

Commercial in Confidence Sensorise Proprietary

Presentation to:

ITU COE on IOT Technologies & Applications

Subject:

A perspective on standardization and developments in Intelligent Transport Solutions (ITS)

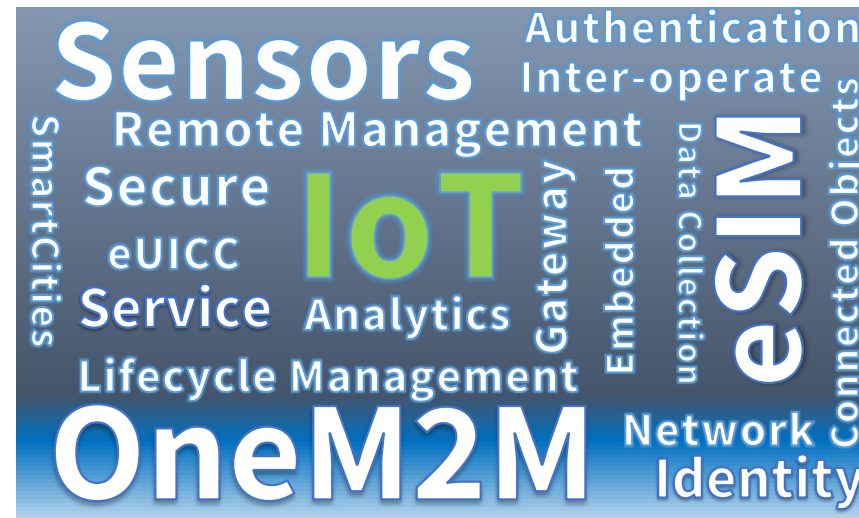
Presentation By:

Sharad Arora, Founder & MD, Sensorise Digital

Mr PK Seshadri, National Account Manager, BSNL

Date:

29 Oct 2018



SENSORISE
Connect & Serve



Presentation Theme

Theme

- *A perspective on standardisation and developments in Intelligent Transport Solutions (ITS)*

Agenda

- *Standardisation: Challenges for ITS*
- *Indian ITS: Developments in Standards and Ecosystem*
- *Heroes of the Indian ITS*
- *AIS 140 / BIS 16833 Example*
- *Identity, Authentication and Security for M2M Devices and IoT Applications*



About Us | Active role in Standardisation

Author

- 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 (Due for Release in Sep 2018)

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

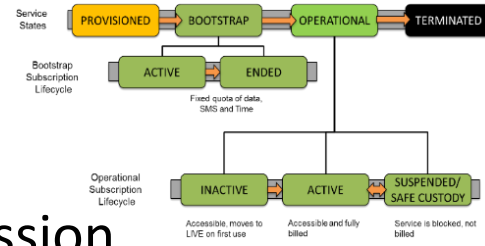
- Key contributor to TRAI Consultation on 'Spectrum, Roaming and QoS related requirements in Machine-to-Machine (M2M) Communications
- Member of the Telecom Engineering Centre MTCTE Committee on Certification
- Member of the Telematics Working Group of Niti Aayog in India overseeing the AIS 140 Standard 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



Beyond Standards, Implementing the mandate



- AIS 140



- Swachh Bharat Mission



- Delhi Transport Department

- Childline India



- IoT Experience Centres

- Secure Connectivity and Machine KYC provider for the Tracking and Traceability of Mining Trucks in the State of Odisha

- Design, manufacturing, deployment and managed Services for the Customer Feedback Device and Portal for the Ministry of Urban Development (Delhi, Kerala, Haryana)

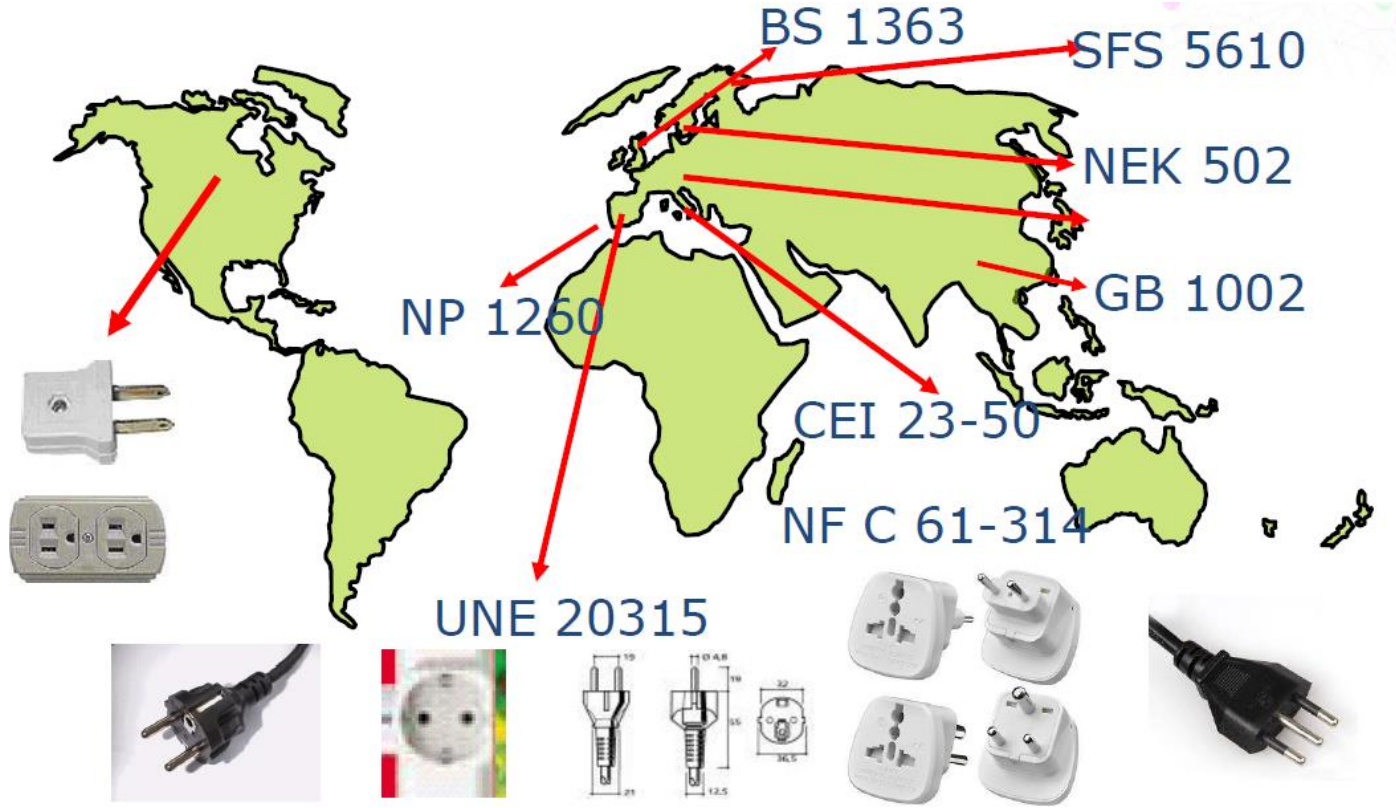
- Secure IMSI locked SIM and Subscription

- Conceptualisation of a Child Helpline IoT Device and Backend Call Centre infrastructure for identification and assistance of destitute children

