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REDLINE VERSION

INTERNATIONAL STANDARD



Field device integration (FDI)[®] –
Part 150-1: Profiles – ISA100-**WIRELESS**

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Field device integration (FDI)[®] –
Part 150-1: Profiles – ISA100-**WIRELESS**

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FIELD DEVICE INTEGRATION (FDI®) –

Part 150-1: Profiles – ISA100-WIRELESS

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62769-150-1:2021. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62769-150-1 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This second edition cancels and replaces the first edition published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) added namespace to Annex A.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65E/866/CDV	65E/923/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62769 series, published under the general title *Field device integration (FDI[®])*, can be found on the IEC website.

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

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FIELD DEVICE INTEGRATION (FDI®) –

Part 150-1: Profiles – ISA100 ~~WIRELESS~~

1 Scope

This part of IEC 62769 specifies an FDI^{®1} profile of IEC 62769 for IEC 62734 (ISA100 ~~WIRELESS~~.11a)².

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62734:2014, *Industrial networks – Wireless communication network and communication profiles – ISA 100.11a*

IEC 61804 (all parts), *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL)*

IEC TR 62541-2, *OPC unified architecture – Part 2: Security Model*

~~IEC 62541-6, OPC unified architecture – Part 6: Mappings~~

IEC 62541-100:2015, *OPC unified architecture – Part 100: Device Interface*

IEC 62734:2014, *Industrial networks – Wireless communication network and communication profiles – ISA 100.11a*

~~IEC 62769-2, Field Device Integration (FDI) – Part 2: FDI Client~~

IEC 62769-4, *Field device integration (FDI®) – Part 4: FDI® Packages*

IEC 62769-5, *Field device integration (FDI®) – Part 5: ~~FDI~~ Information Model*

IEC 62769-6, *Field device integration (FDI®) – Part 6: ~~FDI~~ Technology Mapping*

IEC 62769-7, *Field device integration (FDI®) – Part 7: ~~FDI~~ Communication devices*

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² ISA100 WIRELESS™ is a trade name of the non-profit consortium Wireless Compliance Institute. This information is given for the convenience of users of this standard and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

3 Terms, definitions, abbreviated terms and acronyms

3.1 Terms and definitions

~~No terms and definitions are listed in this document.~~

For the purposes of this document, the terms and definitions given in, IEC 61804 (all parts), IEC TR 62541-2, IEC 62541-100, IEC 62734, IEC 62769-4, IEC 62769-5, IEC 62769-7 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1 Object

basic entity which defines standardized behavior and features in a ISA100 WIRELESS device

3.2 Abbreviated terms and acronyms

For the purposes of this specification, the following abbreviations apply.

EDD	Electronic Device Description
EDDL	Electronic Device Description Language (see IEC 61804 (all parts))
FDI®	Field Device Integration
FCG	FieldComm Group
XML	Extensible markup language (see REC-xml-20081126)
CFF	Common file format
UAP	User Application Process
UAPMO	User Application Process Management Object
DMO	Device Management Object
IM	Information Model
SM	System Manager
WCI	Wireless Compliance Institute
CP	Communication profile

4 Conventions

4.1 EDDL syntax

This part of IEC 62769 specifies content for the EDD component that is part of FDI® Communication Packages. The **specification** content using EDDL syntax uses the font `Courier New`. The EDDL syntax is used for method signature, variable, data structure and component declarations.

4.2 XML syntax

XML syntax examples use font `Courier New`. The XML syntax is used to describe XML document schema.

Example: `<xs:simpleType name="ExampleType">`

4.3 Capitalizations

The IEC 62769 series uses capitalized terms to emphasize that these terms have a FDI® specific meaning.

Some of these terms using an acronym as a prefix for example

- FDI® Client, or
- FDI® Server.

Some of these terms are compound terms such as:

- Communication Servers, or
- Profile Package.

Parameter names or attributes are concatenated to a single term, where the original terms start in this term with a capital letter such as:

- ProtocolSupportFile or
- ProtocolType.

Parameter names or attributes can also be constructed by using an underscore character to concatenate two or more terms such as:

- DEVICE_REV or
- DEVICE_MODEL

5 Profile for ISA100 WIRELESS

5.1 General

This profile specifies the protocol specifics needed for FDI® Packages describing communication servers, gateways and devices. ~~Requirements for Direct Access transfer service parameters are given in Annex B.~~

Annex B defines the XML schema for Direct Access Services.

5.2 Catalog profile

5.2.1 Protocol support file

5.2.1.1 Capability file

Each ISA100 WIRELESS FDI® Device Package shall contain a capability file. The capability file part is described in Table 1.

Table 1 – Capability file part

Parameter	Description
Content Type:	txt/plain
Root Namespace:	Not applicable
Source Relationship:	http://fdi-cooperation.com/2010/relationships/attachment-protocol
Filename:	Use file extension .CFF

~~5.2.1.2 FDI Communication Packages~~

~~The same rules as for FDI Device Packages applies.~~

5.2.2 CommunicationProfile definition

IEC 62769-4 defines a CommunicationProfileT string for the Catalog XML schema. The ISA100 WIRELESS specific value shall be "ISA100_Wireless".

5.2.3 Profile device

Not supported in this document.

5.2.4 Protocol version information

IEC 62769-4 defines an element type named InterfaceT for the Catalog XML schema. The element type InterfaceT contains an element named Version which is supposed to provide version information about the applied communication protocol profile. The value has to follow the IEC 62769-4 defined version information schema defined in the element type VersionT.

ISA100 WIRELESS defines the version of the protocol as a value of the parameter DMO.Comm_SW_Minor_Version. A value of 0 indicates protocol version 2009 and a value of 1 indicates protocol version 2011. The general rule is to use the value of DMO.Comm_SW_Minor_Version parameter as the major version part of VersionT and the value "0" for the minor version and build parts Table 2 shows the protocol version information:

Table 2 – Protocol Version Information

Protocol Version	InterfaceT Version value
ISA100 WIRELESS 2009	1.0.0
ISA100 WIRELESS 2011	2.0.0
The Protocol Version defined in a package is provided for informational purposes only, and shall not be used to determine the compatibility or applicability of a package to a device.	

5.3 Associating a Package with a device

5.3.1 Device type identification mapping

The purpose of device type identification mapping is to enable FDI[®] host systems to compare the scan result against the topology representation in the Information Model. FDI[®] host systems shall also be enabled to determine the FDI[®] Device Package that fits for a device entry contained in the scan result. This will enable the user of an FDI[®] host system to synchronize the Information Model with the actual installation.

The Communication Server implemented scan service (defined in 5.6.1.7 provides the scan result through an XML document (the schema is defined in Clause A.6).

The scan result contains device type identification and device instance identification.

FDI[®] host systems comparing the actual network topology configuration against the topology representation in the Information Model shall be enabled to handle the following situations:

- a) The physical Device instance identified at a specific device address is not logically present in the Information Model (as Instance): Enable the FDI[®] Host system to find the appropriate FDI[®] Device Package according to the device catalog information.

b) The physical Device instance identified by the device address is logically present in the Information Model (as Instance): Enable the FDI[®] Host system to compare device type information presented in scan result (see the identification in Clause A.6) and the device type specific information of the Instance present in the Information Model.

The FDI[®] Device Package contains device type identification information that can be compared to scan result based on the Catalog Schema in IEC 62769-4 defining the XML (simple) element types “DeviceModel” and “Manufacturer”.

As a result of the FDI[®] Package deployment the FDI[®] Package information is then present in the Information Model as the specified FunctionalGroup Identification containing SerialNumber and Tag (see 5.4.3).

The mapping between different device identification data sources is described in Table 3. Since scan results provided by the Communication Server can convey data that is produced by the device (firmware) the device type identification mapping shall be supported by providing corresponding data in the FDI[®] Device Package contained Catalog and Information Model.

Table 3 – Device identification information mapping

FDI [®] Device Package	Information Model	Communication Server provided scan result
Catalog specified type Manufacturer	FunctionalGroup: Identification Browse Name: Manufacturer	Element (path): ConnectionPoint/Identification Attribute: Manufacturer
Catalog specified type DeviceModel	FunctionalGroup: Identification Browse Name: DeviceModel	Element (path): ConnectionPoint/Identification Attribute: DeviceModel

ISA100 WIRELESS device types are uniquely identified by the parameters UAPMO.IDENT_NUMBER found in the UAPMO. The IDENT_NUMBER parameter contains the Vendor ID, Model ID and Device Revision. These parameters are used to associate a given device instance to an FDI[®] Device Package. These parameters are mapped to the FDI[®] Device Package Catalog according to Table 4.

Table 4 – Device type catalog mapping

Catalog Element	ISA100 WIRELESS CP Mapping
Manufacturer element of InterfaceT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x00FFFFFF00000000 String format “0xddddd” where ddddd is the Vendor ID number in hexadecimal format.
DeviceModel element of InterfaceT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x00000000FFFF0000 String format “0xdddd” where dddd is the Model ID number in hexadecimal format.
DeviceRevision element ListOfSupportedDeviceRevisionsT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x000000000000FFFF String format “x.0.0” where x is the Device Revision in decimal format (no leading zeros).

5.3.2 Device type revision mapping

IEC 62769-4 envisions a concept that allows to determine the compatibility between an FDI[®] Device Package and a Device. IEC 62769-4 specifies a life cycle management process bearing on a single version information provided for the entire device. Mapping of version information is defined in Table 4.

5.4 Information Model mapping

5.4.1 ProtocolType definition

In Table 5 a subtype of ProtocolType is defined to identify network communication using this profile.

Table 5 – Protocol type ISA100 WIRELESS

Attribute	Value				
BrowseName	ISA100_Wireless				
IsAbstract	False				
References	NodeClass	BrowseName	Data Type	TypeDefinition	ModellingRule
Subtype of the ProtocolType defined in IEC 62541-100.					

5.4.2 DeviceType mapping

Each device type inherits the properties of DeviceType. The mapping of the inherited properties from DeviceType is defined in Table 6.

Table 6 – Inherited DeviceType property mapping

Property	ISA100 WIRELESS Mapping
SerialNumber	DMO.EUI_64 – 8 byte Extended Unique Identifier defined in DMO
RevisionCounter	UAPMO.Static_Revision_Level - 2 byte revision counter defined in UAPMO
Manufacturer	String taken from FDI [®] package catalog (ManufacturerName from PackageT)
Model	String taken from FDI [®] package catalog (Name of DeviceTypeT, which is a localized name)
DeviceManual	empty text string (not supported) ^a
DeviceRevision	DEV_REV (UAPMO)
SoftwareRevision	empty string (not defined)
HardwareRevision	empty string (not defined)
^a Device manuals are exposed as attachments of the FDI [®] Device Package.	

5.4.3 FunctionalGroup identification definition

As defined in IEC 62541-100:2015, 5.3, each device representation in the FDI[®] Server hosted Information Model shall contain a protocol specific FunctionalGroup named Identification. This FunctionalGroup organizes variables found in the UAPMO of the device type instance. The FunctionalGroup Identification for ISA100 WIRELESS is defined in Table 7.

Table 7 – ISA100 Wireless Device Types identification attributes

BrowseName	Data Type	Mandatory/Optional
MANUFAC_ID	UInt32	Mandatory
DEV_TYPE	UInt16	Mandatory
DEV_REV	UInt16	Mandatory
HARDWARE_REV	String	Optional
SOFTWARE_REV	String	Optional
ITS_VER	UInt16	Mandatory

5.4.4 BlockType property mapping

ISA100 WIRELESS device types are object oriented referred as block-oriented according to IEC 62541-100. IEC 62769-5 specifies the mapping of EDDL BLOCK_A elements to block types and instances.

The BLOCK_A maps as a subtype of the topology element BlockType and inherits the properties per IEC 62541-100. The mapping of the inherited properties of the BlockType is specified in Table 8.

Table 8 – Inherited BlockType property mapping

Property	ISA100 Wireless Mapping (Object ParameterSet)
RevisionCounter	ST_REV
ActualMode	MODE_BLK.ACTUAL
PermittedMode	MODE_BLK.PERMITTED
NormalMode	MODE_BLK.NORMAL
TargetMode	MODE_BLK.TARGET

5.4.5 Mapping to Object ParameterSet

The ParameterSet is relative to each Object. The ParameterSet includes all the parameters found in the PARAMETERS, LOCAL_PARAMETERS and LIST_ITEMS.

