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Magic Quadrant for Global Industrial IoT Platforms

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Global IIoT platforms are becoming the enterprise industrial data aggregator with advanced analytics capabilities to enable industrial data integration. CIOs and software leaders implementing IIoT platforms to connect traditional OT software systems with IT solutions will learn about which vendors do this best.

Market Definition/Description

This version of the Magic Quadrant for Global Industrial IoT Platform uses data gathered as early as April 2023. In February 2024, Gartner collected refreshed data to ensure we used accurate and up-to-date information for the Execution axis. We did not collect any other data regarding the Vision axis because Gartner believes a longer time frame is needed for vendors to bring their vision to the market, specifically for new products/offerings to be sold, embraced and fully integrated, and delivering value.

This document was revised on 29 April 2024. The document you are viewing is the corrected version. For more information, see the Corrections page on gartner.com.

The global industrial IoT platform delivers multiple integrations to industrial OT assets and other asset-intensive enterprises' industrial data sources to aggregate, curate and deliver contextualized insights that enable intelligent applications and dashboards through an edge-to-cloud architecture.

The global industrial Internet of Things (IIoT) platform market exists because of the core capabilities of integrated middleware software that support a multivendor marketplace of intelligent applications to facilitate and automate asset management decision making. IIoT platforms also provide operational visibility and control for plants, infrastructure and equipment. Common use cases are augmentation of industrial automation, remote operations, sustainability and energy management, global scalability, IT/operational technology (OT) convergence, and product servitization of industrial products.

The IIoT platform monitors IoT endpoints and event streams, supports and/or translates a variety of manufacturer and industry proprietary protocols, analyzes data in the platform, at the edge and in the cloud, integrates and engages IT and OT systems in data sharing and consumption, enables application development and deployment and 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.

The IIoT platform, in concert with the IoT edge and through enterprise IT-OT integration, prepares asset-intensive industries to become digital businesses by enhancing and connecting their core business with external business partners.

The IIoT platform may be consumed as software or cloud services, as a technology suite, or as an open and general purpose application platform, or in combination with analytics, application enablement, data management, device management, integration, and security functional capabilities. It is engineered to include the requirements of safety and mission criticality associated with industrial assets and their operating environments.

Must-Have Capabilities

The global IIoT platform must have the following capabilities:

- **Device management** — This function that enables manual and automated tasks to create, provision, configure, troubleshoot and securely manage fleets of IoT devices and gateways remotely, in bulk or individually.

- **Integration** — This function includes tools and technologies, such as communications protocols, APIs and application adapters, which address the data, process, enterprise application and IIoT ecosystem integration requirements across cloud and on-premises implementations for end-to-end IIoT solutions. IIoT platforms integrate into IIoT devices (for example, communications modules and controllers), IIoT gateways, historians OT systems (hardware, software and industrial apps) and enterprise applications (for example, ERP, materials requirements planning [MRP], supply chain management and CRM).

- **Data management** — This function includes capabilities that support:

  - Ingesting IoT endpoint and edge device data

  - Storing data from multiple industrial data sources like historians, data control systems and edge gateways

  - Providing data accessibility (by devices, IT, OT, engineering technology 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 the processing of data streams, such as device, enterprise and contextual data, to provide insights into asset states 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.

Standard Capabilities

The global IIoT platform should have the following capabilities:

- **Application enablement and management** — This function 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 capabilities, such as application platform as a service, include application-enabling infrastructure components, application development, runtime management, and digital twin and digital thread templates and instances. 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.

- **An edge-to-cloud architecture** — This a centrally managed cloud environment has established cloud service capabilities that are extended to edge environments. In a cloud-to-edge architecture, the cloud control plane — including security, value-added automation principles, governance, operations, programming models and interfaces, and other control elements — originates in the cloud and is then instantiated at the edge. There are some instances where AI is at the edge, and some control plane functions reside at the edge.

- **Data acquisition layer** — IT (including IoT) and OT endpoints for analytics and data sharing across various enterprise business applications and middleware that aggregate, analyze, contextualize and visualize data.

Magic Quadrant

Figure 1: Magic Quadrant for Global Industrial IoT Platforms

Vendor Strengths and Cautions

ABB

ABB is a Visionary in the Magic Quadrant. The ABB Ability Genix IIoT offering has a broad product portfolio that connects to industrial control systems, supervisory control and data acquisition (SCADA), PLCs, historians, ERP systems and other real-time data sources to monitor and analyze assets. ABB is headquartered in Switzerland and has a strong global presence with customers in 129 countries/regions. ABB's business model mainly relies on its customer base of more than 25,000 for other products and partnerships as well as the need for digital transformation. ABB Ability Genix includes the range of capabilities expected in an IIoT platform, and it has customers across most sectors and subsectors, except for air transport, freight and courier. ABB has added GenAI capability, including GPT-4. The new Genix Copilot for Azure embeds GenAI into the Genix platform and enables many industrial applications, such as predictive maintenance GenAI assistant, knowledge vault and services assistant, with a simplified user experience and rich contextualization.

Strengths

- ABB has a global presence that was initiated from its widely deployed hardware, but also extended to be hardware-agnostic. ABB Ability Genix has broad visibility within its base, and ABB can readily offer customer examples in all major global regions with the ability to scale globally.

- ABB's strong technology partnerships increase its availability and performance, such as its recently renewed Microsoft partnership that includes deeper integration of ABB Ability Genix into Azure infrastructure and applications services. ABB continues expanding its technology partners, now including Amazon Web Services, Huawei for cloud infrastructure and Red Hat for hybrid deployments.

- ABB has broad and deep experience with industrial assets and OT, and supports a wide range of deployment models. Genix collects data from operational, IT and engineering systems to provide a contextualized view of assets and processes. Genix Edge AI has demonstrated an ability to modernize and extend the life of industrial assets and enable extended automation.

Cautions

- Although ABB Ability Genix has significant deployments natively supporting device management and digital twins for both ABB and non-ABB hardware, Gartner client inquiries indicate that most equipment they manage with ABB's solutions are non-ABB devices, suggesting limited recognition outside ABB's own hardware customers.

- Although ABB has progressed considerably on the implementation partner ecosystem and developer programs, ABB primarily delivers digital services around its solution directly using its in-house experts globally. This will limit implementation choices for some customers and some regions.

- ABB has a global presence across most industries. However, in the transportation market, its focus is mainly limited to water/marine and e-mobility. Customers in the transportation space may find more capability and flexibility in other offerings.

