



GRUPPO TELECOM ITALIA

oneM2M for smart cities: the experience using Mobius

lot WEEK Korea 2018
OneM2M Industry Day

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TIM

oneM2M IoT Platform in the TIM labs

The origins

It was **originally developed in 2010-2012 in house** in the Telecom Italia Labs.

We reused some principles developed in some experimental platforms (energy control related) that has been introduced in ETSI M2M specifications.

It has been **implemented according to a subset of ETSI M2M Release 2 specification**, with proprietary solution.

On top of standard, **additional rules were included for user creation and pre-configuration, for platform administration, and for semantic interoperability** (a sort of proprietary base ontology).

The migration

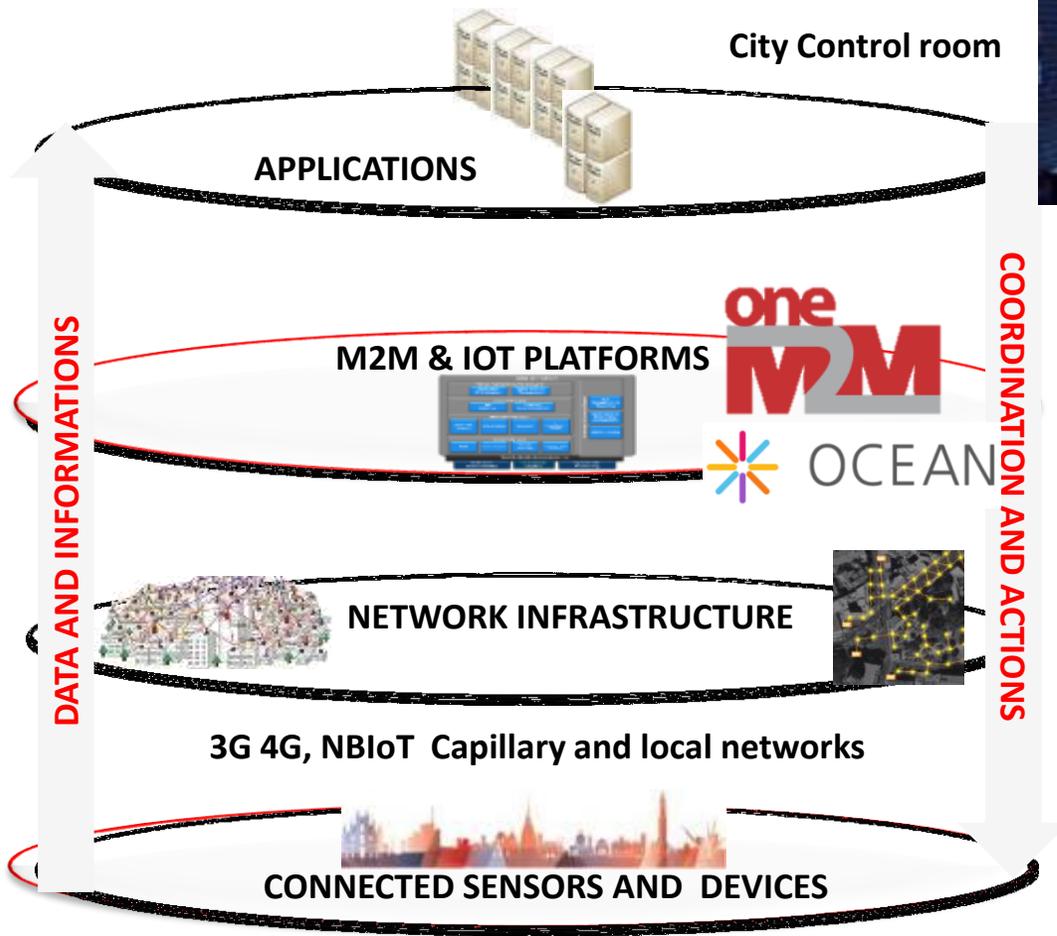
Starting from early 2016 we analyzed **different options for the migration to oneM2M**, and we **selected the Ocean Mobius open source solution**.

