



R-IoT & Smart Cities

BUSINESS

**PEOPLE &
ORGANIZATION**



**THE BOTH-AND
DIGITAL ATTITUDE**

**Customer
experience**

**Employee
experience**

TECHNOLOGY



IOT Smart Cities

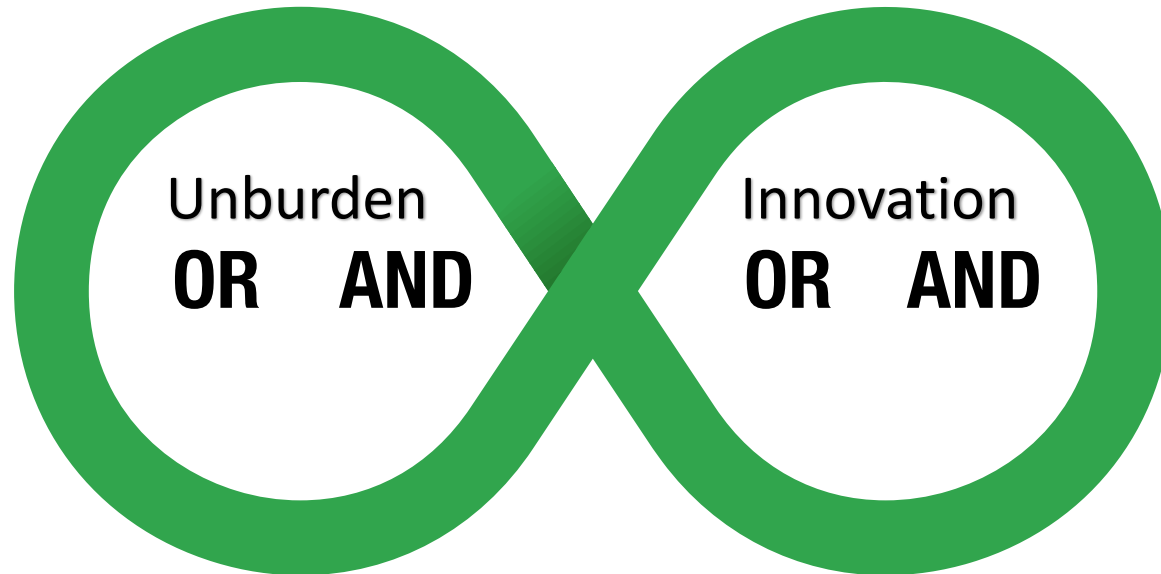
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Innovation services architect

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DIGITAL TRANSFORMATION → DIGITAL FLOW

What are your new challenges? What are your digital paradoxes?



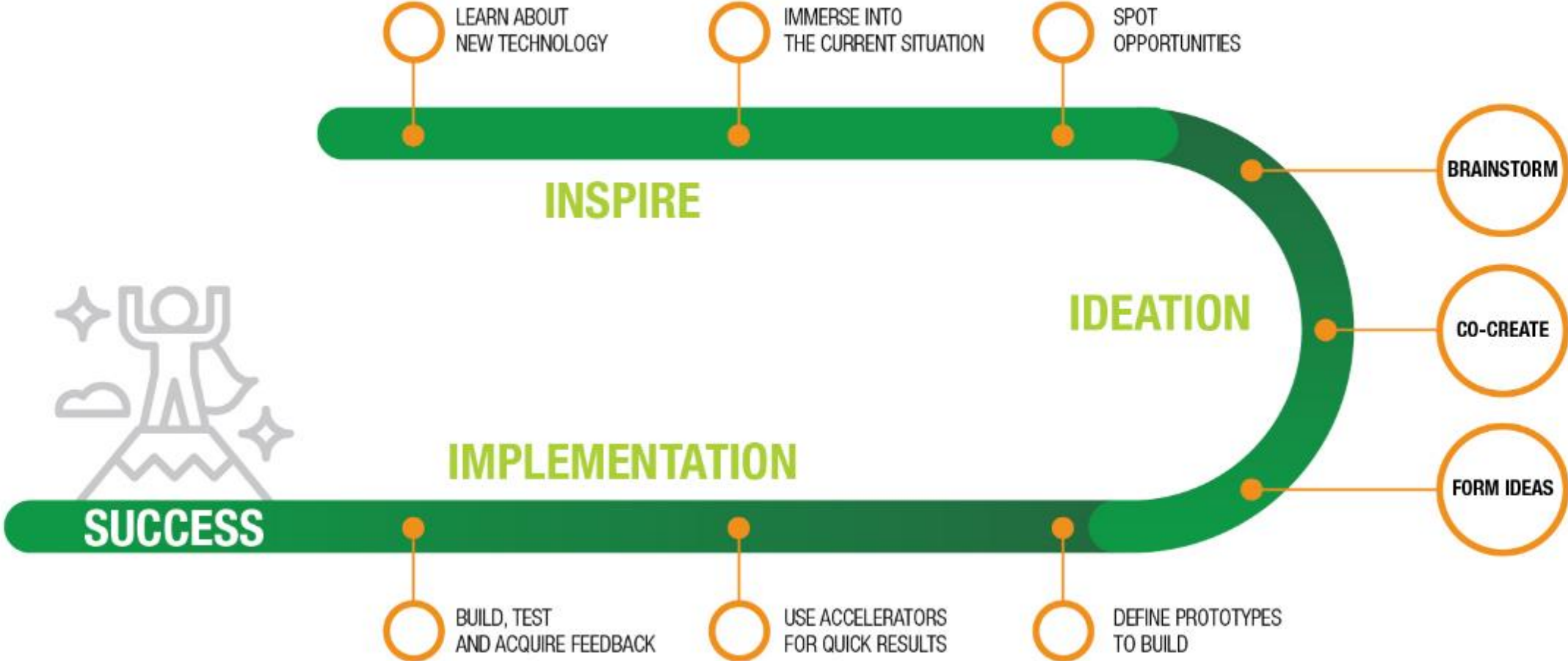
injecting a both-and digital attitude

Let's help you with new ideas ! Let's get you in a digital flow !



Maximize your digital flow

The current Innovation pace requires out of the box thinking



SMART CITY DESIGN THINKING



EMPATHY MAP CANVAS

Inspire

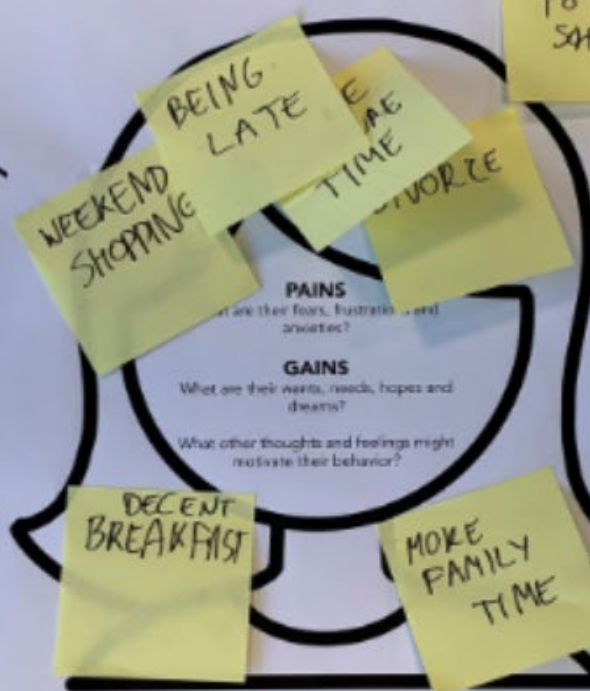
WHO are we empathizing with?
 Who is the person we want to understand?
 What is the situation they are in?
 What is their role in the situation?

GEERT
 VERSCHU-
 EREN
 37

GOAL

What do they need to DO?
 What do they need to do differently?
 What job(s) do they want or need to go to?
 What decision(s) do they need to make?
 How will we know they were successful?

KIDS
 TO
 SCHOOL
 KIDS
 TO
 HOBBIE.



BEING
 LATE
 WEEKEND
 SHOPPING
 TIME
 FORCE

UNSAFE
 ROADS
 NEAR
 SCHOOL

PAINS
 What are their fears, frustrations, and anxieties?

