Market Guide for Indoor Location Services

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Initiatives:Digital Workplace Infrastructure and IT Operations

Real-time location tracking of people and critical assets is now required for safety, compliance and cost optimization. I&O leaders should assess vendors based on their ability to meet multiple indoor location opportunities and address new employee safety and compliance use cases.

Overview

Key Findings

- The granularity of location, latency and communication rate of information needed for each use case will determine what tags and technologies will be used to meet the requirements.
- Most enterprises need to track many different kinds of assets. This means that the location engine must be able to ingest the information from different tags and technologies to ensure that the location for all assets can be determined.
- Clients continue to move applications to the cloud but certain vertical markets — such as healthcare, government and banking — need location information and applications locally to address latency and privacy.

Recommendations

- Identify all use cases requiring location. Collaborate with each line of business to determine the types of assets that need to be tracked and the required granularity of their location.
- Meet the varying business requirements for various beacon rates, battery power levels, frequencies and antenna configuration by selecting a vendor that has integrated these variables into a platform.
- Ensure architectural flexibility by finding a vendor that can deploy the location engine and application on-premises, off-site (for example, through colocation) or in the cloud.

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Strategic Planning Assumption

By 2028, 75% of critical asset and people tracking use cases will require two differing technologies to validate the location.

Market Definition

Gartner defines the indoor location service market as “the hardware, software and service components that provide indoor location coordinates and services.” Indoor location solutions use differing hardware components, data collection methodologies, location data elements, location engine algorithms and architectures to achieve the core functionality of the indoor location market. Solutions provide the location of a static/mobile asset or person, as defined by the needs of the specific vertical market.

Location services provide the x, y and z locations of business-critical assets within one meter (i.e., three feet) to address six major usage scenarios in diverse markets, including:

- Static/fixed-asset monitoring applications
- Mobile assets using location technology to address zonal requirements
- Mobile/fixed assets with real-time location requirements
- People tracking
- Critical-asset tracking
- Peer-to-peer distancing, including presence/proximity detection

Mandatory Features

The mandatory features for this market include:

- A mobile asset tracking component (also called a “tag”) that attaches to, or is integrated within, an asset that communicates data to location algorithms in a location engine to determine the location of a defined static/mobile asset or person
- Data that minimally contains x and y location information, communicated to and from the location engine via a defined and publicly documented API
- A location engine that can be located as an on-premises application, on an edge computing platform or in the cloud

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- An application that provides firmware updates and OS and application updates to all components of the solution
- An application that monitors and communicates the operational aspects of the asset tags, including battery statistics and button or light status

Common Features

The common features for this market include:

- Indoor location solutions may collect location data by using one or more radio frequency technologies, including 125 kHz, 13.56 MHz, 433 MHz, 900 MHz, 2.4 GHz, 5 GHz, Wi-Fi, Bluetooth low energy (BLE) or ultrawideband (UWB). They may also use optical sensors and image analytics, such as passive infrared (PIR) and computer vision-based systems.
- Indoor location solutions must use proprietary overlay infrastructures or existing enterprise network infrastructures to communicate among defined components.
- Platforms may use visible light communication, ultrasound, barometric pressure, light detection and ranging (lidar), geomagnetism, fingerprinting or any technology or combination of technologies to provide x, y and z location data to a location engine.
- Indoor location solutions provide x, y and z coordinates for assets being tracked, but the specific granularity will depend on the market where the solution is being deployed. Most clients are looking for one-meter granularity.
- Indoor location solutions may provide analytics that analyze the location data and provide reporting.
- A detection and alerting capability is provided to support asset tracking in adverse conditions and movement from defined locations.
- Integration of location solutions with other sensors is provided within the tag to monitor additional attributes, such as the temperature, humidity, vibration sensing or battery life of the tag.
- Solutions may be integrated with mapping applications, wayfinding applications, vertical market applications or software development kits (SDKs) that use the indoor location service coordinates.

