

TECHNICAL REPORT



**Field device tool (FDT) interface specification –
Part 501: Communication implementation for common object model – IEC 61784
CPF 1**



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**Field device tool (FDT) interface specification –
Part 501: Communication implementation for common object model – IEC 61784
CPF 1**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

**Part 501: Communication implementation for common object model –
IEC 61784 CPF 1**

FOREWORD

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IEC/TR 62453-501, 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/65/DTR	65E/114/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- withdrawn,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 62453-501 is aligned in the structure of IEC 62453 series.

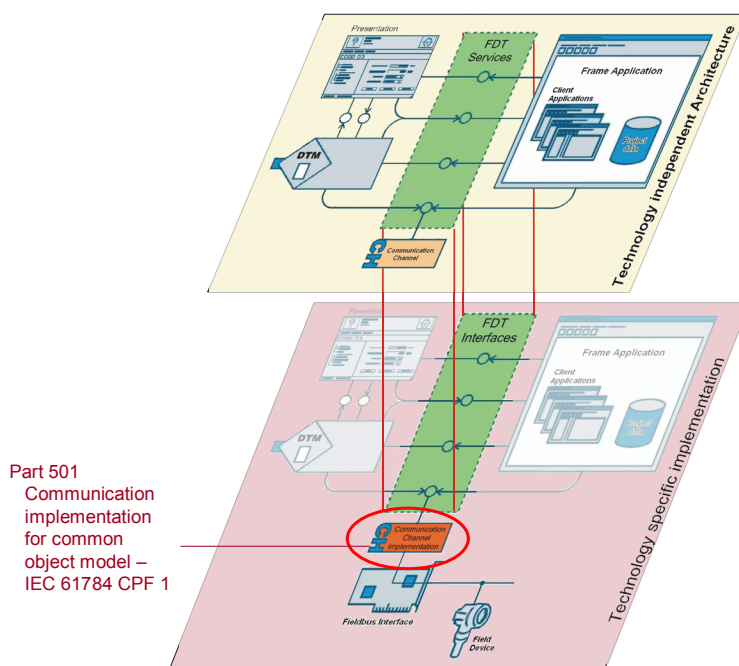


Figure 1 – Part 501 of the IEC 62453 series

FIELD DEVICE TOOL (FDT) INTERFACE SPECIFICATION –

Part 501: Communication implementation for common object model – IEC 61784 CPF 1

1 Scope

IEC/TR 62453-501, which is a technical report, provides additional information for integrating the Foundation Fieldbus (FF) protocol into the COM implementation of the FDT Specification (IEC/TR 62453-41).

The document describes communication definitions, protocol specific extensions and the means for block (e.g. transducer, resource or function blocks) representation.

The new protocol specific definitions are based on FF-Specifications for H1 and HSE protocols. Furthermore, the definitions contain information that is needed by systems to configure FF Devices.

The scope is limited to Foundation Fieldbus device and system specific definitions.

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 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 62453-301:2009, *Field Device Tool (FDT) interface specification – Part 301: Communication profile integration – IEC 61784 CPF 1*

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, IEC 62453-2, IEC/TR 62453-41 and the following apply.

3.2 Symbols and abbreviated terms

CP	Communication Profile	[IEC 61784-1]
CPF	Communication Profile Family	[IEC 61784-1]
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 behaviour.
Usage of “can” or “Optional”	Function or behaviour may be provided, depending on defined conditions.

3.3.3 Use of UML

Figures in this document are using UML notation as defined in Annex A of IEC 62453-1.

4 Bus category

IEC 61784 CPF 1 protocol is identified by the identifiers, as specified in IEC 62453-301.

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 as defined in IEC 62453-301.

6 Protocol specific usage of general data types

Table 1 shows how general data types are used with IEC 61784 CPF 1 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 62453-301.
fdt:protocolId	
fdt:deviceTypeId	
fdt:deviceTypeInfo	
fdt:deviceTypeInfoPath	
fdt:manufacturerId	

Attribute	Description for use
fdt:semanticId	
fdt:applicationDomain	
fdt:tag	

7 Protocol specific common data types - FdtFFDataTypesSchema

This clause specifies the protocol specific common data types, which are used in the definition of other data types.

```
<Schema name="FdtFFDataTypesSchema" xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes"
  xmlns:fdt="x-schema:FDTDataTypesSchema.xml">

  <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>

  <!--
    Common definitions of datatypes for Fieldbus Foundation
    use name space prefix fdtypes when referencing
  -->
  <!--Definition of Attributes-->
  <!-- VFD Reference according to FF-880 section 8 -->
  <AttributeType name="vfdRef" dt:type="ui4"/>
  <AttributeType name="vfdTag" dt:type="string"/>
  <AttributeType name="communicationReference" dt:type="uuid"/>
  <AttributeType name="subIndex" dt:type="ui4"/>
  <AttributeType name="versionOd" dt:type="i2"/>
  <AttributeType name="versionNumber" dt:type="bin.hex"/>
  <AttributeType name="devID" dt:type="string"/>
  <AttributeType name="ip" dt:type="string"/>
  <AttributeType name="port" dt:type="ui2"/>
  <AttributeType name="deviceIndex" dt:type="ui4"/>
  <AttributeType name="listCount" dt:type="ui4"/>
  <AttributeType name="smServiceID" dt:type="enumeration" dt:values="SmSetPDTag SmSetAddress
SmClearAddress SmIdentify SmFindTagQuery SmClearAssignmentInfo SmSetAssignmentInfo"/>
  <AttributeType name="deviceType" dt:type="enumeration" dt:values="linkingDevice ioGateway hseFieldDevice
h1Device"/>
  <!--Attributes of element DataLinkAddress - Denotes the Data link (DL) Addresses. see FF-822 Annex A -->
  <!-- Link designator according to FF-822 -->
  <AttributeType name="linkId" dt:type="ui2"/>
  <!-- Node designator according to FF-822 -->
  <AttributeType name="nodeId" dt:type="ui2"/>
  <!-- Selector according to FF-822 -->
  <AttributeType name="selector" dt:type="ui2"/>
  <!-- See FF-870 section 3.3.4 - FMS services and the options supported by the server-->
  <AttributeType name="fmsFeaturesSupported" dt:type="bin.hex"/>
  <!-- Management attributes -->
  <AttributeType name="smSupport" dt:type="bin.hex"/>
  <AttributeType name="macroCycleDuration" dt:type="ui4"/>
  <AttributeType name="operationalPowerup" dt:type="ui4"/>
  <AttributeType name="scheduleActivation" dt:type="ui4"/>
  <AttributeType name="timeValue" dt:type="bin.hex"/>
  <AttributeType name="domain" dt:type="bin.hex"/>
  <!-- represent parameters DEV_REV and DD_REV from the resource block-->
  <AttributeType name="deviceRevision" dt:type="ui1" />
  <AttributeType name="ddRevision" dt:type="ui1" />
  <AttributeType name="devType" dt:type="ui2" />
  <!--Definition of Elements-->
  <!--Element DataLinkAddress - Denotes the Data link (DL) Addresses. see FF-822 Annex A -->
  <ElementType name="DataLinkAddress" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="linkId" required="yes"/>
    <attribute type="nodeId" required="yes"/>
    <attribute type="selector" required="yes"/>
  </ElementType>
  <!--Element index -->
```

```

<ElementType name="Index" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>
<!-- Element SubIndex -->
<ElementType name="SubIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="subIndex" required="yes"/>
</ElementType>
<ElementType name="IndexList" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="listCount" required="yes"/>
  <element type="Index" minOccurs="1" maxOccurs="*" />
</ElementType>
<ElementType name="IP" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="ip" required="yes"/>
  <attribute type="port" required="no"/>
</ElementType>
<!-- Management elements -->
<ElementType name="VfdTag" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="vfdTag" required="yes"/>
</ElementType>
<ElementType name="VfdRef" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="vfdRef" required="yes"/>
</ElementType>
<ElementType name="OperationalPowerup" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="operationalPowerup" required="yes"/>
</ElementType>
<ElementType name="PdTag" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:tag" required="yes"/>
</ElementType>
<ElementType name="DeviceId" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" default="1" required="no"/>
  <attribute type="devID" required="yes"/>
</ElementType>
<ElementType name="MacrocycleDuration" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="macroCycleDuration" required="yes"/>
</ElementType>
<ElementType name="CurrentTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="timeValue" required="yes"/>
</ElementType>
<ElementType name="SmSupport" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="smSupport" required="yes"/>
</ElementType>

```

```
<ElementType name="VfdIdentification" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="ddRevision" required="yes" />
  <attribute type="deviceRevision" required="yes" />
  <attribute type="devType" required="yes" />
  <attribute type="fdt:manufacturerId" required="no"/>
  <attribute type="vfdTag" required="yes"/>
</ElementType>
</Schema>
```

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]-section shall be exposed by these methods.

8.2 H1 Management – FdtFFH1ManagementSchema

```
<Schema name="FdtFFH1ManagementSchema"
  xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes"
  xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml"
  xmlns:fdt="x-schema:FDTDataTypesSchema.xml">

<!-- ***** -->
<!-- Definition of Attributes -->
<!-- ***** -->

  <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>

  <!-- ***** -->
  <!-- System management information base (SMIB) attributes as in FF-880 section 8 -->

  <!-- "SmAgent" attributes -->
  <AttributeType name="t1" dt:type="ui4"/>
  <AttributeType name="t2" dt:type="ui4"/>
  <AttributeType name="t3" dt:type="ui4"/>

  <!-- "SyncAndScheduling" attributes -->
  <AttributeType name="localTimeDiff" dt:type="ui4"/>
  <AttributeType name="applicationClockSyncInterval" dt:type="ui1"/>
  <AttributeType name="timeLastReceived" dt:type="bin.hex"/>
  <AttributeType name="primaryApplicationTimePublisher" dt:type="ui1"/>
  <AttributeType name="timePublisherAddress" dt:type="ui1"/>
  <!-- "FbSchedule" attributes -->
  <AttributeType name="startTimeOffset" dt:type="ui4"/>

  <!-- ***** -->
  <!-- Network management information base (NMIB) attributes as in FF-801 section 8 -->

  <!-- "DlmeLinkSettings" attributes -->
  <AttributeType name="slotTime" dt:type="ui2"/>
  <AttributeType name="perDlpduPhlOverhead" dt:type="ui1"/>
  <AttributeType name="maxResponseDelay" dt:type="ui1"/>
  <AttributeType name="firstUnpolledNodeId" dt:type="ui1"/>
  <AttributeType name="thisLink" dt:type="ui2"/>
  <AttributeType name="minInterPduDelay" dt:type="ui1"/>
  <AttributeType name="numConsecUnpolledNodeId" dt:type="ui1"/>
  <AttributeType name="preambleExtension" dt:type="ui1"/>
  <AttributeType name="postTransGapExtension" dt:type="ui1"/>
```

```

<AttributeType name="maxInterChanSignalSkew" dt:type="ui1"/>
<AttributeType name="timeSyncClass" dt:type="ui1"/>

<!-- "ScheduleDescriptor" attributes -->
<AttributeType name="timeResolution" dt:type="ui2"/>

<!-- "StackCapabilities" attributes -->
<AttributeType name="fasArTypesAndRolesSupported" dt:type="ui4"/>
<AttributeType name="maxDisapAddressesSupported" dt:type="ui2"/>
<AttributeType name="maxDlcepAddressesSupported" dt:type="ui2"/>
<AttributeType name="dlcepDeliveryFeaturesSupported" dt:type="ui1"/>
<AttributeType name="agentFunctionsSupported" dt:type="ui2"/>

<!-- "ListCharacteristics" attributes -->
<AttributeType name="maxEntries" dt:type="ui2"/>
<AttributeType name="numPermanentEntries" dt:type="ui2"/>
<AttributeType name="numCurrentlyConfigured" dt:type="ui2"/>
<AttributeType name="firstUnconfiguredEntry" dt:type="ui2"/>
<AttributeType name="dynamicsSupportedFlag" dt:type="boolean"/>
<AttributeType name="statisticsSupported" dt:type="ui1"/>
<AttributeType name="numOfStatisticsEntries" dt:type="ui2"/>

<!-- "VcrStaticEntry" attributes -->
<AttributeType name="fasArTypeAndRole" dt:type="ui1"/>
<AttributeType name="fasDIIAddr" dt:type="ui4"/>
<AttributeType name="fasDIIConfiguredRemoteAddr" dt:type="ui4"/>
<AttributeType name="fasDIIISDAP" dt:type="ui1"/>
<AttributeType name="fasDIIConfirmDelayOnConnect" dt:type="ui2"/>
<AttributeType name="fasDIIConfirmDelayOnData" dt:type="ui2"/>
<AttributeType name="fasDIIISduSize" dt:type="ui2"/>
<AttributeType name="fasDIIResidualActivitySupported" dt:type="boolean"/>
<AttributeType name="fasDIITimelinessClass" dt:type="ui1"/>
<AttributeType name="fasDIIPublisherTimeWindowSize" dt:type="ui2"/>
<AttributeType name="fasDIIPublisherSynchronizingDlcep" dt:type="ui4"/>
<AttributeType name="fasDIISubscriberTimeWindowSize" dt:type="ui2"/>
<AttributeType name="fasDIISubscriberSynchronizingDlcep" dt:type="ui4"/>
<AttributeType name="fmsVfdId" dt:type="ui4"/>
<AttributeType name="fmsMaxOutstandingServicesCalling" dt:type="ui1"/>
<AttributeType name="fmsMaxOutstandingServicesCalled" dt:type="ui1"/>

<!-- "VcrDynamicEntry" attributes -->
<AttributeType name="fmsState" dt:type="ui1"/>
<AttributeType name="fmsActualMaxOutstandingServicesCalling" dt:type="ui1"/>
<AttributeType name="fmsActualMaxOutstandingServicesCalled" dt:type="ui1"/>
<AttributeType name="fmsOutstandingServicesCounterCalling" dt:type="ui1"/>
<AttributeType name="fmsOutstandingServicesCounterCalled" dt:type="ui1"/>
<AttributeType name="fasState" dt:type="ui1"/>
<AttributeType name="fasDIIActualRemoteAddress" dt:type="ui4"/>
<AttributeType name="fasDIIISduQueueDepth" dt:type="ui1"/>
<AttributeType name="fasDIIISduReceivingQueueDepth" dt:type="ui1"/>

<!-- "VcrStatisticsEntry" attributes -->
<AttributeType name="clearVcrStatistics" dt:type="boolean"/>
<AttributeType name="fasNumOfAbortsCtr" dt:type="ui2"/>
<AttributeType name="fasLocallyGeneratedLastAborted" dt:type="boolean"/>
<AttributeType name="fasReasonLastAborted" dt:type="ui2"/>
<AttributeType name="dIIISduNumOfDlPduSent" dt:type="ui2"/>
<AttributeType name="dIIISduNumOfDlPduReceived" dt:type="ui2"/>
<AttributeType name="dIIISduNumOfDlDataTransferTimeoutFailures" dt:type="ui2"/>
<AttributeType name="dIIISduNumOfRcvrQuFullDlDataFailures" dt:type="ui2"/>

<!-- "DlmeBasicCharacteristics" attributes -->
<AttributeType name="basicStatisticsSupportedFlag" dt:type="boolean"/>
<AttributeType name="dlOperatFunctionalClass" dt:type="ui1"/>
<AttributeType name="dlDeviceConformance" dt:type="ui4"/>

<!-- "DlmeBasicInfo" attributes -->
<!-- AttributeType name="slotTime" already defined in DlmeLinkSettings /-->
<!-- AttributeType name="perDlPduPhlOverhead" already defined in DlmeLinkSettings /-->
<!-- AttributeType name="maxResponseDelay" already defined in DlmeLinkSettings /-->

```

```

<AttributeType name="thisNode" dt:type="ui1"/>
<!-- AttributeType name="thisLink" already defined in DImeLinkSettings /-->
<!-- AttributeType name="minInterPduDelay" already defined in DImeLinkSettings /-->
<!-- AttributeType name="timeSyncClass" already defined in DImeLinkSettings /-->
<!-- AttributeType name="preambleExtension" already defined in DImeLinkSettings /-->
<!-- AttributeType name="postTransGapExtension" already defined in DImeLinkSettings /-->
<!-- AttributeType name="maxInterChanSignalSkew" already defined in DImeLinkSettings /-->

<!-- "DImeBasicStatistics" attributes -->
<AttributeType name="numOfDlpduTransmitted" dt:type="ui4"/>
<AttributeType name="numOfGoodDlpduReceived" dt:type="ui4"/>
<AttributeType name="numOfPartialReceivedDlpdu" dt:type="ui4"/>
<AttributeType name="numOfFcsFailures" dt:type="ui4"/>
<AttributeType name="numOfNodeTimeOffsetDiscontinuousChanges" dt:type="ui4"/>

<!-- "DImeLinkMasterInfo" attributes -->
<AttributeType name="maxSchedulingOverhead" dt:type="ui1"/>
<AttributeType name="defMinTokenDelegTime" dt:type="ui2"/>
<AttributeType name="defTokenHoldTime" dt:type="ui2"/>
<AttributeType name="targetTokenRotTime" dt:type="ui2"/>
<AttributeType name="linkMaintTokHoldTime" dt:type="ui2"/>
<AttributeType name="timeDistributionPeriod" dt:type="ui4"/>
<AttributeType name="maximumInactivityToClaimLasDelay" dt:type="ui2"/>
<AttributeType name="lasDatabaseStatusSpduDistributionPeriod" dt:type="ui2"/>

<!-- "DImeLinkMasterStatistics" attributes -->
<AttributeType name="numLasRoleDelegOrClaimOrDelegTokenHoldTimeout" dt:type="ui2"/>

<!-- "LastValues" attributes -->
<AttributeType name="frameControlOctetN" dt:type="ui1"/>
<AttributeType name="addressSubfieldsN" dt:type="bin.hex"/>
<AttributeType name="frameControlOctetNminus1" dt:type="ui1"/>
<AttributeType name="addressSubfieldsNminus1" dt:type="bin.hex"/>
<AttributeType name="frameControlOctetNminus2" dt:type="ui1"/>
<AttributeType name="addressSubfieldsNminus2" dt:type="bin.hex"/>
<AttributeType name="frameControlOctetNminus3" dt:type="ui1"/>
<AttributeType name="addressSubfieldsNminus3" dt:type="bin.hex"/>

<!-- "LinkScheduleListCharacteristics" attributes -->
<AttributeType name="numOfSchedules" dt:type="ui1"/>
<AttributeType name="numOfSubSchedulesPerSchedule" dt:type="ui1"/>
<AttributeType name="activeScheduleStartingTime" dt:type="bin.hex"/>

<!-- "PlmeBasicCharacteristics" attributes -->
<AttributeType name="channelStatisticsSupported" dt:type="ui1"/>
<AttributeType name="mediumAndDataRatesSupported" dt:type="bin.hex"/>
<AttributeType name="numOfChannels" dt:type="ui1"/>
<AttributeType name="powerMode" dt:type="ui1"/>

<!-- "PlmeBasicInfo" attributes -->
<AttributeType name="interfaceMode" dt:type="ui1"/>
<AttributeType name="loopBackMode" dt:type="ui1"/>
<AttributeType name="xmitEnabled" dt:type="ui1"/>
<AttributeType name="rcvEnabled" dt:type="ui1"/>
<AttributeType name="preferredReceiveChannel" dt:type="ui1"/>
<AttributeType name="mediaTypeSelected" dt:type="ui1"/>
<AttributeType name="receiveSelect" dt:type="ui1"/>

<!-- "MmeWireStatistics" attributes -->
<AttributeType name="channelNumber" dt:type="ui1"/>
<AttributeType name="totalGoodMsgsSent" dt:type="ui4"/>
<AttributeType name="totalGoodMsgsRcvd" dt:type="ui4"/>
<AttributeType name="numOfJabberFaults" dt:type="ui2"/>
<AttributeType name="numOfInternAndJabberFaults" dt:type="ui2"/>
<AttributeType name="numEndActivityBeforeEndData" dt:type="ui2"/>

<!-- "VcrList" attributes -->
<AttributeType name="listControl" dt:type="ui1"/>

<!-- "DImeLinkMaster" attributes -->

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<AttributeType name="dlmeLinkMasterCapabilities" dt:type="ui1"/>
<AttributeType name="primaryLinkMasterFlag" dt:type="boolean"/>
<AttributeType name="liveListStatusArray" dt:type="bin.hex"/>
<AttributeType name="maxTokenHoldTime" dt:type="bin.hex"/>
<AttributeType name="bootOperatFunctionalClass" dt:type="ui1"/>

<!-- "PlmeBasic" attributes -->
<AttributeType name="channelStates" dt:type="bin.hex"/>

<!-- ***** -->
<!--          Definition of Elements          -->
<!-- ***** -->

<!-- ***** -->
<!-- SMIB elements for basic variables as in FF-880 section 8 -->
<!-- ***** -->

<!-- "SmAgent" elements -->
<ElementType name="T1" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="t1" required="yes"/>
</ElementType>
<ElementType name="T2" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="t2" required="yes"/>
</ElementType>
<ElementType name="T3" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="t3" required="yes"/>
</ElementType>

<!-- "SyncAndScheduling" elements -->
<ElementType name="LocalTimeDiff" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="localTimeDiff" required="yes"/>
</ElementType>
<ElementType name="ApplicationClockSyncInterval" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="applicationClockSyncInterval" required="yes"/>
</ElementType>
<ElementType name="TimeLastReceived" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="timeLastReceived" required="yes"/>
</ElementType>
<ElementType name="PrimaryApplicationTimePublisher" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="primaryApplicationTimePublisher" required="yes"/>
</ElementType>
<ElementType name="TimePublisherAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="timePublisherAddress" required="yes"/>
</ElementType>

<!-- "FbSchedule" elements -->

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<ElementType name="StartTimeOffset" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="startTimeOffset" required="yes"/>
</ElementType>
<ElementType name="FbObjectIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>

<!-- ***** -->
<!-- NMIB elements for basic variables as in FF-801 section 8 -->
<!-- ***** -->

<!-- "DlmeLinkSettings" elements -->
<ElementType name="SlotTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="slotTime" required="yes"/>
</ElementType>
<ElementType name="PerDlpduPhlOverhead" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="perDlpduPhlOverhead" required="yes"/>
</ElementType>
<ElementType name="MaxResponseDelay" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maxResponseDelay" required="yes"/>
</ElementType>
<ElementType name="FirstUnpolledNodeId" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="firstUnpolledNodeId" required="yes"/>
</ElementType>
<ElementType name="ThisLink" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="thisLink" required="yes"/>
</ElementType>
<ElementType name="MinInterPduDelay" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="minInterPduDelay" required="yes"/>
</ElementType>
<ElementType name="NumConsecUnpolledNodeId" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numConsecUnpolledNodeId" required="yes"/>
</ElementType>
<ElementType name="PreambleExtension" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="preambleExtension" required="yes"/>
</ElementType>
<ElementType name="PostTransGapExtension" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>

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        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="postTransGapExtension" required="yes"/>
    </ElementType>
    <ElementType name="MaxInterChanSignalSkew" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxInterChanSignalSkew" required="yes"/>
    </ElementType>
    <ElementType name="TimeSyncClass" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="timeSyncClass" required="yes"/>
    </ElementType>

    <!-- "ScheduleDescriptor" elements -->
    <ElementType name="TimeResolution" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="timeResolution" required="yes"/>
    </ElementType>

    <!-- "StackCapabilities" elements -->
    <ElementType name="FasArTypesAndRolesSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasArTypesAndRolesSupported" required="yes"/>
    </ElementType>
    <ElementType name="MaxDisapAddressesSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxDisapAddressesSupported" required="yes"/>
    </ElementType>
    <ElementType name="MaxDlcepAddressesSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxDlcepAddressesSupported" required="yes"/>
    </ElementType>
    <ElementType name="DlcepDeliveryFeaturesSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="dlcepDeliveryFeaturesSupported" required="yes"/>
    </ElementType>
    <ElementType name="VersionOfNmSpecSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:versionNumber" required="yes"/>
    </ElementType>
    <ElementType name="AgentFunctionsSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="agentFunctionsSupported" required="yes"/>
    </ElementType>
    <ElementType name="FmsFeaturesSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:fmsFeaturesSupported" required="yes"/>
    </ElementType>

    <!-- "ListCharacteristics" elements -->
    <ElementType name="MaxEntries" content="empty" model="closed">

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        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxEntries" required="yes"/>
    </ElementType>
    <ElementType name="NumPermanentEntries" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numPermanentEntries" required="yes"/>
    </ElementType>
    <ElementType name="NumCurrentlyConfigured" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numCurrentlyConfigured" required="yes"/>
    </ElementType>
    <ElementType name="FirstUnconfiguredEntry" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="firstUnconfiguredEntry" required="yes"/>
    </ElementType>
    <ElementType name="DynamicsSupportedFlag" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="dynamicsSupportedFlag" required="yes"/>
    </ElementType>
    <ElementType name="StatisticsSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="statisticsSupported" required="yes"/>
    </ElementType>
    <ElementType name="NumOfStatisticsEntries" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numOfStatisticsEntries" required="yes"/>
    </ElementType>

    <!-- "VcrStaticEntry" elements -->
    <ElementType name="FasArTypeAndRole" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasArTypeAndRole" required="yes"/>
    </ElementType>
    <ElementType name="FasDIILocalAddr" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIILocalAddr" required="yes"/>
    </ElementType>
    <ElementType name="FasDIConfiguredRemoteAddr" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIConfiguredRemoteAddr" required="yes"/>
    </ElementType>
    <ElementType name="FasDIISDAP" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIISDAP" required="yes"/>
    </ElementType>
    <ElementType name="FasDIIMaxConfirmDelayOnConnect" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>

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        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIIMaxConfirmDelayOnConnect" required="yes"/>
    </ElementType>
    <ElementType name="FasDIIMaxConfirmDelayOnData" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIIMaxConfirmDelayOnData" required="yes"/>
    </ElementType>
    <ElementType name="FasDIIMaxDlsduSize" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIIMaxDlsduSize" required="yes"/>
    </ElementType>
    <ElementType name="FasDIIResidualActivitySupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIIResidualActivitySupported" required="yes"/>
    </ElementType>
    <ElementType name="FasDIITimelinessClass" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIITimelinessClass" required="yes"/>
    </ElementType>
    <ElementType name="FasDIIPublisherTimeWindowSize" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIIPublisherTimeWindowSize" required="yes"/>
    </ElementType>
    <ElementType name="FasDIIPublisherSynchronizingDlcep" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIIPublisherSynchronizingDlcep" required="yes"/>
    </ElementType>
    <ElementType name="FasDIISubscriberTimeWindowSize" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIISubscriberTimeWindowSize" required="yes"/>
    </ElementType>
    <ElementType name="FasDIISubscriberSynchronizingDlcep" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fasDIISubscriberSynchronizingDlcep" required="yes"/>
    </ElementType>
    <ElementType name="FmsVfdId" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fmsVfdId" required="yes"/>
    </ElementType>
    <ElementType name="FmsMaxOutstandingServicesCalling" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fmsMaxOutstandingServicesCalling" required="yes"/>
    </ElementType>
    <ElementType name="FmsMaxOutstandingServicesCalled" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fmsMaxOutstandingServicesCalled" required="yes"/>
    </ElementType>

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<!-- "VcrDynamicEntry" elements -->
<ElementType name="FmsState" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fmsState" required="yes"/>
</ElementType>
<ElementType name="FmsActualMaxOutstandingServicesCalling" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fmsActualMaxOutstandingServicesCalling" required="yes"/>
</ElementType>
<ElementType name="FmsActualMaxOutstandingServicesCalled" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fmsActualMaxOutstandingServicesCalled" required="yes"/>
</ElementType>
<ElementType name="FmsOutstandingServicesCounterCalling" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fmsOutstandingServicesCounterCalling" required="yes"/>
</ElementType>
<ElementType name="FmsOutstandingServicesCounterCalled" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fmsOutstandingServicesCounterCalled" required="yes"/>
</ElementType>
<ElementType name="FasState" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fasState" required="yes"/>
</ElementType>
<ElementType name="FasDIIActualRemoteAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fasDIIActualRemoteAddress" required="yes"/>
</ElementType>
<ElementType name="FasDIIMaxSendingQueueDepth" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fasDIIMaxSendingQueueDepth" required="yes"/>
</ElementType>
<ElementType name="FasDIIMaxReceivingQueueDepth" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fasDIIMaxReceivingQueueDepth" required="yes"/>
</ElementType>

<!-- "VcrStatisticsEntry" elements -->
<ElementType name="VcrStaticEntryOdIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>
<ElementType name="ClearVcrStatistics" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="clearVcrStatistics" required="yes"/>
</ElementType>
<ElementType name="FasNumOfAbortsCtr" content="empty" model="closed">

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    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fasNumOfAbortsCtr" required="yes"/>
  </ElementType>
  <ElementType name="FasLocallyGeneratedLastAborted" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fasLocallyGeneratedLastAborted" required="yes"/>
  </ElementType>
  <ElementType name="FasReasonLastAborted" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fasReasonLastAborted" required="yes"/>
  </ElementType>
  <ElementType name="DIINumOfDtPdsSent" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dIIINumOfDtPdsSent" required="yes"/>
  </ElementType>
  <ElementType name="DIINumOfDtPdsReceived" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dIIINumOfDtPdsReceived" required="yes"/>
  </ElementType>
  <ElementType name="DIINumOfDIDataTransferTimeoutFailures" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dIIINumOfDIDataTransferTimeoutFailures" required="yes"/>
  </ElementType>
  <ElementType name="DIINumOfRcvrQuFullDIDataFailures" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dIIINumOfRcvrQuFullDIDataFailures" required="yes"/>
  </ElementType>

  <!-- "DImeBasicCharacteristics" elements -->
  <ElementType name="Version" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
  </ElementType>
  <ElementType name="BasicStatisticsSupportedFlag" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="basicStatisticsSupportedFlag" required="yes"/>
  </ElementType>
  <ElementType name="DIOperatFunctionalClass" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dIOperatFunctionalClass" required="yes"/>
  </ElementType>
  <ElementType name="DIDeviceConformance" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dIDeviceConformance" required="yes"/>
  </ElementType>

  <!-- "DImeBasicInfo" elements -->
  <!-- AttributeType name="SlotTime" already defined in DImeLinkSettings -->