GAINS
 What are their wants, needs, hopes and dreams?

What other thoughts and feelings might motivate their behavior?

FRIEND'S
 KIDS CYCLE
 TO SCHOOL

do they HEAR?
 Are they hearing others say?
 Are they hearing from friends?
 Are they hearing from colleagues?
 Are they hearing second-hand?

SPEEDTRAP
 MARATHON
 ON THE
 NEWS

COLLEAGUES
 HAVING
 WORKING
 4/5

DECENT
 BREAKFAST

MORE
 FAMILY
 TIME

"GET READY
 FOR
 SCHOOL!"

What do they SAY?
 What have we heard?
 What can we imagine them saying?

"DAMN!"

QUEUING

RUSHING

PARKING
 TOO FAR
 F. WORKPLACE

CALL
 PARENTS

WAZE

What do they DO?
 What do they do today?
 What behavior have we observed?
 What can we imagine them doing?

...C For
 CUST.
 APPOINTM.

RULES & REGULATIONS
 What policies, rules, and regulations do you think will be applied in the market?
 What is the government up to?
 Any new laws?

GOVERNMENT
 POLICY

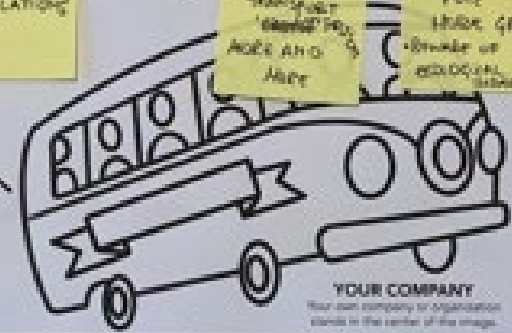
PRIVACY

ECONOMY & ENVIRONMENT
 What is happening in the economy?
 And what is going on in the legal environment?
 Are there economic trends that will impact your business?
 Do you think climate change will have an impact?

BEAN IT

FOCUS FOR
 ENGAGEMENT

E-COMMERCE



YOUR COMPANY
 Your own company or organization stands in the center of the maps.

CLIMATE
 REGULATIONS

TRAFFIC
 TRANSPORT
 MODES AND
 ALTERN.

REQUEST FOR
 MORE GREEN
 BUILDING
 MATERIALS

TRAFFIC LIGHT
 CONSTRUCTION

USE OF
 DATA

CUSTOMER NEEDS
 How will the customer needs change in the future?
 Do you see new trends?
 Do you see any big shifts in customer behavior?
 Are there new needs going mainstream?

MORE
 GREEN
 BUILDING
 MATERIALS

MORE
 INVOLVEMENT

Do you see any ongoing
 COOPERATION
 WITH OTHERS

PROJECTS ON
 LONG
 TERMS

Ideate

TRENDS

JOINT PURCHASING			CONCRETE STOP/+ RENOVATE GRANTS
COMMUNITY "VEGGY" GARDENS	SHARING ECONOMY	CAR SHARING	
HOUSE SHARING	SHARING TOOLS WITHIN THE COMMUNITY	RECYCLING IDEAS	

PROMOTE AWARENESS

WASTE NOT: CENTRAL BIN SYSTEM: YOU THROW YOUR WASTE AT HOME IN THE CORRECT BIN & CENTRE COLLECTED

CREATE APPS THAT HELP TO REPLACE SERVICES

RECOMMENDED

INTRODUCE MORE CENTRALIZED WASTE CONTAINERS (instead of picking them up)

WASTE SET UP BUDDY SYSTEM FOR PUTTING BINS OUTSIDE

MOVING SIDEWALKS (LIKE ~~STREETS~~ AT AIRPORT)

SMARTER WAYS TO ORGANIZE DELIVERIES (DRONES?)

CRUISE SERVICES RETIREES PEOPLE

GOOD CONTRAST

PARKING ISSUE:
- SMALLER VEHICLE
- USE UNPAID SPACES (CHURCH)

High Occupation Rate

TRACK AND INFORM ON STREET PARKING

WASTE PROBLEM ZERO WASTE 😊

USE COMMERCIAL SPACES TO ORGANISE EVENTS

SHARE YOUR ALTERNATIVE HOUSE

ORGANISE EMPLOYEES TO CREATE A CONTROLLED SECURE ENV.

PROVIDE ALT. MEANS OF TRANSPORT (BICYCLE) ON PARKING SPOTS

create Dedicated Parking with smart technology indic

ORGANIZE "SAFE" TRIPS TO SCHOOL

INST. SHARING AND TRAFFIC

OFFER "MEETING ROOMS FOR COMPANIES"

reduce traffic density and guide accordingly

DYNAMIC ROAD SIGNS

TRAFFIC FLOW: EXPLORE OTHER OPTIONS THEN THE EXISTING ROAD LIKE

WASTE DISCUSS

IMPLEMENT CAR SHARING SYSTEMS → PARKING

USE OFFICE IN W FOR THE

LEEK
~~BRIDGE~~ DOESN'T
LOOK TOO FRESH

STRESSFUL
EXPERIENCE

AFTER

OMG!
WOW

MONTE ICH APP
WOW
LEEK ... NE
LEEK FARMING

7 → YAY I WANT
TO WORK HERE → 8

FRESH

WOW I
LIKE THE
SHOPS ON THE
APP AND MAKE
A JOB FOR

- WASTO
- 6 CARS IN CITY
- 12 EXTEND PUBLIC TRANSPORT NETWORK. TRANSPORT TRAINING. NO CARS. ALL PUBLIC TRANSPORTATION. CAR-BAN
- 17 = 1 'CAR' PER SHOP
- 7 EVERYTHING IS A GREAT GREEN PARK
- 18 PROVIDE BIKES TO TRAVEL BETWEEN BUS / RAIL STATION TO INDUSTRIAL ZONES
- 8 FEES FOR PLOGGING PLIKING
- 13 SOLVE MINDS ROAD ACCIDENT WITHOUT INVOLVING THE POLICE (Parks - Jan)
- 19 COMPANY "VEGGY" GARDENS
- MEM SHARING
- 14 HOUSE SHARING
- 20 INCENTIVES FOR LOCAL PRODUCTION
- 15 BUDIE FOR REFURIES
- 21 SOCIAL COOPER. + JAM
- 16 TRANSIT BELT FOR CHILDREN COMMUNITIES
- 22 PUT MIRRORS IN THE PARK WITH POS.

Implement

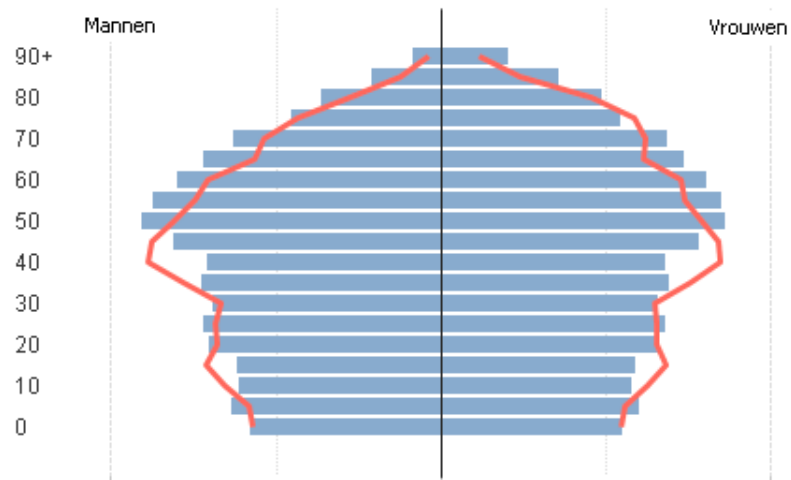


Challenges Faced by Cities

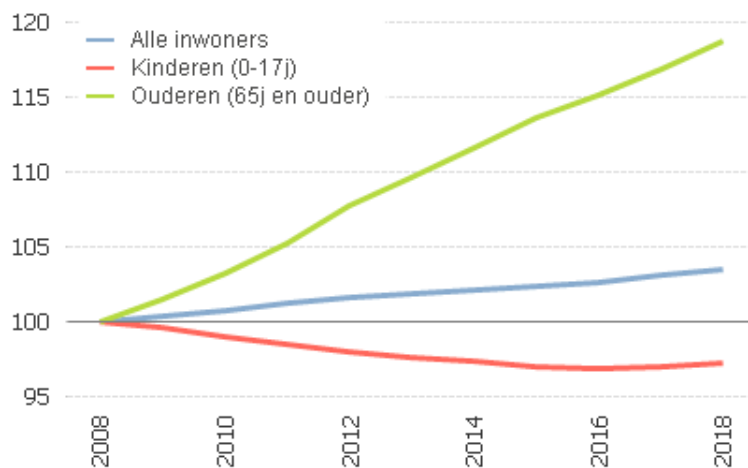
Overzicht van 1 gebied: P.West-Vlaanderen

