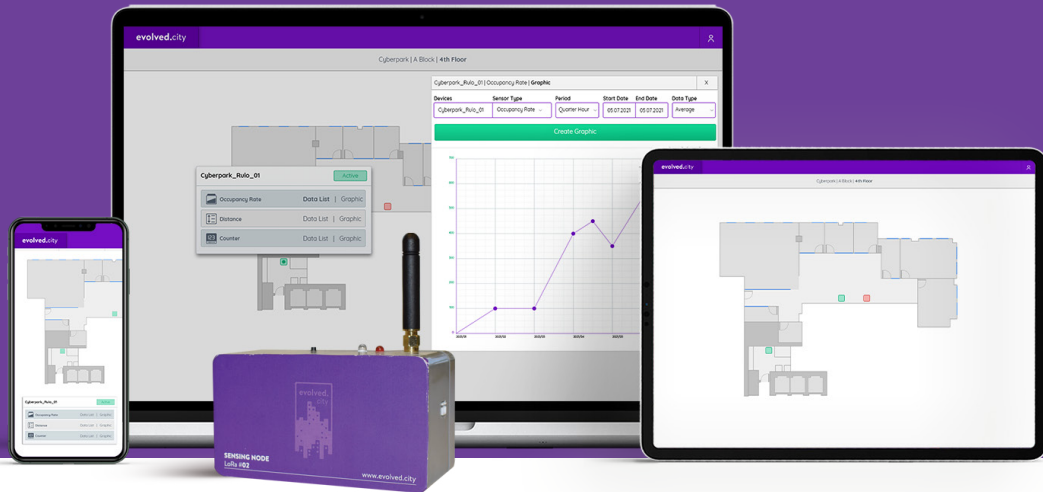




evolved.city

IoT-BASED TASK, ASSET AND FACILITY MANAGEMENT SYSTEM



Your *system*, your *rules*

Evolved.City is a full-stack IoT solution that can provide a vertical cut across a wide range of application domains such as smart buildings, facility management, manufacturing facilities, public spaces and so on.

In terms of IoT hardware, together with the flexible workflow component and the integrated CMS, it is easy to integrate 3rd party hardware.

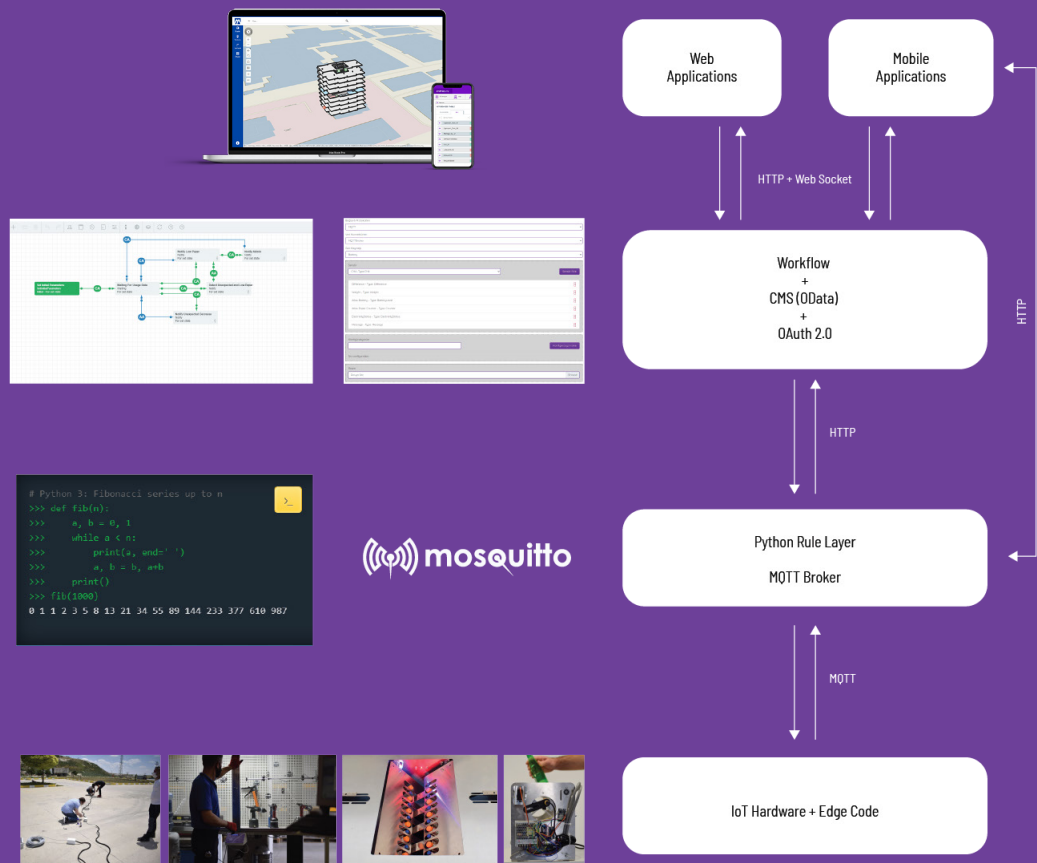
Basic sensor data (and rules) are handled by a Python service layer, which in turn communicates with the real powerhouse of the system; the workflow component (as shown in the following figure). Complex workflows can be easily designed and updated via the user interface, allowing users to participate in a continuously adaptive IoT system where they can:

- Dynamically add new devices or sensor types,
- Customise task-related inputs from field operators,
- Create contextual rules (time of day, field conditions, nearby users, etc.),
- Combine inputs from multiple IoT devices for innovative solutions and much more.

Enter into the IoT world in only 3 Steps:

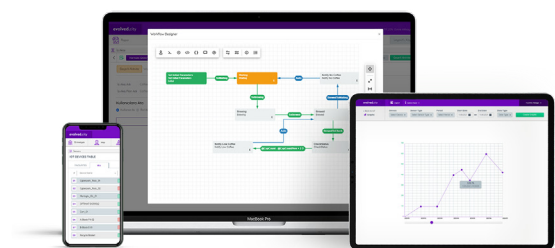
1. We can make your current devices smarter or install new devices to suit your needs.
2. Let's define rules and processes that prevent loss, increase efficiency, and add new capabilities to your business.
3. Control is yours. Stay one step ahead in the world of IoT by repeating steps 1 and 2 to continually promote growth, productivity and safety.

At the core of evolved.city is a technology that automates, monitors and adds intelligence to your workflows. You can define work items such as regular maintenance, early warning or field tasks via a web application. Based on your definitions sensors placed in your facility or field of operations can verify task completion and automatically assign new ones according to detected conditions (for example, control for unexpected temperature fluctuations, warnings towards misplaced equipment etc.).



