

A Flexible Market Model for UK Smart Metering

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ElectraLink

Introduction

The roll out of smart meters across the UK SME and residential markets is widely expected to deliver a broad range of benefits to consumers, Suppliers and Network Operators. Much work has been done to date to model the costs, benefits, deployment and technical options of such a roll out. Whilst logistical roll out variants and communications technologies have been assessed in some detail, the effects of centralised communications backhaul, data processing and integration have not yet been explored in sufficient detail to understand the impact these factors may have on the strengths and weaknesses of the base options. This paper aims to stimulate industry debate by outlining the case for a range of common, industry scale functions, hereafter referred to as the Smart Interoperability Portal. The provision of common functions will minimise the overall costs and risks of a UK wide smart metering roll out, and improve the quality of data and processes benefiting all stakeholders. The extent to which these concepts strengthen or weaken roll out options, meter specifications and market models should be noted by energy Suppliers, Network Operators, meter manufacturers, metering service providers, settlement bodies and government policy makers during the next stages of evaluation and planning for a UK roll out of smart meters to SME and residential markets.

Market Models

By considering the advantages of shared and centralised smart meter functions, further information

will be available to support the evaluation of a UK smart metering roll out. In particular industry cost models for a roll out based on existing market structure, and regional franchise models, could be further refined and assessed.

Consolidating standard smart metering data management functions into industry scale services can deliver economies of scale where those functions would otherwise need to be repeated at each of the stakeholders. Furthermore improvements can be expected in areas of stakeholder to meter interoperability, dual fuel operations, data quality, supply market entry and competition for services, over comparable fragmented and regional implementations.

Mandating a fully managed, or new and replacement cycle based roll out might support the confidence needed for investment in industry scale shared services. The benefits of such an approach are likely to be significant and therefore this factor should not be overlooked in the evaluation of the roll out options themselves.

Interoperability

The need for an efficient Change of Supplier process is fundamental to customer experience and operation of the competitive supply market. The seamless transfer of smart metered sites between Suppliers is therefore a key challenge in the preparation for a UK wide roll out. Unlike solutions for AMR roll outs commissioned in predominantly vertically integrated situations, UK energy markets will require

additional features to ensure that authorised parties can access meter data and functions at various stages of operation of the metering point, relative to appropriate UK market processes. Meter devices must meet a suitable minimum specification to ensure that meters deployed can provide the minimum range of functions foreseen by energy Suppliers and their customers. However further development and innovation in meters and devices should also be promoted to allow manufacturers to innovate and develop further value adding services over time. The use of an industry scale Smart Interoperability Portal can help here; firstly by providing a web services portal through which Suppliers (large, small or new entrant) can access the standard range of functions available from meters; secondly by providing authentication for direct access to the value adding meter functions and other services where Suppliers choose to commission them; and finally by allowing multiple technical standards to exist between meter and Portal. This last point can allow existing smart meter deployments to be integrated into an interoperable environment thus ensuring return on current smart metering investments. The communications aspect of the Smart Interoperability Portal is independent of any communications methodology and will support the full range of existing and emerging communications technologies. By providing Suppliers access through the portal to both standard and optional non standard meter functions, the potential risks of stifled innovation due to a 'lowest common denominator' effect can be avoided.

Process Improvements

By rationalising smart meter data and functions into industry scale services, the overall risk and cost of a UK roll out can be reduced.

The potential to implement the next generation of market processes, business transactions and data types as a function of rolling out of smart meters is rightly anticipated by many stakeholders with a great deal of optimism. The next generation of business processes will require open standard asynchronous transactions, near real time latency, and excellent data quality. These market processes will support collaborative data sharing whilst maintaining process efficiency, quality and security of data.

However, the risks of introducing entirely new market processes in a 'big bang' implementation are great. Exceptions arising

from a lack of integration with existing processes, and additional operational complexity may present a 'cliff face' for operations staff across the industry, and adversely affect the quality of shared business data.

By implementing an industry scale Smart Interoperability Portal, smart meter functions can be integrated with existing 'Supplier hub' processes. A further advantage of this approach is that smart meter roll out is de-coupled from business process re-design thus avoiding a dependency on new processes impacting the lead time to roll out. Immediate benefits of smart metering data such as opening and closing reads on Change of Supplier, improved billing accuracy and time of use data, can all flow immediately whilst at the same time avoiding the operational hit of a big bang changeover to new processes. To ensure

smart meter data is seamlessly integrated into existing processes, the portal could produce the associated meter reading, advance and Supplier purchase files required for seamless integration with existing gas and electricity market processes defined by the MRA, BSC and UK Link. During the period following a UK roll out, the Smart Interoperability Portal could facilitate a managed migration to the next generation of market processes as required. Competitive retail energy markets in the UK may disadvantage a UK smart metering roll out when compared to vertically integrated implementations in Italy, France, Sweden and North America, however the deployment of a shared Smart Interoperability Portal offers a unique proposition that can enable UK markets to access similar benefits and employ appropriate technology whilst minimising

