infsoft
smart connected locations

Indoor Positioning for Offices and Smart Buildings

Content

Benefits of Indoor Positioning for Offices and Smart Buildings

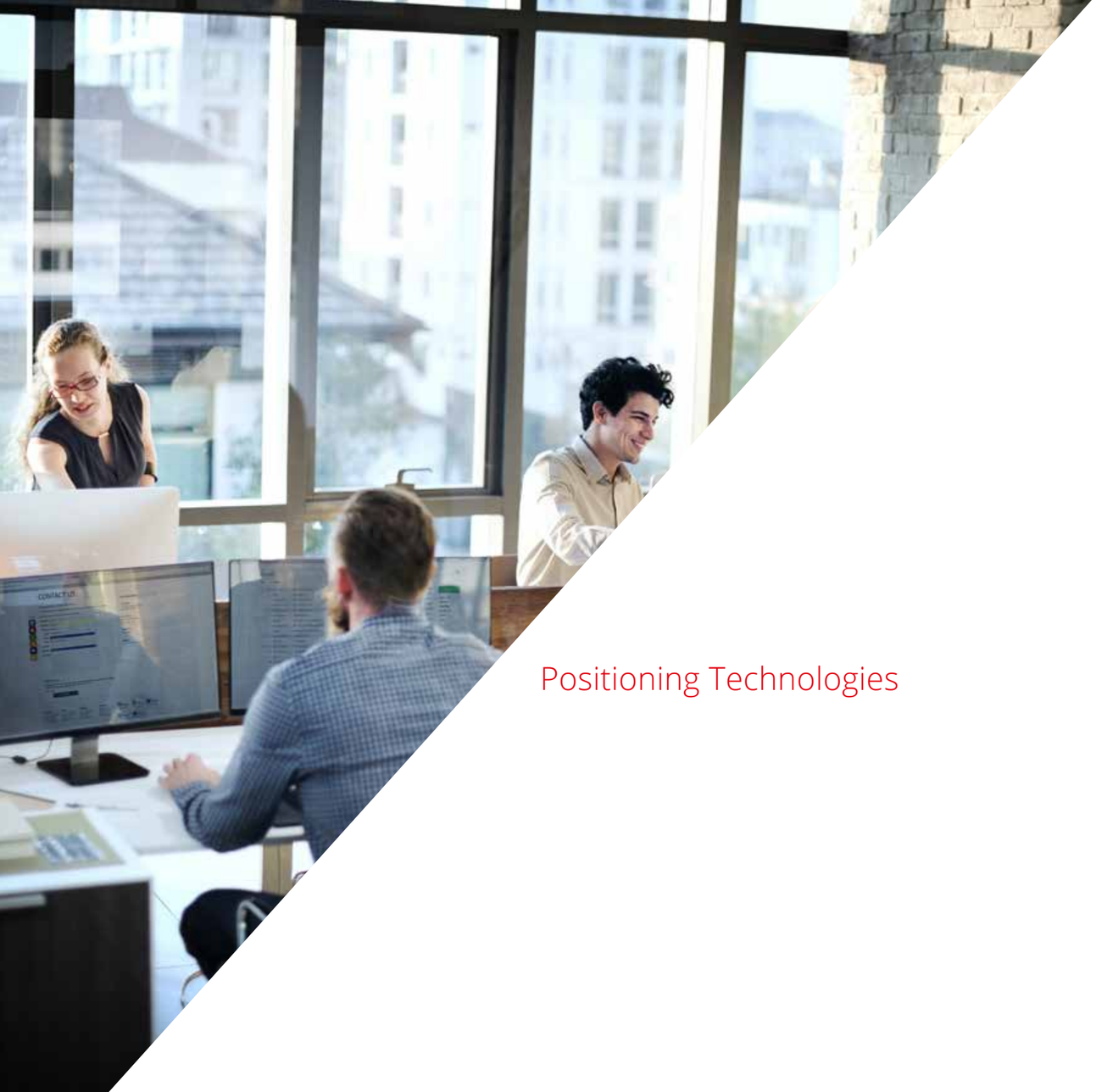
In office environments, RTLS (Real-Time Locating Systems) can provide various functions that benefit both management and employees. RTLS solutions dealing with personnel and resources contribute to increased productivity, efficiency and safety in the workplace.

Offices are more and more evolving into intelligent working environments. Location-based solutions such as indoor navigation, smart meeting rooms and device localization can support management, employees and visitors.

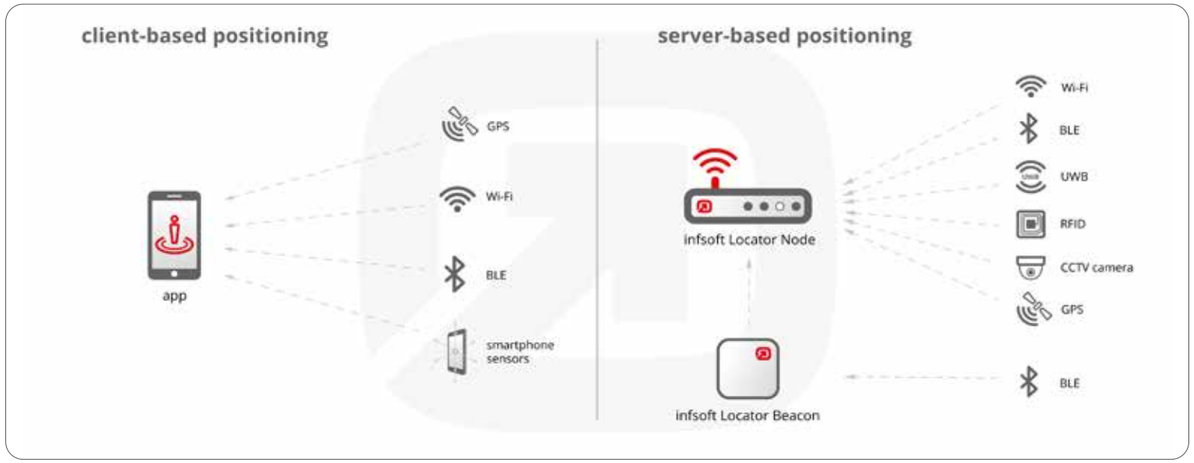
Operational tasks like inventory management and control involve tedious manual processes that are prone to error. RTLS solutions can greatly simplify and automate these processes. Implementing a tracking system results in streamlined workflows and enables real-time alerts, predictive maintenance and meaningful insights.

