ENERGY RETAIL Association

DLMS Demystified

Version 1 8th November 2010

Version	Date	Author	Changes
0.1	5.11.10	Simon Harrison, ERA	Initial draft
1	8.11.10	Simon Harrison, ERA	Updated to include comments from Secure Meters and Itron

This Paper

At the SMDG on 21.10.10, the ERA were asked to provide a short paper explaining the DLMS standard and how it could relate to issues with interim interoperability.

Note that this paper represents the views of the ERA project team only and do not reflect the collective or individual positions of ERA members.

Further note that the paper has not been prepared by an expert user of DLMS/COSEM.

The DLMS Standard

The **Device Language Message Specification** is a suite of standards developed and maintained by the DLMS User Association, and is the closest current solution to a common International approach to data formatting and messaging for metering equipment.

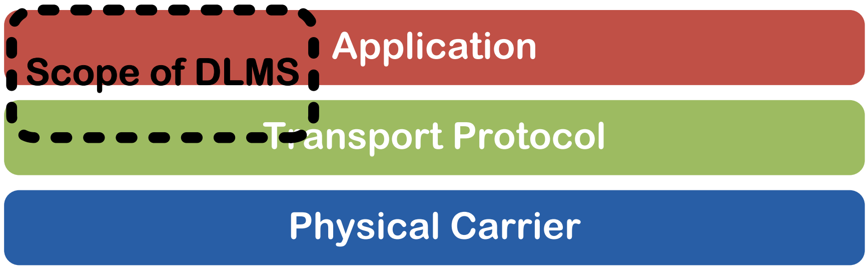
Initial DLMS publications were in the mid to late 1990's, and the User Association has over 190 international members, with products available from over 50 manufacturers.

The IEC standard 62056 family of international standards cover the layers DLMS protocol. The standard is subdivided into parts to describe each layer. The DLMS User Association publish a set of 'coloured books' (Green Book, Blue Book etc) as a set of guidelines of how to implement the standard and approve products.

COSEM – the Companion Specification for Energy Metering, is a set of rules for modeling meter data. It provides a common, structured and extensible solution and is part of the overall DLMS solution. COSEM also includes transport layer specifications.

Scope of DLMS

Using the simple model established in the ERA Interface paper, the scope of DLMS is as shown below (there are much, much more complicated architecture options, but this illustrates the basics):



DLMS is essentially an application standard, it provides common techniques for modeling meter data and then capturing this data in message formats. For certain technologies – typically different power line carrier technologies, it can incorporate details within the lower layers to effect end to end communications.

It is primarily suited to 'real time' conversation types of communications – like GPRS or PSTN, rather than sequential messaging – e.g. it is not well suited to SMS based communications.

In the GB context, particularly for interim interoperability, we are most concerned with the application layer.

COSEM, OBIS, Interface Classes - ?

Helpfully, these terms all form part of DLMS and how it has approached the challenge of providing a common approach to modeling pretty much any kind of data item.

OBIS – the Object Identification System – provides a solution to ensuring that different data items are always identified in the same way. It provides a set of rules that clarify, for example, that the gas firmware version data item is always identified in the same way by meters and systems.

Where different individual data items can be described in a common way, these are bundled into COSEM Interface Classes – volume for gas, current for electricity, clock activity for anything etc. Thus, if the class is measuring time, then parameters such as scaling are known to be in hours, minutes, seconds etc.

This is very complicated – there are over 70 Interface classes, albeit that a proportion of them deal with lower layer activities. Classes exist to model data profiles, with a range of approaches to capture and express such profiles.

Suffice to say that the DLMS Blue Book defines and classifies much of the data envisaged to travel between SMS metering components and Head Ends.

ABC of DLMS

This section is very, very simplified and focuses on data – head ends often do much more with application and lower layers and associated processes, but this is also covered by DLMS and is not as relevant to the GB market issue.

