



Presentation Title  
eSim – a Game Changer?  
Presentation to  
TiE Bangalore – Industrial IoT Summit  
Presentation by  
Rajeev Arora  
Sensorise Digital Services Pvt Ltd  
15 June 2019



**SENSORISE**  
Connect & Serve

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# Sensorise Introduction

## Who we Are

- Strong team with several decades of experience in Telecom, Analytics, Security, Products and Services
- HQ in Noida with PAN India reach

## Our Achievements So far

- First company to introduce embedded SIM (QoSimsim) and its Life Cycle Management in Indian market. Filed a Patent in Indian, USA and Sweden Patent Offices
- More than 40 OEMs using QoSimsim with over 100 thousand SIMs deployed
- Development & deployment Customer Feedback Device with Portal, Reports, Analytics and field support for Swachh Bharat Mission in states of Delhi NCR, Haryana and Kerala

## Our Differentiator

- End-to-End Service Provider; takes complete responsibility of hardware, embedded Software, Portals, Analytics and Field deployment and support
- Regularly participate and contribute to Standards and Policies for India; ensures our products and Services are always "Standards aware"

### Authored

- Technical Report on Intelligent Transport Systems, Vehicle to Vehicle Communications and Embedded SIMs (Nov, 2015)
- Author of the ITU Paper on Digital Identity and eKYC for Automotive Industry (Mar 2016, Sep 2017, Jul 2018)
- Lead Author of the M2M Security Workgroup, Recommendations for M2M Security (Released Jan 2019)

### Editorial Group

- Technical Report on Communication Technologies in M2M / IoT (TEC, May 2015)
- M2M Gateway & Architecture (TEC, May 2015)
- M2M Enablement in Safety & Surveillance System (TEC, Nov 2015, Released by Secretary, Telecoms)
- ICT deployment and strategies for Smart Cities (TEC, Jul 2016)

### Contributor

- Key contributor to TRAI Consultation on 'Spectrum, Roaming and QoS related requirements in Machine-to-Machine (M2M) Communications
- Member of the Telecom Engineering Centre MTCTE Committee on Certification
- Member of the Telematics Working Group of Niti Aayog in India overseeing the AIS 140 Standard and its Implementation
- Invited Speaker / Participant at several Telecom Standards Development Society of India (TSDSI) meetings
- Member of National Working Group 20, aiding the ITU SG20
- Member of National Working Group 13, aiding the ITU SG13
- Member of National Working Group 17, aiding the ITU SG17



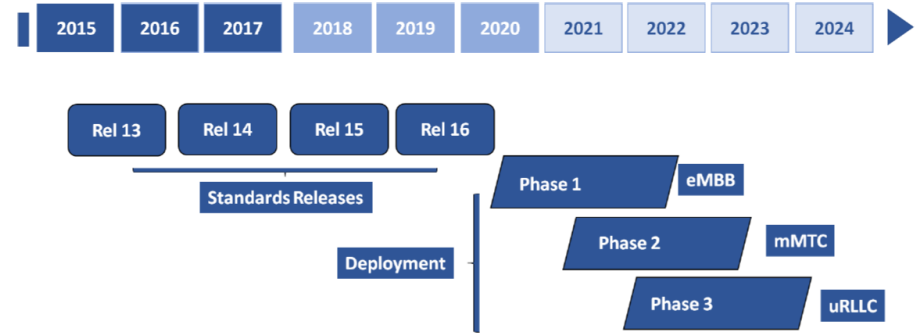
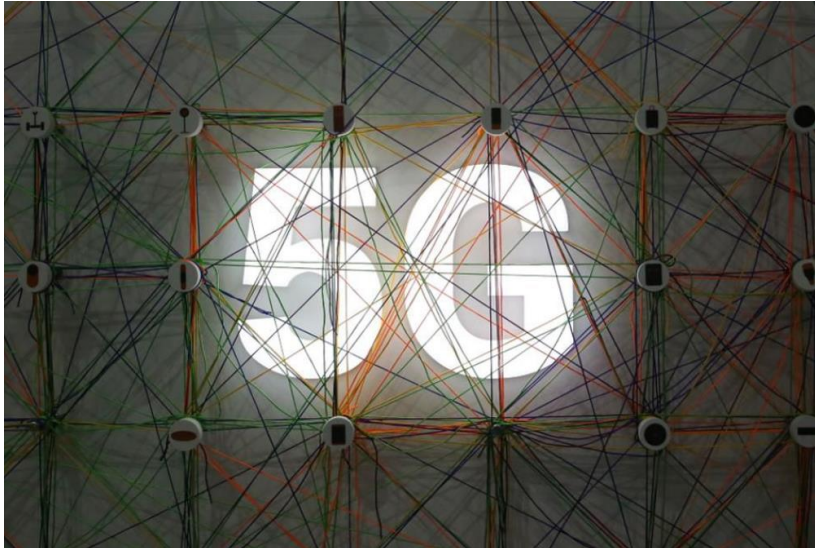
# Curtain Raiser

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Future of the Connected Society



## 5G is the catalyst for smart cities



4G networks led to a boom for smartphones;

5G is set to do the same for smart cities

By 2050, nearly 70% of the world's population will live in cities — people who will need housing, jobs, services and infrastructure for their burgeoning (and aging) populations.

5G will provide the connectivity that will transform the lives of millions of new city-dwellers; these networks will give cities of all sizes the opportunity to become smart, vibrant hubs that offer people a great quality of life

Source: E&Y



## New smart cities tech: digital twins



Alibaba and Huawei showcased Digital twins, a virtual replica of a city operating in real time, allowing city leaders to plan new infrastructure, simulate changes to mobility networks or energy grids, or plan for natural disasters or climate shocks with greater accuracy through sensor networks embedded across the city

Source: MWC 2019



## Data is the currency for the new economy

Surveying the exhibitors at MWC19, it was clear that **all companies** are now tech companies

Businesses that once operated in the automotive sector building cars are moving into mobility-as-a-service, where **data and apps are as important as autonomous technology**

Source: MWC 2019







## Connected health



From health wearables to monitor vital signs, [the City of Barcelona's 5G ambulances](#), and connected hospitals, connected health is rapidly approaching

NEC showed 5G connected healthcare services being trialled in Japan, where an ambulance and a physician were able to transmit real-time information on the patient during a medical emergency

