Current Smart-House Business

30,Oct,2014

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Kanagawa Institute of Technology

JSCA is Japanese government-industry liaison, aiming at making long term collaboration with overseas

Total 350 companies and associations

JSCA

METI

Support and Cooperation

NEDO

Technical perspective: Smart House has three functions

Past

For Saving energy in demand side

NOW

For saving energy + For generate energy + For storing energy

Innovation

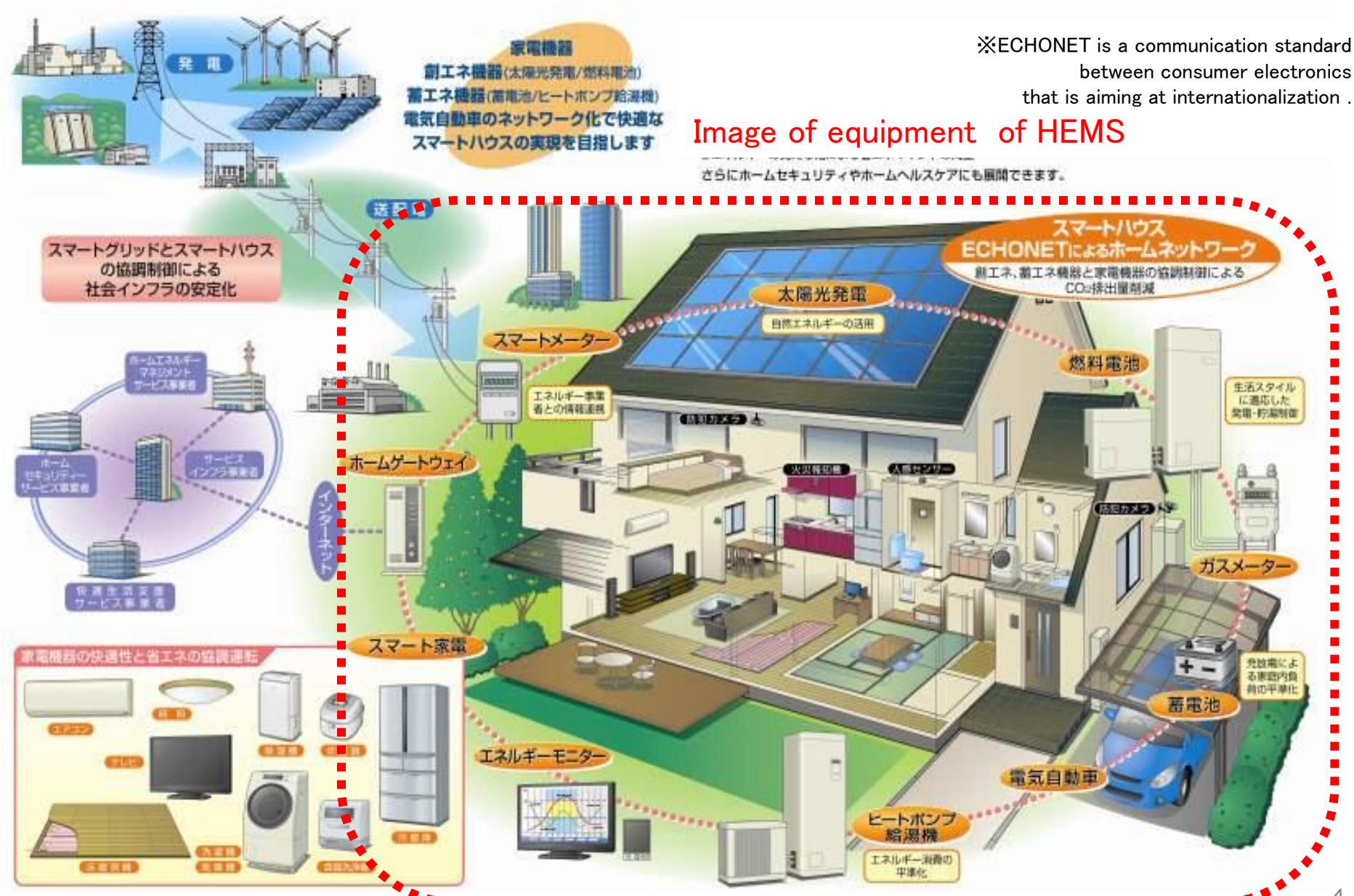
Consumer has become "Prosumer"

