



# Jim White, CTO, IOTech Systems

## **Predictions for 2024**

1. Edge/IoT Solutions Take a Vertical Focus
2. Security Concerns, Practices and Application of Standards
3. No - Generative AI is not going to take over the edge & it doesn't have to
4. Ensuring Open Source Sustainability requires a Thriving Ecosystem

# Introduction



As has been an end of year tradition at IOTech, we try to polish our crystal ball and look into what the upcoming new year brings in the edge/IoT industry. This year's prediction routine is bittersweet to me as it will be my last. I am hanging up my mouse and keyboard and retiring at the end of 2023. I end my career on the high of serving as CTO of IOTech. The quality of people at IOTech is second to none and I am so grateful to Keith Steele (our CEO) and the whole IOTech team for allowing me to be a small part of such a wonderful group.


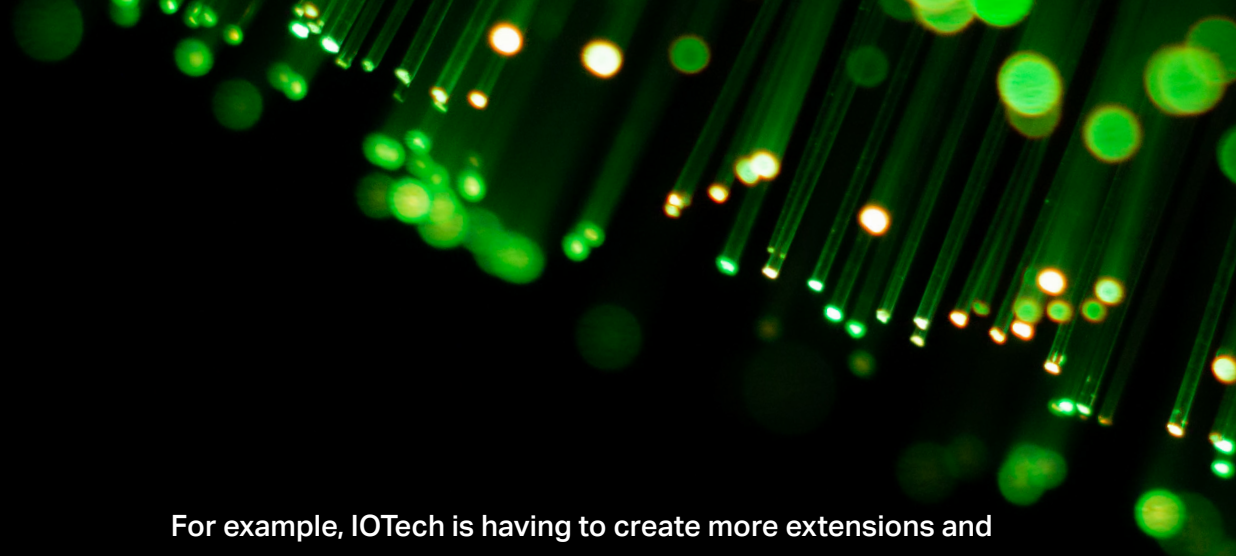
Ever want to be humbled? Make some predictions about what is going to happen in the coming year and then look at it next Christmas. It is a tall order, but we at IOTech pride ourselves on being edge experts and our past predictions have been more correct than they have been wrong. So on to 2024 we go...



# Prediction 1

Edge/IoT Solutions Take a Vertical Focus





Due to the complexity of edge and IoT computing, companies are looking for product sets (and the organizations that create them) that satisfy more of their needs. They don't want the challenges of having to assemble an edge solution from lots of disparate parts. They would like an easier path where someone gives them something that is closer to the whole solution.

This is something I identified a few years back based on conversations with our customers. It is what drove IOTech into the creation of an edge management solution. We had/have a wonderful edge platform, but found customers kept asking us how we can help deploy and orchestrate our platform to the edge.

This same problem is now more acute as organizations are looking for vertical specialization and looking to find edge products that already cover the specific needs of their industry.

For example, IOTech is having to create more extensions and customizations to our edge platform for customers in battery energy storage and building automation areas – two verticals where we have found commercial success.


