

The Industry IoT Consortium's (IIC) fourth-quarter member meeting was held face-to-face in Long Beach, California, December 7th ~ 9th. You heard me: *face-to-face*. It was another success with:

- a good number of on-site attendees, and more virtual attendees,
- seven technology track sessions,
- six plenary track sessions, including the virtual member meeting opening,
- six security track sessions,
- four digital transformation presentations,
- two marketing and innovation track sessions plus a member-value panel,
- testbed and test drive updates and
- two keynote addresses: "Space Robot Operating System, a new collaboration between Blue Origin and NASA" by Amalaye Oyake, Senior Flight Software Engineer, Blue Origin; and "Introduction to the Augmented Reality for Enterprise Alliance (AREA): Potential Areas and Opportunities for Collaboration" by Christine Perey, AREA Founder, and Founder and Principal Analyst, PEREY Research & Consulting.

The meeting profiled one published paper from the several groups: the [Industrial IoT Trustworthiness Framework Foundation](#), which describes trustworthiness as the degree of confidence one has that the system performs as expected. Characteristics include safety, security, privacy, reliability, and resilience in the face of environmental disturbances, human errors, system faults, and attacks. It discusses in detail how these characteristics can be reconciled to make a system trustworthy. (We profiled this work in a prior quarterly report.) It also outlines eleven principles to help reconcile the characteristics.

We also published a technical brief on [Virtualized Programmable Logic Controllers: A Paradigm Shift Toward Industrial Edge and Cloud Computing](#). (A technical brief is a short report attributed to named authors, rather than an 'official' publication of the IIC.) The report outlines "virtualized" PLCs that are PLCs (ruggedized microprocessors used in industrial applications) that can be treated as logical processors sharing jobs, rather than one processor doing one specific thing. These VPLCs are, of course, placed near "the edge" in an industrial IoT system, but have many of the capabilities once limited to data centers.

We also published one testbed: [The Automotive and Over-The-Air Update Testbed](#) demonstrates how software can be managed (deployed, updated, and replaced) on a fleet of vehicles remotely. It covers standard topics such as vehicle control and data handling: collection, filtering, and analysis. The solution also addresses the specific automotive safety risks in a cybersecurity realm and introduces Li Fi as a complementary wireless communication option for such updates as well

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as general V2X communication. While the focus is on automotive, OTA is applicable to other domains such as healthcare, manufacturing and any IoT devices that need updating.

This quarter also saw the publication of the November 2021 edition of the peer-reviewed Journal of Innovation: [Rapid Advancements in Digital Transformation](#). We held a plenary session to outline the results from each article. All of the articles are fascinating, but [Digital Transformation in Practice: Learning from IIC Deployments](#) is of special interest because it showcases what we have learned from testbeds and test drives.

CROSS-COLLABORATION

The IIC is just one program of many at the [Object Management Group® \(OMG®\)](#), which was founded in 1989. Its focus is to build communities around advanced technologies to enable collaboration to advance the creation of markets of value to everyone. It has several programs, each with many members from hundreds of organizations including users in over two dozen vertical markets from healthcare, automotive and insurance and virtually every large organization in the technology industry.

OMG's one organization, one vote policies ensures that every member organization—whether large or small—has an effective voice in the approval of joint work. OMG hosts the [Consortium for Information & Software Quality™ \(CISQ™\)](#), the [DDS Foundation](#), and most recently the [Augmented Reality for Enterprise Alliance \(AREA\)](#).

Three additional programs met in Long Beach:

- Industry IoT Consortium (you know who we are),
- the [OMG standards-development organization](#) and
- the [Digital Twin Consortium](#).

The mission of the OMG standards-development organization is to develop technology standards that provide real-world value for thousands of vertical industries. OMG standards are driven by vendors, end-users, academic institutions and government agencies. They develop enterprise integration standards for a wide range of technologies and an even wider range of industries.

OMG's modeling standards, including the [Unified Modeling Language® \(UML®\)](#) and [Model Driven Architecture® \(MDA®\)](#), enable powerful visual design, execution and maintenance of software and other processes. To become an OMG standard, there must be an implementation; this guarantees that all OMG specifications are immediately useable. Many OMG specifications have also been adopted in their entirety by ISO as [ISO standards](#).