The full migration happened in middle 2017 and **was very quick and smooth** due to the similarity of the basic key elements (AE, Containers, ACP) and of the REST interfaces, that allowed also an almost direct migration of the additional configuration rules we added.

Another enhancement was the inclusion of a MongoDB solution in parallel to the relational DB



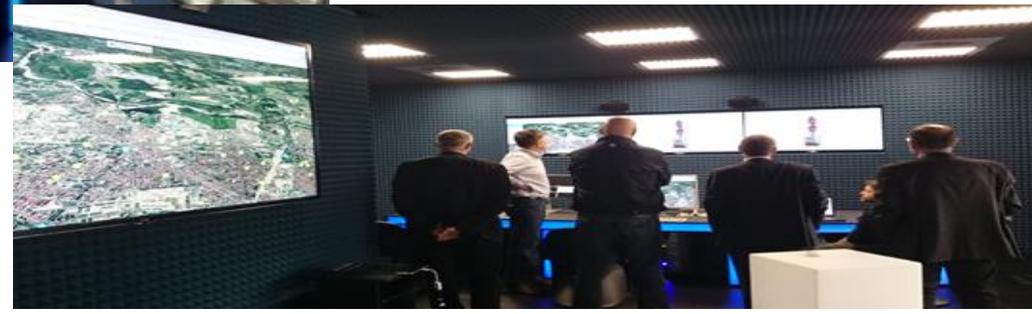
The TIM OPENAIR LAB Assets



City Control room



Showroom



Distributed and local assets (Sensors, Aggregated Data, other platforms, actuator, etc...)

Some Smart City Use Cases in the OPENAIR Lab



Smart Bench and Cyberhead



Smart Light, and advanced Videosurveillance



Electric Mobility and Smart Parking



Road Side Units for Connected Cars



Smart Metering (Gas and Water)



Digital Island



Smart Bus Stop



Smart Waste



Smart Green

Some Project integrated in Innovation Lab and based on OneM2M



Livorno Smart City (Harbor) and Connected Car Project (2016)



Firenze Smart City funded Project (from 2016 to 2021)



Torino Smart City Project: Living Lab (2016-2017)

