IDIS
INTEROPERABILITY SPECIFICATION

Package 2
IP Profile

Edition 2.0 (including G3-PLC), 03-09-2014

EXCERPT

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1. Foreword

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THE USE OF THE IDIS LOGO AND THE IDIS TEST LABEL

The IDIS logo is a registered trademark. The use of the logo is regulated by the IDIS Industry Association.

The IDIS test label is granted by the IDIS Industry Association for registered equipment which has passed the IDIS interoperability test. The interoperability testing and the use of the test label is regulated by the IDIS Industry Association.

2. Scope

2.1 Scope of IDIS

The IDIS Association develops, maintains and promotes publicly available technical interoperability specifications (“IDIS Specifications”) based on open standards and supports their implementation in interoperable products. The Association manages, administers and protects the IDIS quality label (IDIS = “Interoperable Device Interface Specifications”) and supports rigorous interoperability testing to ensure high quality standards.

The IDIS specifications are completely based on existing standards. In order to ensure true interoperability between the IDIS devices the IDIS specifications define specific choices of the different options offered by the standards. The purpose of the IDIS specifications is to close the gaps left by the standards and thus reducing integration and operation costs (comp. Figure 1)

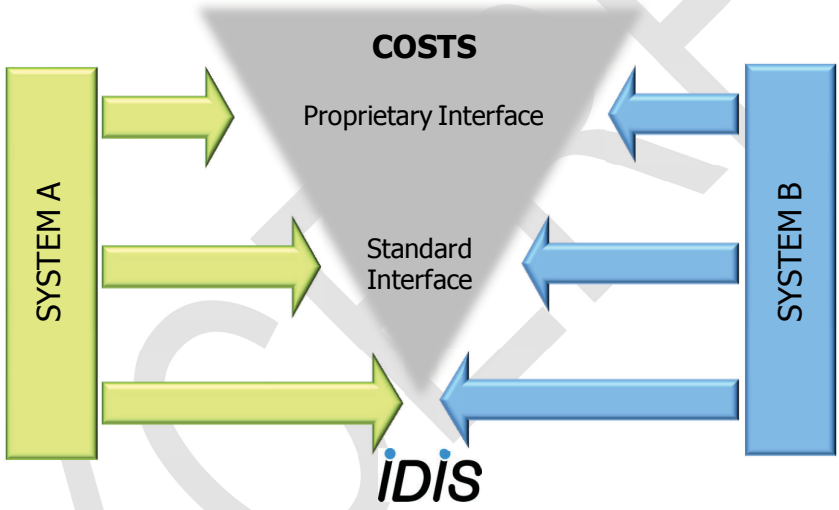


Figure 1: Costs to integrate and operate different types of interfaces

2.2 Scope of this document

This document is part of the IDIS Interoperability Package 2. It specifies the functionality of an IDIS device integrated into a IP communication network.

The functionality of the IDIS device is based on the DLMS/COSEM standards.

3. Introduction

3.1 Referenced Documents

Ref.	Title
DLMS UA 1000-2 Ed. 8.0:2014	*DLMS/COSEM Architecture and Protocols, the "Green Book"*
DLMS UA 1000-1 Ed. 12.0	*COSEM Identification System and Interface Classes, the "Blue Book" Ed. 12*
IDIS P2-OBJ Ed.2.0	*IDIS Package 2, Smart metering Objects, Ed.2.0*
IDIS P1-PLC-P Ed.1.1	*IDIS Package 1, PLC Profile Specification, Ed.1.1*
EN 13757-1:2002	*Communication system for meters and remote reading of meters – Part 1: Data exchange*
EN 13757-2:2002	*Communication system for meters and remote reading of meters – Part 2: Physical and Link layer*
EN 13757-3:2004	*Communication systems for and remote reading of meters – Part 3: Dedicated application layer*
IEC 62056-1-0/Ed.1/FDIS	ELECTRICITY METERING DATA EXCHANGE – The DLMS/COSEM suite – Part 1-0: Smart metering standardisation framewor
IEC 62056-21 Ed. 1.0:2002	*Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange*
IEC 62056-46 Ed. 1.1:2007	*Electricity metering – Data exchange for meter reading, tariff and load control – Part 46: Data link layer using HDLC protocol*
IEC 62056-5-3:2013 Amd.1 CDV	ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE – Part 5-3: DLMS/COSEM application layer – Amendment 1
IEC 62056-6-1:2013 Amd.1 CDV	ELECTRICITY METERING DATA EXCHANGE - The DLMS/COSEM SUITE - Part 6-1: Object Identification System (OBIS) – Amendment 1
IEC 62056-6-2:2013 Amd.1 CDV	ELECTRICITY METERING DATA EXCHANGE – THE DLMS/COSEM SUITE – Part 6-2: COSEM interface classes – Amendment 1
STD0006 (1980)	User Datagram Protocol. Also: RFC0768
STD0007 (1981)	Transmission Control Protocol. Also: RFC0793
IETF STD 0005:1981	Internet Engineering Task Force (IETF): Internet Protocol. J. Postel. September 1981. (Also IETF RFC0791, RFC0792, RFC0919, RFC0922, RFC0950, RFC1112) Available from: http://www.faqs.org/rfcs/std/std5.html
IETF STD 0051:1994	Internet Engineering Task Force (IETF): The Point-to-Point Protocol (PPP). W. Simpson, Ed.. July 1994. (Also RFC1661, RFC1662) Available from: http://www.faqs.org/rfcs/std/std51.html
"How to get the IDIS Test Label ", R1.1, April 2012"	"How to get the IDIS Test Label ", R1.1, April 2012, IDIS association Available from http://www.idis-association.com
ITU-T G.9903 (05/2013)	SERIES G: TRANSMISSION SYSTEMS AND MEDIA,DIGITAL SYSTEMS AND NETWORKS, Access networks – In premises networks -Narrowband orthogonal frequency division multiplexing power line communication transceivers for G3-PLC networks.
IEEE Std 1901.2-2013	IEEE Standard for Low-Frequency (less than 500 kHz) Narrowband Power Line Communication for Smart Grid Applications

3.2 Terms, Definitions and Abbreviations

Abbreviation	Explanation
AA	Application Association
AARE	Application Association Response

Abbreviation	Explanation
AARQ	Application Association ReQuest
ACSE	Association Control Service Element
APDU	Application Protocol Data Unit
ASE	Application Service Element
A-XDR	Adapted Extended Data Representation
CII	Consumer Information Interface
CIP	Consumer Information Push
class_id	Interface class identification code
COSEM	Companion Specification for Energy Metering
COSEM object	An instance of a COSEM interface class
DC	Data Concentrator used for PLC communication
DLMS	Device Language Message Specification
ERP	Enterprise Resource Planning
FC	Frame Counter
G3	G3 PLC supporting IPv6
GCM	Galois/Counter Mode, an algorithm for authenticated encryption with associated data
UTC	Coordinated Universal Time (replaces GMT in IDIS package 1)
CSD	Circuit Switched Data
HDLC	High-level Data Link Control
HES	Head End System similar to MDC
HLS	COSEM High Level Security
IC	COSEM Interface Class
IEC	International Electrotechnical Commission
LLC	Logical Link Control (Sublayer)
LLS	COSEM Low Level Security
LN	COSEM Logical Name
MDC	Meter Data Collect similar to HES
MDM	Meter Data Management
NN	Neighborhood Network as defined in IEC 62056-1-0/Ed.1/FDISIEC 62056-1-0/Ed.1/FDISIEC 62056-1-0/Ed.1/FDIS
OBIS	Object Identification System
PDU	Protocol Data Unit
PUSH	the data is pushed by the meter to the HES using the Data Notification service
SAP	Service Access Point
SMS	Short Message Service
L_SAP	Link layer Service Access Point

3.2.1 Expressions/Definitions used throughout the document:

Expression	Definition
“reserved” or “reserved for future use”	Strictly reserved for IDIS use; i.e. these values must NOT be used for any manufacturer specific extensions.

“manufacturer specific”	The choice of this parameter is left to the manufacturer: The manufacturer is responsible to avoid any inconsistencies.
“optional “ (features)	These features may be implemented by the manufacturer. The testing of these features is not part of the conformance test.
“optional objects”	The implementation of the “optional objects” is left to the manufacturer. If optional objects are identified in the “Optional Objects List” by the manufacturer they will become part of the conformance test.
“default values”	For conformance testing the manufacturer has to set the attributes to the default values as defined in IDIS P2-OBJ Ed.2.0. For those attributes where no default value is defined the manufacturer may set any value within the allowed range.

