# ARE YOU READY FOR INDUSTRIAL IoT DEPLOYMENT?
## White Paper

## OVERVIEW

By 2021, according to Gartner, 25 billion of devices will be "connected" generating hyperscale of data and offering organizations a multitude of insights to optimize operations, cut costs and improve decision-making.

The Industrial Internet of Things (IIoT) bonds devices with applications and services and, in doing so, offers industrial manufacturers and enterprises the opportunities for value creation.
On one hand, manufacturers want to evolve from moving rapidly commoditizing boxes to offering cross-business models - selling bundled hardware/software solutions and services.
On the other hand, enterprises are eager to improve their efficiency - increasing productivity, reducing cost of operation and increasing profitability. Sounds like a win-win for everyone!
To achieve the objectives, they would like to leverage the intelligence gathering from devices and sensors, and to turn it into value-add services and new revenue streams.
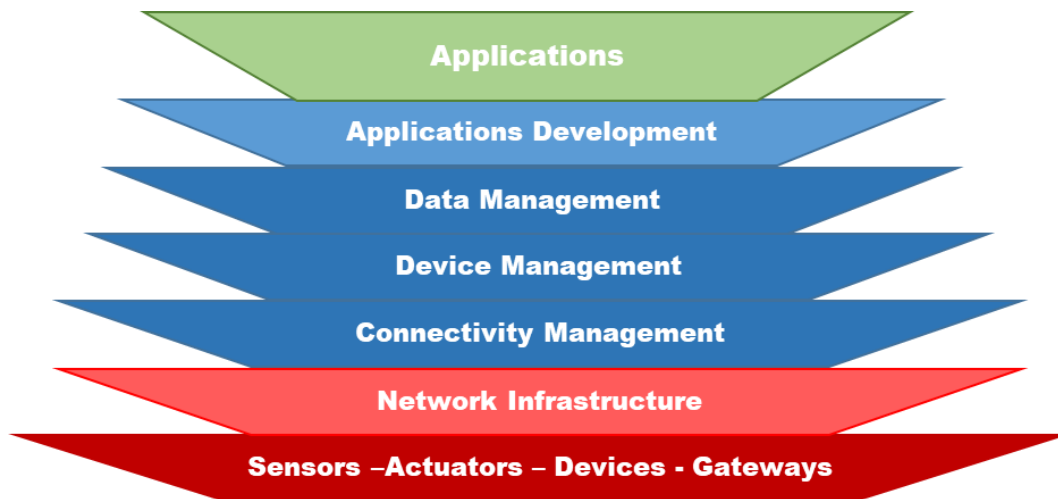


**Figure 1. The components of IIoT solution**

## OT/IT CONVERGENCE AND DATA GOVERNANCE

At the core of these new offerings is a massive amount of data generated by devices and transmitted over the IIoT infrastructure. Collecting, processing and managing data, from devices to high-level enterprise applications, requires new tools and capabilities.
Architecting a successful IIoT deployment involves new ways of thinking about machine-generated data, and requires new levels of collaboration across the organization. As data is collected from the field, there are overlaps and synergies between traditionally separate domains of Information Technology (IT) and Operations Technology (OT).
For example, IT personnel typically focus on networking and productivity technologies and may not have direct experience working with industrial equipment deployed in the field. By the same token, OT personnel typically focus on the very specific processes required for industrial control, and may be new to the nuances of gathering, transmitting, and protecting data in the IIoT environment.
Creating an effective IIoT deployment requires combining expertise from IT and OT and, so, when it's done well, it breaks the barriers between two groups. The resulting convergence

creates a new operational blueprint and prepares organizations for scalable and sustainable growth.

To guide organizations in their design of IIoT deployments, and to help simplify the process of converging IT and OT, Vixtera has developed this brief with the idea of connecting, managing and visualizing the building blocks needed for IIoT-driven services while illustrating key points for data handoffs. It highlights which, when and how platforms, systems or processes need to be addressed, and makes it easier to see what and where IT and OT expertise comes into play.

## There're three functional tiers that participate in a flow of governing data:

- At the top of the stack is the **Applications Tier** containing business applications and services
- The Applications Tier is fed by the **Data & Analytics Tier** which prepares data for the use by pre-defined business processes
- The Data & Analytics Tier is, in turn, receiving data from the **Edge & Connectivity Tier** where data, generated by devices in the field, is collected and analyzed before is being delivered to the Data & Analytics Tier
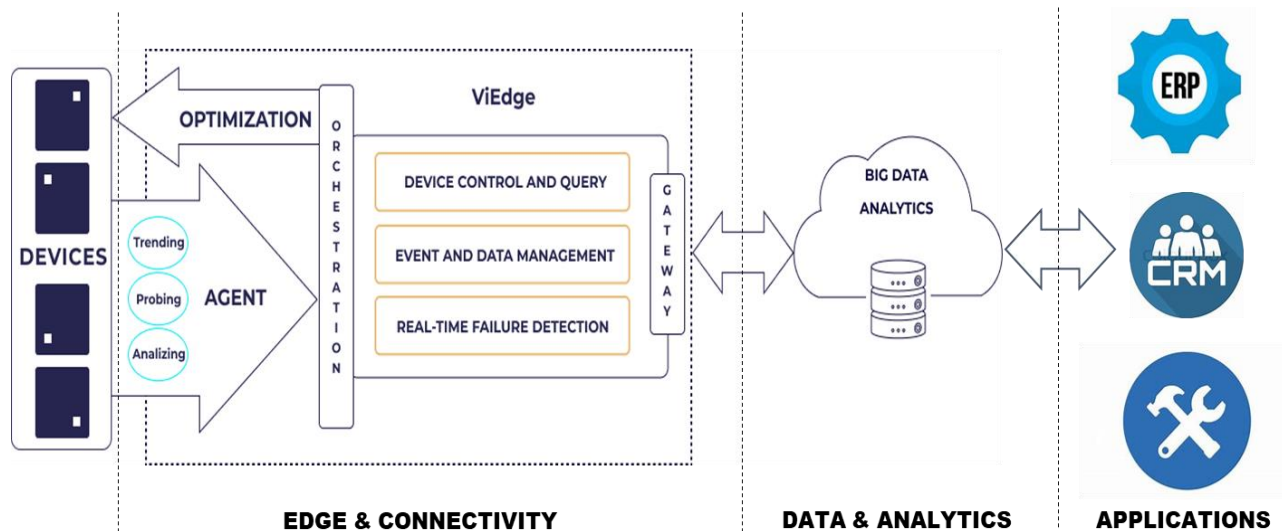


