

- **5th Hungarian Future Internet Conference 2018**

Novi Sad Evolution towards Smart City

Dr Dejan Drajić, DunavNET

28.11.2018.
Budapest

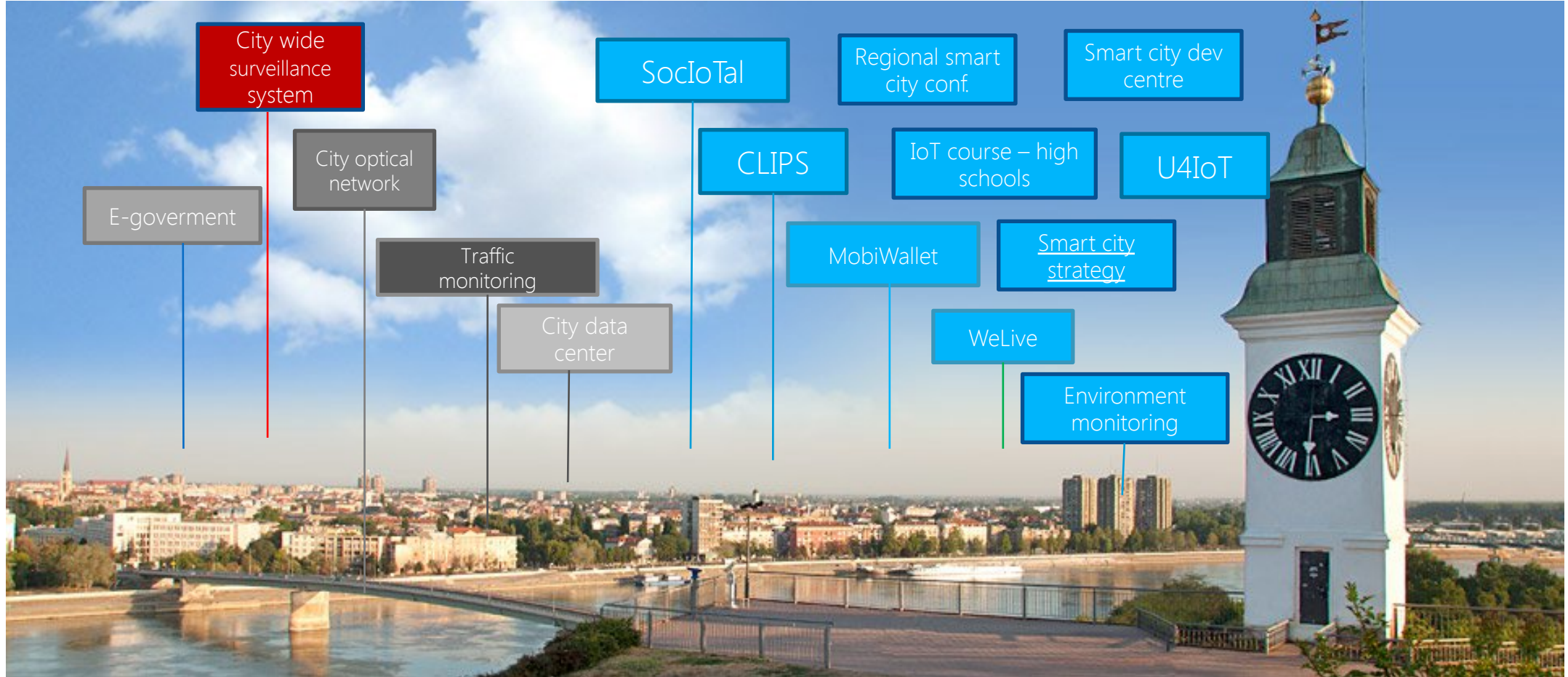
Before EU collaborative projects...



Novi Sad in FP7 & H2020



After EU collaborative project...



Crowdsourcing community problems

The screenshot displays the mojNS mobile application interface, which is used for crowdsourcing community problems. The interface is divided into three main sections: 'Set position', 'New Event', and 'My Events'.

Set position: This section shows a map of a city area with a location pin. The map includes labels for streets such as Skadarska, Novoseljanski put, Bosanska, Hercegovačka, E-70, Miloša Obrenovića, Čumićeva, Kneza Mihaila Obrenovića, and Oslobodjenja. A location pin is placed near 'Pančevo Varoš' (Панчево Варош) and 'Stevana Šupljikca'.

New Event: This section contains a form for creating a new event. The fields are as follows:

- Topic:** Prijavljivanje komunalnih probl..
- Date:** 28 September 2015, 10:43
- Exp date:** 29 September 2015, 10:43
- Comment:** komentar

My Events: This section displays a list of previously reported events. Each event entry includes the following information:


- Time:** 18:42, 18:38, 13:10, 12:41, 18:48, 18:45
- Description:** hshs, fff, sjsj, vshd, hhh, gggg
- Request ID:** null
- Status:** EVIDENTIRANA
- Date:** 25.9.2015 0:00:00, 23.9.2015 0:00:00

The application also features a sidebar with logos for 'mojNS', 'ИНФОРМАТИКА ЈКП НОВИ САД', 'DUNAV NET', 'Cloud Approach for Innovation in Public Services', and 'Град Нови Сад City of Novi Sad'. The version number 'Version 1.4' is visible in the bottom left corner.

Open data – community infrastructure

clips.dunavnet.eu/AddressEquipment

Opremljenost adrese Registracija [Prijava](#)



Pretraži:

Naziv kom. opremljenosti	Naziv
Apoteka u prečniku do 1500 m	Ima
Banke, štedionice i sl. u prečniku do 2500 m	Ima
Biblioteka u prečniku do 1500 m	Ima
Bioskop u prečniku do 1500 m	Ima
Broj stanovnika po hektaru stambenog dela u prostornoj jedinici	Do 160 st/ha

Prikaz 1 - 5 od ukupno 24 rezultata Prethodna **1** 2 3 4 5 Sledeća



Registration

Username

CLIPSNS1

E-mail

clips_ns1@gmail.com

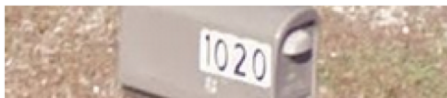
Password

.....

Password (again)

.....

Captcha



1020



I accept [Terms and Conditions](#)

Sign Up

[Forgot password](#) | [Didn't receive confirmation instructions?](#)

Popunite podatke

Dobićete email da aktivirate nalog

Hello CLIPSnovisad!

Welcome and thank you for registering for Informatika's cloud services, part of the CLIPS project pilot! See more details about the project [here](#)

[Please, click here to activate your account.](#)

Your utility bill, online.



DUNAV
NET



ИНФОРМАТИКА
JKP НОВИ САД



Dobrodošli!

Dobrodošli na stranicu za registraciju gde možete da napravite nalog kojim ćete pristupati servisima koji su deo pilota u okviru CLIPS projekta (www.clips-project.eu).

Cilj pilot je da demonstrira i evaluira mogućnosti korišćenja "cloud" tehnologija za optimizaciju i efikasniju implementaciju različitih gradskih servisa čime se olakšava korišćenje takvih servisa građanima i stvara osnova za kreiranje novih servisa od strane pojedinaca i zainteresovanih kompanija.