Produce, save, and consume energy in demand side

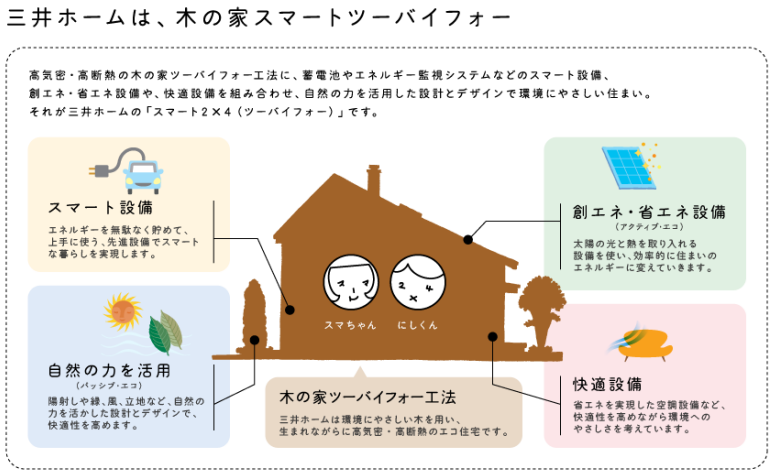
Home Energy Management System[HEMS] enables Smart House

※ECHONET is a communication standard between consumer electronics that is aiming at internationalization .

Image of equipment of HEMS



Accomplishment:
Smart House has been commercialized -1-



Mitsui Home Group

Misawa Homes

Daiwa House

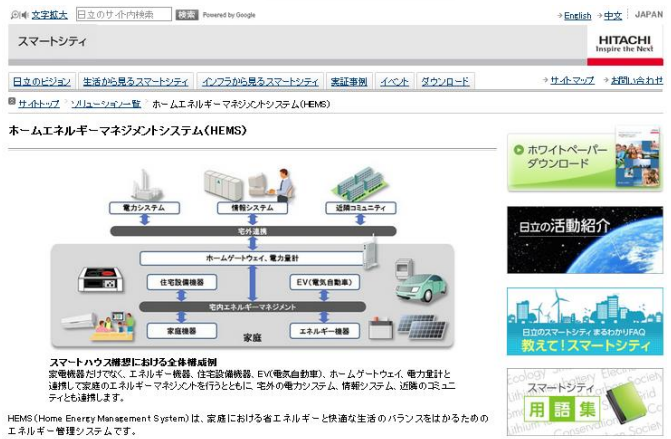
Sekisui Chemical

Accomplishment:
Smart House has been commercialized -2-

Panasonic

Toshiba

Sharp



Hitachi

ECHONET Lite delivers network access to all appliances

IP based and Media Free

- ECHONET Lite is IP based interface and interoperable to any standardized medias.

Open Interface

- ECHONET-Lite, owned by ECHONET Consortium, has become open interface since on Dec 21, 2011.

OSI Layer

Layer 5-7

Layer 1-4

ECHONET Lite

- Specifies OSI Layer 5 - 7
- Communication Address is "MAC Address" or "IP Address"

Application

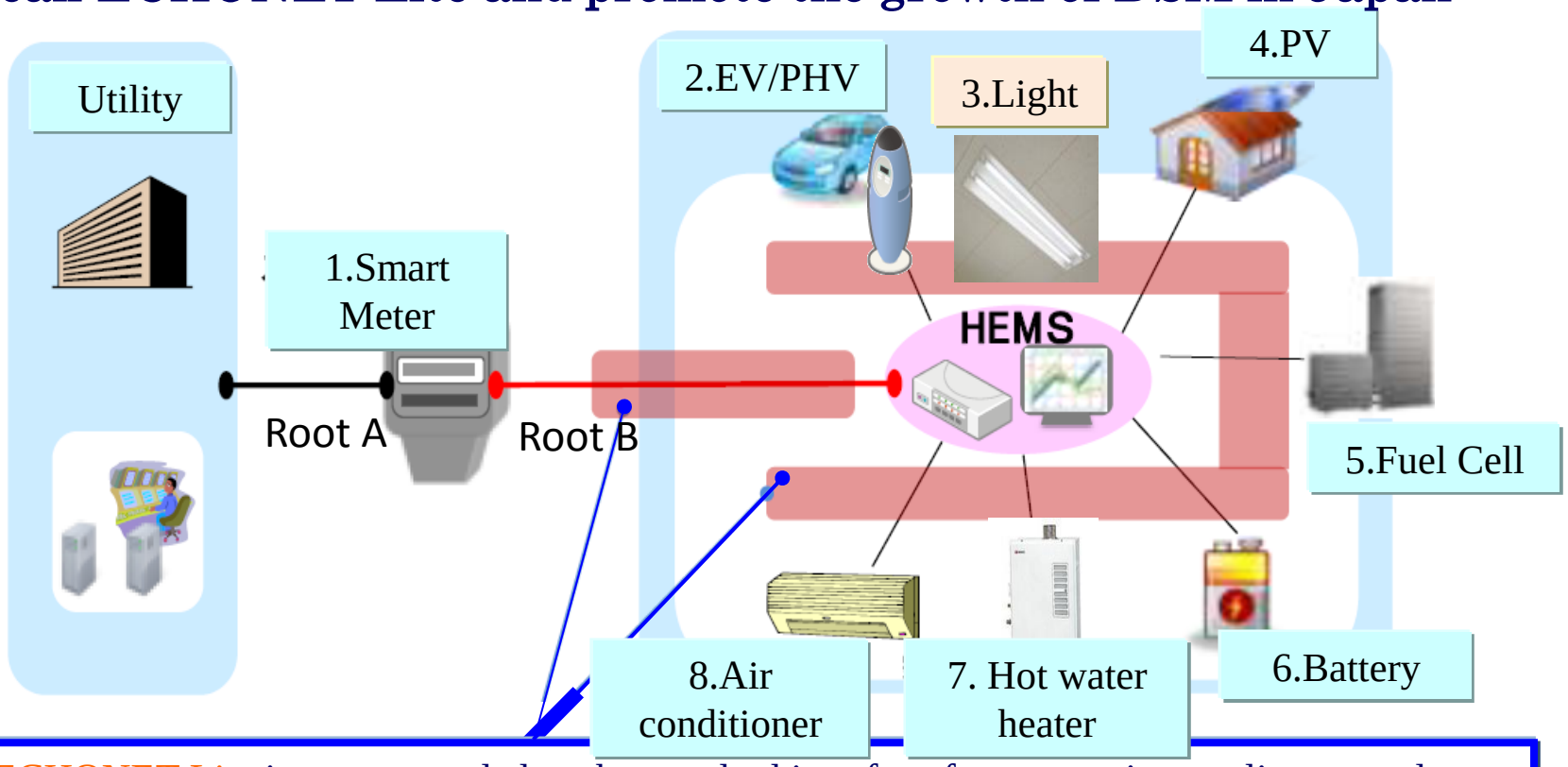
ECHONET Lite Communication Processing Block

