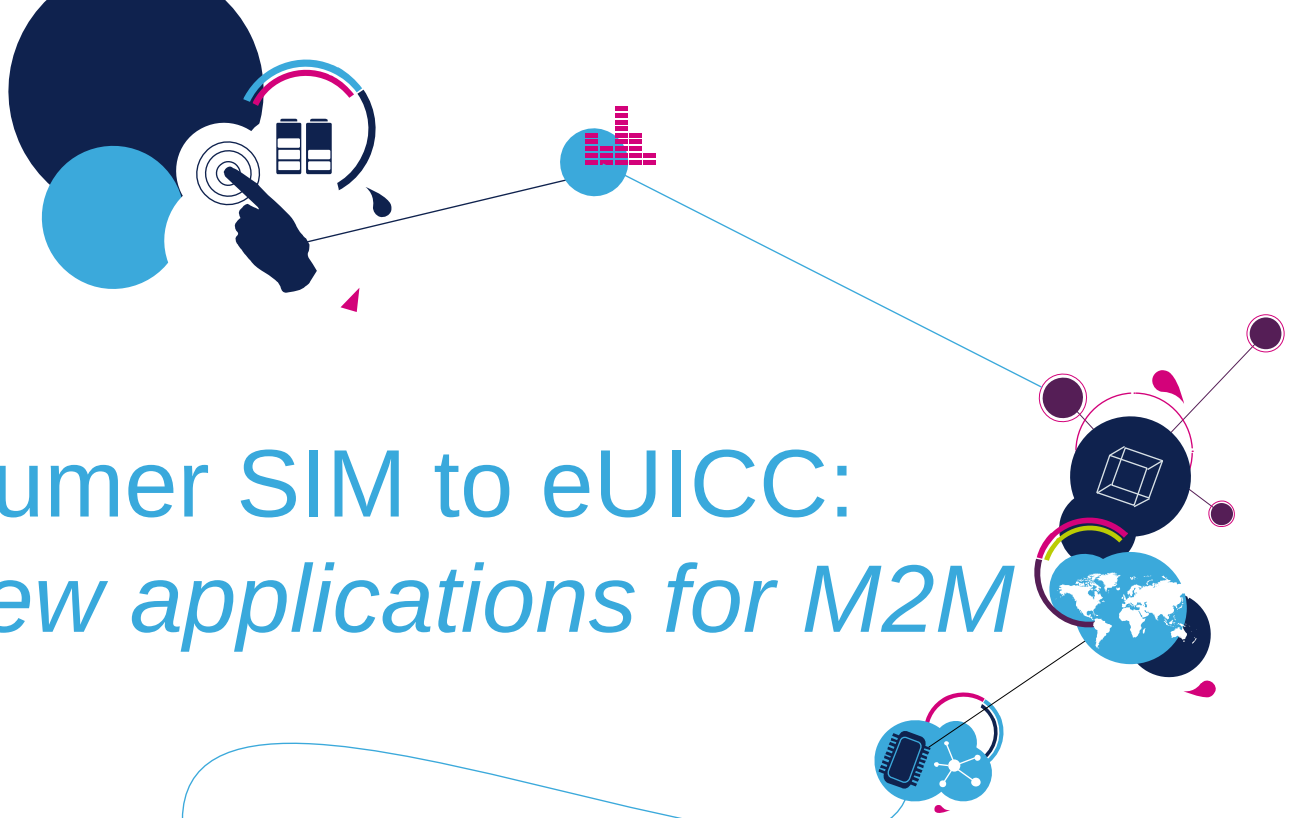

From consumer SIM to eUICC: *enabling new applications for M2M*

Agostino Vanore

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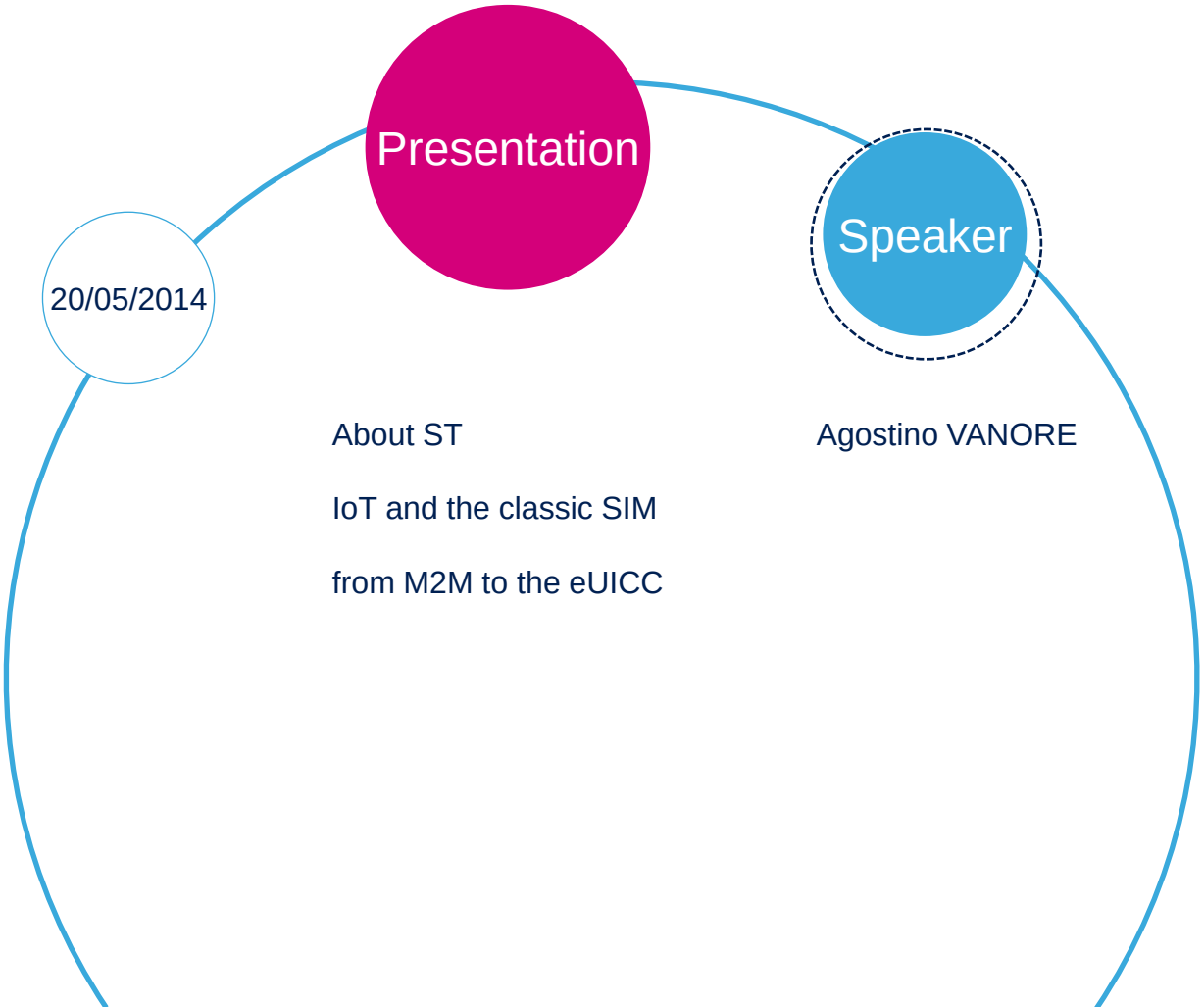
Agenda


Presentation
Speaker
20/05/2014
About ST
IoT and the classic SIM
from M2M to the eUICC
Agostino VANORE

About ST

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Who we are

- A global semiconductor leader
- The largest European semiconductor company
- 2013 revenues of **$8.08B**
- Approx. **45,000** employees worldwide
- Approx. **9,000** people working in R&D
- **12** manufacturing sites
- Listed on New York Stock Exchange, Euronext Paris and Borsa Italiana, Milano

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As of December 31, 2013

Where you find us

Our MEMS & Sensors
are augmenting
the consumer experience

Our digital consumer products
are powering the augmented
digital lifestyle

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Our automotive products
are making driving safer,
greener and more
entertaining

Our Microcontrollers
are everywhere
making everything smarter
and more secure

Our smart power products
are allowing our mobile products to operate longer
and making more of our energy resources

