

IoT and Digitalization

# **SPARK Matrix™:** **Industrial Internet of Things** **(IIoT) Platform, Q4 2022**

Market Insights, Competitive Evaluation, and Vendor Rankings

**December 2022**



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## Executive Overview

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This research service includes a detailed analysis of global Industrial Internet of Things (IIoT) Platform market dynamics, vendor landscape, and competitive positioning analysis. The study provides a competitive analysis and ranking of the leading IIoT Platform vendors in the form of the SPARK Matrix. This research provides strategic information for technology vendors to better understand the market supporting their growth strategies and for users to evaluate different vendors capabilities, competitive differentiation, and its market position.

## **An Introduction to Industrial Internet of Things (IIoT) Platform**

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The Industrial Internet of Things (IIoT) platform includes an integrated software suite that helps industrial organizations collect data and monitor, manage, and control the connected devices via applications built on the platform. IIoT platform provides capabilities to support various industrial use cases, including asset tracking & monitoring, predictive maintenance, and operational visibility & control among others, to support the complex industrial requirements of large asset-intensive organizations. The key functionalities of an IIoT platform include connectivity, application enablement & management, device management, data management & processing, analytics & visualization, integration, security, and user interface for users as well as developers.

The Industrial Internet of Things (IIoT) platform market is still evolving through the presence of multiple vendors with varying technological capabilities and market presence to serve a variety of industrial use cases. Most IIoT platform vendors focus on serving their specific target market and industrial application segments for verticals that include processing, energy & utilities, transportation, and others. To succeed in the industrial environment, IIoT platform vendors are making significant investments in expanding their capabilities through in-house developments, strategic acquisitions, partnership ecosystems, and robust industry-specific and use-case-specific out-of-the-box industrial applications.

IIoT platforms facilitate bulk device management and integrate a huge volume of data generated from sensors, devices, IIoT gateways, and others. The IIoT platforms combine all machine data from devices, network sites, and applications to generate insights using analytical capabilities to improve performance, identify bottlenecks and gaps in production & process, and identify quality issues. IIoT platforms are designed to fulfill the requirements of secure, safe, and sensitive data & processes within industrial assets and their operating environments. The distinct functions performed by IIoT platform includes monitoring IIoT event streams and endpoints, data analysis on both edge and cloud, integration of informational technology (IT) and operational technology (OT) systems, supporting various industry proprietary and manufacturer protocols, enhancing asset management life cycles, and facilitating application development & deployment.

IIoT platform assists industries in digitalizing processes, transforming businesses, and improving productivity, while reducing costs and resources. The main

advantages of deploying IIoT platforms are proactive asset management, predictive maintenance, real-time manufacturing visibility, reduced quality defects, and faster time-to-market. End users can select IIoT platforms based on parameters such as the platform's capabilities, end-user business model, internal use case, implementation strategies, and ability to support the desired use cases. When choosing IIoT platform providers, it is crucial to strike a balance between commercial and technological factors, such as adherence to standards-based technologies and participation in industrial ecosystems.

A detailed description of some of the key capabilities envisaged in every IIoT platform is given below:

- **Integration:** Seamless integration offers easy, secure, and cost-effective ways to integrate Industrial IoT devices & gateways, operational & information technology (IT/OT), cloud-based services, data, and applications over multiple networks to monitor, manage, and control various devices, and software applications & data sources across verticals. The IIoT vendors offer pre-built drivers, application programmable interfaces (APIs), and connectors or adaptors for effective integration of various devices on the shop floor and across other software portfolios such as product lifecycle management (PLM), customer relationship management (CRM), and enterprise resource planning (ERP) through a visual, a codeless, and an easy editable process. The integration capability is also extended to support edge-to-cloud integration, the third-party interface of devices and software into the IIoT platform through various database & device connectivity protocols, REST APIs, software development kits (SDKs), and socket-based/streaming sources. Additionally, IIoT security capability is integrated into the platform to provide restricted access, device security, and compliance standards.
- **Device Connectivity & Management:** The device management capability governs the entire aspect of the device lifecycle by providing end-to-end functionality designed to manage IIoT devices and their deployments with scalability. The device management functionalities include device planning & onboarding, device configuration & monitoring, device security, maintenance, and device retirement. The device connectivity uses different protocols, such as message queuing telemetry transport (MQTT), advanced message queuing

protocol (AMQP), Profinet, and Modbus as well as connectivity to IT systems using open database connectivity/Java database connectivity (ODBC/JDBC) and native Web APIs.

The device planning and onboarding function enables the operators to create metadata to support the bulk implementation of IIoT devices and use digital twins to store this data in the form of tags and properties. The device management functionality identifies and creates device credentials and manages native devices integrated into the system with a trusted platform module (TPM).

The device configuration functionality provides bulk configuration changes and firmware updates to all the IIoT devices connected to the platform, in addition to the device health monitoring. The device monitoring functionality provides real-time status of ongoing operations, device health, and geo-location. It also facilitates remote troubleshooting, alerts operators, and protects the IIoT environment. The clients can customize device configuration depending on the specific use cases that cater to industry-specific verticals.

The device update functionality offers over-the-air updates for every IIoT device, from sensors to gateway devices. With extended edge-to-cloud functionality, the device application supports a wide range of operating systems and enables easy fix options through updates and security patches. Some vendors use software content management to update their devices automatically based on predefined parameters such as location, software version, and dependencies. In the retirement phase, the device is either replaced or decommissioned based on the device data collected.

- **Data Management:** The data management capability governs data collected from sources such as devices, IT/OT systems, and cloud-based applications in real-time. It supports edge data management for processing & contextualising data to align with industry standards, making it conducive for analytical purposes by allowing it to be accessed by applications and users. The data ingestion and orchestration, along with robust data modeling through the digital twin functionality, helps to manage asset data, thereby reducing the time and cost. The IIoT platform encompasses artificial intelligence/

machine learning (AI/ML) modeling, restricted access control, and prebuilt applications for effective IIoT data management. The data management capability ensures secure communication of edge modules and configuration of metadata and cloud databases to retrieve and process data to deploy analysis in real time.