```

```

<!-- AttributeType name="maxResponseDelay" already defined in DlmeLinkSettings /-->
<ElementType name="ThisNode" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="thisNode" required="yes"/>
</ElementType>
<!-- AttributeType name="ThisLink" already defined in DlmeLinkSettings /-->
<!-- AttributeType name="timeSyncClass" already defined in DlmeLinkSettings /-->
<!-- AttributeType name="preambleExtension" already defined in DlmeLinkSettings /-->
<!-- AttributeType name="postTransGapExtension" already defined in DlmeLinkSettings /-->
<!-- AttributeType name="maxInterChanSignalSkewthisLinkalready defined in DlmeLinkSettings /-->

<!-- "DlmeBasicStatistics" elements -->
<ElementType name="NumOfDlpduTransmitted" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfDlpduTransmitted" required="yes"/>
</ElementType>
<ElementType name="NumOfGoodDlpduReceived" dt:type="ui4">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfGoodDlpduReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfPartialReceivedDlpdu" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfPartialReceivedDlpdu" required="yes"/>
</ElementType>
<ElementType name="NumOfFcsFailures" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfFcsFailures" required="yes"/>
</ElementType>
<ElementType name="NumOfNodeTimeOffsetDiscontinuousChanges" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfNodeTimeOffsetDiscontinuousChanges" required="yes"/>
</ElementType>

<!-- "DlmeLinkMasterInfo" elements -->
<ElementType name="MaxSchedulingOverhead" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maxSchedulingOverhead" required="yes"/>
</ElementType>
<ElementType name="DefMinTokenDelegTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="defMinTokenDelegTime" required="yes"/>
</ElementType>
<ElementType name="DefTokenHoldTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="defTokenHoldTime" required="yes"/>
</ElementType>
<ElementType name="TargetTokenRotTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="targetTokenRotTime" required="yes"/>

```

```

</ElementType>
<ElementType name="LinkMaintTokHoldTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="linkMaintTokHoldTime" required="yes"/>
</ElementType>
<ElementType name="TimeDistributionPeriod" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="timeDistributionPeriod" required="yes"/>
</ElementType>
<ElementType name="MaximumInactivityToClaimLasDelay" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maximumInactivityToClaimLasDelay" required="yes"/>
</ElementType>
<ElementType name="LasDatabaseStatusSpduDistributionPeriod" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="lasDatabaseStatusSpduDistributionPeriod" required="yes"/>
</ElementType>

<!-- "DlmeLinkMasterStatistics" elements -->
<ElementType name="NumLasRoleDelegOrClaimOrDelegTokenHoldTimeout" content="empty"
model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numLasRoleDelegOrClaimOrDelegTokenHoldTimeout" required="yes"/>
</ElementType>

<!-- "LastValues" elements -->
<ElementType name="FrameControlOctetN" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="frameControlOctetN" required="yes"/>
</ElementType>
<ElementType name="AddressSubfieldsN" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="addressSubfieldsN" required="yes"/>
</ElementType>
<ElementType name="FrameControlOctetNminus1" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="frameControlOctetNminus1" required="yes"/>
</ElementType>
<ElementType name="AddressSubfieldsNminus1" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="addressSubfieldsNminus1" required="yes"/>
</ElementType>
<ElementType name="FrameControlOctetNminus2" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="frameControlOctetNminus2" required="yes"/>
</ElementType>
<ElementType name="AddressSubfieldsNminus2" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>

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        <attribute type="addressSubfieldsNminus2" required="yes"/>
    </ElementType>
    <ElementType name="FrameControlOctetNminus3" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="frameControlOctetNminus3" required="yes"/>
    </ElementType>
    <ElementType name="AddressSubfieldsNminus3" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="addressSubfieldsNminus3" required="yes"/>
    </ElementType>

    <!-- "LinkScheduleListCharacteristics" elements -->
    <ElementType name="NumOfSchedules" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numOfSchedules" required="yes"/>
    </ElementType>
    <ElementType name="NumOfSubSchedulesPerSchedule" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numOfSubSchedulesPerSchedule" required="yes"/>
    </ElementType>
    <ElementType name="ActiveScheduleVersion" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:versionNumber" required="yes"/>
    </ElementType>
    <ElementType name="ActiveScheduleOdIndex" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fdt:index" required="yes"/>
    </ElementType>
    <ElementType name="ActiveScheduleStartingTime" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="activeScheduleStartingTime" required="yes"/>
    </ElementType>
    <ElementType name="ScheduleDomain" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:domain" required="yes"/>
    </ElementType>

    <!-- "PlmeBasicCharacteristics" elements -->
    <ElementType name="ChannelStatisticsSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="channelStatisticsSupported" required="yes"/>
    </ElementType>
    <ElementType name="MediumAndDataRatesSupported" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="mediumAndDataRatesSupported" required="yes"/>
    </ElementType>
    <ElementType name="IecVersion" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>

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    <attribute type="fftypes:versionNumber" required="yes"/>
  </ElementType>
  <ElementType name="NumOfChannels" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfChannels" required="yes"/>
  </ElementType>
  <ElementType name="PowerMode" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="powerMode" required="yes"/>
  </ElementType>

  <!-- "PlmeBasicInfo" elements -->
  <ElementType name="InterfaceMode" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="interfaceMode" required="yes"/>
  </ElementType>
  <ElementType name="LoopBackMode" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="loopBackMode" required="yes"/>
  </ElementType>
  <ElementType name="XmitEnabled" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="xmitEnabled" required="yes"/>
  </ElementType>
  <ElementType name="RcvEnabled" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="rcvEnabled" required="yes"/>
  </ElementType>
  <ElementType name="PreferredReceiveChannel" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="preferredReceiveChannel" required="yes"/>
  </ElementType>
  <ElementType name="MediaTypeSelected" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="mediaTypeSelected" required="yes"/>
  </ElementType>
  <ElementType name="ReceiveSelect" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="receiveSelect" required="yes"/>
  </ElementType>

  <!-- "MmeWireStatistics" elements -->
  <ElementType name="ChannelNumber" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="channelNumber" required="yes"/>
  </ElementType>
  <ElementType name="TotalGoodMsgsSent" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>

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        <attribute type="totalGoodMsgsSent" required="yes"/>
    </ElementType>
    <ElementType name="TotalGoodMsgsRcvd" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="totalGoodMsgsRcvd" required="yes"/>
    </ElementType>
    <ElementType name="NumOfJabberFaults" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numOfJabberFaults" required="yes"/>
    </ElementType>
    <ElementType name="NumOfInternAndJabberFaults" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numOfInternAndJabberFaults" required="yes"/>
    </ElementType>
    <ElementType name="NumEndActivityBeforeEndData" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="numEndActivityBeforeEndData" required="yes"/>
    </ElementType>

    <!-- "VcrList" elements -->
    <ElementType name="ListControl" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="listControl" required="yes"/>
    </ElementType>

    <!-- "DlmeLinkMaster" elements -->
    <ElementType name="DlmeLinkMasterCapabilities" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="dlmeLinkMasterCapabilities" required="yes"/>
    </ElementType>
    <ElementType name="PrimaryLinkMasterFlag" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="primaryLinkMasterFlag" required="yes"/>
    </ElementType>
    <ElementType name="LiveListStatusArray" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="liveListStatusArray" required="yes"/>
    </ElementType>
    <ElementType name="MaxTokenHoldTime" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxTokenHoldTime" required="yes"/>
    </ElementType>
    <ElementType name="BootOperatFunctionalClass" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="bootOperatFunctionalClass" required="yes"/>
    </ElementType>

    <ElementType name="LinkScheduleActivation" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>

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        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:scheduleActivation" required="yes"/>
    </ElementType>

    <!-- "PlmeBasic" elements -->
    <ElementType name="ChannelStates" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="channelStates" required="yes"/>
    </ElementType>

    <!-- SMIB level 3 -->

    <ElementType name="VfdRefEntry" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <element type="fftypes:VfdRef" minOccurs="1" maxOccurs="1"/>
        <element type="fftypes:VfdTag" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="FbStartEntry" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <element type="StartTimeOffset" minOccurs="1" maxOccurs="1"/>
        <element type="FbObjectIndex" minOccurs="1" maxOccurs="1"/>
        <element type="fftypes:VfdRef" minOccurs="1" maxOccurs="1"/>
    </ElementType>

    <!-- SMIB level 2 -->

    <ElementType name="SmAgent" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <element type="fftypes:SmSupport" minOccurs="1" maxOccurs="1"/>
        <element type="T1" minOccurs="1" maxOccurs="1"/>
        <element type="T2" minOccurs="1" maxOccurs="1"/>
        <element type="T3" minOccurs="1" maxOccurs="1"/>
    </ElementType>

    <ElementType name="SyncAndScheduling" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <element type="fftypes:CurrentTime" minOccurs="1" maxOccurs="1"/>
        <element type="LocalTimeDiff" minOccurs="1" maxOccurs="1"/>
        <element type="ApplicationClockSyncInterval" minOccurs="1" maxOccurs="1"/>
        <element type="TimeLastReceived" minOccurs="1" maxOccurs="1"/>
        <element type="PrimaryApplicationTimePublisher" minOccurs="1" maxOccurs="1"/>
        <element type="TimePublisherAddress" minOccurs="1" maxOccurs="1"/>
        <element type="fftypes:MacrocycleDuration" minOccurs="1" maxOccurs="1"/>
    </ElementType>

    <ElementType name="AddressAssignment" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <element type="fftypes:DeviceId" minOccurs="1" maxOccurs="1"/>
        <element type="fftypes:PdTag" minOccurs="1" maxOccurs="1"/>
        <element type="fftypes:OperationalPowerup" minOccurs="1" maxOccurs="1"/>
    </ElementType>

    <ElementType name="VfdList" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fftypes:listCount" required="yes"/>
        <element type="VfdRefEntry" minOccurs="1" maxOccurs="*/"/>
    </ElementType>

    <ElementType name="ListOfFbStartEntries" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fftypes:listCount" required="yes"/>
        <element type="FbStartEntry" minOccurs="1" maxOccurs="*/"/>
    </ElementType>

    <ElementType name="FbSchedule" content="eltOnly" model="closed">

```

```
<attribute type="fdt:nodeId" required="no"/>
<element type="Version" minOccurs="1" maxOccurs="1"/>
<element type="ListOfFbStartEntries" minOccurs="1" maxOccurs="1"/>
</ElementType>
```

<!-- SMIB level 1 -->

```
<ElementType name="SMIB" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="SmAgent" minOccurs="1" maxOccurs="1"/>
  <element type="SyncAndScheduling" minOccurs="1" maxOccurs="1"/>
  <element type="AddressAssignment" minOccurs="1" maxOccurs="1"/>
  <element type="VfdList" minOccurs="1" maxOccurs="1"/>
  <element type="FbSchedule" minOccurs="1" maxOccurs="1"/>
</ElementType>
```

<!-- ***** -->
<!-- NMIB elements as in FF-801 section 8 -->

<!-- NMIB level 4 -->

```
<ElementType name="DImlinkSettings" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="SlotTime" minOccurs="1" maxOccurs="1"/>
  <element type="PerDlpduPhlOverhead" minOccurs="1" maxOccurs="1"/>
  <element type="MaxResponseDelay" minOccurs="1" maxOccurs="1"/>
  <element type="FirstUnpolledNodeId" minOccurs="1" maxOccurs="1"/>
  <element type="ThisLink" minOccurs="1" maxOccurs="1"/>
  <element type="MinInterPduDelay" minOccurs="1" maxOccurs="1"/>
  <element type="NumConsecUnpolledNodeId" minOccurs="1" maxOccurs="1"/>
  <element type="PreambleExtension" minOccurs="1" maxOccurs="1"/>
  <element type="PostTransGapExtension" minOccurs="1" maxOccurs="1"/>
  <element type="MaxInterChanSignalSkew" minOccurs="1" maxOccurs="1"/>
  <element type="TimeSyncClass" minOccurs="1" maxOccurs="1"/>
</ElementType>
```

```
<ElementType name="ScheduleDescriptor" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="Version" minOccurs="1" maxOccurs="1"/>
  <element type="fftypes:MacrocycleDuration" minOccurs="1" maxOccurs="1"/>
  <element type="TimeResolution" minOccurs="1" maxOccurs="1"/>
</ElementType>
```

<!-- NMIB level 3 -->

```
<ElementType name="StackCapabilities" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="FasArTypesAndRolesSupported" minOccurs="1" maxOccurs="1"/>
  <element type="MaxDisapAddressesSupported" minOccurs="1" maxOccurs="1"/>
  <element type="MaxDlcepAddressesSupported" minOccurs="1" maxOccurs="1"/>
  <element type="DlcepDeliveryFeaturesSupported" minOccurs="1" maxOccurs="1"/>
  <element type="VersionOfNmSpecSupported" minOccurs="1" maxOccurs="1"/>
  <element type="AgentFunctionsSupported" minOccurs="1" maxOccurs="1"/>
  <element type="FmsFeaturesSupported" minOccurs="1" maxOccurs="1"/>
</ElementType>
```

```
<ElementType name="ListCharacteristics" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="Version" minOccurs="1" maxOccurs="1"/>
  <element type="MaxEntries" minOccurs="1" maxOccurs="1"/>
  <element type="NumPermanentEntries" minOccurs="1" maxOccurs="1"/>
  <element type="NumCurrentlyConfigured" minOccurs="1" maxOccurs="1"/>
  <element type="FirstUnconfiguredEntry" minOccurs="1" maxOccurs="1"/>
  <element type="DynamicsSupportedFlag" minOccurs="1" maxOccurs="1"/>
  <element type="StatisticsSupported" minOccurs="1" maxOccurs="1"/>
  <element type="NumOfStatisticsEntries" minOccurs="1" maxOccurs="1"/>
</ElementType>
```

```

<ElementType name="VcrStaticEntry" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="FasArTypeAndRole" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIAddr" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIConfiguredRemoteAddr" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIISDAP" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIConfirmDelayOnConnect" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIConfirmDelayOnData" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIConfirmDelayOnSize" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIResidualActivitySupported" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIITimelinessClass" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIPublisherTimeWindowSize" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIPublisherSynchronizingDlcep" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIISubscriberTimeWindowSize" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIISubscriberSynchronizingDlcep" minOccurs="1" maxOccurs="1"/>
  <element type="FmsVfdId" minOccurs="1" maxOccurs="1"/>
  <element type="FmsMaxOutstandingServicesCalling" minOccurs="1" maxOccurs="1"/>
  <element type="FmsMaxOutstandingServicesCalled" minOccurs="1" maxOccurs="1"/>
  <element type="FmsFeaturesSupported" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="VcrDynamicEntry" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="FmsState" minOccurs="1" maxOccurs="1"/>
  <element type="FmsActualMaxOutstandingServicesCalling" minOccurs="1" maxOccurs="1"/>
  <element type="FmsActualMaxOutstandingServicesCalled" minOccurs="1" maxOccurs="1"/>
  <element type="FmsOutstandingServicesCounterCalling" minOccurs="1" maxOccurs="1"/>
  <element type="FmsOutstandingServicesCounterCalled" minOccurs="1" maxOccurs="1"/>
  <element type="FasState" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIActualRemoteAddress" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIMaxSendingQueueDepth" minOccurs="1" maxOccurs="1"/>
  <element type="FasDIIMaxReceivingQueueDepth" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="VcrStatisticsEntry" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="VcrStaticEntryOdIndex" minOccurs="1" maxOccurs="1"/>
  <element type="ClearVcrStatistics" minOccurs="1" maxOccurs="1"/>
  <element type="FasNumOfAbortsCtr" minOccurs="1" maxOccurs="1"/>
  <element type="FasLocallyGeneratedLastAborted" minOccurs="1" maxOccurs="1"/>
  <element type="FasReasonLastAborted" minOccurs="1" maxOccurs="1"/>
  <element type="DIINumOfDtPduSent" minOccurs="1" maxOccurs="1"/>
  <element type="DIINumOfDtPduReceived" minOccurs="1" maxOccurs="1"/>
  <element type="DIINumOfDIDataTransferTimeoutFailures" minOccurs="1" maxOccurs="1"/>
  <element type="DIINumOfRcvrQuFullDIDataFailures" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DImeBasicCharacteristics" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="Version" minOccurs="1" maxOccurs="1"/>
  <element type="BasicStatisticsSupportedFlag" minOccurs="1" maxOccurs="1"/>
  <element type="DIOperatFunctionalClass" minOccurs="1" maxOccurs="1"/>
  <element type="DIDeviceConformance" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DImeBasicInfo" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="SlotTime" minOccurs="1" maxOccurs="1"/>
  <element type="PerDlpduPhlOverhead" minOccurs="1" maxOccurs="1"/>
  <element type="MaxResponseDelay" minOccurs="1" maxOccurs="1"/>
  <element type="ThisNode" minOccurs="1" maxOccurs="1"/>
  <element type="ThisLink" minOccurs="1" maxOccurs="1"/>
  <element type="MinInterPduDelay" minOccurs="1" maxOccurs="1"/>
  <element type="TimeSyncClass" minOccurs="1" maxOccurs="1"/>
  <element type="PreambleExtension" minOccurs="1" maxOccurs="1"/>
  <element type="PostTransGapExtension" minOccurs="1" maxOccurs="1"/>
  <element type="MaxInterChanSignalSkew" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DImeBasicStatistics" content="eltOnly" model="closed">

