

M2M-Standardisierung.

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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

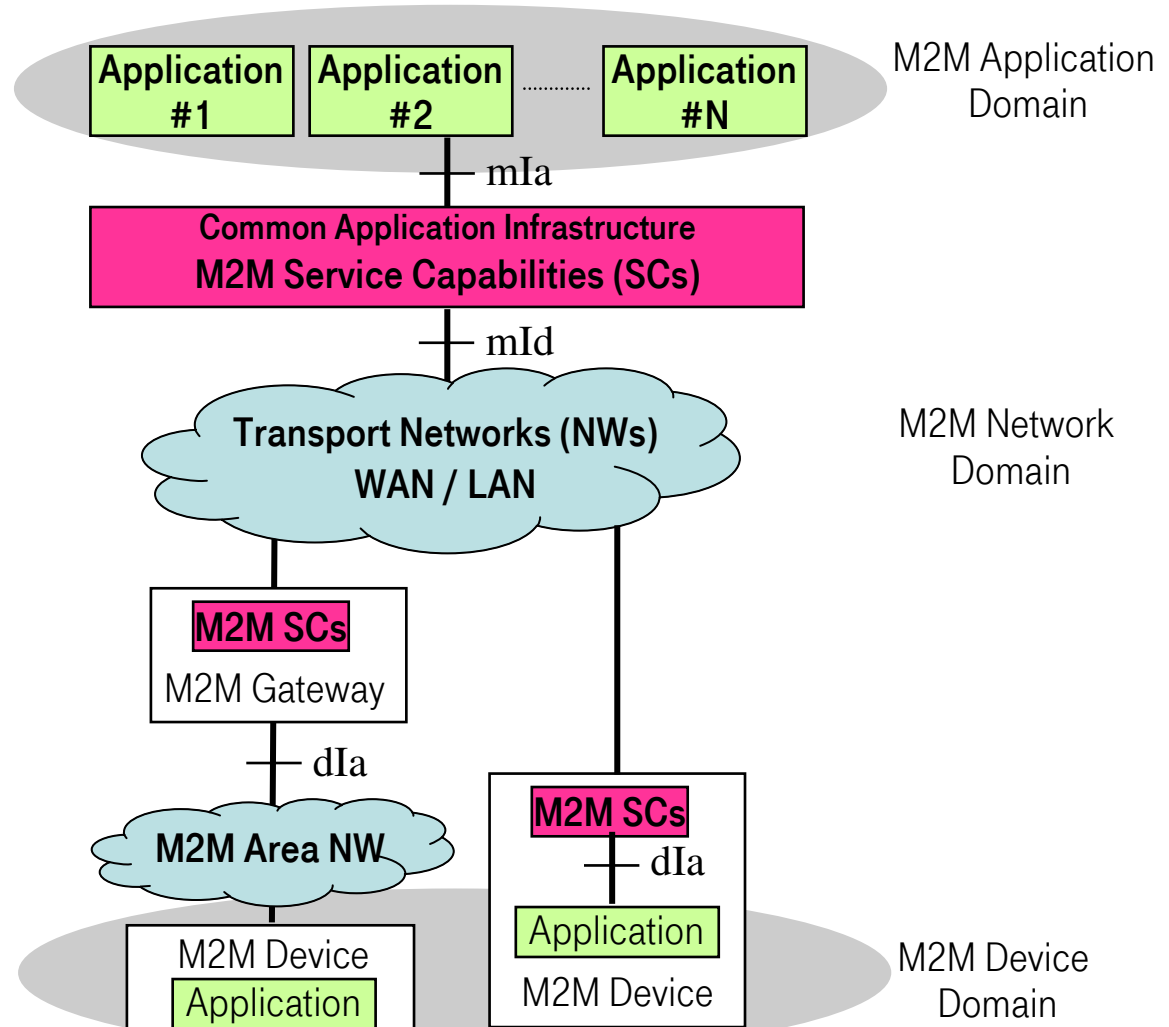
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Common Layer for Different Applications and Devices. ETSI TC M2M.

