

# M2M-Standardisierung.

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Hamburg, 30.09.2011

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# M2M Standardization. Outline.

## Outline

- Common Layer for Different Applications and Devices
- M2M Device Management
- Machine Type Communication at 3GPP
- Status at IEEE 802 regarding M2M
- Communication Concept for Smart Meter / Grid & Home Automation
- EC Mandates on Smart Meter, Smart Grid, eMobility, and IoT
- Conclusion

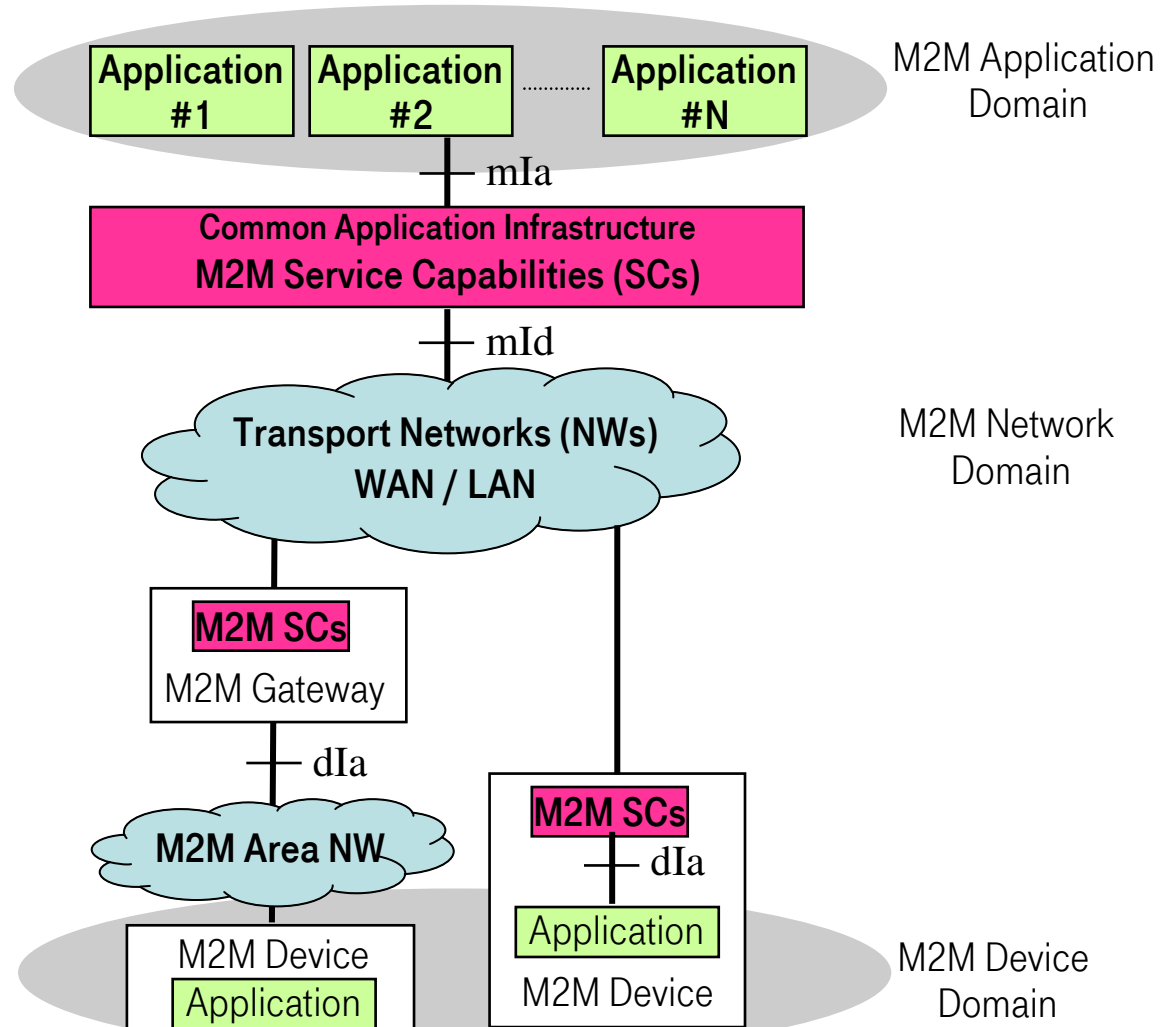


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# Common Layer for Different Applications and Devices. ETSI TC M2M.