Not only assets but also employees and visitors can be located. Alert systems can provide maximum safety for personnel – especially in the event of an emergency or evacuation. Furthermore, based on collected location data, office space design can be aimed at maximized work efficiency. Occupancy information on workspaces and conference rooms can also contribute significantly to more efficient use of office space.

Moreover, indoor positioning enables indoor navigation and other mobile services. An app offers employees, visitors and external service providers many added benefits. For example, the app can be used to display the nearest printer or the next available meeting room, and users can be navigated to their desired destination with the help of directional instructions.



Positioning Technologies



client-based and server-based indoor positioning

Basics: Indoor Positioning

Indoor positioning systems (IPS) enable locating the position of objects and people within buildings. GPS is not available in interior spaces, because there is no visual contact with the GPS satellites. Furthermore, with GPS, it is not possible to determine the floor level a device is located on. For this reason, other positioning technologies are used indoors.

Indoor positioning is based on a transmitter-receiver-model which offers two approaches to determine the current location of a person or object.

Client-Based Approach

A client-based technology is used to keep track of individuals that might require a back channel for further information exchange and navigation purposes.

Indoor navigation is usually based on Bluetooth Low Energy beacons. For this purpose, beacons are mounted at regular intervals in the building.

The position is determined on a mobile device (e.g. smartphone) and an app is required.

Optionally, the position can also be transmitted continuously to a backend in order to make the data available for communication and analysis purposes.

Technology		Accuracy	Range	Suitable for	Transmitter power supply	Battery lifetime
Wi-Fi		< 15 m	< 150 m	area detection	or	medium
BLE	4.0	< 8 m	< 75 m	area detection		high
	5.1	< 1 m with line-of-sight				
RFID		presence detection only	< 1 m	spot detection	— (passive RFID tag)	— (passive RFID tag)

comparison of different technologies for server-based indoor positioning

Server-Based Approach

A server-based technology is used to keep track of assets and persons. For this purpose, transmitters are attached to assets or are carried by people. Receiver hardware is installed within the client's premise to capture the signals of the transmitters and to transfer the data to a backend engine. In offices, the most common applications are the localization of work equipment and personnel.

To meet the requirements of a client with regard to the requested accuracy, there are several potential sensor technologies available for server-based indoor positioning.

Wi-Fi

For positioning with Wi-Fi, the so-called fingerprinting method is used. Relevant factors are the strength of the Wi-Fi signals (Received Signal Strength Indication, RSSI) and the MAC address (Media Access Control).

In a server-based solution, Wi-Fi-enabled devices and Wi-Fi tags are detected by the infsoft Locator Nodes (specially developed hardware). This allows for people flow measurement and asset tracking.

Accuracy depends on multiple factors, such as reflections, for example in corridors, and shielding through walls, ceilings, and your own body. The accuracy of Wi-Fi used for indoor positioning varies from 5 to 15 meters – depending on the preconditions.

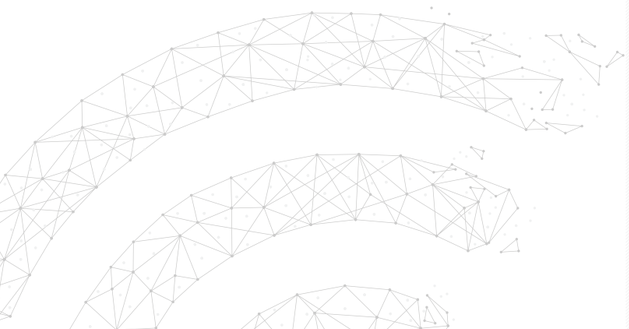
Wi-Fi at a glance

Pros:

- enabled Wi-Fi is sufficient
- under certain circumstances, the customer's existing infrastructure can be used (e.g. Cisco DNA Spaces)

Cons:

- relatively inaccurate (5-15 m)
- no constant latency with mobile devices
- use of randomized MAC address if smartphone is not connected to Wi-Fi network
- high energy consumption with Wi-Fi tags



beacons for indoor positioning

Bluetooth Low Energy (BLE) Beacons

Beacons are small radio transmitters that broadcast signals using Bluetooth Low Energy in a radius of up to 70 meters. These signals are detected by infsoft Locator Nodes in a server-based approach. In office buildings, the localization of beacons enables various tracking solutions to be implemented.

BLE beacons are cost-effective and energy-efficient components that can run on button cells for up to five years and more. The transmitters are available from numerous suppliers and come in various shapes and sizes. From BLE tags that can be attached to goods and work equipment to ISO cards or wristbands for employees – there is a suitable beacon for every application in the office environment. Beacons with E-Ink display enable digital labeling of rooms and lockers.