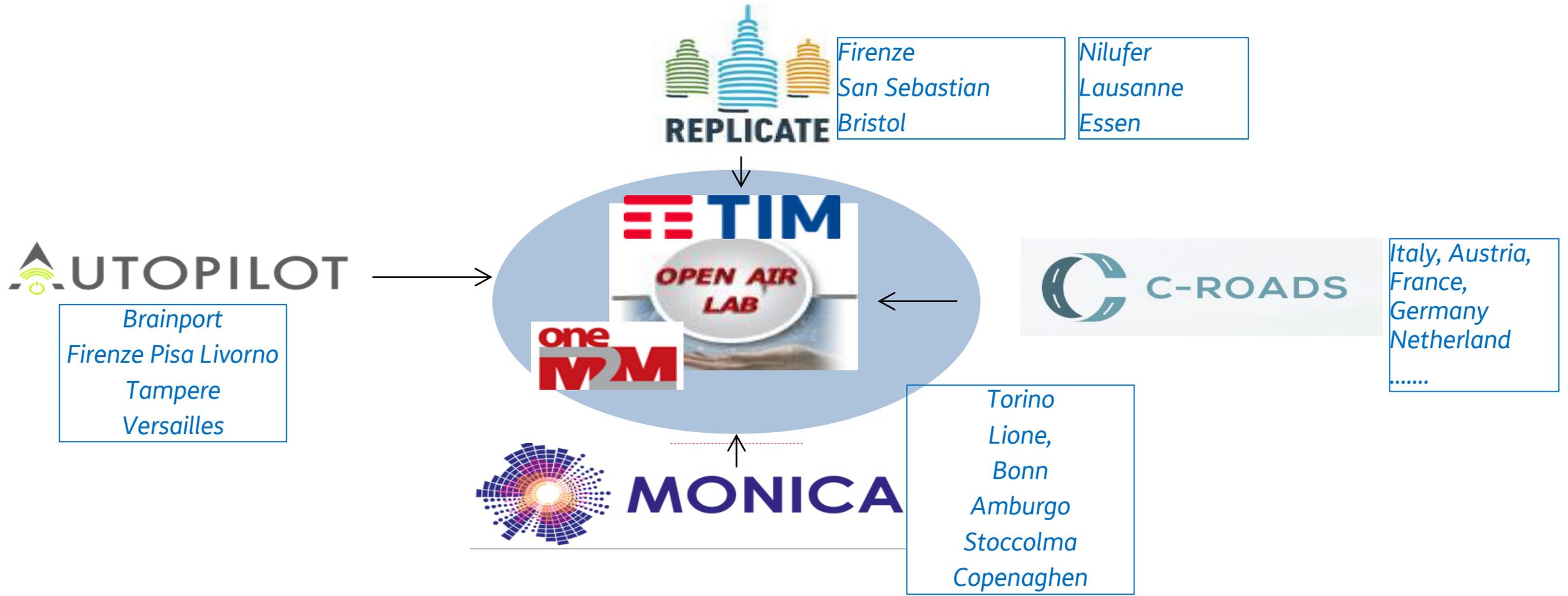


MONICA Project Torino + 5 european cities (from 2017 to 2020)



Torino Smart City EC funded Project: Almanac (from 2013 to 2016)

Telecom Italia delivers “Open Air Lab” concept in the cities: EU Lighthouse and Large scale pilots Projects MONICA, AUTOPILOT, REPLICATE and C-ROADS Italy



The Italian 5G Pilots participated by TIM will use OneM2M



Torino 5G



Bari/Matera
5G MISE



San Marino 5G



Bari/Matera: 55 Partners

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University and
research centers

Consiglio Nazionale delle Ricerche
Scuola Superiore Sant'Anna di Pisa

Istituto tumori di Bari
Politecnico di Bari
Università degli Studi di Bari A. Moro
Università degli Studi della Basilicata
Università del Salento

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Lead Partners

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Public administrations

Aeroporti di Puglia
Agenzia lucana Sviluppo e Innovazione in
Agricoltura
Agenzia Regionale per le Attività Irrighe e
Forestali
Autorità Portuale del Mare Adriatico
Meridionale
Azienda Mobilità e Trasporti di Bari
Azienda Ospedaliera Policlinico di Bari
Azienda Sanitaria Locale di Bari
Azienda Sanitaria Locale di Matera
Conservatorio di Musica "E.R. Duni"
Consorzio per lo Sviluppo Industriale Matera
Fondazione E. Pomarici Santomasi

TIM
Fastweb
Huawei

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Companies from the
territory

Digmat
Digital Lighthouse
DileoPietro
Geocart
Graffiti Smart City NEXTOME
Gruppo Servizi Informatici
HSH Informatica e Cultura
Idea 75
Innova Puglia
Isotta Fraschini Motori
Itel Telecomunicazioni
Item Oxygen
Mac&Nil SrL
Medical Electronic Applications
Mer Mec
NEXHIS
OPENET Technologies
Planetek Italia
Publisy
Silos Granari della Sicilia
SITAEI
TECNOBLEND

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sector leaders

Alleantia
Athonet
Digital Magics
Ducati Motor Holding
Leonardo
NTT DATA EMEA
RAI WAY
Bosch
Sogetel
SPEE - Cybersecurity
TT Tecnosistemi
WAY

