IoT Applications and Services

Our approach for intelligent communities.

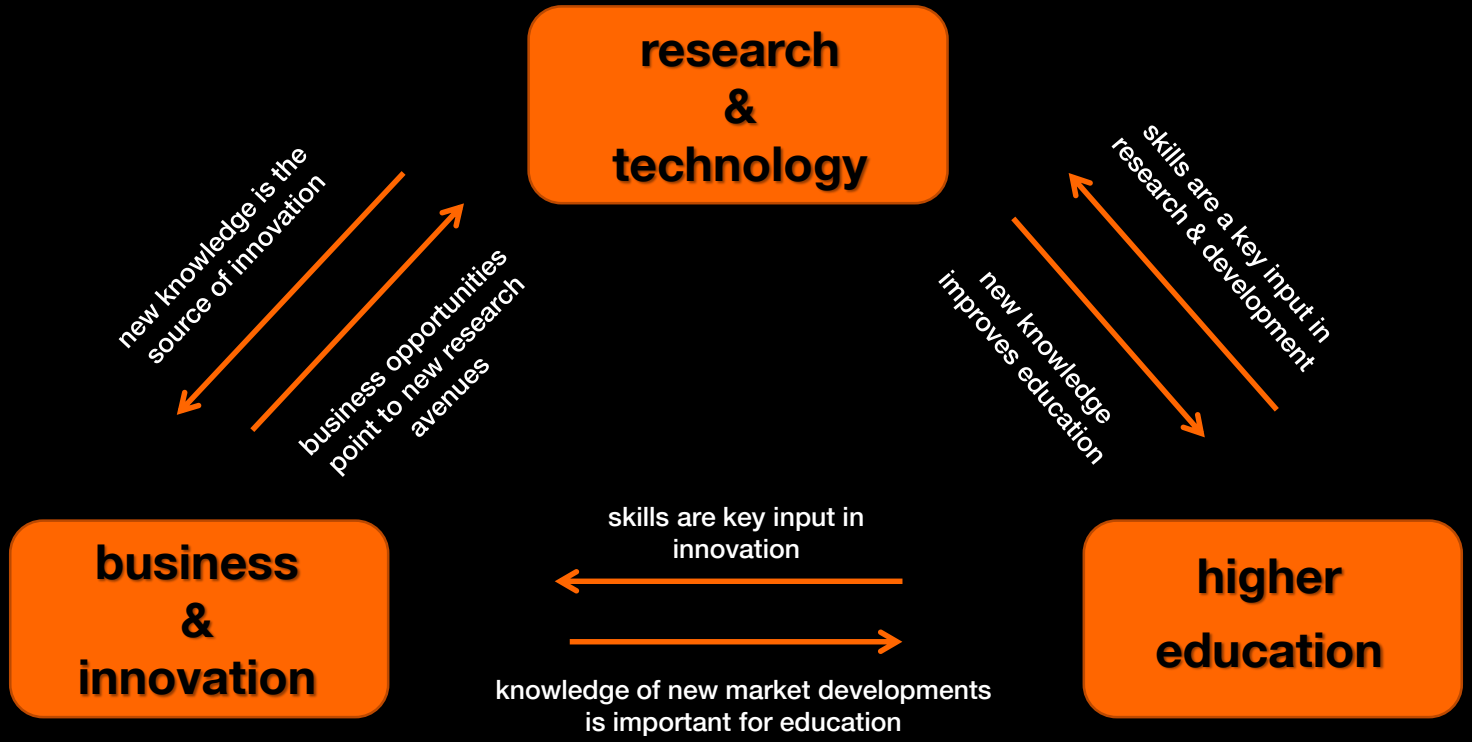
Dorian Draghici
Orange Romania
April 9th, 2019