Some Use Cases:

- Automated task assignments
- Workflow digitalisation and automatisisation
- Environmental conditions monitoring with room sensors
- KPI (Key Performance Indicators) and OEE (Overall Equipment Effectiveness) tracking to reduce process bottlenecks
- Asset and personnel tracking
- Preventing inventory and time loss with automatic device assignment
- Automated tracking and optimization of production stages
- Critical equipment location tracking
- Energy optimization
- Smart Maintenance (Automated maintenance scheduling)



- Workflow: Enable and empower complex user-defined workflows.



- Digital Twin: Utilising serious gaming technology



- Sensors: Shape the future of the city with smart devices.



- People: Easily set up task allocation and employee authorisations.

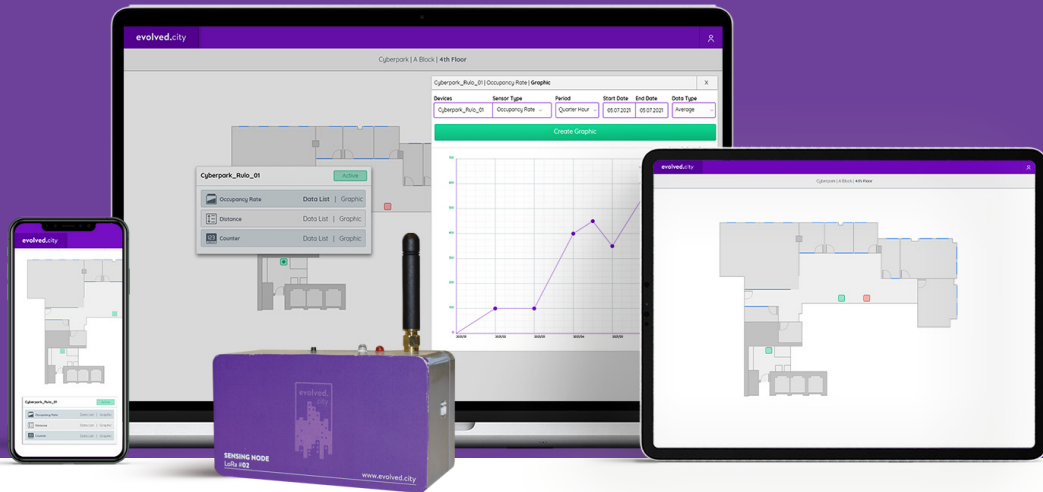


- Reports: Make complex workflows understandable with custom user-designed PDF reports.



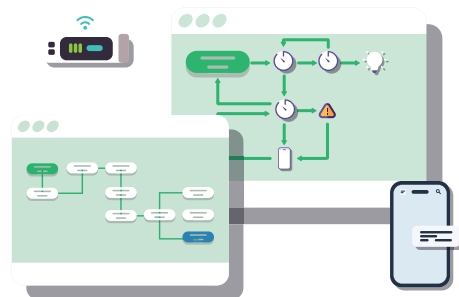
- Maps: With Esri ArcGIS Indoors integration.

INFRASTRUCTURE OF THE EVOLVED.CITY



Fast and easy way to enter the IoT world, You just need a few sensors and rules

With 29 billion smart devices expected to be connected to the internet through IoT (Internet of Things) by 2030, it is inevitable that key sectors such as healthcare, transportation and manufacturing will experience radical changes. The goal of the Evolved.City technology developed by MipMap Technologies is to enable companies, facilities and organisations to reap the benefits and gains of IoT technology in the near future.

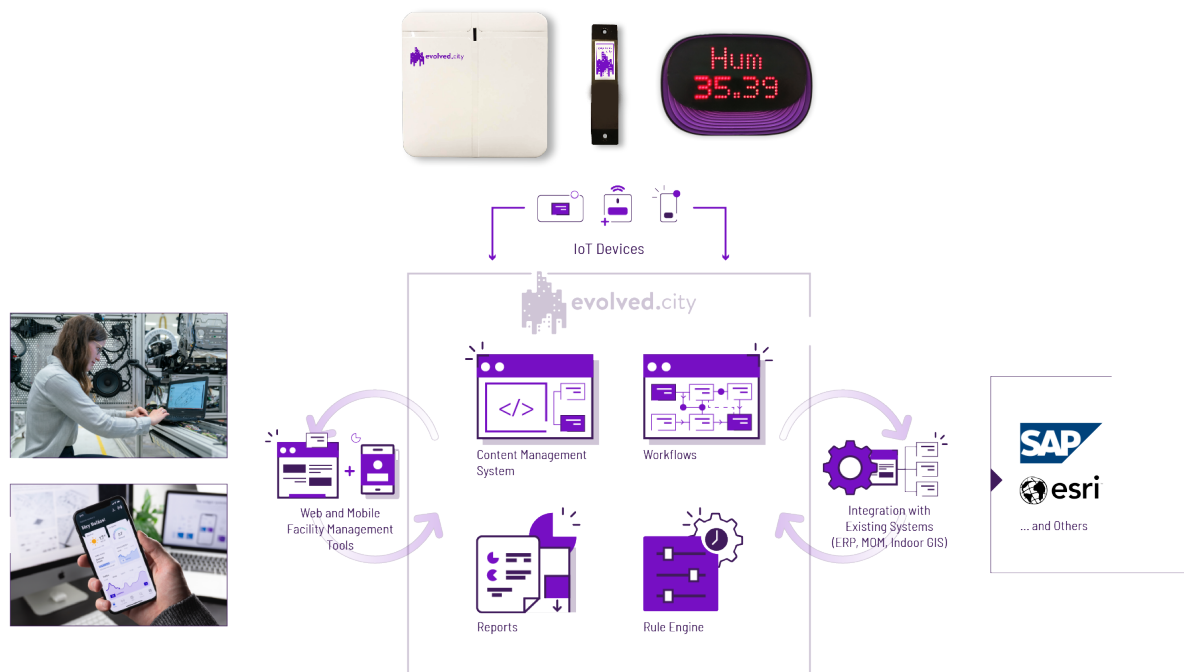


When smart devices are connected through the Evolved.City infrastructure;

- Reduce losses,
- Increase revenue,
- Provide safer processes,
- Integrated with existing information systems
- are expected to be the main benefits of the system.

Field applications powered by Evolved.City deliver rapid ROI (Return on Investment) ranging from 6% to 18% in the energy and manufacturing industries.