- **Application enablement & Management:** The application enablement & management capability assists the IIoT platform developers to build, integrate, manage, configure, monitor, secure, and customize applications. This capability helps in integrating hardware, software, and analytics into the IIoT system. The application enablement & management capability also supports low code development for faster application development. It promotes open platforms and extensibility through the use of python, Azure logic flow, Java, and Javascript. It also encourages clients to use public API and SDK to build and integrate applications into the platform. The back-end and front-end developing components for domain models, system connectors, domain logic, and user interface ( UI) widgets are used for effective application management for the IIoT platform. Application management also helps in enhancing configuration and simplifying application enablement on the platform. Vendors provide prebuilt applications, accelerators, and solutions that support a wide variety of customer use cases and offer multiple levels of configuration to tailor-made applications for customer-specific needs.
- **Security & compliance:** Security and compliance integrated into the IIoT platforms offer end-to-end security to both IIoT hardware and software, guaranteeing security, privacy, encryption, identity management, and access control. Security management tools can encrypt any key value from the application's configuration, such as database and licensing passwords. Additionally, security capability facilitates encryption of information, access control lists (ACL), and single sign-on, (SSO), and audits to trace activities of devices and applications and ensures compliance to regulations to promote security standards on the IIoT platform.
- **Analytics:** IIoT platform offers a full suite of native analytics capabilities such as descriptive, diagnostic, predictive, and prescriptive analytics that help clients harness the full potential of IIoT data for insights generation and data-based decision-making. Users can apply a

variety of analytics techniques within their solutions from threshold monitoring, data visualizations, statistical calculations, anomaly detection, overall equipment efficiency (OEE) & transformations, to advanced supervised and unsupervised ML along with the ability to integrate with in-house and third-party data models. IIoT platform vendors provide pre-built analytical models utilizing their domain expertise to fast-track deployment across commonly used equipment within different industry verticals.

The analytics capability generates different events and notifications for alerting users in case deviations or disturbances are identified during steady state or transient operating modes. It also triggers different workflows based on actionable insights for corrective action planning and recommendations. All analytics capabilities can be deployed on edge servers as well as on the cloud platform to ease scalability and functionality.

- **Mode of Deployment:** The different modes of deployment for IIoT platforms include on-premises, edge, and cloud. Vendors deploy IIoT platforms in the cloud through their partnerships with the leading cloud infrastructure providers to ease the scalability and flexibility concerns of their clients. The Edge deployment functionality is offered with the help of cloud microservices and edge modules along with proper infrastructure to run processes on edge. Some of the key capabilities envisaged in every IIoT Platform is given below:



## Competitive Landscape and Analysis

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Quadrant Knowledge Solutions conducted an in-depth analysis of the major IIoT platform vendors by evaluating their products, market presence, and value proposition. The evaluation was based on primary research with expert interviews, analysis of use cases, and Quadrant's internal analysis of the overall IIoT platform market. This study mainly includes an analysis of the following key vendors: ABB, Actility, Altizon, AWS, Braincube, Cisco, Davra, Envision Digital, Eurotech, Exosite, Flutura, Hitachi Vantara, IBM, Knowledge Lens, Litmus, Microsoft, PTC, ROOTCLOUD, Samsung SDS, Siemens, Software AG, and Telit.

PTC, Siemens, Microsoft, Software AG, and ABB are the top performers in the global IIoT platform market and next to it are Eurotech, Telit, and Litmus. All the above-mentioned vendors are the top performers in the global IIoT Platform market and have been positioned as the SPARK leaders.

PTC offers the Thingworx IIoT platform along with its in-house software solution, Kepware, to create a digital thread for connected operations and products across the enterprise. ThingWorx is a purpose-built IIoT platform to support industrial-grade performance in terms of connectivity, scalability, and security required for industrial use cases. ThingWorx provides comprehensive features, including industrial connectivity support, application development tools, analytics, security, augmented reality (AR), and integration with enterprise applications and cloud technologies that enable industrial organizations to develop, deploy, and manage IIoT solutions. These functionalities allow industries to securely connect assets and create innovative applications and services supporting digital transformation. ThingWorx offers a complete IIoT platform with end-to-end capabilities that enable end-users to address every facet of the digital transformation journey - connect, build, analyze, manage, and experience. Kepware offers software for industrial automation and the internet of things (IIoT) for effective industrial communication.

Siemens' MindSphere IIoT platform is a cloud-based open platform that integrates physical, web, and enterprise-based systems in one location and streamlines connectivity with its multi-tiered federated architecture. The platform supports all core capabilities of the IIoT platform, such as device management, data management, IIoT analytics, application management, digital twins, security, and cloud-to-edge to govern all aspects of the platform. Siemens MindSphere differentiates itself with edge capabilities & analytics, OOTB functionalities, low code capability, and marketplace. The platform also extends its capability by

integrating other third-party vendors, enterprise software, and cloud providers to offer various functionalities and flexible deployment options.

Microsoft offers the Azure IIoT platform as a suite of different modules to connect assets or environments, discover insights, and drive informed actions. Azure Industrial IoT integrates the cloud into industrial and manufacturing shop floors with industry-standard open interfaces such as the open platform communications unified architecture (OPC UA). Data transmission in the cloud enables Microsoft Azure to be used more rapidly and flexibly as feedback for developing transformative business and industrial processes. Some of the key components of Microsoft Azure that enable industrial organizations to develop, deploy, and manage IIoT solutions include Azure Cosmos DB, Azure Digital Twins, Azure IoT Central, Azure IoT Hub, Azure IoT Edge, Azure Machine Learning, Azure Sphere, Azure Time Series Insights, and Azure Percept. These functionalities allow quick connectivity between IoT devices and the cloud and offer centralized management to easily reconfigure and update devices from anywhere in real-time.