- Sensorise has set up the IoT Experience Centre for Indian Public Sector Manufacturing giant, ITI Ltd

The Challenge of Standardisation

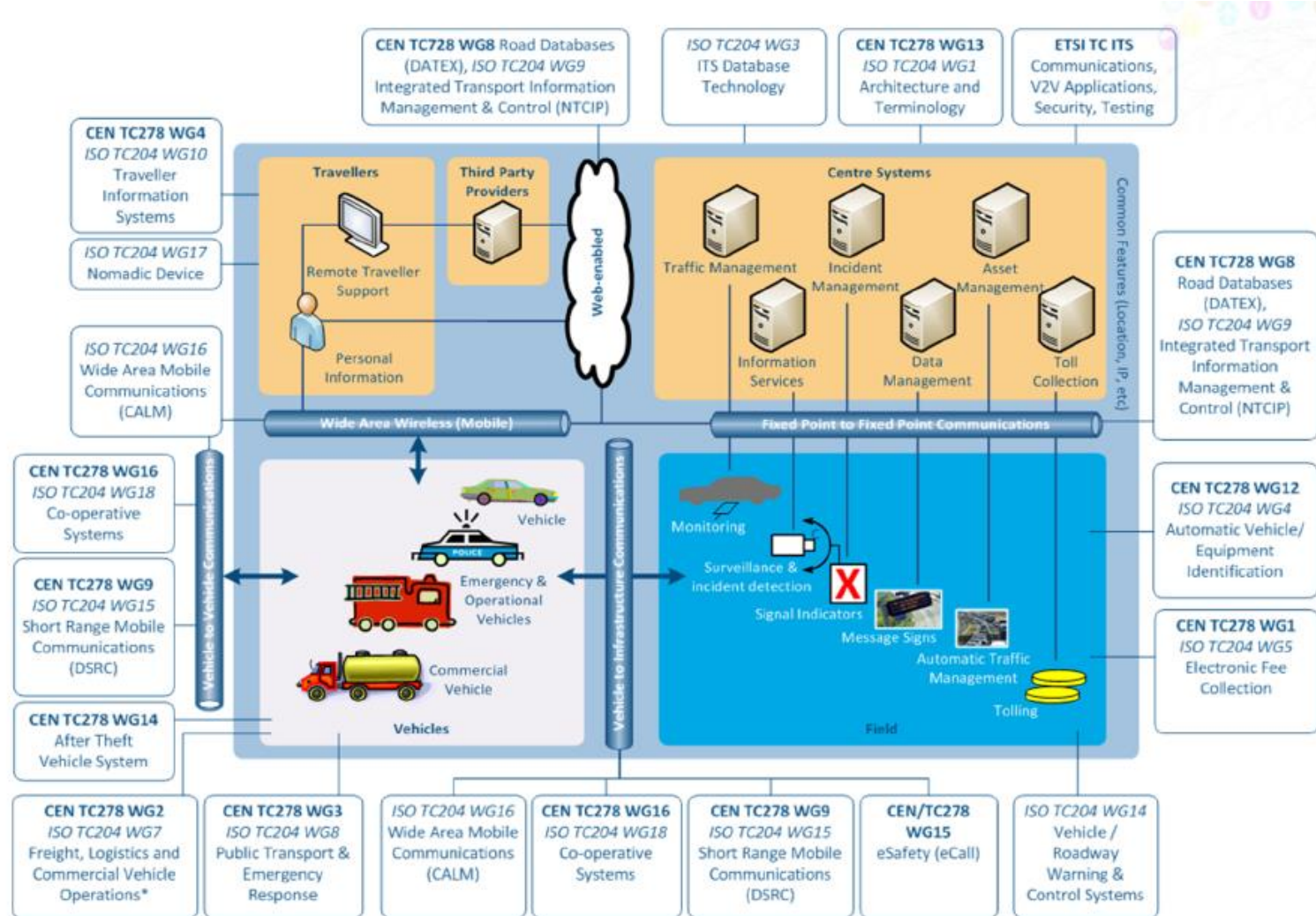
ITS Standardisation: A European Perspective



Imagine the cataclysmic disaster if the example of electrical plugs was to follow for ITS



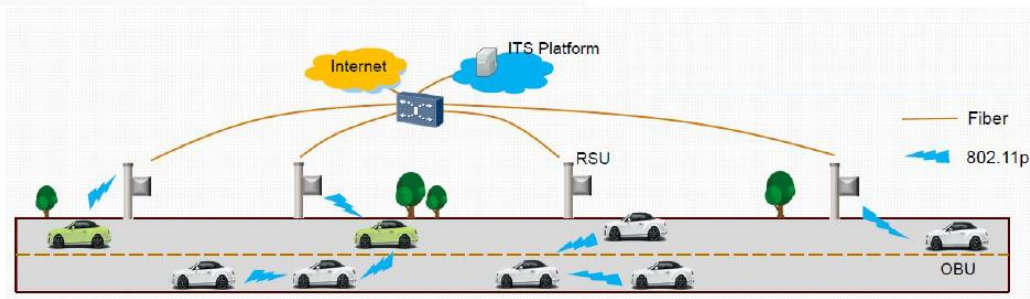
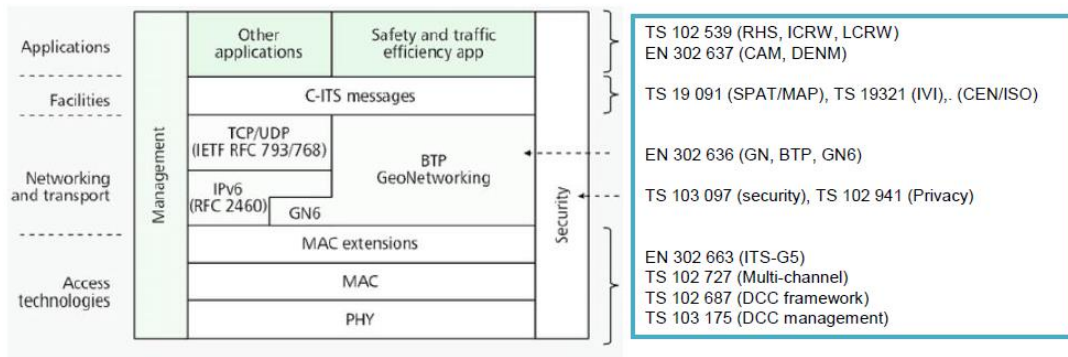
The ITS Standardisation threat is real!