At the top are examples of devices and sensors that are the entry point for IoT-based systems: location tracking (people, equipment, etc.), energy usage and environmental condition monitoring (temperature, humidity, light, sound, etc.). However, the solutions are not limited to these, any device that can exchange data can be added to Evolved.City applications. Loss of intermediate products in the manufacturing process, inefficient operation of equipment and emergency solutions, including tracking the location of staff in case of emergency, are just a few of the useful examples among hundreds of other application examples.

On the top side, examples of devices and sensors that are the entry point of IoT-based systems are given; field location tracking (people, equipment, etc.), energy consumption and environmental condition monitoring (temperature, humidity, light, sound, etc.). However, solutions are not limited to these, any device that can share data can be added to Evolved.City applications. The loss of intermediate products in the manufacturing process, inefficient operation of devices and emergency solutions including tracking the location of staff in the case of emergency are only a few of the useful examples over hundreds of other application examples.

However, to turn these applications into useful solutions, it is not enough to simply analyse the current state. In addition to the tasks that can be automatically assigned from the field via Evolved.City, the real-time status of these tasks, whether they are fulfilled or not, can be monitored by the sensors. Performance and problems can also be reported through the same system.

As summarised on the right-hand side of the diagram, various information systems such as SCADA and ERP-based applications that companies currently use can also be part of the Evolved.City ecosystem. In this way, other organisation-related information (e.g. product serial number or employee information on to define the most role-appropriate employee) can be accessed from a common source and more data-driven decisions can be made in a more effective way. In addition to pulling information from existing in-house systems, Evolved.City can also provide process-related feedback. For example, the real-time status of a product can be sent to ERP systems and shared with managers and customers on demand.

To summarise the structure, an example scenario can be given: Evolved.City uses IoT sensors to detect whether the intermediate product is ready (location and process monitoring). Then the intermediate product is moved to the next step (machine energy usage monitoring). At this point, if there is a delay in this step, the logistically closest and most role-appropriate person is defined using user-defined values and automatically redirected. If the problem is not resolved quickly, the site manager or field supervisor is notified and a status report can be generated.

SMART BUILDING MANAGEMENT BY EVOLVED.CITY | IN COOPERATION WITH ESRI



*Design your workflows, add sensors
and **manage directly from the floor plan.***

Geographic Information Systems (GIS) pave the way for smarter maps and provide an indispensable capacity for modern cities in fields such as: transportation, urban planning and infrastructure. However, considering that 80% of our time is spent indoors, the next (natural) step is to carry the analysis, control and planning methods of GIS into buildings.

As a Platinum Partner we can bundle Evolved.City with Esri's geospatial ecosystem to create a highly effective solution for smart facility management (Please see overleaf for the advantages Esri's ArcGIS Indoors and IoT technologies provide). This bundle supports both locations without existing facility management systems, as well as integrating with IBM, Cisco and similar FM solutions to further enhance their capacity.

Evolved.City and Esri ArcGIS Indoors work together to provide a common operating space for your facilities while providing the following capabilities:

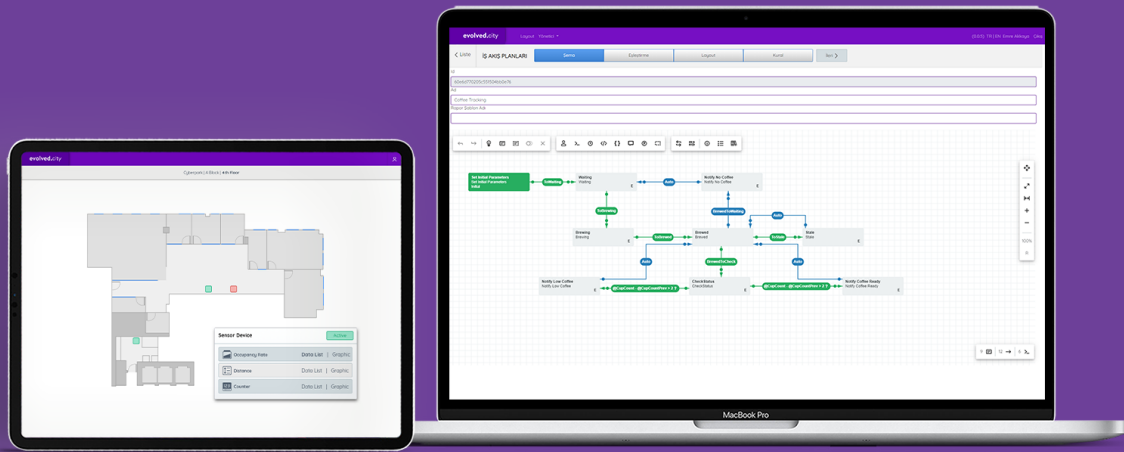
Evolved.City:

- Asset management using sensors
- Remote monitoring of indoor conditions
- Workflow definitions and automated task assignment
- Reporting and analysis

ArcGIS Indoors:

- Indoor positioning and routing
- Efficient use of space
- Expert system integration (IBM, Cisco etc.)
- Dashboard screens and floor plan site status summary
- Advanced data analysis with artificial intelligence

"Secure and automated processes to increase efficiency can only be established by choosing the right devices according to the user's needs and desires. Evolved.City, with its pioneering approach that brings the benefits of the IoT world, is your software partner that continuously evolves with its use, allowing you to stay ahead of the curve."



