Machine-to-Machine Communication

the Environment Surrounding the Networked Car

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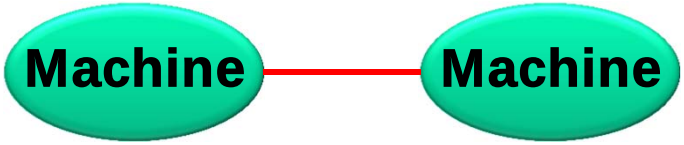
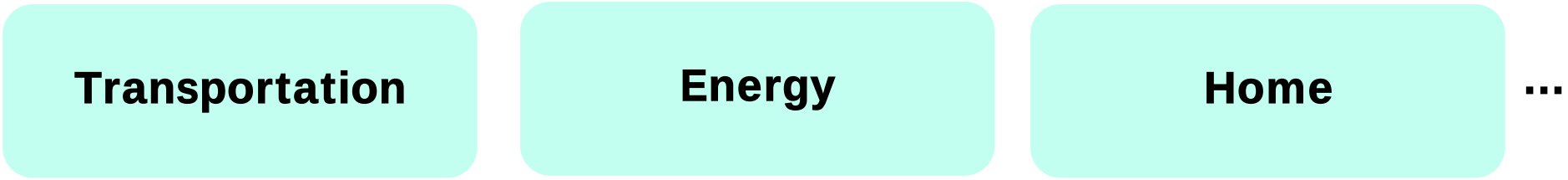
Development of Machine-to-Machine Communications

Machine-to-Machine (M2M) Communications

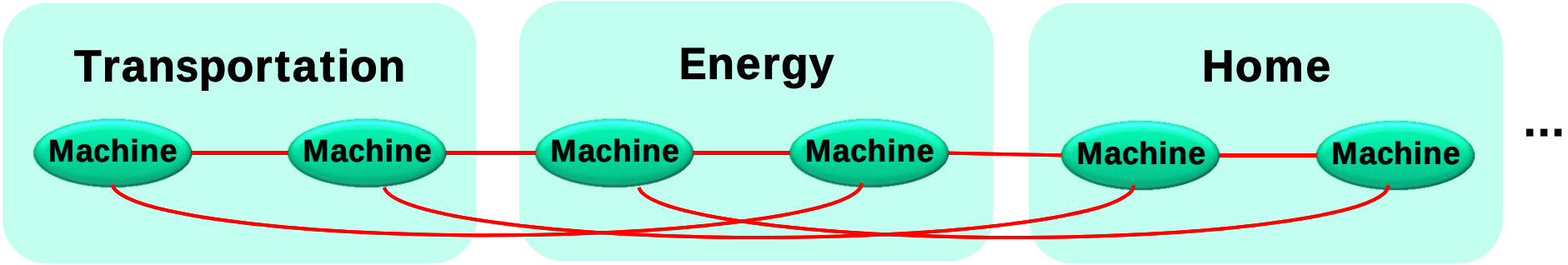
- **Communication among machines without (or only limited) human intervention**



