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ADLINK Smart Gateway Selected for Michelin-SoftBank Tire Control System

The first inclusion of IoT tire monitoring system in Japan by a tire maker, the Michelin TPMS Cloud Service provides significant logistics and resource benefits

Understanding IoT and M2M
Things, machines & people

Compass Intelligence Honors ADLINK as Edge Computing Company of the Year

GE Wants to Ditch Its Digital Assets
there is nothing older than the news of last night

What Is Edge Computing?

Industrial Internet of Things
High-level architecture discussion

The Internet of Things will connect Billions of Devices,
IoT World is connecting you with your Next Customers & Partners TODAY

In this Edition

Daniel Dierickx
CEO & co-Founder
at e2mos
Acting Chief Editor

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ADLINK Smart Gateway Selected for Michelin-SoftBank Tire Control System

ADLINK
Leading EDGE COMPUTING

The first inclusion of IoT tire monitoring system in Japan by a tire maker, the Michelin TPMS Cloud Service provides significant logistics and resource benefits

San Jose – 27-Jun-2018

ADLINK Technology, Inc., a global provider of leading edge computing solutions, announced that its intelligent, industrial gateway has been selected for the Nihon Michelin-Softbank IoT tire control system. The first launch of an IoT tire monitoring system in Japan by a tire maker, the Michelin Tire Pressure Monitoring System (TPMS) Cloud Service provides improved safety and efficiency, as well as cost savings benefits, for industries such as fleet management and construction.

The TPMS system contains sensors that measure a tire's air pressure and temperature, sending out alerts when these deviate from their standard levels. ADLINK's industrial IoT gateway, the MXE-110i, provides an extremely compact form factor with versatile RF connectivity and fanless rugged construction to serve as the vehicle-mounted communications device. Softbank provides the IoT platform within the Michelin infrastructure and overall system. The versatility of the TPMS allows it to handle vehicles of all classes, including camper vans, light trucks, heavy vehicles, trailers and buses.

When factors within the tire are outside of normal tolerance levels, the ADLINK MXE-110i will send an email over-the-cloud to the end customer's operations manager and the Michelin tire vendor. An alert will also go out automatically to the Michelin Rescue Network, which can dispatch a vehicle to provide assistance.

“The beauty of this system is that both the driver of the vehicle and the operations manager can monitor all of the vehicle's data right on a smartphone, tablet, or personal computer,” said Vincent Tseng, general manager of ADLINK's Asia Pacific region. “This information is invaluable for preventing blowouts and other problems. It increases safety and saves both human and monetary resources ”

“Japan faces societal issues such as reduction in the working population and the aging of society. Particularly serious is the lack of staffing in the transportation, construction and agriculture industries. The improvement of productivity and reduction of workload are matters of great urgency,” said Paul Perriniaux, Managing & Representative Director of Nihon Michelin Tire Co., Ltd. “At Michelin we believe it our duty to contribute through our tire and related services, such as our TPMS.”

SoftBank anticipates business growth not just in communications infrastructure and services but also in the IoT field for mobility such as ride-sharing and automatic driving.

“In facing the coming future of 5G and IoT, we support the development of new services for our customers as an IoT service platform for the further 'value-fication' of data,” said Yasuyuki Imai, representative director & COO of SoftBank Corp.

Based on the Intel® Quark™ SoC X1021 and integrating Wind River® Intelligent Device Platform XT 3.1, ADLINK's MXE-110i industrial IoT gateway delivers manageability and security critical to industrial IoT applications. The IoT gateway presents an intelligent and robust embedded system supporting wide application development and easy service deployment, delivering outstanding performance in industrial applications such as smart city, facility management and industrial automation applications.

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Understanding IoT and M2M

Things, machines and people

Take a look at our
case studies

Changing the world byte by byte

The world is alive with 'things'. By 2020 there's expected to be over 20 billion connected devices. So, what is 'The Internet of Things' and 'M2M connectivity', and what's our role within this dynamic marketplace?

The Internet of Things (IoT) is a network of tangible objects (things) that are connected through the internet to exchange data, without any human interaction. These 'things' have embedded software, sensors, actuators and network connectivity that enables the collection and exchange of data.

'Things' can refer to physical devices, buildings, vehicles and in fact anything that can be embedded with the connectivity technology.

The 'connected home', the 'connected car', the 'Internet of Everything', and the 'Industrial Internet of Things'. These phrases are starting to become everyday terms as connected technology continues to impact the way we work and live.

From farming to vehicle telematics, street lighting to mobile health, M2M and IoT applications are reaching more and more industrial and commercial sectors. We are transforming business and operational models to become more efficient, safe and secure.

IoT or M2M?

So how does IoT differ from the more traditional Machine to Machine (M2M) term? The key is IP (Internet Protocol). M2M has mainly focused on direct point-to-point connectivity across mobile networks or fixed lines.

IoT communications involve IP networks and will usually employ cloud or middleware platforms. M2M is really about the communication only, not the broader processes and applications associated with IoT.

