

Corporate Presentation  
Sensorise Technology & Solutions

Sep 2016

Commercial In Confidence



A word cloud graphic with various terms related to IoT and M2M. The words are arranged in a grid-like fashion with varying sizes and orientations. The most prominent words are 'Sensors', 'IoT', 'OneM2M', and 'eSIM'. Other words include 'Authentication', 'Inter-operate', 'Remote Management', 'Data Collection', 'SmartCities', 'Secure', 'eUICC', 'Service', 'Analytics', 'Gateway', 'Embedded', 'Connected Objects', 'Lifecycle Management', 'Network', and 'Identity'. The background is a dark grey to blue gradient.

**SENSORISE**  
Connect & Serve

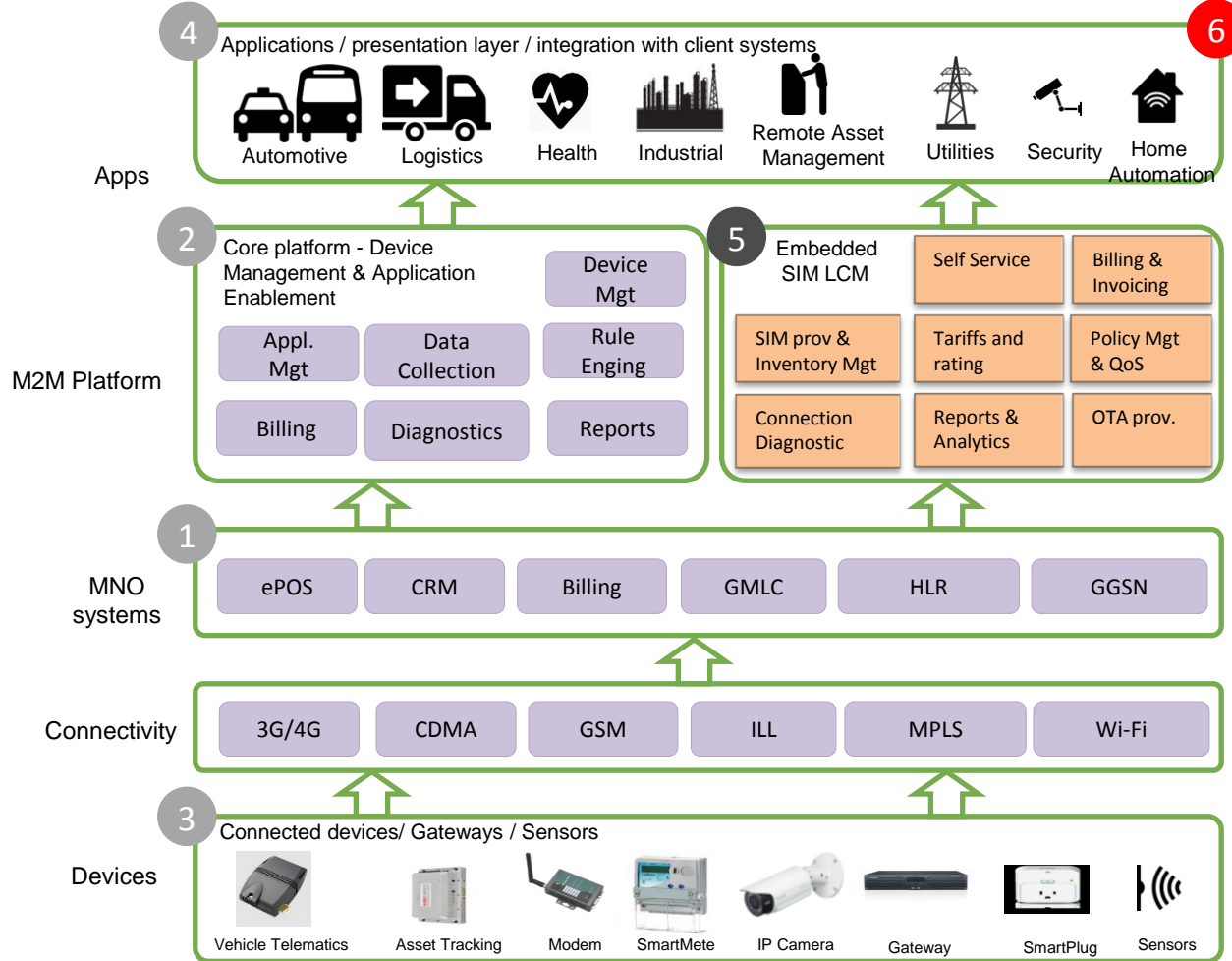


# Overall Technology Architecture

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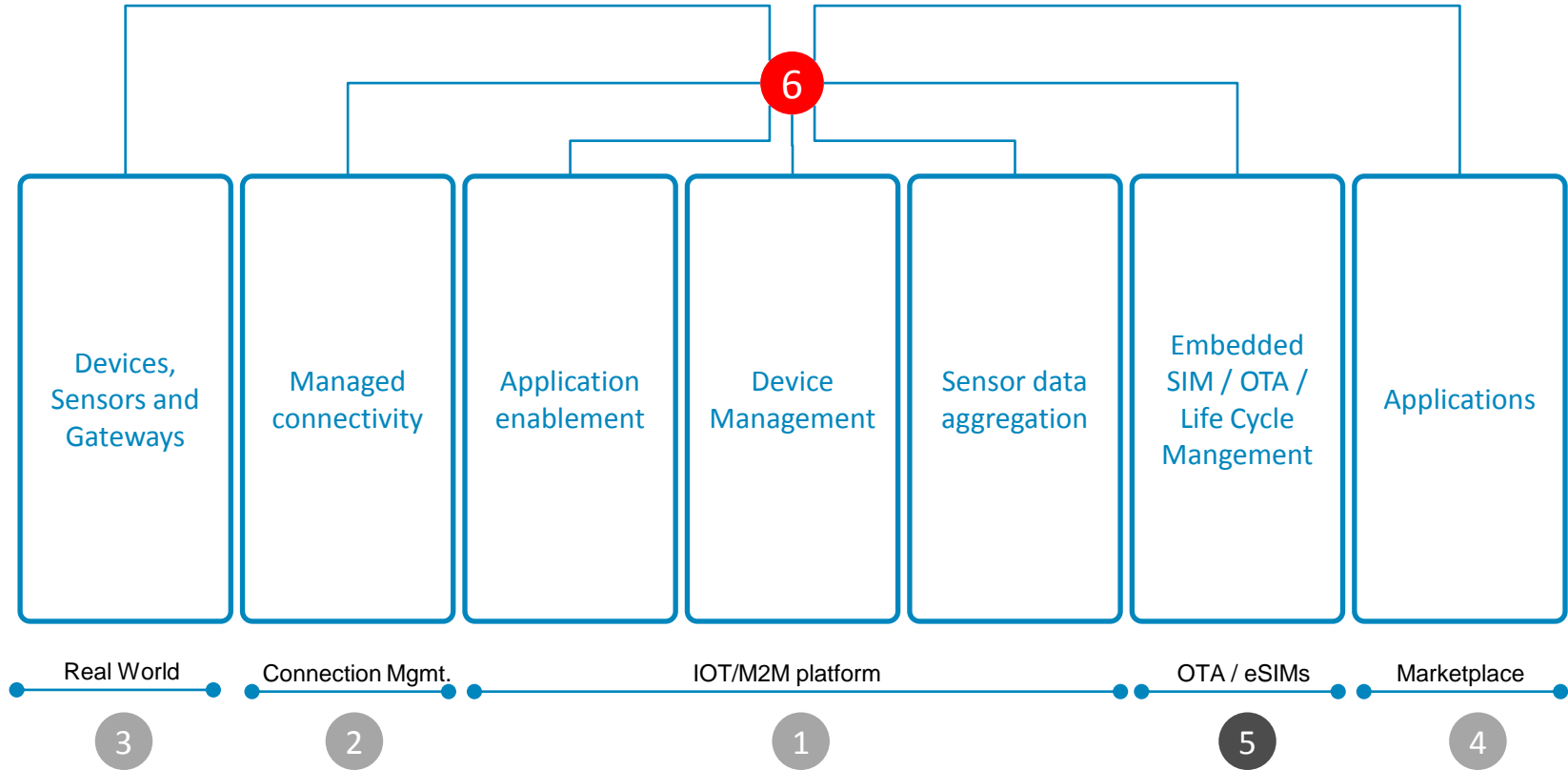


