M2M Workshop Report

A workshop on Machine to Machine Standardization was held at ETSI on the 4th and 5th of June 2008.

1 Scope and objectives

Machine to Machine standardization is one of the ETSI strategic technical topics for 2008, and the purpose of the workshop was to evaluate the type of standardization activities which could be performed by ETSI, and the degree of interest from members.

Machine to machine communications can encompass many different types of applications, deployment scenarios and technologies. For some presenters, M2M was clearly limited in scope to communications with a GSM/UMTS terminal without human intervention. For others, it covered a much wider spectrum beyond sensor networks, through RFID to an internet of devices and a web of things. The workshop sought to concentrate on the telecommunications perspective of M2M, although other points of view were welcome.

2 Structure and presentations

The workshop was structured as follows

1. Information from current standardization initiatives, research projects etc.
2. Experience from current M2M deployments, business models and best practices
3. Future perspectives and requirements, from operators, system integrators, technology suppliers and users
4. Proposals for standardization at ETSI

All presentations from the workshop are available at http://www.etsi.org/m2m.

Rather than summarise each presentation, the following items were worthy of note:

The potential market for M2M devices was claimed to be some 50bn connected devices, of which only approximately 50m have been connected today. The largest potential markets are for automatic meter reading, remote diagnostics and control, and telematics.

2.1 3GPP and ETSI:

3GPP SA1 has completed a Technical Report in TR 22.868, Facilitating M2M Communications in GSM and UMTS. They have now started a new work item on Network Improvements for Machine-type Communications, to gather requirements in order to reduce the operational costs of supporting M2M services. Possible 3GPP requirements include:

- De-activation of mobility signalling for stationary terminals
- Optimised mobility signalling for low mobility and low activity terminals
- Possibility to instruct individual/group of terminal types e.g. static, low mobility, low activity terminals, not to perform any periodic location updates, and optionally location updates due to movement between LA/RAs.
- Possibility to instruct individual/groups of terminal types to perform a location update at a specific date and time
- Purging of subscriber data from VLR/SGSN for low activity / MO only terminals
- Tamper Save/Theft proof terminal including a UICC
- Possibility to change subscription out in the field e.g. after contract expiry without human intervention
- Possibility to allocate the terminals at initial power up to a network operator without human intervention
- Re-use of PNM mechanisms for M2M communication
- Possibility to define groups and to have group counters to count the traffic to and from the servers at the network boundary

- Per group counters to count location update traffic
- Add a terminal type identifier to the subscription information to facilitate mobility management and charging
- Overcoming the limitations of the IMSI range by alternative addressing solutions
- To simplify terminals and networks and thus reduce costs the CS should not be impacted and preferably PS should be used.

3GPP SA3 are studying the following three issues:

1. How to initially provision (download) an M2M equipment with a new USIM/ISIM application from an operator of customer's choice?
2. How to change subscription to a different operator?
3. How to prevent theft of and tampering with subscription credentials?

ETSI SCP are studying the need for new form factors for the UICC for M2M applications, and the deployment of confidential applications on the UICC.

There were examples given of physical and environmental requirements from GSM/UMTS-based M2M applications which can only or can best be satisfied by a UICC which is soldered onto a circuit board. But it was also explained that there was a requirement for system operators of such M2M systems to be able to change mobile network service providers. Therefore new form factors for UICCs and new manufacturing and distribution methods may be required. It may be necessary to deploy subscription data to M2M devices late in the deployment process, difficult with a soldered UICC.

It is clear that 3GPP M2M activities only cover cases where the M2M terminal is a GSM/UMTS mobile terminal, and do not consider the interfacing of Wireless Sensor Networks with mobile telecoms networks.

2.2 Other standardisation activities

A number of networking technologies have been built on top of IEEE 802.15.4, including ZigBee, ISA SP100.11a & Wireless HART. Together with proprietary solutions, there is significant choice of air interfaces for WSNs, and their number is unlikely to be reduced. There are differing needs and usage scenarios across industry segments, and indeed between industrial and consumer devices, which lead to multiple choices of air interfaces.

There is varying degrees of support for IPv6 at sensor node level. IPv4 and IPv6 protocol stack implementations have been reduced in size. Activities in IETF ROLL (Routeing in Low power and Lossy networks) and 6LoWPAN (IPv6 over Low power Wireless Personal Area Networks) working groups may enable easier use of IPv6 for routeing at sensor network level, and independent of wireless technology used. However, for example ZigBee only supports IPv6 at gateway level, not at each node.