Aantal personen naar leeftijd

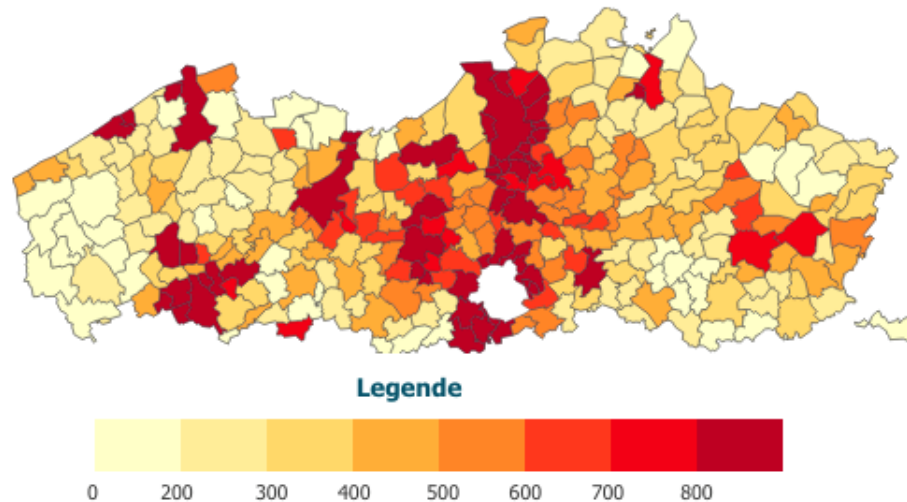
2018 t.o.v. 2008



Toe- of afname van aantal personen (Referentiejaar 2008 = 100)



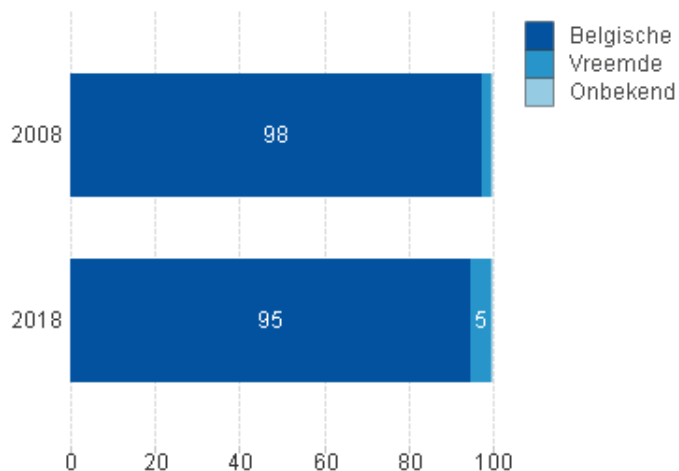
Gemiddelde bevolkingsdichtheid per km² in 2018



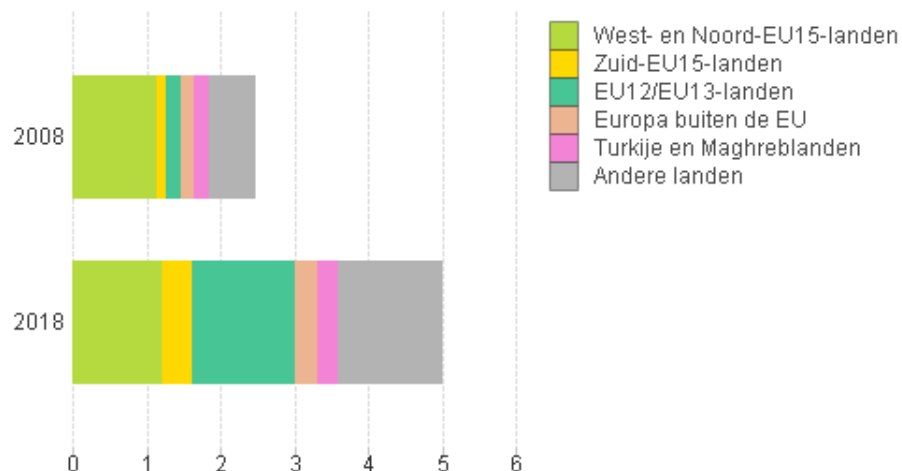
Personen naar positie in het huishouden (in aantal en %)

	Aantal		%	
	2008	2018	2008	2018
Totaal aantal personen	1.150.487	1.191.059	100,0%	100,0%
-	-	1.191.059	-	100,0%
Thuiswonend kind bij paar	270.906	-	23,5%	-
Thuiswonend kind bij alleenstaande ouder	52.614	-	4,6%	-
Alleenwonende	146.279	-	12,7%	-
Samenwonend met partner zonder kind	302.338	-	26,3%	-
Samenwonend met partner en kind	301.134	-	26,2%	-
Alleenstaande ouder	34.939	-	3,0%	-
Anders (wonend in privaat huishouden)	25.648	-	2,2%	-
Collectief wonend	16.629	-	1,4%	-

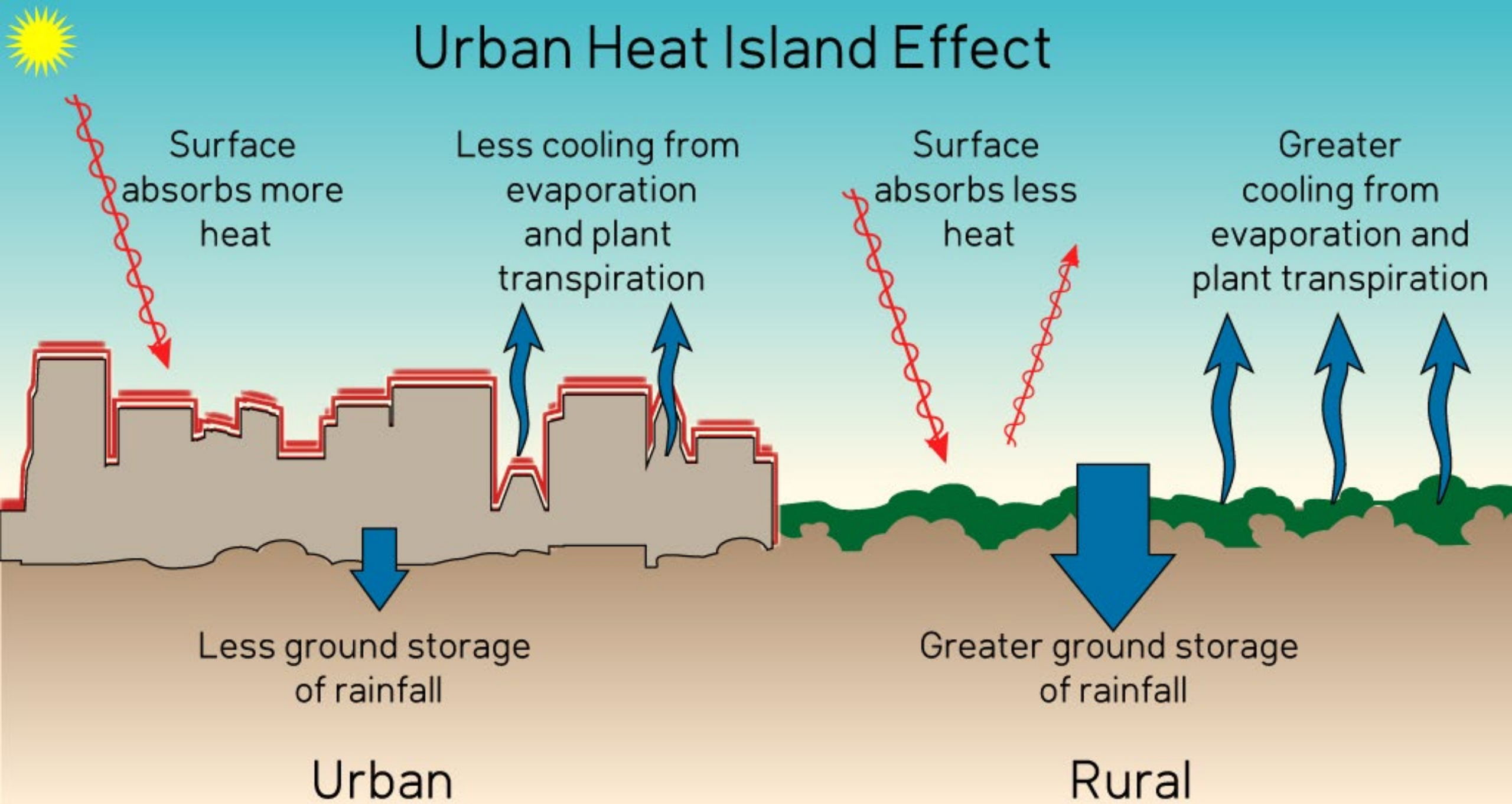
Personen naar nationaliteit (in %)



