Smart Metering Implementation Programme: consultation on draft licence conditions and technical specifications for the roll-out of gas and electricity smart metering equipment (August 2011).

Whatever happened to Telehealth?

A consultation response from Acute Technology Limited, October 2011

For additional information please contact:

For more details of the work of Project Hydra described here, please visit:

http://projecthydra.info

Introduction

Acute Technology Limited is pleased to submit this response to DECC's smart metering technical specifications consultation.

This response is limited to a single topic: the extent to which the technical specifications are capable of supporting extension beyond the domain of electricity and gas metering, into other domains such as telehealth or home automation.

We are concerned that the Industry's Draft Technical Specifications will result in a system that is very difficult to extend into new domains, and as a consequence much of the potential benefit that could be gained from the huge smart metering infrastructure investment will remain unfulfilled.

The limited mention of telecare and telehealth in early Government documents seem to have vanished from current specification and consultation documents. For example, the "Prospectus" document (July 2010) included this:

"We recognise that the smart metering infrastructure will be attractive for other applications such as smart water metering. The proposed functional requirement for a flexible HAN solution (i.e. one where new device classes can be accommodated) enables the smart metering infrastructure to be used for smart water metering, as well as other value added services, such as energy management and access to home automation initiatives, or healthcare monitoring services at the consumer's request." (Statement of Design requirements, 4.44)

and in the Prospectus Response (March 2011):

"the emergence of electric vehicles and other initiatives, such as health monitoring, continue to be areas that the evolving smart metering design will support. Liaison with all interested stakeholders from these and other areas will continue in the next phase of the programme." (Ofgem Response to Prospectus Consultation, Design Requirements document, p3).

References to health have vanished from the Industry's Draft Technical Specifications and the consultation documents. The relevant technical requirements suggest that it will be difficult if not impossible to add support for telehealth services at a later stage. The same applies to the addition of other new services. This is important not just for those of us with an interest in this field, but should be a concern for DECC if they want to re-use the smart metering infrastructure for other services in the future.

We recommend that DECC carry out a thorough appraisal of the ability of the Industry's Draft Technical Specifications to support services beyond energy metering.

Project Hydra, Telehealth and Value-Added Services

Acute Technology and our Project Hydra partners have been working to demonstrate that the smart meter telecommunications network is capable of supporting a range of value-added services, such as “telecare”, “telehealth” and “assisted living”. These exemplar applications are indicative of a wider range of value-added services that could be supported.

Our work is described at http://projecthydra.info

A rapidly aging population and increase in chronic diseases pose a huge problem to the health services in many countries, including ours. Part of the solution must be the deployment of technology to allow people to live safely in their own homes for longer, involving remote monitoring of their health and well-being. This is the domain of “telecare”, “telehealth” and “assisted living”.

The forthcoming smart meter communications infrastructure offers a new way of communicating with patients in their homes. The smart meter comms network will be ubiquitous, always-on, and free to the householder.

The figure below is a schematic of what we have achieved within Project Hydra.

We have installed smart meters and telehealth equipment in the homes of people who are both patients of Chorleywood Health Centre and customers of Scottish and Southern Energy. These people take daily weight and blood pressure measurements which are transmitted through a wireless ZigBee HAN to the smart meter. From there we re-use a completely unmodified smart meter communications infrastructure to return these readings to a server, from where we collect the data and present it to the nurses at Chorleywood Health Centre.

Value-added services such as telehealth offer to transform the economics and benefits of the smart meter programme:

- These services can be presented to the public as examples of real benefits that *they* will receive from smart metering.
- New services will mean new revenue streams, for utilities, the DCC and its subcontractors, and considerable benefits to health services.

It is important that the smart meter specifications remain open to such value-added services.

Consultation Response: Answers to Questions 24 & 25

In the remainder of this response we provide answers to the two questions that ask about specification. The consultation says "The Government proposes to use the IDTS [Industry's Draft Technical Specifications] as the basis for the SMETS [Smart Metering Equipment Technical Specification]".

Question 24: Do you think that there are other requirements that the Government should adopt in the SMETS? Please explain your reasoning.

Question 25: Do you agree that all the requirements recommended in the IDTS should be adopted by the Government in the SMETS? Please explain your reasoning.

The IDTS proposes that devices in the home can connect to the smart meter system as follows:

- Certain "Approved SMHAN Devices" can connect directly to the smart meter HAN (SMHAN). Requirement HA.19 covers new device classes that can join the SMHAN, HA.2 covers Approved SMHAN Devices, and HA.17 covers other utility meters.
- Consumer devices can connect indirectly, through a Consumer Gateway Device. Requirement HA.13 covers the Gateway Device.

To support new value-added services such as telehealth (or indeed water metering) the following is necessary:

1) New classes of devices, such as telehealth devices, must be able to connect to the smart meter system either directly (to the SM HAN) or indirectly (through the Consumer Gateway Device), or both.
2) The communications protocols must be capable of supporting the message types that the new devices need to exchange.

It is not clear that the IDTS, as it stands, will meet these two requirements. We suggest to DECC that as the IDTS is transformed into the SMETS the need to support telehealth devices, and other value-added services devices, is made explicit. We suggest the following adjustments.

Change to HA.17 (Utility Meters)

HA.17 says this:

The HAN shall be capable of supporting other utility meters where the data or physical (e.g. range) requirements do not exceed those of gas and electricity Smart Meters.

