

Magic Quadrant for Industrial IoT Platforms

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Initiatives: [Applications and Software Engineering Leaders](#)

Industrial IoT platform-based solutions continue to evolve and support IT/OT integration. Applications and software engineering leaders in industrial enterprises must help their businesses select IIoT platforms by balancing their short-term and long-term capabilities and potential.

This Magic Quadrant is related to other research:

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Market Definition/Description

Gartner defines the industrial Internet of Things (IIoT) platform market as a set of integrated software capabilities to improve asset management decision making within asset-intensive industries. IIoT platforms also provide operational visibility and control for plants, infrastructure and equipment.

IIoT Platforms

The IIoT platform is differentiated from legacy operational technology (OT) by its ability to cost-effectively collect higher volumes of high-velocity, complex machine data from networked IoT endpoints. The IIoT platform also orchestrates historically siloed data sources to enable better accessibility and improve insights and actions across a heterogeneous asset group through specialized analysis of the data.

The IIoT platform:

- Monitors IoT endpoints and event streams
- Supports and translates a variety of manufacturer and industry proprietary protocols
- Analyzes data at the edge and in the cloud

- Integrates and engages IT and OT systems in data sharing and consumption
- Enables application development and deployment
- Can enrich and supplement OT functions for improved asset management life cycle strategies and processes

In some emerging use cases, the IIoT platform may obviate some OT functions.

In concert with the IoT edge and through enterprise IT/OT integration, the IIoT platform prepares asset-intensive industrial businesses to become digital businesses. Digital capabilities are enabled by the IIoTP by enhancing and connecting their assets or products, in other words their core business with internal stakeholders, customers and business partners.

The IIoT platform may be consumed as a technology suite, or as an open and general-purpose application platform, or both in combination. It is engineered to include the requirements of security, safety and mission-criticality associated with industrial assets and their operating environments. IIoT platform software that resides on and near devices – such as controllers, routers, access points, gateways and edge compute systems – is considered part of the “distributed IIoT platform.”

Horizontal and vertical business applications are out of scope for this Magic Quadrant. However, each IIoT platform provider must exhibit demonstrable value in terms of integration and interoperability with such applications as:

- Enterprise asset management (EAM)
- Computerized maintenance management systems (CMMSs)
- Fleet management
- Condition-based maintenance (CBM)
- Manufacturing execution systems (MES)
- Maintenance, repair and operations (MRO)
- Product life cycle management (PLM)
- Asset portfolio management (APM)
- Field service management (FSM)

- Building management systems (BMS)

IloT Platform Capabilities

The IloT platform is composed of the following technology functions:

- **Device management** – This function includes software that enables manual and automated tasks to create, provision, configure, troubleshoot and manage fleets of IoT devices and gateways remotely, in bulk or individually, and securely.
- **Integration** – This function includes software, tools and technologies, such as communications protocols, APIs and application adapters, which minimally address the data, process, enterprise application and IloT ecosystem integration requirements across cloud and on-premises implementations for end-to-end IloT solutions. These IloT solutions include IloT devices (for example, communications modules and controllers), IloT gateways, IloT edge and IloT platforms.
- **Data management** – This function includes capabilities that support:
 - Ingesting IoT endpoint and edge device data
 - Storing data from edge to enterprise platforms
 - Providing data accessibility (by devices, IT and OT systems, and external parties, when required)
 - Tracking lineage and flow of data
 - Enforcing data and analytics governance policies to ensure the quality, security, privacy and currency of data
- **Analytics** – This function includes processing of data streams, such as device, enterprise and contextual data, to provide insights into asset state by monitoring use, providing indicators, tracking patterns and optimizing asset use. A variety of techniques, such as rule engines, event stream processing, data visualization and machine learning, may be applied.

- **Application enablement and management** – This function includes software that enables business applications in any deployment model to analyze data and accomplish IoT-related business functions. Core software components manage the OS, standard input and output or file systems to enable other software components of the platform. The application platform – for example, application platform as a service (aPaaS) – includes application-enabling infrastructure components, application development, runtime management and digital twins. The platform allows users to achieve “cloud scale” scalability and reliability, and to deploy and deliver IoT solutions quickly and seamlessly.
- **Security** – This function includes the software, tools and practices facilitated to audit and ensure compliance. It also establishes preventive, detective and corrective controls and actions to ensure privacy and the security of data across the IIoT solution.

Targeted Industrial Enterprises

For this market evaluation, Gartner focuses on three asset-intensive industries:

- **Manufacturing and natural resources** – This includes the subsectors of equipment and other discrete manufacturing, automotive and vehicle manufacturing, pharmaceutical, agriculture, food and consumer process industries, chemicals, metals and other industrial process manufacturing and other manufacturing.
- **Transportation** – This includes the subsectors of air transport, motor freight, rail and water, warehousing, couriers, and support services.
- **Energy and utilities** – This includes the subsectors of electric and gas utilities, energy resources and processing, pipelines and water utilities.

Magic Quadrant

Figure 1: Magic Quadrant for Industrial IoT Platforms



Source: Gartner (October 2021)

Vendor Strengths and Cautions

ABB

ABB is a Niche Player in this Magic Quadrant. ABB Ability Genix includes the range of capabilities expected in an IIoT platform and has been deployed in a variety of industries and use cases. Given its history as a provider of industrial equipment and components, ABB's installed base for Ability Genix is industrial and global in nature. The platform consists of a combination of ABB development components and curated capabilities from a range of independent software vendor (ISV) partners (e.g., Microsoft Azure) and open-source projects. ABB's marketing approach emphasizes industrial analytics and AI, and the product roadmap reflects the vendor's intent to continue to deliver more packaged industry- and use-case-specific applications.

Strengths

- ABB's installed base for Ability Genix reflects a well-balanced mix of customers across industrial sectors, including manufacturing, utilities, and transportation and logistics. In addition, the vendor can readily offer customer examples in all major global regions.
- The existing base of ABB industrial assets (motors and generators, power transmission equipment, drives, and more) creates a good opportunity for the vendor to capitalize on its incumbency in many enterprises. This is reflected in feedback from customers who often cite a pre-existing relationship with ABB as a key driver for selecting Ability Genix.
- ABB's experience with industrial assets and OT in general has driven it to ensure that Ability Genix supports a range of deployment models, from on-premises and edge, to hybrid and fully cloud-based. This diversity aligns well with the variety and fluidity of customer demand currently seen in this market.

Cautions

- At present, ABB holds limited mind share in this market. The vendor's go-to-market approach currently places more emphasis on the industrial AI and analytics capabilities of Ability Genix than the complete IIoT platform and the business benefits customers achieve with the IIoT platform alone.
- ABB has yet to establish any substantial third-party community of Ability Genix users, nor any substantial momentum for a community of developers (general development skills, ISV partners, and so forth) based on its platform. ABB currently leverages its large in-house developer and system integration (SI) resources.

- Ability Genix's device management and digital twin capabilities are less-frequently deployed, particularly for scenarios that do not involve ABB industrial assets. Customers with non-ABB assets will require add-on partners' or implementing extended capabilities.

Altizon

Altizon is a Niche Player in this Magic Quadrant. Altizon's go-to-market approach is shifting toward applications and away from the Datonis IIoT platform itself, resulting in increasing emphasis on the Datonis Manufacturing Intelligence (MInt) application. Altizon is primarily an India-centric organization with many solid customers and reference accounts, particularly in manufacturing and natural resources. International expansion is continuing as Altizon gains investment, growing in both Asia/Pacific and the U.S., where the company has its headquarters. Datonis provides real-time asset monitoring, uptime performance monitoring and asset traceability, all of which play well with its MInt application.

Strengths

- Altizon has strong domain expertise in industrial markets, particularly in the monitoring and analysis of manufacturing and industrial assets and processes, including real-time machine data, which now plays well with the MInt industrial integration application.
- The Datonis IIoT platform exhibits strong integration capabilities with a wide range of both "greenfield" and "brownfield" industrial applications.
- Ease of deployment and fast onboarding using Datonis's IIoT architecture provide a wide range of implementation options, including cloud and on-premises deployments.

