

IoT-rješenja za digitalnu transformaciju gradova



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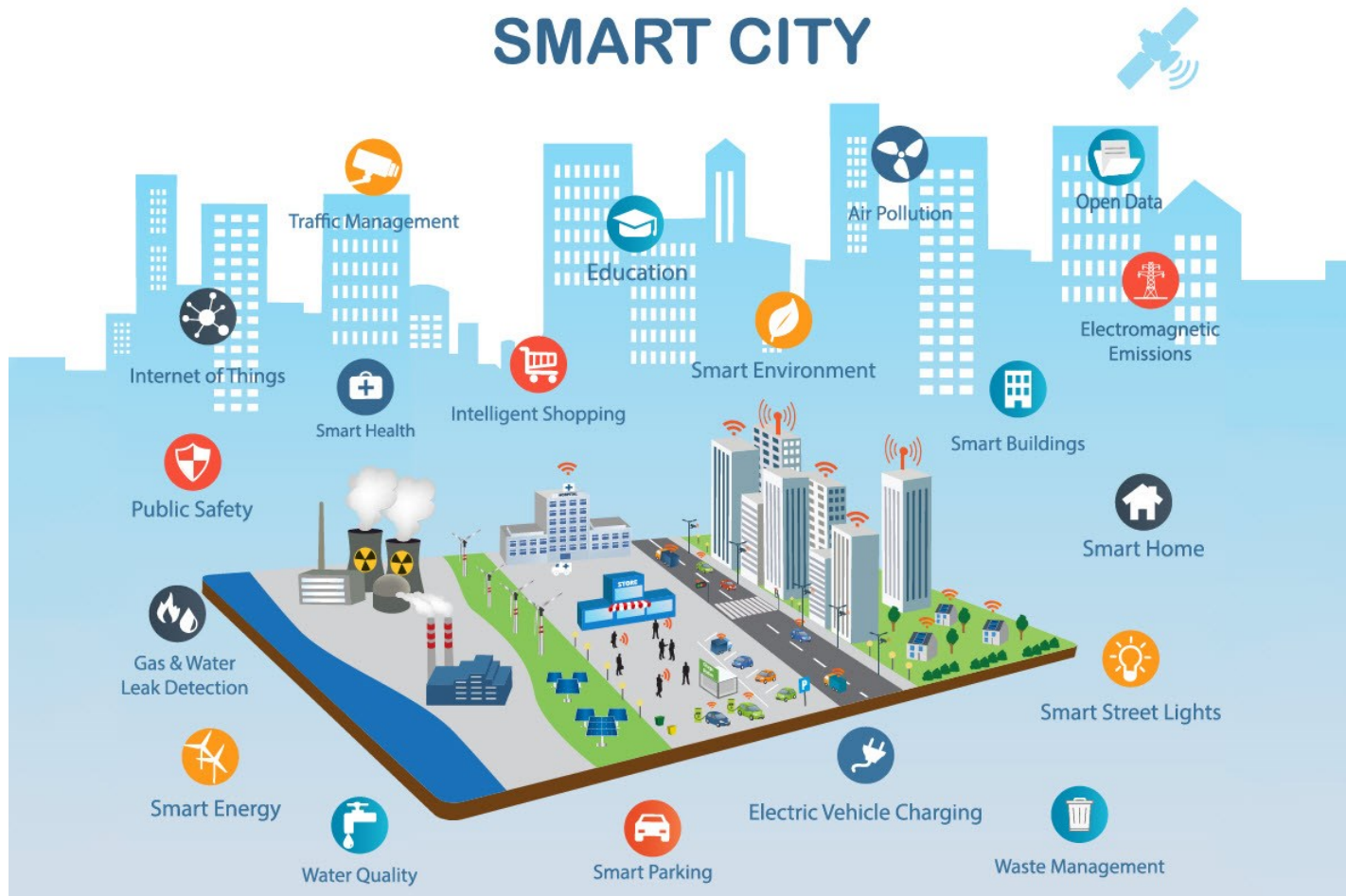
The Earth Will Don An Electronic Skin

„In the next century, planet earth will don an electronic skin. It will use the Internet as a scaffold to support and transmit its sensations.”

