
    <ElementType name="IdSoftwareRevisionPA" content="eltOnly" model="closed">
        <attribute type="profibusident:softwareRevisionPA" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="IdHardwareRevisionPA" content="eltOnly" model="closed">
        <attribute type="profibusident:hardwareRevisionPA" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="ProfileRevisionPA" content="eltOnly" model="closed">
        <attribute type="profibusident:profileRevisionPA" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="Device_man_id" content="eltOnly" model="closed">
```

```
        <attribute type="profibusident:device_man_id" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="Device_id" content="eltOnly" model="closed">
        <attribute type="profibusident:device_id" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <ElementType name="ProfileSpecificTypePA" content="eltOnly" model="closed">
        <attribute type="profibusident:profileSpecificTypePA" required="no"/>
        <element type="profibusident:RegExpr" minOccurs="0" maxOccurs="*"/>
    </ElementType>
    <!-- -->
    <!-- -->
    <!-- -->
    <ElementType name="ManufacturerSpecificExtension" content="empty" model="closed">
        <attribute type="profibusident:manufacturerSpecificExtension" required="yes"/>
    </ElementType>
    <ElementType name="DeviceIdentification_DP" content="eltOnly" model="closed">
        <attribute type="profibusident:idDTMSupportLevel" required="yes"/>
        <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
        <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
        <!--    manufacturer specific extension, added in manufacturer specific identification -->
        <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="DeviceIdentification_IM" content="eltOnly" model="closed">
        <attribute type="profibusident:idDTMSupportLevel" required="yes"/>
        <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
        <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
        <element type="Manufacturer_id" minOccurs="1" maxOccurs="1"/>
        <element type="Order_id" minOccurs="1" maxOccurs="1"/>
        <element type="IdHardwareRevision" minOccurs="1" maxOccurs="1"/>
        <element type="IdSoftwareRevision" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileID" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileSpecificType" minOccurs="1" maxOccurs="1"/>
        <element type="ImVersion" minOccurs="1" maxOccurs="1"/>
        <element type="ImSupported" minOccurs="1" maxOccurs="1"/>
        <!--    manufacturer specific extension, added in manufacturer specific identification -->
        <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="DeviceIdentification_PA" content="eltOnly" model="closed">
        <attribute type="profibusident:idDTMSupportLevel" required="yes"/>
        <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
        <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
        <element type="IdSoftwareRevisionPA" minOccurs="1" maxOccurs="1"/>
        <element type="IdHardwareRevisionPA" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileRevisionPA" minOccurs="1" maxOccurs="1"/>
        <element type="Device_man_id" minOccurs="1" maxOccurs="1"/>
        <element type="Device_id" minOccurs="1" maxOccurs="1"/>
        <element type="ProfileSpecificTypePA" minOccurs="1" maxOccurs="1"/>
        <!--    manufacturer specific extension, added in manufacturer specific identification -->
        <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
    </ElementType>
    <ElementType name="DeviceIdentifications" content="eltOnly" model="closed">
        <attribute type="fdt:busCategory" required="yes"/>
        <group order="one" minOccurs="1" maxOccurs="*">
            <element type="DeviceIdentification_DP" minOccurs="0" maxOccurs="*"/>
            <element type="DeviceIdentification_IM" minOccurs="0" maxOccurs="*"/>
            <element type="DeviceIdentification_PA" minOccurs="0" maxOccurs="*"/>
        </group>
    </ElementType>
    <ElementType name="FDT" content="eltOnly" model="closed">
        <element type="DeviceIdentifications" minOccurs="1" maxOccurs="1"/>
    </ElementType>
</Schema>
```

11.5 XSLT Transformation

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<!--
FDT: device identification transformation for Profibus device identification xml files
-->
<xsl:transform      xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
        xmlns:str="http://xsltsl.org/string"
        xmlns:ident="x-schema:DTMIdentSchema.xml"
        xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
        xmlns:scanident="x-schema:DTMScanIdentSchema.xml"
        xmlns:devident="x-schema:DTMDeviceTypeIdentSchema.xml"
        xmlns:pbident="x-schema:FDTProfibusIdentSchema.xml"
        xmlns:pbdevice="x-schema:FDTProfibusDeviceTypeIdentSchema.xml"
        xmlns:pbscan="x-schema:FDTProfibusScanIdentSchema.xml" version="2.0">