# The Overall IoT Ecosystem, Sensorise Components



- 1 Several MNOs rapidly ramping up capabilities for M2M / IoT support
- 2 Dozens of M2M Platform partners, MNOs will deploy based on selection
- 3 100's of Cameras, Devices and Sensors
- 4 Growing Marketplace of IoT / M2M Apps
- 5 Limited players with eUICC LCM / OTA Platform
- 6 Absence of an end to end Apps and Connectivity Lifecycle Management Service Provider

# The IOT/M2M Play : Components



**6** = IoT Lifecycle Management

# Sensorise Solution Components



## SenseLCM : Lifecycle Management for Embedded SIM

Home Add Device Add Subscription Change Profile Greetings Customer Sign out

Sensorise My Devices Search

**My device: Raspberry Device**

Manufacture : Rasberry PI foundation  
 Model: Rasberry PI 2 Model B  
 Serial: 082476293475  
 IMEI: 44-015320-34-3751

Subscription	Vodafone
Account balance	INR 400
Valid to:	3-Oct-2015
Remaining quota:	12 MB

## SenseMatic : IoT Platform

Dashboard Installations Administration Notifications 24 Hello, sensorise enControl

Inside Outside

Temperature Humidity ON 25°C Target Temp 18°C Temperature 14°C Forecast

Comfort Security Consumptions Control

Dashboard Installations Administration Notifications 24 Hello, sensorise enControl

Central Control

Temperature Control

ON 25 °C

Inside Outside

Temperature Humidity 18°C Temperature 14°C Forecast

Dashboard Installations Administration Notifications 24 Hello, sensorise enControl

Control

22 December 2015 Tuesday

9:40 AM Office Sensing Demos The Water Machine located in the Main Hall area is Off

## SenseTrack: Tracking device with eUICC



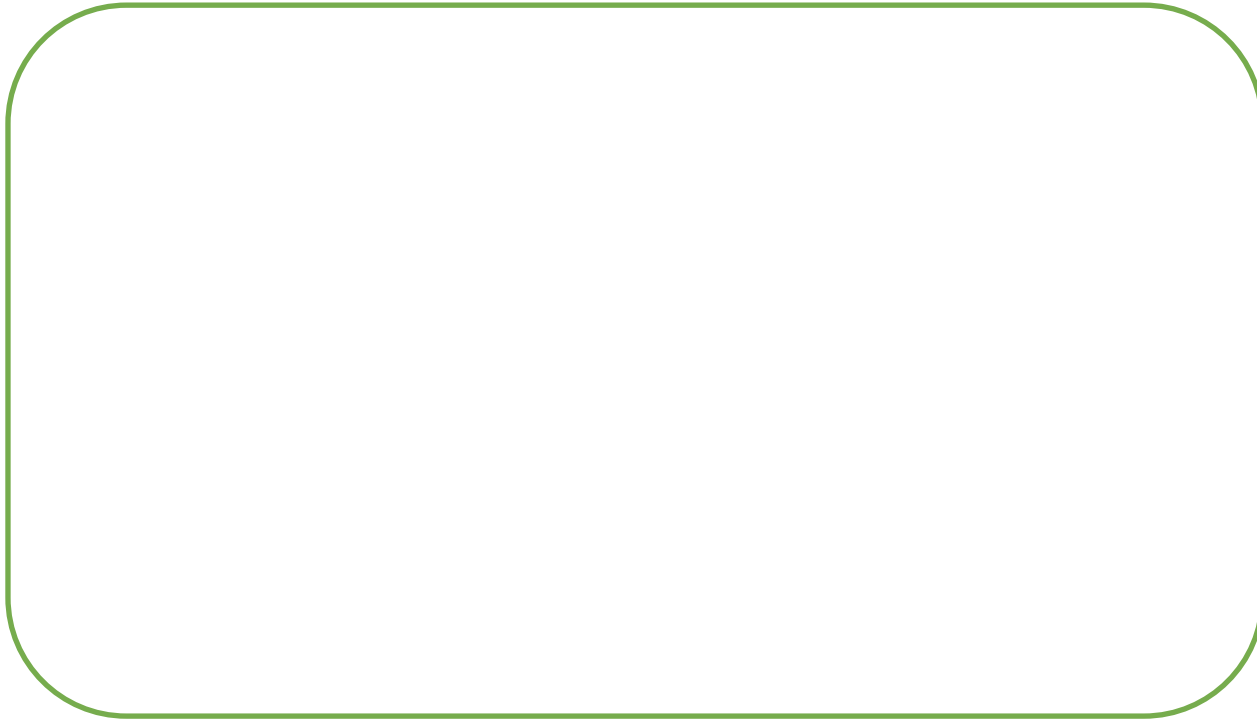
## Sensors and Cameras: Choice of wireless devices





# Sensorise Cloud Infra

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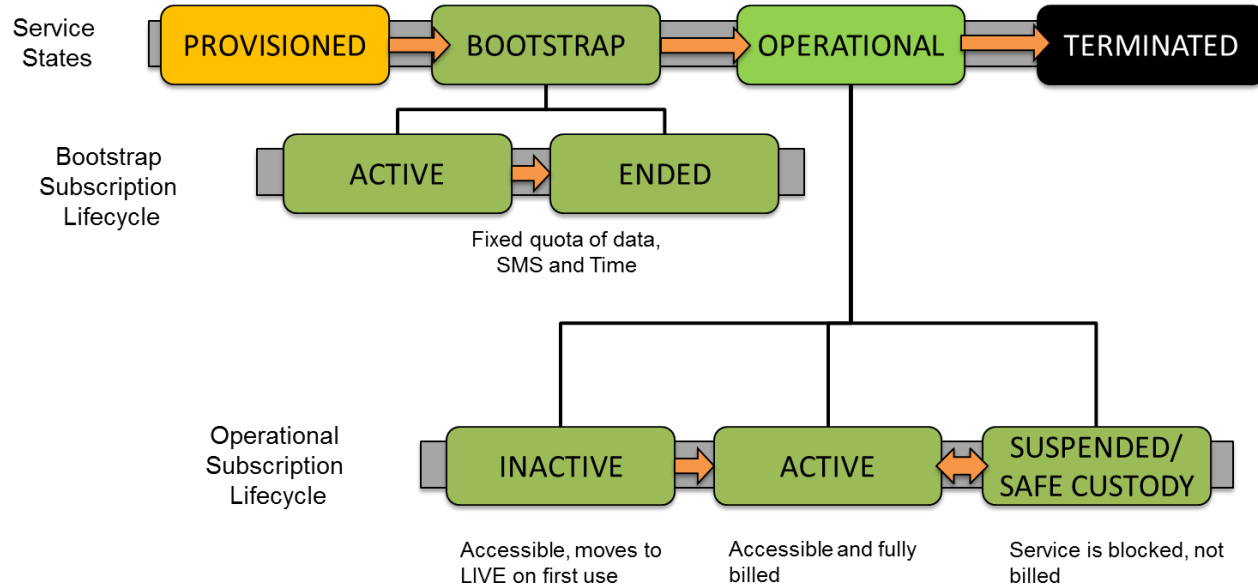