Source: MWC 2019



# Digital Trust



Digital Trust is a pre-requisite for Smart Cities and IoT

**Privacy:** protection against collection of personal data to train the AI algorithms

**Integration:** protection against use of PII and user data resulting from the syndication / coordination of multiple parties

**Reliability:** protection against inferior Quality of the software (e.g., the recent fatal accident of an Uber driverless car in Arizona)

**Security:** vulnerability of high density environments against cyber attacks.

Source: MWC 2019



# 5G, IoT and AI are the future of the global economy

5G



IoT



AI

- **Enhanced mobile broadband**
- **Internet of Things**
- **Mission-critical control**
- **Fixed wireless access**

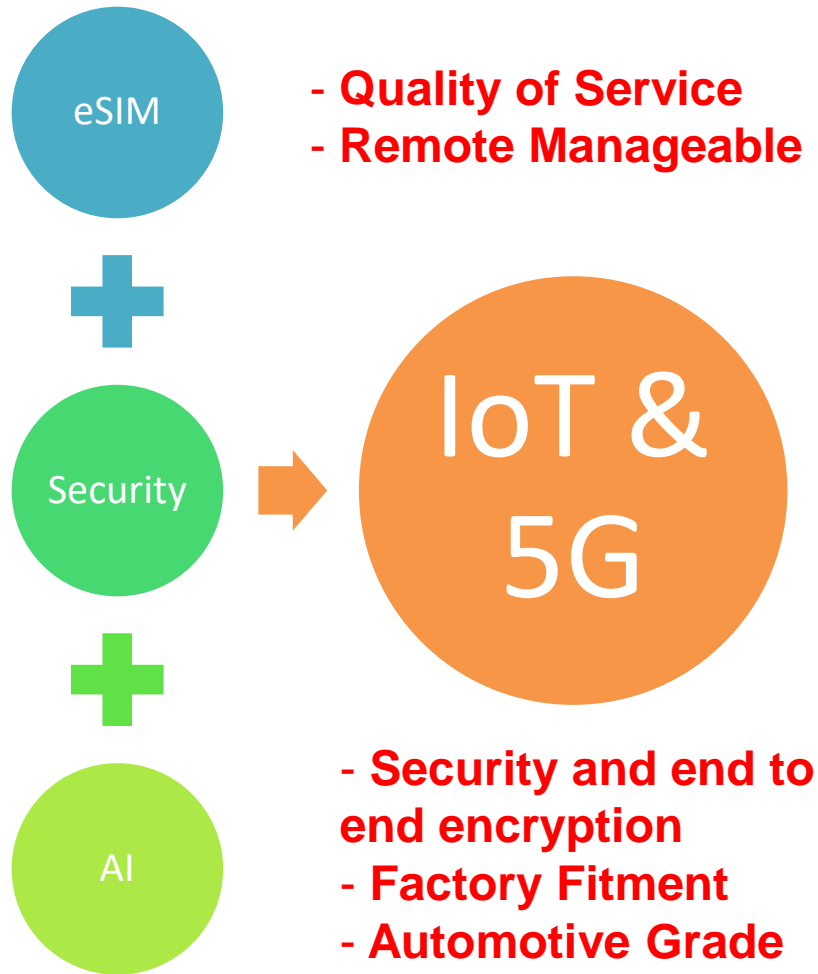
Future  
Economic  
Value

**We expect high-band 5G to be deployed selectively in those micro-markets where the economics work best – McKinsey, Feb 2018**

## IoT Use case characteristics

- 5G is key for use cases of Smart Cities, remotely operated equipment, connected work forces, robotics, asset monitoring, connected vehicles, V2X communication, traffic optimisation, video analytics
- Most Use cases are Mission Critical, requiring **Quality of Service** in IoT connectivity
- Most use cases are dispersed and benefit from seamless **Remote Manageable** connectivity
- Most Use Cases Require carrier class **Security and end to end encryption**
- Last but not the least, **Factory Fitment and Automotive Grade** form factors

# E-SIM, Security and AI are key for IoT and 5G Proliferation



## eSIM Advantage for 5G

- 5G Devices and Applications require **security** and **seamless network access** across different geographical location
- The traditional SIM technology is a major limiting factor for cellular IoT – limited life, consumer grade, physical handling during commissioning / replacing, fixed service
- The embedded SIM (eSIM) offers a advantages of **factory fitment**, **automotive grade**, **small footprint**, **Telco choice**, **quality of service**, **seamless connectivity**, **embedded crypto capabilities**



# Critical State and Ecosystem Interventions

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## Management of the Data Deluge

1

Secure and Reliable  
Management of Public  
Data is essential, privacy  
norms a priority

# 2

Resilient and Remote  
manageable Connectivity  
is a pre-requisite for  
mission critical use cases

# 3

Registration of M2M Service Providers, Standardisation and Certification of IoT Devices & Applications is necessary to deliver a trustful ecosystem

# 4

Local Start-up and  
Innovation, Skill  
development and capacity  
building



# 5

Data Sovereignty and  
Customer Ownership in the  
context of Internationally  
Produced Devices and  
Applications used in India

# 6

Local Manufacturing, with  
access to international  
markets with reciprocal  
agreements for connectivity  
is essential for scale



# Significant Inputs for the Ecosystem

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Telecom Policy and Standardisation

# Indian National Telecom M2M Roadmap (May 2015) Charter

## Remote Provisionable eSIM and M2M SP Role

### Key Anchor Role: Mr RM Agarwal, DDG (NT), DoT

In order to cater to unique requirements of M2M market, GSMA has recently floated the draft standards of embedded SIM, which tackles security concerns of Telecom operators with respect to ETSI standards of soft or virtual SIMs. In case of Soft SIMs, mobile operator's secret credentials are stored inside the operating system of mobile device whereas in the case of embedded SIM, it embeds existing hardware based UICC into devices and evolves the existing credential distribution mechanism into over the air mechanism. Thus SIM technology is fast evolving and future M2M devices are likely to adopt soft, virtual, embedded SIMs in place of physical SIMs so as to have the ease of remote configuration. Such SIMS should be adopted for M2M devices as it will facilitate change of Telecom Operator at the discretion of customer and will help in meeting KYC norms in case of device transfer, as same SIM can be used across different operators.