*Efficient
use of space*



*Indoors reports
and improved
data analyses*



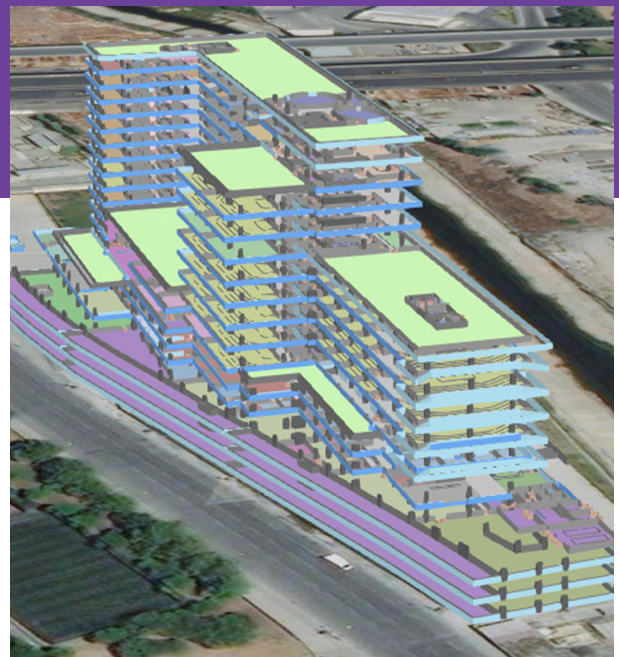
*Indoor
Positioning
System*



*Real-time
sensor data
visualizations*



*Workflow definitions
and automatic task
assignment*



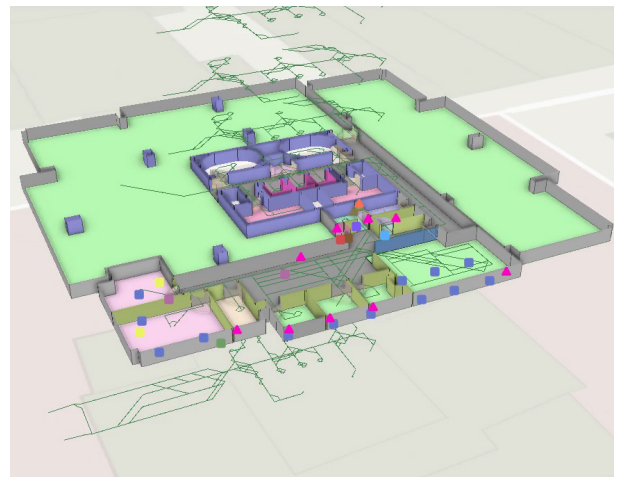
Atlas University Project:

Campus has been built on 115.000 m² (outdoor-indoors) with 3 Connected Blocks.

Building has;

- 19 floors
- 19 Laboratories
- 2500 m² Library
- 2500 m² cafes/restaurants/social areas
- 1000 m² Sports areas

In the project floor plans are imported to an ArcGIS Indoors geodatabase, floor transitions and navigation networks are established. The mobile application is configured and put in service. Also system is providing a framework for IoT implementation use case like critical room monitoring.



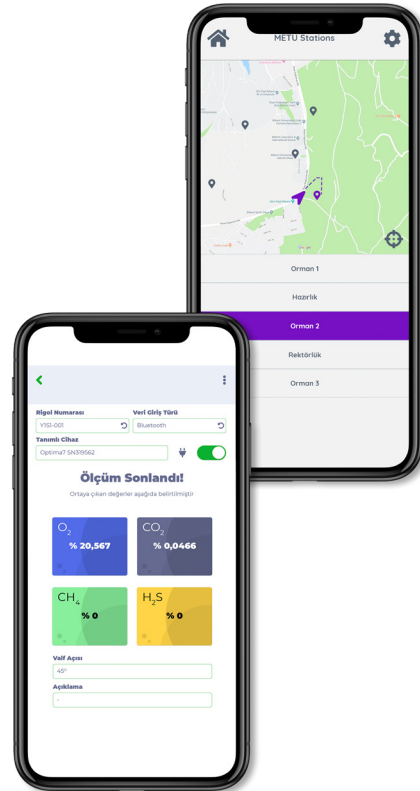
FIELD WORKS AND SMART SENSOR NETWORKS

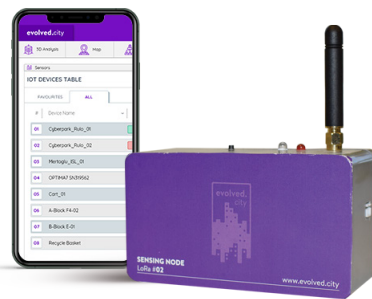
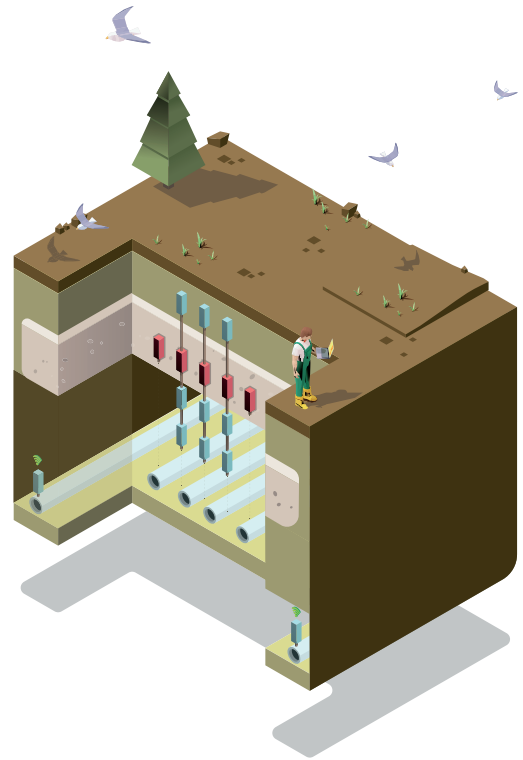
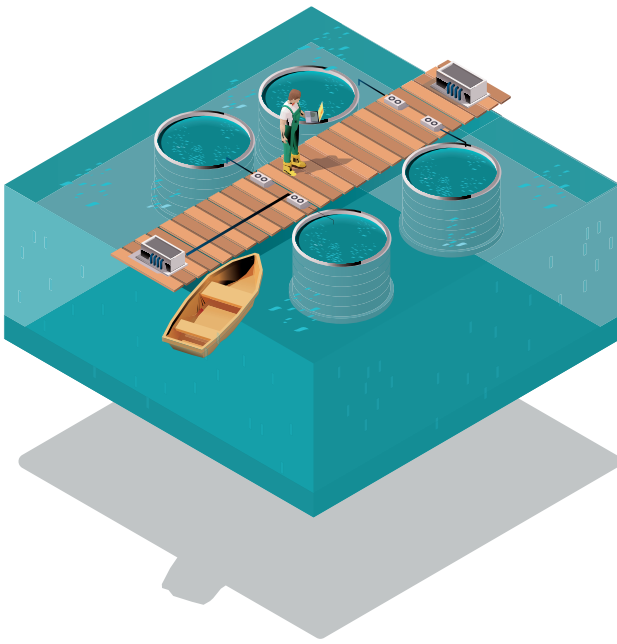
Implementation Description and Application Areas

The power of IoT extends beyond facilities, lending itself well to many outdoor applications such as in the fields of energy production, agriculture and vehicle tracking. Long-lasting sensors can monitor soil conditions in agricultural fields and provide early warning against infestation; they can also enable us to regularly share information and take the right actions in energy production from areas with low accessibility.

