Meeting the challenges of interoperability in the world of smart devices and meters

The new IoT world of smart devices and systems creates a fast-moving business environment in which new business cases and opportunities emerge quickly.

A common, standardised language for exchanging data with these devices is vital for their successful, secure and timely integration into systems and business processes.
Why choose DLMS?

Choosing DLMS can help to avoid the risks often associated with large scale roll-outs such as vendor lock-in and volatility of the technology and can provide predictability over the lifetime of the assets.

**DLMS assurances:**
- Leading international standard globally recognised by regulators, utilities and suppliers;
- Wide and growing supplier base, with over 1,200 meter types certified as compliant;
- Interoperability ensured by the standard;
- Interchangeability ensured by project specific companion specifications;
- Efficiency for usage in constrained devices and networks;
- Proven by many large-scale deployments;
- Constantly evolving to meet future needs.

**DLMS supports:**
- Revenue metering and control of all utilities: electricity, gas, thermal energy, water;
- Payment metering: pre-payment or post-payment, local or central accounting;
- Power quality measurements;
- Sensing and monitoring any physical quantity;
- Data exchange over a wide range of communication media.

DLMS based systems are successfully deployed in all market segments: generation, C&I, residential.
How does DLMS work?

DLMS, the Device Language Message Specification uses a three-tier approach:

Modelling defines the semantics of the language: the device functions and system use cases are modelled with COSEM interface objects and the OBIS object naming system.

Messaging defines the syntax of the language: the DLMS/COSEM application layer defines services to access the data stored by the objects and to perform operations on them as well as the encoding rules for the messages to be exchanged.

Transport is defined in communication profiles that specify how the messages are transported over various network technologies:

- **Internet transport and network layer protocols including:** TCP/UDP, IPv6/IPv4, RPL, 6LowPAN;
- **Physical and link layer solutions, including:** Power line carrier (S-FSK PLC, B-PSK PLC, G3-PLC, Prime PLC, High speed PLC), Wired (Ethernet, M-Bus, Euridis), Wireless (M-Bus, ZigBee, Wi-SUN FAN, LP-WAN) and Public Networks (PSTN, GSM, GPRS, 3G, 4G, 5G).

Main characteristics:

- **End-to-end, Application-to-Application, layered security concept** that provides cryptographic protection of COSEM data and the DLMS messages carrying them, complemented with protection provided by the lower layers;

- **Efficiency mechanisms** that optimise the message sizes and the number of exchanges to match the properties of the communication media;

- **Firmware upgrade mechanism** to keep devices up-to-date during their whole lifetime using image transfer that is safe, secure, efficient and multicast-capable.

- **Evolutive and future proof:** All three elements – Modelling, Messaging and Transport – can evolve independently to keep pace with changing needs, while maintaining backwards compatibility.
Interoperability benefits:

- DLMS User Association conformance certification gives surety of compliance with the standard;
- Testing to project specific companion specifications gives surety of interchangeability;
- Products, protocol stacks and chip sets are available from multiple sources.
**Representative companion specifications and deployments**

### DLMS IN NORTH AND SOUTH AMERICA

#### THE NETHERLANDS:
Three generations of smart meter requirements specification

- **DSMR, DUTCH SMART METER REQUIREMENTS SPECIFICATION:** Developed by Netbeheer Nederland in cooperation with manufacturers, grid operators (Alliander, Delta, Enduris, Enexis, Stedin) and suppliers. Used for rollouts until 2016.

- **SMRS, SMART METER REQUIREMENTS SPECIFICATION:** Developed by Grid Operators (Alliander, Stedin, Enduris, JUVA) in cooperation with smart meter manufacturers. Used for rollouts from 2016.

- **ESMRS, ENEXIS SMART METER REQUIREMENTS SPECIFICATION:** Developed by ENEXIS in cooperation with manufacturers. Used for rollouts from 2017.

  **Applications:** Mainly electricity and gas, supports heat and water metering as well.

  **Technologies:** DLMS/COSEM over GPRS, CDMA, LTE Cat 1, LTE Cat M1/NB-IoT.

  **Deployments:** 6.3 M electricity, 5.3 M gas meters by July 2019.

### DLMS IN EUROPE

#### GREAT BRITAIN: GBCS, THE GREAT BRITAIN COMPANION SPECIFICATION
Developed by major manufacturers and utilities, mandated by the Government.

- **Applications:** Electricity and gas metering, payment and customer information for domestic and smaller non-domestic customers.

