The aim of the ALMANAC project is to develop a Smart City Platform which can connect data from multiple city devices, systems and people in new and secure ways to promote smarter city services.

Based on a middleware and federated networks, the platform enables data interoperability and information sharing in a complex urban ecosystem. It also provides the basic building blocks for third party developers of Smart City applications through open APIs.

The Smart City Platform is tested and evaluated in the City of Torino, providing solutions for waste and water management and for citizen engagement.

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ALMANAC
RELIABLE SMART SECURE
INTERNET OF THINGS FOR SMART CITIES

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The Alexandra Institute, www.alexandra.dk

Creating a Smart City infrastructure

The ALMANAC Smart City Platform provides all the key components necessary to develop and implement Smart City solutions:

A middleware based on service-oriented architecture enables heterogeneous resources, devices and services to cooperate at the semantic level, thus bridging new technologies with existing systems.

The middleware provides **device abstraction, data management and virtualized access to data** through a Smart City Resource Adaptation Layer and a Data Management Framework, which is exposed through a Virtualization Layer. The middleware also consists of a Policy Management Framework, managing the **privacy policies** of individual providers, and a Communication Management Framework, handling **network aspects**.

The platform supports the federation of private and public networks and includes a **dedicated capillary communication network**, linking sensors and actuators to the platform. As a first mover, ALMANAC integrates the ETSI M2M standard release 2.

An open federated IoT Storage Cloud provides elasticity in the data storage services with gateways giving access to different logical parts of the Smart City structure for analysis and sharing among different stakeholders.

Case: The City of Torino

The ALMANAC platform is tested in the City of Torino, covering three application areas: Waste management, water management and citizen engagement.

Challenge 1: Dynamic waste collection

The wish is to optimise the collection of waste to avoid overfilled bins in the street and to increase recycling rates.

By using the ALMANAC SmartWaste application, the waste management company can monitor bins and their fill levels and generate routes based on the actual situation. Citizens will also be able to report abandoned garbage via an ALMANAC Citizen app, sending a picture and geo-location which are then linked to an existing waste collection route. The citizen is notified when the issue has been solved.

Additional services will include general information and relevant notifications such as: How do I recycle; what type of waste is collected when, and which bins closest by are available here and now.

Challenge 2: Efficient water management

Sustainable management of the water supply in and around urban areas is an important issue in Torino as in most European cities.

To save the cost of manual meter readings, the ALMANAC platform automatically collects data from smart meters and presents the results to the water utility as well as to the customers who can follow the consumption. Due to federation agreements between the involved service providers, water data from public buildings can be filtered, accessed and shown - also to citizens. Similarly, individual users can make visible their own consumption to friends who use the same platform. The new service can also be added to existing portfolios of online services to customers.

Loss of water is a known problem when managing water supply; in Torino there is a 24 % loss of water on average. Using ALMANAC data fusion, the water utility can detect water leakages faster based on real-time data. Different water related issues can be registered and shared among users such as the municipality responsible for the service, which in turn can give citizens access to the information via a mobile app.

Challenge 3: Engage the citizens

Being aware of what happens around you makes you more likely to change behaviour and respond.

In ALMANAC, relevant data are made available to citizens for greater awareness and participation. To identify key needs, residents from the social housing initiative SHARING are involved in co-designing smart living applications. Suggestions include support for waste collection and recycling; notification of issues at building and city level and integration with external services and social media.