Neil Gross

30. kolovoza 1999

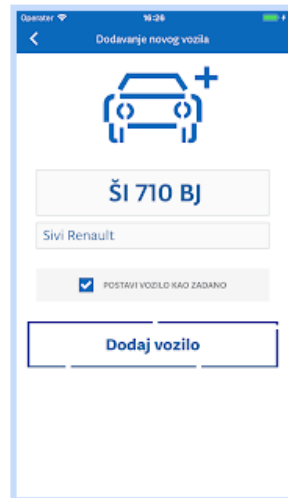
Koncept „pametnog” grada



Umreženi uređaji i inovativne IKT usluge su pokretači razvoja održivih i tehnološki naprednih gradova u službi **građana i gradskih službi.**

- ♦ Javni prijevoz
- ♦ Parkiranje
- ♦ Gradski promet
- ♦ Zbrinjavanje otpada
- ♦ Mjerenje buke, kvalitete zraka
- ♦ Pametna rasvjeta
- ♦ Energetska učinkovitost
- ♦ Nadzor prometnica
- ♦ Upravljanje prometom

Gdje smo danas?



ZgPark



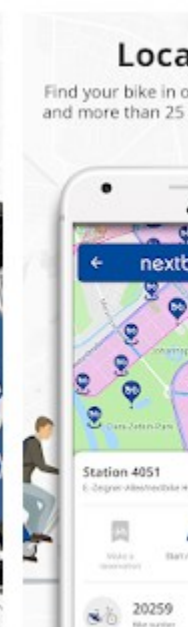
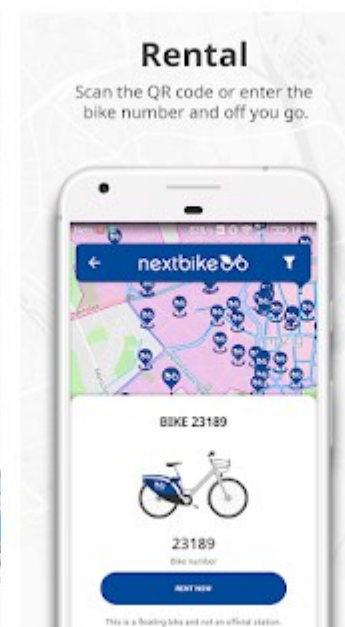
Radio Taxi Zagreb
inTAXI Solutions



Rik Taxi Zagreb
Opus Mobilis

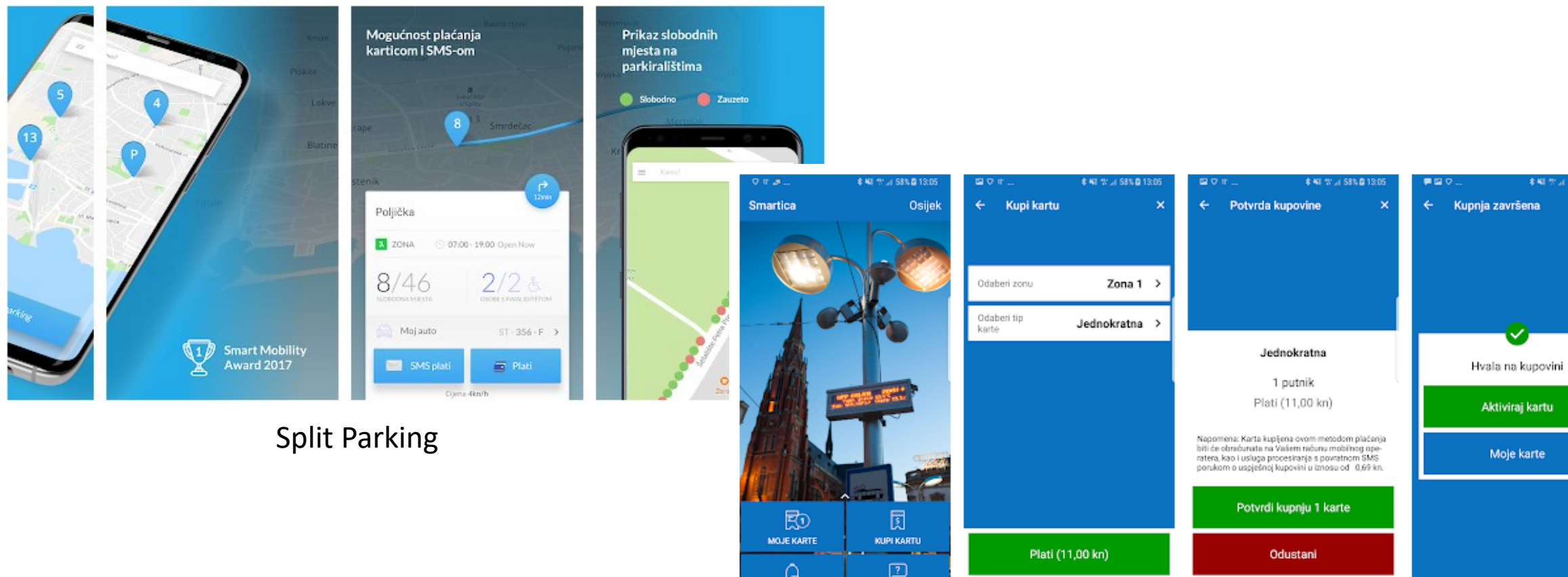


EKO
inTA



nextbike

Gdje smo danas?