Personen naar buitenlandse nationaliteit (in % van het totaal)

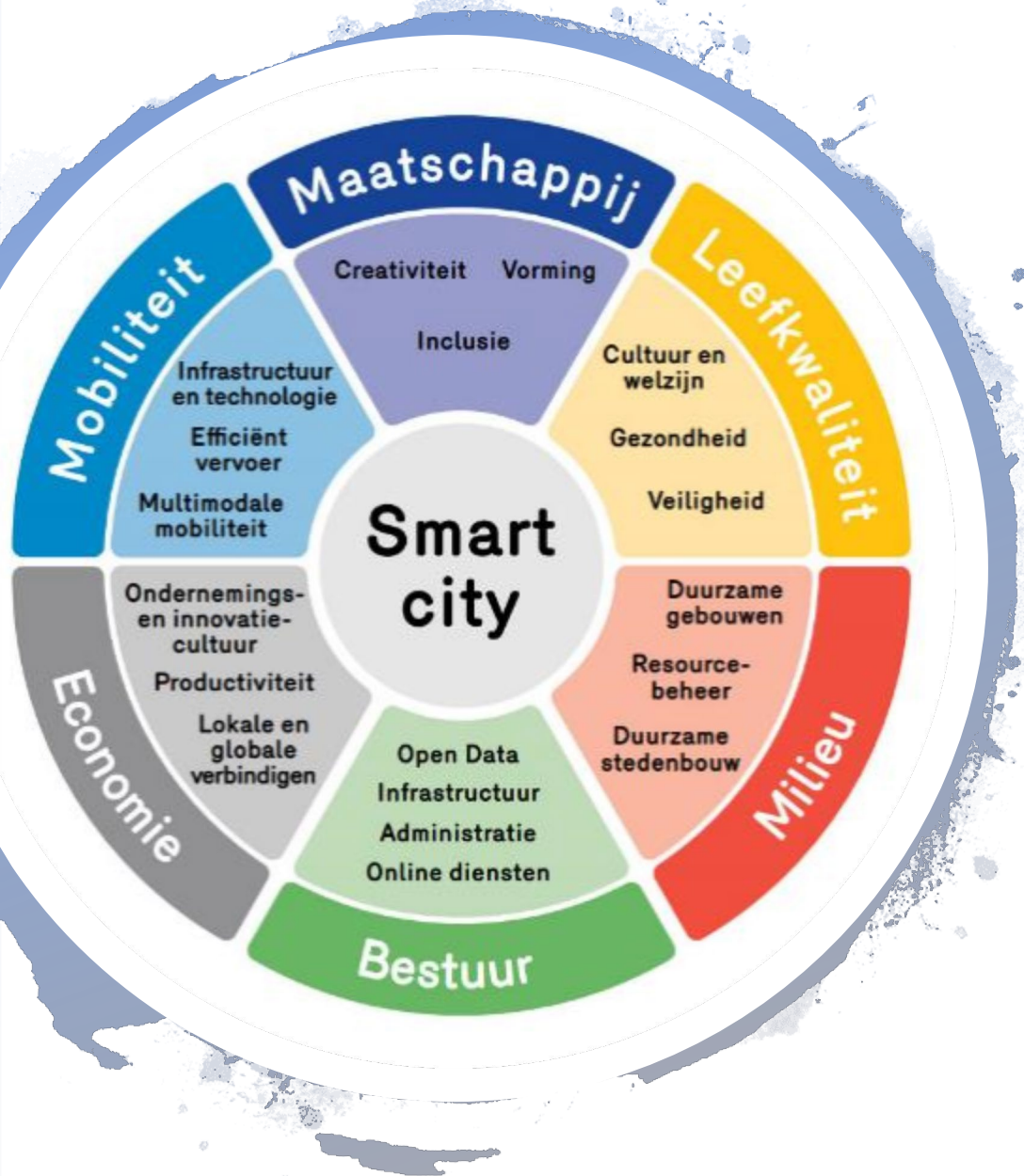


Urban Heat Island Effect



An aerial night view of a city skyline, likely Hong Kong, featuring numerous skyscrapers and illuminated buildings. The scene is dominated by a dark blue and teal color palette, with the city lights providing a warm, golden glow. The text 'MAKING YOUR CITY FUTURE PROOF' is overlaid in the center in a white, sans-serif font.

MAKING YOUR CITY FUTURE PROOF



THE HISTORY OF THE TERM SMART CITY

- In 2007, Prof Rudolf Giffinger of Vienna University of Technology formally coined the term “Smart City”
- Investment in human & social capital and traditional and modern infrastructure fuel sustainable economic growth and a high quality of life with wise management of natural resources through participatory government.
- Smart cities Europe study (2007)
 - Identify 6 domains, 31 factors and 72 indicators (ISO 37120 as ref.)
 - www.smart-cities.eu
 - 70 medium sized cities.
 - Bruges and Ghent in top 20.



SMART CITY 2019

- A Smart City is a city that can combine (sensor) datasets that were not meant for each other, and derive information to be used in a decision making application for the well being of its citizens. (Bart de Lathouwer)



A smart city overlapping technological layers

Digital information

raw material to build our growing smart city

Infrastructure

required assets and connectivity to gather data.