- **Various applications for diverse sectors and services**

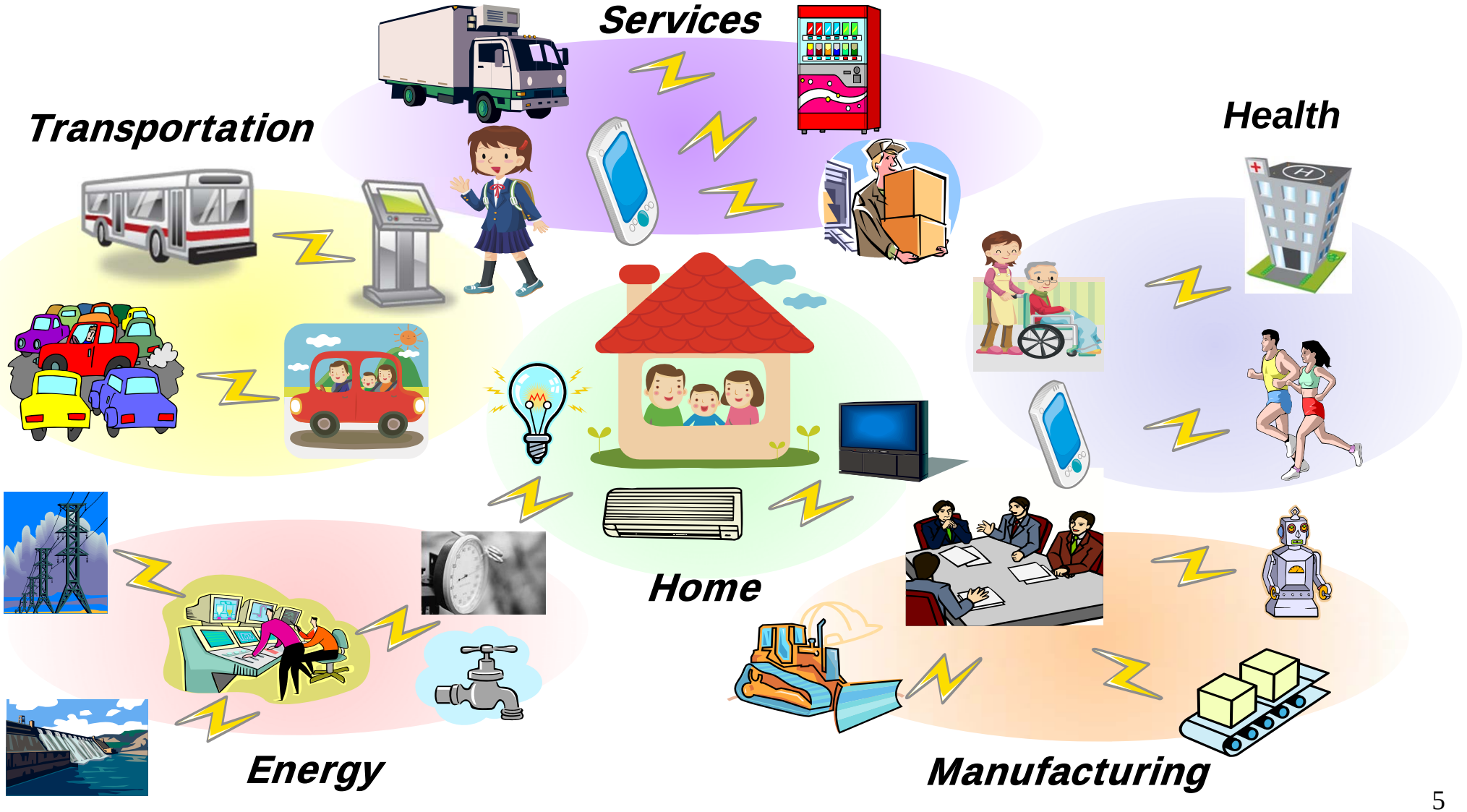


- **Horizontal integration and cross-sector services**



Applications of M2M Communications

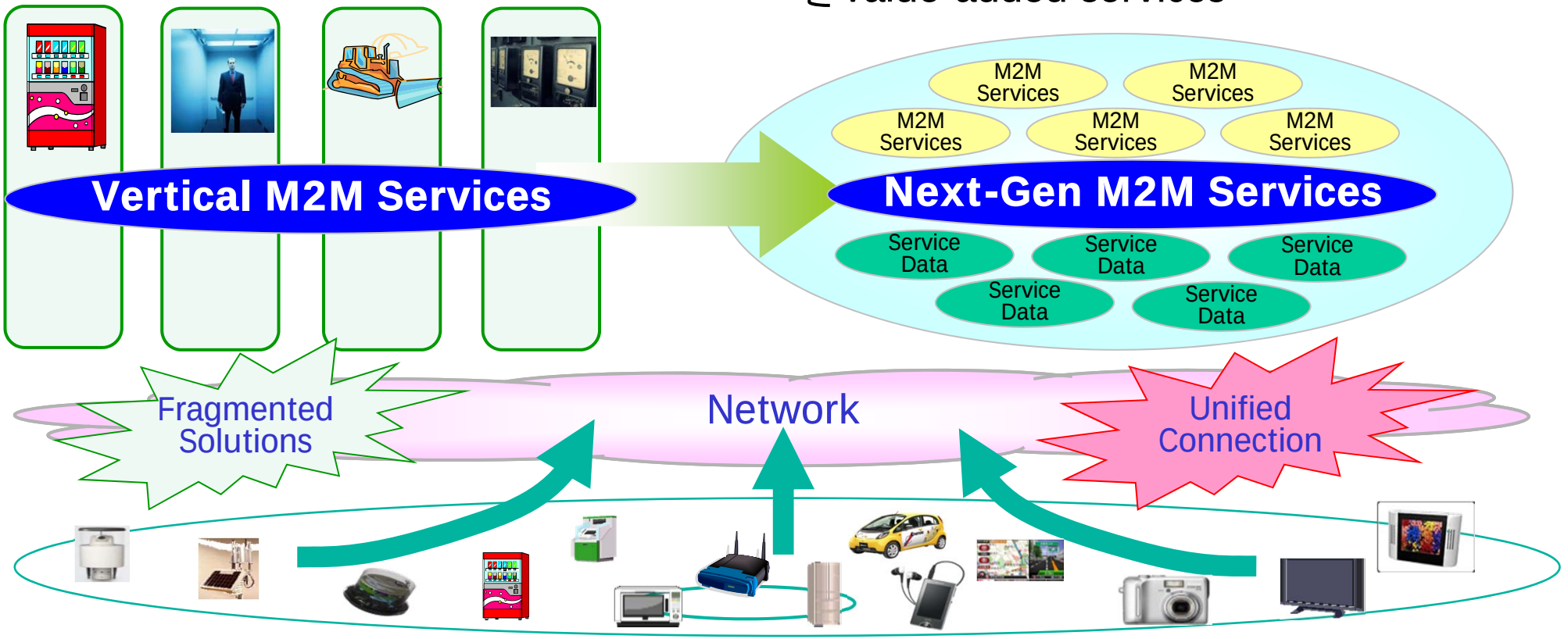
Vertical M2M applications are already deployed in various sectors.



