

Interoperability in Electricity Metering– Facts & Myths

MIOS forum – IEEMA

In India microprocessors based energy meters are used in the electrical system. These meters measure and record energy consumption & load profile. Energy meters stores monthly energy consumption data which gets downloaded to the Meter Reading Instrument and further to the Base Computer Software (BCS). The consumption data from BCS gets imported to the billing software after which bills are generated and dispatch to the consumer. This complete process takes too much time as meters are of different make / manufacturer and BCS is also manufacturer specific while doing AMR (Automatic Meter Reading) or RMR (Remote Meter Reading) using hand held devices. Hence utility requires a system / products by which multiple manufacturers make meter having different communication protocol, the communication media and database should be interoperable.

Interoperability provide capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units. This means ability of a system or a product to work with other systems or products without special effort on the part of the customer. This is important for effective use of metering assets by means of automation, data retrievals, processing & analysis.

Interoperability should be seen at each level starting from meter to communication media to backend system. In this context, many attempts have been made around the world; people have tried to evolve common standards of communicating with and interpreting data from the meter. These approaches so far has been to adopt one of the many proposed standards of data exchange for electronic meters. Some attempts have also been made to use standards of data exchange coupled with standards of data interpretation. But before choosing any of the methods the most important thing is that we should get the parameters / requirements standardize which should cover all the components suppliers for example vendor of energy meter vendor, communication media and backend system (databases).

The interoperability should be chosen on the basis of application area and its practical usage. Since the utility requirement is to acquire meter data from meter for bill generation, monitor important distribution parameters, and generate exceptions / MIS reports for proper planning, monitoring, decision support and taking corrective actions on the business activities by the management, then in that case interoperability at system level is very much required. Hence looking into the requirement and the install base meters / legacy meters the various options of common data communication protocols, it is very much clear that most of the existing common protocol did not meet the basic requirement of being able to harness the capabilities of the existing installed base of metering assets and do not provide the backward compatibility.

Moreover adoption of such a technique would also not guarantee a truly manufacturer independent system solution, as there may be many common protocols or parameters required by one utility time to time or different utility different protocol and parameters.

Looking into the utilities scenario, in case of AMR the energy meters required can have common protocol, now in this case also there should be uniformity across the country or atleast in individual utilities that one protocol shall be there, otherwise then interchange-ability problem will come. Like if some meters procured by one utility with common protocol “A” and after certain duration the same utility purchases meter with common protocol “B” then again the problem will start on how to get both the common protocol data in common software with common format output.

Therefore while setting the strategy; the utility industry need to focus on their key objective and should have unified high level application software that can be integrated with any compliant meter. Most importantly they did not let their vision be stifled by having to choose one of the many available protocol options. However, metering assets, but also put the onus of providing the meter drivers (like printer drivers) in form of Application Program Interface (API) of the meter with the respective meter manufacturers.

The MIOS (Meter Interoperability Solution – A Forum under IEEMA) solution provides interoperability at system level. All meter manufacturers will have to supply APIs complying with the specification. The executable file will allow reading the meter data, check security, interpret and provide data in a common agreed data format. Such an agreed data format should be flexible for future expansion and adaptable to various customer needs. Open formats using languages like XML (eXtensible Markup Language (XML)) is quite well suited for this kind of application. This will much more cost effective for both utility & meter manufacturer vis-à-vis to consumer also. The system based interoperability also allows other parties (like software vendors / system integrators) to come & join. Hence it is proposed that an interoperability standard

be so defined that it meets all the requirements outlined above and does not lose sight of the key objectives of the electricity utilities.

The system level interoperability will provide seamless integration. In this scenario when there will be different components like meter, communication channel / media, database, and other IT infrastructure, interoperability plays a major role. Therefore, before moving for big projects one should focus on the application area and the need clearly, based upon which the right technology can be adopted. The “interoperability” requirement should be seen with the installed meters / legacy meters as well as new purchases and also less cost effective solutions.