Software AG's Cumulocity is an independent device and application management IIoT platform that connects and manages all assets and devices. The platform can be deployed as a cloud service, at the edge or on-premises, with core capabilities such as device management, data management, application management analytics, and security. The platform offers real-time, automated, and complex analytics models through its Cumulocity IoT, TrendMiner, and Apama product portfolios. The platform extends its integration capability to support extensive device management & third-party integration through open APIs, firmware, SDKs, and a device management library. The Cumulocity platform addresses customer-specific requirements through its pre-packaged features, configuration, remote connectivity, and extensive security capabilities.

ABB Ability™ Genix Industrial Analytics and AI Suite is ABB's comprehensive suite that contextualizes and integrates diverse data across Operations Technology (OT), Information Technology (IT), and Engineering Technology (ET) for building performance management and AI/ML analytics capability, developing analytical applications, digital twin, and others. It empowers real-time data-driven decisions for sustainable operations. With a broad range of digital solutions, the IIoT platform enables businesses to automate, improve, and future-proof their operations to obtain maximum performance and propel long-term success.

Eurotech's IIoT solutions are based on the Everyware IoT platform, the company's integrated edge-to-cloud IoT architecture. Eurotech offers Everyware Software

Framework (ESF) for edge computing and Everyware Cloud (EC) as an IIoT integration platform at the data center level. Everyware IIoT offers OT Centric approach with seamless integration into the IT world. The company's open-source IIoT software has delivered major contributions to its platform, including Eclipse Paho, Eclipse Kura, and Eclipse Kapua. The platform seamlessly integrates end-to-end OT security with IT security. Eurotech's IIoT solution portfolio includes multi-service IIoT Edge Gateways, IIoT Edge Framework, and IIoT Integration Platform. Eurotech provides a holistic OT stack for IIoT solutions with powerful, enterprise-ready, and open-source IIoT software building blocks.

Telit's deviceWISE IIoT platform provides end-to-end IIoT solutions by creating overall visibility of all connected devices and data for improved quality in the entire manufacturing process. When integrated with deviceWISE EDGE, deviceWISE CLOUD, and deviceWISE VIEW, the platform offers a holistic integration of information & operation technology (IT/OT) that collects asset data and generates insights. The platform runs on edge logic, and its comprehensive design, deployment, and management features support scalability and solutions lifecycle. Telit secureWise offers secure end-to-end remote connectivity to its assets for effective monitoring and access management for semiconductor Original Equipment Manufacturers (OEMs).

Litmus Edge platform for IIoT unifies data, analytics, application enablement, and data integration into its platform to handle a complex set of operational/information technology (OT/IT) assets. Litmus Edge Manager manages the entire IIoT deployment with its centralized management capability for devices, data, applications, and machine learning (ML) models when deployed in the cloud or data center. Litmus offers features like remote device configuration and management, deployment templates, and the ability to visualize data from all devices and factories for large-scale IIoT edge deployment. Litmus Edge IIoT platform can be deployed in any OT or IT infrastructure and run on any edge gateway, virtual machine, or container (Docker, Kubernetes, and others).

Vendors such as IBM, AWS, Hitachi Vantara, Cisco, and Samsung SDS have been positioned among the primary challengers. These companies provide comprehensive technological capabilities and are rapidly gaining market traction across industries and geographical regions. Moreover, the other vendors in the IIoT Platform market include Altizon, Davra, Flutura, Envision Digital, Actility, Exosite, Braincube, Knowledge Lens, and ROOTCLOUD. These vendors are aware of the upcoming market trends and have laid out a detailed roadmap to capitalize on future growth opportunities by leveraging technologies and enhancing current capabilities to support a wide variety of customer-centric use cases.

The global IIoT platform market has many strong contenders, and the competition is bound to increase in the near future. With the continuously evolving global technology scenarios, faster digitization as well as digitalization, and compelling developments happening around the clock, the vendors need to keep up with the evolving requirements and customer needs. The impact of the COVID-19 pandemic on the operational cycles of organizations varies across different sectors globally, and the opportunities for growth and presenting solutions that truly make a difference in the global IIoT platform market are limitless. Hence, it is an open ground for IIoT Platform vendors, who could leverage the current situation to innovate and establish themselves further.

## Key Competitive Factors and Technology Differentiators

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The following are the key competitive factors and differentiators for evaluating Industrial Internet of Things (IIoT) platform vendors. While most IIoT platform vendors provide all the core functionalities, the breadth and depth of functionalities may differ from one vendor to another. Driven by increasing competition, vendors are increasingly looking at improving their IIoT platform capabilities and overall value proposition to remain competitive. Some of the key differentiators include:

- **IIoT Platform Architecture:** The IIoT architecture incorporates and governs all aspects of the IIoT platform, including hardware and software. The IIoT architecture consists of individual blocks of subsystems that cater to discrete services that are easily scalable and independently deployable. The core subsystems include on-premises and edge devices management, cloud gateway services, business processes, and storage & user interface (UI). Additionally, the architecture should support intelligent edge devices, data transformation, AI/ML modeling, and user management. The IIoT architecture should also have a wide range of pre-built plug-and-play connectors and adapters for device data, OT systems, IT systems, and engineering technology (ET) systems data integration with data capture functionality. Users should carefully evaluate the key features offered by the IIoT architecture that governs IIoT platforms and select vendors accordingly.
- **Hardware Management:** Some vendors in the IIoT segment offer hardware management for IIoT, including devices, sensors, edge gateways, edge servers, edge AI systems, edge data centers, and boards & modules. Hardware management of IIoT devices offers better edge-to-cloud integration of edge computing applications and hardware for networking and performance. The vendors also incorporate security by a design approach that adopts intense security standards for IT and OT that ensure end-to-end security. The IIoT hardware also supports X.509, trusted platform module (TPM) 2.0, secure management access, encryption, and more as part of its security capability. Users should carefully assess the hardware

management capability of IIoT vendors under evaluation and select the vendor that offers maximum value relative to their cost.