```

```

<attribute type="fdt:nodeId" required="no"/>
<element type="NumOfDlpduTransmitted" minOccurs="1" maxOccurs="1"/>
<element type="NumOfGoodDlpduReceived" minOccurs="1" maxOccurs="1"/>
<element type="NumOfPartialReceivedDlpdu" minOccurs="1" maxOccurs="1"/>
<element type="NumOfFcsFailures" minOccurs="1" maxOccurs="1"/>
<element type="NumOfNodeTimeOffsetDiscontinuousChanges" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DlmeLinkMasterInfo" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="MaxSchedulingOverhead" minOccurs="1" maxOccurs="1"/>
  <element type="DefMinTokenDelegTime" minOccurs="1" maxOccurs="1"/>
  <element type="DefTokenHoldTime" minOccurs="1" maxOccurs="1"/>
  <element type="TargetTokenRotTime" minOccurs="1" maxOccurs="1"/>
  <element type="LinkMaintTokHoldTime" minOccurs="1" maxOccurs="1"/>
  <element type="TimeDistributionPeriod" minOccurs="1" maxOccurs="1"/>
  <element type="MaximumInactivityToClaimLasDelay" minOccurs="1" maxOccurs="1"/>
  <element type="LasDatabaseStatusSpduDistributionPeriod" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DlmeCurrentLinkSettings" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="DlmeLinkSettings" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DlmeConfiguredLinkSettings" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="DlmeLinkSettings" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DlmeLinkMasterStatistics" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="NumLasRoleDelegOrClaimOrDelegTokenHoldTimeout" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="LastValues" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="FrameControlOctetN" minOccurs="1" maxOccurs="1"/>
  <element type="AddressSubfieldsN" minOccurs="1" maxOccurs="1"/>
  <element type="FrameControlOctetNminus1" minOccurs="1" maxOccurs="1"/>
  <element type="AddressSubfieldsNminus1" minOccurs="1" maxOccurs="1"/>
  <element type="FrameControlOctetNminus2" minOccurs="1" maxOccurs="1"/>
  <element type="AddressSubfieldsNminus2" minOccurs="1" maxOccurs="1"/>
  <element type="FrameControlOctetNminus3" minOccurs="1" maxOccurs="1"/>
  <element type="AddressSubfieldsNminus3" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="LinkScheduleListCharacteristics" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="NumOfSchedules" minOccurs="1" maxOccurs="1"/>
  <element type="NumOfSubSchedulesPerSchedule" minOccurs="1" maxOccurs="1"/>
  <element type="ActiveScheduleVersion" minOccurs="1" maxOccurs="1"/>
  <element type="ActiveScheduleOdIndex" minOccurs="1" maxOccurs="1"/>
  <element type="ActiveScheduleStartingTime" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="ListOfScheduleDescriptors" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:listCount" required="yes"/>
  <element type="ScheduleDescriptor" minOccurs="1" maxOccurs="*/"/>
</ElementType>

<ElementType name="ListOfScheduleDomains" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:listCount" required="yes"/>
  <element type="ScheduleDomain" minOccurs="1" maxOccurs="*/"/>
</ElementType>

<ElementType name="PlmeBasicCharacteristics" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>

```

```

    <element type="ChannelStatisticsSupported" minOccurs="1" maxOccurs="1"/>
    <element type="MediumAndDataRatesSupported" minOccurs="1" maxOccurs="1"/>
    <element type="IecVersion" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfChannels" minOccurs="1" maxOccurs="1"/>
    <element type="PowerMode" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="PlmeBasicInfo" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="InterfaceMode" minOccurs="1" maxOccurs="1"/>
    <element type="LoopBackMode" minOccurs="1" maxOccurs="1"/>
    <element type="XmitEnabled" minOccurs="1" maxOccurs="1"/>
    <element type="RcvEnabled" minOccurs="1" maxOccurs="1"/>
    <element type="PreferredReceiveChannel" minOccurs="1" maxOccurs="1"/>
    <element type="MediaTypeSelected" minOccurs="1" maxOccurs="1"/>
    <element type="ReceiveSelect" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="MmeWireStatistics" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ChannelNumber" minOccurs="1" maxOccurs="1"/>
    <element type="TotalGoodMsgsSent" minOccurs="1" maxOccurs="1"/>
    <element type="TotalGoodMsgsRcvd" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfJabberFaults" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfInternAndJabberFaults" minOccurs="1" maxOccurs="1"/>
    <element type="NumEndActivityBeforeEndData" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- NMIB level 2 -->

  <ElementType name="StackMgmt" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="StackCapabilities" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="ListOfVcrStaticEntries" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="VcrStaticEntry" minOccurs="1" maxOccurs="*/"/>
  </ElementType>

  <ElementType name="ListOfVcrDynamicEntries" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="VcrDynamicEntry" minOccurs="1" maxOccurs="*/"/>
  </ElementType>

  <ElementType name="ListOfVcrStatisticsEntries" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="VcrStatisticsEntry" minOccurs="1" maxOccurs="*/"/>
  </ElementType>

  <ElementType name="VcrList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListControl" minOccurs="1" maxOccurs="1"/>
    <element type="ListCharacteristics" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfVcrStaticEntries" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfVcrDynamicEntries" minOccurs="0" maxOccurs="1"/>
    <element type="ListOfVcrStatisticsEntries" minOccurs="0" maxOccurs="1"/>
  </ElementType>

  <ElementType name="DlmeBasic" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="DlmeBasicCharacteristics" minOccurs="1" maxOccurs="1"/>
    <element type="DlmeBasicInfo" minOccurs="1" maxOccurs="1"/>
    <element type="DlmeBasicStatistics" minOccurs="0" maxOccurs="1"/>
  </ElementType>

```

```

<ElementType name="DlmeLinkMaster" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="DlmeLinkMasterCapabilities" minOccurs="1" maxOccurs="1"/>
  <element type="PrimaryLinkMasterFlag" minOccurs="1" maxOccurs="1"/>
  <element type="LiveListStatusArray" minOccurs="1" maxOccurs="1"/>
  <element type="MaxTokenHoldTime" minOccurs="1" maxOccurs="1"/>
  <element type="BootOperatFunctionalClass" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeLinkMasterInfo" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeCurrentLinkSettings" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeConfiguredLinkSettings" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeLinkMasterStatistics" minOccurs="0" maxOccurs="1"/>
  <element type="LastValues" minOccurs="0" maxOccurs="1"/>
</ElementType>

<ElementType name="LinkScheduleList" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="LinkScheduleActivation" minOccurs="1" maxOccurs="1"/>
  <element type="LinkScheduleListCharacteristics" minOccurs="1" maxOccurs="1"/>
  <element type="ListOfScheduleDescriptors" minOccurs="1" maxOccurs="1"/>
  <element type="ListOfScheduleDomains" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="DlmeBridge" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- Nothing yet defined in here, listed for completeness only -->
</ElementType>

<ElementType name="PlmeBasic" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="ChannelStates" minOccurs="1" maxOccurs="1"/>
  <element type="PlmeBasicCharacteristics" minOccurs="1" maxOccurs="1"/>
  <element type="PlmeBasicInfo" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="ListOfMmeWireStatistics" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:listCount" required="yes"/>
  <element type="MmeWireStatistics" minOccurs="1" maxOccurs="1"/>
</ElementType>

<!-- NMIB level 1 -->

<ElementType name="NMIB" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="StackMgmt" minOccurs="1" maxOccurs="1"/>
  <element type="VcrList" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeBasic" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeLinkMaster" minOccurs="1" maxOccurs="1"/>
  <element type="LinkScheduleList" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeBridge" minOccurs="1" maxOccurs="1"/>
  <element type="PlmeBasic" minOccurs="1" maxOccurs="1"/>
  <element type="ListOfMmeWireStatistics" minOccurs="0" maxOccurs="1"/>
</ElementType>

<!-- Schema root level (0) -->

<ElementType name="H1NmaVfd" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:linkId" required="no"/>
  <attribute type="fftypes:nodeId" required="no"/>
  <attribute type="fftypes:selector" required="no"/>
  <element type="SMIB" minOccurs="1" maxOccurs="1"/>
  <element type="NMIB" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="ListOfH1NmaVfds" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:listCount" required="yes"/>
  <element type="H1NmaVfd" minOccurs="1" maxOccurs="1"/>

```

```
</ElementType>
</Schema>
```

8.3 HSE Management – FdtFFHseManagementSchema

```
<Schema name="FdtFFHseManagementSchema"
xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes"
xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml">
```

```
<!-- ***** -->
<!-- Definition of Attributes -->
<!-- ***** -->

<AttributeType name="schemaVersion" dt:type="string" default="1.21"/>

<!-- ***** -->
<!-- System management information base (SMIB) attributes as in FF-589 section 6 -->

<!-- "SmCharacteristics" elements -->
<!-- "ListOfVersionNumbers" -->
<AttributeType name="maxNumberOfInterfaces" dt:type="ui4"/>
<AttributeType name="installedInterfaces" dt:type="bin.hex"/>
<AttributeType name="maxNumberOfVFDs" dt:type="ui4"/>
<AttributeType name="actualNumberOfVFDs" dt:type="ui4"/>

<!-- "SyncAndScheduling" elements -->
<!-- "SyncAndSchedulingCharacteristics" -->
<AttributeType name="standardTimeDifference" dt:type="i4"/>
<AttributeType name="timeRequestTimeout" dt:type="ui4"/>
<AttributeType name="timeRequestInterval" dt:type="ui4"/>
<AttributeType name="capableTimeSyncClass" dt:type="ui4"/>
<AttributeType name="targetTimeSyncClass" dt:type="ui4"/>
<AttributeType name="scheduleSyncPeriod" dt:type="ui4"/>
<AttributeType name="daylightTimeDifference" dt:type="i4"/>
<!-- "ListOfSNTPTimeStamps" -->
<AttributeType name="sntpTimestamp" dt:type="ui4"/>

<!-- "VfdList" elements -->
<!-- "VfdRefEntry" -->
<AttributeType name="vfdServerSelector" dt:type="ui4"/>

<!-- "FbSchedule" elements -->
<!-- "ScheduleListCharacteristics" -->
<AttributeType name="numberOfSchedule" dt:type="ui2"/>
<!-- "ListOfFBScheduleDescriptors" -->
<!-- "SyncAndScheduling" -->
<AttributeType name="lastSNTPMessage" dt:type="bin.hex"/>

<!-- ***** -->
<!-- Network management information base (NMIB) attr. as in FF-803 sect. 5 and 7 -->

<!-- "ListHeader" attributes -->
<AttributeType name="maxNumEntries" dt:type="ui4"/>
<AttributeType name="numConfigured" dt:type="ui4"/>
<!-- "SessionEndpoint" attributes -->
<AttributeType name="endpointType" dt:type="ui1"/>
<AttributeType name="msgHdrOptions" dt:type="bin.hex"/>
<AttributeType name="state" dt:type="ui1"/>
<AttributeType name="transportProtocol" dt:type="ui1"/>
<AttributeType name="nmaConfigurationUse" dt:type="ui1"/>
<AttributeType name="bufferSize" dt:type="ui4"/>
<AttributeType name="transmitDelayTime" dt:type="ui4"/>
<AttributeType name="inactivityCloseTime" dt:type="ui4"/>
<AttributeType name="maxMessageLength" dt:type="ui4"/>
<!-- "HseVcrEndpoint" attributes -->
<AttributeType name="hseVcrType" dt:type="ui4"/>
```

```

<AttributeType name="fdaAddress" dt:type="bin.hex"/>
<AttributeType name="hseSubnetMask" dt:type="bin.hex"/>
<AttributeType name="vcrUserId" dt:type="ui4"/>
<AttributeType name="onChangeThreshold" dt:type="ui4"/>
<!-- "SessionStatisticsEntry" attributes -->
<AttributeType name="statisticsControl" dt:type="ui1"/>
<AttributeType name="maxNumOfVcrs" dt:type="ui4"/>
<AttributeType name="numOfMsgsReceived" dt:type="ui4"/>
<AttributeType name="numOfInvalidMsgsReceived" dt:type="ui4"/>
<AttributeType name="numOfMsgsSent" dt:type="ui4"/>
<AttributeType name="numOfOpenStateCtr" dt:type="ui4"/>
<!-- "HseVcrStatisticsEntry" attributes -->
<AttributeType name="numOfConnects" dt:type="ui4"/>
<AttributeType name="numOfAborts" dt:type="ui4"/>
<AttributeType name="numOfUnconfirmedMessagesSent" dt:type="ui4"/>
<AttributeType name="numOfUnconfirmedMessagesReceived" dt:type="ui4"/>
<AttributeType name="numOfConfirmedRequestMessagesSent" dt:type="ui4"/>
<AttributeType name="numOfResponseMessagesSent" dt:type="ui4"/>
<AttributeType name="numOfErrorMessageSent" dt:type="ui4"/>
<AttributeType name="numOfConfirmedRequestMessagesReceived" dt:type="ui4"/>
<AttributeType name="numOfResponseMessagesReceived" dt:type="ui4"/>
<AttributeType name="numOfErrorMessageReceived" dt:type="ui4"/>
<AttributeType name="numOfNonMisorderedMessages" dt:type="ui4"/>
<AttributeType name="numOfDuplicatedMessages" dt:type="ui4"/>
<AttributeType name="numOfLateMessages" dt:type="ui4"/>
<AttributeType name="numOfMissedMessages" dt:type="ui4"/>
<AttributeType name="numOfLossOfSyncMessages" dt:type="ui4"/>
<!-- "BridgeCharacteristic" attributes -->
<AttributeType name="numberOfInterfaces" dt:type="ui1"/>
<AttributeType name="rootInterface" dt:type="ui1"/>
<AttributeType name="interfaceStatisticsSupported" dt:type="bin.hex"/>
<AttributeType name="maxForwardingDelayUrgent" dt:type="ui2"/>
<AttributeType name="minForwardingDelayUrgent" dt:type="ui2"/>
<AttributeType name="maxForwardingDelayNormal" dt:type="ui2"/>
<AttributeType name="minForwardingDelayNormal" dt:type="ui2"/>
<AttributeType name="maxForwardingDelayTimeAvailable" dt:type="ui2"/>
<AttributeType name="minForwardingDelayTimeAvailable" dt:type="ui2"/>
<AttributeType name="minRepublishingDelay" dt:type="ui2"/>
<AttributeType name="republishingDatabaseListHeaderOdIndex" dt:type="ui4"/>
<AttributeType name="filteringDatabaseListHeaderOdIndex" dt:type="ui4"/>
<!-- "NmaConfigurationAccess" attributes -->
<AttributeType name="h1ConfiguratorAddress" dt:type="ui4"/>
<!-- "RepublishingEntry" attributes -->
<AttributeType name="subAddress" dt:type="ui4"/>
<AttributeType name="repubAddress" dt:type="ui4"/>
<AttributeType name="fasDIIMaxConfirmDelayOnConnect" dt:type="ui2"/>
<AttributeType name="fasDIIMaxDlsduSize" dt:type="ui2"/>
<AttributeType name="fasDIISDAP" dt:type="ui1"/>
<!-- "FilteringEntry" attributes -->
<AttributeType name="dstLinkAddress" dt:type="ui4"/>
<AttributeType name="interfaceNumber" dt:type="ui1"/>
<!-- "InterfaceStatisticsEntry" attributes -->
<AttributeType name="forwardedInbound" dt:type="ui4"/>
<AttributeType name="ignoredInbound" dt:type="ui4"/>
<AttributeType name="discardedForLackOfBuffers" dt:type="ui4"/>
<AttributeType name="discardedForForwardingDelayExceeded" dt:type="ui4"/>
<!-- "NmCharacteristics" attributes -->
<AttributeType name="h1DIOperatFunctionalClassSupported" dt:type="ui1"/>
<AttributeType name="tcpProtocolSupported" dt:type="boolean"/>
<AttributeType name="msgHdrOptionsSupported" dt:type="bin.hex"/>
<AttributeType name="onChangeRefreshRate" dt:type="ui1"/>
<AttributeType name="hseSubnetMaskBits" dt:type="bin.hex"/>
<AttributeType name="fdaGuardBand" dt:type="ui4"/>
<AttributeType name="h1Timeout" dt:type="ui4"/>
<AttributeType name="sessionMaxOutstanding" dt:type="ui4"/>
<AttributeType name="sessionStatisticsControlDefaultValue" dt:type="ui1"/>
<AttributeType name="vcrStatisticsControlDefaultValue" dt:type="ui1"/>
<AttributeType name="restartStatisticsCollectionControl" dt:type="ui1"/>
<!-- "DImeBridge" attributes -->
<AttributeType name="interfaceLinkId" dt:type="ui2"/>

```

```
<AttributeType name="interfaceNodeId" dt:type="ui1"/>
<AttributeType name="interfaceStateArray" dt:type="bin.hex"/>
```

```
<!-- ***** -->
<!--          Definition of Elements          -->
<!-- ***** -->

<!-- ***** -->
<!-- SMIB elements for simple variables as in FF-589 section 6 -->
<!-- ***** -->

<!-- "ListOfVersionNumbers" elements -->
<!-- "MIBVersion" -->
<ElementType name="NMIBVersion" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>
<ElementType name="SMIBVersion" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>
<!-- "VFDVersion" -->
<ElementType name="VFDVersion" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>

<!-- "SmCharacteristics" elements -->
<!-- "ListOfVersionNumbers" -->
<ElementType name="HSEDeviceVersion" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>
<ElementType name="MaxNumberOfInterfaces" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maxNumberOfInterfaces" required="yes"/>
</ElementType>
<ElementType name="InstalledInterfaces" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="installedInterfaces" required="yes"/>
</ElementType>
<ElementType name="MaxNumberOfVFDs" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maxNumberOfVFDs" required="yes"/>
</ElementType>
<ElementType name="ActualNumberOfVFDs" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="actualNumberOfVFDs" required="yes"/>
</ElementType>
<!-- "ListOfLocalIPAddresses" -->
<ElementType name="LocalIPAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
```

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        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:ip" required="yes"/>
    </ElementType>

    <!-- "SyncAndScheduling" elements -->
    <!-- "SyncAndSchedulingCharacteristics" -->
    <ElementType name="StandardTimeDifference" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="standardTimeDifference" required="yes"/>
    </ElementType>
    <ElementType name="PrimaryTimeServer" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:ip" required="yes"/>
    </ElementType>
    <ElementType name="SecondaryTimeServer" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:ip" required="yes"/>
    </ElementType>
    <ElementType name="TimeRequestTimeout" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="timeRequestTimeout" required="yes"/>
    </ElementType>
    <ElementType name="TimeRequestInterval" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="timeRequestInterval" required="yes"/>
    </ElementType>
    <ElementType name="CapableTimeSyncClass" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="capableTimeSyncClass" required="yes"/>
    </ElementType>
    <ElementType name="TargetTimeSyncClass" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="targetTimeSyncClass" required="yes"/>
    </ElementType>
    <ElementType name="ScheduleSyncPeriod" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="scheduleSyncPeriod" required="yes"/>
    </ElementType>
    <ElementType name="DaylightTimeDifference" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="daylightTimeDifference" required="yes"/>
    </ElementType>
    <ElementType name="StartDaylightTime" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:timeValue" required="yes"/>
    </ElementType>
    <ElementType name="EndDaylightTime" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>

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    <attribute type="fftypes:timeValue" required="yes"/>
</ElementType>

<!-- "ListOfSNTPTimeStamps" -->
<ElementType name="SNTPTimestamp" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="snptTimestamp" required="yes"/>
</ElementType>

<!-- "VfdList" elements -->
<!-- "VfdRefEntry" -->
<ElementType name="VfdServerSelector" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="vfdServerSelector" required="yes"/>
</ElementType>
<ElementType name="DDDomainIndex" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fdt:index" required="yes"/>
</ElementType>

<!-- "FbSchedule" elements -->
<!-- "ScheduleListCharacteristics" -->
<ElementType name="NumberOfSchedule" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numberOfSchedule" required="yes"/>
</ElementType>
<ElementType name="ActiveScheduleVersion" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>
<ElementType name="ActiveScheduleIndex" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fdt:index" required="yes"/>
</ElementType>
<!-- "FBScheduleDescriptor" elements -->
<ElementType name="ScheduleVersion" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>
<ElementType name="DomainIndex" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fdt:index" required="yes"/>
</ElementType>

<!-- "SmCharacteristics" -->
<ElementType name="OperationalIPAddress" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:ip" required="yes"/>
</ElementType>
<ElementType name="DeviceContentsDomain" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>

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        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:domain" required="yes"/>
    </ElementType>

<!-- "SyncAndScheduling" -->
<ElementType name="LastSNTPMessage" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="lastSNTPMessage" required="yes"/>
</ElementType>

<!-- "DeviceIdentification" -->
<ElementType name="DeviceIndex" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:deviceIndex" required="yes"/>
</ElementType>
<ElementType name="DeviceType" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:deviceType" required="yes"/>
</ElementType>

<!-- "FbSchedule" -->
<ElementType name="ScheduleActivation" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:scheduleActivation" required="yes"/>
</ElementType>

<!-- ***** -->
<!-- NMIB elements for simple variables as in FF-803 sections 5 and 7 -->
<!-- ***** -->

<!-- "ListHeader" elements -->
<ElementType name="Version" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
</ElementType>
<ElementType name="FirstConfiguredIndex" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fdt:index" required="yes"/>
</ElementType>
<ElementType name="FirstUnconfiguredIndex" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fdt:index" required="yes"/>
</ElementType>
<ElementType name="MaxNumEntries" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="maxNumEntries" required="yes"/>
</ElementType>
<ElementType name="NumConfigured" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numConfigured" required="yes"/>
</ElementType>

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<!-- "SessionEndpoint" elements -->
<ElementType name="RemotePdTag" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:tag" required="yes"/>
</ElementType>
<ElementType name="RemoteIpAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:ip" required="yes"/>
</ElementType>
<ElementType name="EndpointType" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="endpointType" required="yes"/>
</ElementType>
<ElementType name="MsgHdrOptions" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="msgHdrOptions" required="yes"/>
</ElementType>
<ElementType name="State" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="state" required="yes"/>
</ElementType>
<ElementType name="TransportProtocol" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="transportProtocol" required="yes"/>
</ElementType>
<ElementType name="NmaConfigurationUse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="nmaConfigurationUse" required="yes"/>
</ElementType>
<ElementType name="UdpPortNumber" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:port" required="yes"/>
</ElementType>
<ElementType name="BufferSize" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="bufferSize" required="yes"/>
</ElementType>
<ElementType name="TransmitDelayTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="transmitDelayTime" required="yes"/>
</ElementType>
<ElementType name="InactivityCloseTime" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="inactivityCloseTime" required="yes"/>
</ElementType>
<ElementType name="MaxMessageLength" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>