3.3 Revision History

Version	Date	Editor	Comment
Edition 1.0		IDIS Association	Internal release
Edition 1.1	30.09.13	IDIS Association	Public release based on w05
Edition 1.2	15.11.13	IDIS Association	Public release based on w09
Edition 2.0	03.09.14	IDIS Association	Public release based on: *draftIDIS-S02-001 E2.0 IDIS Pack2 IP profile 140903* Replaces Ed. 1.2 (15.11.2013) and Corrigendum 2 (02.05.2014).

4. IDIS Conformance Testing

IDIS components are tested for conformity according to the rules set by the IDIS Industry Association. More details can be found in “How to get the IDIS Test Label “, R1.1, April 2012”.

By introducing new mandatory functionalities with a new package N+k a device conforming to package N cannot conform to the specifications of package N+k.

Every IDIS devices carries an **IDIS Test Label** which identifies:

- the *Extensions* (comp. 7.2) to the minimal IDIS functionality implemented in this device
- the *Test Report* produced by the type-testing of this device

Examples of the IDIS test labels:

Device supporting Basic functionality of IDIS package 2

IDIS 2
No 100820

Device supporting Basic, Disconnector and Multi-Utility functionality of IDIS package 2

IDIS 2DM
No 100840

Device supporting Basic, Disconnector. Load Management and Multi-utility functionality of IDIS package 2

IDIS 2DLM
No 100110

The **Test Report** clearly identifies:

- The type and manufacturer of the device
- The Extensions supported by the device
- The additional *Options* supported by the device

Test Reports are available through the IDIS association.

NB: depending on the IP supporting medium, additional medium specific tests may be required by the IDIS association.

5. IDIS System Architecture

5.1 Basic principles

IDIS package 2 supports direct communication between the electricity meter and the HES via interface I3. Further, PLC communication between the meter and the concentrator via interface I3.1 is supported.

The green parts shown in Figure 2 are supported by IDIS package 2.

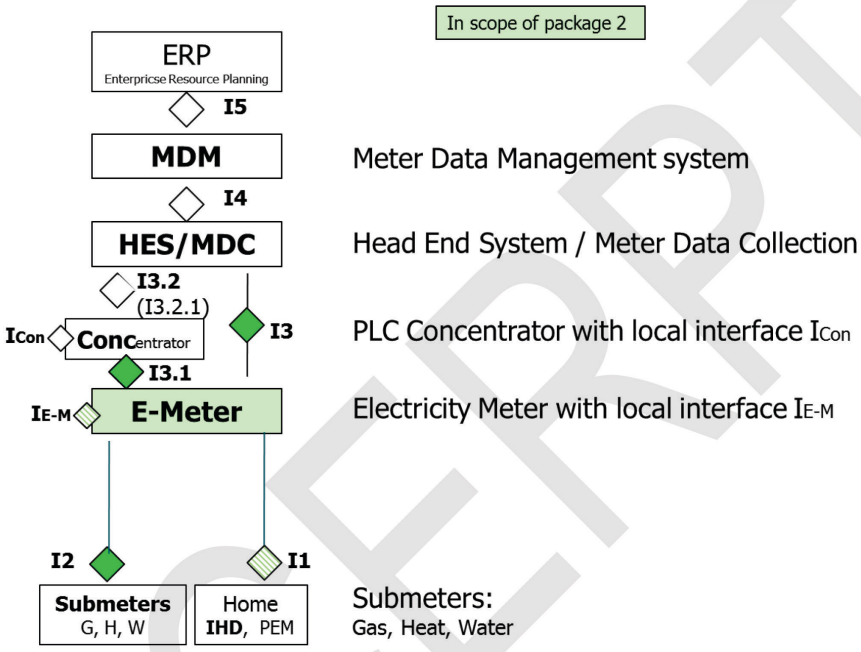


Figure 2: System architecture supported by IDIS package 2

For I1 and I_{E-M} IDIS package 2 defines the required functionality but the choice of the physical interface is left to the manufacturer.

The following interfaces are *NOT* in scope of IDIS package 2: I5, I4, I3.2, and the local interfaces: Icon.

Remark:
The support of interface I3.1 is restricted to PLC technologies based on IPv4/6 communication. IP and the communication layers above are the same for I3.1 and I3. The COSEM client may be located in the HES or in the DC.

5.2 Interface I3

IDIS package 2 supports communication via

- IP networks as specified in DLMS UA 1000-2 Ed. 8.0:2014 and shown in Figure 3.

- SMS service (limited to unconfirmed xDLMS services for PLMN[1] networks)
- CSD / CLIP (limited to wake up calls via PLMN networks)

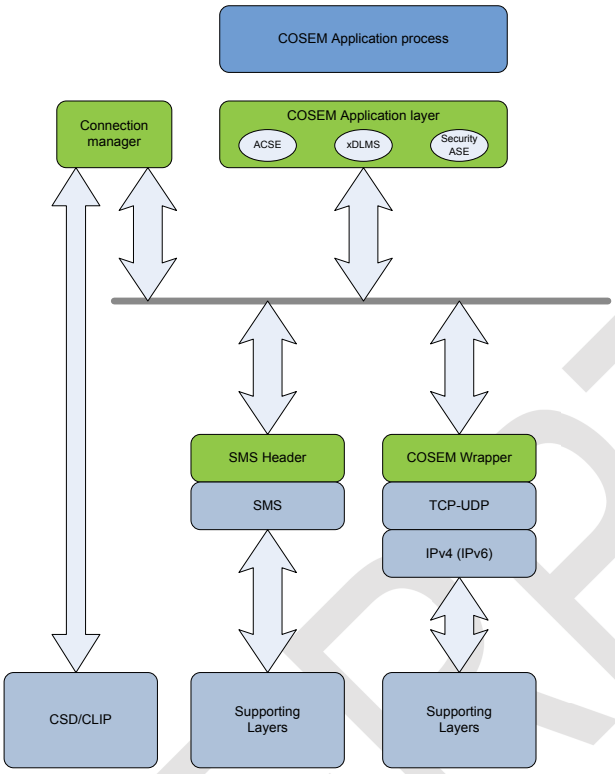


Figure 3: Communication means supported by IDIS package 2

The following "Supporting Layers" are covered by package 2:

- GSM: CSD/CLIP (for wake up only), SMS, GPRS
- 3G
- Ethernet
- G3-PLC

Communication between the HES and the Meter is supported in the following operation modes:

- PULL for 1-way or 2-way communications *initiated by the HES*
- PUSH[2] for 1-way communication *initiated by the Meter*

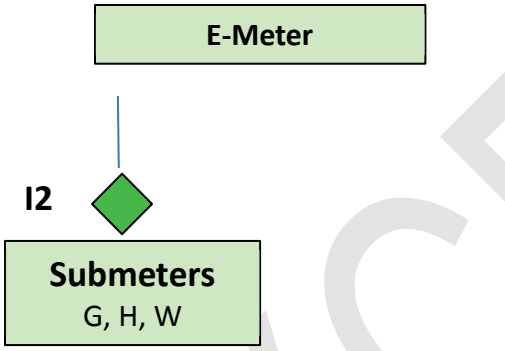
[1] Public Land Mobile Network
[2] Comp. 7.8

Operation mode / usage	DLMS service for IP communication	DLMS services for SMS communication	CSD service
PULL	GET, SET, ACTION	SET (Unconfirmed), ACTION (Unconfirmed)	-
PUSH	DATA-NOTIFICATION (unconfirmed)	DATA-NOTIFICATION (unconfirmed)	-
Wake up	-	-	CLIP caller identification, SMS

Table 1: Operation modes and communication services on different channels

For meters supporting only Ethernet or G3 communication, the wake up service is not supported.