5G pilots: 10 service domain, more than 70 use cases



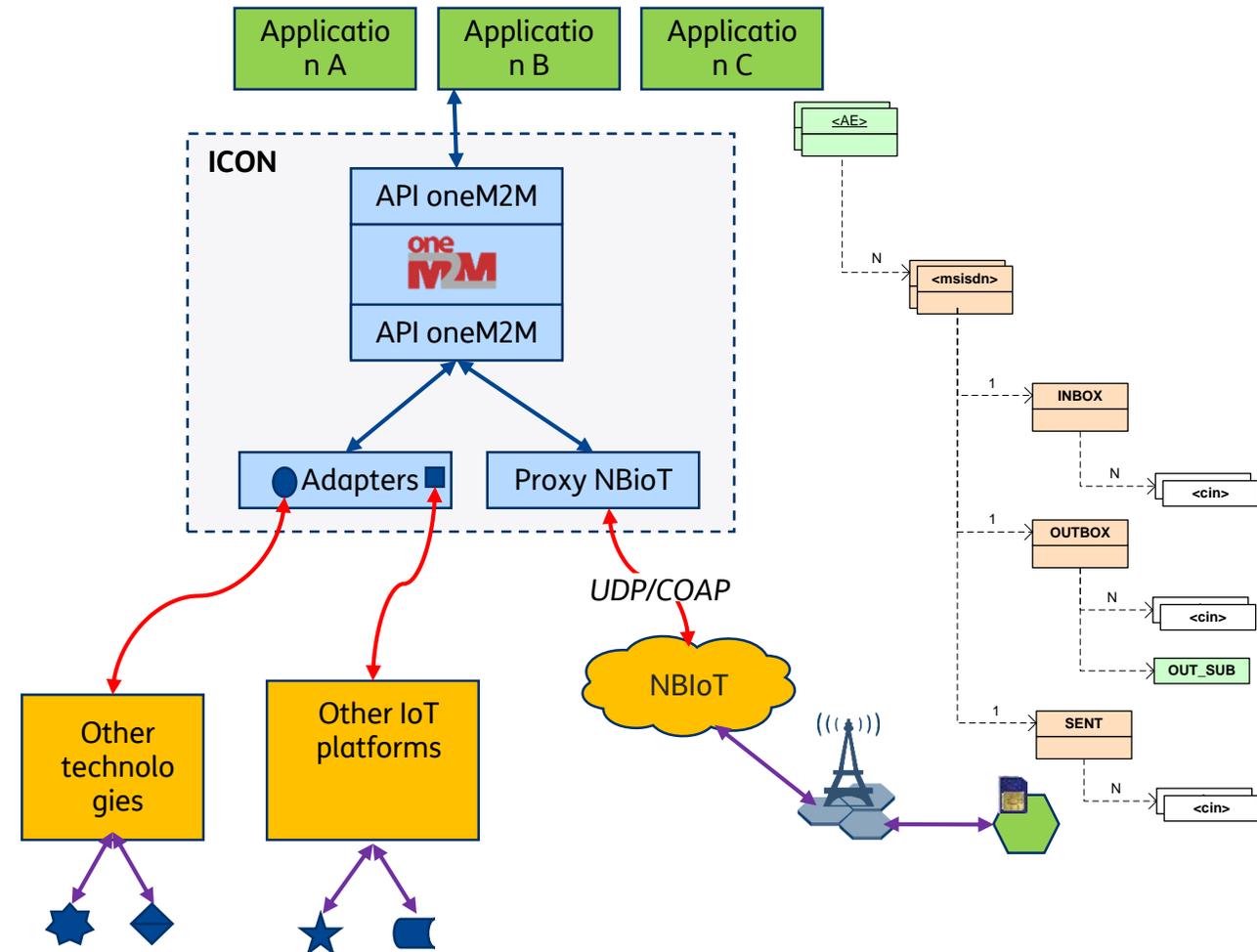
The TIM ICON

IoT **CON**nectivity Platform is a service platform for IoT devoted to the store&share of information among IoT devices and IoT applications, via oneM2M conformant API.

ICON includes the interfacing with the cellular networks, in particular for Nb-IoT. For such purpose, a specific set of predefined resources has been defined

As for the Lab version, it includes the interfaces with other technologies on the field, as well other IoT platforms

It is compliant with the oneM2M Rel 2 specifications, and it exists as in-house version (Ocean Mobius opensource based) and a third party version, on the basis of a commercial oneM2M solutions.