# SenseLCM Architecture

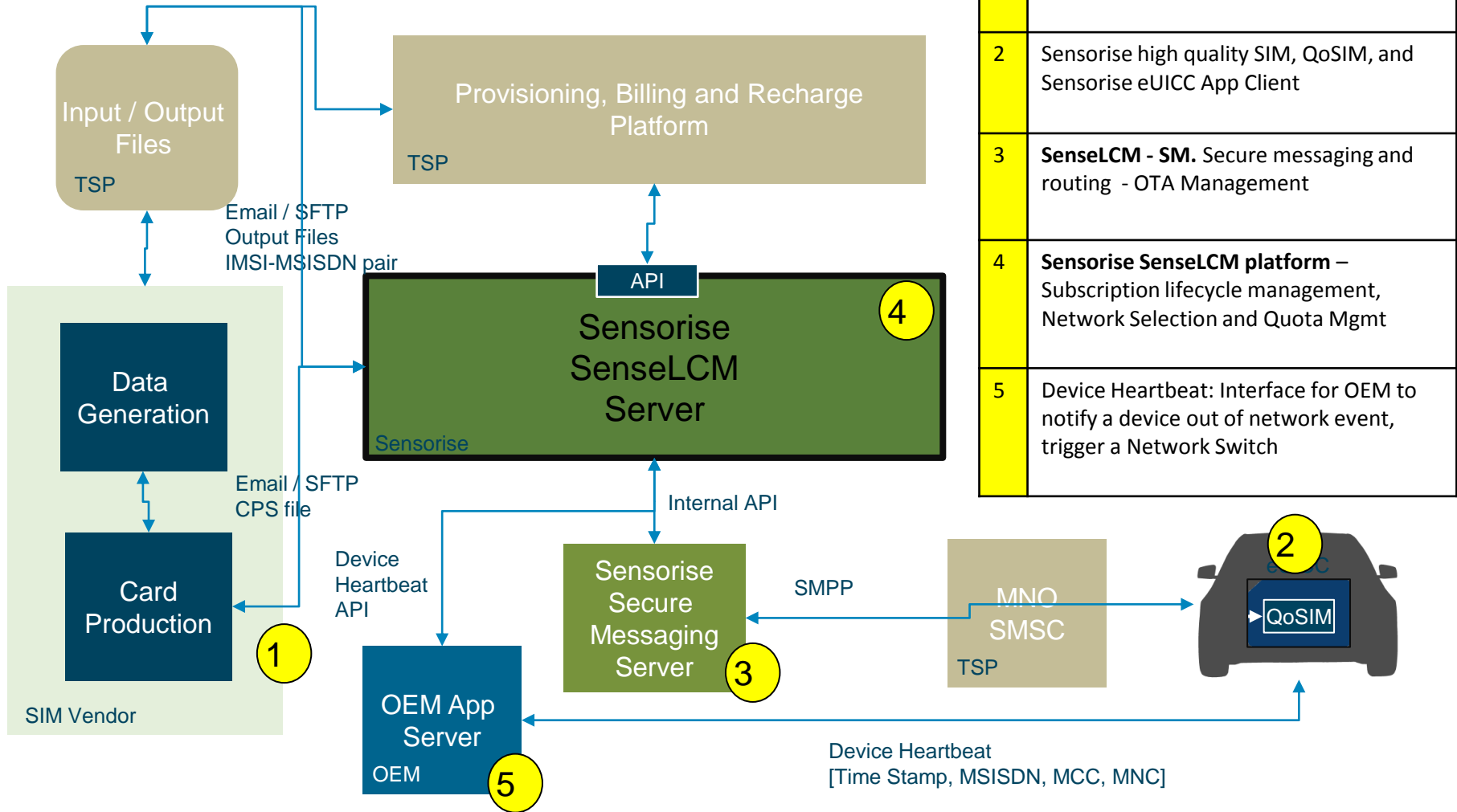
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# Sensorise eSIM lifecycle management



# The solution components – High level





## Bootstrap Connection

- Pre-market SIM usage
- Quota for time and usage

## Subscription Management

- Best fit Data and SMS plans, Prepaid and Advance paid
- SIM Card Provisioning, per SIM and Batch
- On Demand Activation & Suspension, per SIM and Batch

## Order Management

- Online Ordering of SIMs
- Sensorise SIM for the industry
- E-KYC for Individuals using AAdhaar

## Balance monitoring

- Daily SIM usage alerts
- Over use protection

## File based imports and exports

- Import plans and subscription management actions in bulk
- Usage reports for a batch of SIM cards

## Over use protection

- Per SIM alert to SMS
- Batch alerts to email
- Automatic suspension at a threshold

## Fraud Protection

- URL filtering
- Unique APN

## QoS

- Multi operator SIM
- Operator switching based on device status interface to

## OEM

- Auto Switching Applet for devices without SMS support

## Factory and Environment Ready

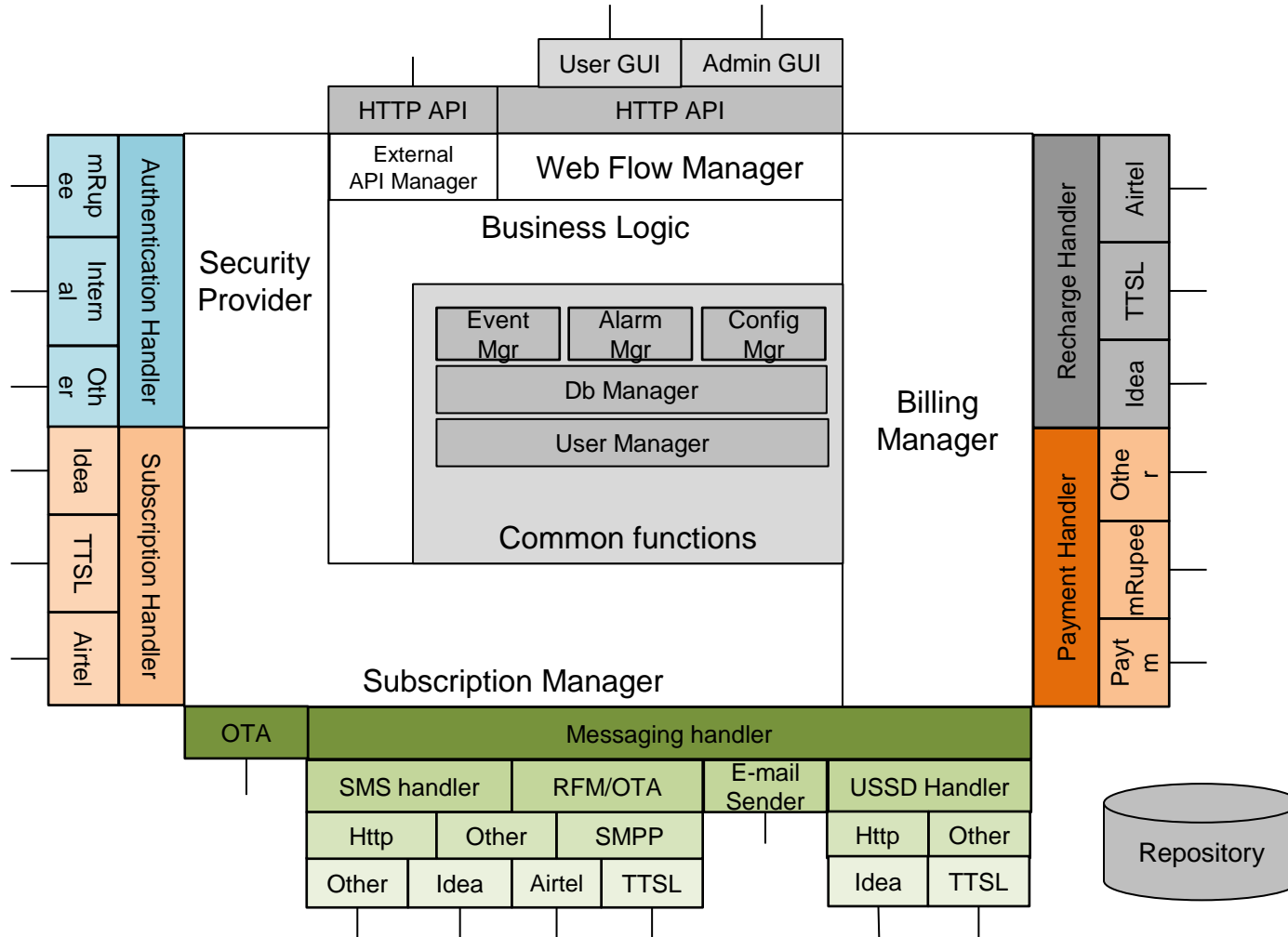
- Optional Ruggedised Solderable SIM
- Environment ready (-25 to +85°C)
- High Memory, Java Card with Apps



# TSP Integration

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# Solution Diagram - SenseLCM

