Nokia High Accuracy Indoor Positioning
High accuracy positioning for real-time location tracking

Many asset-intensive enterprises with large indoor facilities are challenged with locating assets especially in the absence of GPS in indoor locations. By acquiring precise location data and services, you can accelerate your digital transformation and enable digital twins, predictive analytics and many other industrial automation applications.

The Nokia High Accuracy Indoor Positioning solution is an advanced solution for locating and tracking assets, parts, products and people using high accuracy positioning data. Also, known as real-time location service (RTLS), the use cases extend across many industries — warehouses, factories, hospitals, offices, care homes, high-security facilities — any organization that needs to keep track of inventory, assets, vehicles and people.

The Nokia High Accuracy Indoor Positioning (HAIP) solution cost-efficiently improves on existing solutions by providing higher accuracy 2D and 3D location of objects using Bluetooth technology with the angle of arrival (AoA) method. With built-in visualization and analytics, it provides you with real-time location tracking that is designed to help you locate assets faster and more easily. It uses edge computing to process information in real-time and ensures that sensitive data does not leave your premises. A low-energy solution using non-licensed spectrum and easy to install, HAIP is highly secure and provides the kind of accuracy currently only offered by much more expensive solutions.

Improve the utilization rate of shared assets, gain real-time operational awareness of workers and assets, enable automated real-time inventory, use location-based billing for shared assets and optimize lay-out based on statistical location data. These are just a few of the use cases enabled by Nokia HAIP. The solution has all the features to meet even your most ambitious use cases.
Transform your operations with accurate digital positioning

Organizations are embracing Industry 4.0 technologies and pursuing the digital transformation of their operational processes. The most compelling use cases for automation require greater accuracy and reliability than is currently offered by technologies such as Wi-Fi. Businesses that are adopting location tracking for the first time, have an opportunity to accelerate their digital transformation by affordably adopting the next generation of tracking systems.

There are many reasons to invest in indoor positioning, from the time saved to locate objects and people, to improved utilization rates for shared assets, or to simply have historical data available to analyze for activities such as optimizing the layout of warehouses. It can help to prevent loss and theft and provide forensic data for legal matters. It can even make new business models possible, such as location-based billing for assets shared between organizations.

Typical examples of tracked assets include wheelchairs, beds, medicine trolleys in hospitals, production equipment, testers and toolboxes in factories, and pallets, forklifts and containers in warehouses. Vehicle tracking (e.g., AGVs, forklifts and trucks) helps ensure efficient fleet management through usage recording, zone guards and alerts if a vehicle leaves a facility or enters a restricted zone. Likewise, people tracking options can be used to ensure that staff is accounted for during emergency evacuations, proper staffing levels are maintained across operational areas, restricted zones are better secured and, in the case of hospitals and extended care facilities, wandering patients are quickly locatable.
Get the accurate, affordable and secure positioning you need

The Nokia High Accuracy Indoor Positioning solution utilizes a network of antennas called locators that receive radio packets transmitted by Bluetooth tags. Each low-powered tag securely transmits its ID and other information using the 2.4 GHz ISM band. The receiving locator or locators transmit this information as well as the Angle of Arrival (AoA) of the tag signal to a local (on-premises) edge cloud processor. In principle, the processor only needs information from one locator to determine the 2D location of the tag. With two locators, the location can be determined in 3D: important for high-ceilinged warehouses, for instance. Depending on locator deployment density, maximum accuracy up to 30 cm is possible with submeter values being typical.

Lost-cost, low-powered digital IDs

The asset tag is small enough to be attached to virtually anything. As well as transmitting its ID, it can also gather local sensor information such as temperature or acceleration. Low-powered, the tag battery can last up to one year depending on the frequency of transmission. It can be configured remotely according to the intended usage (i.e., slow or fast-moving asset). HAIP tags outperform competing high-precision tags based on battery life, cost and robustness.
Accurate and reliable locators
The HAIP locators contain multiple antennas and one Bluetooth low-energy (BLE) transceiver and, because they require line of sight to the tag, are typically mounted on high ceilings. They can be mounted on high walls as well. Locators use a downlink channel to configure the tags (Tx rate and power), although generally they are in listening mode.

Powerful edge processing
The HAIP application runs on an edge cloud server and uses the information from the locators to calculate the real-time location of the asset. It provides the location data, using an API, to any software program that can use the information. The Nokia HAIP solution provides a graphical user interface that supports single and multiple maps deployments (i.e., one HAIP covering two floors). It contains a database for storing locations and configurations of tags and can provide a visualization of the tags’ localization history including a heatmap and distance travelled. Other solution features include geofencing, near-collision detection, time spent in area, last-seen positioning and follow-the-tag functionality.

The open API built into the solution makes for easy integration with automated business workflows that can use location information. The Nokia Digital Automated Cloud provides completely secure, on-premises edge processing.

High level system view

• Full blown open API
• Nokia DAC cloud access is only for
  - Deployment through Nokia DAC application framework
  - Operation and maintenance
• Secure: Location information stays on site
Simple activation for accurate positioning
The Nokia High Accuracy Indoor Positioning solution is part of the Nokia Digital Automation Cloud (DAC) offering, which is a digitalization enablement platform providing a variety of applications such as Scene Analytics, industrial connectors and voice communications, as well as reliable private wireless connectivity. The HAIP solution is simply activated through the Nokia DAC dashboard. You can quickly deploy tags and locators through your facility, confident that Nokia has engineered a reliable end-to-end solution that has sub-meter accuracy for locating your valuable assets and people.

Leverage the power of our cloud
The power of the Nokia DAC cloud can provide processing for applications that rely on real-time positioning data for:
- Asset position
- Distance travelled by an asset
- Time spent by an asset in a user predefined area during a time interval
- Time spent by an asset moving (not idle) during a time interval
- Instantaneous numbers of assets in an area (both preconfigured and static areas, areas created ad-hoc and dynamically movable areas).

Private wireless accessibility
Beginning with Nokia High Accuracy Indoor Positioning is a great start on your Industry 4.0 journey, as it runs on the Nokia Digital Automation Cloud edge server. By simply adding Nokia 4G/LTE or 5G small cells and a private wireless subscription, you can also easily deploy a private wireless network for fast, reliable wireless connectivity that will extend your Industry 4.0 digitalization capabilities.

Seamless integration
Nokia DAC services can work with you to integrate the HAIP solution with existing applications such as inventory management or facility security. The solution also provides data visualization and analytics for historical information that can be used by applications such as workflow optimization to improve your operational efficiency using AI and machine learning.

Reduce time, effort and risk
Streamline network, device and application deployment and ensure smooth operations with a pre-packaged service backed by our global team of support experts.

Succeed with a proven partner
Work with a trusted wireless solution provider to deploy a positioning solution that meets your needs. We have deployed private wireless networks with more than 300 enterprise customers and support many different industrial markets worldwide.

Benefits

For more information visit Nokia High Accuracy Indoor Positioning
About Nokia
We create technology that helps the world act together.

As a trusted partner for critical networks, we are committed to innovation and technology leadership across mobile, fixed and cloud networks. We create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Adhering to the highest standards of integrity and security, we help build the capabilities needed for a more productive, sustainable and inclusive world.

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