



# ALMANAC

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## Develop IoT applications with the ALMANAC Smart City Enablers

**ALMANAC Smart City Enablers provide you with ready-to-use, state-of-the-art tools for developing IoT applications. Enablers can be used standalone or as a platform, supporting scenarios and deployments of different scales: from simple prototypes to large-scale real-world deployments.**

The ALMANAC Smart City Enablers provide solutions for recurring problems in IoT development, covering the whole IoT stack, from sensor integration over data analysis and storage to resource management and security.

Applying de-facto IoT standards such as MQTT and OGC SensorThings, our enablers integrate seamlessly with other IoT platforms and applications.

### Try it out right now

The ALMANAC consortium has unleashed the full potential of the ALMANAC Smart City Enablers at [the ALMANAC Lab](#). Here you can find further information and links to the dockerized versions of all Smart City Enablers.

All ALMANAC Smart City Enablers are available as Docker containers that allow you to download, deploy and use them in just a few minutes in a truly platform-independent fashion.

The screenshot shows the ALMANAC Lab website with a navigation bar (ABOUT, ENABLERS, DOWNLOAD, CONTACT) and a section titled 'Available Enablers'. It features eight icons representing different enablers, each with a brief description:

- Virtualization Layer**: Offers a single entry point to application developers, hiding the internal details and decentralized complexity of all other IoT components.
- Resource Catalogue**: Discovers and keeps track of available sensors and devices in the network. It provides a set of RESTful interfaces to select, actuate on and retrieve data from these IoT resources.
- Storage Manager**: The Storage Manager provides flexible integration of multiple storage solutions for IoT time series data and RESTful access using the OGC SensorThings API open standard.
- Data Fusion Manager**: The Data Fusion Manager is a Smart City agent for Stream Mining. With it, we can discover context in real-time in the city with millions of devices, e.g. waste bins are full, leakages in some areas. Using the learnt models, it can discover or forecast more complex situations.
- SCRAL**: The Smart City Resource Adaptation Layer (SCRAL) provides a REST-based, uniform and transparent access to physical devices, capillary networks, systems and services for monitoring (and actuation) in a Smart City context.
- LinkSmart GlobalConnect**: LinkSmart GlobalConnect establishes an overlay network to interconnect local IoT networks and enables the discovery and sharing of IoT services and resources across these local IoT networks.
- Security and Policy Framework**: The Security and Policy Framework allows to secure IoT services. It implements Identity management with OpenID Connect 1.0 and allows to define fine-grained access control for IoT services, providing an XACML Policy Decision Point.
- Metadata Framework**: The Metadata Framework eases the use of semantic data in IoT applications. It allows management, querying, and processing of highly structured graph-based RDF domain models and metadata.

### Source code

The source code of all components is available on [GitHub](#).

### Lab deployment

The ALMANAC reference deployment is available at [this link](#), allowing you to play around with the ALMANAC Smart City Enablers. Explore the interfaces and services offered by our enablers.

### Real-world deployment

ALMANAC Smart City Enablers are currently deployed in a case study of improving waste management in the city of Turin, Italy. Fill-level sensors have been installed in underground waste containers, called underground ecological islands, which are placed in areas of the city where door-to-door collection is not possible. The containers have a large storage capacity and serve several households in the area.

ALMANAC Smart City Enablers are used to collect, process and analyse data for the local waste management company, allowing them to optimise their waste collection procedures. With ALMANAC it is

## Deliverables

The following public deliverables have been completed to date:

- D2.1 Scenarios for Smart City applications
- D2.4.1 Updated Requirements Report 1
- D2.4.2 Updated Requirements Report 2
- D3.1.1 System Architecture Analysis & Design Specification 1
- D3.1.2 System Architecture Analysis & Design Specification 2
- D3.1.3 System Architecture Analysis & Design Specification 3
- D4.2 Features of the ALMANAC Platform for sustainable Smart City applications
- D5.1.2 Design of the abstraction framework and models 2
- D6.1 A scalable data management architecture for Smart City environments
- D7.1 Test and Integration Plan
- D7.3.1 Cloud based APIs for Smart City applications - Developers Guide 1
- D8.2 Application Definition – Water Management
- D8.4 Application Definition – Waste Management
- D8.6 Application Definition - Citizen-centric Application
- D9.1 Project Website

Public deliverables can be downloaded from the project website after they have been reviewed and approved by the EC. Currently, 12 public deliverables are available for download here:

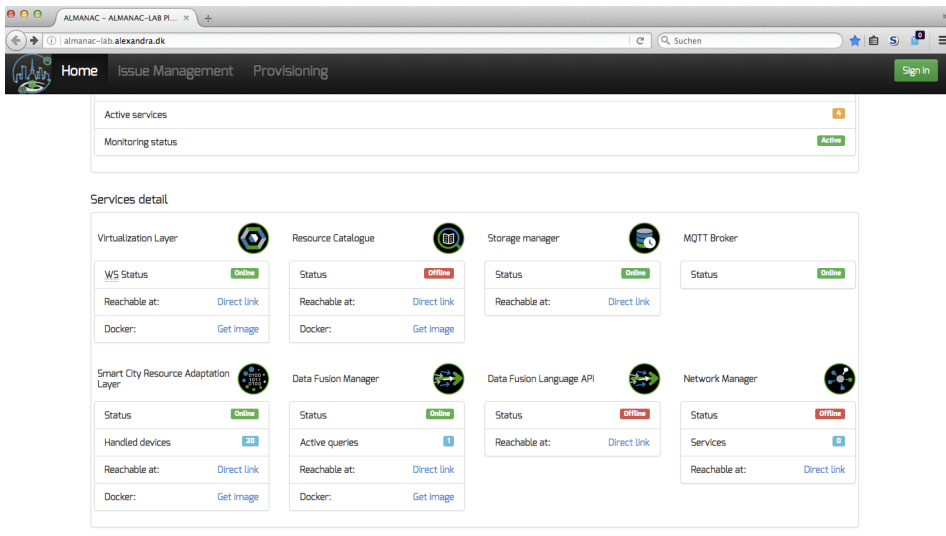
[www.almanac-project.eu](http://www.almanac-project.eu)

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reliable, smart and secure Internet of Things for Smart Cities'.  
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Read more at:  
[www.almanac-project.eu](http://www.almanac-project.eu)

even possible to predict the future fill levels of the underground ecological islands.

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You're receiving this newsletter because you have been in contact with one or more of the ALMANAC partners.

We thought you might be interested in following the progress of the project.

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