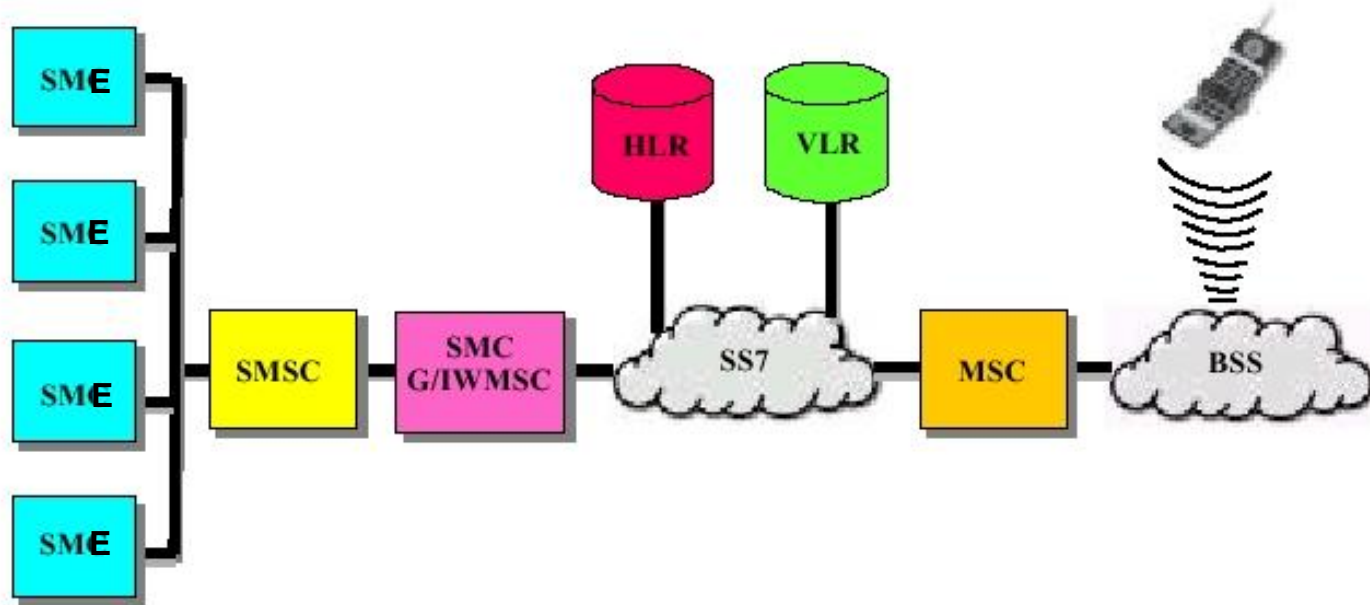




## About SMSC Integration

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# SMS network elements





- **Abbrv:**
  - SC: Service Centre
  - MS: Mobile Station
- **Basic types:**
  - SMS-DELIVER (SC → MS)
  - SMS-DELIVER-REPORT (SC ← MS)
  - SMS-SUBMIT (MS → SC)
  - SMS-SUBMIT-REPORT (MS ← SC)
  - SMS-COMMAND (MS → SC)
  - SMS-STATUS-REQUEST (MS → SC)



# SMS-SUBMIT



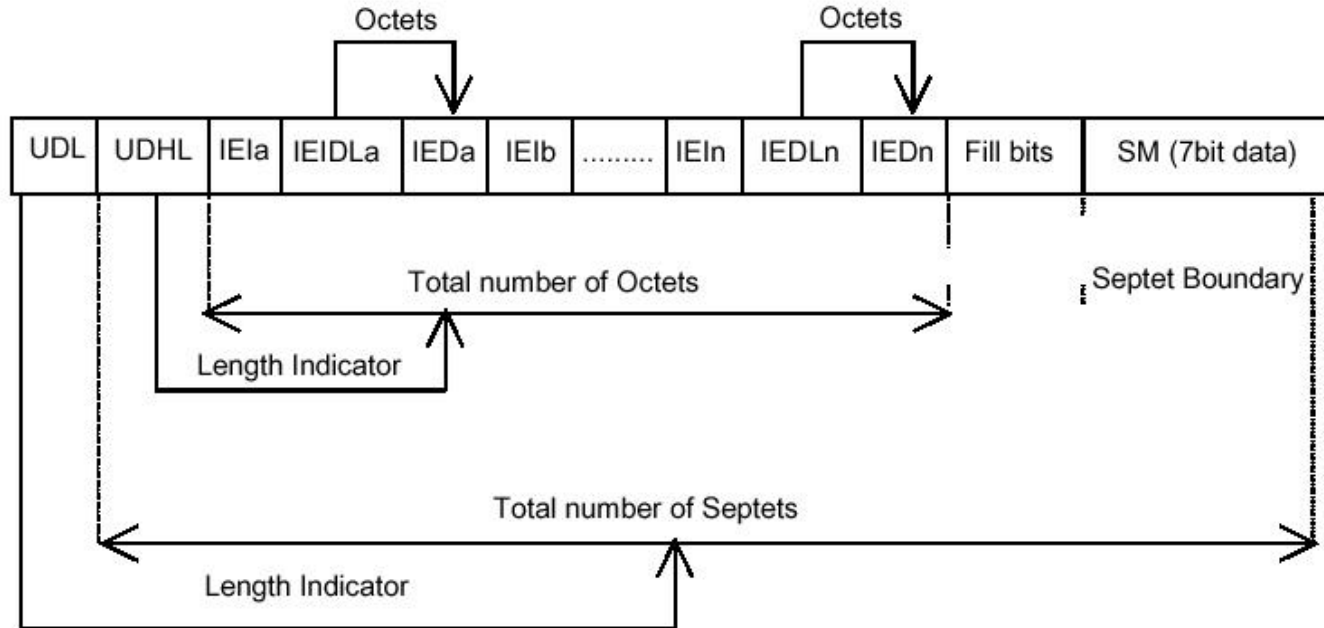
	Description	Size	Mandatory
TP-MTI	Message Type Indicator	2 bit	Y
TP-RD	Reject Duplicates	1 bit	Y
TP-VPF	Validity period format	2 bit	Y
TP-RP	Reply Path	1 bit	Y
TP-UDHI	User Data Header Ind.	1 bit	N
TP-SRR	Status Report Request	1 bit	N
TP-MR	Message Reference	Int	Y
TP-DA	Destination Address	2-12 byte	Y
TP-PID	Protocol Identifier	1 byte	Y
TP-DCS	Data Coding Scheme	1 byte	Y
TP-VP	Validity period	1/7 byte	Y
TP-UDL	User Data Length	2 byte	Y
TP-UD	User Data	?	N

# SMS-DELIVER



	Description	Size	Mandatory
TP-MTI	Message Type Indicator	2 bit	Y
TP-MMS	More Messages to Send	1 bit	Y
TP-RP	Reply Path	1 bit	Y
TP-UDHI	User Data Header Ind.	1 bit	N
TP-SRI	Status Report Ind.	1 bit	N
TP-OA	Originating Address	2-12 byte	Y
TP-PID	Protocol Identifier	1 byte	Y
TP-DCS	Data Coding Scheme	1 byte	Y
TP-SCTS	SC Time Stamp	7 byte	Y
TP-UDL	User Data Length	2 byte	Y
TP-UD	User Data	?	N

# User Data Header



Septets can be octets for 8-bit SMS messages

# User Data Header Elements



IEI	Meaning
0	Concatenated 8-bit ref.
1	SMS message indication
4	8-bit port
5	16-bit port
6	SMSC control parameter
7	UDH source indicator
8	Concatenated 16-bit ref.
9	WCMP
70-7F	SIM Toolkit security
80-9F	SME to SME specific use
C0-DF	SC specific use

# Integrating the SMPP Channel using HTTPS



## Sensorise Port Details

IP:

Port: 443

## Partner Port Details

IP:

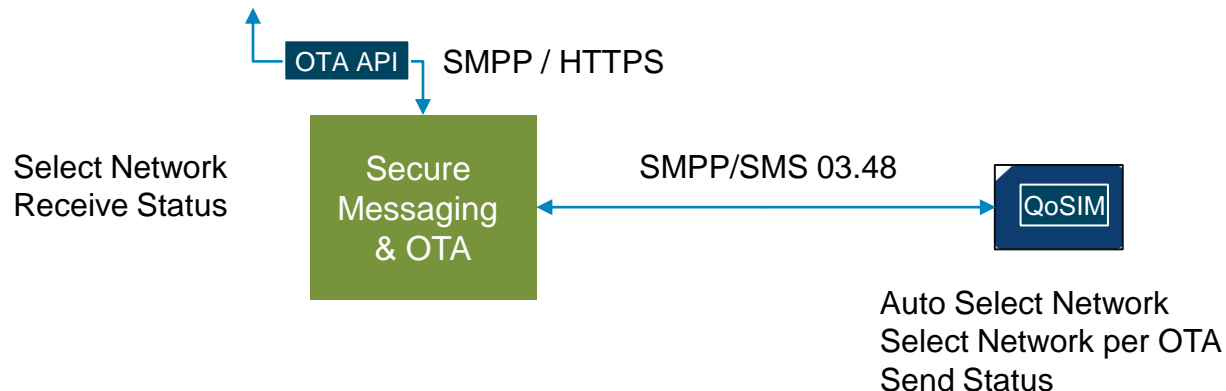
Port: TBD

‘Deliver’ Payload Description for  
“Select Network”