Cautions

- Global enterprises will need to factor in that Altizon is primarily an India-centric company with direct operations in the U.S. and Asia, while operations in Europe are presently 100% partner-driven.
- Datonis does not have the required advanced artificial intelligence (AI)/machine learning (ML) capabilities built-in, and its analytics capabilities are not sufficiently domain-specific. This results in time-consuming customization to meet specific customer needs.

- The Datonis platform does not support a full range of safety, security and privacy standards for all of the vertical markets in which the company operates.

Amazon Web Services

Amazon Web Services (AWS) is a Challenger in this Magic Quadrant. AWS' IIoT platform is delivered via the AWS IoT Core offerings and relevant services. Skilled users can create a solution with a combination of over 60 AWS cloud and edge services. Common service elements across all deployment models are AWS IoT Greengrass, Amazon Monitron and AWS Panorama. More broadly, the catalog available to create IIoT platform capabilities includes various types of AWS services beyond the AWS IoT services portfolio, which includes services for data persistence, integration, AI, analytical models and security. AWS offers a rapidly growing portfolio of capabilities for edge-centric computing that includes intelligence and inference closer to monitored events.

Strengths

- Customers identify their partnership with AWS, specifically the vendor's willingness and ability to quickly innovate on enhancements to existing services, as a significant reason for their successful deployments. Gartner has observed case studies where AWS accelerates the convergence of IT and OT, such as the modernization of legacy data historians.
- AWS' commitment to edge-centric products and related architecture makes the company a contender to provide IIoT solutions where intelligence and inference reside at the edge.
- AWS' ability to support OEM efforts in order to create smart, connected industrial products is well-established across different manufacturers, product types and classes.

Cautions

- While AWS' horizontal IoT capabilities are strong, it currently lacks an impactful catalog of organic, or partnered, industrial-specific applications, packaged business capabilities (PBCs), connectors and extensions that leverage the capabilities of its IoT portfolio into specific use cases. Increasingly, industrial enterprises seek value-added, use-case-specific applications as an approach to accelerated capabilities, in addition to broader platform features and functions.

- AWS IoT Core is not available across all regions. AWS IoT SiteWise and AWS Lookout for Equipment are only available within a limited number of regions in the U.S., Europe and Asia/Pacific. Additionally, AWS SiteWise Edge has only been generally available since July 2021. Amazon Monitron sensors and gateways ship only to the U.S., the U.K., Germany, Spain, France and Italy. AWS IoT Device Defender is not available in South America, nor for edge cloud and on-premises deployments.
- Edge cloud and on-premises deployment solutions for industrial IoT offer fewer capabilities, especially relating to data management and analytics. Such inconsistent availability of IoT capabilities across all regions and deployment options is likely to be an inhibitor for some global organizations.

Braincube

Braincube is a Niche Player in this Magic Quadrant. It primarily focuses on manufacturing and demonstrates deep industry expertise, resulting in repeated successes. Solutions from Braincube are intended to provide continuous improvement to manufacturers by applying a variety of condition monitoring, asset tracking and predictive maintenance capabilities. Braincube, a French company, has 50% of its customers in Europe. It has a growing business in the U.S. and Latin America, and an emergent presence in Asia. Braincube has diverse partnerships including Siemens, Microsoft Azure, ENGIE, SAS and RapidMiner. Even with these partnerships, customers report working directly with Braincube on over 80% of implementations.

Strengths

- Braincube demonstrates strength and experience in optimizing process manufacturing by continuing to rapidly build and deploy solutions for satisfied customers.
- The Braincube Advanced Analysis visualization app enables manufacturing engineers to perform advanced analysis without requiring data science expertise.
- Braincube demonstrates the ability to implement solutions across complex manufacturing environments in a mix of on-premises and cloud/hybrid cloud environments.

Cautions

- Braincube has a limited set of service partners trained on the platform. This means enterprises working with Braincube services would need to scale or have internal skilled developers or operations personnel for product life cycle services.

- Braincube needs to continue to improve its ease-of-deployment capabilities, such as integration with an even broader set of manufacturing databases and systems than it currently has, global multisite deployments, and reducing the labor intensity and length of time for customizations.
- Braincube is regionally centered in Europe, with approximately 27% of revenue generated in France. Braincube continues to expand in the U.S. and Latin America, and is starting to build its business in Asia, which will be essential for continued success.

Davra

Davra is a Niche Player in this Magic Quadrant. Davra is one of the few pure-play IIoT platform vendors, and its IoT platform continues to provide a cohesive and well-integrated range of developed and open-source technologies. Davra's solutions offer implementation flexibility. Its architecture allows hybrid cloud and edge deployments with identical functionality, and end users can choose which features are implemented and where to match their business architecture. Solutions can also operate fully on-premises and fully disconnected, further strengthening implementation options that can be applied to a wide range of use cases and scenarios. Davra has a focus on utilities and transportation and logistics.

Strengths

- As a strong independent IIoT-focused platform vendor, Davra's key product and technology strength is platform deployment flexibility across cloud, edge and on-premises, with identical functionality.
- Critical success factors for Davra include its integration with other platforms, cloud and enterprise application components, which drives customer acceptance and above-average product satisfaction scores.
- Customers favorably reference Davra's ease of use, customer service and support, including timely response and contract flexibility.

Cautions

- As a small company, Davra relies on partners and channels, but lacks the depth of global service partners and trained channel partners that larger organizations offer. This may limit the scale and scope of projects that Davra can address.

- Davra, like any other Niche Player, needs to continue investing in security policies and technology, both within its own product, as well as taking into account end-to-end solution security requirements.
- Davra has an emphasis on technology and product outcomes and needs to have more of a focus on business deliverables and business outcomes that match its target markets.

Envision Digital

Envision Digital is a Niche Player in this Magic Quadrant, with a strong presence in energy. It is headquartered in Singapore. Its Envision Operating System (EnOS) platform focuses on five energy domains: intelligent renewables, connected energy, networked e-mobility, smart cities and energy management for smart plants. Common use cases include asset and device management, monitoring, predictive maintenance, asset performance and energy optimization. The target market for Envision Digital is energy- and asset-intensive end users. The company has a strong industry presence in the Americas, Europe and Asia/Pacific, but none in Africa, the Middle East and Australia.

Strengths

- Envision Digital has strong renewable energy credentials and ambitions, with an IIoT platform complemented by a suite of applications to manage energy. This includes power and load forecasting and performance analytics support across its target domains.
- Envision Digital's deployment architecture is flexible, supporting patterns from edge cloud, on-premises and multisite with extensive deployment capabilities. For example, automation tools, asset models and data quality work together to accelerate deployment and reduce onboarding efforts.
- EnOS has seen strong investment in analytics and applications to create a one-stop enterprise analytics platform. This includes reporting and dashboards, as well as a model-driven digital twin asset life cycle that can scale from device to asset through process to system.

Cautions

- Envision Digital is growing its presence outside Asia, requiring enterprises with operations in South America, the Middle East, Africa, or Australia to ensure they can get the proper level of support from the vendor and its partners.

- Envision Digital's deep energy domain expertise limits its ambition to drive wider industrial business value, and means that it has limited experience outside of energy. Furthermore, its approach to other industrial segments often starts with an energy cost-optimization value proposition.
- Customers cite challenges in product configuration for users, and challenges in raw versus generated data alignment.

Eurotech

Eurotech is a Niche Player in this Magic Quadrant. Its Everyware IoT platform integrates OT gateway capabilities through Eurotech's Everyware Software Framework (ESF) with Everyware Cloud (EC), connecting the edge to IoT cloud services, including platforms from Azure IoT, AWS IoT, IBM, SAP, Cumulocity IoT and Exosite. Eurotech extends microservice architected capabilities to edge and cloud platforms with an open-source approach based on Eclipse Kura and Kapua collaborations. The architecture is MQTT based, and allows for a homogeneous security approach from devices to the cloud. Eurotech has demonstrated use cases in transportation, utilities and manufacturing.