Education & Innovation

for a smart sustainable society

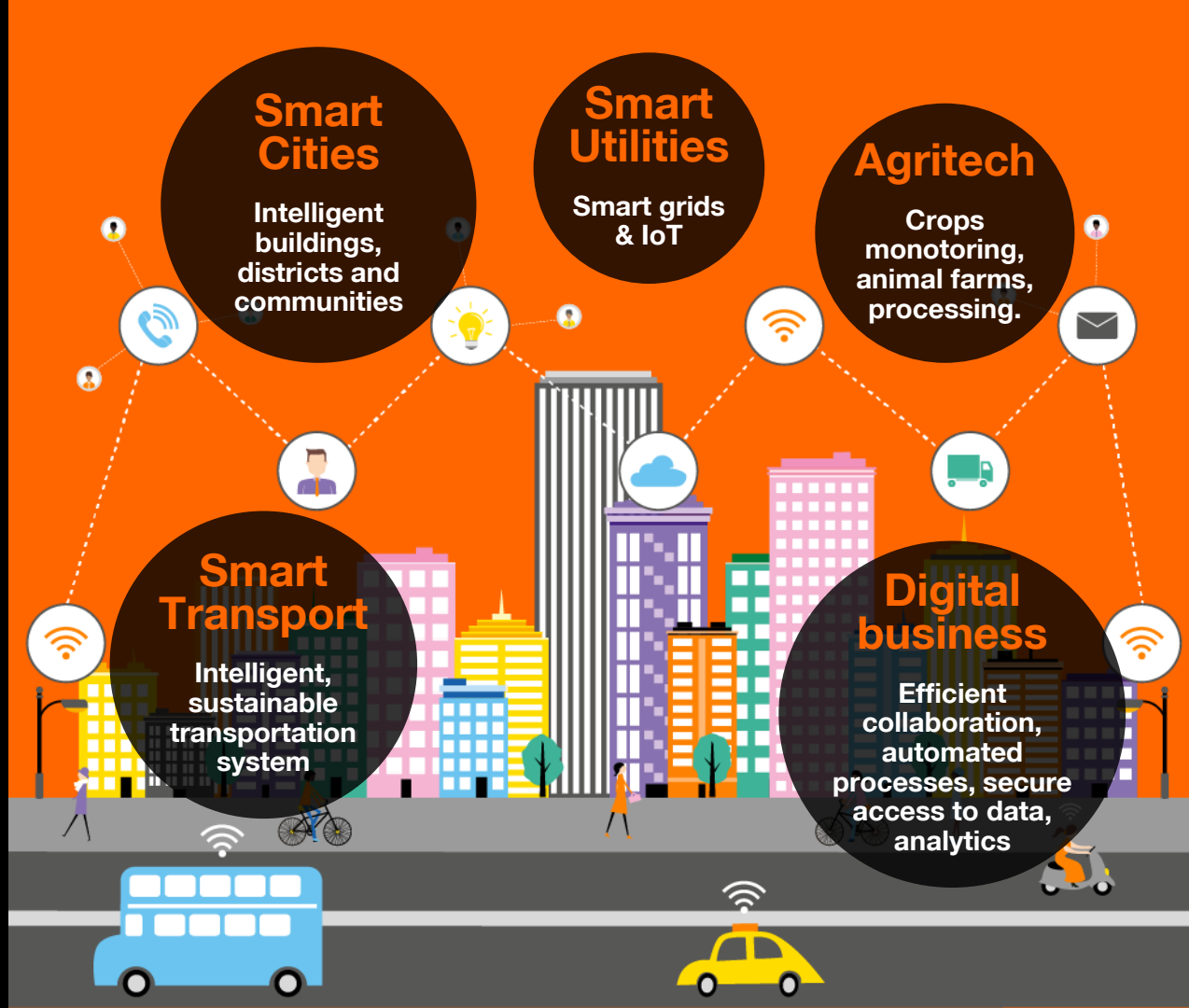
orange™

knowledge triangle
what is it?



Orange combines the strength of an operator and the expertise of a specialized digital services company to ensure the successful design, development, implementation and operation of your Smart Territories program.

Our services cover intelligent businesses, communities and cities.



our approach
partnering with top technological suppliers and key stakeholders

Cities

The product owner, who defines the objective, the planning and the scope of the project

Real estate

Prime contractor for buildings, districts and/or public spaces

City operators

Smart grid/water companies, companies established in urban space

Telcomms vendors & telcos

Leveraging their core expertise (Wi-Fi, M2M, IoT)