The browse name of the parameters found in the PARAMETERS and LOCAL_PARAMETERS is the member name in the respective lists. For example, ST_REV is the browse name of the Static Revision parameter. LIST_ITEMS do not have member names; therefore the browse name of each LIST in the LIST_ITEMS is the item name of the list.

5.5 Topology elements

5.5.1 ConnectionPoint definition

The ConnectionPoint type ConnectionPoint_ISA100_Wireless shall be used to identify ISA100 WIRELESS network communication and is defined in Table 9. The ConnectionPoint type ConnectionPoint_ISA100_Wireless is a sub type of the abstract type ConnectionPointType defined in IEC 62541-100.

The DevAddr property shall be the IPV6 (16 bytes) address of the device.

The DevMfg property shall be the 4-byte UAPMO.IDENT_NUMBER.VendorID, and can be used to help automate the process of assigning live devices in the scan list to offline placeholders.

The DevType property shall be the 2-byte UAPMO.IDENT_NUMBER.ModelID, and can be used to help automate the process of assigning live devices in the scan list to offline placeholders.

The DevRev property shall be the UAPMO.UAPMO.IDENT_NUMBER.DeviceRevision, and can be used to help automate the process of assigning live devices in the scan list to offline placeholders.

The DevTag property shall be the DMO.Tag_Name (16 characters).

The DevPollAddr property shall be the DMO.ShortDMO.DL_Address_16_Bit (2 bytes).

Table 9 – ConnectionPointType ConnectionPoint_ISA100_Wireless definition

Attribute	Value				
BrowseName	ConnectionPoint_ISA100_Wireless				
IsAbstract	False				
References	NodeClass	BrowseName	Data Type	TypeDefinition	ModellingRule
Inherits the properties of ConnectionPointType defined in IEC 62541-100.					
HasProperty	Variable	IPAddress	ByteString	PropertyType	Mandatory
HasProperty	Variable	DevMfg	UInt32	PropertyType	Optional
HasProperty	Variable	DevType	UInt16	PropertyType	Optional
HasProperty	Variable	DevRev	UInt16	PropertyType	Optional
HasProperty	Variable	DevTag	String	PropertyType	Optional
HasProperty	Variable	DevPollAddr	UInt16	PropertyType	Optional

The ConnectionPoint type ISA100_Wireless shall be described by an EDD element contained in a Communication Device related FDI® Package that can drive an ISA100 Wireless network. Actual ConnectionPoint properties are declared by VARIABLE constructs grouped together in a COLLECTION named ConnectionPoint_ISA100_Wireless_Properties. The following EDDL source code is an example describing ISA100-~~WIRELESS~~ connection point.

```
COMPONENT ConnectionPoint_ISA100_Wireless
{
  LABEL "ISA100 Wireless Connection point";
  CLASSIFICATION NETWORK_CONNECTION_POINT;
  CAN_DELETE FALSE;
  PROTOCOL ISA100_Wireless;
  CONNECTION_POINT ConnectionPoint_ISA100_Wireless_Properties;
}
```

```
COLLECTION ConnectionPoint_ISA100_Wireless_Properties
{
  LABEL "ISA100 Wireless Connection Point data";

  MEMBERS
  {
    ADDRESS,      IPAddress,      "Device Address";
    MFG,          DevMfg,         "Manufacturer";
    DEV_TYPE,     DevType,        "Device Type";
    DEV_REV,      DevRev,         "Device Revision";
    TAG,          DevTag,         "Device Tag";
    POLL_ADDR,    DevPollAddr,    "Poll Address";
  }
}
```

```
VARIABLE IPAddress
{
  LABEL "ISA100 Wireless Node Address";
  HELP "Address of the ISA100 Node";
  CLASS DEVICE;
  TYPE OCTET (16 );

  HANDLING READ & WRITE;
}
```

```
VARIABLE DevMfg
{
```

```
LABEL "Manufacturer";
CLASS DEVICE;
TYPE UNSIGNED_INTEGER(4);
HANDLING READ & WRITE;
}

VARIABLE DevType
{
  LABEL "Model Id";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(2);
  HANDLING READ & WRITE;
}

VARIABLE DevRev
{
  LABEL "Device Revision";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(2);
  HANDLING READ & WRITE;
}

VARIABLE DevTag
{
  LABEL "Tag";
  CLASS DEVICE;
  TYPE ASCII(16);
  HANDLING READ & WRITE;
}

VARIABLE DevPollAddr
{
  LABEL "Poll Address";
  HELP "Short address of the device";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(2)
  {
    MIN_VALUE 01; //Define appropriate min value for various revisions
  }
  HANDLING READ & WRITE;
}
```

5.5.2 Communication Device definition

According to IEC 62769-7 each FDI[®] Communication Package shall contain an EDD element describing the communication device. The following EDDL source code in is an example describing a Communication Server.

```
COMPONENT ISA100_Wireless_Communication_Server
{
  LABEL "ISA100 Wireless communication server",
  PRODUCT_URI "urn:Wireless Compliance Institute:ISA100 Wireless
Communication Server";
  CAN_DELETE TRUE;
  CLASSIFICATION NETWORK_COMPONENT;
  COMPONENT_RELATIONS
  {
  ISA100_Wireless_Communication_Device_Setup
  }
}
```

```

COMPONENT_RELATION ISA100_Wireless_Communication_Device_Setup
{
  LABEL "Relation between Device and communication device";
  RELATION_TYPE CHILD_COMPONENT;
  ADDRESSING {IPAddress}
  COMPONENTS
  {
    ISA100_Wireless_Communication_Device{AUTO_CREATE 1;}
  }
}

```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI[®] server and FDI[®] Communication Server to create an instance of type CommunicationServerType as described in IEC 62769-7.

According to IEC 62769-7, each FDI[®] Communication Package shall contain at least one EDD element describing at least one Communication Device component. The following EDDL source code is an example for a ISA100 WIRELESS communication device

```

COMPONENT ISA100_Wireless_Communication_Device
{
  LABEL "ISA100 Wireless communication device";
  CAN_DELETE TRUE;
  CLASSIFICATION NETWORK_COMPONENT;
  COMPONENT_RELATIONS
  {
    ISA100_Wireless_Service_Provider_Relation
  }
}

COMPONENT_RELATION ISA100_Wireless_Service_Provider_Relation
{
  LABEL "ISA100 Wireless communication service provider";
  RELATION_TYPE CHILD_COMPONENT;
  COMPONENTS
  {
    ISA100_Wireless_Service_Provider{AUTO_CREATE 1;}
  }
  MINIMUM_NUMBER 1;
  MAXIMUM_NUMBER 1;
}

```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI[®] server and FDI[®] Communication Server to create an instance of type ServerCommunicationDeviceType as described in IEC 62769-7.

5.5.3 Communication service provider definition

According to IEC 62769-7, each FDI[®] Communication Package shall contain at least one EDD element describing at least one communication service provider component. The following EDDL source code below is an example for an ISA100 Wireless communication service provider component:

The component reference (ConnectionPoint_ISA100_Wireless) corresponds to the related connection point definition in 5.5.

```

COMPONENT ISA100_Wireless_Service_Provider
{

```

```
LABEL "ISA100 Wireless communication service provider";
CAN_DELETE FALSE;
CLASSIFICATION NETWORK_COMMUNICATION_SERVICE_PROVIDER;
COMPONENT_RELATIONS
{
    ISA100_Wireless_Connection_Point_Relation
}
BYTE_ORDER BIG_ENDIAN;
}
```

```
COMPONENT_RELATION
ISA100_Wireless_Service_Provider_Connection_Point_Relation
{
    LABEL "Relation between communication service provider and
connection point";
    RELATION_TYPE CHILD_COMPONENT;
    ADDRESSING {IPAddress}
    COMPONENTS
    {
        ConnectionPoint_ISA100_Wireless{ AUTO_CREATE 1;}
    }
    MINIMUM_NUMBER 1;
    MAXIMUM_NUMBER 1;
}
```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI[®] server and FDI[®] Communication Server to create an instance of type ServerCommunicationServiceType as described in IEC 62769-7.

5.5.4 Network definition

According to IEC 62769-7, each FDI[®] Communication Package shall contain at least one EDD element describing network configuration constraints using the component construct.

```
COMPONENT Network_ISA100_Wireless
{
    LABEL "ISA100 Network";
    CAN_DELETE TRUE;
    CLASSIFICATION NETWORK;
    PROTOCOL ISA100_WIRELESS;
    COMPONENT_RELATIONS
    {
        ISA100_Wireless_Network_Connection_Point_Relation
    }
}
```

```
COMPONENT_RELATION ISA100_Wireless_Network_Connection_Point_Relation
{
    LABEL "Relation between network and connection point";
    RELATION_TYPE CHILD_COMPONENT;
    ADDRESSING {IPAddress}
    COMPONENTS
    {
        ConnectionPoint_ISA100_Wireless
    }
    MINIMUM_NUMBER 1;
    MAXIMUM_NUMBER 1;
}
```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI[®] server and FDI[®]

Communication Server to create an instance of type NetworkType as described in IEC 62541-100.

5.6 Methods

5.6.1 Methods for FDI® Communication Servers

5.6.1.1 General

The Communication Server contained Information Model shall implement services according to method signatures described in 5.6.1.

5.6.1.2 Connect

Table 10 shows the Method Connect arguments.

Signature:

```
Connect (
    [in] ByteString      CommunicationRelationId,
    [in] ByteString      IPAddress,
    [in] UInt32          ConnectType,
    [out] Int32          ServiceError);
```

Table 10 – Method Connect arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the Device ConnectionPoint representing the connection between a device and a physical network which is directly connected to the FDI® Communication Server hardware. The nodeId allows finding the direct parent-child relation.
IPAddress	The argument name shall match with the corresponding attribute name defined for the ConnectionPoint which is described by a corresponding EDD element specified in 5.5.1. The argument value holds the device's node address.
ConnectType	ConnectType specifies the type of connection communication server shall make with the ISA100 Wireless device. Below are valid connection types 0: Client 1: Server 2: Publisher 3: Subscriber 4: Bulk Transfer Client 6: Reserved 7: Alert Subscription
ServiceError	0: OK / execution finished, connection established successfully -1: Connect Failed / canceled by caller -2: Call Failed / unknown service ID -3: Connect Failed / device not found -4: Connect Failed / invalid device node address -5: Connect Failed / invalid device identification

NOTE 1 IEC 62769-7 defines the argument AddressData of the Connect Method as an array of Variant. The address arguments defined with the table are represented as entries of the Variant array in the order they are specified above.

NOTE 2 IEC 62769-7 defines the argument DeviceInformation as a protocol specific argument list in which the Connect Method stores the resulting data. The DeviceInformation argument is defined as an array of Variant. The DeviceInformation argument is not used for ISA100 Wireless devices.

5.6.1.3 Disconnect

Table 11 shows the Method Disconnect arguments.

Signature:

```

Disconnect(
    [in]  ByteString      CommunicationRelationId,
    [out] UInt32          ServiceError)
    
```

Table 11 – Method Disconnect arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeld of the Device ConnectionPoint representing the connection between a device and a physical network which is directly connected to the FDI® Communication Server hardware. The nodeld allows finding the direct parent-child relation.
ServiceError	0: OK / disconnect finished successfully -1: Disconnect Failed / no existing communication relation -2: Disconnect Failed / invalid communication relation identifier

5.6.1.4 Transfer

Table 12 shows the Method Transfer arguments.