Strengths

- Overall, customers expressed satisfaction with their experience with the vendor on technical terms. Eurotech delivers enterprise class IT-OT integration through the single edge (ESF) and cloud (EC) platform integration.
- Collaborations with Red Hat (OpenShift, AMQ and JBoss Fuse) allow for available preconfigured cloud and edge integrations. Eurotech's platform offers preintegration with multiple leading IT systems as provided by Microsoft Azure, AWS, Software AG, IBM, SAP and others.
- Longstanding and active relations with Eclipse Working Groups enable Eurotech to develop and bring open-source community technologies into its solutions early on.

Cautions

- Analytics remains a fundamental challenge for Eurotech, as it is not a built-in capability of the Everyware IoT platform. Rather, it is either integrated from client-selected, third-party, OT-focused vendors or from capabilities provided by SIs. Absence of strong capabilities in analytics or application enablement and management narrows the competitiveness of the Eurotech platform, as value creation shifts to these capabilities.

- Eurotech's customer base remains closely aligned with Europe and the U.S. and the vendor needs more resources to support customers in other regions.
- Eurotech's customer feedback emphasizes challenges in regard to "pricing and contract flexibility," which reflects a need to invest in expressing a clear value proposition.

Exosite

Exosite is a Niche Player in this Magic Quadrant. Exosite's Murano IIoT platform is delivered as a managed service and can be deployed on public cloud infrastructures. Cloud-to-cloud integrations with providers such as AWS, Azure, Electric Imp and Digi allow for quick integrations through codeless environments. Hardware partners such as Moxa, Eurotech and Ewon provide preconfigured hardware for easy connectivity. The analytic capabilities of the platform are packaged into ExoSense, a condition monitoring application allowing domain-specific development to take place quickly. The Exosite Murano platform is best suited for OEMs and other organizations seeking cloud-oriented capabilities to process and analyze data from connected products.

Strengths

- Exosite facilitates the quick creation of vertically oriented applications through ExoSense, particularly when connecting to OEM hardware and leveraging the bundled Murano and ExoSense capabilities. It also offers alternative edge analytics options via partnerships with AI companies such as Boon Logic.
- Flexibility of pricing models provides ease of commercial engagements and, with subscription models, this scales directly with customer use.
- Customers commented on the platform's ease of use and speed of development from pilot to production.

Cautions

- Exosite demonstrates limited experience with common requirements in physical plant and integration with OT and industrial control and automation systems. Customer feedback was mixed on ease of integration using standard APIs and tools.
- Limited availability of global third-party resources (for example, large-scale SIs and service providers with operations expertise in multiple geographies) remains an area for improvement.

- Utilities and energy customers looking to work with Exosite in internal operations will require service partner support with sector-specific technical and business expertise in their IIoT use cases.

Flutura

Flutura is a Niche Player in this Magic Quadrant with its Cerebra IIoT platform. Flutura specializes in the oil and gas and heavy industries, focusing on improving asset uptime and operational efficiency. The lack of oil and gas demand during 2020 affected its direct sales, so Flutura invested in signing up new partners to bolster its channel business. Flutura's recent product offering, Engineer's WorkBench, aims to capitalize on the trend toward self-service analytics and democratization of data science across engineering users. Expertise in specific assets and processes resides in the Cerebra vertical-specific nano apps, a form of analytics-focused digital twin, that targets specific equipment and process optimization.

Strengths

- Flutura has firmly demonstrated positive business outcomes, as most of its customer case studies identify hard ROI outcomes. This reflects its expertise in oil and gas and manufacturing operations.
- Flutura has bolstered its partner program with new names and is poised to extend its reach via partners to new regions and industries.
- Flutura's Cerebra provides a broad range of analytical styles leveraging physics, heuristics and ML for industrial asset optimization and operations and management (O&M), with proven results.

Cautions

- Flutura has limited adoption beyond its oil and gas and manufacturing implementations. Customers will need to assess how Flutura can address specific business challenges in their respective sectors.
- While Flutura's device management leverages the Cerebra light edge device management module, and open-source capabilities, customers may need to ensure they have a more robust device management module option. Flutura does not offer a device integration software development kit. Generally, it will defer to the device manufacturer's device management capabilities before leveraging its own.
- Flutura is yet to fully scale revenue-generating partnerships with IT and OT vendors to add value to its IIoT platform.

Hitachi

Hitachi is a Leader in this Magic Quadrant. Hitachi Vantara is a Hitachi subsidiary and the parent company of Lumada. Hitachi's range of industrial businesses provides a base of experience which all of its business units can leverage. The Lumada IIoT platform supports projects across industries, including manufacturing, transportation, and energy and utilities, and the installed base reflects this mix. Lumada is a curated platform of Hitachi-developed technology, acquired technology (including AI-enabled data management and digital engineering services) and capabilities from OEM partners. Hitachi's repertoire of IIoT use cases, industries, data types and applications form a foundation upon which customers can develop personalized solutions.

Strengths

- Lumada can be fully deployed in on-premises, hybrid and cloud-centric patterns, giving customers a range of options with a substantial degree of consistency in functionality and technology. The vendor's installed base reflects a substantial number of deployments in each of these styles.
- Lumada exhibits strong capabilities, validated by numerous customers, in integration functionality, analytics and data management, security and application development/composition. The platform's composable nature helps Hitachi in co-creation activities for the personalization of the platform for specific solution requirements.
- The consolidation of Hitachi Consulting into the Hitachi Vantara business unit, completed in early 2020, has extended the vendor's sales and service footprint in the market, and enables more-focused and leverageable co-creation activities. Hitachi has a breadth of industrial use cases, spanning many different industrial sectors in all major geographic regions.

Cautions

- Device management capabilities remain an area of relative weakness for Hitachi and, among the core capabilities of the platform, device management functionality is the least frequently used in production deployments.
- Hitachi Vantara leadership roles have seen substantial and frequent change during the last 12-24 months. New executive leadership – across CEO, CMO, chief product officer and other key roles – will be challenged to bring stability and consistency of strategy to the organization.

- Lumada currently captures limited mind share among potential customers and developers in the IIoT context. The vendor needs to accelerate awareness, particularly among IT leaders and their teams, in order to progress its global execution in this market.

Knowledge Lens

Knowledge Lens is a Niche Player in this Magic Quadrant with its IIoT platform, iLens. Knowledge Lens specializes in manufacturing and helps clients improve plant efficiency and reduce asset downtime. While one-third of the vendor's projects are new sites, the bulk are brownfield sites. Thus its solutions are optimized for legacy industrial environments, with strategies to optimize the use of sensors to mitigate deployment complexity. Regionally, almost 80% of its accounts are in India, with some Middle Eastern and North American clients. Knowledge Lens has focused on capabilities that deliver value to customers, with apps such as asset lifetime prediction, forecasting models and vision analytics.

Strengths

- Knowledge Lens customer success stories demonstrate business value, such as lowering loading operations time, reducing waste and audit compliance.
- Knowledge Lens continues to demonstrate expertise and implementation capabilities for manufacturing companies across the spectrum, from cement to bottling to textiles.
- Knowledge Lens' clear pricing structure and pragmatic technology architecture contributes to delivering clear value and short-term payback for its client base.

Cautions

- Knowledge Lens has limited implementation expertise beyond its core manufacturing base. Thus customers in other industries need to verify how it can deliver value for their specific industrial challenges.
- Knowledge Lens' footprint and operations outside India are limited, which constrains its ability to scale and support nondomestic clients.
- Since it has limited partners, Knowledge Lens has to improve its global training capabilities and documentation to support enterprise teams seeking to ramp up their skills and internal competencies.

Litmus

Litmus is a Niche Player in this Magic Quadrant, with a focus on the manufacturing sector. The Litmus Edge platform is an edge-deployed solution with strong integration capabilities based on its suite of 250 preloaded connectors and drivers. Litmus Edge is deployed by manufacturing organizations for a variety of use cases such as basic asset data acquisition and analytics, through to more advanced applications such as AI/ML-enabled condition-based monitoring, overall equipment effectiveness (OEE) and predictive maintenance. Litmus has proven and verifiable industrial customer references in these use cases, most in industrial manufacturing.