Changing Market Structure of M2M

The horizontal integration of the current vertical markets is expected to create new M2M services

- Only vertical applications ⇨ Fragmented M2M market
- Horizontally integrated markets ⇨
  - Economies of scale
  - Data-sharing across sectors
  - Value-added services



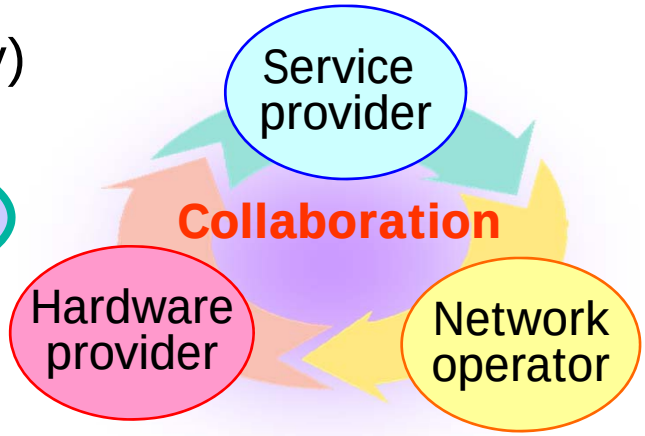
New Generation M2M Consortium in Japan

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**

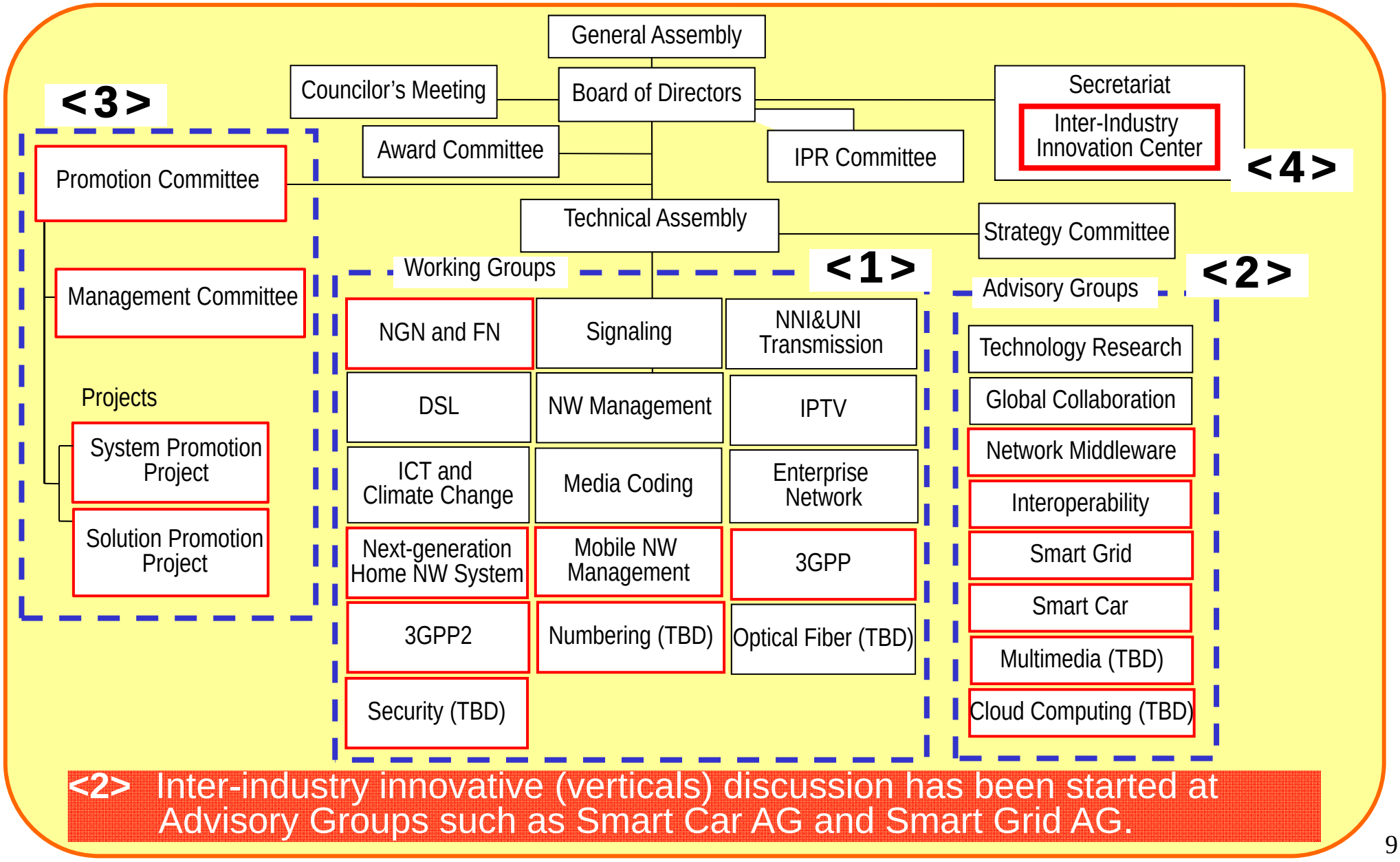
- **Technical Working Group (with 1 Sub Working Group (SWG))**

5. **IP-SWG : Infrastructure and Platform**

New Generation M2M Consortium

Standardization of M2M

M2M Related Activities in TTC



<2> Inter-industry innovative (verticals) discussion has been started at Advisory Groups such as Smart Car AG and Smart Grid AG.

M2M in ARIB

◆ 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