- **Edge computing & Analytics:** The edge capabilities of IIoT platforms are supported through the cloud, edge devices, edge modules, and AI. An IoT Edge device comprises IoT Edge Runtime and IoT Edge Modules. The edge modules are docker containers consisting of open platform communication (OPC) publisher modules and OPC twins. IIoT platforms should support edge industrial connectivity and cloud-to-edge data transfer for robust edge governance. The implementation of edge analytics solutions helps reduce latency in critical decision-making for human operators and control systems. It also helps to process data near the source to reduce the volume transferred over the network and eliminate sharing of sensitive data beyond organizational boundaries.

IIoT platforms offer software development kits (SDKs) that enable the deployment of custom AI/ML logic modeling that can interact with edge applications. These edge analytics applications generate real-time insights to support critical decisions for operators and control systems. Certain IIoT vendors also provide pre-built analytical models for controls which can be easily trained with their data and deployed for execution with zero coding. Therefore, users should always prefer those vendors that offer edge computing and analytics capabilities as part of their IIoT platform.

- **Advanced Security:** Many vendors in the IIoT platform market offer extended cybersecurity certifications to ensure the safety of both IT and OT. As cybersecurity threat increases, both hardware and software security need to be addressed by vendors. Some vendors with certifications in cybersecurity, such as IEC 62443, govern end-to-end industrial IT/OT security. Cybersecurity certification, such as IEC TR 60601-4-5:2021, ensures the security of medical electrical equipment. Security certifications are specific to the industry verticals catered to by the vendors. Therefore, end users should assess potential IIoT vendors based on their extended security capabilities and make decisions accordingly.
- **Digital Twin:** The digital twin capability provides a digital representation of the physical assets integrated into the IIoT platform. These assets

generate huge volumes of data periodically, and digital twins provide a comprehensive lens into the context that is useful to the physical thing, allowing end users to spend more time building analytics and application logic. Vendors provide prebuilt templates that help digital twins create models using AI/ML algorithms.

IIoT vendors offer various types of digital twins, such as status twins for real-time device monitoring, asset information digital twin for IT, OT & ET systems, AI twin for entire data modeling, operational twins for predictive modeling & decision support, and process simulation twin for entire process visualization.

Digital twins drive manufacturing operations, and service departments benefit from putting IoT telemetry data to work in analytical models and driving logic-based workflows in response to diagnostics and predictions through relevant historical and current data. Users should evaluate IIoT platform vendors based on their ability to demonstrate digital twin capabilities specific to the organization's requirements, and preference should be given to those vendors that offer the highest value relative to their cost.

- **Out-of-the-box (OOTB) functionality:** The market is shifting from IIoT platforms to IIoT-enabled applications, and customers' expectations are moving from technology to business outcomes. Given the economic uncertainty and input inflation, customers focus more on return on investment. From a product perspective, customers expect pre-built OOTB solutions, which are faster to value, easy to implement, and capable of scaling.

There is significantly more interest in IIoT-enabled applications than in pure technology platforms. Digital Performance Management (DPM) solution helps enterprises eliminate manual, late, and error-prone bottleneck reporting and expose high-value investments in automation and production software to increase factory-wide efficiency. Therefore, users should look for those IIoT platform vendors that offer OOTB functionality as part of their IIoT platforms

- **Marketplace:** Certain IIoT vendors offer a marketplace that provides APIs, device drivers, and firmware for integrating multiple devices or assets into the platform. The marketplace also offers analytical templates for modeling, third-party integrating applications, edge application modules, and cloud applications to support various use cases. The end users should assess potential vendors based on the marketplace they provide and make decisions accordingly.
- **Partnership ecosystem IIoT:** Most IIoT platform vendors have developed significant partnerships with top technology vendors to cater to multiple industries. IIoT platform vendors partner with leading cloud providers for ease of deployment and integration capabilities and intelligent application development, along with prebuilt templates for analytics, edge computing, and hardware capabilities for the IIoT platform. Therefore, users should carefully assess each IIoT platform vendor's partner ecosystem and prefer vendors who leverage their partnership to offer multiple capabilities.
- **Low code development:** The low code/no code capability enables developers to build APIs and applications and integrate device drivers easily into the platform. The main concept of low code capability is to offer end users the ability to customize their platforms and gain flexibility by integrating necessary components without technical expertise. It improvises the overall agility of the platform, and therefore end users should look out for this capability while selecting potential IIoT vendors.
- **Vendor's Domain Knowledge and Industry Experience:** Organizations should evaluate the expertise and domain knowledge of potential IIoT vendors to understand their ability to address unique and complex business challenges, use cases, and industry-specific requirements. Users must consider vendors' in-depth knowledge of a specific industry, including how it is evolving, emerging trends, and factors that will influence the overall industry. Users should look for ease of use, comprehensiveness of offering, platform flexibility to adapt to dynamic market changes and regulatory requirements, minimizing total cost of ownership, and transparency. Vendors should be to understand and uncover unmet business requirements as well



as bridge the technology and service gaps. While assessing the best practices for IIoT platform deployments, users should look for a solution with a history of successful large-scale deployments and carefully analyze the existing case studies of those deployments.