Big data

The term 'big data' is now very much a used term referring to the sheer scale of data intelligence being generated from connected assets, from which programming and analysis can lead to improved business performance.

Our role in IoT and M2M

Since we started in 2000, our industry has evolved dramatically. Many of the applications we support have become more intelligent, IP-based and connected to integrated applications where data works smarter and harder.

It's often said that we provide the plumbing for IoT – the fundamental connection between device and hub. But it's more than just pipes.

Whether across cellular, fixed line, satellite or low power radio networks, the connectivity that we provide is tailored to meet the needs of each application.

Our connectivity role is crucial to making applications work. Working alongside application developers, Systems Integrators, OEMs and enterprises, we are the enablers of two-way, resilient and secure communications.

Secure by design

Today, security is a global issue facing connected devices – from hacking cars to breaking into organisational networks and accessing sensitive personal data.

Key to our solution is the connectivity security. We create a secure VPN with links back to all of the mobile network operators that we work with. This means that our users can integrate enterprise-class networking that delivers 99.79% uptime and secure point-to-point communication between connected assets.

GE Wants to Ditch Its Digital Assets

July 31, 2018 - 10:20 am PT - Sue Marek, VP of Content and Editor-in-Chief at SDxCentral

GE is looking for a buyer for its San Ramon, California-based digital unit. According to the Wall Street Journal, citing sources familiar with the matter, the company has hired an investment bank to auction GE Digital's assets.

The news is not a complete surprise. In April, GE CEO John Flannery said that digital was still a priority, but he slashed GE Digital's budget and let go of many staff members.
GE Digital was the brainchild of former GE CEO Jeffrey Immelt who's vision was to transform the industrial conglomerate into a software company. Immelt created GE Digital in 2015 and later predicted that it would hit $15 billion in software sales by 2020. He also estimated that half of that amount would come from providing IoT applications to other industries.

GE Digital is home to Predix, which was initially developed for GE's own internal IoT operations. The company then decided to sell the platform to airlines and utilities to help them gather data and streamline their businesses. At the Mobile World Congress 2016 GE made a splash by demonstrating Predix's capabilities.

Immelt also made a number of acquisitions in the IoT area to bolster the company's IoT platform. In 2016 GE Digital purchased asset-tracking software firm Meridium for $495 million and ServiceMax, which makes computer models for logistics and workforce optimization, for $916 million.

At GE Digital's Mind & Machines 2017 conference in October in San Francisco, the company painted a pretty rosy picture of Predix. GE Digital CEO Bill Ruh said that Predix had 1,000 customers and more than 960 ecosystem partners. He also said Predix-powered orders had grown more than 100 percent year-over-year and that the platform was operating in more than 85 countries.

But MachNation analyst Dima Tokar said that despite GE's investments in Predix, the platform never gained a lot of traction. In particular, he said that the platform is not developer friendly and has outdated features. "The platform is not developer friendly, takes ten-times as long to complete normal tasks compared to best-in-class IoT platforms, and does not have a modern IT architecture," Tokar said.

Who Will Buy Predix?

It's unclear what companies might be interested in buying GE Digital's assets. One possibility might be Bosch Software, which is a division of Bosch Group. Bosch and GE Digital formed a partnership in 2016 to make their IoT platforms interoperable. However, Bosch Software, like GE Digital, is in the midst of trying to morph from a stodgy corporation into a more innovative software firm. And the company just recently appointed a new CEO of the unit, Michael Bolle.

20 DAYS BEFORE

Demand growing fast for digital twins and AI in automotive, power generation and aviation, says GE's CDO

July 11, 2018 - Posted by Zenobia Hegde for IoT Now

EXCLUSIVE INTERVIEW: Autonomous systems, supported by artificial intelligence (AI) and digital twins, are a game-changer for industrial organisations. Today we are moving away from people telling machines what to do to a world where machines tell people what to do.

In this exclusive interview, Bill Ruh, CEO of GE Digital tells editorial director, Jeremy Cowan that his company saved US$1 billion (€0.85 billion) in 2017 through productivity gains from using its Predix platform and AI-based applications for factories, power plants, aircraft and energy turbines.

Sampling of the Q&A - Full Report CLICK HERE

IoT Now: In what industries and geographies are autonomous systems, supported by AI and digital twins, today?
Bill Ruh: Digital twins are becoming increasingly common in all industries and are used all over the world. From oil & gas (O&G) pipelines in the middle east to wind turbines in the North Sea, they are being implemented across multiple sectors. GE Digital has 1.2 million digital twins in operation today. **.....**

IoT Now: Which industry sectors do you expect will grow AI the most in the next five years?
BR: Industrial internet will fuel unprecedented gains in productivity and innovation for industrial companies by enabling the wider adoption of AI and digital technology. Our own estimates suggest the Industrial Internet could be a $225 billion (€192.05 billion) market by 2020. **.....**

IoT Now: What is the USP for GE's Predix platform? Why would users choose it?
BR: A platform is only as good as its apps. Our Predix-Powered "killer apps" for industry are APM (Asset Performance Management) and FSM (Field Service Management). These are helping customers – almost out of the box – to dramatically increase productivity with quick time to value. This is essential when making purchasing decisions. **.....**

What Is Edge Computing?