New requirements may be placed on existing standardization activities from various industrial sectors. Requirements from the automotive sector were presented – both physical requirements on M2M modules, and also commercial requirements such as the ability to change service providers for fleets of vehicles. Requirements arising from the manufacturing process of USIMs for M2M applications were also presented

2.3 Service Layer

A number of presentations offered views of different potential M2M applications, some near term, some depending on widespread adoption of personal area sensor networks. A common theme repeated in many presentations was the need for standardisation at service level. This was sometimes expressed as the need for standardized APIs from service platforms to applications, standardized IMS enablers for M2M applications (or how to support M2M applications with IMS), or even standardized service platforms. It was suggested to use XMPP as an overlay protocol to interconnect and address wireless sensors from applications. More than one presentation suggested using the OSA/Parlay interfaces as components of

this work. There was also a need expressed for standardization for the interconnection of WSNs and a telecoms network, such as standardized APIs to a WSN gateway.

3 Discussion

A moderated discussion at the end of the workshop was organised, in order to evaluate if there was an interest in establishing a standardization activity on M2M at ETSI.

The discussion walked through the different topics identified above:

UICC hardware issues
Subscription Management, Identity and Addressing
WSN Air Interfaces
Network issues
Architectures, Service Platforms and Enablers

It was indicated that 3GPP only looks at those requirements related to M2M applications using mobile networks, and that most M2M devices will be attached through fixed, not mobile networks. There is potential work for TISPAN (network optimisation, addressing, security, home networking), ITS (in-vehicle M2M devices), perhaps RRS (SDR techniques to support many wireless sensor technologies)

The discussion made it clear that despite the existing ongoing work in 3GPP and TC SCP, perhaps not all M2M requirements have been correctly collected and taken into account. In addition, the presentations to the workshop made it clear that numerous bodies are already involved in M2M standardization. And other bodies not represented at the workshop are also active: e.g. OMA is working on Device Management and Service Enablers, IUT-T is working on ubiquitous sensor networks and networked ID.

Beyond the issues raised above of gateway and service layer standardization, there was also a need identified to consider security, privacy and trust issues: it is possible that requirements for privacy and security for RFID applications may in turn be applied to WSNs. In addition, and perhaps more importantly, integration, interoperability and testing need much more work, with no obvious standards body responsible.

There were a number of calls for ETSI to establish a group which would look at M2M standardization. While not specifying the nature of this group (e.g. Technical Body or Special Committee), it could perform the following functions

- Act as a focal point for M2M activities in ETSI
- Gather requirements for M2M standardization in ETSI and 3GPP committees (a means may need to be found to not disrupt the existing 3GPP or TISPAN or SCP requirements process)
- Enable members to co-ordinate their M2M activities in different standards committees
- Potentially co-ordinate detailed standardization at ETSI on e.g. service platform or gateway issues, or interoperability or testing.

Consideration should be given to the participation of non-members of ETSI in such a group: some of the participants to the workshop with interesting M2M requirements were not members of ETSI.

4 Conclusions and next steps

As a conclusion, the workshop recommends that ETSI considers the establishment of a specific group at ETSI to deal with M2M standardization issues.

The ETSI Board champion for M2M will bring this recommendation to the ETSI Board on 11-12th June next, and will request as an initial step the establishment of a Board Ad-hoc group. This ad-hoc group will further evaluate and develop the proposal to create an ETSI committee, identifying the ETSI members involved, specific scope and terms of reference, and a basic work programme. This formal proposal, if developed, will be brought to a later Board meeting (next Board meetings are 2-3 September 2008 and 13-14 November 2008.)

5 Post Workshop note:

At the its meeting of 11-12 June 2008, the ETSI Board decided to create an M2M Standardization ad-hoc group. The first meeting of this group, open to all ETSI members, takes place on 28th of August at ETSI. Please see http://portal.etsi.org/board for details of this and subsequent meetings of the ad-hoc group. The mailing list for the group is: Board_M2M@list.etsi.org. ETSI members may subscribe to this list from the above ETSI Portal page for the Board, or at http://webapp.etsi.org/TBMembershipList/.

The scope and objectives of the group are:

- To evaluate the need for a specific ETSI committee on M2M standardization, which may include requirements gathering and standards co-ordination;

- To develop a detailed proposal for the establishment of such a committee, if required, including scope and terms of reference, list of ETSI members interested, draft work programme, and liaison arrangements with other ETSI committees and 3GPP.