Using the evolved.city infrastucture you can:

- Control the field remotely at any time using mobile and web applications
- Manage field operations in real-time
- Combine sensor data with user defined workflows to increase the efficiency and safety of your operations
- Use your own sensors or use custom evolved.city hardware
- Full data access, reporting and analysis capabilities





METU Biology Department AquaCosm Project

The primary requirements for the AquaCosm Project, an international research on lake biodiversity, was the control of water conditions and long range wireless data transfer using IoT. The requirements were met through a custom electronic design, data over GPRS (mobile machine communication) and a rule-based warning system. Throughout the project lifecycle, site conditions were monitored remotely via mobile and web applications.

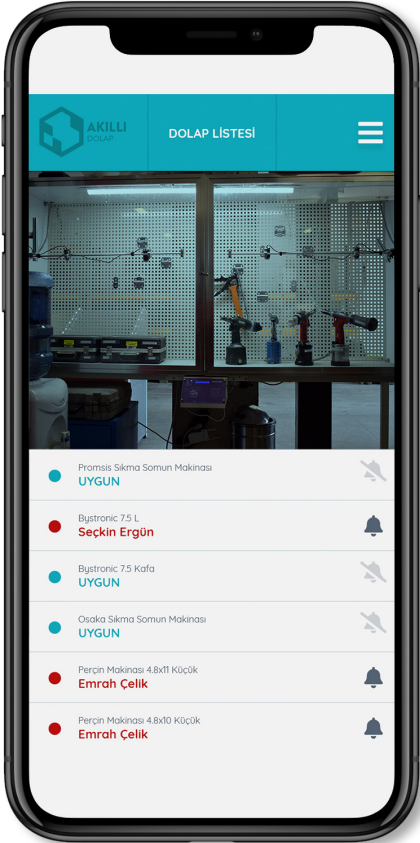


Afyon Bioenergy Application

This project required the installation of an underground sensor network to optimize the bioenergy produced in the Afyon municipality landfill. In addition to the sensor data, daily field measurements were automated with the evolved.city mobile application, accelerated via Bluetooth and QR support. The project results were a hefty 18% increase in energy production and moreover, some additional designs were completed to increase this efficiency towards a 40% peak value

INDUSTRIAL SMART LOCKER

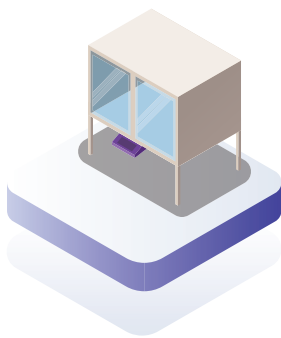
A New Perspective on Industrial Cabinets



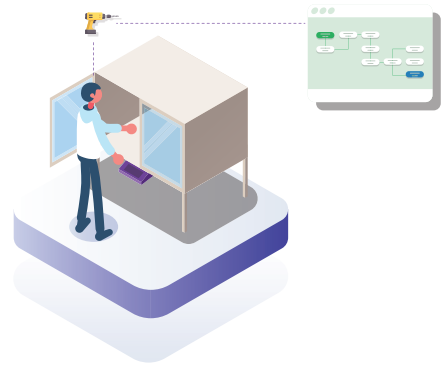
Industrial Smart Locker (ISL); is the perfect solution for all types of equipment needed in any kind of domain; from large work areas to manufacturing facilities, airports as well as healthcare centres. ISL systems provide multiple storage and tracking solutions.

Using Artificial Intelligence (AI) and image processing technologies, it is possible to keep track of the equipment inside and protect its condition.

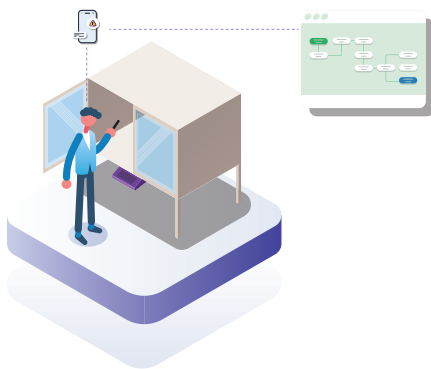
With ISL, which can be customized to suit any environment or workspace, tools can be assigned to the user and automatically reported at the end of use. In addition, ISL's mobile and web applications make daily and routine processes smarter and faster.



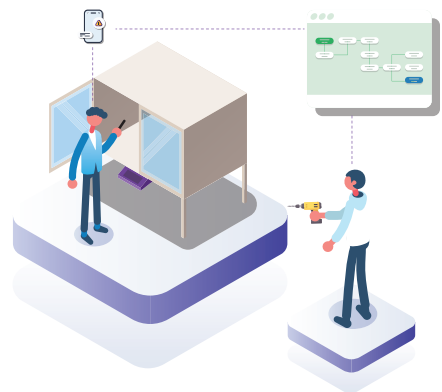
1. ISL is a locked system that provides solutions for the storing and tracking of all types of tools needed in large work areas, facilities, airports, parks or hospitals.



2. The user opens the ISL with the RFID card and takes the required tool from the locker. The removed tool is matched with the user ID in the database and the assign process takes place.



3. If another user cannot find the tool they need inside the ISL, they can use the mobile application to see who is in possession of the tool and make a request.



4. After the request; the user who has finished with the tool replaces the tool in the ISL. The second user who has requested the same tool opens the ISL with the RFID card and takes the tool. The same process as step 2 is repeated