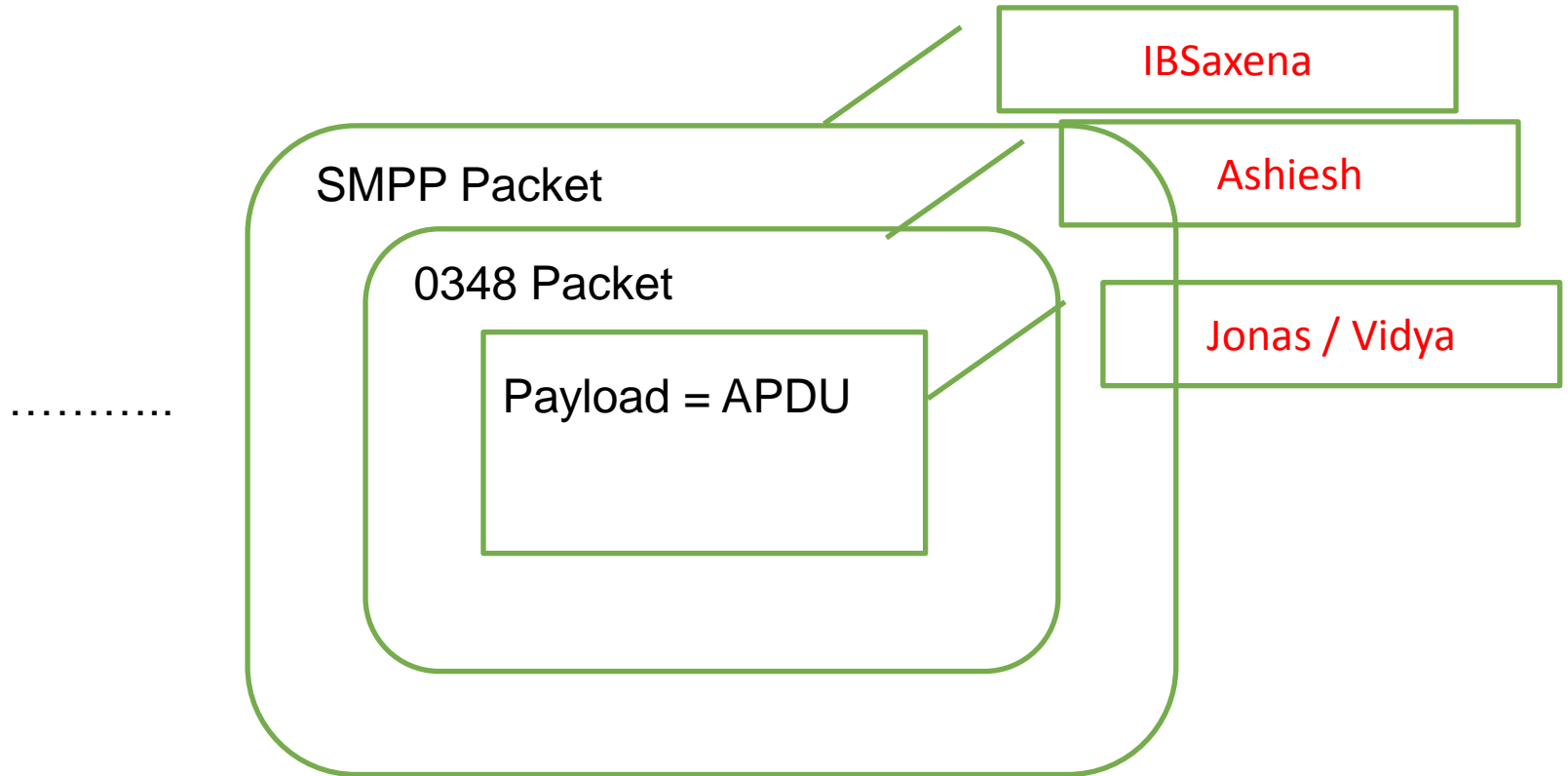
[TBD]

‘Send’ Payload Description for “Read  
Status”

[TBD]



# Building it from scratch





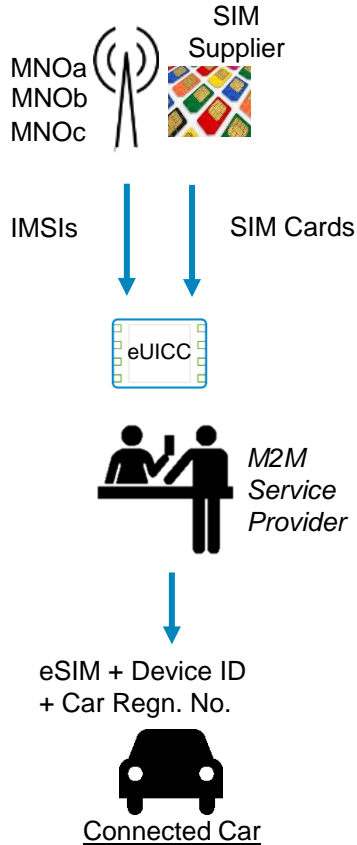
## eKYC and the eSIM

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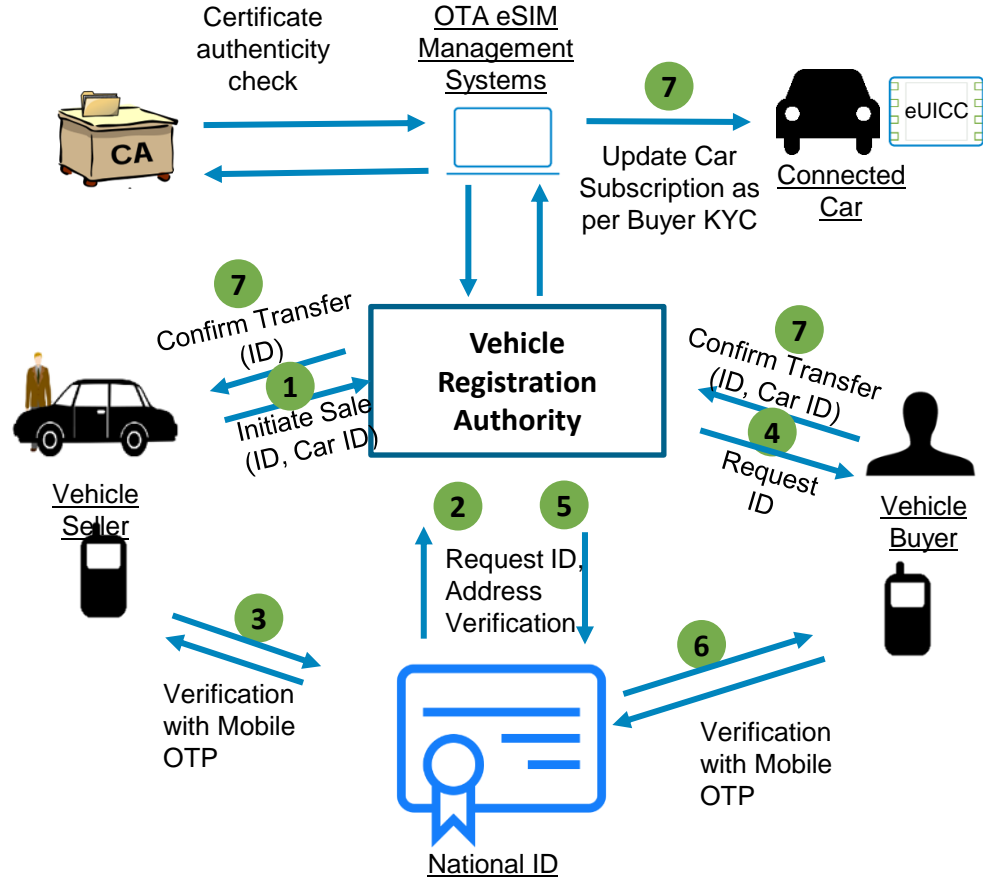
# M2M Call Flows in the Vehicle Registration



