



OPEN & AGILE SMART CITIES

CREATE A SMART CITY MARKET

One city is not
a market

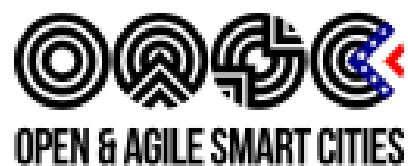
NETWORK OF NATIONAL SMART CITY NETWORKS

STAKEHOLDERS

- 1: Cities
- 2: National networks of cities
- 3: International city networks
- 4: Projects & organisations

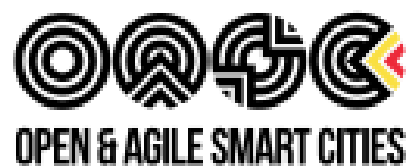
EXISTING, OPEN, DE FACTO STANDARDS:
SIMPLE, POWERFUL – AND DEMAND-DRIVEN

- 1/ Supports the Digital Single Market
- 2/ Global initiative (born in EU)
- 3/ Driven by cities (working with everyone)
- 4/ 3 mechanisms (+ driven by implementation)
- 5/ 2+ cities/country (local collaboration)
- 6/ 1 year to implement (maturity / integration)
- 7/ OASC Task Force (user-driven)



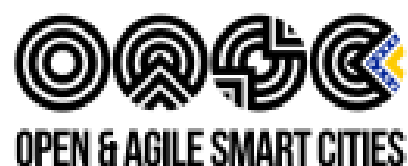
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Australia 



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Belgium 



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Bosnia and Herzegovina 



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Austria 



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Brazil 



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Croatia 



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Denmark 



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Mexico 



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England 



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France 



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Finland 



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Poland 



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Ireland 



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Italy 



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Netherlands 



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Portugal 



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Scotland 



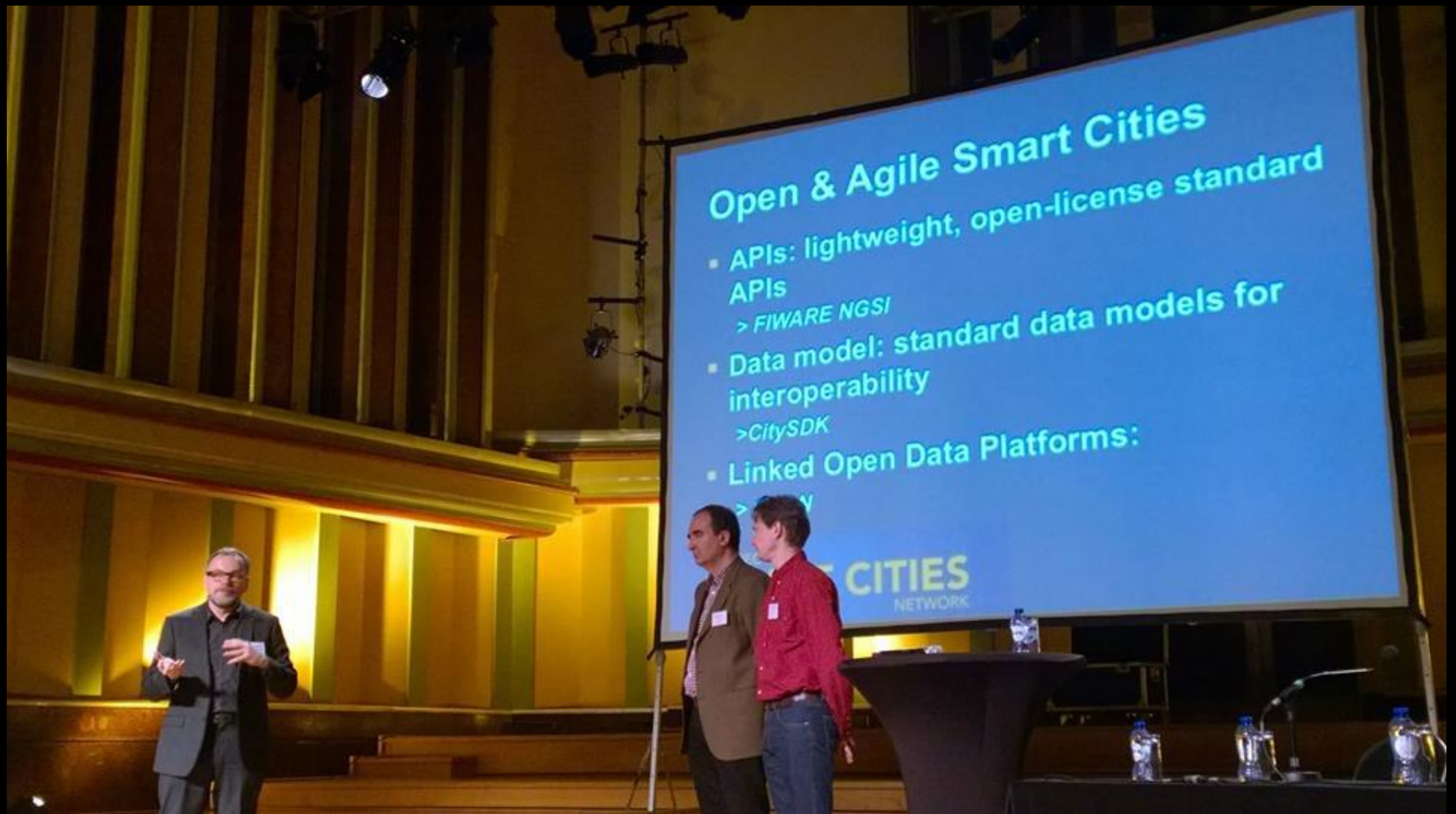
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Spain 



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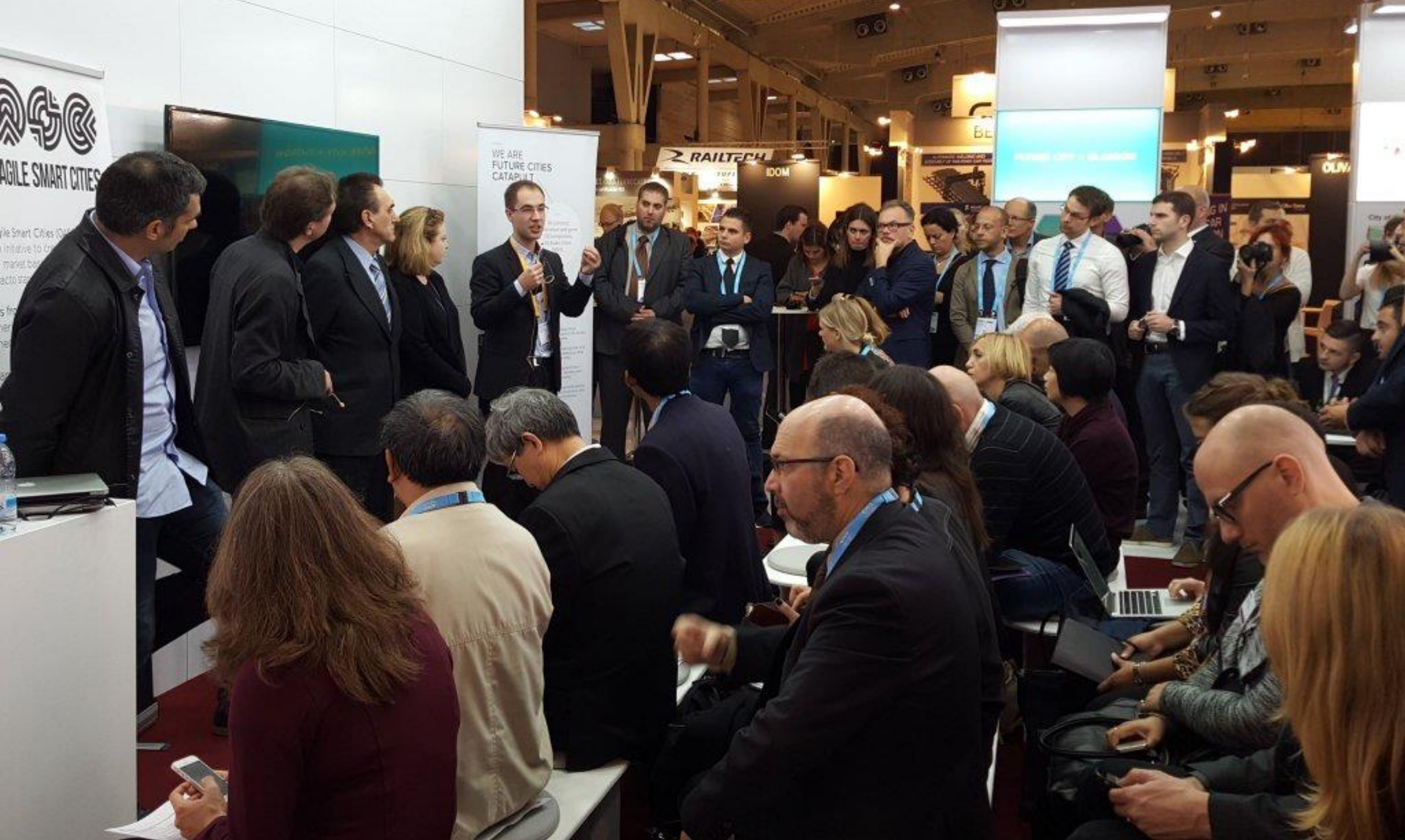
Slovenia 



