A Smart City Enablement Platform

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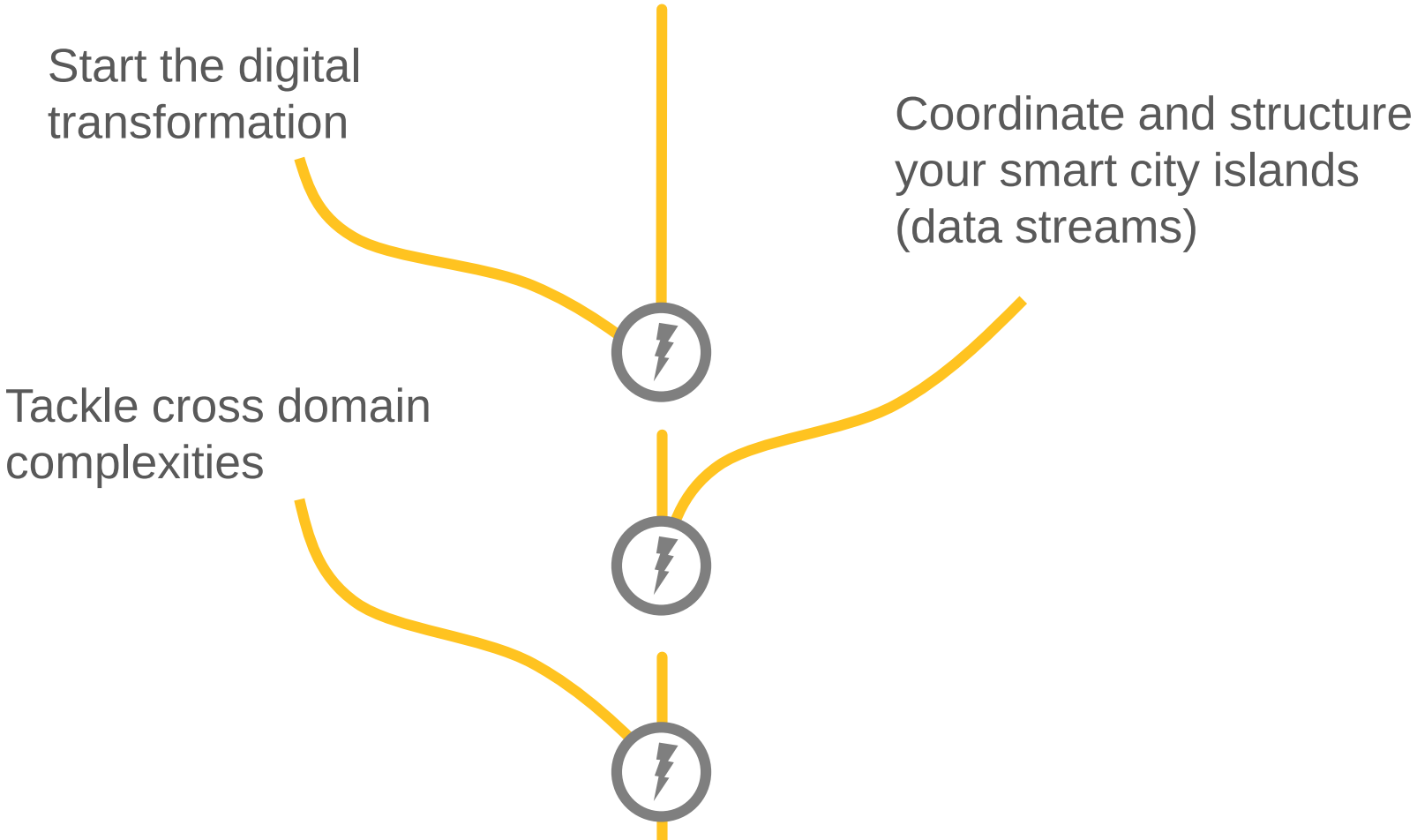
Our understanding of what cities need

> “I want to take fact-driven, data supported measures and once implemented monitor them continuously to track their effectiveness on multiple facets.”