## eSIM Issuance



## Vehicle Identification and Registration Process







# SenseMatic Architecture

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## 8 Alarms & Notifications



## 5 Analytics



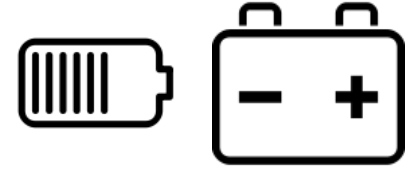
## 6 Cloud



## 7 Rules Engine



## 3 Power



## 1 Imaging & Signage



## 2 Sensors



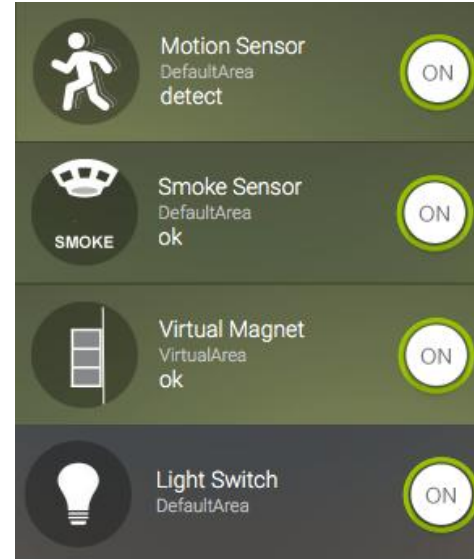
## 9 Escalations





# Sensorise IoT Applications: ATM use-case

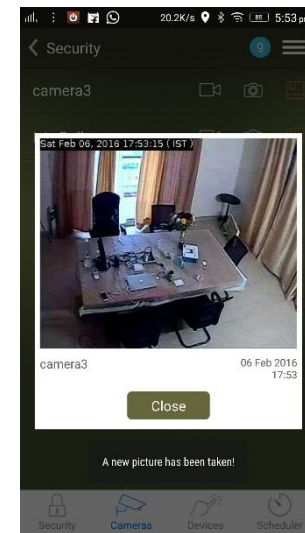
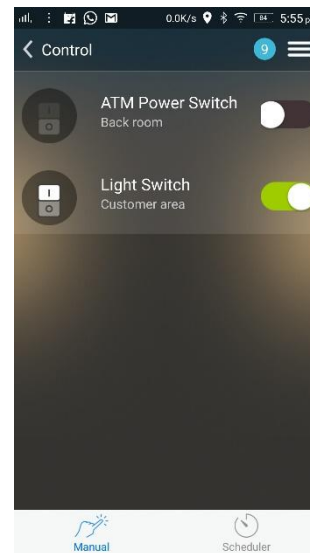
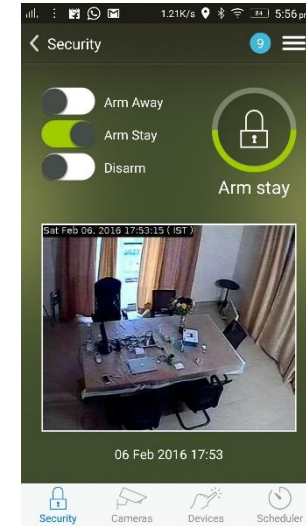
- Go Green – save power, reduce carbon footprint
  - Business rules that use real time Humidity, Temperature, Light and Motion data to automate environment management with scheduler, notifications remote control
- Control - Remote Maintenance
  - Remotely turn ON and turn OFF machines to save logistical costs and engineer time
  - Configure and manage sensors and devices remotely from Command Centres
- Security & Surveillance
  - Motion Sensors, Smoke Sensors, Fire alarms that automate controls such as door locks, power, alarms and hooters
  - 24x7 Camera Recording with playback
  - Instant Photo capture and real time em web view based on business rules
- Analytics
  - Monitor, Compare and Report Energy Consumption at remote Sites



# Powerful Mobile App that creates an always ON office



- Go Green – save power, reduce carbon footprint
  - Business rules that use real time Humidity, Temperature, Light and Motion data to automate environment management with scheduler, notifications remote control
- Control - Remote Maintenance
  - Remotely turn ON and turn OFF machines to save logistical costs and engineer time
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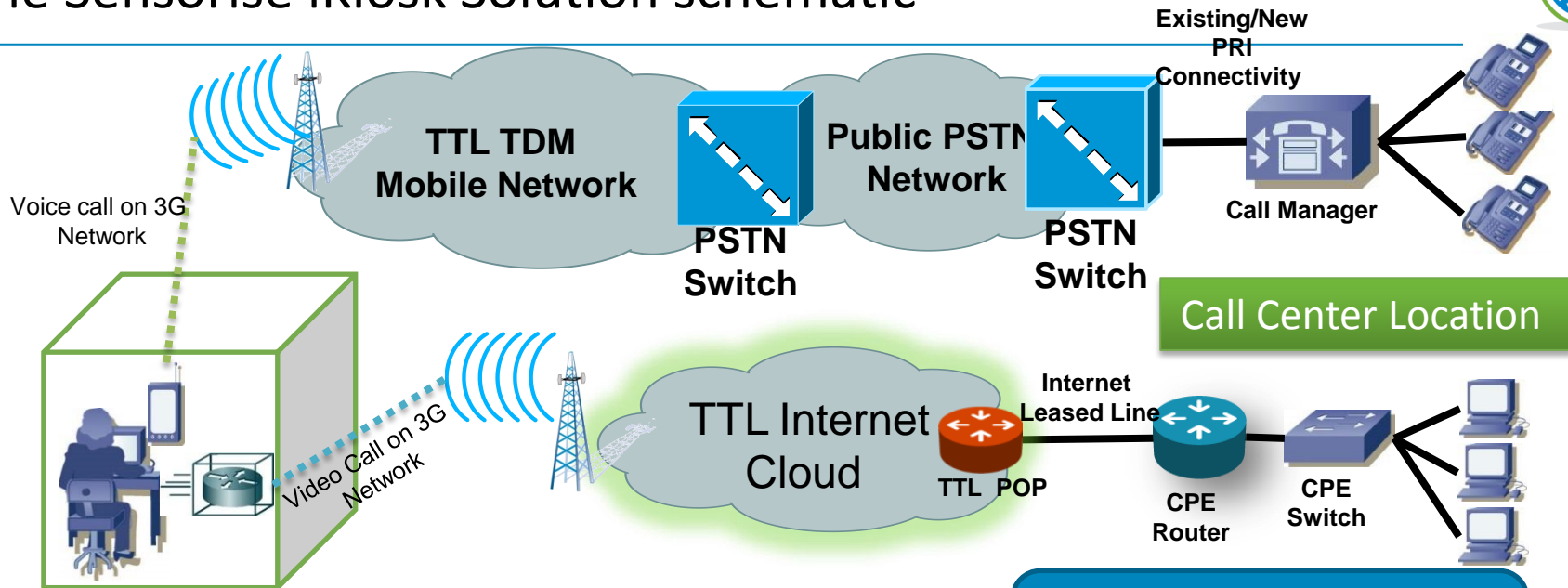




# SenseMatic Gateway

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# The Sensorise iKiosk Solution schematic



**Kiosk Location**  
(Managed by Customer)

**Call Center Location**

- Proposed Changes**
- TTL 1800 Number
  - New PRIs to TCS Call Centres
  - Origin based Routing to TCS Call Centres
  - Dual GSM networks at

- Solution Description**
- ❖ Only 3G connectivity would be provided by TTSL
  - ❖ Calling Modem / infrastructure to be provided by Customer
  - ❖ PRI /Internet Sizing would be designed by Customer.
  - ❖ Wi-Fi/Internet Connectivity for Surveillance Camera to be managed and provided by customer
  - ❖ All infrastructure at Kiosk and call center location would be managed by customer .