## ETSI M2M Architecture Rel. 1

- M2M applications providers run individual M2M services.
- Applications share M2M service provider's common infrastructure (service capabilities).
- End user's M2M devices are connected via the transport network operator's domain with the application domain.
- Reuse of existing solutions where available
  - Core network technologies
  - Device domain technologies



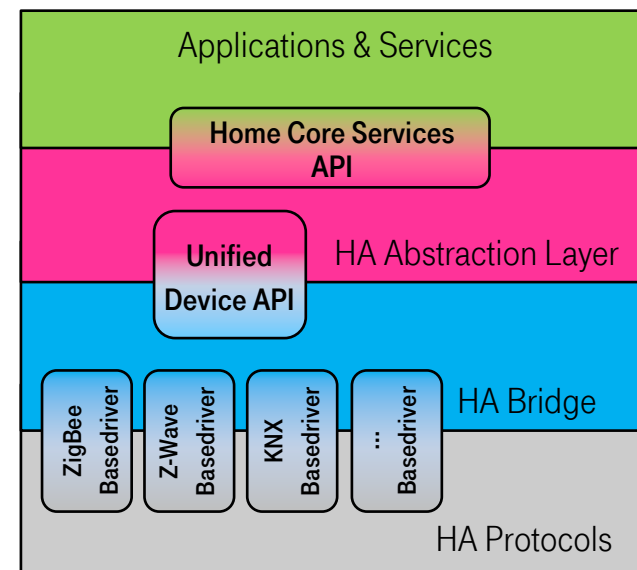
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# Common Layer for Different Applications and Devices. Abstraction Layer in the Smart Home.

## Abstraction Layer

- Communication technologies of devices in a Smart Home differ in physical layers and application layers.
- Interoperability between heterogeneous devices required.
- Different standardization activities to define possible abstraction layers:
  - Broadband Forum & Home Gateway Initiative work on abstraction layer spec.
  - UPnP abstraction layer based (UPnP HEMS Working Group)
    - EEBus UPnP HEMS reference implementation (local German gateway for HA abstraction incl. SmartGrid functionality, to be standardized by DKE)
  - IEEE 1905.1 Convergent digital home network
  - Open Smart Grid Protocol (OSGP)
  - OSGi Alliance prepares OSGi based abstraction layer
  - Open Gateway Energy Management Alliance (OGEMA / OSGi based)
  - Sensor Abstraction and Integration Layer for Context Awareness (SAIL / OSGi based)