The platform Evolution : SAREF to assure smooth Semantic interoperability

Current enhancement are concentrated on the interoperability at the semantic level.

We believe **the extended use of flexcontainers in the specification is breaking the major reason of adoption for oneM2M**: The interoperability among system is disrupted, **fragmenting the platform implementations and making the interworking complex.**

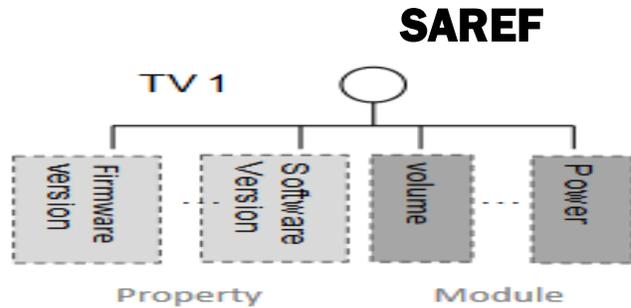
With flexcontainers, each time a subsystem (e.g. a controller) needs to communicate and share information with other subsystems (e.g. traffic sensors, traffic lights, environment sensors, etc.) it needs to understand the data structure and the semantic of each peer part.

Some sensors have very long life and are deployed with multiple different technologies among years so it forces a **contiguous modification of the platform to support the different flexcontainers, and of the applications to interpret such new resources.**

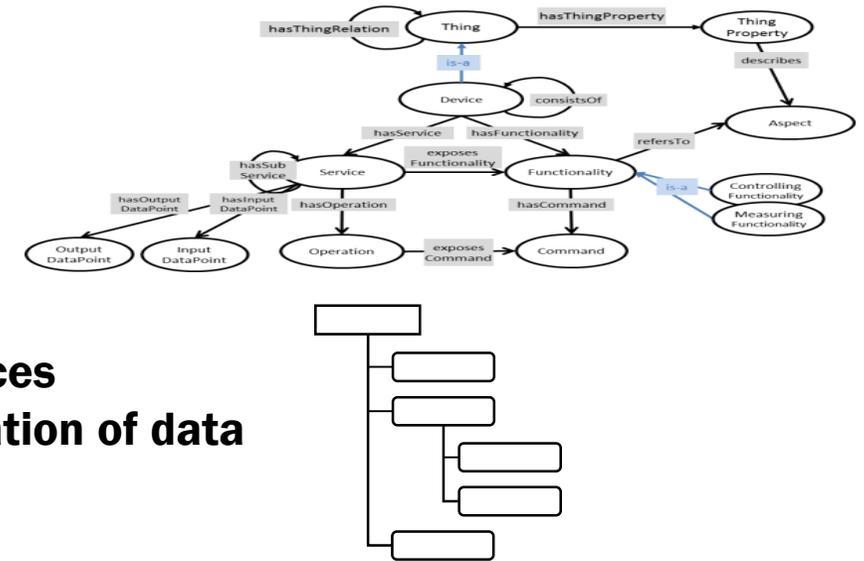
For this reason we are developing **the oneM2M «generic interworking» approach** with a common ontology. In particular we are working with **the SAREF ontology as a way to provide a common solution.**