The Olympic minimum of a true smart city enablement platform

Vision aligned with:

Vlaamse overheid ABB

VLOCA

imec

OPEN & AGILE SMART CITIES

FIWARE

Vlaamse overheid SMART FLANDERS

SUSTAINABLE DEVELOPMENT GOALS

CENTRALISE

OPEN

COMBINE
ENRICH
INNOVATE

COLLABORATE

The Olympic minimum of a true smart city enablement platform

WHY

CENTRALISE

OPEN

COMBINE
ENRICH
INNOVATE

COLLABORATE

preventing data provider lock-in

own the data yourself
or have it managed for you

solid underlying architecture

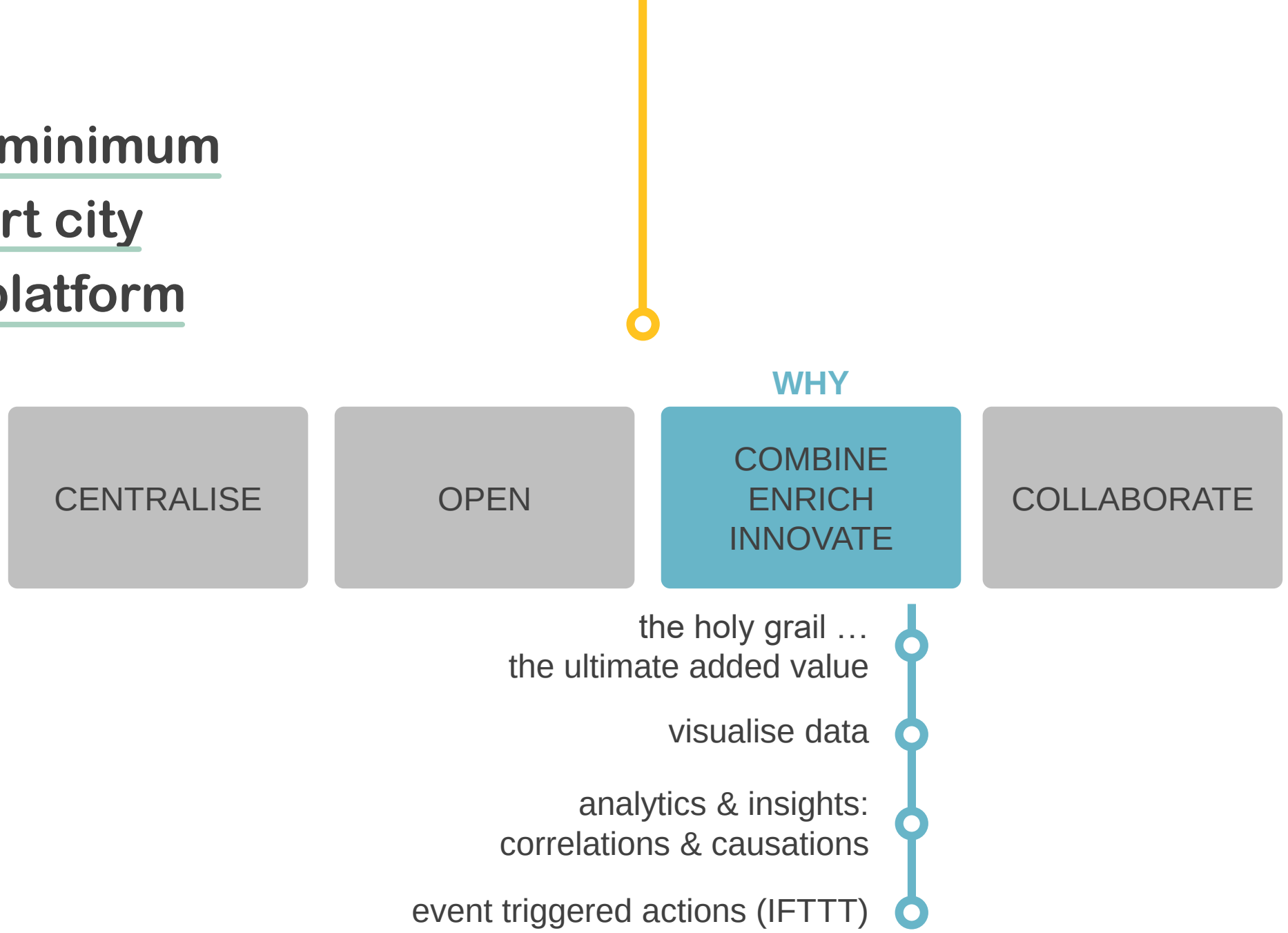
The Olympic minimum of a true smart city enablement platform

