M2M Ecosystem: Advanced Service Platforms

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Current M2M solutions

Current State of M2M based services

- Current M2M /WS&AN solutions are application-specific (fragmented markets).

- Highly inefficient building blocks: different network technologies, components and legacy systems.

- High deployment costs (also maintenance, evolution and long-term availability).

- Difficult and complex articulation of different actors Telco, IT and Service Providers.
1 Current M2M solutions

Current Telco Roles

1. Communication provider based on SIM:
   - High development cost

2. Platform provider:
   - Lower development cost
   - Each Operator provides a different solution.

M2M Service A
M2M Service B

M2M Platform A
Telco A
M2M Platform B
Telco B

xDSL / GSM / GPRS / UMTS

TELCO Roles
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To promote new business opportunities

Ambient intelligence services

for a broad range of application domains: personal (lifestyle assistants), community (professional users) and industrial.

Future Networks (towards Internet-of-Things):

- Ubiquitous Sensor Network (USN) into future Next-Generation Networks (NGN)

USN: “…not simple sets of interconnected networks (machines) but intelligent information infrastructures” (ITU TSAG-C 22-E).

- Ambient Intelligence Architectures and Platforms as WS&AN / M2M enablers for service creation in future Telco 2.0 environments.

Future Service Platforms

- Horizontally layered (Service Oriented) architectures to decouple services and networks, so services can be separately deployed and evolve independently.

- Open Architectures that enable both Telco and Third Party Service Providers to deploy future AmI services and applications.
M2M Platform Architectures for NGN (IMS)

Requirements

- A new platform concept
  - **Generic** Platform based on a flexible and modular design.
  - **Not limited to the current sensing or networking technologies**
  - **Adaptable for** present and future **Service Architectures**
  - **A Standard** procedures **integrated in NGN initiatives (mainly IMS)**
  - **Open to third party players**

- **Key issues:**
  - Network functionalities: **integrated access to a wide range of network technologies**
  - **Homogeneous representation** of sensor, actuator and machine – related data and information
  - **Service Oriented** deployment environment
M2M Platform Architectures for NGN (IMS)

Advanced Service Platforms Functionalities

- Resource discovery
- Publish, subscribe, notify
- Event-driven filtering & processing
- Abstract and efficient communication management (Service-Oriented Communication)
- Homogeneous remote machine management

- Security & Trust
- Charging (class/type)
- Addressing: M2M terminals identification (group id)

- QoS
- Scalability
- Unified communication network management, xDSL, GSM, GPRS, UMTS, WiFi, ...

M2M Services

Framework

AAA
DIR
OSS
BSS

SERVICE ENABLERS

M2M ACCESS

IMS SERVICES

IMS (HSS, CSCF,..)

CONTROL

WS&AN

xDSL GSM / GPRS

UMTS / WiFi / WiMax

Access

IMS ENABLERS

M2M WS&AN

WS&AN

Framework

M2M Service Platform

Requirements

Capabilities

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3 M2M Standardization issues & activities

Standardization Needs

Application / Service Layer

Application

Application

Enablers

Control Layer

NGN Core

Access Layer

Messages & Data Format Adapter

Communication Protocol Adapter

Gateway Applications:
Entry points to Core NGN

Standard service layer components (Enablers, Application Servers,...) for Service Interoperability.

Standardized M2M Languages

WS&AN/M2M

Standard service layer components (Enablers, Application Servers,...) for Service Interoperability.

Standardized M2M Languages

Gateway Applications:
Entry points to Core NGN

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M2M Standardization issues & activities

WS&AN current TID’s developments

Resource discovery
- Publish, subscribe, notify
- Event-driven filtering & processing
- Homogeneous remote management

Application/Service Layer
- Presence Enabler
- UNS-Enabler

Control Layer
IMS Core
- XML Messages
  - SensorML, C&M
  - SIP Messages
  - MESSAGE, NOTIFY
  - SUBSCRIBE, PUBLISH

Access Layer
- Communication Protocol Adapter
- Messages & Data Format Adapter

Sensor Networks
- Body Sensors
- Radar Systems
- Parking Control
- Security Sensors

Jesus Bernat Vercher et al., “Ubiquitous Sensor Networks in IMS: an Ambient Intelligence Telco Platform”
ICT-MobileSummit 2008
3 M2M Standardization issues & activities

Topics (I)

- Standardized Gateways as entry points to the Communication Network.
  Communication Protocol Adaptation: bridging specific M2M/WS&AN communication protocols to a unified network protocol.
  - Authentication and authorization protocols
  - Secure control and privacy for information exchange between different application domains
  - QoS
  - Scalability
  - Remote management
  - Automatic discovery procedures
  - Single subscription to many devices: addressing, signalling and operational costs
3 M2M Standardization issues & activities

Topics (II)

- Standard service layer components (Enablers, Application Servers,...) to ensure service interoperability across WS&AN and M2M infrastructures
  - Current TID USN Enabler considers standardization issues from:
    - OMA Service Environment specifications
    - OSA/Parlay X (Web Services)
    - Sensor Web Enablement (SWE) family of standards OpenGIS® from the Open Geospatial Consortium (OGC®)
Homogeneous model to represent data, measurements and operation from heterogeneous WS&Ans and Machines (OGC® - SensorML)

- Unification of abstract level representations at the application layer to make it easier the integration of different protocols and technologies.
- Flexible and extensible standard XML schemas for representing and exchanging data with different sensors, actuators and machinery.
- Suitable for applying different processing algorithms to derive higher-level information from low-level data.
- Fusion with other metadata information from external complementary information sources.
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Towards future M2M Ecosystems: Bridging Internet with WS&AN / M2M