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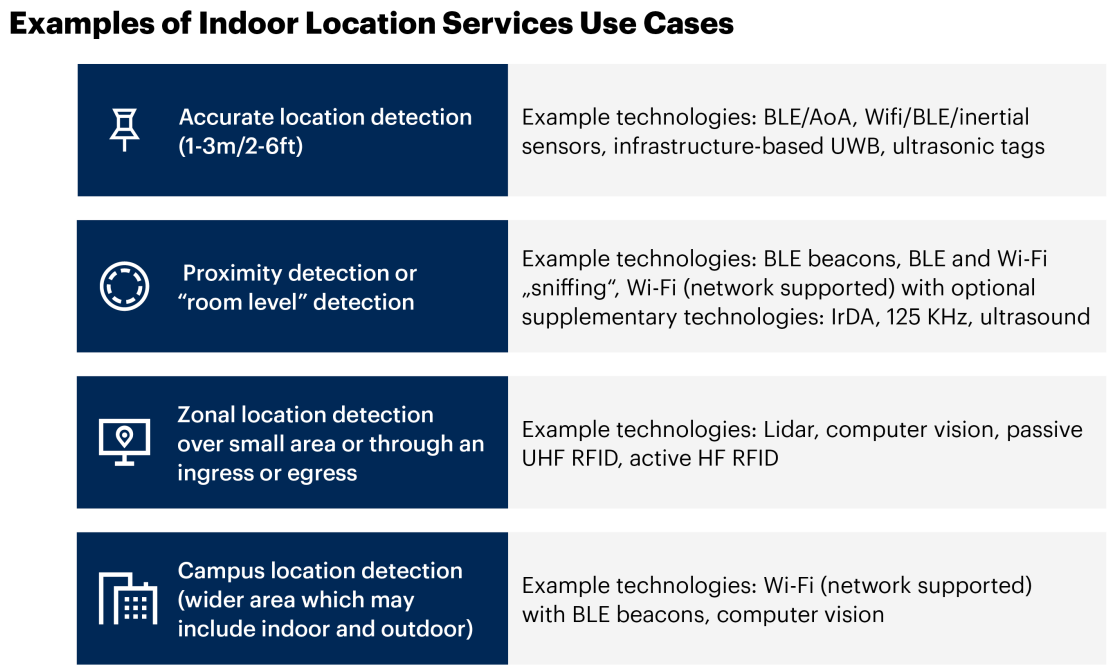
Market Description

Customer needs for indoor location services vary by vertical market and, while location is a common element across the verticals, there are limited generic horizontal use cases. For example, the healthcare market may need only room-level granularity for patients, infants or elders, but banking may require accuracy of less than one meter to manage high-value assets.

Additionally, in large facilities, such as warehouses and transportation facilities without defined "rooms," technologies like infrared data association (IrDA), 125Hz and ultrasound — used for supplemental input for less granular technologies — are impractical. An entirely different technology is required to meet these differing requirements. As location data becomes required to track people and assets in new markets, the requirements have also evolved in established markets for the use cases shown in Figure 1.

Figure 1: Examples of Indoor Location Services Use Cases



Source: Gartner
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Gartner

Benefits of indoor location services include:

- Better reporting of assets when they leave assigned zones, buildings or locations.

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- Lower total cost of ownership (TCO) through more closely managing assets' locations throughout their life cycle.
- Reduced compliance risk through improved visibility into missing or lost assets.
- Increased safety associated with people tracking, both for staff duress and hazardous environment use cases.

Market Direction

Gartner clients report that the ability to reliably track people for safety and compliance requirements has been a significant driver for investment in indoor location solutions. Indoor location technologies like UWB and computer vision, and other innovations such as wireless sensing (IEEE 802.11bh) and energy harvesting, are creating ways to determine location. They are also creating new location parameters, such as height (z-axis). A platform approach to the requirements of indoor location engines has evolved as organizations realize that multiple technologies are required to address a growing number of specific use cases.

Over the next 12 to 18 months, Gartner anticipates the following demand-side market changes:

- Improved analytics with the use of machine learning and AI.
- Supplemental data points (anchors) that can be added to existing infrastructure instead of priority networks.

