ALMANAC
RELIABLE SMART SECURE
INTERNET OF THINGS FOR SMART CITIES

THE ALMANAC PROJECT IS DEVELOPING A SERVICE DELIVERY PLATFORM THAT INTEGRATES SMART CITY INFORMATION SYSTEM FOR GREEN AND SUSTAINABLE SMART CITY APPLICATIONS.
ALMANAC SMART CITY PLATFORM (SCP) COLLECTS, AGGREGATES, AND ANALYSES REAL-TIME DATA FROM HETEROGENEOUS SENSORS AND ACTUATORS TO SUPPORT SMART CITY PROCESSES, ENABLING INTEROPERABILITY AMONG HETEROGENEOUS DEVICES, RESOURCES AND SERVICES.
THE ALMANAC ARCHITECTURE WILL BE DEMONSTRATED THROUGH THREE SELECTED APPLICATIONS:
WASTE MANAGEMENT, WATER MANAGEMENT AND CITIZEN ENGAGEMENT.
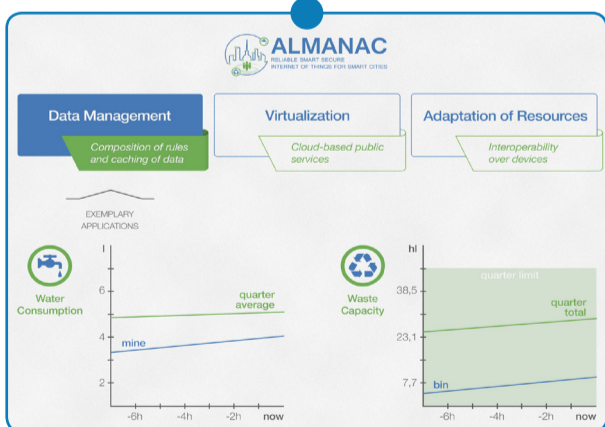
DATA MANAGEMENT

Sometimes applications are not interested in current device values but would rather like to be informed if specific thresholds are met, or see trends for particular intervals. This capability is provided by the Data Management (DM) entity. The DM directly grabs data coming from devices and by parsing and indexing it, enables later complex querying. The rules to be executed by the DM can be specified directly or indirectly either by the applications or the Virtualization Layer.

VIRTUALIZATION

Virtual services are enabled by the Virtualization Layer, the applications relying on the middleware do not have to know where the services or devices they consume are placed, or whether they actually exist. The Virtualization Layer provides service look-up mechanisms that bridge physical network boundaries, or can even wrap arbitrary data-sets (like historic measurements or cached values) as consumable services.

ADAPTATION OF RESOURCES

The Interoperability of devices is enabled by the Smart City Resources Adaptation Layer (SCRAL) so applications can access any kind of heterogeneous devices, whichever proprietary protocol they may speak, over a uniform web-service based interface. Additionally to this service, the layer exploits any kind of meta-information and semantic information of appearing devices and feeds them into the Virtualization Layer.

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ALMANAC DEMO SHOWS AN INFORMATION-GATHERING PLATFORM WHERE DATA IS COLLECTED IN REAL-TIME FROM LARGE AMOUNTS OF SMART CITY SENSORS AND OBJECTS. THE PROTOTYPE MAINLY FEATURES THE PLATFORM'S ABSTRACTION FRAMEWORK AND ITS MIDDLEWARE PROVIDING PROOF-OF-CONCEPT INTEROPERABILITY WITH SMART CITY APPLICATIONS OVER THE INTERNET.

