

The Industry IoT Consortium's (IIC) second quarter of 2022 member meeting was held physically, in Orlando, Florida, USA, June 20th ~ 22nd. This meeting had multiple interesting keynotes:

- Florida High Tech Corridor: Clustering for Increased Innovation Capacity
- Innovation Keynote Panel: Digital Transformation in Orlando
- Security Maturity Models
- Manufacturing Industry Leadership Council
- Advancing Energy Through Enterprise-Wide Innovation and Cultural Transformation

The meeting profiled recent publications and a test drive:

- Industrial Internet [Connectivity Framework](#)
- Security Maturity Model: 62443: [Mappings for Asset Owners and Product Suppliers](#)
- Journal of Innovation: [Role of Artificial Intelligence in Industry](#)
- Industrial IoT [Artificial Intelligence Framework](#)
- [Ahoy Test Drive](#)

DIGITAL TRANSFORMATION ENABLERS

The theme of the meeting was *digital transformation enablers*. These are specific digital technologies, best practices or approaches that (surprise!) enable digital transformation. The effect of a given enabler extends beyond the resolution of technical problems into discovering challenges, providing new perspectives on current problems and uncovering previously unconsidered use cases. The disruption expands beyond the boundary of technology and into the business realm, transforming the way companies think, operate and act.

Industrial digital transformation (IDX) is a business endeavor focused on the application of digital transformation enablers *in industry*. It implies strategic realignment of the organization to improve business models, industrial models and processes and ultimately to create new ones. An example of an industrial digital transformation enabler is “machine learning”.

An *industrial digital transformation enabler playbook* describes a digital transformation enabler, how to use it, provides examples of its use in real-world applications, describes issues that have to be considered, the concerns that have to be dealt with, and how. A playbook offers examples and insights into ways this enabler has been successfully deployed in industrial IoT environments to transform businesses and their operations. It provides guidance to help organizations uncover transformative solutions to deal with customer problems, enabling the creation of value-added services that drive new revenue streams.

A digital transformation enabler playbook is aimed at a wide range of stakeholders, such as the CXOs who are mainly concerned about digital transformation and how a technology enables it, and the system architects, engineers and operators who implement and operate it. It helps a

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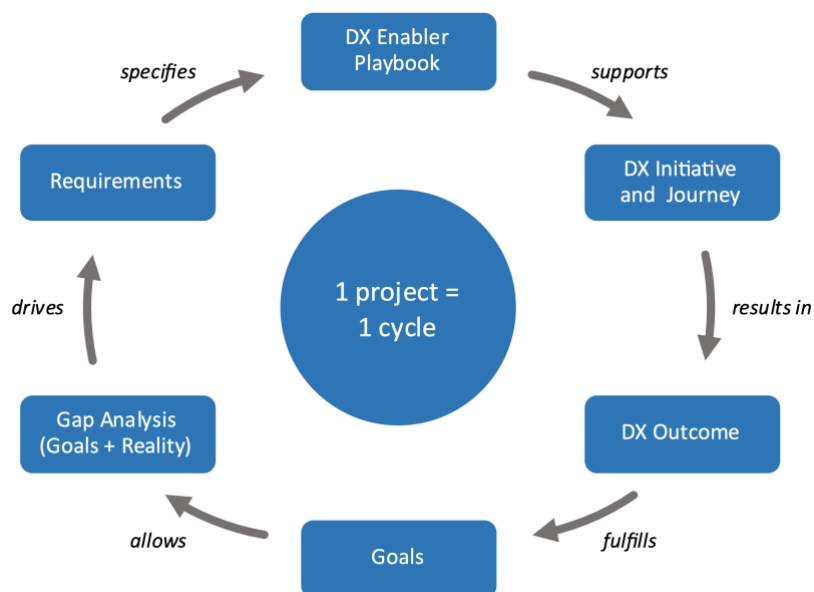
stakeholder understand ways in which this DXE can transform a core process and ultimately a business, ranging from strategies to policies. DX efforts are driven by business initiatives that are often motivated by *pain points*, such as difficulties in uploading software to automobiles or the high costs associated with unscheduled maintenance. An example is shown below.