Over the next 12 to 18 months, Gartner anticipates these supply-side market changes:

- More publicly-available APIs that provide location data.
- More diversity of tags providing location. These include energy harvesting tags that do not require batteries and hybrid tags that combine multiple different technologies to determine location or address environmental concerns.
- The addition of new technologies to determine location — such as computer vision — both as a primary technology for use cases such as people tracking and also as a supplementary technology for two-factor authentication/verification.

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- Synergies between location and sensing (also called “interactions” or “sensor fusion”), where monitoring of temperature or the presence of hazardous materials is important for the safety of employees.
- New partnerships, created through the licensing of differing technologies.

Market Analysis

Several factors differentiate representative indoor location services solutions from each other and from complementary technologies. These include:

- **Primary use cases.** Providing the location of fixed (that is, nonmoving) assets, notifications when assets pass through defined points (also known as zonal) and the real-time location of people and high-value or critical assets.
- **Target markets.** The ability to service differing vertical markets is a significant differentiator. These include:
  - Healthcare
  - Manufacturing
  - Retail (including malls)
  - Warehousing and distribution
  - Enterprise
- **Platform-based.** This is a growing requirement. A logically defined platform architecture that can support the input of multiple types of location data. The data is input into the location engine to determine where the tracked asset is located. An API provides the location information to upstream applications in the targeted vertical markets. The platform must be deployable both on local premises and in the cloud.

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- **Integration with multiple technologies.** Tag developers are also increasing the number of technologies being combined or nested into hybrid tags. Additionally, we are seeing the use of computer vision to track assets and video analytics to address some existing use cases. Some of the newer combinations include:
  - BLE and NFC
  - UWB and BLE
  - UWB, passive UHF and bar code
  - BLE and GPS
  - Wi-Fi and geomagnetic
  - Wi-Fi, BLE and IrDA
  - BLE and ultrasound
  - Wi-Fi, LF and ultrasound
  - UHF, LF and IrDA
  - Computer vision

- **Hosting options.** While most clients are leaning toward SaaS-first, there is still demand for on-premises hosting options. Leading vendors provide a choice, but many vendors offer only one hosting option. Enterprises must ensure that the solution meets the required hosting needs for their use case. For vendors that offer both options, customers should expect SaaS delivery to receive updates more frequently than on-premises installations.
- **Scalability.** As indoor location information becomes a requirement for an increasing number of use cases, scalability needs to be considered. This includes scaling to include more variables such as z- axis or momentum, as well as technologies needed to meet new business requirements.
- **Geographic coverage.** While most vendors provide coverage in North America and EMEA, there's also demand in Latin America and Asia/Pacific. This will impact the ability to procure the tool locally and support interfaces in local languages.

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Representative Vendors

The vendors listed in this Market Guide do not imply an exhaustive list. This section is intended to provide more understanding of the market and its offerings.

Vendor Selection

The representative vendors listed in this research (see Table 1) represent a subset of the entire market. The included vendors offer a majority of the required must-have capabilities for indoor location service solutions and are of interest to Gartner clients, as evidenced by client interactions in the last 12 months. Vendors were chosen after a careful search and analysis of market offerings, based upon publicly available information and an optional survey.

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Table 1: Representative Vendors for Indoor Location Services

(Enlarged table in Appendix)