CBINSIGHTS

The cloud is no longer sufficient to instantaneously process and analyze the troves of data generated — or soon to be generated — by IoT devices, connected cars, and other digital platforms.
Enter edge computing.

Sometimes faster data processing is a luxury — other times it's the difference between life and death.

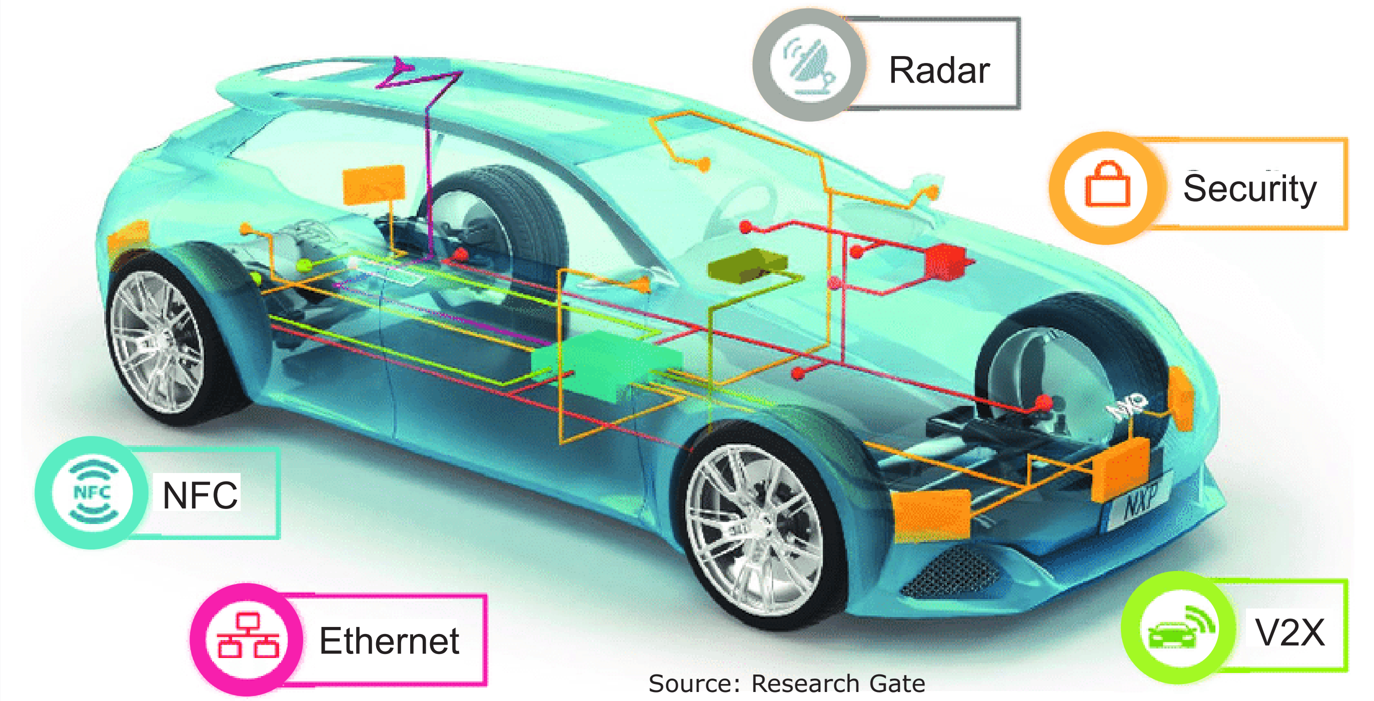
An autonomous vehicle, for example, is essentially a large, high-powered computer on wheels that collects data through a multitude of sensors. For these vehicles to operate safely and reliably, they need to respond to their surroundings right away. Any lag in processing speed can be deadly.

While the bulk of data processing for connected devices now happens in the cloud, sending data back and forth across a central server can take seconds too long.

Edge computing makes faster data processing for autonomous vehicles possible. This technology enables connected devices to process data created at the "edge," which is either within or much closer to devices themselves.

By the year 2020, it is estimated that the average person will generate 1.5 GB worth of data per day. With so many more devices connected to the internet and generating data, cloud computing might not be able to handle it all — especially at the faster speeds required for certain uses.

Edge computing offers an alternative to cloud computing that will likely have applications far beyond autonomous vehicles.



Source: Research Gate

Some of the biggest players in tech — including Amazon, Microsoft, and Google — are exploring edge computing, potentially giving rise to the next big computing race. While Amazon Web Services (AWS) remains dominant in the public cloud landscape, it remains to be seen who will emerge as the leader in this nascent edge computing space.

In this explainer, we dive into what edge computing is, the benefits associated with the technology, and its applications across a wide range of industries.