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A DXE playbook comprises a set of guide points that complement the maps that frameworks provide. A framework describes the preparatory work needed before the DX journey can start, the type of sponsorship needed to support the initiative and the stakeholders and leadership involved in the execution of the initiative. A specific playbook looks at the role of the DXE in enabling the sought-after transformation and accelerating it. Some DXEs apply to a specific set of application verticals, although many can be employed universally. Examples are included for a deeper understanding.

The following diagram highlights the steps involved in using a digital transformation enabler:



These steps are typically executed in the following order:

1. The reader understands the DXE playbook.
2. That knowledge enables tasks that support the DX journey.
3. This journey enables the organization to achieve a transformative outcome.

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4. The organization is now equipped to fulfill new goals.
5. Gap analysis shows how the organization can be improved and drives the creation of new requirements.
6. New requirements may call for the deployment of a new technology that has not yet been considered.
7. The reader obtains another DXE playbook focused on this new technology and restarts the process.

With a digital transformation enabler playbook, we have the tools to be able to understand the digital transformation enabler, how to apply it, and transform our businesses. They turn headwinds into tailwinds.

OTHER GROUP ACTIVITY

Digital Transformation Working Group

The *Digital Transformation Working Group* is working on digital transformation enablers, as described above, and on industrial digital transformation looking carefully at the processes involved in industry. It is identifying tools for speedy and deep innovation (product, process and business model) process for user industries and identifying key issues for solving possible conflicts between the tool-driven innovation processes and organizational structure, incentives and funding system. The group is developing a framework to help solution operators undergoing digital transformation create their own innovation processes resolving problems integrating IT and OT.

We also held a Digital Transformation Industry Day in April. You can find the links below:

- Opening Keynote by Accenture: [Digital Transformation and AI in Action](#)
- [The IIC Digital Transformation Perspective](#)
- [Case Study in Steel Inspections by Toshiba: Metalspector](#)
- [Keynote by Mitsubishi Electric: A Continuous Improvement \(Kaizen\) Approach for Realistic Digital Transformation in Smart Manufacturing](#)
- Panel Discussion: [Real-World Advancements in Digital Transformation](#)

Industry Working Group

The *Industry Working Group* engages industry leaders and technology users to understand their IIoT needs and facilitate digital transformation in their business. It has two initiatives:

- The Digital Transformation Enabler Initiative identifies sets of end-user-driven use cases and digital transformation technology enablers that it can support through development of guidelines, best practices, frameworks, test drives, testbeds and business pain points. The initiative focuses on specific application areas of interest to specific verticals and technology that can be applied to enable use cases in multiple verticals. This initiative led

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to the digital transformation enabler you see above and a template for future digital transformation enabler.

- The Business Deployment Acceleration Initiative identifies customer pain points, business challenges and collaborative co-innovation activities to solve them. The goal is to engage end users to understand business challenges and involve the IIC ecosystem to co-create a solution. This initiative led to approval of the [Ahoy Test Drive](#).

The group supports several vertical groups (below) that are identifying architecture patterns and reference architectures that support deployment of use cases for their respective industries.

The *Smart Factory Group* identifies the technology, security and market criteria necessary to promote the adoption of the industrial internet in factories. There is a strategic focus on engaging end-users in all initiatives to address real business needs. This group is exploring Autonomous Manufacturing and Data Lifecycle & Ownership and looking at collaboration with the Digital Twin Consortium to ensure interoperability. They have also taken on the planning for the Manufacturing Industry Leadership Council. The group held a [Global Industry Organizations Workshop](#) at IoT Solutions World Congress, in Barcelona. This workshop resulted in an accompanying [paper](#). The group also seeks examples of maturity models deployed in factories.

The *Healthcare* group is focused on using IoT and IIoT solutions that provide safer and more efficient patient care. It promotes testbeds, facilitates collaboration with academia, industry and government. It develops patterns, promotes standards and whitepapers.