Beacons can also provide sensor data. They may include sensor capabilities in order to allow the detection of movement (accelerometer), temperature, humidity, CO_2 levels and light intensity. This makes them particularly suitable for office applications such as intelligent room monitoring and control or workspace utilization sensing.

infsoft solutions are compatible with beacons from all manufacturers. Bluetooth beacons usually do not affect other wireless networks.

BLE at a glance

Pros:

- cost-effective, unobtrusive hardware
- low energy consumption
- high accuracy compared to Wi-Fi
- under certain circumstances, the customer's existing infrastructure can be used (e.g. Cisco DNA Spaces)

Cons:

- attachment to mobile office assets can be difficult in some cases

Bluetooth 4

The current standard for BLE beacons is Bluetooth 4 (4.0 / 4.1 / 4.2) which uses RSSI (Received Signal Strength Indication) to determine a position, meaning that the location is calculated based on the measured signal strength. RSSI-based positioning is usually suitable for localization with area accuracy.

Bluetooth 5

The latest Bluetooth version, Bluetooth 5, achieves significant improvements in terms of signal range, bandwidth and data transfer speed compared to applications using Bluetooth 4.

Bluetooth 5.1 furthermore has a direction-finding function and can use Angle of Arrival and/or Angle of Departure for positioning. With direct line-of-sight, this determination of the direction of a Bluetooth signal enables significantly more precise positioning than Bluetooth 4. However, due to reflection behavior, this direction-finding function does not work reliably in office environments.

RFID

RFID stands for “Radio-Frequency Identification” and describes systems that use radio waves to identify objects or persons. In a passive RFID system, there is a transponder (“RFID tag”) on whose microchip data (usually a serial number) are stored, which can be forwarded wirelessly to a reader. The reading unit (e.g. infsoft Locator Node 1100) generates an energy field that activates the RFID tag. In order to enable information exchange, the distance between Locator Node and transponder must be less than one meter (remote-coupling). RFID tags do not require visual contact with the reader, are durable against impact and environmental factors and are almost maintenance-free.

Common applications of passive RFID in office buildings include systems for access control, time recording or inventory management of office materials.

RFID at a glance

Pro:

- low costs per asset
- no battery needed

Cons:

- short range (< 1 m)
- only providing a “point-in-time” location
- installation requires significant planning
- infrastructure can be expensive

Summary View

Client-Based Positioning

Client-based positioning is most commonly used for indoor navigation.
In most cases, this type of solution is realized with Bluetooth 4 beacons. Advantages of this technology are the

easy installation, the long battery life and the comparatively low maintenance effort required for the beacons, which are installed at regular intervals in the building. Also, Bluetooth enables client-based positioning on both Android and iOS devices, which is a major advantage in comparison to Wi-Fi.
Being able to use indoor navigation requires a smartphone app and enabled Bluetooth. Using the app, employees and external personnel, for example employees of maintenance companies, can be easily navigated to relevant destinations on the premises and view their position on a digital building map. Sensor fusion – the use of smartphone sensors – can further improve precision in client-based applications.

Server-Based Positioning

Server-based positioning in offices is mainly used for tracking valuable work equipment such as office chairs, laptops and monitors. Locating employees, for example for process optimization or security purposes, is another important application scenario.
Depending on the application and accuracy requirements, different localization technologies can be used for server-based positioning. Bluetooth 4 tags, which are characterized by a long battery life and low maintenance requirements, are particularly suitable for area-accurate or room-accurate positioning. In offices, this is usually sufficient and Bluetooth 4 is the most common technology of choice here. If the beacons are equipped with integrated sensor technology, environmental conditions can also be monitored (e.g. temperature, humidity).
The use of the new Bluetooth 5 version opens up advantages of higher signal range and optimized data transmission. However, a more precise object localization based on the direction finding function (Angle of Arrival) included in Bluetooth 5.1 typically cannot be implemented effectively in an office environment.
Tracking based on RFID can be useful at some important checkpoints (e.g. time recording, material check-ins/check-outs for inventory management).

Hardware

In order to address a client's need for a reliable positioning solution, we rely on our own hardware.

Positioning is based on a transmitter-receiver model. To implement a localization project, you need hardware for receiving signals and hardware for transmitting signals. For our hardware products we offer flexible mounting options, which are sold separately. The mounts are magnetic and have additional boreholes for fixed installation.

infsoft receiver hardware for office applications includes infsoft Locator Nodes 1400 and infsoft Locator Beacons.

infsoft Locator Node 1400 © infsoft GmbH

infsoft Locator Nodes 1400

infsoft Locator Nodes 1400 are hardware components that can receive Wi-Fi and Bluetooth Low Energy (BLE) signals from mobile transmitters. This enables the positioning of Wi-Fi tags and beacons attached to objects or

carried by people, as well as the localization of Bluetooth or Wi-Fi-capable mobile devices. The gateway function allows communication between different types of devices and the cloud and enables bidirectional information exchange between infsoft Locator Nodes 1400 and Bluetooth transmitters such as infsoft E-Ink Display Beacons. Connecting systems from third-party providers such as Cisco (CMX, DNA Spaces, MSE, Meraki), HP Aruba or Xirrus is also possible.

infsoft Locator Node 1400

infsoft Locator Beacons

infsoft Locator Beacons are battery-operated hardware components deployed in fixed positions, which periodically scan for signals of mobile asset tags (beacons) and send information about the received signals to the nearest infsoft Locator Node. This technology is particularly suitable for applications in which area-accurate positioning with a small time delay is sufficient.

