

2018 TAKES THE STAGE

2018 waits under the marquee with anticipation. It was only a few years ago that we were reading reports of the next Industrial Revolution, called the Industrial Internet of Things (IIoT) and how it was going to disrupt everything by merging operational and informational technologies across all departments, throughout all industries, and around the globe. Market sizing by some estimates was USD 170B in 2017 (ARM Limited), to USD 267B by 2020 (Forbes), and USD 934B, by 2025! (Grand View Research). Fast forward to today -- IIoT is the hottest ticket in town.

In just the past few months, the Industrial Internet Consortium (IIC) has powered through a number of deliverables including publication of the Edge Computing Edition of the [Journal of Innovation](#) and the [Industrial IoT Analytics Framework](#) technical report. A recently published white paper by the [Smart Factory Task Group](#) discusses how to get started in IoT by creating a “green patch” in your “brownfield” factory environment. Two new testbeds were introduced this quarter: [Digital Solar Plant Testbed](#) and [Manufacturing Quality Management Testbed](#). One of our testbeds reporting significant results is the [Intelligent Urban Water Supply Tested](#), featured in this Journal of Innovation and several others have been summarized in our report, “[Why We Build Testbeds: First Results](#).” In addition, we have established liaison agreements with [Avnu Alliance](#), [EdgeX Foundry](#), [Industrial Internet Brazilian Association](#), [NEMA](#) and [oneM2M](#).

The Industrial IoT Analytics Framework

Advanced analytics is at the core of the IIoT. When analytics are applied to machine and process data, they help optimize decision-making and enable intelligent operations. These new insights and intelligence can be applied across any level of any industry if the appropriate data can be collected and analytics are applied correctly. Data analytics is the new engine that is driving IIoT transformation. The [Industrial IoT Analytics Framework](#) is a first-of-its-kind blueprint that maps analytics to IIoT applications.

Testbeds – Venture Boldly!

The IIC is a global theater for the IIoT. The IIC’s unique and powerful combination of industry leaders, economic focus and dynamic technology gives its members a platform for huge impact. At center stage, we have the Testbed Program; an incredible resource for the industry and for our members.

At the highest level, the testbed program exists to substantially impact the IIoT market. And for any complex IIoT implementation to be successful, there are diverse technologies that need to be integrated. Testbeds serve as demonstration proof points of interoperability, architectural patterns and technologies. This lets the IIC establish best practice examples for IIoT system implementers. The IIC does not seek

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testbeds that address minor applications; testbeds must deliver real technical acceleration with significant economic impact on success. They must answer real questions and deliver real results.

In the end, the IIC testbed program intentionally takes risks. We fully expect some efforts to fail. That's OK. Testbeds exist to test something. The main outputs should be learning and feedback. With ambitious goals, clear process, and community involvement, the testbed program can be a driver of the IIC's success. As the saying goes, "nothing ventured, nothing gained."

Venture Boldly!¹

Digital Solar Plant Testbed

Renewable energy is a transformative solution that will meet energy as well as economic challenges globally. However, utility companies face several issues as global interest in solar energy soars – from mitigating operational and regulatory risks to maintaining efficiencies and improving capacity utilization. The [Digital Solar Plant testbed](#) includes framework for solar plants plus platform integration, providing the necessary insights and dashboards for plant status, forecasting and data analytics.

Manufacturing Quality Management Testbed

China has been the "World's Factory" especially for manufacturing labor-intensive products, for more than two decades. In recent years, as the world is moving towards Smart Manufacturing, the Chinese industry has been feeling the pinch from facing the enormous challenges of the number and diversity of factories needing to be upgraded. By managing the quality measures throughout the production line and using them as the key factor to demonstrate the effectiveness of the improvement while modernizing the existing factory, the testbed team adopted the IIC's [Industrial Internet Reference Architecture \(IIRA\)](#) and constructed the testbed with advanced data collection, analysis and process management capability.

Special Report – Why We Build Testbeds: First Results

After three years of testbeds making groundbreaking innovations and discoveries in IIoT, the Industrial Internet Consortium is pleased to announce a free report giving you an inside look at how our testbeds have matured. [Why We Build Testbeds: First Results](#) reflects on our astounding growth from two to twenty-six testbeds. It describes specific results from several testbeds and draws some conclusions across multiple testbeds in the program.

Testbeds highlighted in the *First Results* report are:

- **Track and Trace** – Improves the overall manufacturing process by accurately tracking and tracing industrial assets and collecting usage and status data in industrial factory, maintenance and logistics environments.