WHY

CENTRALISE | OPEN | COMBINE ENRICH INNOVATE | COLLABORATE

- interoperability
- re-usability
- cost optimised data onboarding
- accelerate time-to-market
- risk reduction
- simplify collaboration

The Olympic minimum of a true smart city enablement platform



The Olympic minimum of a true smart city enablement platform

CENTRALISE

OPEN

COMBINE
ENRICH
INNOVATE

WHY

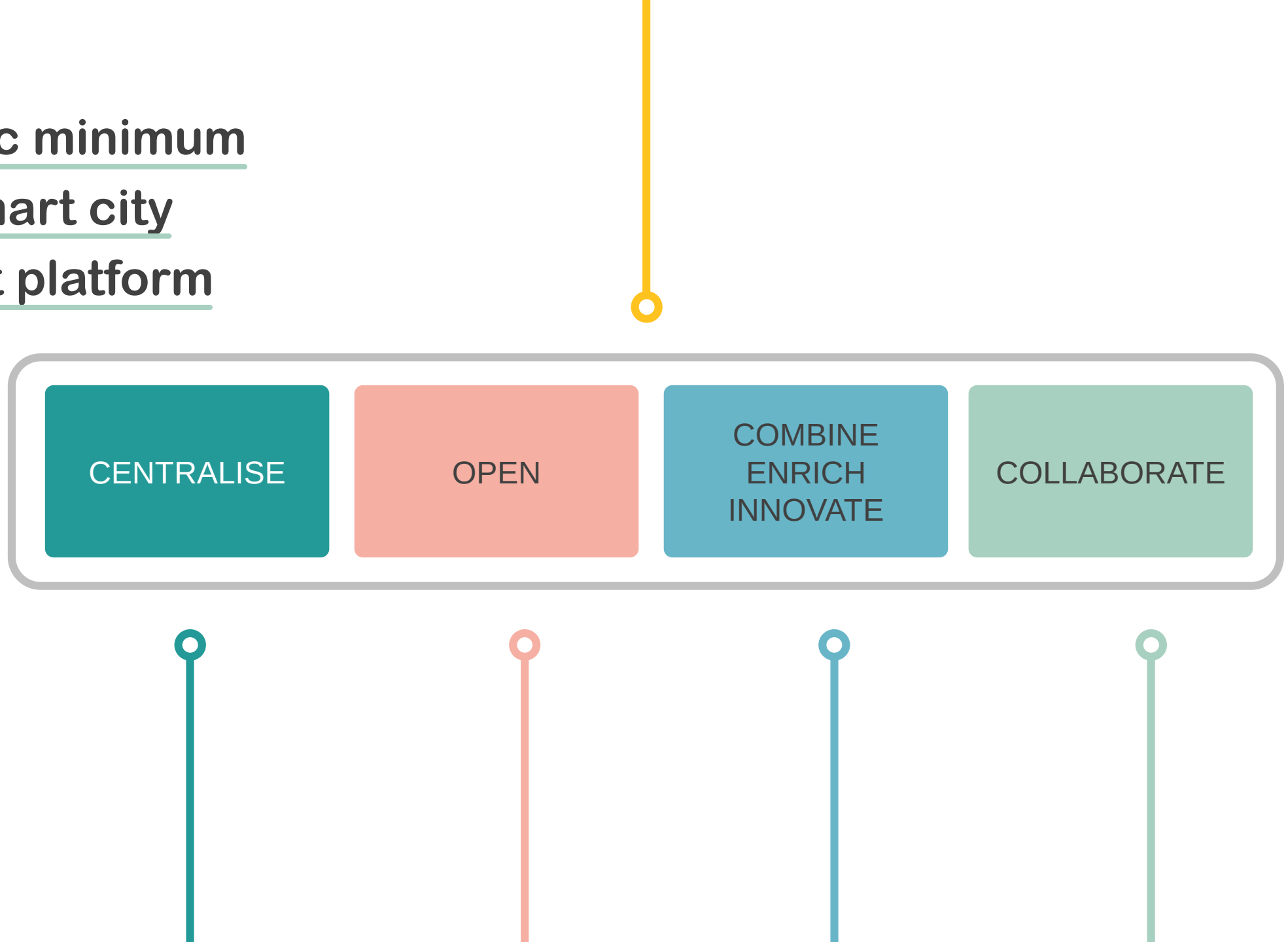
COLLABORATE

Quadruple Helix:
citizens + government + R&D institutes + enterprises

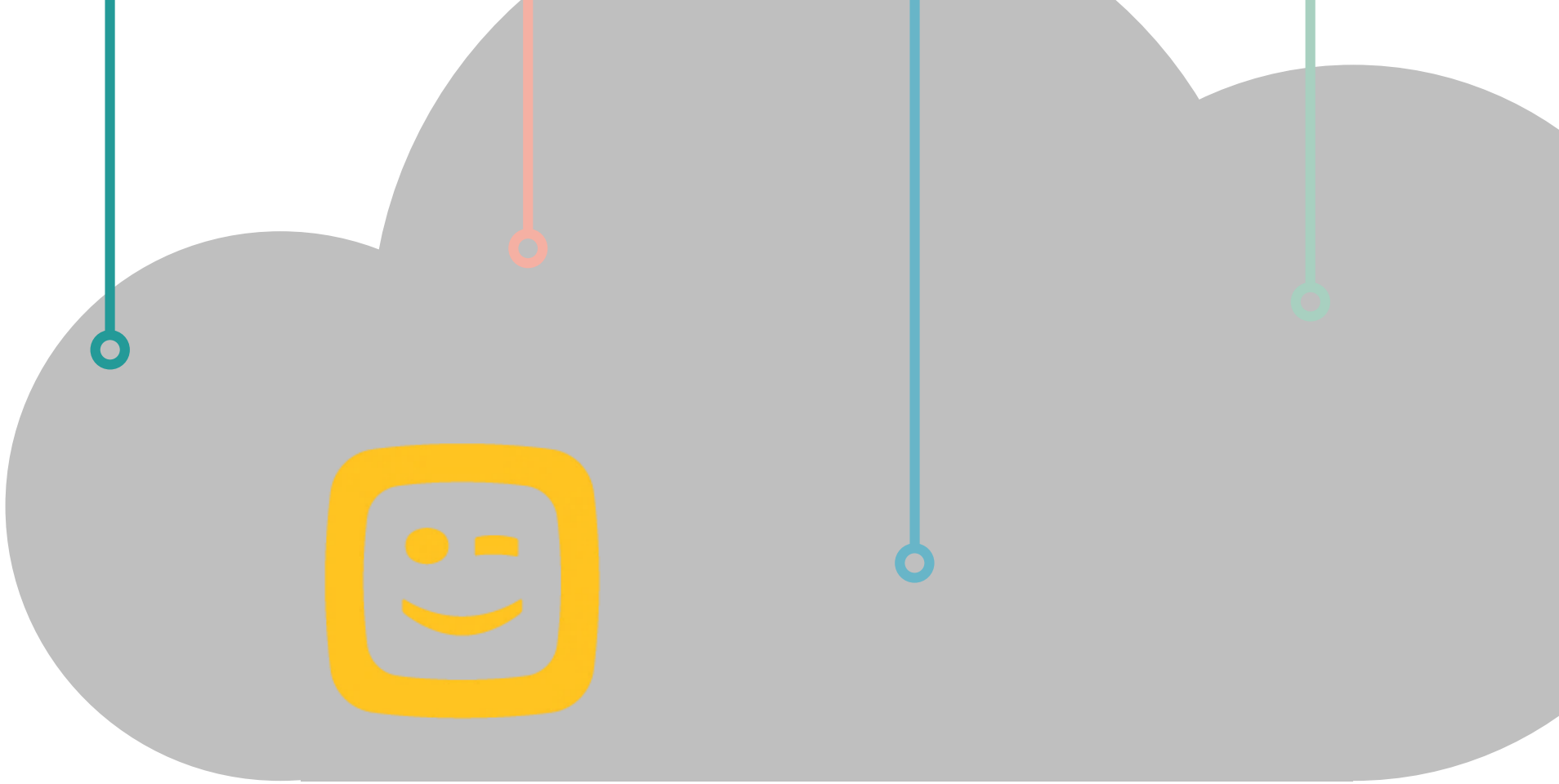
everyone bring his/her
expertise to the table