Report 26 Pages
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Table of Contents

Compass Intelligence Honors ADLINK as Edge Computing Company of the Year

More than 40 industry journalists, thought leaders, analysts vote on annual award recipients

16-Jul-2018 – San Jose, California

ADLINK Technology, a global provider of leading Edge Computing solutions, has been named Edge Computing Company of the Year in the sixth annual Compass Intelligence awards. The awards honor the top companies, products, and technology solutions in mobile, IoT and emerging technology industries. ADLINK won its award in the category of IoT Data.

“It's an honor to have Compass Intelligence publicly recognize all our hard work in this area,” said Steve Jennis, senior vice president at ADLINK. “Processing at a network's edge makes data available without increased latency and bandwidth or exposure to security risks. As this becomes increasingly important in a growing number of industries, ADLINK will be there to help companies apply this technology to reduce costs and improve performance and productivity. We're happy to be acknowledged as a leader in this area.”

A global leader in Edge Computing, ADLINK reduces the complexity of building Industrial Internet of Things systems that balance the requirements for data availability both at the edge and in the cloud. The company is a Premier Member of the Intel® Internet of Things Solutions Alliance and has a strategic partnership with NVIDIA to bring AI to the Edge. ADLINK is an active contributor in many standards and interoperability initiatives , and the company's products are available in more than 40 countries across five continents.

The Compass Intelligence Awards nomination process begins as industry players submit their picks in three primary award categories: Mobile & Wireless, IoT/Connected Solutions, and Bamboo Mobile, focused on sustainability. After the nominations are closed, more than 40 industry-leading editors, journalists, thought leaders and analysts vote on the award recipients. The 50 nominated awards and five Compass-selected awards identify the best among a number of technology products and services.

“In this ever-so-competitive tech environment, it is important to take note of companies like ADLINK that excel in the industry, and evaluate them with a neutral, third-party process,” said Stephanie Atkinson, CEO and founder of Compass Intelligence, a market acceleration research and consulting firm that has been guiding technology companies with actionable insight for more than a decade. “We are honored to announce this year's award recipients and want to congratulate each and every one of them for the dedicated leadership, innovation, and accomplishments.”

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Industrial Internet of Things

A high-level architecture discussion

By: Doug Sandy, VP Technology, PICMG - PCI Industrial Computer Manufacturer's Group

Introduction

The concept for the "Internet of Things" appears to have been born out of work within MIT and Berkeley in the 1990s and was coined as a phrase in 2004 in an article in Scientific American (Neil Gershenfeld, 2004). The original concept allowed everyday objects to connect with one another in order to provide added benefit to the user. In this vision, household appliances, vehicles, smart wearable devices, parking meters – virtually everything would be connected in order to provide additional layers of intelligence and guidance.

Over a decade has passed since the concept of IoT was introduced and the vision has yet to fully materialize. Some strides have been made with small wearable devices, thermostats, and smart phones, but the average consumer has yet to experience significant advantage from interconnected devices working together for their benefit. Cloud computing, big data analytics and artificial intelligence may help to change this trend, but each of these technologies also brings new challenges. The largest barriers to commercial IoT rollout today appear to be technological (security), sociological (privacy), and economic (cost vs benefit).

This is not to say that the future of IoT is bleak, but rather, its immediate application may be best suited to areas where these barriers are less significant. The industrial markets that PICMG serve are such a place. In military, medical, transportation, and industrial automation, the adoption and use of embedded computing and control solutions has long been commonplace. PICMG's computing technologies today are used in ground, air and sea-based military applications, they control railroads and factories, and they provide critical functionality to scientific and medical equipment.

At PICMG we seek to accelerate the adoption of industrial internet of things (IIoT) in the markets we serve by providing meaningful open specifications and design guides to aid our member companies in creating high-quality, interoperable computing solutions. We are doing this by leveraging our historic strengths in industrial computing, expanding our community of practice to embrace a wider audience of IoT developers, and building partnerships with other IIoT-focused standards organizations.

Distinctions of Industrial Internet of Things

If industrial market segments have been deploying automation for decades, what makes IIoT different? There really are only three main distinctions: ubiquitous sensing, advanced analytics, and IT methodologies. Each of these is described briefly below.

Ubiquitous Sensing

Analogous to the broader IoT space, which envisions ubiquitous connectivity of intelligent devices, Industrial IoT is characterized by ubiquity of connected sensors and actuators. Where traditional automation employed sensors and actuators primarily for the most critical elements of control, IIoT includes sensors and actuators for facility operations, machine health, ambient conditions, quality, and a variety of other functions. Virtually everything that can be measured and controlled within the industrial context is fair game for IIoT. The ubiquity of sensing and control is key to enabling the next cornerstone of IIoT – advanced analytics.