Amazon Web Services

Amazon Web Services (AWS) is a Leader in this Magic Quadrant. AWS's IIoT platform consists of technologies and services categorized as edge devices, hybrid edge and gateways, AWS cloud infrastructure offerings, IoT SiteWise (industrial data management), analytics, AI and ML, digital twin (AWS IoT TwinMaker), visualization, and app enablement. AWS is headquartered in Seattle, Washington, and has a global presence with customers in 132 countries/regions. AWS is changing the current strategy of its IIoT platform and services to adapt to changing industry requirements focused on solving key capabilities such as IT/OT integration, edge/cloud models and interoperability with other solutions in AWS or other industry clouds.

Strengths

- AWS accelerated the scalability of its IIoT platform to cover multiple industries, such as discrete manufacturing, utilities (engineering, procurement and construction [EPC] and owner operators), consumer goods and process manufacturing, and transportation, by leveraging

industry-specific platform packaged business capabilities (PBCs). Enterprises are scaling their IIoT initiatives using a comprehensive list of vertically integrated solutions due to the agility and performance of the product functionalities.

- AWS has expanded its IIoT functional offering into sustainability, connected factory worker solutions, digital twin solutions and supply chain optimization. AWS is expanding its partner technology ecosystem with other IIoT platform providers as a "whitebox" platform solution, thereby further extending its platform capabilities to enable IT/OT/ET integration.

- AWS enhanced its partnership network delivery model by working closely with multiple service integrators in large-scale manufacturing transformation projects in manufacturing, asset and utilities industries.

Cautions

- Solution bundling and pricing is perceived as complex and expensive by end users, and often requires product mapping to connect and bind everything together in an RFP process. This can be done mostly by involving AWS solution specialists or specialized partners.

- AWS has a number of options, which creates complexity in the adoption and implementation process of the platform, posing a steep learning curve for implementation. Due to the same reasons, small-scaled enterprises struggle to get started on their IIoT implementation journey.

- The IIoT platform's general technical support and services are not optimal for small-scale enterprises, which have experienced limited attention in discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights.

AVEVA

AVEVA is a Niche Player in the Magic Quadrant. AVEVA IIoT Platform offers AVEVA Edge Data Store, AVEVA Adapters and AVEVA Connect (now CONNECT), which consists of AVEVA Data Hub and AVEVA Edge Management. AVEVA is headquartered in Cambridge (under the Schneider Electric parent company headquartered in France) and has a global presence, with customers in 38 countries and regions. AVEVA launched its AVEVA Data Hub solution in 2022. This solution focused its IIoT platform on extracting OT data from a few basic protocols, AVEVA PI Servers and downstream OT monitoring systems associated with AVEVA assets, such as AVEVA Historian and AVEVA System Platform. The common use cases AVEVA IIoT platform supports are remote asset management and monitoring, condition monitoring, connected fleet services, data science, and anomaly detection. AVEVA is in the midst of transitioning its 2020 acquisition of OSIsoft's assets, such as OSIsoft's digital solutions partners, to AVEVA partners, which currently includes more than 5,000 members.

Strengths

- AVEVA's acquisitions of OSIsoft and Wonderware contain entrenched historian database products within the manufacturing and energy client base. This large collection of time series data from a diverse set of industrial assets enables AVEVA Predictive Analytics and CONNECT solutions to deliver data insights.

- AVEVA's industrial automation strategy, large installed base, and technologies give the vendor opportunities to innovate a cloud, edge, and on-premises solution that supports and enables end users' smart manufacturing deployments.

- AVEVA Data Hub, a centralized cloud-native aggregator, ingests time-series data from its customer installation base of AVEVA PI Servers and AVEVA Historians to contextualize industrial data to align to customer's IT/OT integration strategies.

Cautions

- AVEVA lacks a feature-rich device management offering that can authenticate and manage industrial assets. It employs an edge connect framework approach, where enterprises can connect and discover assets with its open API framework, but any additional device management functionalities like provisioning, firmware updates and management would require additional software development.

- AVEVA IIoT Platform predominantly centers on its AVEVA PI Server installed base and other AVEVA assets. Non-AVEVA assets need to use protocols such as MQTT, OPC UA, BACnet, DNP3 and Modbus TCP, which will require custom integrations of the Open Message Format Connect framework when connecting to the AVEVA platform.

- Discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, indicate the pricing model for AVEVA Flex Credit has been perceived as inflexible and higher for existing PI historian-licensed subscribers that are switched to the SaaS-based Flex Credit pricing model.

Braincube

Braincube is a Challenger in this Magic Quadrant. Its main offering is delivered through the Braincube Smart IIoT Platform and its products, including Digital Twins, Advanced Analytics and AI, Studio, Data Flows Manager, and IoT Server. It has a well-stated marketing strategy across all channels. Braincube has headquarters in France, North America and Brazil, providing a global presence for customers. It is heavily focused on automated data treatment for manufacturing and natural resources, although it also has a solid utility business. The company leverages and differentiates itself by offering prebuilt components, including templates, applications and connectors, and well-reviewed services. The company uses its technology and these components to focus on customer priorities such as process control and optimization, autonomous factory, cost and scrap reduction, asset performance, identification of golden batch parameters, sustainability, and net zero. Braincube's customers are primarily in Western Europe, North America and Latin America. Key technology partners include AWS, Dell and Azure. Direct sales are its primary channel for distribution, although it does work on partner-led sales and implementation with firms such as Accenture, AVEVA and Tiama.

Strengths

- Braincube continues to build on its user interface and integration for the IIoT platform implementation and analytics for manufacturers, with positive feedback from customers on the user-friendly tool to create apps and improve upon processes.

- Braincube made investments at the foundation level and the solution level for its analytics and digital twins, ranging from improved ingesting and processing of large datasets to self-serve manufacturing digital twins, and to energy monitoring and control dashboards.

- Braincube has libraries of packaged business capabilities and modular apps to accelerate delivery of solutions to clients and shorten time to value.

Cautions

- Due to the limited number of Braincube's implementation partners, enterprises should be prepared to allocate IT and engineering teams for the setup and configuration process, on a global basis. This allocation of resources will help customize the Braincube solution and ensure integration with existing systems of record on-site.

- Transportation-focused enterprise customers will need to dedicate resources, including potentially scarce and/or expensive developers, to become proficient with Braincube's IIoT platform and develop IoT and analytics-powered business solutions.

- Enterprises implementing Braincube at sites outside its core markets in North and South America, and in Europe, will need to actively work with Braincube to identify implementation partners or train an enterprise team internally.