General Abstraction Layer Architecture

API = Application Programming Interface; HA = Home Automation

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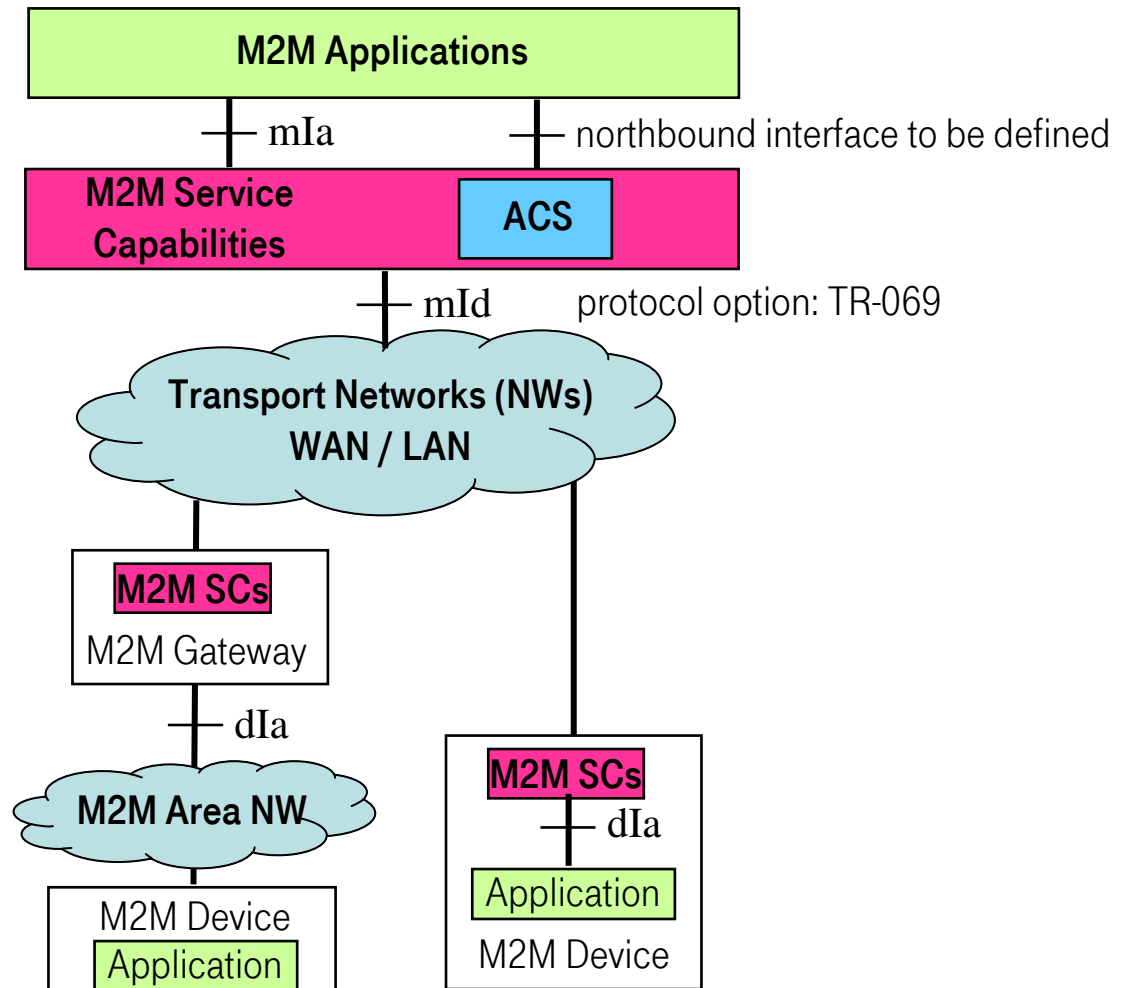


# M2M Device Management. Broadband Forum.

(1/2)

## Management for Fixed Network

- Broadband Forum is currently discussing how to use TR-069 for managing M2M devices.
- Auto Configuration Server (ACS) can be seen as part of the Service Capabilities and fits into the ETSI M2M architecture.
- TR-069 (CWMP) protocol can be re-used at **mId** interface with possible extensions (type-length-value necessary).