infsoft Locator Beacon © infsoft GmbH

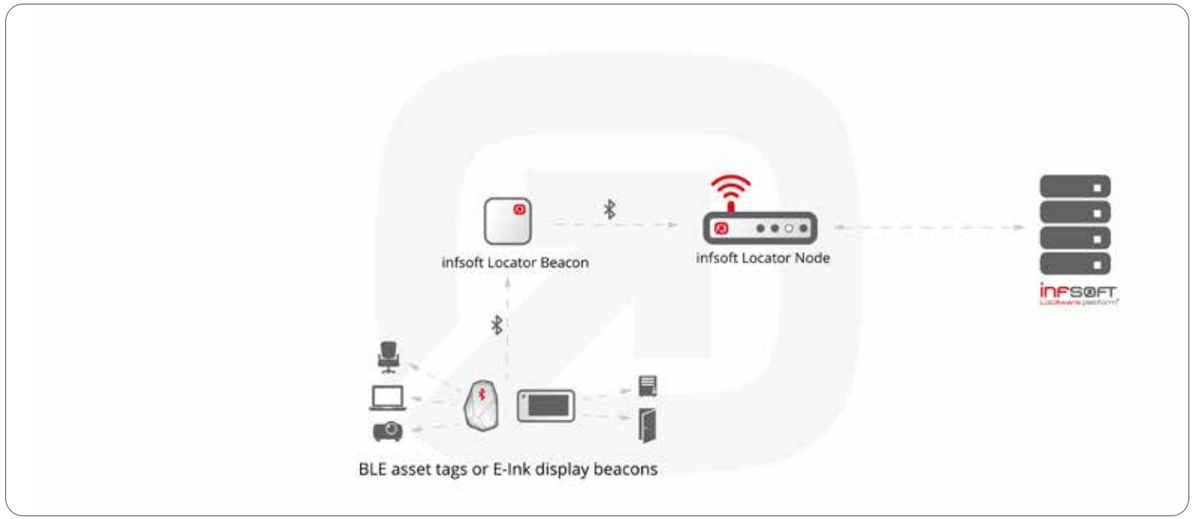
A big advantage is that the number of deployed Locator Nodes can be minimized, which significantly reduces installation effort and costs. Moreover, infsoft Locator Beacons require very little maintenance, as their battery life is up to ten years (depending on the scan interval).
In addition to their asset tracking capabilities, Locator Beacons can also emit signals that are received by mobile devices (e.g. smartphones), making them suitable for applications such as indoor navigation and location-based services.

infsoft Locator Beacon

Transmitter hardware emits signals that are detected by the receiver hardware. Depending on the application, Bluetooth 4 / 5 tags or infsoft E-ink Display Beacons are used. In addition, the positioning can be enriched with sensor data.

BLE 4 / 5 Tags

Bluetooth Low Energy tags, also known as BLE beacons, are small battery-powered radio transmitters that broadcast signals at a specific time interval. Beacons are



server-based positioning using infsoft Locator Beacons

available in many sizes and shapes and are suitable for a variety of applications, e.g. indoor navigation and tracking solutions. Bluetooth technology is continuously subject to further development, and beacons currently available on the market are equipped with different Bluetooth versions. While Bluetooth 4 and 5.0 are best suited for room-accurate positioning, for example in office buildings or hospitals, Bluetooth 5.1 enables more precise positioning when there is a direct line-of-sight and is mainly used in positioning systems in open spaces, such as industrial halls.

Bluetooth Low Energy tags (beacons)

infsoft E-Ink Display Beacons

infsoft E-Ink Display Beacons deliver look and utility of paper encompassing good readability, very wide viewing angles, design freedom, robustness, and low power consumption. Combining E-Ink displays and Bluetooth Low Energy (BLE) technology enables transferring content flexibly to the display as well as visualizing and tracing the device's location.

A fast, efficient and wireless update of the displayed content can be realized not only manually but also automatically by defining (geo-based) triggers. The time and effort required to print labels manually are thus eliminated.

infsoft E-Ink Display Beacons © infsoft GmbH

Beacons with E-Ink display are suitable for the electronic labeling of (meeting) rooms, lockers and shelves, among other things.

infsoft E-Ink Display Beacons

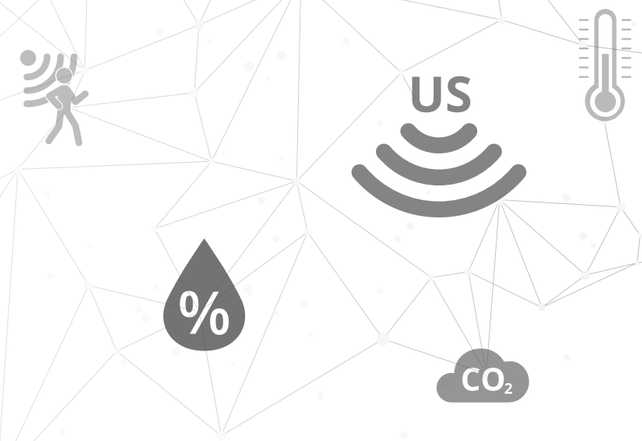
Condition Monitoring Systems

Existing Real-Time Locating Systems (RTLS) can be enriched with sensor data. Collecting and transmitting these data (e.g. CO_2 levels, temperature, humidity, light intensity, air pressure, acceleration) achieves an innovative, holistic sensor data fusion.

Some of the sensors can be a built-in feature of a BLE beacon, others represent a separate hardware component.

In office buildings, sensor data can be used to monitor compliance with a safe and appropriate working environment (e.g., in terms of air quality and/or lighting).

Beacons with integrated motion sensors have the potential to detect workspace occupancy.



Solutions

infsoft offers a full range of positioning services. This includes indoor mapping and navigation solutions as well as tracking, location analytics and geo-based services inside and outside of office buildings.

