SMARTENING YOUR CITY WITH Km₄City

http://www.disit.org/km4city
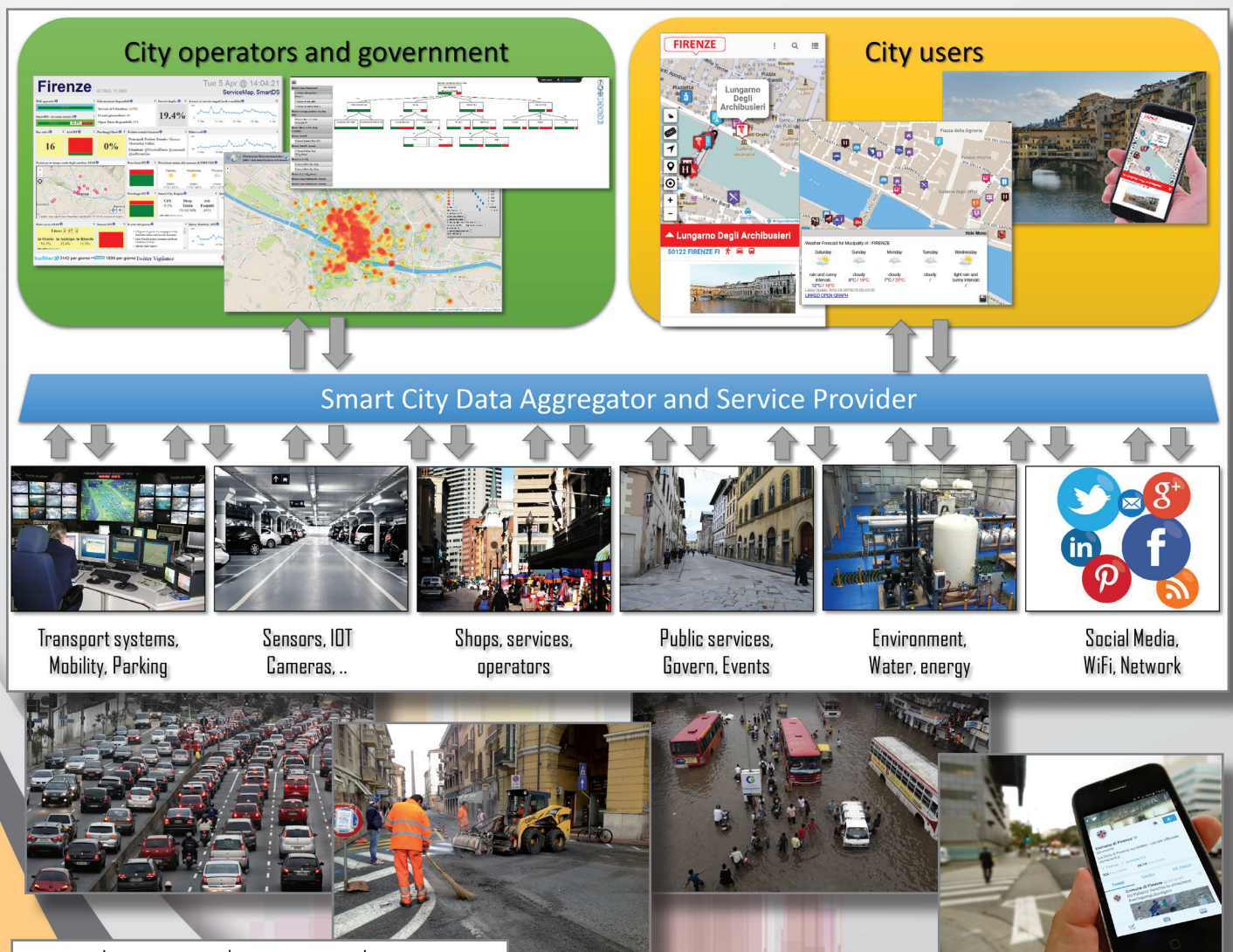
Public administrations need to improve quality of life and competitiveness. Smart city services should be manageable in terms of complexity and sustainability. This is highlighted by the fact that in most cases innovative proposed services are poorly scalable and inadequate. Cities need sustainable solutions based on open standard, open source, interoperability, scalability and flexibility, without falling on a vendor lock-in. Most of the smart cities projects founded in the last years are based on vertical applications using closed technologies at high costs. This approach is no longer viable and neither sustainable.