In most cases of M2M, the MSP ties up with TSP, fits the device with activated SIM card issued in his name and sells the device through its retail chain. SIM's are generally secured in the device so as to ward off the possibility of the customer removing it and using it for some other purpose. In continuity of same, device manufacturers & M2M application providers can get the SIM issued in their name after completing KYC requirements and get the M2M device tested after fitting it with SIM and subsequently communicate the actual custodian of the device to TSP after the sale/ resale of the device.

# TRAI Guidelines

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2.82 Accordingly, the Authority recommends that:

- a) Device manufacturers should be mandated to implement “Security by design” principle in M2M device manufacturing so that end-to-end encryption can be achieved.
- b) The government should provide comprehensive guidelines for manufacturing/ importing of M2M devices in India.
- c) A National Trust Centre (NTC), under the aegis of TEC, should be created for the certification of M2M devices and applications (hardware and software).



Telecom Regulatory Authority of India



## **Recommendations**

on

**“Spectrum, Roaming and QoS related requirements in  
Machine-to-Machine (M2M) Communications”**

5<sup>th</sup> September, 2017

Mahanagar Doorsanchar Bhawan  
Jawahar Lal Nehru Marg  
New Delhi-110002

TRAI Guidelines accepted by the Telecom Commission

# TRAI Guidelines

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3.106 In view of the foregoing, the Authority recommends that:

- a) Devices with pre-fitted eUICC should be allowed to be imported only if it has the ability to get reconfigured 'Over the air' (OTA) with local subscription. GSMA approved guidelines shall be followed for provisioning of new profile remotely with 'Over-the-air' (OTA) mechanism.
- b) Devices fitted with eUICC shall be allowed in operation in roaming for maximum three years from the date of activation of roaming in the network of Indian TSP and mandatorily converted/reconfigured into Indian TSP's SIM within the stipulated period or on change of ownership of the device, whichever is earlier. The Authority/Licensor shall review the condition later based on the developments and requirements
- In case imported equipment to which the SIM/ device is fitted with such as automobile/ machines (like earth movers), arms etc. (requiring mandatory registration at local authorities such as RTO, State/ District administration) is transferred/ sold to another party before three years, the roaming device (eUICC) shall also be immediately configured with local subscription/eUICC of Indian TSP. The KYC details of the new owner/ buyer must be compulsorily updated in the database of concerned authorities.

TRAI Guidelines accepted by the Telecom Commission

# Telecom Policies | DoT Instructions for eSIM

- SIM Cards
  - Ownership of all SIM cards with entity/organisation providing M2M Services
  - Platform to maintain SIM, Device, Machine, Custodian details
  - Web Interface for checking the credentials to be provided to Licensee
- Custodian KYC and Transfer
  - KYC to be done by the M2M Service Provider
  - Connections transferable to a new Custodian after KYC and update of record

QOSIM DEVICE DETAILS

Vehicle Registration Number

SEARCH DETAILS

CSV

Search:

Sr. No.	Vehicle No	Device IMEI	Use Case	Make	Model	Customer	Dealer	Primary MSISDN	Fallback MSISDN	Status
1	OR-05-Q-6809	862462031864829	VTS	SKYLABS	V400	VENKAT CHANDAK	GLOBAL SOLAR VENTURE, TALCHER	917042046115	917065055708	Installed
2	OR-05-Q-6808	862462031960528	VTS	SKYLABS	V400	VENKAT CHANDAK	GLOBAL SOLAR VENTURE, TALCHER	917042044734	917065054474	Installed
3	OR-05-Q-6807	862462031921306	VTS	SKYLABS	V400	VENKAT CHANDAK	GLOBAL SOLAR VENTURE, TALCHER	917042044939	917065054487	Installed

- Deadline for compliance
  - 6 months from the date of DoT Instructions of 16th May 2018 i.e. 15th Nov 2018



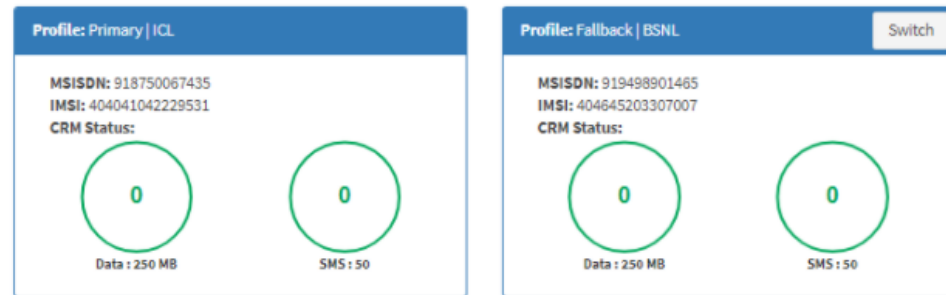
# Telecom Policies | DoT Instructions for eSIM

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- Mobile Connections shall be issued to organisations providing M2M Services as per procedure for issuing Bulk Connections
  - Sensorise has formal agreements with BSNL, Idea Cellular (now Vodafone Idea), MTNL and Airtel for procuring connections
  - Sensorise is the ONLY organisation to have this spread of TSP Partners
- Such M2M Connections must have certain restrictions
  - Outgoing/Incoming calls to/from ONLY one Predefined Numbers, remotely configurable / changed in the future
    - This requires a platform for remote management of the Cards
    - This Platform has to be hosted in India
    - The Platform has to have secure connections with Indian TSP SMSC for LI purpose
    - Number to be published to the Licensee
  - Outgoing/Incoming calls to/from ONLY one Predefined Numbers
    - This requires a platform for remote management of the Cards
    - This Platform has to be hosted in India
    - The Platform has to have secure connections with Indian TSP SMSC for LI purpose
  - Data Communication with a private APN and maximum 2 whitelisted IPs
    - Requires a Private APN with whitelisting

# Telecom Policies | DoT Instructions for eSIM

- eSIM options
  - Single or Multiple Profiles
  - With OTA Update facility



- Instructions to Licensees profiling eSIMs
  - Device Manufacturer must not tamper with eSIMs
  - To avoid TSP Lock-in, Licensees permitted for profile updation over the air
  - Comply to Security, LI and Monitoring