Cognite

Cognite is a Niche Player in this Magic Quadrant. Cognite's IIoT platform is centered on the Cognite Data Fusion, which collects, cleans and contextualizes industrial data. Cognite is headquartered in Norway, and has a strong global presence with global offices in 12 locations (Oslo, Stavanger, Austin, Houston, Tokyo and Riyadh). Cognite partners with Amazon, Google and Microsoft for its data services and data lake functionalities. Furthermore, Cognite partners with Agora, Litmus Automation, Microsoft and Rockwell Automation for its edge and device management capabilities. Cognite provides the API gateways to connect to partners' solutions and offers a singular contractual IIoT platform to the end users. Cognite's IIoT platform is predominantly deployed in the European and North American markets, particularly the oil and gas and process manufacturing industries.

Strengths

- Cognite offers a comprehensive industrial data management, contextualization and governance software solution based on its knowledge graph technology. The knowledge graph technology enables the staging of industrial data to be utilized by the digital twin and advanced analytics, as well as orchestrating industrial assets and intelligent dashboards.

- Cognite utilizes a 3D modeling capability as its industrial data management curation process as a data ops differentiator.

- Cognite orchestrates heterogeneous robotic machines as a part of its IIoT platform solution, with the intention of reducing management complexity for the robotic administrators. Robotics is an extension of Cognite's IIoT platform that is specific to field-service-type functions.

Cautions

- Cognite's IIoT platform consists of third-party partner capabilities such as Agora, Litmus Automation, Microsoft and Rockwell. Enterprises considering Cognite as their end-to-end IIoT platform provider would be confined to a limited set of implementation partners that have knowledge of both Cognite and third-party technology partners.

- Most industrial deployments are in oil and gas, and power generation and renewables. Customers in other sectors (manufacturing or transportation) will need to work with Cognite to develop business solutions optimized for their respective industries.

- Most Cognite IIoT platform deployments are in Europe, North America and the Middle East. Outside of Cognite's main geographical footprint, global enterprises will need to invest in people and potentially pay for local partners to be certified on implementing Cognite's IIoT platform.

Davra

Davra is a Niche Player in this Magic Quadrant. Davra is headquartered in Ireland and has a strong global presence, with customers in 100 countries/regions. Primary targets are selling and marketing to all global customers across subindustries. Davra's main customers are industrial equipment manufacturers and mining and transportation companies. Its customer base of more than 1,200 companies comes mostly from OEM vendors that embed Davra technology. Although Davra has a mature partner network, it is shifting efforts to reach customers directly. It differentiates through deployment flexibility and excelling in environments that have fewer devices producing large amounts of data. Davra has tilted its product strategy toward compliance and ISO standards, and advancement of low-code development for non-IT professionals. Davra now offers a LoRa Network Server and LwM2M server fully managed as part of the Davra platform. This reduces complexity of integration and the onboarding of LwM2M and LoRa devices.

Strengths

- A large customer base achieved through OEM relationships gives the company a broad presence and industry reach, although not necessarily direct firsthand customer knowledge.

- Strong partnerships with EY and AWS are broadening Davra's industry expertise and relieving resource constraints, while expanding deployment reach. These partnerships give Davra access to a wider range of customers and resources.

- Discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, indicate higher satisfaction scores due to Davra's dedication to IIoT solutions only, which prevents distractions and promotes solution results.

Cautions

- The reliance on OEM partners for embedded delivery has distanced the company from direct access to a large portion of customers, limiting the ability to expand the product into adjacent segments through customer interactions.

- Davra is most appropriate for embedding the technology of professional developers and OEMs in third-party solutions. Nontechnical users and process engineers might be challenged to use it directly without help from developers, but this may be alleviated by a focus on developing their own low-code capability.

- Although Davra's device management is currently limited in feature-rich capabilities, discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, indicate that partnering with a feature-rich third-party device management provider has been an advantage to managing industrial assets.

Eurotech

Eurotech is a Niche Player in the Magic Quadrant. Its global IIoT offering is intended to simplify edge complexity through both modular hardware and open-source-based software solutions. Eurotech is headquartered in Italy, and has a global presence with more than 100 customers. The offering is marketed and sold directly in the United States, Europe and Asia/Pacific. The offering is designed to be used in a variety of industries, with the largest customer segment being "other" at 40% (meaning industries leveraging the scope of this Magic Quadrant), followed by utilities at 16%. The offering is based on a number of open-source technologies, including Eclipse Kura (for edge environments) and Kapua (for data and device management), Red Hat JBoss AM-Q, JBoss Fuse, Elasticsearch and Cassandra. The pricing for the offering is based on the customer's needs and the size of the deployment. The IoT device/gateway middleware, Everyware Software Framework (ESF), is offered as a perpetual license or subscription on Eurotech hardware, a subscription on third-party hardware, or as a subscription on the data and device management platform (Everyware Cloud).

Strengths
- Eurotech has a long history of developing and deploying IoT, hardware, software and solutions, which gives it a deep understanding of the challenges and opportunities in this space.

- Eurotech's contribution to, support of and use of open source, particularly through the Eclipse Foundation, makes its platform flexible and adaptable to customer needs, which often results in easier integration to third-party technologies with containerized edge.

- Eurotech maintains strong partnerships across all major cloud providers and works to remain partner-agnostic, which can protect customers from vendor lock-in.

Cautions
- Eurotech's limited presence outside of Europe and the U.S. will make it less appealing for global companies, especially those headquartered elsewhere.

- Enterprises that require advanced analytic capabilities will require partners, third-party software or additional developers.

- Eurotech's IoT platform has limited-edge AI support, which will require additional third-party solutions and investments outside the Eurotech platform.

Exosite

Exosite is a Niche Player in this Magic Quadrant. It is headquartered in Minneapolis, Minnesota, and has a global presence with customers in 60 countries/regions. The analytics capabilities of the platform are packaged as ExoSense, primarily a condition-monitoring app with digital twin capability allowing domain-specific extensions. ExoEdge enables industrial protocol conversion capabilities to support the ingestion of OT data streams into the platform. Exosite approaches the market via direct sales to end users, but it emphasizes industrial OEMs in its go-to-market approach. The integration of Diode's zero trust solution in the Exosite platform provides a robust cyber-physical security solution. The majority of Exosite's deployments have been replacing home-built, connected product architectures with a robust and automated platform.

Strengths

- Exosite's purpose-built, low-code platform solution includes Murano IoT connectors and APIs, which enable application infrastructure libraries that enterprise product teams can use to shorten the time to develop smart, connected products.

- Exosite has built a marketplace of connected product templates, including condition-based monitoring, anomaly detection, environmental monitoring and energy management.

- Exosite follows a best-of-breed, third-party, open-source approach to security by working with companies like AWS, Diode, Intel, Microchip Technology and Synopsys for its cyber-physical security solution.

Cautions

- Exosite primarily focuses on selling to OEMs or replacing existing homegrown IIoT platforms. Exosite does not focus on providing solutions to enterprises looking to deploy IIoT-enabled business solutions across multiple sites and a variety of equipment types.