MAC Address or IP Address

Lower Communication Block
(IEEE802.15.4 etc.)
Transmission Medium

8 strategic devices in EMS speak ECHONET Lite

ECHONET-Lite, owned by ECHONET Consortium, has become open interface since on Dec 21, 2011. With following that strategy change, JSCA, government- industry liaison, has decided for 8 strategic devices to speak ECHONET Lite and promote the growth of DSM in Japan



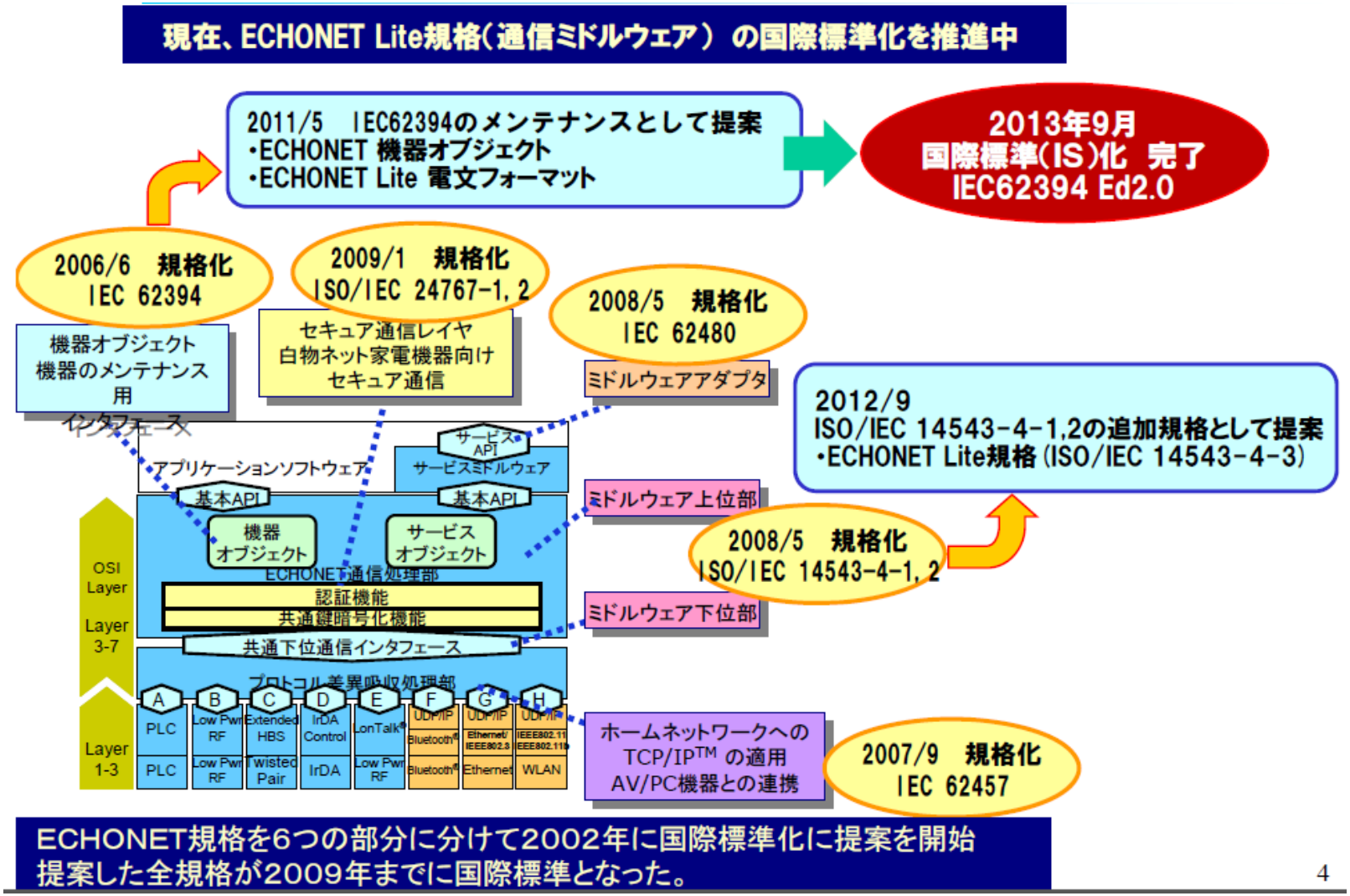
- ECHONET-Lite is recommended as the standard interface for connecting appliances and smart meter.
- Communication protocol between HEMS and devices should be based on IP.