Split Parking

Smartica



IoT, interoperabilnost i pametni grad

- Postojeća gradska infrastruktura je nedovoljno iskorištena
- Nedostatak interoperabilnih ekosustava
- Potreba za aplikacijama neovisnim o IoT-infrastrukturi i platformama (*cross-domain apps*)
- Tehnička interoperabilnost, na nivou komunikacijskih protokola, je dobro pokrivena standardima, ali **semantička nad različitom infrastrukturom** i dalje predstavlja izazov

Projekt symbloTe (2016.-2018.)



symbiote [sim-bee-oht]

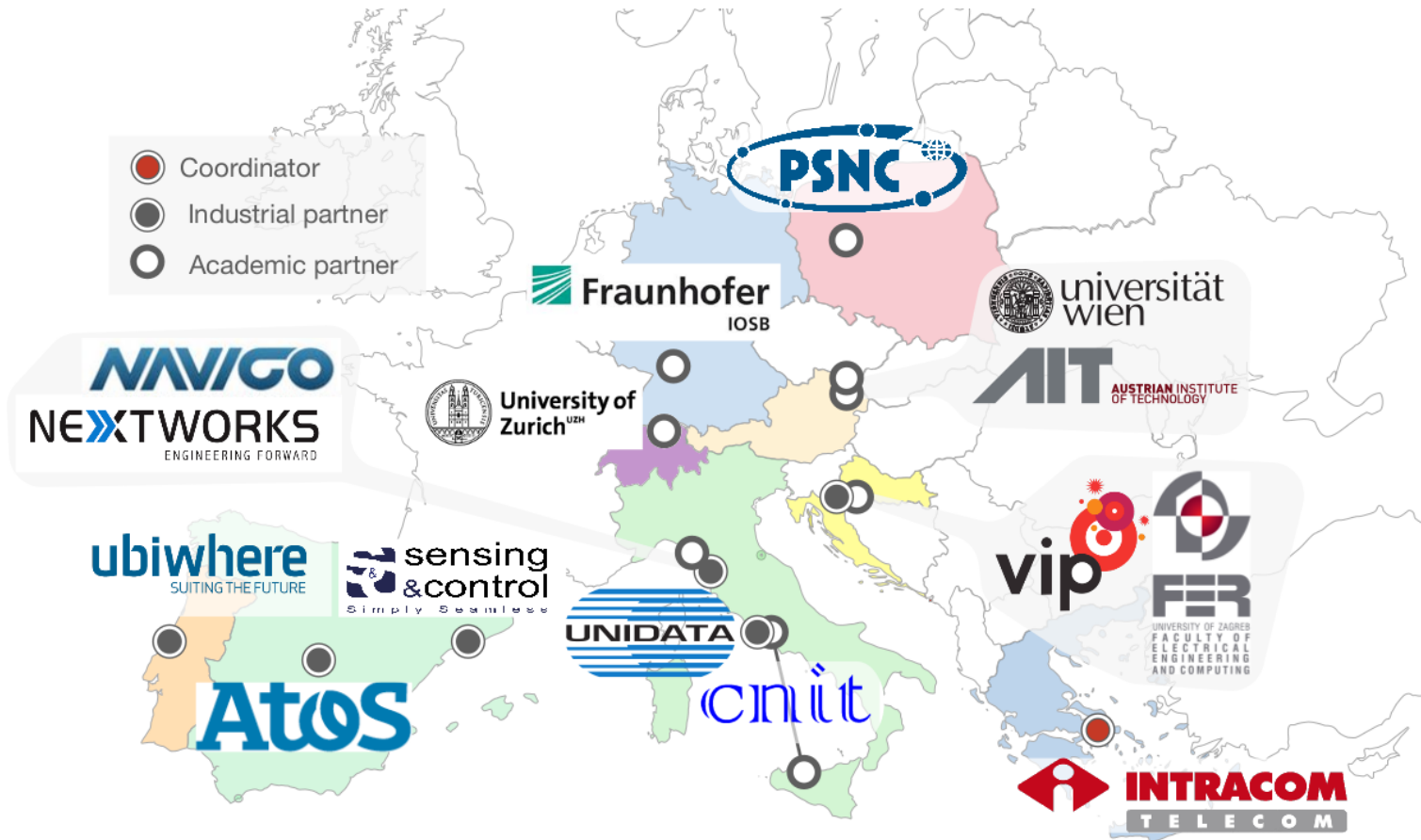
noun, *biology*

an organism living in a state of symbiosis

**symbloTe: Symbiosis of smart objects
across IoT environments**

istraživački projekt (RIA) financiran u
programu Obzor2020
(2016. – 2018.)

Konzorcij symbloTe



- 15 partners
- SMEs w/ IoT solutions
- research institutes
- universities
- large companies

use cases:

- smart residence
- smart campus
- smart mobility
- smart yachting
- smart stadium

symbloTe middleware