Software application

the layer to add all required intelligence

SMART CITY LAYERS

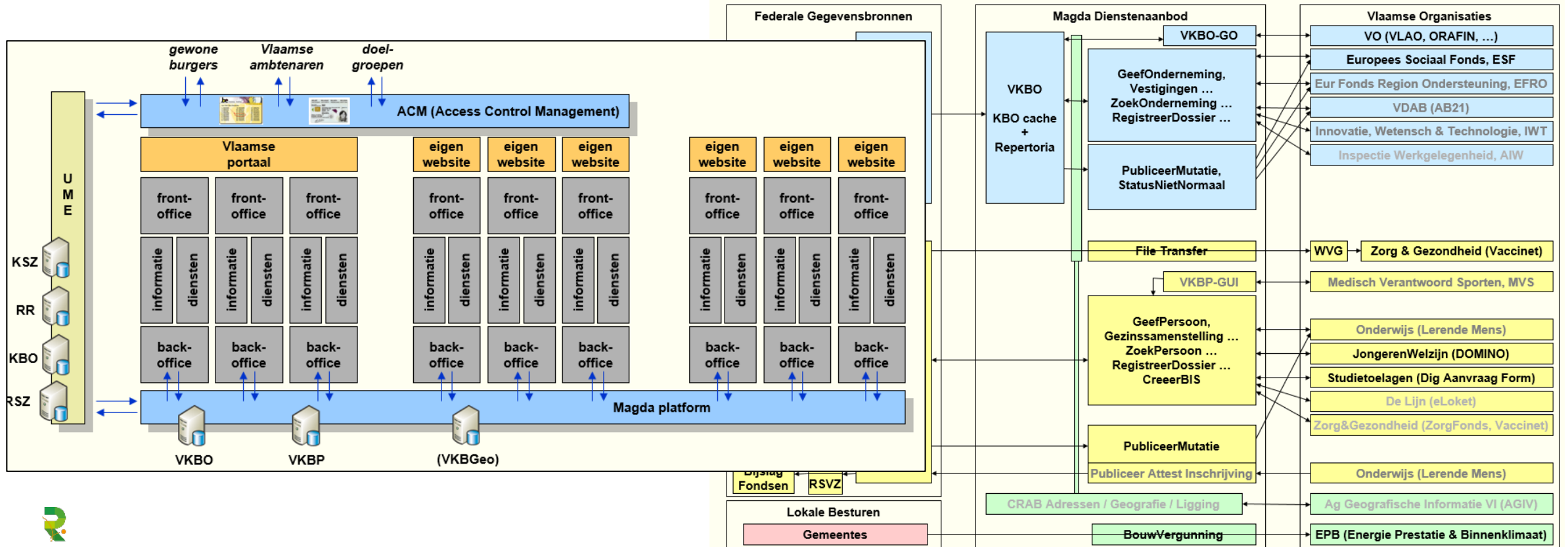
SMART CITY - INITIATIVES

- A lot of initiatives by progressive cities
- Funded projects by Vlaio



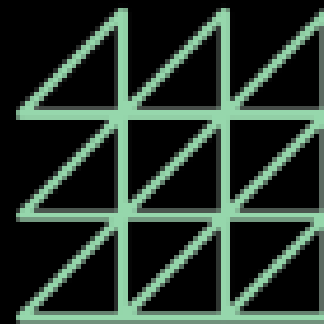
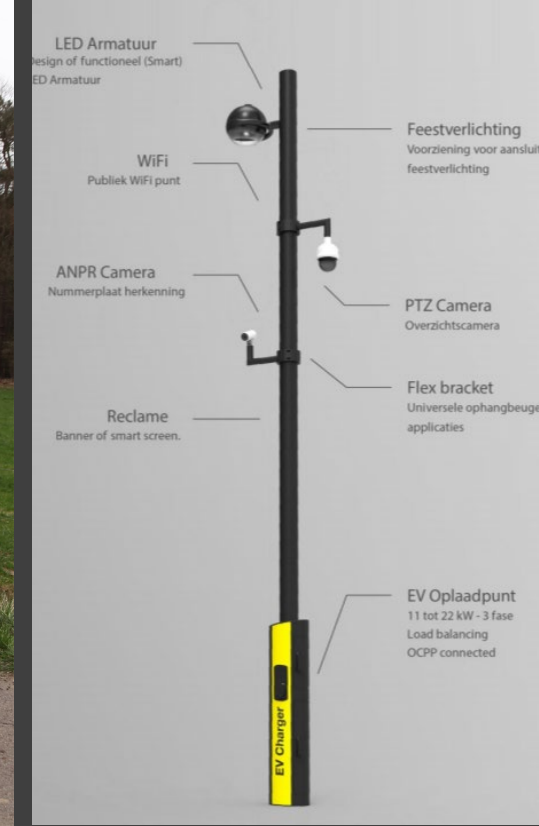
SMART CITY ASSETS - MAGDA

New platform to connect to multiple authentic sources



1000+ INITIATIVES

- Modular hardware to support IOT
- New software as a service concepts
- Data gathering
- ...



Traffic Management
TMaaS
as a Service

MICROSOFT AZURE

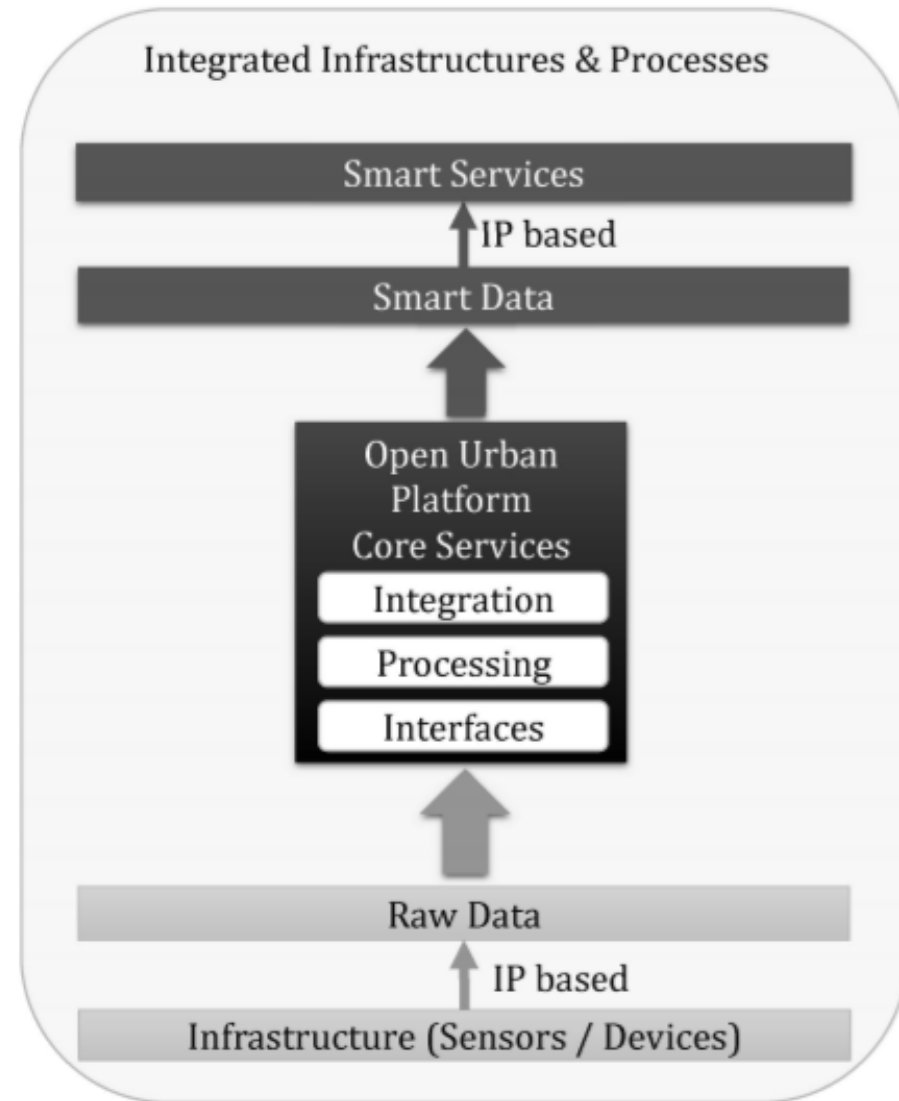


AMAZON AWS



THE OPEN URBAN PLATFORM

- An open layered solution enabler
- Focus on collaborations and sharing
- Privacy and security
- System of systems
- DIN 91357