Strengths

- Customers particularly appreciate Litmus' ability to collect and normalize data from OT sources.
- Litmus has developed a wide portfolio of 250+ IoT and OT drivers and connectors to enable simple deployment on all common devices.
- Litmus' dedication to supporting large-scale manufacturing operations is borne out by its portfolio of prebuilt applications, and its support of private or proprietary marketplaces dedicated to serving a specific customer.

Cautions

- Litmus' primary focus on manufacturing means it has currently less emphasis and expertise in the utilities and transportation segments.
- Litmus currently operates primarily in North America and Europe and has limited presence in other regions, where it primarily operates via a limited set of partners.
- While Litmus' pragmatic edge-centric approach to IoT has appeal for cloud-averse enterprises, its cloud-based capabilities will need to continue to be enhanced or it will be challenged in its ability to address enterprisewide use cases.

Microsoft

Microsoft is a Leader in this Magic Quadrant with Azure IoT, a set of services delivered on the Azure platform. Azure IoT capitalizes on Microsoft's broader platform and offers cloud, edge and hybrid deployment options. Azure IoT services can run on-premises and Azure IoT edge solutions offer architecturally secure isolation through a hierarchical deployment approach. Azure IoT delivers development and solution accelerators, including both MLOps and DevOps specifically for IoT, and can replace some OT building blocks such as historians. Microsoft capitalizes on the domain expertise of partners such as Accenture, Infosys and PwC. Customers also have access to the broad Microsoft offering and a marketplace for third-party software.

Strengths

- Microsoft leads with a flexible business solutions deployment approach underpinned by its comprehensive underlying Azure platform, its Azure IoT platform services, AI/ML for advanced predictive analytics, its digital twins implementation framework, and a comprehensive edge deployment offering (Azure IoT Edge, Azure Stack Edge, etc.).
- Microsoft has a strong baked-in security approach that encompasses a full stack asset-to-enterprise application approach. This includes Azure Defender, Azure Sphere and Azure RTOS, enhanced with Microsoft security services for industrial assets.
- Microsoft has a global ISV and SI partner ecosystem trained on Azure IoT for industrial clients, as well as indirect sell-through partners.

Cautions

- Azure IoT customers will need to bring in partners to supplement Microsoft's device management capabilities to achieve an overall holistic life cycle device management capability.
- Azure IoT can be used to help enable solutions in many vertical markets. Additional industry-specific solutions can be acquired for additional cost via Dynamics 365 or Microsoft's industry cloud strategy, but the vendor relies on partners to deliver vertical-specific solutions. Thus customers will need to involve domain experts with Microsoft's ecosystem partners for complete end-to-end vertical solutions.
- Customers are challenged by Azure IoT pricing complexity and lack of contract flexibility.

PTC

PTC is a Leader in this Magic Quadrant with its ThingWorx IoT platform. PTC's strength lies in its experience with asset monitoring, optimization and maintenance. It built a global ecosystem of IIoT-focused solution partners. PTC maintains a global sales force and reseller channel. PTC focuses increasingly on IoT-enabled applications – mainly OEM-related applications such as product life cycle management (PLM). It increasingly leverages the Microsoft Azure IoT stack to support horizontal ThingWorx IoT-related middleware functionality for scale, device management and other capabilities. Almost 80% of ThingWorx's reference accounts are in manufacturing, with a strong North American and European footprint.

Strengths

- PTC provides a comprehensive IIoT platform with flexible capabilities that is optimized for manufacturing environments.
- PTC's professional services team, combined with its broad ecosystem of services partners, provides clients with a resource to help its customers produce successful implementations.
- PTC continues to invest in its broad and deep portfolio and roadmap of technical capabilities, including PBCs. It is further expanding on this with a focus on developing applications that effectively leverage its IoT technology – for example, asset life cycle management (ALM) and PLM.

Cautions

- Some PTC customers expressed frustration relating to the complexity of the solution (which comprises many acquired and organic technologies) and the limited quality of documentation and user experience.
- PTC still lacks deep adoption and experience outside of manufacturing – for example, in the utilities, transportation, and oil and gas sectors.
- PTC is continually challenged with a long-term perception that its pricing is expensive, reflecting both the competitive nature of the market and PTC's need to more clearly express the value for the price.

ROOTCLOUD

ROOTCLOUD is a Niche Player in this Magic Quadrant, with a strong presence in manufacturing. It is one of the first IIoT platform providers to originate in China. ROOTCLOUD investors include MatrixPartners China, Hejun Group and Tencent. The ROOTCLOUD platform services a diverse variety of industrial assets for real-time data collection, asset performance management, product life cycle management, intelligent services, analytics and AI to deliver value across the industrial value chain to create agile industrial capabilities across an ecosystem. ROOTCLOUD Edge is an on-premises solution. ROOTCLOUD is headquartered in China, where it has a strong presence, and is building its presence in the rest of the world.

Strengths

- ROOTCLOUD has a broad range of support for API and protocol data integration with manufacturing execution systems, industrial control systems and computer numerical control (CNC) machinery. ROOTCLOUD also supports a large portfolio of industrial protocols that connect to a series of programmable logic controllers, CNC tools, sensors and select devices from OEMs.
- The ROOTCLOUD platform supports both cloud and edge (via ROOTCLOUD Edge) deployments, and has seen strong investment in the last year across its core capabilities. It has also enhanced its ability to support mobile and browser applications.
- The ROOT Enterprise Application Accelerator creates operations-focused PBCs that leverage prebuilt models and logic, with strong visualizations, securely across federated architectures.

Cautions

- ROOTCLOUD's center of adoption is China, although it is growing in Europe and the U.S. This requires enterprises to invest time and effort to get a global implementation plan and resources from ROOTCLOUD.
- ROOTCLOUD has minimal experience and a minimal installed base within the utility sector.
- For service and support, ROOTCLOUD uses outsourced global technical support of providers for local language and capabilities.

Samsung SDS

Samsung SDS is a Niche Player in this Magic Quadrant. Its IIoT platform, Brightics IoT, is primarily targeted at manufacturing, with a limited footprint in transportation and construction. Brightics IoT aligns strategically with Samsung SDS's focus on digital transformation, and has a core foundation in its analytics and AI capabilities. The data strategy aligns with this strategy – with structured and unstructured approaches – optimized for manufacturing. Brightics IoT provides packaged support for a range of communications protocols and interoperability with a variety of data persistence solutions. It is deployable on public and private clouds such as AWS, Microsoft Azure, Oracle Cloud and Samsung SDS Cloud.

Strengths

- Brightics IoT follows a standard IoT architecture, enabling modular deployments, and supports a range of manufacturing assets.
- Brightics IoT leverages a DevOps strategy for IoT that includes its internal AI and ML capabilities, plus communities such as GitLab and GitHub.
- Brightics IoT device management provides strong capabilities for configuration, provisioning and authentication of IoT endpoints.

Cautions

- Samsung SDS does not consistently demonstrate the quantitative business value versus price of Brightics IoT delivered for industrial enterprises.
- Brightics IoT has limited visibility in industrial sectors, reflecting its IT-centric heritage, which in turn limits its ability to credibly engage with industrial audiences.
- Samsung SDS has relatively limited presence and adoption outside of Asia/Pacific. Regionally, over 70% of its reference accounts are in Asia/Pacific, in particular South Korea. This is also reflected in its limited set of industry-specific partners outside of manufacturing.

Siemens

Siemens is a Visionary in this Magic Quadrant. Siemens' MindSphere IIoT platform is developed and curated by Siemens to support IoT technology and business design patterns, leveraging the vendor's experience in manufacturing and operating equipment. MindSphere leverages a combination of proprietary Siemens software, open-source software, and a number of curated third-party software solutions from ISVs such as SAS, Tableau and Software AG. MindSphere can also be deployed on third-party hardware. MindSphere is used in industrial enterprises for generating operational intelligence on the factory floor, creating digital twins of machines and assets, and managing fleets of smart products.