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

M2M Standardization Work at International SDOs

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

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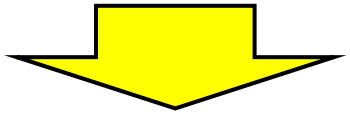
Challenges

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

Efforts

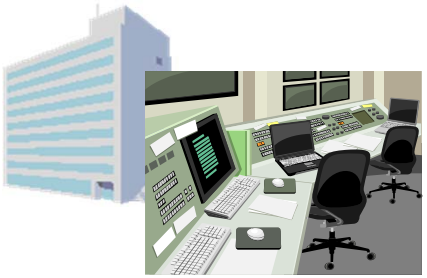


Collaboration and consolidation of SDO work is the key to effective interaction among different sectors and services in order to identify common needs for standardization.

M2M and the Networked Car

Fleet Management and Anti-theft Systems

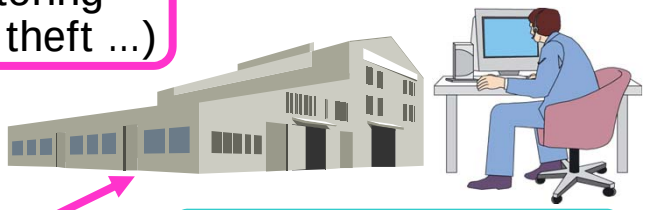
M2M applications are already used in transportation.



Bus Company

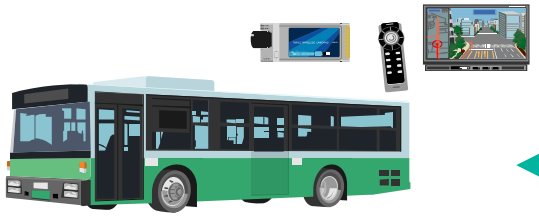
Monitoring operation
(for drive guidance)

Remote monitoring
(for breakdown, theft ...)