- Owner-operators would need specialized systems integrators and/or developers who understand operational processes and systems to develop IIoT business capabilities, which requires additional cost and time.

- Enterprises that are outside of Exosite's partner footprint in North America, Taiwan, Japan, Hong Kong and Europe will require additional investments in developing skill sets and business solutions.

Litmus

Litmus is a Niche Player in this Magic Quadrant. It provides an edge-first industrial IoT platform built around Litmus Edge and Litmus Edge Manager. Litmus is headquartered in Santa Clara, California, and has a global presence with customers in 107 countries/regions. Litmus Edge provides a quick path to data collection, with more than 300 native industrial connectors and machine analytics at the edge. Litmus Edge has developed industry-specific and generic solutions that are available to customers as part of the platform. Examples of implementations around

Litmus Edge include SparkplugB node, FANUC CNC, Common Vulnerability and Exploits as per NIST/NVD/Mitra databases and the Production Record Database. Technology companies and solution providers also offer white-labeled versions of the Litmus Edge platform.

Strengths

- Litmus Edge simplifies data collection, processing, and analysis at the edge before sending data to the cloud and other northbound data ingression systems. These have become repeatable processes where Litmus has shown quicker paths to ROI and reduced systems integrator dependencies for organizations.

- Purpose-built industrial edge capabilities from Litmus include instant connectivity, edge analytics and data models, and a prebuilt connector to cloud and business systems. Litmus has accelerated investments in the solution from discrete and large manufacturers, and hyperscalers and systems integrators, as part of its offering to manufacturing clients.

- With the company's multiple large manufacturing clients, including a number of double-digit plant implementations, scalability is a proven capability of the solution.

Cautions

- Limited application enablement development capabilities on the Litmus IIoT platform will impede application development of domain-specific dashboarding.

- Adopters of the Litmus Edge platform should note that the provider remains in the process of acquiring IEC62443, IS27001 and NIST critical infrastructure security standards while providing access control and deployment security features, as audited by third-party cybersecurity firms.

- More than 100 of Litmus' customers are from the manufacturing industry, with limited expansion into verticals such as utilities, transportation and logistics.

Losant

Losant is a Niche Player in this Magic Quadrant, and is focused on providing IoT product capabilities to OEM manufacturing markets across manufacturing OEMs, telcos and infrastructure providers. Losant is headquartered in Cincinnati, Ohio, and has a global presence with customers in 100 countries/regions. Losant provides a set of capabilities across connection, control, protection of equipment controllers, and sensors with observability and analytics that position OEMs to take actions that improve customers' experiences and business goals. Losant also has at least 200 application templates within its library so end users can utilize prebuilt applications to onramp new devices or software integrations. Losant IIoT platform also includes a low-code/no-code application builder that enables its rich 20,000 developer community to build industrial applications to deliver business value.

Strengths

- Losant's IIoT platform is optimized for OEMs working on developing smart, connected products.

- Its strong, low-code platform has a wide range of supported device connections and an extensive application template library.

- Losant's IIoT platform has a robust industrial data ingestion capability from certified devices and tags, allowing classification, and contextualization of industrial data for the purpose of extracting insights and computation for AI modeling purposes.

Cautions
- Energy, utility and transportation enterprises working to deploy Losant to drive sustainability or IT/OT integration or automation will find challenges with utilizing its IIoT platform capabilities due to its central focus on manufacturing and smart products.

- Outside Losant's target markets of OEMs, enterprises will have limited choices in partners to deploy IoT-enabled projects, and will need to train and allocate internal resources.

- Losant's deployments are predominantly cloud-based and particularly specific to the manufacturing industry. There is very little adoption in on-premises/edge environments and in transportation and utilities.

Microsoft

Microsoft is a Leader in the Magic Quadrant with Azure IoT, which capitalizes on Microsoft's broader platform and offers continuous cloud-to-edge computing capabilities. Microsoft is headquartered in Redmond, Washington, and has a global presence with customers in 108 countries. Microsoft provides cloud-to-edge services with a continuous fabric that connects the edge with cloud infrastructure, application services, developer tools, a SaaS-based data and analytics platform, AI, and IT operations management. Microsoft's Azure IoT platform combines edge operations with the cloud, binding the IIoT platform with cloud services, such as AI, digital twins, messaging and a SaaS-based analytics and data platform. Microsoft Copilot for Azure offers GenAI assistants to analyze information from IoT data sources supporting interactive insights and device management operations. Microsoft is focused on scaling its partnership engagements with a diverse partner ecosystem of OEMs, ISVs and SIs.

Strengths
- Scalability and ease of use of the Azure IoT platform makes it reliable and intuitive. The overall integration capabilities with the native Microsoft enterprise applications integrate with infrastructure as a service, security and collaboration applications. The core IoT applications are highly customizable.

- Microsoft has robust device management capabilities. A wide array of devices can be registered and connected with flexible application development functions to manage the devices. Monitoring endpoint devices is easy with seamless integration to Azure IoT in the cloud.

- Microsoft provides robust security solutions in its IIoT security architecture for direct cloud-connected and indirect edge devices in factories and for assets in the field.

Cautions

- Discussions with users of Gartner's client inquiry service, along with evidence from Gartner Peer Insights, indicate a lack of clear industry-centric business value delivered by the IIoT platform to the business unit and/or IT organization, given the cost of products and services.

- Enterprises consider the platform complex due to the vast number of services and product functionalities offered, especially for new customers creating inertia during the initial implementation stages. However, Microsoft is aware that organizations need a more simplified approach to their industrial transformations and has taken steps to consolidate IT and OT operations.

- Microsoft has a strong roadmap, but general availability of new functionalities can be slow, thus inhibiting time to value for enterprises to accelerate their digital transformation strategies.

PTC

PTC is a Visionary in this Magic Quadrant, focused on providing an integrated suite of IIoT-enabled digital transformation applications that enable closed-loop, model-based digital threads connecting data generated across the value chain in manufacturing. PTC is headquartered in Boston, Massachusetts, and has a global presence with customers in 100 countries/regions. PTC's IIoT platform consists of two primary software products, ThingWorx as an IIoT platform and Kepware for industrial connectivity. With the ServiceMax acquisition, PTC is looking ahead to accelerate its capability to manage assets and digitized field service management, closing the loop of a digital thread connecting the service life cycle with the product development life cycle. PTC offers off-the-shelf IIoT applications and accelerators.

Strengths

- PTC provides a stable and robust IIoT platform for discrete, batch and process manufacturers. The combination of Kepware as an industrial connectivity solution, ThingWorx as the IIoT application and Microsoft in a partnership makes it a strong option for all IIoT projects.

