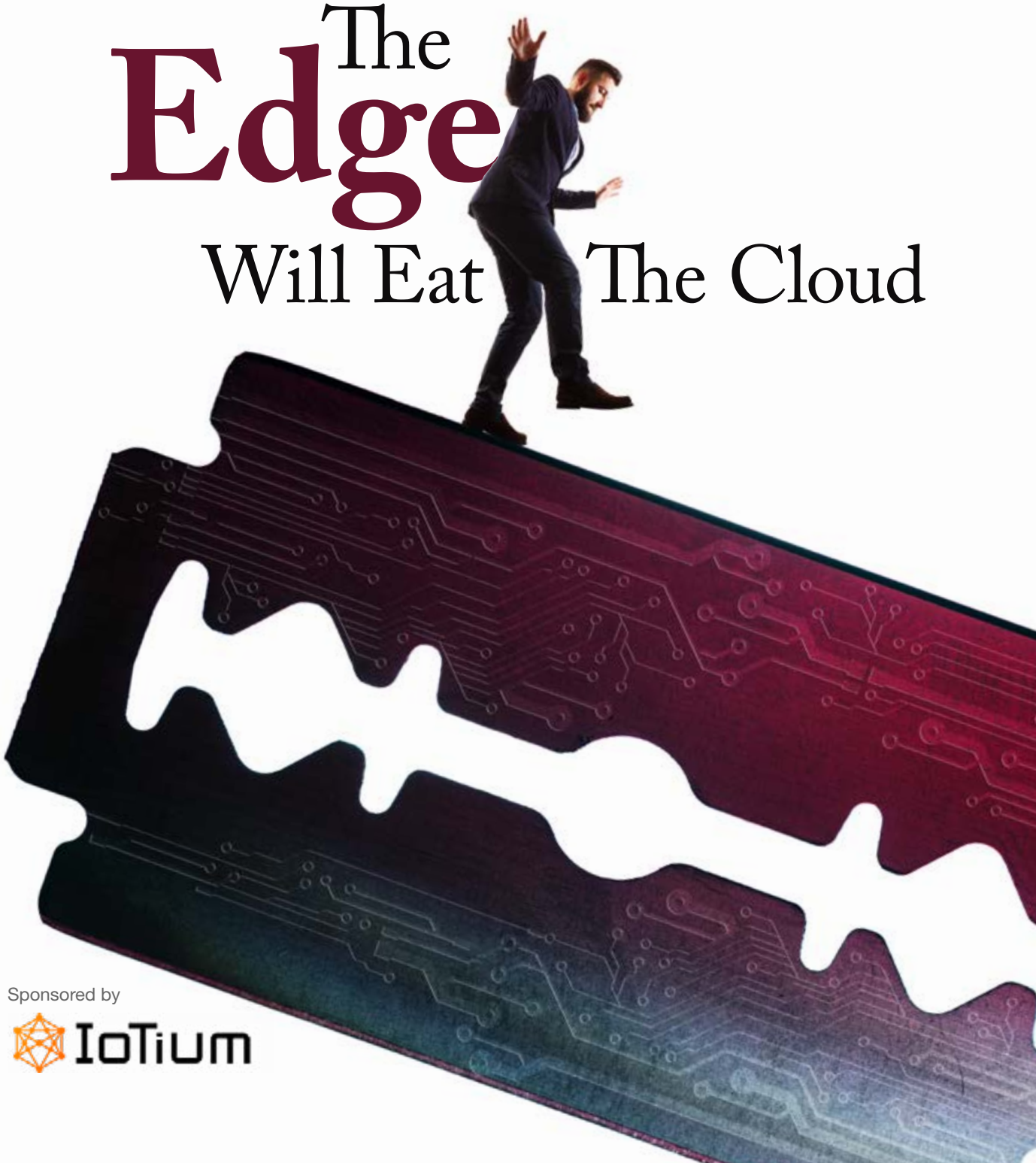
Smart industry

SPECIAL REPORT

The Edge Will Eat The Cloud



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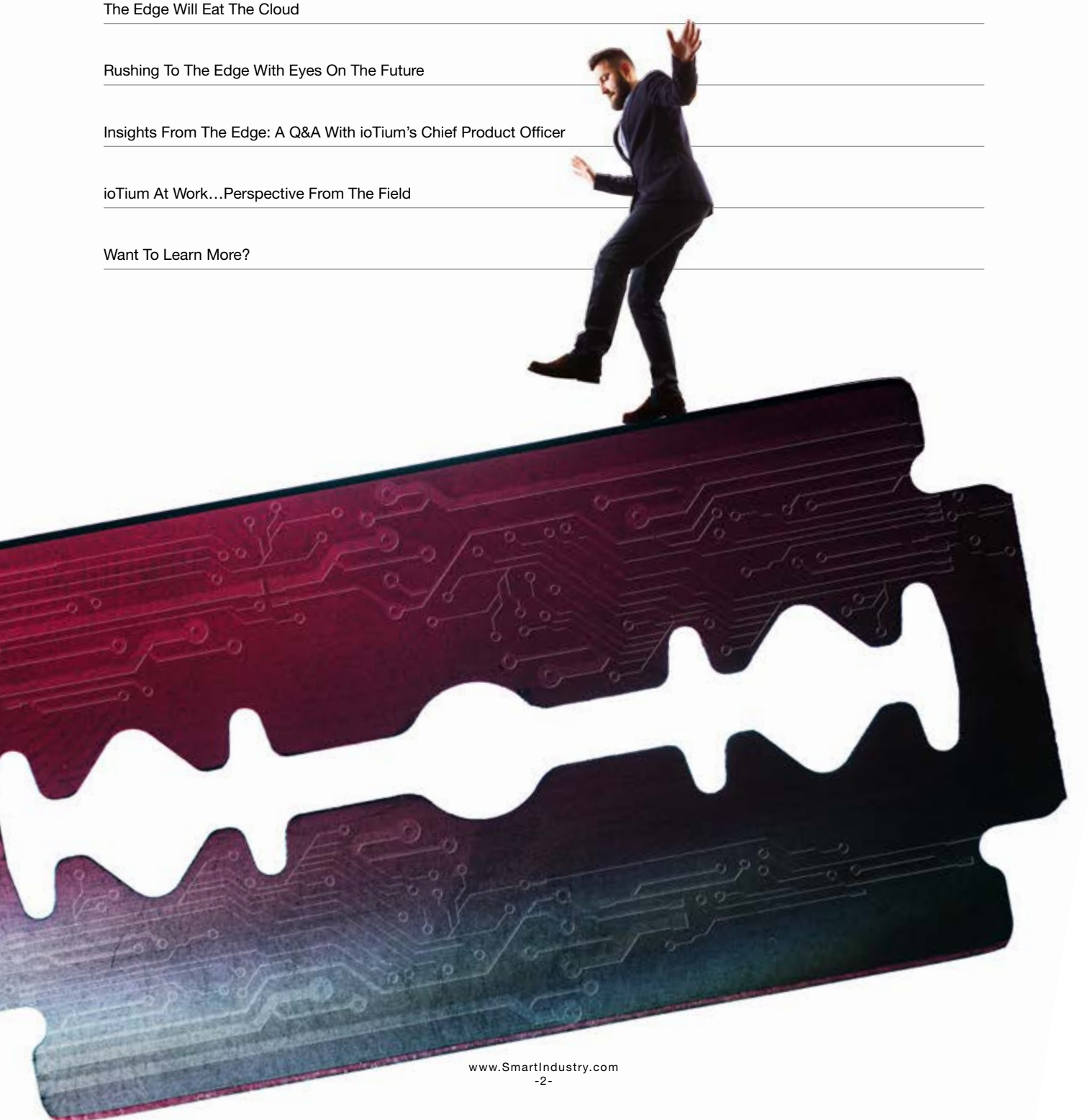

The Edge Will Eat The Cloud

By Ron Victor, ioTium CEO

There is great complexity in connected legacy assets. This much is obvious to anyone who has worked with aging machines that have—some for as long as 100 years—operated within isolated, closed systems.