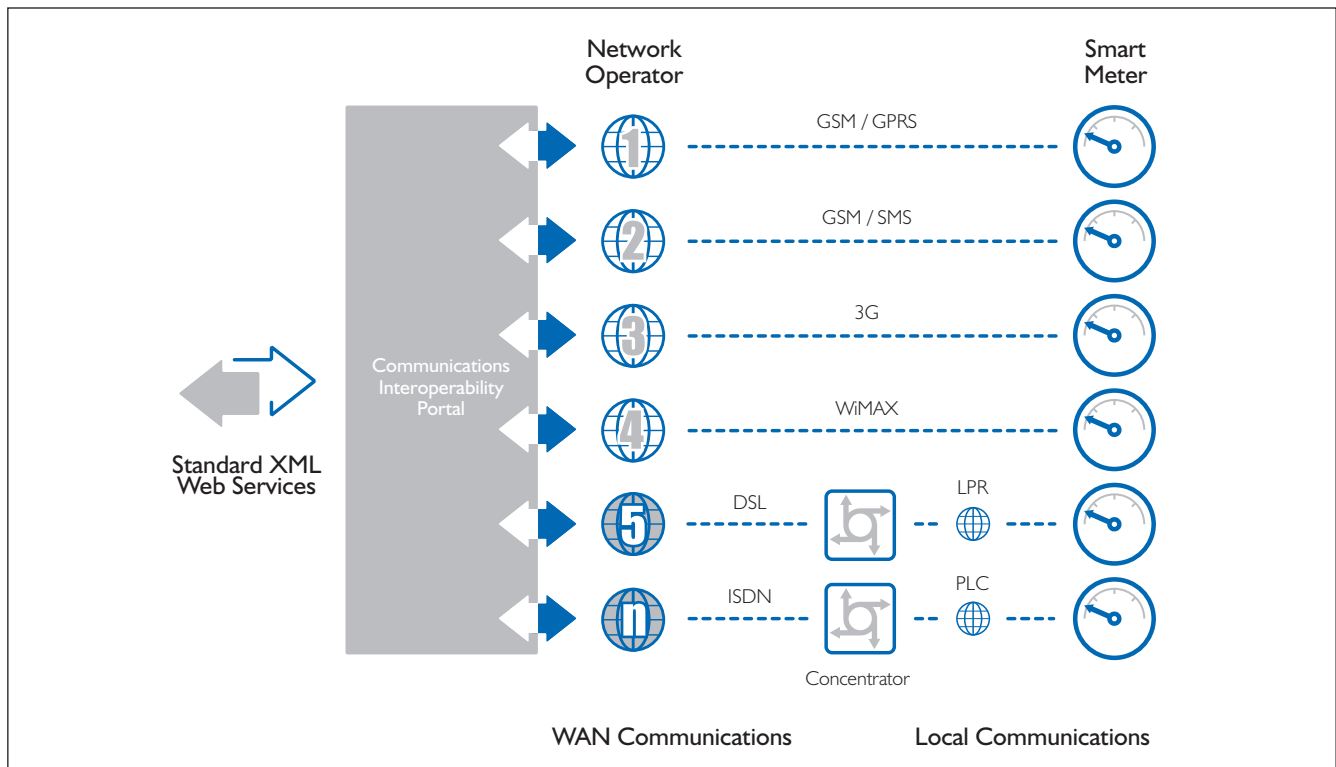


Figure 1: Smart Interoperability Portal - Communications Interoperability

commercial and operational risks that might otherwise compromise commercial and technical architecture.

Competition and Innovation

Central to the case for a Smart Interoperability Portal is the concept of competition at all levels of end to end smart metering service provision. Logistical and commercial benefits may be available to Energy Suppliers if the potential for any 'lock in' can be reduced. Suppliers may opt to buy commercially attractive bundled services but the market model should support unbundling where it may be required. The provision of a common platform would provide a mechanism for energy Suppliers to register a metering point and 'take on' the meter and its associated services under framework agreement terms. The Smart Interoperability

Portal would provide an integrated customer switching process to synchronise access control and 'clear' communications costs between the parties in line with existing and future Change of Supplier processes. The same mechanics (Figure 1) will provide energy Suppliers the degree of control required to support commercial flexibility in the communications market enabling large scale migration of metered sites between Network Operators. Whilst the treatment of SIM devices by mobile operators may hamper this in the short term the situation will almost certainly change in future and may even be overcome by innovative marketing options in the short to medium term.

Commercial flexibility at all levels of smart metering service provision will encourage innovation and competition with consumers

being the ultimate beneficiaries. Bundled services provided on a regional or national basis would provide less choice, potentially stifling innovation and competition for these services.