5.3 Interface I2 (submeters)



- The M-Bus is used to connect the submeters (such as Gas, Heat and Water) to the E-Meter.
- The data of the M-Bus devices (according to EN 13757-3) is mapped to COSEM objects in the E-Meter.
- M-Bus devices are always accessed via the COSEM objects in the E-meter (no transparent access through the E-meter)

5.3.1 Wired M-Bus

- The wired M-Bus is based on the EN 13757-2 physical and link layer.
- The format class FT1.2 of EN 60870-5-1 and the telegram structure according to EN 60870-5-2 is used.
- The baud rate is 2400 b/s, E,8,1.

5.3.1.1 Uniqueness of M-bus device identification

According to EN 13757-3 sect. E8.2 the following 4 parameters are needed to guarantee uniqueness of the M-Bus device identification:

- Fabrication Number (DIF/VIF)
- Manufacturer (header of M-Bus frame)
- Version (header of M-Bus frame)
- Medium (header of M-Bus frame)

IDIS provides all information necessary to uniquely identify the device as follows:

M-Bus Information	IDIS object model information
Fabrication Number	Object (IC 1): “M-Bus Device ID 1 channel X” Type octet string containing the ASCII encoded fabrication number. The length of the octet string matches the length of the fabrication number.
Manufacturer	Object (IC 72): M-Bus client channel X Attribute: manufacturer_id
Version	Object (IC 72): M-Bus client channel X Attribute: version
Medium	Object (IC 72): M-Bus client channel X Attribute: device type

For systems where the uniqueness can be guaranteed by the M-Bus “Identification Number” (part of the Data Header of the M-Bus frame according to EN 13757-3:2004, sect. 5.4) IDIS provides this information in the attribute “identification_number” of the object “M-Bus client channel X” (where X=1,2,3, or 4).

M-Bus Information	IDIS object model information
Identification Number 8 BCD digits (part of the Data Header)	Object (IC 72): M-Bus client channel X Attribute: identification_number Type double-long-unsigned. Contains the integer value represented by the 8 BCD digits (not BCD !)

5.3.1.2 Conversion of M-Bus VIF into COSEM scaler_unit

At least one of the following two scenarios must be supported by the E-meter:

1: The e-meter automatically configures the COSEM scaler_unit according to the corresponding information contained in VIF.

2: The COSEM scaler_unit is manually configured in the e-meter (e.g. according to the requirement of the system or display). In this case the e-meter automatically converts the values coming from the M-bus device considering the information provided by VIF. This scenario requires the provision of the optional SET service on attribute scaler_unit of the M-bus value object.

5.3.2 Wireless M-Bus

Wireless M-Bus is not in scope of IDIS package 2.

6. Use Cases supported by IDIS package 2

The following Use Cases (comp. Table 2) are supported by IDIS Package 2.

NB: The meter acts as a COSEM server, the HES acts as COSEM client.

	"Open Meter" Use Case	Description	IDIS Package 2 specific remarks
UC1	Meter Registration	Process of incorporating devices (E-meters, submeters, ...) into the system.	• Registration at the HES or MDM, or DC level is performed in conjunction with the PUSH operation. • Submeters must be configured and registered.
UC2	Remote Tariff Programming	Process of remotely programming the parameters necessary to support a time of use (TOU) based tariff contract.	• Downloading and activation of TOU tables .
UC3	Meter reading (On demand) For multi-utility meters	Process of spontaneously collecting meter readings upon a specific request.	• Total/Rated-Registers • Profiles and Event-Logs
UC4	Meter reading (for billing) For multi-utility meters	Process of periodically collecting meter readings for billing purposes (periodic reading)	• Total/Rated-Registers • Profiles and Event-Logs
UC5	Disconnection and Reconnection (E, G)	Process of disconnecting or reconnecting the electricity (E) or gas (G) supply of a consumer	• Remote controlled (E,G) • Time (local) controlled (E,G) • Load (local) controlled (E)
UC6	Clock Synchronization	Process of adjusting the internal clock of the metering equipment	• For E-meters only • Source of sync HES, NTP server, Data Concentrator (where applicable)

UC7	Quality of Supply Reporting	Process of supervising Power Outages, Sags and Swells	• Event-Logs and counters • current/power/voltage instantaneous and average values
UC8	Load Management by relay (E only)	Process of controlling specific local loads by means of relays.	• Remote controlled • Time (local) controlled • Load (local) controlled
UC9	Firmware update	Process of downloading new firmware to a device	• For E-meters only • Only remote upgrade • interoperability restricted to the downloading process
UC10	Meter supervision	Process of supervising any events which could compromise the meter and the system.	• For E-meters only • Security event logs
UC11	Consumer Information	Process of periodically transmitting consumer information via a local interface	• For E-meters only
UC12	Communication Supervision	Process of supervising events affecting the meter to HES communication.	• Communication event log.

Table 2 Use Cases supported by IDIS package 2

6.1 Meter Registration

In contrast to package 1 where meter registration is part of the PLC network management in package 2 IP profile meter registration is limited to the logical registration at HES level. Establishment of the IP network connectivity is achieved following standard IP rules.

Independently of fixed or dynamic IP addressing, the IP address is typically provided to the HES (or DC) via a Push on Connectivity (comp. 8.3) operation issued by the meter.

Logical registration at HES (or DC) level is typically achieved by the valid system title of the meter provided by the Data-Notification service as defined by the Push setup – On Installation object (comp. 6.1.3).

Alternatively, logical registration at HES level may be achieved by reading the necessary data (e.g. COSEM logical device name, SAP assignment) by the Public Client.

6.1.1 System Title

Length: 8 bytes
Type: octet-string[8]

byte1	byte 2	byte 3	byte 4	byte 5		byte 6	byte 7	byte 8
MC	MC	MC	$T1_b$	$T2_b$	SN_b	SN_b	SN_b	SN_b

MC: Manufacturer Code according FLAG coded as ASCII (byte1,2,3)

$T1_b$: IDIS Meter Device Type

$T2_b$: IDIS Meter FunctionType

SN_b: manufacturer specific serial number (the next 28 bits, half of byte5, byte6,7,8)

<section deleted in excerpt>

6.1.2 COSEM Logical Device Name

<section deleted in excerpt>

6.1.3 Meter Registration using Data-Notification

After commissioning the meter sends its IP address and its system title to the HES (or DC) using the Data-Notification service. The IDIS meter must provide a trigger (e.g. optical port, button, …) to invoke the push method of the corresponding push object ("Push setup-On Installation" LN: 0-0.25.7.8.255). The execution of the push method results in a transmission of the Data-Notification message to the set IP address destination. If the "Push setup-On Installation" object is configured for SMS communication the Data-Notification message is sent by SMS to the set telephone number destination.

<section deleted in excerpt>

6.2 Remote Tariff Programming

In package 2 Remote Tariff Programming is performed in the same way as in package 1.

Tariffication is handled by instances of the following COSEM Interface classes:

- Clock (class_id: 8)
- Activity calendar (class_id 20)
- Special days table (class_id 11)
- Script table (class_id 9)
- Register activation (class_id 6)
- Register (class_id 3)
- Currently active energy tariff (class_id 1)

<section deleted in excerpt>

6.2.1 Activity Calendar

Tariffs are controlled by an instance of the IC "Activity Calendar" (class_id =20) with the attributes and methods as displayed below:

<section deleted in excerpt>

6.2.2 Script table

For tariffication there is exactly one Script table

Tariffication script table (class_id 9)	logical_name: 0-0:10.0.100.255

The attribute script has at least 4 entries representing the tariffs as shown in Table 3:

<section deleted in excerpt>

6.2.2.1 Default tariff

In case of an invalid clock script 1 will be activated.

6.2.3 Register activation

Two Register activation objects are used for tariff management.

<section deleted in excerpt>

6.2.4 Data: Currently active energy tariff

Currently active energy tariff (class_id 1)	logical_name: 0-0:96.14.0.255

The attribute “Value” (octet-string length 1..8) contains the “mask name” of the currently active mask of the Register Activation – Energy object.

6.2.5 Example “High and low tariff”:

HIGH Tariff is currently active

```
RegisterActivation-Energy
        Logical_name ::= 0-0:14.0.1.255
        Register_assignment ::= {
                                { class_id ::= 3, logical_name ::= 1-0:1.8.1.255},
                                { class_id ::= 3, logical_name ::= 1-0:1.8.2.255},
                                { class_id ::= 3, logical_name ::= 1-0:2.8.1.255},
                                { class_id ::= 3, logical_name ::= 1-0:2.8.2.255}
                                }
        Mask_list ::= {
                        { mask_name ::= “LOW”, index_list ::= { 1,3 } },
                        { mask_name ::= “HIGH”, index_list ::= { 2,4 } }
                }

        Active_mask ::= “HIGH”
```

<section deleted in excerpt>

6.2.6 Remote Tariff programming using PUSH operation

Services provided by PUSH operation are not used in this use case.