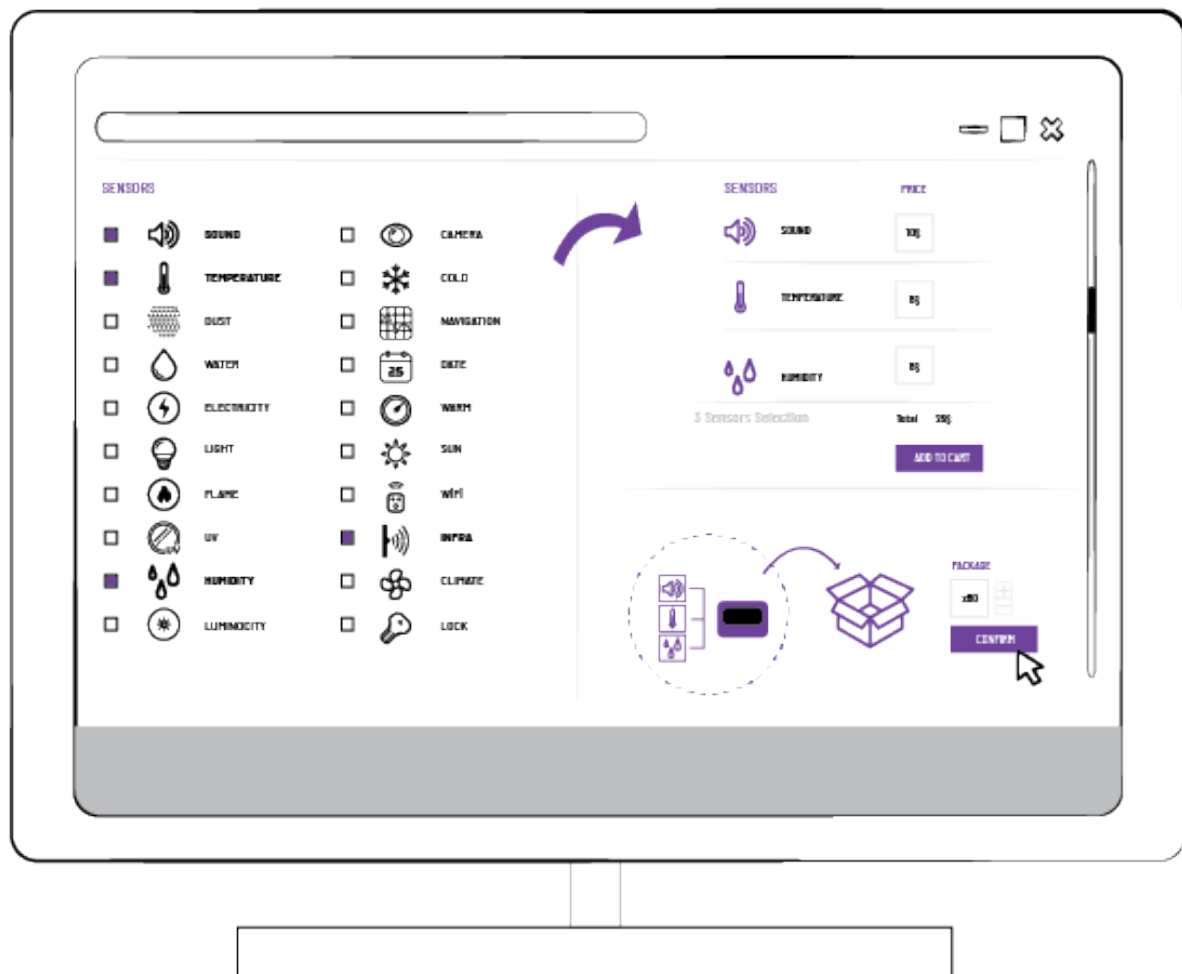
5. At the end of the day, if missing materials are detected inside the ISL, a notification is sent to the authorised staff. In addition, it is also possible to identify and generate a materials-in-demand report automatically.



6. The ISL system provides missing material, most requested material and staff information, and works integrated with various information systems including SCADA and other ERP-based applications.

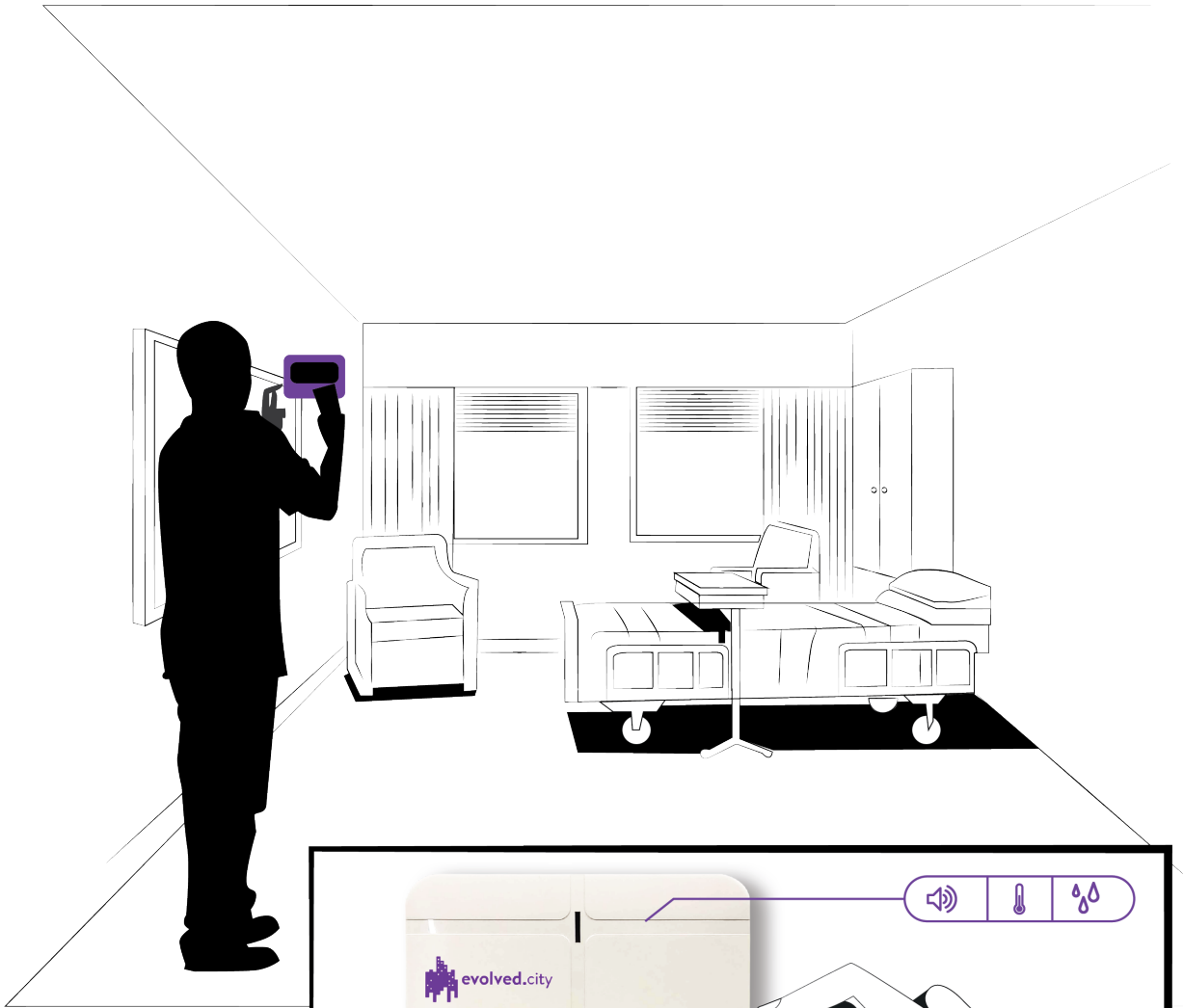
Health Centre Application Areas

Here are some examples of use case scenarios for Evolved.City in hospitals, healthcare centres and laboratories. All of which can lead to better patient care and a more efficient hospital environment.