We suggest that this can safely be generalised to encompass other devices that can provide useful services in the home. This generalisation will not compromise security or integrity of the system, but will keep open the opportunity for obtaining more value from the smart metering investment. Change HA.17 as follows:

The HAN shall be capable of supporting other utility meters **and telehealth devices** where the data or physical (e.g. range) requirements do not exceed those of gas and electricity Smart Meters.

And the Extended Requirements should also be adjusted, as follows:

HA17.1 The SM HAN shall be capable of supporting other utility meters **and telehealth devices** where the data or physical (e.g. range) requirements do not exceed those of gas and electricity Smart Meters. Examples of such meters are for measuring water, heat, micro-generation etc. **Examples of telehealth devices are weighing scales, blood pressure monitors, medication monitors and activity monitors**.

HA17.2 Where another utility meter or **telehealth device** is installed within the premises then, subject to appropriate security measures, the SM HAN will facilitate connection of the meter **or telehealth device** as an SM HAN-connected device. This shall facilitate the transmission of data and provide for remote configuration, software and firmware updates. For example micro generation data could be transmitted to and stored within the SM HAN.

For even better flexibility and future-proofing, the phrase “telehealth device” above could be further generalised to read “teleheath device or device delivering another value-added service”. This then encompasses home automation, home security, and services that are not yet foreseen.

Change to HA.19 (New Device Classes)

HA.19 says this:

The HAN shall support addition of new devices classes

and this requirement is expanded into four Extended Requirements. These are reasonable, and can be seen to cover new device classes such as telehealth devices, provided that telehealth devices can be included within HA.19.2: “New device classes shall meet the requirements of the published specification for SM HAN devices.” It is not clear what “the published specification for SM HAN devices” is, or how it can be extended to allow for these new device classes. DECC should ensure that there is an understood mechanism for this, and that new device classes are not limited to energy metering.

We suggest that Extended Narrative of HA.19 is extended to explicitly encompass telehealth, as follows:

This will allow, within the physical, security, technical and capacity constraints of the SM HAN, for it to be considered for a range of potential future devices and applications within the smart grid, load control and demand response, and other similar activities **including telehealth**.

Change to HA.13 (Consumer Gateway Device)

While we prefer the approach that allows direct connection of telehealth devices to the SMHAN, with the appropriate security constraints, an alternative approach could be through the Consumer Gateway Device.

HA.13 covers connection of other devices to the smart meter system through “Approved Gateway SM HAN Devices”. There is nothing wrong with this as far as it goes, but we fear that the scope of the Consumer Gateway device is likely to be limited to allowing access to

energy consumption data and energy messages.

For example, the Consumer Gateway Device is described on pp42-43 of the IDTS as "a method to allow consumers to gain access to local data." And the Data Access and Privacy consultation document discusses the Consumer Gateway Device only as a means to provide the customer with energy consumption data.

If this is the case then it will not be useful for supporting new services, such as telehealth. We think that support for non-energy messages must be made explicit. Since the use of telehealth devices requires a connection to a remote server, the WAN requirements must also be adjusted to allow for communications between telehealth devices, through the Consumer Gateway Device, and on to the remote server.

Therefore we suggest this change to HA.13:

The HAN interface shall support authorised gateway/bridging devices to access data made available on the HAN **and to allow communications between devices outside the SM HAN and servers located across the WAN**.

and a new HA.13.2:

HA.13.2 The Gateway SM HAN Devices shall facilitate communications between devices outside the SM HAN with servers located across the WAN.

Change to HA.14 (Application Profile)

The next impediment to the deployment of value-added services such as teleheath is restriction imposed by HA.14. This states:

HA.14.1 The SM HAN shall utilise the Smart Energy Profile v1.x as the application profile for devices that connect to the SM HAN.

This is likely to be adequate for connection of electricity and gas metering functionality but does not encompass other services, such as telehealth.

It is regrettable that Smart Energy Profile v1.x appears to be the only practical application level protocol for energy metering available today (although actually, many UK requirements are missing from v1.1 and will have to wait for a future v1.2).

Smart Energy Profile v1.x is tied tightly to ZigBee HAN (indeed it has not been implemented on anything except the ZigBee wireless HAN). Other HAN application protocols are just around the corner and will offer much more flexibility, and alignment with the Internet Protocols (IP) used in the rest of the networking world. ZigBee Smart Energy v2.0 is an example of this – it uses Internet Protocol, but is less developed than Smart Energy Profile v1.x. Can DECC wait for SE v2.0?

Adoption of Smart Energy Profile v1.x could leave the UK smart meter system in a technological dead-end.

We would like to make two suggestions for changes to HA.14. The first extends HA.14 to allow explicitly for telehealth, by mandating ZigBee Healthcare Profile for moving telehealth data. This is a companion protocol to ZigBee Smart Energy v1.x. The second change

requires support for the eventual upgrade of Smart Meter Protocol v1.x to Smart Energy Protocol v2.0, using the upgrade features built into Smart Energy Profile v1.x. This is provided for by the "over-the-air bootload cluster" and exists explicitly to allow for the eventual upgrade to the Internet Protocol HAN protocols.

We propose:

HA.14.1 The SM HAN shall utilise the Smart Energy Profile v1.x as the application profile for **energy** devices that connect to the SM HAN.

HA.14.2 The SM HAN shall utilise the zigBee Healthcare Profile as the application profile for telehealth devices that connect to the SM HAN.

HA.14.3 All SM HAN devices shall support the over-the-air (OTA) bootload cluster.