By providing robust interconnections to communications Network Operators, the Portal would allow all authorised parties to interact with any meter through a range of industry agreed 'standard' XML web services.

A managed communications Portal could also ease the logistics of a UK smart metering roll out by acting as the "common access database for metering installations" referred to in the Mott MacDonald Smart Metering Cost Benefit Appraisal Report.

In addition to providing a standard communications interface a Smart

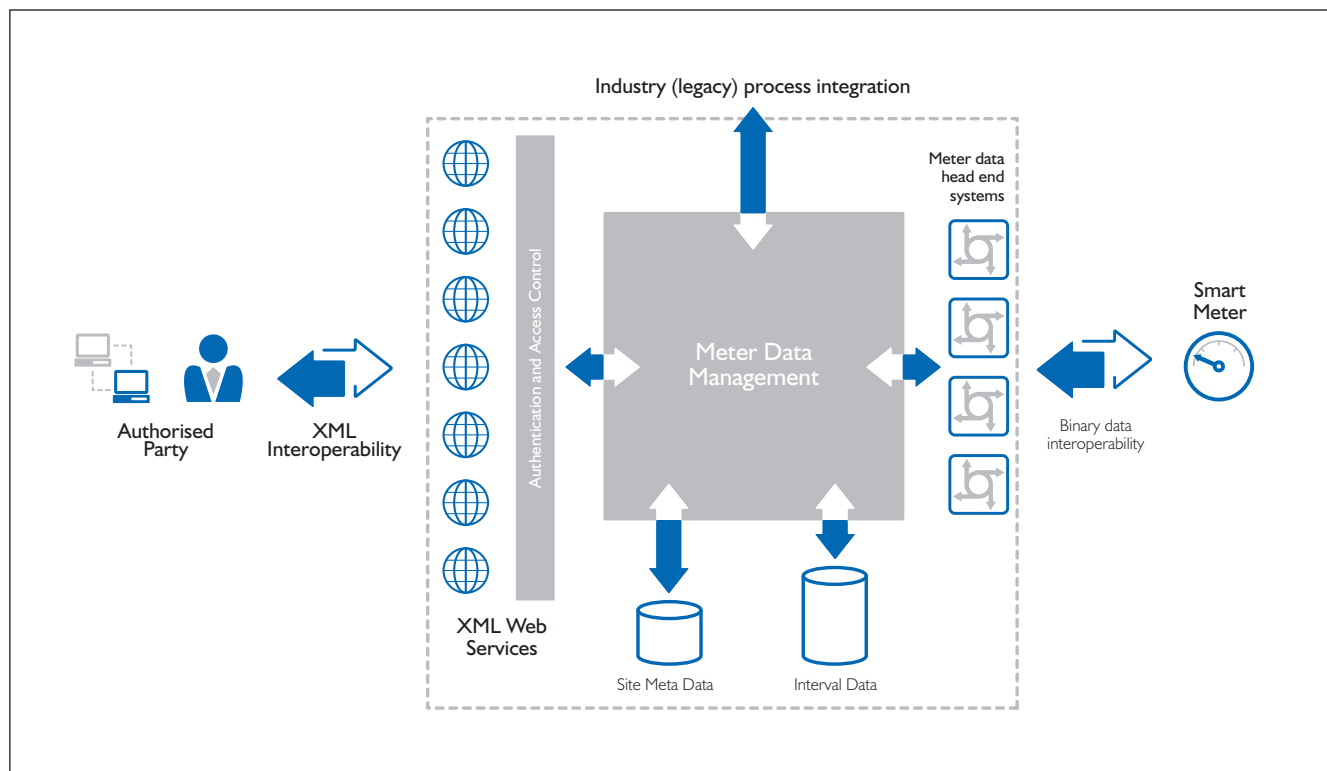


Figure 2: Smart Interoperability Portal - Meter Data Management

Interoperability Portal would provide the range of common data management functions covered in the next section of this paper. It is important to emphasise the point that the proposed use of centralised data management resources is intended to support, rather than replace, distributed data management functions. It is natural that energy Suppliers will seek, to differing degrees, to gain competitive advantage through additional layers of data management. However, access to consistent source data will provide a sound foundation for, and facilitate further distributed data management. The common data management services will provide core functionality to support effective market operation for new entrants and established businesses alike.

Architecture

It is essential that the Smart Interoperability Portal is designed and implemented to open standards. To meet this aim the Smart Interoperability Portal services (Figure 2) are fundamentally defined and presented as XML web services within a Service Oriented Architecture (SOA). The use of a SOA will provide the commercial flexibility to allow the Smart Interoperability Portal to be procured from, and operated by, a single or multiple service providers.