JANUARY 2015



Opening of OASC Secretariat in Brussels



18 Nov: 3rd wave, Barcelona



17 Feb: 4th wave, Mexico

AUSTRALIA

- Brisbane
- Gold Coast
- Springfield

AUSTRIA

- **Salzburg**
- **Linz**
- **Graz**
- **Salzburg**

BELGIUM

- Antwerp
- Brussels
- Ghent
- Leuven

BOSNIA AND HERZEGOVINA

- Mostar
- Sarajevo
- Tuzla

BRAZIL

- Anapólis (Goiás)
- Colinas de Tocantins (Tocantins)
- Olinda (Recife)
- Porto Alegre (Rio Grande do Sul)
- Rio das Ostras
- Taquaritinga (São Paulo)
- Vitória (Espírito Santo)

CROATIA

- Dubrovnik
- Sibenik
- Split

DENMARK

- Aalborg
- Aarhus
- Copenhagen
- Vejle

ENGLAND

- Bristol
- Leeds
- Manchester
- **Milton Keynes**
- **Cambridgeshire**

FINLAND

- Espoo
- Helsinki
- Oulu
- Tampere
- Turku
- Vantaa

FRANCE

- Amiens
- Arras
- Saint-Quentin
- Valenciennes

IRELAND

- Cork
- Dublin
- Galway
- Limerick

ITALY

- Ancona
- Cagliari
- Lecce
- Messina
- Milan
- Palermo
- Terni

MEXICO

- **Cuautla**
- **Guanajuato**
- **Leon**

NETHERLANDS

- Amersfoort
- Amsterdam
- Eindhoven
- Enschede
- Rotterdam
- Utrecht

POLAND

- **Gdansk**
- **Grudziadz**

PORTUGAL

- Águeda
- Fundão
- Lisbon
- Palmela
- Penala
- Porto

SCOTLAND

- Aberdeen
- Dundee
- Edinburgh
- Glasgow
- Inverness
- Perth
- Stirling

SLOVENIA

- **Koper**
- **Idrija**

SPAIN

- Guadalajara
- Las Palmas
- Malaga
- Murcia
- Sabadell
- Santander
- Sevilla
- Valencia



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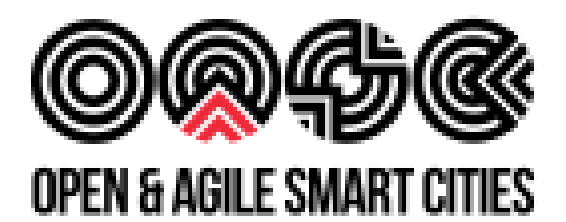
4th wave · February
17, 2016

