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## Discussion Summary

# The Internet of Things:

## Opportunities and Applications across Industries

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**Interview Featuring:**

**Jason Mann, Director, Industry Product Management, SAS**

## Introduction

The Internet of Things is much talked about and fast becoming a fixture in some industries. And the technologies for transformative business applications are at hand. Yet many companies are slow to recognize and act on the opportunities. To explore those business opportunities, the associated implementation challenges, and how companies can accelerate their progress, IIA spoke with Jason Mann, Director of Industry Product Management at SAS.

## Q: How do you define the Internet of Things?

The closest to an official definition comes from the Internet of Things Global Standards Initiative: The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. That's a high-level definition, and the IoT goes by other names as well.

High capital asset companies like GE refer to the "Industrial Internet." The "Industry 4.0" concept originating with smart factories in Germany includes IoT elements. Even Complex Event Processing initiatives from the early 90's contained IoT-like objectives.

"Smart City" initiatives – and connected cars, smart houses, wearables – they all largely fall under the IoT umbrella.

For me, the essence of IoT resides in the source of the data, which are the sensors. Those smart devices generate data about activities, events, and influencing factors that provide visibility into performance and support decision processes across a variety of industries and consumer channels. It's something that's been in place for quite some time in many industries, but is a totally new concept for others.

## Q: If this has been happening for a while, why is IoT gaining traction now, and why is it important for businesses?

The primary driver is the broader adoption and deployment of sensors and smart devices. Sensors are smaller, cheaper and they require less power and have more compute capacity. No longer are they limited to high capital equipment and factory infrastructure; they are literally everywhere, from the traffic signal helping to optimize traffic flow to the watch that is monitoring your vital signs. Sensors are pervasive in your everyday environment.

Pair that explosion of data generation with the commodity storage options that the cloud provides and you have all of the ingredients necessary for businesses to drive tremendous value from insights that analysis of that data can provide.

Another change driving traction is the availability of technology and analytical methods that can be applied to streaming data from the sensors, data in motion. You now have the option to push decision support and performance monitoring to the edge, the source of the data. This provides expanded options for businesses to monetize the IoT.

With all this capability at hand, additional industries are starting to investigate opportunities for deploying sensors to better manage the performance of processes or machinery, as well as to track consumers' behavior and anticipate their needs and intentions.

## Q: How are some different industries approaching the opportunity of IoT?

Manufacturing industries, especially high volume facilities, are leveraging sensor data and advanced analytics to increase yield. Early identification of process or product variance allows early correction, resulting in reduced defects and increased efficiency. Processes that require highly variable elements such as temperature, pressure, and viscosity, or industries that require precision placement of components are benefiting from the increased density of sensors and insights generated from the data.

An industry with a history here is oil and gas, specifically production and refining. Downtime incurs huge risk and cost, so the industry continues to improve and expand how it uses sensors, networks, and analytics to generate predictive insight into the degradation of equipment performance and predict failures in oil fields, pipeline networks, and refineries. The result is expedited identification of possible equipment failures and optimization of the entire production process.

Electric utilities are expanding the use of phasor measurement unit (PMU) data outside normal operational reporting. Initially the PMU data was used to visualize and report on parameters such as voltage, current and frequency. New capabilities in streaming analytics allow them to use the data to identify events occurring within the power grid. The response to a lightning strike is quite different than a transformer failure. Being able to discern the difference in near real-time is critical to formulating and deploying a response.

Transportation is another industry leveraging IoT advancements. Heavy truck industries are using streaming data from the engines and subsystems to identify potential break-downs and then use that data to schedule efficient maintenance visits outside of operating hours. The technicians are pre-notified as to the potential problems and are equipped with the right repair parts for the quickest turn-around possible. Sensors are also deployed to the trailers or actual loads being transported. Heat, vibration, and sound frequency can all be used to monitor the safe transport of freight.

You see similar benefits in the automotive space. Onboard diagnostic data is being leveraged for early detection of equipment failure, safety risks, and defects. This information can be evaluated for insight into single vehicles or across fleets. The “connected car” also provides top-line growth opportunities. The trend of integrating mobile devices with in-car infotainment systems provides endless opportunities for consumer promotion. All necessary components are in place: the customer profile, geo proximity to retail or service outlets, and the channel to deliver the message to the consumer.

To continue with the consumer promotion theme, many retailers are investing in IoT programs. In-store promotion opportunities can now be targeted to individual consumers. Advancements with beacons and in-store video tracking allow retailers to deliver targeted customer-specific messaging based on their exact location and proximity to products within the store. First the consumer opts into the retailer’s app. As the customer passes end-of-aisle displays or other areas of potential interest, the store can generate an instant promotion based on his profile and purchase history, and deliver the message or coupon to his mobile device. Real-time analytics are assessing (based on the consumer profile) what promotions to present, and at what frequency and timing, as the consumer moves through the store. While the “creepy factor” associated with having every move tracked may be a hurdle for some consumers, the

benefits reported from some early pilots suggest that retailers will continue to expand deployments.