Strengths

- MindSphere has a strong focus on ease of implementation and ease of use, reflecting Siemens' product strategy and key acquisitions such as Mendix. Ease of use also extends to the availability of off-the-shelf extensions and connectors for integration.
- The MindSphere Store aligns with composable application innovation, whereby legacy application suites are decomposed into more granular ready-to-use SaaS, applications and PBCs. Siemens' customers create suites of industrial applications to achieve planned outcomes, and use the MindSphere Store for value-added applications from Siemens and third parties.
- MindSphere provides an application development platform based on Cloud Foundry and the use of native cloud and on-premises services from Alibaba, AWS and Microsoft Azure. Developers may use current development tools without having to purchase or learn special software or tools to develop applications for MindSphere.

Cautions

- MindSphere's ability to create an IIoT platform for edge and on-premises deployment is hampered by a lack of significant functionality and capabilities, compared with its ability when deployed in public or virtual public clouds.
- The MindSphere catalog is confusing in terms of selecting services, and for costing solutions for budgetary planning. Some customers complain of misconfiguration and price shocks, and that Siemens does not allow for due testing of applications ahead of purchase.

- The configuration and management of edge devices and apps is centralized and is optimized for cloud deployments. Edge data containerization requires custom feature development to optimize data traffic.

Software AG

Software AG is a Leader in this Magic Quadrant. Software AG's Cumulocity IoT platform consists of Cumulocity IoT Cloud and Cumulocity IoT Edge. Software AG promotes the ability for the user to self-service and build business solutions as a strength, and has a wide suite of integration and application enablement capabilities. Cumulocity IoT has a strong customer base in manufacturing and a growing base in the transportation and utilities segments. Cumulocity IoT provides users with a variety of ready-to-use or self-built custom business solutions, including OEE, condition monitoring and predictive maintenance. Cumulocity IoT is marketed to OEM-connected product manufacturers, as well as to operators in asset-intensive industries.

Strengths

- Cumulocity IoT's integration capabilities are strong, with over 300 connectors to SaaS and on-premises IT applications.
- Customers particularly appreciate the close presales and onboarding support provided by Software AG. The vendor has invested significant effort in building an ecosystem community that includes multiple partners, technology alliances and a large developer community.
- Customers feel that the Cumulocity IoT solution empowers their frontline engineers to create and manage their own business-specific data processes. They also highlight the user interface as simple to use and graphically intuitive.

Cautions

- Customers report that the modular pricing structure can be complex in terms of what is provided as part of the standard subscription. The resulting cost can be high, though Software AG is working to clarify how it reduces total cost of ownership, particularly for services.
- The majority of Software AG's customer base are in the manufacturing segment. Software AG has less-developed but growing expertise and experience in the utilities and transportation segments.
- Software AG's strongest market geographically remains Europe. Although the vendor has global representation, its current presence in Asia/Pacific is relatively small.

Vendors Added and Dropped

We review and adjust our inclusion criteria for Magic Quadrants as markets change. As a result of these adjustments, the mix of vendors in any Magic Quadrant may change over time. A vendor's appearance in a Magic Quadrant one year and not the next does not necessarily indicate that we have changed our opinion of that vendor. It may be a reflection of a change in the market and, therefore, changed evaluation criteria, or of a change of focus by that vendor.

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Added

- ABB
- Envision Digital
- Knowledge Lens
- Siemens

Dropped

These tech providers shifted their business strategy to require a joint sale of their IIoT platform and their application software. They thus fell out of our inclusion criterion that the IIoT platform be sold independently of any other hardware or software outside of the defined IIoT platform.

- GE Digital
- IBM
- Oracle
- QiO

Inclusion and Exclusion Criteria

To qualify for inclusion in this Magic Quadrant, each vendor had to meet the following criteria:

- Be an IoT platform supplier to asset-intensive industries. The IoT software platform tendered for consideration must be generally available and in production deployments in at least two defined industrial sectors. For this evaluation, Gartner has identified the following allowed sectors (and allowed subsectors) as representing asset-intensive industries:
 - Manufacturing and natural resources, including the subsectors of equipment and other discrete manufacturing, automotive and vehicle manufacturing, pharmaceuticals, agriculture, food and consumer process industries, chemicals, metals and other industrial process manufacturing, and other manufacturing
 - Transportation, including the subsectors of air transport, motor freight, rail and water, warehousing, couriers and support services
 - Energy and utilities, including the subsectors of electric and gas utilities, energy resources and processing, pipelines and water utilities
- The IIoT platform must be able to deliver and support the following capabilities in a single bundled offering, across a distributed architecture:
 - Analytics
 - Device management
 - Integration
 - Data management
 - Application enablement and management
 - Security

- The provider may include, via a formal ongoing partnership(s) with other software vendors, portions of the IIoT platform capabilities. The vendor must demonstrate purpose-built integration, and support for scalability and interoperability relating to partnered IIoT platform capabilities. Partnered solution capabilities can include IaaS and PaaS elements from third-party cloud service providers. If the predominance of the intellectual property that comprises the IIoT platform is derived from third parties, then the partnered software functionality or capabilities must only be accessible by the evaluated vendor's own APIs. Evaluated vendors cannot consider third-party software sold under a separate contract as an IIoT platform functionality or capability.

- The general availability (GA) date for the IIoT platform must be 19 April 2021 or earlier. We also offer the following enhanced guidance relating to product releases:
 - Product releases occurring between 20 April 2021 and 25 May 2021 will be considered, but vendors will need to inform us of all impacts of the release(s) at the RFP level (vendor survey) occurring within this window. Rating for impacted functionality may be based solely on analyst opinion.
 - Product releases after 26 May 2021 will not be factored into scoring and may not impact positioning on the Magic Quadrant.
 - Major events, such as mergers and acquisitions, occurring after 26 May 2021 will be assessed for impact to influence Magic Quadrant positioning.

- The IIoT platform must be saleable as an independent purchase without requirements for companion hardware or software purchases. Similarly, purchase of the IIoT platform should not be contingent on an existing asset base of vertical applications, software or hardware (e.g., MRO, PLM, APM, EAM, MES, DCS, ICS, SCADA, historians). However, the IIoT platform can take advantage of an existing legacy installed base, provided it also connects to other third-party applications.
Note: Stand-alone IoT-enabled applications and SaaS are not considered part of this market and do not meet the inclusion criteria. Stand-alone IoT-enabled applications and SaaS will be considered an element of Vision, but not considered within Execution (e.g., Product/Service Evaluation Criteria). Manufacturers considered for inclusion within this Magic Quadrant must offer value to the equipment of other manufacturers. At least 30% of assets under management by manufacturers of IIoT platforms must be outside of their own product lines.

- Each vendor must have 75 customers that have deployed GA versions of the IIoT platform in production. These customers must demonstrate data acquisition, ingestion and analysis from industrial assets, from a diverse set of OEMs, in industrial environments for industrial companies.
- Each vendor must have, at a minimum, 250,000 industrial IoT endpoints that can span servitized industrial assets (see below) connected to its platform across the installed base of customers. At least 10,000 of these must be industrial gateways. **Note:** An IoT endpoint enables equipment, assets or other objects to participate in one or more IoT solutions. There are three characteristics of an IoT endpoint when it is enabling an asset or object: (1) sense or activation capabilities; (2) compute (at a minimum data acquisition and control functions); and (3) communication. Gateways may have sense/actuation capabilities, but must provide some compute (even if this is fundamental message filtering and formatting) and communication.
- Each vendor must have four unique customers operating the platform in production in at least three major geographies (in the North America, European Union, Latin America, Middle East and Africa, and Asia/Pacific regions).
- The product must be available in all of the designated deployment models: cloud-only, hybrid edge-cloud, on-premises. For on-premises deployments, Gartner will accept containerized solutions where all solution elements are available and the system is able to operate in a disconnected scenario for extended periods of time.
- Offer, directly or through partnerships, professional services (installation, implementation and integration) and support services (help desk, product support, sustaining engineering) in at least three major geographies and three major languages (such as English, German, Mandarin, Arabic or Spanish).
- The vendor product must provide the features and capabilities to secure the IIoT platform. The IIoT platform must also offer (organic or partnered) secure functions and capabilities at critical integration points: edge to platform, and platform to applications.