¹"*Venture Boldy*" is an excerpt from IIC Blog by Stan Schneider, CEO & Founder Realtime Innovations, Inc. December, 2016. <http://blog.iiconsortium.org/2016/12/index.html>

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- **Time-Sensitive Networking (TSN)** – Winner of the IoT Solutions World Congress Testbed Award and the IIC Testbed Showcase, the TSN Testbed brings a number of enhancements to Ethernet (a foundational piece of IoT) – time synchronization, sending scheduled traffic flows and central, automated system configuration.
- **Communication and Control for Microgrid Applications** – Examines IoT technologies that solve engineering challenges associated with energy microgrids while focusing on open architectures and interoperability.
- **INFINITE** – Provides an interoperable infrastructure to test solutions and drive the development of IIoT products. INFINITE's anchor use case, "Bluelight," seeks to enable intelligent route planning for emergency ambulance services as they are dispatched to an incident and en-route to the hospital.
- **Condition Monitoring for Predictive Maintenance** – Demonstrates the value of continuously monitoring industrial equipment to detect early signs of performance degradation or failure.
- **Manufacturing Quality Management** – Retrofitting existing manufacturing facilities with modern technologies by leveraging the IoT and sensory network technologies for data collection, transmission and intelligent storage to support an effective data processing scheme.
- **Smart Factory Web** – Creating a network of smart factories to improve order fulfillment by aligning capacity across production sites with flexible adaptation of production capabilities and sharing of resources, assets and inventory.

Our October report is the first of many, as our many testbeds continue to report results. To subscribe to future reports, please send a request to info@iiconsortium.org.

New Liaison Members

The Liaison Working Group continues to approve and pursue strategic technical relationships with over 65 organizations including Avnu Alliance, ITAC, CAICT, ISO/IEC, IEEE, OASIS, OMG, SGIP and many others. Recently established Liaison Members of the IIC include:

[Avnu Alliance](#)

[Avnu Alliance](#) (Avnu), is a community creating an interoperable ecosystem of low-latency, time-synchronized, highly reliable networked devices using open standards. In working together to help drive industry awareness surrounding the benefits of TSN Time Sensitive Networking), Avnu and IIC hope to maximize industry interoperability between IIoT systems, while increasing portability, security and privacy for the industrial Internet now, and into the future.

[EdgeX Foundry](#)

[EdgeX Foundry](#) is an open-source project building a common interoperability framework to facilitate an ecosystem for IoT edge computing. EdgeX Foundry's primary goal is to simplify and accelerate IIoT by delivering a unified edge computing platform supported by an ecosystem of solutions providers. EdgeX Foundry is hosted by [The Linux Foundation](#).

What's New at the IIC?

Industrial Internet Brazilian Association

The [Industrial Internet Brazilian Association](#) (ABII), is a non-profit organization accelerating the adoption of the industrial Internet in Brazil. This liaison with IIC connects the Brazilian IoT ecosystem to rest of the world. Reciprocally, the liaison relationship also provides access to the Brazilian market for IIC members.

NEMA

The [National Electrical Manufacturers Association](#) (NEMA) represents electrical equipment and medical imaging manufacturers at the forefront of electrical safety, reliability and resilience, as well as efficiency and energy security. NEMA provides a forum for the development of technical standards that are in the best interests of the industry and users, advocacy of industry policies on legislative and regulatory matters, and collection, analysis, and dissemination of industry data.

oneM2M

The purpose and goal of [oneM2M](#) is to develop technical specifications which address the need for a common M2M Service Layer that can be readily embedded within various hardware and software and relied upon to connect the myriad of devices in the field with M2M application servers worldwide.

Want to learn more?

- Download the Why We Build Testbeds -- First Results Technical Paper here: www.iiconsortium.org/pdf/Why_we_build_testbeds-first_results_091917.pdf
- View video on the importance of testbeds here: <https://youtu.be/NZp8WgDNzi8>
- View membership value video here: https://youtu.be/_HrWDtoPa9Q
- View membership information and rates here: www.iiconsortium.org/become-member

Quick Links:

- Technical Documents: www.iiconsortium.org/white-papers.htm
- Testbed Overview: www.iiconsortium.org/test-beds
- Member Directory: www.iiconsortium.org/members
- Liaison Working Group: www.iiconsortium.org/wc-liaison
- Journal of Innovation: www.iiconsortium.org/journal-of-innovation
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