The banner features a blurred background of a city street at night with bokeh light effects. On the left, there is a network node icon. In the center, the text 'symbloTe' is displayed in a large, white, sans-serif font, with a double underline under the 'o'. To the right of the text is a white wireless signal icon. Below the main title, the text 'The Open Source IoT interoperability middleware' is written in a smaller, white, sans-serif font. A red rectangular box with white text 'LATEST VERSION: 3.1.0, FEBRUARY 2019' is positioned below the main title. At the bottom, there are four white rectangular boxes, each containing a large red number and a corresponding label below it.

Contributing partners	Software releases	Number of components	Lines of code
15	7	25	133000

Open source

<https://github.com/symbiote-h2020>

For more information

<https://middleware.symbiote-h2020.eu>

IoT portal & semantička tražilica

- **IoT platforme**

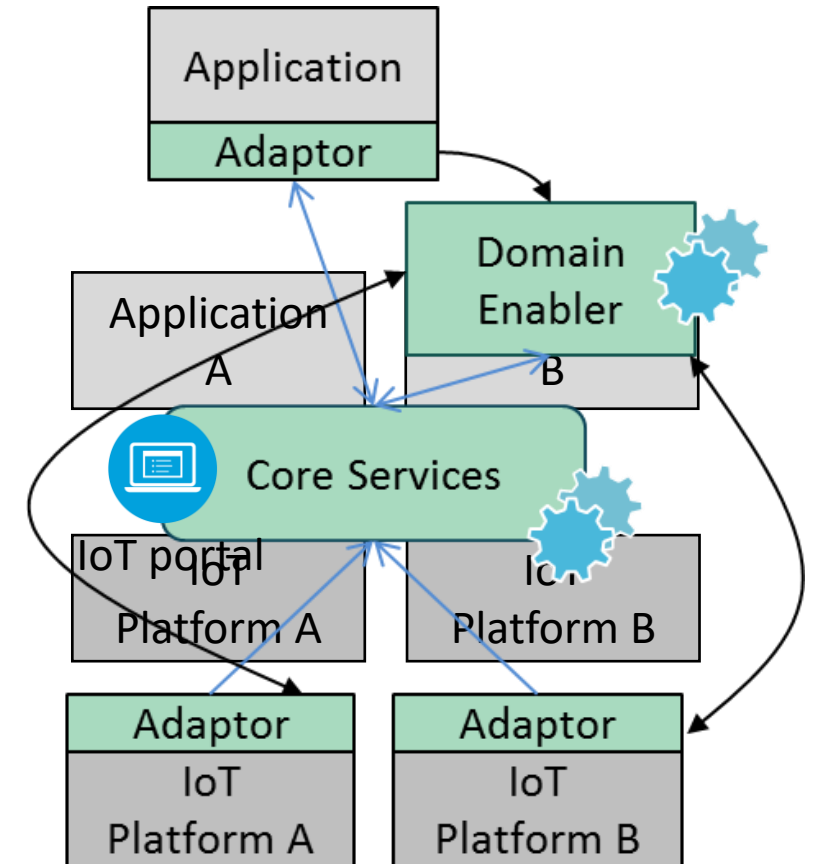
- nude resurse (senzore, aktuatore, servise) putem unificiranog sučelja (*RESTful*)
- definiraju **pravila pristupa resursima** (*attribute-based access control*)