Hardware manufacturers

Turn-key energy, mobility, security and building solutions

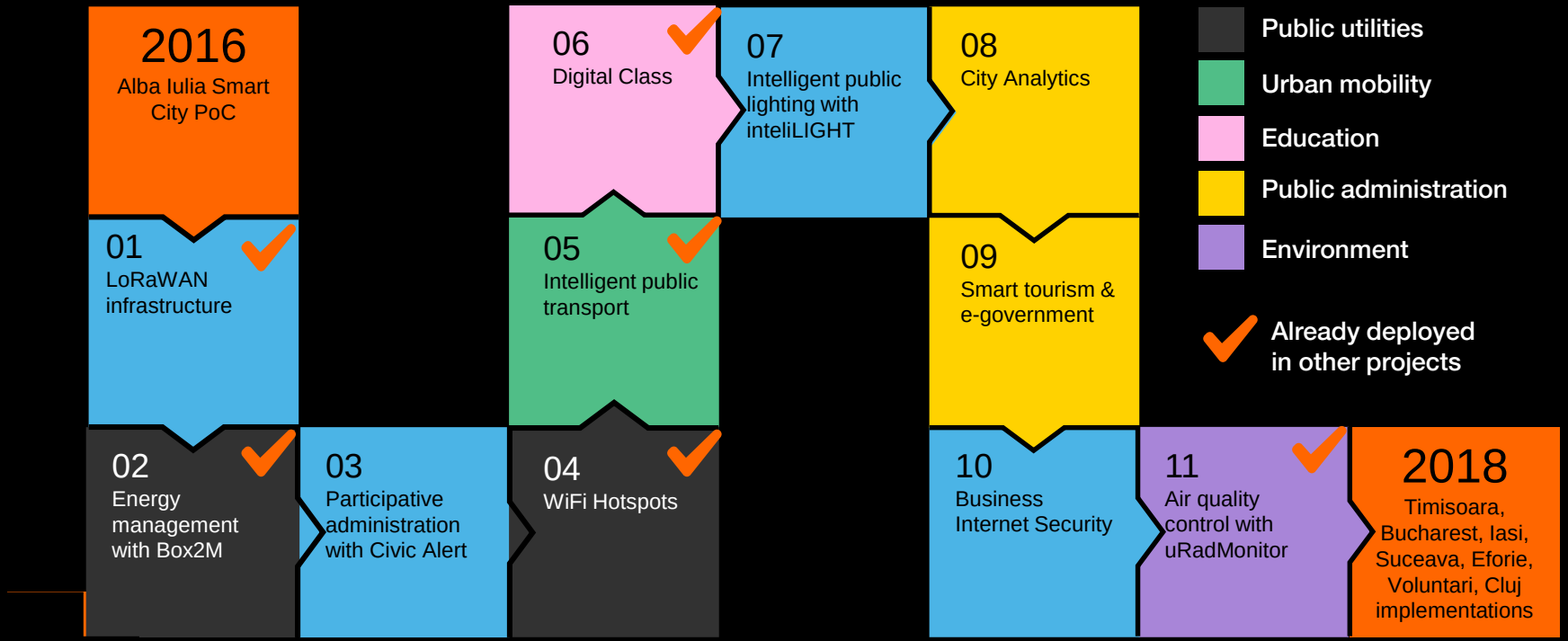
Start-ups & local innovation

City or state driven initiatives promoting local innovation ecosystem

Alba Iulia

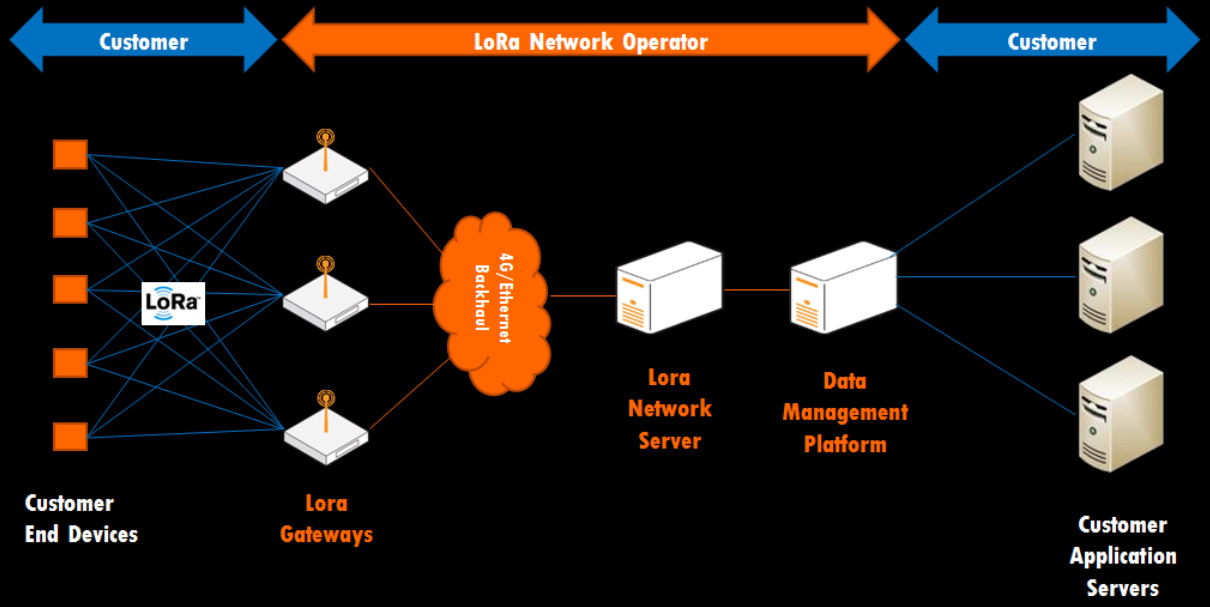
From the medieval citadel to the first open data pilot in Romania