It is working on identifying technologies and digital transformation enablers as well as defining terminology, outcomes and patterns. The 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 Cyclist Performance Monitoring architecture pattern.

The *Energy* group identifies and establishes the technology, security and market criteria necessary to establish standards and specifications leading to wide-spread adoption of the industrial internet in this sector. It brings together business and technology experts in the energy sector from around the world to verify the feasibility of technology solutions and assess the viability of new business models emerging with the adoption of IIoT. It is working on Energy Reference Architecture Patterns.

The [Automotive and Industrial Over-The-Air](#) group promotes OTA updates and related technologies to end users in the automotive, intelligent transport systems and other IIoT industries. The group identifies and develops best practices, test drives, testbeds and use cases that guide the application of OTA and related. This is supported by the “Go Kart” testbed that 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,

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filtering, and analysis and automotive security and safety risks. It also introduces Li Fi as a complementary wireless communication option for updates and general V2X communication.

The *Mining* group helps mining operators and mining equipment manufacturers optimize business operations and find new revenue streams. The objectives include global collaboration, engagement with global mining companies and organizations, research, whitepapers, case studies, mining reference architecture and development of mining test beds. The group is working on addressing mining end user security pain points and use cases, to support an IoT Mining Security Maturity Model profile.

The [*Business Deployment Accelerator*](#) group addresses the pain points that IIoT users face in their businesses, and identifies the key technologies and digital transformation enablers to 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 solutions to resolve the pain points.

It is creating a pain-point repository for IIC members organized by business operational technologies and end-user-solutions and how to use them various. This will lead to a practical guide on how to support the go-to-market strategies and reach the customers.

The [*Manufacturing Industry Leadership Council*](#) meets quarterly. An attendee (who need not be a member) should be in a director-level role or higher and actively implementing or using an IIoT solution in manufacturing facilities. IIC seeks to add additional councils.

The group provides actionable guidance and best practices for all aspects of developing and operating an IIoT solution: business case creation, architectural design, technology selection, implementation, testing, roll out and operations.

Security Working Group

The [*Security Working Group*](#) addresses the trustworthiness of the IIoT ecosystem, addressing safety, reliability, security, resilience, and privacy. Its objectives are to:

- promote IIoT business adoption of trustworthy technology, interoperability, best practices and models,
- guide practical implementation by working with IIC testbeds, providing public-facing technology demonstrations and thought leadership for the industry,
- apply the breadth of industry understanding through maturity models, use cases, case studies, norms and best practices and
- identify gaps and collaborate with external consortia, standards bodies and industry groups.

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The group is working on a minor update to the [Industrial Internet Security Framework](#) and with representatives of the Digital Twin Consortium to develop a Digital Twin Security Maturity Model profile.

The [Trustworthiness](#) group explores aspects of trustworthiness relevant to IIoT and the IIC's vision of an IIoT ecosystem. Trustworthiness is the degree of confidence one has that the system performs as expected with characteristics including safety, security, privacy, reliability and resilience in the face of environmental disturbances, human errors, system faults and attacks.

Establishing confidence and being able to communicate that an IIoT system is trustworthy benefits many stakeholders. Assuring trustworthiness benefits the organization and customers by enabling the organization to deliver value while managing risks systematically. Additional value includes safety for employees and the community, privacy for individuals and the ability to communicate explicitly in a standardized manner about the grounds for claiming that an IIoT system, component or capability is trustworthy.

Technology Working Group

The [Technology Working Group](#) and its subgroups work with the vertical groups to maximize specific industry content in deliverables. They collaborate with other groups to maximize work on emerging technologies and digital transformation enablers.