Signature

```

Transfer(
    [in]  ByteString      CommunicationRelationId,
    [in]  String          Operation,
    [in]  UInt16          AppID,
    [in]  UInt16          ObjectID,
    [in]  UInt16          AttrOrMethID,
    [in]  UInt16          SubIndex,
    [in]  Byte+[]         WriteData,
    [in]  UInt32          RequestId,
    [out] Byte+[]         ReadData,
    [out] Int32           ServiceError);
    
```

Table 12 – Method Transfer arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the ConnectionPoint representing the connection between a device and a physical network within the Information Model.
Operation	The argument value indicates the data transfer operation. The allowed values are "READ", "WRITE" and "EXECUTE".
AppID	The argument denotes the ID of the application in ISA100 Wireless device being addressed. The CFF file lists all the App IDs present in the device.
ObjectID	The argument denotes the ID of the Object in the application being addressed.
AttrOrMethID	The argument denotes the ID of the Attribute or the Method in an Object of the particular application being addressed. When the OPERATION is either READ or WRITE this ID shall refer to a valid Attribute number. And when OPERATION is EXECUTE then this ID shall refer to a valid Method number.
SubIndex	<p>OPERATION indicates "READ" or "WRITE": The argument denotes the subindex of a member of the Object's Attribute being addressed if the Attribute is of type RECORD or ARRAY.</p> <p>To address a simple attribute a value of 0 shall be passed with this argument.</p> <p>To address a specific member of an attribute of type RECORD or ARRAY a 1 relative value shall be passed with this argument.</p> <p>To address the attribute of type RECORD or ARRAY as a whole a value of 0 shall be passed with this argument.</p> <p>OPERATION indicates "EXECUTE": The argument shall be 0 and be ignored.</p>
WriteData	Write data encoded as byte array. Encoding of integers shall follow the rules defined in IEC 62541-6. The argument shall be ignored if OPERATION indicates a read transfer.
RequestID	The request transaction code establishes the relation between the request and the corresponding response.
ReadData	With this argument the read data byte stream is returned as byte array. Encoding of integers shall follow the rules defined in IEC 62541-6. The argument shall be ignored if OPERATION indicates a write transfer or execute transfer.
ServiceError	0: OK / execution finished -1: Transfer Failed / canceled by caller -2: Call Failed / unknown request ID -3: Transfer Failed / no existing communication relation. -4: Transfer Failed / invalid communication relation identifier -5: Transfer Failed / invalid Request content -6: Transfer Failed / invalid Response format -xx
<p>NOTE 1 IEC 62769-7, defines the argument SendData of the Transfer Method as an array of Variant. The arguments Operation, AppID, ObjectID, AttrOrMethID, SUB_INDEXSubIndex, WriteData and RequestID defined in the table are represented as entries of the Variant array in the order they are specified above.</p> <p>NOTE 2 IEC 62769-7, defines the argument ReceiveData of the Transfer Method as an array of Variant. The argument ReadData defined in the table is represented as an entry of the Variant array in the order specified above.</p>	

5.6.1.5 GetPublishedData

ISA100 Wireless alerts represent unsolicited messages as defined in IEC 62769-7. Table 13 shows the Method GetPublishedData arguments.

NOTE ISA100 Wireless ~~devices~~ uses the term alerts to refer to alarms and event messages. These are asynchronous, unsolicited messages that deliver state change notifications such as diagnostic conditions. These messages are mapped to the GetPublishData service. ISA100 Wireless ~~devices~~ also uses the term publish to refer to synchronous, network scheduled communication for process values. These published messages are not mapped to the GetPublishedData service.

Signature:

GetPublishedData(

```
[in]  ByteString CommunicationRelationId,
[out] UInt16 AppID,
[out] UInt16 ObjectID,
[out] Byte[] AlarmEventData,
[out] UInt16 AlarmEventType,
[out] DateTime TimeStamp,
[out] Int32 ServiceError);
```

Table 13 – Method GetPublishedData arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the ConnectionPoint representing the connection between a device and a physical network within the Information Model.
AppID	The output argument denotes the ID of the application in ISA100 WIRELESS device being addressed.
ObjectID	The output argument denotes the ID of the Object in the application being addressed.
AlarmEventData	With this argument the alarm/event data byte stream is returned as a byte array. Encoding of integers shall follow the rules defined in IEC 62541-6.
AlarmEventType	The two bytes of this UInt16 denotes below information AlertClass – Byte 1 Bit 0 AlarmDirection – Byte 1 Bit 1 AlertCategory – Byte 1 Bit 2 to Bit 3 AlertPriority – Byte 1 Bit 4 to Bit 7 AlertType – Byte 2 Bit 0 to Bit 7 Refer to IEC 62734:2014 for further details
TimeStamp	Denotes the time the alarm or event was detected by the device.
ServiceError	0: OK / execution finished -1: GetPublishedData Failed / canceled by caller -2: Call Failed / unknown service ID -3: GetPublishedData Failed / not supported -4: GetPublishedData Failed / no existing communication relation. -5: GetPublishedData Failed / invalid communication relation identifier -8: GetPublishedData Failed / no alarm/event data published. -9: GetPublishedData Failed / invalid AlarmEventType

The FDI[®] Server maintains an Information Model defined in IEC 62541-100. Hence topology elements representing an IS100ObjectType are separated from actual object instances. An instance called Objects of a ConfigurableObjectType is used to implement instantiation rules. Instantiation of objects is further detailed with IEC 62769-5. According to the rules defined in IEC 62769-5, the FDI[®] Server needs to gather information from the UAPMO. ObjectIDandType in order to be able to create object instances. This information shall be provided by the Scan Method defined in 5.6.1.7.

NOTE 1 IEC 62769-7 defines the argument SendData of the Transfer Method as an array of Variant. The argument RequestID defined in the table is represented as entries of the Variant array in the order specified above.

NOTE 2 IEC 62769-7 defines the argument ReceiveData of the GetPublishedData Method as an array of Variant. The arguments AppID, ObjectID, AlarmEventData and AlarmEventType defined in the table are represented as entries of the Variant array in the order they are specified above.

5.6.1.6 SetAddress

This service is not supported in ISA100 Wireless.

5.6.1.7 Scan

The Method signature specified in IEC 62769-7 applies. The corresponding topologyScanResult schema is specified in Annex A.

5.6.1.8 ResetScan

The Method signature specified in IEC 62769-7 applies.

5.6.2 Methods for Gateways

Not supported in this document.

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Annex A (normative)

Topology Scan result schema

A.1 General

The topology scan result schema specified in Annex A describes the ISA100 WIRELESS specific format Method Scan argument `topologyScanResult`. The XML document content and structure shall correspond to the Information Model designed concept to describe a topology in order to enable generic matching between physical devices connected to the network and the FDI® Server hosted Information Model.

A.2 Target Namespace

The target namespace defined for the scan result is defined by:

```
<xs:schema
  xmlns:isa100=" http://fdi-cooperation.com/2021/FDI/PROFILE/ISA100"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://fdi-
  cooperation.com/2021/FDI/PROFILE/ISA100"
  elementFormDefault="unqualified" version="1.1.0">
```

A.3 Network

The root element that is used to return the scan result of an ISA100 WIRELESS network.

The XML schema for a Network element is:

```
<xs:element name="Network" type="isa100:ISA100_WirelessNetworkT"/>
```

A.4 ISA100_WirelessNetworkT

A complex type that defines the network for ISA100 WIRELESS.

The XML schema for ISA100_WirelessNetworkT element is:

```
<xs:complexType name="ISA100_WirelessNetworkT">
  <xs:sequence>
    <xs:element name="ConnectionPoint"
      type="isa100:ISA100_WirelessConnectionPointT"
      maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
```

The elements of an ISA100_WirelessNetworkT type are described in Table A.1.

Table A.1 – Elements of ISA100_WirelessNetworkT

Element	Description
ConnectionPoint	ISA100 WIRELESS connection point

A.5 ISA100_WirelessConnectionPointT

A complex type that defines the connection point for ISA100 WIRELESS. The XML schema for a ISA100_WirelessConnectionPointT type is:

```
<xs:complexType name="ISA100_WirelessConnectionPointT">
  <xs:sequence>
    <xs:element name="Identification"
type="isa100:ISA100_WirelessIdentificationT">
    </xs:element>
    <xs:element name="Address" type="isa100:ISA100_WirelessAddressT">
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

The elements of a ISA100_WirelessConnectionPointT type are described in Table A.2.

Table A.2 – Elements of ISA100_WirelessConnectionPointT

Element	Description
Identification	The element data holds the device type identification data. Compared to the Information Model (IEC 62769-5) the ConnectionPoint does not contain or refer to the device type identification data. But in order to support the FDI [®] host system in finding the package that matches the connected device this schema associates the device type identification with the ConnectionPoint.
Address	The address element holds the specific information used to uniquely address the device in the network.

A.6 ISA100_WirelessIdentificationT

The element content corresponds to the "FunctionalGroup Identification".

The XML schema for an ISA100_WirelessIdentificationT type is:

```
<xs:complexType name="ISA100_WirelessIdentificationT">
<xs:sequence>
  <xs:element minOccurs="1" maxOccurs="unbounded" name =
"ObjIdentification" type="isa100:ISA100_WirelessObjIdentification" />
</xs:sequence>
<xs:attribute name="DEV_TAG" type="xs:string" use="required">
</xs:attribute>
<xs:attribute name="MANUFAC_ID" type="xs:unsignedInt"
use="required">
</xs:attribute>
<xs:attribute name="DEV_TYPE" type="xs:unsignedShort"
use="required">
</xs:attribute>
<xs:attribute name="DEV_REV" type="xs:unsignedShort"
use="required">
</xs:attribute>
<xs:attribute name="ITS_VERSION" type="xs:unsignedShort"
use="required">
</xs:attribute></xs:complexType>
</xs:attribute></xs:complexType>
```

The attributes of an ISA100_WirelessIdentificationT type are described in Table A.3.

Table A.3 – Attributes of ISA100_WirelessIdentificationT

Attribute	Description
ObjectIdentification	List of ISA100 Object information that is currently activated in the device.
DEV_TAG	Tag of the device
MANUFAC_ID	See Table 7
DEV_TYPE	See Table 7
DEV_REV	See Table 7
ITS_VERSION	See Table 7

A.7 ISA100_WirelessAddressT

A ~~simple~~ complex type that defines the address structure for ISA100 WIRELESS ~~devices~~. The XML schema for a ISA100_WirelessAddressT type is:

```
<xs:complexType name="ISA100_WirelessAddressT ">
  <xs:sequence>
    <xs:element name="IPv6Address">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:pattern value="([A-Fa-f0-9]{1,4}:){7}[A-Fa-f0-9]{1,4}"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

A.8 ISA_WirelessObjIdentificationT

A complex type that defines the object instance identification for an ISA100 WIRELESS device. The XML schema for a ISA100_WirelessObjIdentificationT type is:

```
<xs:complexType name="ISA100_WirelessObjIdentificationT">
  <xs:attribute name="OBJ_ID" type="xs:unsignedShort" use="required">
  </xs:attribute>
  <xs:attribute name="OBJ_TYPE" type="xs:unsignedShort"
  use="required">
  </xs:attribute>
  <xs:attribute name="OBJ_SUBTYPE" type="xs:unsignedShort"
  use="required">
  </xs:attribute>
  <xs:attribute name="OBJ_VENDOR_SUBTYPE" type="xs:unsignedShort"
  use="required"/>
</xs:complexType>
```

The attributes of an ISA100_WirelessObjIdentificationT type are described in Table A.3.

Table A.4 – Attributes of ISA100_WirelessObjIdentificationT

Attribute	Description
OBJ_ID	Unique identifier of the Object in UAP.
OBJ_TYPE	Type of the Object in UAP.
OBJ_SUBTYPE	Profile Sub type of the Object.
OBJ_VENDOR_SUBTYPE	Vendor Sub type of the Object.

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Annex B (normative)

Transfer service parameters

B.1 General

Direct Access Services specified in ~~IEC 62769-2~~ IEC TR 62541-2 enable the User Interface Plug-in (UIP) to directly exchange data with the device. Direct data exchange means that data exchanged between a device and a UIP may not be reflected in the Information Model. The IEC 62769-6 defined interface IDirectAccess corresponds to the ~~IEC 62769-2~~ IEC TR 62541-2 specified Direct Access Services. Interface IDirectAccess defined functions BeginTransfer and EndTransfer need to convey protocol specific information. The protocol specifics shall be captured in an XML document.

B.2 sendData

The element described in the following contains data to be submitted through the IDirectAccess function BeginTransfer defined argument sendData.

The XML schema for a sendData element is:

```
<xs:element name="sendData" type="isa100:TransferSendDataT"/>
```

B.3 receiveData

The element described in the following contains data that is returned through the IDirectAccess function EndTransfer defined return value.

The XML schema for a receiveData element is:

```
<xs:element name="receiveData" type="isa100:TransferResultDataT"/>
```

B.4 TransferSendDataT

A complex type that defines the service parameter data format that shall be applied to Transfer defined argument sendData.

The XML schema for a TransferSendDataT type is:

```
<xs:complexType name="TransferSendDataT">
  <xs:attribute name="OPERATION" type="isa100:OperationT"
    use="required"/>
  <xs:attribute name="OBJ_ID" type="xs:unsignedShort"
    use="required"/>
  <xs:attribute name="ATTR_ID" type="xs:unsignedShort"
    use="required"/>
  <xs:attribute name="ATTR_INDEX" type="xs:unsignedShort"
    use="optional"/>
  <xs:attribute name="DATA" type="xs:hexBinary" use="optional"/>
</xs:complexType>
```

The attributes of a TransferSendDataT type are described in Table B.1.

