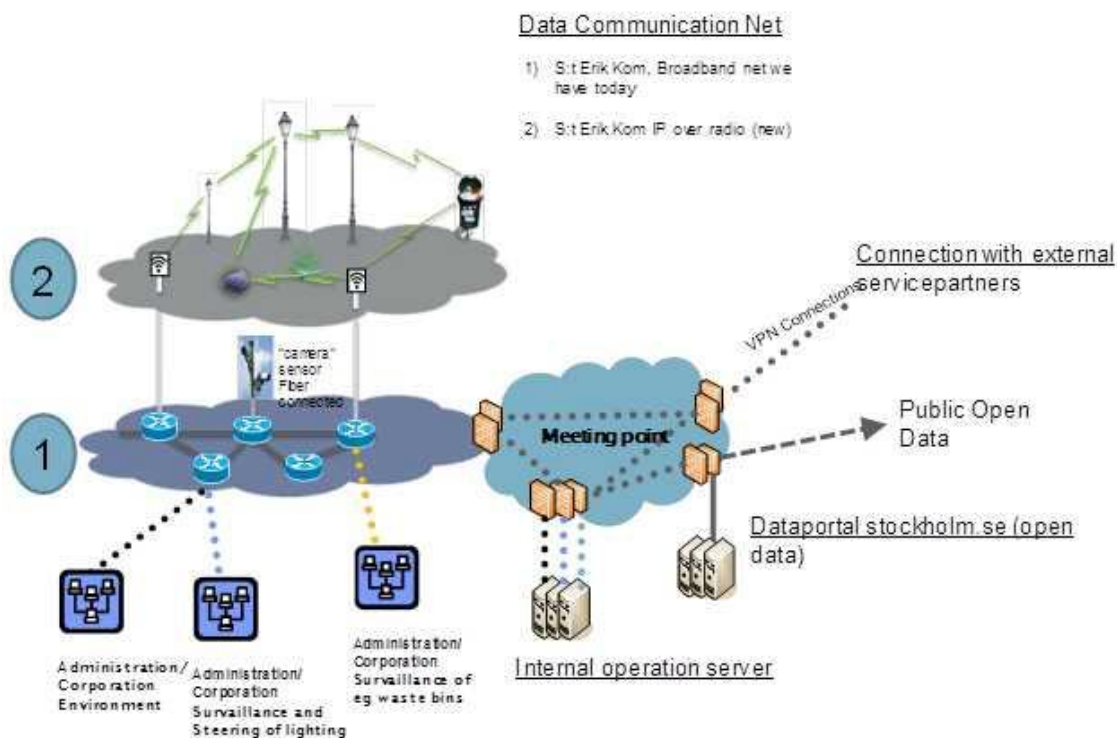


## Smart Connected Street Environment

### 5.2 An Integrated Infrastructure solution



- Adds sensors to existing fibre-optic network and connects to an Internet of Things open data platform
- Produces real-time information for traffic emissions reduction
- Open data system can be used by all parts of the city administration and innovated by local SMEs

Stockholm

Partners involved:

- IBM
- City of Stockholm
- Stokab

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## What is the solution?

The Smart Connected Street Environment is a process that involving the following steps:

1. Define users and their needs for data collection and adaptive steering in City environments
2. Analyse the existence of optical fibre and electricity
3. Procure sensors and Internet of Things (IOT) platform to be able to both collect data, but also for applications and adaptive steering of street environments
4. Install and connect the sensors to an IOT platform
5. Analyse data and develop applications/solutions in the platform
6. Test and evaluate applications in the connected street environment to get instant feedback on their performance

## How does it work?

In Slakthusarea two types of sensors are installed to collect data on people and vehicle flow. (See *Figure 1*).

The sensors are connected to the existing optical fibre network. When pedestrians and bicyclists pass a sensor a time and ID-tag is collected from their mobile phone devices. When the same ID passes another sensor it is possible to, for instance, define the average speed and direction of the person. The other sensor is identifying vehicles' registration plates and checks it against the vehicle register. When there is a match the vehicle information such as type of vehicle, CO<sub>2</sub> emission can be defined.

This gives very exact information of the transport emissions in the area over a given time. The real-time data in Stockholm is then transferred to IBM:s IOT Watson environment, where it can be analysed, visualised, but also used for developing applications for users.