Nakon registracije posetite: ckan-clips.dunavnet.eu ili skinite mojNS aplikaciju sa **Google Play** za Vaš Android telefon

Na clips.dunavnet.eu možete pristupiti evidenciji svojih računa kod JKP Informatika, samostalno promeniti broj članova domaćinstva ili pregledati ponude osiguravajućih kuća.

U pripremi je i online plaćanje računa JKP Informatike o čemu ćemo Vas blagovremeno obavestiti.

Ako ste kompanija koja želi da iskoristi "open data" koje gradska uprava Novog Sada daje, pristupite ckan-clips.dunavnet.eu i istražite mogućnosti uključivanja pretrage open-data u Vašu aplikaciju ili servis. Svi ostali mogu da vide podatke o komunalnoj opremljenosti pojedinih gradskih zona na osnovu podataka koje JKP Informatika ima.

Aplikacija za pametne telefone mojNS Vam omogućuje da prijavite određene komunalne probleme odgovarajućim gradskim službama. Svaka prijava se prosleđuje gradskom dispečerskom centru Komunalne policije grada, a odatle nadležnim službama. U svakom trenutku možete dobiti obaveštenje o statusu Vaše prijave.

Više detalja o CLIPS projektu možete naći na www.clips-project.eu.

Pravila korišćenja i izjave o privatnosti podataka možete pročitati [ovde](#).

Opremljenost adrese

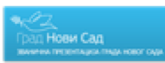
Registracija

Prijava

Utility bill

Račun Promena ▾ Opremljenost adrese

Hello clipsnovisad! Odjava



CLIPS Demo

1536211007

Pogledajte najnoviji ili stare račune

Mesec: Avgust ▾

Godina: 2015. ▾

Filtriraj

Usluga	Snabdevač	Cena usluge (din)	Za uplatu (din)	Količina	Odabrane usluge	
DIM	Dimničarina	JKP STAN	106	0	0	<input type="checkbox"/>
HLV	Hladna voda	JKP VODOVOD I KANALIZACIJA NOVI SAD	2223.93	0	0	<input type="checkbox"/>
ČIS	Odošenje smeća	ČISTOĆA JKP	813.45	0	0	<input type="checkbox"/>
DER	Deratizacija - dezinfekcija	CIKLONIZACIJA	45.52	0	0	<input type="checkbox"/>
EKO	Ekologija	NAKNADA ZA ZAŠTITU ŽIVOTNE SREDINE	106	0	0	<input type="checkbox"/>

UKUPNO (din) 0.00

Uplati

Change number of residents

Technology part
was easy

Updating internal
processes was
not...

Promena broja članova

Ime:

CLIPS

Prezime:

Demo

Email:

clips.ns1@gmail.com

Telefon:

1

ApartmentId:

1536211007

CitizenId:

2405971805029

Broj članova:

5

Datum korišćenja:

08/01/2015

Potvrdi

Current public services are built following an **administration-centric approach** which drives into a low usage of those services.

PAs are facing **key socioeconomic challenges** such as demographic change, employment, mobility, environment... plus the squeeze on public finances

Citizens expectations in terms of burden reduction, efficiency and personalisation **are growing...**

Cities and territories should be **transformed** into **hubs of welfare, innovation** and **economic growth** giving place to Smarter Cities or territories.

WeLive provides tools to promote **co-innovation** where data publishers, citizens and developers can meet each other and **co-create personalized and sustainable public services** for real needs and actively take part in the value-chain of a municipality or a territory

P. Administration



Citizens



Companies

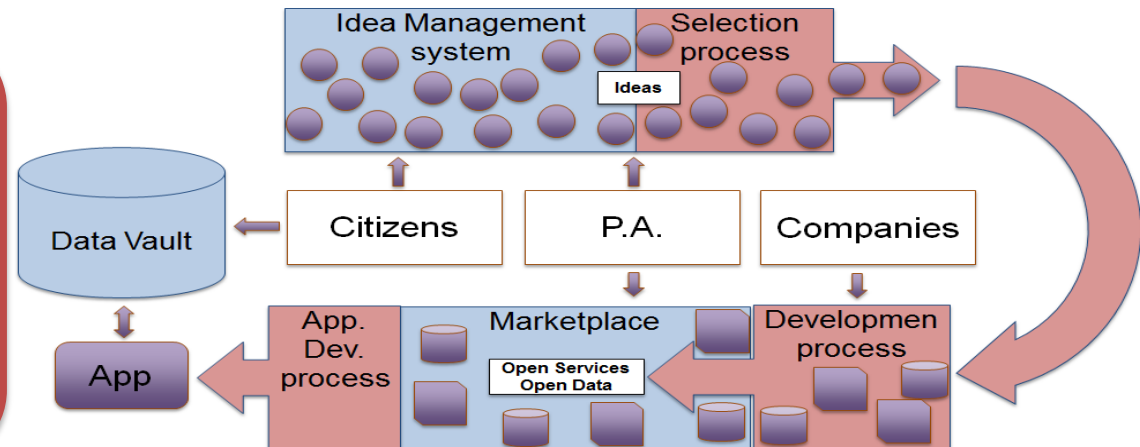


**Stakeholder Collaboration + Public-private Partnership →
IDEAS >> APPLICATIONS >> MARKETPLACE**

1 WeLive offers tools to **transform the needs into ideas**

2 Tools to **select the best Ideas** and create the **B. Blocks**

3 A way to **compose the Building Blocks into mass market Applications** which can be exploited through the marketplace



To provide an integrated framework made up of technologies and methodologies to facilitate the collaboration between the local actors and PAs during the **design**, **production**, **delivery** and **monitoring** of the public services.