- PTC's product-life-cycle-centric IoT solution capabilities for remote services have increased with its acquisition of ServiceMax. The combining of ServiceMax and ThingWorx products through the acquisition bridges the gap between connected products and automation in field service management services.

- The ThingWorx IIoT platform offers prebuilt applications for manufacturing, engineering and service, leveraging IT/OT/ET integration to support a closed-loop, model-based digital thread.

Cautions

- Although PTC focuses investment on applied analytics, it has not made the same investment in general analytics and AI developments.

- PTC's ThingWorx is optimized for discrete manufacturing, whereas it highly prioritizes all manufacturing opportunities. Other industries like transportation, oil and gas, mining, and utilities have a lower priority and smaller deployment footprint.

- Discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, indicate challenges with PTC's onboarding and operations due to limited documentation and technical support, and the technical skills needed to deploy and integrate in nonmanufacturing instances.

Rockwell Automation

Rockwell Automation is a Niche Player in this Magic Quadrant. As a result of its March 2023 acquisition of Knowledge Lens, Rockwell Automation now offers a common platform that supports its FactoryTalk applications. The former Knowledge Lens UnifyTwin is now FactoryTalk DataMosaix Private Cloud, and its prebuilt applications portfolio helps workers connect and achieve operational efficiency. The bulk of its customers are brownfield sites, representing an installed base that enables Rockwell Automation to deliver solutions intended to optimize legacy industrial environments. The current strategy supports hybrid infrastructure with a cloud-based knowledge base for analytics, asset predictions and forecast models that also integrates human worker knowledge, as well as product knowledge.

Strengths

- Discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, suggest that FactoryTalk DataMosaix Private Cloud delivers significant value to manufacturers, including improved manufacturing yield and less equipment downtime.

- In Gartner client inquiries and Peer Insights, customers reported strong satisfaction with software functionality and ease of use.

- Discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, suggest a strong implementation and service model.

Cautions

- FactoryTalk DataMosaix Private Cloud is relatively new to field service industries, utilities and construction compared to its deep experience with manufacturers. Prospective customers must inquire with actual customer references within their own industry to ensure deployment experience.

- FactoryTalk DataMosaix Private Cloud's approach to global markets depends on partners more than direct sales and service, which can undermine communications and responsiveness to customers.

- Although FactoryTalk DataMosaix Private Cloud has security capabilities, the company needs to continue investing in adherence to standards like IEC 62443-4, which specifies process requirements for the secure development of products used in industrial automation and control systems.

ROOTCLOUD

ROOTCLOUD is a Niche Player in this Magic Quadrant. ROOTCLOUD is headquartered in China, where it has a strong global presence with customers in 112 countries. The company has an extensive installed base across asset-intensive manufacturers, along with utility, transportation and logistics sectors. ROOTCLOUD is the most visible IIoT platform provider to originate in China. The IIoT platform and related software enable real-time data collection, APM, PLM, intelligent services and analytics across the industrial value chain and ecosystem. ROOTCLOUD Edge is an on-premises, containerized edge-to-cloud capability that extends capabilities beyond acquire, process and analyze device data (things) to improve operations with edge AI through the Thing Model. ROOTCLOUD has a strong offering for organizations embarking on their sustainability journey.

Strengths

- ROOTCLOUD is focused on solving complex manufacturing problems by delivering owner-operator, OEM and smart product IIoT platform solutions.

- ROOTCLOUD has an assortment of diverse manufacturing and sustainable case studies, particularly on greenhouse emissions management, digital carbon monitoring and asset-specific operational efficiencies.

- ROOTCLOUD's technology roadmap incorporates AI-based software like GenAI, video analysis for quality inspection and knowledge graphs to monitor equipment health.

Cautions

- ROOTCLOUD has a limited number of implementation partners in Europe and North America. Enterprises in Europe and North America should work closely with ROOTCLOUD to optimize resources, time and people (independent of the vendor's) to get projects deployed on schedule.

- ROOTCLOUD's primary focus is on the manufacturing industry, although it does have a smaller footprint among transportation and utilities enterprises.

- Although ROOTCLOUD has been growing its global footprint and expanding its strategic alliances with companies like Microsoft and Tencent, its coverage remains concentrated in Asia and Europe. Clients outside Asia and Europe should seek third-party partnerships that are trained in and understand ROOTCLOUD's IIoT platform capabilities prior to deployment.

Siemens

Siemens Digital Industries is a Visionary in this Magic Quadrant. Siemens Insights Hub, formerly known as Siemens MindSphere, forms the Industrial IoT platform component of Industrial Operations X, the portfolio of capabilities in Siemens Xcelerator targeted for production. Siemens is headquartered in Munich, Germany, and has a global presence with customers in 161 countries/regions. Insights Hub and Industrial Edge are used for connected product and connected shop floor solutions to manage data from assets and operations. They extend the value of insights through industry solutions such as OEE, Energy Manager, Intralogistics, Quality Prediction, Asset Health & Maintenance, and Performance Insight. The Insights Hub Factory Twin solution offers innovative insights into production performance by integrating with simulation

models. Siemens' IIoT security standard is industry certified, such as ISO27001, IEC62443-4-1 and TISAX.

Strengths

- Siemens delivers Industrial IoT capabilities as either packaged business capabilities or SaaS solutions, and leverages its engineering and automation portfolio and expertise to develop a range of industry solutions for quicker time to value for clients.

- Insights Hub and Industrial Edge bring IT and OT data and integration into one framework where value-added industry IoT solutions and the ability to develop applications through low-code tools (Mendix) accelerate operational insights.

- Discussions with users of Gartner's client inquiry service, together with evidence from Gartner Peer Insights, indicate successful cross-support teams and customer success management, including reference selling, for Siemens. Siemens had also improved onboarding and sales processes for clients by enhancing the value proposition of its industrial IoT platform solution for smart factories and digital business transformation in general.

Cautions

- Ongoing marketing developments around Siemens Xcelerator, Industrial Operations X and Insights Hub have led to some confusion regarding Mindsphere's native capabilities and distribution among Siemens' industrial IoT platform offering, as indicated by discussions with users of Gartner's client inquiry service, along with evidence from Gartner Peer Insights.

- Siemens' pricing structure is in line with the total cost of ownership of feature-rich IIoT platform providers, but users of Gartner's client inquiry service indicate its product and service costs remain a concern due to scaling of the IIoT platform to accommodate the increasing requirements of lines of business.

- Siemens has a large presence in the manufacturing industry as it serves commercial manufacturing customers and supports its own manufacturing plants. Although it has a smaller footprint of customers in other markets like oil and gas, transportation, and mining, the manufacturing sector is its core industrial strategy.