city = data owner,
3rd parties may use this data

The Olympic minimum of a true smart city enablement platform



Presenting the ...



TELENET SMART CITY ENABLEMENT PLATFORM

Telenet Smart City Enablement Platform USPs, Essentials

CENTRALISE

OPEN

COMBINE
ENRICH
INNOVATE

COLLABORATE

premium platform

unique combination: Fiware deployed on Microsoft Azure infrastructure

pre-installed advanced tool set readily available

ecosystem thinking

easy data onboarding

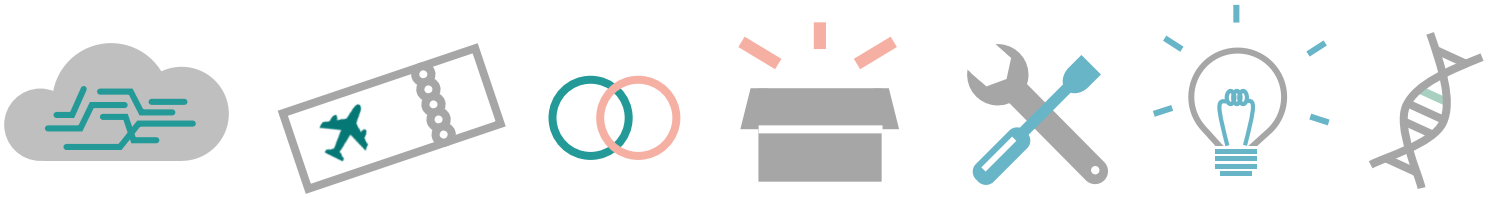
extensive data & platform openness

easily host / build new smart city apps

Telenet Smart City Enablement Platform USPs, Premium

cost optimisations

complementary IoT services



Unique & compelling combination between openness, scalability and reliability

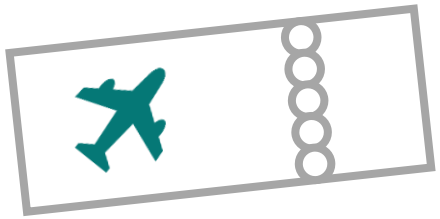
Adhering to the EU standards
and guidelines of smart city initiatives