- ***IoT portal & Core services***

- registar i semantička tražilica IoT-resursa, unificira opis resursa
- pojednostavljeni razvoj aplikacija i servisa za krajnjeg korisnika koristeći resurse različitih IoT-platформи
- aplikacija je ovisna o kontekstu

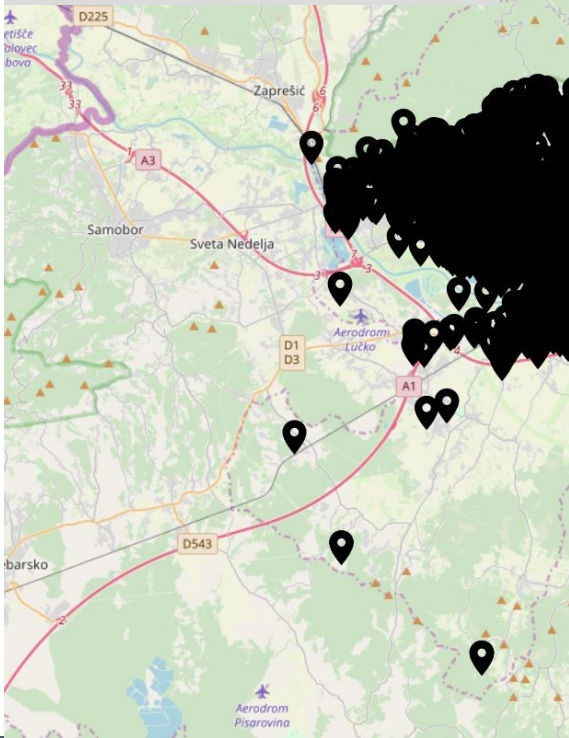
- ***Domain Enabler***

- razvoj servisa s dodanom vrijednosti (analitika, AI), pojednostavljuje interakciju s različitim platformama



IoT-portal za grad Zagreb

Zagreb: 1,812 entries
OpenIoT: 75
openUwedat: 30
HERE traffic API: 1693



Gdi Ensamble

Hebrangova od HNK do Zrinjevca

DETAILS

RotationalSpeed

rpm



AverageSpeed

speed



HERE API

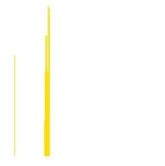
Andrije Hebranga

Sensor for getting average speed and jam factor of the road.

DETAILS

Jam Factor

Jam factor, range[0-10]



Average speed

Average speed



OpenIoT

Virtual sensor based on the MGRS cell

DETAILS

no2



pressure



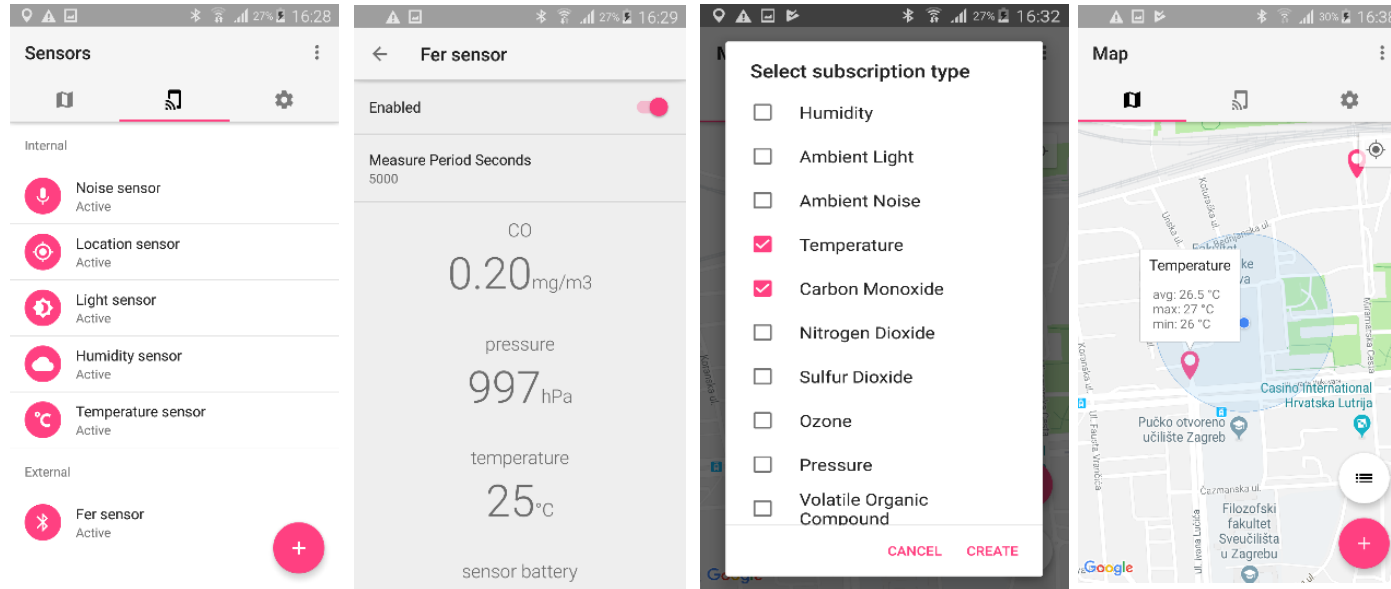
5G dan, 23.09.2019.