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        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxMessageLength" required="yes"/>
    </ElementType>
    <ElementType name="StatisticsEntryOdIndex" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fdt:index" required="yes"/>
    </ElementType>
    <!-- "HseVcrEndpoint" elements -->
    <ElementType name="HseVcrType" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="hseVcrType" required="yes"/>
    </ElementType>
    <ElementType name="FdaAddress" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fdaAddress" required="yes"/>
    </ElementType>
    <ElementType name="RelatedSessionEndpointOdIndex" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fdt:index" required="yes"/>
    </ElementType>
    <ElementType name="HseSubnetMask" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="hseSubnetMask" required="yes"/>
    </ElementType>
    <ElementType name="VcrUserId" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="vcrUserId" required="yes"/>
    </ElementType>
    <ElementType name="OnChangeThreshold" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="onChangeThreshold" required="yes"/>
    </ElementType>
    <!-- "SessionStatisticsEntry" elements -->
    <ElementType name="SessionEndpointEntryOdIndex" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fdt:index" required="yes"/>
    </ElementType>
    <ElementType name="StatisticsControl" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="statisticsControl" required="yes"/>
    </ElementType>
    <ElementType name="StatisticsCollectionStartTime" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="fftypes:timeValue" required="yes"/>
    </ElementType>
    <ElementType name="MaxNumOfVcrs" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <attribute type="fdt:readAccess" required="no"/>
        <attribute type="fdt:writeAccess" required="no"/>
        <attribute type="maxNumOfVcrs" required="yes"/>

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</ElementType>
<ElementType name="NumOfMsgsReceived" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfMsgsReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfInvalidMsgsReceived" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfInvalidMsgsReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfMsgsSent" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfMsgsSent" required="yes"/>
</ElementType>
<ElementType name="NumOfOpenStateCtr" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfOpenStateCtr" required="yes"/>
</ElementType>
<!-- "HseVcrStatisticsEntry" elements -->
<ElementType name="HseVcrEntryOdIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>
<ElementType name="NumOfConnects" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfConnects" required="yes"/>
</ElementType>
<ElementType name="NumOfAborts" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfAborts" required="yes"/>
</ElementType>
<ElementType name="NumOfUnconfirmedMessagesSent" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfUnconfirmedMessagesSent" required="yes"/>
</ElementType>
<ElementType name="NumOfUnconfirmedMessagesReceived" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfUnconfirmedMessagesReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfConfirmedRequestMessagesSent" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfConfirmedRequestMessagesSent" required="yes"/>
</ElementType>
<ElementType name="NumOfResponseMessagesSent" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="numOfResponseMessagesSent" required="yes"/>
</ElementType>
<ElementType name="NumOfErrorMessageSent" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>

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    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfErrorMessageSent" required="yes"/>
</ElementType>
<ElementType name="NumOfConfirmedRequestMessagesReceived" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfConfirmedRequestMessagesReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfResponseMessagesReceived" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfResponseMessagesReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfErrorMessageReceived" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfErrorMessageReceived" required="yes"/>
</ElementType>
<ElementType name="NumOfNonMisorderedMessages" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfNonMisorderedMessages" required="yes"/>
</ElementType>
<ElementType name="NumOfDuplicatedMessages" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfDuplicatedMessages" required="yes"/>
</ElementType>
<ElementType name="NumOfLateMessages" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfLateMessages" required="yes"/>
</ElementType>
<ElementType name="NumOfMissedMessages" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfMissedMessages" required="yes"/>
</ElementType>
<ElementType name="NumOfLossOfSyncMessages" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numOfLossOfSyncMessages" required="yes"/>
</ElementType>
<!-- "BridgeCharacteristic" elements -->
<ElementType name="NumberOfInterfaces" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="numberOfInterfaces" required="yes"/>
</ElementType>
<ElementType name="RootInterface" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="rootInterface" required="yes"/>
</ElementType>
<ElementType name="MaxForwardingDelayUrgent" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="maxForwardingDelayUrgent" required="yes"/>

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</ElementType>
<ElementType name="MinForwardingDelayUrgent" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="minForwardingDelayUrgent" required="yes"/>
</ElementType>
<ElementType name="MaxForwardingDelayNormal" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maxForwardingDelayNormal" required="yes"/>
</ElementType>
<ElementType name="MinForwardingDelayNormal" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="minForwardingDelayNormal" required="yes"/>
</ElementType>
<ElementType name="MaxForwardingDelayTimeAvailable" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="maxForwardingDelayTimeAvailable" required="yes"/>
</ElementType>
<ElementType name="MinForwardingDelayTimeAvailable" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="minForwardingDelayTimeAvailable" required="yes"/>
</ElementType>
<ElementType name="MinRepublishingDelay" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="minRepublishingDelay" required="yes"/>
</ElementType>
<ElementType name="InterfaceStatisticsSupported" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="interfaceStatisticsSupported" required="yes"/>
</ElementType>
<ElementType name="RepublishingDatabaseListHeaderOdIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>
<ElementType name="FilteringDatabaseListHeaderOdIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>
<!-- "NmaConfigurationAccess" elements -->
<ElementType name="H1ConfiguratorAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="h1ConfiguratorAddress" required="yes"/>
</ElementType>
<ElementType name="HseConfiguratorIpAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="fftypes:ip" required="yes"/>
</ElementType>
<!-- "RepublishingEntry" elements -->
<ElementType name="SubAddress" content="empty" model="closed">

```

```

    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="subAddress" required="yes"/>
</ElementType>
<ElementType name="RepubAddress" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="repubAddress" required="yes"/>
</ElementType>
<ElementType name="FasDIIMaxConfirmDelayOnConnect" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fasDIIMaxConfirmDelayOnConnect" required="yes"/>
</ElementType>
<ElementType name="FasDIIMaxDisduSize" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fasDIIMaxDisduSize" required="yes"/>
</ElementType>
<ElementType name="FasDIISDAP" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fasDIISDAP" required="yes"/>
</ElementType>
<!-- "FilteringEntry" elements -->
<ElementType name="DstLinkAddress" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="dstLinkAddress" required="yes"/>
</ElementType>
<ElementType name="InterfaceNumber" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="interfaceNumber" required="yes"/>
</ElementType>
<!-- "InterfaceStatisticsEntry" elements -->
<ElementType name="ForwardedInbound" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="forwardedInbound" required="yes"/>
</ElementType>
<ElementType name="IgnoredInbound" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="ignoredInbound" required="yes"/>
</ElementType>
<ElementType name="DiscardedForLackOfBuffers" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="discardedForLackOfBuffers" required="yes"/>
</ElementType>
<ElementType name="DiscardedForForwardingDelayExceeded" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="discardedForForwardingDelayExceeded" required="yes"/>
</ElementType>
<!-- "NmCharacteristics" elements -->
<ElementType name="NmibRevision" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>

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```

    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
  </ElementType>
  <ElementType name="H1DIOperatFunctionalClassSupported" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="h1DIOperatFunctionalClassSupported" required="yes"/>
  </ElementType>
  <ElementType name="TcpProtocolSupported" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="tcpProtocolSupported" required="yes"/>
  </ElementType>
  <ElementType name="MsgHdrOptionsSupported" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="msgHdrOptionsSupported" required="yes"/>
  </ElementType>
  <ElementType name="OnChangeRefreshRate" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="onChangeRefreshRate" required="yes"/>
  </ElementType>
  <ElementType name="HseSubnetMaskBits" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="hseSubnetMaskBits" required="yes"/>
  </ElementType>
  <ElementType name="FmsFeaturesSupported" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fftypes:fmsFeaturesSupported" required="yes"/>
  </ElementType>
  <ElementType name="FdaGuardBand" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="fdaGuardBand" required="yes"/>
  </ElementType>
  <ElementType name="H1Timeout" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="h1Timeout" required="yes"/>
  </ElementType>
  <ElementType name="SessionMaxOutstanding" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="sessionMaxOutstanding" required="yes"/>
  </ElementType>
  <ElementType name="SessionStatisticsControlDefaultValue" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="sessionStatisticsControlDefaultValue" required="yes"/>
  </ElementType>
  <ElementType name="VcrStatisticsControlDefaultValue" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fdt:readAccess" required="no"/>
    <attribute type="fdt:writeAccess" required="no"/>
    <attribute type="vcrStatisticsControlDefaultValue" required="yes"/>
  </ElementType>

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```

<ElementType name="RestartStatisticsCollectionControl" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="restartStatisticsCollectionControl" required="yes"/>
</ElementType>
<!-- "DlmeBridge" elements -->
<ElementType name="NmaConfigurationAccess" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="H1ConfiguratorAddress" minOccurs="1" maxOccurs="1"/>
  <element type="HseConfiguratorIpAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="CurrentNmaConfigurationAccess" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <element type="NmaConfigurationAccess" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="PreviousNmaConfigurationAccess" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <element type="NmaConfigurationAccess" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="InterfaceAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="interfaceLinkId" required="yes"/>
  <attribute type="interfaceNodeId" required="yes"/>
</ElementType>
<ElementType name="InterfaceAddressArray" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:listCount" required="yes"/>
  <element type="InterfaceAddress" minOccurs="1" maxOccurs="*/"/>
</ElementType>
<ElementType name="InterfaceDesiredStateArray" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="interfaceStateArray" required="yes"/>
</ElementType>
<ElementType name="InterfaceActualStateArray" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:readAccess" required="no"/>
  <attribute type="fdt:writeAccess" required="no"/>
  <attribute type="interfaceStateArray" required="yes"/>
</ElementType>

<!-- ***** -->
<!-- SMIB elements for structured variables as in FF-589 section 6 -->
<!-- ***** -->

<!-- SMIB level 4 -->

<!-- "ListOfVersionNumbers" elements -->
<ElementType name="MIBVersion" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="NMIBVersion" minOccurs="1" maxOccurs="1"/>
  <element type="SMIBVersion" minOccurs="1" maxOccurs="1"/>
</ElementType>

<!-- SMIB level 3 -->

<!-- "SmCharacteristics" elements -->
<ElementType name="ListOfVersionNumbers" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>

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```

    <element type="HSEDeviceVersion" minOccurs="1" maxOccurs="1"/>
    <element type="MaxNumberOfInterfaces" minOccurs="1" maxOccurs="1"/>
    <element type="InstalledInterfaces" minOccurs="1" maxOccurs="1"/>
    <element type="MaxNumberOfVFDs" minOccurs="1" maxOccurs="1"/>
    <element type="ActualNumberOfVFDs" minOccurs="1" maxOccurs="1"/>
    <element type="MIBVersion" minOccurs="1" maxOccurs="1"/>
    <element type="VFDVersion" minOccurs="0" maxOccurs="1"/>
  </ElementType>
  <ElementType name="ListOfLocalIPAddresses" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="LocalIPAddress" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- "SyncAndScheduling" elements -->
  <ElementType name="SyncAndSchedulingCharacteristics" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="fftypes:CurrentTime" minOccurs="1" maxOccurs="1"/>
    <element type="StandardTimeDifference" minOccurs="1" maxOccurs="1"/>
    <element type="PrimaryTimeServer" minOccurs="1" maxOccurs="1"/>
    <element type="SecondaryTimeServer" minOccurs="1" maxOccurs="1"/>
    <element type="TimeRequestTimeout" minOccurs="1" maxOccurs="1"/>
    <element type="TimeRequestInterval" minOccurs="1" maxOccurs="1"/>
    <element type="CapableTimeSyncClass" minOccurs="1" maxOccurs="1"/>
    <element type="TargetTimeSyncClass" minOccurs="1" maxOccurs="1"/>
    <element type="ScheduleSyncPeriod" minOccurs="1" maxOccurs="1"/>
    <element type="DaylightTimeDifference" minOccurs="1" maxOccurs="1"/>
    <element type="StartDaylightTime" minOccurs="1" maxOccurs="1"/>
    <element type="EndDaylightTime" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="ListOfSNTPTimestamps" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="SNTPTimestamp" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- "VfdList" elements -->
  <ElementType name="VfdRefEntry" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="fftypes:VfdRef" minOccurs="1" maxOccurs="1"/>
    <element type="fftypes:VfdTag" minOccurs="1" maxOccurs="1"/>
    <element type="VfdServerSelector" minOccurs="1" maxOccurs="1"/>
    <element type="DDDomainIndex" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- "FbSchedule" elements -->
  <ElementType name="ScheduleListCharacteristics" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="NumberOfSchedule" minOccurs="1" maxOccurs="1"/>
    <element type="ActiveScheduleVersion" minOccurs="1" maxOccurs="1"/>
    <element type="ActiveScheduleIndex" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="FBScheduleDescriptor" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ScheduleVersion" minOccurs="1" maxOccurs="1"/>
    <element type="fftypes:MacrocycleDuration" minOccurs="1" maxOccurs="1"/>
    <element type="DomainIndex" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="ListOfFBScheduleDescriptors" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="FBScheduleDescriptor" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- SMIB level 2 -->

  <ElementType name="SmCharacteristics" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="fftypes:SmSupport" minOccurs="1" maxOccurs="1"/>

```

```

    <element type="fftypes:OperationalPowerup" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfVersionNumbers" minOccurs="1" maxOccurs="1"/>
    <element type="OperationalIPAddress" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfLocalIPAddresses" minOccurs="1" maxOccurs="1"/>
    <element type="DeviceContentsDomain" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="SyncAndScheduling" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="SyncAndSchedulingCharacteristics" minOccurs="1" maxOccurs="1"/>
    <element type="LastSNTPMessage" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfSNTPTimestamps" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="DeviceIdentification" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="fftypes:DeviceId" minOccurs="1" maxOccurs="1"/>
    <element type="fftypes:PdTag" minOccurs="1" maxOccurs="1"/>
    <element type="DeviceIndex" minOccurs="1" maxOccurs="1"/>
    <element type="DeviceType" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="VfdList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="VfdRefEntry" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="FbSchedule" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ScheduleActivation" minOccurs="1" maxOccurs="1"/>
    <element type="ScheduleListCharacteristics" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfFBScheduleDescriptors" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- SMIB level 1 -->

  <ElementType name="SMIB" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="SmCharacteristics" minOccurs="1" maxOccurs="1"/>
    <element type="SyncAndScheduling" minOccurs="1" maxOccurs="1"/>
    <element type="DeviceIdentification" minOccurs="1" maxOccurs="1"/>
    <element type="VfdList" minOccurs="1" maxOccurs="1"/>
    <element type="FbSchedule" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- ***** -->
  <!-- NMIB elements for structured variables as in FF-803 sections 5 and 7 -->
  <!-- ***** -->

  <!-- NMIB level 3 -->

  <ElementType name="ListHeader" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="Version" minOccurs="1" maxOccurs="1"/>
    <element type="FirstConfiguredIndex" minOccurs="1" maxOccurs="1"/>
    <element type="FirstUnconfiguredIndex" minOccurs="1" maxOccurs="1"/>
    <element type="MaxNumEntries" minOccurs="1" maxOccurs="1"/>
    <element type="NumConfigured" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <!-- "SessionList" elements -->
  <ElementType name="SessionEndpoint" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="RemotePdTag" minOccurs="1" maxOccurs="1"/>
    <element type="LocalIPAddress" minOccurs="1" maxOccurs="1"/>
    <element type="RemoteIpAddress" minOccurs="1" maxOccurs="1"/>
    <element type="EndpointType" minOccurs="1" maxOccurs="1"/>
    <element type="MsgHdrOptions" minOccurs="1" maxOccurs="1"/>
    <element type="State" minOccurs="1" maxOccurs="1"/>
    <element type="TransportProtocol" minOccurs="1" maxOccurs="1"/>
    <element type="NmaConfigurationUse" minOccurs="1" maxOccurs="1"/>

```

```

    <element type="UdpPortNumber" minOccurs="1" maxOccurs="1"/>
    <element type="BufferSize" minOccurs="1" maxOccurs="1"/>
    <element type="TransmitDelayTime" minOccurs="1" maxOccurs="1"/>
    <element type="InactivityCloseTime" minOccurs="1" maxOccurs="1"/>
    <element type="MaxMessageLength" minOccurs="1" maxOccurs="1"/>
    <element type="StatisticsEntryOdIndex" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="ListOfSessionEndpoints" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="SessionEndpoint" minOccurs="0" maxOccurs="*" />
  </ElementType>

  <!-- "HseVcrList" elements -->
  <ElementType name="HseVcrEndpoint" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="HseVcrType" minOccurs="1" maxOccurs="1"/>
    <element type="FdaAddress" minOccurs="1" maxOccurs="1"/>
    <element type="RelatedSessionEndpointOdIndex" minOccurs="1" maxOccurs="1"/>
    <element type="VcrUserId" minOccurs="1" maxOccurs="1"/>
    <element type="HseSubnetMask" minOccurs="1" maxOccurs="1"/>
    <element type="OnChangeThreshold" minOccurs="1" maxOccurs="1"/>
    <element type="InactivityCloseTime" minOccurs="1" maxOccurs="1"/>
    <element type="StatisticsEntryOdIndex" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="ListOfHseVcrEndpoints" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="HseVcrEndpoint" minOccurs="0" maxOccurs="*" />
  </ElementType>

  <!-- "SessionStatistics" elements -->
  <ElementType name="SessionStatisticsEntry" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="SessionEndpointEntryOdIndex" minOccurs="1" maxOccurs="1"/>
    <element type="StatisticsControl" minOccurs="1" maxOccurs="1"/>
    <element type="StatisticsCollectionStartTime" minOccurs="1" maxOccurs="1"/>
    <element type="MaxNumOfVcrs" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfMsgsReceived" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfInvalidMsgsReceived" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfMsgsSent" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfOpenStateCtr" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="ListOfSessionStatisticsEntries" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="SessionStatisticsEntry" minOccurs="0" maxOccurs="*" />
  </ElementType>

  <!-- "HseVcrStatistics" elements -->
  <ElementType name="HseVcrStatisticsEntry" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="HseVcrEntryOdIndex" minOccurs="1" maxOccurs="1"/>
    <element type="StatisticsControl" minOccurs="1" maxOccurs="1"/>
    <element type="StatisticsCollectionStartTime" minOccurs="1" maxOccurs="1"/>
    <element type="VcrUserId" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfConnects" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfAborts" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfUnconfirmedMessagesSent" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfUnconfirmedMessagesReceived" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfConfirmedRequestMessagesSent" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfResponseMessagesSent" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfErrorMessageSent" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfConfirmedRequestMessagesReceived" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfResponseMessagesReceived" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfErrorMessageReceived" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfNonMisorderedMessages" minOccurs="1" maxOccurs="1"/>
  </ElementType>

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```

    <element type="NumOfDuplicatedMessages" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfLateMessages" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfMissedMessages" minOccurs="1" maxOccurs="1"/>
    <element type="NumOfLossOfSyncMessages" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="ListOfHseVcrStatisticsEntries" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="HseVcrStatisticsEntry" minOccurs="0" maxOccurs="*/"/>
</ElementType>

<!-- "DlmeBridge" elements -->
<ElementType name="BridgeCharacteristics" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="Version" minOccurs="1" maxOccurs="1"/>
    <element type="NumberOfInterfaces" minOccurs="1" maxOccurs="1"/>
    <element type="RootInterface" minOccurs="1" maxOccurs="1"/>
    <element type="InterfaceStatisticsSupported" minOccurs="1" maxOccurs="1"/>
    <element type="MaxForwardingDelayUrgent" minOccurs="1" maxOccurs="1"/>
    <element type="MinForwardingDelayUrgent" minOccurs="1" maxOccurs="1"/>
    <element type="MaxForwardingDelayNormal" minOccurs="1" maxOccurs="1"/>
    <element type="MinForwardingDelayNormal" minOccurs="1" maxOccurs="1"/>
    <element type="MaxForwardingDelayTimeAvailable" minOccurs="1" maxOccurs="1"/>
    <element type="MinForwardingDelayTimeAvailable" minOccurs="1" maxOccurs="1"/>
    <element type="MinRepublishingDelay" minOccurs="1" maxOccurs="1"/>
    <element type="RepublishingDatabaseListHeaderOdIndex" minOccurs="1" maxOccurs="1"/>
    <element type="FilteringDatabaseListHeaderOdIndex" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="RepublishingEntry" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="SubAddress" minOccurs="1" maxOccurs="1"/>
    <element type="RepubAddress" minOccurs="1" maxOccurs="1"/>
    <element type="FasDlIMaxConfirmDelayOnConnect" minOccurs="1" maxOccurs="1"/>
    <element type="FasDlIMaxDisduSize" minOccurs="1" maxOccurs="1"/>
    <element type="FasDlISDP" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="ListOfRepublishingDatabaseRecords" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="RepublishingEntry" minOccurs="0" maxOccurs="*/"/>
</ElementType>

<ElementType name="RepublishingDatabase" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfRepublishingDatabaseRecords" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="FilteringEntry" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="DstLinkAddress" minOccurs="1" maxOccurs="1"/>
    <element type="InterfaceNumber" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="ListOfFilteringDatabaseRecords" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="FilteringEntry" minOccurs="0" maxOccurs="*/"/>
</ElementType>

<ElementType name="FilteringDatabase" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfFilteringDatabaseRecords" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="InterfaceStatisticsEntry" content="eltOnly" model="closed">

```

```

    <attribute type="fdt:nodeId" required="no"/>
    <element type="ForwardedInbound" minOccurs="1" maxOccurs="1"/>
    <element type="IgnoredInbound" minOccurs="1" maxOccurs="1"/>
    <element type="DiscardedForLackOfBuffers" minOccurs="1" maxOccurs="1"/>
    <element type="DiscardedForForwardingDelayExceeded" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="InterfaceStatisticsList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <element type="InterfaceStatisticsEntry" minOccurs="0" maxOccurs="*" />
  </ElementType>

  <!-- NMIB level 2 -->

  <ElementType name="NmCharacteristics" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="NmibRevision" minOccurs="1" maxOccurs="1"/>
    <element type="H1DIOperatFunctionalClassSupported" minOccurs="1" maxOccurs="1"/>
    <element type="TcpProtocolSupported" minOccurs="1" maxOccurs="1"/>
    <element type="MsgHdrOptionsSupported" minOccurs="1" maxOccurs="1"/>
    <element type="OnChangeRefreshRate" minOccurs="1" maxOccurs="1"/>
    <element type="HseSubnetMaskBits" minOccurs="1" maxOccurs="1"/>
    <element type="FmsFeaturesSupported" minOccurs="1" maxOccurs="1"/>
    <element type="FdaGuardBand" minOccurs="1" maxOccurs="1"/>
    <element type="H1Timeout" minOccurs="1" maxOccurs="1"/>
    <element type="SessionMaxOutstanding" minOccurs="1" maxOccurs="1"/>
    <element type="SessionStatisticsControlDefaultValue" minOccurs="1" maxOccurs="1"/>
    <element type="VcrStatisticsControlDefaultValue" minOccurs="1" maxOccurs="1"/>
    <element type="RestartStatisticsCollectionControl" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="ConfiguredSessionList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfSessionEndpoints" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="AutomaticSessionList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfSessionEndpoints" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="SessionStatisticsList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfSessionStatisticsEntries" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="HseConfiguredVcrList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfHseVcrEndpoints" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="HseAutomaticVcrList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfHseVcrEndpoints" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="HseVcrStatisticsList" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ListHeader" minOccurs="1" maxOccurs="1"/>
    <element type="ListOfHseVcrStatisticsEntries" minOccurs="1" maxOccurs="1"/>
  </ElementType>

