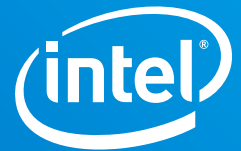


SOLUTION BRIEF

Industrial Technology Solutions
Internet of Things Technology
Industry 4.0



Achieving the Power of Industry 4.0 with Plug-and-Play Simplicity

Intel is helping power game-changing advancements in Industry 4.0 to offer industrial companies an easy, intuitive, and highly scalable machine integration solution for data analytics, enterprise applications, and automated controls



Executive Summary

The Industrial Internet of Things (IIoT) and Industry 4.0 are changing almost every aspect of how industry operates. All operational functions—from maintaining machines to managing supply chains to developing new products and processes—can be optimized, networked, and made smarter and autonomous by capturing and analyzing machines and production data more intelligently, using that insight to manage the operations of machines and processes, and integrate across processes and extended supply chains. Systems and products become much smarter by making their embedded intelligence available to create new applications with focused and personalized features. Usage information can also enable new, smart services and business models.

Together, Alleantia and Intel are rewriting the rules for Industry 4.0 digital transformation by offering a new IoT platform that bridges the gaps between machines, sensors, and the broader IT applications and infrastructures.

Empowered by Alleantia's XPANGO* device integration technology, virtually any new and legacy machinery can instantly feed data into multiple enterprise IT applications and clouds, including those from GE, IBM, Microsoft, SAP, Dassault Systèmes, and Advantech, with a fast, cost-effective implementation of innovative Industry 4.0 applications and processes. These IIoT Apps (including APIs, connectors to enterprise software platforms, and dedicated interfaces to partner applications) implemented by Alleantia and by its application partners ensure fast integration of industrial machines and production systems "connected by Alleantia" to target IT infrastructures and Industry 4.0 applications.

The combination of XPANGO device integration technology and of IIoT Apps creates an Industry 4.0 ecosystem "connected by Alleantia" that enables end users to wisely select infrastructures and applications. This helps ensure interoperability across devices, machines, platforms, and applications, and a smooth transition toward industrial digital transformation.

"Industry 4.0 will fundamentally reshape the competitive landscape and bring fundamental change to established industries."

\$2T

cost savings resulting from Industry 4.0 investments in the next five years¹

\$2.5T

increased revenues in the next five years due to digital features of new and existing industrial products¹

The Industrial Digital Transformation Opportunity

More and more companies of all sizes are leveraging automation and data exchange in manufacturing technologies to generate incredible results in innovation and profitability. Recent surveys¹ show global industries' commitment via massive investments in industry digital transformation, driven by great expectations of investment returns in cost optimization and incremental digital revenues on existing and new products.

Creating **smart factories** generates many opportunities for operational efficiencies, asset tracking, and process improvements. But it also allows organizations to develop new products for greater efficiency and effectiveness and get them to market faster and less expensively. OEMs can have a much better understanding of their machines' life cycles and the way customers use them to ensure higher equipment efficiency, and to provide new, highly profitable services and recurring revenues through **smart product** features. Near-real-time machine information allows many other organizations—such as financial institutions, insurance companies, consumables vendors—to create new **smart services** and **smart business models** to maximize return on invested capital for the industrial assets, and the creation of new intangible assets associated with the value of the information, as it happens today in the web economy.

The High Cost of Industrial Intelligence

While expectations are high, many companies operate with a diverse ecosystem of solution providers that offer machines, software, and back-end platforms that don't always talk to each other. What's more, most factories have grown in stages, over the years, frequently installing equipment from different vendors within each phase of development. Machine vendors use different technologies to build their machines over the years, leading to a large number of legacy devices.

How do you get an entire organization on the same page when machines and applications all speak different languages? The complexity of extracting the data and creating a common information layer in such an environment can dramatically increase operational costs. It also can limit information availability and dilute the business value of the data.

Simply and Quickly Create Powerful Industry 4.0 Solutions

Alleantia, supported by Intel and a member of the Intel® IoT Solutions Alliance (Intel® ISA), is responding to the need for greater efficiency and intelligence by providing its powerful XPANGO device integration technology. XPANGO enables the creation, for each device and machine type, of a driver similar to printer drivers on a PC, for collecting and configuring data to and from devices, independently from device manufacturers and supported communication protocols, which include FOCAS*, OPC UA*, Siemens S7*, Heidenhain*, MTConnect*, Modbus*, MQTT*, EtherNet/IP*, NMEA*, Aurora-BUS*, Mastervolt*, and others.