Table B.1 – Attributes of TransferSendDataT

Attribute	Description
OPERATION	Data transfer operation
OBJ_ID	Unique identifier of the Object in UAP.
ATTR_ID	Unique identifier of the Attribute in the Object.
ATTR_INDEX	Sub index of the Attribute in case of aggregate data type attribute
DATA	Mandatory attribute for data to be transferred in the service WRITE operation. This attribute is not used for the READ. This attribute may or may not be used for EXECUTE service operation.

B.5 OperationT

A simple type that defines service operations.

The XML schema for an OperationT enumeration type is:

```
<xs:simpleType name="OperationT">
  <xs:restriction base="xs:string">
    <xs:enumeration value="READ"/>
    <xs:enumeration value="WRITE"/>
    <xs:enumeration value="EXECUTE"/>
  </xs:restriction>
</xs:simpleType>
```

The enumeration values of a OperationT enumeration type are described in Table B.2.

Table B.2 – Enumerations of OperationT

Enumeration	Description
READ	Read Service according to IEC 62734:2014, 12.22.2.6
WRITE	Write Service according to IEC 62734:2014, 12.22.2.7
EXECUTE	Execute Service according to IEC 62734:2014, 12.22.2.8

B.6 TransferResultDataT

A complex type that defines the service parameter data format that shall be applied to Transfer defined receiveData return value.

The XML schema for a TransferResultDataT type is:

```
<xs:complexType name="TransferResultDataT">
  <xs:attribute name="DATA" type="xs:hexBinary" use="optional"/>
</xs:complexType>
```

The attributes of a TransferResultDataT type are described in Table B.3.

Table B.3 – Attributes of TransferResultDataT

Attribute	Description
DATA	Data received after the service operation. This attribute is required for the READ and EXECUTE service operations.

Bibliography

IEC 62769 (all parts), *Field device integration (FDI)*[®]

REC-xml-20081126, Extensible Markup Language (XML) 1.0 (Fifth Edition) – W3C Recommendation 26 November 2008, available at <http://www.w3.org/TR/xml/>

~~FCG_TS62769-150-1, Profiles – ISA100_1.1.0.3, available at <https://fieldcommgroup.org> [viewed 2020-06-02]~~

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INTERNATIONAL STANDARD

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Part 150-1: Profiles – ISA100**

**Intégration des appareils de terrain (FDI)[®] –
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIELD DEVICE INTEGRATION (FDI®) –

Part 150-1: Profiles – ISA100

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This second edition cancels and replaces the first edition published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) added namespace to Annex A.

The text of this International Standard is based on the following documents:

Draft	Report on voting
65E/866/CDV	65E/923/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62769 series, published under the general title *Field device integration (FDI)*[®], can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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FIELD DEVICE INTEGRATION (FDI®) –

Part 150-1: Profiles – ISA100

1 Scope

This part of IEC 62769 specifies an FDI^{®1} profile of IEC 62769 for IEC 62734 (ISA100.11a)².

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62734:2014, *Industrial networks – Wireless communication network and communication profiles – ISA 100.11a*

IEC 61804 (all parts), *Devices and integration in enterprise systems – Function blocks (FB) for process control and electronic device description language (EDDL)*

IEC TR 62541-2, *OPC unified architecture – Part 2: Security Model*

IEC 62541-100:2015, *OPC unified architecture – Part 100: Device Interface*

IEC 62734:2014, *Industrial networks – Wireless communication network and communication profiles – ISA 100.11a*

IEC 62769-4, *Field device integration (FDI®) – Part 4: FDI® Packages*

IEC 62769-5, *Field device integration (FDI®) – Part 5: Information Model*

IEC 62769-6, *Field device integration (FDI®) – Part 6: Technology Mapping*

IEC 62769-7, *Field device integration (FDI®) – Part 7: Communication devices*

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² ISA100 WIRELESS™ is a trade name of the non-profit consortium Wireless Compliance Institute. This information is given for the convenience of users of this standard and does not constitute an endorsement by IEC of the trademark holder or any of its products. Compliance does not require use of the trade name. Use of the trade name requires permission of the trade name holder.

3 Terms, definitions, abbreviated terms and acronyms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in, IEC 61804 (all parts), IEC TR 62541-2, IEC 62541-100, IEC 62734, IEC 62769-4, IEC 62769-5, IEC 62769-7 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

Object

basic entity which defines standardized behavior and features in a ISA100 WIRELESS device

3.2 Abbreviated terms and acronyms

For the purposes of this specification, the following abbreviations apply.

EDD	Electronic Device Description
EDDL	Electronic Device Description Language (see IEC 61804 (all parts))
FDI®	Field Device Integration
FCG	FieldComm Group
XML	Extensible markup language (see REC-xml-20081126)
CFF	Common file format
UAP	User Application Process
UAPMO	User Application Process Management Object
DMO	Device Management Object
IM	Information Model
SM	System Manager
WCI	Wireless Compliance Institute
CP	Communication profile

4 Conventions

4.1 EDDL syntax

This part of IEC 62769 specifies content for the EDD component that is part of FDI® Communication Packages. The specification content using EDDL syntax uses the font `Courier New`. The EDDL syntax is used for method signature, variable, data structure and component declarations.

4.2 XML syntax

XML syntax examples use font `Courier New`. The XML syntax is used to describe XML document schema.

Example: `<xs:simpleType name="ExampleType">`

4.3 Capitalizations

The IEC 62769 series uses capitalized terms to emphasize that these terms have a FDI® specific meaning.

Some of these terms using an acronym as a prefix for example

- FDI® Client, or
- FDI® Server.

Some of these terms are compound terms such as:

- Communication Servers, or
- Profile Package.

Parameter names or attributes are concatenated to a single term, where the original terms start in this term with a capital letter such as:

- ProtocolSupportFile or
- ProtocolType.

Parameter names or attributes can also be constructed by using an underscore character to concatenate two or more terms such as:

- DEVICE_REV or
- DEVICE_MODEL

5 Profile for ISA100 WIRELESS

5.1 General

This profile specifies the protocol specifics needed for FDI® Packages describing communication servers, gateways and devices.

Annex B defines the XML schema for Direct Access Services.

5.2 Catalog profile

5.2.1 Protocol support file

5.2.1.1 Capability file

Each ISA100 WIRELESS FDI® Device Package shall contain a capability file. The capability file part is described in Table 1.

Table 1 – Capability file part

Parameter	Description
Content Type:	txt/plain
Root Namespace:	Not applicable
Source Relationship:	http://fdi-cooperation.com/2010/relationships/attachment-protocol
Filename:	Use file extension .CFF

5.2.2 CommunicationProfile definition

IEC 62769-4 defines a CommunicationProfileT string for the Catalog XML schema. The ISA100 WIRELESS specific value shall be "ISA100_Wireless".

5.2.3 Profile device

Not supported in this document.

5.2.4 Protocol version information

IEC 62769-4 defines an element type named InterfaceT for the Catalog XML schema. The element type InterfaceT contains an element named Version which is supposed to provide version information about the applied communication protocol profile. The value has to follow the IEC 62769-4 defined version information schema defined in the element type VersionT.

ISA100 WIRELESS defines the version of the protocol as a value of the parameter DMO.Comm_SW_Minor_Version. A value of 0 indicates protocol version 2009 and a value of 1 indicates protocol version 2011. The general rule is to use the value of DMO.Comm_SW_Minor_Version parameter as the major version part of VersionT and the value "0" for the minor version and build parts Table 2 shows the protocol version information:

Table 2 – Protocol Version Information

Protocol Version	InterfaceT Version value
ISA100 WIRELESS 2009	1.0.0
ISA100 WIRELESS 2011	2.0.0
The Protocol Version defined in a package is provided for informational purposes only, and shall not be used to determine the compatibility or applicability of a package to a device.	

5.3 Associating a Package with a device

5.3.1 Device type identification mapping

The purpose of device type identification mapping is to enable FDI® host systems to compare the scan result against the topology representation in the Information Model. FDI® host systems shall also be enabled to determine the FDI® Device Package that fits for a device entry contained in the scan result. This will enable the user of an FDI® host system to synchronize the Information Model with the actual installation.

The Communication Server implemented scan service (defined in 5.6.1.7 provides the scan result through an XML document (the schema is defined in Clause A.6).

The scan result contains device type identification and device instance identification.

FDI® host systems comparing the actual network topology configuration against the topology representation in the Information Model shall be enabled to handle the following situations:

- a) The physical Device instance identified at a specific device address is not logically present in the Information Model (as Instance): Enable the FDI® Host system to find the appropriate FDI® Device Package according to the device catalog information.
- b) The physical Device instance identified by the device address is logically present in the Information Model (as Instance): Enable the FDI® Host system to compare device type information presented in scan result (see the identification in Clause A.6) and the device type specific information of the Instance present in the Information Model.

The FDI[®] Device Package contains device type identification information that can be compared to scan result based on the Catalog Schema in IEC 62769-4 defining the XML (simple) element types “DeviceModel” and “Manufacturer”.

As a result of the FDI[®] Package deployment the FDI[®] Package information is then present in the Information Model as the specified FunctionalGroup Identification containing SerialNumber and Tag (see 5.4.3).

The mapping between different device identification data sources is described in Table 3. Since scan results provided by the Communication Server can convey data that is produced by the device (firmware) the device type identification mapping shall be supported by providing corresponding data in the FDI[®] Device Package contained Catalog and Information Model.

Table 3 – Device identification information mapping

FDI [®] Device Package	Information Model	Communication Server provided scan result
Catalog specified type Manufacturer	FunctionalGroup: Identification Browse Name: Manufacturer	Element (path): ConnectionPoint/Identification Attribute: Manufacturer
Catalog specified type DeviceModel	FunctionalGroup: Identification Browse Name: DeviceModel	Element (path): ConnectionPoint/Identification Attribute: DeviceModel

ISA100 WIRELESS device types are uniquely identified by the parameters UAPMO.IDENT_NUMBER found in the UAPMO. The IDENT_NUMBER parameter contains the Vendor ID, Model ID and Device Revision. These parameters are used to associate a given device instance to an FDI[®] Device Package. These parameters are mapped to the FDI[®] Device Package Catalog according to Table 4.

Table 4 – Device type catalog mapping

Catalog Element	CP Mapping
Manufacturer element of InterfaceT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x00FFFFFF00000000 String format “0xddddd” where ddddd is the Vendor ID number in hexadecimal format.
DeviceModel element of InterfaceT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x00000000FFFF0000 String format “0xdddd” where dddd is the Model ID number in hexadecimal format.
DeviceRevision element ListOfSupportedDeviceRevisionsT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x000000000000FFFF String format “x.0.0” where x is the Device Revision in decimal format (no leading zeros).

5.3.2 Device type revision mapping

IEC 62769-4 envisions a concept that allows to determine the compatibility between an FDI[®] Device Package and a Device. IEC 62769-4 specifies a life cycle management process bearing on a single version information provided for the entire device. Mapping of version information is defined in Table 4.

5.4 Information Model mapping

5.4.1 ProtocolType definition

In Table 5 a subtype of ProtocolType is defined to identify network communication using this profile.

Table 5 – Protocol type ISA100 WIRELESS

Attribute	Value				
BrowseName	ISA100_Wireless				
IsAbstract	False				
References	NodeClass	BrowseName	Data Type	TypeDefinition	ModellingRule
Subtype of the ProtocolType defined in IEC 62541-100.					

5.4.2 DeviceType mapping

Each device type inherits the properties of DeviceType. The mapping of the inherited properties from DeviceType is defined in Table 6.

Table 6 – Inherited DeviceType property mapping

Property	ISA100 WIRELESS Mapping
SerialNumber	DMO.EUI_64 – 8 byte Extended Unique Identifier defined in DMO
RevisionCounter	UAPMO.Static_Revision_Level - 2 byte revision counter defined in UAPMO
Manufacturer	String taken from FDI [®] package catalog (ManufacturerName from PackageT)
Model	String taken from FDI [®] package catalog (Name of DeviceTypeT, which is a localized name)
DeviceManual	empty text string (not supported). ^a
DeviceRevision	DEV_REV (UAPMO)
SoftwareRevision	empty string (not defined)
HardwareRevision	empty string (not defined)
^a Device manuals are exposed as attachments of the FDI [®] Device Package.	