# Telecom Engineering Centre M2M SIM IR

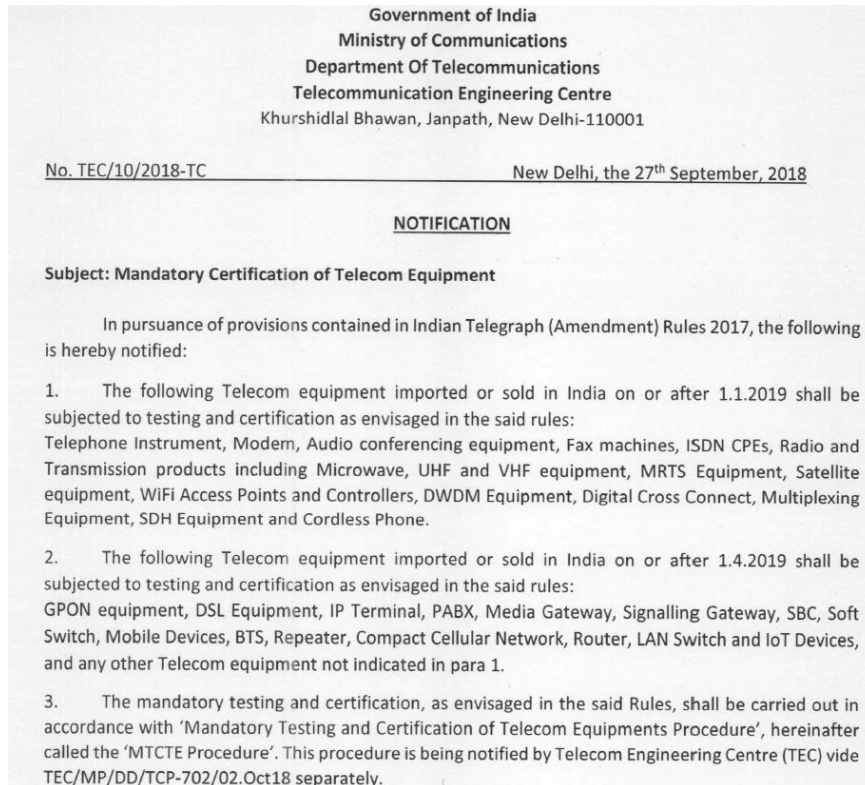
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- Follow on Standard after the first IR in Mar 2016 and TEC ESIM Essential Requirements in Apr 2018
- Specification for harmonisation and enablement of the IoT ecosystem
- Supports the AIS140 and BIS 16833
- Specifies and allows all ETSI approved SIM form factors
- Refers to the 3GPP Standards and GSMA Guidelines
- Allows Remote Provisionable (eUICC) in addition to the UICC
- Single, Multiple IMSIs / Profiles for UICC / eUICC
- Future protected for SIM, USIM, ISIM
- Test Schedule and Test Procedure for the ESIM

# MTCTE / ER – Telecom Amendment in Sep 2017

- Salient Points

- Telecoms Act amendment - Mandatory Testing & Certification for Telecom Equipment
- Any Device requiring connection to a licensed communication network requires TEC Certification
- Responsibility for compliance falls on Manufacturer and Network Service Provider
- First set of devices require Certification by 1 Jan 2019
- IoT Devices require Certification by 1 April 2019, which includes Telematics devices



MTCTE: Mandatory Testing and Certification for Telecom Equipment

# BIS Standard IS 16833 - Sep 2018

## Automotive Tracking Devices and Integrated Systems

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13. The system's GPRS module should have:

- a) Multi slot GPRS with in - built quad-band GPRS module/modem.
- b) GPRS Class 10 or above.
- c) Support embedded SIM (As per TEC specification released time to time) to cater to the automotive operational requirement such as vibration, temperature and humidity and provide long life span with at least 10 years life and more than 1 million read/write cycles.
- d) GPRS module and SIM:
  - 1) Shall support SMS, data (GPRS, TCP/IP).
  - 2) Support multiple network OTA switching (on-demand/automatic) capabilities.
  - 3) In case of use on city buses it shall support minimum 3G network compliance.

- Salient Points

- Mandates support for the Embedded SIM
- Refers the TEC Specification for the Embedded SIM
- Requires support for multiple network OTA Switching
- Minimum 3G Network for City Buses

BIS: Bureau of Indian Standards

# AIS Standard 140 - Dec 2017

## Intelligent Transportation Systems (ITS) - Requirements for Public Transport Vehicle Operation

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3.1.1.21 The Device GPRS module shall have:

- Multi slot GPRS with In - built Quad-band GPRS module/Modem
- GPRS class 10 or above
- Support Embedded SIM to cater to the automotive operational requirement such as vibration, temperature and humidity and provide long life span with at least 10 years life and more than 1 million read/write cycles
- GPRS module & SIM shall support
  - SMS, Data (GPRS, TCP/IP) and
  - Support multiple network OTA switching (on-demand/automatic) capabilities.

AIS: Automotive Indian Standards

- **Salient Points**

- Mandates support for the Embedded SIM
- Requires support for multiple network OTA Switching

# MoRTH Gazette SO 5454 Dated 25 Oct 2018

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## MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

### NOTIFICATION

New Delhi, the 25th October, 2018

**S.O. 5454 (E).**—In exercise of the powers conferred by clause (a) of sub-section (3) of section 110 of the Motor Vehicles Act, 1988 (59 of 1988), and in supersession of the notification of the Government of India in the Ministry of Road Transport and Highways published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) *vide* number S.O 1663 (E), dated the 18<sup>th</sup> April, 2018, the Central Government hereby exempts upto the 1<sup>st</sup> day of January, 2019 all public service vehicles registered upto the 31<sup>st</sup> day of December, 2018 from the provisions of clause (k) of sub-section 1 of section 110 of the Motor Vehicle Act, 1988:

Provided that after the expiry of the time-period of exemption specified above, the concerned State or Union Territory Government may notify the date for compliance of requirements, as specified in pursuance of the said provision, in their respective State or Union Territory, as per the applicable law, in regard to the said for public service vehicles registered upto the 31<sup>st</sup> day of December, 2018.

[F. No. RT-11028/12/2015-MVL Pt. I]

PRIYANK BHARTI, Jt. Secy.

- Public Service Vehicles exempted from AIS 140 compliance till 31 Dec 2018, applicability from 1 Jan 2019
- States empowered to notify the date for compliance for Vehicles registered upto 31 Dec 2018

MoRTH: Ministry of Road Transport and Highways



- **Identification of VLT**

**Integration of the retro-fitted Vehicle Location Tracking Device and Emergency Button (VLT) on Public Service Vehicles with the VAHAN-database.**

For the retro-fitment of Vehicle Location Tracking Device and Emergency Button (VLT) for the public service vehicles, the following be ensured with respect to linking of approved VLT Devices with the specific vehicle model through VAHAN database.