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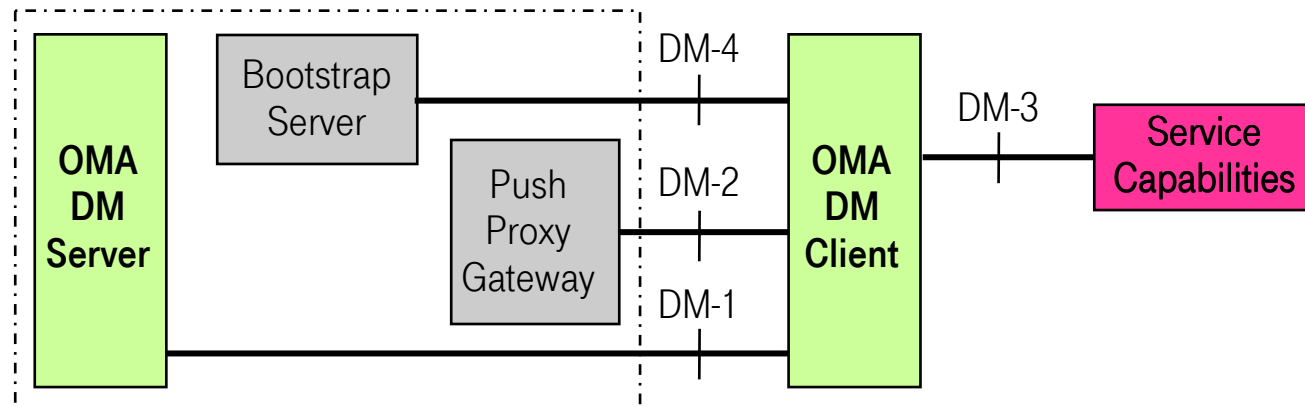


# M2M Device Management. Open Mobile Alliance.

(2/2)

## Management for Mobile Network

- OMA-DM specified device management for mobile network that can be used for M2M devices (OMA DM client) and Service Capabilities.



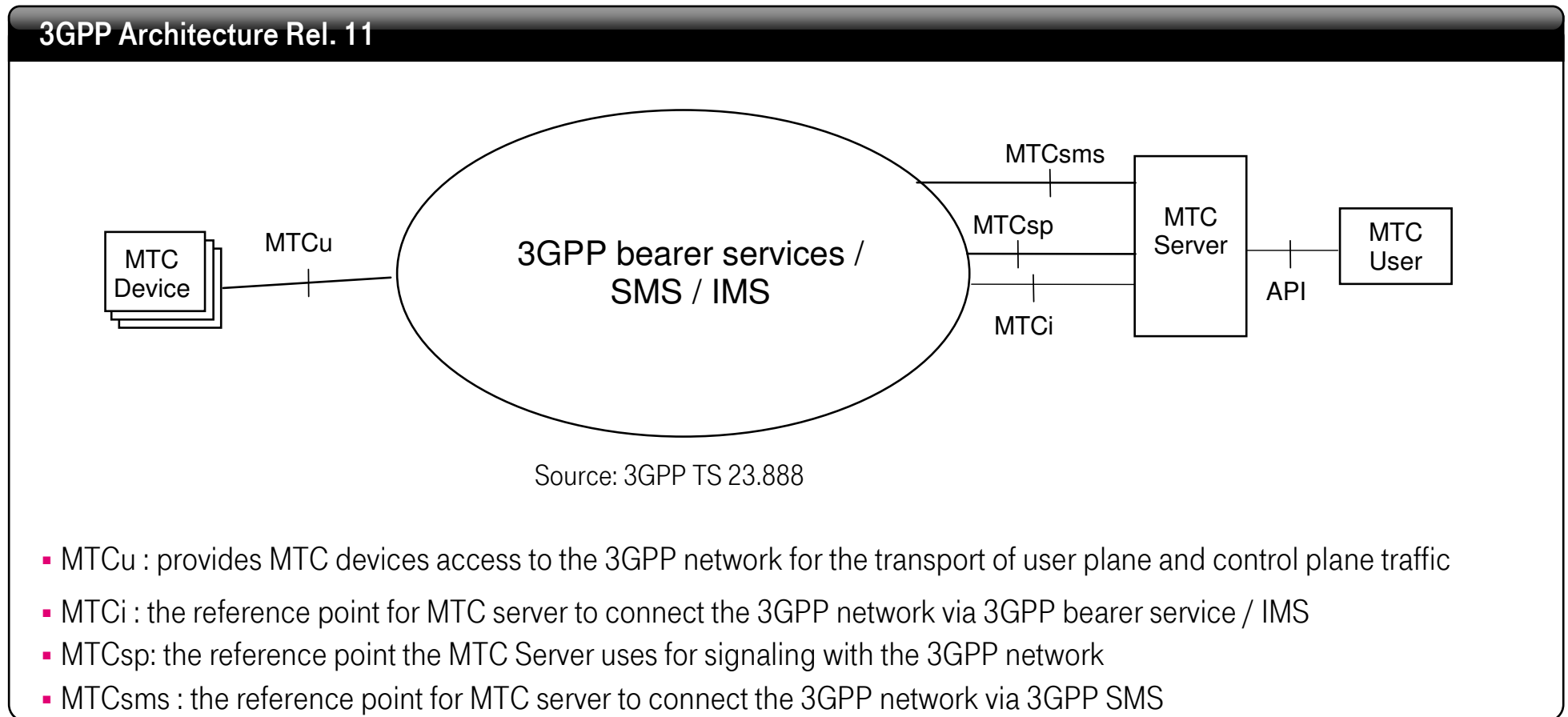
- OMA-DM Gateway will make devices behind firewalls and via non-OMA DM protocols reachable and manageable.
- OMA Lightweight M2M will take care about devices with resource constraints caused by hardware and/or connectivity on various transport protocols.
- Wide range of device and various protocol can be made accessible and manageable.