Zelene rute za bicikliste i pješake

- Zelene rute za bicikliste i pješake u Zagrebu, Beču i Portu

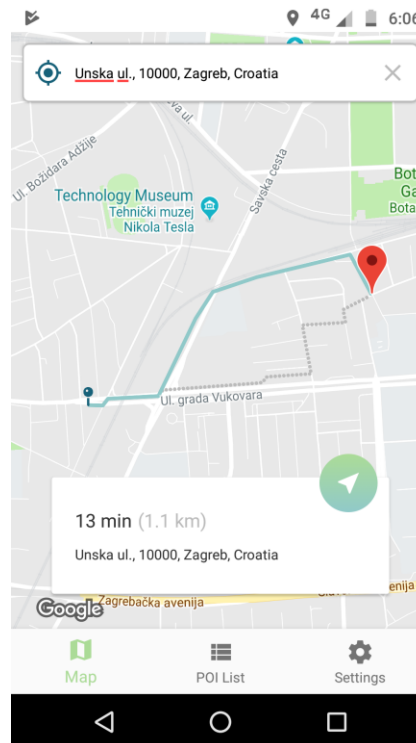
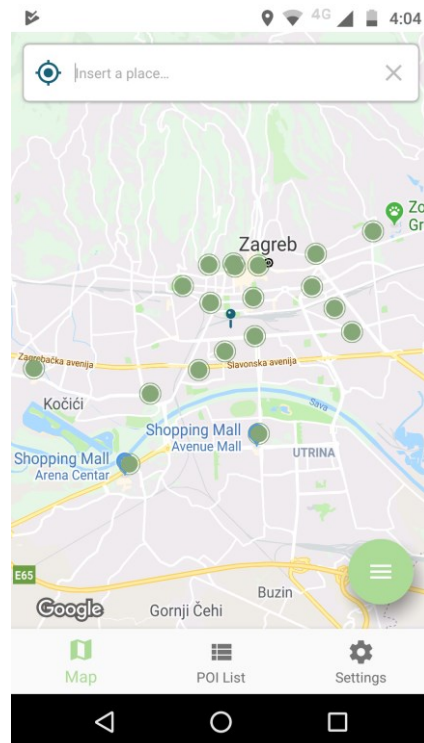
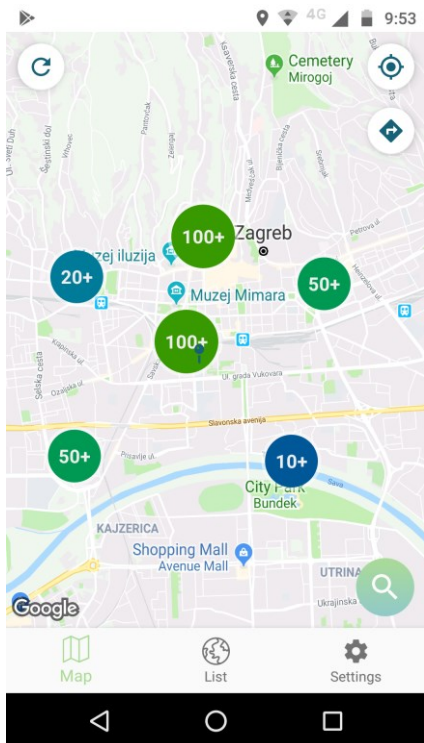


CUPUS Crowdsensing App



 **Google Play / CUPUS Crowdsensing**

symbloTe SMEUR Green Routing App



Ispitivanje rješenja u gradu
Zagrebu u drugoj polovici 2018.
u suradnji s udrugom