- Legend**
- Customer Managed Router
  - Customer Managed Switch
  - Customer Mobile Router with Dongle/3G SIM Support
  - Customer Managed 3G Calling Device
  - Customer Managed Call Manager

# CIF Kiosk – Hardware Modules



## GSM

- Handset
- Microphone
- Speaker
- Call Button

### GSM Call Board

With Speaker,  
Microphone, Handset

## Kiosk CFB

- LCD
- Pinhole Cam
- Proximity Sensor
- HDMI Display
- External Speaker
- Disk

Utility  
Power

### Comms Board with 3G & WiFi

### Kiosk CFB

- RSP
- Linux + Java
- HTML5

Power  
Board

Battery

## Comms Board

- LAN1: Ext Security Cam 1
- LAN2: Ext Security Cam 2
- LAN3: Kiosk CFB
- LAN4: GSM Call
- USB: 3G Dongle
- WAN: DSL Link

### Sensor/Camera Board

## Sensor Board Sensors

- 3 x Contact
- Light Sensor
- Hooter

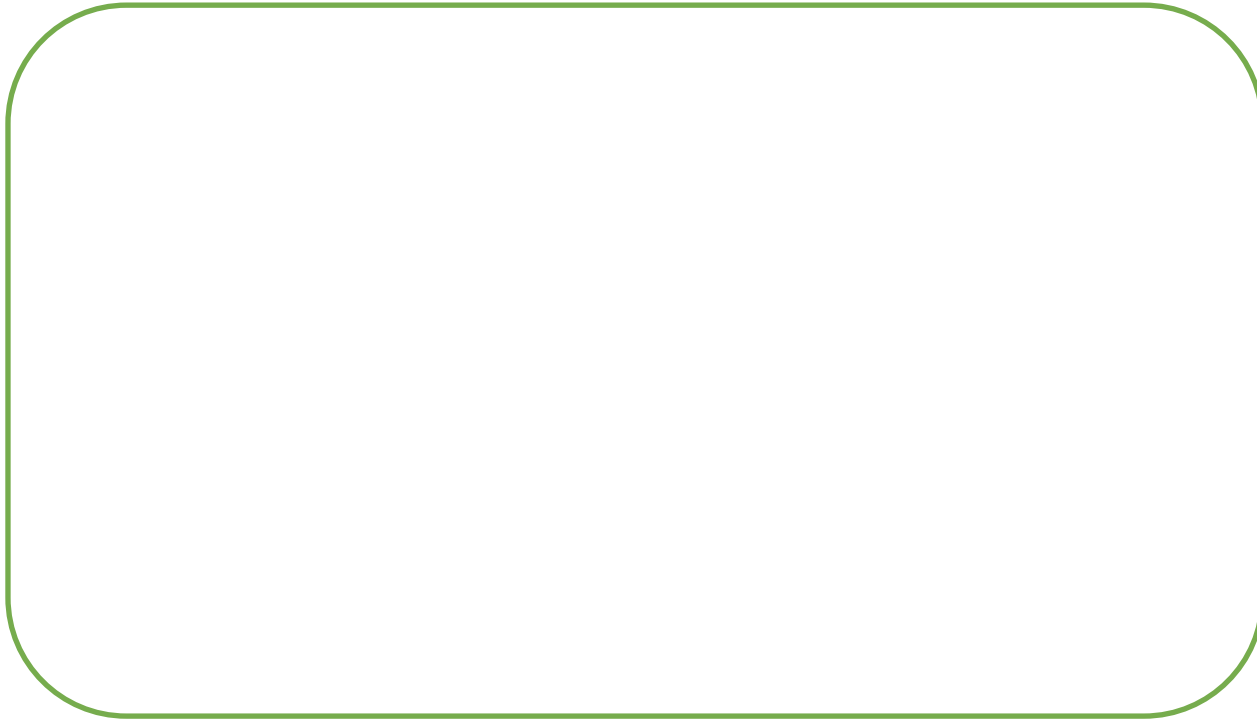
## Button

- Panic

## Devices

- LED Light
- Battery

Charging  
Circuit







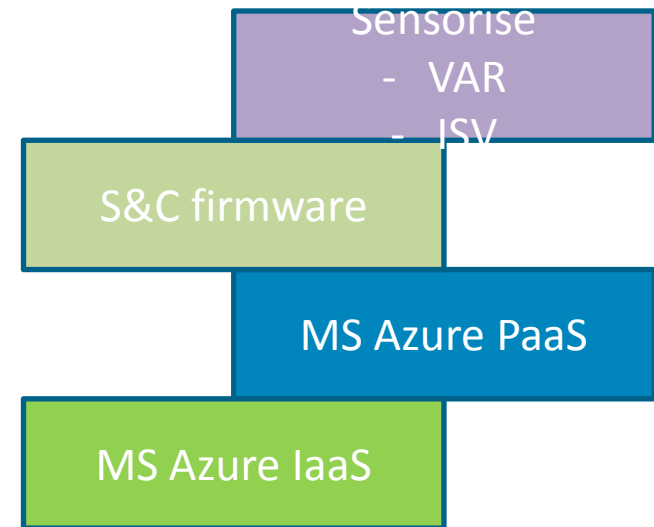
## Questions for Sensorise

### Microsoft

- Role as an ISV that subscribes to the Azure IoT Hub?
- Which MS Technologies are good for us?
- Which Projects can we commit to for the use of the said technologies?
- What are the training and competence development costs?
- What are the licensing costs? For development? For ongoing use?
- What alternate technologies do we miss out on when we commit to this?
- Sensorise benefits?
- Which projects can we commit?

### S&C

- Role as a Strategic Ally for S&C?
- Benefits from the MS arrangement?



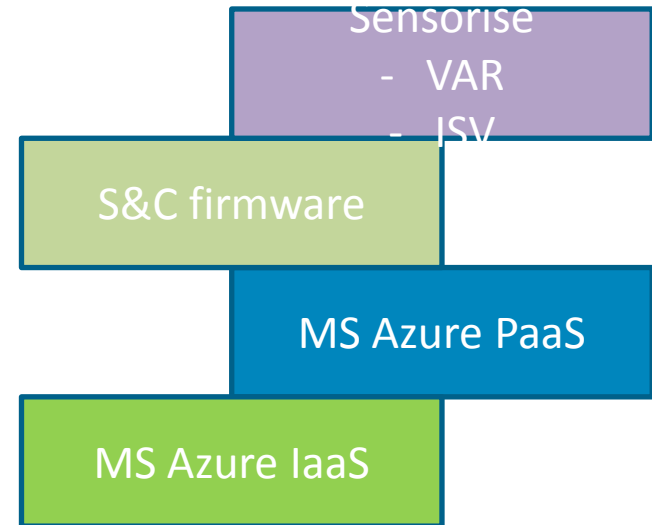


## What can SDS do with MZ Azure IoT Hub

- Block Builder
- Analytics
- Embedded OS?

## What can we do as S&C SA

- Integration
- Device certification & testing





## Sensorise Clients

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## Automatic Switching

- Used for Network issues
- Multiple Networks
  - Primary
  - Failover
  - Alternate
- At first Power ON to Primary
- Subsequent Power ON
  - Select Last Network
- Auto Switch
  - Recognise network loss
  - Select Alternate Network

## Remote Switching

- Used for balance issues
- Remote Switch
  - Secure Message to trigger the Switch
  - Select the Network as advised by SenseLCM Server
  - Inform the server of selected network
- Subsequent Power ON
- If Network Rejection, the SIM recognises the event
  - Select Alternate IMSI
  - Refresh to Select Network