That complexity can prevent business leaders from launching their digital transformation. And that might make those business leaders obsolete sooner than later.

It's dauting, for sure. Suddenly manufacturers who have been successful for decades must connect machines that have never been connected. They must change mindsets of their personnel, alter business practices, take on new roles and purchase new equipment.

And what I see as the biggest change/challenge/opportunity is this: business leaders must start to recognize the true value in edge computing. That's not an easy task when a business has, say, 5.6 million machines in play.

OUTSOURCE FOR INSIGHTS

The best approach to begin reaping the benefits of edge computing in the industrial space is outsourcing the effort—contracting experts to provide managed service to simplify the process of connecting machines (at scale) very rapidly. I like to inform prospective clients that we can connect any machine through any network through any cloud within six minutes. That usually eases some of their concerns.

The best approach is a smart, managed solution for the entire edge infrastructure on which enterprises can run myriad applications. I stress to clients the need for an agnostic approach, which eliminates vendor issues and enables them to choose which applications they want to run across their machines. (The default choice is often the existing applications they're already using.)

I consider this a *virtualize edge*—flexible, adjustable per applications and machines, enabling manufacturers to properly transition the bulk of data analytics to the edge.

The goal is to push data back and forth with ease. With the click of a button you can access machine-performance information that can inform actionable insights.

This can be a battle—edge vs. cloud. But I like to think we have created a demilitarized zone.

And that's where we get back to scale. Deployment complexity increases with each additional machine in the mix. Common questions arise. *"Do I need to build a staff to oversee this process in-house?"*

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"Will the costs outweigh the benefits of this massive undertaking?" "What's the real value in all of this data?"

But in my decades of experience overseeing these programs I have recognized that early successes always enable scaled efforts. Dip you toes. The water feels great. Jump in!

CONNECTED…BUT SAFE?

Naturally, the issue of security comes up. This is a good discussion to have early in the process. Connecting formerly isolated machines—enabling machines to talk to machines—always entails a heightened level of risk. The first issue we like to examine is how dependent the enterprise is on the cloud. The greater the dependence, the higher the level of risk.

The moment you connect, you need to make sure that your connectivity is completely secure, both in terms of the hard elements and the personnel. This extends beyond some rogue employee in the factory intent on causing harm. With 10 subsystems from 10 manufacturers you must ensure that those subsystems don't touch each other. There must be complete isolation of data—OT information disconnected from IT information, built into the transport layer.

And, of course, enterprises must have the ability to send to each vendor the data—and only the data—that is relevant to that vendor. Likewise, vendors must be able to access their information in real-time to provide remote maintenance but be prevented from peeking into other areas.

Are there hurdles to overcome? Certainly. Educating yourself about the benefits, launching your digital transformation, scaling efforts and—all the while—keeping security top of mind is a lot to take on. The older the enterprise and the more brownfield the equipment, the more resistance you will find.

But this digital transformation only needs to be undertaken by businesses that want to be around in the future.

The edge will eat the cloud, I like to say.

Pithy? For sure. But it's also true, increasingly as machines continuously gain newfound capability to produce and react to their own data, all while becoming less reliant on offsite data aggregators. Real-time cannot exist in the cloud, after all. ◻