1. VLT Devices fitted on the vehicle shall be type approved as per AIS:140.
2. After the type approval, NIC shall issue a unique username and password to each VLT Device manufacturer for uploading the Type approval data on VAHAN portal.
3. VLT Devices Manufacturers shall upload the following data for every device in VAHAN portal:
  - a) VLT Device make and model
  - b) Type Approval Certificate (TAC) and / or Conformity of Production Certificate (COP) as applicable
  - c) IMEI Number
  - d) Icc ID Number

- **Fitment and Verification of VLT**

4. The authorised dealer of the VLT manufacturer shall enter the Unique Identification number in VAHAN database for the purposes of linking the VLT device to the specific public service vehicle. In case the VLT device is installed by the public service vehicle manufacturer, then the above process shall be undertaken by the vehicle manufacturer.
5. Regional Transport Offices shall verify the unique identification number of VLT device at the time of fitness testing.



eUICC

eUICC	A removable or non-removable UICC which enables the remote and/or local management of Profiles in a secure way. NOTE: The term originates from "embedded UICC".
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Alternate  
Emergency  
Profile

Emergency Profile	An Operational Profile with a Profile Attribute allocated, indicating that this Profile is an Emergency Profile. An Emergency Profile complies with regulatory requirements and only provides the capability to make Emergency Calls and receive calls from an Emergency centre (e.g. Public Safety Answering Point)
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Local Enable for  
Automatic  
Switching

Local Disable	A function of the interface between a Device and an eUICC that provides the capability for a Device to locally disable the Emergency Profile or Test Profile on the eUICC without involvement of an SM-SR and/or SM-DP.
Local Enable	A function of the interface between a Device and an eUICC that provides the capability for a Device to locally enable the Emergency Profile on the eUICC without involvement of an SM-SR and/or SM-DP.

Role of M2M  
Service Provider  
VS  
MNO

M2M Service Provider (M2M SP)	A Service Provider relying on an Operator providing the Profiles on the eUICC.
Mobile Network Operator	An entity providing access capability and communication services to its Customers through a mobile network infrastructure.

# Summary

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## MoRTH Gazettes, AIS, BIS

- Owners of Public Service Vehicles [1 Jan 2018] and National Permit Goods Carriers [2<sup>nd</sup> Nov 2018] required to fit VLT Devices as per AIS 140
- VLT Device Manufacturers required to offer Certified Devices, Verification of VLT at the time of Fitness Testing
- Requires embedded SIM with multi network support and OTA Switching

## Telecom Standards and Policy

- TRAI Guidelines for “Spectrum, Roaming and QoS related requirements in Machine-to-Machine (M2M) Communications” allow the embedded SIM with local MNO profiles
- Mandatory Certification of Network Connected Devices under MTCTE as per TEC ERs
- TEC IR permits the embedded SIM with multi network profiles, Automatic and Over the Air switching
- TSPs allowed to offer Subscriptions to entities providing M2M Services using the Bulk KYC Process [M2MSP]
- Cards shall belong to M2MSP, Transfer of Subscriptions is permitted for a new buyer
- KYC Process for the Custodian / Machine is the responsibility of the M2M Service Provider using the Bulk KYC Process [no updated process defined in 6 Nov Policy]



# E-SIM, M2M Communications, Diagnostics & Remote Management

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Critical enabler for IoT and Security

# SIM Evolution



	Removable non-reprogrammable	Removable and reprogrammable	Sealed and reprogrammable but with a second slot for standard SIM	Sealed and reprogrammable
Form factor	Standard	Standard	Standard + Embedded	Embedded
Reprogra-mmable	✗	✓	✓	✓
SIM slot required ?	✓	✓	✓	✗

Legend:



Standard SIM



Removable and  
reprogrammable  
SIM



Embedded and  
reprogrammable  
SIM

Sources: EY analysis and interviews

# eUICC Card form factors

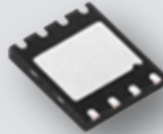


SIM Card



> 108  
mm<sup>2</sup>

M2M UICC MFF2 6x5



30  
mm<sup>2</sup>

DFN 4x4.2



16.8  
mm<sup>2</sup>

WLCSP 3.5x2



7  
mm<sup>2</sup>

DFN 2x2



4  
mm<sup>2</sup>

# SIM Cards for IoT and Automotive



## Temperature



-40°C to +105°C

## Reliable



up to 15-17 years data retention

## Size



Smaller size easy for integration

## Multiple Profile



Flexible subscription management

## Secure



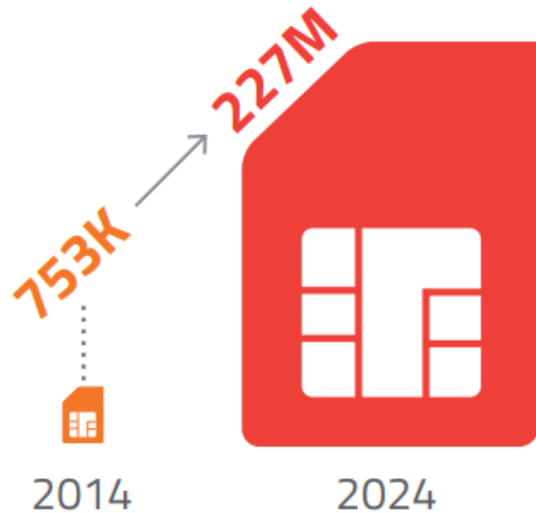
Security for connection



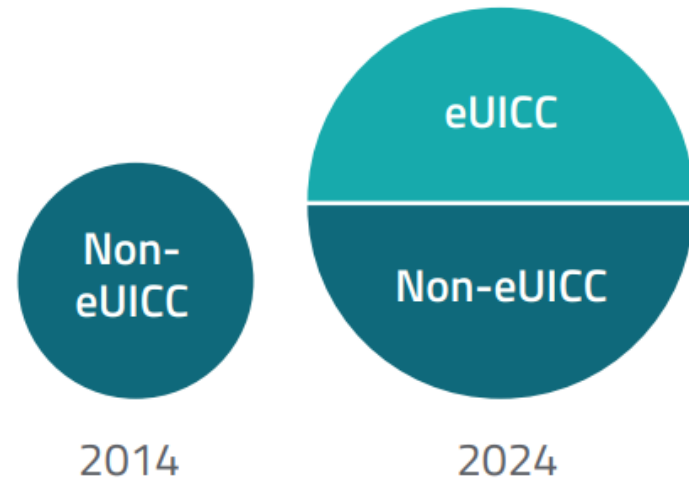
# Two Types of SIMs – UICC and eUICC based