ITS Standardisation from the Telecom Prism

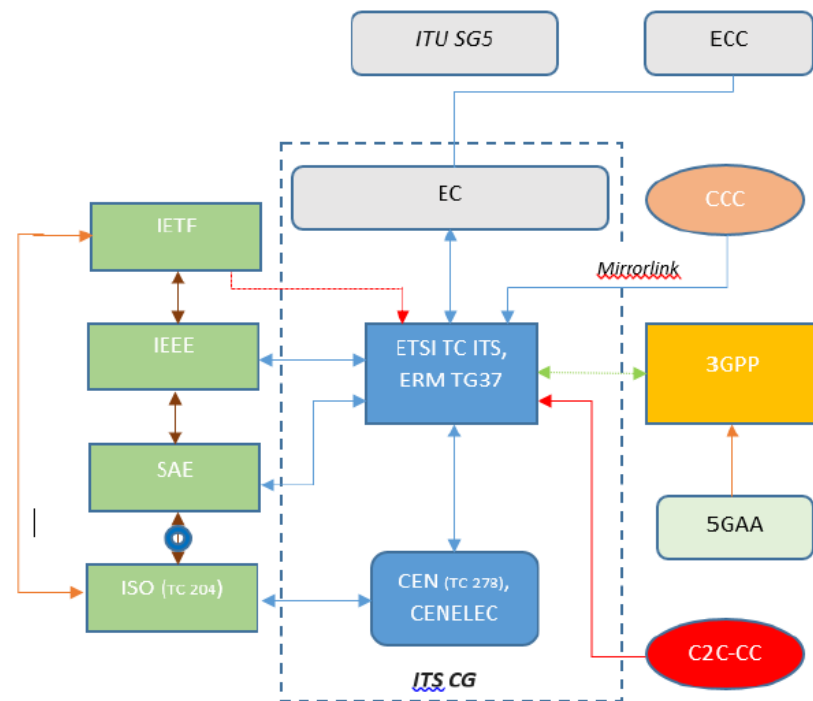
ITS Standardisation: A European Perspective

- Global Harmonisation of Standards
- Coordination across ETSI, IEEE, SAE, ISO, IETF
- Involvement of 3GPP, CCC, C2C-CC, 5GAA



Courtesy: Presentation by Adrian Scrase, CTO, ETSI, 3rd Indo European Conference on Standards and Emerging Technology

ITS: Intelligent Transport Systems



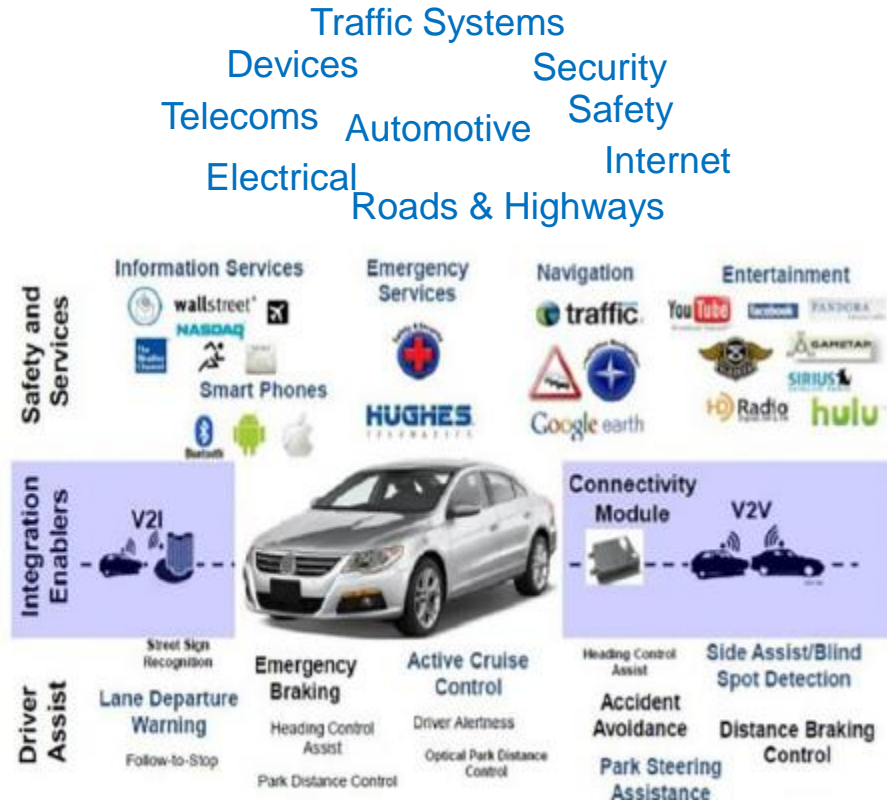
CCC: Car Connectivity Consortium

C2C-CC: Car 2 Car Communication Consortium

5GAA: 5G Automotive Association



ITS Applications | Many Stakeholders



- The Basic Set of ITS Applications are grouped as below
 - Road Safety
 - Traffic Efficiency
 - Cooperative Local Services
 - Global Internet Services
- ITS Safety Services will use the band 5875-5905 MHz to realise the V2X and I2X communication
- Telco stakeholders are working on a solution for the use of 5.9 Ghz band for LTE-V2X communication (PC5)

Courtesy: Presentations, 3rd Indo European Conference on Standards and Emerging Technology



ITS – Applications: Day 1 List

1. Emergency electronic brake light
2. Emergency vehicle approaching
3. Slow or stationary vehicle(s)
4. Traffic jam ahead warning
5. Hazardous location notification
6. Road works warning
7. Weather conditions
8. In-vehicle signage
9. In-vehicle speed limits
10. Probe vehicle data
11. Shockwave damping
12. GLOSA / TTG
13. Signal violation/Intersection safety
14. Traffic signal priority request by designated vehicles
15. Off street parking information
16. On street parking information and management
17. Park & Ride information
18. Information on AFV fuelling & charging stations
19. Traffic information and smart routing
20. Zone access control for urban areas
21. Loading zone management
22. Vulnerable road user protection
23. Cooperative collision risk warning
24. Motorcycle approaching indication
25. Wrong way driving

Courtesy: Presentation by Antonino Pirrotta, AP Crono, 3rd Indo European Conference on Standards and Emerging Technology

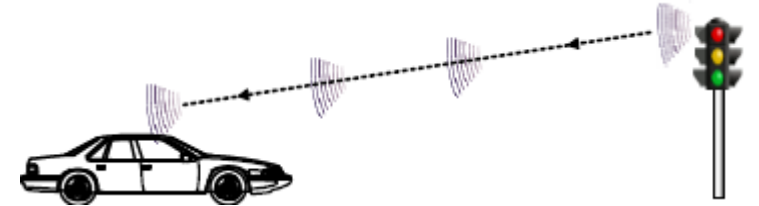


C-ITS Vision

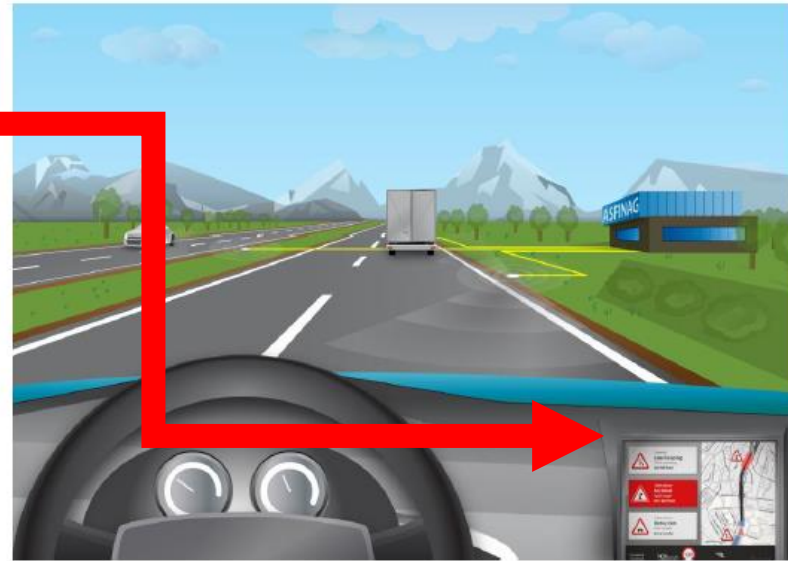
ITS Standardisation: A European Perspective