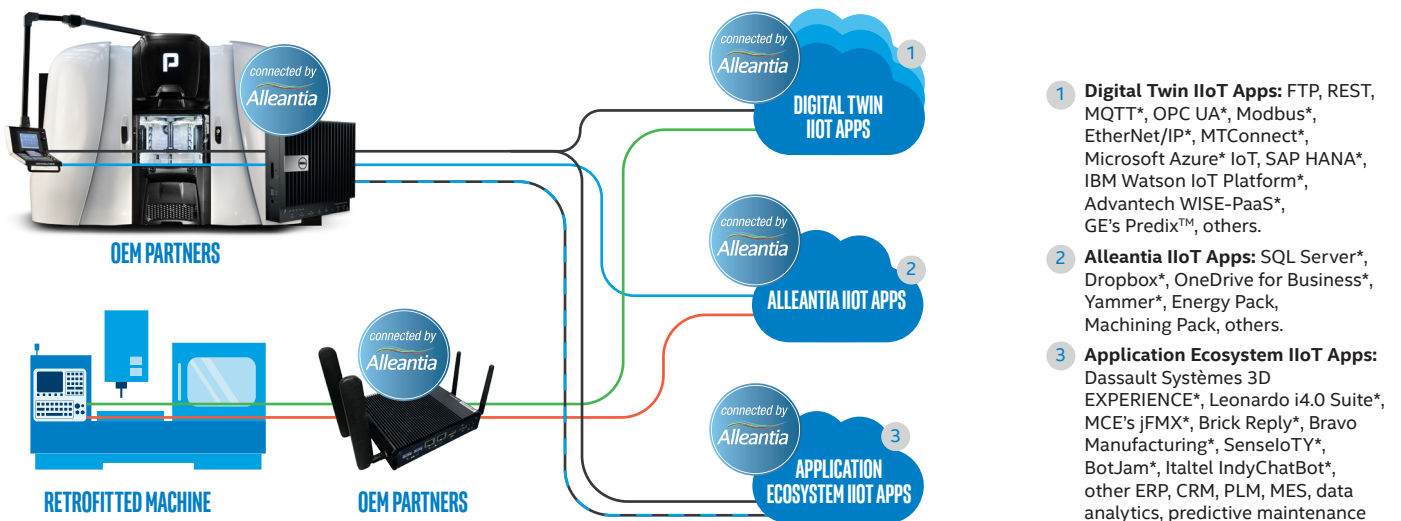
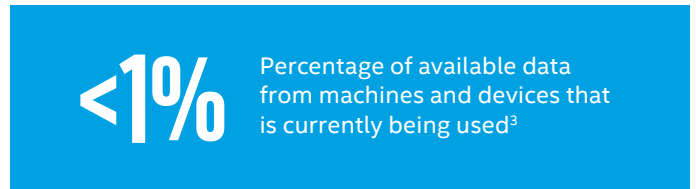
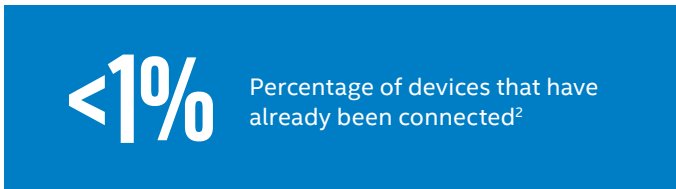


Figure 1. Alleantia machine-to-applications plug-and-play interoperability

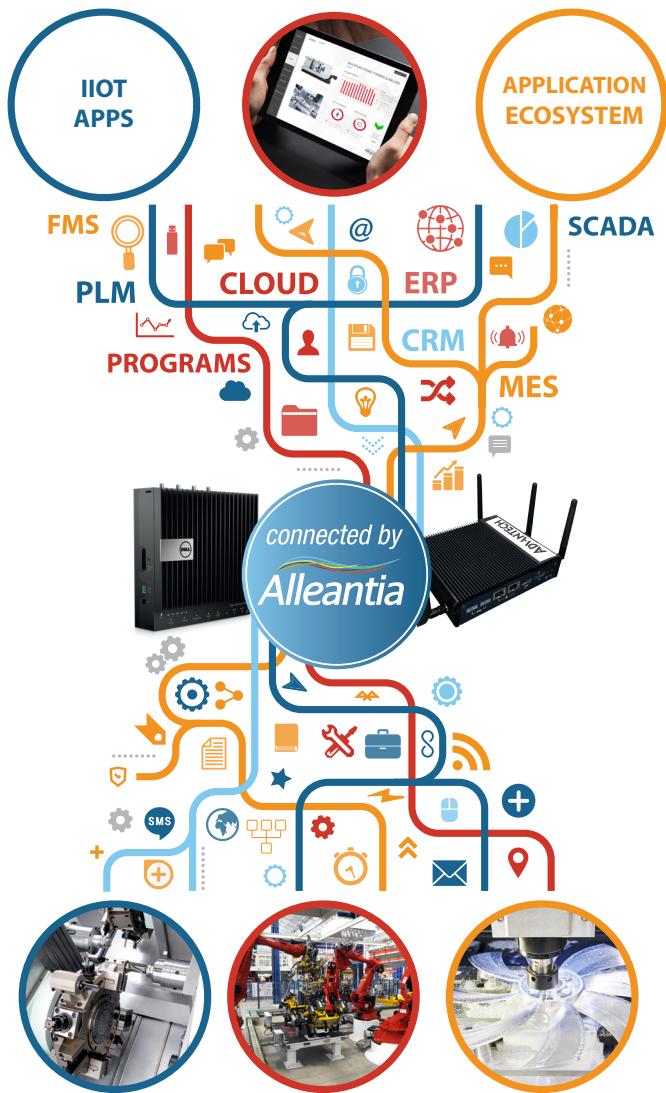


Figure 2. The Alleantia plug-and-play Industry 4.0 solution architecture

Alleantia software utilizes the powerful XPANGO Library of Things, which includes thousands of XPANGO drivers for machines, controllers, inverters, and sensors from many bespoke vendors, plus the free XPANGO driver editor for OEMs and system integrators, creating new drivers for their machines and production systems.