## Strong Global Demand Expected for eUICC IoT SIMs by 2024

**77% CAGR** for eUICC annual IoT SIM additions



**50% of all IoT SIMs** will support eUICC



Source: Sierra Wireless

# Benefits of UICC / eUICC in MFF2 Form factor

M2M UICC MFF2 6x5



30  
mm²

## Benefits of eUICC:

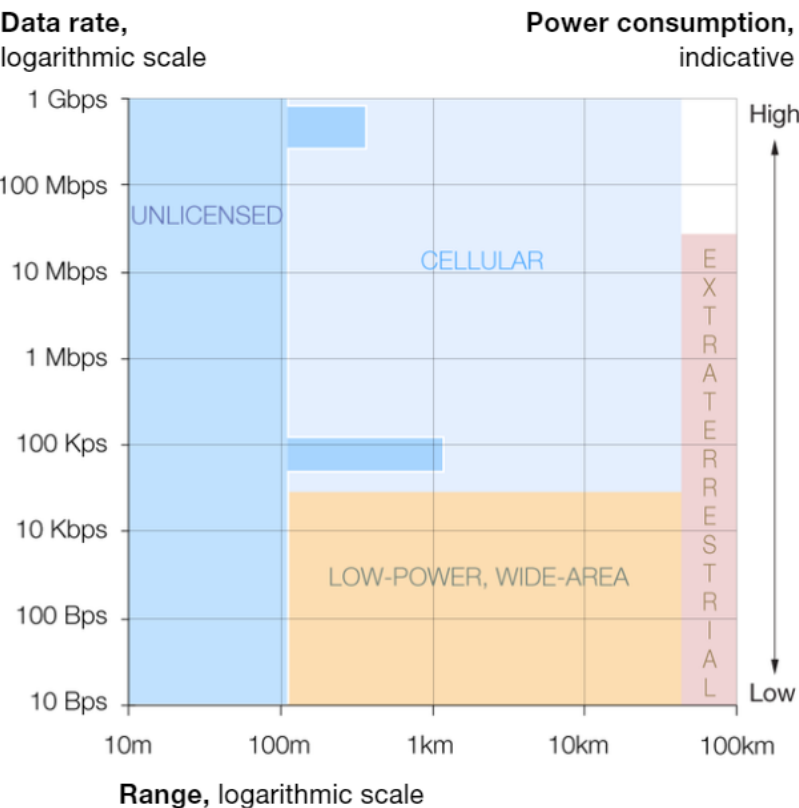
- + Seamless Telco Selection
- + Wider Low Cost Coverage
- + Factory Ready

## Benefits of UICC:

- + Quality of Service
- + Simplicity
- + Cost

# IoT Connectivity Requires High Reliability (QoS)

## IoT Networks



Source: McKinsey

## IoT Connectivity Requirements

Sector	Potential use cases	Bandwidth	Range	Reliability	Willingness and ability to manage a network
Automotive	Over-the-air updates, predictive maintenance	Primarily low, high for entertainment content	Medium-long	High	Low
Manufacturing	Operations optimization, predictive maintenance	Low	Short-medium	High	Low
Defense	Asset management, remote monitoring	Medium	Long	High	Medium
Agriculture	Yield optimization, asset management	Low	Short	High	Low
Mining	Predictive maintenance, operations	Low	Medium-long	High	Low-medium
Construction	Predictive maintenance, operations optimization	Low	Short	Medium	Low
Oil and gas	Predictive maintenance, production optimization	Low	Medium-long	High	Low-medium
Insurance	Patient monitoring, asset management	Low	Long	Medium	Low
Healthcare	Remote monitoring, safety	Low	Short-medium	Medium	Low
Cities	Traffic control, security	Low	Medium-long	High	Low-medium
Utilities	Asset management, remote monitoring, energy management	Low	Long	High	Low
Travel, transport, and logistics	Predictive maintenance, logistics optimization, automation	Low	Long	High	Low
Consumer	Productivity optimization, personalization, energy monitoring	Medium-high	Short	Medium	Low



<i>eUICC features / functionality</i>	<i>Security Challenges</i>							<i>Logistical Challenges</i>			
	Hacking & hijacking	Authentication	Privacy breaches	Data authentication & integrity	Software / firmware authenticity & integrity	Remote updates & upgrades	In-car entertainment piracy	Connectivity	Regulation	Post-issuance mgmt	Extreme physical environments
Remote provisioning & mgmt	X	X	X	X	X	X	X		X	X	
Tamper resistant	X	X	X	X	X	X	X				
Isolated	X	X	X	X	X	X	X				
Encryption	X	X	X	X	X	X	X				
GSMA certified	X	X	X	X	X	X	X	X	X	X	
Multiple connectivity profiles								X	X	X	
Soldered											X
Miniaturised											X
Ruggedised											X
Quality controlled									X		



**simalliance**  
Security | Identity | Mobility

## About SIMAlliance (Security, Identity, Mobility)

SIMAlliance is the global, non-profit industry association which advocates the protection of sensitive connected and mobile services to drive their creation, deployment and remote management across multiple industries and use cases, including IoT.