5.4.3 FunctionalGroup identification definition

As defined in IEC 62541-100:2015, 5.3, each device representation in the FDI[®] Server hosted Information Model shall contain a protocol specific FunctionalGroup named Identification. This FunctionalGroup organizes variables found in the UAPMO of the device type instance. The FunctionalGroup Identification for ISA100 WIRELESS is defined in Table 7.

Table 7 – ISA100 Wireless Device Types identification attributes

BrowseName	Data Type	Mandatory/Optional
MANUFAC_ID	UInt32	Mandatory
DEV_TYPE	UInt16	Mandatory
DEV_REV	UInt16	Mandatory
HARDWARE_REV	String	Optional
SOFTWARE_REV	String	Optional
ITS_VER	UInt16	Mandatory

5.4.4 BlockType property mapping

ISA100 WIRELESS device types are object oriented referred as block-oriented according to IEC 62541-100. IEC 62769-5 specifies the mapping of EDDL BLOCK_A elements to block types and instances.

The BLOCK_A maps as a subtype of the topology element BlockType and inherits the properties per IEC 62541-100. The mapping of the inherited properties of the BlockType is specified in Table 8.

Table 8 – Inherited BlockType property mapping

Property	ISA100 Wireless Mapping (Object ParameterSet)
RevisionCounter	ST_REV
ActualMode	MODE_BLK.ACTUAL
PermittedMode	MODE_BLK.PERMITTED
NormalMode	MODE_BLK.NORMAL
TargetMode	MODE_BLK.TARGET

5.4.5 Mapping to Object ParameterSet

The ParameterSet is relative to each Object. The ParameterSet includes all the parameters found in the PARAMETERS, LOCAL_PARAMETERS and LIST_ITEMS.

The browse name of the parameters found in the PARAMETERS and LOCAL_PARAMETERS is the member name in the respective lists. For example, ST_REV is the browse name of the Static Revision parameter. LIST_ITEMS do not have member names; therefore the browse name of each LIST in the LIST_ITEMS is the item name of the list.

5.5 Topology elements

5.5.1 ConnectionPoint definition

The ConnectionPoint type ConnectionPoint_ISA100_Wireless shall be used to identify ISA100 WIRELESS network communication and is defined in Table 9. The ConnectionPoint type ConnectionPoint_ISA100_Wireless is a sub type of the abstract type ConnectionPointType defined in IEC 62541-100.

The DevAddr property shall be the IPV6 (16 bytes) address of the device.

The DevMfg property shall be the 4-byte UAPMO.IDENT_NUMBER.VendorID, and can be used to help automate the process of assigning live devices in the scan list to offline placeholders.

The DevType property shall be the 2-byte UAPMO.IDENT_NUMBER.ModelID, and can be used to help automate the process of assigning live devices in the scan list to offline placeholders.

The DevRev property shall be the UAPMO.UAPMO.IDENT_NUMBER.DeviceRevision, and can be used to help automate the process of assigning live devices in the scan list to offline placeholders.

The DevTag property shall be the DMO.Tag_Name (16 characters).

The DevPollAddr property shall be the DMO.DMO.DL_Address_16_Bit (2 bytes).

Table 9 – ConnectionPointType ConnectionPoint_ISA100_Wireless definition

Attribute	Value				
BrowseName	ConnectionPoint_ISA100_Wireless				
IsAbstract	False				
References	NodeClass	BrowseName	Data Type	TypeDefinition	ModellingRule
Inherits the properties of ConnectionPointType defined in IEC 62541-100.					
HasProperty	Variable	IPAddress	ByteString	PropertyType	Mandatory
HasProperty	Variable	DevMfg	UInt32	PropertyType	Optional
HasProperty	Variable	DevType	UInt16	PropertyType	Optional
HasProperty	Variable	DevRev	UInt16	PropertyType	Optional
HasProperty	Variable	DevTag	String	PropertyType	Optional
HasProperty	Variable	DevPollAddr	UInt16	PropertyType	Optional

The ConnectionPoint type ISA100_Wireless shall be described by an EDD element contained in a Communication Device related FDI® Package that can drive an ISA100 Wireless network. Actual ConnectionPoint properties are declared by VARIABLE constructs grouped together in a COLLECTION named ConnectionPoint_ISA100_Wireless_Properties. The following EDDL source code is an example describing ISA100 connection point.

```
COMPONENT ConnectionPoint_ISA100_Wireless
{
  LABEL "ISA100 Wireless Connection point";
  CLASSIFICATION NETWORK_CONNECTION_POINT;
  CAN_DELETE FALSE;
  PROTOCOL ISA100_Wireless;
  CONNECTION_POINT ConnectionPoint_ISA100_Wireless_Properties;
}
```

```
COLLECTION ConnectionPoint_ISA100_Wireless_Properties
{
  LABEL "ISA100 Wireless Connection Point data";

  MEMBERS
  {
    ADDRESS,      IPAddress,      "Device Address";
    MFG,          DevMfg,         "Manufacturer";
    DEV_TYPE,     DevType,        "Device Type";
    DEV_REV,      DevRev,         "Device Revision";
    TAG,          DevTag,         "Device Tag";
    POLL_ADDR,   DevPollAddr,    "Poll Address";
  }
}
```

```
VARIABLE IPAddress
{
  LABEL "ISA100 Wireless Node Address";
  HELP "Address of the ISA100 Node";
  CLASS DEVICE;
  TYPE OCTET (16 );

  HANDLING READ & WRITE;
}
```

```
VARIABLE DevMfg
{
```

```

LABEL "Manufacturer";
CLASS DEVICE;
TYPE UNSIGNED_INTEGER(4);
HANDLING READ & WRITE;
}

VARIABLE DevType
{
    LABEL "Model Id";
    CLASS DEVICE;
    TYPE UNSIGNED_INTEGER(2);
    HANDLING READ & WRITE;
}

VARIABLE DevRev
{
    LABEL "Device Revision";
    CLASS DEVICE;
    TYPE UNSIGNED_INTEGER(2);
    HANDLING READ & WRITE;
}

VARIABLE DevTag
{
    LABEL "Tag";
    CLASS DEVICE;
    TYPE ASCII(16);
    HANDLING READ & WRITE;
}

VARIABLE DevPollAddr
{
    LABEL "Poll Address";
    HELP "Short address of the device";
    CLASS DEVICE;
    TYPE UNSIGNED_INTEGER(2)
    {
        MIN_VALUE 01; //Define appropriate min value for various revisions
    }
    HANDLING READ & WRITE;
}

```

5.5.2 Communication Device definition

According to IEC 62769-7 each FDI[®] Communication Package shall contain an EDD element describing the communication device. The following EDDL source code in is an example describing a Communication Server.

```

COMPONENT ISA100_Wireless_Communication_Server
{
    LABEL "ISA100 Wireless communication server",
    PRODUCT_URI "urn:Wireless Compliance Institute:ISA100 Wireless
Communication Server";
    CAN_DELETE TRUE;
    CLASSIFICATION NETWORK_COMPONENT;
    COMPONENT_RELATIONS
    {
        ISA100_Wireless_Communication_Device_Setup
    }
}

```

```

COMPONENT_RELATION ISA100_Wireless_Communication_Device_Setup
{
  LABEL "Relation between Device and communication device";
  RELATION_TYPE CHILD_COMPONENT;
  ADDRESSING {IPAddress}
  COMPONENTS
  {
    ISA100_Wireless_Communication_Device{AUTO_CREATE 1;}
  }
}

```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI® server and FDI® Communication Server to create an instance of type CommunicationServerType as described in IEC 62769-7.

According to IEC 62769-7, each FDI® Communication Package shall contain at least one EDD element describing at least one Communication Device component. The following EDDL source code is an example for a ISA100 WIRELESS communication device

```

COMPONENT ISA100_Wireless_Communication_Device
{
  LABEL "ISA100 Wireless communication device";
  CAN_DELETE TRUE;
  CLASSIFICATION NETWORK_COMPONENT;
  COMPONENT_RELATIONS
  {
    ISA100_Wireless_Service_Provider_Relation
  }
}

COMPONENT_RELATION ISA100_Wireless_Service_Provider_Relation
{
  LABEL "ISA100 Wireless communication service provider";
  RELATION_TYPE CHILD_COMPONENT;
  COMPONENTS
  {
    ISA100_Wireless_Service_Provider{AUTO_CREATE 1;}
  }
  MINIMUM_NUMBER 1;
  MAXIMUM_NUMBER 1;
}

```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI® server and FDI® Communication Server to create an instance of type ServerCommunicationDeviceType as described in IEC 62769-7.

5.5.3 Communication service provider definition

According to IEC 62769-7, each FDI® Communication Package shall contain at least one EDD element describing at least one communication service provider component. The following EDDL source code below is an example for an ISA100 Wireless communication service provider component:

The component reference (ConnectionPoint_ISA100_Wireless) corresponds to the related connection point definition in 5.5.

```

COMPONENT ISA100_Wireless_Service_Provider
{

```

```

LABEL "ISA100 Wireless communication service provider";
CAN_DELETE FALSE;
CLASSIFICATION NETWORK_COMMUNICATION_SERVICE_PROVIDER;
COMPONENT_RELATIONS
{
    ISA100_Wireless_Connection_Point_Relation
}
BYTE_ORDER BIG_ENDIAN;
}

COMPONENT_RELATION
ISA100_Wireless_Service_Provider_Connection_Point_Relation
{
    LABEL "Relation between communication service provider and
connection point";
    RELATION_TYPE CHILD_COMPONENT;
    ADDRESSING {IPAddress}
    COMPONENTS
    {
        ConnectionPoint_ISA100_Wireless{ AUTO_CREATE 1;}
    }
    MINIMUM_NUMBER 1;
    MAXIMUM_NUMBER 1;
}

```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI® server and FDI® Communication Server to create an instance of type ServerCommunicationServiceType as described in IEC 62769-7.

5.5.4 Network definition

According to IEC 62769-7, each FDI® Communication Package shall contain at least one EDD element describing network configuration constraints using the component construct.

```

COMPONENT Network_ISA100_Wireless
{
    LABEL "ISA100 Network";
    CAN_DELETE TRUE;
    CLASSIFICATION NETWORK;
    PROTOCOL ISA100_WIRELESS;
    COMPONENT_RELATIONS
    {
        ISA100_Wireless_Network_Connection_Point_Relation
    }
}

COMPONENT_RELATION ISA100_Wireless_Network_Connection_Point_Relation
{
    LABEL "Relation between network and connection point";
    RELATION_TYPE CHILD_COMPONENT;
    ADDRESSING {IPAddress}
    COMPONENTS
    {
        ConnectionPoint_ISA100_Wireless
    }
    MINIMUM_NUMBER 1;
    MAXIMUM_NUMBER 1;
}

```

Semantics of the EDDL constructs shown with the EDDL source code above are described in IEC 62769-7. The EDDL COMPONENT will be utilized by the FDI® server and FDI®

Communication Server to create an instance of type NetworkType as described in IEC 62541-100.

5.6 Methods

5.6.1 Methods for FDI[®] Communication Servers

5.6.1.1 General

The Communication Server contained Information Model shall implement services according to method signatures described in 5.6.1.

5.6.1.2 Connect

Table 10 shows the Method Connect arguments.

Signature:

```
Connect (
    [in] ByteString      CommunicationRelationId,
    [in] ByteString      IPAddress,
    [in] UInt32          ConnectType,
    [out] Int32          ServiceError);
```

Table 10 – Method Connect arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the Device ConnectionPoint representing the connection between a device and a physical network which is directly connected to the FDI [®] Communication Server hardware. The nodeId allows finding the direct parent-child relation.
IPAddress	The argument name shall match with the corresponding attribute name defined for the ConnectionPoint which is described by a corresponding EDD element specified in 5.5.1. The argument value holds the device's node address.
ConnectType	ConnectType specifies the type of connection communication server shall make with the ISA100 Wireless device. Below are valid connection types 0: Client 1: Server 2: Publisher 3: Subscriber 4: Bulk Transfer Client 6: Reserved 7: Alert Subscription
ServiceError	0: OK / execution finished, connection established successfully -1: Connect Failed / canceled by caller -2: Call Failed / unknown service ID -3: Connect Failed / device not found -4: Connect Failed / invalid device node address -5: Connect Failed / invalid device identification

NOTE 1 IEC 62769-7 defines the argument AddressData of the Connect Method as an array of Variant. The address arguments defined with the table are represented as entries of the Variant array in the order they are specified above.