- **Ability to support use cases:** Users should evaluate the ability of IIoT platform vendors to support a wide range of industry-specific and organization-specific use cases. The platform should be proficient in handling general value stream management-related use cases, including customer service, platform support, application & device management, and more. The platform should support enterprise-wide use cases across functions, such as manufacturing, oil & gas, energy & utilities, and more, along with sustainability compliance and standards. IIoT platforms should be able to provide flexibility while addressing the organization's challenges by supporting new use cases that can be customized based on organization-specific business requirements and objectives.
- **Digital thread:** Some IIoT platforms enable a digital thread across the value chain, from engineering to manufacturing to service. Customers are expanding their adoption of IIoT, from smart factories and products to smart value chains. IIoT products are integrated with core engineering products like product lifecycle management (PLM), computer-aided design (CAD), application lifecycle management (ALM), simulations, and augmented reality (AR) to enable a closed-loop digital thread. The end users should assess the capability of potential IIoT platform vendors based on their holistic integration through the digital thread and select suitable vendors accordingly.
- **Vendor's Product Strategy and Roadmap:** IIoT platforms are constantly evolving to accommodate ongoing and emerging technology disruptions and market trends. Vendors are leveraging their domain expertise and partnerships to formulate strategies and roadmaps to enhance the capabilities of IIoT platforms, in the long run, to cater to a wide variety of industry verticals. Therefore, end-users should carefully evaluate the product strategy & roadmap of each vendor before finalizing on any IIoT platform vendor.

- **Pricing Model:** Organizations should carefully evaluate the competitive pricing model of potential IIoT platform vendors. They should prefer those IIoT platform vendors who offer a flexible pricing structure and the highest value relative to the cost.

## SPARK Matrix™: Strategic Performance Assessment and Ranking

Quadrant Knowledge Solutions' SPARK Matrix provides a snapshot of the market positioning of the key market participants. SPARK Matrix provides a visual representation of market participants and provides strategic insights on how each supplier ranks related to their competitors, concerning various performance parameters based on the category of technology excellence and customer impact. Quadrant's Competitive Landscape Analysis is a useful planning guide for strategic decision makings, such as finding M&A prospects, partnerships, geographical expansion, portfolio expansion, and similar others.

Each market participant is analyzed against several parameters of Technology Excellence and Customer Impact. In each of the parameters (see charts), an index is assigned to each supplier from 1 (lowest) to 10 (highest). These ratings are designated to each market participant based on the research findings. Based on the individual participant ratings, X and Y coordinate values are calculated. These coordinates are finally used to make SPARK Matrix.

Technology Excellence	Weightage	Customer Impact	Weightage
Sophistication of Technology	20%	Product Strategy & Performance	20%
Competitive Differentiation Strategy	20%	Market Presence	20%
Application Diversity	15%	Proven Record	15%
Scalability	15%	Ease of Deployment & Use	15%
Integration & Interoperability	15%	Customer Service Excellence	15%
Vision & Roadmap	15%	Unique Value Proposition	15%

### Evaluation Criteria: Technology Excellence

- **The Sophistication of Technology:** The ability to provide comprehensive functional capabilities and product features, technology innovations, product/platform architecture, and such others.
- **Competitive Differentiation Strategy:** The ability to differentiate from competitors through functional capabilities and/or innovations and/or GTM strategy, customer value proposition, and such others.

- **Application Diversity:** The ability to demonstrate product deployment for a range of industry verticals and/or multiple use cases.
- **Scalability:** The ability to demonstrate that the solution supports enterprise-grade scalability along with customer case examples.
- **Integration & Interoperability:** The ability to offer product and technology platform that supports integration with multiple best-of-breed technologies, provides prebuilt out-of-the-box integrations, and open API support and services.
- **Vision & Roadmap:** Evaluation of the vendor's product strategy and roadmap with the analysis of key planned enhancements to offer superior products/technology and improve the customer ownership experience.

## Evaluation Criteria: Customer Impact

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- **Product Strategy & Performance:** Evaluation of multiple aspects of product strategy and performance in terms of product availability, price to performance ratio, excellence in GTM strategy, and other product-specific parameters.
- **Market Presence:** The ability to demonstrate revenue, client base, and market growth along with a presence in various geographical regions and industry verticals.
- **Proven Record:** Evaluation of the existing client base from SMB, mid-market and large enterprise segment, growth rate, and analysis of the customer case studies.
- **Ease of Deployment & Use:** The ability to provide superior deployment experience to clients supporting flexible deployment or demonstrate superior purchase, implementation and usage experience. Additionally, vendors' products are analyzed to offer user-friendly UI and ownership experience.
- **Customer Service Excellence:** The ability to demonstrate vendors capability to provide a range of professional services from consulting,