# IoT Needs Trust | eSIM is the root of Trust for IoT



**Confidentiality**

**Integrity**

**Authentication**

**Non-repudiation  
of Origin**

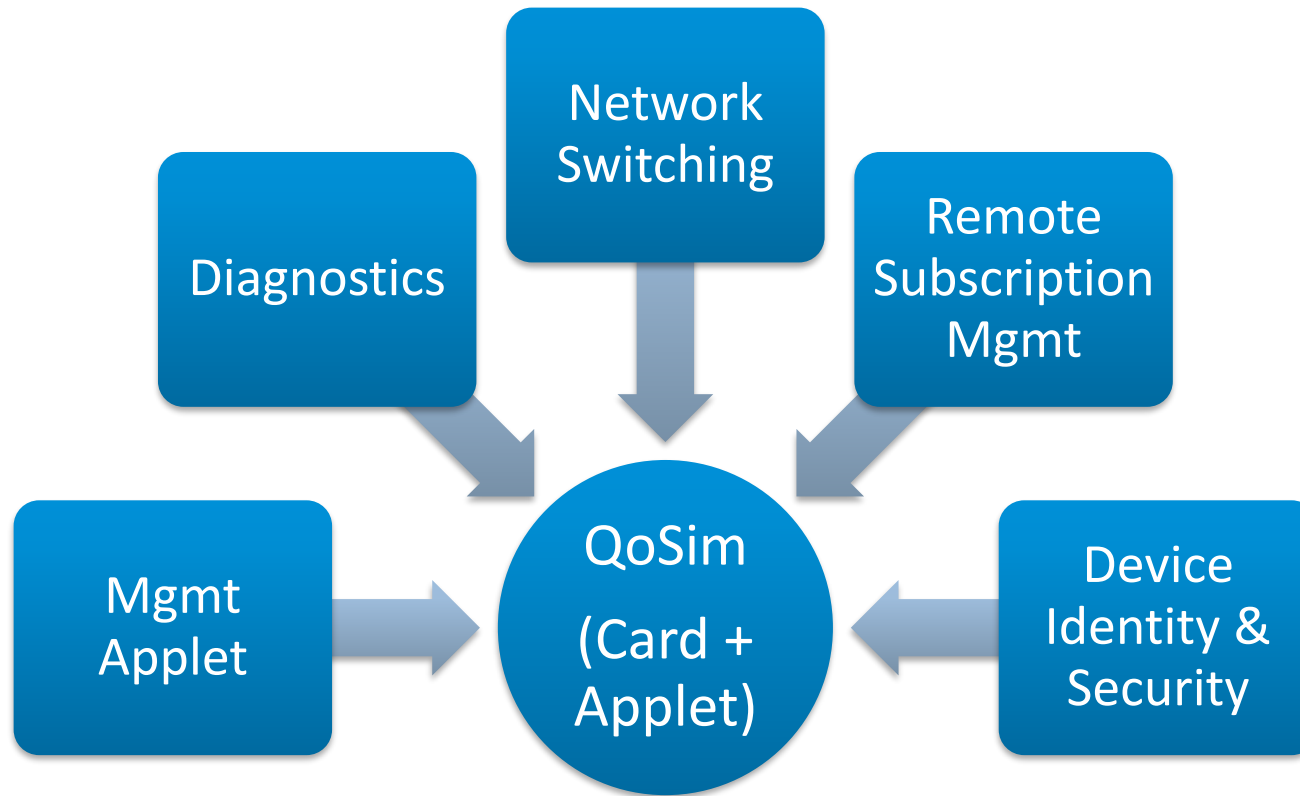




# Technical Realisation

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## Use Case Scenarios



The Solution meets the Requirements of UICC Standards, BIS and AIS140 Standards and TRAI Security Guidelines

# Realisation of the eUICC – Nodes required for fulfilment



Subscription Manager Data Preparation  
(**SM-DP / SM-DP+**)



Subscription Manager Secure Routing (**SM-SR**)



Local Profile Assistant (**LPA**)



Subscription Manager Discovery Service (**SM-DS**)



Entitlements Server



Websheets & OS integration



Mobile Network Operator (**MNO**)



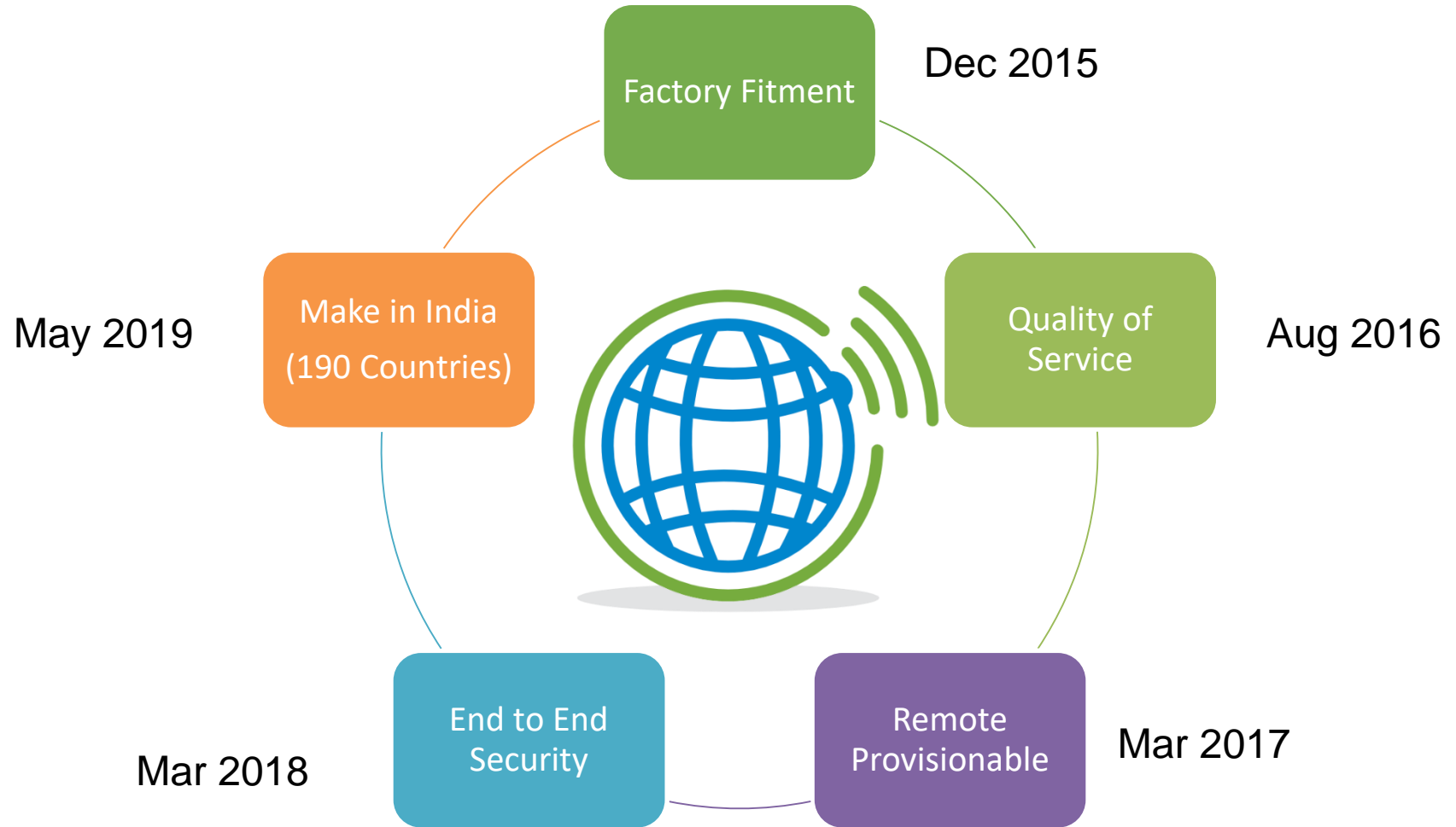
Embedded SIM (**eSIM or eUICC**)