  <ElementType name="DImeBridge" content="eltOnly" model="closed">

```

```

<attribute type="fdt:nodeId" required="no"/>
<element type="BridgeCharacteristics" minOccurs="1" maxOccurs="1"/>
<element type="CurrentNmaConfigurationAccess" minOccurs="1" maxOccurs="1"/>
<element type="PreviousNmaConfigurationAccess" minOccurs="1" maxOccurs="1"/>
<element type="InterfaceAddressArray" minOccurs="1" maxOccurs="1"/>
<element type="InterfaceDesiredStateArray" minOccurs="1" maxOccurs="1"/>
<element type="InterfaceActualStateArray" minOccurs="1" maxOccurs="1"/>
<element type="InterfaceStatisticsList" minOccurs="0" maxOccurs="1"/>
<element type="RepublishingDatabase" minOccurs="1" maxOccurs="1"/>
<element type="FilteringDatabase" minOccurs="1" maxOccurs="1"/>
</ElementType>

<!-- NMIB level 1 -->

<ElementType name="NMIB" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="NmCharacteristics" minOccurs="1" maxOccurs="1"/>
  <element type="ConfiguredSessionList" minOccurs="1" maxOccurs="1"/>
  <element type="AutomaticSessionList" minOccurs="1" maxOccurs="1"/>
  <element type="SessionStatisticsList" minOccurs="1" maxOccurs="1"/>
  <element type="HseConfiguredVcrList" minOccurs="1" maxOccurs="1"/>
  <element type="HseAutomaticVcrList" minOccurs="1" maxOccurs="1"/>
  <element type="HseVcrStatisticsList" minOccurs="1" maxOccurs="1"/>
  <element type="DlmeBridge" minOccurs="1" maxOccurs="1"/>
</ElementType>

<!-- Schema root level (0) -->

<ElementType name="HseNmaVfd" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="SMIB" minOccurs="1" maxOccurs="1"/>
  <element type="NMIB" minOccurs="1" maxOccurs="1"/>
</ElementType>
</Schema>

```

8.4 Address management

The address of a device or a block is managed in the <BusInformation/UserdefinedBus> element.

8.5 FF specific Parameter Set

A device or a block shall provide the data as defined in IEC 62453-301

9 Communication data types

9.1 General

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

9.2 FMS communication – FdtFFFmsSchema

```

<Schema name="FdtFFFmsSchema" xmlns="urn:schemas-microsoft-com:xml-data" xmlns:dt="urn:schemas-
microsoft-com:datatypes"
  xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
  xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml">

  <!--Definition of Attributes-->
  <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>
  <!-- Indicates which option is to be used to open the FMS connection. See FF-588 section 6.5.3.2 -->
  <AttributeType name="connectOption" dt:type="enumeration" dt:values="VCRSelector NMAAccess
FBAPConnect"/>
  <!-- See FF-870 section 3.2.6 OD shall be transferred in the short form (false) or in the long form (true). -->
  <AttributeType name="allAttributes" dt:type="boolean"/>
  <!-- See FF-588 section 6.5.3.7.1 - get multiple consecutive OD entries true / false -->

```

```

<AttributeType name="startFlag" dt:type="boolean"/>
<!-- See FF-870 section 3.2.6 - more object descriptions follow -->
<AttributeType name="moreFollows" dt:type="boolean"/>
<!-- See FF-870 section 3.2.6 - number of object descriptions -->
<AttributeType name="numberOfObjectDescriptions" dt:type="ui1"/>
<!-- See FF-870 section 3.3.4 - version of the clients Object Dictionary -->
<AttributeType name="versionOdCalling" dt:type="i2"/>
<!-- See FF-870 section 3.3.4 - Profile Number of the client. -->
<AttributeType name="profileNumberCalling" dt:type="ui2"/>
<!-- See FF-870 section 3.3.4 - Access Protection Supported attribute of the clients OD object description. -->
<AttributeType name="accessProtectionSupportedCalling" dt:type="boolean"/>
<!-- See FF-870 section 3.3.4 - password to be used for the access to all objects of the server on this VCR and
membership in access groups -->
<AttributeType name="passwordAndAccessGroupsCalling" dt:type="bin.hex"/>
<!-- See FF-870 section 3.3.4 - maximum length of the FMS PDU to be sent on VCR -->
<AttributeType name="maxFmsPduSendingCalled" dt:type="ui1"/>
<!-- See FF-870 section 3.3.4 - maximum length of the FMS PDU to be received -->
<AttributeType name="maxFmsPduReceivingCalled" dt:type="ui1"/>
<!-- See FF-870 section 3.3.4 - Profile Number of the server. -->
<AttributeType name="profileNumberCalled" dt:type="ui2"/>
<!-- See FMS-870 section 3.3.4 - Access Protection Supported attribute of the servers OD object description. --
>
<AttributeType name="accessProtectionSupportedCalled" dt:type="boolean"/>
<!-- See FMS-870 section 3.3.4 -->
<AttributeType name="passwordAndAccessGroupsCalled" dt:type="ui2"/>
<!-- See FMS-870 section 3.6.3.6 - Access groups and access rights. -->
<AttributeType name="accessProtection" dt:type="bin.hex"/>
<!--Attributes of element FmsStatusResponse -->
<!-- See FMS-870 section 3.1.3.1 - state of the communication capabilities of the device. -->
<AttributeType name="logicalStatus" dt:type="enumeration" dt:values="stateChangesAllowed
limitedServicesPermitted odLoadingNonInteracting odLoadingInteracting"/>
<!-- See FMS-870 section 3.1.3.1 - coarse summary of the state of the real device. -->
<AttributeType name="physicalStatus" dt:type="enumeration" dt:values="operational
partiallyOperational inoperable needsCommissioning"/>
<!-- See FMS-870 section 3.1.3.1 - local state of the application and the device. -->
<AttributeType name="localDetail" dt:type="bin.hex"/>
<!-- Attributes of element FmsIdentifyResponse -->
<!-- See FMS-870 section 3.1.3.3 - model name -->
<AttributeType name="modelName" dt:type="string"/>
<!-- See FMS-870 section 3.1.3.3 - Revision attribute of the VFD. -->
<AttributeType name="revision" dt:type="string"/>
<!-- Attribute of element FmsStandardResponse - refers to NULL response according
to FF-870 section 10 -->
<AttributeType name="responseType" dt:type="enumeration" dt:values="FmsWrite FmsDeleteVariableList
FmsGenericInitiateDownloadSequence FmsGenericDownloadSegment FmsAbort"/>
<!-- Attributes for elements regarding domain management -->
<!-- See FMS-870 section 3.4.3.3 - informs client whether or not the server successfully finished the
Download.-->
<AttributeType name="finalResult" dt:type="boolean" default="1"/>
<!-- Attributes for element FmsServiceError -->
<!-- See FMS-870 section 6.1-->
<AttributeType name="additionalCode" dt:type="ui2"/>
<!-- See FMS-870 section 6.1-->
<AttributeType name="additionalDescription" dt:type="string"/>
<!-- Error codes for ErrorInfo element according to FF-870 section 6.1 and 10.1.4.4
the error code values defined with the attribute errorCode shall comply with the codes defined with FF-870
section 10.1.4.4 -->
<AttributeType name="errorCode" dt:type="i1"/>
<!-- Error classes for ErrorInfo element according to FF-870 section 6.1 and 10.1.4.4
the error class values defined with the attribute errorClass shall comply with the codes defined with FF-
870 section 10.1.4.4 -->
<AttributeType name="errorClass" dt:type="i1"/>
<!-- See FMS-870 section 3.3.4.2-->
<AttributeType name="abortReason" dt:type="ui1"/>
<AttributeType name="abortIdentifier" dt:type="enumeration" dt:values="FMSUSER FMS FAS DLL"/>
<AttributeType name="locallyGenerated" dt:type="boolean"/>
<AttributeType name="abortDetail" dt:type="bin.hex"/>
<!-- ***** -->
<!--Definition of Elements-->
<!--Element VariableName identifies the name for a variable.

```

Used by variable access services - see FF-870 section 3.6.3 and section 10.1.10 -->

```
<ElementType name="VariableName" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:name" required="yes"/>
</ElementType>
```

<!-- Element VariableListName identifies the name of variable list.
Used by variable access services - see FF-870 section 3.6.3 and section 10.1.10
and OD management service see FF-870 section 3.2.6 -->

```
<ElementType name="VariableListName" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:name" required="yes"/>
</ElementType>
```

<!-- Element DomainName identifies name of a domain.
Used by OD management (see FF-870 section 3.2.6)
and Domain management services (see FF-870 section 3.4.3) -->

```
<ElementType name="DomainName" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:name" required="yes"/>
</ElementType>
```

<!-- Element EventName identifies name of a event.
Used by OD management (see FF-870 section 3.2.6) services -->

```
<ElementType name="EventName" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:name" required="yes"/>
</ElementType>
```

<!-- Element PiName identifies name of a program invocation object.
Used by OD management services (see FF-870 section 3.2.6) -->

```
<ElementType name="PiName" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:name" required="yes"/>
</ElementType>
```

<!-- Index, starting with which the object descriptions shall be read.
OD management (see FF-870 section 3.2.6) services -->

```
<ElementType name="StartIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:index" required="yes"/>
</ElementType>
```

<!-- Element AccessSpecificationVar - Selection of type of variable access used
for variable access services (see FF-870 section 3.6.3) -->

```
<ElementType name="AccessSpecificationVar" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="1" maxOccurs="1">
    <element type="fftypes:Index"/>
  </group>
</ElementType>
```

<!-- Element AccessSpecificationVL - Selection of type of variable list access
used for service FMS DeleteVariableList (see FF-870 section 3.6.3.7) -->

```
<ElementType name="AccessSpecificationVL" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="1" maxOccurs="1">
    <element type="fftypes:Index"/>
    <element type="VariableListName"/>
  </group>
</ElementType>
```

<!-- Element VariableListItem - Selection of type of variable access
used for service FMS DefineVariableList (see FF-870 section 3.6.3.6)
see also element FmsDefineVariableListRequest -->

```
<ElementType name="VariableListItem" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="1" maxOccurs="1">
    <element type="fftypes:Index"/>
    <element type="VariableName"/>
  </group>
</ElementType>
```

<!-- Element AccessSpecificationOd - Selection of type of OD access
used by OD management services (see FF-870 section 3.2.6).
See also element FmsGetOdRequest -->

```
<ElementType name="AccessSpecificationOd" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="1" maxOccurs="1">
```

```

        <element type="fftypes:Index"/>
        <element type="VariableName"/>
        <element type="VariableListName"/>
        <element type="DomainName"/>
        <element type="EventName"/>
        <element type="PiName"/>
        <element type="StartIndex"/>
    </group>
</ElementType>
<!-- Element AccessSpecificationDomain - Selection of type of domain access
    used for Domain management services (see FF-870 section 3.4.3). -->
<ElementType name="AccessSpecificationDomain" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <group order="one" minOccurs="1" maxOccurs="1">
        <element type="fftypes:Index"/>
        <element type="DomainName"/>
    </group>
</ElementType>
<!-- ***** -->
<ElementType name="ErrorDescription" content="eltOnly" model="closed">
    <!-- Error description shall contain the following entries:
        One EnumeratorEntry for the error class describing the error class.
        One EnumeratorEntry for the error code.

    EnumeratorEntry for error class:
    EnumeratorEntry/@index - shall contain the error class according to FF-870 section 10.1.4.4
    EnumeratorEntry/@name - shall contain a descriptive name of the error class that complies with
    the error class names defined with FF-870 section 10.1.4.4 (e.g. access).
    EnumeratorEntry/@descriptor - free description of error class - could also be a localized text.

    EnumeratorEntry for error code:
    EnumeratorEntry/@index - shall contain the error code according to FF-870 section 10.1.4.4
    EnumeratorEntry/@name - shall contain a descriptive name of the error code that complies with
    the error code names defined with FF-870 section 10.1.4.4 (e.g. invalid-address).
    EnumeratorEntry/@descriptor - free description of error code - could also be a localized text.

    -->
    <element type="fdt:EnumeratorEntry" minOccurs="1" maxOccurs="1"/>
    <element type="fdt:EnumeratorEntry" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- ErrorInfo element according to error classes FF-870 section 10.1.4.4 -->
<ElementType name="ErrorInfo" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="errorClass" required="yes" />
    <attribute type="errorCode" required="yes" />
    <attribute type="additionalCode" required="no"/>
    <attribute type="additionalDescription" required="no"/>
    <!-- optional error description -->
    <element type="ErrorDescription" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="CommonErrorType" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ErrorInfo" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="OdErrorType" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ErrorInfo" minOccurs="1" maxOccurs="1"/>
    <element type="fftypes:Index" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- ***** -->
<!-- Context management see FF-870 section 3.3.4 and section 10.1.7 -->
<ElementType name="FmsInitiateRequest" content="eltOnly" model="closed">
    <!-- Corresponds to Initiate-RequestPDU -->
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="connectOption" required="yes"/>
    <!-- this is the FDT communication reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <!-- PD Tag -->
    <attribute type="fdt:tag" required="yes"/>
    <attribute type="versionOdCalling" required="no"/>
    <attribute type="profileNumberCalling" required="no"/>

```

```

    <attribute type="accessProtectionSupportedCalling" required="no"/>
    <attribute type="passwordAndAccessGroupsCalling" required="no"/>
    <!-- additional data for FMS Initiate -->
    <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
    <element type="fftypes:VfdTag" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="FmsInitiateResponse" content="empty" model="closed">
    <!-- Corresponds to Initiate-ResponsePDU -->
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FMS connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="fftypes:versionOd" required="no"/>
    <attribute type="profileNumberCalled" required="no"/>
    <attribute type="accessProtectionSupportedCalled" required="no"/>
    <attribute type="passwordAndAccessGroupsCalled" required="no"/>
</ElementType>

<ElementType name="FmsInitiateError" content="eltOnly" model="closed">
    <!-- Corresponds to Initiate-ErrorPDU -->
    <attribute type="fdt:nodeId" required="no"/>
    <!-- Since no FMS connection has been established this is the FDT communication reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="maxFmsPduSendingCalled" required="no"/>
    <attribute type="maxFmsPduReceivingCalled" required="no"/>
    <attribute type="fftypes:fmsFeaturesSupported" required="no"/>
    <element type="CommonErrorType" minOccurs="1" maxOccurs="1"/>
</ElementType>

<ElementType name="FmsAbortRequest" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FMS connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="abortIdentifier" required="yes"/>
    <attribute type="abortReason" required="yes"/>
    <attribute type="abortDetail" required="no"/>
</ElementType>

<!-- Abort response is FmsStandardResponse with responseType = FmsAbort -->
<!-- FMS abort indication where the device is the source i.e. is not a request issued by the DTM -->
<ElementType name="FmsAbortIndication" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FMS connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="locallyGenerated" required="yes"/>
    <attribute type="abortIdentifier" required="yes"/>
    <attribute type="abortReason" required="yes"/>
    <attribute type="abortDetail" required="no"/>
</ElementType>

<!-- ***** -->
<!-- Element FmsStandardResponse - refers to NULL response according
to FF-870 section 10 -->
<ElementType name="FmsStandardResponse" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FMS connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="responseType" required="yes"/>
</ElementType>

<!-- ***** -->
<!-- Element FmsServiceError - refers to FMS ServiceError response according
to FF-870 section 10.1.4 -->
<ElementType name="FmsServiceError" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FMS connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <group order="one" minOccurs="1" maxOccurs="1">
        <element type="CommonErrorType"/>
        <element type="OdErrorType"/>
    </group>
</ElementType>

<!-- ***** -->
<!-- VFD Support see FF-870 section 3.1.3 and section 10.1.5 -->

```

```

<ElementType name="FmsStatusRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="FmsStatusResponse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="logicalStatus" required="yes"/>
  <attribute type="physicalStatus" required="yes"/>
  <attribute type="localDetail" required="no"/>
</ElementType>
<ElementType name="FmsIdentifyRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="FmsIdentifyResponse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="fdt:vendor" required="yes"/>
  <attribute type="modelName" required="yes"/>
  <attribute type="revision" required="yes"/>
</ElementType>
<!-- ***** -->
<!-- Variable access see FF-870 section 3.6.3 and section 10.1.10 -->
<ElementType name="FmsReadRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <element type="AccessSpecificationVar" minOccurs="1" maxOccurs="1"/>
  <element type="fftypes:SubIndex" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="FmsReadResponse" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="FmsWriteRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <element type="AccessSpecificationVar" minOccurs="1" maxOccurs="1"/>
  <element type="fftypes:SubIndex" minOccurs="0" maxOccurs="1"/>
  <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="FmsDefineVariableListRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="accessProtection" required="yes"/>
  <!-- extension as optional byte array -->
  <attribute type="fdt:byteArray" required="no"/>
  <attribute type="fftypes:listCount" required="yes"/>
  <element type="VariableListItem" minOccurs="1" maxOccurs="*/>
  <element type="VariableListName" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="FmsDefineVariableListResponse" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <element type="fftypes:Index" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="FmsDeleteVariableListRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FMS connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>

```

```

        <element type="AccessSpecificationVL" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <!-- ***** -->
    <!-- OD Management see FF-870 section 3.2.6 and section 10.1.6 -->
    <ElementType name="FmsGetOdRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FMS connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <attribute type="allAttributes" required="yes"/>
        <attribute type="startFlag" required="yes"/>
        <element type="AccessSpecificationOd" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="FmsGetOdResponse" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FMS connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <attribute type="moreFollows" required="yes"/>
        <attribute type="numberOfObjectDescriptions" required="yes"/>
        <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <!-- ***** -->
    <!-- Domain management see FF-870 section 3.4.3 and section 10.1.8 -->
    <ElementType name="FmsGenericInitiateDownloadSequenceRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FMS connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <element type="AccessSpecificationDomain" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="FmsGenericDownloadSegmentRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FMS connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <attribute type="moreFollows" required="yes"/>
        <element type="AccessSpecificationDomain" minOccurs="1" maxOccurs="1"/>
        <element type="fdt:CommunicationData" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="FmsGenericTerminateDownloadSequenceRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FMS connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <element type="AccessSpecificationDomain" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="FmsGenericTerminateDownloadSequenceResponse" content="empty" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FMS connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <attribute type="finalResult" required="no"/>
    </ElementType>
    <!-- ***** -->
</Schema>

```

9.3 H1 communication – FdtFFH1CommunicationSchema

```

<Schema name="FdtFFH1CommunicationSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml"
xmlns:fms="x-schema:FdtFFFmsSchema.xml">

```

```

    <!--Definition of Attributes-->
    <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>
    <!-- Period of time in [ms] for the whole sequence -->
    <AttributeType name="sequenceTime" dt:type="ui4"/>
    <!-- Delay time in [ms] between two communication calls -->
    <AttributeType name="delayTime" dt:type="ui4"/>
    <!-- System management related attributes -->
    <!-- Determines whether the tag is to be set or cleared. Used with system management
    service Set PD-Tag see FF-880 section 5.2.1.1.2
    see element SmSetPDTagRequest -->
    <AttributeType name="clearPDTag" dt:type="boolean" default="0"/>

```

```

<!-- Reason code according to FF-880 section 7 - used for H1 system management services. -->
<AttributeType name="reasonCode" dt:type="enumeration" dt:values="success serviceNotSupported
invalidParameter
errorDLLInsufficientResources errorDLLSendingQueueFull
errorDLLErrorTimeOutBeforeTransmission errorDLLReasonUnspecified
deviceFailedRespondSetPDTag deviceFailedRespondWhoHasPDTag
deviceFailedRespondSetAddress deviceFailedRespondIdentify
deviceFailedRespondEnableSMOp deviceFailedRespondClearAddress
multipleResponsefromWhoHasPDTag nonMatchingPDTagfromWhoHasPDTag
nonMatchingPDTagfromIdentify nonMatchingdevIDfromIdentify
remoteErrorInvalidState remoteErrorPDTagMatch
remoteErrordevIDMatch remoteErrorSMIBWriteFailed
remoteErrorStartingSMOperational "/>
<!-- Attributes of element SmSetAddressRequest -->
<!-- Application clock synchronization interval for the link on which the field device resides.
See system management service Set Address FF-880 section 5.2.1.2.2.
Refer also to element SmSetAddressRequest.
-->
<AttributeType name="smAPClockSyncInterval" dt:type="ui1"/>
<!-- This is the address of the primary application clock time publisher for the link on which the field device
resides.
See system management service Set Address FF-880 section 5.2.1.2.2. Refer also to element
SmSetAddressRequest. -->
<AttributeType name="smPrimaryAPTimePublisher" dt:type="ui1"/>
<!-- Used by system management service Find Tag Query according to FF-880 section 5.5.2.1 This is the
unsigned 32-bit integer that, when present, together with the Tag identifies the element (e.g. FB parameter) to be
located. See also element SmQueryFB and SmFindTagQuery -->
<AttributeType name="elementID" dt:type="ui4"/>
<!-- Used by system management service Find Tag Reply according to FF-880 section 5.5.2.2. This Boolean
flag is true when there are additional communication relationships in the remote device which may be used for the
communication path. See also elements SmReplyVFD, SmReplyFB and SmFindTagReply -->
<AttributeType name="moreVCRL" dt:type="boolean" default="0"/>
<!-- ***** -->
<!--Definition of Elements-->
<!-- System management related elements -->
<!-- Designates the type of query for PD Tag. Used by element SmFindTagQuery -->
<ElementType name="SmQueryPhysicalDevice" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:tag" required="yes"/>
</ElementType>
<!-- Designates the type of query for VFD Tag. Used by element SmFindTagQuery -->
<ElementType name="SmQueryVFD" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="fftypes:vfdTag" required="yes"/>
</ElementType>
<!-- Designates the type of query for Function block/ Function block parameter. Used by element
SmFindTagQuery. -->
<ElementType name="SmQueryFB" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- acts as function block tag -->
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="elementID" required="no"/>
</ElementType>
<!-- Denotes type of reply for a PD Tag find tag query. Refer to element SmFindTagReply -->
<ElementType name="SmReplyPhysicalDevice" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:devID" required="yes"/>
</ElementType>
<!-- Denotes type of reply for a VFD Tag find tag query. Refer to element SmFindTagReply. -->
<ElementType name="SmReplyVFD" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:vfdRef" required="yes"/>
  <attribute type="moreVCRL" required="no"/>
  <attribute type="fftypes:versionOd" required="yes"/>
  <!-- represents a list of VcrStaticEntryOdIndices
see FF-801 section 5.2.3 -->
  <element type="fftypes:IndexList" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- Denotes type of reply for a Function block or Function block parameter find tag query.

```

Refer to element SmFindTagReply -->