I think it's inevitable. For organizations purchasing edge solutions, it makes sense. Solutions offering more out of the box can mean less effort and products that get to market faster. Yet, this can be a challenge for solution providers. How many vertical slices of the product can be effectively supported in a cost-efficient manner? How much industry expertise needs to be hired? So, look for solution providers to have to make some tough decisions in 2024 – aligning with certain industries and vertical markets.



# Prediction 2

## Security Concerns, Practices and Application of Standards





Last year, I predicted that OT Edge Security becomes a thing. Security solutions are not all there yet, but security has become a focal point for organizations building edge solutions. In the past, edge security was overlooked or haphazard; largely because projects were still in prototypical or proof-of-concept staging. Minimal protections were enough to get organizations to explore, if not productize, solutions. Now, organizations are not only asking about how security is woven into our products and solutions, they are asking about threat models, certifications and security process audits.

However, edge solutions are typically the assembly of many ingredients from disparate suppliers. So too are the security considerations and products. As an edge community, we haven't quite defined our chief threats and therefore how and what we want to defend against. Security audits still focus on things like security code scans.

While that's ok, I've often said that my biggest concern, as an edge engineer, is someone with a grudge and a \$2 Bic Lighter in proximity to a 15-cent sensor that controls how multi-million-dollar equipment will behave.


There are plenty of security products emerging. There are plenty of security standards, certifications, and audit processes (most of them originated in either IT or OT realms and don't quite fit the heterogeneity of an end-to-end edge solution). We need an edge industry that clearly identifies the real threats, consolidates around best of breed solutions and codifies the certifications and audit processes that ensure the right edge security is in place in an edge architecture. I don't think this is going to happen in a single year, but I think 2024 will establish itself as the year that more edge solution companies will cooperate to start – dare I say – edge security standards.



# Prediction 3

No - Generative AI is not going to take over the edge  
& it doesn't have to





2023 has been the year of AI. It has been in the news, in your emails, in your entertainment, potentially impacting your government (certainly politics), and your finances. In particular, all sorts of new generative AI technology and products are creating all sorts of new content, images, videos, etc. This technology has captured imaginations and financing as organizations try to figure out how and where to apply it.

I've lost track of the number of writers or industry analysts that have asked me "how is generative AI impacting the edge." It is one of the easiest questions I get to answer right now, but I also know the answer disappoints a bit due to the hype of AI. Plainly speaking, it doesn't impact edge. To be fair, we have seen a few cases where people have used generative AI tools to help create some edge code a bit faster, but this is a very small and indirect impact. By the way, frameworks like [EdgeX Foundry](#) make the use of generative AI to generate custom code modules or services more practical and easier because it has a well-defined and documented interface.

The edge creates its own "content". So generative AI isn't really impacting right now. What is needed? Analytics, and yes, potentially some AI to help digest and understand all the edge data – because

there is typically lots of it. The good news: there is a high level of return on edge investment by just using some simple analytics on edge data.

So, AI isn't required to get started. As an example, we are working with an agricultural startup that has plans to do all sorts of interesting analytics and AI with crop, water and soil data (all farm edge data). However, right now some simple conditional analytics (a.k.a. rules engines) operating on the edge data are sufficient to help improve farming operations and the crop bounty that come from those farms.

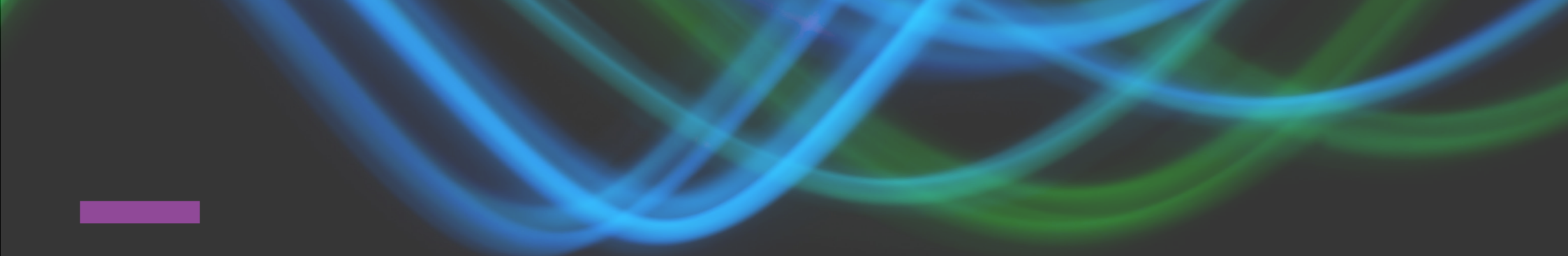
I made the prediction last year that edge solution providers would discover the fact that not everything requires AI/ML technology at the edge. The hype around AI and specifically generative AI has muddied that picture in 2023 but I still see edge solutions (and company bottom lines) improved more by simple edge data collection and actionable analytics versus trying to apply AI (certainly generative AI) at the edge. Use generative AI to create the PowerPoint deck that shows the CEO just how well your simple (non-AI) edge solution added profits to the company bottom line.