- In Vehicle Information
- Intersection Safety
- Other Events



Driver's perspective today



Driver's perspective tomorrow

- In EU, Starting 2019
- One New Vehicle = One Connected C-ITS OBU
- 16 Mn new cars / year



Courtesy: Presentation by Antonino Pirrotta, AP Crono, 3rd Indo European Conference on Standards and Emerging Technology



Critical State and Ecosystem Interventions

Management of the Data Deluge



1

Secure and Reliable
Management of Public
Data becomes essential



2

Resilient and Remote manageable Connectivity



3

Standardisation and Certification of IoT Devices



4

Skill development and capacity building



5

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



6

Enable Local Manufacturing,
with access to international
markets with reciprocal
agreements for connectivity

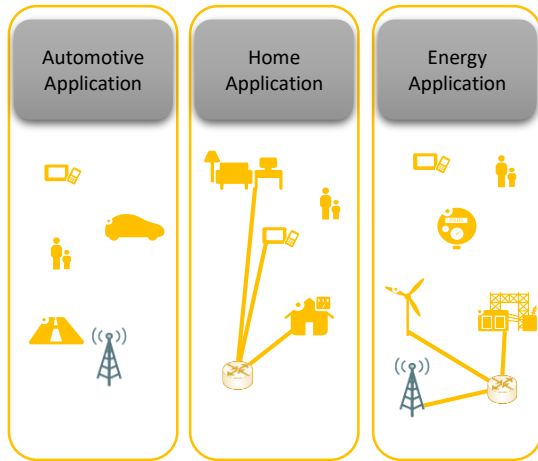


Global collaboration for IoT / M2M Enablement

OneM2M: The Standard of Standards

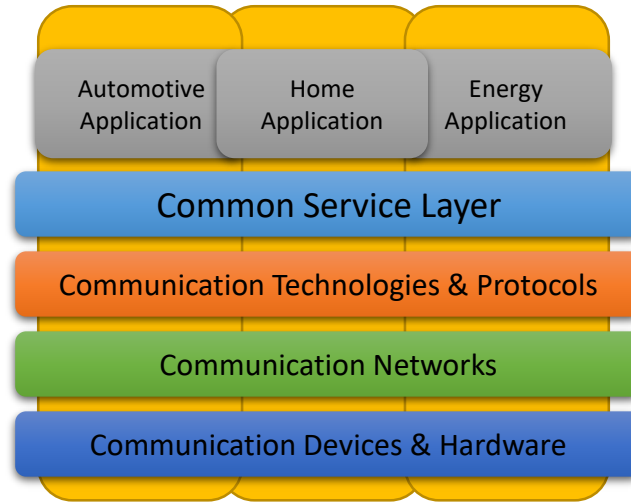


oneM2M enablement for IoT



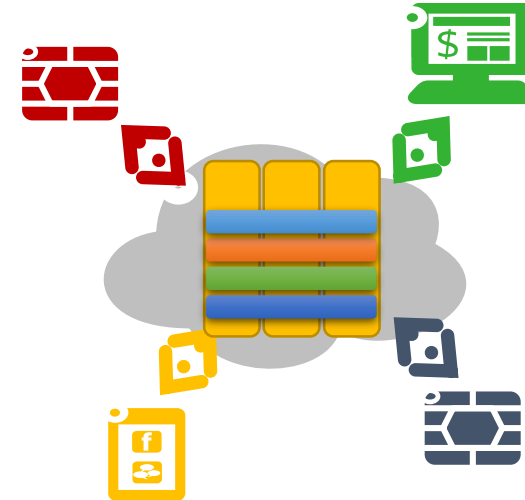
Legacy Solutions are Technology Verticals (Zigbee, DLMS for smart meters, etc.)

Disparate Machines and Applications



Horizontal framework, APIs, Objects as Resource Access Control Policy

OneM2M Common Framework



IoT Ontologies (formal description of concepts and relationships, e.g. W3C Semantic Sensor Network) as well as big data frameworks