➡ Goal: Harmonized device management for fixed and mobile network.

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# Machine Type Communication (MTC). 3GPP.



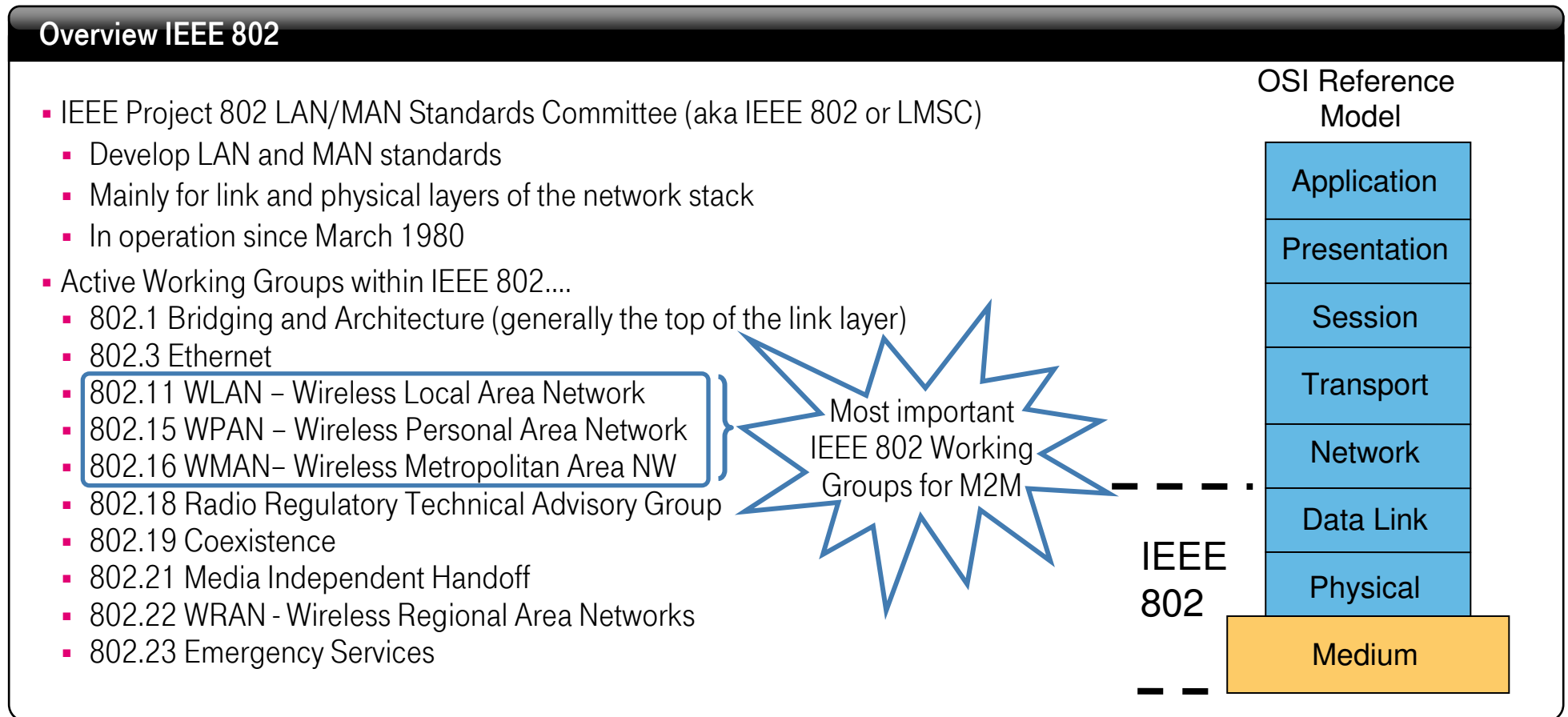
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# Status at IEEE 802 regarding M2M.