 **Google Play / symbloTe SMEUR**





ABOUT THIS SITE ▾

DATASET CATALOGUE

PRESENT ▾

REUSERS ▾

STATIS

Barcelona: primjer pametnog grada

e.g. environment

There are a total of **453** datasets in the Open Data Barcelona Catalogue



Territory



Population



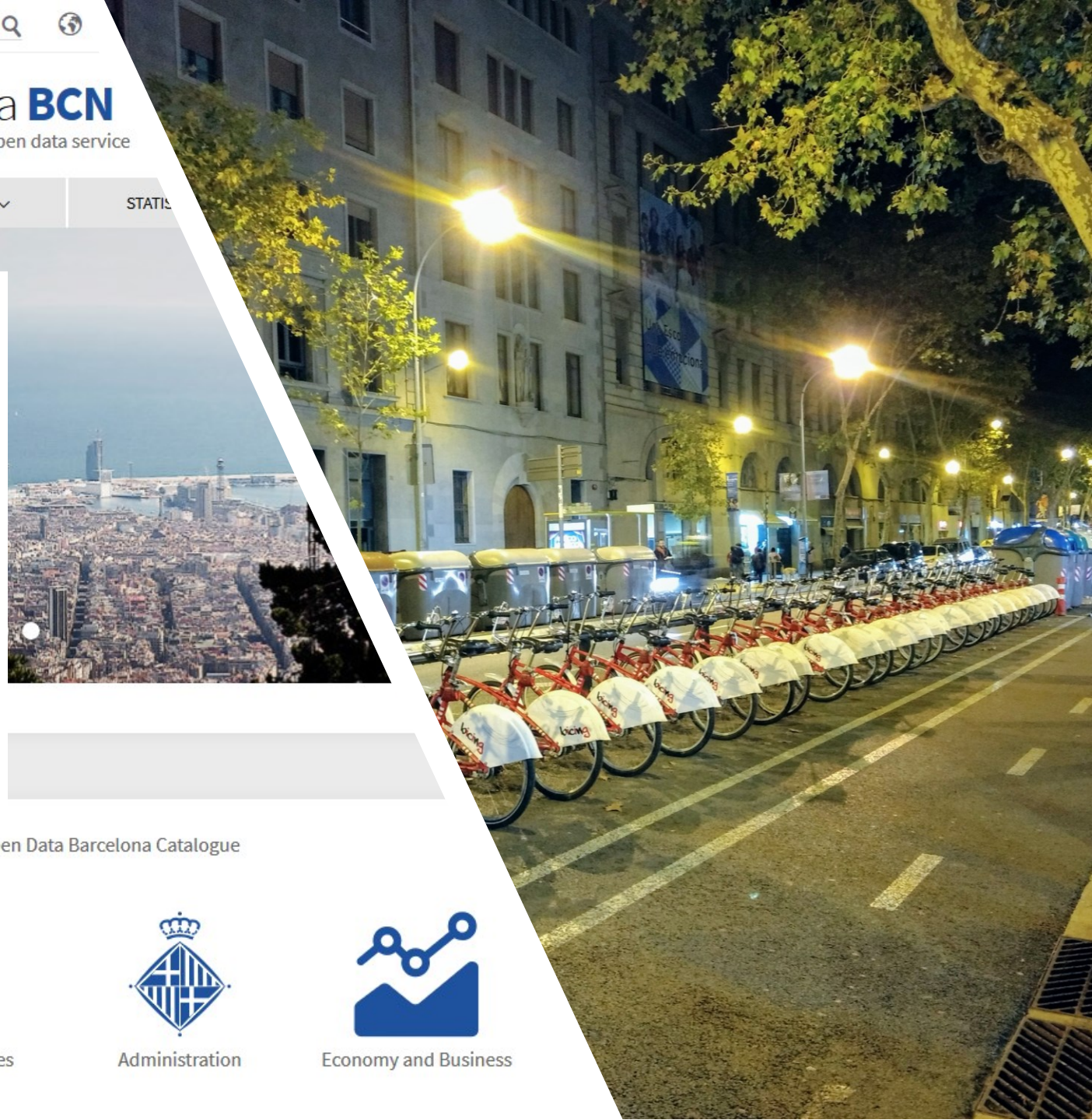
City and Services



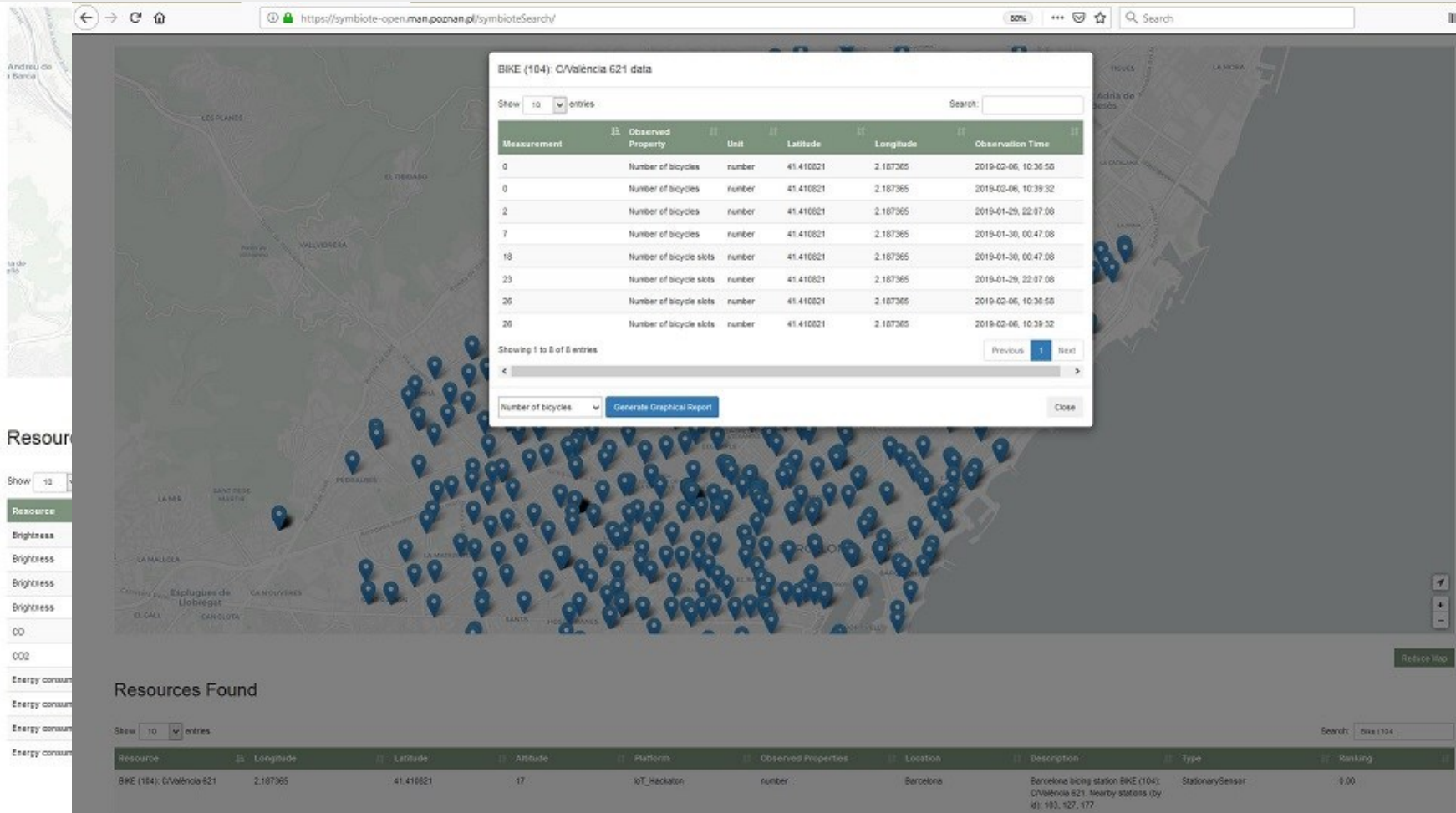
Administration



Economy and Business



symbloTe portal za Barcelonu



Laboratorij za Internet stvari IoT@FER



Istraživačka područja

- programske platforme za IoT i interoperabilnost, end-to-end rješenja
- energetske učinkovite rješenja za IoT
- područja primjene: smart city, smart home, smart grid, smart agriculture...

Nastava: kolegij Internet stvari na diplomskom studiju, brojni studentski projekti/završni i diplomski radovi

- Članovi laboratorija: 8 istraživača u znanstveno-nastavnom zvanju, 1 poslijedoktorand, 7 doktoranada
- Istraživački projekti



Za više informacija



Zahvale: prof. dr. sc. Mario Kušek,
prof. dr. sc. Gordan Ježić, dr. sc. Pavle Skočir



www.iot.fer.hr
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[@ivanapodnar](https://twitter.com/ivanapodnar)



github.com/symbiote-h2020