Remote Lock on theft

M2M-PF
(Database)

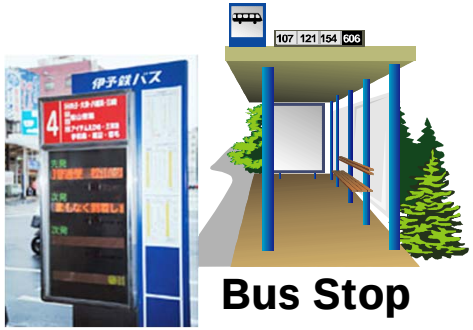


Drive recorders, GPS unit
(for location, brake frequency)

Mobile
Network

Sensor

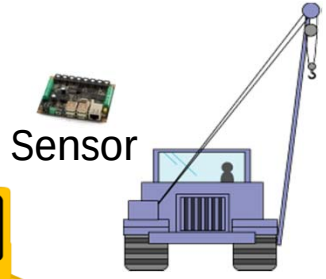
Gather data on vehicles



Bus Stop

Notify ETA,
based on the bus location

Sensor



Sensor

Environmental Impact Reduction through Harmonization of Electric Vehicles and Mobile Networks

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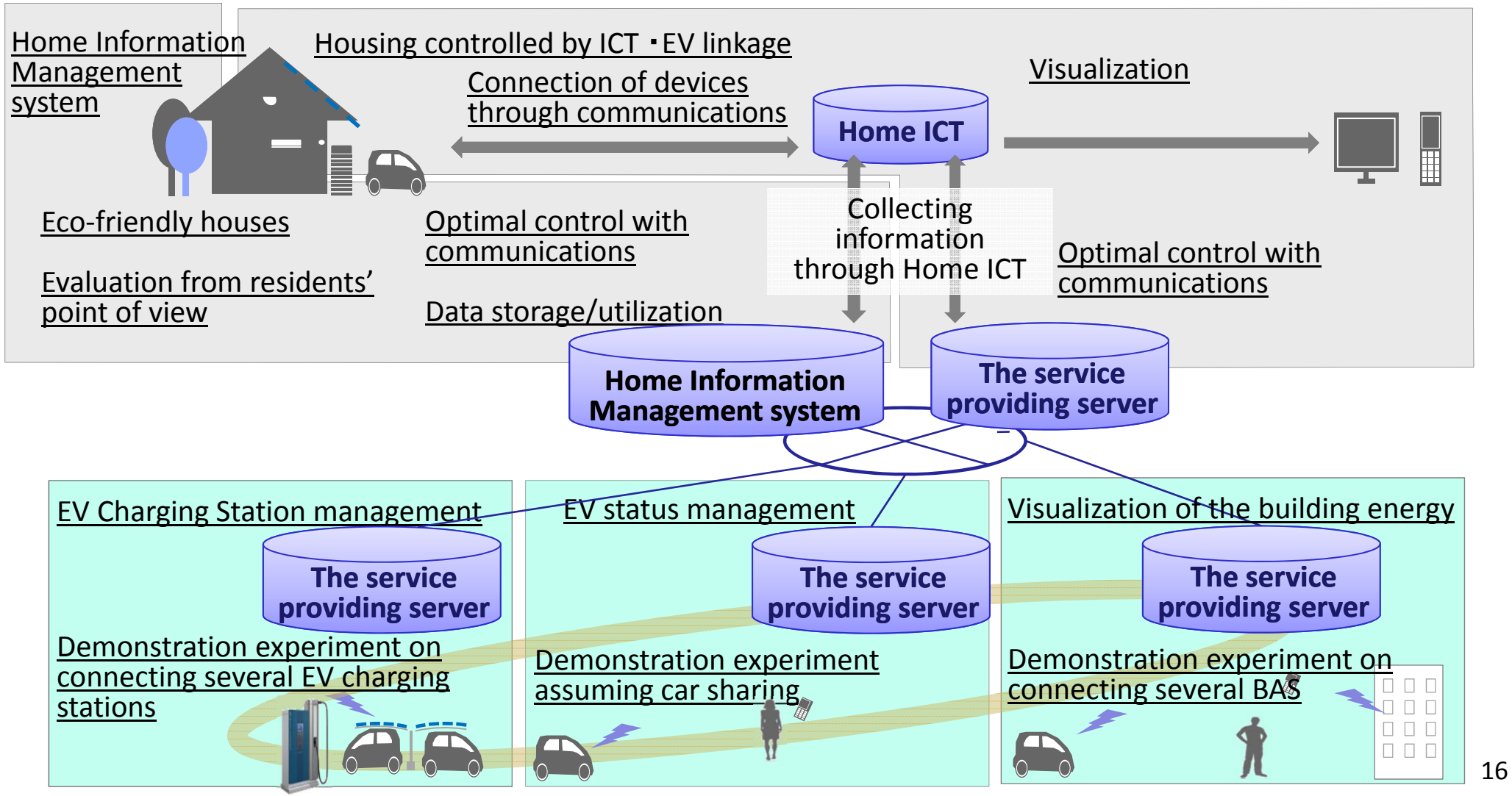
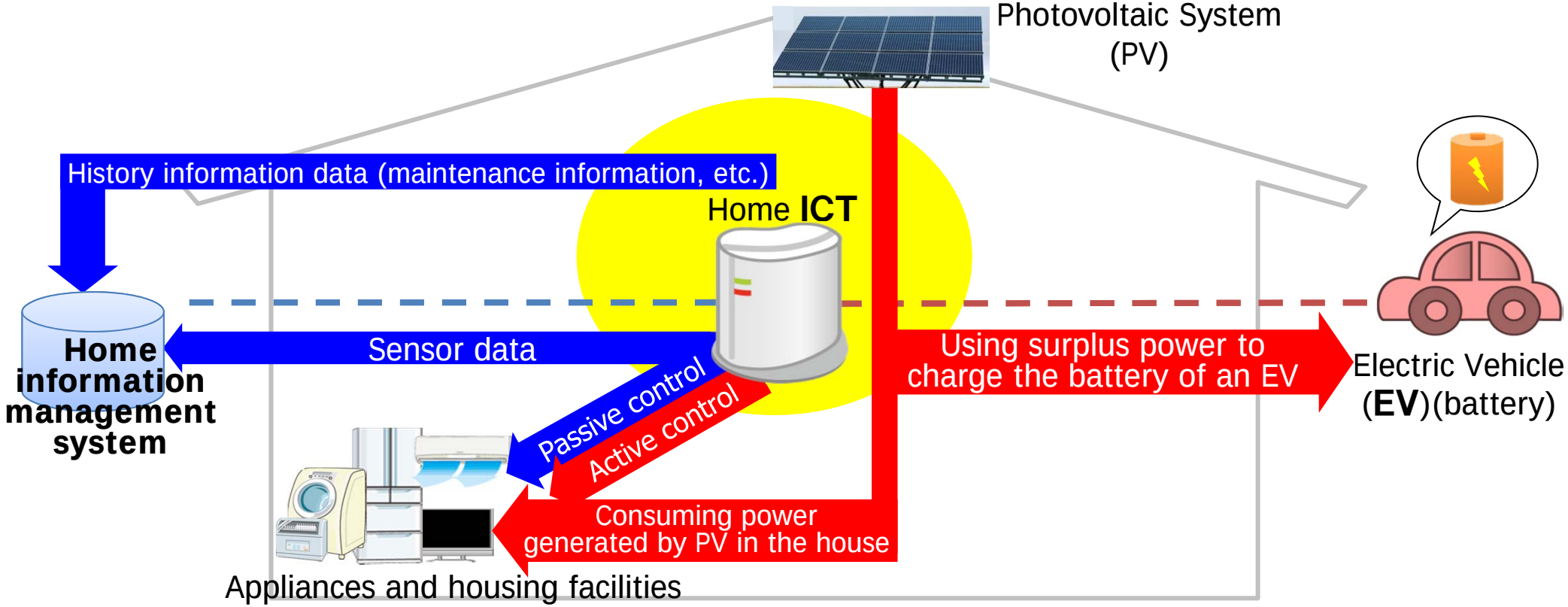
Outline: Towards Smart Grid and electric vehicles (EVs) disseminated society, promoting standardization of ICT systems and mass production. As a result, it would reduce CO2 emissions and achieve environmental load reduction.