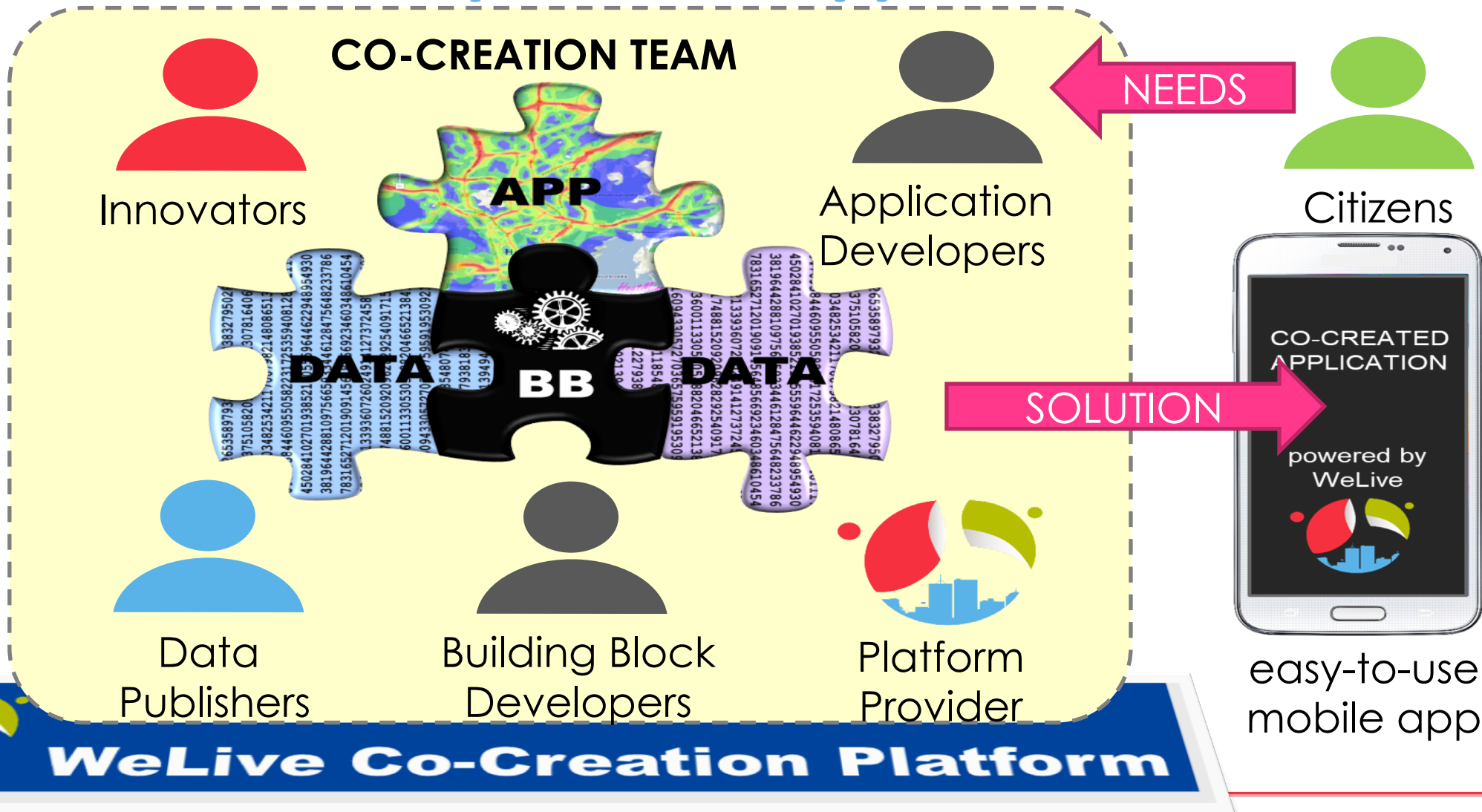
Government/Public Authorities

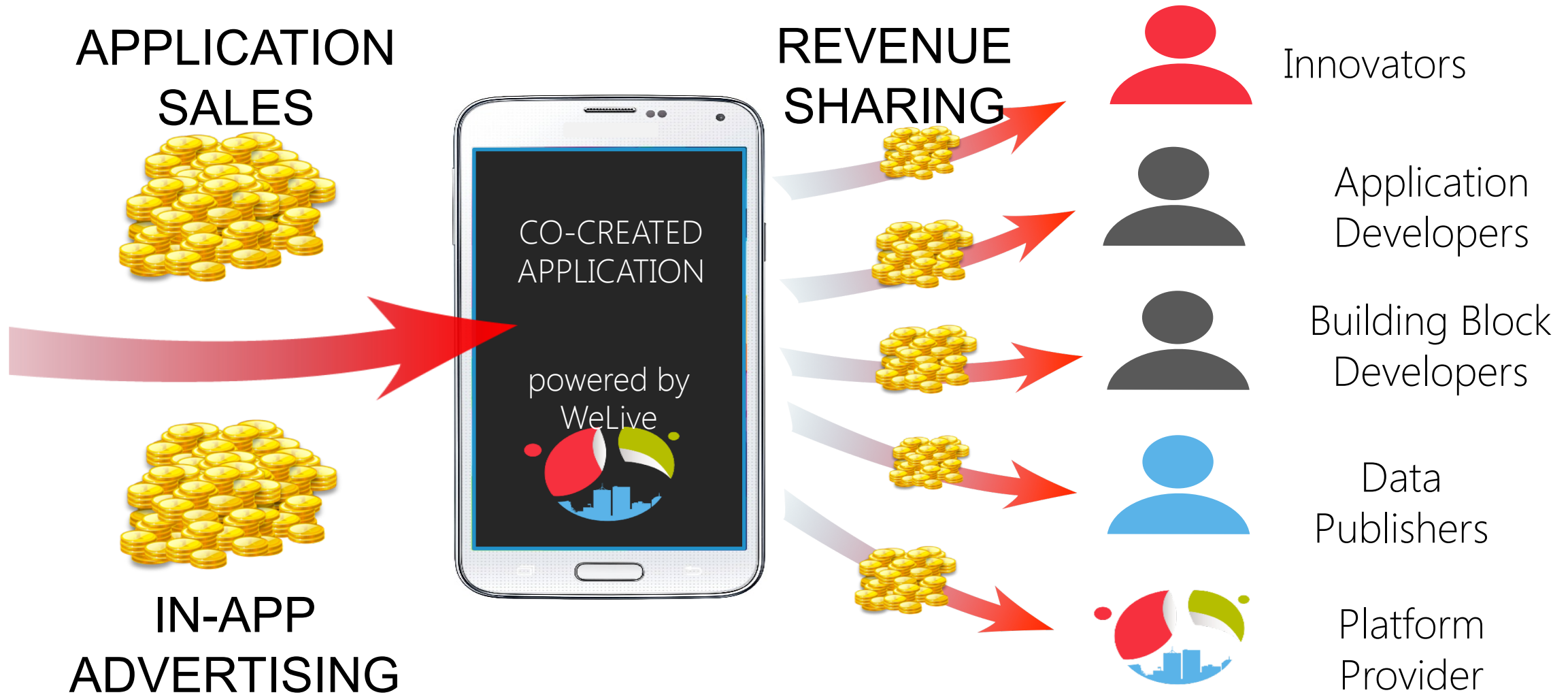
- can identify the needs of citizens in more effective way;
- are the facilitators of the activities aimed at solving the needs in a citizen-driven perspective.

Citizens, Academics, Industries

- can report common needs;
- can cooperate with each other (including the PAs) in order to create high valued and personalized services.

WeLive makes it EASY and FUN to CO-CREATE Open Data Applications





Urban apps obtained by WeLive

The screenshot shows a Google Play Store search for 'welve_project'. The search results are displayed in a grid of app cards. Each card includes an app icon, the app name, the developer 'WeLive Project', and a star rating. The apps are:

App Name	Rating
WeLive Player	★★★★★
sportit	★★★★★
Bilbozkatu	★★★★★
Auzonet	★★★★★
Bilbon	★★★★★
Public procurement	★★★★★
My Polls	★★★★★
Trento Informer	★★★★★
Helsinki City Museum	★★★★★
My Opinion	★★★★★
Helsinki City Bikes	★★★★★
Relocation Advisor	★★★★★
Trento Transport	★★★★★
My Neighbourhood	★★★★★
Safe Trip	★★★★★
Bilbao Events	★★★★★
Trento Room Book	★★★★★
BIG Klub	★★★★★

ekoNET - know the air you're breathing

ekoNET combines portable devices and cloud based functionality to enable air quality monitoring (indoors and outdoors) in a very granular manner, previously not possible due to high cost.

Enables monitoring of concentration of

- PM (particles), CO, CO₂, SO₂, NO_x, Ozone, temp., humidity, noise
- in the air
- in real time
- air quality index calculated

People advised on how to behave in case of increased pollution.