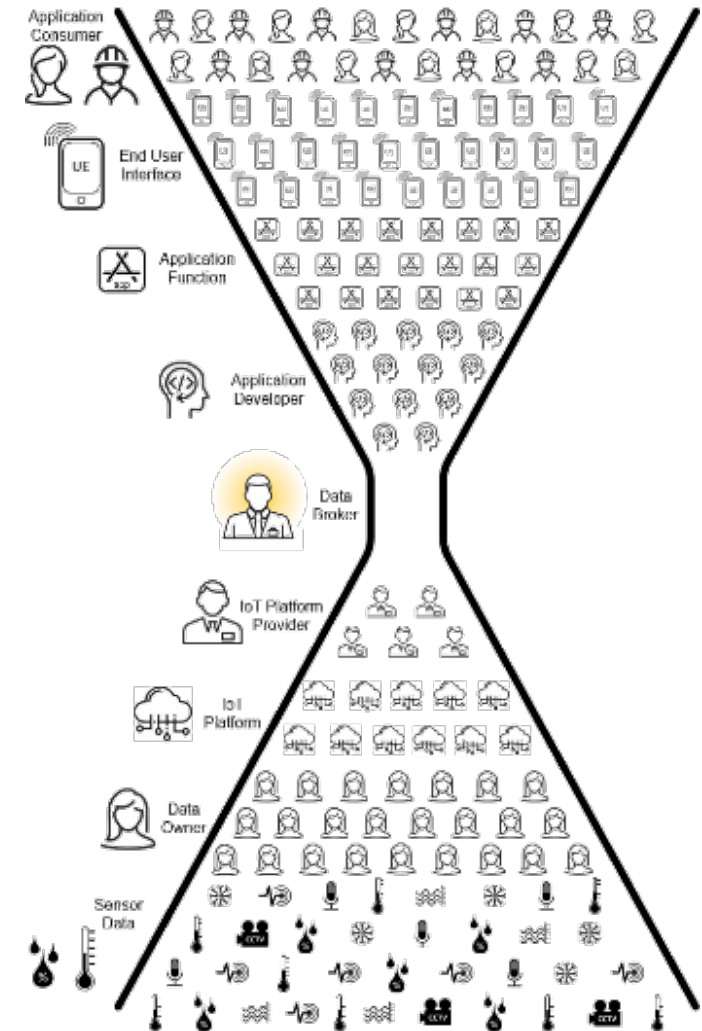
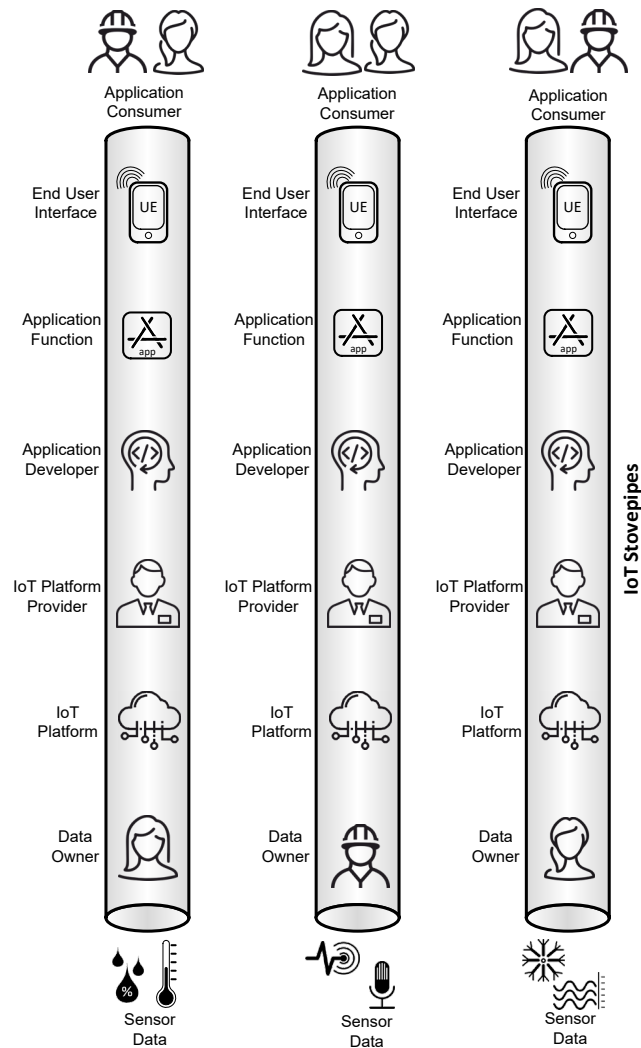




R-IOT / Accelerators

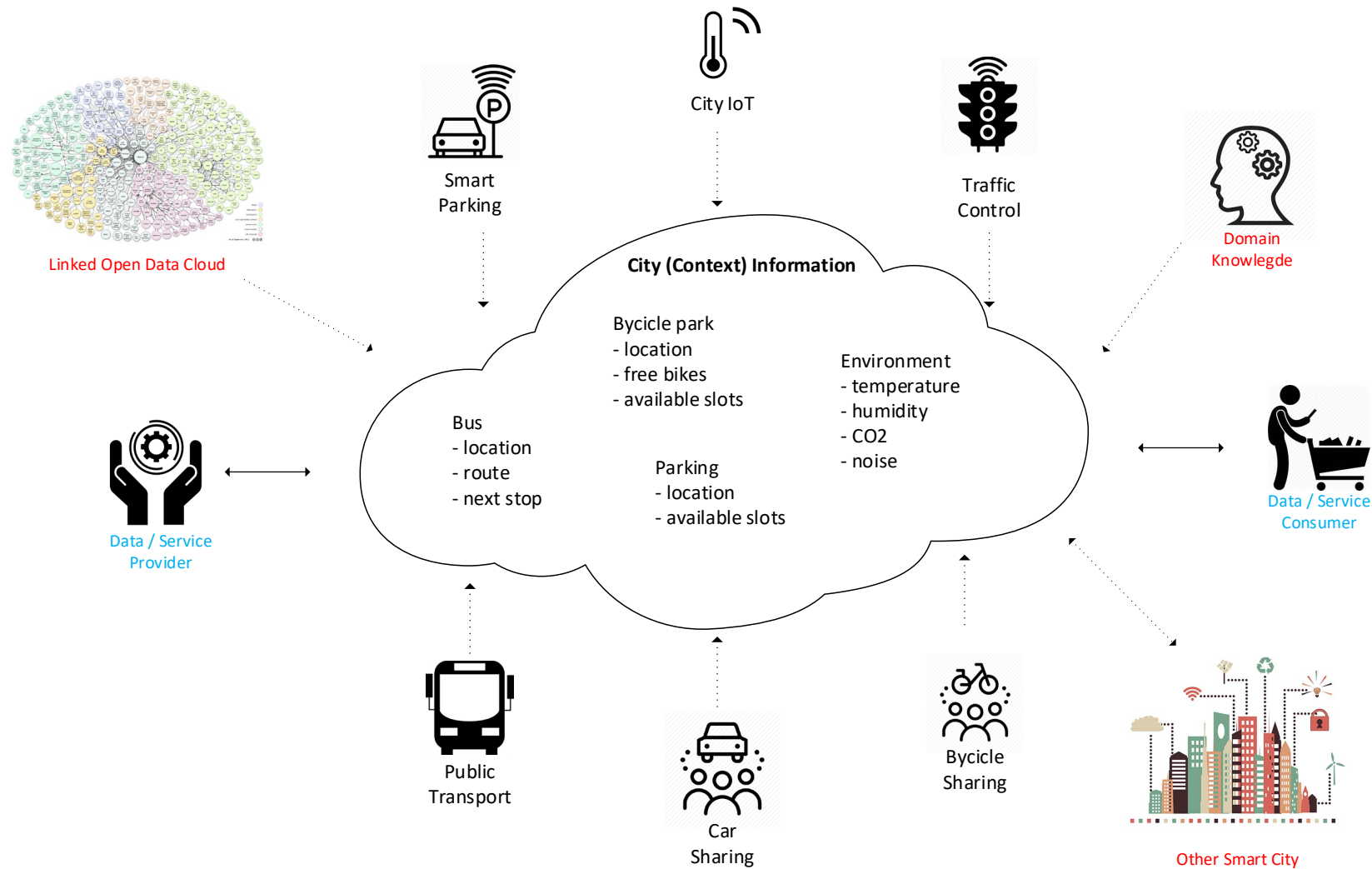
BROKERED PLATFORM BASED INTEGRATION

Use of Open Standards is key!