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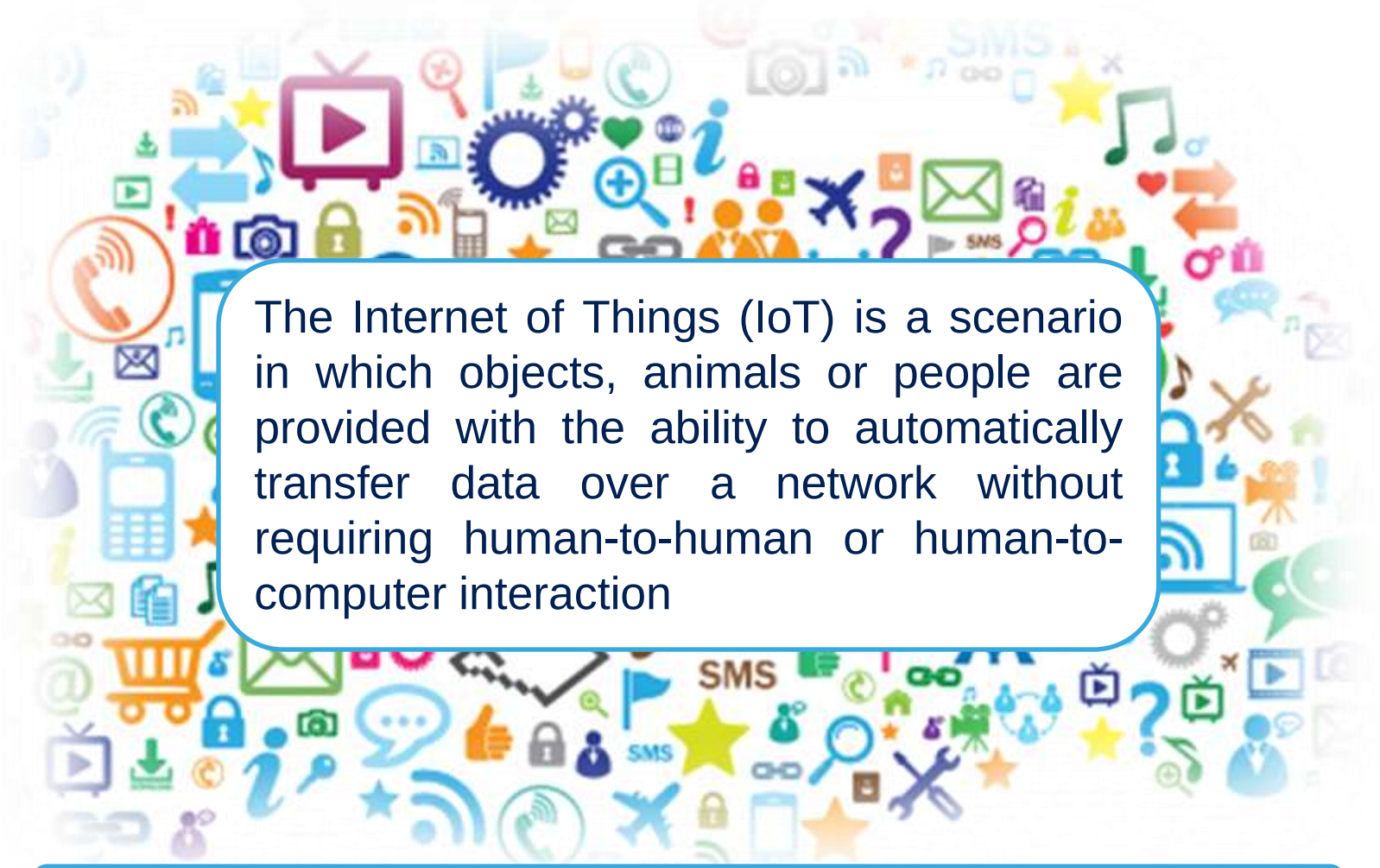
IoT and the classic SIM

Internet of Things (IoT)



The Internet of Things (IoT) is a scenario in which objects, animals or people are provided with the ability to automatically transfer data over a network without requiring human-to-human or human-to-computer interaction

convergence of wireless technologies, MEMS and the Internet

The Things are

person with a health monitor implant

Smart meters

a farm animal with a biochip transponder

Smart grid sensors

automobile that has built-in sensors

Products built with M2M communication capabilities

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M2M needs connectivity

M2M needs SIM

The classic SIM

Subscriber Identity Module

is an integrated circuit that securely stores the international mobile subscriber identity (IMSI) and the related key used to identify and authenticate subscribers on mobile devices.