The next step is the horizontal and transversal integrations in which data coming from different sources and sectors can be combined to better manage the city and reduce risks. The openness and the interoperability are the keys to open the data market to create new innovative and competitive solutions in the city for the whole services. These potentialities can be really exploited by using a solution for data aggregation based on a unified ontological model that allows the semantic reasoning of heterogeneous data coming from different sources and operators.

City operators and government

City users

Smart City Data Aggregator and Service Provider

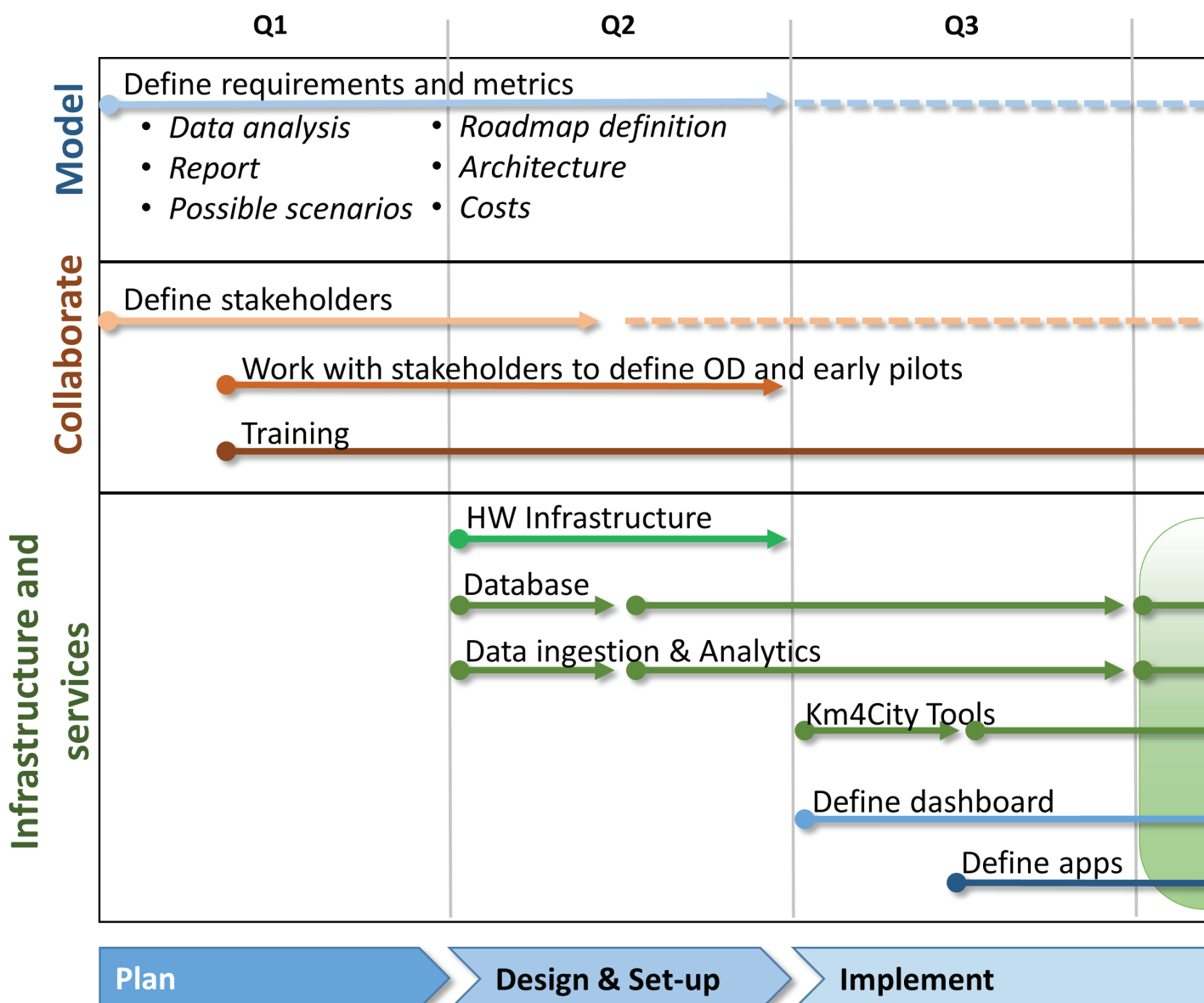| Transport systems, Mobility, Parking | Sensors, IOT Cameras, .. | Shops, services, operators | Public services, Govern, Events | Environment, Water, energy | Social Media, WiFi, Network |