Honorable Mentions

The evaluation process identified more than 40 vendors that were excluded from this Magic Quadrant, but each has forward-looking or specialized value for industrial enterprises. Application and software engineering leaders have myriad choices for their IIoT platforms beyond the cohort of vendors evaluated herein.

It is important to note that the exclusion of any vendor from this market evaluation is not a de facto assessment that the excluded vendor cannot provide value to industrial enterprises. Exclusion is a function of nonconformance with the inclusion criteria established, which is based on Gartner's view of the evaluated market. Upon determining the criteria, Gartner seeks to evaluate vendors that are relevant and extensible to as many Gartner customers as possible. This evaluation of IIoT platforms focuses on a small number of providers that meet Gartner's inclusion criteria for this Magic Quadrant cycle. Other vendors merit consideration in any due diligence for IIoT solutions.

The following vendors are presented based on platform capabilities, experience with industrial enterprises, and an ability to create related value.

Advantech

Advantech's IoT offering spans a range of required IIoT platform components for industrial enterprises, with a strong presence throughout Asia and clear focus on manufacturing. The company did not meet the Magic Quadrant criterion for offering the platform in at least three major geographies and demonstrating its capabilities with four unique customers in each of these geographies.

Covacsis

The Covacsis IoT offering spans a range of required IIoT platform components for industrial enterprises, with a strong presence in India and focus on manufacturing. The company did not meet the Magic Quadrant criterion for offering the platform in at least three major geographies and demonstrating its capabilities with four unique customers in each of these geographies.

Vodafone

Vodafone's IoT offering spans a range of required IIoT platform components for industrial enterprises, with a strong presence in Africa and Europe. The company did not meet the Magic Quadrant criterion for offering the platform in at least three major geographies and demonstrating its capabilities with four unique customers in each of these geographies.

Xugong TEC

The Xugong IoT offering spans a range of required IIoT platform components for industrial enterprises, with a strong presence in China. The company did not meet the Magic Quadrant criterion for offering the platform in at least three major geographies and demonstrating its capabilities with four unique customers in each of these geographies.

Evaluation Criteria

Ability to Execute

Gartner evaluates vendors on the quality and efficacy of the processes, systems, methods or procedures that enable IT provider performance to be competitive, efficient and effective. Vendors are also rated on the ability to positively impact revenue, retention and reputation within Gartner’s view of the market.

Providers are judged on their ability and success in translating market requirements – and their vision for the market – into products that match market needs and enable clients to achieve a successful outcome with minimal risk.

Table 1: Ability to Execute Evaluation Criteria

<i>Evaluation Criteria</i> ↓	<i>Weighting</i> ↓
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	High
Market Responsiveness/Record	Medium
Marketing Execution	Low
Customer Experience	High
Operations	High

Source: Gartner (October 2021)

Product/Service

This criterion includes the core products and services that compete in and/or serve the defined market for IIoT platforms. This includes current product and service capabilities, quality, feature sets and skills. These can be offered natively or through some OEM agreements or partnerships, as defined in the Market Definition/Description section and detailed in the subcriteria. The subcriteria for this evaluation criterion are analytics, IoT edge device management, integration, data management, application enablement and management, and security.

Overall Viability (Business Unit, Financial, Strategy and Organization)

Viability includes an assessment of the organization's overall financial health, as well as the financial and practical success of the business unit. This evaluation criterion views the likelihood of the organization to continue to offer and invest in the product. Additionally, this criterion works to understand the product position in the current portfolio and within the company's strategic view of IIoT. Ultimately, IIoT must relate to digital business strategy and the digital optimization and transformation of its customers.

Sales Execution/Pricing

This criterion includes the organization's capabilities for presales activities and the structures and tools that support them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of sales channels. Gartner is especially interested in the sophistication and efficacy of the company's indirect channel to enable resellers, integrators and outsourcers of IT and OT to extend the company's platform to asset-intensive companies.

Market Responsiveness and Track Record

This criterion includes the vendor's ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve, and IIoT market dynamics change. This criterion also considers the vendor's history of responsiveness to changing market demands.

Marketing Execution

This criterion involves the clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to:

- Influence the IIoT market

- Promote the brand
- Increase awareness of products
- Establish a positive identification in the minds of customers

This “mind share” can be driven by a combination of publicity, promotional, thought leadership, social media, referrals and sales activities. Gartner views successful engagement of developers, standards bodies, industry consortia and related organizations as key capabilities.

Customer Experience

This criterion includes IIoT products and services and/or programs that enable customers to achieve anticipated results with the products evaluated. Specifically, this includes quality supplier/buyer interactions, technical support or account support. It may also include ancillary tools, customer support programs, availability of user groups and service-level agreements. Considered within this criterion are efforts to educate and transfer knowledge and insight to the market, including users, partners and the growing community of industrial-specific IoT developers.

Operations

This criterion involves the ability of the organization to meet goals and commitments of industrial enterprise customers. Factors include the perceived quality of the organizational structure, skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently. Investments in tools, support structures and marketplaces are considered essential elements in this criterion.

Completeness of Vision

Table 2: Completeness of Vision Evaluation Criteria

<i>Evaluation Criteria</i> ↓	<i>Weighting</i> ↓
Market Understanding	High
Marketing Strategy	High
Sales Strategy	Medium
Offering (Product) Strategy	High
Business Model	Low
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Low

Source: Gartner (October 2021)

Market Understanding

This criterion involves the vendor’s ability to understand customer needs in asset-intensive industries and translate them into products, services, and market awareness and trust. Vendors meeting this criterion show a clear vision of their market – listen and understand customer demands – and can shape or enhance market changes with their added vision through the following:

- Product and service development
- Effective market conditioning and awareness
- Innovation spanning platform functionalities
- Business practices creating greater overall demand

Marketing Strategy

This criterion looks for clear, differentiated messaging consistently communicated internally and externalized through social media, advertising, customer-facing programs, partner programs and positioning statements to generate platform recognition and positive brand regard in the IIoT platform market.

It also includes the vendor's ability to either identify opportunities to expand adoption through geographic expansion, or identify the underserved or poorly served market subsectors and unique business requirements through microsegmentation analysis and outreach.

Sales Strategy

This criterion involves a focused and structured strategy for selling IIoT platforms. The strategy identifies the appropriate channel mix, including:

- Direct and indirect sales
- Marketing and business development
- Direct and partnered service delivery (partner-led, co-delivery and private label)
- Supportive communication

Developing sales and value-added service partners and market alliances, all of which extend the scope and depth of market reach, expertise, technologies, services and their customer base, is a key consideration.

Offering (Product) Strategy

This criterion includes an approach to IIoT platform development and delivery that emphasizes market differentiation, functionality, methodology and features as they map to current and future requirements for asset-intensive businesses.

Business Model

This criterion includes the design, logic and execution of the organization's business proposition to achieve continued success in selling IIoT platforms to asset-intensive industries.

Vertical/Industry Strategy

This criterion involves the vendor's strategy and approaches to direct resources, skills and products to meet the needs of industrial market segments and industry subsectors within manufacturing and natural resources, utilities, and transportation and logistics.

Innovation

This criterion involves the direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or preemptive purposes to:

- Secure the trust and business of asset-intensive industries
- Apply IoT to internal operations
- Extend product capabilities and services into adjacent and new industrial use cases

Geographic Strategy

This criterion involves the vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography. This may be achieved either directly or through partners, channels and subsidiaries, as appropriate for that geography and market.