The SIM card is the mobile connectivity enabler

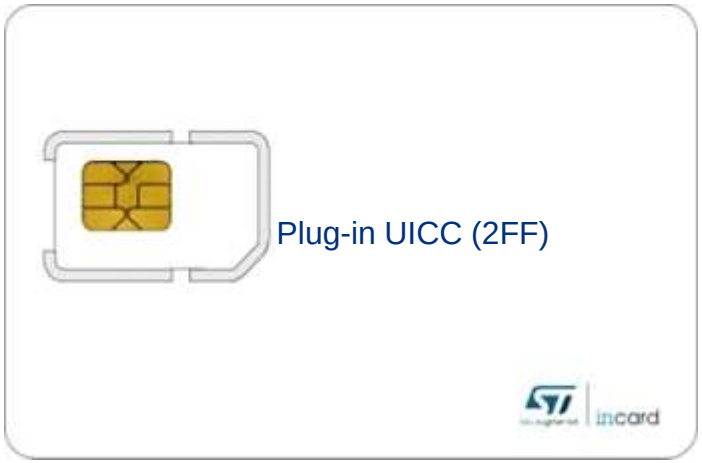
- Authenticates device/user into the mobile network operator
- Plays role as security token
- Enables the mobile internet data communication

The SIM card is a standard component

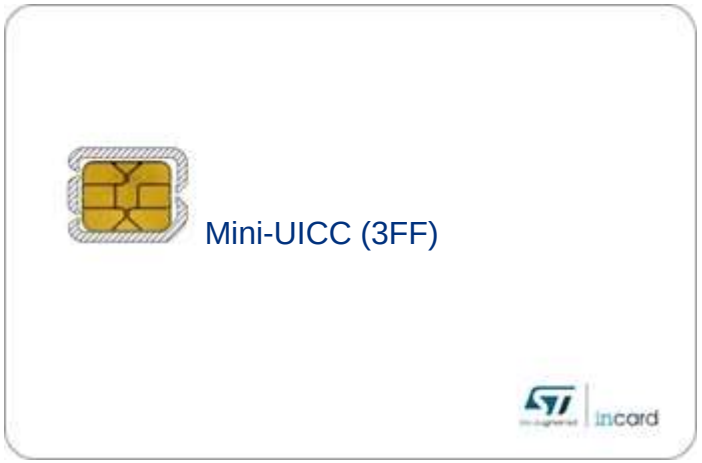
- Functional and physical by ETSI/3GPP committee
- Different form factors

The classic SIM Form Factors

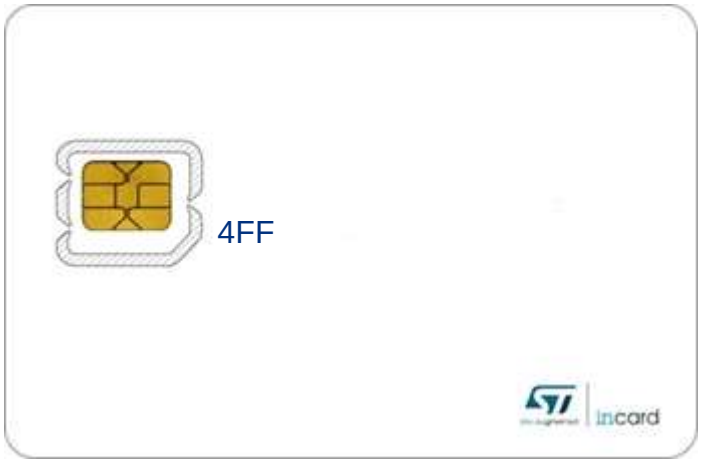
ID-1 UICC



ID-1 UICC



ID-1 UICC



ETSI TS 102 221 defines physical characteristics

- The physical characteristics of the **ID-1 UICC** shall conform to ISO/IEC 7816-1 and ISO/IEC 7816-2.
- The **Plug-in UICC (2FF)** shall have a width of 25 mm, a height of 15 mm, a thickness the same as an ID-1.
- The **Mini-UICC (3FF)** shall have a width of 15 mm, a height of 12 mm, a thickness the same as an ID-1 UICC.
- The **4FF** shall have a width of 12,3 mm ± 0,1 mm and a height of 8,8 mm ± 0,1 mm, with a thickness range of 0,67 mm + 0,03 mm/-0,07 mm.

The standard temperature range for storage and full operational use shall be between -25 °C and +85 °C.

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The classic SIM in M2M

In principle the classic SIM was used in the M2M applications

Elevators

The SIM card in the elevators panel for alarms and status communication.

Vehicle Tracking System

The SIM card in the VTS for sending updated satellite coordinates and alarms.

Metering

The SIM card in the Gas meter for sending current consumptions.