NOTE 2 IEC 62769-7 defines the argument DeviceInformation as a protocol specific argument list in which the Connect Method stores the resulting data. The DeviceInformation argument is defined as an array of Variant. The DeviceInformation argument is not used for ISA100 Wireless devices.

5.6.1.3 Disconnect

Table 11 shows the Method Disconnect arguments.

Signature:

```

Disconnect (
    [in]   ByteString      CommunicationRelationId,
    [out]  UInt32          ServiceError)
    
```

Table 11 – Method Disconnect arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the Device ConnectionPoint representing the connection between a device and a physical network which is directly connected to the FDI® Communication Server hardware. The nodeId allows finding the direct parent-child relation.
ServiceError	0: OK / disconnect finished successfully -1: Disconnect Failed / no existing communication relation -2: Disconnect Failed / invalid communication relation identifier

5.6.1.4 Transfer

Table 12 shows the Method Transfer arguments.

Signature

```

Transfer(
    [in]   ByteString      CommunicationRelationId,
    [in]   String          Operation,
    [in]   UInt16          AppID,
    [in]   UInt16          ObjectID,
    [in]   UInt16          AttrOrMethID,
    [in]   UInt16          SubIndex,
    [in]   Byte[]          WriteData,
    [in]   UInt32          RequestId,
    [out]  Byte[]          ReadData,
    [out]  Int32           ServiceError);
    
```

Table 12 – Method Transfer arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the ConnectionPoint representing the connection between a device and a physical network within the Information Model.
Operation	The argument value indicates the data transfer operation. The allowed values are "READ", "WRITE" and "EXECUTE".
AppID	The argument denotes the ID of the application in ISA100 Wireless device being addressed. The CFF file lists all the App IDs present in the device.
ObjectID	The argument denotes the ID of the Object in the application being addressed.
AttrOrMethID	The argument denotes the ID of the Attribute or the Method in an Object of the particular application being addressed. When the OPERATION is either READ or WRITE this ID shall refer to a valid Attribute number. And when OPERATION is EXECUTE then this ID shall refer to a valid Method number.
SubIndex	<p>OPERATION indicates "READ" or "WRITE": The argument denotes the subindex of a member of the Object's Attribute being addressed if the Attribute is of type RECORD or ARRAY.</p> <p>To address a simple attribute a value of 0 shall be passed with this argument.</p> <p>To address a specific member of an attribute of type RECORD or ARRAY a 1 relative value shall be passed with this argument.</p> <p>To address the attribute of type RECORD or ARRAY as a whole a value of 0 shall be passed with this argument.</p> <p>OPERATION indicates "EXECUTE": The argument shall be 0 and be ignored.</p>
WriteData	Write data encoded as byte array. Encoding of integers shall follow the rules defined in IEC 62541-6. The argument shall be ignored if OPERATION indicates a read transfer.
RequestID	The request transaction code establishes the relation between the request and the corresponding response.
ReadData	With this argument the read data byte stream is returned as byte array. Encoding of integers shall follow the rules defined in IEC 62541-6. The argument shall be ignored if OPERATION indicates a write transfer or execute transfer.
ServiceError	<ul style="list-style-type: none"> 0: OK / execution finished -1: Transfer Failed / canceled by caller -2: Call Failed / unknown request ID -3: Transfer Failed / no existing communication relation. -4: Transfer Failed / invalid communication relation identifier -5: Transfer Failed / invalid Request content -6: Transfer Failed / invalid Response format -xx
<p>NOTE 1 IEC 62769-7, defines the argument SendData of the Transfer Method as an array of Variant. The arguments Operation, AppID, ObjectID, AttrOrMethID, SubIndex, WriteData and RequestID defined in the table are represented as entries of the Variant array in the order they are specified above.</p> <p>NOTE 2 IEC 62769-7, defines the argument ReceiveData of the Transfer Method as an array of Variant. The argument ReadData defined in the table is represented as an entry of the Variant array in the order specified above.</p>	

5.6.1.5 GetPublishedData

ISA100 Wireless alerts represent unsolicited messages as defined in IEC 62769-7. Table 13 shows the Method GetPublishedData arguments.

NOTE ISA100 Wireless uses the term alerts to refer to alarms and event messages. These are asynchronous, unsolicited messages that deliver state change notifications such as diagnostic conditions. These messages are mapped to the GetPublishData service. ISA100 Wireless also uses the term publish to refer to synchronous, network scheduled communication for process values. These published messages are not mapped to the GetPublishedData service.

Signature:

GetPublishedData(

```
[in]  ByteString CommunicationRelationId,
[out] UInt16 AppID,
[out] UInt16 ObjectID,
[out] Byte[] AlarmEventData,
[out] UInt16 AlarmEventType,
[out] DateTime TimeStamp,
[out] Int32 ServiceError);
```

Table 13 – Method GetPublishedData arguments

Argument	Description
CommunicationRelationId	The argument value contains the nodeId of the ConnectionPoint representing the connection between a device and a physical network within the Information Model.
AppID	The output argument denotes the ID of the application in ISA100 WIRELESS device being addressed.
ObjectID	The output argument denotes the ID of the Object in the application being addressed.
AlarmEventData	With this argument the alarm/event data byte stream is returned as a byte array. Encoding of integers shall follow the rules defined in IEC 62541-6.
AlarmEventType	The two bytes of this UInt16 denotes below information AlertClass – Byte 1 Bit 0 AlarmDirection – Byte 1 Bit 1 AlertCategory – Byte 1 Bit 2 to Bit 3 AlertPriority – Byte 1 Bit 4 to Bit 7 AlertType – Byte 2 Bit 0 to Bit 7 Refer to IEC 62734:2014 for further details
TimeStamp	Denotes the time the alarm or event was detected by the device.
ServiceError	0: OK / execution finished -1: GetPublishedData Failed / canceled by caller -2: Call Failed / unknown service ID -3: GetPublishedData Failed / not supported -4: GetPublishedData Failed / no existing communication relation. -5: GetPublishedData Failed / invalid communication relation identifier -8: GetPublishedData Failed / no alarm/event data published. -9: GetPublishedData Failed / invalid AlarmEventType

The FDI[®] Server maintains an Information Model defined in IEC 62541-100. Hence topology elements representing an IS100ObjectType are separated from actual object instances. An instance called Objects of a ConfigurableObjectType is used to implement instantiation rules. Instantiation of objects is further detailed with IEC 62769-5. According to the rules defined in IEC 62769-5, the FDI[®] Server needs to gather information from the UAPMO. ObjectIDandType in order to be able to create object instances. This information shall be provided by the Scan Method defined in 5.6.1.7.

NOTE 1 IEC 62769-7 defines the argument SendData of the Transfer Method as an array of Variant. The argument RequestID defined in the table is represented as entries of the Variant array in the order specified above.

NOTE 2 IEC 62769-7 defines the argument ReceiveData of the GetPublishedData Method as an array of Variant. The arguments AppID, ObjectID, AlarmEventData and AlarmEventType defined in the table are represented as entries of the Variant array in the order they are specified above.

5.6.1.6 SetAddress

This service is not supported in ISA100 Wireless.

5.6.1.7 Scan

The Method signature specified in IEC 62769-7 applies. The corresponding topologyScanResult schema is specified in Annex A.

5.6.1.8 ResetScan

The Method signature specified in IEC 62769-7 applies.

5.6.2 Methods for Gateways

Not supported in this document.

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Annex A (normative)

Topology Scan result schema

A.1 General

The topology scan result schema specified in Annex A describes the ISA100 WIRELESS specific format Method Scan argument `topologyScanResult`. The XML document content and structure shall correspond to the Information Model designed concept to describe a topology in order to enable generic matching between physical devices connected to the network and the FDI[®] Server hosted Information Model.

A.2 Target Namespace

The target namespace defined for the scan result is defined by:

```
<xs:schema
  xmlns:isa100=" http://fdi-cooperation.com/2021/FDI/PROFILE/ISA100"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="http://fdi-
  cooperation.com/2021/FDI/PROFILE/ISA100"
  elementFormDefault="unqualified" version="1.1.0">
```

A.3 Network

The root element that is used to return the scan result of an ISA100 WIRELESS network.

The XML schema for a Network element is:

```
<xs:element name="Network" type="isa100:ISA100_WirelessNetworkT"/>
```

A.4 ISA100_WirelessNetworkT

A complex type that defines the network for ISA100 WIRELESS.

The XML schema for ISA100_WirelessNetworkT element is:

```
<xs:complexType name="ISA100_WirelessNetworkT">
  <xs:sequence>
    <xs:element name="ConnectionPoint"
      type="isa100:ISA100_WirelessConnectionPointT"
      maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>
```

The elements of an ISA100_WirelessNetworkT type are described in Table A.1.

Table A.1 – Elements of ISA100_WirelessNetworkT

Element	Description
ConnectionPoint	ISA100 WIRELESS connection point

A.5 ISA100_WirelessConnectionPointT

A complex type that defines the connection point for ISA100 WIRELESS. The XML schema for a ISA100_WirelessConnectionPointT type is:

```
<xs:complexType name="ISA100_WirelessConnectionPointT">
  <xs:sequence>
    <xs:element name="Identification"
type="isa100:ISA100_WirelessIdentificationT">
    </xs:element>
    <xs:element name="Address" type="isa100:ISA100_WirelessAddressT">
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

The elements of a ISA100_WirelessConnectionPointT type are described in Table A.2.

Table A.2 – Elements of ISA100_WirelessConnectionPointT

Element	Description
Identification	The element data holds the device type identification data. Compared to the Information Model (IEC 62769-5) the ConnectionPoint does not contain or refer to the device type identification data. But in order to support the FDI [®] host system in finding the package that matches the connected device this schema associates the device type identification with the ConnectionPoint.
Address	The address element holds the specific information used to uniquely address the device in the network.

A.6 ISA100_WirelessIdentificationT

The element content corresponds to the "FunctionalGroup Identification".

The XML schema for an ISA100_WirelessIdentificationT type is:

```
<xs:complexType name="ISA100_WirelessIdentificationT">
<xs:sequence>
  <xs:element minOccurs="1" maxOccurs="unbounded" name =
"ObjIdentification" type="isa100:ISA100_WirelessObjIdentificationT" />
</xs:sequence>
<xs:attribute name="DEV_TAG" type="xs:string" use="required">
</xs:attribute>
<xs:attribute name="MANUFAC_ID" type="xs:unsignedInt"
use="required">
</xs:attribute>
<xs:attribute name="DEV_TYPE" type="xs:unsignedShort"
use="required">
</xs:attribute>
<xs:attribute name="DEV_REV" type="xs:unsignedShort"
use="required">
</xs:attribute>
<xs:attribute name="ITS_VERSION" type="xs:unsignedShort"
use="required">
</xs:attribute></xs:complexType>
```

The attributes of an ISA100_WirelessIdentificationT type are described in Table A.3.

Table A.3 – Attributes of ISA100_WirelessIdentificationT

Attribute	Description
ObjectIdentification	List of ISA100 Object information that is currently activated in the device.
DEV_TAG	Tag of the device
MANUFAC_ID	See Table 7
DEV_TYPE	See Table 7
DEV_REV	See Table 7
ITS_VERSION	See Table 7

A.7 ISA100_WirelessAddressT

A complex type that defines the address structure for ISA100 WIRELESS. The XML schema for a ISA100_WirelessAddressT type is:

```
<xs:complexType name="ISA100_WirelessAddressT ">
  <xs:sequence>
    <xs:element name="IPv6Address">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:pattern value="([A-Fa-f0-9]{1,4}:){7}[A-Fa-f0-9]{1,4}"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

A.8 ISA_WirelessObjIdentificationT

A complex type that defines the object instance identification for an ISA100 WIRELESS device. The XML schema for a ISA100_WirelessObjIdentificationT type is:

```
<xs:complexType name="ISA100_WirelessObjIdentificationT">
  <xs:attribute name="OBJ_ID" type="xs:unsignedShort" use="required">
  </xs:attribute>
  <xs:attribute name="OBJ_TYPE" type="xs:unsignedShort"
  use="required">
  </xs:attribute>
  <xs:attribute name="OBJ_SUBTYPE" type="xs:unsignedShort"
  use="required">
  </xs:attribute>
  <xs:attribute name="OBJ_VENDOR_SUBTYPE" type="xs:unsignedShort"
  use="required"/>
</xs:complexType>
```

The attributes of an ISA100_WirelessObjIdentificationT type are described in Table A.3.