```

<ElementType name="SmReplyFB" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:vfdRef" required="yes"/>
  <attribute type="moreVCRL" required="no"/>
  <attribute type="fftypes:versionOd" required="yes"/>
  <!-- index of object - see FF-880 section 5.5.2.2 -->
  <element type="fftypes:Index" minOccurs="1" maxOccurs="1"/>
  <!-- represents a list of VcrStaticEntryOdIndices
  see FF-801 section 5.2.3 -->
  <element type="fftypes:IndexList" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- ***** -->
<!-- Context management see FF-870 section 3.3.4 and section 10.1.7 -->
<ElementType name="ConnectRequest" content="empty" model="closed">
  <!-- establish a FDT connection -->
  <attribute type="fdt:nodeId" required="no"/>
</ElementType>
<ElementType name="ConnectResponse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="DisconnectRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="DisconnectResponse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<!-- ***** -->
<!-- System management services see FF-880 section 5 -->
<ElementType name="SmStandardResponse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="reasonCode" required="yes"/>
  <attribute type="fftypes:smServiceID" required="yes"/>
</ElementType>
<!-- System management service Set PD-Tag see FF-880 section 5.2.1.1.2 -->
<ElementType name="SmSetPDTagRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <!-- acts as PD-Tag -->
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="fftypes:nodeId" required="yes"/>
  <attribute type="fftypes:devID" required="yes"/>
  <attribute type="clearPDTag" required="no"/>
</ElementType>
<!-- System management service Set Address see FF-880 section 5.2.1.2.2 -->
<ElementType name="SmSetAddressRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <!-- acts as PD-Tag -->
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="fftypes:nodeId" required="yes"/>
  <attribute type="smAPClockSyncInterval" required="yes"/>
  <attribute type="smPrimaryAPTimePublisher" required="yes"/>
</ElementType>
<!-- System management service Clear Address see FF-880 section 5.2.1.3.1 -->
<ElementType name="SmClearAddressRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <!-- acts as PD-Tag -->
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="fftypes:nodeId" required="yes"/>

```

```

        <attribute type="fftypes:devID" required="yes"/>
    </ElementType>
    <!-- System management service SM Identify see FF-880 section 5.3.1 -->
    <ElementType name="SmIdentifyRequest" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FDT connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <!-- for multicasts refer to FF-822 Annex B -->
        <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
    </ElementType>
    <ElementType name="SmIdentifyResponseEntry" content="empty" model="closed">
        <!-- acts as PD-Tag -->
        <attribute type="fdt:tag" required="yes"/>
        <attribute type="fftypes:devID" required="yes"/>
    </ElementType>
    <ElementType name="SmIdentifyResponse" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FDT connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <element type="SmIdentifyResponseEntry" minOccurs="0" maxOccurs="*" />
    </ElementType>
    <!-- System management service Find Tag Query see FF-880 section 5.5.2.1
    if the SmFindTagQuery could not be transmitted, a SmStandardResponse
    with reasonCode will be received
-->
    <ElementType name="SmFindTagQuery" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FDT connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
        <group order="one" minOccurs="1" maxOccurs="1">
            <element type="SmQueryPhysicalDevice"/>
            <element type="SmQueryVFD"/>
            <element type="SmQueryFB"/>
        </group>
    </ElementType>
    <!-- System management service Find Tag Reply see FF-880 section 5.5.2.2 -->
    <ElementType name="SmFindTagReply" content="eltOnly" model="closed">
        <attribute type="fdt:nodeId" required="no"/>
        <!-- this is the FDT connection reference -->
        <attribute type="fftypes:communicationReference" required="yes"/>
        <!-- Dest-Addr -->
        <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
        <!-- Src-Addr -->
        <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
        <!-- resource node address -->
        <attribute type="fftypes:nodeId" required="yes"/>
        <group order="one" minOccurs="1" maxOccurs="1">
            <element type="SmReplyPhysicalDevice"/>
            <element type="SmReplyVFD"/>
            <element type="SmReplyFB"/>
        </group>
    </ElementType>
    <!-- ***** -->
    <!-- General sequence support see FDT spec IFdtCommunication sequence processing -->
    <!-- Describes the sequence begin -->
    <ElementType name="SequenceBegin" content="empty" model="closed">
        <attribute type="sequenceTime" required="no"/>
        <attribute type="delayTime" required="no"/>
        <attribute type="fftypes:communicationReference" required="yes"/>
    </ElementType>
    <!-- Describes the sequence end -->
    <ElementType name="SequenceEnd" content="empty" model="closed">
        <attribute type="fftypes:communicationReference" required="yes"/>
    </ElementType>
    <!-- Describes the sequence start -->
    <ElementType name="SequenceStart" content="empty" model="closed">
        <attribute type="fftypes:communicationReference" required="yes"/>
    </ElementType>
    <!-- Describes the abort -->

```

```

<ElementType name="Abort" content="empty" model="closed">
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="FDT" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="1" maxOccurs="1">
    <element type="ConnectRequest"/>
    <element type="ConnectResponse"/>
    <element type="DisconnectRequest"/>
    <element type="DisconnectResponse"/>
    <element type="fms:FmsInitiateRequest"/>
    <element type="fms:FmsInitiateResponse"/>
    <element type="fms:FmsInitiateError"/>
    <element type="fms:FmsAbortRequest"/>
    <element type="fms:FmsAbortIndication"/>
    <element type="fms:FmsStandardResponse"/>
    <element type="fms:FmsStatusRequest"/>
    <element type="fms:FmsStatusResponse"/>
    <element type="fms:FmsServiceError"/>
    <element type="fms:FmsIdentifyRequest"/>
    <element type="fms:FmsIdentifyResponse"/>
    <element type="fms:FmsReadRequest"/>
    <element type="fms:FmsReadResponse"/>
    <element type="fms:FmsWriteRequest"/>
    <element type="fms:FmsDefineVariableListRequest"/>
    <element type="fms:FmsDefineVariableListResponse"/>
    <element type="fms:FmsDeleteVariableListRequest"/>
    <element type="fms:FmsGetOdRequest"/>
    <element type="fms:FmsGetOdResponse"/>
    <element type="fms:FmsGenericInitiateDownloadSequenceRequest"/>
    <element type="fms:FmsGenericDownloadSegmentRequest"/>
    <element type="fms:FmsGenericTerminateDownloadSequenceRequest"/>
    <element type="fms:FmsGenericTerminateDownloadSequenceResponse"/>
    <element type="SmStandardResponse"/>
    <element type="SmSetPDTagRequest"/>
    <element type="SmSetAddressRequest"/>
    <element type="SmClearAddressRequest"/>
    <element type="SmIdentifyRequest"/>
    <element type="SmIdentifyResponse"/>
    <element type="SmFindTagQuery"/>
    <element type="SmFindTagReply"/>
    <element type="SequenceBegin"/>
    <element type="SequenceEnd"/>
    <element type="SequenceStart"/>
    <element type="Abort"/>
    <element type="fdt:CommunicationError"/>
  </group>
</ElementType>
</Schema>

```

9.4 HSE communication – FdtFFHseCommunicationSchema

```

<Schema name="FdtFFHseCommunicationSchema" xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
  xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml" xmlns:fms="x-schema:FdtFFFmsSchema.xml"
  xmlns:ffh1="x-schema:FdtFFH1CommunicationSchema.xml">

```

```

  <!--Definition of Attributes-->
  <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>
  <!-- Period of time in [ms] for the whole sequence -->
  <AttributeType name="sequenceTime" dt:type="ui4"/>
  <!-- Delay time in [ms] between two communication calls -->
  <AttributeType name="delayTime" dt:type="ui4"/>
  <!-- NMA configuration use - see FF-588 6.5.1.1.1 -->
  <AttributeType name="configurationUseNMA" dt:type="boolean"/>
  <!-- Indicates the type of query for SM Find Tag Query service
  See FF-588 section 6.5.2.1 and FF-589 5.3.1 -->
  <AttributeType name="queryType" dt:type="enumeration" dt:values="queryPrimaryPD
    queryVFD queryFB queryElementId queryVFDRef queryDeviceIndex querySecondaryPD"/>

```

```

<!-- indicates duplicate detection state received with SM Find Tag Reply
See FF-588 section 6.5.2.2 and FF-589 5.3.2 -->
<AttributeType name="duplicateDetectionState" dt:type="ui1"/>
<!-- State of HSE SMK as define with FF-589 -->
<AttributeType name="stateSMK" dt:type="ui1"/>
<!-- Redundant Device Type Capability - see FF-588 section 6.5.2.7.1
used with response to SM Identify service -->
<AttributeType name="redundantCapability" dt:type="enumeration" dt:values="D1 D2 D3"/>
<!-- Device Redundancy State - see FF-589 and FF-588 section 6.5.2.7.1
used with response to SM Identify service -->
<AttributeType name="deviceRedundancyState" dt:type="ui1"/>
<!-- HSE Repeat time for device annunciations see FF-589 -->
<AttributeType name="repeatTimeHSE" dt:type="ui4"/>
<!-- maximum value that the device index may have. See the Redundancy specification FF-593 -->
<AttributeType name="maxDeviceIndex" dt:type="ui2"/>
<!-- Version number of SM annunciation message - see FF-589 -->
<AttributeType name="versionAnnunciation" dt:type="ui4"/>
<!-- version of the List of Version Numbers in SM Characteristics in the SMIB - see FF-589 -->
<AttributeType name="versionHSEDevice" dt:type="ui4"/>
<!-- identifies the HSE interface to be cleared. see FF-589 -->
<AttributeType name="interfaceToClear" dt:type="ui1"/>
<!-- Indicates that no error occurred. Used by SmStandardResponse to encode a SM service
response with no error -->
<AttributeType name="noError" dt:type="boolean" default="1"/>
<!--Definition of elements -->
<!-- Common Elements -->
<!-- IP address from which a request was sent -->
<ElementType name="SourceIP" content="eltOnly" model="closed">
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- Operational IP address of the device responding -->
<ElementType name="OperationalIP" content="eltOnly" model="closed">
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- Session management as defined with FF-588 section 6.5.1.1.1
is up to the COMM DTM or communication channel
- hence no session management services are defined here.
Parameters for session management like Inactivity close time
can be adjusted via a GUI of the COMM DTM or communication
channel.
-->
<ElementType name="OpenSessionRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- PD Tag of HSE device resp. linking device -->
  <attribute type="fdt:tag" required="yes"/>
  <!-- NMA configuration use was missing -->
  <attribute type="configurationUseNMA" required="yes"/>
  <!-- IP address of HSE device to connect to -->
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- Elements for system management services -->
<!-- Designates the type of query for VFD Reference. Used by element SmFindTagQuery-->
<ElementType name="SmQueryVFDRef" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="fftypes:vfdRef" required="yes"/>
</ElementType>
<!-- Designates the type of query for a device index. Used by element SmFindTagQuery-->
<ElementType name="SmQueryDeviceIndex" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:deviceIndex" required="yes"/>
</ElementType>
<!-- See FF-588 section 6.5.2.1 and FF-589 5.3.1 -->
<ElementType name="SmFindTagQuery" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="queryType" required="yes"/>
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
  <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>

```

```

    <group order="one" minOccurs="1" maxOccurs="1">
      <element type="ffh1:SmQueryPhysicalDevice"/>
      <element type="ffh1:SmQueryVFD"/>
      <element type="ffh1:SmQueryFB"/>
      <element type="SmQueryVFDRef"/>
      <element type="SmQueryDeviceIndex"/>
    </group>
  </ElementType>
  <!-- See FF-588 section 6.5.2.2 and FF-589 5.3.2 -->
  <ElementType name="SmFindTagReply" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FDT connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="queryType" required="yes"/>
    <attribute type="duplicateDetectionState" required="yes"/>
    <!-- Queried object FDA address link ID -->
    <attribute type="fftypes:linkId" required="yes"/>
    <!-- Queried object H1 node address (if H1 device) -->
    <attribute type="fftypes:nodeId" required="no"/>
    <!-- PD Tag -->
    <attribute type="fdt:tag" required="yes"/>
    <!-- IP address from which the matching Find Tag Query was sent -->
    <element type="SourceIP" minOccurs="1" maxOccurs="1"/>
    <!-- Queried object IP address -->
    <element type="OperationalIP" minOccurs="1" maxOccurs="1"/>
    <group order="one" minOccurs="1" maxOccurs="1">
      <element type="ffh1:SmReplyPhysicalDevice"/>
      <element type="ffh1:SmReplyVFD"/>
      <element type="ffh1:SmReplyFB"/>
    </group>
  </ElementType>
  <!-- Encodes device information of HSE device - used with SM Identify service. See element
  SmIdentifyResponse -->
  <ElementType name="DeviceInformation" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="redundantCapability" required="yes"/>
    <attribute type="fftypes:deviceIndex" required="no"/>
    <attribute type="maxDeviceIndex" required="no"/>
  </ElementType>
  <!-- Encodes redundancy state/information of HSE device - used with SM Identify service. See element
  SmIdentifyResponse -->
  <ElementType name="RedundancyInformation" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="deviceRedundancyState" required="yes"/>
    <!-- LAN redundancy port -->
    <attribute type="fftypes:port" required="yes"/>
  </ElementType>
  <!-- see element VersionInformation -->
  <ElementType name="H1LiveListVersion" content="empty" model="closed">
    <attribute type="fftypes:linkId" required="yes"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
  </ElementType>
  <!-- see element VersionInformation -->
  <ElementType name="H1NodeAddressVersion" content="empty" model="closed">
    <attribute type="fftypes:nodeId" required="yes"/>
    <attribute type="fftypes:versionNumber" required="yes"/>
  </ElementType>
  <!-- Encodes optional version information of device - used with SM Identify service. See element
  SmIdentifyResponse -->
  <ElementType name="VersionInformation" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="versionAnnunciation" required="yes"/>
    <attribute type="versionHSEDevice" required="yes"/>
    <attribute type="fftypes:listCount" required="yes"/>
    <group order="one" minOccurs="0" maxOccurs="*">
      <element type="H1LiveListVersion"/>
      <element type="H1NodeAddressVersion"/>
    </group>
  </ElementType>
  <!-- See FF-588 section 6.5.2.3 and FF-589 5.3.3 -->

```

```

<ElementType name="SmIdentifyRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <!-- IP address to which the service request is to be sent. -->
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
  <!-- FDA address to which the service request is to be sent. -->
  <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="SmIdentifyResponseEntry" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:deviceType" required="yes"/>
  <!-- acts as PD-Tag -->
  <attribute type="fdt:tag" required="yes"/>
  <!-- Device ID -->
  <attribute type="fftypes:devID" required="yes"/>
  <attribute type="stateSMK" required="yes"/>
  <attribute type="repeatTimeHSE" required="no"/>
  <attribute type="duplicateDetectionState" required="no"/>
  <!-- Operational IP address -->
  <attribute type="fftypes:ip" required="no"/>
  <!-- IP address of the device that responded. -->
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
  <!-- FDA address of the responder. -->
  <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
  <element type="DeviceInformation" minOccurs="1" maxOccurs="1"/>
  <element type="RedundancyInformation" minOccurs="0" maxOccurs="1"/>
  <element type="VersionInformation" minOccurs="0" maxOccurs="1"/>
</ElementType>
<!-- See FF-588 section 6.5.2.7 and FF-589 5.3.3 -->
<ElementType name="SmIdentifyResponse" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <element type="SmIdentifyResponseEntry" minOccurs="0" maxOccurs="*" />
</ElementType>
<!-- Standard response for HSE SM services - contains possible error information as well. -->
<ElementType name="SmStandardResponse" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="fftypes:smServiceID" required="yes"/>
  <attribute type="noError" required="no"/>
  <!-- IP address of the device that responded. -->
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
  <!-- FDA address of the responder. -->
  <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
  <element type="fms:CommonErrorType"/>
</ElementType>
<!-- See FF-588 section 6.5.2.4 and FF-589 5.3.4 -->
<ElementType name="SmClearAddressRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <!-- acts as PD-Tag -->
  <attribute type="fdt:tag" required="yes"/>
  <attribute type="fftypes:devID" required="yes"/>
  <attribute type="interfaceToClear" required="no"/>
  <!-- IP address to which the service request is to be sent. -->
  <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
  <!-- FDA address to which the service request is to be sent. -->
  <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- See FF-588 section 6.5.2.6 and FF-589 5.3.5 -->
<ElementType name="SmClearAssignmentInfoRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <!-- this is the FDT connection reference -->
  <attribute type="fftypes:communicationReference" required="yes"/>
  <!-- acts as PD-Tag -->
  <attribute type="fdt:tag" required="yes"/>

```

```

    <attribute type="fftypes:devID" required="yes"/>
    <!-- IP address to which the service request is to be sent. -->
    <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
    <!-- FDA address to which the service request is to be sent. -->
    <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- See FF-588 section 6.5.2.5 and FF-589 5.3.6 -->
<ElementType name="SmSetAssignmentInfoRequest" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FDT connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <!-- acts as PD-Tag -->
    <attribute type="fdt:tag" required="yes"/>
    <attribute type="fftypes:devID" required="yes"/>
    <attribute type="fftypes:deviceIndex" required="no"/>
    <attribute type="maxDeviceIndex" required="no"/>
    <attribute type="repeatTimeHSE" required="no"/>
    <!-- Operational IP address -->
    <attribute type="fftypes:ip" required="no"/>
    <!-- Used to clear - Clear Duplicate Detection State -->
    <attribute type="duplicateDetectionState" required="no"/>
    <!-- H1 New Address -->
    <attribute type="fftypes:nodeId" required="no"/>
    <!-- IP address to which the service request is to be sent. -->
    <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
    <!-- FDA address to which the service request is to be sent. -->
    <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
    <element type="RedundancyInformation" minOccurs="0" maxOccurs="1"/>
</ElementType>
<!-- See FF-588 section 6.5.2.5 and FF-589 5.3.6 -->
<ElementType name="SmSetAssignmentInfoResponse" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FDT connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <attribute type="repeatTimeHSE" required="no"/>
    <attribute type="maxDeviceIndex" required="no"/>
    <!-- IP address of the device that responded. -->
    <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
    <!-- FDA address of the responder. -->
    <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<!-- ***** -->
<!-- Context management see FF-588 section 6.5.3.2 and FF-870 sections 3.3.4 and 10.1.7 -->
<ElementType name="ConnectRequest" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- if not there indicates a simple FDT connection intended for SM services -->
    <element type="OpenSessionRequest" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="ConnectResponse" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <!-- this is the FDT connection reference -->
    <attribute type="fftypes:communicationReference" required="yes"/>
    <!-- if FDT connection could not be opened -->
    <element type="fms:CommonErrorType" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="DisconnectRequest" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="DisconnectResponse" content="empty" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<!-- ***** -->
<!-- General sequence support see FDT spec IFdtCommunication sequence processing -->
<!-- Describes the sequence begin -->
<ElementType name="SequenceBegin" content="empty" model="closed">
    <attribute type="sequenceTime" required="no"/>
    <attribute type="delayTime" required="no"/>
    <attribute type="fftypes:communicationReference" required="yes"/>

```

```

</ElementType>
<!-- Describes the sequence end -->
<ElementType name="SequenceEnd" content="empty" model="closed">
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<!-- Describes the sequence start -->
<ElementType name="SequenceStart" content="empty" model="closed">
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<!-- Describes the abort -->
<ElementType name="Abort" content="empty" model="closed">
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="FDT" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="1" maxOccurs="1">
    <element type="SmFindTagQuery"/>
    <element type="SmFindTagReply"/>
    <element type="SmIdentifyRequest"/>
    <element type="SmIdentifyResponse"/>
    <element type="SmClearAddressRequest"/>
    <element type="SmClearAssignmentInfoRequest"/>
    <element type="SmSetAssignmentInfoRequest"/>
    <element type="SmSetAssignmentInfoResponse"/>
    <element type="SmStandardResponse"/>
    <element type="ConnectRequest"/>
    <element type="ConnectResponse"/>
    <element type="DisconnectRequest"/>
    <element type="DisconnectResponse"/>
    <element type="fms:FmsInitiateRequest"/>
    <element type="fms:FmsInitiateResponse"/>
    <element type="fms:FmsInitiateError"/>
    <element type="fms:FmsAbortRequest"/>
    <element type="fms:FmsAbortIndication"/>
    <element type="fms:FmsServiceError"/>
    <element type="fms:FmsStandardResponse"/>
    <element type="fms:FmsStatusRequest"/>
    <element type="fms:FmsStatusResponse"/>
    <element type="fms:FmsIdentifyRequest"/>
    <element type="fms:FmsIdentifyResponse"/>
    <element type="fms:FmsReadRequest"/>
    <element type="fms:FmsReadResponse"/>
    <element type="fms:FmsWriteRequest"/>
    <element type="fms:FmsGetOdRequest"/>
    <element type="fms:FmsGetOdResponse"/>
    <element type="fms:FmsDefineVariableListRequest"/>
    <element type="fms:FmsDefineVariableListResponse"/>
    <element type="fms:FmsDeleteVariableListRequest"/>
    <element type="fms:FmsGenericInitiateDownloadSequenceRequest"/>
    <element type="fms:FmsGenericDownloadSegmentRequest"/>
    <element type="fms:FmsGenericTerminateDownloadSequenceRequest"/>
    <element type="fms:FmsGenericTerminateDownloadSequenceResponse"/>
    <element type="SequenceBegin"/>
    <element type="SequenceEnd"/>
    <element type="SequenceStart"/>
    <element type="Abort"/>
    <element type="fdt:CommunicationError"/>
  </group>
</ElementType>
</Schema>

```

9.5 Standard block communication – BtmFFCommunicationSchema

```

<Schema name="BtmFFCommunicationSchema"
  xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes"
  xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
  xmlns:btm="x-schema:BtmDataTypesSchema.xml"
  xmlns:fms="x-schema:FdtFFfmsSchema.xml"

```

```

xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml"
>
<!--Definition of Attributes-->
<AttributeType name="schemaVersion" dt:type="string" default="1.21"/>

<!--Definition of Elements-->
<ElementType name="BlockAddress" content="eltOnly" model="open">
  <attribute type="btm:blockTag" required="yes"/>
  <!-- the index represents the absolute index of the block -->
  <attribute type="fdt:index" required="yes"/>
</ElementType>

<!--Definition of Elements-->
<ElementType name="ConnectRequest" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <element type="BlockAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="ConnectResponse" content="eltOnly" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:communicationReference" required="yes"/>
  <element type="BlockAddress" minOccurs="1" maxOccurs="1"/>
</ElementType>
<ElementType name="DisconnectRequest" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="DisconnectResponse" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:communicationReference" required="yes"/>
</ElementType>
<ElementType name="FDT" content="eltOnly" model="open">
  <attribute type="fdt:nodeId" required="no"/>
  <group order="one" minOccurs="0" maxOccurs="1" >
    <element type="ConnectRequest"/>
    <element type="ConnectResponse"/>
    <element type="DisconnectRequest"/>
    <element type="DisconnectResponse"/>
    <element type="fms:FmsReadRequest"/>
    <element type="fms:FmsReadResponse"/>
    <element type="fms:FmsWriteRequest"/>
    <element type="fms:FmsStandardResponse"/>
    <element type="fms:FmsServiceError"/>
    <element type="fdt:CommunicationError"/>
  </group>
</ElementType>
</Schema>

```

10 Channel parameter data types – FdtFFChannelParameterSchema

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

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

```

<Schema name="FdtFFChannelParameterSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes"
xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml"
xmlns:appld="x-schema:FDTApplicationIdSchema.xml">

<!--Definition of Attributes-->
<AttributeType name="schemaVersion" dt:type="string" default="1.21"/>
<AttributeType name="frameApplicationTag" dt:type="string"/>
<AttributeType name="gatewayBusCategory" dt:type="uuid"/>
<!-- dataTypes define the data type of the channel variable. The frame application can unpack the value using
the coding rules according to the FF specification -->

```

```

<AttributeType name="dataType" dt:type="enumeration" dt:values="Boolean Integer8 Integer16 Integer32
Unsigned8 Unsigned16 Unsigned32 FloatingPoint Visible String Octet String Date TimeofDay Time DifferenceBit
TimeValue ValueStatusFloat ValueStatusDiscrete ValueStatusBitstring Scaling Mode AccessPermissions
AlarmFloat AlarmDiscrete EventUpdate AlarmSummary AlertAnalog AlertDiscrete AlertUpdate TrendFloat
TrendDiscrete TrendBitstring FBLink SimulateFloat SimulateDiscrete SimulateBitstring Test Action Custom other"/>
<AttributeType name="invalidBit" dt:type="ui4"/>
<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="index" dt:type="ui4"/>
<AttributeType name="subIndex" dt:type="ui4"/>