Alba Iulia Smart City story
IoT components tested and ready to be deployed in other projects



orange™ Business Services

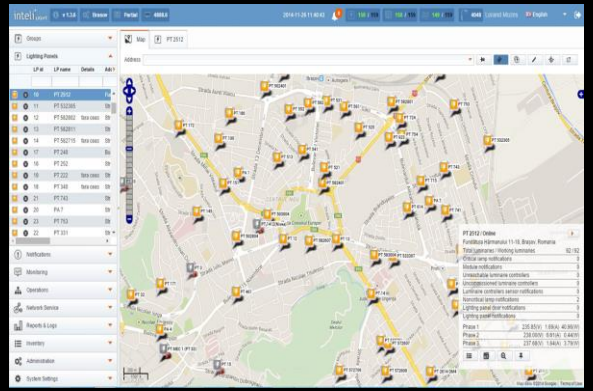
smart city, metering & industrial applications
LoRa WAN architecture

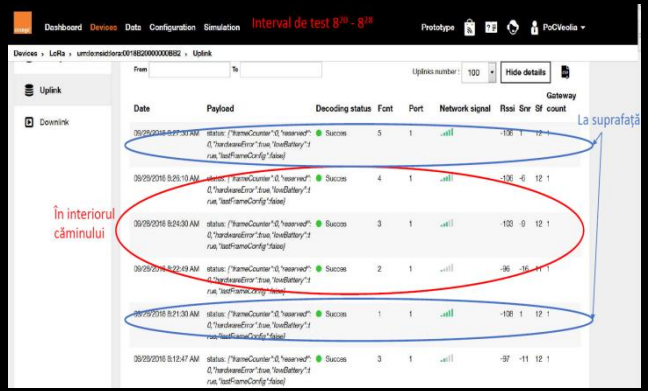


Feature	Description
RF Bands	863 – 870 MHz (for Europe)
Number of Channels	16 LoRa channels 3 mandatory channels: 868.1, 868.3, 868.5 13 channels that can be distributed on the 863-870 MHz
Modulation	FSK, Proprietary Spread Spectrum (LoRa)
Spreading factor	variable Spreading factor : SF7 (128) to SF12 (4096)
Bandwidth	125 kHz, 250 kHz
Coding rate (Forward Error Correction)	4/5 (overhead ratio: 1.25), 4/6, 4/7, 4/8 (overhead ratio: 2)
PHY Data Rate [bps]	250 (SF12, / 125 kHz), 440 (SF11 / 125 kHz), 980 (SF10 / 125 kHz), 1760 (SF9 / 125 kHz) 3125 (SF8 / 125 kHz), 5470 (SF7 / 125 kHz) 11000 (SF7 / 250 kHz) 50000 (FSK)
TX Power	From +2 dBm to +20 dBm (ERP) 2 dBm, 5 dBm, 8 dBm, 11 dBm, 14 dBm, 20 dBm