The Digital Twin Consortium was founded in May 2020. It brings together innovation leaders from industry, government and academia to drive consistency in vocabulary, architecture, security and interoperability of digital twin technology. Its global membership is committed to advancing best practices and standards requirements for themselves and their clients. There is some overlap

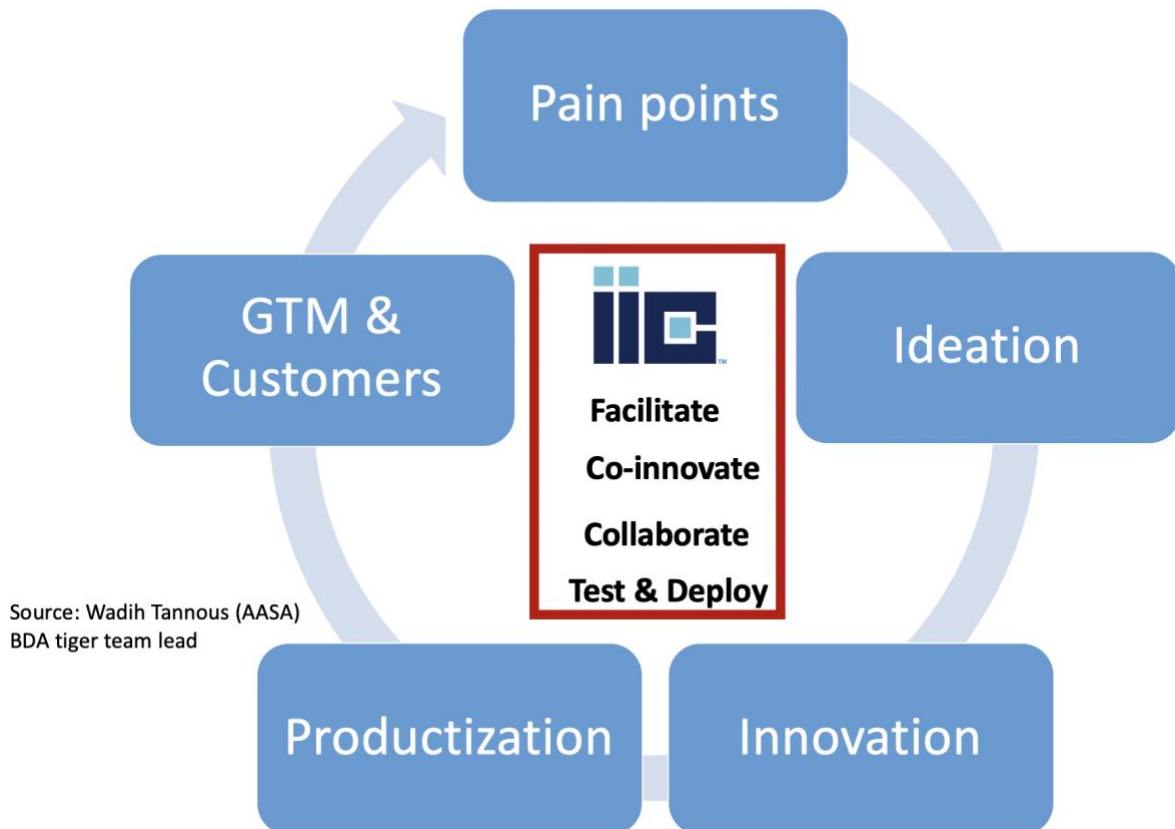
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with IIC because digital twins are a digital transformation enabler in the Industrial Internet of Things.

With this background, you can see that there can be overlap in technologies. This meeting was an opportunity to collaborate across programs, and the fact that we were face-to-face was a bonus. Consequently, we established several joint sessions under liaison agreements between the programs and permitted individuals to join sessions of interest under the cross-participation program.

HELPING USERS

A part of our rebranding to “Industry IoT Consortium” is a clear focus on helping users—that is, *applying technology in the field*. To facilitate that we have established the Business Deployment Accelerator Tiger Team. The group objective is to address pain points that Industrial Internet of Things users face in their businesses.