6.3 Meter Reading on Demand

While in package 1 only the GET service is used for Meter Reading on Demand, in package 2 Meter Reading on Demand may also be performed by invoking the Data-Notification service.

Precondition: if the meter is not on-line then the HES issues a wake up.

6.3.1 Electricity meter

At least the following types of registers are supported by the IDIS meter:

<section deleted in excerpt>

6.3.1.1 Load Profiles for electricity metering

Two instances of the IC Profile Generic are supporting Electricity related registration. The status of the LP entries is encoded into 1 byte according to 6.3.4.

A detailed description of the Load Profiles for electricity metering can be found in sect. 7.4.

Load Profile 1 (1-0:99.1.0.255)

min capacity:	10 days with 15 min, 4 captured objects
structure:	clock.time, profile_status, values
capture_period	range 1-60 minutes[3], default[4] 15 minutes (900 seconds)
default captured objects:	clock.time, profile_status, A+, A-
profile_status:	according to 6.3.4
buffer encoding:	option 1[5]: normal: clock with every entry
	option 2: compressed: if any element can be deducted from the previous buffer entry, then the type "*null data*" (comp. DLMS UA 1000-2 Ed. 8.0:2014, p 306) is used. for values: the same as the previous for clock: previous + capture period[6]
selective access:	by range: mandatory by entry: optional
sorted method:	sorted by smallest with sort object set to 0-0:1.0.0.255

[3] IDIS meters must support at least the following values for the capture period: 5min, 10min, 15min, 30min, 60min.

[4] The meter must use/provide the „default" values during the IDIS conformance testing

[5] It's up to the meter manufacturer to equip the meter with option 1 or option 2. The HES and the MDM system must be able to handle both options.

[6] The missing time values (null data) can be deducted by the COSEM client by taking the last non-"null data" time stamp and adding a capture period for every consecutive missing time stamp. Other missing buffer values can be deducted by copying the last non-"null data" value.

or unsorted (FIFO)

<section deleted in excerpt>

6.3.2 Submeters

<section deleted in excerpt>

6.3.2.1 M-Bus Master Load profile for channel 1..4

<section deleted in excerpt>

6.3.2.2 M-Bus Master Control log object 1..4

<section deleted in excerpt>

6.3.3 Billing Profile for general metering

One instance of the IC Profile Generic is supporting Electricity and/or Multi-utility (submeters) related registration.

A more detailed description of the billing profiles can be found in sect 7.4.

Data of billing period 1 (0-0:98.1.0.255)

min capacity:	13 months with monthly billing period, 5 captured objects
structure:	clock.time, values

<section deleted in excerpt>

6.3.4 Profile Status

The status of a buffer entry consists of a one byte (type *Unsigned*) where the bits have the meaning according to section 7.4.

6.3.5 Meter Reading on Demand using PUSH operation

PUSH operation offers the HES (or DC) the possibility to (re)trigger a Data-Notification service to retrieve missing data from the last reading period(s). If the meter is not on-line then the precondition for the triggering of the Data-Notification service is a successful wake up of the meter.

<section deleted in excerpt>

6.4 Meter Reading for Billing

While in package 1 only the GET service is used for Meter Reading for Billing, in package 2 Meter Reading for Billing may also be performed by invoking the Data-Notification service.

Precondition: if the meter is not on-line then the HES issues a wake up or the push operation is triggered by the meter's scheduler.

6.4.1 Meter Reading for Billing using PUSH operation

PUSH operation offers the possibility to periodically trigger Data-Notification services to transmit billing data to the HES (or the DC).

<section deleted in excerpt>

6.5 Meter Disconnection and Reconnection

The following section is inherited from IDIS Package 1.

Disconnection and reconnection of the electricity supply is supported by the following objects:

<section deleted in excerpt>

Disconnection and reconnection operated via an M-Bus connected submeter is supported by the following objects:

<section deleted in excerpt>

6.5.1 Disconnector script table

The disconnector script table contains the scripts which act on the Disconnect Control object 0-0:96.3.10.255 as follows:

<section deleted in excerpt>

6.5.2 M-Bus Disconnector script table

The M-Bus disconnector script table contains the scripts which act on the M-Bus Disconnect Control objects 0-1:24.4.0.255, 0-2:24.4.0.255, 0-3:24.4.0.255 and 0-4:24.4.0.255 as follows:

<section deleted in excerpt>

6.5.3 Meter Disconnection and Reconnection using PUSH operation

Services provided by PUSH operation are not used in this use case.

6.6 Meter Clock Synchronization

In package 2 Meter Clock Synchronization is performed in the same way as in package 1. In addition, NTP synchronization is possible as an option.

6.6.1 Mandatory Time Server: HES or DC

The time in the electricity meters is set/synchronized by applying the SET service to the attribute “time” of the “clock” object (logical_name: 0-0:1.0.0.255). In IDIS package 2 the time may be regularly set by the HES (or by the DC).

When reading the time attribute of the clock object, then the date_time field contains the information on the local time of the meter.

When setting the time attribute of the clock object then the date_time field contains the information from which the local time of the meter can be derived as shown in Table 4.

<section deleted in excerpt>

6.6.1.1 Relation between the different time parameters

The following clarifications concern the time parameters as used in DLMS UA 1000-1 Ed. 12.0

<section deleted in excerpt>

6.6.2 Meter Clock Synchronization using PUSH operation

Services provided by PUSH operation are not used in this use case.

6.6.3 Optional Time Server: NTP

For IDIS Package 2 the meter may support an NTP client for clock synchronization as an option.

The settings for the NTP server are contained in the following object:

<section deleted in excerpt>

6.7 Quality of Supply Reporting

While in package 1 only the GET service is used for Quality of Supply Reporting, in package 2 Quality of Supply Reporting may also be performed by invoking the Data-Notification service.

Precondition: if the meter is not on-line then the HES issues a wake up or the push operation is triggered by the meter’s scheduler.

The quality of supply is reported by means of the following objects:

<section deleted in excerpt>

6.7.1 Quality of Supply Reporting using PUSH operation

PUSH operation offers the possibility to send periodically or event triggered (comp. 7.3.2) Data-Notification services to transmit Quality of Supply data to the HES.

Periodically transmitted Quality of Supply data is configured by the following objects:

<section deleted in excerpt>

6.8 Load Management by Relay

The following section is inherited from IDIS Package 1.

Loads may be disconnected and reconnected with the help of relay(s). The relay(s) are controlled with the following objects:

<section deleted in excerpt>

6.8.1 Load Management script table

The Load Management script table contains the scripts which act on the Load Management – Relay Control object 0-1:96.3.10.255 as follows:

<section deleted in excerpt>

6.8.2 Load Management by Relay using PUSH operation

Services provided by PUSH operation are not used in this use case.

6.9 Firmware Update

The following section is inherited from IDIS Package 1.

The raw image for firmware download must be provided to the COSEM client as a binary file. The COSEM client then uses the services provided by the objects listed below to transfer the binary file into the meter and to activate the new firmware.

<section deleted in excerpt>

6.9.1 Firmware Update using PUSH operation

Services provided by PUSH operation are not used in this use case.

6.10 Meter Supervision

While in package 1 only the GET service is used for Meter Supervision, in package 2 Meter Supervision may also be performed by invoking the Data-Notification service.

Precondition: if the meter is not on-line then the HES issues a wake up or the push operation is triggered by the meter's scheduler.

The meter automatically supervises critical actions and logs them in the corresponding objects.

<*section deleted in excerpt*>

6.10.1 Meter Supervision using PUSH operation

PUSH operation offers the possibility to send periodically or event triggered (comp. 7.3.2) Data-Notification services to transmit Meter Supervision data to the HES (or to the DC).

Periodically transmitted Meter Supervision data is configured by the following objects where the Meter Supervision data is added next to the Billing data:

<*section deleted in excerpt*>

6.11 Consumer Information Push (CIP) using PUSH operation

In conjunction with PUSH operation IDIS package 2 meters may support the provision of local Consumer Information (as an option). This information consists of a predefined set of attributes which are periodically transmitted to a local port serving as Consumer Information Interface (CII). Depending on the market request, this local port may be connected to a suitable home gateway.