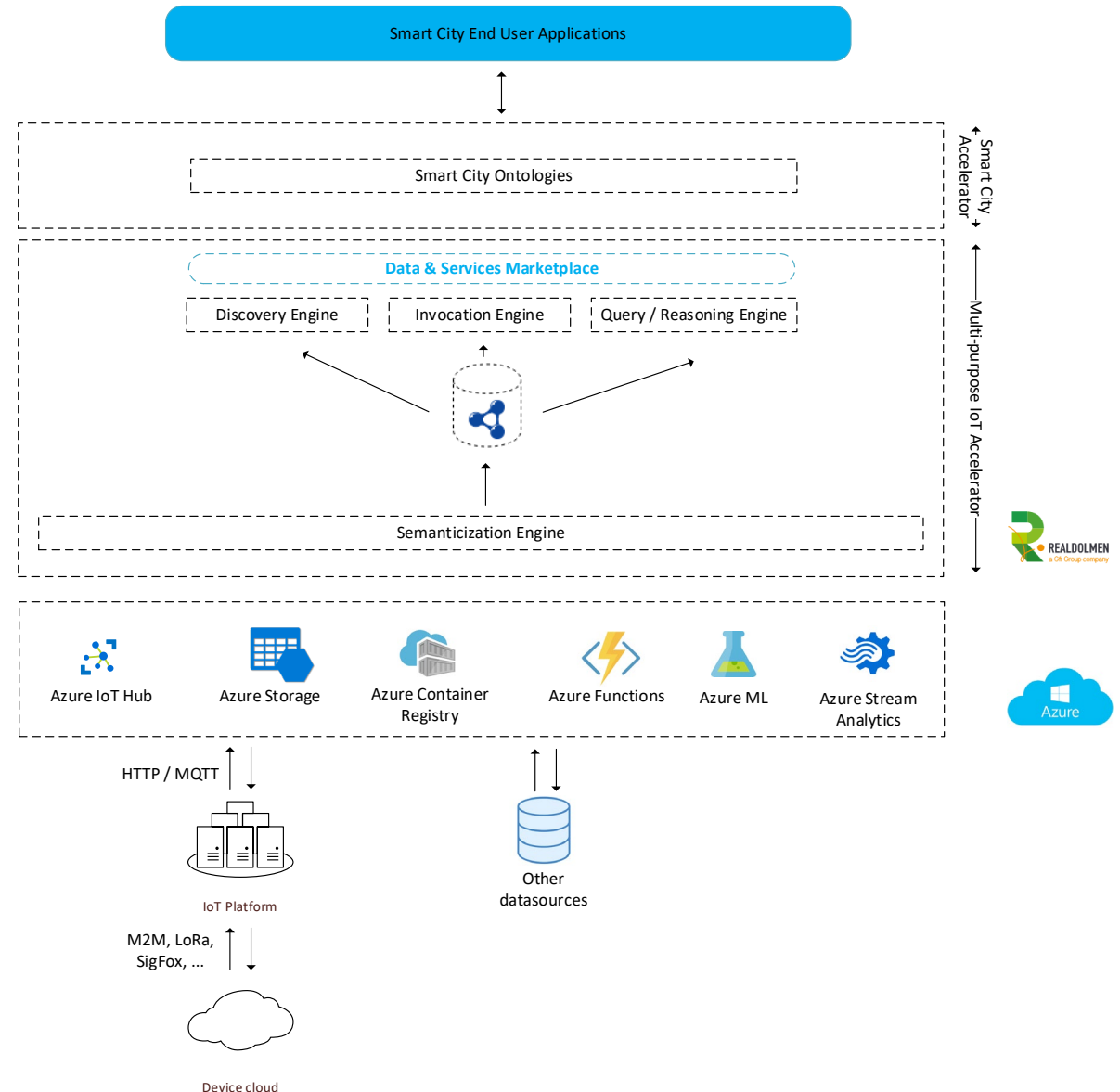
OPEN ECOSYSTEM

Easily discover and access data in a uniform manner



R-IOT PLATFORM + SMART CITY ACCELERATOR

- Build on top of any Cloud platform
 - Microservices architecture
 - Containerized deployment
 - Open Standards
- 3 parts
 - Azure Cloud services
 - Integration with other IoT platforms and data sources
 - R-IoT multi-purpose IoT Accelerator
 - Semantically annotate data
 - Semantic storage
 - Semantic querying & discovery
 - API's to interact with semantic services
 - Marketplace as data & services sharing platform
 - Smart City Accelerator
 - Smart City ontologies



Realdolmen Accelerators as Cloud native application components





REFERENCE CASES

CLIENT

CIRB – Centre d’Informatique pour la Region Bruxelloise

SECTOR

Public/Government

DESCRIPTION

The Brussels Regional Informatics Centre stands at the head of digitalization in Brussels. They assist – the public institutions of Brussels – to face the challenges of the digital age.

CHALLENGE

BRIC had identified two key projects for advancing the communications and collaboration abilities of its constituents. The first was the Intégrateur de Services Régional (ISR), which would serve as a central platform for government agencies within and outside the Brussels region to share information and capabilities.

From a technical perspective, the platform would be a large-scale SOA project acting as a hub for web services offered by government institutions, often through other service integrators. A significant portion of the data exchanged would be private, with strict, legally binding access and audit guidelines.

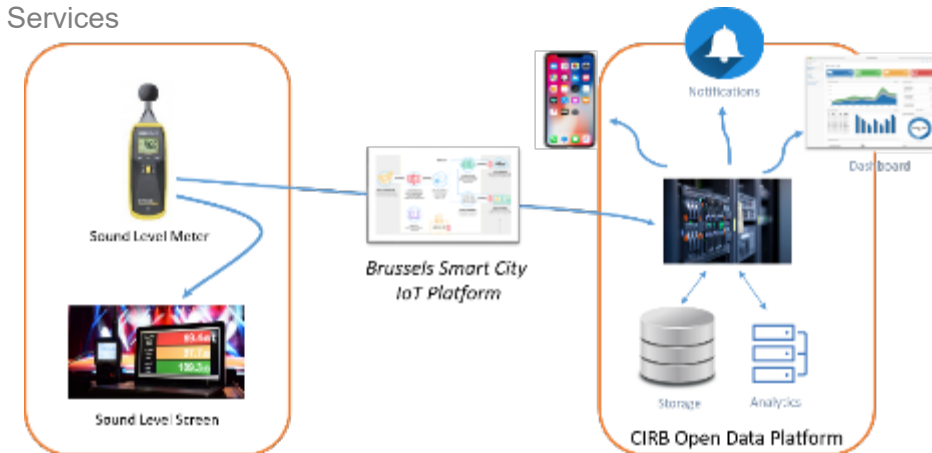
The second project was part of BRIC’s Smart City initiative. It would build on Brussel’s open data initiative by adding new capabilities to provide a generic platform that could exchange data and services in a unified way with internal and external service providers. This platform is to be the future access portal for open data, data from the Internet of Things (IoT) environment, and big data needs as they arise in the future. Additionally the API Store received an appealing visual design.

SOLUTION

- Multipurpose IoT Platform
- Hybrid solution; Ingest data, store raw data and do analytics in Cloud. Send analytics results via API to On-premise
- Decoupling of the users and enterprise applications from analytics modules, device and connectivity complexity
- Use Serverless architecture based on AWS IoT and Services
- Make Serverless and AWS CloudFormation

PROVIDED SERVICES

- Solution architecture of a multi-purpose IoT Platform
- Design and implementation of the Microservices and Serverless Architecture
- Integration with the CIRB back end



CIRB



- Intergovernmental service platform
- Internal Service platform
- Identity Hub
- Smart city platform
 - OpenData platform
 - Platform for Smart city pilots)
- IoT platform (build on AWS)
 - Smart Ears gathers noise metering in public bars & restaurants

CIRB

BRUSSELS SMART CITY'S HAPPY EARS (SON AMPLIFIÉ)

Problem

- Ingest data from devices to CIRB Regional Open Data platform
- Support different Sound Sensors from different providers
- Support different type of device communication and data formats
- Support real-time data streaming and analysis
- Support giga byte of data streaming and storage per day
- Define security to support devices that do not support security standards
- Quick implementation
- Low cost of support and usage