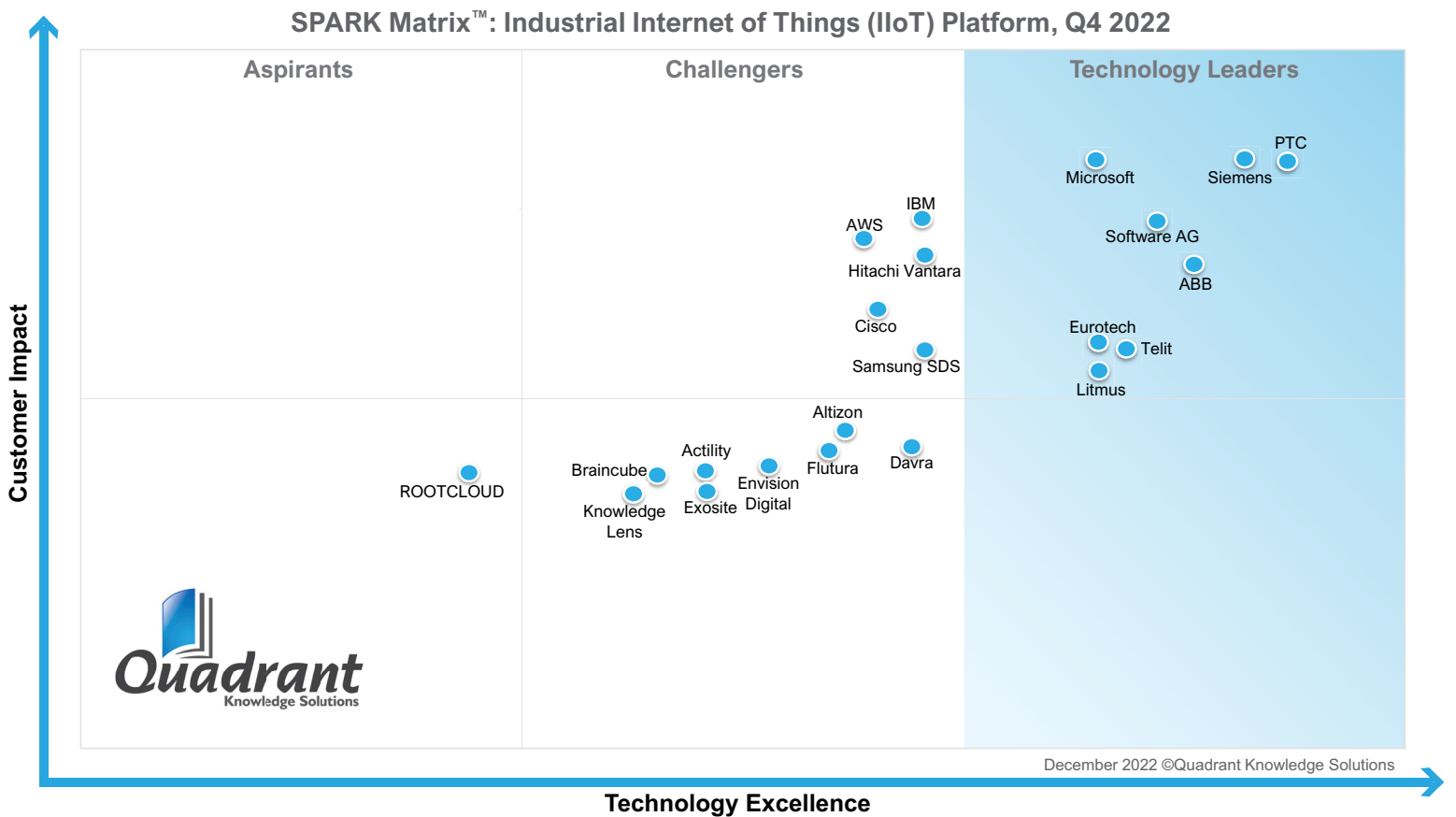
training, and support. Additionally, the company's service partner strategy or system integration capability across geographical regions is also considered.

- **Unique Value Proposition:** The ability to demonstrate unique differentiators driven by ongoing industry trends, industry convergence, technology innovation, and such others.

# SPARK Matrix™: Industrial Internet of Things (IIoT) Platform, Q4 2022

## Strategic Performance Assessment and Ranking

**Figure: 2022 SPARK Matrix™**  
(Strategic Performance Assessment and Ranking)  
Industrial Internet of Things (IIoT) Platform



## Vendor Profile

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Following are the profiles of the leading IIoT Platform vendors with a global impact. The following vendor profiles are written based on the information provided by the vendor's executives as part of the research process. Quadrant research team has also referred to the company's website, whitepapers, blogs, and other sources for writing the profile. A detailed vendor profile and analysis of all the vendors, along with various competitive scenarios, are available as a custom research deliverable to our clients. Users are advised to directly speak to respective vendors for a more comprehensive understanding of their technology capabilities. Users are advised to consult Quadrant Knowledge Solutions before making any purchase decisions, regarding IIoT Platform technology and vendor selection based on research findings included in this research service.

## ABB

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**URL :** [www.global.abb/group/en](http://www.global.abb/group/en)

Founded in 1988 and headquartered in Zürich, Switzerland, ABB is an appliance, electrical, and electronic manufacturing company specializing in robotics, motors & generators, semiconductors, e-mobility, automation, electric vehicle, and more. ABB integrates software with its electrification, robotics, and automation to drive performance in its industry verticals.

ABB Ability™ Genix Industrial Analytics and AI Suite is ABB's comprehensive suite of Industrial IoT platform, Analytics and AI that contextualizes and integrates diverse data across OT (Operations Technology), IT (Information Technology) and ET (Engineering Technology) for building performance management and artificial intelligence/ machine learning (AI/ML) analytics building capability, analytical applications development, digital twin, etc. It empowers real-time data-driven decisions for sustainable operations. With a broad range of digital solutions, the IIoT platform enables businesses to automate, improve, and future-proof their operations to obtain maximum performance and propel long-term success.

### Analyst Perspective

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Following is the analysis of ABB's capabilities in the global Industrial Internet of Things (IIoT) Platform market:

- ABB Ability™ Genix platform integrates industrial internet of things (IIoT), analytics, and artificial intelligence (AI) into an enterprise-grade digital platform and suite for improving industrial productivity and operational performance throughout the digitalization journey. Genix platform operates on a modular architecture that unifies operational technology (OT) data, engineering design parameters, information technology (IT) transactional data, and data from geospatial systems into one database. The Genix suit consists of performance management, analyzer fleet monitoring, system anomaly detection, opportunity loss management, and machine performance analytics. The solution helps asset-intensive industries with complex processes for accurate insight-driven decisions and respond rapidly to achieve optimization and control across the entire value chain by leveraging industry 4.0 principles.