Table A.4 – Attributes of ISA100_WirelessObjIdentificationT

Attribute	Description
OBJ_ID	Unique identifier of the Object in UAP.
OBJ_TYPE	Type of the Object in UAP.
OBJ_SUBTYPE	Profile Sub type of the Object.
OBJ_VENDOR_SUBTYPE	Vendor Sub type of the Object.

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Annex B (normative)

Transfer service parameters

B.1 General

Direct Access Services specified in IEC TR 62541-2 enable the User Interface Plug-in (UIP) to directly exchange data with the device. Direct data exchange means that data exchanged between a device and a UIP may not be reflected in the Information Model. The IEC 62769-6 defined interface IDirectAccess corresponds to the IEC TR 62541-2 specified Direct Access Services. Interface IDirectAccess defined functions BeginTransfer and EndTransfer need to convey protocol specific information. The protocol specifics shall be captured in an XML document.

B.2 sendData

The element described in the following contains data to be submitted through the IDirectAccess function BeginTransfer defined argument sendData.

The XML schema for a sendData element is:

```
<xs:element name="sendData" type="isa100:TransferSendDataT"/>
```

B.3 receiveData

The element described in the following contains data that is returned through the IDirectAccess function EndTransfer defined return value.

The XML schema for a receiveData element is:

```
<xs:element name="receiveData" type="isa100:TransferResultDataT"/>
```

B.4 TransferSendDataT

A complex type that defines the service parameter data format that shall be applied to Transfer defined argument sendData.

The XML schema for a TransferSendDataT type is:

```
<xs:complexType name="TransferSendDataT">
  <xs:attribute name="OPERATION" type="isa100:OperationT"
    use="required"/>
  <xs:attribute name="OBJ_ID" type="xs:unsignedShort"
    use="required"/>
  <xs:attribute name="ATTR_ID" type="xs:unsignedShort"
    use="required"/>
  <xs:attribute name="ATTR_INDEX" type="xs:unsignedShort"
    use="optional"/>
  <xs:attribute name="DATA" type="xs:hexBinary" use="optional"/>
</xs:complexType>
```

The attributes of a TransferSendDataT type are described in Table B.1.

Table B.1 – Attributes of TransferSendDataT

Attribute	Description
OPERATION	Data transfer operation
OBJ_ID	Unique identifier of the Object in UAP.
ATTR_ID	Unique identifier of the Attribute in the Object.
ATTR_INDEX	Sub index of the Attribute in case of aggregate data type attribute
DATA	Mandatory attribute for data to be transferred in the service WRITE operation. This attribute is not used for the READ. This attribute may or may not be used for EXECUTE service operation.

B.5 OperationT

A simple type that defines service operations.

The XML schema for an OperationT enumeration type is:

```
<xs:simpleType name="OperationT">
  <xs:restriction base="xs:string">
    <xs:enumeration value="READ"/>
    <xs:enumeration value="WRITE"/>
    <xs:enumeration value="EXECUTE"/>
  </xs:restriction>
</xs:simpleType>
```

The enumeration values of a OperationT enumeration type are described in Table B.2.

Table B.2 – Enumerations of OperationT

Enumeration	Description
READ	Read Service according to IEC 62734:2014, 12.22.2.6
WRITE	Write Service according to IEC 62734:2014, 12.22.2.7
EXECUTE	Execute Service according to IEC 62734:2014, 12.22.2.8

B.6 TransferResultDataT

A complex type that defines the service parameter data format that shall be applied to Transfer defined receiveData return value.

The XML schema for a TransferResultDataT type is:

```
<xs:complexType name="TransferResultDataT">
  <xs:attribute name="DATA" type="xs:hexBinary" use="optional"/>
</xs:complexType>
```

The attributes of a TransferResultDataT type are described in Table B.3.

Table B.3 – Attributes of TransferResultDataT

Attribute	Description
DATA	Data received after the service operation. This attribute is required for the READ and EXECUTE service operations.

Bibliography

IEC 62769 (all parts), *Field device integration (FDI)*[®]

REC-xml-20081126, Extensible Markup Language (XML) 1.0 (Fifth Edition) – W3C Recommendation 26 November 2008, available at <http://www.w3.org/TR/xml/>

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INTÉGRATION DES APPAREILS DE TERRAIN (FDI®) –

Partie 150-1: Profils – ISA100

AVANT-PROPOS

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Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) ajout d'un espace de noms à l'Annexe A.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
65E/866/CDV	65E/923/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

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INTÉGRATION DES APPAREILS DE TERRAIN (FDI®) –

Partie 150-1: Profils – ISA100

1 Domaine d'application

La présente partie de l'IEC 62769 spécifie un profil FDI^{®1} de l'IEC 62769 pour le profil ISA100.11a² défini dans l'IEC 62734.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 62734:2014, *Réseaux industriels – Réseau de communication sans fil et profils de communication – ISA 100.11a*

IEC 61804 (toutes les parties), *Les dispositifs et leur intégration dans les systèmes de l'entreprise – Blocs fonctionnels (FB) pour les procédés industriels et le langage de description électronique de produit (EDDL)*

IEC TR 62541-2, *OPC Unified Architecture – Part 2: Security Model* (disponible en anglais seulement)

IEC 62541-100:2015, *Architecture unifiée OPC – Partie 100: Interface d'appareils*

IEC 62734:2014, *Réseaux industriels – Réseau de communications sans fil et profils de communication – ISA 100.11a*

IEC 62769-4, *Intégration des appareils de terrain (FDI®) – Partie 4: Paquetages FDI®*

IEC 62769-5, *Intégration des appareils de terrain (FDI®) – Partie 5: Modèle d'Information*

IEC 62769-6, *Intégration des appareils de terrain (FDI®) – Partie 6: Mapping de technologies*

IEC 62769-7, *Intégration des appareils de terrain (FDI®) – Partie 7: Appareils de communication*

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3 Termes, définitions, abréviations et acronymes

3.1 Termes et définitions

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- IEC Electropedia: disponible à l'adresse <http://www.electropedia.org/>
- ISO Online browsing platform: disponible à l'adresse <http://www.iso.org/obp>

3.1.1

Objet

entité de base qui définit le comportement et les fonctionnalités normalisés d'un appareil sans fil ISA100 WIRELESS

3.2 Abréviations et acronymes

Pour les besoins de la présente spécification, les abréviations suivantes s'appliquent.

EDD (Electronic Device Description)	Description électronique de produit
EDDL (Electronic Device Description Language)	Langage de description électronique de produit (voir l'IEC 61804 (toutes les parties))
FDI® (Field Device Integration)	Intégration des appareils de terrain
FCG	FieldComm Group
XML (Extensible Markup Language)	Langage de balisage extensible (voir REC-xml-20081126)
CFF (Common File Format)	Format de fichier commun
UAP (User Application Process)	Processus d'application utilisateur
UAPMO (User Application Process Management Object)	Objet de gestion de processus d'application utilisateur
DMO (Device Management Object)	Objet de gestion d'appareils
IM (Information Model)	Modèle d'information
SM (System Manager)	Gestionnaire de système
WCI	Wireless Compliance Institute
CP (Communication Profile)	Profil de communication

4 Conventions

4.1 Syntaxe EDDL

La présente partie de l'IEC 62769 spécifie le contenu du composant EDD qui fait partie des Paquetages de communication FDI®. Le contenu de la spécification qui utilise la syntaxe EDDL est rédigé avec la police Courier New. La syntaxe EDDL est utilisée pour les déclarations de signature de méthode, de variable, de structure de données et de composant.

4.2 Syntaxe XML

Les exemples de syntaxe XML utilisent la police Courier New. La syntaxe XML est utilisée pour décrire le schéma des documents XML.

Exemple: <xs:simpleType name="ExampleType">

4.3 Utilisation de majuscules

La série IEC 62769 utilise des termes en majuscules pour souligner que ces termes ont une signification spécifique de la FDI®.

Certains de ces termes utilisent un acronyme comme préfixe, par exemple:

- Client FDI®; ou
- Serveur FDI®.

Certains de ces termes sont des termes composés, par exemple:

- Serveurs de communication; ou
- Paquetage de profil.

Les noms de paramètres ou attributs sont concaténés en un seul et même terme, où les termes d'origine composant ce terme commencent par une lettre majuscule. Par exemple:

- ProtocolSupportFile; ou
- ProtocolType.

Les noms de paramètres ou attributs peuvent également être combinés au moyen d'un trait de soulignement afin de concaténer deux ou plusieurs termes. Par exemple:

- DEVICE_REV; ou
- DEVICE_MODEL.

5 Profil pour ISA100 WIRELESS

5.1 Généralités

Ce profil spécifie les éléments spécifiques du protocole nécessaires aux Paquetages FDI® qui décrivent les serveurs de communication, les passerelles et les appareils.

L'Annexe B définit le schéma XML des Services d'accès direct.

5.2 Profil de catalogue

5.2.1 Fichier de prise en charge de protocole

5.2.1.1 Fichier de capacité

Chaque Paquetage d'Appareil FDI® ISA100 WIRELESS doit contenir un fichier de capacité. La partie fichier de capacité est décrite dans le Tableau 1.

Tableau 1 – Partie fichier de capacité

Paramètre	Description
Type de contenu:	Texte brut
Espace de noms racine:	Non applicable
Relation source:	http://fdi-cooperation.com/2010/relationships/attachment-protocol
Nom de fichier:	Utiliser l'extension de fichier .CFF

5.2.2 Définition du CommunicationProfile

L'IEC 62769-4 définit une chaîne CommunicationProfileT pour le schéma XML Catalog. La valeur spécifique à ISA100 WIRELESS doit être "ISA100_Wireless".

5.2.3 Appareil de profil

Non pris en charge dans le présent document.

5.2.4 Informations relatives à la version du protocole

L'IEC 62769-4 définit un type d'élément nommé InterfaceT pour le schéma XML Catalog. Le type d'élément InterfaceT contient un élément nommé Version qui a pour objet de fournir des informations de version relatives au profil de protocole de communication appliqué. La valeur doit respecter le schéma d'informations de version de l'IEC 62769-4 défini dans le type d'élément VersionT.

L'ISA100 WIRELESS définit la version du protocole en tant que valeur du paramètre DMO.Comm_SW_Minor_Version. La valeur "0" indique la version de protocole 2009. La valeur "1" indique la version de protocole 2011. La règle générale consiste à utiliser la valeur du paramètre DMO.Comm_SW_Minor_Version pour la partie version majeure de VersionT et la valeur "0" pour les parties version mineure et numéro de compilation (build). Le Tableau 2 donne les informations relatives à la version du protocole.

Tableau 2 – Informations relatives à la version du protocole

Version de protocole	Valeur de version InterfaceT
ISA100 WIRELESS 2009	1.0.0
ISA100 WIRELESS 2011	2.0.0
La Version de protocole définie dans un paquetage est fournie à titre d'information seulement; elle ne doit pas être utilisée pour déterminer la compatibilité ou l'applicabilité d'un paquetage à un appareil.	

5.3 Association d'un Paquetage à un appareil

5.3.1 Mapping d'identification du type d'appareil

L'objet du mapping d'identification du type d'appareil est de configurer les systèmes Hôtes FDI® afin qu'ils comparent le résultat du balayage à la représentation topologique dans le Modèle d'information. Les systèmes Hôtes FDI® doivent également être configurés afin de déterminer le Paquetage d'Appareil FDI® qui convient pour une entrée d'appareil contenue dans le résultat du balayage. Cela permet à l'utilisateur d'un système Hôte FDI® de synchroniser le Modèle d'information avec l'installation réelle.

Le service de balayage mis en œuvre dans le Serveur de Communication (défini au 5.6.1.7) fournit le résultat du balayage par l'intermédiaire d'un document XML (le schéma est défini à l'Article A.6).

Le résultat du balayage contient les informations d'identification de type d'appareil et d'identification d'instance d'appareil.

Les systèmes Hôtes FDI®, qui comparent la configuration de la topologie réseau réelle à la représentation topologique du Modèle d'information, doivent être en mesure de gérer les situations suivantes:

- l'instance d'Appareil physique identifiée à une adresse d'appareil spécifique n'est pas logiquement présente dans le Modèle d'information (en tant qu'Instance): configurer le

système Hôte FDI® afin qu'il trouve le Paquetage d'Appareil FDI® approprié en fonction des informations du catalogue d'appareils;

- b) l'instance d'Appareil physique identifiée par l'adresse de l'appareil est logiquement présente dans le Modèle d'information (en tant qu'Instance): configurer le système Hôte FDI® afin qu'il compare les informations de type d'appareil fournies dans le résultat du balayage (voir l'identification à l'Article A.6) aux informations spécifiques du type d'appareil de l'Instance fournies dans le Modèle d'information.