<*section deleted in excerpt*>

6.11.1 Client - Server structure for the optional CIP client

In order to support the optional CIP functionality the general Client Server architecture described in **section 8.1** is extended with a CIP client as shown in Figure 6.

The Consumer Information Push (CIP) shall use a dedicated Client [**103**] with at minimum Data-Notification service supported. The Client is **pre-established** and has its own security context.

<*section deleted in excerpt*>

6.11.2 CIP protocol stack

6.11.2.1 HDLC based protocol stack

- The protocol stack is of three layer collapsed type.
- Frame type 3 and the non-basic frame format transparency according to IEC 13239, sect. 4.3.3 is used.

<*section deleted in excerpt*>

6.11.2.2 IP based protocol stack

- For a CIP interface supporting IP communication the architecture shown in Figure 2 (right hand side) is used.

<section deleted in excerpt>

6.11.3 Security on the Consumer Information Interface

The data *from the meter* pushed to the CII (via CIP) may be secured (encryption and/or authentication) *by the meter*.

<section deleted in excerpt>

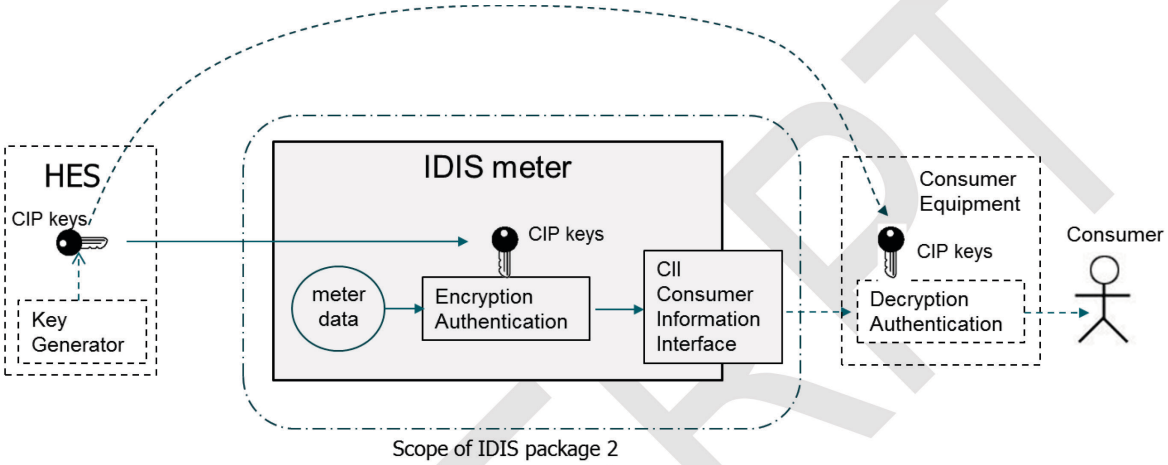


Figure 4: Managing the CIP keys

<section deleted in excerpt>

6.11.4 CIP System Title and Error Handling

<section deleted in excerpt>

6.11.5 Object model and Use cases covered

Instance name	IC	OBIS	Use Case
Consumer Message Text - Consumer Information	1	0-0:96.13.0.255	Sending a text message from HES to the Consumer Information interface (CII). The HES accesses the register on the meter via Management Client [1] or Pre-established Client [102]. The meter will - immediately after receiving the message - forward the data to the CII via the Consumer Information Push to

			the CIP client [103] using the Data-Notification service.

If the optional CIP functionality is supported then the following objects are mandatory:

Instance name	IC	OBIS	Use Case
Push action scheduler - Consumer Information	22	0-4:15.0.4.255	Defines the time instances (by default every 15sec) when the meter is pushing information (as set in Push setup) to the CII (CIP Client 103). The HES may access the settings of the scheduler via the Management Client. The single action schedule is of type 5. with an array of n-execution times in order to provide enough granularity of scheduled action. The scheduler's executed_script references the Push script table [0-0:10.0.108.255].
Push setup - Consumer Information	40	0-6:25.9.0.255	Definition of the set of data the meter will push to the CII. The data will be pushed according to the corresponding push action scheduler execution_time.
Security setup - Consumer Information	64	0-0:43.0.1.255	Security setup instance managing the global keys used to secure the meter data pushed to the CII (via CIP).
HDLC CIP port	23	0-1:22.0.0.255	CIP HDLC configuration

Table 3: Mandatory COSEM objects for IDIS meters supporting the optional CIP functionality

6.12 Communication Supervision

The meter automatically supervises critical events concerning the WAN and the NN (in case of G3 communication) connectivity and logs them in the corresponding objects.

<section deleted in excerpt>

7. E-Meter Functionality

7.1 Data Model

The entire functionality of the IDIS meter is modeled by means of COSEM objects as described in DLMS UA 1000-1 Ed. 12.0.

IDIS P2-OBJ Ed.2.0 provides a complete list of the mandatory and optional objects used in IDIS package 2. The objects are described in all details, in particular:

- explicit type definition of the attributes;
- default values[4] of the attributes;
- specific access rights (GET, SET, ACTION) per attribute or method and per client (Public, Pre-established, Management);

An IDIS server must support ALL IDIS objects, attributes, methods and ranges of attributes (mandatory and optional) as defined in IDIS P2-OBJ Ed.2.0.

7.2 IDIS Meter customization

Every IDIS meter must support the complete set of BASIC objects. Further, the minimal (basic) functionality may be extended with any combination of:

- Disconnector,
- Load Management,
- Multi-Utility functionality,

In all cases the IDIS meter must support all *mandatory objects* in the set of the corresponding extension.

The implemented extensions become part of the IDIS test label (see 4).

In addition, the manufacturer of an IDIS meter may implement also *optional objects* (comp. IDIS P2-OBJ Ed.2.0). The *optional objects* must be identified for the IDIS conformance testing and will be listed in the test report.

7.2.1 BASIC objects

The following (comp. Table 6) COSEM objects are mandatory for every IDIS package 2 device. Not all rated registers are mandatory. For details on the mandatory rated registers comp. 6.3.1.

<section deleted in excerpt>

Remark:
The parameters of the attribute “scripts” of the *Push script table* (comp.DLMS UA 1000-1 Ed. 12.0) are defined as follows:

<section deleted in excerpt>

7.2.1.1 Communication profile and media specific objects

Table 9 shows the Communication Profile specific BASIC (*mandatory)* objects.

Instance Name	OBIS	IC
TCP-UDP setup	0-0:25.0.0.255	41
IPv4 setup	0-0:25.1.0.255	42
IPv6 setup (alternatively to IPv4)	0-0:25.7.0.255	48

Table 4: Communication Profile specific BASIC (mandatory) objects

<section deleted in excerpt>

7.2.2 Extension D objects

The following (comp. Table 11) objects are foreseen for all IDIS devices supporting the Disconnector functionality. Detailed information on mandatory/optional objects and attributes can be found in IDIS P2-OBJ Ed.2.0.

<section deleted in excerpt>

7.2.3 Extension L objects

<section deleted in excerpt>

7.2.4 Extension M objects

<section deleted in excerpt>

7.2.5 Optional objects

Optional objects according to IDIS P2-OBJ Ed.2.0. may be added by the IDIS device manufacturer. They must be tested as described in sect. 4.

Conformance testing of optional objects and attributes:

<section deleted in excerpt>

7.3 Handling Events

A lot of events are generated by the meter itself or by its environment. All these events are logged in several event logs. Additionally they are also used to set and clear errors as well as to trigger alarms.

7.3.1 Events

<section deleted in excerpt>

7.3.2 Alarms

<section deleted in excerpt>

7.3.2.1 Alarming Process

Figure 8 shows the different entities involved in the alarming process.

<section deleted in excerpt>

7.3.2.2 COSEM Objects supporting Alarms

<section deleted in excerpt>

7.3.2.3 Assignment of Alarm Register 1 bits

<section deleted in excerpt>

7.3.2.4 Assignment of Alarm Register 2 bits

<section deleted in excerpt>

7.3.2.4.1 Voltage Level Monitoring based on EN50160

For quality assessment purposes there is also a possibility to monitor the voltage level more in detail.