(1/2)

## General Overview of IEEE 802 and M2M Activities.



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# Status at IEEE 802 regarding M2M.

(2/2)

## M2M related Activities within IEEE 802.11 / .15 / .16.



### IEEE 802.11 - WLAN

- **IEEE 802.11ah Sub1GHz Task Group**  
This amendment defines operation in license-exempt bands below 1 GHz, excluding the TV White Spaces. Initial focus was on Smart Grid applications, but other uses cases were included, too. Standard will support for transmission range up to 1 km and data rates > 100 kbit/s.
- **Smart Grid Adhoc**
  - Input to NIST\* driven Initiative on Smart Grid
  - Wireless capabilities for Smart Grid
  - Inputs from other IEEE802 groups, too



### IEEE 802.16 - WMAN

- **IEEE 802.16p M2M Task Group**  
This standard defines enhancements to enable a range of M2M applications in which the device communications require wide area wireless coverage in licensed bands, and are automated rather than human-initiated or human-controlled for purposes such as observation and control.

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### IEEE 802.15 - WPAN

- **IEEE 802.15.4g Smart Utility Networks (SUN) Task Group**  
To provide a global standard that facilitates very large scale process control applications such as the utility smart-grid network capable of supporting large, geographically diverse networks with minimal infrastructure, with potentially millions of fixed endpoints.
- **IEEE 802.15.4j Medical Body Area Networks (MBAN) Task Group**  
Defines a physical layer in the 2360 to 2400 MHz band which complies with Federal Communications Commission (FCC) MBAN rules
- **IEEE 802.15.4k Low Energy Critical Infrastructure Networks (LECIM) Task Group**  
The role of LECIM is to create a PHY to facilitate point to multi-thousands of points communications for critical infrastructure monitoring devices
- **IEEE802.15.6 Body Area Networks (BAN) Task Group**  
Standard for short range, wireless communication in the vicinity of, or inside, a human body (but not limited to humans)
- **Peer Aware Communications (PAC) Study Group**  
Currently IEEE 802.15 discuss whether they set-up the new study PAC, a follow-up of the former study group PSC\*. PAC will define infrastructureless, fully distributed, peer-to-peer communications: specifically, discovery signaling rate > 100 kbps, the number of devices in the discovery > 100 devices, the data transmission rate > 10 Mbps, n-to-m group communications, fast association, and localization.