Rushing To The Edge With Eyes On The Future

By Chris McNamara, Smart Industry content director

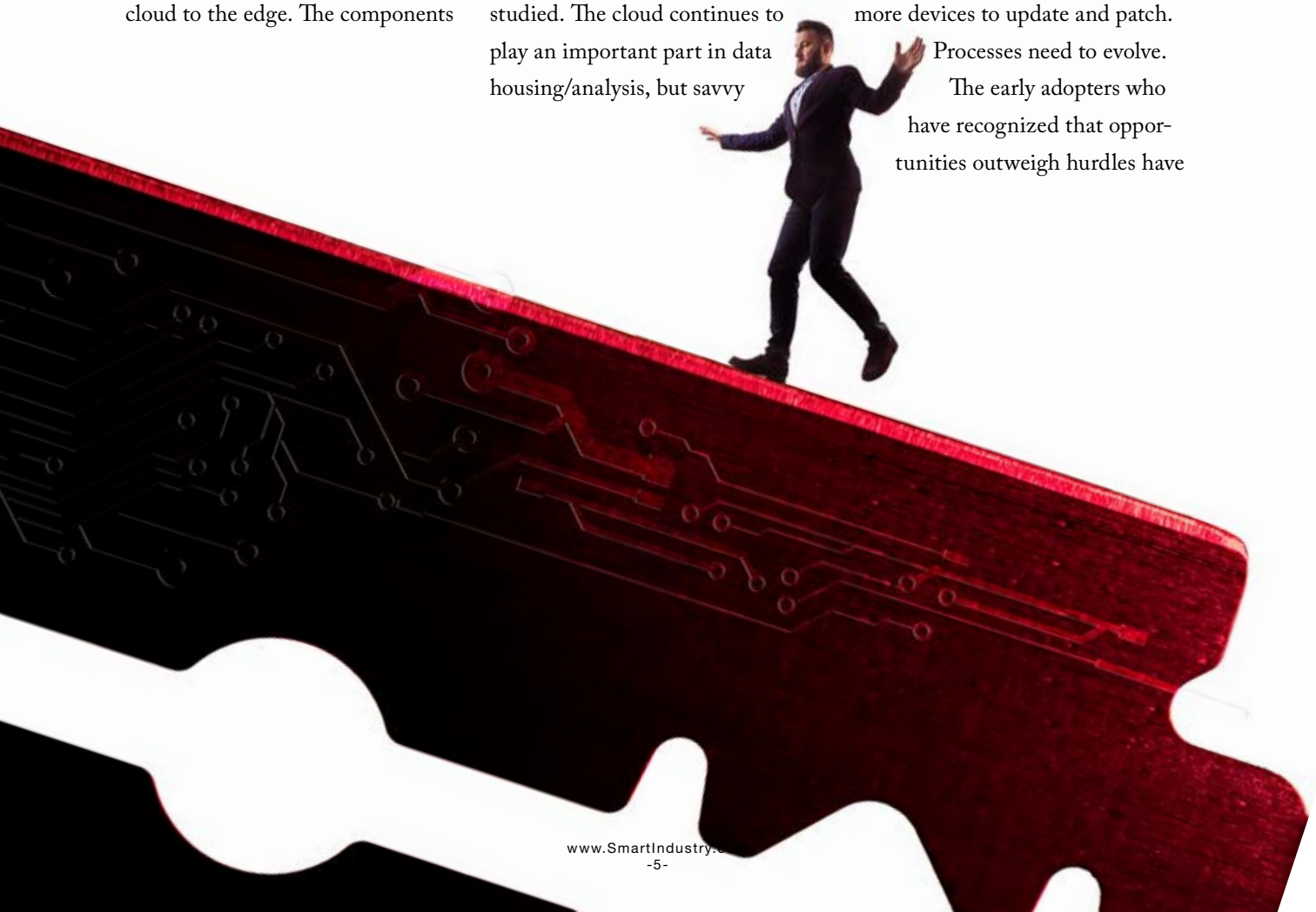
The challenge of digitally transforming your enterprise isn't merely launching deployments that work in the present; the challenge is undertaking your transformation with the foresight to enable it to be adaptable to future changes. If there's one constant in the world of IIoT, it is change.

A great example is emerging role of edge computing, as computing capabilities move from the cloud to the edge. The components producing data are increasingly able to analyze and activate it. This is a good development. This is a challenging development.

LET'S LOOK AT BOTH SIDES. With increased capabilities in edge devices—network switches, controllers and PLCs equipped with serious computing functionality—there is less need to port data to the cloud to be aggregated and studied. The cloud continues to play an important part in data housing/analysis, but savvy enterprises are properly partnering cloud/edge approaches and reaping real rewards. Likewise, the hybrid fog approach is gaining traction—applying cloud-type computing capabilities (such as virtualization) at the edge.