## Q: Please tell us more about the challenges of sourcing and managing all the new data.

There are several challenges. One is certainly the volume and velocity of the data itself, how fast it's moving through these sensors, and being able to react to that. In the retail example I mentioned, there's a need to understand the shopper's location, direction, and proximity to products. You simultaneously have to match the shopper with a consumer persona for purposes of promoting specific items before the shopper walks away. So you can envision how data-intensive that process can be, and how fast you have to determine and offer the promotion.

One way to speed up data-driven processes is to move computing to the "edge" – the devices closest to the action or event. But the devices at the edge, especially when it's a consumer's smartphone, may not offer the capability or access for large-scale processing and instant decision making. What can be done at the edge is continually changing, and there's been a lot of progress in the last 12 to 24 months, but keeping up is a challenge in itself.

Another challenge relates again to the sheer volume of data. What data should be transported and what data should be stored, given that there's cost associated, and that the vast majority of the data generated from most sensors is not important? For example, the data related to a potential fault in machinery is much more important than all the ongoing "everything is fine" data. So it's challenging to determine, as early and as close to the source as possible, what data should move through a business process.

Finally, we all see the news stories of cybersecurity breaches. Remote sensors and other devices and large-scale data transmissions extend the computing environment and hence the security risk. So organizations have to be able to maintain secure integration from the source of the data through any central point of analysis and decision support and back out to the local sensor or device to close the loop. We find in all customer surveys that security continues to be at the top of the list of ongoing challenges.

## Q: What's the biggest blind spot people have with regard to the Internet of Things?

As a variety of customer and analysts surveys have revealed, the biggest blind spot is thinking about IoT as predominantly a data management initiative – how to access and store all the data. But to achieve results, you need to address and manage what I call the full life cycle of IoT initiatives. Access and storage is important, but the value comes from the insights generated from the data. Any complete IoT solution also needs to provide an environment for data analysis, model development, and model maintenance. Sadly, many IoT projects do not factor in the operational elements required for sustained value.

Another element that is missing from many plans is the full consideration of data latency implications to decision support. Some applications require decision support in real-time, while others are "batch" in nature. The technology and business process for each of those scenarios varies greatly. I find that most use cases require a hybrid approach that includes both.

So fix the blind spot and recognize that we have the technological capability to manage the full life cycle, deploy IoT applications at enterprise scale, and create new business opportunities.

## Q: What surprises you about how IoT is progressing, and what disappoints you?

I'll start with the disappointment, which is the overall rate of progress to date. Gartner currently lists IoT initiatives at the top of the "hype cycle." There's a tremendous amount of business buzz, and every event you go to has IoT on the topics list. Yet when you dig in and talk to people about the next level of understanding, about plans and initiatives underway, and about results to date, you find that most companies haven't gotten very far. I see that in discussions with customers across all industries and segments. The opportunity is there, and people aren't seizing it yet.

That said, I think the situation is starting to turn, and we're seeing a pickup in recognition of how big the IoT opportunity can be. I'm excited by the new use cases that come up, and the

many pilots that are exceeding the expected returns. It's also good to see progress with IoT infrastructure in many companies, especially when they're building integrated platforms for the full life cycle – data management, analytics, decision support.

I hope organizations can leverage today's market buzz to create a sense of urgency and launch serious pilots with important use cases. And then we'll see adoption spread rapidly within and across industries. Projections about the coming pervasiveness and persistence of these sensors are astronomical. We're talking billions of sensors in five to ten years. That's just around the corner, and the decisions that you make now and the steps that you take now are going to position you for that new reality.

## Q: What three things should business and technology leaders know and do about IoT?

First, the opportunity to leverage IoT as a competitive advantage is here now, so take it. If you think you don't have an IoT use case, you need to think harder. There are opportunities across all industries. The slow progress of others can create opportunity for your business today. But if you're not working on IoT, you may fall behind quickly.

Second, taking advantage of IoT requires different ways of thinking – about how data is used, how much of it we can handle, how fast we can process and analyze it, and ultimately where and how decisions are made. This is not just a chance to better inform and automate business processes; it is a step change in capability that provides unprecedented opportunities in business integration and customer connection.

Third, on the technical side, the definition of "edge" is changing. Compute capacity once available on servers has moved to routers and gateways, and what used to be available on routers and gateways happens on local devices and the sensors themselves. Analytics is moving to the edge as well. You no longer need to land the data for analysis; you can now take analytics to the data, while it is in motion.

To take advantage of these trends, the technical architecture for IoT must be adaptable – at the same time that it serves the full life cycle of data, analytics, and decisions.

## Additional Information

To learn more about this topic, please visit **sas.com/iot**.

## About the Interviewee

**Jason Mann** is Director, Industry Solutions Product Management and IoT Strategy. He manages the product development direction for SAS' solutions in Manufacturing, Energy, Retail and Health and Lifesciences. His primary area of focus is the application of analytics to identify and solve industry specific business issues.

Mann coordinates forward-looking solution development and consistent delivery of the SAS brand across the company's 14,000 employees in over 400 offices worldwide.

Prior to joining SAS, Jason spent 10 years with Nortel Networks. His management experience and areas of expertise include ERP, manufacturing, demand management and supply chain operations.

Mann received a bachelor's degree in industrial engineering from North Carolina State University in Raleigh, North Carolina.