At runtime, XPANGO drivers allow connectivity to any device with zero coding—from complex machinery to simpler sensors—in a few seconds, and create a complete and interoperable digital twin for each piece of new or legacy industrial equipment. As such, Alleantia solutions do not require changes to application platforms, upgrades, or changing machines and production systems to implement the Industry 4.0 digital transformation.

Distributed Intelligence Supporting Industry Digitization

The Alleantia IIoT software installed on Intel® architecture-powered hardware appliances provides the physical connectivity to machines and networks, leveraging the XPANGO library to access information and interact with sensors, devices, and machines in an intuitive and fast deployment.

Alleantia IIoT software is certified by the Intel ISA and runs smoothly on certified IoT hardware, including Advantech, Dell, HPE, and Eurotech, and, soon, others. Because the solution is powered by Intel architecture, it also offers adequate computing power to generate headroom for future phases of Industry 4.0 development.

The Alleantia Partners Ecosystem and the IIoT Apps

Alleantia's OEM partners include industrial machine and production system builders that embed Alleantia's technologies inside their products, augmenting them through the "connected by Alleantia" interoperability features. These OEM partners create, test, and make available the XPANGO drivers for their machines, in order for their and all other Alleantia customers to benefit from the "connected by Alleantia" features and the associated ecosystem of applications.

Alleantia software provides multiple ways to use machine data:

- **Digital Twin IIoT Apps** instantly feed machine information to IT development platforms, including Microsoft Azure* IoT, SAP HANA*, IBM Watson*, Advantech WISE-PaaS*, and GE's Predix™, as well as IIoT Apps for publishing machine data using specific communication protocols such as REST*, MQTT, OPC UA*, Modbus, EtherNet/IP, and MTConnect.
- **IIoT Apps provided by Alleantia** use machine data within embedded applications (Energy Pack, Machining Pack) and public application platforms, such as SQL Server*, Dropbox*, OneDrive for Business*, Yammer*, and others.
- **Application Ecosystem IIoT Apps** connect many Industry 4.0 applications, helping to ensure fast integration with industrial machines and production systems "connected by Alleantia". These IIoT Apps include product life-cycle management (PLM), manufacturing execution systems (MES), supervisory control and data acquisition (SCADA), flexible manufacturing systems (FMS), data analytics/predictive maintenance, enterprise resource planning (ERP), and customer relationship management (CRM).

The resulting Industry 4.0 ecosystem is the heart of Alleantia's Industry 4.0 plug-and-play offering. Any "connected by Alleantia" OEM system or other industrial device can be instantly connected through IIoT Apps to the customers' platform of choice or the certified partner's application.

Alleantia partners and customers experience exclusive interoperability advantages—tapping industrial information gathered from any equipment, safely and with complete control, and ensuring a smooth transition toward manufacturing digitization.



Figure 3. Alleantia Ecosystem and IIoT Apps

A New Path to Industrial Intelligence

Industry 4.0 presents exciting opportunities for the industrial enterprise, but extracting crucial operational data from machines of many different types, ages, technologies, and communication languages represents a massive technical and economical challenge. The Alleantia IIoT software, embedded in Intel architecture-powered IoT gateways, quickly and cost-effectively connects virtually any device to on-premise or on-cloud IT infrastructures and many Industry 4.0 applications, thanks to the IIoT Apps, with plug-and-play simplicity and speed.




All Alleantia products are powered by XPANGO technology

Learn More

Alleantia is a young and innovative Industrial IoT company based in Pisa, Italy. Alleantia is a member of the Intel IoT Solutions Alliance, the Microsoft Partner Network*, and the SAP PartnerEdge* open ecosystem, as well as a GE Digital Alliance Partner* and a founding member of EdgeX Foundry*. Please visit alleantia.com.

and the Library of Things (a comprehensive collection of industrial machinery drivers) and can use IIoT Apps, providing integration and interoperability for IT infrastructures, platforms, and Industry 4.0 applications. Alleantia and Intel help securely connect factories, machines, and production systems with full information control.

Alleantia solutions enable industrial companies and OEMs to transform the way they operate day to day. This gives the entire enterprise access to rich and powerful information and opens new opportunities for process improvement, enhancements in machine utilization, and the creation and delivery of new products, services, and revenue streams.

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2. "The Internet of Things at the Web Summit," Cisco, 2014, gblogs.cisco.com/uki/the-internet-of-things-at-the-web-summit/.
3. "Unlocking the potential of the Internet of Things," McKinsey, 2015, mckinsey.com/business-functions/business-technology/our-insights/the-internet-of-things-the-value-of-digitizing-the-physical-world.

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