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 and thin edge software. Software AG is headquartered in Darmstadt, Germany, and has a global presence with customers in 124 countries/regions. Software AG promotes commercial-off-the-shelf (COTS) capabilities that allow users to build their own technical architecture to drive business results. Software AG leverages its partner-first strategy in proliferating Cumulocity IoT among industrial hardware providers. Software AG has a solid customer base in manufacturing and a growing base in the transportation and utilities segments. In 2023, Cumulocity has an estimated 12 million endpoints connected to the platform.

Strengths

- Software AG offers full platform functionality and ease of deployment for both on-premises and cloud deployments with its Cumulocity IoT platform.

- Software AG has increased and embedded partnerships with industrial and technology providers like Phoenix Contact, KUNBUS, and AWS to co-develop thin edge and edge technologies together.

- The company has an end-to-end IIoT platform offering of device management, security, application enablement, data management, advanced analytics, and edge and cloud that is developed and built through acquisitions, partnerships and internal software investments.

Cautions

- Recent majority ownership and investment by private equity Silver Lake may change Software AG's strategic direction. As of this publication, Cumulocity IoT and industrial automation will continue to be a priority for Software AG.

- Cumulocity IoT's direct go-to-market is focused on connected-product use cases while it has a partner-led approach for owner-operator clients that utilize the platform for operational excellence-type use cases.

- Software AG's edge AI capabilities require AI-specific technology partners to further extend its edge solutions to enable AI use cases.

Univers

Univers, which was formerly named Envision Digital, is a Visionary in this Magic Quadrant. The company is headquartered in Singapore, serving global customers with a primary focus on Asia, Europe and North America. Univers emphasizes supporting customers' decarbonization, net-zero emissions journeys and sustainability objectives with its EnOS platform. Univers builds on its energy domain expertise with its EnOS Solution Suite for energy management, carbon management and device management. These are complemented by industry solutions for renewables, manufacturing, ports, transport and more. Univers leverages a composable approach to business solutions that starts with building blocks for device models, alarm rules or visualization templates, for example. Univers partners cover a broad spectrum, including Accenture, Advantech, AWS, Dassault Systèmes, Google, Microsoft and SAP.

Strengths

- Univers' focus on decarbonization and its net-zero carbon solutions aligns with customer sustainability initiatives and process improvement, and has led to the creation of ecosystem partners with complementary competencies.

- Univers' software platform minimizes implementation efforts and accelerates time to value through a combination of platform features, tools and specialized applications. These include data discovery tools, device connectivity and management, EnOS Edge, and i200+ protocol adapters for heterogeneous industrial assets and sensors.

- Univers is working to help enterprises accelerate their adoption of IoT-enabled sustainability solutions by creating new financing models for net-zero carbon models with financing partners, such as HSBC, that reduce the risk and expense for enterprises.

Cautions

- Univers' primary focus on sustainability and energy management solutions complicates internal enterprise communication and adoption of IoT-enabled projects where the enterprise focus is not on sustainability but rather on automation, IT/OT integration or asset uptime.

- Outside its core operations in Asia, North America and Europe, Univers has limited resources and partners to help enterprises deploy and scale IoT-enabled business solutions.

- Univers' EnOS platform for industrial data management has improved over the years but lacks an automated data modeling tool that can concatenate industrial instances like material, process, order and information data models together. Enterprises seeking an automated data modeling tool may need to invest in third-party alternate solutions.

XCMG HANYUN

XCMG HANYUN is a Niche Player in this Magic Quadrant. XCMG HANYUN is headquartered in China and has a global presence with customers in 86 countries/regions. XCMG HANYUN provides an IIoT platform to its parent industrial equipment company, to OEMs and to the industrial market as a whole. XCMG HANYUN customers require support for more complex edge-cloud environments, with its growing number of microservices and digital twins in its libraries. XCMG HANYUN is focused on global expansion, leveraging the parent Xuzhou Construction Machinery Group's (XCMG's) global equipment ecosystem along with key partners. While its customer base is centered in China, the company is making progress at expanding into the Middle East, Africa, Europe, North America and Latin America. Partners include AInnovation, Alibaba, France Telecom, Huawei, SAP and Vodafone.

Strengths

- XCMG HANYUN is capitalizing on the latest technology trends, including production process simulation, artificial intelligence, low-code technologies and enabling customers to create digital twins.

- XCMG HANYUN goes beyond the standard technology portfolio of many IIoT providers by enabling integrated IT/OT functionality, including manufacturing operations management (MOM), manufacturing execution systems (MES), supply chain management (SCM) software, and construction support.

- XCMG HANYUN invested in significant usability and diagnostic advances with its low-code/no-code technology and ongoing enhancements to analytics support.

Cautions

- XCMG HANYUN's international footprint remains modest where much of the sales and support outside of China is through partners. Non-Chinese prospects considering XCMG HANYUN must

determine if they will get sufficient service and local language support.

- XCMG HANYUN's cloud and cybersecurity strategy is still evolving. Prospective customers must run pilots to ensure flexibility, performance and cybersecurity are sufficient.

- Enterprises working with XCMG HANYUN will want to set up multiyear contractual terms for pricing as, discussions with users of Gartner's client inquiry service have historically indicated licensing terms and conditions and increasing licensing costs were dissatisfactory.

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.

Added

- AVEVA

- Cognite

- Losant

Dropped

Hitachi shifted its business strategy to service and solution-based offerings and the IIoT platform is no longer the focus of innovation. It does not meet inclusion criteria because it does not offer a complete bundled solution of all capabilities.

Inclusion and Exclusion Criteria

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

1. The vendor must be an IoT platform supplier to asset-intensive industries. The IoT software platform tendered for consideration must be generally available (GA) and in production deployments in at least three defined industrial sectors. For this evaluation, Gartner has identified the following sectors (and allowed subsectors) as representing asset-intensive industries:

- **Manufacturing and Natural Resources**: Subsectors are automotive, consumer nondurable products, energy resources and processing, heavy industry, IT hardware, life sciences and healthcare products, mining, oil and gas, and construction.

- **Transportation**: Subsectors are air transport, motor freight, pipelines, rail and water, warehousing, couriers and support services.

- **Utilities**: Subsectors are electrical, gas and water.

2. 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

3. The provider may include, via a formal ongoing partnership or partnerships 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 services 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.

4. The GA date for the IIoT platform must be 24 April 2023, or earlier. For enhanced guidance relating to product releases, product releases must be GA by 24 April 2023 in order to be assessed in the customer reference survey.

5. 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., including product life cycle management, asset performance management, manufacturing execution systems, industrial control systems, historians). However, the IIoT platform can take advantage of existing legacy installed bases, provided the IIoT platform 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 50% of assets connected to and interacting with the manufacturer's IIoT platform must be outside of their own product lines.