<section deleted in excerpt>

7.4 Load Profiles

Different profiles are available in the IDIS meters:

- Load Profiles for electricity metering (Load profile 1, Load profile 2)
- M-Bus Master load profiles (multi utility profiles)
- Billing profile for general metering

<section deleted in excerpt>

7.5 Synchronous Load Profiles

7.5.1 Structure

<section deleted in excerpt>

Table 5 Profile structure representation

7.5.2 Sort Order

<section deleted in excerpt>

7.5.2.1 Sorted

<section deleted in excerpt>

7.5.2.2 Unsorted

<section deleted in excerpt>

7.5.3 Reset

<section deleted in excerpt>

7.5.4 Capture period

<section deleted in excerpt>

7.5.5 Timestamp

<section deleted in excerpt>

7.5.6 Access to the stored values

<section deleted in excerpt>

7.5.6.1 Normal Read

Every row in the table below shows how the profile should look like when read out. A 'from…to' readout (selective access) request will return a response containing the buffer entries within the 'from…to' range (including the values at the boundaries of the range)

The example below (comp. Table 15) shows the result of a readout request from 13.8.2004 00:00

<section deleted in excerpt>

7.5.6.2 Compressed Read

In order to reduce the amount of transmitted data an IDIS meter may support "compressed" readout of the profile buffer (according to DLMS UA 1000-1 Ed. 12.0) the value of a captured object may be replaced by "null-data" if it can be unambiguously recovered from the previous value). In particular, the "null-data" replacement is used:

<section deleted in excerpt>

7.5.6.2.1 Example for time "compression"

<section deleted in excerpt>

7.5.6.2.2 Example for time and status "compression"

<section deleted in excerpt>

7.5.6.2.3 Example for time status and register value compression

Some register values may also remain constant between different capturing periods. In these cases the register values may be compressed by replacing the repeated register value by "null-data".

<section deleted in excerpt>

7.5.6.3 Compact Array

The compact array is not in the scope of IDIS Package 2.

7.5.6.4 Selective access

<section deleted in excerpt>

7.5.7 Profile Status Register

<section deleted in excerpt>

7.5.8 Events

The following section describes the behavior of the profile and the setting of the status bits considering different events.

<section deleted in excerpt>

7.5.8.1 Season Change

<section deleted in excerpt>

7.5.8.2 Power Down

<section deleted in excerpt>

7.5.8.2.1 Power Down within one capture period

<section deleted in excerpt>

7.5.8.2.2 Power Down across several capture periods

<section deleted in excerpt>

7.5.8.2.3 Power Down over a season change

<section deleted in excerpt>

7.5.8.2.4 Exhaust of power reserve

<section deleted in excerpt>

7.5.8.3 Setting Time

<section deleted in excerpt>

7.5.8.3.1 Time changes within capture period

Figure 11 and Table 24 show a clock adjustment from 21:15 to 21:20. The entry at 22:00:00 will be marked with the CAD flag.

<section deleted in excerpt>

7.5.8.3.2 Advancing the time over the end of the period

Figure 12 and Table 25 show a clock adjustment from 21:15:37 to 22:22:00. At 22:00:00 an entry is generated with the CAD flag set since the period was not closed correctly. The entry at 23:00:00 is marked with the CAD flag..

<section deleted in excerpt>

7.5.8.3.3 Advancing the time over several periods

Figure 13 and Table 26 show a clock adjustment from 21:15 to 00:22 of the next day. All generated intermediate values are marked with the CAD flag.

<section deleted in excerpt>

7.5.8.3.4 Advancing the time over a season change

No additional recordings are generated. The profile acts the same way as with advancing the clock over one or more periods.

7.5.8.3.5 Setting the time back - sorted

Due to the fact that the profile is sorted, in case of a time change backwards the new entry will be stored at the appropriate position in the buffer.

Figure 14 and Table 27 show a profile after a clock adjustment backwards from 23:15 to 18:42.

<section deleted in excerpt>

7.5.8.3.6 Setting the time back - unsorted

In case of an unsorted profile all profile entries remain in the buffer which will lead to duplicated entries.

Table 29 shows a profile before and after (Table 30) a time change backwards from 23:15 to 18:42.

<section deleted in excerpt>

7.5.8.4 Profile Reset

If the reset method is executed explicitly or implicitly (as a consequence of a modification in the data structure of the profile, comp DLMS UA 1000-1 Ed. 12.0. the first entry after the reset will

<section deleted in excerpt>

7.5.9 Power down

7.5.9.1 Power failure across capture periods

The regular billing intervals are defined by the date and time definitions specified in the execute_time attribute of a single action schedule. When the time of the internal clock reaches the time instance specified in the single action schedule the capture method of the profile is invoked via the corresponding script defined in the “MDI reset/end of billing period” script table.

<section deleted in excerpt>

7.5.10 Setting Time

7.5.10.1 Advancing the time over the end of the billing interval

<section deleted in excerpt>

7.5.10.2 Setting the time back over the start of billing interval

Figure 17 and Table 34 show the effects of a clock retarding from 1.3.2012 2:15 to 29.2.2012 23:25.

<section deleted in excerpt>

7.5.10.3 Asynchronous billing period reset/end

Data may be captured asynchronously by explicit triggering:

<section deleted in excerpt>

7.6 Reading profiles with parameterized access “from”-“to”

The following specifications are valid for any IDIS object which is an instantiation of the interface class “Profile Generic” (e.g. profiles, logs, …).

7.6.1 Interval boundaries

If the requested interval boundaries (“from”, “to”) match the time stamps of profile entries, then the response contains the buffer entries *including the boundaries* of the requested interval.

7.6.2 Covering the DST switchover interval with partly defined time parameters

<section deleted in excerpt>

7.7 PUSH operation

IDIS package 2 supports PUSH operation triggered:

- on connectivity
- on alarm,
- on installation,
- scheduled.

<section deleted in excerpt>

8. E-Meter Communication

8.1 IDIS Client and Server Architecture

The IDIS Server consists of one COSEM Logical Device (LD name: 0-0:42.0.0.255, SAP: 001) which supports a Pre-established Client (SAP: 102), a Public Client (SAP: 016), and a Management Client (SAP: 001) as illustrated in Figure 21. Details on the use of the different clients can be found in section 8.2.2.

<section deleted in excerpt>

8.2 Application Layer

The E-Meter communicates with the upper system (via I3) using the IEC 62056-53 COSEM Application Layer with extension documented in DLMS UA 1000-2 Ed. 8.0:2014.

8.2.1 Minimal set of services

Logical name services are supported. The Conformance Block (IEC 62056-5-3:2013 Amd.1 CDV) defines the minimal set of supported application layer services:

- General-protection (1)
- General-block-transfer (2)
- Block-transfer-with-get (11)
- Block-transfer-with-set (12)
- Multiple-references (14)
- Data-Notification (16)
- Get (19)
- Set (20)
- Selective-access (21)
- Action (23)

<section deleted in excerpt>

8.2.1.1 The Invoke-Id-And-Priority byte

is handled according to DLMS UA 1000-2 Ed. 8.0:2014. In particular, Bit 6 (service_class) must be set by the HES in order to get an answer from the meter. The meter only answers if Bit 6 is set in the request.

<section deleted in excerpt>

8.2.1.2 Data-Notification

The service Data-Notification (tag nr [15]) is used with:

Long-Invoke-Id-And-Priority configured as follows:

<section deleted in excerpt>

8.2.2 Minimal set of Associations

At least the following (comp. Table 36) 3 Associations must be supported:

<section deleted in excerpt>

8.2.2.1 Enciphering of the InitiateRequest field in the RLRQ and AARQ pdus

<section deleted in excerpt>

8.2.2.2 Power-down

For the remote comm. port:

- The context for the pre-established client is automatically re-established upon power up.

<section deleted in excerpt>

8.2.2.3 Pre-established Association

Used by the pre-established client.

<section deleted in excerpt>

8.2.2.4 Association Release Request RLRQ

If in the “Association Release Request “service (sent by the client) the optional parameter “user information” is present, then server must answer with the “Association Release Response” service with the parameter “user information” also present.

If in the RLRQ the parameter “user information” is not present then it must also be not present in the RLRE.