List of ECHONET Lite devices

- 88 kinds of devices is ready to speak ECHONET Lite over IP in Japan. This move is expanding to overseas from Japan
  - FY 2011-2012, several device objects, mainly “energy storage devices” and “energy generation devices”, were newly specified or revised.

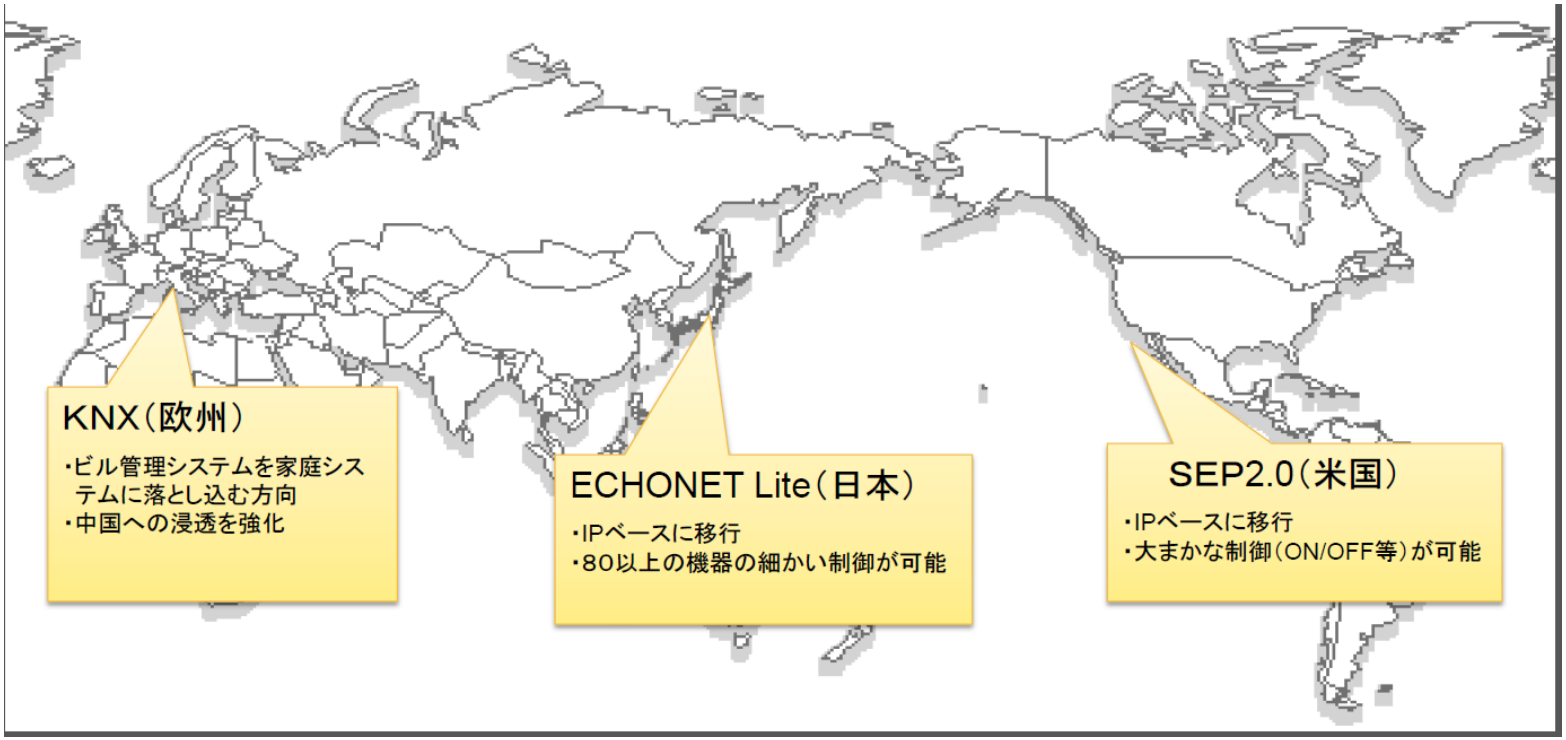
Sensor Related	Security Sensor, Human Detect Sensor, Temperature Sensor, CO2 Sensor, Electricity Sensor, etc.
HVAC Related	Air Conditioner, Fan, Ventilator, Air Cleaner, Carpet, Fan Heater, etc.
Facility Related	Blind, Curtain, Boiler, Lock, Storage battery, Fuel cell, Photovoltaic system, Gas Meter, Watt-Hour Meter, EV/PHV, etc.
Cocking Related	Refrigerator, Microwave, Washing Machine, Rice Cooker, Coffee Mill, etc.
Health Related	Weighing scales, Clinical thermometer, Blood Pressure Meter, Blood Sugar Meter, etc.
Controller Related	Controller, switch, etc.