IoT Ready Ecosystem

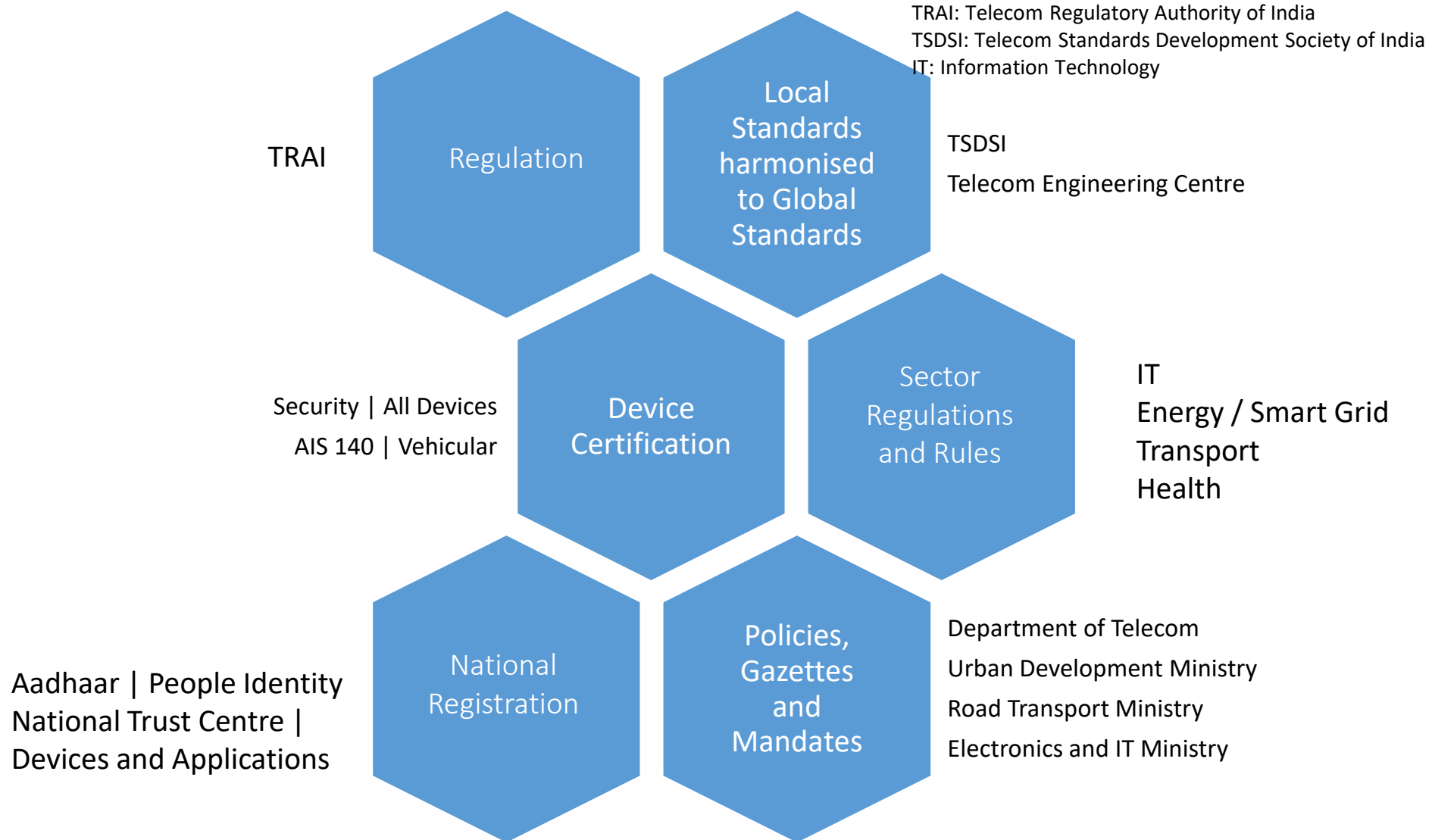


Standards and Policies | Indian Example



- National M2M Roadmap
 - Technical Reports by Telecom Engineering Centre
 - M2M Service Provider Registration Guidelines (Draft)
 - TRAI Guidelines for M2M
 - Telecom Act Amendment for Device Certification
 - TEC Essential Requirements for Mandate for Certification of all connected devices by 1Oct2018
 - DoT M2M / e-SIM Mandate
 - AIS 140 Standard for enablement of all Public Transport Vehicles with Devices for Tracking & Alarms
 - National Trust Centre Mandate by Telecom Commission
 - Coming Soon
 - Privacy Policy
 - Data Management Policy
- Apr 2015
 - May-Nov 2015
 - Jul 2016
 - Sep 2017
 - Sep 2017
 - Apr 2017
 - May 2018
 - July 2018
 - Aug 2018

Indian IoT Ecosystem Concept



Intelligent Transport Systems

Initiatives in India





ITS – INDIAN Perspective



Our Challenges are Different!



Smart City Solutions | ITS is a key area



The Road Safety Agenda

Road traffic deaths	Vulnerable road users	Legislation
1.25 million people die each year on the world's roads	Almost 50% of the people who die each year on the world's roads - pedestrians, cyclists, and motorcyclists	17 countries have amended their laws to bring them into line with best practice on one or more key risk factors for road traffic injuries between over the past 3 years
Number of Road Traffic Deaths	Distribution of Traffic Deaths by Road User	Existence of child restraint legislation

90% of the world's fatalities on the roads occur in low- and middle-income countries, even though these countries have approximately 54% of the world's vehicles.

India and China contribute > 0.5 Mn deaths per annum over the global total of ~1.25 Mn



National Digital Communications Policy



सत्यमेव जयते

Department of Telecommunications
Ministry of Communications
Government of India

- Released on 1 May 2018
- Open for Public Comment

Inviting Public comments on Draft National Digital Communications Policy – 2018

The objective of a national policy on digital communications is to prepare the country and its citizens for the future. Achieving these goals would require that the key stakeholders – namely the Centre, the States, local governments and agencies, Telecom Service Providers, Internet Service Providers, handset and equipment manufacturers, the academic community, the innovators and start-ups come together to forge a coalition to deliver this national policy and its missions.



5G India Vision | 23 Aug 2018

“5G technology has the potential for ushering a major societal transformation in India by enabling a rapid expansion of the role of information technology across manufacturing, educational, healthcare, agricultural, financial and social sectors. India must embrace this opportunity by deploying 5G networks early, efficiently, and pervasively, as well as emerge as a significant innovator and technology supplier at the global level. Emphasis should be placed on 5G touching the lives of rural and weaker economic segments so as to make it a truly inclusive technology”



5G India Mission

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Participants

High Level Forum Members

Ms. Aruna Sundararajan	Secretary, DoT	Chairperson
Mr. Ajay Prakash Sawhney	Secretary, Melty	Co-Chairperson
Prof. Ashutosh Sharma	Secretary, DST	Co-Chairperson
Mr. Prabhash Singh	Member (T), DoT	Member
Mr. N. Sivasailam	Special Secretary (T), DoT	Member
Mr. M P Singhal	Sr. DDG (TEC), DoT	Member
Mr. R B Prasad	Wireless Advisor, DoT	Member
Prof. A J Paulraj	Professor, Stanford University	Member
Dr. G Deshpande	Chairman, Sycamore Networks	Member
Prof. B Ramamurthi	Director, IIT Madras	Member
Prof. Abhay Karandikar	Professor, IIT Bombay	Member
Prof. U B Desai	Director, IIT Hyderabad	Member
Prof. Anurag Kumar	Director, IISc Bangalore	Member
Prof. Ramgopal Rao	Director, IIT Delhi	Member
Mr. S Mashruwala	MD, Reliance Jio	Member
Mr. G Vittal	MD & CEO, Bharti Airtel	Member
Mr. A K Muniswamy	Chairman, IESA	Member
Mr. K A Krishnan	VP & CTO, TCS	Member
Mr. Vipin Tyagi	ED, C-DoT	Member
Mr. Rajiv Sinha	DDG (NT), DoT	Member
Mr. G Narendranath	DDG (SA), DoT	Member
Mr. Anupam Shrivastava	CMD, BSNL	Member
Mr. T V Ramchandran	President, BIF	Member
Mr. R K Pathak	DDG (IC), DoT	Member Secretary

7



ITS Standardisation / Projects activity

- National M2M Roadmap, 2015
- TEC Technical Report on ITS released May 2016
- TEC Technical Report on V2X and Embedded SIM released Nov 2015
- Standard for Tracking of Public Transport Vehicles Notified vide G.S.R. 1095(E) dated 28 Nov 2016; Implementation deadline of 1 Apr 2018 subsequently revised to 1 Apr 2019
- DoT Connected Device Certification related rules released 5 Sep 2017
- TRAI Guidelines on M2M released 6 Sep 2017, address e-SIM and E-Call Pilot
- DoT M2M SIM Instructions released 16 May 2018
- TSDSI is transcribing OneM2M Standards for adoption in India
- Niti Aayog ITS Working Group is preparing policy recommendations for transformational impact

- IS 16490 : 2016-LED Destination Board System for Buses
- AIS 140: Vehicle Location Tracking Device with Emergency Button
- IS 16833 : 2018 -ANNEX B: Electronic Fare meter with Integrated ATD and an integrated emergency system
- IS 16833 : 2018 -ANNEX C/D: CCTV system with an integrated emergency system

Ongoing Projects

- Consultations for readying the norms for back-end Emergency Response Centres for Alarms initiated from AIS-140 Connected Vehicles
- AIS-140 related State-wide Project implementation activities initiated in Kerala
- AIS-140 related Auto-Rickshaw Enablement Project implementation activities initiated in Andhra Pradesh
- Automotive OEMs of Public Transport Vehicles readying for the AIS-140 Implementation in new vehicles
- BSNL Smart Cities
- ITI Smart City Initiatives
- C-DoT initiatives for Standardisation and Common Service Layer