        <!--
FDT: version of this file
    -->

    <xsl:variable name="FileVersion">
        <xsl:number value="1.21"/>
    </xsl:variable>
    <xsl:output method="xml" omit-xml-declaration="yes" indent="yes"/>
<!--
root: transform device or scan identification
-->
    <xsl:template match="/">
            <xsl:apply-templates select="//pbscan:ScanIdentifications"/>
            <xsl:apply-templates select="//pbdevice:DeviceIdentifications"/>
    </xsl:template>
<!--
profibus identification list
-->
    <xsl:template match="pbdevice:DeviceIdentifications">
        <xsl:text disable-output-escaping="yes">&lt;?xml version="1.0"?&gt;
    &lt;!-- This file is created by FDTxxxIdentTransformation.xsl after transformation of
xxxDTMDeviceIdentificationInstance.xml --&gt;
    &lt;FDT xmlns="x-schema:DTMDeviceTypeIdentSchema.xml"
     xmlns:ident="x-schema:DTMIdentSchema.xml" xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
&gt;</xsl:text>
                <xsl:element name="DeviceIdentifications">
                    <xsl:apply-templates select="pbdevice:DeviceIdentification_DP"/>
                    <xsl:apply-templates select="pbdevice:DeviceIdentification_IM"/>
                    <xsl:apply-templates select="pbdevice:DeviceIdentification_PA"/>
                </xsl:element>
        <xsl:text disable-output-escaping="yes">&lt;/FDT&gt;</xsl:text>
    </xsl:template>
<!--
profibus DP catalog identification
-->
    <xsl:template match="pbdevice:DeviceIdentification_DP">
            <xsl:element name="DeviceIdentification">
                <xsl:attribute name="ident:idDTMSupportLevel">
                    <xsl:value-of select="@pbident:idDTMSupportLevel"/>
                </xsl:attribute>
                <xsl:element name="IdBusProtocol">
                    <xsl:attribute name="ident:protocolSpecificName">Profibus DP</xsl:attribute>
                    <xsl:attribute name="ident:value">
                        <xsl:value-of select="pbdevice:IdBusProtocol/@pbident:busProtocol"/>
                    </xsl:attribute>
                </xsl:element>
                <xsl:element name="IdBusProtocolVersion">
                    <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
                </xsl:element>
                <xsl:element name="IdManufacturer">
                    <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
                </xsl:element>
                <xsl:apply-templates select="pbdevice:IdTypeID"/>
                <xsl:element name="IdSoftwareRevision" >
                    <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
                </xsl:element>
                <xsl:element name="IdHardwareRevision" >
```

```
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="pbdevice:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>
<!--
DP scan identifcation
-->
    <xsl:template match="pbscan:ScanIdentification_DP">
        <xsl:element name="ScanIdentification">
            <xsl:apply-templates select="@configuredState" />
            <xsl:apply-templates select="fdt:CommunicationError"/>
            <xsl:element name="IdBusProtocol">
                <xsl:attribute name="ident:protocolSpecificName">Profibus DP</xsl:attribute>
                <xsl:attribute name="ident:value">
                    <xsl:value-of select="pbscan:IdBusProtocol/@pbident:busProtocol"/>
                </xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="pbscan:IdBusProtocol"/>
            <xsl:element name="IdBusProtocolVersion">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="pbscan:IdAddress"/>
            <xsl:element name="IdManufacturer">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="pbscan:IdTypeID"/>
            <xsl:element name="IdSoftwareRevision" >
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdHardwareRevision" >
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdDeviceTag">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdSerialNumber">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="pbscan:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>
<!--
profibus IM catalog identifcation
-->
    <xsl:template match="pbdevice:DeviceIdentification_IM">
        <xsl:element name="DeviceIdentification">
            <xsl:attribute name="ident:idDTMSupportLevel">
                <xsl:value-of select="@pbident:idDTMSupportLevel"/>
            </xsl:attribute>
            <xsl:element name="IdBusProtocol">
                <xsl:attribute name="ident:protocolSpecificName">Profibus IM</xsl:attribute>
                <xsl:attribute name="ident:value">
                    <xsl:value-of select="pbdevice:IdBusProtocol/@pbident:busProtocol"/>
                </xsl:attribute>
            </xsl:element>
            <xsl:element name="IdBusProtocolVersion">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="pbdevice:Manufacturer_id"/>
            <xsl:apply-templates select="pbdevice:IdTypeID"/>
            <xsl:apply-templates select="pbdevice:IdSoftwareRevision"/>