The *Architecture* group is developing architecture patterns. It has a draft of the Industrial Internet Reference Architecture v2.0 (IIRA v2.0) that aligns better with ISO/IEC 42010 Architecture Framework and supports ISO SC41. It addresses how to use the IIRA, adds patterns including the System of Systems Orchestrator Architecture Pattern and Digital Twin as a Middle Layer Pattern, and includes other clarifications and corrections. Content includes architecture patterns and heuristic computational intelligence, digital twin, blockchain, edge computing, physical senses, voice recognition, AI, machine learning and big data.

The *Connectivity* group is a resource for connectivity related issues and interfaces with IIC testbeds to promote connectivity innovations. The group is discussing future deliverables with the Networking Task Group with the goal of eventually merging the two groups. They are also discussing collaboration with the Industry Working Group and the Patterns group.

The *Digital Twin Interoperability* group provides a precise digital twin definition, elaborates on advanced use cases, conveys the role as the interoperability enabler among vendors and business value of digital twins. It is in the process of completing a Digital Twin technical report entitled *Digital Twin Core: Essential Elements for Interoperability*.

The *Distributed Data Interoperability and Management* group will define the properties of a data service framework for the industrial internet. Its purpose is to provide a ubiquitous data-sharing integration framework for all architecture elements. The group is currently working on a report on information entity identification. They are researching future deliverables: community-

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sourced perspectives on information modeling, digital twin information models and exchange with testbeds and test drives.

The [Edge Computing](#) group is responsible for the creation, maintenance and adoption of a technical report addressing the implementation of edge computing. They have developed a technical brief template to present specific areas of edge to the group for addition to reports. An update to the [Virtualized Programmable Logic Controllers](#) technical brief was published in May.

The *Industrial Internet Artificial Intelligence* group is responsible for developing the [Industrial IoT Artificial Intelligence Framework](#) and defining and promoting best practices for realizable, comprehensive techniques and methods to derive information from data and where to deploy AI in IIoT.

The *Networking* group maintains and develops the Industrial Internet Networking Framework (IINF), serves as a resource to the IIC and the IIoT community for networking related issues and interfaces with IIC testbeds to promote networking innovations. It is discussing future deliverables with the Connectivity Task Group and the Industry Working Group with the goal of eventually merging the two groups.

The *Patterns* group gathers, creates and publishes architectural and design patterns for industry. It provides guidance and expert knowledge to support the selection of patterns.

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

The *Vocabulary* group develops the Industrial Internet Vocabulary Technical Report to establish a common vocabulary for stakeholders to reference. The [Industrial Internet Vocabulary Technical Report \(IIVTR\) v3.0](#) was published in April. A German version is due in 2023.

Marketing and Innovation Working Group

The *Marketing and Innovation Working Group* concentrates its efforts on promoting the value of IIoT, supporting the IIC's industry programs, initiatives, groups and testbed results. It works directly with IIC members to promote their work and deliverables, thereby delivering brand awareness for the representative, the member company and the IIC. The group has accumulated a substantial collection of IIoT technology and business presentations and corresponding videos (51 sets in total), and is working to make this valuable asset accessible to a wider audience.

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.

WEBINARS AND PUBLICATIONS

Visit our [Webinars Webpage](#) for access to IIC-hosted and liaison-syndicated webinars as well as a comprehensive list of past and future webinars. A complete list of IIC publications can be found [here](#). IIC also has a [blog](#).

NEW MEMBERS

Please welcome new members this quarter:

- [Network Test](#)

And our “zero-stage” startups:

- iiDevice Nevada Technology Labs Inc.
- Sextant International
- Onteon Tech Sp. z o.o.
- Hoobartechology
- InnovaloT, S.L.U.
- Senzary LLC
- Imandra

The Industry IoT Consortium is the world’s leading membership program transforming business and society by accelerating the Industrial Internet of Things. Our mission is to deliver a trustworthy Industrial Internet of Things in which the world’s systems and devices are securely connected and controlled to deliver transformational outcomes. Founded March 2014, the Industry IoT Consortium catalyzes and coordinates the priorities and enabling technologies of the Industrial Internet. The Industry IoT Consortium is a program of the Object Management Group® (OMG®). Visit www.iiconsortium.org.