Advanced Analytics

Advanced analytics enables the IIoT system to realize higher levels of operational efficiency by extracting meaning from a vast array of deployed sensors. Similar to cloud datacenters, where sensors data is used to optimize virtually every aspect of operational efficiency, smart factories and other IIoT applications utilize analytics to improve uptime, optimize asset utilization, and reduce overhead costs. Improved operational efficiency provided by advanced analytics is the primary motivator for IIoT adoption today.

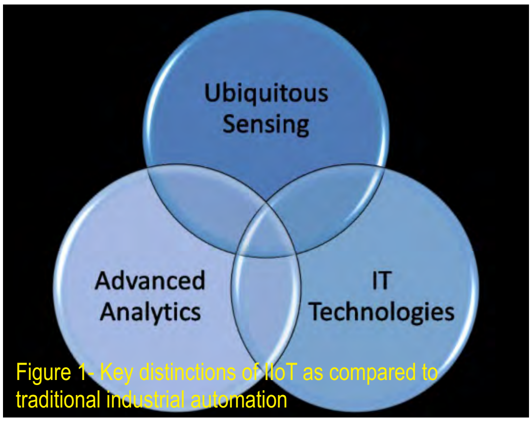

Figure 1- Key distinctions of IIoT as compared to traditional industrial automation

IT methodologies

The third defining characteristic of Industrial Internet of Things is the transformation of traditional automation techniques to utilize technologies that have been historically associated with information technology. This transformation has three key benefits. First, migration to IT technology enables the IIoT operator to utilize the large IT talent pool to deploy, monitor, and optimize their IIoT application. Second, standardization around IT practices helps to eliminate islands of proprietary equipment within the installation and provide tighter integration between the control domain and the operations domain. Lastly, adoption of IT methodologies enables IIoT companies to leverage the large existing base of IT hardware and software solutions when appropriate. Each of these benefits offers significant potential for capital and operational savings.

Barriers to Adoption

A recent study by Morgan Stanley (Morgan Stanley, 2017) indicates the top three challenges to IIoT deployment in order are: cybersecurity, lack of standardization, and legacy installed base. Each of these is summarized briefly below.

... to next page

... from previous page

Cybersecurity

Cybersecurity in IIoT takes on new dimensions because the connected devices interact and control real world activities. Connected factories, power plants, aircraft and other vehicles pose significant threats to public safety if hacked. Corporate and national economic impacts also cannot be overlooked. The collapse of a power grid or national transportation system has much farther reaching impacts than even the largest consumer data breaches. For these reasons, robust cybersecurity is an absolute essential in IIoT. It is expected that most IIoT applications will run on private, dedicated networks with strict physical access control protocols.

Lack of Standardization

Historically, industrial automation has been accomplished using a variety of proprietary, vertically integrated automation solutions, or by open standards-based industrial computing solutions such as PICMG's CompactPCI. While the first of these solutions offers convenience of an integrated approach, each vendor's equipment may not work well with others. This causes islands of isolated equipment within the industrial deployment that is difficult to integrate and manage as a whole. The second solution, while offering many benefits such as scalability, flexibility, and less risk, often puts the burden of software creation on the operator. This can be cumbersome when attempting to assimilate the large number of dissimilar sensor types associated with IoT deployment.

Standardization of the upstream interfaces for controller devices and meta-data models for sensors would go a long way toward eliminating both of these problems. Standardized interfaces would allow dissimilar pieces of hardware to communicate with the IIoT command center in a uniform fashion and eliminate isolated islands within the installment. Likewise, an extensible standardized meta-data model for sensors would allow for systematic detection and control of sensors and control points without extensive code re-writes. From a hardware standpoint, IIoT would also benefit from greater standardization around communications interfaces, power, and environmental requirements.

Large industrial automation suppliers are not incentivized to embark on open standardization because it loosens the customer's dependence upon their proprietary solutions. Smaller automation suppliers lack the industry clout or size to take on such an ambitious undertaking. This is a task best suited for an industry standards organization, and one which PICMG is well equipped to handle.

Legacy Installed Base

Very few technology transformations occur overnight. As a result, legacy equipment must be able to coexist with the new. Any successful IIoT strategy must incorporate this reality. Standardization can help bridge the gap in the short term and PICMG is preparing to apply its track record of backward compatibility and interoperability toward alleviating the worst of these issues.

Architectural Overview

Because factory automation is projected to be the largest and fastest growing segment of the Industrial Internet of Things market, this section of the document focuses on an architecture for the smart factory. This selection was chosen merely as an example of a relevant application to which the IIoT architecture may be applied. Figure 2 shows an example of a smart factory layout.

Smart Factory Example

The factory floor is the heart of the smart IIoT application. It contains multiple robotic assembly machines, automated test equipment and various other process-related pieces of equipment. Each of these is fully automated and integrated utilizing the same network interfaces and common data model and protocols. In addition to control and monitoring of the actual manufacturing process, the machines are also instrumented with other sensors to help assess the health of the equipment and correlate operational dynamics with factory output quality.

In order to feed the automated factory, the warehouse and stockroom is also fully instrumented. Because the factory control and the inventory control systems both leverage IT methodologies, integration and analysis between the two domains is easily achievable, allowing actual factory production rates to factor into intelligent purchasing and inventory management algorithms.