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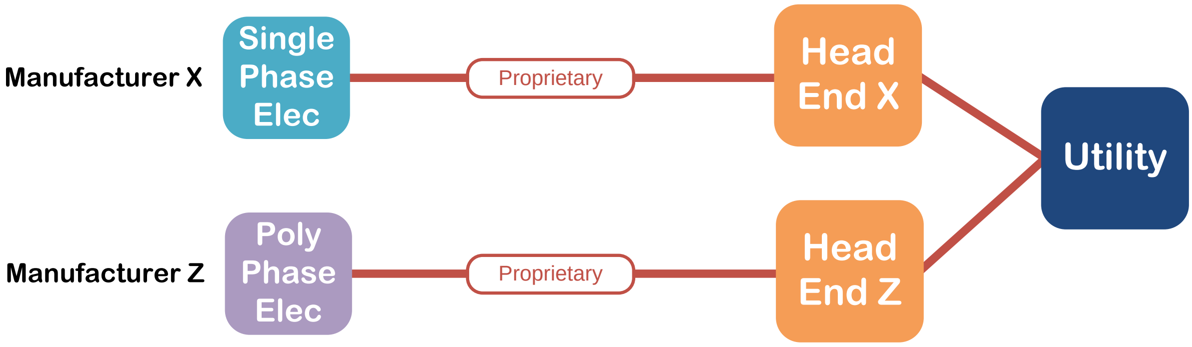
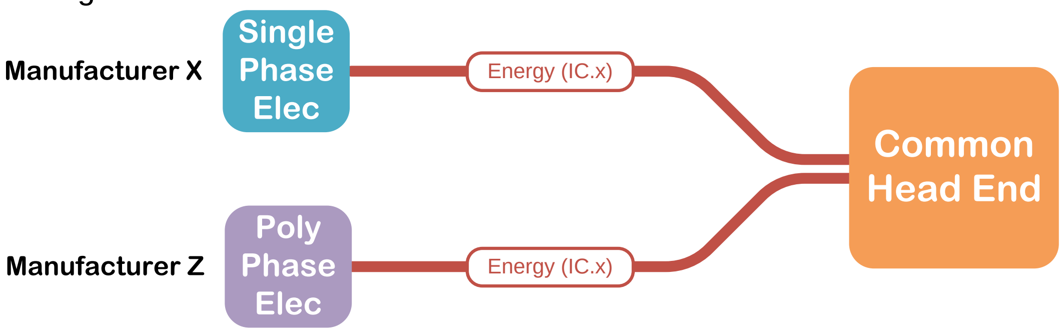
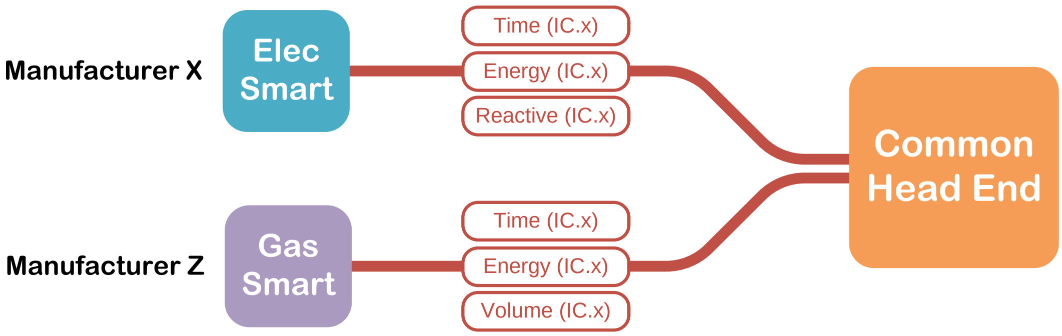
Without a standardised data/application approach such as DLMS, utilities may have to support a range Head End equipment where they have sourced meters from different manufacturers.



By introducing common descriptions and models for the data that travels between the meters and the Head Ends, the 'Common' head end concept can be used – the meters can be very different designs and used for very different customers, but the use of a standard interface class for Energy data allows for a single head end to manage this data.