            <xsl:apply-templates select="pbdevice:IdHardwareRevision"/>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="pbdevice:order_id"/>
                <xsl:apply-templates select="pbdevice:ProfileID"/>
```

```
                <xsl:apply-templates select="pbdevice:ImVersion"/>
                <xsl:apply-templates select="pbdevice:ProfileSpecificType"/>
                <xsl:apply-templates select="pbdevice:ImSupported"/>
                <xsl:apply-templates select="pbdevice:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>
<!--
profibus IM scan identifcation
-->
    <xsl:template match="pbscan:ScanIdentification_IM">
        <xsl:element name="ScanIdentification">
            <xsl:apply-templates select="@configuredState" />
            <xsl:apply-templates select="fdt:CommunicationError"/>
            <xsl:element name="IdBusProtocol">
                <xsl:attribute name="ident:protocolSpecificName">Profibus IM</xsl:attribute>
                <xsl:attribute name="ident:value">
                    <xsl:value-of select="pbscan:IdBusProtocol/@pbident:busProtocol"/>
                </xsl:attribute>
            </xsl:element>
            <xsl:element name="IdBusProtocolVersion">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="pbscan:IdAddress"/>
            <xsl:apply-templates select="pbscan:Manufacturer_id"/>
            <xsl:apply-templates select="pbscan:IdTypeID"/>
            <xsl:apply-templates select="pbscan:IdSoftwareRevision"/>
            <xsl:apply-templates select="pbscan:IdHardwareRevision"/>
            <xsl:element name="IdDeviceTag">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdSerialNumber">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="pbscan:order_id"/>
                <xsl:apply-templates select="pbscan:ProfileID"/>
                <xsl:apply-templates select="pbscan:ImVersion"/>
                <xsl:apply-templates select="pbscan:ProfileSpecificType"/>
                <xsl:apply-templates select="pbscan:ImSupported"/>
                <xsl:apply-templates select="pbscan:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>

<!--
profibus PA catalog identifcation
-->
    <xsl:template match="pbdevice:DeviceIdentification_PA">
        <xsl:element name="DeviceIdentification">
            <xsl:attribute name="ident:idDTMSupportLevel">
                <xsl:value-of select="@pbident:idDTMSupportLevel"/>
            </xsl:attribute>
            <xsl:element name="IdBusProtocol">
                <xsl:attribute name="ident:protocolSpecificName">Profile</xsl:attribute>
                <xsl:attribute name="ident:value">
                    <xsl:value-of select="pbdevice:IdBusProtocol/@pbident:busProtocol"/>
                </xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="pbdevice:ProfileRevisionPA"/>
            <xsl:apply-templates select="pbdevice:Device_man_id"/>
            <xsl:apply-templates select="pbdevice:IdTypeID"/>
            <xsl:apply-templates select="pbdevice:IdSoftwareRevisionPA"/>
            <xsl:apply-templates select="pbdevice:IdHardwareRevisionPA"/>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="pbdevice:Device_id"/>
                <xsl:apply-templates select="pbdevice:ProfileSpecificTypePA"/>
                <xsl:apply-templates select="pbdevice:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
```

```
    </xsl:template>
<!--
profibus PA scan identifcation
-->
    <xsl:template match="pbscan:ScanIdentification_PA">
            <xsl:element name="ScanIdentification">
                <xsl:apply-templates select="@configuredState" />
                <xsl:apply-templates select="fdt:CommunicationError"/>
                <xsl:element name="IdBusProtocol">
                    <xsl:attribute name="ident:protocolSpecificName">Profile</xsl:attribute>
                    <xsl:attribute name="ident:value">
                        <xsl:value-of select="pbscan:IdBusProtocol/@pbident:busProtocol"/>
                    </xsl:attribute>
                </xsl:element>
                <xsl:apply-templates select="pbscan:ProfileRevisionPA"/>
                <xsl:apply-templates select="pbscan:IdAddress"/>
                <xsl:apply-templates select="pbscan:Device_man_id"/>
                <xsl:apply-templates select="pbscan:IdTypeID"/>
                <xsl:apply-templates select="pbscan:IdSoftwareRevisionPA"/>
                <xsl:apply-templates select="pbscan:IdHardwareRevisionPA"/>
                <xsl:apply-templates select="pbscan:IdTag"/>
                <xsl:apply-templates select="pbscan:IdSerialNumber"/>
                <xsl:element name="IdValues">
                    <xsl:apply-templates select="pbscan:Device_id"/>
                    <xsl:apply-templates select="pbscan:ProfileSpecificTypePA"/>
                    <xsl:apply-templates select="pbscan:ManufacturerSpecificExtension"/>
                </xsl:element>
            </xsl:element>
    </xsl:template>

<!--
scan list
-->
