Machine-to-Machine Communication

the Environment Surrounding the Networked Car

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Machine-to-Machine (M2M) Communications

- Communication among machines without (or only limited) human intervention

- Various applications for diverse sectors and services

- Horizontal integration and cross-sector services
Vertical M2M applications are already deployed in various sectors.
The horizontal integration of the current vertical markets is expected to create new M2M services.

- Only vertical applications
- Horizontally integrated markets

Fragmented M2M market →

- Economies of scale
- Data-sharing across sectors
- Value-added services

Vertical M2M Services → Next-Gen M2M Services

Economies of scale → Unified Connection
New Generation M2M Consortium in Japan

Stakeholders collaborate to increase joint business opportunities and to ensure interoperability

- Established in November 2010 (62 members currently)

**Scope of work**
- Information sharing
- Create new services
- IoT among devices
- Joint participation in National Projects

- Realize M2M services in collaboration with many types of providers

- Business Development Working Group (with 4 Sub Working Groups (SWG))
  1. AFF-SWG : Agriculture, Forestry & Fishery
  2. EE-SWG : Environment and Energy
  3. TD-SWG : Transport and Distribution
  4. SL-SWG : Smart Life SWG

- Technical Working Group (with 1 Sub Working Group (SWG))
  5. IP-SWG : Infrastructure and Platform

Service provider
Network operator
Hardware provider
Standardization of M2M
Inter-industry innovative (verticals) discussion has been started at Advisory Groups such as Smart Car AG and Smart Grid AG.
In the Past
- Most information on M2M was brought from 3GPP and 3GPP2
- No significant activities on M2M can be seen in ARIB

Establishment of “M2M Study AdHoc Group”
- To promote the M2M standardization activities, “M2M Study AdHoc Group” was established on 22 June 2011 in ARIB
- Seventeen (17) 3GPP/3GPP2 Individual Members, who designate ARIB as Principal OP, and TTC are registered in the AdHoc Group
- The first AdHoc Group meeting was held on 5 July 2011

Responsibilities of “M2M Study AdHoc Group”
- Study on M2M standardization
- Promote and coordinate framework with relevant international standardization bodies on M2M standardization activities
# M2M Standardization Work at International SDOs

<table>
<thead>
<tr>
<th>SDO</th>
<th>Activities</th>
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| **ETSI** | TC M2M established in Jan 2009  
3 documents published: smart metering, M2M requirements, threat analysis |
| **TIA**    | TR-50 (Smart Device Communication) established in Oct 2009  
Initial goal: ubiquitous protocol for communicating with smart devices used in industries |
| **ATIS**   | M2M Focus Group established in Aug 2011  
Areas of study: carrier portability, inter-service platform communications, billing |
| **CCSA**   | TC 10 (Ubiquitous Networks) established in Feb 2010  
5 documents published: terminology, requirements, green community, vehicle communication systems, e-health monitoring |
TTA

- M2M/IoT Forum established in Oct 2009
- Activities: policy for M2M activation, technological development, standardization, M2M/IoT service models

ITU-T

- IoT-GSI (Global Standards Initiatives) established in May 2011
- The incoming meeting aims at progressing the work on IoT overview, IoT definition, IoT work plan

Coordination for consolidation of M2M standardization work is in progress among different SDOs
Challenges and Efforts

**Challenges**

- Requirements for M2M vary widely, depending on sectors and services
- M2M standardization requires collaboration frameworks for different sectors and services

**Efforts**

Collaboration and consolidation of SDO work is the key to effective interaction among different sectors and services in order to identify common needs for standardization.
M2M and the Networked Car
Fleet Management and Anti-theft Systems

M2M applications are already used in transportation.

- Monitoring operation (for drive guidance)
- Remote monitoring (for breakdown, theft …)
- Remote Lock on theft
- Gather data on vehicles
- Notify ETA, based on the bus location

Bus Company

Drive recorders, GPS unit (for location, brake frequency)

Bus Stop

M2M-PF (Database)
Environmental Impact Reduction through Harmonization of Electric Vehicles and Mobile Networks

Outline: Towards Smart Grid and electric vehicles (EVs) disseminated society, promoting standardization of ICT systems and mass production. As a result, it would reduce CO2 emissions and achieve environmental load reduction.
R&D on Communication Interface with Home

**Theme 1**
- Development and demonstration of Home ICT that makes effective use of PV using an EV (battery)
- Definition and development of communication interfaces needed to use the EV (battery)

**Theme 2**
- Development and demonstration of home information management systems managing history information
- Definition and development of communication interfaces for stock equipment information in home information management systems through the Home ICT
Advantages of “LEAF to Home”

1. Contribute to Smart electricity use
   - Charge at night time
   - Supply during day time
   - Peak-cut & peak-shift of electricity use

2. Back-up power source in a time of Emergency
   - Electricity stored in batteries
   - Use as back-up power source in a time of emergency

3. Coordination with solar power generation
   - Collaboration utilizing “solar power generation” and “EV”
   - Reduce consumption of overall electricity at home
Smart House in Yokohama
R&D on Communication Standards of Charging Infrastructure

Charge map
Availability information server

① Unattended operation and interconnection
(Certification charges and maintenance between charger and management server)

② Mutual certification between the different systems
(certification between different servers)

③ Providing information of charging spot
(Operational information between management server and ASP)

Management server A  
Management server B

Minatomirai 21  
Yokohama Media Tower  
Service station (Kawasaki City)  
Office (Tamagawa)
Thank you very much for your attention!
Back up slides
Examples of current and future ITS using radio waves in Japan

Fig 1.
VICS: Vehicle Information and Communication System

Fig 2.
ETC: Electronic Toll Collection

Fig 3.
79GHz High-Resolution Radar

Fig 4.
DSSS: Driving Safety Support Systems

Vehicle approaching, Beware on turning right.

Motorbike close-by, Beware on turning left.
The Service Image of Mobile Multimedia Broadcasting Services

- Provide all types of service efficiently, as a “Broadcast”, for portable terminal units (for example, mobile phones, tablets, car navigation systems, game machines, etc.

- It will be possible to combine fee-based broadcasting (paid programming) with no-charge broadcasting (advertising-supported model).