UNIVERSITÀ DEGLI STUDI FIRENZE

DINFO
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

DISIT
DISTRIBUTED SYSTEMS AND INTERNET TECHNOLOGIES LAB

Km4City is a new generation approach substantially different with respect to the approaches that merge data and provide services without leaving in the hand of the city the data power. The effective power of data aggregation and unification for the smart city reside in the city control, city supervision, improving city resilience, provide processed data to commercials and institutional activities in the city. This approach is coherent with the emerging approaches for creating urban platforms, by means of which tens of valuable apps would be easily created for a large set of different purposes, and specific dashboard would be accessible to control: events, areas, domains, and also to communicate with the citizens, for all.

The set-up of a smart city process is based on a roadmap of activities, as presented in the following example.
The roadmap presents three main areas: 1) Model: study of the context and model definition, requirements analysis, data and metrics analysis; 2) Collaborate: stakeholders definition and interaction; and 3) ICT infrastructure and services, set-up and implementation of the solution.
From the temporal point of view, the roadmap presents four phases: a) planning, b) design and set-up, c) implementations, and the d) use in the real context and production.

Suggested process for Km4Cit

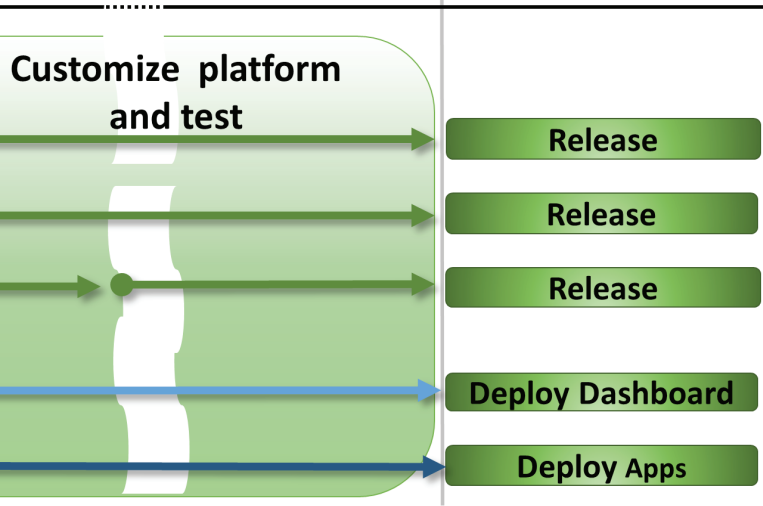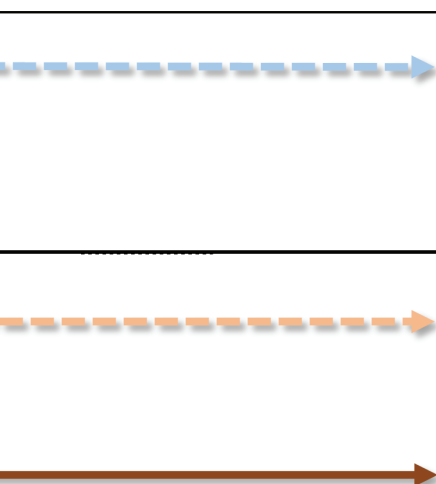|	Q1	Q2	Q3
Model	Define requirements and metrics • Data analysis • Roadmap definition • Report • Architecture • Possible scenarios • Costs		
Collaborate	Define stakeholders Work with stakeholders to define OD and early pilots Training		
Infrastructure and services		HW Infrastructure Database Data ingestion & Analytics	Km4City Tools Define dashboard Define apps

Plan → **Design & Set-up** → **Implement**

During planning, all stakeholders have to be involved in the process to define detailed scenarios and initial cases of application. In order to balance stakeholders' interests different actors in the process of modernization have to be involved, as: managers and local government leaders; public or private service operators (water, energy, gas, communications, transport, waste, education, etc.); end-users, citizens and representatives of local businesses; investors, banks, venture capital; and technology providers. The training activity is focused on coaching the staff that will use the solution.