Open Data Charter Smart Flanders
Open Gov Data Principles VLOCA …

Flexible
Scalable
Resilient
Performant
Agile
EU-based

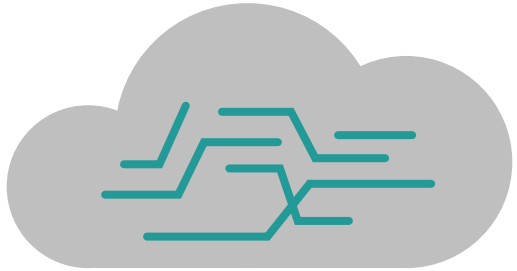
underlying architecture

Easy data onboarding



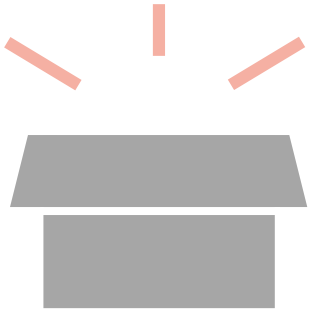
- Heterogenous options for
  - data ingestion (get data into the platform)
  - data exposure (retrieve data out of the platform)
- Device-2-platform & platform-2-platform
- Telenet Cloud Gateway to onboard any sensor (any protocol, any data format)
- Onboard both real-time sensor and static data sources
- Re-use pre-integrated data streams

Premium design



- Frame work designed for modular / upgradeable / adaptable to customer specific needs
- Security by design
- Tight control on privacy aspects (GDPR)

Extensive data & platform openness



- Standardised frame work, functional building blocks, interfacing and data formats
- any sensor, any protocol
  any 3rd party data platform
- API’s everywhere
- Open to all app developers
- Development language agnostic
- No platform lock-in:
  - widely known infrastructure (Microsoft Azure)
  - you could take your city specific application logic and leave …

Pre-installed next-level tool set readily available

- Visualisation through dashboarding, portals
- Analytics & insights: correlations & causations
- Event-triggered actions “If This Then That”

- Readily available advanced data tools:
  - Machine Learning
  - Artificial Intelligence
  - Digital Twin
  - Augmented | Virtual Reality

Easily host or build new specialized smart city applications

Cost optimisations

- Cost optimisations for
  - platform running costs
  - data stream onboarding
- Platform designed with resource sharing in mind
- Re-usability
- No technology (develop in your preferred code language) nor platform (you could take your code and leave) lock-in

Complementary IoT services,

- Connectivity:
  wired & wireless
  WiFi, NB-IoT, LTE-M, 2/3/4G, 5G ready

- Datastream-as-a-Service:
  1. choose which data to be onboarded
     (air temperature eg)
  2. choose data quality parameters
     (accuracy, polling frequency … eg)
  3. we onboard the data into your smart city platform
     fulfilling the requested specifications

- Field services:
  installation | maintenance | repair | calibration

- Technical & business consultancy

- Project management:
  phased approach | AGILE way-of-working

- Operations:
  support | monitoring

Concrete use case:

Via its smart city platform, Telenet unlocks cross-domain smart city applications for the city of Mechelen.

- Take factual policy decisions and monitor the intended versus the actual impact of a measure on a continuous basis.
- Need a converged platform to aggregate and correlate multiple / diverse data streams to unlock visualisations, insights and linked actions.

- Selected by the city of Mechelen in 2019 to deploy its Smart City Enablement Platform (fueled by the IoT Azure platform of Microsoft) and onboard the associated data sources to implement this vision using 3 specific use cases

1. EXPANSION OF THE LOW-TRAFFIC ZONE

- On April 1st 2020, the low-traffic zone in Mechelen is expanded to include Ijzerenleen and Onze-Lieve-Vrouwestraat.
- Sensors, designed by the local neighbour committee “Rondom ‘t Veer”, monitor the air quality before and after the expansion. Sensor data is directly sent to and visualised on the smart city platform.
- The corona crisis measures thwarted the intended monitoring though nevertheless show their impact on the air quality.