6. The vendor has 100 customers who 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. Among the 100 customers, the vendor must show both product services (product servitization

enablement) and owner-operator intelligent operations (outcome-based capabilities such as asset utilization, energy efficiency, process health, remote operations, global scalability, IT/OT integration, app enablement/production, and/or robotics automation) to show diversity of the capability enablement of the IIoT platform deployment. Other types of innovative enablement are welcome in lieu of the suggestions highlighted.

The IIoT platform has to be "in production," enabling product services and/or owner-operator intelligent operations (outcome-based solutions such as asset utilization, energy efficiency and process health). Other types of innovative outcomes are welcome in lieu of the suggestions highlighted.

7. The vendor must have a minimum of 12 unique customers operating the GA platform in production in each of three major geographies (such as North America, South America, Europe, Asia/Pacific, the Middle East or Africa) for a minimum total of 36 unique customers. Within the three major geographies, there must be a minimum of five certified implementation/migration partners per geo:

- Number and name of third-party certified develops

- Company name

- Type of certifications

- Number of trained engineers/developers on platform (by region)

8. The vendor must have, at a minimum, 400,000 industrial IoT endpoints, which can span industrial IoT endpoints connected to their platforms across the installed base of customers. At least 20,000 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.

9. The product must be available in all of the designated deployment models: cloud-only, hybrid edge-cloud, on-premises with microcontroller cloud/edge capabilities. 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.

10. 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 in at least three major languages (such as English, French, German, Mandarin, Arabic, Spanish, Japanese, Hindi-Urdu).

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. CIOs and IT 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 are 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.

Covacsis Technologies

Intelligent Plant Framework (IPF) offers implementation services of advanced analytics, AI/ML models, and IoT, with a strong presence in Asia and India markets. Covacsis partners with systems integrators to extend its market reach outside of its core geographic footprint. IPF is predominantly a manufacturing IoT platform that supports such use cases as quality improvement, yield production efficiency and production throughput resiliency. The company did not meet the Magic Quadrant criterion because it did not provide any customers in other subindustries such as transportation, logistics and utilities.

Inductive Automation

Inductive Automation's IIoT offering spans a range of required IIoT platform components for industrial enterprises, with a strong North America presence, plus partners for the rest of the world. It works with customers in manufacturing, both process and discrete, as well as water and power utilities. Typical projects involve integrating plant data to drive cost optimization or automation efforts. The company did not meet the Magic Quadrant criterion for offering the platform as a stand-alone solution without the need for acquiring third-party software sold under separate contract.

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

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

Source: Gartner (April 2024)

Product or 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/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 industry-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

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

Source: Gartner (April 2024)

Market Understanding

This criterion involves the vendor's ability to understand customer needs in asset-intensive industries and translate them into products, services, 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

This includes industrial enterprises' need for IoT-enabled sustainability, automation, remote operations or transformation of OT and industrial applications — at a global scale.

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 IT/OT integration and merger and acquisitions 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 with a large global footprint. 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). As well as additional applications, packaged business capabilities and

composable services that supplement the IIoT platform. 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 independent software vendors. Three 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. They also provide a consistent set of solutions and technologies across cloud-based, on-premises-based, and hybrid cloud-on-premises deployments that leverage both custom development or development via marketplaces for microservices, apps, connectors and more. Leaders provide IT/OT thought leadership within the internal sector-specific use-case frameworks and methodologies, as well as via active participation in multiple industry consortia and trade groups.They also form formal technology alliances and service partnerships to facilitate integration and interoperability with third-party IT and OT hardware and software.

Leaders can accommodate unique customer requirements with flexible engagement models and business development activities, and provide value across multiple geographies.They also engender trust by presenting numerous compelling and complex industrial reference customers and case studies in industrial environments to the market and prospects. Leaders also augment and/or replace functions of legacy closed-loop control and automation systems, as well as augmenting 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 and ability to execute, predominantly built for manufacturing use cases, but has a growing expansion to other submarkets. The challenger brings to market a consistent set of technologies across cloud-based and on-premises deployments. Only one vendor is rated as an IIoT platform Challenger this year.

Challengers have an emerging and coalescing vision of the market's direction. Challengers develop competencies expressed more in adjacent, value-added application capabilities, such as digital business, 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 current and future market needs. This year, four companies are Visionaries.

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 may 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 number of industrial markets. Often, they dedicate a small set of sales and marketing resources to newer, stand-alone IIoT platform opportunities. There are 10 Niche Players in this year's Magic Quadrant.

Niche Players approach the market from an analytics perspective and are building up their industrial IoT capabilities. They need to expand their execution capabilities or geographic reach. Niche Players exhibit a vision that is not market-leading and has a limited focus on a subset of use cases. Niche Players may be in transition from other markets, and, to progress in this market, they generally 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

This Magic Quadrant presents a view of the maturing industrial IoT platform market and excludes the commercial and consumer IoT platform markets. Gartner's analysis and opinion emerge from its unique ability to engage in user dialogue and to research the industrial enterprises across all subsectors and the vast landscape of competitive vendors.

CIOs should not use this Magic Quadrant alone as a tool for vendor selection. Since market conditions change, historical comparison with Magic Quadrants from previous years (to assess vendor capabilities) is strongly discouraged for projecting capabilities for industry-specific use cases and driving bid opportunities for vendors not evaluated.

Quadrant descriptions help to determine the gaps between player types when considering vendor engagement. CIOs should determine the most essential provider attributes laid out in the Quadrant Descriptions section and align those with the 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, CIOs must keep up to date with the relevant reference model documents and other IIoT-centric research.

Market Overview

IIoT Platform Market Adoption Shifting From Custom-Made Solutions to Mainstream Business Solutions

Previous generations of IIoT platform deployments were driven by large enterprises that dedicated significant resources to building out business solutions. This enabled the IIoT platform vendors to focus on building their technology instead of addressing customer needs for business solutions powered by IoT, and the need for implementation partners.

The current reality has shifted toward mainstream enterprises that need the IoT-platform-powered business solutions to address needs for corporate objectives as well as site objectives. These enterprises lack the level of resources and expertise the leading adopters were able to allocate for the IIoT business solutions. They require the IIoT platforms to be simpler to deploy, on a global basis, and to have a localized set of deployment partners that they can leverage. In addition, the total cost of ownership (TCO) story has to align well with the business value that is delivered, and this needs to be quantified to business buyer audiences that include the executives, site leadership, operations and IT teams.