The challenges? Distributed intelligent edge elements add to system complexity. Security needs are heightened. There are more vulnerabilities to manage. There are more devices to update and patch. Processes need to evolve.

The early adopters who have recognized that opportunities outweigh hurdles have



The coolest thing inside the modern enterprise isn't necessarily *inside* the enterprise.

learned that the strategic selection of new technologies is critical. Simultaneously, the right personnel must be in place to oversee this process shift. Working at the edge in this manner requires a special set of skills and a mindset different than that of many seasoned professionals, many of whom just happen to be retiring. Finally…and this should go without saying… commitment to this approach must be made at all levels within an enterprise. Just as buy-in among the executive suite enables funding and strategy-development, so too is education of and commitment by the staff getting their hands dirty at the edge. This must be a team effort, if the team plans on succeeding.

It should be an easy sell. The coolest thing inside the modern enterprise isn't necessarily *inside* the enterprise. Whether we're talking windmills or oil wells or road-roaming vehicles—these assets are no longer just doing their primary jobs of generating power or sucking fuel out of the earth or transporting materials. Industrial assets are simultaneously data-generators, providing unprecedented insights on asset performance, maintenance and reliability.

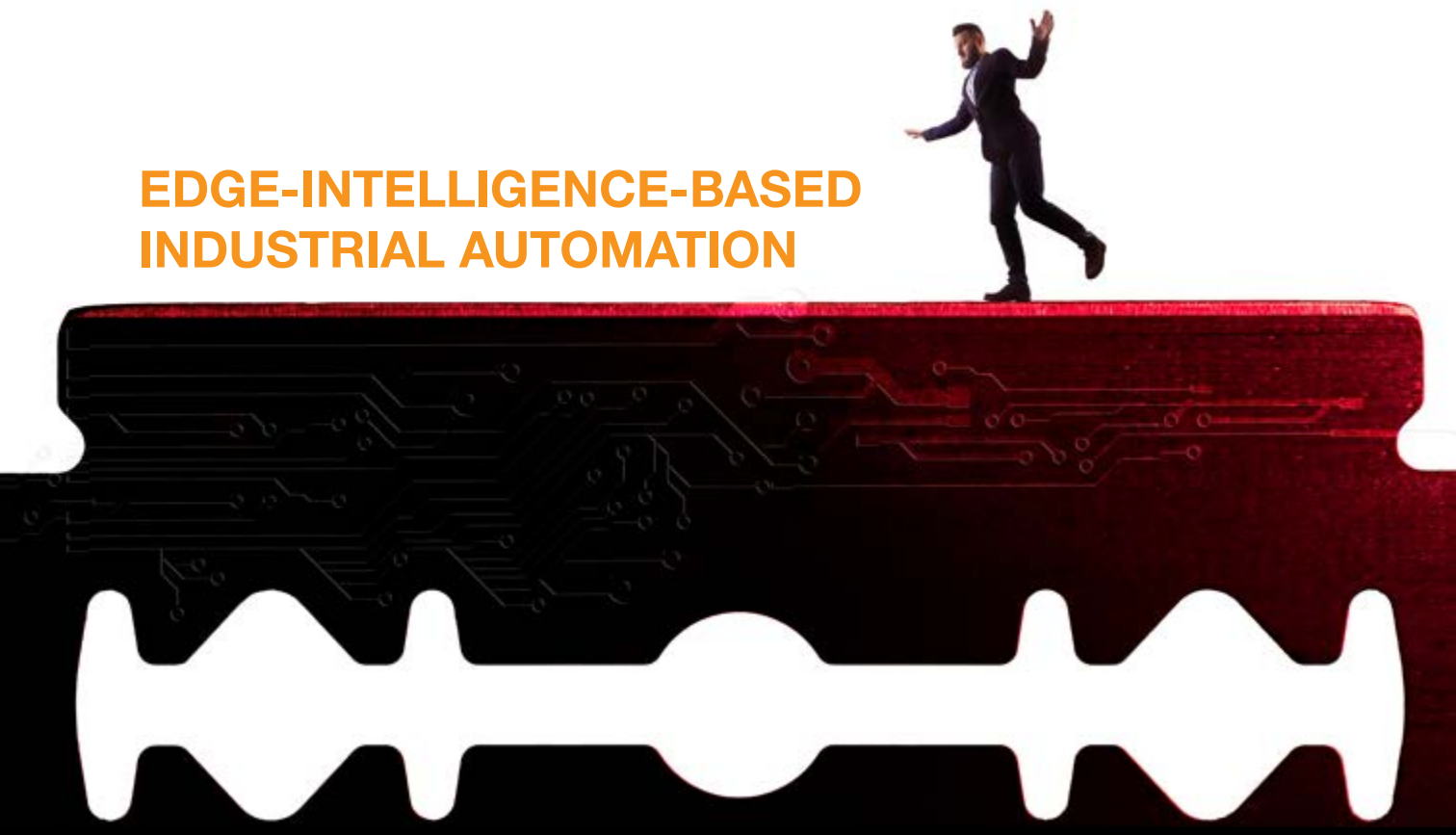
THE INTEGRATION PROBLEM

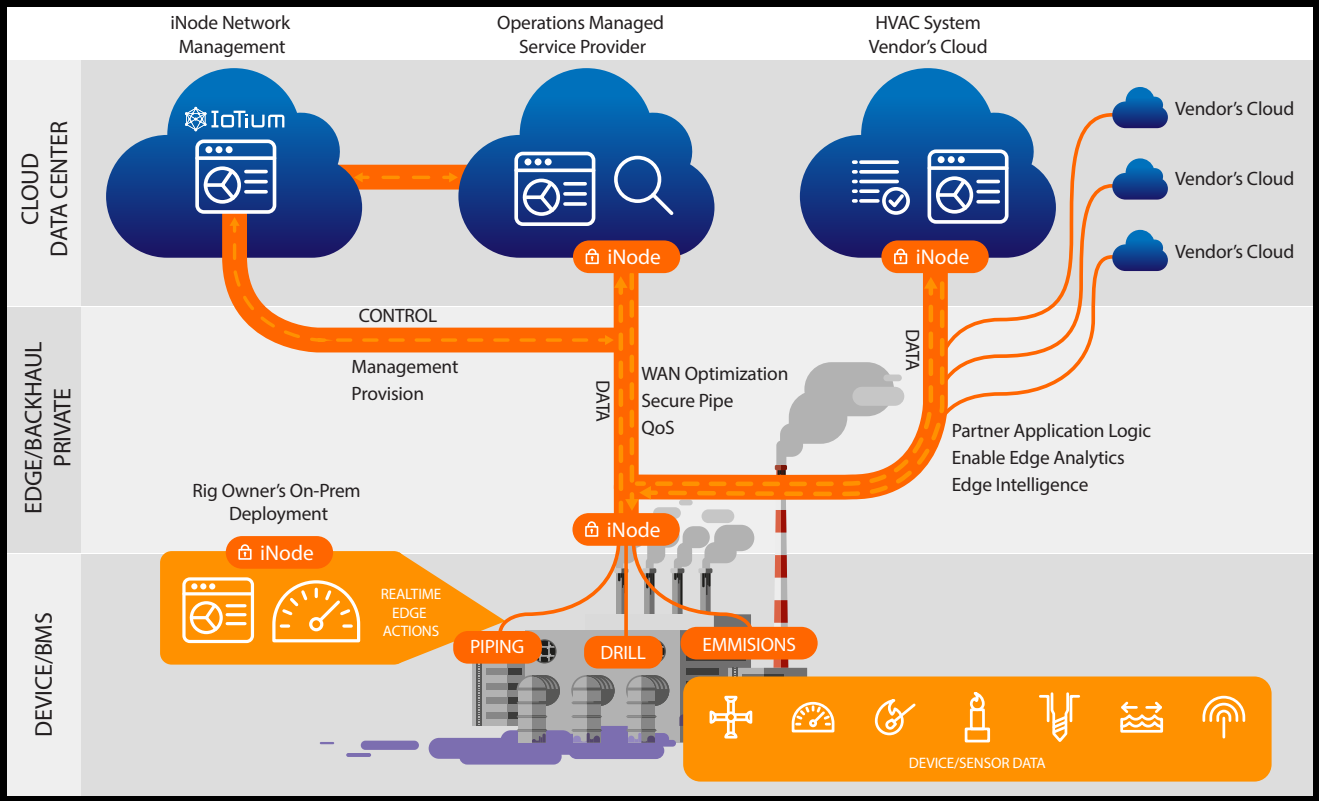
Like trying to schmooze an intimidating bouncer outside of a hot nightclub, getting into the world of edge computing can be tricky. Integration can be a challenge so scary that many people don't even get started. A huge part of that problem is that manufacturers are bound by various contracts with various vendors, which limits flexibility. Vendor X handles connectivity. Vendor Y manages cloud storage. Vendor Z oversees gateways. And business owner U—as in *you*—are stuck trying to make these disparate elements play nice as you push processes to the edge. The solution? Vendor-neutral approaches that can marry all protocols, gateways, applications and clouds.