    <xsl:template match="pbscan:ScanIdentifications">
            <xsl:text disable-output-escaping="yes">&lt;?xml version="1.0"?&gt;
    &lt;!-- This file is created by FDTxxxIdentTransformation.xsl after transformation of
xxxDTMScanIdentificationInstance.xml --&gt;&lt;FDT xmlns="x-schema:DTMScanIdentSchema.xml"
     xmlns:ident="x-schema:DTMIdentSchema.xml" xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
&gt;</xsl:text>
                <xsl:element name="ScanIdentifications">
                    <xsl:attribute name="fdt:busCategory">
                        <xsl:value-of select="@fdt:busCategory"/>
                    </xsl:attribute>
                    <xsl:attribute name="resultState">
                        <xsl:value-of select="@resultState"/>
                    </xsl:attribute>
                    <xsl:apply-templates select="pbscan:ScanIdentification_DP"/>
                    <xsl:apply-templates select="pbscan:ScanIdentification_IM"/>
                    <xsl:apply-templates select="pbscan:ScanIdentification_PA"/>
                </xsl:element>
        <xsl:text disable-output-escaping="yes">&lt;/FDT&gt;</xsl:text>
    </xsl:template>

<!--
configured attribute
-->
    <xsl:template match="@configuredState">
        <xsl:attribute name="configuredState">
            <xsl:value-of select="."/>
        </xsl:attribute>
    </xsl:template>

<!--
device tag
-->
    <xsl:template match="pbscan:IdTag">
        <xsl:element name="IdDeviceTag">
            <xsl:attribute name="ident:value"><xsl:value-of select="@pbident:deviceTAG"/></xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">TAG_DESC</xsl:attribute>
        </xsl:element>
```

```
    </xsl:template>
<!--
communicationError
-->
    <xsl:template match="fdt:CommunicationError">
        <xsl:element name="fdt:CommunicationError">
            <xsl:attribute name="communicationError"><xsl:value-of
select="@communicationError"/></xsl:attribute>
            <xsl:attribute name="tag"><xsl:value-of select="@tag"/></xsl:attribute>
        </xsl:element>
    </xsl:template>
<!--
serialnumber
-->
    <xsl:template match="pbscan:IdSerialNumber">
        <xsl:element name="IdSerialNumber">
            <xsl:attribute name="ident:value"><xsl:value-of select="@pbident:serialNumber"/></xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">DEVICE_SER_NUM</xsl:attribute>
        </xsl:element>
    </xsl:template>
<!--
busaddress
-->
    <xsl:template match="pbscan:IdAddress">
        <xsl:element name="IdAddress">
            <xsl:attribute name="ident:value"><xsl:value-of select="@pbident:slaveAddress"/></xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Slave Address</xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
Device_id, saved as protocol specific value
-->
    <xsl:template match="pbdevice:Device_id">
        <xsl:param name="value" select="@pbident:device_id"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">DEVICE_ID</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">DEVICE_ID</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:Device_id">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">DEVICE_ID</xsl:attribute>
            <xsl:attribute name="ident:name">DEVICE_ID</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:device_id"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>
<!--
DeviceType, saved as protocol specific value
-->
    <xsl:template match="pbdevice:DeviceType">
        <xsl:param name="value" select="@pbident:devicetype"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">IDENT_NUMBER</xsl:attribute>
            <xsl:attribute name="ident:name">IDENT_NUMBER</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:DeviceType">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">IDENT_NUMBER</xsl:attribute>
            <xsl:attribute name="ident:name">IDENT_NUMBER</xsl:attribute>
            <xsl:attribute name="ident:value">
```

```
                <xsl:value-of select="@pbident:devicetype"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
YearOfFirmware, saved as protocol specific value
-->
    <xsl:template match="pbdevice:YearOfFirmware">
        <xsl:param name="value" select="@pbident:yearOfFirmware"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">Date of Firmware (Year)</xsl:attribute>
            <xsl:attribute name="ident:name">YearOfFirmware</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:YearOfFirmware">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">Date of Firmware (Year)</xsl:attribute>
            <xsl:attribute name="ident:name">YearOfFirmware</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:yearOfFirmware"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
ProfileRevisionPA
-->
    <xsl:template match="pbdevice:ProfileRevisionPA">
        <xsl:param name="manid" select="@pbident:profileRevisionPA"/>
        <xsl:element name="IdBusProtocolVersion">