The classic SIM issues in M2M

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Elevators

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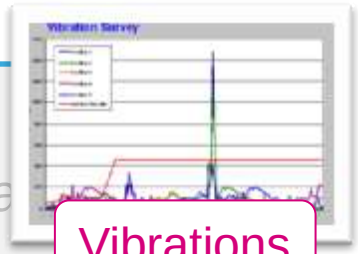

Vibrations

Vehicle Tracking System

The SIM card in the VTS for ser
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High Temperature
& Shocks

Metering

The SIM card in the Gas meter for sendi
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Corrosion

from M2M to the eUICC

M2M specific environmental conditions

ETSI TS 102 671 defines environmental condition for M2M

Operational and storage temperature

- Class A, B, C from -40°C to +85°, 105°C, 125°C

Moisture/Reflow conditions

- Moisture/reflow conditions according to IPC/JEDEC J-STD-020D

Humidity

- Supporting high humidity shall withstand the test conditions as described within JEDEC JESD 22-A101C with 1000 hour duration

Corrosion

- M2M SIMs shall be able to pass the salt atmosphere test according to JESD22-A107

Vibration

- M2M SIMs shall be able to pass the variable frequency vibration tests according to JESD22-B103

Fretting Corrosion

- Defines the M2M SIMs performance when in a connector

Shock

- Defines the M2M SIMs susceptibility to shock. JESD22-B104 for Automotive.

Data Retention time

- M2M SIMs data retention time property defines the fully operate with no loss of stored information over a 10 or 12 or 15 year period from the time of manufacture

Minimum Updates

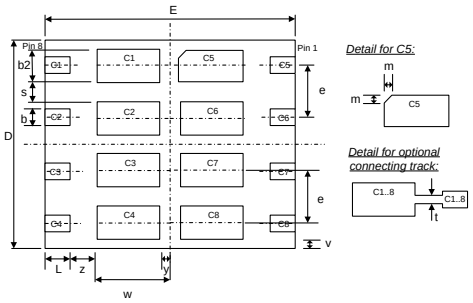
- Defines the M2M SIM's expected minimum number of UPDATE commands supported for specified files, which are indicated as "high" in the "update activity" field. (100K, 500K, 1000K)

M2M SIM - Physical Characteristics

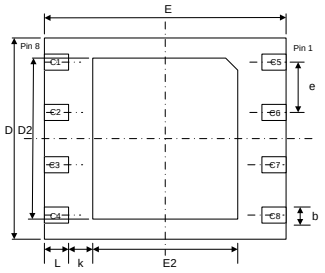
Two form factors are defined:

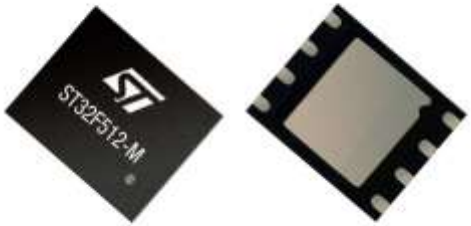
- **MFF1** conceived for socketing
- **MFF2** conceived for soldering

MFF1



MFF2





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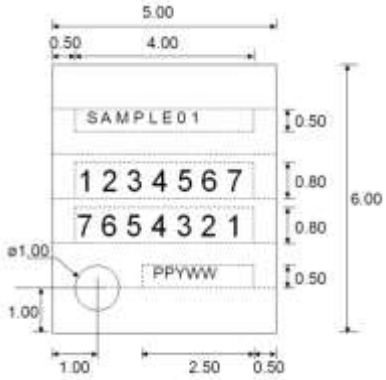
M2M SIM - personalization

SIM Manufacturing & Personalization → SIM Activation → Usage → End of Life / End of Subscription

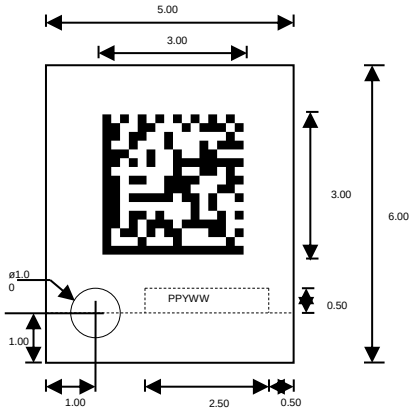


- M2M SIM cards, go to the field in a “personalized” state
  - Graphical: a identifier of the subscription is printed on the SIM at manufacturing time
  - Electrical: sensitive information and key material loaded into the SIM at manufacturing time