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



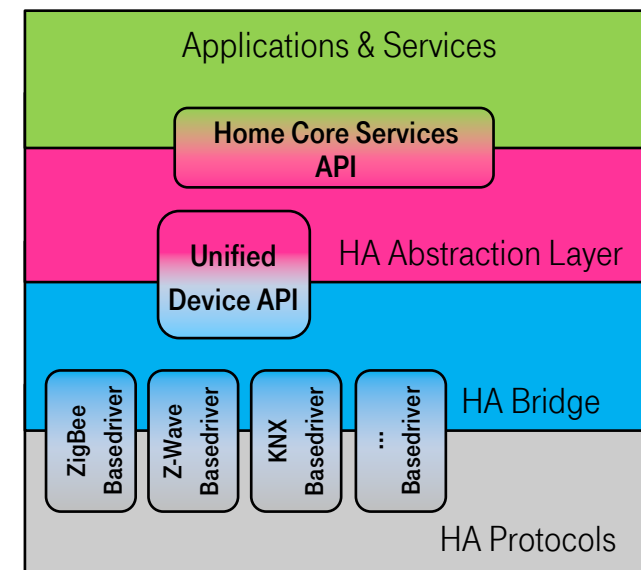
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Common Layer for Different Applications and Devices. Abstraction Layer in the Smart Home.

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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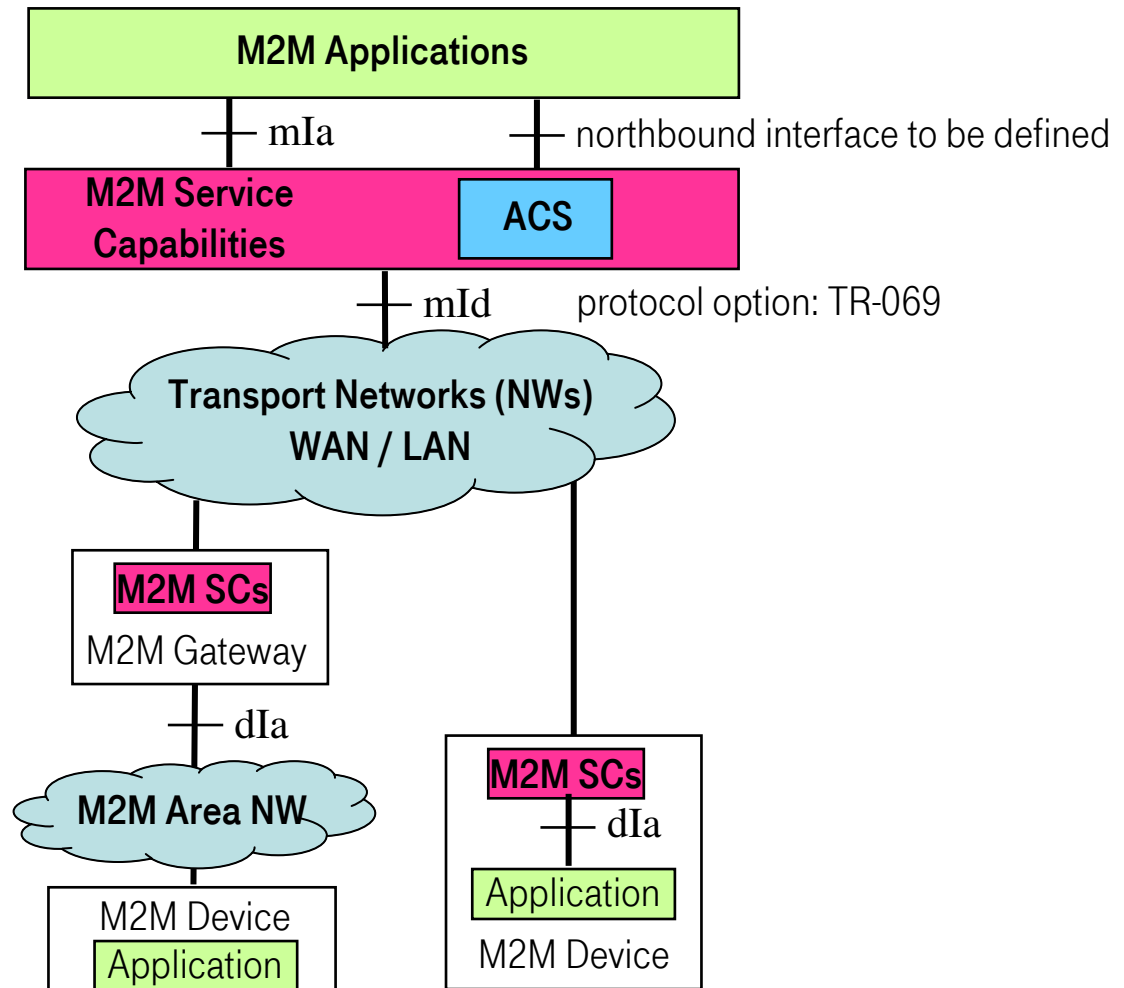


M2M Device Management. Broadband Forum.