            <xsl:attribute name="ident:protocolSpecificName">Profile Revision</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$manid"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:ProfileRevisionPA">
        <xsl:element name="IdBusProtocolVersion">
            <xsl:attribute name="ident:protocolSpecificName">Profile Revision</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:profileRevisionPA"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
DayMonthOfFirmware, saved as protocol specific value
-->
    <xsl:template match="pbdevice:DayMonthOfFirmware">
        <xsl:param name="value" select="@pbident:dayMonthOfFirmware"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">Date of Firmware (Day/Month)</xsl:attribute>
            <xsl:attribute name="ident:name">DayMonthOfFirmware</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:DayMonthOfFirmware">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">Date of Firmware (Day/Month)</xsl:attribute>
            <xsl:attribute name="ident:name">DayMonthOfFirmware</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:dayMonthOfFirmware"/>
            </xsl:attribute>
        </xsl:element>
```

```
    </xsl:template>

<!--
ProfileNumber, saved as protocol specific value
-->
    <xsl:template match="pbdevice:ProfileNumber">
        <xsl:param name="value" select="@pbident:profileNumber"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">Profile Number</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileNumber</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:ProfileNumber">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">Profile Number</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileNumber</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:profileNumber"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
ProfileSpecificTypePA, saved as protocol specific value
-->
    <xsl:template match="pbdevice:ProfileSpecificTypePA">
        <xsl:param name="value" select="@pbident:profileSpecificTypePA"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">BO PARENT_CLASS</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileSpecificTypePA</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:ProfileSpecificTypePA">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">BO PARENT_CLASS</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileSpecificTypePA</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbscan:profileSpecificTypePA"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
Order_id, saved as protocol specific value
-->
    <xsl:template match="pbdevice:Order_id">
        <xsl:param name="value" select="@pbident:order_id"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">ORDER_ID</xsl:attribute>
            <xsl:attribute name="ident:name">Order_id</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:Order_id">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">ORDER_ID</xsl:attribute>
            <xsl:attribute name="ident:name">Order_id</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:order_id"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>
```

```
<!--
ProfileID, saved as protocol specific value
-->
    <xsl:template match="pbdevice:ProfileID">
        <xsl:param name="value" select="@pbident:profileID"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">PROFILE_ID</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileID</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:ProfileID">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">PROFILE_ID</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileID</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:profileID"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>
<!--
ProfileSpecificType, saved as protocol specific value
-->
    <xsl:template match="pbdevice:ProfileSpecificType">
        <xsl:param name="value" select="@pbident:profileSpecificType"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">PROFILE_SPECIFIC_TYPE</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileSpecificType</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:ProfileSpecificType">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">PROFILE_SPECIFIC_TYPE</xsl:attribute>
            <xsl:attribute name="ident:name">ProfileSpecificType</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:profileSpecificType"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
ImVersion, saved as protocol specific value
-->
    <xsl:template match="pbdevice:ImVersion">
        <xsl:param name="value" select="@pbident:imVersion"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">IM_VERSION</xsl:attribute>
            <xsl:attribute name="ident:name">ImVersion</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="pbscan:ImVersion">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:protocolSpecificName">IM_VERSION</xsl:attribute>
            <xsl:attribute name="ident:name">ImVersion</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@pbident:imVersion"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
```