Turnkey, cost-efficient, scale as you grow solution for monitoring a range of environmental parameters.



A city-wide granular view of air quality – the first step in combating air pollution health hazards

Powerful reporting

- Dashboard view to visualize real-time and historical measurements
- CAQI calculation and reporting
- Mobile app and web widget for more flexibility

Flexible configuration

- Multiple communication interfaces (WiFi, 3G, LoRa, NB-IoT, Ethernet)
- Rich set of sensors to choose from (PM, NOx, SO2, CO, CO2, O3, temp. humidity, etc.)

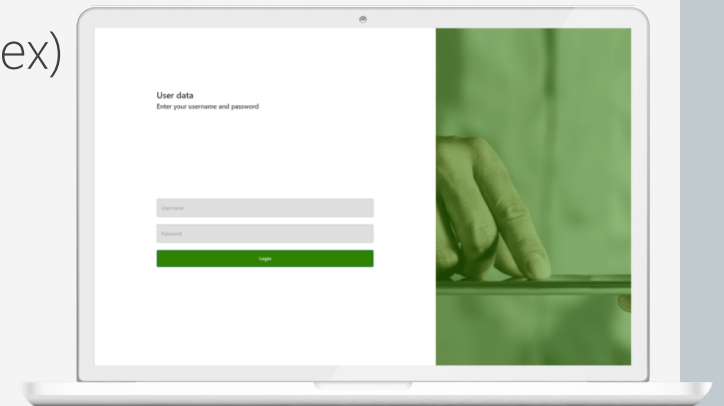
Secure, enterprise grade environment

- Deployed on MS Azure for security and reliability
- On ours or yours cloud subscription for increased control of private data
- GDPR compliance