Current Status of International Standardization of ECHONET Lite



Collaboration with Other Standards

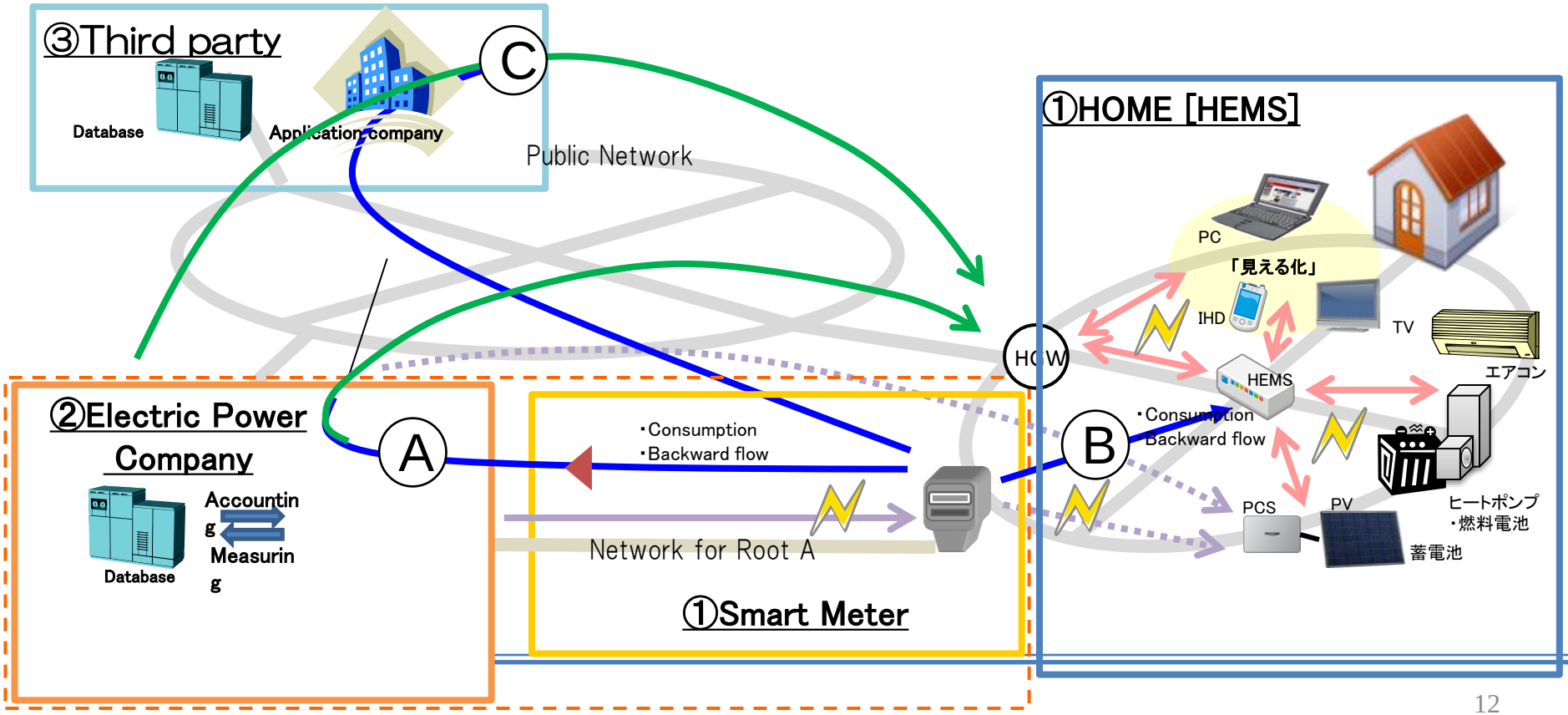
You can realize flexible EMS with ECHONET Lite, because it supports detailed functions of wide range of products. Documents are open to public through the web site. We are also collaborating with other standards worldwide.