89

cities

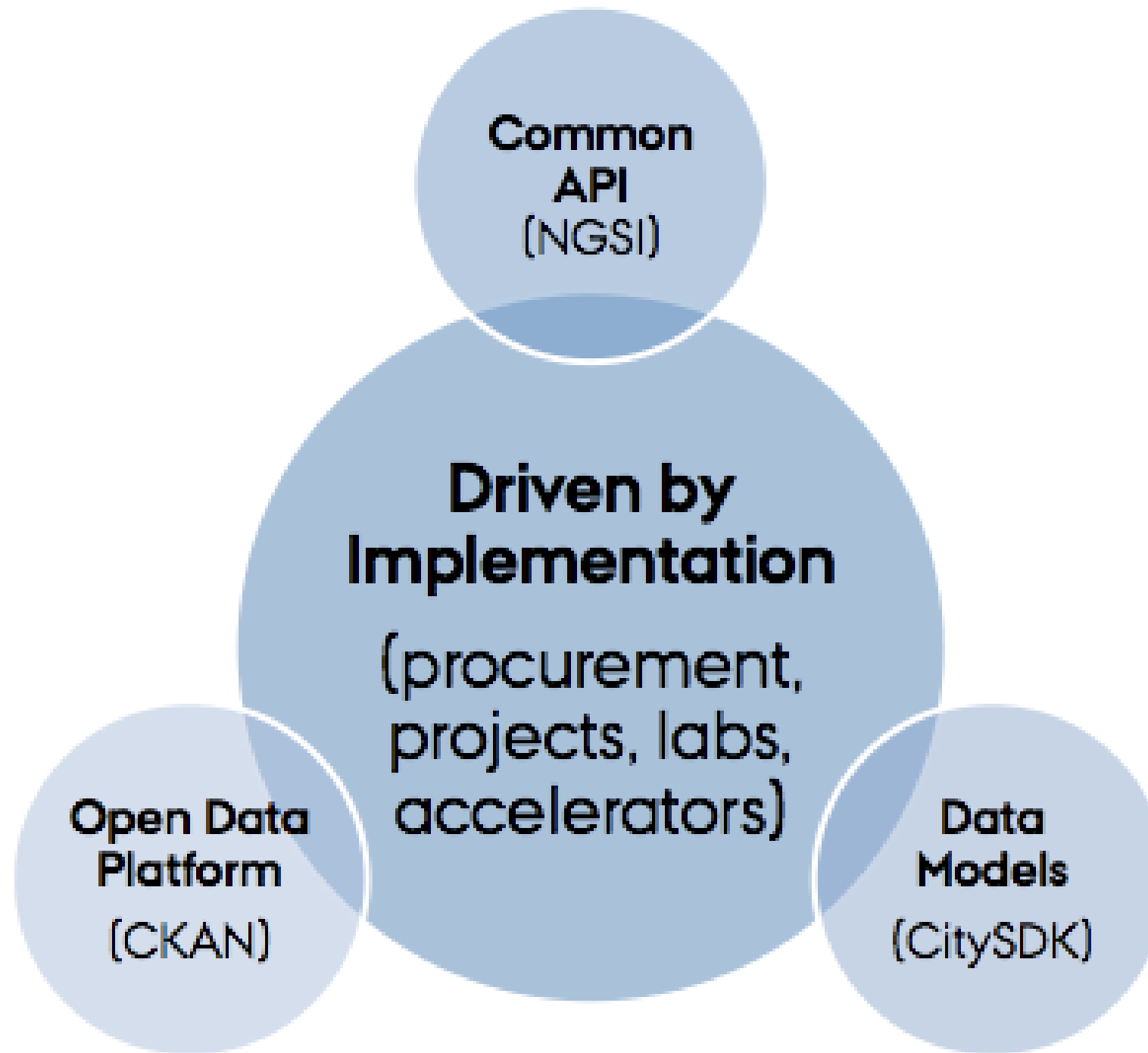
19

countries

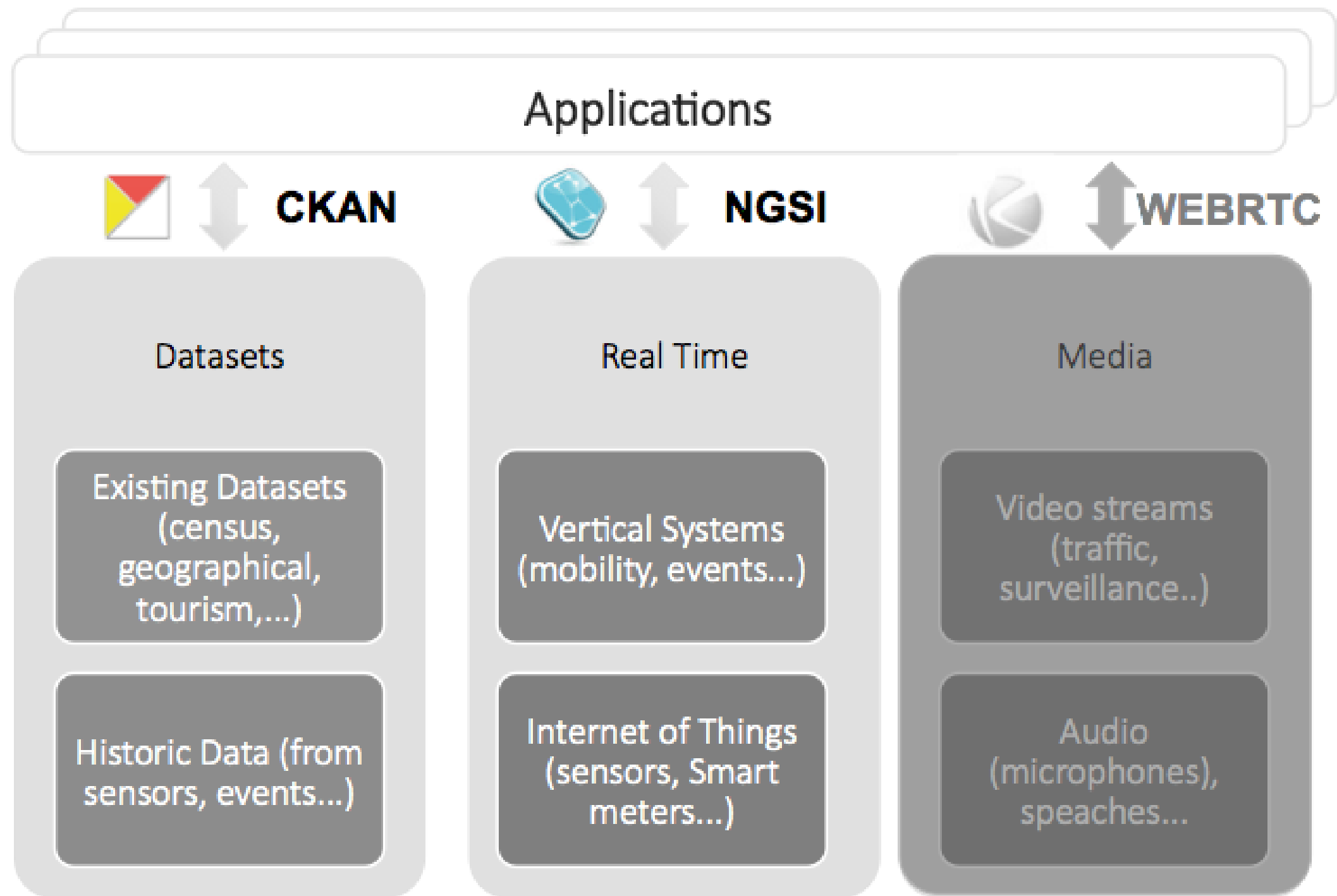


Austria 

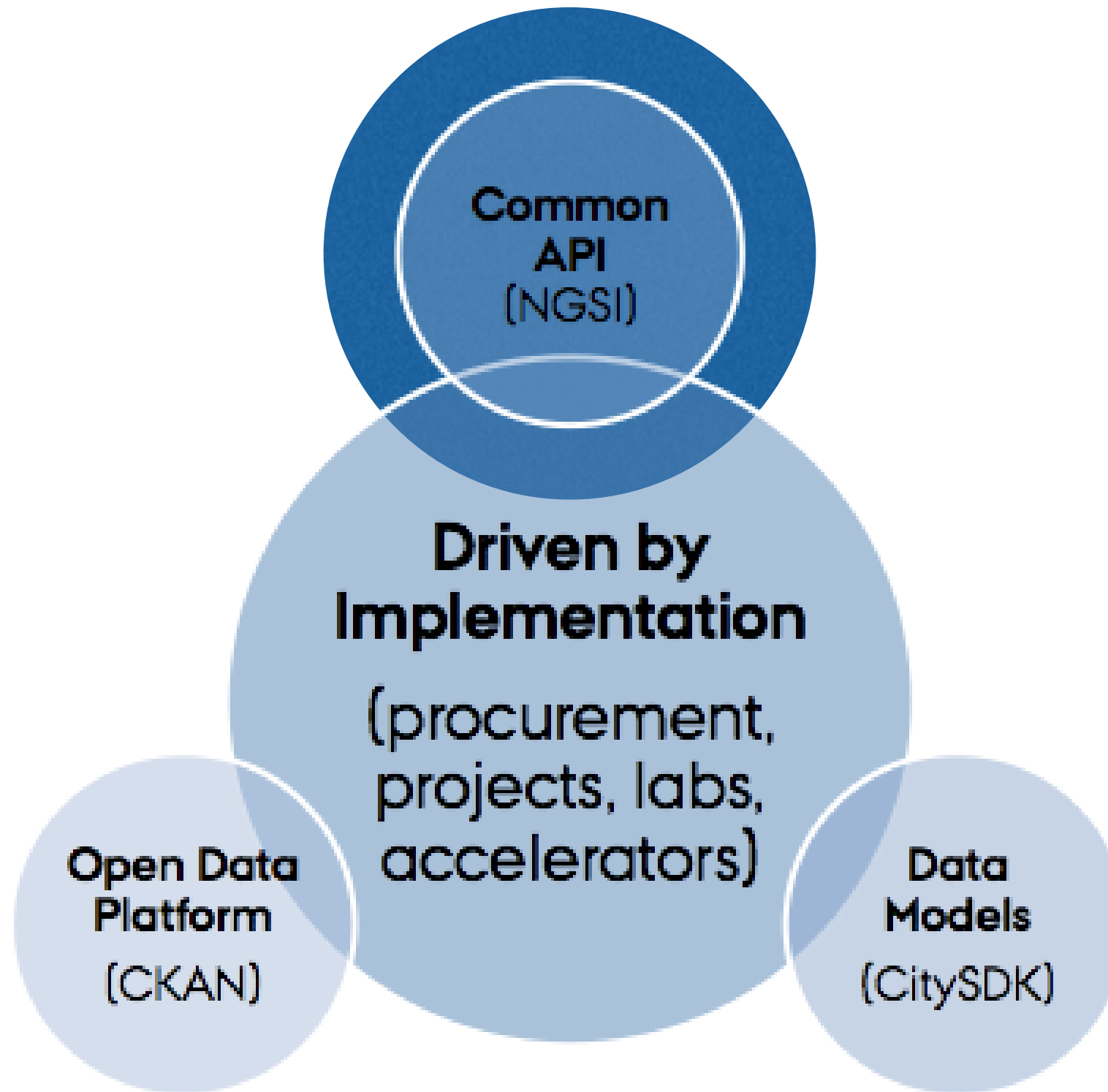
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OPEN DATA/CONTENT APPROACHES



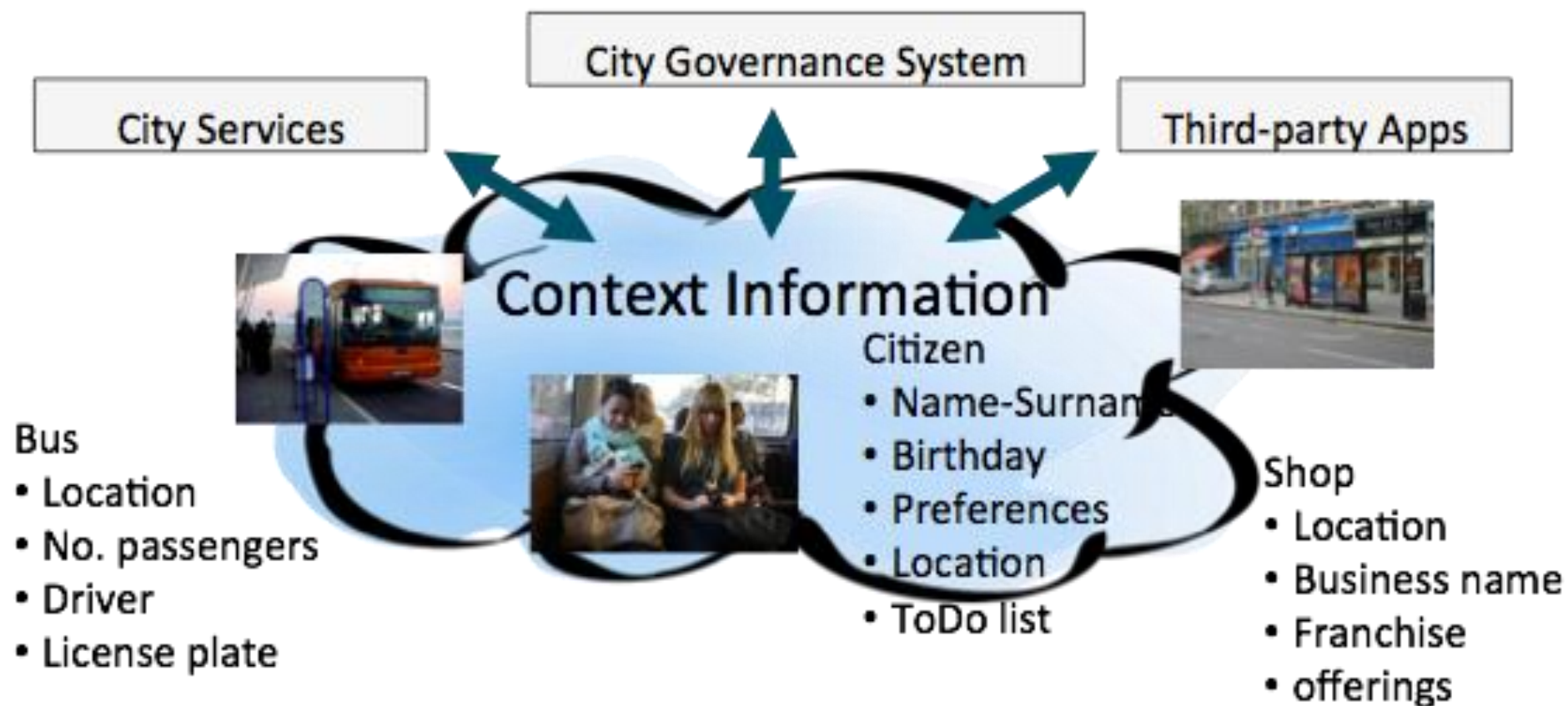
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BEING “SMART” REQUIRES FIRST BEING “AWARE”

Implementing a Smart City requires gathering and managing context information describing the current and historic “state” of the city

Context information refers to the values of attributes characterizing entities relevant to city services, governance and third-party apps



NGSI: CONTEXT FROM MANY SOURCES

FIWARE: Restful binding of OMA NGSI 9 and NGSI 10

Context information may come from many sources:

Existing systems, Users, through mobile apps, Sensor networks

Source of info related to a given entity may vary over time

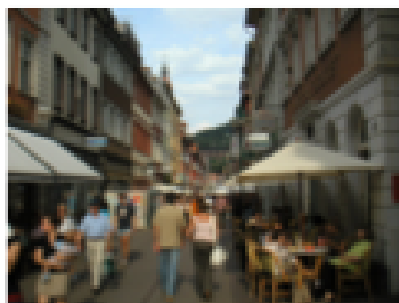
What's the current
temperature in place "X"?