LoRaWAN for IoT applications
Alba Iulia services

LoRa Alliance
Wide Area Networks for IoT



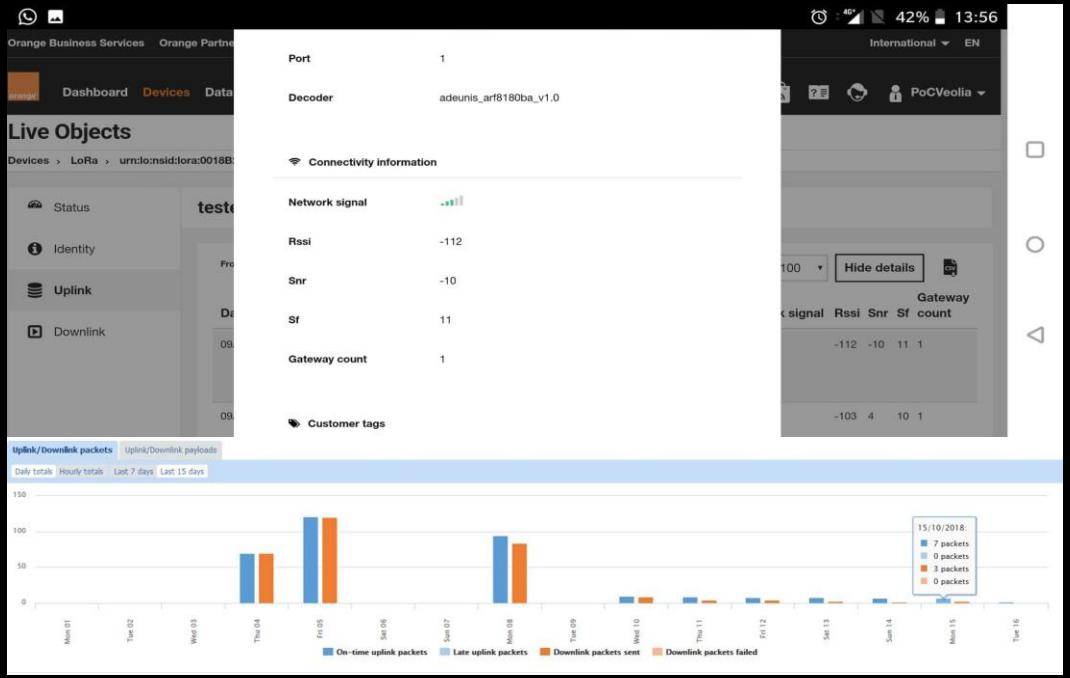


orange Business Services

LoRaWAN – Smart Metering
Bucharest – with Live Objects

orange™ Business Services

LoRaWAN – Smart Metering
Bucharest – with Live Objects



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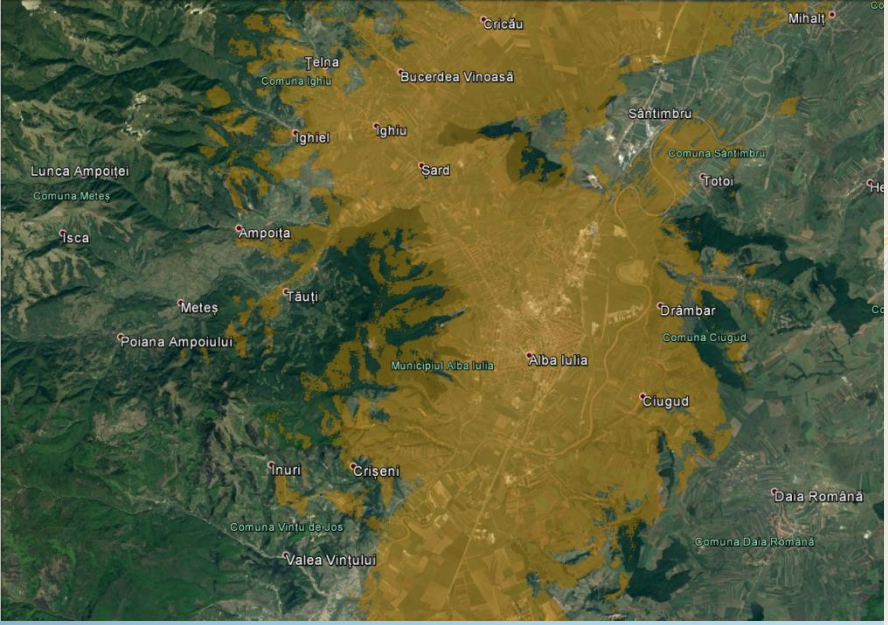
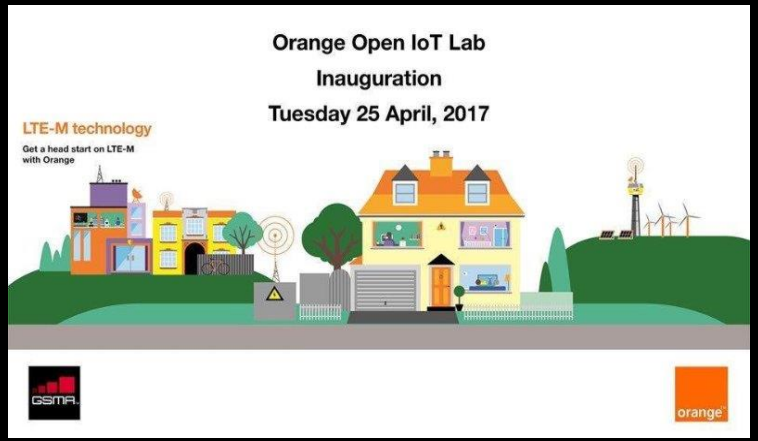

Cricău
Mihalț
Teiuș
Comuna Ighiu
Bucerdea Vinoasă
Sântimbru
Ighiel
Ighiu
Comuna Sântimbru
Lunca Ampoiței
Șard
Totoi
Comuna Meteș
Isca
Ampoița
Tăuți
Meteș
Drâmbar
Poiana Ampoiului
Comuna Ciugud
Municipiul Alba Iulia
Alba Iulia
Ciugud
Inuri
Crișeni
Daia Română
Comuna Vințu de Jos
Comuna Daia Română
Valea Vinților