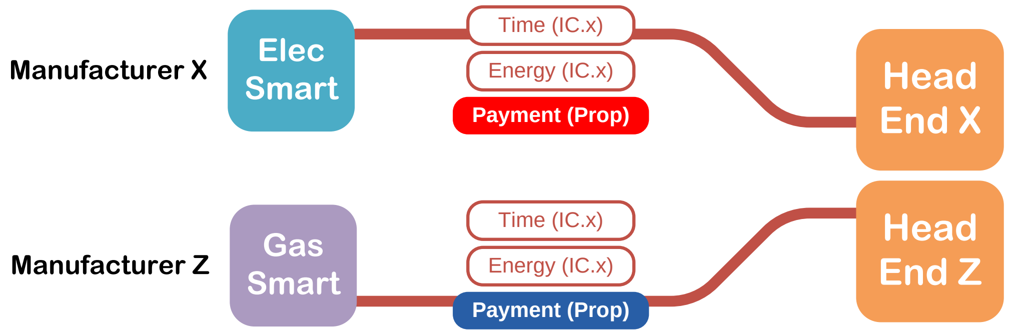
Because DLMS has defined a number of Interface classes, a great deal of the data for smart metering can be accommodated within this common, interoperable approach.



The Key "Wrinkles"

DLMS currently provides a solution for many advanced and smart metering deployments globally. However, these deployments tend to be in vertical, single utility environments, and DLMS has adapted to support bespoke arrangements from specific utilities, manufacturers etc.

There is scope within the OBIS approach for specific objects, and within the COSEM classes for Companion Specifications – head room to cover for specific data items. Therefore, Manufacturer X could take a different approach from Manufacturer Z to modeling