In that vein, there are organizations attempting to standardize our approaches. The Edge X Foundry is a vendor-neutral, open-source project aimed at building a common open framework for IoT edge computing. Likewise, the Open Fog Consortium is focused on creating a framework for efficient and reliable networks and intelligent endpoints combined with identifiable, secure, and privacy-friendly information flows between clouds, endpoints and services based on open standard technologies. These are important efforts that will benefit all of us.

Just a few years ago, we were all excited about the capabilities of the cloud. And most of us are benefiting from the cloud's capability to store massive amounts of data. But in the process of sending everything *up* (figuratively speaking), we're starting to recognize the value in keeping data *down*, at the edge, where it is actually being generated, and where it is currently able to be digested and acted upon. The expansion of these capabilities will only be further proof that we're doing something right. ◻

EDGE-INTELLIGENCE-BASED INDUSTRIAL AUTOMATION





Insights from the Edge: A Q&A with ioTium's Chief Product Officer

Dhawal Tyagi is ioTium's co-founder and chief product officer, with years of experience leading teams in designing high-performance, scalable security, data-analytics and wireless services solutions. As such, he possesses a unique perspective on the evolution of edge computing. Take a look…

Smart Industry: Do enterprises understand the opportunities that await them with modern edge computing?

Dhawal: I do believe so. Our customers have provided us this feedback repeatedly—that they have very good ideas on how to leverage the advances in modern edge computing and may already have working prototypes. What they struggle with is how to deploy these solutions across their portfolio.

Smart Industry: Explain the concept of "future-proofing IIoT deployments."

Dhawal: Traditionally, industrial deployments have been made using purpose-built hardware devices. In recent years, the speed of innovation has outpaced the life of these single-purpose hardware devices and customers are struggling to do complete rip-and-replace upgrades. Recent technological advances have enabled customers to build solutions using commercial off-the-shelf hardware and virtualization techniques, with which they can deploy (without any infrastructure upgrades) advanced applications as they mature through the development cycle.

Smart Industry: What are the latest technologies/products at play in edge computing?

Dhawal: Edge computing is all about bringing applications "closer to the data." Industrial IoT demands a unique set of

Industrial IoT demands a unique set of capabilities at the edge to efficiently extract value out of the data that is being generated. If you peel the onion further, it quickly becomes clear that the hardware layer is completely commoditized.

capabilities at the edge to efficiently extract value out of the data that is being generated there. If you peel the onion further, it quickly becomes clear that the hardware layer is completely commoditized. Key challenges reside in deployment and orchestration of applications at scale, which traditional data-center-focused solutions are not designed to handle.