**Figure 2. ViEdge Data Management**

The generated data need to be stored and processed to create the results. Some data is processed at the edge in relatively intelligent devices, thereby minimizing what is communicated for central processing, while other data is simply shipped to the cloud for analysis.
The data management extends across all three tiers and includes workflow handling, visualization, orchestration and data analytics. In addition, an application usually needs to be developed or provided to make specific use of created data.

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## 1. APPLICATION TIER

This tier comprises of reporting, remote monitoring, and predictive modeling. The Application Tier interfaces with the enterprise, using service network to communicate with mission-critical applications like ERP, CRM, modeling and maintenance. The Applications Tier uses data from the field to build company-specific functionalities and fulfill business requirements. Many enterprise applications are supplied by the third-party partners who have already designed the solutions and/or frameworks to accept the IIoT data.

## 2. DATA & ANALYTICS TIER

In this tier, the data from devices gets assembled, processed and analyzed. The task of preparing data for use by other applications requires substantial computing resources and can take place in the public cloud or within the enterprise's data center or private cloud. In many instances, especially related to industrial use cases, the data analytics must be performed on the premises, closer to data collected devices. The Data & Analytics Tier serves the Application Tier by creating and streaming operational data. Data in this tier can be used for real-time analytics or placed in the long-term storage for historical reporting.

The functions performed by the Data & Analytics Tier are often supplied by the same third-party partners who're furnishing enterprise applications. Many of these applications provide a set of open protocols for connecting data integration layer of the Data & Analytics Tier to the network-access functions of the Edge & Connectivity Tier. The open nature of these interfaces simplifies the work of accepting data from devices and prepares it for use by the enterprises.

## 3. EDGE & CONNECTIVITY TIER

This is where data is collected from devices and sensors, analyzed and filtered to cut out noise, errors and repetitions, and is delivered to Analytics and Application tiers. It's critical, at this tier, to optimize data governance identifying the shortest path to analytics engine and the least amount of data that may impact your most critical business outcomes. Providing data consumers with single view of the metadata and giving them the opportunity to provision a curated inventory of metadata is a necessary step toward practical implementation of all analytics and AI/ML processes.

The edge takes care of IIoT "essentials", connecting to and managing devices, events and data. On one side of the edge is a local network that communicates with devices via various hardware interfaces and an alphabet of communication protocols. And on the other side is an access network that communicates with Data & Analytics Tier via a collection of open and semi-proprietary protocols. This is a tier with a ton of not well-publicized and "hidden minefields". And, so most of the existing IIoT platforms may require significant DIY development (drivers, software) to stich it all together - connecting devices and adapting it to applications. So, watch out for solutions that help you simplify this lengthy and laborious processes.

## END2END SERVICES

The Edge & Connectivity Tier, along with data-integration part of the Data & Analytics Tier, embodies the **core of Industrial IoT.**

The equipment manufacturers and industrial enterprises often overlook complexity of developing and deploying the IIoT-driven solutions having limited domain expertise and resources to get it off the ground, and then to successful roll-out and operation. Repeatedly, these solutions are hastily designed to meet the immediate needs, and aren't well-equipped with tools and components for integration with other platforms, systems and clouds.
While early PoCs and limited deployments beginning to scale, their shortcomings will repeatedly lead to lengthy implementation and costly operational breakouts. So, it compels enterprises to seek out solutions that help them to accelerate the deployment and to improve their operational efficiency.

Vixtera out-of-the-box solution consists of easily deployable and customizable distributed software (ViEdge) with essential components providing industrial enterprises with:

- robust device, event and data management
- automated mass installations and upgrades
- ability to host it anywhere with a Single Pane of Glass dashboard

It includes a ground-breaking tool for instant failure detection promptly identifying its root cause and a chain of associated events that's leading to a problem helping to prevent potential problems and improve the cost of operation.
The ViEdge extends the benefits of multifaceted data curation turning collected and filtered data into intelligent data pipes of aggregated and contextualized information tagged to a service or application of your choice while delivering fully-automated handoff to the Data & Analytics Tier for the quick action and decision making.

## FINAL THOUGHTS

Collecting data from the field and using it to drive new, service-oriented businesses, requires a well-structured flow of information and integrated processes. There are very few IIoT ecosystems alike and their deployments are very much relying on the number of complex technologies that, to be successful, must be architected to be scalable, agile and rapidly integrated. Enterprises must take a holistic view of the IIoT and, in doing so, should have a good grasp of the IIoT ecosystem and its main tiers that allow collection, analyzes, processing and acting on data, providing powerful experience for maximizing operational efficiency and enabling new value-added services.

At every step in the way, Vixtera makes it simple to facilitate your IIoT journey. To get you started, we offer an extensible pre-built software framework with run-time core components, and empower you with variety of services to assist with rapid productization of your solution and integration with platforms and clouds.