- ABB Ability™ Genix platform components include a contextual fusion hub for IT/OT & engineering data integration and generating insights, contextual analytics hub for industry-specific data modeling, system twin integrity hub for deploying digital twins in real-time, cognitive AI apps hub for building apps, value applications that has pre-built apps using AI and machine learning (ML), industry insights for cross-functional insights, and platform administration for central resource data management.
- Some of the key capabilities of ABB's Ability™ Genix platform include data management, industrial analytics, device management, contextual integration, security features, and deployment mode.
- Data management capability of Genix integrates OT/IT data and web/cloud-based services in real-time/batch and transforms the data, contextualizing it to align with industry standards, making it structured for analytical purposes by allowing it to be accessed by applications and users. Genix utilizes its platform components such as Genix Edge for edge data management, Genix Data Hub for managing data modules and secure communications, Genix Contextual Fusion Hub for connectivity management & configuring metadata, Genix System Twin Integrity Hub for consolidating metastructure to deploy digital twins, Genix Cognitive Data Lake for maintaining large volume of data, Genix Time Series Database for maintaining complex operational analytics, Genix Industry Cognitive Model for offering pre-built scalable data model, and Genix Knowledge Services Hub for authentication, role-based access control, pre-built apps, and third-party integration.
- Industrial analytics capability is a built-in feature in Genix that is supported by a cognitive data model to contextualize data from IT, OT, and ET for creating complex data models using deep learning, ML, and statistical models to address operational and asset-related diagnostics and performance monitoring needs. The Genix Model Fabric reinforces the analytics self-service capabilities for data science model development, training, and deployment. Genix calculation engine is used for creating physics-based models, whereas Genix dashboard manager is used for creating dashboards.
- The device management capability of Genix provides holistic device management that caters to device discovery, device integration, edge,

device onboarding, remote diagnostics, device integration with edge gateway devices & protocols such as message queuing telemetry transport (MQTT), Modbus, highway addressable remote transducer (HART) and third-party middleware. The contextual integration capability of Genix is supported by intelligent pre-built integration adapters that support IT business & assets, OT, engineering & big data. ABB supports stringent industry standards for delivering digital projects and software as a service (SaaS) operation, and also vertical-specific standards for manufacturing, mining, and water industries.

- The security capability of Genix is built into its architecture and consists of security components such as data security, encryption, data privacy, IT/OT convergence security, industry-specific security standards, and compliance. Genix with trusted platform module (TPM) certified Edge hardware and software ensures IT/OT security. ABB Ability™ Genix Industrial Analytics and AI Suite can be cloud deployed and scaled seamlessly & securely across multiple deployments: edge, fleet, plant, on-premises, hybrid, cloud, and multi-cloud.
- The key differentiators of the ABB Ability™ Genix IIoT platform include platform architecture, edge platform, digital twin partnership ecosystem, marketplace, and domain expertise.
- The Genix IIoT platform architecture is designed and built to integrate, contextualize, model, analyze, deliver, and optimize data. The platform is also supported by an open-source tech stack for integration. The Genix suite is a three-layer technology configurable suite consisting of ABB sensors and devices, the control system (ABB 800xA) layer, and an integration layer. The edge capability of the ABB Ability Genix platform supports a variety of IoT Edge devices, both ABB and non-ABB. ABB Ability Genix platform delivers edge capabilities using Genix Hub and Genix Edge management portal. Genix Edge has a wide range of pre-built plug-and-play connectors and adapters for device data, OT systems, IT systems, and ET systems data integration with data capture functionality. Genix Edge has industrial AI capabilities driven by ML & deep learning AI models that are built into the Genix cloud.
- The digital twin capability of Genix offers multiple twins such as status twin for real-time device monitoring, asset information digital twin for

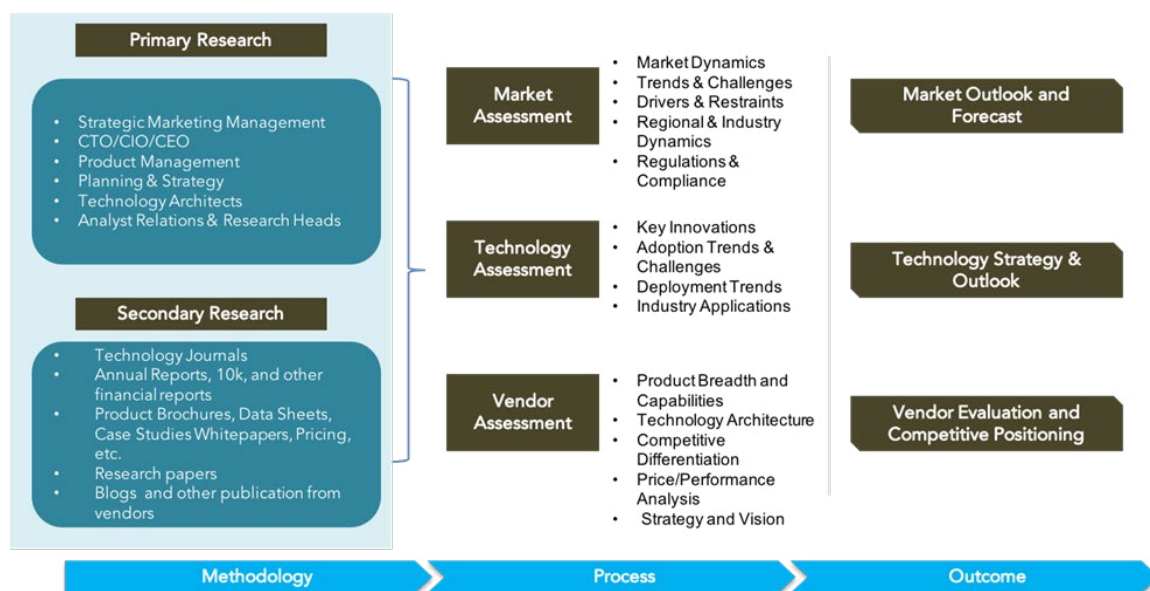
IT, OT & ET systems, AI twin for entire data modeling, operational twin for predictive modeling & decision support, and process simulation twin for entire process visualization. ABB's unique industrial domain expertise enables the development of pre-built industry-specific content, AI models, analytics, and knowledge services to be embedded in the IIoT platform.