- **Technologies:** DLMS/COSEM over a nationwide communications infrastructure: long range RF, cellular and mesh radio. ZigBee® SE for HAN communications between devices.

- **Deployments:** Being rolled out by 40+ energy suppliers to 30 M electricity and 23 M gas customers.

#### PRIME COSEM MODEL SPECIFICATION:
Smart energy distribution grid solution deployed in Spain, Portugal, Poland, Latvia, Greece. Developed by the PRIME Alliance. Utilities involved: Iberdrola, EDP, Naturgy, CIDE, Energa, EVN, Sadales Tikls.

- **Applications:** Advanced metering, energy management, energy storage, demand response, smart grid control and asset monitoring.

- **Technology:** DLMS/COSEM over PRIME PLC (ITU-T G.9904).

- **Deployments:** 21+ M meters installed in EMEA, Americas, Asia / Pacific.

### SWEDEN: SECOND ROLLOUT BY E.ON BASED ON THE IDIS SPECIFICATION
More than 1 M residential and ICC meters will be rolled out by 2024.

#### IDIS: THE MANUFACTURER-LED INTEROPERABLE DEVICE INTERFACE SPECIFICATION
Developed by a group of leading manufacturers.

- **Applications:** Electricity metering, in all market segments.

- **Technology:** DLMS/COSEM over G3-PLC, S-FSK PLC, GPRS, 3G, 4G 5G and IP technologies.

- **Deployments:** Rolled out in EMEA. 100s of customers with millions of metering points.

### FRANCE: LINKY, THE FRENCH SMART METER PROJECT:
Companion specification developed by Enedis, responsible for 95% of the French electricity distribution network.

- **Applications:** General purpose smart infrastructure bringing benefits to all users of the network: metering, control, monitoring, end users.

- **Technology:** DLMS/COSEM over G3-PLC (ITU-T G.9903).

- **Deployments:** More than 20 M meters by end of July 2019, daily installation rate is 30 to 40 000 meters, 35 M meters will be deployed by 2021.

### UNI/TS 11291, ITALIAN NATIONAL SMART GAS STANDARD
Developed by Comitato Italiano Gas, CIG. Mandated by the Regulator ARERA.

- **Applications:** Industrial, commercial and residential gas metering and control.

- **Technology:** DLMS/COSEM over 169 MHz wireless M-Bus networks. Extension to support DLMS/COSEM over cellular networks and NB-IoT. Seamless integration of meters supporting different communication technologies.

- **Deployments:** Being deployed by all Italian gas utilities for 22 M users, 7M residential and 200 000 C&I meters installed so far.

### CEI TS 13-82/83/84/85, ITALIAN NATIONAL SMART ELECTRICITY CUSTOMER INFORMATION STANDARD
Developed by Comitato Elettrotecnico Italiano, CEI. Mandated by the regulator ARERA.

- **Applications:** Communication from 2nd generation smart residential electricity meters to end-user devices, to support customer awareness and advanced energy management.

- **Technology:** DLMS/COSEM over PLC and over 169 MHz wireless M-Bus networks.

- **Deployments:** Currently pilot projects. Rollout of 2G meters in progress to over 30 M users.
DLMS delivers an interoperable, efficient and secure framework for the roll-out of large-scale smart systems. Coupled with Companion Specifications, the standard can provide a complete ‘how-to-guide’ for interoperability and interchangeability. By working with the DLMS UA, consultants and system integrators can develop deep knowledge that can be applied to deployments across the globe.

Utilise the technical experience of the Association with your clients to support roll-out projects and offer surety for the lifespan of the system.

**DLMS for consultants and system integrators – interoperability, efficiency, security guaranteed**

**The DLMS User Association:**
over 20 years of experience of managing change and the evolution of smart devices

The DLMS UA is a non-profit organisation founded in 1997 by leading utilities and meter manufacturers. It has grown to a global organisation with 300+ members from all continents and 70+ countries involving utilities, meter manufacturers, system developers and integrators, and chip manufacturers.

By becoming a member of the Association benefit from:

- Knowledge and experience of 150+ implementers;
- The surety of over 1200 certified device types;
- An established compliance certification platform and test tool;
- Training and support from renowned experts;
- The ability to drive and influence the specification development;
- International recognition of the specification through IEC, EN and national adoptions as standard.

Get involved with the DLMS UA to shape and maintain the future of the smart world of devices.

Contact us via our website or via email to: dlms@dlms.com