Notify me the changes of
temperature in place "X"

Standard API



Place = "X", temperature = 30°



**A sensor in a
pedestrian street**



A person from his smartphone

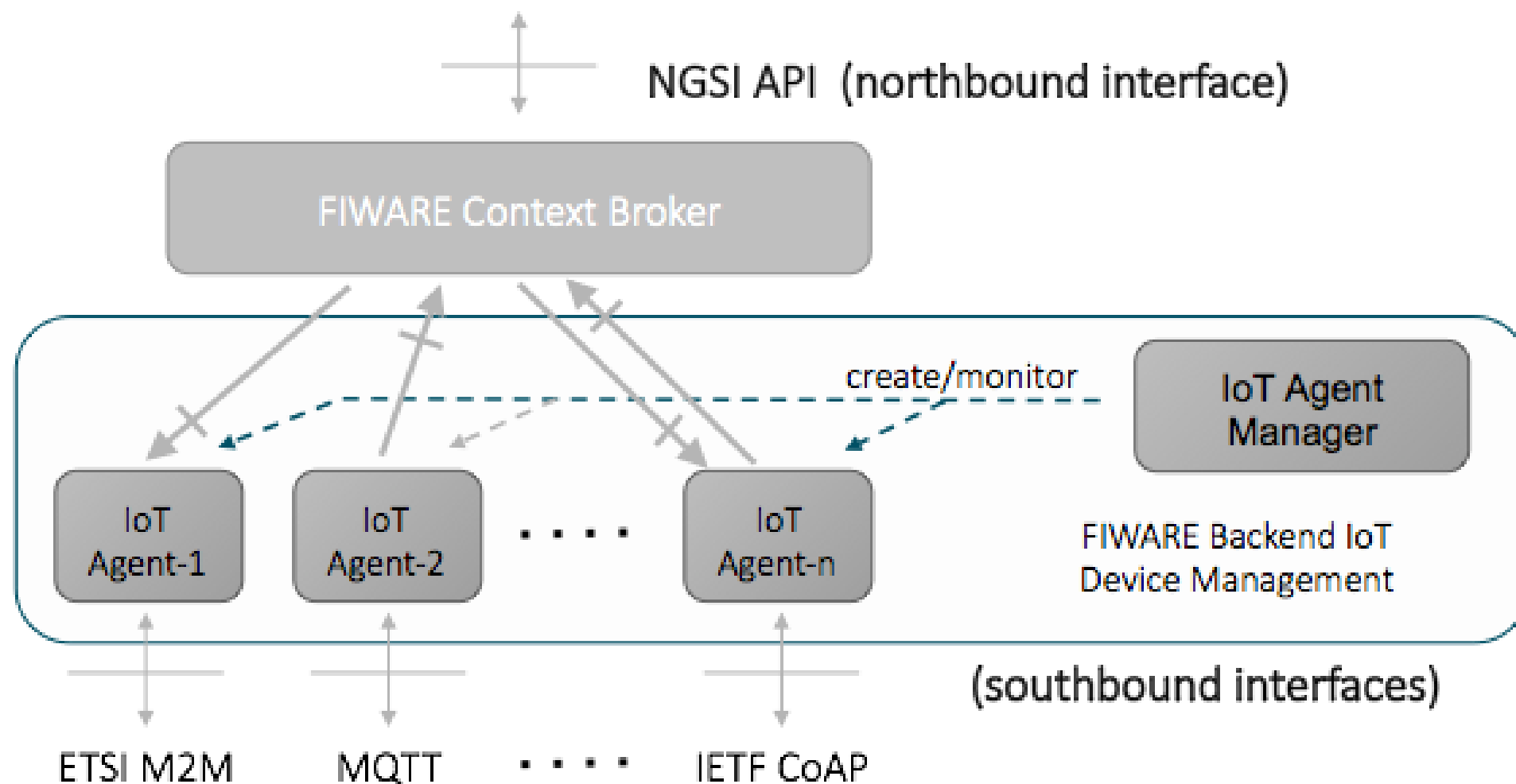


**The Public Bus Transport
Management system**

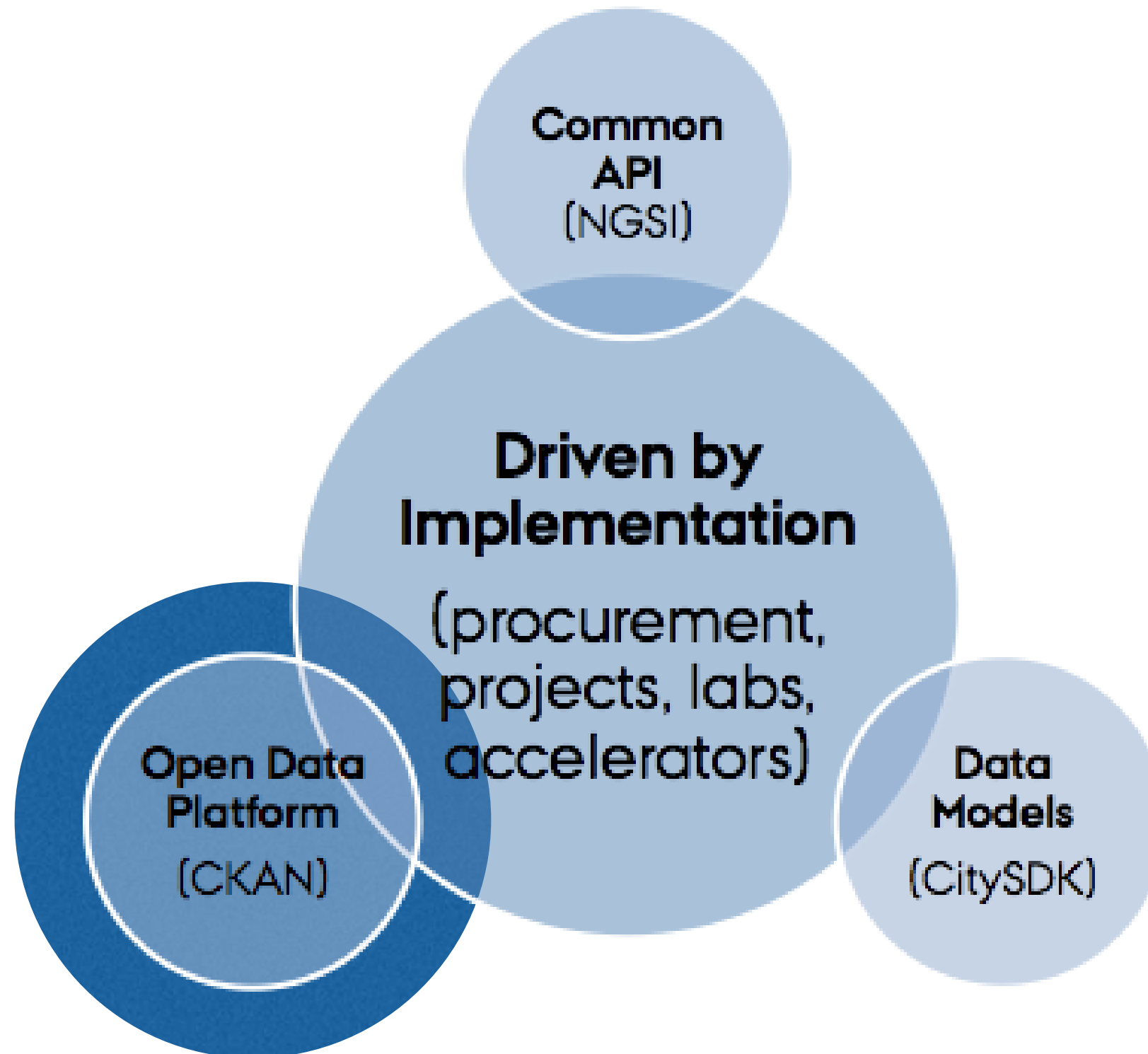
SENSOR NETWORK INTEGRATION

The backend IoT Device Management GE enables creation and configuration of NGSI IoT Agents that connect to sensor networks

Each NGSI IoT Agent can behave as Context Consumers or Context Providers, or both



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DATA PLATFORM



De facto standard platform for open data in Europe and beyond.

Search & Discover Data:

- Search by keywords

- Browse by facets

- Explore data with previews & visualization

- REST/JSON APIs to access data and metadata

Data Management for publishers

- Easy store & update of metadata and data

Plenty of extensions: harvesting, geographical information, data visualization....

OPEN DATA/CONTENT APPROACHES

CB QUERY, <http://orion.lab.fiware.org:1026/ingst10/queryContext?offset=200&limit=200>

From the dataset abstract

List of entities which are deployed at static locations of Santander. Each entity provides a sound level measurement and also information about its geolocation, battery charge and...

Source: FIXED SENSORS



```
{
  "contextResponses": [
    {
      "contextElement": {
        "type": "santander:device",
        "isPattern": "false",
        "id": "urn:x-iot:smartsantander:u7jcfa:fixed:t380",
        "attributes": [
          {
            "name": "TimeInstant",
            "type": "urn:x-ogc:def:trs:IDAS:1.0:ISO8601",
            "value": "2014-12-23T16:29:02.015899+01:00"
          },
          {
            "name": "Latitude",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:latitude",
            "value": "43.46451"
          },
          {
            "name": "Longitude",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:longitude",
            "value": "-3.79688"
          },
          {
            "name": "batteryCharge",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:batteryCharge",
            "value": "83"
          },
          {
            "name": "sound",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:sound",
            "value": "79"
          }
        ]
      }
    }
  ]
}
```


Harvest data from external repositories (geospatial servers, HTML, CKANs...)

Manage the publication process: visibility, organizations, workflows...

Entering data (web, files, CKAN API)

Datasets / Create Dataset

What are datasets?

CKAN Dataset is a collection of data resources (such as files), together with a description and other information, at a fixed URL. Datasets are what users see when searching for data.

1 Create dataset 2 Add data 3 Additional information

Title:

* URL:

Description:

You can use Markdown formatting here

Tags:

License: License definitions and additional information can be found at opendefinition.org

Organization:

Visibility: Private datasets can only be accessed by certain users, while public datasets can be accessed by anyone.

Searchable: Searchable datasets can be searched by anyone, while not-searchable datasets can only be accessed by entering directly its URL.