The group collects pain points with the goal of creating a pain-point repository for IIC members organized by business operational technologies and user solutions as well as how to use the various resources available that will lead to a practical guide on how to support the go-to-market strategies and reach the customers.

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The group also identifies the key technologies, deployments and digital transformation enablers that resolve them. These business deployment accelerators are used in go-to-market strategies and mapping of potential “customers” who will benefit from them. Testbeds and test drives are the vehicles to test solution to resolve the pain points. The goal is to engage users to understand business challenges and involve the IIC ecosystem to co-create a solution.

The Industry Working Group is also collaborating with the [Digital Transformation Working Group](#) to define and identify digital transformation enablers. The initiative identifies sets of end-user-driven use cases and digital transformation technology enablers for which IIC members can develop guidelines, best practices, frameworks, test drives, testbeds and business pain points. It focuses on specific application areas of interest to specific verticals and technology that can be applied to enable use cases in multiple verticals.

The [Business Pain Point Collection](#), [Industry Leadership Councils](#), [Special Interest Groups](#), [Test Drives](#) and [Testbeds](#) together establish a close connection to user business impact, technology and solutions.

The [Industry Leadership Councils](#), spearheaded by the Industry Working Group, are executive roundtables of innovative strategists representing organizations who meet regularly to set the vision for next-generation solutions in their respective industries. Due to the very busy week planned in Long Beach, this meeting was held the week prior.

The Vertical Task Groups are looking to identify architecture patterns and reference architectures that support deployment of use cases for their respective industries.

PATTERNS

We are gathering, creating, and publishing architectural and design patterns for use in industry to support the selection of patterns by providing guidance and expert knowledge in various forms.

[Patterns](#) are providing solutions for recurring problems and offer a possibility to present knowledge in a compact and simple way. This year, the IIC has described eleven patterns and made them available in the [public repository](#). Three algorithmic/microservice design patterns, three computing model design patterns, and six architectural patterns have been collected to date. More patterns from the fields of energy, security, and healthcare will follow.

In fact, the [Health Care Task Group](#) completed the [Remote Patient Monitoring](#) architecture pattern which was split into two patterns: a generic pattern and a specialization of the generic pattern to the remote patient monitoring. The current focus is on the [Air Quality Measurement](#) architecture pattern.

End products are posted on the [Resource Hub Patterns Webpage](#). You can submit a pattern using the [Pattern Template](#).

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WEBINARS AND PUBLICATIONS

Visit our [Webinars Webpage](#) for access to one IIC-hosted and three liaison syndicated webinars this past quarter as well as a comprehensive list of past and future webinars.

A complete list of IIC publications can be found [here](#).

NEW MEMBERS

Please welcome new members this quarter:

- [BIRD INITIATIVE, Inc.](#)
- [AdvME LLC](#)
- [Ahoj](#)
- [Opticoms GmbH](#)
- [CityAir Corp.](#)
- [Senseforce GmbH](#)
- [Maplewell Energy](#)

The Industry IoT Consortium® (IIC®) delivers transformative business value to industry, organizations, and society by accelerating adoption of a trustworthy internet of things. The IIC is a program of the Object Management Group® (OMG®). Visit www.iiconsortium.org.



IIC members gain experience they could never have as a non-member. Here are some key benefits of membership:

- **Networking**—Make the connections; find the needed expertise.
- **Information & News**—A fast pass to newsworthy industry developments.
- **Competitive edge**—Stay ahead of the competition or take advantage of changes and developments that might otherwise have passed you by.
- **Create a market**—Join a collective voice supporting a single mission; create the disruption in the market and develop the business opportunities.
- **Establish a vision**—Members work to define future architectures and innovate technologies for IIoT.
- **Success**—Members are building businesses and dedicating their professional lives to IIoT. They want to be successful, and they want others to succeed.
- **Professional development**—Grow your career, meet mentors and mentees, career prospects.
- **Solve important problems**—and help your partners and customers.
- **Events**—Capitalize on opportunities for continuous exposure to industry developments.