- M2M SIM has some data that make it unique, in order to uniquely identify a subscriber on a mobile network

- M2M SIMs are delivered to HW integrator

- Activation time might impact production lines



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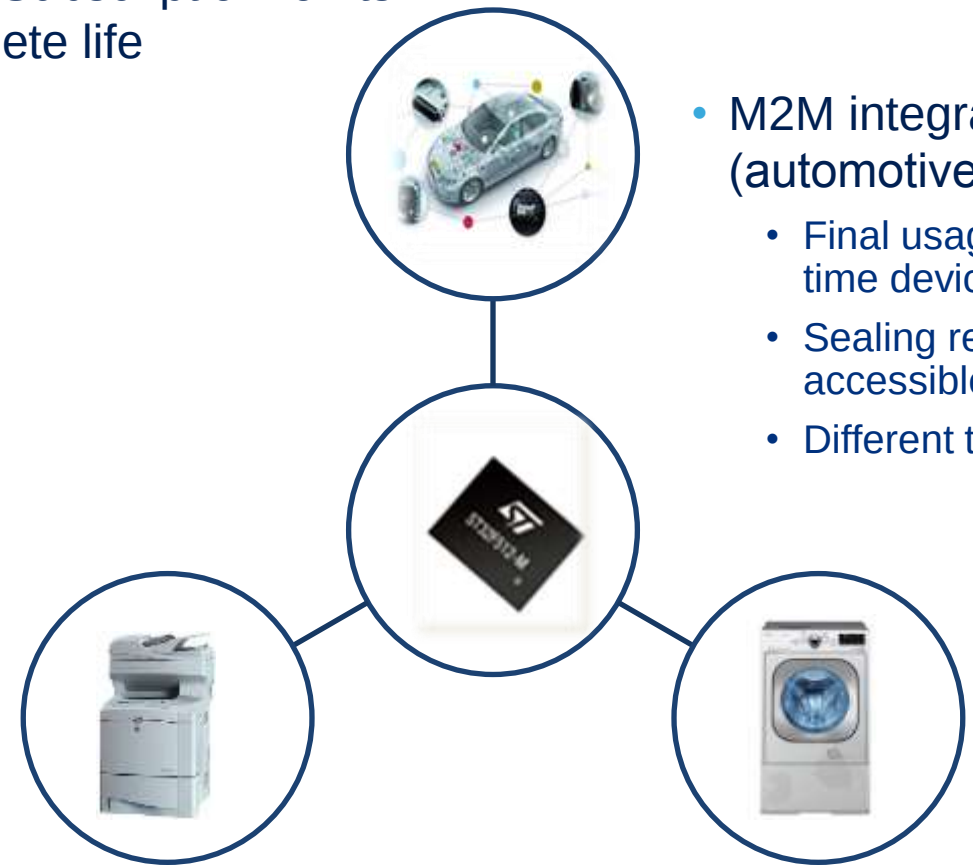
Why classic lifecycle is a limitation for M2M

- Physically linked with a unique MNO Subscription for its complete life

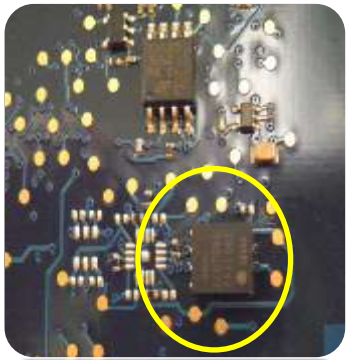


- M2M integration cycles (automotive, consumer electronic, …)
  - Final usage, location or owner unknown at the time device need to be assembled
  - Sealing requirements or SIM slot not accessible
  - Different testing during all steps of integration

eUICC and the new paradigm

- The embedded UICC is a separately identifiable hardware component
  - Installed in a device at manufacturing time, replacing the need for a traditional SIM
  - Not intended to be removed or replaced
- The embedded UICC is not owned and managed by MNO
  - eUICC is owned by the owner of the device and not by a MNO
  - Several subscriptions from different MNO can be hosted on the embedded UICC, only one is active at a time
- The embedded UICC is remotely manageable
  - Functionality allowing loading / reloading of MNO credentials (subscription) and applications
  - eUICC can be remotely (Over The Air) and securely managed