Quadrant Descriptions

Leaders

Leaders invest in, and shape, the future of IIoT. Leaders perform skillfully and often exceed expectations regarding outcomes achieved with their technologies and services. The companies within the Leaders quadrant bring to market a stable IoT business unit and a cohort of lead executives with relevant IIoT experience aligned with the overall corporate strategy and vision.

Leaders combine an insightful understanding of the realities of the IIoT market, a results orientation, the ability to influence the market's direction, and the capability to grow with customers. In the IIoT platform market, Leaders not only have a clear vision of the market's direction, but also develop and bundle targeted competencies and capabilities for sector-specific requirements on a global and local basis. This means they consistently market and sell an IIoT platform as a single solution to any asset-intensive subsector for industrial use cases. This includes services, capabilities and functions essential to those markets they serve (for example, protocol and regulatory support and conformance). The vision and execution of Leaders are evident in the platform's ability to integrate and interoperate with a broad and diverse installed base of industrial assets, OT systems and IT/OT independent software vendors. Four vendors are rated as IIoT platform Leaders this year.

Leaders help customers, partners and their ecosystem through:

- A focus on customer success, using the metrics of the industry they work in.
- Providing a consistent set of solutions and technologies across cloud-based and on-premises deployments that leverage both custom development or development via marketplaces for microservices, apps, connectors, and more.
- Thought leadership via internal sector-specific use case frameworks and methodologies, as well as via active participation in multiple industry consortia and trade groups.
- Formal technology alliances and service partnerships to facilitate integration and interoperability with third-party IT and OT hardware and software.
- Accommodate unique customer requirements with flexible engagement models and business development activities, and provide value across multiple geographies.

- Engendering trust by presenting numerous compelling and complex industrial reference customers and case studies in industrial environments to the market and prospects.
- Augmenting and/or replacing functions of legacy closed-loop control and automation systems, as well as augmenting and/or replacing industrial enterprise applications, such as MES, EAM and APM.

Customers should note that a Leader is not always the best choice. A focused, smaller vendor can provide excellent support and commitment to suit individual needs. Other vendors may provide a certain capability – such as enhanced security or expertise in a specific submarket like pharmaceutical manufacturing – that is important to your organization.

Challengers

Challengers have excellent IIoT platform technical abilities, but they have to continue to build and grow their vision. Challengers perform skillfully across multiple business-driven use cases and industrial subsectors, often meeting or exceeding expectations regarding planned outcomes achieved with their technologies and services. Challengers bring to market a consistent set of technologies across cloud-based and on-premises deployments. One vendor is rated as an IIoT platform Challenger this year.

Challengers have an emerging and coalescing vision of the market's direction. They develop competencies expressed more in adjacent, value-added application capabilities such as digital business, fleet management or use-case-specific analytics “applets,” rather than end-to-end horizontal IIoT platforms/suites. Challengers choose a narrower path to sell their IIoT platforms to a targeted number of asset-intensive subsectors, rather than a broad cross-industrial focus. They transfer knowledge to customers, partners and prospects through a deep and broad library of sector-specific use case frameworks and methodologies.

Challengers have the organizational capabilities and scale to pursue and win multinational opportunities for IIoT consistently. These opportunities are global in terms of supporting referenceable enterprises that build digital solutions using the IIoT platform of the provider in at least three regions.

Visionaries

Visionaries in a market are innovators that drive the market forward by responding to emerging, leading-edge customer demands and by offering new opportunities to excel. Alternatively, these Visionaries have a clear view of the market's requirements and direction, and help drive their customers to new opportunities. Visionaries provide differentiated value in targeted IIoT platform elements to meet the current and future market needs. This year, only one company is a Visionary.

Visionaries provide a broad continuum of business value in the form of technologies or business and operational models. They expand their capabilities through acquisition, internal development and, increasingly, robust partnering. They must extend market adoption through service delivery partnerships and technology alliances (for example, resell and OEM agreements). Additionally, these vendors must show insightful understanding of market trends and visionary marketing, sales and related product and business management strategies.

Visionaries should eventually grow to become IIoT platform Leaders. Alternatively, they may decide to limit their target markets to focus on their core competencies in technologies, vertical markets and use cases, and become Niche Players. They may also develop their broad portfolio of competencies to advance in execution and become Challengers.

Niche Players

Niche Players focus successfully on a set of products and services and, often, focus on a narrow set of industry use cases. Niche Players focus on the IoT platform to support legacy or new applications and SaaS capabilities. Niche Players can show sales and marketing success in a limited number of industrial enterprises in regional markets or, often, dedicate only a portion of sales and marketing resources to newer, stand-alone IIoT platform opportunities. There are 12 Niche Players in this year's Magic Quadrant. They:

- Approach the market from an analytics perspective, and are building up their industrial IoT capabilities.
- Need to expand their execution capabilities or geographic reach.
- Exhibit a vision that is not market-leading or focus on a subset of use cases.
- May be in transition from other markets. Generally, to progress in this market, they need to focus and invest more extensively in industrial IoT.

Niche Players are still very much viable providers of IIoT platforms. They often represent the best choice for a specific category of buyer, or for a particular use case. They typically offer specialized vertical equipment sector expertise, focused support practices, flexible terms and conditions, lower costs, and dedication to a particular market segment and its customers.

Context

Gartner customers should not use this Magic Quadrant alone as a tool for vendor selection. This Magic Quadrant presents a view of an emerging market. Our analysis and opinion emerge from Gartner's unique ability to engage in user dialogue and to research the industrial enterprises across all subsectors and the vast landscape of competitive vendors. Gartner presents this modified and differentiated definition of the generalized IoT platform to reflect the segment of the IoT market where most of the high-impact, high-value investigation and net new adoption is taking place.

Because of this definition, historical comparison with Magic Quadrants from previous years (to assess vendor capabilities) is strongly discouraged for projecting capabilities for industrial-specific use cases and driving bid opportunities for vendors not evaluated.

Readers should pay careful attention to the Quadrant Descriptions section to understand the qualities of each quadrant provider type, and to determine the gaps between player types when considering vendor engagement. It is essential to determine the most essential provider attributes laid out in the Quadrant Descriptions section and align those with the enumerated Strengths and Cautions of individual vendors.

Gartner advises that platform due diligence, bid solicitation and selection decisions move in parallel with analyst inquiry engagement. Additionally, readers must keep up to date with forthcoming reference model documents and other IIoT-centric research.

For insight into vendors considered outside of this Magic Quadrant evaluation, see the Honorable Mentions section. Otherwise, this Magic Quadrant is a summary of Gartner's current perspective and research on this market, with a focus on platforms for the IoT dedicated to asset-intensive industries.

Market Overview

Industrial IoT Is Evolving Toward a Results-Focused Market

Industrial enterprises are acquiring IIoT platforms to either solve business challenges or drive opportunities. As such, this shifts the buyer mentality from a technologist looking to solve interesting problems toward business or operations leaders with specific tasks to solve. While the technology remains fundamentally important, buyers are more interested in whether it works, and that it works at scale.

IIoT platforms are increasingly judged by this requirement, which drives technology providers to focus on technology solutions that integrate well with legacy assets, or that use modern sensors or historians to simplify the integration challenge. Providers also work on improving their solution's user interface and user experience for developers to improve the developer's overall productivity.

Beyond that, the focus is on the business objectives. As such, most end-user enterprises, and the technology providers that serve them, are shifting toward outcomes. For practical purposes, this has translated into a shift toward including investments for more robust application enablement capabilities and analytics within the IIoT platform. This includes packaged business capabilities (PBCs) to deliver specific value, such as leak detection or asset tracking or orchestrating technicians. In addition, the technology providers are expanding their ecosystem of third-party independent software vendors (ISVs) to better serve their customers with key applications and enhanced analytics.