\*) NIST: National Institute of Standards and Technology  
PSC: Personal Space Communications

# Communication Concept for Smart Meter/Grid & Home Automation.(1/2) Proposal Deutsche Telekom.

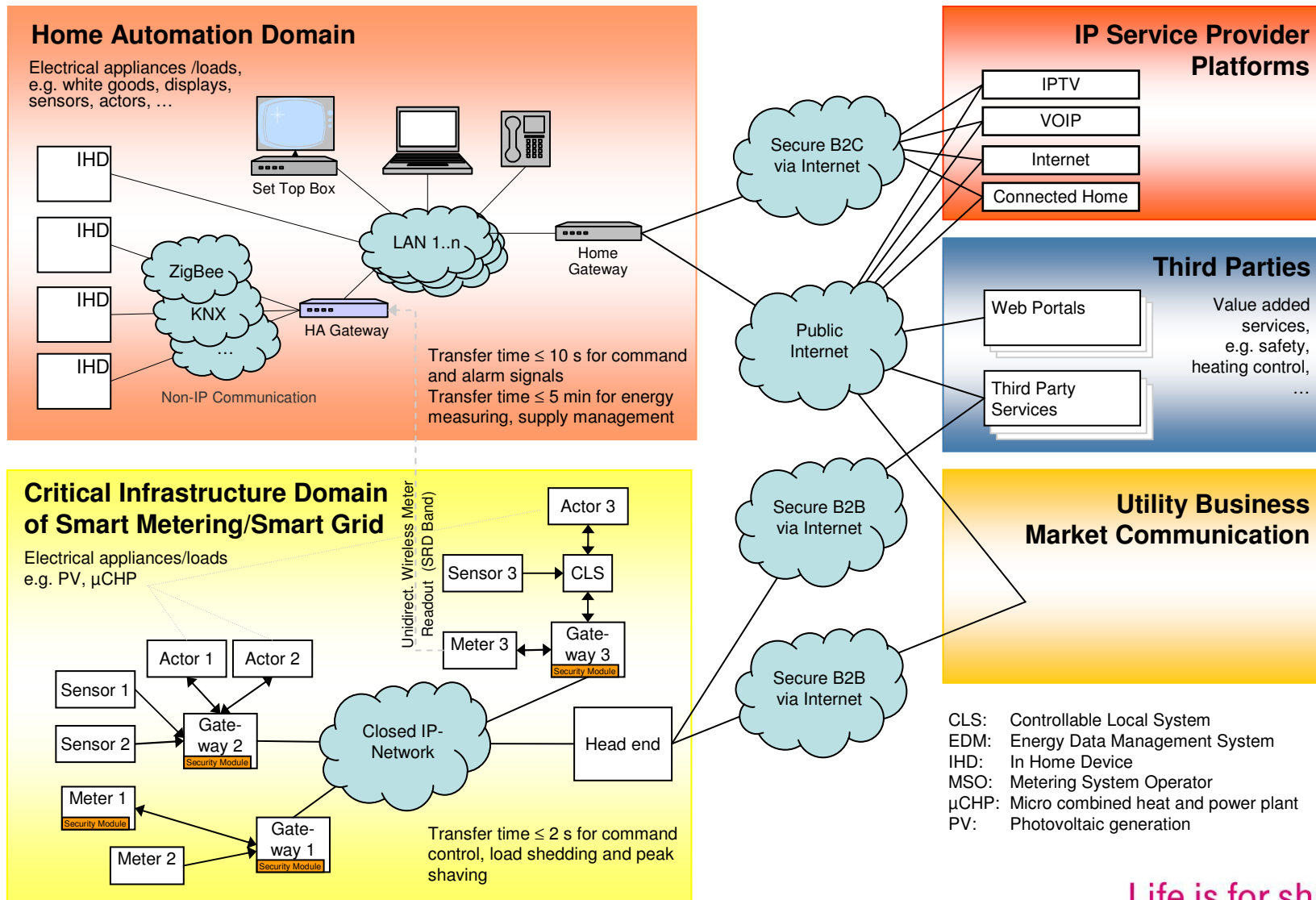
## Architecture

- Differentiation between critical infrastructure domain of Smart Metering/Smart Grid and home automation domain because of different security profiles
- Critical infrastructure domain of Smart Metering/Smart Grid
  - No physical interconnection to the home automation domain
    - Customer access via web services over Internet
    - Local unidirectional wireless meter readout possible
  - High to very high reliability and security levels
- Home automation domain
  - Customer has final control and responsibility
  - Guarantee on the delivery of the service dependable on SLA, if managed
  - Service dependant variable reliability and security levels