tariff or payment . Although both manufacturers have implemented the standard, their different approach means that a 'common' head end would not be possible. Even one inconsistency in a single data item breaks the interoperability.



There are a number of gaps between the existing defined classes for DLMS and the anticipated requirements for full GB smart metering.

Maturity

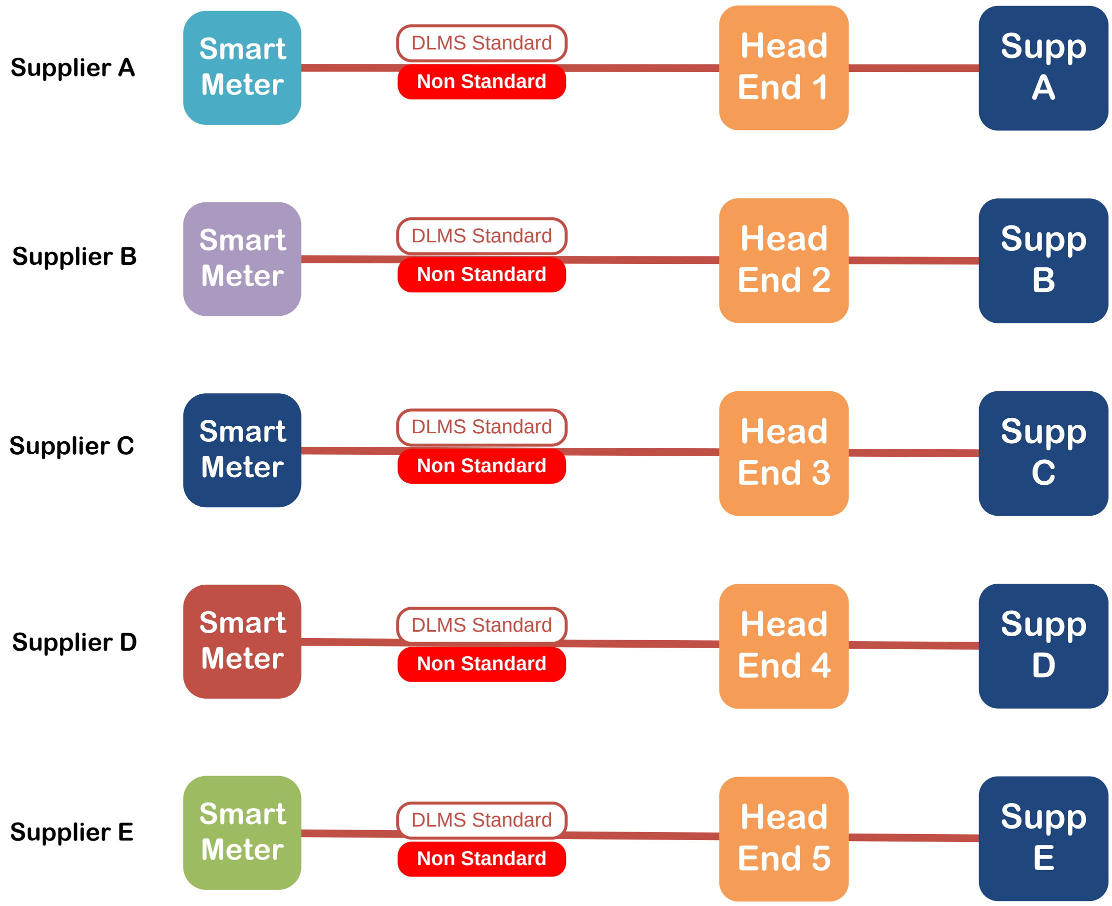
The roots of DLMS are in electricity power systems – it was originally the *Distribution Line* Messaging System. It is understandably more comprehensive in its treatment of electricity metering, particularly over wired communications media. The original metering solutions tended to be for larger customers using AMR equipment.