Indoor Digitization

Mapping a location is the first step in any indoor positioning project – and crucial for accessing the digital value of indoor spaces. It provides access to digital maps and every layer of building information, allowing all indoor processes to be digitized.
The integration of digital maps lays the foundation for the use of indoor navigation, indoor tracking, indoor analytics and geo-based services.

Indoor Digitization

Indoor Navigation

In complex office buildings and on large company premises, it can sometimes be difficult to find your way around and reach a destination on the shortest route. Indoor navigation, wayfinding within buildings, facilitates orientation and can be used by employees, visitors and external service providers carrying out cleaning or maintenance jobs, for example.

Turn-by-turn navigation (displaying directional instructions on a digital map) is one of the most popular forms of indoor navigation and reliably guides users across indoor and outdoor areas to relevant points-of-interest on the premises (e.g. canteen, offices, conference rooms).
For the implementation of such a system, a client-based positioning based on Bluetooth Low Energy is used in most cases. This requires users to have a corresponding smartphone app installed and the phone's Bluetooth function activated. In order to refine the positioning, smartphone sensors are always utilized as well.
However, indoor navigation is possible even without automatic positioning – for example, when digital building maps are integrated into a digital signage system (multi-touch kiosk/interactive terminal).

Additional App Features

In addition to the navigation, users benefit from additional valuable features within the app. For employees, a Colleague Finder might be useful. When searching for a certain coworker, their location can be viewed on a digital map (if location sharing has been granted) and a navigation route to that position can be started.

Company news and cafeteria schedules also create added value for employees in their daily work. Interfaces to third-party systems provide app users with additional features – these can include room booking systems, information on parking options and on public transportation, just to name a few examples.

For visitors and service providers, especially those arriving at the site for the first time, an app can make for a pleasant and stress-free stay. For example, app users can be assisted in finding parking upon arrival and automatically receive a welcome message with relevant information about their upcoming appointment. Seamless indoor and outdoor navigation ensures on-time arrival at the meeting location.

Indoor Tracking

Indoor Tracking describes the localization of people and objects within buildings. Depending on the application, the tracking solution can be realized based on different positioning technologies and is usually implemented following a server-based approach. In office environments, a tracking solution can be used to monitor the movements of personnel and various work equipment.

Person Tracking

Indoor tracking of personnel can be useful in many situations. On the one hand, safety aspects play a role, for instance when monitoring lone workers and evacuating employees and visitors in emergencies. On the other hand, recorded walking routes provide essential information for process optimization.

Employee Safety and Health

If employees and visitors are equipped with a beacon (e.g. in the form of an ISO card), their locations can be displayed on a map in an emergency situation such as a fire. This is important for determining which areas are still occupied and for evacuating people quickly and safely. When using an app, there is also the option of contacting people at risk via a back channel.

A tracking system can also prevent the spread of contagious respiratory infections in the workplace. Monitoring of safety distances and contact persons helps to identify possibly infected persons and maintain business-critical processes.

Motion Profiles

The collected position data of employees can be used to carry out location- and time-related analyses. This allows

more and less frequented areas of the office building to be identified, for example. Bottlenecks and optimization potentials are revealed and can be promptly responded to. For this purpose, people are tracked via the Wi-Fi or Bluetooth function of their smartphones – always in compliance with data protection requirements.

Object Tracking

In office settings, the tracking of assets is particularly relevant with regard to time savings, process optimization and theft protection. The current location of work equipment and, if necessary, vehicles can be viewed on a digital map at any time. When storing sensitive materials (e.g. in the archive) and as a measure to promote employee health, the tracking solution can be enhanced with sensor data to record temperature and humidity.

Inventory Management

A tracking solution allows you to view the location of work equipment, furniture and other company assets at any time. Additional information can be stored, such as the date of acquisition, the department assigned to the object and the value of the asset. This enables automatic and continuous inventory control.

Monitoring of Working Conditions

Monitoring air quality and lighting conditions can ensure consistent, optimal working conditions in office buildings. This has a positive impact on the health and safety of all employees.

Use Cases for Office Environments

Indoor Navigation

- Mobile App and Navigation for Company Premises
- Visitor and Invitation Management
- Location-Based Employee Services

Indoor Tracking

- Asset Inventory
- Tracking of Multi-User Workstations
- Evacuation of Employees and Visitors

Indoor Analytics

- Workplace Occupancy Sensing
- People Flow Analysis
- Management and Analysis of Cleaning Services

Geo-Based Processes & Additional Services

- Digital Room Signage
- Geo-Based Incidents and Data Enrichment for ITSM Software
- Condition-Capturing Sensor Functions
- Mobile Access Control System
- Automated Workflow Management
- Condition Monitoring in Archive Rooms

Use Case: Indoor Tracking in an Office Building

inventory of office assets

Indoor Analytics

The analysis software from infsoft can be added to existing positioning systems (client-based or server-based) or set up independently.

It is possible, for example, to analyze walking routes or the utilization of workstations, meeting rooms and social rooms. The location- and time-related analyses reveal a wide range of optimization potential.

The data is displayed in a comprehensive web interface in the form of diagrams and heat maps so that it can be easily evaluated and processed. The analytics dashboards can be customized to fit the needs of each customer.

infsoft Analytics dashboard

Workspace Occupancy Sensing

The utilization of individual workstations and rooms can be determined using various technologies – for example, via beacons with integrated motion sensors on the office chairs or via passive infrared sensors (PIR) on the ceiling.

In companies with shared workstation models, upon arrival at the office employees can easily find a free space via an app and start their work without delay.