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



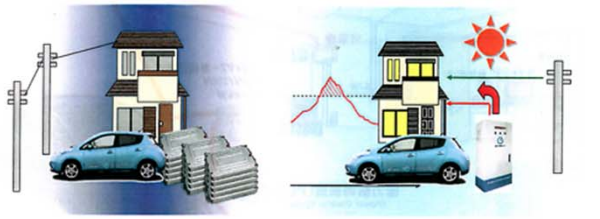
EV to Home

Advantages of “LEAF to Home”

1. Contribute to Smart electricity use
2. Back-up power source in a time of Emergency
3. Coordination with solar power generation

1. Contribute to Smart electricity use

- Charge at night time
- Supply during day time
- Peak-cut & peak-shift of electricity use

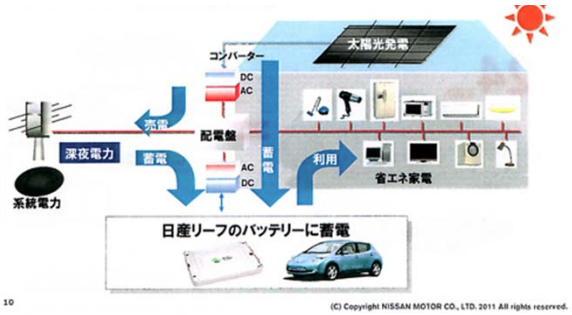


2. Back-up power source in a time of Emergency

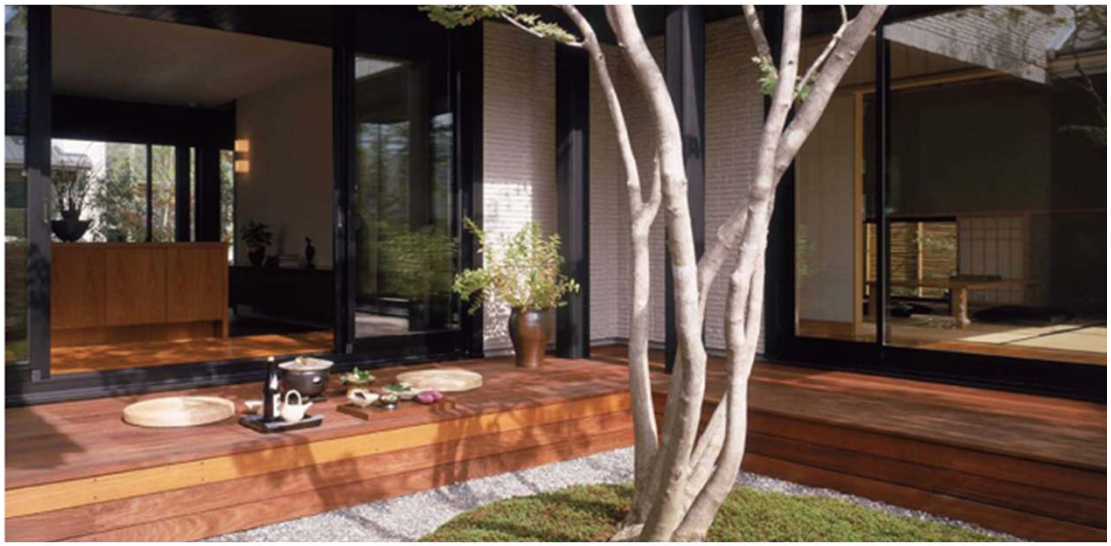
- Electricity stored in batteries
- Use as back-up power source in a time of emergency

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

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

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

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

Management server A

Management server B

Minatomirai 21

Yokohama Media Tower

Service station (Kawasaki City）

Office (Tamagawa)

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Thank you very much for your attention!

Back up slides

Intelligent Transport Systems in Japan

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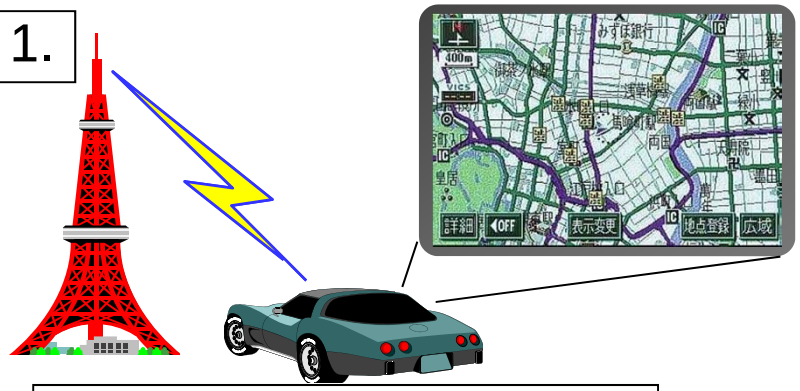
Examples of current and future ITS using radio waves in Japan

Fig 1.