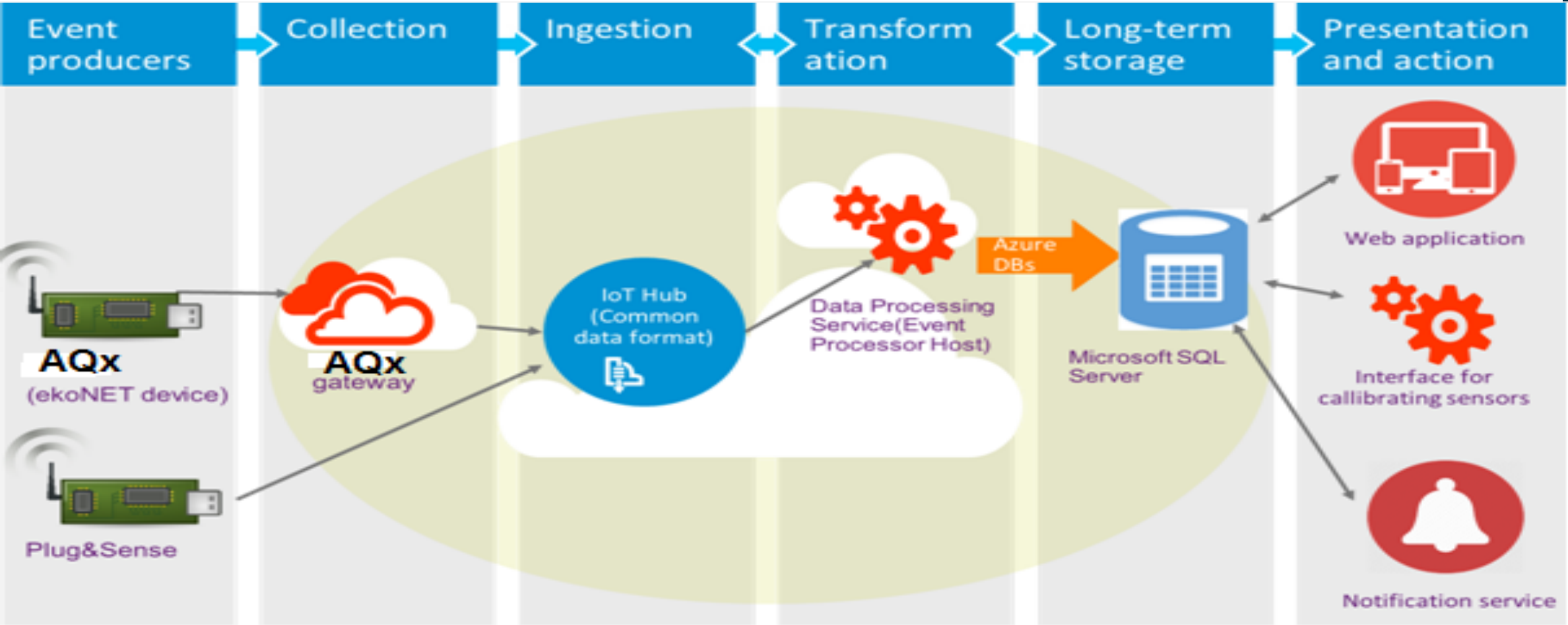


Main features

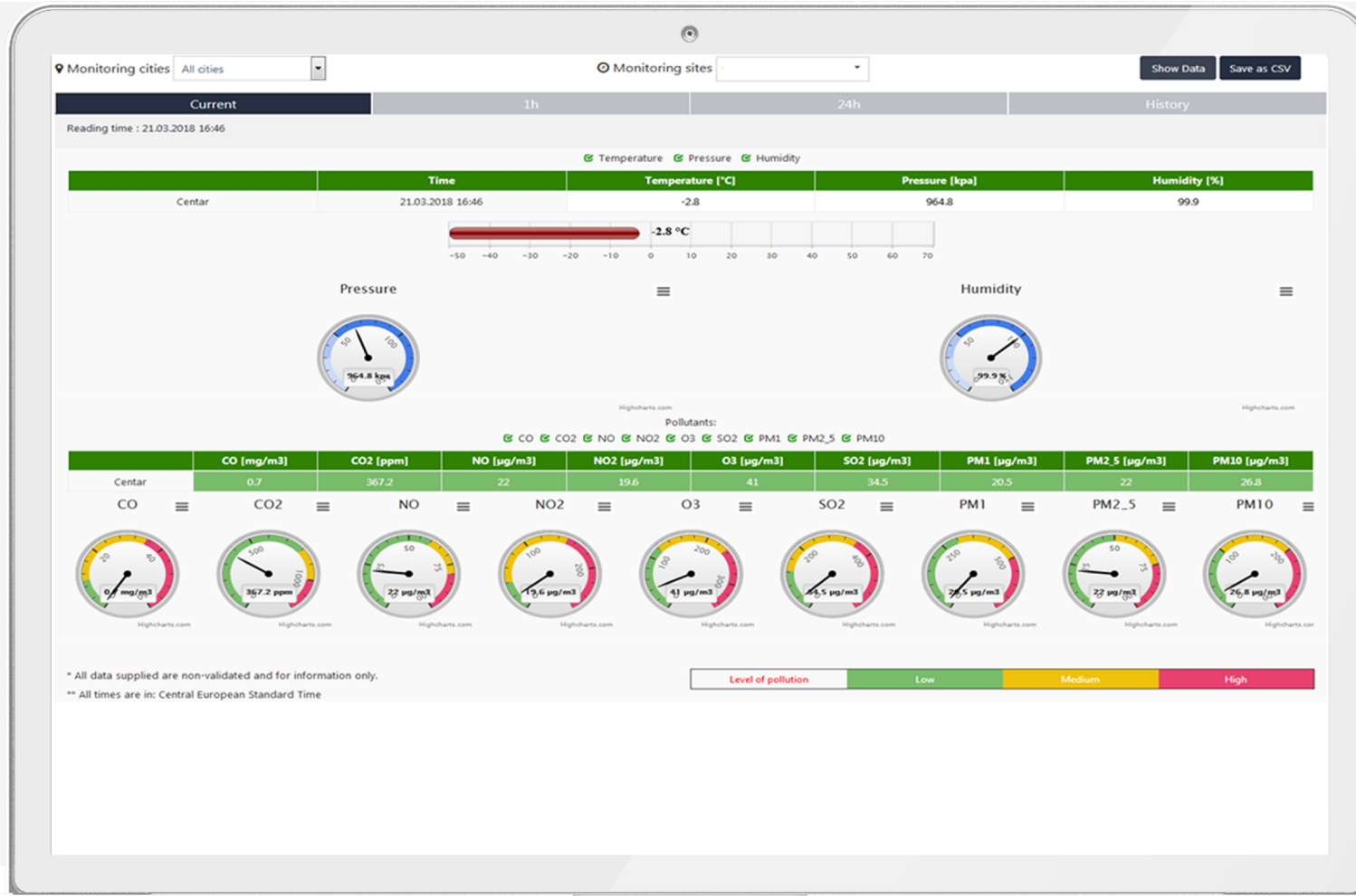
- Flexible device configuration
 - Multiple communication interfaces supported (3G, LoRa, NB-IoT, WiFi, Ethernet)
 - Configurable set of sensors: PM, CO, CO₂, NO, SO₂, NO₂, O₃, temp, humidity, noise
 - High quality gas sensors
- Data visualization (map, list, graph)
 - Current values
 - 1h values
 - 24 values
 - Calculated CAQI-1h and CAQI-24h (Common Air Quality Index)
 - Historical values (over selected period of time)
- Notifications/alarms when values out of defined range
- Algorithms for data processing
- Export to CSV file (RAW, calibrated values, time, GPS ...)



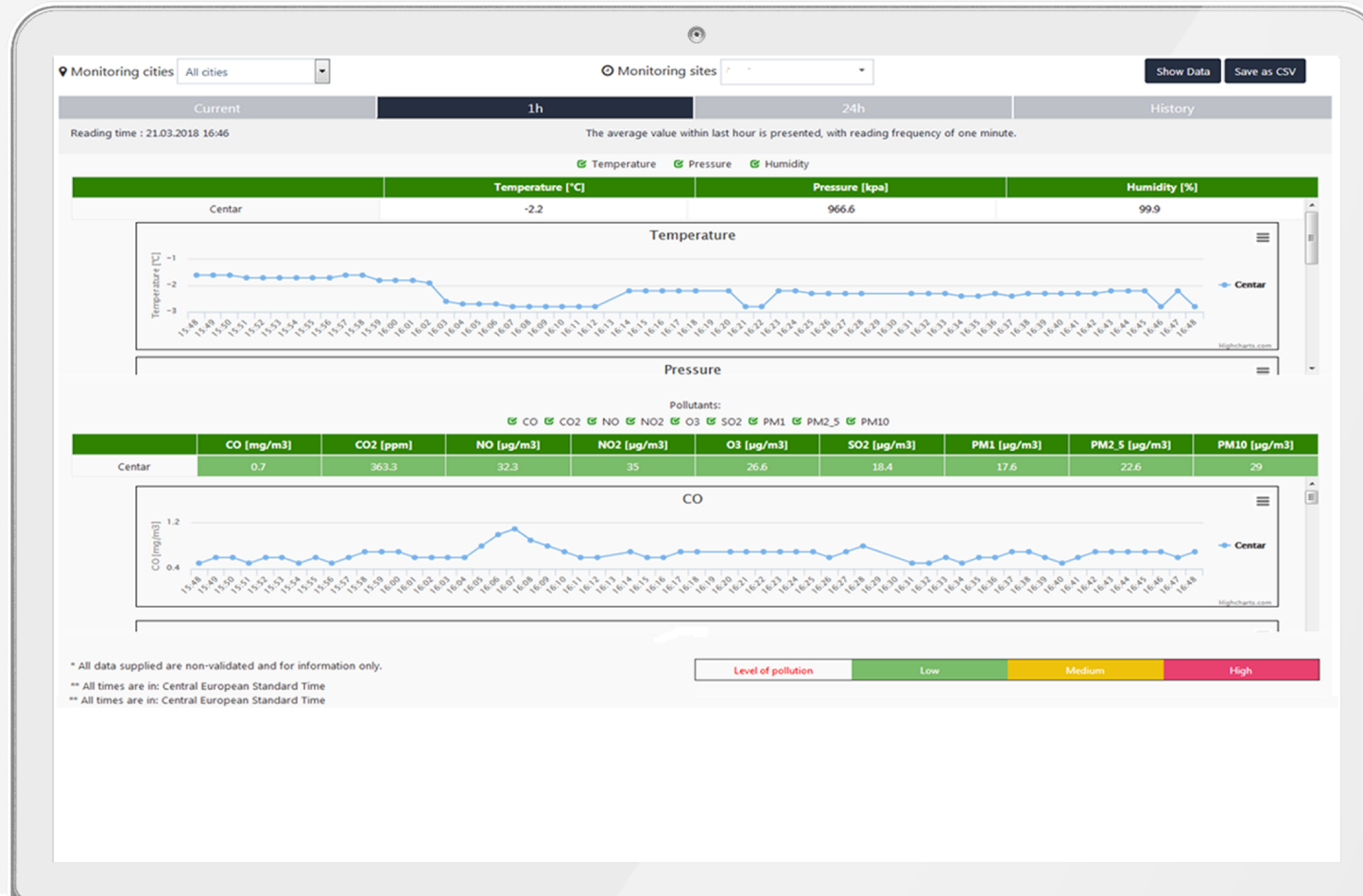
Architecture



Data visualization



Data visualization



Data visualization



Monitoring cities: All cities | Monitoring sites: 3 selected | Show Data | Save as CSV

Current | 1h | 24h | History

Reading time: 21.03.2018 16:53 | Table

Temperature Pressure Humidity

	Time	Temperature [°C]	Pressure [kpa]	Humidity [%]
Centar	21.03.2018 16:53	-2.8	964.8	99.9
Toplana	21.03.2018 16:53	-0.9	1005	99.9
Žitopromet	30.01.2018 12:39	13.2	1003.8	59.9

Pollutants:
 CO CO2 NO NO2 O3 SO2 PM1 PM2_5 PM10 Noise

	Time	CO [mg/m3]	CO2 [ppm]	NO [µg/m3]	NO2 [µg/m3]	O3 [µg/m3]	SO2 [µg/m3]	PM1 [µg/m3]	PM2_5 [µg/m3]	PM10 [µg/m3]	Noise [dB]
Centar	21.03.2018 16:53	0.7	364.9	30.7	30.6	26.9	17	19.5	24.8	30.1	-
Toplana	21.03.2018 16:53	0.5	-	24.7	59.9	0	15.6	13.4	16.9	26.3	-
Žitopromet	30.01.2018 12:39	0.2	-	11.5	3.7	21.3	32.8	0.2	0.2	0.3	-