2. INTRODUCTION OF A SCHOOL STREET

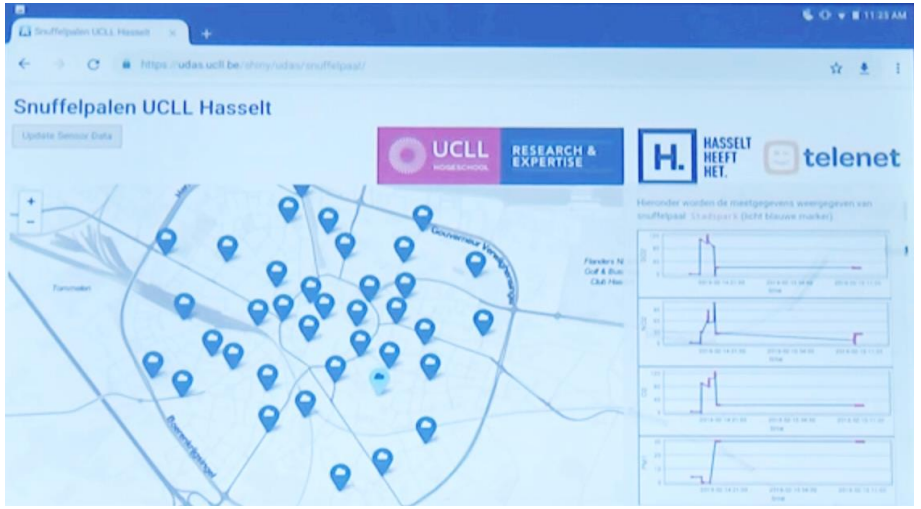
- The city intends to introduce a school street in the Kleine Nieuwedijkstraat, barring cars during school starting & closing hours.
- During the pilot phase (Febuary, March, April 2020) both the air quality and traffic flow/density are monitored in the neighbourhood to measure the effectiveness of the measure. Air quality data comes from sensors like in use case #1, the traffic density data is provided through an API from Telramen (telraam.net).

3. CONNECTED CYCLE PATH LIGHTING

- To increase the cyclists’ sense of safety along the N15 in Mechelen – Bonheiden from/to the Douaneplein, Fluvius (www.fluvius.be) installed light poles with dynamic lighting capabilities. They increase luminosity when bikes cycle along the path.
- Detection loops (Signco - www.signco.be) count drive-by cyclers. These measurements are sent to Telenet's smart city platform and fed to the Fluvius light management system to trigger increased luminosity.
- Presence data gathered through sensors on the lighting poles on the other hand, will be sent to the smart city platform to perform data quality assessments.

Concrete use case:

The city of Hasselt monitors open air quality using the smart city platform of Telenet.