Allowed Users:

Important: By submitting content, you agree to release your contributions under the Open Database License. * Required field

ckan Search and discovery

*Search by text,
facets (tags, format,
...) in the portal*

*Search and query
through an API*

The screenshot displays the CKAN search interface. At the top, there's a navigation bar with links: Cloud, Store, Mashup, Data, Account, and Help&info. A user profile for Sergio Garcia is visible on the right. Below the navigation bar, there are tabs for Datasets, Organizations, Groups, and About. A search bar labeled 'Search datasets...' is present. The main content area shows '2,259 datasets found' and an 'Order by: Relevance' dropdown. On the left, there are facets for Organizations (listing various cities and their dataset counts) and Groups (listing Santé). The main list of datasets includes entries like 'cigüena' (CSV format), 'CONTROL DE FLOTA DE AUTOBUSES' (ngsi10 format), 'Control de plagas para el año 2014' (CSV format), and 'Información SIG Mapa Estratégico de Ruido de Málaga - Ruido total Índice Ltarde' (shp format).

FIWARE Lab Cloud Store Mashup Data Account Help&info Sergio Garcia

Datasets Organizations Groups About Search datasets...

Datasets

Organizations

- ntino (867)
- aga (512)
- ence (320)
- erdam (179)
- sterdam (168)
- Valencia (75)
- Vigo (15)
- Alcobendas (14)
- Logroño (13)
- Lleida (12)
- Show More Organizations

Groups

- Santé (1)
- Show More Groups

Tags

- medio ambiente (195)
- energía (188)
- fotovoltaica (187)
- Firenze (156)

Add Dataset

Search datasets...

2,259 datasets found Order by: Relevance

cigüena
CSV

CONTROL DE FLOTA DE AUTOBUSES
ngsi10

Control de plagas para el año 2014
CSV

Información SIG Mapa Estratégico de Ruido de Málaga - Ruido total Índice Ltarde
shp



Metadata

A CKAN portal provides a rich set of metadata for each dataset

UK: Adur District Council Spending Data

From Spikes Cavell, Spotlight on Spend.
For Ardur, records from April 2009-March 2010 are currently available (2011-008-04)

Data and Resources

Resource	Download
Adur District Council April 2009	Explore
Revised CSV for import	Explore

country-uk date-2009 openspending regional

Additional Info

Field	Value
Source	http://www.spotlightonspend.co.uk/Downloads/1038
Author	Lucy Chambers
Spatial	"type": "Polygon"

Title, group, owner, dates, license...

Activity Stream

demo User updated the dataset 3 months, 3 days and 21 hours ago



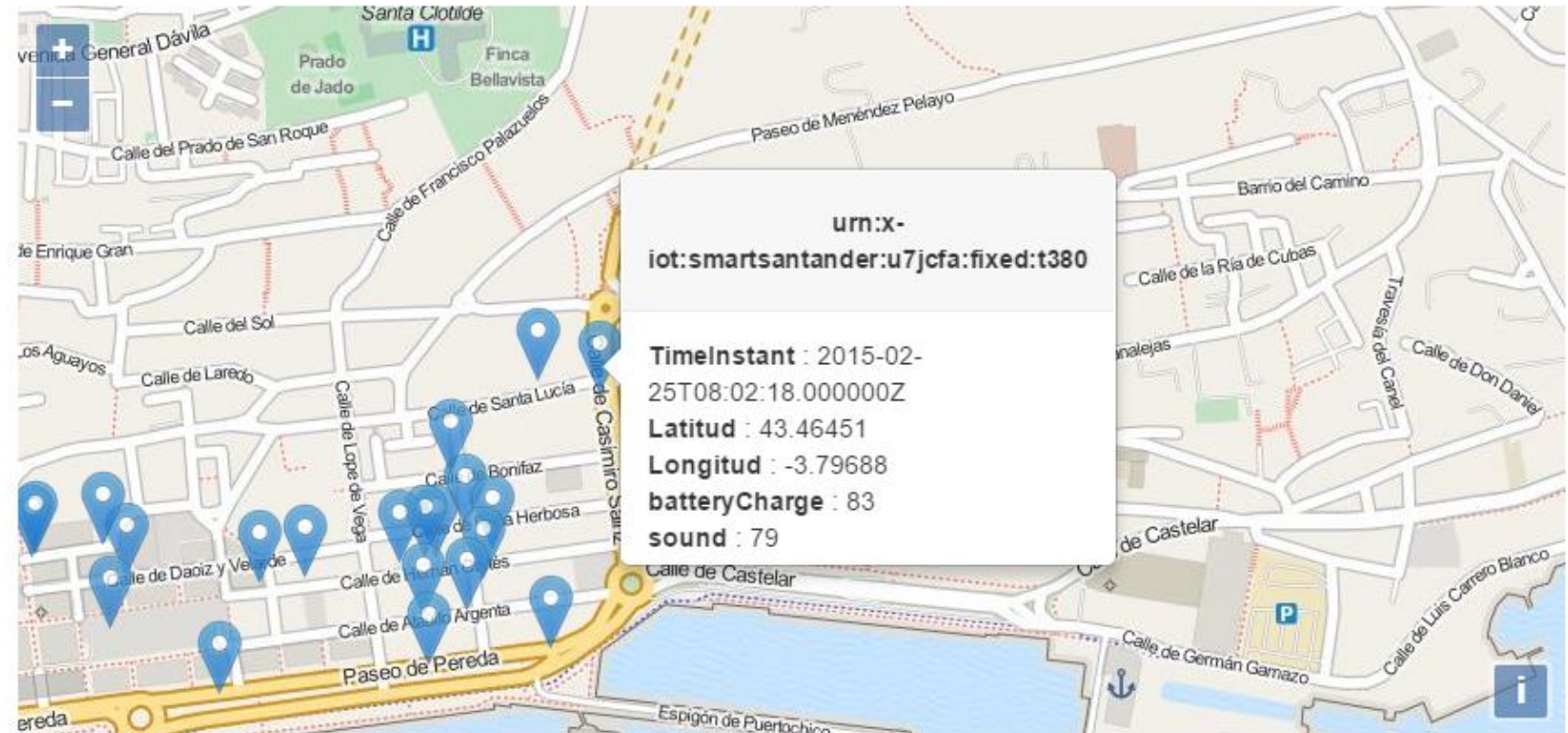
NGSI resource visualization

CB QUERY: <http://orion.lab.fiware.org:1026/ngsi10/queryContext?offset=200&limit=200>