Share information across the differences

Specific Abstraction Models, groped around a core common ontology



Unspecific base Ontology



OneM2M resources
Semantic annotation of data

Vertical ontologies support



TC SmartM2M
SAREF and its extensions



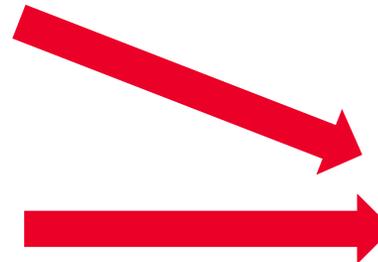
Semantic Support



oneM2M base ontology



Communication Framework



oneM2M Data sharing



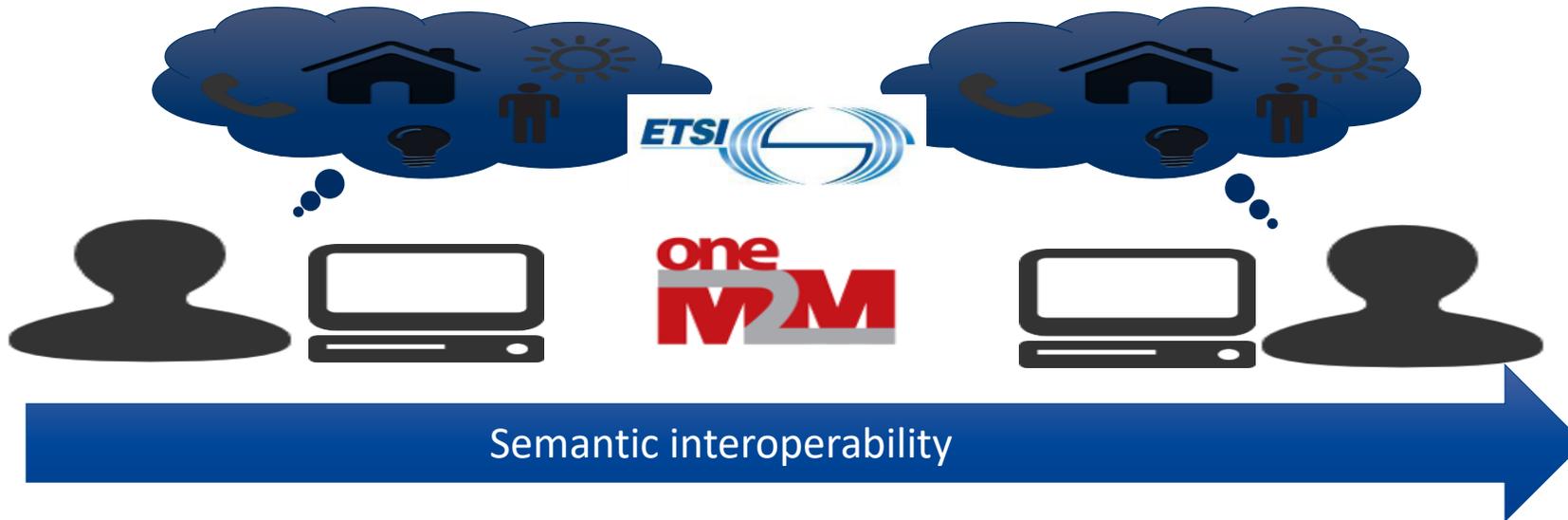
SAREF extensions

[ETSI TS 103 264: SAREF and oneM2M Mapping](#)

[ETSI TS 103 410 \(1-10 \): SAREF extensions](#)

[ETSI TS 103 267: Communication Framework](#)

[ETSI TS 103 268 \(1-4 \): SAREF Test Suite](#)



Contact details

Enrico Scarrone

*ETSI smartM2M Chairman,
oneM2M Steering Committee Vice Chairman*

Standards Coordination

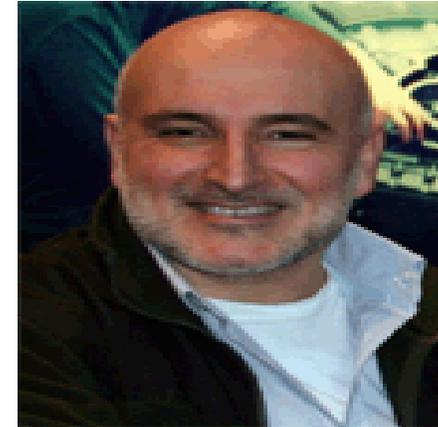
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IOT:

It is not which protocol... or which platform... that makes the IoT!

The key is to share the information and its meaning among different systems and applications , and among different business sectors !

Thank you!