Environmental conditions are monitored in real time providing useful information regarding energy usage from air conditioning, lighting and other resources. This function also monitors and controls other resources such as on-site power generation and backup generator status. This information, combined with deep analytics, may be used to prioritize workloads in order to optimize resource utilization and minimize operational costs.

All of these functions are interconnected with the factory control center via Ethernet (or industrial Ethernet when required). The control center provides visualization and control of the entire factory operations utilizing standard IT technologies.

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By: Doug Sandy, VP Technology, PICMG - PCI Industrial Computer Manufacturer's Group

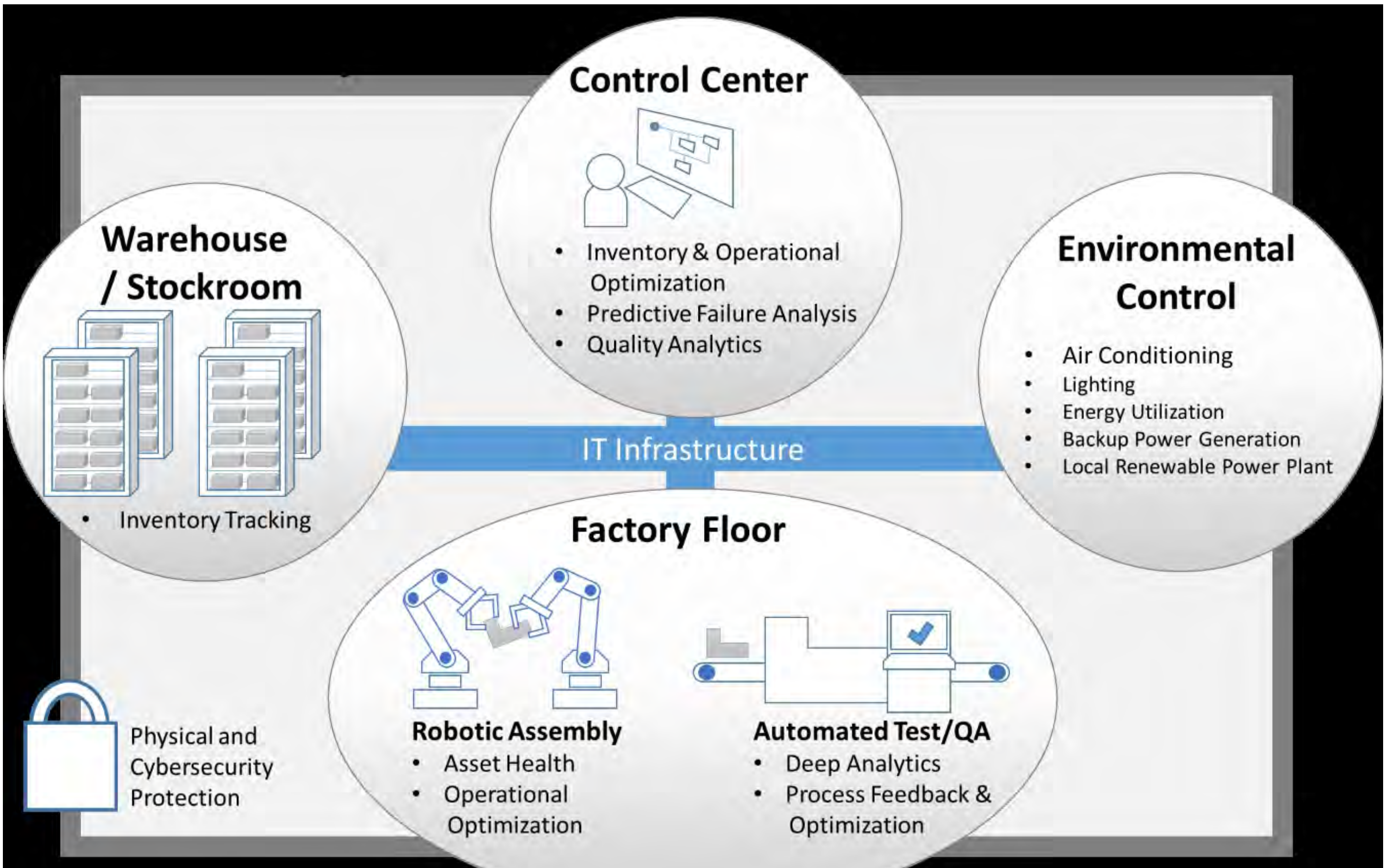

Figure 2- Smart Factory Layout

Architectural Decomposition for IIoT

Figure 3 shows an architectural decomposition for Industrial Internet of Things. All components are connected via Ethernet (or industrial Ethernet) unless otherwise shown. Legacy equipment co-exists with newer equipment, though potentially at a lower level of functionality, and a common metadata model enables discovery and control of IIoT devices in a flexible and extensible fashion.