Furthermore, environmental sensors can be used to determine the actual occupancy of conference rooms. If an appointment ends earlier than originally planned, the room can be unblocked in the booking system and used for other purposes.

Demand-Driven Process Optimization

According to the actual use of office space, efficient plans can be drawn up for services such as cleaning routines, allowing workflows to be optimized. The analysis reports help identify and eliminate weaknesses and enable cost savings.

Use Case: Indoor Analytics for Office Premises

workplace occupancy sensing

Geo-Based Processes & Services

A distinction is made between reactive and proactive location-based services. For reactive location-based services, a user searches for locations in the vicinity directly on their mobile device. Proactive services “recognize” when a user enters a specific area and automatically trigger a predefined action. When using proactive location-based services, the detection of a smartphone or a BLE beacon at a specific location could trigger such an action.

Geofencing

Triggering an action when entering or leaving a certain area is called geofencing (a combination of geography and fencing). Using infsoft Automation, various triggers with or without geo reference can be defined. This can be used, for example, to configure alerts and tasks or to control automatic door unlocking.

Geofencing is relevant in office buildings to protect valuable assets from theft and to ensure that certain areas are only accessed by authorized personnel. It is also possible to automatically change asset status or check items in and out as part of the inventory management of office supplies.

Automated Workflow Management

Positioning, combined with the definition of various triggers, can help streamline workflows and improve operational efficiency. Based on location, skills and availability, tasks can be assigned directly to an appropriate employee via push notification. In offices, this is particularly useful with regard to the maintenance and servicing of equipment and sanitary facilities.

Use Case: Geo-Based Processes and Services in an Office Environment

automated workflow management

Products

In addition to tailor-made, customized solutions, infsoft also offers ready-to-use solutions with powerful and innovative features. Smart applications for offices include our solutions for space utilization analysis, room signage, inventory management, and room climate monitoring, as well as our intelligent Workplace Experience App, which connects users with their office environment.

infsoft Occupancy

Being able to reliably estimate the occupancy of areas inside a building can prove beneficial for managing busy environments such as offices much more efficiently. It is crucial for organizations to make good use of the available space, especially since office facilities represent one of the biggest cost factors for them. Using our smart out-of-the-box infsoft Occupancy solution enables achieving a flexible, agile and space-efficient office portfolio in no time.

infsoft Analytics dashboard

Our approach does not require the occupants to carry any devices with them. Instead, it relies on cost-effective BLE hardware that is easy to install and easy to maintain.

Workspace Occupancy Sensing

By equipping chairs with beacons with motion sensors, workspace usage can be easily monitored. Employees can profit from an app, especially when flexible office concepts are applied.

Occupancy Monitoring for Conference Rooms

Placing infrared sensors in conference rooms allows to reliably attain occupancy information for that room (occupied / not occupied) and detect changes in real time.

Data Insights & Evaluations

infsoft Occupancy delivers highly useful data for corporate management to help determine if a workplace is meeting demand and make adjustments for optimal use of office space.

Implementation

Bluetooth Low Energy (BLE) beacons with built-in motion sensor capability are attached to the office chairs. A small number of infsoft Locator Nodes 1400 are installed in the areas to be monitored. In conference rooms, presence detectors (Passive Infrared Sensors, PIR) can be used to monitor occupancy.

More information and cost examples

- infsoft Occupancy

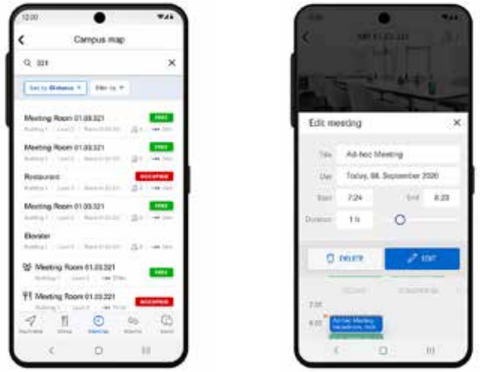
infsoft Workplace Experience

Diverse solutions and applications in intelligent offices lead to a more pleasant and productive working day for employees. From a business perspective, the main potential lies in saving costs and optimizing processes. In addition, the app increases employee satisfaction and leads to higher productivity and lower fluctuation.

There are many features that a digital employee app can provide to enrich everyday working life.

Travel Information / Mobility

An app can be used to provide employees with greater convenience during their journey to work. By integrating parking garage information, company shuttle and public transportation schedules, the user gets a quick overview of the possibilities for getting there.



infsoft Workplace Experience App

Wayfinding

Navigation at the site facilitates orientation for employees, visitors and guests. The basic function provides an interactive map of the entire site, including all buildings, which are available with all floors. This is supplemented by a search function including category assignments.

Room Booking

Conference rooms can be booked and meetings can be organized. Information on equipment, capacity and utilization is also available. Additional added value is provided by a wayfinding system, links to catering services and sorting according to geographical distance.

Communication / Social Connection

With this feature, internal company events can be planned and the connection between employees can be strengthened. Various functionalities such as chat, personal profile, SkillFinder, and friends list can be added.

Dining & Food Options

Here you will find information about canteens, cafés, and snack and coffee machines on the company premises. Menus can be viewed, and navigation can be called up.

Implementation

Bluetooth Low Energy Beacons or infsoft Locator Beacons are installed on the premises.

Employees install a mobile app on their mobile devices. The smartphones receive the Bluetooth signals from the beacons and use a signal strength measurement for positioning. The app can precisely guide the user to selected destinations using directional instructions. Push messages can be received via a back channel.