107H
Șard
74
Alba Iulia
Teleac
Drâmbar
E81
107
107C
Șeușa
Ciugud
Limba
Mureș
Strada Carpenului
LoRaWAN enabled water meter [50]
LoRaWAN enabled lighting controller [100]
LoRaWAN GW [6]

LoRaWAN infrastructure to address current opportunities considering also the available applications and modules ecosystem

testing lighting control, energy sub-metering and water metering for optimizing energy and water consumption + air quality

LTE-M to address most of IoT use cases starting with 2018



digital class room
a complete solution for education

Dedicated Internet Access

Business Internet Security

Business Wi-Fi

Smart Board Videoprojector

Laptop, tablet, smartphone

Smart Printing

Video surveillance

Digital catalogue

e-learning apps training, virtual class

Videoconferencing Collaboration

softschool educational management

innovation partner

Innovation Labs 2017

Alba Iulia:
Universitatea “1 Decembrie 1918”
Grupul Scolar “Horea, Closca si Crisan”
Colegiul Economic “Dionisie Pop Martian”

orange™ Business Services

connectivity and engagement
on main city touching points

transportation: 8,883 unique users

Alba Iulia:
15 x buses Public Transport Company
2 bus stations
CFR train station

city hotspot: 75,243 unique users

Alba Iulia:
Alba Carolina citadel with all pedestrian places and bike trails including the 7 citadel gates

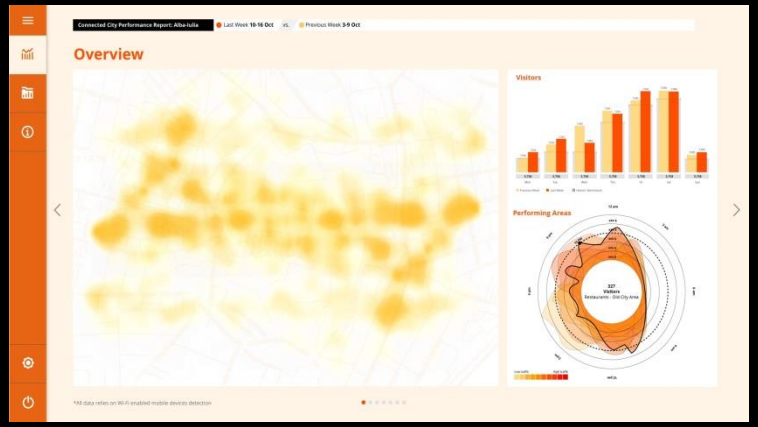
retail: 468,273 unique users

* one month reference

Secured Wi-Fi Hotspots

- Alba Carolina Citadel
- 2 Bus Stations
- Train Station
- 1 Decembrie 1918 University
- Horea, Cloșcă și Crișan College
- Dionisie Pop Marțian College

from networks to big data analysis for public service optimization
connected City Analytics



Fullscreen Digital

innovation partner

Innovation Labs 2014 winner

we use **Wi-Fi tracking technology**, **triangulation**, and **device detection** to create **real-time analytics** around visitors patterns and match these with other public services specific information to **improve Alba Iulia brand awareness** and boost citizens & visitors interactions with local authorities

> 65% of citizens & visitors will be anonymously monitored

from connectivity to data collection for customer engagement
citizen polling through public Wi-Fi