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        "type": "santander:device",
        "isPattern": "false",
        "id": "urn:x-iot:smartsantander:u7jcfa:fixed:t619",
        "attributes": [
          {
            "name": "TimeInstant",
            "type": "urn:x-ogc:def:trs:IDAS:1.0:ISO8601",
            "value": "2014-12-23T16:29:02.015899+01:00"
          },
          {
            "name": "Latitud",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:latitude",
            "value": "43.46451"
          },
          {
            "name": "Longitud",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:longitude",
            "value": "-3.79688"
          },
          {
            "name": "batteryCharge",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:batteryCharge",
            "value": "83"
          },
          {
            "name": "sound",
            "type": "urn:x-ogc:def:phenomenon:IDAS:1.0:sound",
            "value": "79"
          }
        ]
      }
    }
  ]
}
```

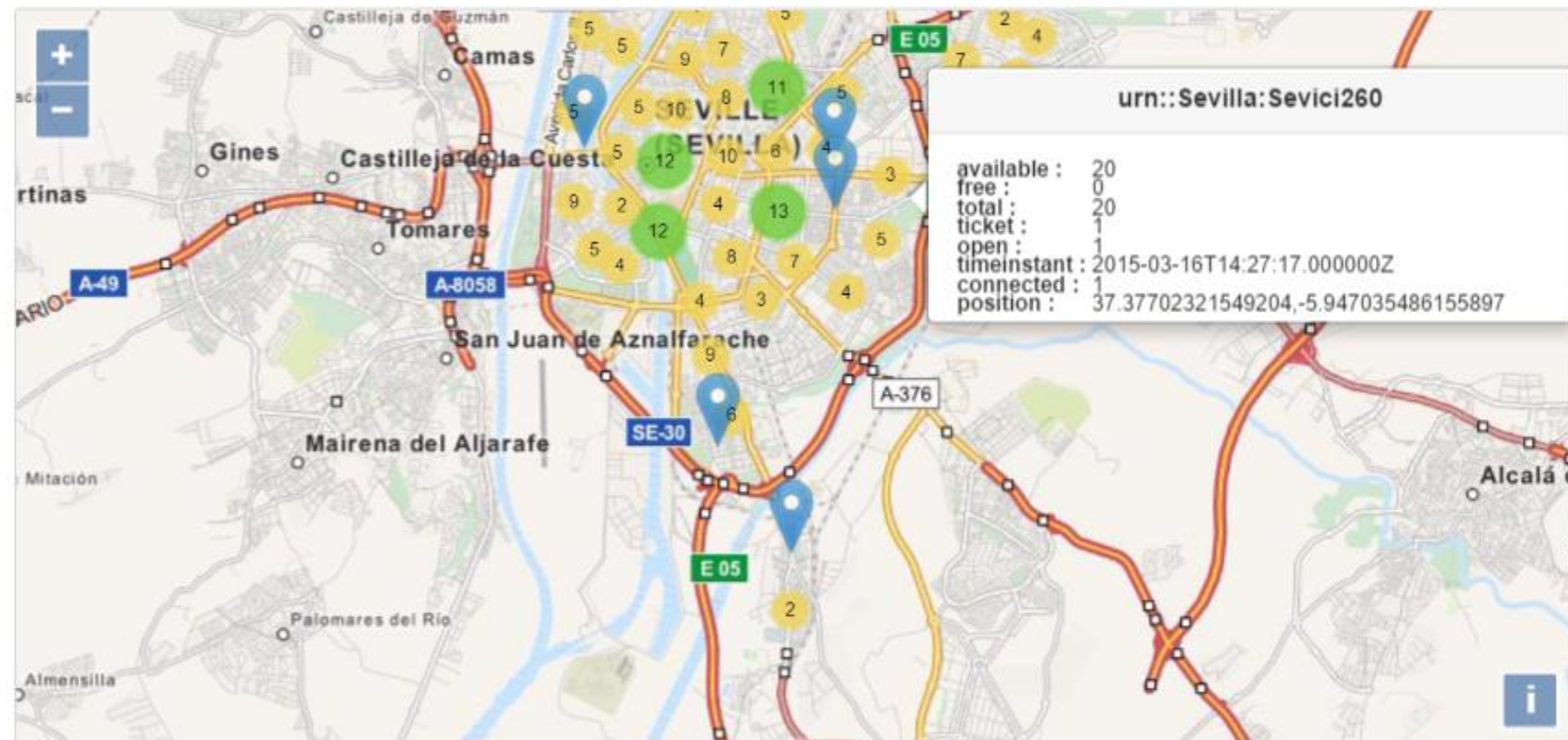

From the dataset abstract

Real time information of bike renting (SEVICI) stations. Every time a resource is previewed, a query of that station is sent to the Orion Context Broker in order to get the last updated...

Source: [Sevici real time](#)

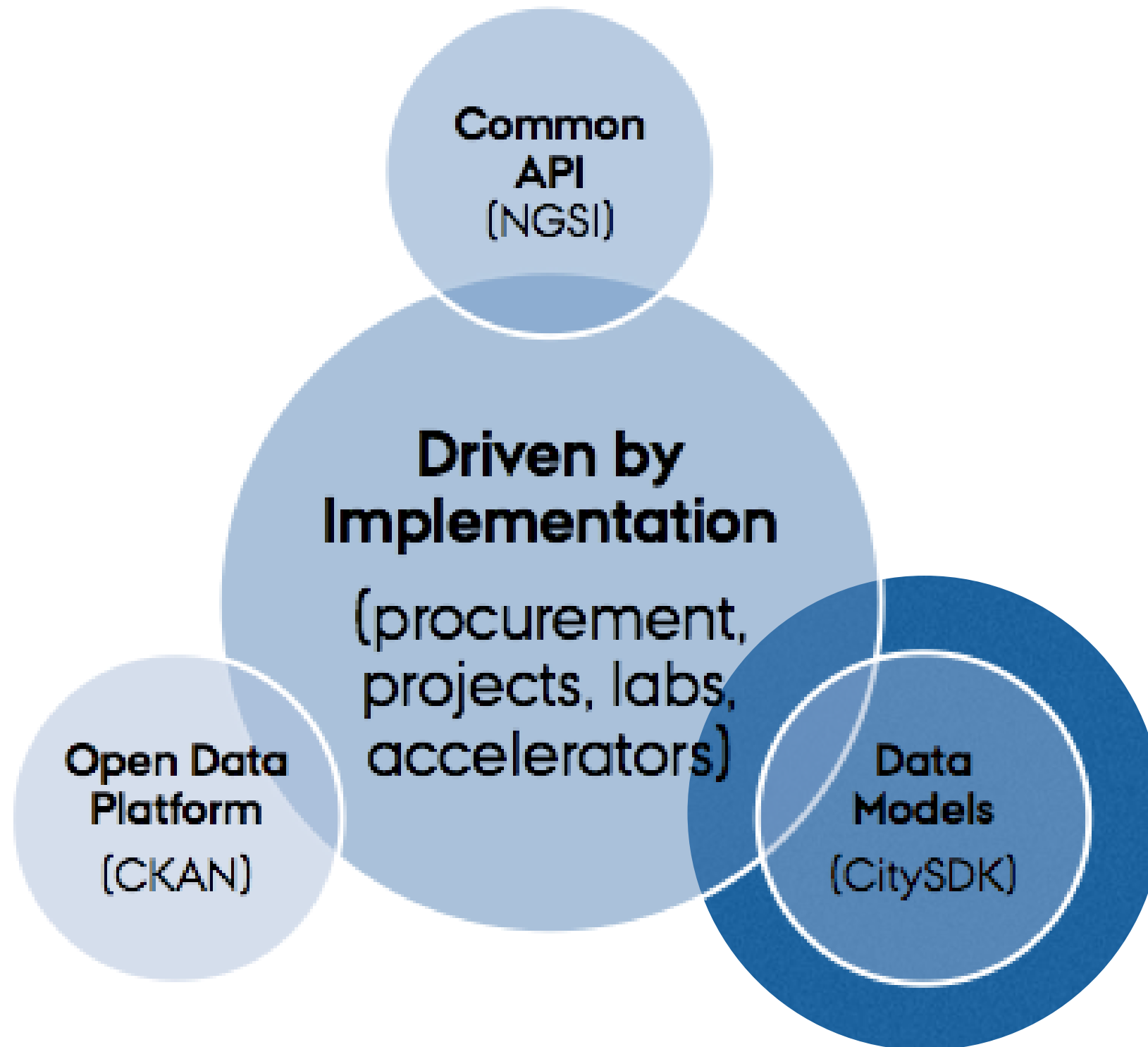


NGSI resources visualization



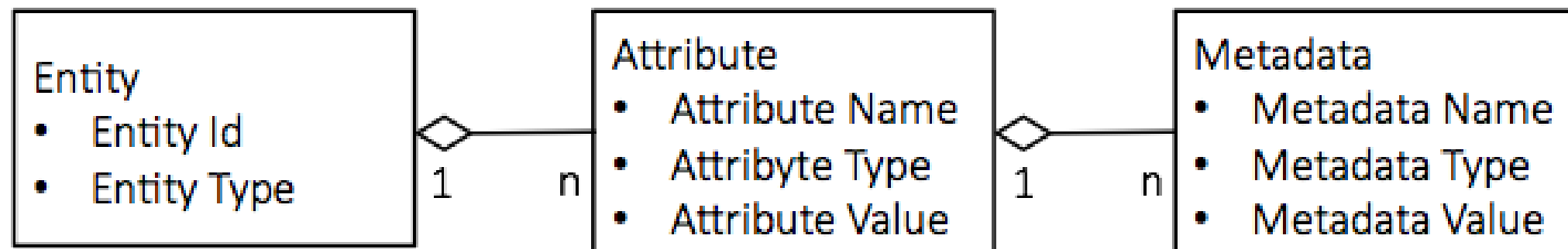
```
{
  "contextResponses": [
    {
      "contextElement": {
        "type": "sevici",
        "isPattern": "false",
        "id": "urn::Sevilla:Sevici1",
        "attributes": [
          {
            "name": "available",