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# Communication Concept for Smart Meter/Grid & Home Automation.(2/2)



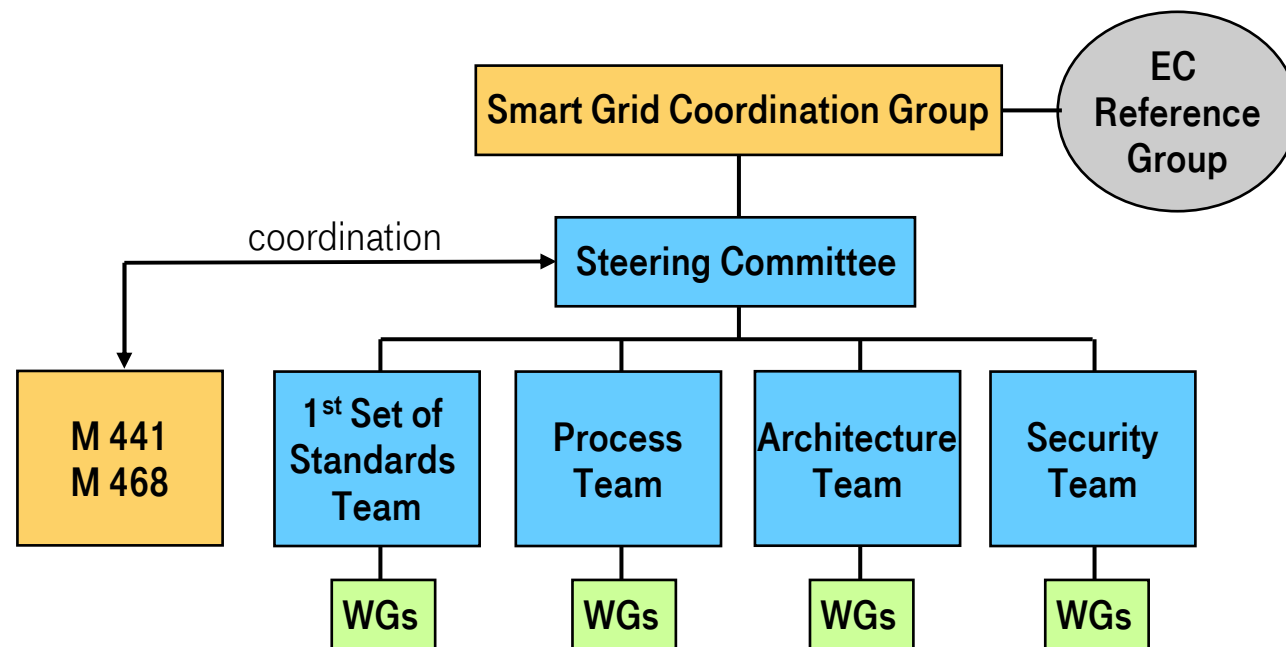
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# EC Mandates on Smart Meter, Smart Grid, eMobility, IoT. CEN/CENELEC/ETSI.

## EC Mandates to CEN/CENELEC/ETSI

- M441 Smart Metering
- M490 Smart Grid
- M468 Charging of electric vehicles
- Future mandate on Internet of Things (IoT)



Organization of Smart Grid Coordination Group

WG = Working Group

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# Conclusion.

## M2M Standardization is necessary for:

- Interoperable Solution
  - ➔ Ensure Interoperability
- Product Innovation
  - ➔ Encourages innovation through R&D
- New Markets
  - ➔ Expands markets
- Standards Solution
  - ➔ Reduces cost
- Regulatory Requirements
  - ➔ Satisfies essential regulatory requirement



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