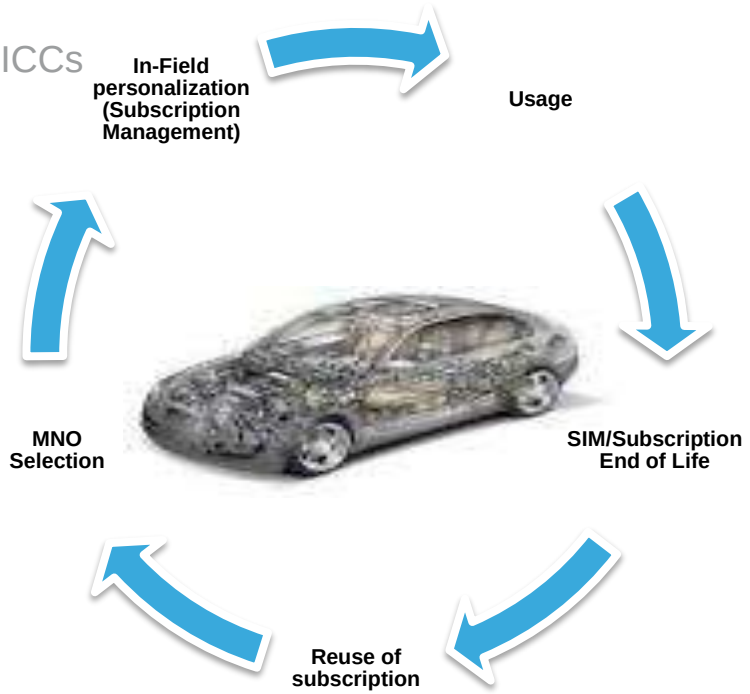
Classical range



eUICC

eUICC life-cycle model

- M2M Service Provider's
  - eUICC delivered to a HW Integrator
  - Activation time might impact production lines
  - Big number of subscriptions to be managed
    - Changing a contract may involve thousands of eUICCs
  - SIM Life Cycle circular



Challenges solved with eUICC

- Physical constraints
  - Not easily accessible and/or replaceable

  ➔ OTA methods to virtually swap the SIM anywhere, anytime

- Manufacturing constraints
  - Need to have ad hoc live subscriptions for testing purpose and business continuity

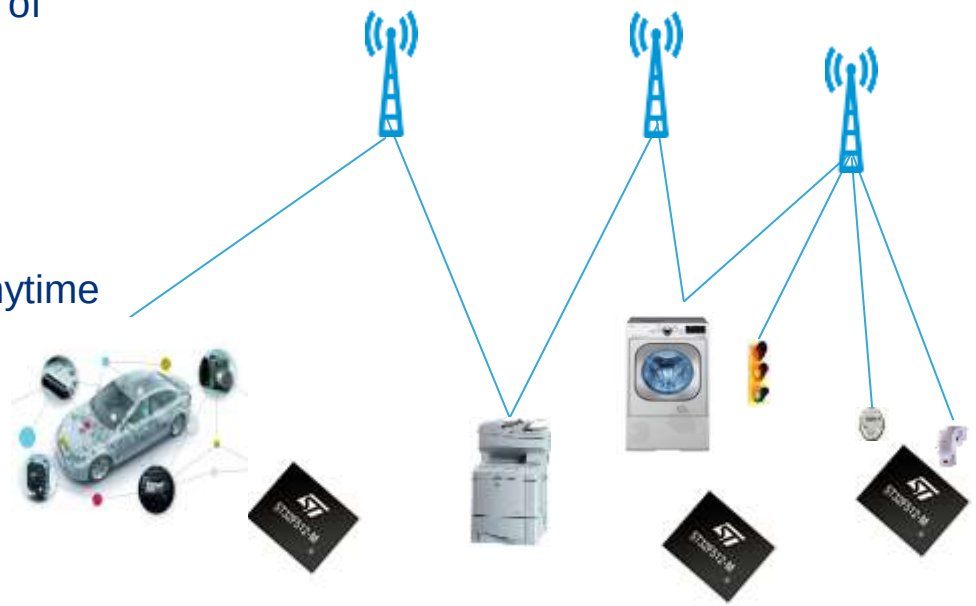
  ➔ activate and de-activate any type of subscription anywhere, anytime

- Life-cycle constraints
  - MNO credentials at device EOL

  ➔ Reuse subscription anywhere, anytime

- Supply Chain constraints
  - The device manufactured in a different location to the final user and ahead of time of usage