            "type": "integer",
            "value": "4"
          },
          ...
        ]
      }
    },
    ...
  ]
}
```

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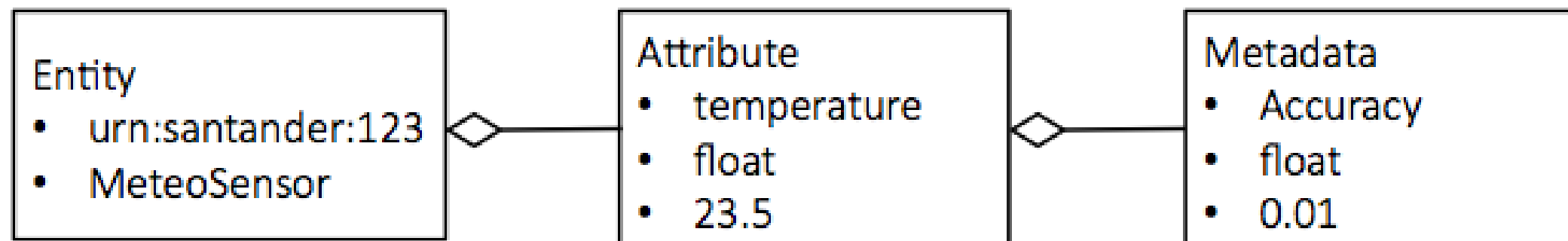


FROM META MODEL TO DATA MODEL

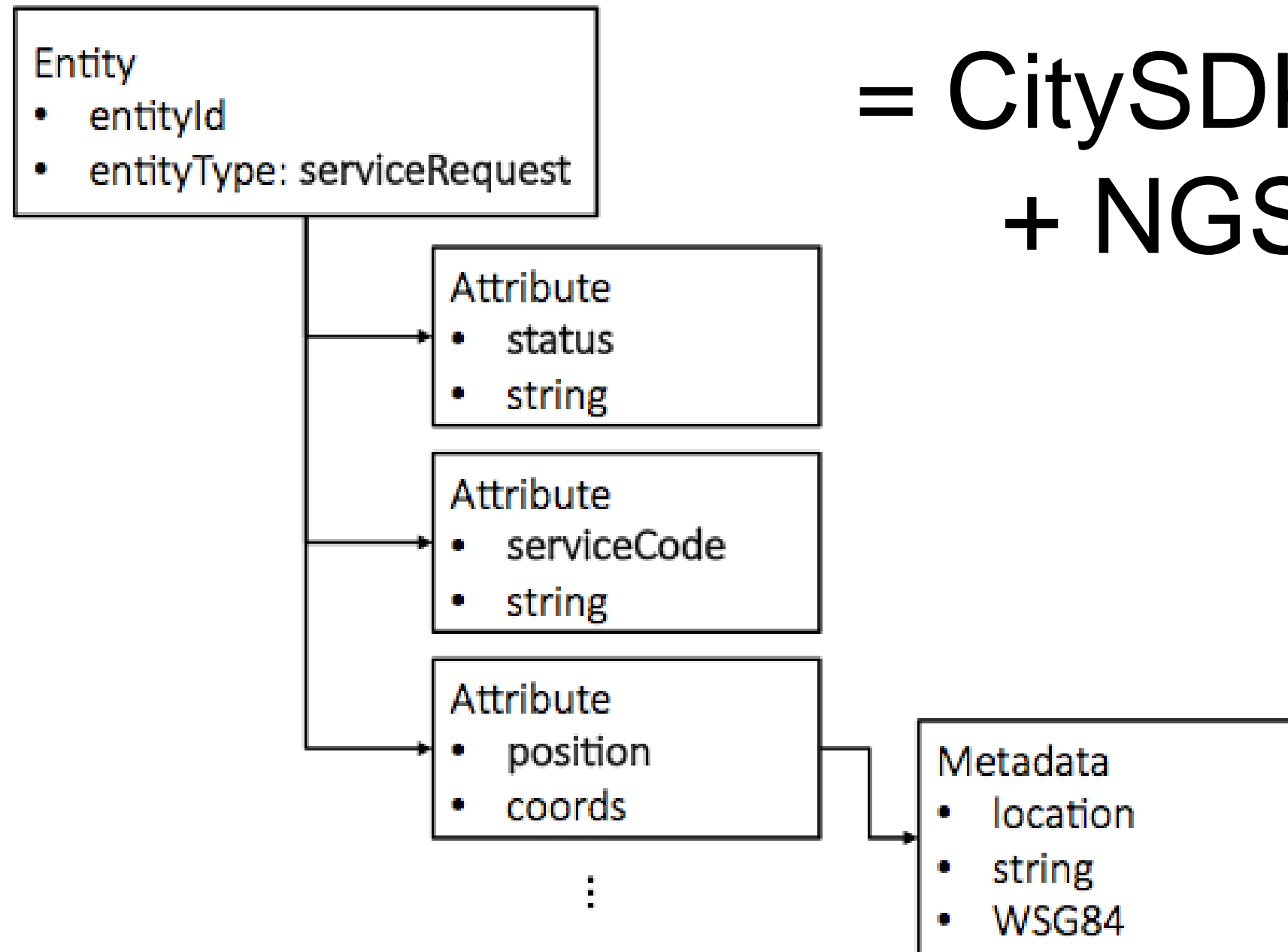
NGSI Metamodel



NGSI data example



OASC PARTICIPATION MODEL



= CitySDK/Open311
+ NGSI model

EXAMPLES

Road

This entity contains data about a road. Roads are made up of roadSegments.

Entity Specification

Field Type	Field Name	Description
String	id	The UUID of the Road.
Object	roadSegments	References to segments of the road.
String	name	The official name of the road.
String	altName	The alternative name of the road.
String	class	The class of the road, e.g. motorway, trunk, secondary etc.
String	type	The type of the entity.
String	source	A string giving the source of the data as a URL.
Object	extraProperties	An object containing arbitrary properties not included in the schema.
Date	created	The ISO8601 string date / time at which the entity was created in UTC. Automatically populated by the platform.
Date	updated	The ISO8601 string date / time at which the entity was last modified in UTC. Automatically populated by the platform.

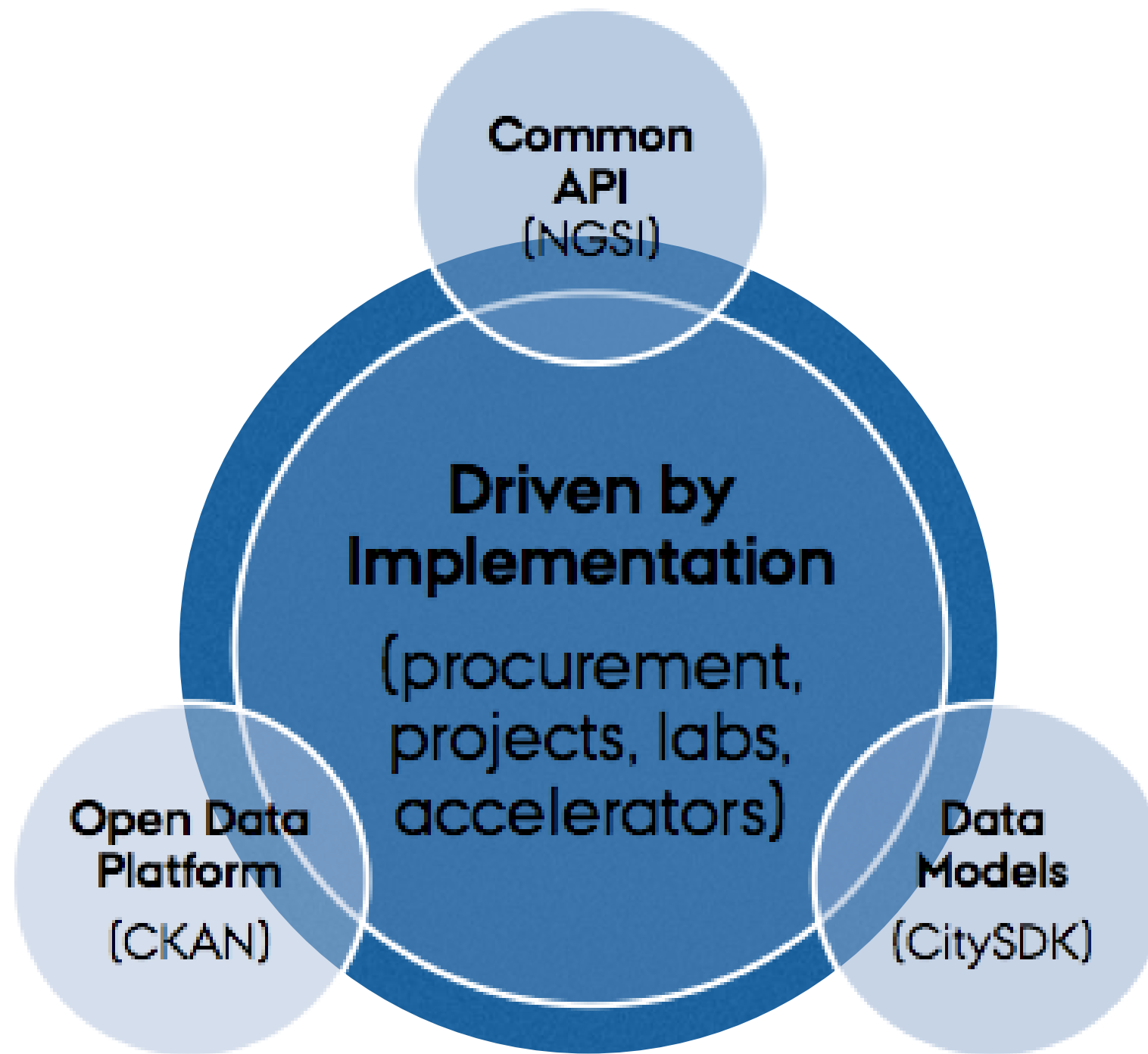
Vehicle

This entity contains data about a specific vehicle.

Entity Specification

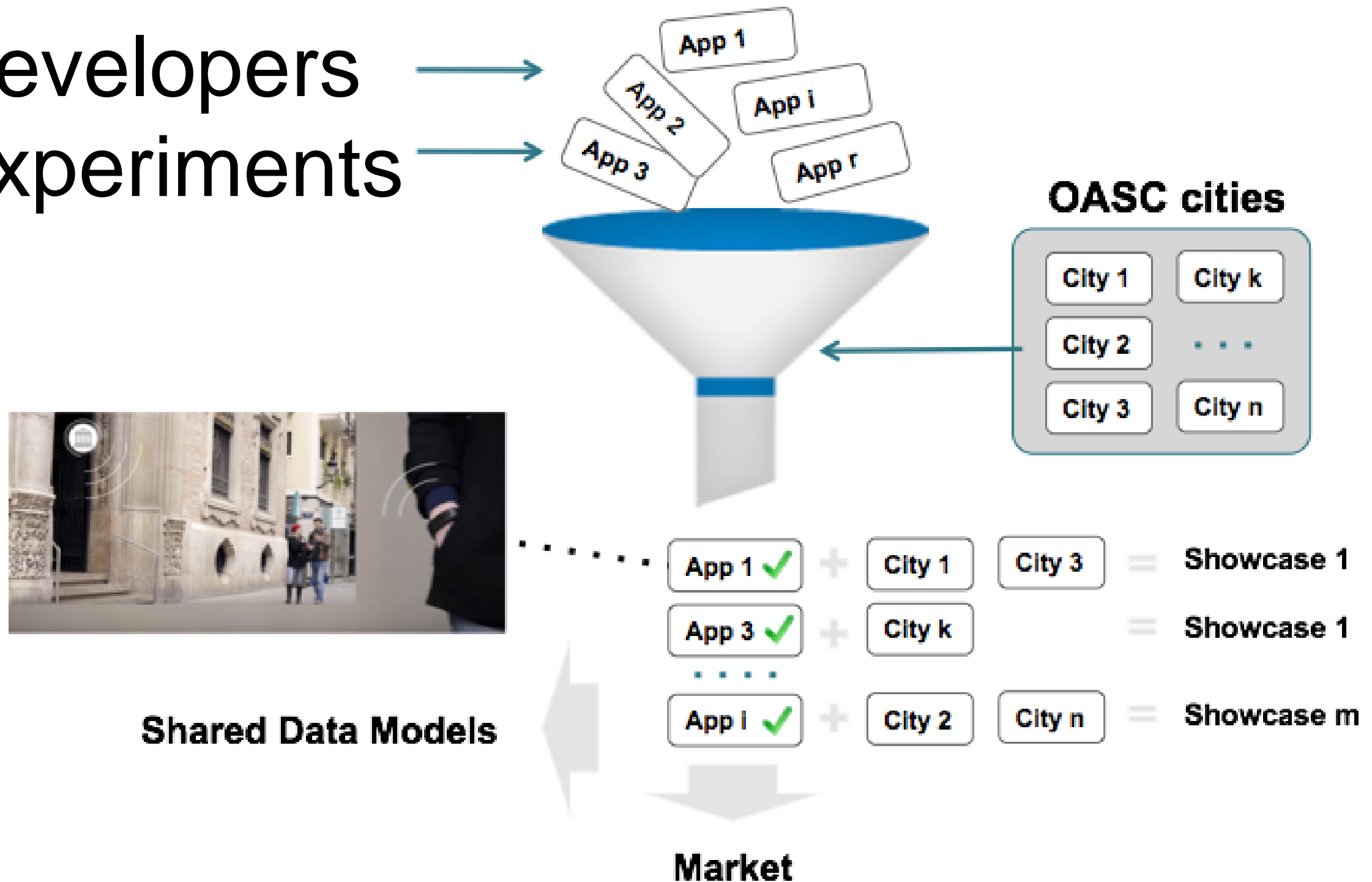
Field Type	Field Name	Description
String	id	The unique ID of the Vehicle object.
Reference	vehicleType	A reference to the <code>vehicleType</code> entity which describes the type of this vehicle.
String	fuel	A string indicating the fuel e.g. petrol, diesel, lpg or electric.
