Machine to Machine - Challenges and Opportunities

Presented by Joachim Koss
Current state of affairs

- M2M has been around for several decades now – some deployments date back more than 20 years. However M2M markets are struggling to realise the full M2M market potential.

- Fragmentation, provisioning, efficiency, integration complexity, scalability – and – lack of standards, seem to be major obstacles.
Current state of affairs

- Inhibitors for large scale M2M deployments – extracts from industry reports:

  ... a key challenge for the industry remains the complexity of developing, deploying, and managing M2M applications ... This is a challenge both for mobile network operators that are trying to offer profitable services tailored to the M2M market, as well as for application developers and service providers that are trying to reduce costs, speed time to market, and simplify robust application deployments, ABI Research, M2M software platforms.

  For many years M2M was held back by the lack of a low cost, global access medium, the fragmented nature of the ecosystem, the lack of any single killer application driving demand and the complex nature of M2M solutions leading to high-cost development and systems integration. Strategy analytics, M2M strategies.
M2M Use Cases

- Fleet Management
- Home Energy Management
- Smart Parking
Smart City – a complex Ecosystem with a wide range of different services
## Smart Solutions

... meaning interlinked intelligent infrastructure solutions

### Transportation & Safety

- **Public Transport**
  - road, rail, air and sea transport as well as ticketing and passenger information systems

- **Traffic Management**
  - parking space management and payment, congestion charging and road tolls, traffic volume monitoring, connected road signs, traffic lights, enforcement cameras, in-vehicle congestion and toll devices

- **Environment and Public Safety**
  - CCTV, street lighting, waste collection, public alarms, intercoms, tourist information services

- **Public Space Advertising**
  - static advertising and billboards

### Energy & Home/Building Automation

- **Smart Grid**
  - intelligent management of load between energy generation and consumption e.g. loading stations for e-Cars

- **Smart Buildings**
  - intelligent, integrated management of all building systems e.g. hospitals, offices, residential, restaurants, hotels, shopping centers, schools

- **Networked infrastructure for**
  - business services, payment systems, housing, leisure and lifestyle services, and ICTs (mobile and fixed phones, satellite TVs, computer networks, e-commerce, internet services

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Source: Machina Research, June 2012
What is emerging from the Use Cases?

- What is a device?
- How do devices interact with multiple applications?
- Need to interwork?
- How are devices managed?
- How is data shared?
- How secure is the system?

A common service layer can provide all of these needs and more.
ETSI M2M

- ETSI TC M2M established in 2008
  - Developing and maintaining an end-to-end overall telecommunication high level architecture for M2M
  - Architecture kernel: M2M Service Layer Platform
  - Provided the first set of M2M platform standards to the market in 2011, the second set in 2013
- Transfer of the technical work to “oneM2M”
- Renaming: ETSI TC SmartM2M in 2013
  - New scope
Vertical Pipes

M2M Service Layer

Agriculture
Energy
Enterprise
Finance
Healthcare
Industrial
Public Services
Transportation

Devices
Devices
Devices
Devices
Devices
Devices
Devices
Devices
M2M Service Layer

**Middleware** - supporting secure end-to-end data/control exchange between M2M devices and customer applications by providing functions for remote provisioning & activation, authentication, encryption, connectivity setup, buffering, synchronization, aggregation and device management

- a software layer
- sits between M2M applications and communication HW/SW that provides data transport
- normally rides on top of IP
- provides functions that M2M applications across different industry segments
ETSI M2M Architecture

M2M Device and Gateway Domain

- M2M Device
  - App. Client (Device)
  - M2M SCL

- M2M Area Network

- M2M Gateway
  - App. Client (Gateway)
  - M2M SCL

M2M Network Domain

- Wide Area Network
- M2M Service Capabilities Layer (SCL)

Business Application

- M2M Application Server #1
- Smart Energy
- M2M Application Server #2
- Smart User
- M2M Application Server #n
- Smart Transport

Technologies:
- Bluetooth
- Wi-Fi
- ZigBee

Applications:
- Smart Transport
- Smart Health
- Smart Energy
- Smart User
ETSI TC SmartM2M

- Maintain ETSI M2M published specifications
- Provide specifications for M2M services and applications
- Identification of EU policy and regulatory requirements on M2M services and applications to be developed by oneM2M, and the conversion of the oneM2M specifications into European Standards.
- Produce specifications as needed for regulatory purposes
On July 24, 2012 seven of the world’s leading ICT Standards Development Organizations (SDOs) launched a new global organisation: the oneM2M Partnership Project: [http://www.oneM2M.org](http://www.oneM2M.org) to:

**Mission:**

oneM2M is working to unify the Global M2M Community, by enabling the federation and interoperability of M2M systems, across multiple networks and topologies.

In addition Broad Band Forum, Continua Health Alliance, Home Gateway Initiative and Open Mobile Alliance (OMA) have been accepted as a oneM2M Partners Type 2.
Participation

Levels of participation

- **Partner Type 1**
  - Member companies participate directly

- **Partner Type 2**
  - Contributes on behalf of Member companies

- **Associate Member**
  - Government or regulatory agency

Join:  [http://www.onem2m.org/join.cfm](http://www.onem2m.org/join.cfm)
Docs:  [http://www.onem2m.org/library/index.cfm](http://www.onem2m.org/library/index.cfm)
News:  [http://www.onem2m.org/subscribe.cfm](http://www.onem2m.org/subscribe.cfm)
Scope and Objectives

- To develop
  Global M2M end-to-end specifications - using common use cases and architecture principles across multiple M2M applications to connect M2M devices with application servers worldwide with an access independent view of end-to-end services

- To define
  Service Layer platform with high level / detailed service architecture including:
  - Protocols/APIs/standard objects (open interfaces & protocols)
  - Interoperability, test and conformance specifications
  - Common use cases, terminal/module aspects
  - Service Layer interfaces/APIs between:
    - Application and Service Layers
    - Service Layer and communication functions
    - Security and privacy aspects
    - authentication, encryption, integrity verification
oneM2M Functional Architecture

M2M Applications

M2M Service Layer

Underlying Transport
Common Services Functions

Application Entity (AE)

Mca Reference Point

Common Services Entity (CSE)

- Addressing and Identification
- Data Management & Repository
- Location
- Security
- Communication Management/Delivery Handling
- Registration
- Group Management
- Device Management
- Subscription Notification
- Service Charging & Accounting
- Discovery
- Network Service Exposure/Service Ex+Triggering
- Registration
- Device Management
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- Location

Mcc Reference Point

Mcn Reference Point

Underlying Network Service Entity (NSE)
Conclusion

A oneM2M-specified M2M Service Layer (CSF) being access technology independent could become a vehicle to transport and manage data traffic of M2M applications, globally across many M2M sectors and across all regions, enabling the following:

- Efficient use of underlying networks => lower connectivity cost
- Abstracting out complexity => lower development cost
  => shorter development time
  => faster time to market
- Sharing of components and infrastructure => lower investments
- Use of same technology as in other verticals => Synergies => Lower cost
- Focus on business logic rather then connectivity, security, buffering etc.
- Expansion into other business cases due to horizontal nature of M2M CSF
- Reduction of fragmentation due to horizontal nature of M2M CSF
Key messages

- M2M Communications meets non-ICT Industry sectors
- Make intelligent use of information, enabled by connected IT
- IoT is the social network of things
Thank you for your attention!

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