More information

- infsoft Workplace Experience

infsoft Room Environment

This intelligent room climate monitoring solution empowers businesses to improve the well-being and performance of their workforce. By collecting various sensor data that characterize the quality of the office environment (e.g. temperature, relative humidity, carbon dioxide levels, illuminance), optimal working conditions can be created and maintained. This can serve as an important measure to promote employee health and increase productivity and innovation. Automated notifications can be triggered when certain thresholds are exceeded, allowing an ideal indoor air quality to be restored as quickly as possible.

infsoft Room Environment can be used standalone or as an additional feature of the infsoft Workplace Experience App. The system relies on cost-effective, low-maintenance Bluetooth Low Energy hardware, is non-intrusive, and integrates seamlessly with existing control systems.

Environmental Data

Collecting sensor data helps companies create a healthy working environment for their staff. Relevant metrics are usually temperature, humidity, CO_2 levels, and possibly light intensity.

Analysis & Insights

Interpreting the gathered environmental sensor data helps with the monitoring and optimization of office spaces. That way, the health and productivity of personnel can be increased.

Room Climate Control

Sensor data can be integrated into a mobile app. With existing interfaces to the building control system, adjustments to the room climate, such as temperature regulation, can be made via the app.

Implementation

Beacons with integrated sensors for collecting environmental data («Sensor Beacons») and infsoft Locator Nodes 1400 are installed on the premises. Based on the sensor functions, the beacons determine various values such as temperature and relative humidity in the area to be monitored. Via Bluetooth, the collected data is sent to a Locator Node 1400 within range. From there, the data is transmitted to the infsoft LocAware platform®, where it is intelligently processed and made available via web services.

More information and cost examples

- infsoft Room Environment

infsoft Room Signage

infsoft offers innovative electronic room signage systems based on battery-powered E-Ink display beacons. These modern and also very practical room signs simplify work processes and create transparency, as employees and visitors can view up-to-date information about ongoing and upcoming meetings at any time. The displays enable the automation of processes and a reduction in overall operating costs.

In addition to office, seminar and conference rooms, the E-Inks can also be used to digitally label and manage lockers, which many companies provide to their employees and customers for storing valuables and personal items. The display can show, for example, the name of the employee assigned to the locker and current presence information (on site / on a business trip).

The displays are centrally managed via an infsoft Locator Node 1400 and the displayed content is automatically updated via infsoft Automation. Room lists and schedules can be easily imported and displayed via interfaces to third-party systems (e.g. Google Calendar, Office 365). While sample templates are available for this product, individual layouts according to your own corporate design can be used as well.

The tricolor display is equipped with an LED indicator and uses fully daylight-compatible ePaper technology. The batteries last for about 5 years, even with several content updates a day. The battery status can be monitored using the software tool infsoft E-Inks. Due to the simple assembly, complete office buildings can be easily retrofitted with the room signs.

Implementation

Bluetooth Low Energy beacons with E-Ink display are placed next to the room doors / on the lockers. infsoft Locator Nodes 1400 installed in the building receive the signals of the display beacons and transmit them to the infsoft LocAware platform®.

infsoft E-Ink Display 7.5 inch

Via Bluetooth, the content is transferred from an infsoft Locator Node 1400 to the E-Ink display to be labeled. The content on the display can be automatically updated using infsoft Automation.

More information and cost examples

- infsoft Room Signage

infsoft Inventory

With infsoft Inventory, we provide our customers with a solution that facilitates efficient inventory management of all assets.

In the basic version without tracking functionality, infsoft Inventory does not require any hardware investment. For product identification, assets are tagged with QR codes or barcodes.

There are several options available if companies wish to use infsoft Inventory more extensively. The application can be integrated into ERP software, for example, and can thus be connected to existing databases. Another option is to link the application to geodata. Either Bluetooth beacons or E-Ink display beacons can be used for this purpose. E-Ink display beacons offer the added benefit of allowing information to be displayed directly on the asset (e.g. product details, reservation status, maintenance schedule).

Other possible functions of infsoft Inventory include automatic notifications before an upcoming inspection date or colored highlighting of borrowed items in the user interface.

Localization

The tracking solution enables reliable positioning of mobile and stationary inventory with room or area accuracy. The position can be determined seamlessly across all floors of the building.

Analyses

In addition to location and status information, a comprehensive dashboard provides the user with insights into asset utilization. Furthermore, there are functions for grouping and filtering the assets.

Theft Protection

Via infsoft Automation, an automated warning can be generated, e.g. when an asset enters or leaves a predefined area or stays in a certain area for a certain period of time.