<!--Definition of Elements-->
<ElementType name="ParameterAddress" content="empty" model="closed">
  <attribute type="fdt:nodeId" required="no"/>
  <attribute type="fftypes:communicationReference" required="yes"/>
  <attribute type="index" required="yes"/>
  <attribute type="subIndex" default="0" 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="dataType" required="yes"/>
  <attribute type="fdt:signalType" required="yes"/>
  <attribute type="frameApplicationTag" required="no"/>
  <attribute type="appld:applicationId" required="no"/>
  <attribute type="logic" default="positive" 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="ParameterAddress" 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" />
</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="fdt:nodeId" required="no"/>
  <element type="FDTChannelType" minOccurs="0" maxOccurs="1" />
  <element type="FDTChannel" minOccurs="0" maxOccurs="1" />
</ElementType>
</Schema>

```

11 Device identification

11.1 Device type identification data types – FDTFieldbusIdentSchema

```

<Schema name="FDTFieldbusIdentSchema" 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_FF_H1 protocol_FF_HSE
protocol_FF_Block"/>
  <AttributeType name="manufacturerSpecificExtension" dt:type="string"/>

```

```

<!-- -->
<!-- FF H1 -->
<!-- -->
<AttributeType name="deviceAddress" dt:type="string"/>
<!-- Node address assigned to the device - FF-581 – System Architecture chapter 7.4 – “Node-Address” FF-880
– System Management chapter 5.2 Address Assignment -->
<AttributeType name="manufacturerID" dt:type="ui4"/>
<!-- MANUFAC_ID: Resource Block Index 10 - FF-891 chapter 3.1 -->
<AttributeType name="dev_type" dt:type="ui2"/>
<!-- idDeviceTypeID DEV_TYPE: Resource Block Index 11 - FF-891 chapter 3.1-->
<AttributeType name="device_dd_Revision" dt:type="ui2"/>
<!-- DEV_REV (Resource Block Index 12) multiplied by 256 + DD_REV (Resource Block Index 13) - FF-891
chapter 3.1 -->
<AttributeType name="pd_tag" dt:type="string"/>
<!-- PD-TAG - Physical device tag from SM-IDENTIFY - String[32] - fixed array, left trimmed filled with spaces
- FF-581 – System Architecture FF880 – System Management chapter 5.3.1 -->
<AttributeType name="dev_id" dt:type="string"/>
<!-- Dev-ID - unique identifier for a device instance =Serial Number – not a device type - fixed array, left
trimmed, filled with spaces - FF-581 – System Architecture chapter 7.4.2 See also TN002-1.1 -->
<!-- -->
<!-- FF HSE -->
<!-- -->
<AttributeType name="dataLinkAddress" dt:type="bin.hex"/>
<!-- data link address as defined in FF-588 Field Device Access Agent - Annex B -->
<!-- reused from FF H1:
<AttributeType name="manufacturerID" dt:type="ui4"/>
    To be extracted from first 6 CHAR (0-based) CHAR[0] – CHAR[5] from DEV_ID by CommChannel - TN002-
1.1
<AttributeType name="dev_type" dt:type="ui2"/>
    To be extracted from (0-based) CHAR[6] – CHAR[9] from DEV_ID by CommChannel.
<AttributeType name="pd_tag" dt:type="string"/>
    Physical Device Tag. Octed string [32] - FF-588 Field Device Access (FDA) Agent. FF-803 FS 1.19 NM
Section 5.2.1 – Physical device tag
<AttributeType name="dev_id" dt:type="string"/>
    Dev-ID - unique identifier for a device instance =Serial Number - not a device type - fixed array, left
trimmed, filled with spaces FF-581 – System Architecture chapter 7.4.2 See also TN002-1.1
-->
<!--Attributes without semantic identification -->
<AttributeType name="deviceClass" dt:type="enumeration" dt:values="linkingDevice ioGateway hseFieldDevice
h1Device"/>
<!-- FF-588 chapter Annex A – DeviceType FDA Agent Internal interface (informative). -->
<AttributeType name="vendorName" dt:type="string"/>
<!-- As defined in FMS identify reply. FF 588. chapter 6.5.3.6.2.Visible string[32] -->
<AttributeType name="modelName" dt:type="string"/>
<!-- As defined in FMS identify reply. FF 588. chapter 6.5.3.6.2. Visible string[32] -->
<AttributeType name="revision" dt:type="string"/>
<!-- As defined in FMS identify reply. FF 588. chapter 6.5.3.6.2.Visible string[32] -->
<!-- -->
<!-- FF Block -->
<!-- -->
<!-- reused from H1
<AttributeType name="manufacturerID" dt:type="ui4"/>
    MANUFAC_ID: Resource Block Index 10 - FF-891 chapter 3.1
<AttributeType name="dev_type" dt:type="ui2"/>
    idDeviceTypeID DEV_TYPE: Resource Block Index 11 - FF-891 chapter 3.1
<AttributeType name="device_dd_Revision" dt:type="ui2"/>
    DEV_REV (Resource Block Index 12) multiplied by 256 + DD_REV (Resource Block Index 13) - FF-891
chapter 3.1
-->
<AttributeType name="blockTag" dt:type="string"/>
<!-- Block tag in Object Dictionary.FF-890 Function Block part 1. Chapter 5.14.1. Block structure.-->
<AttributeType name="blockIndex" dt:type="ui4"/>
<!-- Block index in Object Dictionary.FF-890 Function Block part 1. Chapter 5.4. Directory Object.-->
<AttributeType name="ddMemberID" dt:type="ui4"/>
<!--DDMemberID in Object Dictionary.FF-890 Function Block part 1. Chapter 5.14.1 Block structure. -->
<AttributeType name="ddltemId" dt:type="ui4"/>
<!--DDItemID in Object Dictionary.FF-890 Function Block part 1. Chapter 5.14.1. Block structure. -->
<AttributeType name="ddRevision" dt:type="ui2"/>
<!-- DDRRevision in Object Dictionary.FF-890 Function Block part 1. Chapter 5.14.1. Block structure.-->
<AttributeType name="profile" dt:type="ui2"/>
<!-- profile in Object Dictionary.FF-890 Function Block part 1. Chapter 5.14.1. Block structure. -->

```

```

<AttributeType name="profileRevision" dt:type="ui2"/>
<!-- FF-890 Function Block part 1. Chapter 5.14.1. Block structure.-->
<AttributeType name="idDTMSupportLevel" dt:type="enumeration" dt:values="genericSupport profileSupport
blockSpecificProfileSupport specificSupport identSupport"/>
<AttributeType name="match" dt:type="string"/>
<AttributeType name="nomatch" dt:type="string"/>
<ElementType name="RegExpr" content="empty" model="closed"/>
</Schema>

```

11.2 Topology scan data types

11.2.1 General

Used at IDtmEvents::OnScanResponse()

11.2.2 Scan for devices – DtmFFSchema

The XML document describes a device entry, for the list of scanned devices.

```

<?xml version="1.0"?>
<Schema name="DtmFFSchema"
  xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes"
  xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
  xmlns:fftypes="x-schema:FdtFFDataTypesSchema.xml"
  xmlns:ffhse="x-schema:FdtFFHseCommunicationSchema.xml"
  xmlns:ffblock="x-schema:FdtFFBlockSchema.xml"
>

  <!--Definition of Attributes-->
  <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>

  <!--Definition of Elements-->
  <ElementType name="blockList" content="eltOnly" model="open">
    <attribute type="fdt:nodeId" required="no"/>
    <element type="ffblock:BlockInformation" minOccurs="0" maxOccurs="*" />
  </ElementType>
  <ElementType name="HSEDeviceInformation" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="ffhse:stateSMK" required="yes"/>
    <attribute type="ffhse:repeatTimeHSE" required="no"/>
    <attribute type="ffhse:duplicateDetectionState" required="no"/>
    <!-- Operational IP address -->
    <attribute type="fftypes:ip" required="no"/>
    <!-- IP address of the device that responded. -->
    <element type="fftypes:IP" minOccurs="1" maxOccurs="1"/>
    <element type="ffhse:DeviceInformation" minOccurs="1" maxOccurs="1"/>
    <element type="ffhse:RedundancyInformation" minOccurs="0" maxOccurs="1"/>
    <element type="ffhse:VersionInformation" minOccurs="0" maxOccurs="1"/>
  </ElementType>
  <ElementType name="FoundationFieldbusH1Device" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:deviceType" required="yes"/>
    <!-- acts as PD-Tag -->
    <attribute type="fdt:tag" required="yes"/>
    <!-- Device ID -->
    <attribute type="fftypes:devID" required="yes"/>
    <element type="fftypes:VfdIdentification" minOccurs="1" maxOccurs="*" />
    <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
  </ElementType>
  <ElementType name="FoundationFieldbusHSEDevice" content="eltOnly" model="closed">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="fftypes:deviceType" required="yes"/>
    <!-- acts as PD-Tag -->
    <attribute type="fdt:tag" required="yes"/>
    <!-- Device ID -->
    <attribute type="fftypes:devID" required="yes"/>
    <element type="fftypes:VfdIdentification" minOccurs="1" maxOccurs="*" />

```

```

    <element type="HSEDeviceInformation" minOccurs="1" maxOccurs="1"/>
    <!-- H1 device - nodeId contains node address
         HSE device - linkId = 0 nodeId = 0 selector = 2 -->
    <element type="fftypes:DataLinkAddress" minOccurs="1" maxOccurs="1"/>
  </ElementType>
</Schema>

```

11.2.3 Scan for blocks – FdtFFBlockSchema

The XML document describes a block entry, for the list of scanned blocks.

```

<?xml version="1.0"?>
<Schema name="FdtFFBlockSchema"
  xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes"
  xmlns:btm="x-schema:BtmDataTypesSchema.xml"
  xmlns:fdt="x-schema:FDTDataTypesSchema.xml"
>
  <!--Definition of Attributes-->
  <AttributeType name="schemaVersion" dt:type="string" default="1.21"/>

  <!--Definition of Elements-->
  <!-- Block address for scanning -->
  <ElementType name="BlockInformation" content="eltOnly">
    <attribute type="fdt:nodeId" required="no"/>
    <attribute type="btm:blockTag" required="yes"/>
    <!-- the index represents the absolute index of the block -->
    <attribute type="fdt:index" required="yes"/>
    <attribute type="btm:profile" required="yes"/>
    <attribute type="btm:profileRevision" required="yes"/>
    <attribute type="fdt:descriptor" required="no"/>
    <element type="btm:BtmBlockType" minOccurs="1" maxOccurs="1"/>
  </ElementType>
</Schema>

```

11.3 Scan identification data types – FDTFieldbusScanIdentSchema

This schema defines the XML document provided by a scan response of a network.

```

<Schema name="FDTFieldbusScanIdentSchema" xmlns="urn:schemas-microsoft-com:xml-data"
  xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fieldbusident="x-schema:FDTFieldbusIdentSchema.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="configured unConfigured"/>
  <!--Definition of elements-->
  <ElementType name="IdBusProtocol" content="empty" model="closed">
    <attribute type="fieldbusident:busProtocol" required="yes"/>
  </ElementType>
  <!--
        FF H1
  <!--
  <!--
  <ElementType name="IdAddress" content="empty" model="closed">
    <attribute type="fieldbusident:deviceAddress" required="yes"/>
  </ElementType>
  <ElementType name="IdManufacturer" content="empty" model="closed">
    <attribute type="fieldbusident:manufacturerID" required="yes"/>
  </ElementType>
  <ElementType name="IdTypeID" content="empty" model="closed">
    <attribute type="fieldbusident:dev_type" required="yes"/>
  </ElementType>
  <ElementType name="IdHardwareRevision" content="empty" model="closed">
    <attribute type="fieldbusident:device_dd_Revision" required="yes"/>
  </ElementType>
  <ElementType name="IdSoftwareRevision" content="empty" model="closed">
    <attribute type="fieldbusident:device_dd_Revision" required="yes"/>
  </ElementType>

```

```

<ElementType name="IdTag" content="empty" model="closed">
  <attribute type="fieldbusident:pd_tag" required="yes"/>
</ElementType>
<ElementType name="IdSerialNumber" content="empty" model="closed">
  <attribute type="fieldbusident:dev_id" required="yes"/>
</ElementType>
<!--          -->
<!--      FF HSE      -->
<!--          -->
<ElementType name="DataLinkAddress" content="empty" model="closed">
  <attribute type="fieldbusident:dataLinkAddress" required="yes"/>
</ElementType>
<!-- reused from H1
<ElementType name="IdTag" content="empty" model="closed">
  <attribute type="fieldbusident:pd-tag" required="yes"/>
</ElementType>
<ElementType name="IdTypeID" content="empty" model="closed">
  <attribute type="fieldbusident:dev_id" required="yes"/>
</ElementType>
-->
<ElementType name="DeviceClass" content="empty" model="closed">
  <attribute type="fieldbusident:deviceClass" required="yes"/>
</ElementType>
<ElementType name="VendorName" content="empty" model="closed">
  <attribute type="fieldbusident:vendorName" required="yes"/>
</ElementType>
<ElementType name="ModelName" content="empty" model="closed">
  <attribute type="fieldbusident:modelName" required="yes"/>
</ElementType>
<ElementType name="Revision" content="empty" model="closed">
  <attribute type="fieldbusident:revision" required="yes"/>
</ElementType>
<!--          -->
<!--      FF Block      -->
<!--          -->
<ElementType name="BlockIndex" content="empty" model="closed">
  <attribute type="fieldbusident:blockIndex" required="yes"/>
</ElementType>
<ElementType name="DDMemberID" content="empty" model="closed">
  <attribute type="fieldbusident:ddMemberID" required="yes"/>
</ElementType>
<ElementType name="DDItemId" content="empty" model="closed">
  <attribute type="fieldbusident:ddItemId" required="yes"/>
</ElementType>
<ElementType name="DDRRevision" content="empty" model="closed">
  <attribute type="fieldbusident:ddRevision" required="yes"/>
</ElementType>
<ElementType name="IdProfile" content="empty" model="closed">
  <attribute type="fieldbusident:profile" required="yes"/>
</ElementType>
<ElementType name="IdProfileRevision" content="empty" model="closed">
  <attribute type="fieldbusident:profileRevision" required="yes"/>
</ElementType>
<!-- reused from H1
<ElementType name="IdManufacturer" content="empty" model="closed">
  <attribute type="fieldbusident:manufacturerID" required="yes"/>
</ElementType>
<ElementType name="IdTypeID" content="empty" model="closed">
  <attribute type="fieldbusident:dev_type" required="yes"/>
</ElementType>
-->
<!--      -->
<!--      -->
<!--      -->
<ElementType name="ManufacturerSpecificExtension" content="empty" model="closed">
  <attribute type="fieldbusident:manufacturerSpecificExtension" required="yes"/>
</ElementType>
<ElementType name="ScanIdentification_FF_H1" 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="IdManufacturer" minOccurs="1" maxOccurs="1"/>
<element type="IdHardwareRevision" minOccurs="1" maxOccurs="1"/>
<element type="IdSoftwareRevision" minOccurs="1" maxOccurs="1"/>
<element type="IdTag" minOccurs="1" maxOccurs="1"/>
<element type="IdSerialNumber" minOccurs="1" maxOccurs="1"/>
<!-- manufacturer specific extension, added in manufacturer specific identification -->
<element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="ScanIdentification_FF_HSE" content="eltOnly" model="closed">
  <attribute type="configuredState" required="no"/>
  <!-- attributes with semantic meaning: -->
  <element type="fdt:CommunicationError" minOccurs="0" maxOccurs="1"/>
  <element type="DataLinkAddress" minOccurs="1" maxOccurs="1"/>
  <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
  <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
  <element type="IdManufacturer" minOccurs="1" maxOccurs="1"/>
  <element type="IdTag" minOccurs="1" maxOccurs="1"/>
  <element type="IdSerialNumber" minOccurs="1" maxOccurs="1"/>
  <element type="DeviceClass" minOccurs="1" maxOccurs="1"/>
  <element type="VendorName" minOccurs="1" maxOccurs="1"/>
  <element type="ModelName" minOccurs="1" maxOccurs="1"/>
  <element type="Revision" minOccurs="1" maxOccurs="1"/>
  <!-- manufacturer specific extension, added in manufacturer specific identification -->
  <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="ScanIdentification_FF_Block" 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="IdManufacturer" minOccurs="1" maxOccurs="1"/>
  <element type="IdHardwareRevision" minOccurs="1" maxOccurs="1"/>
  <element type="IdSoftwareRevision" minOccurs="1" maxOccurs="1"/>
  <element type="IdTag" minOccurs="1" maxOccurs="1"/>
  <element type="BlockIndex" minOccurs="1" maxOccurs="1"/>
  <element type="DDMemberID" minOccurs="1" maxOccurs="1"/>
  <element type="DDItemID" minOccurs="1" maxOccurs="1"/>
  <element type="DDRevision" minOccurs="1" maxOccurs="1"/>
  <element type="IdProfile" minOccurs="1" maxOccurs="1"/>
  <element type="IdProfileRevision" 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_FF_H1" minOccurs="0" maxOccurs="*" />
    <element type="ScanIdentification_FF_HSE" minOccurs="0" maxOccurs="*" />
    <element type="ScanIdentification_FF_Block" 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 – FDTFieldbusDeviceIdentSchema

This subclause defines data types that are used to protocol specific information for device types.

```
<Schema name="FDTFieldbusDeviceIdentSchema" xmlns="urn:schemas-microsoft-com:xml-data"
xmlns:dt="urn:schemas-microsoft-com:datatypes" xmlns:fieldbusident="x-schema:FDTFieldbusIdentSchema.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="fieldbusident:busProtocol" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <!--      -->
  <!-- FF H1 -->
  <!--      -->
  <ElementType name="IdDeviceAddress" content="eltOnly" model="closed">
    <attribute type="fieldbusident:deviceAddress" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="IdManufacturer" content="eltOnly" model="closed">
    <attribute type="fieldbusident:manufacturerID" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="IdTypeID" content="eltOnly" model="closed">
    <attribute type="fieldbusident:dev_type" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="IdHardwareRevision" content="eltOnly" model="closed">
    <attribute type="fieldbusident:device_dd_Revision" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="IdSoftwareRevision" content="eltOnly" model="closed">
    <attribute type="fieldbusident:device_dd_Revision" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="IdTag" content="eltOnly" model="closed">
    <attribute type="fieldbusident:pd_tag" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="IdSerialNumber" content="eltOnly" model="closed">
    <attribute type="fieldbusident:dev_id" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <!--      -->
  <!-- FF HSE -->
  <!--      -->
  <ElementType name="DeviceClass" content="eltOnly" model="closed">
    <attribute type="fieldbusident:deviceClass" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="VendorName" content="eltOnly" model="closed">
    <attribute type="fieldbusident:vendorName" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="ModelName" content="eltOnly" model="closed">
    <attribute type="fieldbusident:modelName" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <ElementType name="Revision" content="eltOnly" model="closed">
    <attribute type="fieldbusident:revision" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <!--      -->
  <!-- FF Block -->
  <!--      -->
  <ElementType name="BlockIndex" content="eltOnly" model="closed">
    <attribute type="fieldbusident:blockIndex" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
  </ElementType>
  <!--      -->
  <ElementType name="IdTag_Block" content="eltOnly" model="closed">
    <attribute type="fieldbusident:blockTag" required="no"/>
    <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="**"/>
```

```

</ElementType>
-->
<ElementType name="DDMemberID" content="eltOnly" model="closed">
  <attribute type="fieldbusident:ddMemberID" required="no"/>
  <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="DDItemId" content="eltOnly" model="closed">
  <attribute type="fieldbusident:ddItemId" required="no"/>
  <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="DDRevision" content="eltOnly" model="closed">
  <attribute type="fieldbusident:ddRevision" required="no"/>
  <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="IdProfile" content="eltOnly" model="closed">
  <attribute type="fieldbusident:profile" required="no"/>
  <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="IdProfileRevision" content="eltOnly" model="closed">
  <attribute type="fieldbusident:profileRevision" required="no"/>
  <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="1"/>
</ElementType>
<!-- reused from H1
<ElementType name="IdManufacturer" content="eltOnly" model="closed">
  <attribute type="fieldbusident:manufacturerID" required="no"/>
  <element type="fieldbusident:RegExpr" minOccurs="0" maxOccurs="1"/>
</ElementType>
-->
<!-- -->
<!-- -->
<!-- -->
<ElementType name="ManufacturerSpecificExtension" content="empty" model="closed">
  <attribute type="fieldbusident:manufacturerSpecificExtension" required="yes"/>
</ElementType>
<ElementType name="DeviceIdentification_FF_H1" content="eltOnly" model="closed">
  <attribute type="fieldbusident:idDTMSupportLevel" required="yes"/>
  <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
  <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
  <element type="IdManufacturer" minOccurs="1" maxOccurs="1"/>
  <element type="IdHardwareRevision" minOccurs="1" maxOccurs="1"/>
  <element type="IdSoftwareRevision" minOccurs="1" maxOccurs="1"/>
  <!-- manufacturer specific extension, added in manufacturer specific identification -->
  <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="DeviceIdentification_FF_HSE" content="eltOnly" model="closed">
  <attribute type="fieldbusident:idDTMSupportLevel" required="yes"/>
  <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
  <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
  <element type="IdManufacturer" minOccurs="1" maxOccurs="1"/>
  <element type="DeviceClass" minOccurs="1" maxOccurs="1"/>
  <element type="VendorName" minOccurs="1" maxOccurs="1"/>
  <element type="ModelName" minOccurs="1" maxOccurs="1"/>
  <element type="Revision" minOccurs="1" maxOccurs="1"/>
  <!-- manufacturer specific extension, added in manufacturer specific identification -->
  <element type="ManufacturerSpecificExtension" minOccurs="0" maxOccurs="1"/>
</ElementType>
<ElementType name="DeviceIdentification_FF_Block" content="eltOnly" model="closed">
  <attribute type="fieldbusident:idDTMSupportLevel" required="yes"/>
  <element type="IdTypeID" minOccurs="1" maxOccurs="1"/>
  <element type="IdBusProtocol" minOccurs="1" maxOccurs="1"/>
  <element type="IdManufacturer" minOccurs="1" maxOccurs="1"/>
  <element type="IdHardwareRevision" minOccurs="1" maxOccurs="1"/>
  <element type="IdSoftwareRevision" minOccurs="1" maxOccurs="1"/>
  <element type="BlockIndex" minOccurs="1" maxOccurs="1"/>
  <element type="DDMemberID" minOccurs="1" maxOccurs="1"/>
  <element type="DDItemId" minOccurs="1" maxOccurs="1"/>
  <element type="DDRevision" minOccurs="1" maxOccurs="1"/>
  <element type="IdProfile" minOccurs="1" maxOccurs="1"/>
  <element type="IdProfileRevision" 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="1">
      <element type="DeviceIdentification_FF_H1" minOccurs="0" maxOccurs="1"/>
      <element type="DeviceIdentification_FF_HSE" minOccurs="0" maxOccurs="1"/>
      <element type="DeviceIdentification_FF_Block" minOccurs="0" maxOccurs="1"/>
    </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 FF device identification xml files
-->
<xsl:transform xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
  xmlns:str="http://xslt.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:ffident="x-schema:FDTFieldbusIdentSchema.xml"
  xmlns:ffdevice="x-schema:FDTFieldbusDeviceTypeIdentSchema.xml"
  xmlns:ffscan="x-schema:FDTFieldbusScanIdentSchema.xml" version="2.0">
  <xsl:output method="xml" omit-xml-declaration="yes" indent="yes"/>

<!--
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="//ffscan:ScanIdentifications"/>
    <xsl:apply-templates select="//ffdevice:DeviceIdentifications"/>
  </xsl:template>

<!--
FF identification list <?xml version="1.0"?>
-->
  <xsl:template match="ffdevice: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="ffdevice:DeviceIdentification_FF_H1"/>
      <xsl:apply-templates select="ffdevice:DeviceIdentification_FF_HSE"/>
      <xsl:apply-templates select="ffdevice:DeviceIdentification_FF_Block"/>
    </xsl:element>
    <xsl:text disable-output-escaping="yes">&lt;/FDT&gt;</xsl:text>
  </xsl:template>

<!--
FF scan list
-->
  <xsl:template match="ffscan: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="ffscan:ScanIdentification_FF_H1"/>
            <xsl:apply-templates select="ffscan:ScanIdentification_FF_HSE"/>
            <xsl:apply-templates select="ffscan:ScanIdentification_FF_Block"/>
        </xsl:element>
        <xsl:text disable-output-escaping="yes">&lt;/FDT&gt;</xsl:text>
    </xsl:template>
<!--
FF H1 catalog identification
-->
    <xsl:template match="ffdevice:DeviceIdentification_FF_H1">
        <xsl:element name="DeviceIdentification">
            <xsl:attribute name="ident:idDTMSupportLevel">
                <xsl:value-of select="@ffident:idDTMSupportLevel"/>
            </xsl:attribute>
            <xsl:apply-templates select="ffdevice:IdBusProtocol"/>
            <xsl:element name="IdBusProtocolVersion" >
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="ffdevice:IdManufacturer"/>
            <xsl:apply-templates select="ffdevice:IdTypeID"/>
            <xsl:apply-templates select="ffdevice:IdSoftwareRevision"/>
            <xsl:apply-templates select="ffdevice:IdHardwareRevision"/>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="ffdevice:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>
<!--
FF H1 scan identification
-->
    <xsl:template match="ffscan:ScanIdentification_FF_H1">
        <xsl:element name="ScanIdentification">
            <xsl:apply-templates select="@configuredState" />
            <xsl:apply-templates select="fdt:CommunicationError"/>
            <xsl:apply-templates select="ffscan:IdBusProtocol"/>
            <xsl:element name="IdBusProtocolVersion" >
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="ffscan:IdAddress"/>
            <xsl:apply-templates select="ffscan:IdManufacturer"/>
            <xsl:apply-templates select="ffscan:IdTypeID"/>
            <xsl:apply-templates select="ffscan:IdSoftwareRevision"/>
            <xsl:apply-templates select="ffscan:IdHardwareRevision"/>
            <xsl:apply-templates select="ffscan:IdTag"/>
            <xsl:apply-templates select="ffscan:IdSerialNumber"/>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="ffscan:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>
<!--
FF HSE catalog identification
-->
    <xsl:template match="ffdevice:DeviceIdentification_FF_HSE">
        <xsl:element name="DeviceIdentification">
            <xsl:attribute name="ident:idDTMSupportLevel">
                <xsl:value-of select="@ffident:idDTMSupportLevel"/>
            </xsl:attribute>