The analysis of available data will allow to identify information that could / should be integrated to expand the solution to cover innovative and interesting scenarios. A report will be produced with the details of scenarios, a detailed roadmap of activities, the definition of the architecture and a detailed planning for the implementation. This phase will take about 3 months. In the design and set-up phase the infrastructure configuration and the start of the phase of customization of the tools and solutions are performed. These activities include the set up of tools to acquire and process data. A first release of the solution will be ready in 6-8 months.
Subsequent activities are focused on the optimization, customization and validation. This phase is strictly related to the context in which the process of adoption is applied.

ty adoption

Q4

Customize platform and test

Release

Release

Release

Deploy Dashboard

Deploy Apps

Use and operate

Download the latest version of the Km4City brochure

WHAT IS NEW

Main User: city decision maker
Scenario description: the city decision maker on Km4City can take under control critical parameters of the city in case of unexpected and sudden events like floods, water bombs, vehicles accidents and terroristic attacks. A specific dashboards is set-up, in addition to those managed by the civil protection and police. This dashboard is focused on the Smart City multi domain data integration (mobility, energy, environment, welfare, and gov services, social media, etc.) including real time info such as: alarms about critical conditions, critical infrastructure drivers, webcam in the city, traffic flows status, people flow conditions, data from sensors for river's, weather forecast, social media information. Then the city decision maker may define resilience model of the city with its decision support processes and dashboards. Alarms and activation rules can be set up according to the conditions. To this end: FRAM model, decision support system, data analytics, etc., will be exploited in transparent manner. When specific dashboard and views of the city conditions will detect firing condition, decision makers will be informed to take the right one on the basis of objective data and information on the desk in real time.

Main User: city operator
Scenario description: a city operator is interested to encourage participation from citizens to harness the power of crowd-sourcing and elicit the feeling of participation. Via Km4City tools, the city operator can analyse the user's activities and the city context/situation with the aim to define a set of rules to engage the user in city participation. Systems of gamification and rewarding are exploited in ad-hoc scenario to gain feedback loops towards an actively participation from citizens. By using the participatory app, citizens are stimulated to provide information about services dysfunctions, street holes, and incidents or other unexpected events, etc. and can actively contribute by uploading photos or scoring services in the city. Via the app, the city authorities provide information where it's needed rather than force citizens to looking for that, reducing the cost of services and improving their qualities.

Main User: commercial activity
Scenario description: a shopping center aims at providing a better service to its customers by showing real time and updated information about mobility and transport. Some informative monitors show timetables of public transport services close to the shopping center (bus, train, tram, etc.) and information about events in the city and weather forecast. The shopping manager can go on the Km4City server to provide their information regarding their activities and this data will be used for proximity advertising and customer engagement.
By using Km4City tools, the manager is also supported in the process to take decision about where and when open a new shop in the city, in which hours and period extend the opening of its shops by taking under consideration many different aspects of the city (i.e. people flow, bus stops, events in the city, etc).

Main User: citizen
Scenario description: a citizen downloads the Personal Assistant mobile app that learns and remembers the user' habits: most visited places, when and which kind of services the user use to move in his city (car, bike, bus, by walk, etc.). In addition, the app knows if places the user usually frequents are open/closed: pharmacy, supermarket, gym, and cinema, school, cultural sites, etc., and send suggestions to optimize his movements depending on the user's personal agenda. When the user is going to take the preferred path, the personal assistant is able to be aware about this and informs the user if something change in the path, for example in case of incident or other unexpected events in the city. If the citizen found a problem during the move, he reports it by using the personal assistant app so that the other users will be informed about this problem.

Main User: tourist
Scenario description: a tourist arrives in the city by car, downloads the personal assistant mobile app, and specify its touristic interests and destinations. The app suggest to him the closest available parking or the park-and-ride. The app suggests the tourists to take the bus at a specific time and then to walk to the final destination. Through the app the tourist purchase the ticket for parking, for public transportation suggested and for the touristic place he will visit, all in one click. Also he can ask to receive suggestions on shops and restaurant in the path close ti its tastes and interests. An award in the form of a discount for the museum ticket for choosing the solution suggested will be provided to him.

Contact
Paolo Nesi, @paolonesi
DISIT Lab, DINFO: Department of Information Engineering
Università degli Studi di Firenze - School of Engineering
Via S. Marta, 3 - 50139 Firenze, ITALY
http://www.disit.dinfo.unifi.it , http://www.disit.org

E-mail: paolo.nesi@unifi.it
Office: +39-055-2758-515
Cell: +39-335-566-86-74
DISIT Lab: +39-055-2758516
Fax.: +39-055-2758570