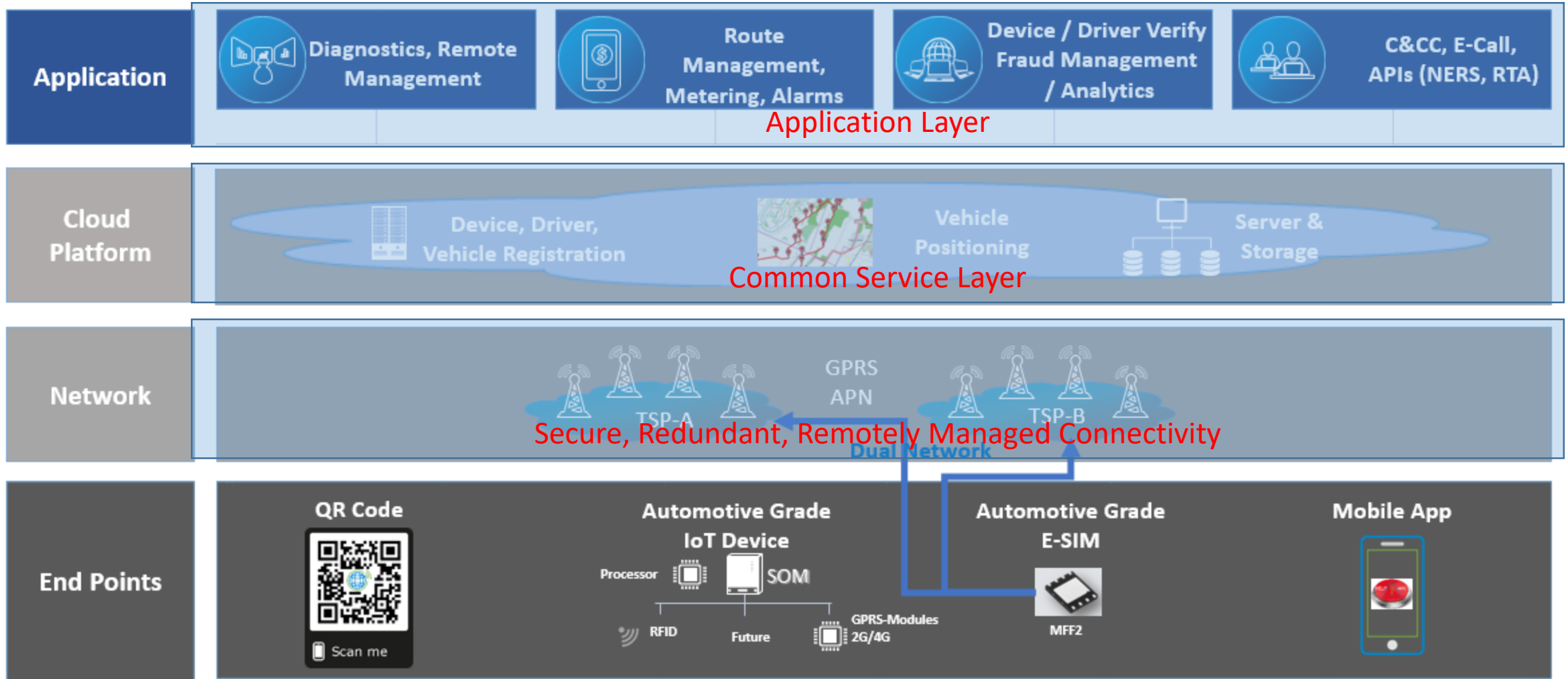


What is AIS-140?

- Mandate to provide a uniform capability Vehicle Location Tracking (VLT) Unit in every Public Transport Vehicle for PUBLIC SAFETY
- Certification of VLTs by ICAT/ARAI
- Position-Velocity-Time data from every vehicle every 10s while moving
- Device Health / Security Monitoring data
- High QoS, Secure, Embedded, Multi-network Connectivity with SMS Fall-back
- Alerts
 - Emergency
 - Tamper
 - Parameter Changes
 - Ignition Off
 - Rash Driving
 - Battery Disconnection / Low battery
- Integration with Back End Command and Control Centres for Emergency Response



Sensorise AIS-140 Solution Rendition



Security – key enabler for IoT / M2M

Safety & Security

Identity & Auth

Know the Connected Device, the Machine, The Custodian and that it is safe

Inability to tell between genuine and rogue

Availability and QoS

Redundancy

Ensure that the Connected Object is reachable and manageable all the time

Absence of assurance of QoS

Scalability and Inter-operability

Continuity

Ensure that the Users have a reliable service that is assured for business continuity

Coverage, Technology & SP Gaps



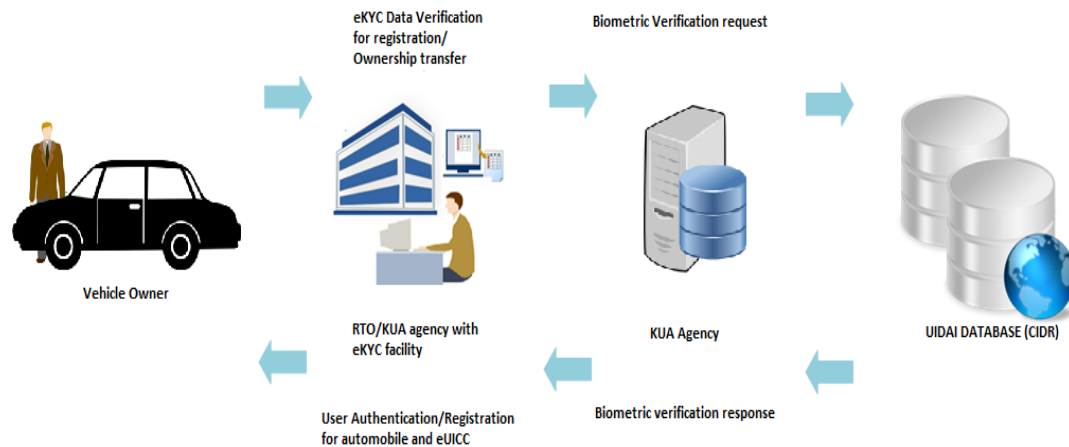
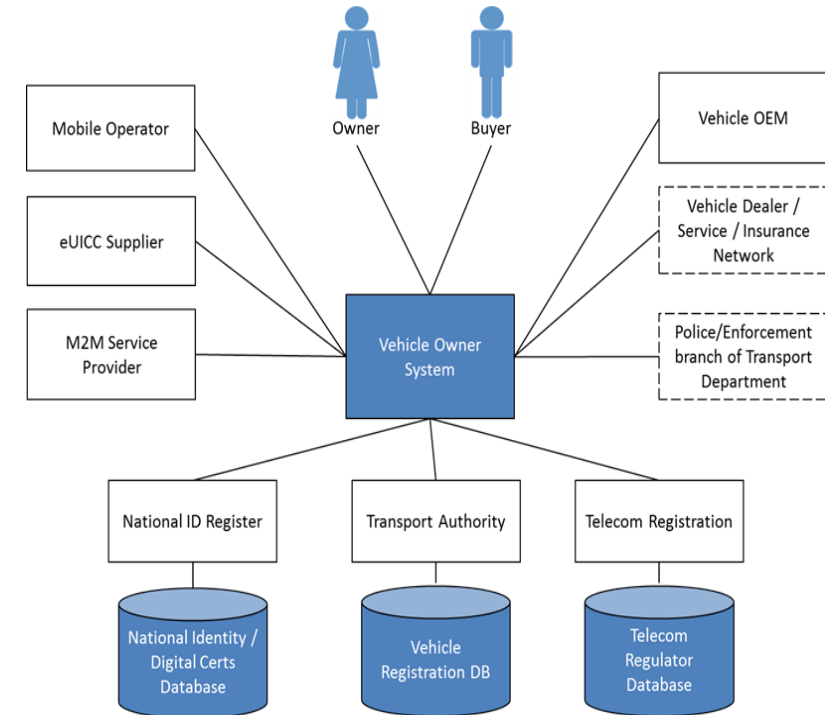
Participation in ITU