Work is ongoing to expand DLMS to cover the smart metering use cases for domestic electricity and gas (and water and heat) meters. This is being addressed through the M441 work by CENELEC, in areas such as prepayment critical to an interoperable British smart meter infrastructure – security and encryption, retail competition etc.

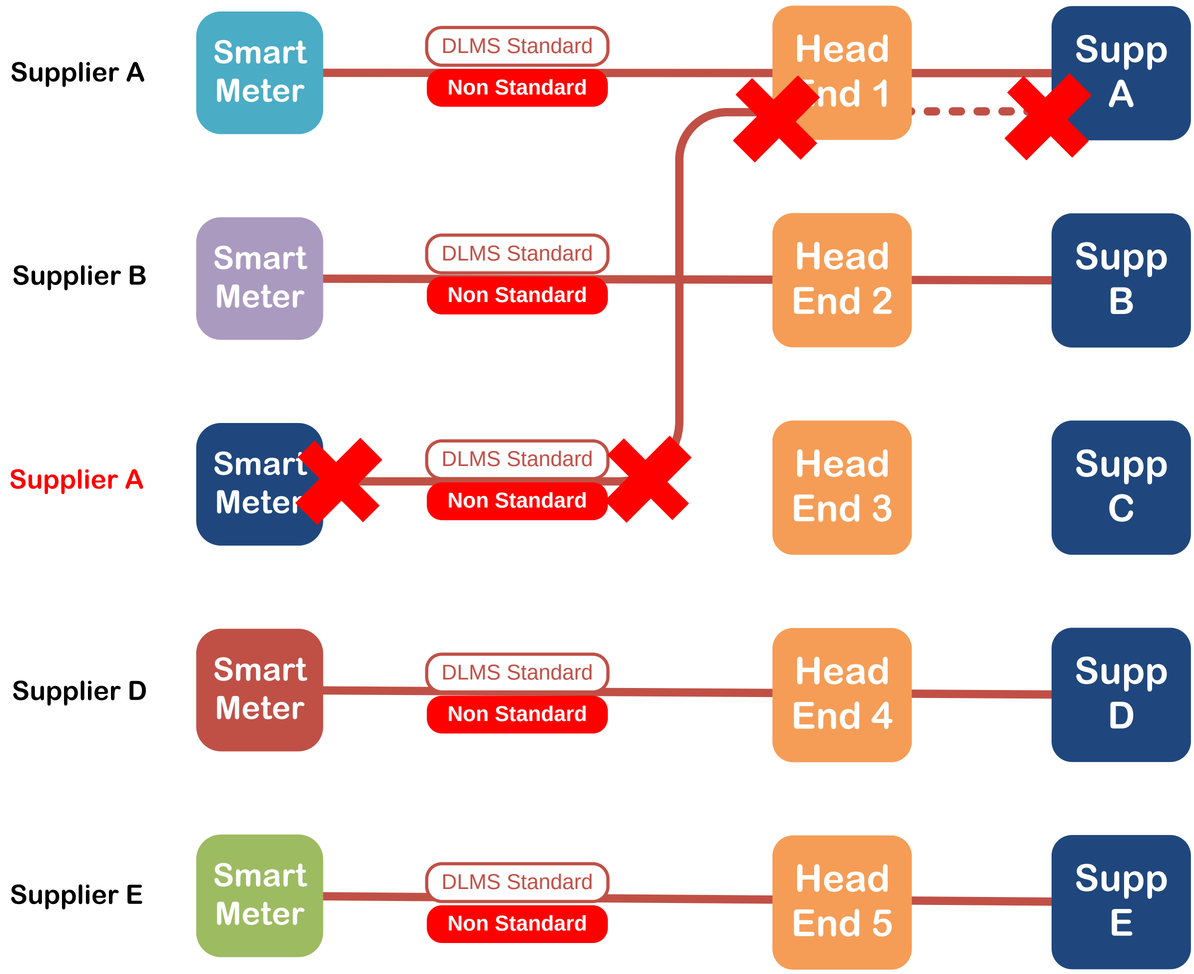
As it was designed as a measurement standard, DLMS is very comprehensive when it comes to measurements, but is less mature for non-measurement data items, or in terms of being prepared for the volume of data from smart metering, as opposed to large industrial AMR-type metering.

The Interim Issue

Potentially, without working to address the issue, it is possible that individual Suppliers (or manufacturers) address the gaps in DLMS in different ways.



This approach is OK until a single customer changes from one Supplier to another – who has a meter from a different manufacturer who has implemented the object model in a different way or implemented new features such as prepay prior to it being standardised. In such cases, the new supplier would be unable to access some of the objects from the meter.



There are ways to cope with this issue – recognition and translation within the Head End boxes, but it would be more sensible to attempt to prevent it from occurring, by defining a GB DLMS Companion Specification prior to the installation of the first smart meter.

A technique discussed with regard to the DCC is the provision of translation services to accommodate non-standard data items (shown below). Having an agreed GB DLMS Companion Specification would prevent the requirement for such a function in the DCC