(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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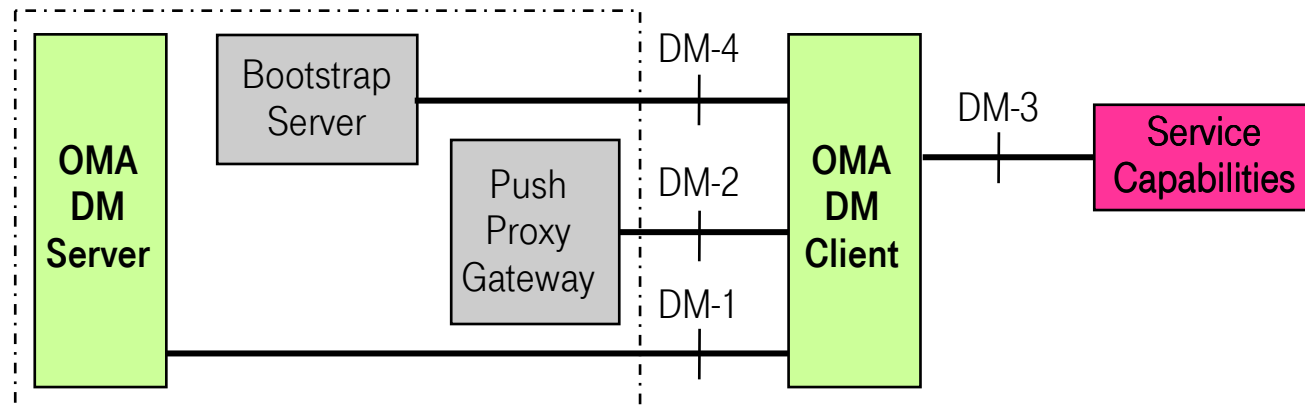


M2M Device Management. Open Mobile Alliance.

(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.



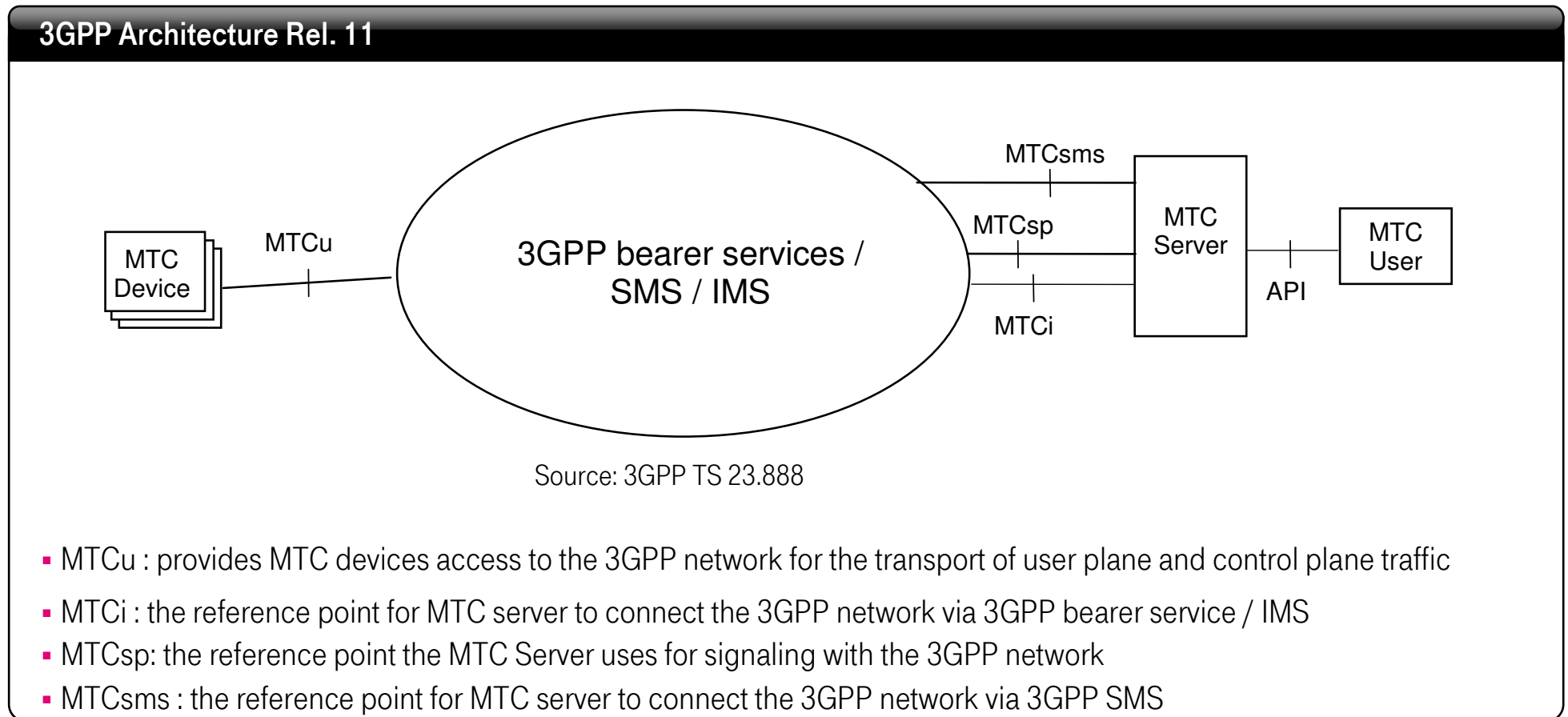
- OMA-DM Gateway will make devices behind firewalls and via non-OMA DM protocols reachable and manageable.
- OMA Lightweight M2M will take care about devices with resource constraints caused by hardware and/or connectivity on various transport protocols.
- Wide range of device and various protocol can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