ALMANAC Dashboard Application

Waste prototype application

A "waste monitoring" solution using fill-level sensors could allow to save time and money by enabling a more dynamic waste collecting process, while being better for the environment: fewer collections equals less driving, less fuel consumption and thus lower CO_2 emission levels.
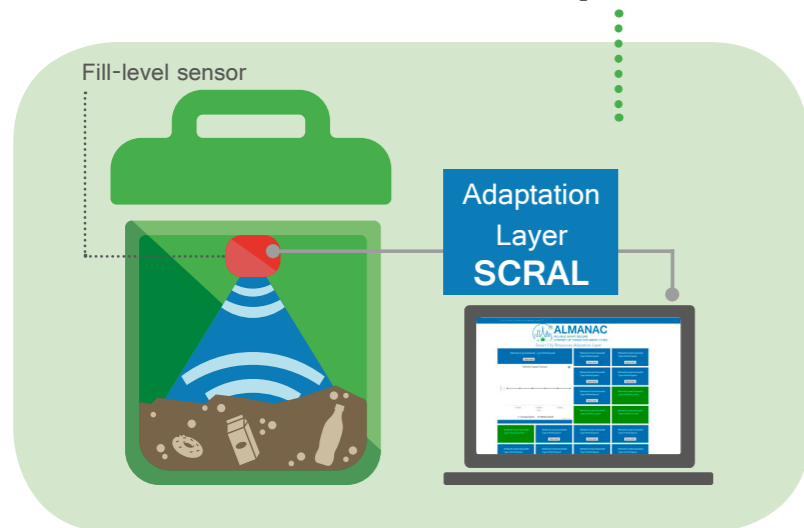
Fill-level sensor

Adaptation Layer SCRAL

Mobile APP

The Mobile App will allow users to search for specific IoT devices in the ALMANAC SCP, and view measurements from said devices. The app will also act as an IoT device itself, feeding data into the SCP. The app will continuously send location information to the platform while the user will have the possibility to manually upload data in the form of pictures.

Data Management

Virtualization Layer
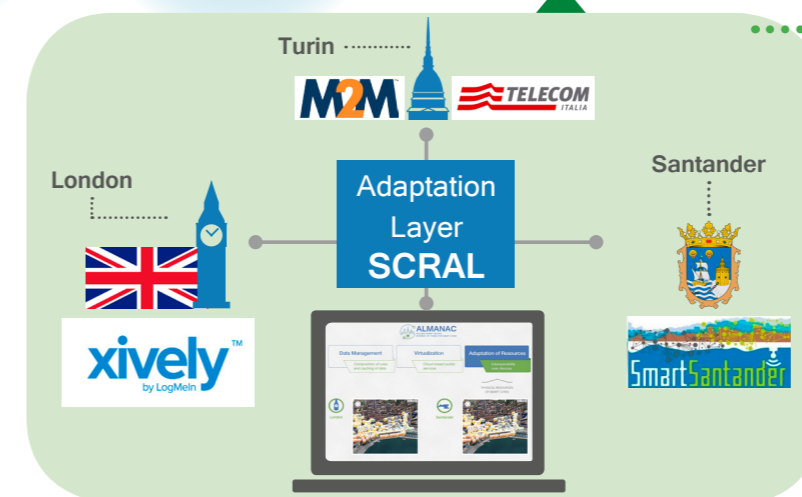
LinkSmart Middleware

Water prototype application

"Smart metering" will enable utilities to deliver new services to their end users, including leakage detection, usage notification, consumption optimisation and true monthly usage billing.

Flow-meter sensor
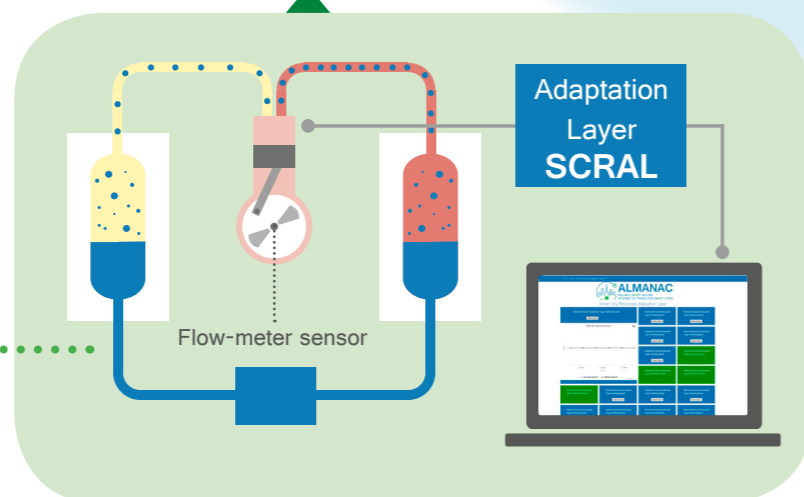
Adaptation Layer SCRAL

3rd party services integration

The ALMANAC platform enables the interoperability of devices through the Smart City Resources Adaptation Layer. Applications can access any kind of devices, whichever proprietary protocol they may speak, over a uniform web-service based interface.

Turin

London

Adaptation Layer SCRAL

Santander