Management and Provisioning of M2M Devices and Applications

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OMA – Mission and Background

• Develop specifications for the application layer Service Enablers that help our member companies achieve interoperability in the global marketplace.

• Provide standardized interfaces to the service infrastructure residing within communication networks and on devices.

• Develop several enablers that will fit in M2M scenarios in different ways covering some of the features needed for M2M applications.
Some OMA Enablers

Devices
- Lightweight Machine to Machine
- Device Management
  - Device Capability Management Object
  - DM Firmware Update Management Object
  - DM Gateway Management Object
- Management Object Design Guidelines 1.0

M2M
- Converged Personal Network Service
- M2M Device Classification
- OIG DM Profile

Network APIs
- Payment, Terminal Status, File Transfer, Presence, Chat, Address Book, Audio Call, Terminal Location, Messaging, Image Share, ... and many more

Location
- Secure User Plane Location
- Mobile Location Service
- Dynamic Navigation
- LPP Extensions

Device APIs
- Open Connection Manager API
- Web Runtime API
- Mobile Code APIs
- Device Apps Network Efficiency

Person-to-Person
- RCSe Deployment Suite
- Converged IP Messaging
- Social Network Web
- Enhanced Visual Voice Mail Service

Access to Content
- Mobile 2D bar codes
- Telcos’ Application Store
- Mobile Augmented Reality
- Always Online Infrastructure
- Mobile Search Framework
- Unified Virtual Experience
OMA Device Management

- OMA DM is a framework that enables device customization and services configuration remotely.
- The Enabler defines the syntax and semantics of the two-way message exchange protocol and the data model format (DM Protocol).
- Configuration and management is exposed in a logical interface, which is represented under the structure of a MO (Management Object) within the Management Tree.
- MO is a XML based structure which can be modified by DM Commands allowing the triggering of functional behavior in the device, e.g.
  - Schedule and automate device management tasks
  - Configure connectivity
  - Update firmware
  - Diagnose problems
  - Monitor performance
  - Install and update software
  - Lock and wipe personal data
  - Manage device capabilities

DM Commands:
Add, Get, Replace, Delete, Exec, Alert, etc.

DM Protocol
DM Representation
Bindings to Transports
Transports

DM Client
DM Server

Application MO
DM Commands:
Add, Get, Replace, Delete, Exec, Alert, etc.
DM Protocol
OMA DM Gateway Management Object (GwMO)

- OMA DM was originally designed to manage devices where direct communication exists between the Server and the Client
- OMA DM GwMO provides a mechanism for OMA DM to manage devices indirectly, through a gateway, when:
  - Direct and unaided interaction between server and client is not possible
  - Device does not have a publicly routable address
  - Device may be sitting behind a firewall
  - Device supports a management protocol other than OMA-DM
  - Management of devices within a Machine-to-Machine (M2M) ecosystem

- **Version v.1.1 (scheduled 1Q2014)** provides further guidelines for adaptation to the following non-OMA DM protocols: ZigBee, KNX, OpenWebNet, Bluetooth.

**KNX:** OSI-based network communications protocol for intelligent buildings
OMA Lightweight M2M (LWM2M)

- Lightweight M2M is focused on constrained M2M devices, and is applicable to Cellular, 6LoWPAN, WiFi and ZigBee IP or any other IP based devices
- Can be combined with existing DM offerings
- OMA Lightweight M2M protocol supports both device management and service logic.
  - The rational behind is that in many M2M scenarios, the service logic is very simple and similar to device management.
  - LWM2M can be extended to satisfy the requirements of specific service logic
- It will be complemented with a public registry of Objects from OMA, other SDOs or enterprises
- Device-Server Protocol based on open IETF standards
  - CoAP and DTLS bound to UDP or SMS
- Extensible Object and Resource model for application semantics
- Published in December 2013
Commercial DM Deployment on a Global Scale

• OMA has achieved commercial deployment of 1.6 Billion devices implementing the Firmware Update Management Object enabler (February 2013)

• Press release, May 21st 2012 – Sprint, Metrum, Tollgrade Make Smart Grid Smarter Enabling smart meters with wireless connectivity¹

• Sensinode Announces Commercial Support of OMA Lightweight M2M at Mobile World Congress, February 27 2013²

• OMA Lightweight M2M tested in a Plug-tests event (jointly organized by ETSI, IPSO Alliance and OMA) held in November 2013 in Las Vegas, co-located with the OMA meeting³

Simplified M2M Architecture

The main functionalities in a M2M architecture:

- **Network API**
  - M2M Application
  - Client Application
  - Service capabilities

- **Device API**
  - M2M Core
  - M2M Gateway
  - M2M Area Network

- **Communication management**
  - DIRECT CONNECT

- **Device management**
  - Simplified development and operations

- **Application Domain**
- **Network Domain**
- **M2M Device Domain**
OMA and oneM2M

• OMA collaborated with ETSI TC M2M during the specification of ETSI M2M Release 1
• OMA DM is natively included in the ETSI M2M R1 Functional Architecture and several OMA DM compliant Management Objects have been specified.
• OMA, in the interest of collaboration, harmonization and coordination, joined oneM2M as first Partner Type 2 member
Continuation of Collaborative Efforts

• A team has been created for joint coordination among oneM2M MAS (Management Abstraction and Semantics) WG5\(^1\), BBF Broadband Home WG\(^2\) and OMA DM WG on DM Server Interaction:
  – Led by Timothy Carey (Alcatel Lucent), oneM2M MAS WG Vice Chair
  – Scope: define a framework and requirements for the interaction between the M2M Service Layer and the Device Management Layer (via the ms interface)

• Held first call on 13 November 2013,
• Joint conference calls for the 1Q of 2014 as follows:
  – January 8, January 15, January 27, March 24

\(^1\) In charge of the technical aspects related to management of M2M entities and/or functions, link.
\(^2\) In charge to maintain and evolve the TR-069 CPE WAN Management Protocol (CWMP), link.
Continuation of Collaborative Efforts (cont’d)

OMA WID 0294 «Management Interface for M2M»

- **ms** is in the oneM2M architecture the interface exposed by the management server in the underlying network domain or in the M2M service domain for use by other systems.

- The ms interface is functionally the same interface regardless if the Device Management Server resides in the Underlying Network or the Service Layer.
Summary

To keep in sync with oneM2M needs, OMA has introduced the following work item:

- OMA-WID_0294-Management_Interface_for_M2M-V1_0-20131211-A Work Item Document WI 0294 - Management Interface for M2M

OMA will introduce additional work items as needed to address future needs of oneM2M.
Thank You!