* All data supplied are non-validated and for information only.
** All times are in: Central European Standard Time

Level of pollution: Low (green), Medium (yellow), High (red)



CAQI – common air quality index



CAQI		NO2	PM 10 (1h)	PM 2.5 (1h)	CO	O3	SO2	CAQI-1h	PM 10 (24h)	PM 2.5 (24h)	CAQI-24h
	AQ_Belit1	>400	31	48.5	19.1	-	-	48.5	-	-	-
	AQ_Belit2	20.4	31.7	42.7	52.8	-	-	52.8	64.5	52.3	64.5
	AQ-TMobile0	-	17.3	21.6	-	-	-	21.6	37.2	40.3	40.3
	AQ-TMobile1	-	0	0	-	-	-	0	0	0	0
	AQ-TMobile10	-	3.7	6.1	-	-	-	6.1	21.4	27.7	27.7
	AQ-TMobile2	-	3.2	5.4	-	-	-	5.4	20.3	26	26
	AQ-TMobile3	-	0	0	-	-	-	0	0.2	0.2	0.2

Administration



- Registration/update of access credentials
- User role privileges
- Monitoring sites
- Device parameter settings
- Alarms (SMS and emails)

The screenshot displays the 'Setting parameters' page for a device. On the left, a sidebar lists various parameters: Temperature, Pressure, Humidity, CO, CO2, NO, NO2, O3, SO2 (highlighted in green), PM1, PM2.5, and PM10. The main content area is titled 'Setting parameters' and includes fields for Device (Stanica1), Sensor (SO2), and Unit (µg/m3). Below this is a 'Measuring range' table with columns for Scope, Name, Min, Max, and Color. A 'Save scope' button is located below the table. The 'Calibration' section contains a formula field (A * conc + B), a description of the formula, and fields for Coefficient A (315.31) and Coefficient B (2.16). At the bottom, there are 'Back' and 'Save' buttons.

Below the settings page, a table shows the activity log. The table has columns for 'ctivity date', 'Approved', 'Locked', and a set of action buttons (Delete, Edit, Change password). The 'Approved' column contains green checkmarks, and the 'Locked' column contains padlock icons. The 'Change password' button is disabled for all entries.

ctivity date	Approved	Locked	Delete	Edit	Change password
015 10:15:57 PM	✓	🔒	Delete	Edit	Change password
015 9:19:46 AM	✓	🔒	Delete	Edit	Change password
15 11:32:24 AM	✓	🔒	Delete	Edit	Change password
16 10:14:10 AM	✓	🔒	Delete	Edit	Change password
015 8:43:30 AM	✓	🔒	Delete	Edit	Change password
15 12:32:34 PM	✓	🔒	Delete	Edit	Change password
5 11:33:28 AM	✓	🔒	Delete	Edit	Change password
5 9:39:05 AM	✓	🔒	Delete	Edit	Change password
15 11:17:23 AM	✓	🔒	Delete	Edit	Change password
nebojsh@gmail.com			Delete	Edit	Change password
nedic.daliborka@gmail.com		6/23/2015 2:07:26 PM	Delete	Edit	Change password



- **AIMS**
 - inclusion of end users in the design of applications
 - gathering of Big data (if majority of citizens install the app)
- **METHODOLOGY – creative workshops with citizens > feedback**
- **Novi Sad**
 - 9 workshops with local communities**
 - 120 attendants**
 - 45 – age from 30 to 50**
 - 75 – age over 50**
- **Co-creation workshops - small focus groups in Novi Sad**
 - official representatives of communities
 - daily internet users, but not IT experts
 - professionals (software developers)

Novi Sad – pilot implementation

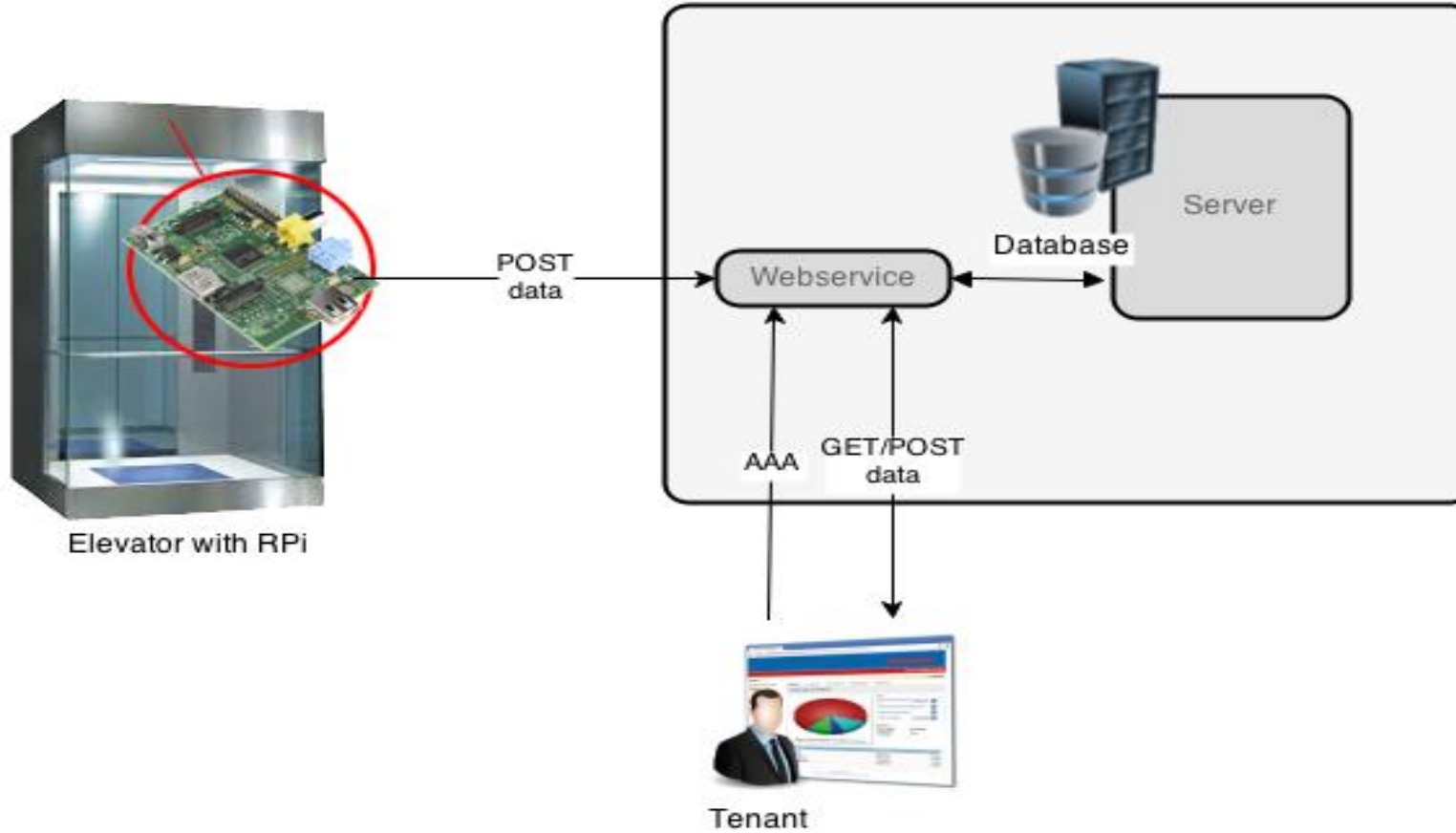
- *Elevator Supervisor*
- *Mood of the city*