Smart Industry: Is the greatest challenge adopting the new tools or changing mindsets?

Dhawal: I believe that customers' mindsets are already changing, but they don't have the right tools to realize gains at scale. Lots of customers have already been in a "Proof of Concept" mode for some time now, so they clearly understand the value. But they lack the right tools to deploy these edge applications in a secure and scalable way.

Smart Industry: What is a persistent obstacle to successful edge computing?

Dhawal: ioTium's solution meets the current needs of the customers in the easiest way possible. In the future, I see continuing improvements in making the solution more flexible in handling legacy applications. Additionally, as some customers continue to migrate legacy applications to a more modern stack, our solution will continue to mature to address new challenges.

Smart Industry: What most excites you in the near future of digital transformation?

Dhawal: I am very excited about the inflexion point that we are reaching where customers are beginning to leverage ioTium's solution to truly extract the value that has stayed "locked" within their data. They are able to do this in the most secure and scalable way possible, deriving benefits that help them run their businesses in the most efficient ways. ◻

ioTium At Work…Perspective From The Field

As a multiplatform industrial leader that services a global network of customers, Milwaukee, Wisconsin-based Rexnord prides itself on developing smarter solutions in the world of bearings, couplings and gears. As part of that approach, Rexnord partners with ioTium for firmware-development for its deployment team as they secure field updates of embedded systems.

How long have you been implementing elements of IoT?

Mike: Rexnord has a team built of industry experts that have been doing machine monitoring and control for decades. And we have been shipping Industrial IoT products since early 2017.

What has been an "Aha!" moment courtesy of insights from ioTium?

Mike: It would be their supply chain integration, which enables us to simply order an industrial PC with their kernel preloaded.

How would you describe the bearings/couplings/gears industry in embracing digital transformation?

Mike: We see customers across the entire adoption spectrum. Early adopters see the business and operational gains, and have in-place infrastructure for automation, asset management, etc., into which they can add Rexnord smart devices fairly easily and begin to realize benefits immediately. Slower adopters may be missing key infrastructure pieces that make integration more challenging, and/or need further research to justify the investment. There's also a fair amount of "cognitive dissonance" among the mechanical power-transmission segment that has been in place for more than a century!

What excites you about moving forward with these new tools/capabilities?

Mike: The fact that the electro-mechanical (or digi-mechanical) world evolves at the speed of Moore's Law, doubling every 18 months or so. The fact that our digital transformation aligns with how customers' researching/buying/using patterns continue to change–largely influenced by their transformation as consumers. We enjoy working with partners that bring fresh capabilities and continue to update/renew their part of our evolving and growing overall solution. ioTium is one such partner.

There's a fair amount of "cognitive dissonance" among the mechanical power-transmission segment that has been in place for more than a century!

About ioTium

ioTium is the first commercially deployed secure Edge-Cloud infrastructure company for the IIoT. Headquartered in Silicon Valley and funded by GE Ventures, March Capital, Juniper Ventures and the Fabric, ioTium is the company of choice for Fortune 500 organizations looking to enable secure, scalable IIoT deployment today. ioTium bridges the legacy brown-field world with the new cloud-enabled world. The company's Edge-Cloud offerings have been deployed in dozens of leading organizations in the building automation, oil and gas, power and utilities, manufacturing, and healthcare verticals as well as in smart cities. ioTium solutions include the groundbreaking ioTium OT-Net; ioTium OT-Access; and the ioTium OT-Edge Edge-Cloud infrastructure solution. The company's solutions ensure that any machine, using any protocol, can be instantly, seamlessly and securely connected to any application residing in any cloud or data center through any network infrastructure and operator; while eliminating deployment complexity issues and minimizing network security risks. For more information, visit **http://www.iotium.io or email us at info@iotium.io**

THE EDGE-CLOUD INFRASTRUCTURE OF INDUSTRIAL IOT

IoTium for Manufacturing

- **Plug & Play Solution.** Connect securely to any remote industrial control systems or devices to analytics applications running in the cloud.

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