Hyperscalers Emerging as Providers of IIoT Platforms From a Portfolio of Vendors

Industrial IoT platform and OT providers are partnering with hyperscalers to fill the cloud infrastructure gap within their IIoT platform product portfolio. The hyperscalers' strongest position is to provide the best IIoT platform capability to the marketplace, whether it be directly to the end users or partnering and white-boxing capabilities to existing IIoT platform and/or OT providers. Providers that partner with the hyperscalers are typically investing in domain-centric, value-added capabilities, like industrial applications and services that require an open architecture with embedded services. These providers do not have the skill sets, deep investment resources or agility to develop and deliver IIoT platform capabilities that the hyperscalers have built, so they partner to fulfill the capability gaps.

In several instances, domain-centric IIoT platform providers are partnering with the hyperscalers to provide device management, OT integration, data governance, cloud/edge and security capabilities, and white-boxing these third-party infrastructure capabilities as part of their own IIoT

platform solution. The domain-specific IIoT platform providers continue to invest in areas such as application enablement and domain expertise in the form of professional services and/or managed services to best deliver an end-to-end IIoT platform solution to the end users.

Industrial IoT Advancing Sustainability Goals

The use cases of industrial IoT supporting sustainability goals are rapidly expanding in multiple industries, such as discrete and process manufacturing, utilities and transportation. IoT technologies with smart edge monitoring solutions and intelligent tracking and reporting capabilities are helping organizations achieve decarbonization and environmental conservation efforts.

The renewable industries are accelerating their mission and vision by adopting IoT solutions to deploy smart edge technologies, enabling intelligent data collection at the asset level and creating new data monetization models. Renewable industries are critical to global sustainability strategies providing sustainable energy sources. The factories monitoring material waste, water utilization and energy consumption patterns using industrial IoT solutions comply with environmental sustainability goals because the data is accurate and in real time. Disparate sources such as equipment and sensors collect the data to monitor the sustainability parameters.

Increasingly, industries will need standard solutions and templates to jump-start their sustainability-based IoT initiatives. Industrial IoT platforms must leverage packaged business capabilities, providing speedy solutions and increasing the ROI opportunities in IoT investments. Advanced analytics and AI could add operational insights from assets by using edge-to-cloud IoT platforms. This can make information rapidly available for decision making for sustainability target improvements, with recommended solutions accelerating the business to adapt and adjust with the regulatory requirements. Almost all the vendors listed in this Magic Quadrant have emphasized adding capabilities that will advance the sustainability objectives of their customers.

IoT-Enabled Applications as the Next Generation of Industrial IoT

Some IoT technology and service providers are shifting from selling IoT platforms as lead products to vertical market applications enabled by IoT capabilities. This is due to a combination of the hyperscalers building platform-rich capabilities that IoT technology and service providers partner with and/or focus their domain expertise to intelligent applications. The shift from stand-alone IoT platforms to applications enabled by such platforms is an opportunity that builds on the benefits of platforms in orchestrating the management of devices, data, analytics and applications, integration, and security. It also extends and adds to the benefits of the IoT solution concrete and measurable business outcomes from applications. This shift resonates well with buyers focusing on end-to-end solutions from asset to edge to enterprise application, ensuring that insights do not remain siloed in discrete applications but become an integrated and actionable piece of data in the broader enterprise environment. Predictive maintenance (PdM) is a solution that is a good example of this.

As developments in the application space continue with microservices and packaged business capabilities, this application world becomes richer for CIO to explore. Consequently, the impact is

that the lead product for multiple vendors is no longer the stand-alone IoT platform, but the applications and services supported by the platform. IoT is represented by the stack of critical components, including the endpoints (devices), the platforms and enterprise applications. The figure also illustrates the shift in value from a platform-centric technology outcome model to more of an application-centric business outcome model. This shift is evidenced by the number of vendors, such as GE Digital, Hitachi Vantara, IBM and Oracle, that either no longer center their proposition on an IoT platform or have abandoned selling IoT platforms as separate products entirely.

Industrial Data Ops/Management Essential for IIoT Platforms

This global industrial IoT platform Magic Quadrant focuses on industrial data ops/management. As enterprises are transitioning to intelligent assets, applications and operations, industrial data becomes more relevant. IIoT platform providers like Cognite, Envision Digital and Amazon Web Services (AWS) are investing in industrial data management frameworks that properly tag and classify OT data at the point of ingestion. Once tagged and classified, industrial data can then be contextualized against multiple data sources and curated into actionable insights for dashboarding, hyperautomation and closed-feedback-loop, base-point decision making.

Traditionally, OT systems like SCADA or historians are closed-loop which creates a fragmentation and do not solve the industrial data ops/management problem. However, enterprises that build a comprehensive industrial management strategy lay the groundwork to enable digital capabilities like digital twins, advanced analytics and prebuilt visualization dashboards.

Data Acquisition and Management Capabilities Requiring Data Transportability

Enterprises are having difficulty transporting industrial data freely from one data source to the other or to another application based on platform-of-platform design patterns illustrated in Create an Optimal IoT Architecture Using 5 Common Design Patterns. CIOs should either inquire about the vendor or have the resources, capabilities and skill set to transport industrial data from one platform design pattern to the other without being metered or inhibited by the vendor's overall IIoT platform architecture.

Secure by Design as an Imperative

Industrial and critical infrastructure organizations are rapidly deploying large numbers of IIoT devices to optimize their automation processes using the data provided by these devices. Unfortunately, this trend is creating new security risks. The security of the connected IIoT devices often follows an "out of sight, out of mind" approach, while these devices can be used as stepping stones to eventually compromise an entire organization.

Because the IIoT devices are usually deployed in or around core value creation assets, if they malfunction, they halt production or derail missions. The more connected these assets become, the larger the attack surface. This increasingly makes these devices attractive targets for ransomware and targeted malware. Other risks include device hijacking, DDoS, device impersonation and device theft. Security features must therefore 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, such as IEC 62443, protocols and best practices, must be embedded right from the start, and must adapt as threat vectors evolve. In addition, due to the cyber-physical nature of IIoT devices, the impact of security incidents can be catastrophic and include shutdown of production, damage to the environment and even loss of life. The market has responded by developing technology to identify and secure devices outside the regular IT realm (see Market Guide for Operational Technology Security). Gartner considers OT as a form of cyber-physical systems (CPS). (See Market Guide for CPS Protection Platforms.)

Best-in-class industrial IoT vendors will exhibit the following security behavior:

- Proactively develop products with a secure-by-design mindset

- Actively participate in vertical industry security groups

- Maintain a close relationship with government entities in charge of cybersecurity information sharing and cross-industry coordination

- Have teams of researchers actively looking for vulnerabilities and performing threat hunting

- Have built-in security controls at all levels of the cyber-physical spectrum, from device to analytics and from fieldbus to cloud

- Demonstrate a security-conscious culture not just for their own devices and platform, but also to elevate the security posture of their clients

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.