reference：スマートハウス標準化検討委員会　中間取りまとめ（案）より
http://www.meti.go.jp/press/2011/02/20120224007/20120224007-2.pdf

Smart electricity meter in Japan speaks ECHONET Lite

- **Two communication lines for a smart meter in Japan**
  - **A root is for AMI and DR, connecting meter and utility**
  - **B root is for delivering meter data to demand side:**
    (Watt hour, Voltage, Ampere, Power flow, Reverse power flow, Log data)



The Center has started SMA certification

We have certified three products of “SMA” since April 2014.

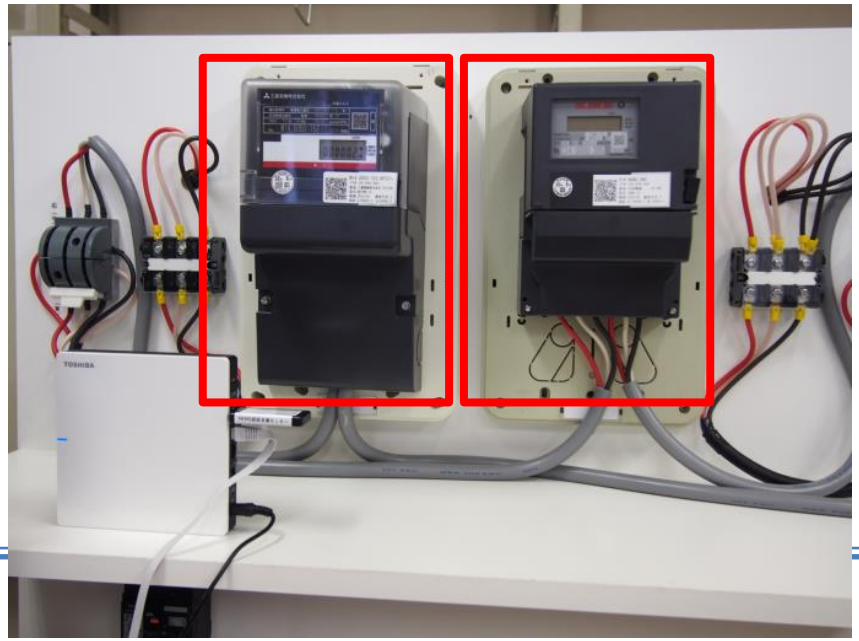
List of certified products

Reference: ECHONET consortium home page（http://www.echonet.gr.jp/kikaku_ninsyo/list_sma/equip_srch）

SMA certification number	Product type	Communication layer	Date of certification	Manufacturer	Product Code
PZ-000001	Smart Electricity Meter	Wi-SUN (WSA 0004)	2014.04.23	Toshiba	SM-3GCOM1
PZ-000002	Smart Electricity Meter	Wi-SUN(WSA0017)	2014.07.29	Mitsubishi	FS-897F
QZ-000001	HEMS Controller	Wi-SUN (WSA 0008)	2014.06.23	Toshiba Lighting Technology	HEM-GW13A

■SMA Certificate of Registration

■SMA Certification Products



Smart-House Project at KAIT

"METI supported program
- Research of Smart House international standardization"

This project supports positive proof and education of EMS related products with ECHONET Lite in order to promote HEMS.

Three main activities

1)Preparing Inter-operability test environment of ECHONET Lite
　-Certification Support Center
2)Development of SDK for HEMS service
　-Free Software Development Kits
3)Making guidelines of HEMS services and operations
　-Guidelines for HEMS

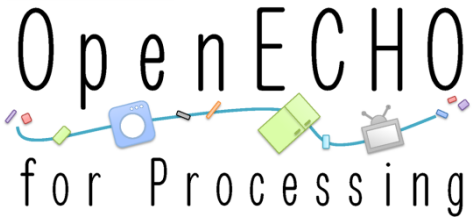
The Center opened on Nov. 21st, 2012

ECHONET Lite SDK [Free!!!]