At the lowest level of the architecture, sensors and control points provide connectivity to physical phenomena within the factory. IIoT sensors present themselves as intelligent, managed devices over the factory network using the common meta-data model. Using RESTful application programming interfaces, sensors may be monitored and controlled using standard IT methodologies. Because these sensors operate in a live factory environment, ruggedization is an expected requirement.

For sensors and actuators that must respond in a hard, real-time fashion, it may be necessary to place a controller close to devices in order to monitor the devices locally. This reduces the latency and improves determinism over having the devices remotely controlled through the factory control center. These local IIoT controllers would present the connected sensor data models to the upstream control center. They would also introduce programmable “listener” functions that implement local policies when sensor events occur. Listener functions may also be directly implemented in sensors and actuators.

Legacy sensors and controllers may be connected to the IIoT control center. Initially, PLCs can be connected over their existing interfaces and be managed through legacy software. As an intermediate step to full IIoT functionality, the PLC can later be replaced by an IIoT control gateway. This device “translates” the sensor's native protocols to a RESTful data interface using the common meta-data model. This allows the same sensors to be used while the control architecture is migrated to IIoT technologies. As a final step, sensors can later be replaced with fully IIoT-enabled sensors.

The final piece of the IIoT architecture is an aggregating network gateway. This device serves to aggregate and isolate traffic between zones on the factory floor and the rest of the network. In many cases, the bandwidth of traffic from the factory devices will be low so a ruggedized, 10/100/1000 switch will typically be more than sufficient.

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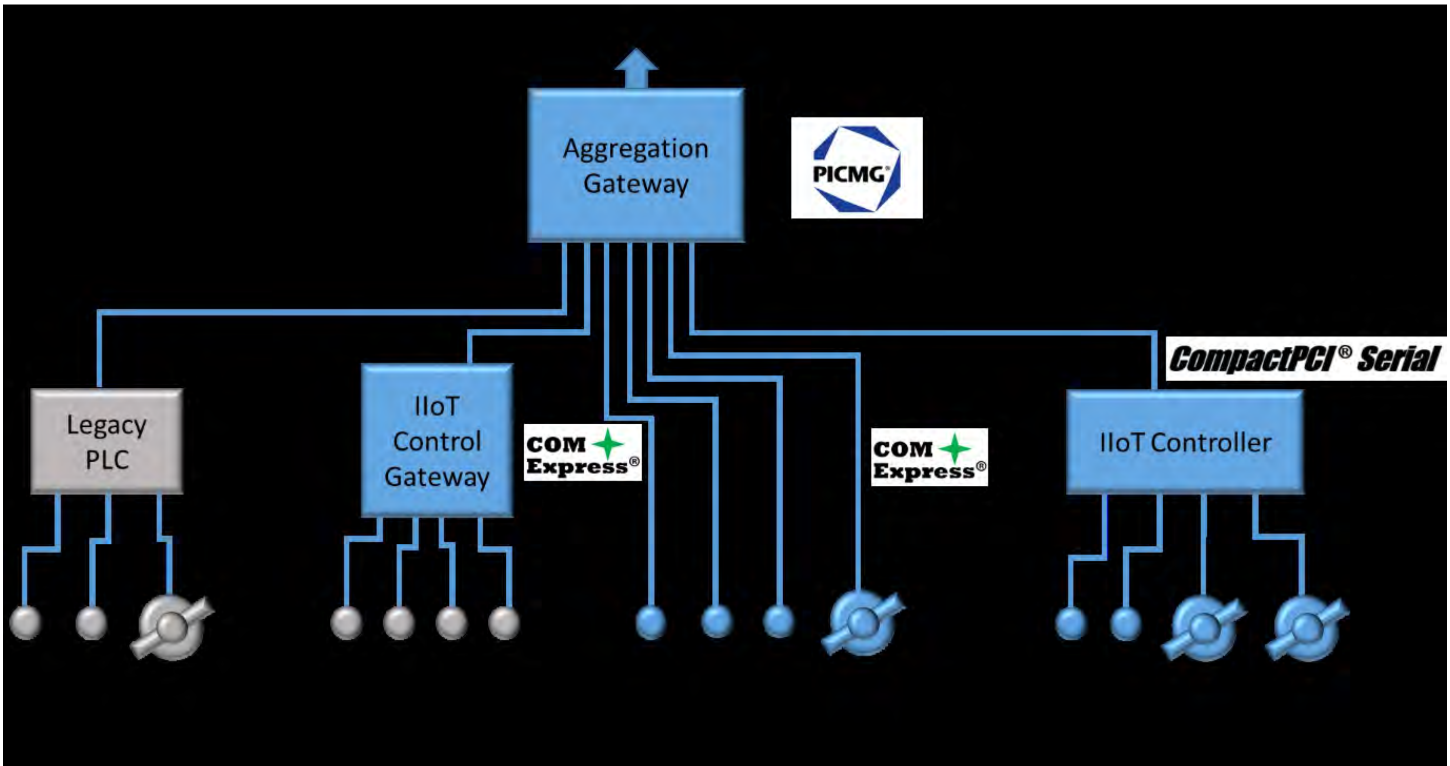

Figure 3- IIoT Components showing areas of PICMG contribution

PICMG Contributions to IIoT

Because of the importance of industry standardization to IIoT rollout, and PICMG's long-standing support of the industrial computing marketplace, the opportunities for PICMG contributions are strong. In particular, COM Express is well suited for small gateway control and IIoT controller functions. CompactPCI Serial may also have a play in larger IIoT controllers and control gateways where scalability is required.