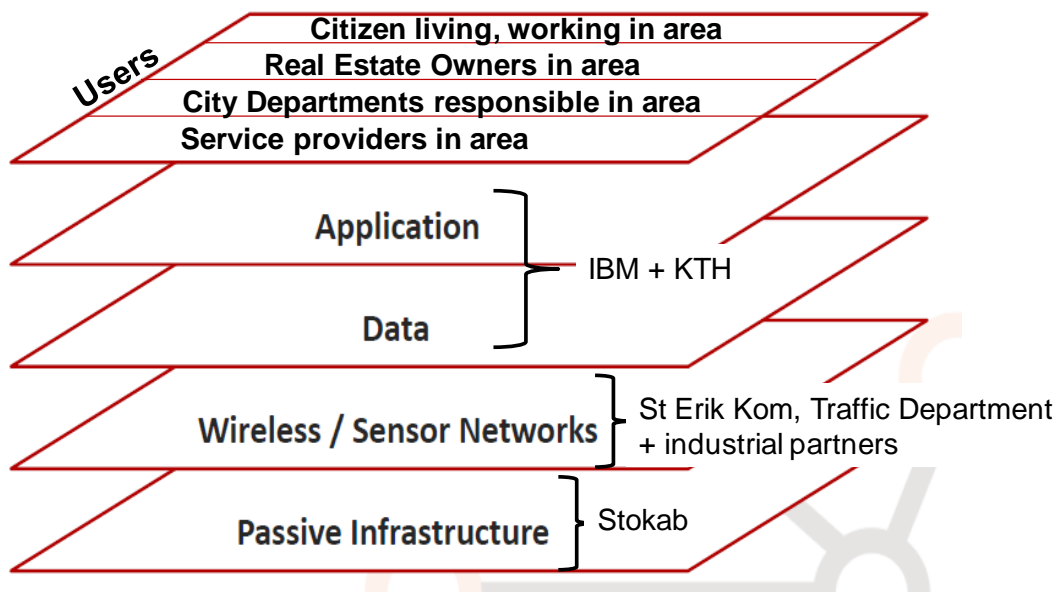


Figure 2: Overview of the process

## Integration with other smart solutions

In Smart Measure 8.1 IBM is implementing an open consolidated big data platform. All data from the sensors installed in Slakthusarea are gathered in the IBM platform called Blue Mix. The connection with the use cases in Smart Measure 8.1 is shown in *Figure 3* (below).

## Expected Impact

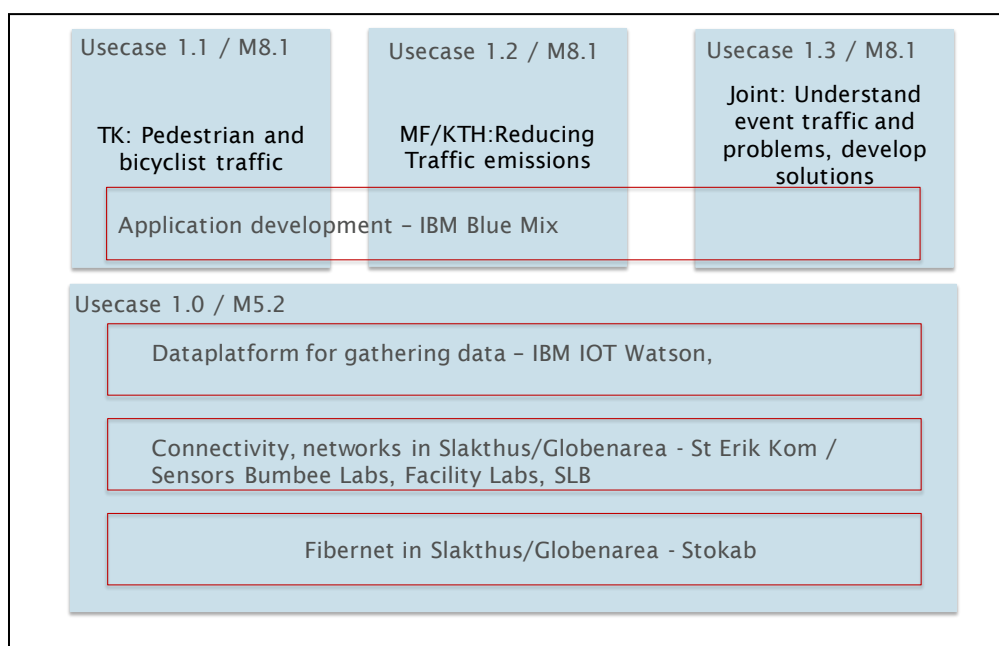
As a first phase the sensor data is used to analyse the transport mix and emissions in the Slakthusarea.

As a second phase the real-time data is used for adaptive steering of pedestrian, bicycle and vehicle traffic to reduce emissions and enhance the flow of traffic. A special focus is put on event traffic, where large numbers of people are entering and exiting the area in a short

period, causing, at worst, long queues. The real impact is created when the data is used for developing applications for end-users in the open consolidated big data platform. By providing the data to external developers, which can develop new services for the public, it will also create economical growth.

## Potential for replication

The concept is possible to replicate in other cities even if they do not have an optical fibre network. The sensors can also send data through 3G/4G. The data collecting sensor solutions are selected so that they fulfil the criteria of data security and do not jeopardise the anonymity of individuals. These are currently approved for the Swedish market, but can after approval in other countries, be used for gathering data in street environments. IBM's IOT Watson platform is available in all markets, as well as the Blue Mix platform.



*Figure 3: Integration with other smart solutions*

## About GrowSmarter

GrowSmarter ([www.grow-smarter.eu](http://www.grow-smarter.eu)) brings together cities and industry to integrate, demonstrate and stimulate the uptake of '12 smart city solutions' in energy, infrastructure and transport, to provide other European cities with insights and create a ready market to support the transition to a smart, sustainable Europe.

## GrowSmarter project partners



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