No.1

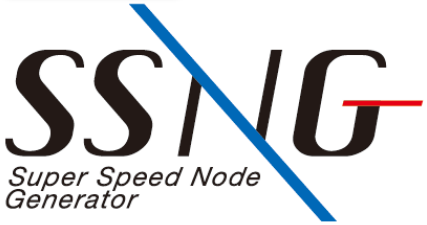
IDE	
Maker：NISSIN SYSTEMS	
Programming Languag	C
Target OS	Linux
Target CPU	INTEL×86

No.2



IDE	
Maker：SONY　CSL	
Programming Languag	Java(Processing)
Target OS	Linux,Windows, Mac
Target CPU	INTEL×86

No.3

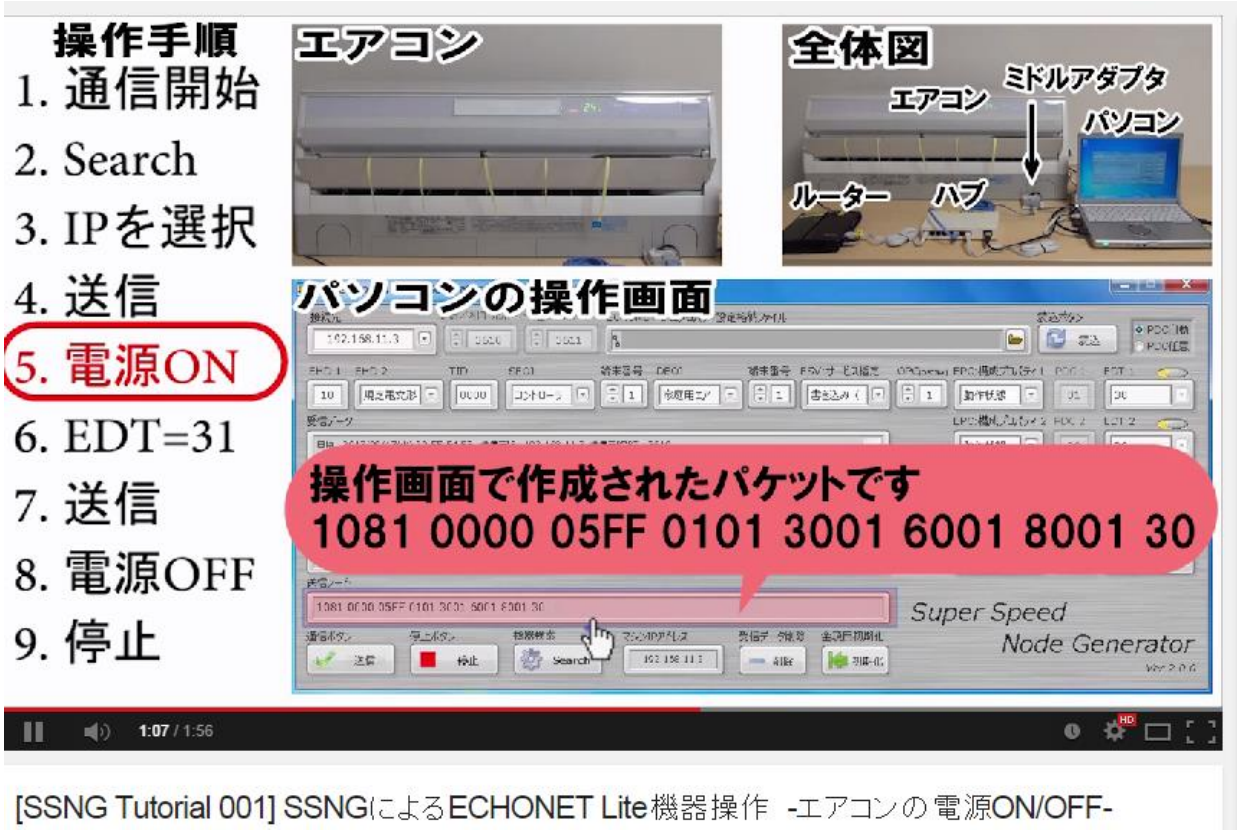


IDE	
Maker：KAIT　students	
Programming Languag	LabVIEW2013
Target OS	Windows
Target CPU	PentiumⅢ /Celeron866MHZLevel

Demo Video -1

SSNG (*) controls an air conditioner

http://youtu.be/R7hHVkCie6g



* Developed by a KAIT student

Demo Video -2

Demonstrated with a smartphone at ENEX2014

http://t.co/ELhNr6pQxn

Android App (HEMS Controller) controls water heater, air conditioner, light and window shade by variety of manufacturers