Contributions towards the ITS Ecosystem



Digital ID and eSIM for Vehicles

- Independent and Tamper Identity for each vehicle
- Embedded, Remote Manageable Connectivity
- Carrier class intervention with sustainable, inter-operable solutions





INTERNATIONAL TELECOMMUNICATION UNION

TELECOMMUNICATION STANDARDIZATION SECTOR

STUDY PERIOD 2013-2016

COM 20 – C Q2 - E

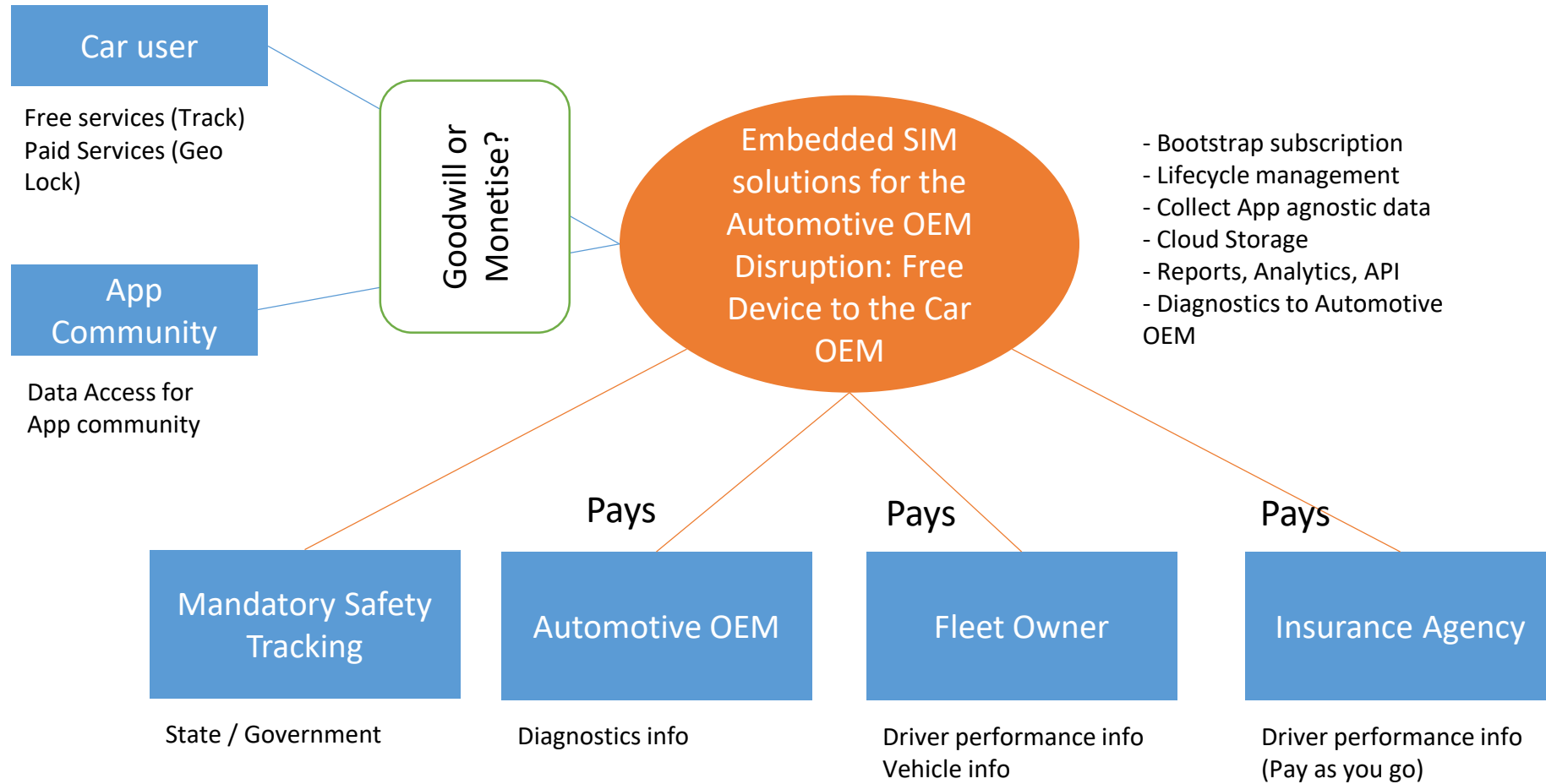
July, 2016

English only

Original: English

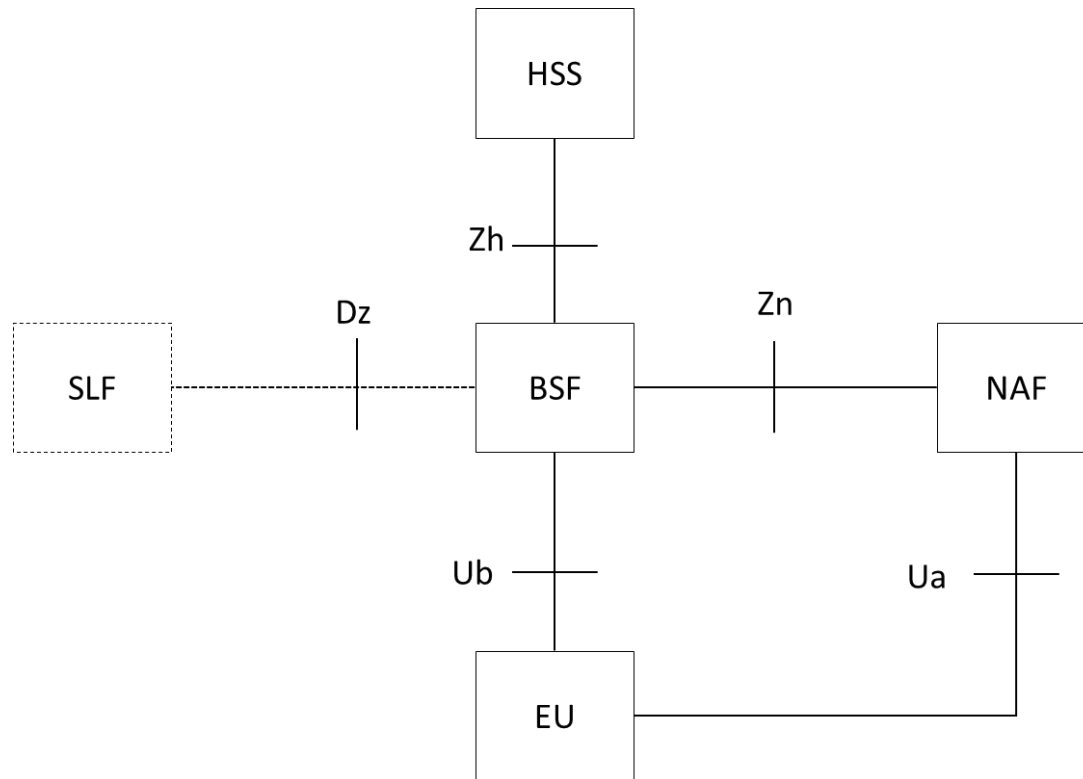


Solutions for Multi-Stakeholder Telematics Play



ITU SG 13 New Item Proposal for IoT/M2M Security

Current ETSI GBA Architecture



Proposed NIP for ITU SG13

- Current Standard
 - Based on historically trusted algorithms and protocols for authenticating UE
 - Proven Interoperable
 - Simplifies for application developers as they don't need to worry about key management
- Proposed to ITU via SG 13
 - Make the GBA TSP Agnostic so that the Service works when changing a Service Provider
 - Enable the GBA to act independent of the HLR/HSS
 - Enable the M2M Service Provider community in providing Security and Authentication from the M2M SIM