Number	displacement	A number indicating the engine displacement in litres if using a combustion engine.
Number	fuelEconomy	A number indicating the fuel economy index.
Date	released	The ISO8601 string timestamp string indicating the year of release.
Date	discontinued	The ISO8601 string timestamp string indicating the year which the vehicle was discontinued.
String	vin	The VIN (vehicle identification number) of the vehicle, if provided.
Number	odometer	The total distance the car has travelled according to the onboard odometer in m.
String	type	The type of the entity.
String	source	A string giving the source of the data as a URL.
Object	extraProperties	An object containing arbitrary properties not included in the schema.
Date	created	The ISO8601 string date / time at which the entity was created in UTC. Automatically populated by the platform.
Date	updated	The ISO8601 string date / time at which the entity was last modified in UTC. Automatically populated by the platform.

OPEN & AGILE SMART CITIES

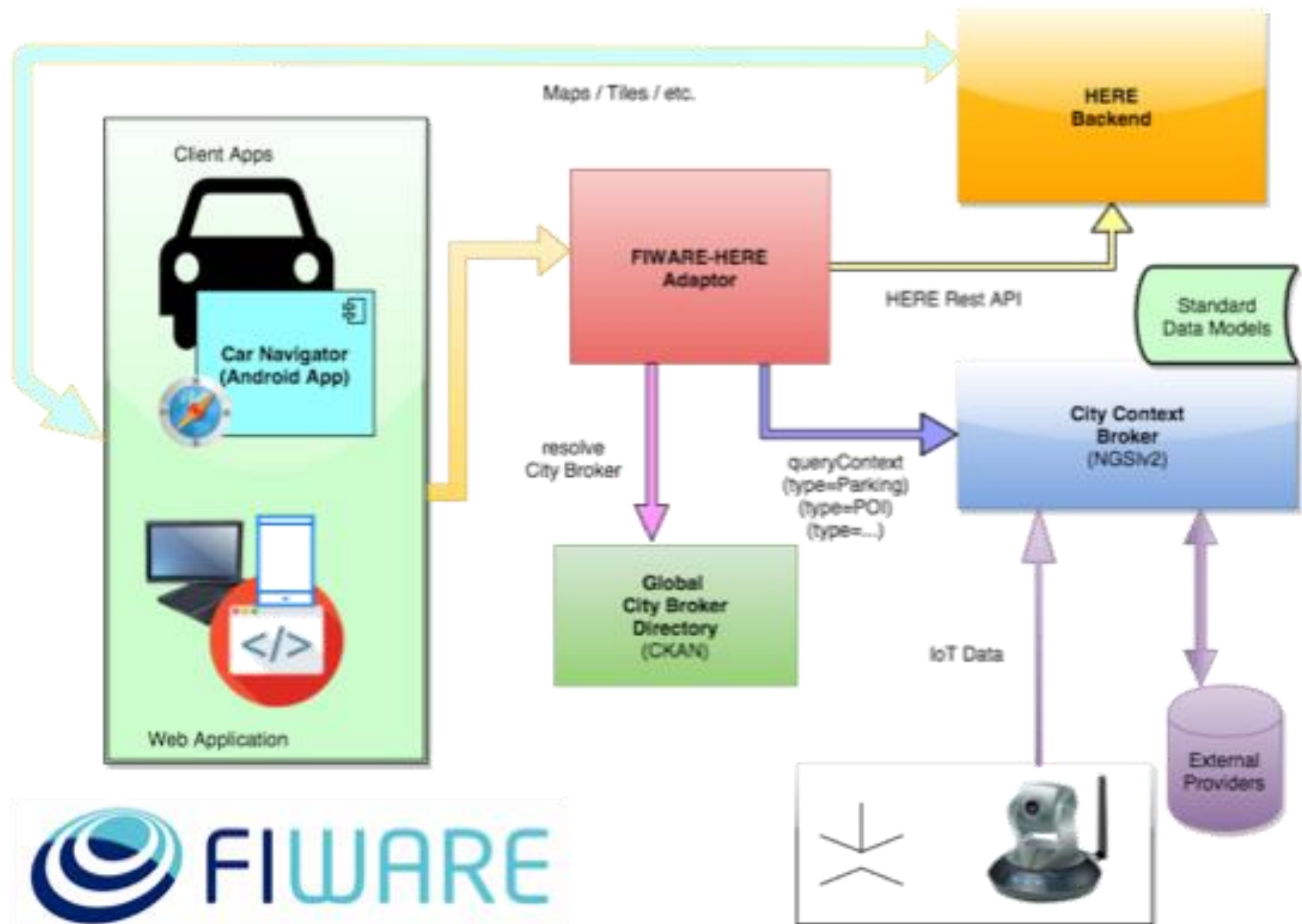


SHOWCASES

Developers
Experiments



PARKING: PORTO, SANTANDER, ANTWERP, SEVILLE



PARKING: PORTO, SANTANDER, ANTWERP, SEVILLE



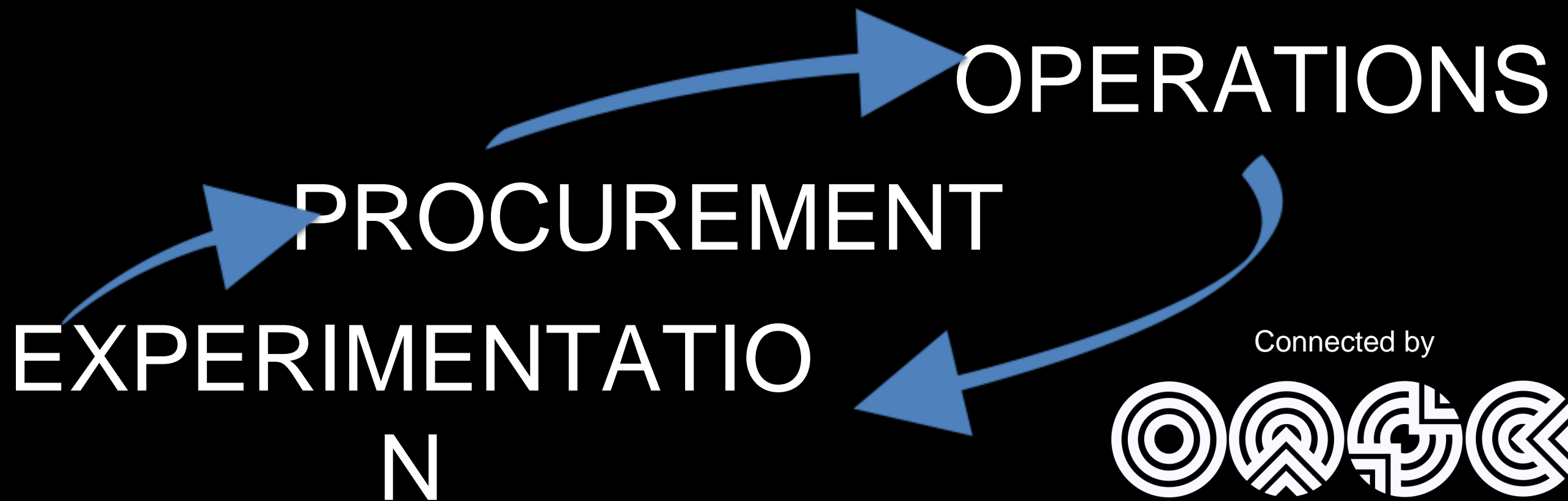
PARKING: PORTO, SANTANDER, ANTWERP, SEVILLE



WORLD

NATION

CITY



Connected by



OPEN & AGILE SMART CITIES



OPEN & AGILE SMART CITIES

Martin Brynskov-martin.brynskov@oascities.org

Chair, Open & Agile Smart Cities, Coordinator, Danish Smart City
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Dalibor Baskovc-dalibor.baskovc@eurocloud.si

Coordinator, Slovene Smart City Network