The COM Express® specification (PICMG, 2017) defines a family of Small Form Factor (SFF) and Computer On Module (COM) single board computers appropriate for a wide range of commercial applications. It is designed for the latest chip sets and serial signaling protocols, including PCI Express Gen 3, 10GbE, SATA, USB 3.0, and high resolution video interfaces. COM Express provides the highest performance of the many small form factor standards and products available. When used in conjunction with an I/O base-board, COM Express can easily interface to the wide array of legacy industrial control interfaces deployed today.

CompactPCI Serial® finds its origins in PICMG's first truly ruggedized industrial automation platform (PICMG, 2011). With multiple expansion slots based off of PCI Express, CompactPCI Serial is a high-performance, flexible platform that has been successfully deployed in a variety of industrial applications.
A third hardware form-factor (not yet developed) may also benefit I/O sensor vendors. This form factor would feature ruggedization, low power operation, moderate processing capabilities, and a postage-stamp size board outline. Such a form factor would allow today's sensor vendors to quickly migrate their existing products to fully IIoT compatible devices by leveraging off-the-shelf solutions from a variety of manufacturers.

RESTful APIs

REST, which stands for REpresentational State Transfer, is a communication architecture style based on the IETF RFC 2616 protocol (Fielding, 1999). With REST, web resources provide textual representations of themselves that may be manipulated by using common verbs (i.e. GET, POST, PUT, DELETE). RESTful APIs are a necessary skill for any modern web designer and RESTful APIs built on HTTP and JSON and other protocols are common.

A RESTful approach was applied in systems management applications for cloud computing by the DMTF (Distributed Management Task Force) Redfish technology (DMTF, 2017). Building management interfaces using RESTful APIs allows operators to deploy a scalable interface that leverages existing web skills and taps into the momentum from a growing IT technology base.

Currently no RESTful APIs are defined to specifically meet the needs of Industrial IoT.

... to next page

Industrial Internet of Things

... from previous page

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As important as hardware is, the software meta-data model is key to the success of Industrial IoT and provides the best place for PICMG to contribute to the overall adoption of IIoT. While this effort is not directly aligned with the hardware platform management efforts of the past, PICMG has domain expertise in this area that is directly applicable. DMTF is the other industry standards organization that has been involved in this area with the development of the Redfish schema for datacenters. PICMG is currently exploring how to best work with DMTF in order to provide a solution for a unified data model for Industrial IoT.

PICMG is committed to accelerating the roll-out of Industrial IoT. Through standardization, these solutions significantly improve the ease in which IIoT installations can be deployed. If you or your company are interested in joining PICMG in this effort, please contact us using the information below.

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Justin Moll, Vice President of Marketing justin@picmg.org

About the Author

Doug Sandy is the Vice President of Technology for PICMG with over 24 years of industry experience in the embedded computing, industrial automation, telecommunications and cloud computing spaces. Doug has worked as Technical Fellow, Chief Technology Officer and Chief Architect for major corporations including Motorola, Emerson, and Artesyn Embedded Technologies. Sandy has focused much of his career advancing industry standards that provide multi-vendor interoperability and COTS solutions such as DeviceNet, ETSI NFV, and the PICMG families of specifications. He now enjoys training the next generation of engineers at Arizona State University's Polytechnic Campus where he is a full-time educator and program coordinator for software engineering capstone projects.

About PICMG

PICMG is a nonprofit consortium of companies and organizations that collaboratively develop open standards for high performance telecommunications, military, industrial, and general purpose embedded computing applications.

There are over 150 member companies that specialize in a wide range of technical disciplines, including mechanical and thermal design, single board computer design, very high speed signaling design and analysis, networking expertise, backplane and packaging design, power management, High Availability software, and comprehensive system management.

Founded in 1994, PICMG's original mission was to extend the PCI standard to non-desktop applications. The formal name of the organization is the PCI Industrial Computer Manufacturers Group. It is now known as PICMG (pronounced “PICK-EM-GEE” or “PICK-MIG”).

Equipment built to PICMG standards is used worldwide and anyone can build or use equipment without restriction (although certain technologies used for some military applications may be subject to U.S. export restrictions governed by ITAR rules).

Key standards families developed by PICMG include: CompactPCI®, AdvancedTCA®, MicroTCA®, AdvancedMC®, CompactPCI® Serial, COM Express®, SHB Express®, and HPM (Hardware Platform Management).

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