# Functional description

Livin' is a hypervisory software platform that allows various kinds of users to visualize, operate and plan developments in urban infrastructure that has been connected to it.

Infrastructure networks can be connected directly to the platform or through legacy management software. Examples of networks that can be connected include street lights, traffic control panels and red-green lights, security cameras, parking meters, air quality sensors, electric vehicle charging posts and variable message panels.

City administrators, infrastructure managers, end users and the general public can participate in operating and using the platform. Each specific user belongs to one or several profile types which determine the scope of what they can do when logged in.

Depending on their level of permissions, users who are logged into the system may access a number of features:

1. **Real time operation of infrastructure** (orchestration): internal users may access specific infrastructure networks and operate them in real time on the basis of data from CMS, sensors and legacy applications. Operators can visualize those events (alarms, interruptions, status reports) in several ways:
    - **Maps**: Users can navigate (pan, zoom) using the map, fly over icons, click on icons (devices, events) and visualize the associated information. The map is organized into "business layers" to facilitate accessibility (See Image 1 at the end of this document).
    - **Logbook**. The logbook is centralized record that ensures operations involving one or more business layers can be monitored together. It allows users to manage:
        - **Synthetic events**: events are aggregated to facilitate operations. Operators can execute shared operations via events (acknowledgement, complete information, creation of a logbook, discard the event, …
        - **Action plans**. Action plans are triggered by events. They are multi-business. They implement city policy through a rule-based engine. Actions may be executed automatically or manually an by operator (examples of actions: switch on lampposts, display a message on digital signage, etc.).
2. **Data visualisation through dashboards**: users can access KPIs (Key Performance Indicators) shown on the platform. These KPIs relate to various policy goals (reducing traffic speed, for example) and are based on aggregate data (spatial and temporal) from the business-layer CMS (and their associated sensors) and other data sources (open data, legacy applications). There are different kinds of KPIs that can be set up within Livin':
    - Realtime operational indicators to facilitate and support operators in their decision-making,
    - Real-time performance indicators on business processes,
    - Indicators calculated afterwards to improve business processes.

KPIs can take the form of simple numbers, charts, pie charts, infographics, histograms, maps. If relevant, the data generated may be fed into the public open data portal.

3. **Platform administration**: device creation, action plan modification, scenario deletion.
4. **Platform supervision**: set of tools to control the health of the platform.

ENGIE is a system integrator offering the best software "bricks" in a way that is supplier-agnostic and ensures the interoperability of existing and future software. Our platform architecture is based on an API manager that integrates, connects and secures access to data from various city infrastructure.

# ENGIE Livin' Smart City Platform architecture overview

Livin's architecture consists of 3 main levels:

1. **Business supervision level**. It contains all the business layers operating in the field. These systems are autonomous, implement their own business rules and operate all the sensors, actuators, and other smart devices installed in the field from a vertical approach. They provide APIs to communicate with Livin' and implement specific protocols to communicate with devices. Business supervision is conducted by specific city staff members in charge of public lightning, parking, video surveillance, etc. This layer could be connected to the following in a specific city, for example:
    - IoT plarforms based on low/medium bandwidth, to be able to connect IoT devices (i.e.: environmental sensors) to retrieve the data they produced.
    - Wifi analytics platform, to provide more and more services to citizen and get analytics about their usage.
    - Lighting CMS to efficiently manage lighting.
    - CCTV CMS and video analytics to manage security.
    - Smart Parking CMS top optimize mobility of citizens.
2. **City operations (hypervisory) level**. This level provides global operating capabilities for a whole city. The platform establishes bi-directional communication with business supervision platforms using their APIs. This part of the platform contains the components that oversee data intake, storage, processing, analysis and publication and global control-command operations. By bringing together the data from the underlying systems, the platform offers cross-business capabilities to break down barriers between vertical systems. This platform is designed for higher-level city operators. It also provides APIs.
3. **Territorial operating level**. The main characteristics of the territorial level are shared with the city operations level, but over a broader area: the core functions are the same, but the business services included are different, as are the the operators, who manage global operations at the territorial level.

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