Courtesy: Truphone



# Sensorise M2M Connectivity Solutions Evolution

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# eSIM – the Game changer

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E-SIM Technology allows IoT Devices to be bootstrapped with connectivity from one M2M Service Provider, and then be moved around across the globe.

The downloadable SIM card can host any technology (2G, 3G, 4G, NB-IoT, CAT-M1, 5G) and the SIM profile from any country, so it totally future proof.

In addition, Sensorise offers a Quality of Service solution, which can allow coverage from multiple operators to be summated, providing a more reliable connectivity for mission critical uses cases.

Sensorise enables Make-In-India, offering bootstrap connectivity in India, and downloadable local profiles from more than 200+ countries.

# Use Cases & Future Outlook

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## Future Outlook

- eSIM penetration in India is less than 1%. It is expected to grow to 25% by 2025.
- Globally, the eSIM market is estimated to grow to \$978.3 million in 2023 from \$253.8 million in 2018

## Connect & Serve

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## Use Cases

- Metering
- Mission Critical Tracking Apps
- Connected Cars
- Connected Homes
- Point of Sale
- Consumer Devices
- Agriculture
- Logistics and Transport
- SmartCities Connectivity
- IoT Devices
- Make-In-India

**Thank You**  
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# Definitions

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- UICC
- eUICC
- eSIM
- eID
- IccID
- IMSI
- MSISDN
- SM-DP
- SM-SR
- SM-DS
- SM-DP+
- ES
- Multi-Profile Universal Integrated Circuit Card
- Remote Provisionable SIM
- The Card with Multi Profile UICC and Profiles
- Identity of the Chip hosting the profiles
- The good old identifier of the SIM Card
- Identifier of the Subscription issued by an MNO
- Mobile Number attached to the IMSI
- Subscription Management – Data Preparation
- Secure Router having information of the card
- Node that helps an eSIM Discover profiles
- Consumer Architecture Node for data and routing
- Node that helps establish the Profile's Entitlement

# Brief Description of Nodes related to the eUICC Management



## **SM-DP / SM-DP+**

The initials stand for Subscription Manager Data Preparation (the regular SM-DP is for M2M devices and the SM-DP+ is for consumer devices). Both are the components responsible for preparing, storing and protecting operator profiles for installation to an eSIM.

## **SM-SR**

An SM-SR (Subscription Manager Secure Routing) is the component responsible for remotely managing the status of operator profiles on an eSIM. This is used for M2M use cases where no user interaction for a device may be possible.

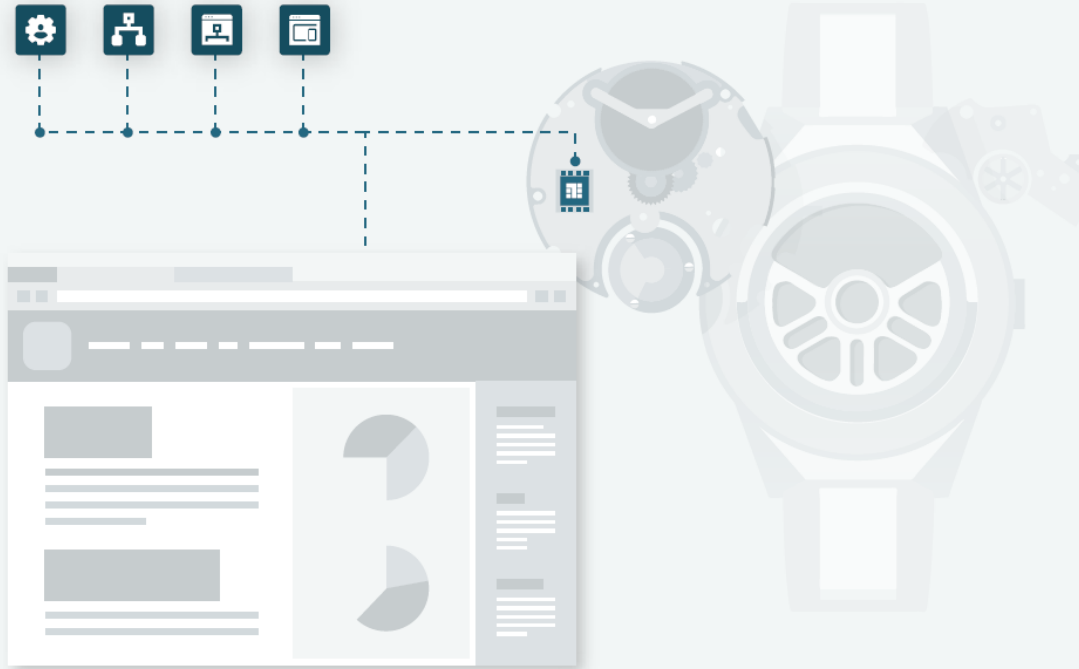
## **LPA**

An LPA is a Local Profile Assistant, typically provided as part of the device operating system or as an application. It provides the ability to install operator profiles to the eSIM in a device as well as to manage the activation or deactivation of an operator profile on a device.

## **SM-DS**

The SM-DS (Subscription Management Root-Discovery Service) is a service that allows a device to receive notifications about tasks that need to be actioned on an eSIM—for example, if there is a new operator profile available to download and install.

Courtesy: Truphone



## Entitlements Server

For many mobile devices, you need more than just a SIM to successfully connect to a mobile network for the first time. Various other configuration data are needed, such as APNs, network access rules, data usage policies around roaming, tethering, and support for services such as voice over Wi-Fi (VoWiFi), voice over LTE (VoLTE) and mobile switching service (MSS).

Courtesy: Truphone