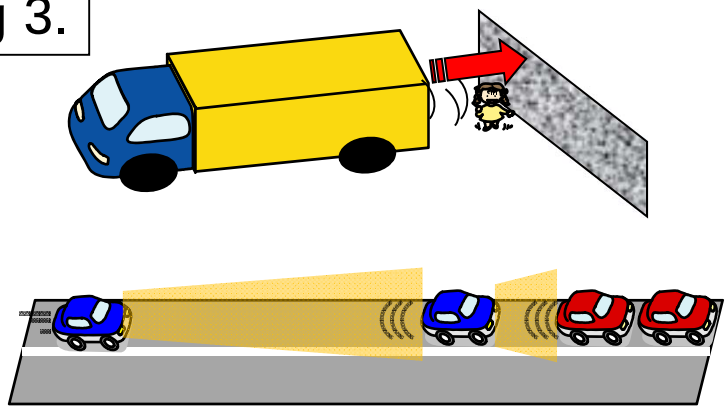


VICS: Vehicle Information and Communication System

Fig 2.

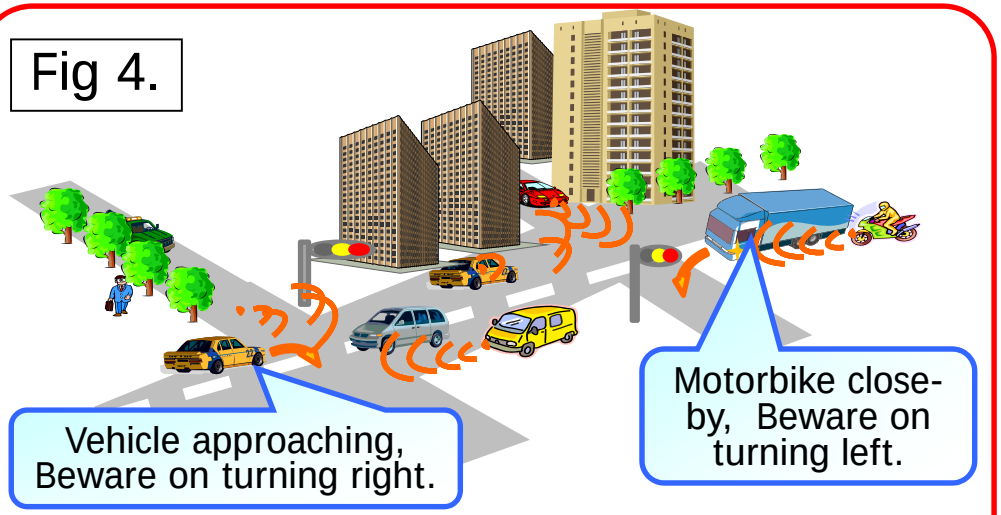
ETC: Electronic Toll Collection

Fig 3.



79GHz High-Resolution Radar

Fig 4.

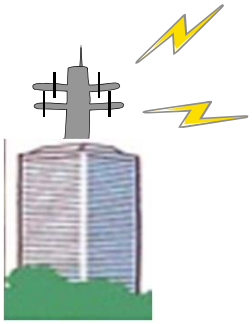


DSSS: Driving Safety Support Systems

The Service Image of Mobile Multimedia Broadcasting Services

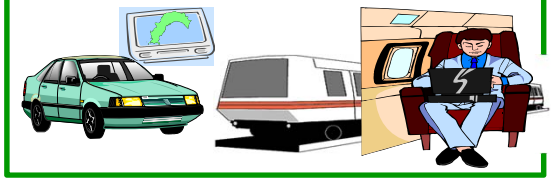
- Provide all types of service efficiently, as a “Broadcast”, for portable terminal units (for example, mobile phones, tablets, car navigation systems, game machines, etc.
- It will be possible to combine fee-based broadcasting (paid programming)with no-charge broadcasting (advertising-supported model)

Broadcasting Wave



Traffic Information

- Provide traffic information.
- Traffic information for car drivers in times of disaster.



Disaster Information

- Provide disaster information, without network shutdown due to overloading, a key point of broadcast waves.

Entertainment (Music, Games, Movies・・・)

- Accumulation of high-capacity data (music or motion picture), to use later.

Education / Welfare

- Provide electronic education materials, etc.

Newspaper / Magazine

- Provide electronic newspapers and magazines.

News, Weather Information, Live Broadcasting

- Provide information simultaneously.