- **Elevator Supervisor has been chosen as a pilot project on the co-creation workshop due to the following reasons:**
 - each elevator has its own closed software system
 - no digital back up of working history
 - better quality assurance if elevator is monitored

Elevator Supervisor

- **Raspberry Pi device with accelerator has been installed**
 - detecting distance
 - automatic malfunction detection and notification
 - tracking history of previous maintenances
 - data is uploaded and stored on web portal,
 - accessible only by authorized users

Elevator Supervisor

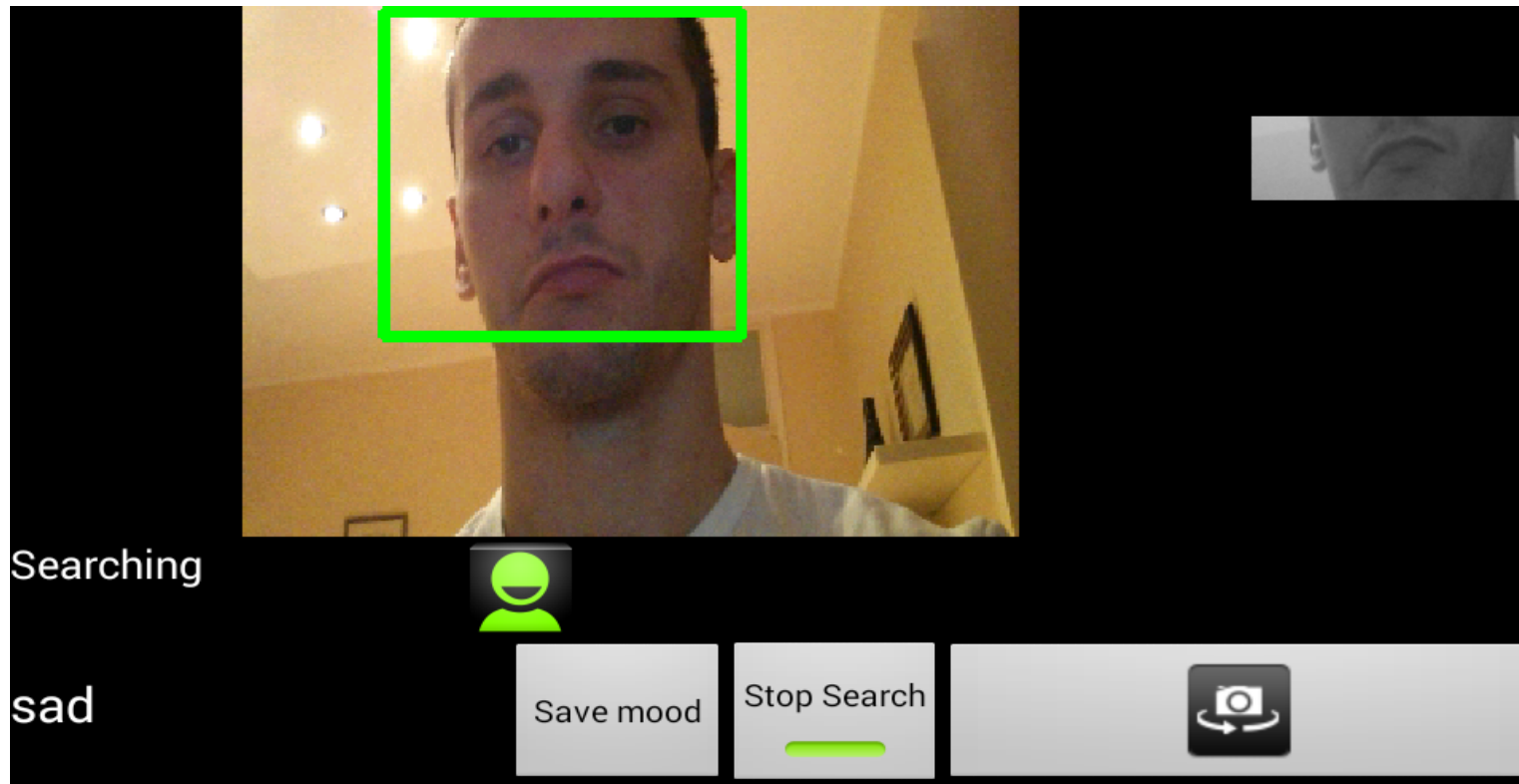


Mood of the city 😊

- ***Mood of the city*** calculated in accordance with:
 - data collected from citizens
 - environmental data collected via sensors
- **Aggregation of user data based on:**
 - user's image
 - questioner filled in by the user
 - weather data (temperature and relative humidity)
- **Combination of collected data, where the highest weight have data sent by the user**