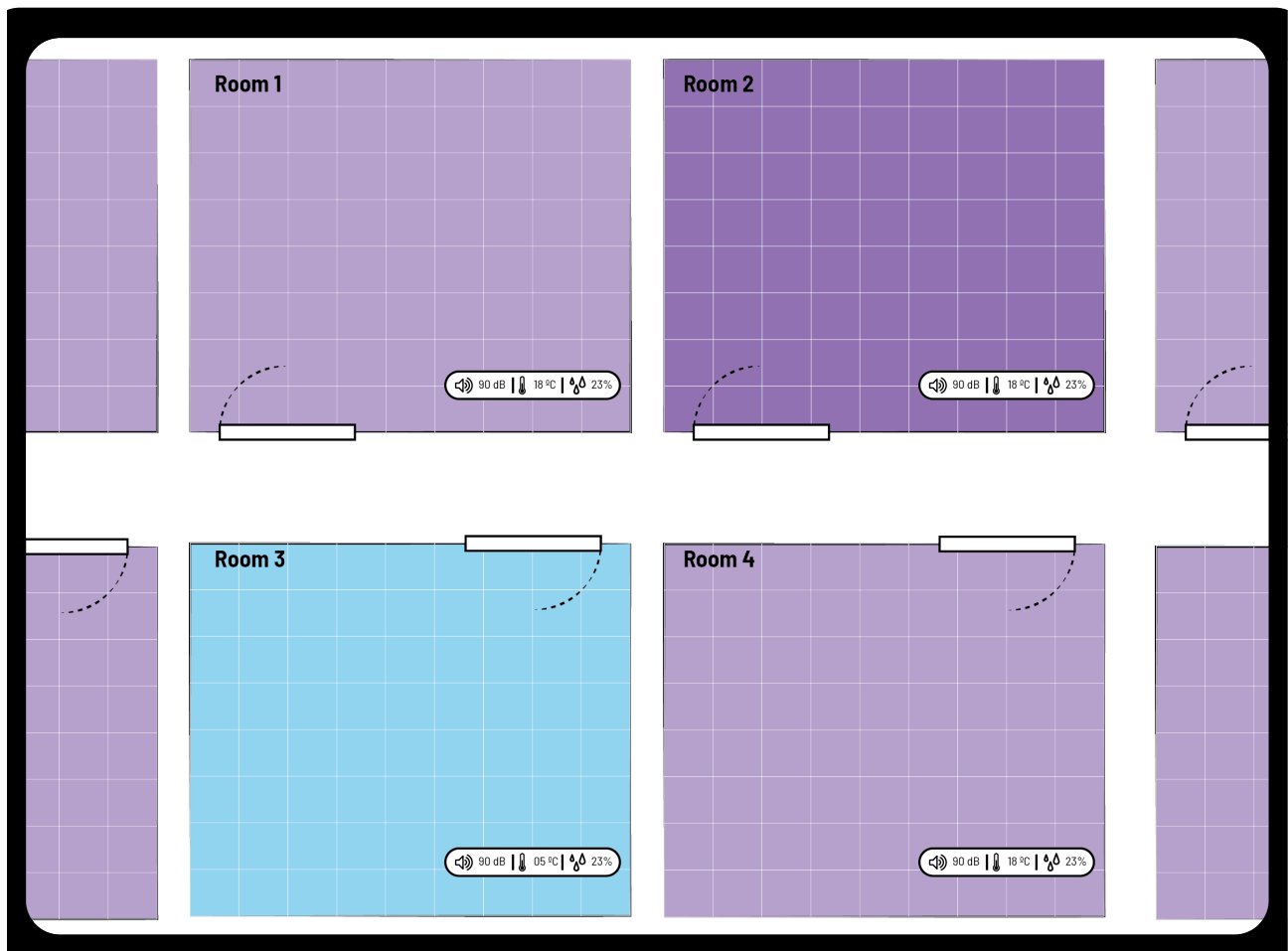
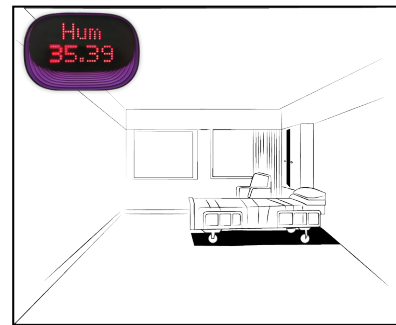
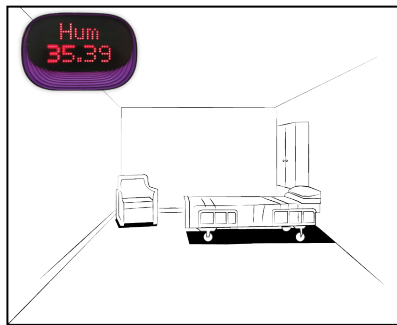
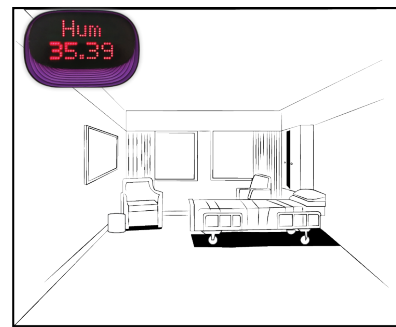
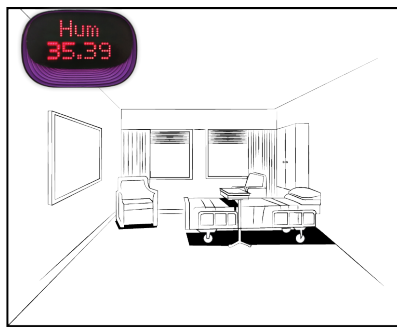
A room monitor is a small device containing a set of environmental sensors that can measure various conditions such as temperature, humidity, air quality, light levels, and noise levels in a given room or area. The device has a Bluetooth communication module that allows it to connect to the Evolved.City infrastructure and send data in real time. This allows the data collected by the sensors to be easily monitored and analysed by the responsible staff in order to maintain the environmental conditions in the monitored area.

Room Monitor includes features such as a display screen that shows real-time data readings, an automatic notification system that alerts the most role-appropriate person when conditions are out of range, and the ability to generate reports on the changes in environmental conditions over time.





