The standard of choice for smart meter data exchange

Energy metering has been profoundly transformed by new energy policies, market environments and technologies. The new, smart generation of meters handle not only energy but also data flows supporting a wide range of use cases, business and operational processes and functions.

Smart meters play a key role in operating energy markets and improving efficiency by providing all market participants with energy information.

Deployed in large numbers, they change the way energy is generated, distributed and used.

Well specified, widely accepted standards are essential in building efficient, interoperable metering systems. DLMS/COSEM meets the need for such standards.

The DLMS/COSEM standardization framework is based on the principle of one common data model and application layer used over a range of communication media. This principle reflects the fact that the data model standards are driven by the use cases while data communication standards are driven by technology evolution.

DLMS/COSEM specifies the COSEM data model, the DLMS application layer protocol and communication profiles. It continuously evolves to meet new requirements. It is the only global standard for meter data exchange adopted by global, regional and national standards organizations.

Companion specification

The Dutch Smart Meter Requirements specification DSMR

Main functions of P3 port using DLMS

- HLS 3, 4 or 5 authentication
- AES 128 authenticated encryption
- connection setup (internal trigger, alarm, wake up SMS or CSD)
- storage of interval values, daily readings and monthly readings
- tariff control
- firmware update E meter
- power quality
- instantaneous and average values (voltage, current, power)
- event logs communication session log
- error and alarm handling
- P1 output
- electricity meters: 2.5 million (as per 07/2016)
- gas meters: 2 million

Ports

P0 - Maintenance port
P1 - Consumer Interface
P2 - Interface M-Bus device and E-meter
P3 - Interface between E-meter and Head End (DLMS)
P4 - Interface between Head End and market parties
DESIGN CONCEPT

DLMS/COSEM has been conceived to model advanced metering and control functions for all energy types, all market segments and to exchange data over all communication media.

Various COSEM objects are available to hold measurement and configuration data, for time or event based control, to manage access rights, security and functionality, and to set up the communication interfaces.

The COSEM objects can be used the same way for metering and controlling electrical, gas, water, heat energy and more.

The OBIS codes are energy type specific to reflect the differences in physical quantities and the way they are processed.

With the COSEM object model a large range of metering and control functions, like billing, payment, load profiling, power quality measurement, revenue protection, customer information, load and supply control can be modelled.

Management functions include configuration, parametrization, firmware update, security, meter and communication channel supervision.
KEY CHARACTERISTICS

Evolutionary
Standard extension mechanisms are available that facilitate adding new features while maintaining backward compatibility. The COSEM model, the DLMS services and the communication profiles can be extended independently.

Flexible
The standard elements can be freely combined to tailor the system to the target application.

Secure end-to-end
Advanced security features based on proven cryptographic standards ensure end-to-end security between systems of market participants and the meter through the metering head end system.

Efficient
Data organization tools, efficient encoding and adaptation to communication channel characteristics ensure low overhead and efficient data exchange.

Interoperable
The self-descriptive COSEM object model, negotiation of the features implemented, standard identifiers and data types ensure interoperability between products of different vendors.

Companion specifications
Such documents are established by project groups or consortia. They specify choices where these are provided in DLMS/COSEM and close interoperability gaps to ensure full functional interoperability.

Companion specification
The French smart meter specification using DLMS/COSEM G3P-PLC profile

Linky has been designed as an „infrastructure” that should benefit every user on the electricity network.
DLMS/COSEM SPECIFICATION: „THE COLOURED BOOKS”

The Blue Book specifies the functional model of the meter as seen through its interfaces. Using the object oriented approach, it specifies COSEM interface classes and their instances, the COSEM objects that interact with each other to realize the functions required. The objects are identified by the OBIS codes.

The Green Book specifies how to access data and how to transport the messages over the communication media. Pull and push operation is supported. DLMS application layer services allow establishing secure associations between applications running in meters and central systems, and accessing COSEM objects to read / write data and execute actions. It also specifies how application data and messages are cryptographically protected. Communication profiles specify how DLMS/COSEM is used over various communication channels and media. Lower protocol layers use widely accepted international standards.