- ABB has dedicated partnerships & alliances with other leading vendors in the IIoT market for cloud deployment of Ability™ and to cater to more customer-centric solutions. The company also has its own marketplace for intelligent integrators and pre-built applications that support third-party integrations in its Ability™ platform.
- The top use cases of ABB in the IIoT platform market include improving maintenance, preventing failure, reducing downtime, reducing maintenance costs using Genix Asset Performance Management Suite (APM), offering real-time monitoring, improving energy efficiencies, improving power recovery and production through emission monitoring, and integrating OT/IT/ET systems across functional areas using process performance management and system optimization. Additionally, the Genix Sustainability application suite brings applications across energy management, emission monitoring, regulatory standards - GRI/QAL3, also seamless integration to other value app services with the common IIoT platform underneath.
- ABB has a significant geographical presence in North America, South America, Europe, the Middle East, Africa, and Asia-Pacific. The company caters to various industries such as energy & utilities, manufacturing, life sciences, marine & ports, datacenter, and consumer packaged goods.
- ABB's primary challenges include the growing competition from well-established and emerging vendors. The company may focus on catering to small enterprise needs and supporting more use cases. However, with its sophisticated technology platform and comprehensive functional capabilities, ABB is well-positioned to expand its share in the global IIoT platform provider market in the near future.

- The future roadmap of ABB aims at enhancing and improving the existing capabilities of its Genix platform. Additionally, the firm has a dedicated roadmap in the pipeline that includes adopting 5G services, improving low code capabilities, enhancing security capabilities, and catering to more customer use cases.

## Research Methodologies

[Quadrant Knowledge Solutions](#) uses a comprehensive approach to conduct global market outlook research for various technologies. Quadrant’s research approach provides our analysts with the most effective framework to identify market and technology trends and helps in formulating meaningful growth strategies for our clients. All the sections of our research report are prepared with a considerable amount of time and thought process before moving on to the next step. Following is a brief description of the major sections of our research methodologies.



## Secondary Research

Following are the major sources of information for conducting secondary research:

### Quadrant’s Internal Database

Quadrant Knowledge Solutions maintains a proprietary database in several technology marketplaces. This database provides our analyst with an adequate foundation to kick-start the research project. This database includes information from the following sources:

- Annual reports and other financial reports
- Industry participant lists
- Published secondary data on companies and their products

- Database of market sizes and forecast data for different market segments
- Major market and technology trends

## Literature Research

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Quadrant Knowledge Solutions leverages on several magazine subscriptions and other publications that cover a wide range of subjects related to technology research. We also use the extensive library of directories and Journals on various technology domains. Our analysts use blog posts, whitepapers, case studies, and other literature published by major technology vendors, online experts, and industry news publications.

## Inputs from Industry Participants

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Quadrant analysts collect relevant documents such as whitepaper, brochures, case studies, price lists, datasheet, and other reports from all major industry participants.

## Primary Research

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Quadrant analysts use a two-step process for conducting primary research that helps us in capturing meaningful and most accurate market information. Below is the two-step process of our primary research:

**Market Estimation:** Based on the top-down and bottom-up approach, our analyst analyses all industry participants to estimate their business in the technology market for various market segments. We also seek information and verification of client business performance as part of our primary research interviews or through a detailed market questionnaire. The Quadrant research team conducts a detailed analysis of the comments and inputs provided by the industry participants.

**Client Interview:** Quadrant analyst team conducts a detailed telephonic interview of all major industry participants to get their perspectives of the current and future market dynamics. Our analyst also gets their first-hand experience with the vendor's product demo to understand their technology capabilities, user experience, product features, and other aspects. Based on the requirements, Quadrant analysts interview with more than one person from each of the market participants to verify the accuracy of the information provided. We typically engage

with client personnel in one of the following functions:

- Strategic Marketing Management
- Product Management
- Product Planning
- Planning & Strategy

## **Feedback from Channel Partners and End Users**

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Quadrant research team researches with various sales channel partners, including distributors, system integrators, and consultants to understand the detailed perspective of the market. Our analysts also get feedback from end-users from multiple industries and geographical regions to understand key issues, technology trends, and supplier capabilities in the technology market.

## **Data Analysis: Market Forecast & Competition Analysis**

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Quadrant's analysts' team gathers all the necessary information from secondary research and primary research to a computer database. These databases are then analyzed, verified, and cross-tabulated in numerous ways to get the right picture of the overall market and its segments. After analyzing all the market data, industry trends, market trends, technology trends, and key issues, we prepare preliminary market forecasts. This preliminary market forecast is tested against several market scenarios, economic most accurate forecast scenario for the overall market and its segments.

In addition to market forecasts, our team conducts a detailed review of industry participants to prepare competitive landscape and market positioning analysis for the overall market as well as for various market segments.

## **SPARK Matrix: Strategic Performance Assessment and Ranking**

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Quadrant Knowledge Solutions' SPARK Matrix provides a snapshot of the market positioning of the key market participants. SPARK Matrix representation provides a visual representation of market participants and provides strategic insights on how each supplier ranks in comparison to their competitors, concerning various performance parameters based on the category of technology excellence and customer impact.

## Final Report Preparation

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After finalization of market analysis and forecasts, our analyst prepares necessary graphs, charts, and table to get further insights and preparation of the final research report. Our final research report includes information including market forecast; competitive analysis; major market & technology trends; market drivers; vendor profiles, and such others.



## **Client Support**

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For information on hard-copy or electronic reprints, please contact Client Support at [rmehar@quadrant-solutions.com](mailto:rmehar@quadrant-solutions.com) | [www.quadrant-solutions.com](http://www.quadrant-solutions.com)