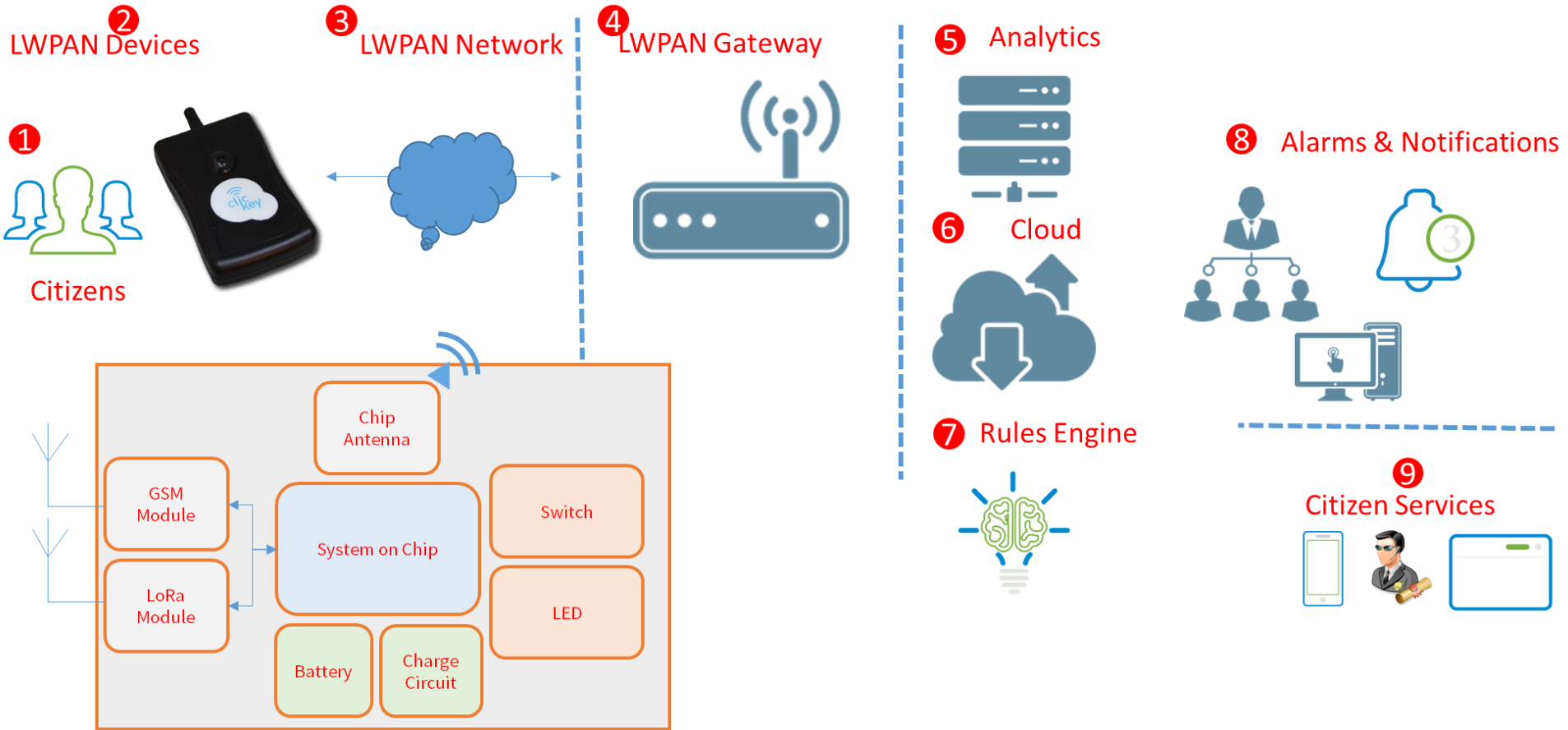


## Sensorise Devices & Sensors

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# Solution Concept



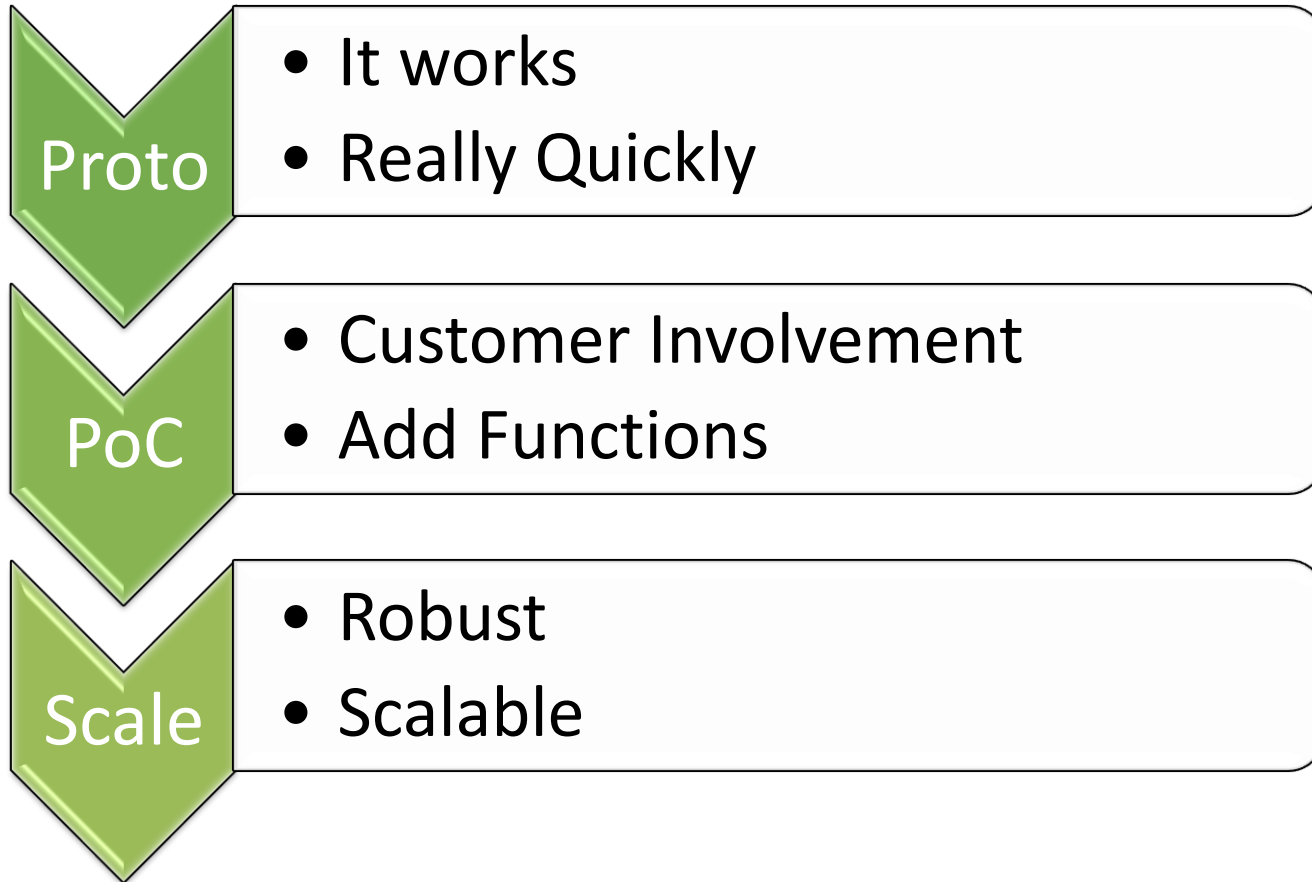
Slide Number 38



# Development Approach

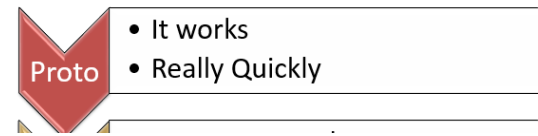
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# Development Approach



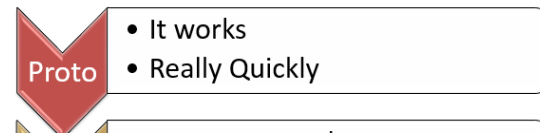


# Proto Candidates



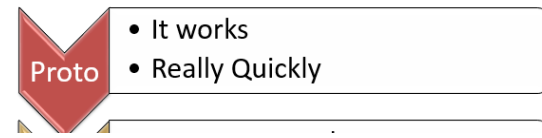
- Sensorise SIM Ordering
  - Input / Output files
- SIM Card Sales, Price and Packs
  - Partner
  - Device Type (Telematics/Agri/Health)
  - Order Qty
  - Form Factor
  - SIM Supplier (optional)
  - Import Device (optional)
- Lifecycle Management with Always On, QoS and Price Controls
  - G&D Applet ?
  - Follow the standards with GSMA
  - Follow the Regulatory
- Integrated UIs for Sensematic
  - iFrame issues with IE? → Use Chrome
  - Not Used by USR02/03: S&C Screen
    - view and manage properties and assets created by the Super/Enterprise/company admin.
    - creation and management of properties, assets and company level users and has access to company level configuration.
  - Used By: USR03
    - asses all the events triggered from the sites of interest
    - Manage
      - Take to a page within iVIS or S&C
      - Initiate an email to support
      - Initiate an SMS to a pre-configured mobile

# Proto Candidates



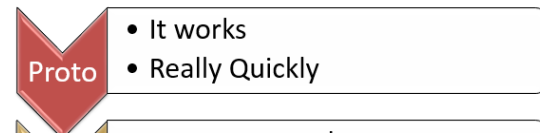
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# Proto Candidates



- SenseHome
  - Android App / Responsive Web
  - Import Map of a Building
  - Allocation of Gateways to Buildings
  - Allocation of Houses to Gateways
  - Show availability of Shared Gateways
  - Show Categories of Sensors
  - Show available payment plans for Sensors
  - Show existing Sensors
  - Show Person's bill plan and next payment date
  - Available Rules to select from
  - Request for a new rule
  - Remote management of the Sensors (reuse the S&C App)
- SenseHome FM
  - Android App / Responsive Web
  - Import Map of a Building
  - Allocation of Gateways to Buildings
    - Connected Homes: Green
    - Shared GW Available: Amber
    - Not in coverage: Red
  - Allocation of Houses to Gateways
  - Show availability of Shared Gateways
  - Show Gateways in Common areas
  - Show Subscribers
  - Show existing Sensors per Subscriber
  - Show Person's bill plan and next payment date

# Proto Candidates



- Open Source
  - Android App / Responsive Web
  - Import Map of a Building
  - Allocation of Gateways to Buildings
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