# Prediction 4

Ensuring Open Source Sustainability requires a  
Thriving Ecosystem





Those that know me, know that I wholeheartedly support the creation, curation and adoption of open source software. With apologies to Winston Churchill, I borrow and paraphrase: open source software is the worst form of software creation except for all others. Open source software is particularly important to providing baseline capabilities and ad hoc standards that enable the creation of a rich set of commercially viable products. It saves industry resources (time, energy, money) in giving everyone a better starting point and avoids having to re-invent the wheel.

Unfortunately, I am seeing too many organizations – particularly large technology organizations – reduce or abandon their open source support. In some cases, they will use a lot of open source software, but without seeing a need to support it in any way.

We are also seeing organizations that created an open source product decide that they are not getting enough return on the open source investment.

So, they changed the license of that product.

They are moving from business-friendly licenses like Apache and Mozilla to business source license (BSL). While it's a necessary step given the lack of organizations supporting (with people or financing) the open source efforts. It's why I am bias toward open source software that is created by an ecosystem versus a single company. License changes create lots of confusion or worse – disillusion with the open source ideal.


Edge and IoT open source efforts are under the same pressures. Company leadership has to have an eye on the bottom line and "return on investment." The impact of open source efforts on a company's balance sheet is not easy to draw out. I worry that some of the open source edge/IoT projects may disappear in 2024. I encourage leaders to ask your software teams a couple of questions:

1. What open source software are we using in our edge solutions?
2. What would happen if that software was to go away or not continue advancing? Specifically, what would we have to (re)create from scratch if it wasn't there?



# Other 2023 Predictions and Doubling Down





Last year, I made a few other predictions. I would say that some of these predictions have yet to fully materialize. But I am sticking to my guns and doubling down on my prediction. Meaning, I still think these predictions hold for 2024 (we've already seen some bits of evidence that suggests these are not bad bets).

### ***Hyperscalers reinvent and disrupt at the edge.***

Cloud and other hyperscalers have made several attempts at being bigger players at the edge. There have been a lot of noted failures and abandoned efforts in the last few years. Let's face it, hyperscalers know how to do scale, they just need to abandon the "send it all to the cloud" mentality and figure out how to provide more value to companies building edge/IoT solutions.

### ***CNCF figures out edge native***

As I said last year, there have been and continue to be more CNCF efforts to extend cloud native to the edge. But it's not enough to just try to shrink products like Kubernetes. The edge, often resource constrained and having unique challenges in security, networking and connectivity, require some new approaches and architectures. At the same time, IT and OT convergence requires CNCF to participate and embrace cloud native to edge native

### ***Consolidation***

The economic conditions of 2023 made big bets on edge/IoT tough. Companies are emerging from a challenging year and wanting to accelerate their edge/IoT solutions. Sure, companies are spending and betting big on AI. When will they realize that those AI engines are often fed by data coming from the edge of the network? When will they realize that decisions made by AI need to be actuated at the edge to be effective? I predict that the need to accelerate company efforts in edge development and the value of IP and industry experts available in edge solution companies will result in some purchases and consolidation. Like AI, edge/IoT, and OT skill sets (and IP) are not always part of an organization's native capabilities and not easily developed. And given the current economic environment, some of this IP and expertise can be obtained at a bargain price right now – especially in comparison to what we have seen in the AI field.

I wish everyone a happy, healthy and successful 2024.





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