  ➔ manage subscription anywhere, anytime



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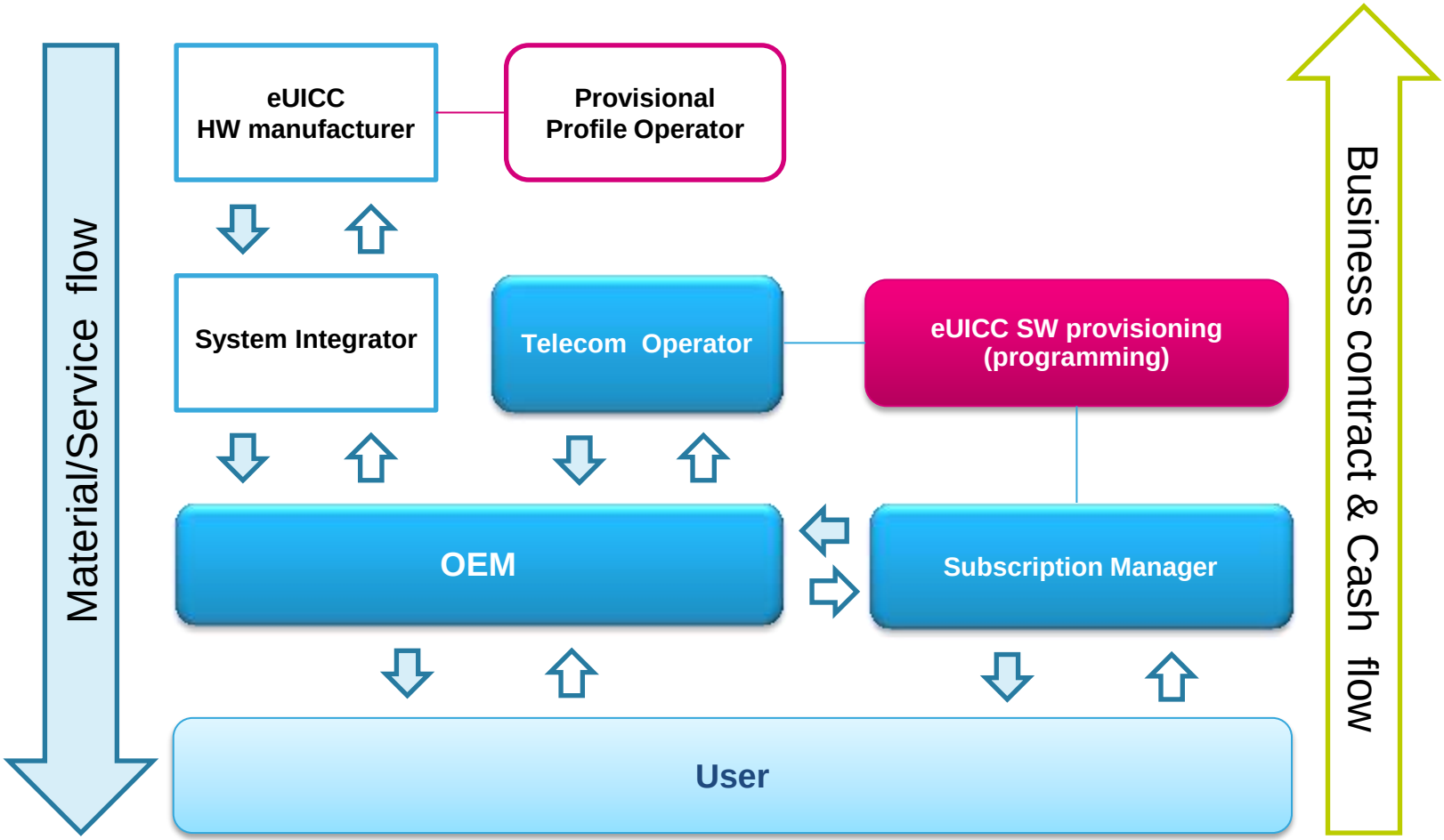
eUICC business model hypothesis



Conclusion

- ST believes that M2M is a field of sustained growth in the coming years
- Complete vertical offer for Industrial, Automotive & highly secure applications
  - Full SoC based on ST32-M: Already qualified by ST, customers and leading MNOs
  - Full SoC based on ST32-MC: Dedicated solution designed for Automotive with real AEC-Q100
  - Full SoC basec on ST33-M: Large memory, CC certified, high end features, NFC compatible
- Fit-for-purpose packages as made available by ST backends
- Best partnership in the Telecom Services area
- ST is a strategic partner for eUICC deployments, thanks to its strong expertise in Automotive and Industrial applications

Thank you !