The Future of IIoT Requires a Hybrid Edge-Cloud Approach

Industrial enterprises are demanding that IIoT platforms have the ability to ingest and process time series and batch data and events. The business process often has critical time requirements, so the data is processed with minimal lag (on a millisecond time frame). The IIoT platforms must integrate into a very heterogeneous set of equipment on site, industrial and other enterprise software deployed on the edge, and a variety of industrial systems such as historians and programmable logic controllers (PLCs). To do so requires a distributed computing topology with capabilities both in the cloud and on the edge. Engagement with industrial enterprises highlights a bonded interest in hybrid edge-cloud-based solutions so they can process information and make decisions. This makes the most sense for the enterprise. They also do this to integrate into enterprise-class systems that are based in the cloud, which can be accessed by a broad range of stakeholders and systems of record.

Gartner inquiry and engagement with industrial enterprises on a global scale also highlights that a significant fraction of the market is reluctant to adopt cloud-based IIoT platforms. These customers often choose to deploy hybrid edge-cloud-based IIoT platforms to leverage the best of both worlds. Edge-based solutions minimize lag issues and process data on the edge to optimize speed of use for local decisions. These edge capabilities use an event architecture to minimize the data that is sent to the cloud, in order to reduce effort and cost. Edge-based solutions also align with enterprise needs to share local data with executives and drive cross-site decisions and comparisons.

Data Ownership Issues in IIoT

In addition to focusing on the challenges of connectivity, ingestion, storage and analysis of data, enterprises deploying industrial IoT solutions must also address a range of nontechnology issues. An increasingly critical consideration is data ownership – whether the customer deploying an IIoT solution has the rights to access, analyze and otherwise use data in the desired manner. IIoT solutions raise a key question – who owns the data?

This question is often completely ignored in contracts related to industrial assets and IIoT platforms, and at best is very unclear. Several different types of parties can potentially claim ownership of the data in an IIoT solution:

- The manufacturer of the industrial assets (which built the “things” generating the data)
- The IIoT platform provider (whose technology enables the ingestion, processing and analysis of the data)
- The owner/operator of the industrial assets and IIoT platform (which bought and implemented all the above and is in essence paying to achieve business outcomes from the data)

Enterprises deploying IIoT platforms must secure the rights to the data needed to support their desired business outcomes. This includes platform-generated artifacts derived from industrial sensor data, such as digital twins, ML models and other analytic outputs. Considerations of data ownership should always be included in evaluations of IIoT platform providers, and explicitly spelled out in contracts and licensing terms and conditions.

Additionally, the users of IIoT platforms must identify which parties have access to data and how the data is used by providers within the ecosystem. Where third parties are granted access to enterprise asset data as a function of product service by the OEM, or by various IoT technology providers such as third-party applications within the ISV's marketplace or gateways used as part of the IIoT solution, enterprises are urged to ensure that privacy-preserving techniques are used where possible.

IIoT Platforms Need to Invest to Meet Mainstream Five-Nines Availability Requirements

Users understand availability as a measurement of uptime from a connected sensor, across the communications layer and IT infrastructure to the app-driven event signal. IIoT platform vendors need to pay attention to availability.

Organizations are moving from a batch- and transaction-driven business model to an event-driven business model. In a batch-driven world, availability glitches cause data gaps that can be closed with validation, error and estimation functionality. In an event-driven world, availability glitches along the path mean that events could be lost, and some of the lost events might be critical information.

IIoT platforms need to measure, monitor and report their availability by component across all layers to create user confidence that will, in turn, drive IoT/OT convergence. Failure to pay attention to availability, from sensor to application event availability, will constrain IoT platforms to an optional investment to provide contextual data that might inform a maintenance decision.

Invest in Security in Order to Scale

When it comes to industrial environments, security concerns go beyond data confidentiality, integrity and availability — safety and reliability are also at stake. This is why security features and functionality should be central to all IIoT platforms. This means the security of the platform itself, but also the ability to deploy the platform without introducing additional risks to ongoing operations.

Industry standards, protocols and best practices must be embedded right from the start, and must adapt as threat vectors evolve. Whether protecting against IP theft or ransomware, IIoT platform vendors must continually stay abreast of security events. The best have teams of researchers actively looking for vulnerabilities and performing threat hunting, and have built-in security controls at all levels of the cyber-physical spectrum, from device to analytics.

Evaluation Criteria Definitions

Ability to Execute

Product/Service: Core goods and services offered by the vendor for the defined market. This includes current product/service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements/partnerships as defined in the market definition and detailed in the subcriteria.

Overall Viability: Viability includes an assessment of the overall organization's financial health, the financial and practical success of the business unit, and the likelihood that the individual business unit will continue investing in the product, will continue offering the product and will advance the state of the art within the organization's portfolio of products.

Sales Execution/Pricing: The vendor's capabilities in all presales activities and the structure that supports them. This includes deal management, pricing and negotiation, presales support, and the overall effectiveness of the sales channel.

Market Responsiveness/Record: Ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors act, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

Marketing Execution: The clarity, quality, creativity and efficacy of programs designed to deliver the organization's message to influence the market, promote the brand and business, increase awareness of the products, and establish a positive identification with the product/brand and organization in the minds of buyers. This "mind share" can be driven by a combination of publicity, promotional initiatives, thought leadership, word of mouth and sales activities.

Customer Experience: Relationships, products and services/programs that enable clients to be successful with the products evaluated. Specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programs (and the quality thereof), availability of user groups, service-level agreements and so on.

Operations: The ability of the organization to meet its goals and commitments. Factors include the quality of the organizational structure, including skills, experiences, programs, systems and other vehicles that enable the organization to operate effectively and efficiently on an ongoing basis.

Completeness of Vision

Market Understanding: Ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen to and understand buyers' wants and needs, and can shape or enhance those with their added vision.

Marketing Strategy: A clear, differentiated set of messages consistently communicated throughout the organization and externalized through the website, advertising, customer programs and positioning statements.

Sales Strategy: The strategy for selling products that uses the appropriate network of direct and indirect sales, marketing, service, and communication affiliates that extend the scope and depth of market reach, skills, expertise, technologies, services and the customer base.

Offering (Product) Strategy: The vendor's approach to product development and delivery that emphasizes differentiation, functionality, methodology and feature sets as they map to current and future requirements.

Business Model: The soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of individual market segments, including vertical markets.

Innovation: Direct, related, complementary and synergistic layouts of resources, expertise or capital for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: The vendor's strategy to direct resources, skills and offerings to meet the specific needs of geographies outside the "home" or native geography, either directly or through partners, channels and subsidiaries as appropriate for that geography and market.

Document Revision History

[Magic Quadrant for Industrial IoT Platforms - 19 October 2020](#)

[Magic Quadrant for Industrial IoT Platforms - 25 June 2019](#)

[Magic Quadrant for Industrial IoT Platforms - 10 May 2018](#)

Recommended by the Authors

Some documents may not be available as part of your current Gartner subscription.

[How Markets and Vendors Are Evaluated in Gartner Magic Quadrants](#)

[Survey Analysis: Focus on Practical Outcomes for IoT Projects](#)

[Emerging Technologies and Trends Impact Radar: Internet of Things](#)

[Tool: 50-Plus Digital Twin and IoT Cost Optimization Examples](#)

[Survey Analysis: Companies Heavily Use Digital Twins to Optimize Operations](#)

[What Should I Do To Ensure Digital Twin Success?](#)

[Video: The Future of IoT Is Combinatorial Innovation at the Edge](#)

[Architect IoT Using the Gartner Reference Model](#)

[Create an Optimal IoT Architecture Using 5 Common Design Patterns](#)

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Table 1: Ability to Execute Evaluation Criteria

<i>Evaluation Criteria</i> ↓	<i>Weighting</i> ↓
Product or Service	High
Overall Viability	High
Sales Execution/Pricing	High
Market Responsiveness/Record	Medium
Marketing Execution	Low
Customer Experience	High
Operations	High

Source: Gartner (October 2021)

Table 2: Completeness of Vision Evaluation Criteria

<i>Evaluation Criteria</i> ↓	<i>Weighting</i> ↓
Market Understanding	High
Marketing Strategy	High
Sales Strategy	Medium
Offering (Product) Strategy	High
Business Model	Low
Vertical/Industry Strategy	Medium
Innovation	High
Geographic Strategy	Low

Source: Gartner (October 2021)