Overview IEEE 802

- IEEE Project 802 LAN/MAN Standards Committee (aka IEEE 802 or LMSC)
 - Develop LAN and MAN standards
 - Mainly for link and physical layers of the network stack
 - In operation since March 1980
- Active Working Groups within IEEE 802....
 - 802.1 Bridging and Architecture (generally the top of the link layer)
 - 802.3 Ethernet
 - 802.11 WLAN – Wireless Local Area Network
 - 802.15 WPAN – Wireless Personal Area Network
 - 802.16 WMAN– Wireless Metropolitan Area NW
 - 802.18 Radio Regulatory Technical Advisory Group
 - 802.19 Coexistence
 - 802.21 Media Independent Handoff
 - 802.22 WRAN - Wireless Regional Area Networks
 - 802.23 Emergency Services

Most important IEEE 802 Working Groups for M2M

OSI Reference Model

Application
Presentation
Session
Transport
Network
Data Link
Physical

IEEE 802

Medium

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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.

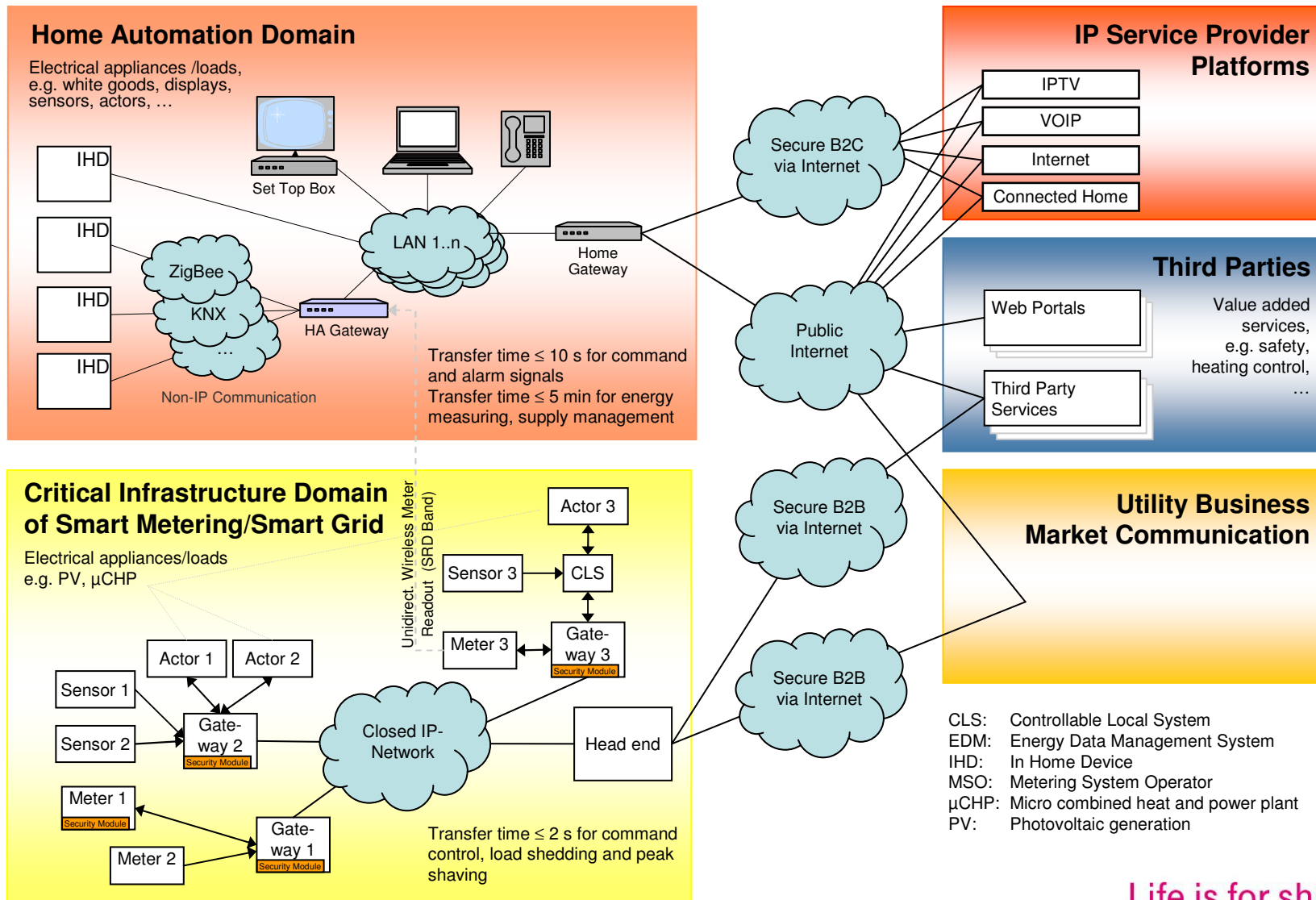
Architecture

- 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)



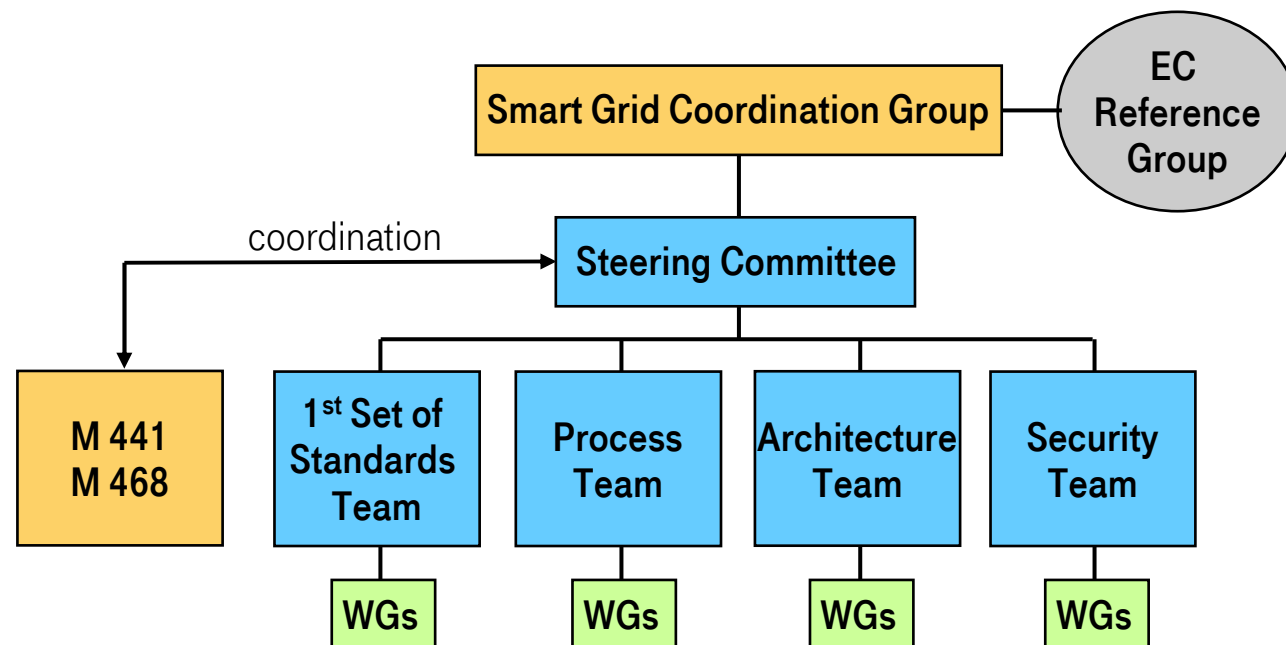
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EC Mandates on Smart Meter, Smart Grid, eMobility, IoT. CEN/CENELEC/ETSI.

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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