Vendor	HQ location	Product, service or solution name
AiRISTA	Timonium, Maryland	Sofia RTLS Software
Blueiot	Beijing, China	BlueIOT Real Time Locating System
CenTrak	Newtown, Pennsylvania	ConnectRT
Cisco	San Jose, California	Cisco Spaces
Comcast (MachineQ)	Philadelphia, Pennsylvania	MachineQ platform
HID	Irvine, California	HID Location Services
Huawei	Shenzhen, Guangdong, China	Huawei Location Service
Inpixon	Palo Alto, California	RTLS Platform
Juniper	Sunnyvale, California	Juniper Mist Location Services
KINEXON	Munich, Bayern, Germany	KINEXON OS
Kontakt.io	New York, New York	Kio Cloud
Litum	Izmir, Türkiye	RTLS solutions
Midmark	Dayton, Ohio	CareFlow RTLS
Purple	Oldham, U.K.	Purple
Quuppa	Espoo, Finland	Quuppa Intelligent Locating System
Securitas	Stockholm, Sweden	MobileView Software Platform
Sewio Networks	Brno, Jihomoravský kraj, Czech Republic	UWB Real-Time Location System
Sonitor Technologies	Oslo, Norway	Sonitor Sense, SonitorBLU, SonitorMOBILE
Thinaer	Richardson, Texas	Thinaer Sonar
Trio Mobil	Marietta, Georgia	IoT platform
Ubisense	Cambridge, U.K.	SmartSpace
Wirepas	Tampere, Finland	Wirepas mesh
WiTTRA Networks	Stockholm, Sweden	IoT solution
Worlds	Dallas, Texas	AI platform
Zebra Technologies	Lincolnshire, Illinois	MotionWorks Enterprise Software

Source: Gartner (March 2025)

Market Recommendations

People tracking, critical asset tracking, asset management, safety, compliance and cost optimization use cases across many vertical markets now require location as an element for making business decisions. As the market continues to mature, enterprises are finding that they have multiple location opportunities. However, the technology needed to capture location varies widely depending on the use cases.

As the market continues to evolve, enterprises must consider the following advances:

- New business models where location is provided as a service instead of a capital expense.

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- The introduction of advanced analytics using computer vision to provide primary location for people or critical assets and secondary location information to validate a movement or a change in state of an asset.
- Understanding that old technologies can be new again with the maturity of 802.11bh. Wi-Fi signals, which provided limited location granularity in the past, but can now be used to detect movement of assets within the coverage area as part of supplementary data.
- Knowing the location of an asset at a specific time is slowly becoming a data repository of location within the enterprise. AI algorithms can use the historical location information and analytics to improve business patterns, business processes or facility layouts to provide more location business value.

While there will continue to be business benefits attributed to knowing the location of an asset, enterprises need to also be aware of the pitfalls. Gone are the days that a single technology can be used to provide location data for all of an enterprise's location needs without making serious concessions on critical parameters such as granularity or battery life.

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Acronym Key and Glossary Terms

AI	artificial intelligence
AoA	angle of arrival
BLE	Bluetooth low energy
EMEA	Europe, the Middle East and Africa
GPS	global positioning system
I&O	infrastructure and operations
IoT	Internet of Things
IrDA	Infrared data association
Lidar	light detection and ranging
LF	low frequency
NFC	near-field communication
RFID	radio frequency identification
RTLS	real-time location system
UHF	ultrahigh frequency
UWB	ultrawideband

Evidence

This research is based on the following:

- More than 100 indoor location vendor briefings discussing the direction of indoor location services technology during 2024.
- More than 500 inquiries on indoor location services with current and proposed Gartner clients during 2024.

Recommended by the Authors

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Comcast (MachineQ)	Philadelphia, Pennsylvania	MachineQ platform
HID	Irvine, California	HID Location Services
Huawei	Shenzhen, Guangdong, China	Huawei Location Service
Inpixon	Palo Alto, California	RTLS Platform
Juniper	Sunnyvale, California	Juniper Mist Location Services
KINEXON	Munich, Bayern, Germany	KINEXON OS
Kontakt.io	New York, New York	Kio Cloud
Litum	Izmir, Türkiye	RTLS solutions
Midmark	Dayton, Ohio	CareFlow RTLS
Purple	Oldham, U.K.	Purple
Quuppa	Espoo, Finland	Quuppa Intelligent Locating System

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Securitas	Stockholm, Sweden	MobileView Software Platform
Sewio Networks	Brno, Jihomoravský kraj, Czech Republic	UWB Real-Time Location System
Sonitor Technologies	Oslo, Norway	Sonitor Sense, SonitorBLU, SonitorMOBILE
Thinaer	Richardson, Texas	Thinaer Sonar
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