8.2.2.5 Application association object

In IDIS there exists one current association object representing the information on the currently open association.

Current Association (class_id 15)	logical_name: 0-0:40.0.0.255

8.2.2.6 Handling lost Associations

If the server responds to any Get or Set or Action request from the client with an ”ExceptionResponse” due to a lost association then the client has to send an AARQ again (has to establish the association again).

8.2.2.7 Associations on different communication ports

The following rules apply:

- On the local communication port (IEC 62056-21), only one association can be opened at a time.
- On the remote communication port (IP) several associations may be opened at the same time.

<section deleted in excerpt>

8.2.3 Error handling in the application layer

The protocol error management copes with situations where the peer station does not act/react in the way normally expected. The following specifications of the error situations and the corresponding error information allow the recipient of the information to react in the appropriate way.

8.2.3.1 General rule

The server always answers to a service request: either with the proper response or with an EXCEPTION response or confirmed service error.

8.2.3.2 Errors related to the AARQ service

<section deleted in excerpt>

8.2.3.3 Errors related to the Get/Set/Action services

Errors related to the Get/Set/Action services are shown in Table 38

<section deleted in excerpt>

8.2.3.4 Errors related to the Data-Notification service

<section deleted in excerpt>

8.2.3.5 Errors related to the RLRQ service

Errors related to the RLRQ service are shown in Table 39

Condition NOT fulfilled in the service	Action performed by the server
Association OPEN	RLRE.reason = normal Alternatively, Exception response(state-error=service-not-allowed, service-error=operation-not-possible)
User Information = RECEIVED	RLRE.reason = not_finished

Table 6 Error events associated to the RLRQ service

8.2.3.6 Errors in secured services

The following tables are related to application association when the security policy is higher than 0.

8.2.3.6.1 Errors in the secured AARQ service

Errors in the secured AARQ service are shown in Table 40

Condition NOT fulfilled in the service	Action performed by the server
Secured initiate request	AARE.result = reject-permanent AARE.result-source-diagnostic = no reason given
Received Security Header == authenticated & encrypted	AARE.result = reject-permanent AARE.result-source-diagnostic = no reason given
FC received > FC previous	AARE.result = reject-permanent AARE.result-source-diagnostic == no reason given
Authentication succeeded	AARE.result = reject-permanent AARE.result-source-diagnostic = no reason given
Deciphering succeeded	AARE.result = reject-permanent AARE.result-source-diagnostic = no reason given

Table 7 Error events associated to the secured AARQ service

8.2.3.6.2 Errors in the secured RLRQ service

<section deleted in excerpt>

8.3 Network Connectivity

The network connectivity of an IDIS meter is controlled by the auto connect objects (see also 11) and the Push setup – On Connectivity:
The following auto connect modes are supported:

<section deleted in excerpt>

8.3.1 Wake-Up Process

In conjunction with GPRS (or GSM/PPP) communication the meter may not always be connected to the IP network. In this case the IDIS meter must be set to auto connect mode (104) in the auto connect object. Upon receiving the wake-up call (SMS or CSD) from the HES, the meter verifies if the calling number is listed in the “list_of_allowed_callers” attribute of the “auto answer” object. If the call is of call_type(1) the meter connects immediately to the network.

<section deleted in excerpt>

8.3.1.1 GPRS or GSM/PPP connection to the IP network

The HES may initiate a connection of the meter to the IP network via a digital connection (e.g. GPRS) or via an analog modem (e.g. GSM/PPP) by choosing the corresponding caller_id. In order to do so the Auto Answer object in the meter must be configured accordingly. In particular, one caller_id must be assigned for call_type(0) (CSD call, resulting in a modem connection) and a different caller_id must be assigned for call_type(1) (call or empty message, resulting in a GPRS connection).

<section deleted in excerpt>

8.4 Lower layers for IP communication

At minimum one IP channel must be supported. On this channel either the IPv4 or IPv6 protocol may be used; i.e. it is not possible to run a IPv4 and a IPv6 connection on this channel in parallel. The choice between IPv4 and IPv6 is made by setting attribute IP_reference in the TCP-UDP setup object accordingly.

8.4.1 IPv4

The IPv4 channel is configured via the COSEM object “IPv4 setup” (class_id: 42) as defined in IDIS P2-OBJ Ed.2.0.

8.4.2 IPv6

The IPv6 channel is configured via the COSEM object “IPv6 setup” (class_id: 48) as defined in IDIS P2-OBJ Ed.2.0

8.4.3 TCP

The TCP channel is configured via the COSEM object “TCP-UDP setup” (class_id: 41) as defined in IDIS P2-OBJ Ed.2.0. If the TCP connection is closed then the meter also releases the application association.

8.4.4 UDP

The UDP channel is configured via the COSEM object “TCP-UDP setup” (class_id: 41) as defined in IDIS P2-OBJ Ed.2.0. The application association is closed due to inactivity timeout.

8.4.5 Physical channels

8.4.5.1 GSM

IP connection through the GSM channel is configured via the COSEM object “PPP setup” (class_id: 44) as defined in IDIS P2-OBJ Ed.2.0.

8.4.5.2 GPRS/UMTS

The GPRS/UMTS channel is configured via the COSEM object “GPRS setup” (class_id: 45) as defined in IDIS P2-OBJ Ed.2.0.

8.4.5.3 Ethernet

The Ethernet channel is configured via the COSEM object “MAC address setup” (class_id: 43) as defined in IDIS P2-OBJ Ed.2.0.

8.4.5.4 G3-PLC

The G3 channel is configured and managed via the following COSEM objects:

- “G3-PLC MAC setup” (class_id: 91) containing the parameters to setup and manage the MAC layer.
- “G3-PLC MAC layer counters” (class_id: 90) containing statistical information on the packet exchange on MAC layer.
- “G3-PLC 6LoWPAN adaptation layer setup” (class_id: 92) to setup and manage the 6loWPAN adaptation layer.
- MAC address setup” (class_id: 43) as defined in IDIS P2-OBJ Ed.2.0

8.5 SMS as a general communication channel

The SMS channel supports xDLMS services with the following restrictions:

<section deleted in excerpt>

9. E-Meter Security Features

IDIS applies the information security methods described in sect. 9.2 of DLMS UA 1000-2 Ed. 8.0:2014.

<section deleted in excerpt>

9.1 Security for Wake-Up

9.1.1 Security for CSD (Circuit Switched Data) call wake-up

Only CSD calls which are explicitly whitelisted in the attribute “list_of_allowed_callers” of the object “Auto Answer” and are of call_type(0) are accepted by the meter. For more details, see DLMS UA 1000-1 Ed. 12.0.

9.1.2 Security for SMS wake-up

Only SMS which are explicitly whitelisted in the attribute “list_of_allowed_callers” of the object “Auto Answer” and are of call_type(1) are accepted by the meter. For more details, see DLMS UA 1000-1 Ed. 12.0.

9.2 Security for SMS as a general communication channel

Only SMS which are explicitly whitelisted in the attribute “list_of_allowed_callers” of the object “Auto answer” and are of call_type(1) are accepted by the meter. For more details, see DLMS UA 1000-1 Ed. 12.0.

9.2.1 Receiving unconfirmed services from HES

- Only possible in pre-established association;

<section deleted in excerpt>

9.2.2 Transmitting unconfirmed services to HES

- Only possible in pre-established association

<section deleted in excerpt>

9.3 Security for PUSH/PULL

<section deleted in excerpt>

9.3.1 Use of the Frame counters

Depending on the security policy applied the meter uses the Global Unicast Key for all outgoing messages. Therefore the transmit frame counter is incremented for every message sent

independently of the channel [7](to “Pre-established Client via SMS”, to “Pre-established Client via IP” or to “Management Client via IP”; see also Figure 21 IDIS Client and Server model) used.

<section deleted in excerpt>

9.4 Security setup object

The IDIS server may support several security contexts. Each security context is configured by its security setup object.

The “Management Client association” and the “Pre-established Client association” share the same

<section deleted in excerpt>

9.4.1 Security Setup

Management Client on remote communication:

- The *client_system_title* is transmitted as part of the AARQ and copied into the COSEM object security setup, attribute: client_system_title.
- From this time instance on the meter uses this *client_system_title* to decipher the pdus from the Management Client.
- After closing the association the attribute *client_system_title* remains in the COSEM object security setup, attribute: client_system_title.