Le Paquetage d'Appareil FDI® contient des informations d'identification de type d'appareil qui peuvent être comparées au résultat du balayage issu du schéma Catalog de l'IEC 62769-4, qui définit les types d'éléments XML (simples) "DeviceModel" et "Manufacturer".

Après le déploiement du Paquetage FDI®, les informations relatives au Paquetage FDI® sont alors présentes dans le Modèle d'information sous la forme du FunctionalGroup "Identification" spécifié, qui contient les éléments SerialNumber et Tag (voir 5.4.3).

Le mapping entre les différentes sources de données d'identification d'appareil est décrit dans le Tableau 3. Etant donné que les résultats du balayage fournis par le Serveur de Communication peuvent comporter des données produites par l'appareil (micrologiciel), le mapping d'identification de type d'appareil doit être assuré en fournissant les données correspondantes fournies dans le Catalogue et le Modèle d'Information du Paquetage d'Appareil FDI®.

Tableau 3 – Mapping des informations d'identification d'appareil

Paquetage d'Appareil FDI®	Modèle d'information	Résultat du balayage fourni par le Serveur de Communication
Type spécifié dans le catalogue Manufacturer	FunctionalGroup: Identification Nom d'exploration: Manufacturer	Élément (chemin): ConnectionPoint/Identification Attribut: Manufacturer
Type spécifié dans le catalogue DeviceModel	FunctionalGroup: Identification Nom d'exploration: DeviceModel	Élément (chemin): ConnectionPoint/Identification Attribut: DeviceModel

Les types d'appareils ISA100 WIRELESS sont identifiés de manière unique par les paramètres UAPMO.IDENT_NUMBER trouvés dans l'UAPMO. Le paramètre IDENT_NUMBER contient l'ID de fournisseur (Vendor ID), l'ID de modèle (Model ID) et la Révision de l'appareil (Device Revision). Ces paramètres sont utilisés pour associer une instance d'appareil donnée à un Paquetage d'Appareil FDI®. Ces paramètres sont mappés avec le Catalogue de Paquetage d'Appareil FDI® conformément au Tableau 4.

Tableau 4 – Mapping dans le catalogue des types d'appareils

Élément Catalog	Mapping des types d'appareils CP
Élément Manufacturer de InterfaceT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x00FFFFFF00000000 Format de chaîne "0xdddddd", où ddddd est le numéro d'ID de fournisseur au format hexadécimal.
Élément DeviceModel d'InterfaceT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x00000000FFFF0000 Format de chaîne "0xdddd", où dddd est le numéro d'ID de modèle au format hexadécimal.
Élément DeviceRevision de ListOfSupportedDeviceRevisionsT (IEC 62769-4)	UAPMO.IDENT_NUMBER 0x000000000000FFFF Format de chaîne "x.0.0", où x représente la révision de l'appareil au format décimal (aucun zéro de tête).

5.3.2 Mapping de révision de type d'appareil

L'IEC 62769-4 prévoit un concept qui permet de déterminer la compatibilité entre un Paquetage d'Appareil FDI® et un Appareil. L'IEC 62769-4 spécifie un processus de gestion du cycle de vie qui s'appuie sur une information de version unique fournie pour l'ensemble de l'appareil. Le mapping des informations de version est défini dans le Tableau 4.

5.4 Mapping du Modèle d'information

5.4.1 Définition du ProtocolType

Dans le Tableau 5, un sous-type du ProtocolType est défini pour identifier la communication réseau à l'aide de ce profil.

Tableau 5 – Type de protocole ISA100 WIRELESS

Attribut	Valeur				
BrowseName	ISA100_Wireless				
IsAbstract	False				
Références	NodeClass	BrowseName	DataType	TypeDefinition	ModellingRule
Sous-type du ProtocolType défini dans l'IEC 62541-100.					

5.4.2 Mapping de DeviceType

Chaque type d'appareil hérite des propriétés du DeviceType. Le mapping des propriétés héritées du DeviceType est défini dans le Tableau 6.

Tableau 6 – Mapping des propriétés héritées du DeviceType

Propriété	Mapping ISA100 WIRELESS
SerialNumber	DMO.EUI_64 – identifiant unique étendu de 8 octets défini dans le DMO
RevisionCounter	UAPMO.Static_Revision_Level – compteur de révision de 2 octets défini dans l'UAPMO
Manufacturer	Chaîne issue du Catalogue de Paquetage FDI® (ManufacturerName issu de PackageT)
Model	Chaîne issue du Catalogue de Paquetage FDI® (Name de DeviceTypeT, qui est un nom localisé)
DeviceManual	Chaîne de texte vide (non prise en charge) ^a
DeviceRevision	DEV_REV (UAPMO)
SoftwareRevision	Chaîne vide (non définie)
HardwareRevision	Chaîne vide (non définie)

^a Les manuels de l'appareil sont présentés sous forme de pièces jointes du Paquetage d'Appareil FDI®.

5.4.3 Définition du FunctionalGroup "Identification"

Comme cela est défini en 5.3 de l'IEC 62541-100:2015, chaque représentation d'appareil dans le Modèle d'information hébergé sur le Serveur FDI® doit contenir un FunctionalGroup spécifique d'un protocole, appelé Identification. Ce FunctionalGroup organise les variables qui se trouvent dans l'UAPMO de l'instance de type d'appareil. Le FunctionalGroup "Identification" pour ISA100 WIRELESS est défini dans le Tableau 7.

Tableau 7 – Attributs d'identification des types d'appareils ISA100 WIRELESS

BrowseName	DataType	Obligatoire/Facultatif
MANUFAC_ID	UInt32	Obligatoire
DEV_TYPE	UInt16	Obligatoire
DEV_REV	UInt16	Obligatoire
HARDWARE_REV	String	Facultatif
SOFTWARE_REV	String	Facultatif
ITS_VER	UInt16	Obligatoire

5.4.4 Mapping des propriétés du BlockType

Les types d'appareils ISA100 WIRELESS sont orientés objet et sont dits "orientés bloc" selon l'IEC 62541-100. L'IEC 62769-5 spécifie le mapping des éléments EDDL BLOCK_A aux types et instances de blocs.

Le BLOCK_A est mappé comme un sous-type de l'élément de topologie BlockType et hérite des propriétés indiquées dans l'IEC 62541-100. Le mapping des propriétés héritées du BlockType est spécifié dans le Tableau 8.

Tableau 8 – Mapping des propriétés héritées du BlockType

Propriété	Mapping ISA100 Wireless (ParameterSet d'Objet)
RevisionCounter	ST_REV
ActualMode	MODE_BLK.ACTUAL
PermittedMode	MODE_BLK.PERMITTED
NormalMode	MODE_BLK.NORMAL
TargetMode	MODE_BLK.TARGET

5.4.5 Mapping avec le ParameterSet d'Objet

Le ParameterSet se rapporte à chaque Objet. Le ParameterSet inclut tous les paramètres qui se trouvent dans PARAMETERS, LOCAL_PARAMETERS et LIST_ITEMS.

Le nom d'exploration des paramètres qui se trouvent dans PARAMETERS et LOCAL_PARAMETERS est le nom du membre dans les listes respectives. Par exemple, ST_REV est le nom d'exploration du paramètre Static Revision. LIST_ITEMS n'a pas de noms de membres; par conséquent, le nom d'exploration de chaque LIST dans LIST_ITEMS est le nom d'élément de la liste.

5.5 Eléments de topologie

5.5.1 Définition du ConnectionPoint

Le ConnectionPoint de type ConnectionPoint_ISA100_Wireless doit être utilisé pour identifier la communication du réseau ISA100 WIRELESS; il est défini dans le Tableau 9. Le ConnectionPoint de type ConnectionPoint_ISA100_Wireless est un sous-type du type abstrait ConnectionPointType défini dans l'IEC 62541-100.

La propriété DevAddr doit correspondre à l'adresse IPV6 (16 octets) de l'appareil.

La propriété DevMfg doit correspondre au UAPMO.IDENT_NUMBER.VendorID de 4 octets; elle peut être utilisée pour favoriser l'automatisation du processus d'attribution des appareils actifs de la liste de balayage aux espaces réservés hors ligne.

La propriété DevType doit correspondre au APMO.IDENT_NUMBER.ModelID de 2 octets; elle peut être utilisée pour favoriser l'automatisation du processus d'attribution des appareils actifs de la liste de balayage aux espaces réservés hors ligne.

La propriété DevRev doit correspondre au UAPMO.UAPMO.IDENT_NUMBER.DeviceRevision; elle peut être utilisée pour favoriser l'automatisation du processus d'attribution des appareils actifs de la liste de balayage aux espaces réservés hors ligne.

La propriété DevTag doit correspondre au DMO.Tag_Name (16 caractères).

La propriété DevPollAddr doit correspondre au DMO.DMO.DL_Address_16_Bit (2 octets).

Tableau 9 – Définition du ConnectionPointType ConnectionPoint_ISA100_Wireless

Attribut	Valeur				
BrowseName	ConnectionPoint_ISA100_Wireless				
IsAbstract	False				
Références	NodeClass	BrowseName	DataType	TypeDefinition	ModellingRule
Hérite des propriétés de ConnectionPointType défini dans l'IEC 62541-100.					
HasProperty	Variable	IPAddress	ByteString	PropertyType	Obligatoire
HasProperty	Variable	DevMfg	UInt32	PropertyType	Facultatif
HasProperty	Variable	DevType	UInt16	PropertyType	Facultatif
HasProperty	Variable	DevRev	UInt16	PropertyType	Facultatif
HasProperty	Variable	DevTag	String	PropertyType	Facultatif
HasProperty	Variable	DevPollAddr	UInt16	PropertyType	Facultatif

Le ConnectionPoint de type ISA100_Wireless doit être décrit par un élément EDD contenu dans le Paquetage FDI® associé à un Appareil de communication, qui peut piloter un réseau ISA100 WIRELESS. Les propriétés réelles de ConnectionPoint sont déclarées par des constructions VARIABLE regroupées dans une COLLECTION nommée ConnectionPoint_ISA100_Wireless_Properties. Le code source EDDL ci-après est un exemple qui décrit un point de connexion ISA100.

```
COMPONENT ConnectionPoint_ISA100_Wireless
{
  LABEL "ISA100 Wireless Connection point";
  CLASSIFICATION NETWORK_CONNECTION_POINT;
  CAN_DELETE FALSE;
  PROTOCOL ISA100_Wireless;
  CONNECTION_POINT ConnectionPoint_ISA100_Wireless_Properties;
}
```

```
COLLECTION ConnectionPoint_ISA100_Wireless_Properties
{
  LABEL "ISA100 Wireless Connection Point data";

  MEMBERS
  {
    ADDRESS,      IPAddress,      "Device Address";
    MFG,          DevMfg,          "Manufacturer";
    DEV_TYPE,     DevType,         "Device Type";
    DEV_REV,      DevRev,          "Device Revision";
  }
}
```

```
TAG,          DevTag,          "Device Tag";
POLL_ADDR,   DevPollAddr,    "Poll Address";
}
}

VARIABLE IPAddress
{
  LABEL "ISA100 Wireless Node Address";
  HELP "Address of the ISA100 Node";
  CLASS DEVICE;
  TYPE OCTET (16 );

  HANDLING READ & WRITE;
}

VARIABLE DevMfg
{
  LABEL "Manufacturer";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(4);
  HANDLING READ & WRITE;
}

VARIABLE DevType
{
  LABEL "Model Id";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(2);
  HANDLING READ & WRITE;
}

VARIABLE DevRev
{
  LABEL "Device Revision";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(2);
  HANDLING READ & WRITE;
}

VARIABLE DevTag
{
  LABEL "Tag";
  CLASS DEVICE;
  TYPE ASCII(16);
  HANDLING READ & WRITE;
}

VARIABLE DevPollAddr
{
  LABEL "Poll Address";
  HELP "Short address of the device";
  CLASS DEVICE;
  TYPE UNSIGNED_INTEGER(2)
  {
    MIN_VALUE 01; //Define appropriate min value for various revisions
  }
  HANDLING READ & WRITE;
}
```