ITU SG 13 New Item Proposal for IoT/M2M Security



INTERNATIONAL TELECOMMUNICATION UNION
**TELECOMMUNICATION
STANDARDIZATION SECTOR**
STUDY PERIOD 2017-2020

T13-SG13-C-0xxx

Study Group 13

Original: English

Question(s): Q16/13

India [First Draft], 2018-09-13

Study Group: 13

Working Party: xx

Intended type of document (R-C-TD): TD

Source: Telecom Engineering Centre, Department of Telecommunications, Ministry of Communications, Government of India

Title: Proposal on new work item- “Providing Trustful access to IoT Devices and Data with a ETSI GBA type Network Authentication Function and Secure Element Services”

Purpose: New Recommendation under Q16/13: Knowledge-centric trustworthy networking and services

Contact: Sh AS Verma, DDG, TEC, DoT
Anuj Jain
TEC, DOT, Govt of India

Tel: +91 11 xxxxxxxxxx
E-mail:

Sharad Arora, MD
Jonas Haggard, CSO
Sensorise Digital Services Pvt Ltd

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E-mail: sharad.arora@sensorise.net



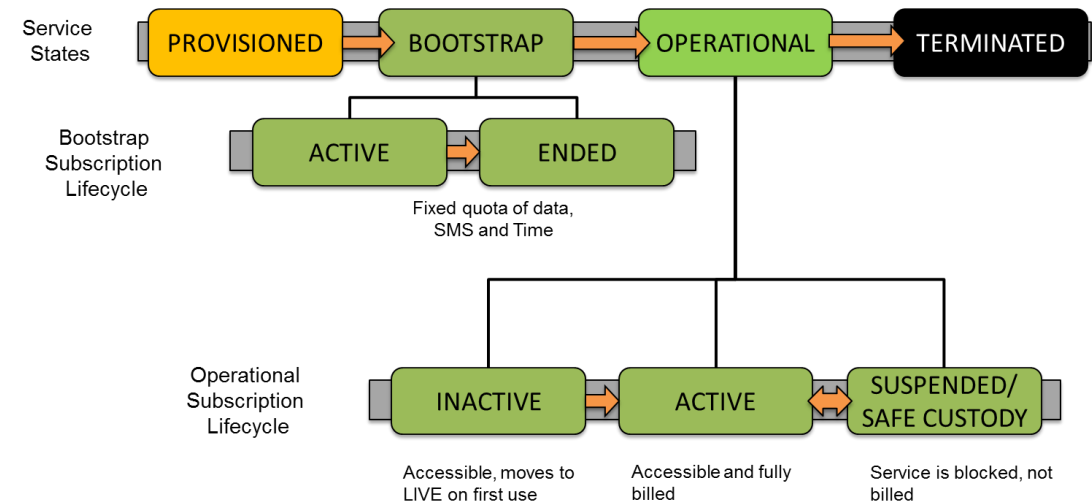
BSNL/Sensorise Intervention

Solutions for real world problems



BSNL / Sensorise Intervention

- Telco and SIM agnostic Connectivity
 - Solderable IC form factor SIM for machines – extends the proven identity and security to machines
 - Industrial grade and tamper resistant
 - Factory fitment possible
 - Multi-Profile SIM - Automatic Network Switching
 - Remote Manageable
- Secure Common Service Layer for Device, Vehicle and Custodian Identity and Authentication
- Remote Management Capabilities



Secure SSO Solutions for IoT / ITS using the eSIM as a Secure Element

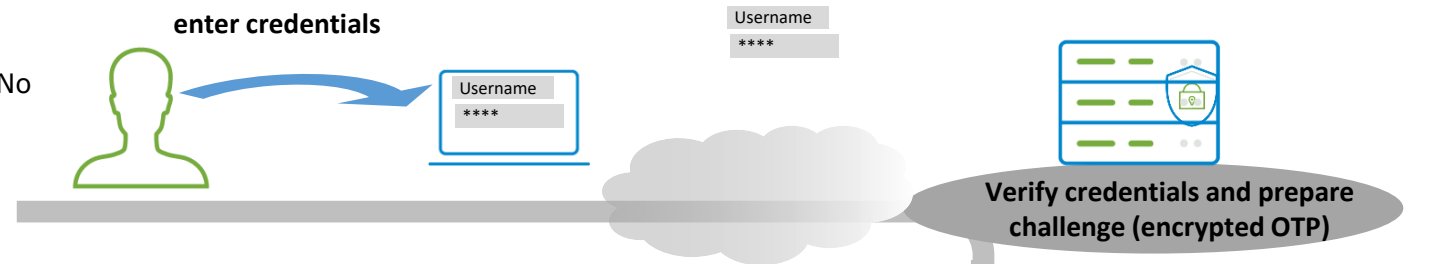
- QoSim Secure
 - Proposition: Secure Platform-As-A-Service FOR Single Sign On using the eSIM, WITHOUT the need for expensive and hard to manage DIGITAL CERTIFICATES
 - Offered on a Pay-As-You-Go (PAYG) model
- SenseIT Secure
 - Proposition: Locate and Identify devices and people using a BLE beacon from the Sensorise VTS Device
 - Connect Commuter App with the VTS device using BLE for purposes of Safety, Driver identification, Raising Alarms and Route selection
 - Server Side Registration and Authentication of Devices and People



QoSIm Secure

Step 1 – Login

User enters credentials as usual. No modification required.



Step 2 – Enter PIN

User gets a message to authenticate the login by entering his/her chosen PIN



Step 3 – Verify

Server verifies the OTP

1. Prevents Replay
2. Prevents Man in the Middle



QoSIm Secure for IoT App User Single Sign On

- Less than 5 seconds from login attempt to user is prompted on the phone
- No additional keys to be managed
- No Certificates required
- 2-factor authentication using two separate channels
- PIN protection – Only local validation, PIN never leaves the device
- Multiple Language support
- More secure than OTP over SMS
 - Challenge is encrypted
 - Replay attacks prohibited
- Device Agnostic
 - Works on feature phones and smartphones



QoSIm Secure for M2M Devices

- Addressed to M2M Devices which are without a display
- Simultaneously uses four identities
 - The Device Identity such as MAC or IMEI
 - The Card Identity such as IccID
 - The Machine Identity such as Vehicle Registration Number
- Much harder to break as a hacker has to gain control of three disparate systems
 - The Device Firmware
 - The SIM card
 - The Security Server



Summary and Thanks

- Sustainable IoT and Smart City development requires Standardisation and inter-operability
- A committed Quality of Service of the Connected Objects is critical to offering Security and Manageability
- A layered architecture for the management of Smart City Objects is critical to Safety, Security, Privacy
 - A redundant connectivity layer that makes the use case reliable
 - A layer to register and identify devices and their custodians
 - A layer to capture the Data from the Devices
 - Making Applications and Analytics independent of the Registration and Data Layer



Thank You

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