Solution

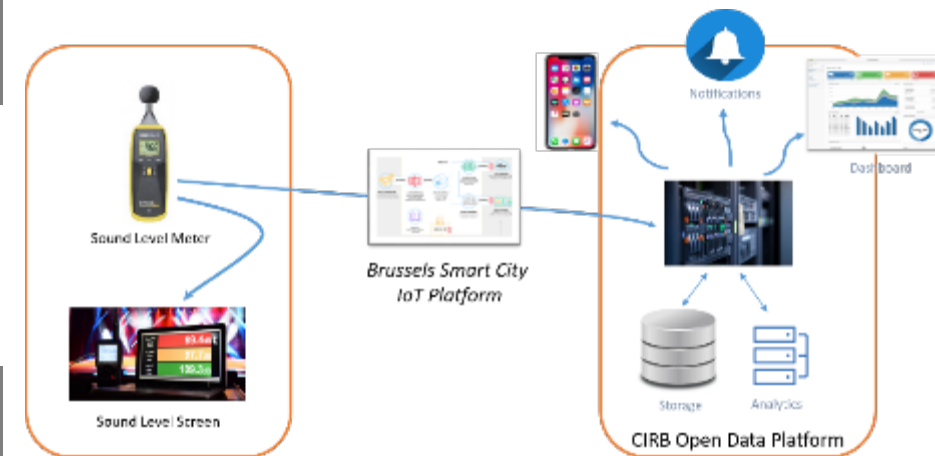
- Use Brussels Smart City IoT Platform
- Hybrid solution, Ingest data and store raw data in Cloud and send analytics results using APIs to On-premise
- Define Serverless templates for quick implementation and support new devices
- API based solution

Added Value Realdolmen

- Provide a real IoT case and service based on Brussels Smart City IoT Platform
- Wide range of integration skills from Embedded, Back-end to Front-end
- Knowledge of AWS services and IoT technology

Benefits Realized

- Easy onboarding of IoT devices
- Easy integration of IoT devices with business applications
- Value added services on top of raw data to citizens
- Create value by improve the quality of life of people



GET



CROWDSENSING

- People + Smartphone + Incentive
- To report / to fix
 - Good or bad
- On top of blockchain / city coins ?



THE HUMBLE LAMPPOST

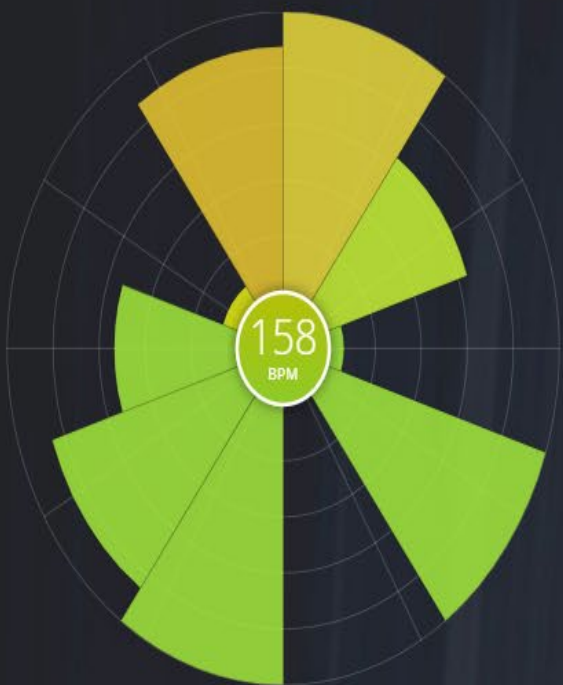
- Multipurpose hardware and sensor platform.
- Security is key
- Specs are defined in DIN 91347



DIN SPEC 91347

Integrated multi-functional Humble Lamppost (imHLa)





1. April 2019 16:20:13



LÄRMBELASTUNG

Karte [On]

Standort: Bad Hersfeld



die letzten 0 Messwerte

PARKHÄUSER

Karte [On]

Standort: 5 Parkhäuser, Bad Hersfeld

- ↑ P City Parking 533
- ↑ P Altstadt 120
- P Schilde 114



P1 Parkhaus Altstadt 56 / 162 frei

PARKPLÄTZE

Karte [On]

Standort: Bad Hersfeld (Marktplatz)



UMWELT

Karte [On]

Standort: Bad Hersfeld



13,3°C
TEMPERATUR

1 µg/m³
FEINSTAUB (PM10)

STÄDTISCHE MÜLLEIMER

Karte [On]

3 Müllcontainer verbunden



CITY DASHBOARD

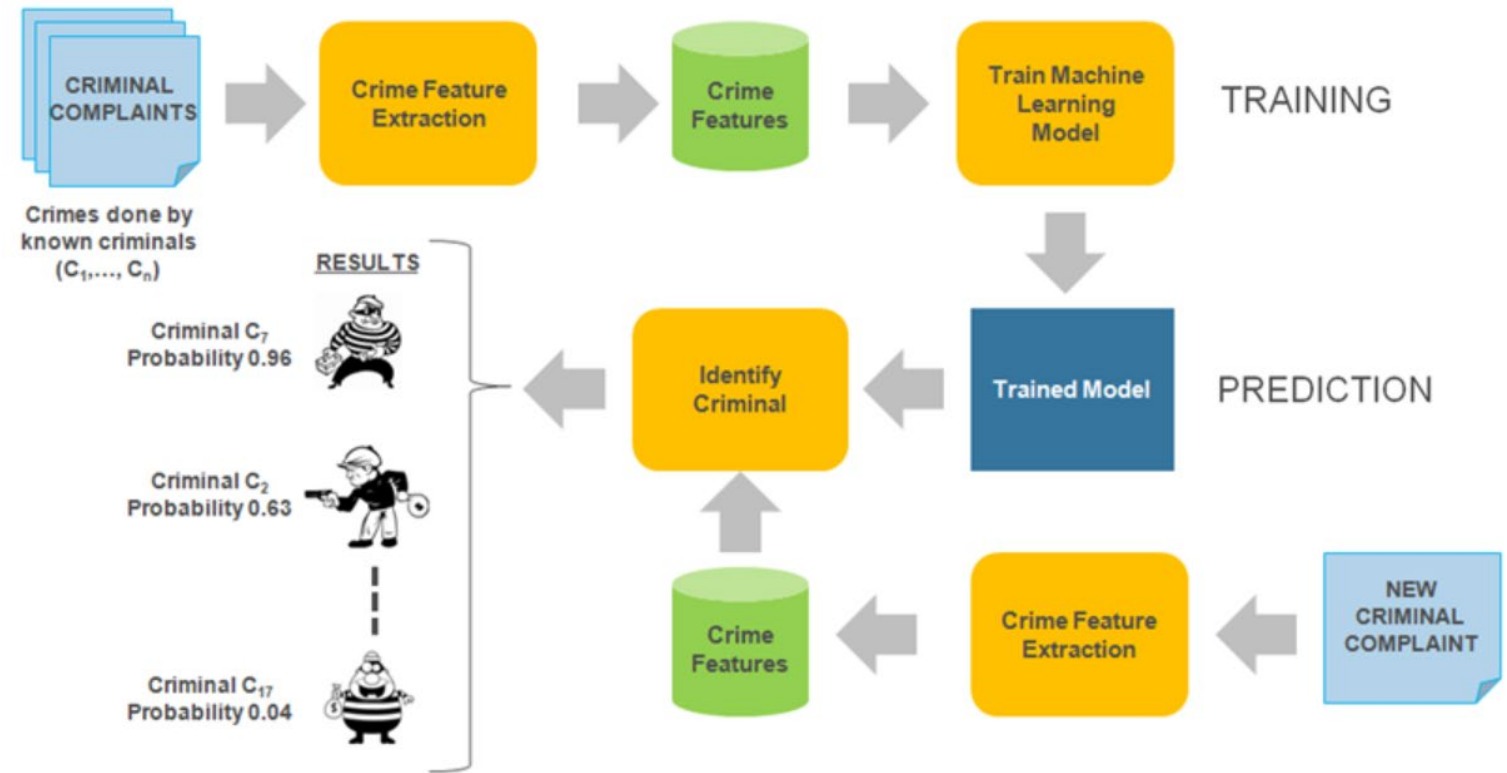
-60 min. -30 min. -90 sek. 0 sek. +30 sek. ECHTZEIT JETZT





SMART CITY TRAFFIC ASSIST

CRIMINAL FINDER AI



- Rate of crime by repeat offenders is as high as 43% in the US among released prisoners