To achieve this goal, IoT room sensors are installed in each patient room and in other areas of the hospital, including the waiting rooms, examination rooms, operating theatres, lounge areas and laboratories. These sensors continuously monitor temperature, humidity levels, sound, light and air quality in real-time, and transmit this information to the Evolved.City service (Common Operating Picture – COP).



Evolved.City analyses the data gathered by the Room Monitors (or other preferred IoT room sensors) and sends notifications to the closest or pre-assigned staff member when conditions fall outside of the optimal range.



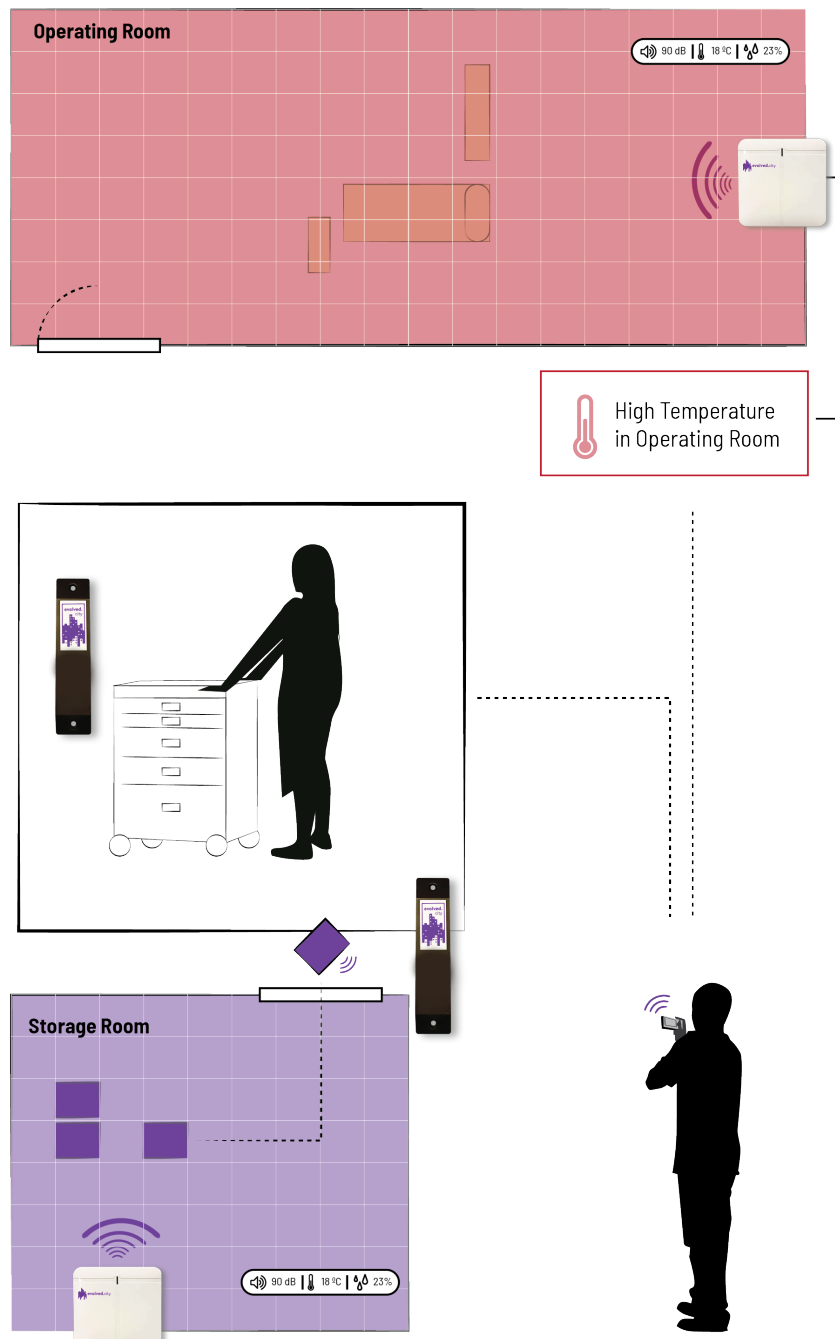
In addition to maintaining optimal environmental conditions, room monitors can be used to monitor the air quality within the healthcare facility. With its improved sensing feature, air pollution can be tracked in real time, and CO₂ levels and VOC (Volatile Organic Compounds) levels can be automatically and continuously measured. Studies have shown that maintaining a healthy environment in healthcare facilities significantly improves patient recovery times and reduces the risk of infection and other potential accidents.



Room monitors are versatile devices used to monitor environmental conditions in a variety of settings including offices, campuses, airports, transportation facilities and healthcare centres. They are used to monitor environmental conditions to ensure a safe and comfortable environment for patients, visitors and staff (medical, operational and administrative) while reducing maintenance costs and improving facility management.



In addition to patient rooms, operating theatres and waiting rooms, the hospital has a number of conference rooms, medical staff offices and administrative areas used for meetings, consultations and appointments. Scheduling and managing these rooms can be time consuming for staff. Implementing an online room booking and scheduling system using Evolved.City and Esri's Reservation Layer can streamline the process for both hospital management and patients. With this system, reservations and appointments can be made online in real time through web or mobile applications. This saves time and increases efficiency by eliminating the need for patients to visit or call the hospital. Staff can also use the online system to reserve rooms for meetings or training sessions by viewing room availability through the system.



Hospitals and healthcare facilities have a significant number of critical assets, such as wheelchairs, crash carts and defibrillators. As these assets are frequently moved around the hospital, tracking their location can become a challenging task for staff and management. An asset tracking system can solve this problem by using IoT-enabled beacons attached to each asset and connected to the Evolved.City ecosystem. As assets move around the hospital, the beacons send real-time location data to Evolved.City, and staff can monitor the location of each asset using a mobile or web-based interface.

Nurses can use the Evolved.City system to quickly locate critical assets such as crash carts on a map, saving critical time that could affect patient outcomes. The system eliminates the need to manually search for assets, improving staff efficiency and reducing the risk of life-threatening delays. The system can also identify frequently used assets and provide regular maintenance to reduce the risk of equipment failure.

In most cases setting up an asset tracking system in health care facilities pays for the setup in less than one year. Some of the studies indicate:

- ***Hospitals lose assets on the order of \$3000 per bed per year.***
- ***It is estimated that medical equipment stolen from hospitals in Germany each year exceed 1 billion euros.***
- ***A major hospital in Europe (name withheld) calculates misplaced asset costs at 1 million euros per year.***

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