```

```

        <xsl:apply-templates select="ffdevice:IdBusProtocol"/>
        <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="ffdevice: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="ffdevice:DeviceClass"/>
            <xsl:apply-templates select="ffdevice:VendorName"/>
            <xsl:apply-templates select="ffdevice:ModelName"/>
            <xsl:apply-templates select="ffdevice:Revision"/>
            <xsl:apply-templates select="ffdevice:ManufacturerSpecificExtension"/>
        </xsl:element>
    </xsl:element>
</xsl:template>
<!--
FF HSE scan identification
-->
    <xsl:template match="ffscan:ScanIdentification_FF_HSE">
        <xsl:element name="ScanIdentification">
            <xsl:apply-templates select="@configuredState" />
            <xsl:apply-templates select="fdt:CommunicationError"/>
            <xsl:apply-templates select="ffscan:IdBusProtocol"/>
            <xsl:element name="IdBusProtocolVersion">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="ffscan:DataLinkAddress"/>
            <xsl:element name="IdManufacturer">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:apply-templates select="ffscan: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:apply-templates select="ffscan:IdTag"/>
            <xsl:element name="IdSerialNumber">
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
            </xsl:element>
            <xsl:element name="IdValues">
                <xsl:apply-templates select="ffscan:DeviceClass"/>
                <xsl:apply-templates select="ffscan:VendorName"/>
                <xsl:apply-templates select="ffscan:ModelName"/>
                <xsl:apply-templates select="ffscan:Revision"/>
                <xsl:apply-templates select="ffscan:ManufacturerSpecificExtension"/>
            </xsl:element>
        </xsl:element>
    </xsl:template>

<!--
FF Block catalog identification
-->
    <xsl:template match="ffdevice:DeviceIdentification_FF_Block">
        <xsl:element name="DeviceIdentification">
            <xsl:attribute name="ident:idDTMSupportLevel">
                <xsl:value-of select="@ffident:idDTMSupportLevel"/>
            </xsl:attribute>
            <xsl:apply-templates select="ffdevice:IdBusProtocol"/>
            <xsl:element name="IdBusProtocolVersion" >
                <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>

```

```

</xsl:element>
<xsl:apply-templates select="ffdevice:IdManufacturer"/>
<xsl:apply-templates select="ffdevice:IdTypeID"/>
<xsl:apply-templates select="ffdevice:DDRevision"/>
<xsl:element name="IdHardwareRevision">
    <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
</xsl:element>
<xsl:element name="IdValues">
    <xsl:apply-templates select="ffdevice:BlockIndex"/>
    <xsl:apply-templates select="ffdevice:DDMemberID"/>
    <xsl:apply-templates select="ffdevice:DDItemId"/>
    <xsl:apply-templates select="ffdevice:IdProfile"/>
    <xsl:apply-templates select="ffdevice:IdProfileRevision"/>
    <xsl:apply-templates select="ffdevice:ManufacturerSpecificExtension"/>
</xsl:element>
</xsl:element>
</xsl:template>
<!--
FF Block scan identification
-->
<xsl:template match="ffscan:ScanIdentification_FF_Block">
    <xsl:element name="ScanIdentification">
        <xsl:apply-templates select="@configuredState" />
        <xsl:apply-templates select="fdt:CommunicationError"/>
        <xsl:apply-templates select="ffscan:IdBusProtocol"/>
        <xsl:element name="IdBusProtocolVersion" >
            <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
        </xsl:element>
        <xsl:apply-templates select="ffscan:IdAddress"/>
        <xsl:apply-templates select="ffscan:IdManufacturer"/>
        <xsl:apply-templates select="ffscan:IdTypeID"/>
        <xsl:apply-templates select="ffscan:DDRevision"/>
        <xsl:element name="IdHardwareRevision">
            <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
        </xsl:element>
        <xsl:apply-templates select="ffscan:IdTag"/>
        <xsl:element name="IdSerialNumber">
            <xsl:attribute name="ident:protocolSpecificName">not applicable</xsl:attribute>
        </xsl:element>
        <xsl:element name="IdValues">
            <xsl:apply-templates select="ffscan:BlockIndex"/>
            <xsl:apply-templates select="ffscan:DDMemberID"/>
            <xsl:apply-templates select="ffscan:DDItemId"/>
            <xsl:apply-templates select="ffscan:IdProfile"/>
            <xsl:apply-templates select="ffscan:IdProfileRevision"/>
            <xsl:apply-templates select="ffscan:ManufacturerSpecificExtension"/>
        </xsl:element>
    </xsl:element>
</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="ffscan:IdTag">
    <xsl:element name="IdDeviceTag">
        <xsl:attribute name="ident:protocolSpecificName">SM-IDENTIFY</xsl:attribute>
        <xsl:attribute name="ident:value"><xsl:value-of select="@ffident:pd-tag"/></xsl:attribute>
    </xsl:element>
</xsl:template>

```

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<!--
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="ffscan:IdSerialNumber">
    <xsl:element name="IdSerialNumber">
      <xsl:attribute name="ident:protocolSpecificName">DEV_ID</xsl:attribute>
      <xsl:attribute name="ident:value"><xsl:value-of select="@ffident:dev-id"/></xsl:attribute>
    </xsl:element>
  </xsl:template>
<!--
DataLinkAddress
-->
  <xsl:template match="ffscan:DataLinkAddress">
    <xsl:element name="IdAddress">
      <xsl:attribute name="ident:protocolSpecificName">Node address</xsl:attribute>
      <xsl:attribute name="ident:value"><xsl:value-of select="@ffident:dataLinkAddress"/></xsl:attribute>
    </xsl:element>
  </xsl:template>
<!--
busaddress
-->
  <xsl:template match="ffscan:IdAddress">
    <xsl:element name="IdAddress">
      <xsl:attribute name="ident:protocolSpecificName">Node address</xsl:attribute>
      <xsl:attribute name="ident:value"><xsl:value-of select="@ffident:deviceAddress"/></xsl:attribute>
    </xsl:element>
  </xsl:template>
<!--
DeviceClass, saved as protocol specific value
-->
  <xsl:template match="ffdevice:DeviceClass">
    <xsl:param name="value" select="@ffident:deviceClass"/>
    <xsl:element name="IdValue">
      <xsl:attribute name="ident:name">DeviceClass</xsl:attribute>
      <xsl:attribute name="ident:protocolSpecificName">Device Class</xsl:attribute>
      <xsl:call-template name="genMatch">
        <xsl:with-param name="value" select="$value"/>
      </xsl:call-template>
    </xsl:element>
  </xsl:template>
  <xsl:template match="ffscan:DeviceClass">
    <xsl:element name="IdValue">
      <xsl:attribute name="ident:name">DeviceClass</xsl:attribute>
      <xsl:attribute name="ident:protocolSpecificName">Device Class</xsl:attribute>
      <xsl:attribute name="ident:value">
        <xsl:value-of select="@ffident:deviceClass"/>
      </xsl:attribute>
    </xsl:element>
  </xsl:template>
<!--
VendorName, saved as protocol specific value
-->
  <xsl:template match="ffdevice:VendorName">
    <xsl:param name="value" select="@ffident:vendorName"/>
    <xsl:element name="IdValue">
      <xsl:attribute name="ident:name">VendorName</xsl:attribute>

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        <xsl:attribute name="ident:protocolSpecificName">Vendor Name</xsl:attribute>
        <xsl:call-template name="genMatch">
            <xsl:with-param name="value" select="$value"/>
        </xsl:call-template>
    </xsl:element>
</xsl:template>
<xsl:template match="ffscan:VendorName">
    <xsl:element name="IdValue">
        <xsl:attribute name="ident:name">VendorName</xsl:attribute>
        <xsl:attribute name="ident:protocolSpecificName">Vendor Name</xsl:attribute>
        <xsl:attribute name="ident:value">
            <xsl:value-of select="@ffident:vendorName"/>
        </xsl:attribute>
    </xsl:element>
</xsl:template>
<!--
ManufacturerSpecificExtension, saved as protocol specific value
-->
    <xsl:template match="ffdevice:ManufacturerSpecificExtension">
        <xsl:param name="value" select="@ffident:manufacturerSpecificExtension"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">ManufacturerSpecificExtension</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:ManufacturerSpecificExtension">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">ManufacturerSpecificExtension</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@ffident:manufacturerSpecificExtension"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>
<!--
ModelName, saved as protocol specific value
-->
    <xsl:template match="ffdevice:ModelName">
        <xsl:param name="value" select="@ffident:modelName"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">Model Name</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Vendor Name</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:ModelName">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">ModelName</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Model Name</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@ffident:modelName"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>
<!--
DevId:IdBusProtocol
-->
    <xsl:template match="ffdevice:IdBusProtocol">
        <xsl:param name="manid" select="@ffident:busProtocol"/>
        <xsl:element name="IdBusProtocol">
            <xsl:attribute name="ident:protocolSpecificName">FF Bus Protocol</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$manid"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>

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```

        </xsl:call-template>
    </xsl:element>
</xsl:template>
<xsl:template match="ffscan:IdBusProtocol">
    <xsl:element name="IdBusProtocol">
        <xsl:attribute name="ident:protocolSpecificName">FF Bus Protocol</xsl:attribute>
        <xsl:attribute name="ident:value">
            <xsl:value-of select="@ffident:busProtocol"/>
        </xsl:attribute>
    </xsl:element>
</xsl:template>

<!--
Revision, saved as protocol specific value
-->
    <xsl:template match="ffdevice:Revision">
        <xsl:param name="value" select="@ffident:revision"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">Revision</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Revision</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:Revision">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">Revision</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Revision</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@ffident:revision"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
BlockIndex, saved as protocol specific value
-->
    <xsl:template match="ffdevice:BlockIndex">
        <xsl:param name="value" select="@ffident:blockIndex"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">BlockIndex</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Block Index</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:BlockIndex">
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">BlockIndex</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">Block Index</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@ffident:blockIndex"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
DDMemberID, saved as protocol specific value
-->
    <xsl:template match="ffdevice:DDMemberID">
        <xsl:param name="value" select="@ffident:ddMemberID"/>
        <xsl:element name="IdValue">
            <xsl:attribute name="ident:name">DDMemberID</xsl:attribute>
            <xsl:attribute name="ident:protocolSpecificName">DD Member ID</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>

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</xsl:template>
<xsl:template match="ffscan:DDMemberID">
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">DDMemberID</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">DD Member ID</xsl:attribute>
    <xsl:attribute name="ident:value">
      <xsl:value-of select="@ffident:ddMemberID"/>
    </xsl:attribute>
  </xsl:element>
</xsl:template>

<!--
DDItemId, saved as protocol specific value
-->
<xsl:template match="ffdevice:DDItemId">
  <xsl:param name="value" select="@ffident:ddltemId"/>
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">DDItemId</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">DD Item 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="ffscan:DDItemId">
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">DDItemId</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">DD Item ID</xsl:attribute>
    <xsl:attribute name="ident:value">
      <xsl:value-of select="@ffident:ddltemId"/>
    </xsl:attribute>
  </xsl:element>
</xsl:template>

<!--
IdProfile, saved as protocol specific value
-->
<xsl:template match="ffdevice:IdProfile">
  <xsl:param name="value" select="@ffident:profile"/>
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">IdProfile</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
    <xsl:call-template name="genMatch">
      <xsl:with-param name="value" select="$value"/>
    </xsl:call-template>
  </xsl:element>
</xsl:template>
<xsl:template match="ffscan:IdProfile">
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">IdProfile</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
    <xsl:attribute name="ident:value">
      <xsl:value-of select="@ffident:profile"/>
    </xsl:attribute>
  </xsl:element>
</xsl:template>

<!--
IdProfileRevision, saved as protocol specific value
-->
<xsl:template match="ffdevice:IdProfileRevision">
  <xsl:param name="value" select="@ffident:profileRevision"/>
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">IdProfileRevision</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
    <xsl:call-template name="genMatch">
      <xsl:with-param name="value" select="$value"/>
    </xsl:call-template>
  </xsl:element>
</xsl:template>

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```

<xsl:template match="ffscan:IdProfileRevision">
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">IdProfileRevision</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
    <xsl:attribute name="ident:value">
      <xsl:value-of select="@ffident:profileRevision"/>
    </xsl:attribute>
  </xsl:element>
</xsl:template>

<!--
DeviceDDRRevision, saved as protocol specific value
-->
<xsl:template match="ffdevice:DeviceDDRRevision">
  <xsl:param name="value" select="@ffident:deviceDDRRevision"/>
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">DeviceDDRRevision</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
    <xsl:call-template name="genMatch">
      <xsl:with-param name="value" select="$value"/>
    </xsl:call-template>
  </xsl:element>
</xsl:template>
<xsl:template match="ffscan:DeviceDDRRevision">
  <xsl:element name="IdValue">
    <xsl:attribute name="ident:name">DeviceDDRRevision</xsl:attribute>
    <xsl:attribute name="ident:protocolSpecificName">???</xsl:attribute>
    <xsl:attribute name="ident:value">
      <xsl:value-of select="@ffident:deviceDDRRevision"/>
    </xsl:attribute>
  </xsl:element>
</xsl:template>

<!--
Manufacturer
-->
<xsl:template match="ffdevice:IdManufacturer">
  <xsl:param name="manid" select="@ffident:manufacturerID"/>
  <xsl:element name="IdManufacturer">
    <xsl:attribute name="ident:protocolSpecificName">MANUFAC_ID</xsl:attribute>
    <xsl:call-template name="genMatch">
      <xsl:with-param name="value" select="$manid"/>
    </xsl:call-template>
  </xsl:element>
</xsl:template>
<xsl:template match="ffscan:IdManufacturer">
  <xsl:element name="IdManufacturer">
    <xsl:attribute name="ident:protocolSpecificName">MANUFAC_ID</xsl:attribute>
    <xsl:attribute name="ident:value">
      <xsl:value-of select="@ffident:manufacturerID"/>
    </xsl:attribute>
  </xsl:element>
</xsl:template>

<!--
Manufacturer
-->
<xsl:template match="ffdevice:Device_man_id">
  <xsl:param name="manid" select="@ffident:device_man_id"/>
  <xsl:element name="IdManufacturer">
    <xsl:attribute name="ident:protocolSpecificName">MANUFAC_ID</xsl:attribute>
    <xsl:call-template name="genMatch">
      <xsl:with-param name="value" select="$manid"/>
    </xsl:call-template>
  </xsl:element>
</xsl:template>
<xsl:template match="ffscan:Device_man_id">
  <xsl:element name="IdManufacturer">
    <xsl:attribute name="ident:protocolSpecificName">MANUFAC_ID</xsl:attribute>

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```

        <xsl:attribute name="ident:value">
            <xsl:value-of select="@ffident:device_man_id"/>
        </xsl:attribute>
    </xsl:element>
</xsl:template>

<!--
device type
-->
    <xsl:template match="ffdevice:IdTypeID">
        <xsl:param name="value" select="@ffident:dev_type"/>
        <xsl:element name="IdTypeID">
            <xsl:attribute name="ident:protocolSpecificName">DEV_TYPE</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:IdTypeID">
        <xsl:element name="IdTypeID">
            <xsl:attribute name="ident:protocolSpecificName">DEV_TYPE</xsl:attribute>
            <xsl:attribute name="ident:value">
                <xsl:value-of select="@ffident:dev_type"/>
            </xsl:attribute>
        </xsl:element>
    </xsl:template>

<!--
software revision
-->
    <xsl:template match="ffdevice:IdSoftwareRevision">
        <xsl:param name="value" select="@ffident:device_dd_Revision"/>
        <xsl:element name="IdSoftwareRevision">
            <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:IdSoftwareRevision">
        <xsl:param name="value" select="@ffident:device_dd_Revision"/>
        <xsl:element name="IdSoftwareRevision">
            <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>

<!--
hardware revision
-->
    <xsl:template match="ffdevice:IdHardwareRevision">
        <xsl:param name="value" select="@ffident:device_dd_Revision"/>
        <xsl:element name="IdHardwareRevision">
            <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
            <xsl:call-template name="genMatch">
                <xsl:with-param name="value" select="$value"/>
            </xsl:call-template>
        </xsl:element>
    </xsl:template>
    <xsl:template match="ffscan:IdHardwareRevision">
        <xsl:param name="value" select="@ffident:device_dd_Revision"/>
        <xsl:element name="IdHardwareRevision">
            <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
            <xsl:call-template name="genMatch">

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```

        <xsl:with-param name="value" select="$value"/>
      </xsl:call-template>
    </xsl:element>
  </xsl:template>

<!--
DDRevision
-->
  <xsl:template match="ffdevice:DDRevision">
    <xsl:param name="value" select="@ffident:ddRevision"/>
    <xsl:element name="IdSoftwareRevision">
      <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
      <xsl:call-template name="genMatch">
        <xsl:with-param name="value" select="$value"/>
      </xsl:call-template>
    </xsl:element>
  </xsl:template>
  <xsl:template match="ffscan:DDRevision">
    <xsl:param name="value" select="@ffident:ddRevision"/>
    <xsl:element name="IdSoftwareRevision">
      <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
      <xsl:call-template name="genMatch">
        <xsl:with-param name="value" select="$value"/>
      </xsl:call-template>
    </xsl:element>
  </xsl:template>

<!--
DeviceRevision
-->
  <xsl:template match="ffdevice:DeviceRevision">
    <xsl:param name="value" select="@ffident:deviceRevision"/>
    <xsl:element name="IdHardwareRevision">
      <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
      <xsl:call-template name="genMatch">
        <xsl:with-param name="value" select="$value"/>
      </xsl:call-template>
    </xsl:element>
  </xsl:template>
  <xsl:template match="ffscan:DeviceRevision">
    <xsl:param name="value" select="@ffident:deviceRevision"/>
    <xsl:element name="IdHardwareRevision">
      <xsl:attribute name="ident:protocolSpecificName">DD_REV and DD_REV</xsl:attribute>
      <xsl:call-template name="genMatch">
        <xsl:with-param name="value" select="$value"/>
      </xsl:call-template>
    </xsl:element>
  </xsl:template>

<!--
generate matching information
-->
  <xsl:template name="genMatch">
    <xsl:param name="value"/>
    <xsl:param name="empty"/>
    <xsl:if test="$value!=$empty">
      <xsl:attribute name="ident:value"><xsl:value-of select="$value"/></xsl:attribute>
    </xsl:if>
    <xsl:apply-templates select="ffident:RegExpr"/>
  </xsl:template>

<!--
generate regular expressions
-->
  <xsl:template match="ffident:RegExpr">
    <!-- copy pattern info -->
    <xsl:call-template name="genPattern">
      <xsl:with-param name="match" select="@match"/>
      <xsl:with-param name="nomatch" select="@nomatch"/>
    </xsl:call-template>
  </xsl:template>

```

```

        </xsl:call-template>
    </xsl:template>

<!--
generate pattern information
-->
    <xsl:template name="genPattern">
        <xsl:param name="match"/>
        <xsl:param name="nomatch"/>
        <xsl:param name="empty"/>
        <xsl:choose>
            <xsl:when test="$match!= $empty">
                <xsl:element name="ident:RegExpr">
                    <xsl:attribute name="match"><xsl:value-of select="$match"/></xsl:attribute>
                    <xsl:if test="$nomatch!= $empty">
                        <xsl:attribute name="nomatch"><xsl:value-of select="$nomatch"/></xsl:attribute>
                    </xsl:if>
                </xsl:element>
            </xsl:when>
            <xsl:when test="$nomatch!= $empty">
                <xsl:element name="ident:RegExpr">
                    <xsl:attribute name="nomatch"><xsl:value-of select="$nomatch"/></xsl:attribute>
                    <xsl:if test="$match!= $empty">
                        <xsl:attribute name="match"><xsl:value-of select="$match"/></xsl:attribute>
                    </xsl:if>
                </xsl:element>
            </xsl:when>
        </xsl:choose>
    </xsl:template>
</xsl:transform>

```

Bibliography

- [1] *FDT Interface Specification V1.2*, Order No. of FDT Joint Interest Group: 0001-0001-001
 - [2] *FDT Interface Specification V1.2.1*, Order No. of FDT Group: 0001-0001-002
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