Mood of the city 😊

- Three basic conditions – happy, regular, sad



Current mood of the city index

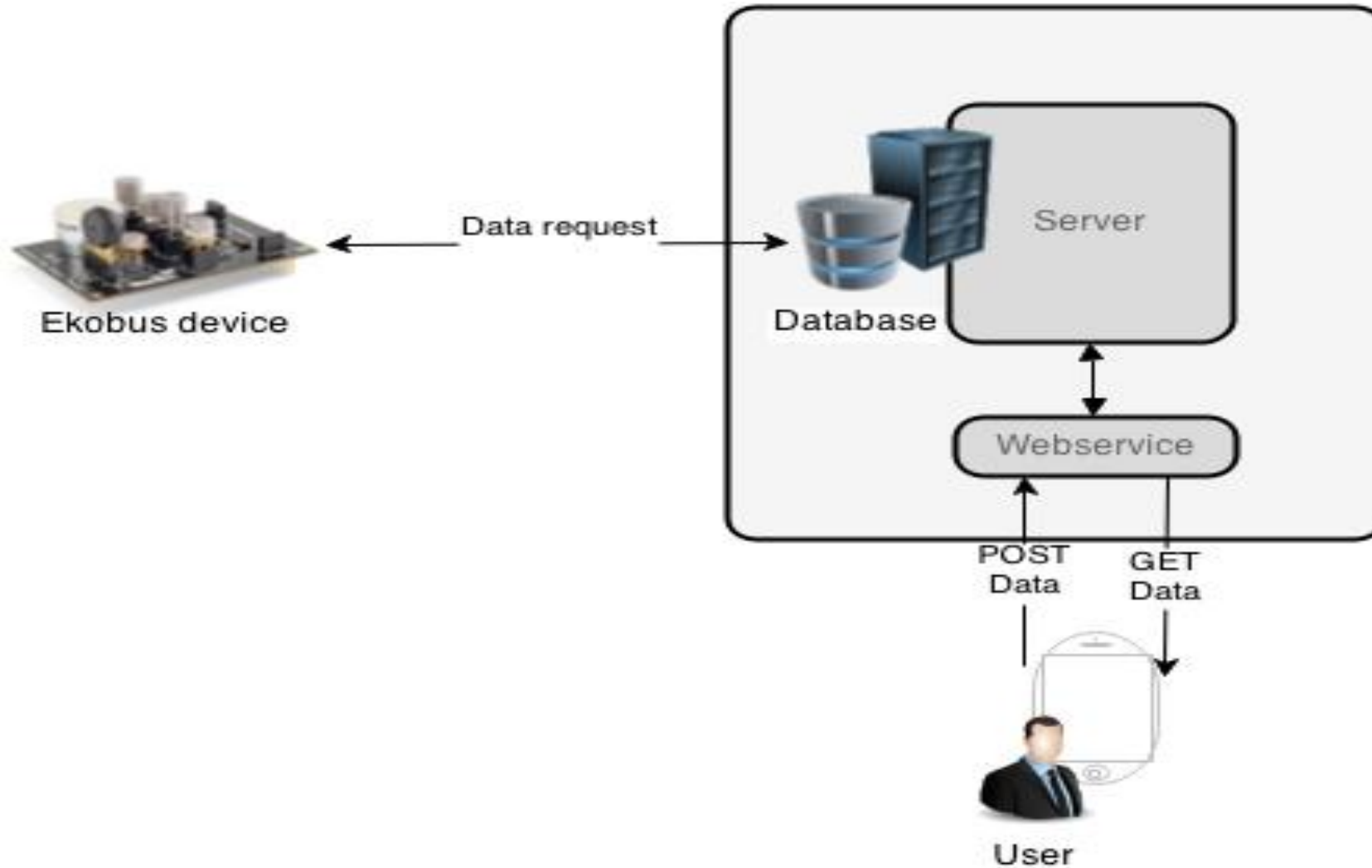
50.0%

This application enables you to post your mood to our server and share it with other citizens in the city :)

Start



Mood of the city 😊



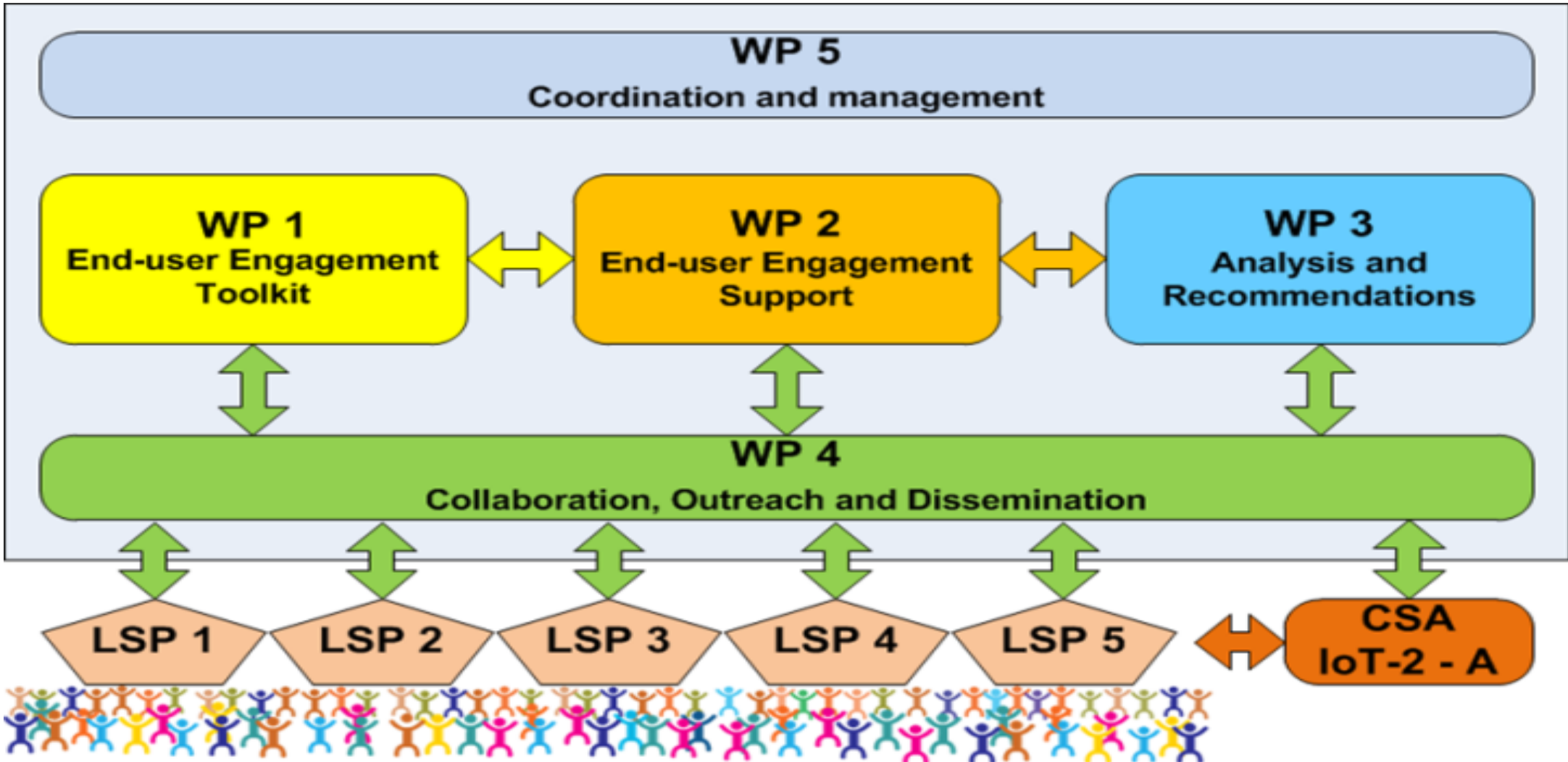
U4IoT



U4IoT will provide tools & support for Large Scale
Pilots to *engage end-users in their processes:*

- *Activage*
- *IOF2020*
- *Monica*
- *SynchroniCity*
- *AUTOPILOT*

Structure



U4IoT envisioned LSP support

WP1 – Toolkit

Online resources & tools

Privacy-compliant crowdsourcing & crowd-sensing tools

Survey tools on assessing user acceptance

Online privacy & data protection game

WP2 – Support

Co-Creative workshops & trainings

Meet-ups & animator trainings

Living Lab
Methodology webinars

Online training modules

Expert pool

WP3 - Analysis & Recommendations

Analysis on societal, ethical and ecological issues & recommendations for tackling IoT adoption barriers

Participatory sustainability models

WP4 - Online portal

U4IoT deliverables

Provides the U4IoT toolkit, support & recommendations

Knowledge base containing insights of horizontal efforts

Collaboration with the other CSA Create-IoT

Thanks!

The logo for DUNAV NET features the word "DUNAV" in a bold, white, sans-serif font. Below it, the word "NET" is written in a smaller, white, sans-serif font. A blue, stylized wave graphic is positioned between the two words. The entire logo is centered within a circular, white, wireframe mesh structure that is semi-transparent and overlaid on the background image.

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NET