IoT app visualise & analyses the sensor measurements

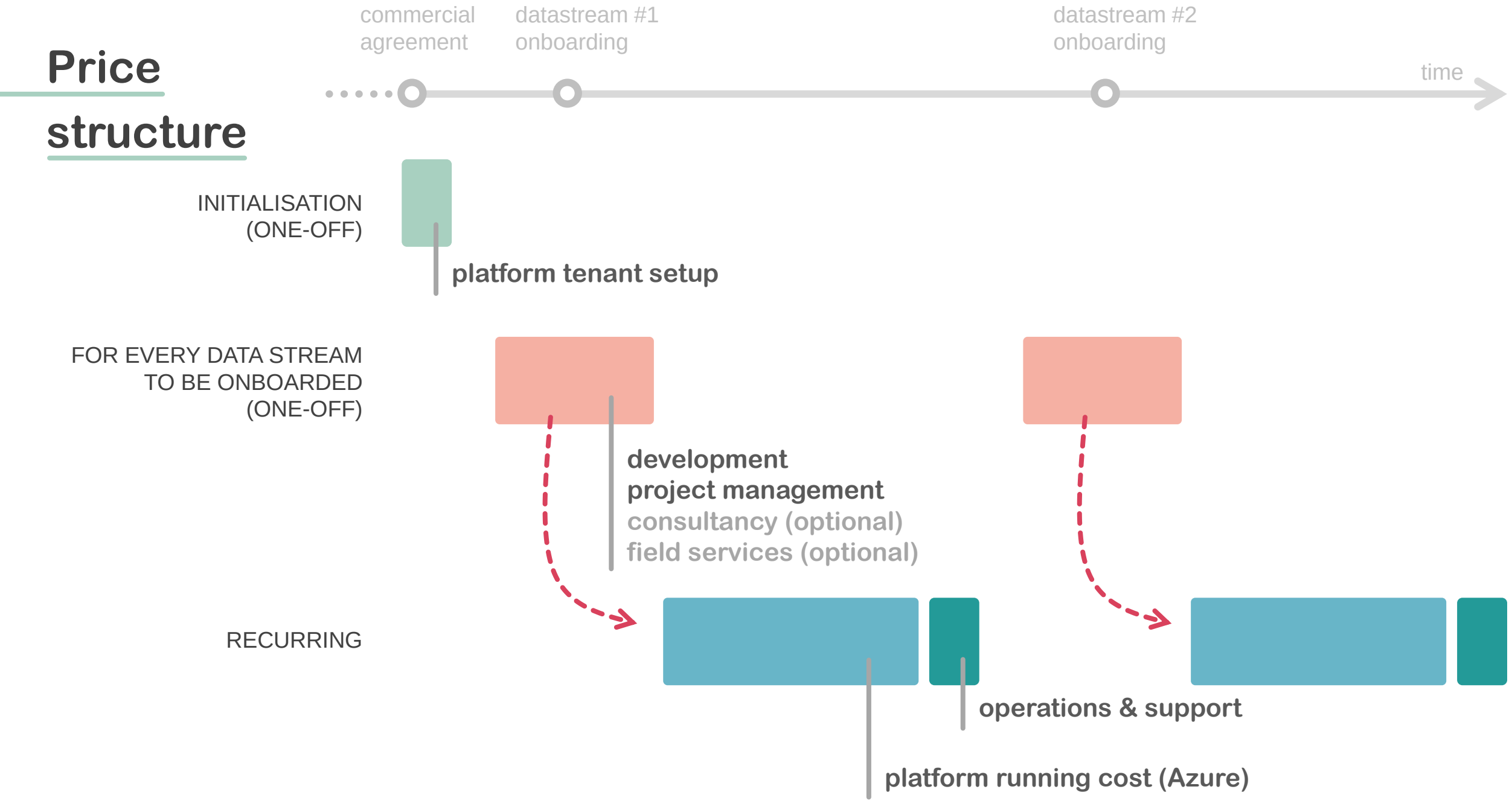
- ozone (O3)
- nitrogen dioxide (NO2)
- sulphur dioxide (SO2)
- dust particles (PM2.5 & PM10)
- sustainable & autonomous

NB-IoT as cellular technology

- battery fed
- deep indoor coverage
- sufficient bandwidth

TELENET
Smart City Platform

Price structure



Price structure, data stream onboarding

data stream onboarding

- Transparent price model
- Benefit from (=re-use) pre-integrated data sources
- For onboarding of a new data source, analysis of the available documentation results in detailed cost figure. Encompasses developing, testing and monitoring.
- If no complete information about the data source is available, below thumb rules are applied to guestimate the required effort to onboard the data source.

parsers

6-7 person days

- Transform received messages from devices or clients to a standard format.
- Less than 2 parsing tasks.
- Testing and monitoring

clients

6-7 person days

- Fetching data from one source (MQTT, HTTP, File …)
- Less than 4 REST endpoints
- One data model design
- Testing and monitoring

webhooks

4-5 person days

- One source, one destination
- Standard protocols (HTTP, MQTT, AMQP, …)
- Testing and monitoring

Price structure, platform consumption

platform consumption

- Transparent, cost-plus price model
- Careful design of the underlying architecture results in cost optimisations.
- 4-level charging model

bronze

- <1000 API calls/s
- <20M ingress stream/month
- <50M messages/month
- limited devices (<400k msg/day)
- <64GB hot storage (retention policy)

silver

- 1000 API calls/s
- 20M ingress stream/month
- 50M messages/month
- limited devices (400k msg/day)
- 64GB hot storage (retention policy)

gold

- 1500 API calls/s
- 50M ingress stream/month
- 100M messages/month
- limited devices (800k msg/day)
- 128GB hot storage (retention policy)

diamond

- 2500 API calls/s
- 100M ingress stream/month
- 150M messages/month
- unlimited devices (800k msg/day)
- cloud to device
- 256GB hot storage (retention policy)

TELENET
BUSINESS

Microsoft
Azure