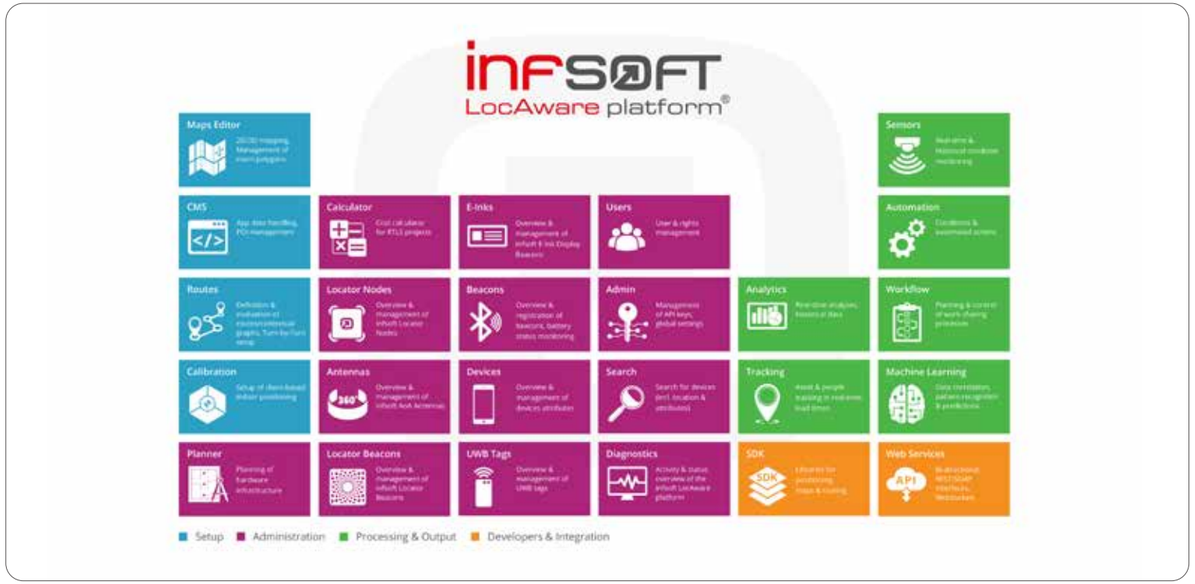
infsoft Tracking dashboard

Implementation

In the basic functionality without a tracking function, QR codes or barcodes are attached to the inventory items. The data of the respective code is captured by a reading device and can then be accessed via the infsoft Inventory user interface.

For location tracking, Bluetooth Low Energy (BLE) beacons are attached to the assets. The signals emitted by the beacons are received by infsoft Locator Beacons and then forwarded to an infsoft Locator Node. From there, the information is sent to the infsoft LocAware platform® where it is intelligently processed.

Software: LocAware platform®



infsoft LocAware platform®

infsoft offers customized, holistic solutions and powerful software tools for the successful implementation of Real-Time Locating Systems.

As a central data hub, the infsoft LocAware platform® represents the centerpiece of the infsoft tools. All tools required for the setup and data management are bundled here and are accessible with a single sign-on. The platform is available as a cloud solution.

The web-based tools enable managing a location on all floor levels, analyzing movement throughout the building, managing hardware such as Beacons and Locator Nodes as well as defining geo-based alerts.

Setup & Administration

The setup tools include all functions required for setting up an indoor positioning system – mapping, calibration, data management and route definition.

The infsoft administration tools provide useful functions for managing the deployed indoor positioning system (e.g. registration and administration of beacons and infsoft Locator Nodes).

Data Processing & Output

infsoft's processing and output tools enable the intelligent use and evaluation of the collected data and help companies to optimize processes and improve decision-making.

infsoft Analytics

infsoft Analytics visualizes detected devices within the floor plans and enables real-time monitoring of motion profiles. You can measure frequencies in specific areas, create time- and location-related analyses and combine the system with infsoft Automation to enrich your data. The live scripting engine can filter information or visualize data links in real time and in retrospect. The tool also provides heat map visualization and route tracing.

infsoft Analytics

infsoft Tracking

Real-time visualization of the position of specific devices is enabled by infsoft Tracking. You can add attributes to a device (e.g. mail address, name), organize devices in groups and send push notifications to selected users. The tool can also be used for asset tracking and can be linked with other tools such as infsoft Automation.

infsoft Sensors

infsoft Sensors visualizes condition sensing devices on the map and enables real-time monitoring of status information (e.g. light, temperature, pressure, humidity, CO_2 and presence).

infsoft Automation

The tool infsoft Automation allows for the definition of various triggers with or without geo reference along the process chain in real time. The automated actions to be triggered can include alerts, notifications (push, email, ...), and door locking/unlocking.

infsoft Tracking

infsoft Workflow

infsoft Workflow enables the active planning, control and logging of work-sharing processes within RTLS projects. Using the tool, all tasks that have to be carried out with the execution of organizational procedures can be registered and structured. Additionally, it is always possible to store geo-information.

infsoft Machine Learning

infsoft Machine Learning is a visual tool that allows creating user-defined machine learning models, train them within a very short time and use them in a wide variety of applications. The powerful environment processes position and/or sensor data and uses self-optimizing algorithms that can learn from experience. By recognizing patterns and regularities in existing data, values and results can be predicted.

infsoft Automation

Software Videos

- infsoft Analytics
- infsoft Tracking
- infsoft Automation

SDKs, Web Services & Developer

infsoft's technology is also available as plugins for integration into third-party apps. The plugins contain indoor positioning, indoor navigation, 2D/3D building maps and GEOItems. The determined position is issued as virtual GPS coordinates and can be used as such in the app for your own purposes. The SDK (Software Development Kit) is currently available for the Android and iOS mobile operating systems and as an HTML5 plugin. In addition to a native implementation, the use of frameworks such as PhoneGap or Xamarin is possible as well.
infsoft's products can also easily be adapted to different system environments. infsoft web services allow fast and efficient data integration via REST/SOAP interface.

infsoft Developer Hub

The infsoft Developer Hub gives developers access to the full range of functions of the infsoft LocAware platform®. The hub provides API explorer capabilities, code samples and comprehensive guides and documentation to help start working with the platform as quickly as possible.

About infsoft

infsoft GmbH, located in Großmehring near Ingolstadt (Germany), has been offering solutions for indoor navigation, indoor analytics, indoor tracking, and location-based services since 2005. In addition to comprehensive solutions for major clients, infsoft also provides developers with access to its core technologies via scalable Software Development Kits (SDK), enabling integration with third-party applications. infsoft's client base includes Frankfurt Airport, Swiss Federal Railways (SBB), UNIDO, Siemens and Roche.

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