Being vendor independent, the selection of web services as the basis for the Smart Interoperability Portal services is a key enabler to integrating stakeholders to the common services available at the Portal and hence reducing

the overall risk and cost of implementing the UK solution for smart metering. By adhering to the agreed service descriptions, and associated schema, stakeholders can integrate with the portal by developing B2B interfaces risk free from interoperability issues and vendor 'lock in'.

Parties accessing the portal services will benefit from low cost bandwidth and the self describing, self validating nature of easily re-usable and adaptable XML file formats. On the portal to meter side, device and WAN network volumes are minimised by using binary data protocols, thus saving bandwidth and device resources at the meter and concentrator.

By providing robust links to existing industry processes the Smart Interoperability Portal can allow smart metered sites at all stages of lifecycle to be handled in a seamless way 'en route' to the next generation business processes when near real time transactions and collaborative parallel data processing will become the norm reducing lead times and bringing a significant improvement in customer experience.

About ElectraLink

ElectraLink Ltd is 100% owned by the UK energy industry and was established in 1998 for the specific task of creating and operating a fast, reliable and secure electronic means of communicating data between participants in the competitive electricity market. This requirement was met through the establishment of the Data Transfer Service (DTS). Since our creation, organisations such as Settlement bodies, Distribution

Network Operators, Suppliers, Metering Services companies and Data Aggregators, have benefited from the reliability of the data transfer network and central data processing infrastructure (DTN). ElectraLink has established a reputation for specialisation and service excellence in transferring business critical data in a secure, reliable and cost effective way. ElectraLink has used its core delivery capability to deliver further data transfer services to its customers in the electricity and gas markets in support of their requirements for DUoS e-billing, gas metering, RGMA gas developments, REMA electricity metering developments and improving the customer transfer process through the NOSI flows. In addition we have diversified our technical delivery capability to include web service design, development and delivery.

Since 1998, the national data transfer network and central data processing infrastructure (DTN) has continued to serve the data transfer requirements of the UK energy industry specified within the Data Transfer Catalogue (DTC). The EDI like, batch based transaction file format specified by the industry in 1998 has remained largely unchanged since.

In 2004, we replaced the underlying national data transfer network and central data processing infrastructure (DTN). This allowed us to take advantage of technology advances since 1998 and the new service provides users with even higher levels of guaranteed service levels for security, availability and speed of data transfer. Users of the DTN are now able to enjoy all the

benefits of the most modern networking technologies and services, including meshed wide area MPLS network, industry scale Enterprise Application Integration (EAI) platform, Service Oriented Architectures (SOA), and web services based on standard IP and related protocols, service discovery and description standards including TCP, FTP, HTTP/HTTPS, XML, SOAP, WSDL, UDDI, WSDL and XSD. ElectraLink provides centralised industry strength data and transaction processing centres and a nationwide data communications network.

Whilst the DTN has increased its capability and maintained currency with modern technical standards, since 1998 there has been little industry appeal to any fundamental changes in 1998 data formats, business processes and systems. This disinclination on the part of the industry to migrate to more modern data formats and near real time business processes is understandable considering the scale of system investments around 1998 and the legacy estate that those investments have created. Despite a lack of appetite for large changes in the years since 1998, the gap left has been filled by a steady stream of incremental changes, and additions to, working practices, process maps and data flow definitions held within the MRA product set, including the Data Transfer Catalogue (DTC). The complexity of existing energy market processes is a historic accumulation of the 1998 electricity process design, incremental change and segregated gas and electricity processes. The DTN has continued to serve the needs of the competitive

electricity market throughout this time and is enabled to meet the future data transfer requirements of the UK energy industry.

Importantly the data transfer network and central data processing infrastructure (DTN), is not limited to EDI file formats, batch operation or existing business processes. The technology that is in place today can equally support XML, web services, SOA and near real time transactions. In addition ElectraLink supports and can de-risk industry initiatives to reduce the complexity of existing gas and electricity market processes. The goal of 'next generation' dual fuel business processes is a significant challenge and one that should be de-risked as far as possible. ElectraLink, our technology partners and the DTN, are ready to help meet these requirements as soon as our customers identify a need. The next stages of preparation for a UK smart meter roll out should identify that need.

Next Steps

ElectraLink is committed to supporting and contributing to the work of BERR, Ofgem, ERA, ENA, BEAMA and other industry led debates on Smart Metering. Hopefully the contents of this white paper will help to stimulate industry debate and promote better understanding of the capabilities of the DTN. To ensure that the points made here are further debated to fully assess their merits relative to a UK Smart Metering roll out, Electralink will welcome the opportunity to engage in all aspects of the smart metering debate, and over the coming

months ElectraLink will contact as many industry participants as possible to discuss the concepts described in this paper.

Contact Us

Please contact Neil Beckwith at ElectraLink to discuss any aspects of this white paper or to request ElectraLink representation at appropriate smart metering events.

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