Demo Video -3

CG girl RAY-chan controls a light with ECHONET Lite

http://www.youtube.com/watch?v=TTbMXyG1JQ8

照明制御の流れ

1. レイちゃんを出現させる
2. 音声を認証させての照明ON
3. 音声を認証させての照明OFF
4. 終わる

操作機器画面

Open platform changes the world

A new world with “ECHONET Lite”, web contents and an air-conditionaer

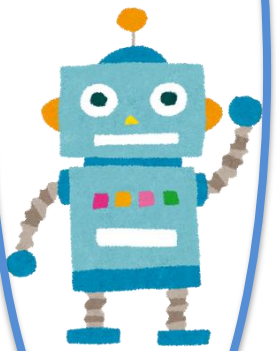
Web Platform

=Open Platform

Service

Service

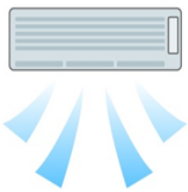
Intelligent Robot

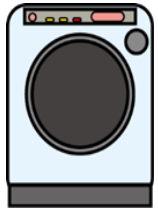


ECHONET Lite + Web = Web controller

+

Devices and Facilities





Air Conditioner, Laundry M, EV/PHV, Lighting, PV, FC, Buttery, Fans,,

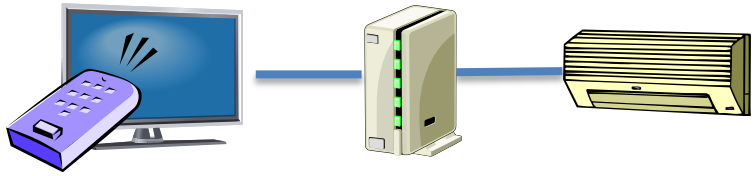
=Open Platform

ECHONET Lite

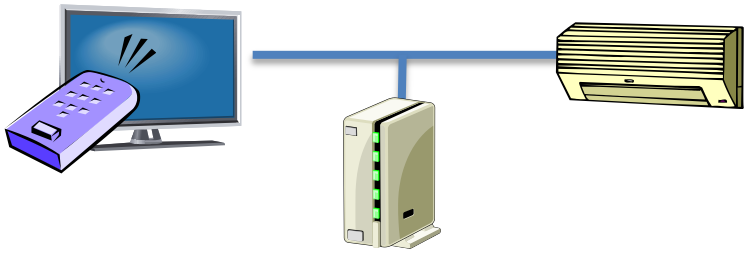
=Open Platform

Examples of ECHONET Lite installation

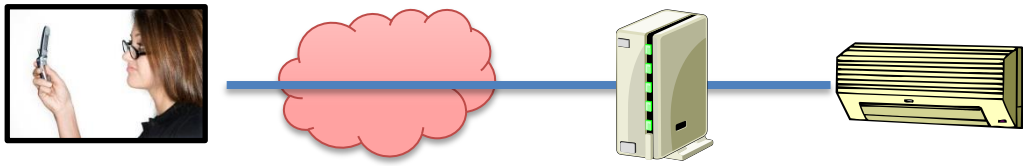
Direct connection model



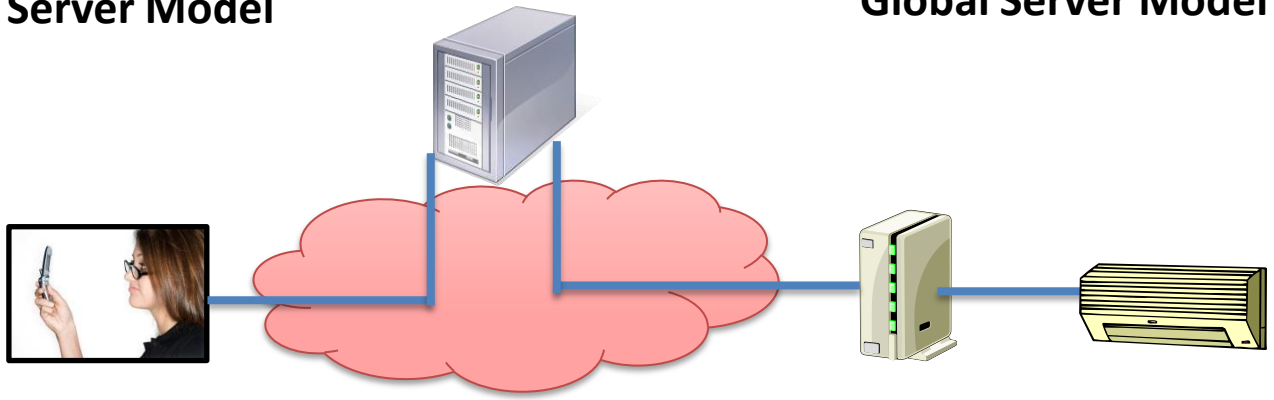
Gateway model



Local Server Model



Global Server Model



Cloud Model

ECHONET Lite Message Structure

EHD1	ECHONET Lite Header
EHD2	ECHONET Lite Header
TID	Transaction ID
SEOJ	Sender
DEOJ	Receiver
ESV	Service Type Definition
OPC	Number of property[command]
EPC	ECHONET Lite property [Command]
PDC	Bite of EDT
EDT	Property Data

E.G. Turn On an air conditioner
EHD1 = 0x10,
EHD2 = 0x81,
TID = 0x00, 0x00,
SEOJ = 0x0E, 0xF0, 0x01,
DEOJ = 0x01, 0x30, 0x01,
ESV = 0x61,
OPC =0x01,
EPC = 0x80, PDC = 0x01, EDT = 0x30

※Operate ECHONET Lite device by 15Byte command

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More detail

- For more detail information, contact to HEMS Interoperability Test Center, Japan
- http://sh-center.org/en/

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