1 Wi-Fi AP per bus with Orange 4G backhaul, 15 buses

enhanced users experience during bus travel

opening the door for a new set of on-board value added services

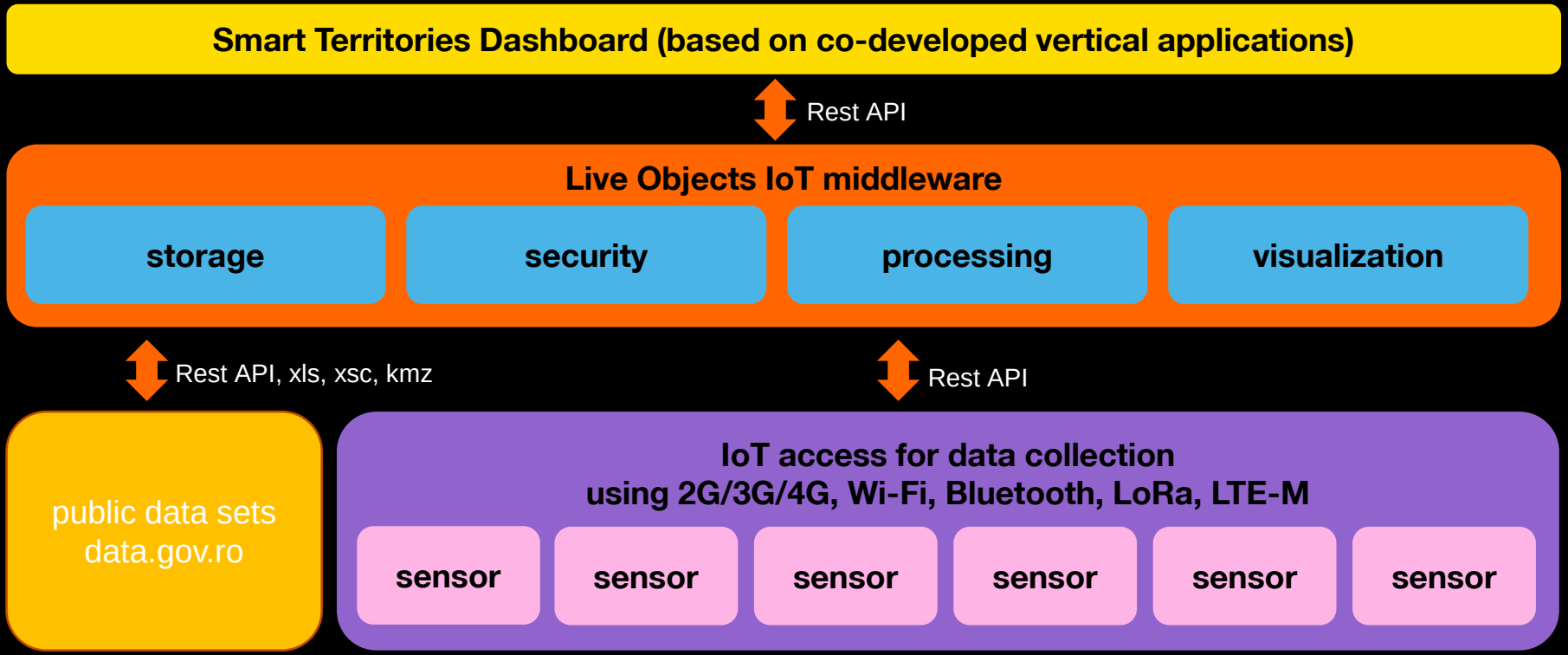
public interest information dissemination, collection and analytics based on on-line questionnaire

real time analyzes with bus dispatch, occupancy and location

safe internet surfing, secured access to digital content and public services, as well as to the preferred applications on smartphone, tablet or laptop

unlimited connexion (time or traffic)

open framework architecture
for co-innovation and urban collaboration



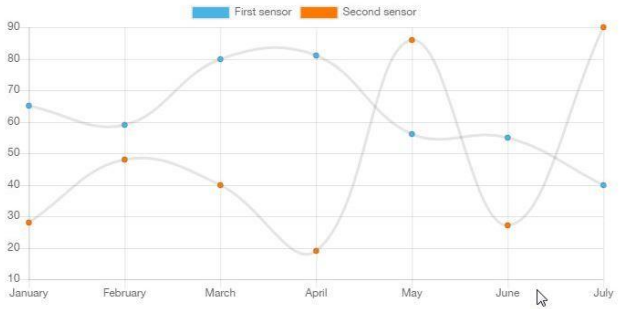
orange Home Settings Profile Help

Search Search

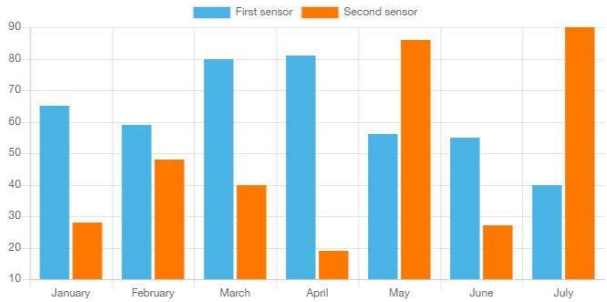
- Overview
- Reports
- Analytics
- Export
- Nav item
- Nav item again
- One more nav
- Another nav item
- Nav item again
- One more nav
- Another nav item

