Executive Summary

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

Alleantia, together with partner Intel, is rewriting the rules for Industry 4.0 transformations by offering a new middleware solution that bridges the gaps between machines, sensors, and the broader IT applications. With plug-and-play ease, Alleantia Industry 4.0 middleware can communicate with virtually any machine a company might be utilizing, so that machines don’t have to be replaced or upgraded to extract data for companies’ processes. Empowered by Alleantia technology, virtually any machine or device can instantly feed data into multiple enterprise IT applications, such as those from SAP and Microsoft, without requiring ad hoc development. What’s more, larger enterprises that already have specific, proprietary processes managed through ERP (Enterprise Resources Planning), logistics, asset management, and other IT applications, are quickly able to augment their existing processes by leveraging machine information. With Alleantia’s plug-and-play middleware, industry’s IoT capabilities can be greatly expanded as machines and devices become smarter and fully connected to their enterprise IT systems and, ultimately, to their decision-makers.

$1.6T Additional business value captured by companies that are leaders in using data assets to their advantage

93% of US companies expect to increase operational effectiveness through Industrial IoT
The Costs of Industrial Intelligence Can Be High

Extracting, analyzing, and sharing real-time data from machines and production systems easily and at competitive costs allows a wide array of organizations to participate in creating smart factories, smart products, and smart services. The resulting smart industry ecosystems are at the heart of Industry 4.0.

Industry 4.0 Smart Ecosystems

Creating smart factories generates many opportunities for operational efficiencies, asset tracking, and process improvements. But it also allows organizations to develop new products with greater efficiency and effectiveness, and get them to market faster and less expensively. OEMs can have a much better understanding of a machine’s life cycle and the way customers use them to ensure overall equipment efficiency, and to provide new, highly profitable services and recurring revenues through smart product features. Real-time machine information allows other organizations—financial institutions, insurance companies, consumables vendors, and others—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.

Overcoming Device Diversity

More and more companies of all sizes are beginning to leverage automation and data exchange in manufacturing technologies to generate incredible results in innovation and profitability. However, many operate with a diverse ecosystem of solution providers offering 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 utilizing different vendors and technologies within each phase of development. Machine vendors use diverse technologies to build their machines, leading to a large number of legacy devices. How do you get an entire organization on the same page when the machines and applications all speak different languages? The complexity of extracting the data and creating a common information layer in such an environment can drive up operational costs dramatically. It can limit information availability and dilute the business value of the data.

A Simple and Cost-Effective Solution to Create Powerful IoT Ecosystems

Alleantia, with the support of Intel, is responding to the need for greater efficiency and intelligence with its XPANGO integration technology, which enables organizations to quickly connect and manage virtually any industrial device and system using web, mobile, and enterprise applications, such as enterprise resource planning (ERP), customer relationship management (CRM), and product life cycle management (PLM). Alleantia’s products utilize the powerful XPANGO Library—which includes thousands of XPANGO drivers for devices, including CNC, from many bespoke vendors—and its freely available PLC integration tools to easily connect, with plug-and-play ease, machines to any IT infrastructure, IT application, and data analytics systems of a customer’s choice. Alleantia products also provide plug-ins to connect bespoke, on premise cloud IT infrastructures (SQL Server*, Azure* IoT, SAP HANA*, and others) and open REST API interfaces, allowing fast connection to any IT environment and application. The Alleantia solutions support

![Image](image.png)

Figure 1. Alleantia turns machine-generated data into intelligent actions empowering Industry 4.0 transformations.
multiple concurrent connections to different applications and IT infrastructures, to provide engineered information to multiple users in a secure and controlled way.

Alleantia’s solution doesn’t ask industrial companies to change application platforms, nor does it ask them to upgrade, or—most disruptively of all—change machines and production systems. Rather, it retrofits any machine or system through its intelligent gateways. Once implemented, developers are able to manage information from any physical machine like from any other IT system. And, unlike other solutions, developers can continue using their preferred IT platforms and languages they already know to create analytics solutions, implement automated controls, or integrate field information within business processes.

**IoT Gateway Server: Plug Machine Data into IT Infrastructures and Applications**

The IoT Gateway Server appliance provides multiple analog, digital, serial, and Ethernet ports, and leverages XPANGO library for accessing information and interacting with sensors, devices and machines. The IoT Gateway Server integrates plug-ins for many on-premise and cloud IT infrastructures (SQL Server, Azure IoT, SAP HANA), with open REST API interfaces allow fast connection to any IT environment and application. Last but not least, a real-time Modbus* TCP interface connects to industrial SCADA and MES systems. The IoT Gateway Server supports Linux*, Windows* OS, and the high-security Moon Island OS.

Alleantia IoT Gateway software is ISA-certified and runs smoothly on Advantech IoT gateways. And, because it’s powered by Intel® architecture, it offers adequate computing power to generate headroom within a solution for future phases of Industry 4.0 development.

**Create Distributed Intelligence to Support Real-Time Business Intelligence**

The IoT Scada Servers—hosted on a similar appliance and including all the features of the IoT Gateway Server—features, and embeds powerful local applications providing bidirectional communication to collect information and to command devices. They also implement specific application features including data logging, information combination, arithmetic and Boolean operations, alarm thresholds setup, energy reporting (Energy Pack), and real-time machine control and efficiency information analysis (Machining Pack).

Web-based visualization enables resident applications to report information to any location, even making it available on smartphones and tablets. Company supervisors and technicians can see the performance of the machine, down to the efficiency of each tool it employs. This insight can greatly improve the effectiveness of all actions taken throughout the organization, including the operator on the manufacturing floor. Future evolutions will allow developers to deploy into ISS systems their own applications, greatly supporting the future needs for distributed control and intelligence within Industry 4.0.
A New Path to Industrial Intelligence

Industry 4.0 presents some incredible opportunities for manufacturers and any other industrial enterprise, but getting crucial operational data from machines of many different types, using many different technologies and communication languages, represents a massive technical and economical challenge. The Alleantia IoT Gateway Server and IoT Scada Server solutions quickly connect virtually any device to on-premise and cloud IT infrastructures and applications, with plug-and-play simplicity, speed, and cost effectiveness. The XPANGO Library, the largest collection of drivers for industrial machinery in the world, powers all the products of Alleantia, from intelligent gateways to powerful local control systems with data analysis and web visualization functions, and plug-ins to multiple, widely used IT infrastructures, cloud, and application platforms.

Alleantia solutions enable industrial companies and OEMs to transform the way they operate day-to-day. It gives the entire organization access to data and analytics that open new opportunities for process improvement, enhancements in machine utilization, creation, and delivery of new products, services and revenue streams.

Figure 3. Alleantia IoT Scada Server and Application Packs
Learn More
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