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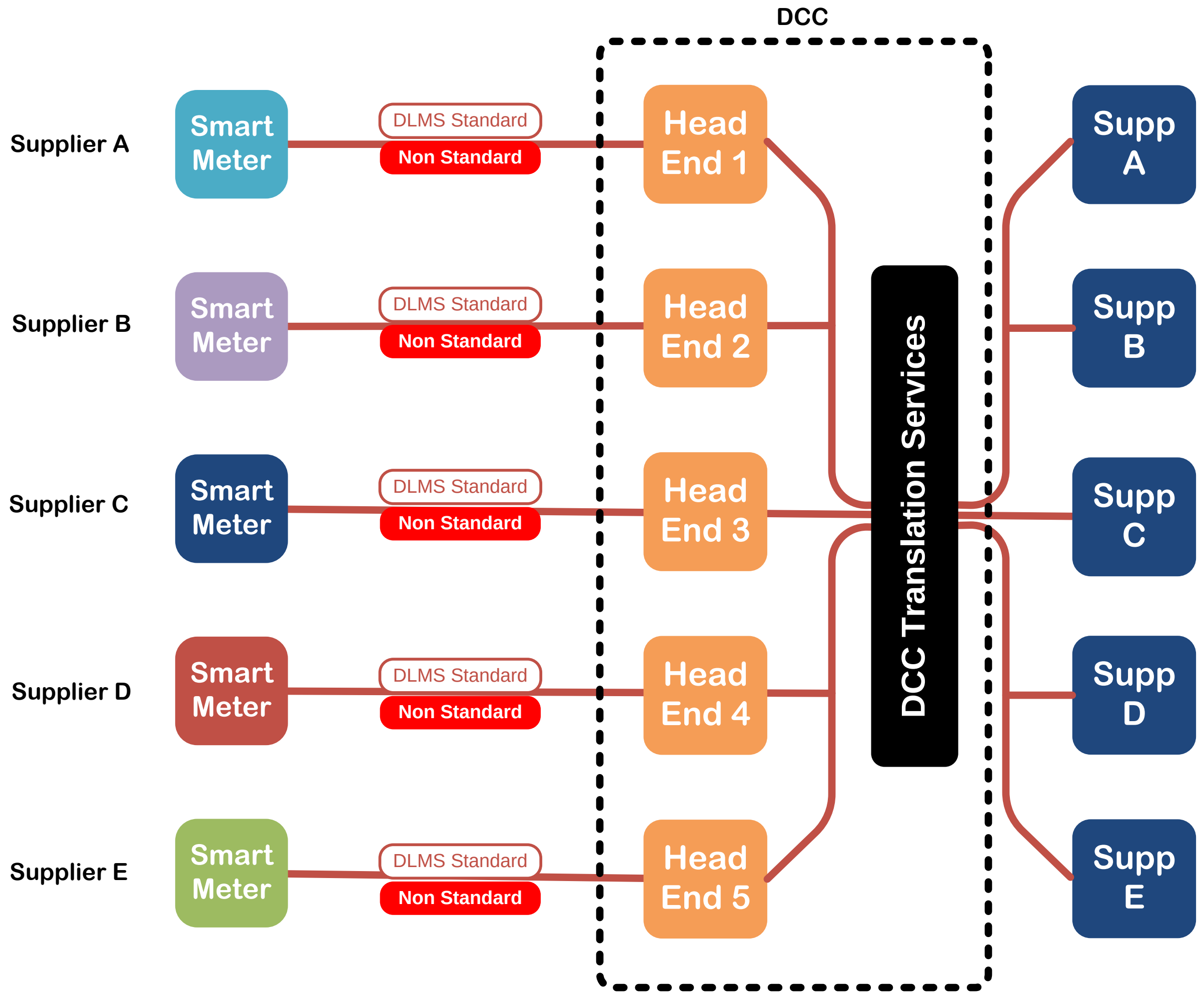

GB Companion Specification

It is expected that, in order for DLMS to support all of the requirements of the GB smart meter roll out, some existing interface classes may need to be updated, or some new specific GB classes defined.

The Dutch DMSR documentation includes 3 new interface classes to address their specific requirements – in total only 8 pages, although there are quite a few pages defining the objects to be used in those classes.

ErDF have a companion specification to support their 35 million meter roll out.

IDIS (Itron, Landis+Gyr and Iskraemeco) have a companion standard available.

It is understood that manufacturer associations are working to this end, but without clarity in the requirements from the Programme, this cannot be finalised – the Elster, Landis+Gyr and Secure activity has identified May 2011 as the date to publish DLMS interoperability.

In the response to the technical assessment questionnaire for SMDG SG1, the response from the DLMS User Association was:

"A companion specification should be developed in co-operation between UK market participants. It mainly comprises determining the list of necessary objects. The DLMS UA will be happy to contribute. It could be achieved in a few months."

Agreeing and adopting a Companion Standard for DLMS for GB could deliver the following structure for data (it is anticipated that there may be individual head end components for different physical media):