The Yellow Book describes the testing and certification process and contains the conformance test plans.

The Conformance Test Tool is available for DLMS UA members through EURO DCS. The tests can be performed by manufacturers or third parties. Test results are verified and Certificates are issued by the DLMS UA. Certified meter types carry the “DLMS COSEM compliant” logo.

The White Book contains a glossary of terms that help understanding the specification.

Companion specification

The Great Britain Companion Specification, GBCS

The GBCS is the largest metering project the UK has ever seen. It covers electricity and gas meters, load control switches, communications hubs, a nationwide communications infrastructure, data access services and a product security certification scheme. It is implemented by many meter manufacturers based in the UK, Europe and Asia. It is currently undergoing System Integration Testing (SIT) involving the Data Communications Company (DCC), energy suppliers, third party agents and meter manufacturers.
INTERNATIONAL STANDARDIZATION

International standardization is a key element of the DLMS UA strategy. The development of the specification takes place in working groups uniting the best experts in the industry. Market requirements and use cases are analysed and mapped to COSEM interface classes, OBIS codes, DLMS services and test procedures.

The contents of the “Coloured Books” are offered to international and regional standards organizations.

IEC

DLMS/COSEM has been adopted in 2002 by the IEC as the IEC 62056 suite for electricity metering. The DLMS UA is liaised with IEC TC 13 WG 14 and acts as the registration authority.

CEN

DLMS/COSEM has been adopted in 2002 by CEN as part of the EN 13757 suite for metering energy types other than electricity. The DLMS UA works closely with CEN TC 294 and acts as a registration authority.

CENELEC

DLMS/COSEM is the basis of developing new communication profiles by CENELEC TC 13 WG 02 under the smart metering standardization mandate M/441. The DLMS UA is a Liaison Partner of CENELEC.

New editions of the international standards are synchronized with new editions of the DLMS UA Books.

Companion specification
UNI/TS 11291, DLMS/COSEM wireless M-Bus profile

The project involves all gas utilities in Italy and many local and international manufacturers, as well as certification bodies.

Installation of commercial and industrial smart meters is now almost completed. Rollout of residential gas meters is in progress, with several million meters installed and / or awarded in tenders.

The CIG (Comitato Italiano Gas) was tasked - as an independent standardization body - to develop the technical specification that led to the UNI/TS 11291 series of national standards.

Project started in 2008 by the regulation ARC / gas 155 / 08, involving the full territory of Italy and for a customer base of approx. 2.5 million residential, commercial and industrial users.
DLMS USER ASSOCIATION

The DLMS UA is a non-profit organization founded in 1997 by leading utilities and meter manufacturers. It has grown to a global organization with 300+ members from all continents and 60+ countries involving utilities, meter manufacturers, system developers and integrators, and chip manufacturers.

Mission
To establish and keep DLMS/COSEM as the leading standard for smart meter data exchange, to foster the operation of energy markets, facilitate energy efficiency and improve business efficiency for energy market players.

Strategy
Involve users of the standard in the development of the specification. Drive international standardization. Promote the benefits of DLMS/COSEM to potential users and help them in developing companion specifications.

Membership is open to entities engaged in the design, manufacture, supply and operation of metering systems. Associated Membership is open to organizations that have common interest with the DLMS UA.

Benefits include free access to the Coloured Books, involvement in forming and deploying the strategy, technical support, and access to conformance testing and certification.

Services
• Specification development and maintenance in cooperation with IEC, CEN and CENELEC
• Operation of the conformance testing and compliance certification scheme. To date, 700+ certificates have been issued to 100+ manufacturers
• Training and technical support
• Registration authority for the IEC 62056 / EN 13757-1 DLMS/COSEM standards

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IEC 62056-6-2
DLMS
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- utilities know what they get

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We speak the same language....

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