Dashboard

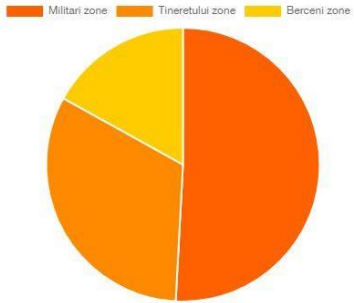
Temperature



Humidity



Level of pollution



List of sensors

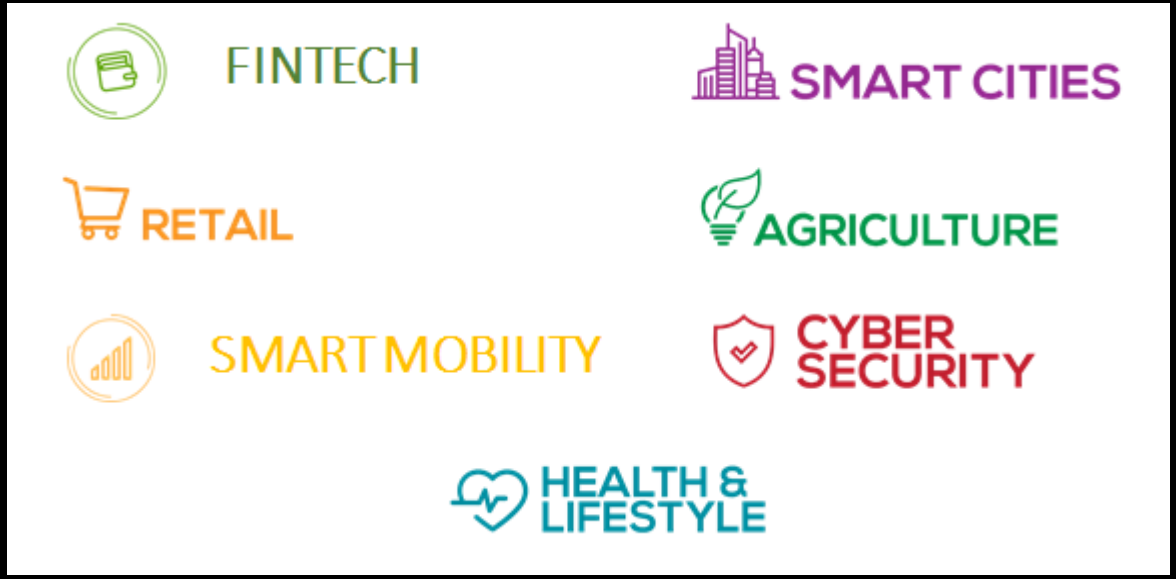
VIN	year	brand	type	Status
sdw3424	2011	Intel	temperature	✓
dsd2434	2016	IBM	temperature	!
sdsd3234	2010	TexasInstruments	temperature	!
s4545454f	2016	Intel	temperature	✓
jkhh88622	2016	TexasInstruments	temperature	✓
fv8232ksd	2009	IBM	temperature	!
jkhqhk786	2017	IBM	temperature	✓

open innovation for students & early start-ups
providing access to Alba Iulia smart city infra

- open data hackathons on smart city
- **Wi-Fi and environmental big data API**
- co-innovation methodology
- **real life prototyping and testing environment**
- crowd information platform
- **LoRa and 4G/LTE-M IoT kits**
- Infrastructure as a service (cloud)
- **use available data sets**

http://www.innovationlabs.ro

INNOVATION LABS 2018

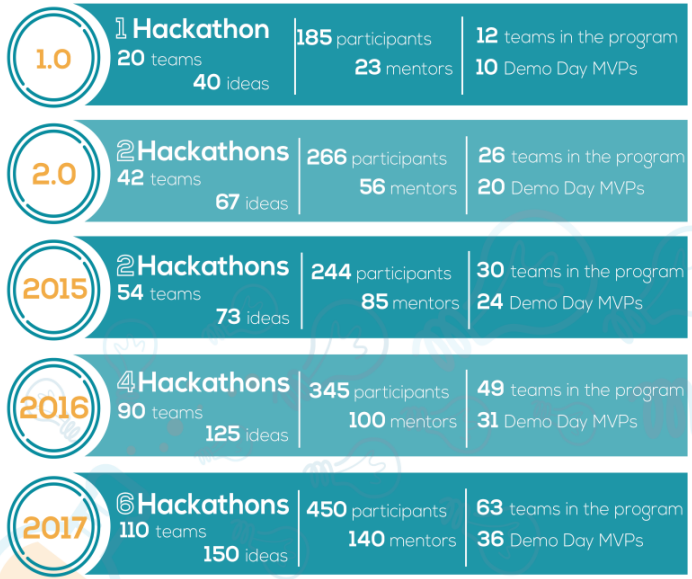


2014 Fullscreen Digital

2016 MAGNASCI

2017 softschool educational management

INNOVATION LABS



HACKATHON	3-4 March
MENTORSHIP PROGRAM	6.03-17.05
DEMODAY	21 May
CONTINOUS SUPPORT	July - Sept

Thank you!