Management Client on local port:

- *client_system_title* is transmitted as part of the AARQ BUT NOT copied into the COSEM object security setup, attribute: client_system_title.
-

<section deleted in excerpt>

9.4.2 The use of Global keys and Dedicated keys

The following rules concerning the keys apply:

- At a given point of time there exists one specific set of keys (dedicated[8], global) per security context.

<section deleted in excerpt>

9.4.3 Frame counters

[7] A specific “Channel” consists of the combination of a specific Client and a specific communication medium

[8] Dedicated keys are assigned only during the establishment of the Association

The following applies for security context shared by the pre-established client and the management client. For the optional security context of the CIP client the frame counter is implicit.

<section deleted in excerpt>

9.4.3.1 Re-synchronizing the FCs

When operating with *global keys* then the HES re-synchronizes its FCs by reading the FCs from the meters (via public client).

<section deleted in excerpt>

9.4.3.2 In case of local access using security:

<section deleted in excerpt>

9.4.4 Application association establishment:

<section deleted in excerpt>

9.4.4.1 Default passwords and global keys for interoperability testing

For testing purposes the following (comp. Table 45) default security material should be used:

<section deleted in excerpt>

9.4.5 Putting a meter into field

The following process is performed:

<section deleted in excerpt>

9.4.6 Using Keys

The keys are used as shown in Table 46.

<section deleted in excerpt>

9.4.6.1 Rules to change the Key

- All global keys are changed by using the security_setup.global_key_transfer method. The method is accessible only via the Management Client.

<section deleted in excerpt>

9.4.7 Changing the Security Policy

The Security Policy may be changed by invoking the security_activate method of the security setup object, or by setting the security_policy attribute of the security setup object. Only the Management Client can change the security policy, considering the following rules:

<section deleted in excerpt>

10. Appendix: Event Codes

The following section list the event codes used in package 2. The list is a copy of the corresponding list in IDIS P2-OBJ Ed.2.0.

The support of some event codes is mandatory for the BASIC IDIS functionality, the support of some events is dependent on the implemented IDIS extensions as shown in Table 47.

The following abbreviations apply:
O optional: the IDIS meter does not need to support this event. However if the event is supported then the listed code must be used.
M mandatory for the BASIC functionality
M-G mandatory for GSM/GPRS communication
M-G3 mandatory for G3-PLC communication
M-D mandatory for extension D
M-L mandatory for extension L
M-M mandatory for extension M

Event Code	Name	Description	Standard Event Log	Fraud Detection Log	Disconnector Control Log	M-Bus Event Log	M-Bus Control Log 1	M-Bus Control Log 2	M-Bus Control Log 3	M-Bus Control Log 4	Power Quality Event Log	Communication Log	Mandatory/optionl
1	Power Down	Indicates a complete power down of the device. Please note that this is related to the device and not necessarily to the network.	x										M
2	Power Up	Indicates that the device is powered again after a complete power down.	x										M
3	Daylight saving time enabled or disabled	Indicates the regular change from and to daylight saving time. The time stamp shows the time before the change. This event is not set in case of manual clock changes and in case of power failures.	x										M
4	Clock adjusted (old date/time)	Indicates that the clock has been adjusted. The date/time that is stored in the event log is the old date/time before adjusting the clock.	x										M
5	Clock adjusted (new date/time)	Indicates that the clock has been adjusted. The date/time that is stored in the event log is the new date/time after adjusting the clock.	x										M
6	Clock invalid	Indicates that clock may be invalid, i.e. if the power reserve of the clock has exhausted. It is set at power up.	x										M
7	Replace Battery	Indicates that the battery must be exchanged due to the expected end of life time.	x										O
8	Battery voltage low	Indicates that the current battery voltage is low.	x										O
9	TOU activated	Indicates that the passive TOU has been activated.	x										M
10	Error register cleared	Indicates that the error register was cleared.	x										M
11	Alarm register cleared	Indicates that the alarm register was cleared.	x										M
12	Program memory error	Indicates a physical or a logical error in the program memory.	x										M
13	RAM error	Indicates a physical or a logical error in the RAM.	x										M

Event Code	Name	Description	Standard Event Log	Fraud Detection Log	Disconnector Control Log	M-Bus Event Log	M-Bus Control Log 1	M-Bus Control Log 2	M-Bus Control Log 3	M-Bus Control Log 4	Power Quality Event Log	Communication Log	Mandatory/optionl
14	NV memory error	Indicates a physical or a logical error in the non volatile memory	x										M
15	Watchdog error	Indicates a watch dog reset or a hardware reset of the microcontroller.	x										M
16	Measurement system error	Indicates a logical or physical error in the measurement system	x										M
17	Firmware ready for activation	Indicates that the new firmware has been successfully downloaded and verified, i.e. it is ready for activation	x										M
18	Firmware activated	Indicates that a new firmware has been activated	x										M
19	Passive TOU programmed	The passive structures of TOU or a new activation date/time were programed	x										O
20	External alert detected	Indicates signal detected on the meter's input terminal	x										O
21	*reserved for future use*												
22	*reserved for future use*												
23	*reserved for future use*												
24	*reserved for future use*												
25	*reserved for future use*												
26	*reserved for future use*												
27	*reserved for future use*												
28	*reserved for future use*												
29	*reserved for future use*												
30	*reserved for future use*												
31	*reserved for future use*												
32	*reserved for future use*												
33	*reserved for future use*												
34	*reserved for future use*												
35	*reserved for future use*												
36	*reserved for future use*												
37	*reserved for future use*												
38	*reserved for future use*												
39	*reserved for future use*												
40	Terminal cover removed	Indicates that the terminal cover has been removed.		x									O
41	Terminal cover closed	Indicates that the terminal cover has been closed.		x									O
42	Strong DC field detected	Indicates that a strong magnetic DC field has been detected.		x									O
43	No strong DC field anymore	Indicates that the strong magnetic DC field has disappeared.		x									O
44	Meter cover removed	Indicates that the meter cover has been removed.		x									O
45	Meter cover closed	Indicates that the meter cover has been closed.		x									O

Event Code	Name	Description	Standard Event Log	Fraud Detection Log	Disconnector Control Log	M-Bus Event Log	M-Bus Control Log 1	M-Bus Control Log 2	M-Bus Control Log 3	M-Bus Control Log 4	Power Quality Event Log	Communication Log	Mandatory/optionl
46	Association authentication failure (n time failed authentication)	Indicates that a user tried to gain LLS access with wrong password (intrusion detection) or HLS access challenge processing failed n-times		x									M
47	One or more parameters changed		x										M
48	Global key(s) changed	One or more global keys changed	x										M
49	Decryption or authentication failure (n time failure)	Decryption with currently valid key (global or dedicated) failed to generate a valid APDU or authentication tag		x									M
50	Replay attack	Receive frame counter value less or equal to the last successfully received frame counter in the received APDU Event signalizes as well the situation when the DC has lost the frame counter synchronization.		x									M
51	FW verification failed	Indicates the transferred firmware verification failed i.e. cannot be activated.	x										M
52	Unexpected consumption	Indicates consumption is detected at least on one phase when the disconnector has been disconnected	x										O
53	Load profile cleared	Any of the profiles cleared. NOTE: If it appears in Standard Event Log then any of the E-load profiles was cleared. If the event appears in the M-Bus Event log then one of the M-Bus load profiles was cleared	x			x							M
54	Event log cleared	Indicates that the event log was cleared. This is always the first entry in an event log. It is only stored in the affected event log.	x	x	x	x	x	x	x	x	x		M
55		<section deleted in excerpt>											

Table 8: Event Codes

11. Appendix: Attribute restrictions used in IDIS package 2

The following specifications are necessary to achieve semantic interoperability in IDIS package 2. The additional specifications do not create any conflict with the specifications of the Interface Classes.

11.1 Send_destination_and_method (Push Setup Class, IC 40)

destination (octet-string) element containing the target address where the data has to be sent

IPv6 address and port number:

<section deleted in excerpt>

12. Appendix: New DLMS/COSEM elements

The following section contains new DLMS/COSEM elements which are in the process to be included into Blue Book (BB) of the DLMS-UA and which are used in IDIS package 2.

<section deleted in excerpt>

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