Instruments, Systems and Protocols in the age of IIoT

IIoT世代の計測・制御システム、デジタル通信プロトコル

8 NOVEMBER, OSAKA, JAPAN

TED MASTERS
PRESIDENT & CEO, FIELDCOMM GROUP
Process industry in IIoT – where are we headed?

- Vision – what is the process automation architecture of the future?
- How does this affect users – what are the new challenges?
- How can standards organizations help in response?
- How are People and Safety enhanced by Digitalization

Ted Masters
President & CEO
What is the vision for the process industry?

PA分野エンドユーザーオートメーションビジョン
Vision – PA architecture in IIoT

Revolution: New architectures will be required
- Merging of IT and OT drives new culture and user collaboration
- Cloud and premise-based analytics require organized data
- Must take into account installed base and suppliers
- Multiple options, some more disruptive than others

Evolution: Users will decide how much/how fast
Vision – Field Devices in IIoT

- Increased need for field devices to feed valuable data
  - Leverage stranded data from field devices with valuable supplier apps
  - Wireless expansion for additional data points
  - Pure digital protocols
  - Faster HART protocols

- What will the field device protocols of the future look like?
  - A new physical layer replacement on Ethernet?
  - An all wireless plant like IoT in our homes?
  - New IT-based protocols?
Are Automation Protocols Becoming Obsolete?
It's not about the protocol
It's about the information that the protocol supplies
and how that information, when easily connected and integrated
Enterprise-wide

It's about VALUE: reduced cost  improved safety
higher output  more profit

Some are better than others for specific user needs ...

Can’t run wires? Use WirelessHART!
Need high-speed? Use Ethernet!
Need simple and reliable? Use HART!
Need to minimize cabling? Use FOUNDATION Fieldbus!

50+ million field instruments with various protocols installed worldwide

Automation Protocols are Here to Stay
What problems do these changes create for users?

この変化はどのような新たな課題をユーザにもたらすか？
ALL future architectures must accommodate existing protocols!

Users will not rip out field devices, the **problem** simply becomes how to integrate the data from them into system and cloud applications.
Simple Integration

One Device - One Package - All Tools

FDI
YOU CAN

Connect Everywhere

- Modbus®
- WirelessHART
- ISA100 Wireless
- EtherNet/IP

Unified Architecture

FDI

OPC®
Welcome!

FDI is an exciting technology that improves lifecycle cost and adds value through simplified device integration. Developed through a collaborative process of major industry foundations and suppliers, FDI brings standardization to the packaging and distribution of all the software and tools necessary to integrate a device with a host system, thus the tagline:

"ONE DEVICE – ONE PACKAGE – ALL TOOLS"

This site is brought to you by FieldComm Group, to help visitors get acquainted with the basics of FDI and the value it brings to our industry. End Users will benefit from visiting the "Purchasing Requests" section where they can download sample documents that can be used to "ASK 4 FDI" in products offered by their suppliers.

We will be adding new content regularly, so please bookmark this site and check back often! If you are a user click the image at left. Suppliers will be redirected to the FieldComm Group main website with a click on image at right.

Visit our new website dedicated to FDI!

Extensive information for users:

- Videos
- Articles
- List of products

ASK4FDI.COM
How do we evolve as a standards organization?

技術標準化組織としていかにIIOT時代に向き合うべきか？
FieldComm Group is the Home of HART, FOUNDATION Fieldbus and FDI Technologies

formed in 2015 • global organization • 350+ members

FieldComm Group Connecting the World of Process Automation
...More standards are required

- Registration of field devices becomes more important as data usage increases
- More standards are required to ensure interoperability of devices and systems across many protocols
  - HART
  - HART-IP
  - Profibus
  - WirelessHART
  - ISA 100
  - FDT
- FDI integration technology requires registration of both hosts and devices
- FDI integration is all inclusive and requires collaboration
THE VALUE

OF REGISTERED PRODUCTS

REGISTERED PRODUCTS MEET ALL USER REQUIREMENTS

- Compliance with Specifications
- Interoperability and Performance
- Promoted in FieldComm Group Catalog of Registered Products

425 Manufacturers

1100+ Registered Products

1370+ Registered Products

FDI Device Packages and Host Registration in 2018
...and even more standards are required

- IT and OT applications need data organized
- Data must be presented in context with standard parameters
- The information model of OPC UA and FDI must define PA field devices
  - Core parameters
  - Parameters by class of device
  - Common information model regardless of supplier or protocol
Information Models Drive Value

Information model

An information model in software engineering is a representation of concept and the relationships, constraints, rules and operations to specify data semantics for a chosen domain of discourse.

It is usually an abstract, formal representation of entity types that may include their properties, relationships and the operations that can be performed on them.
An Information model will turn this ......
into this.....
into this.....
and even this...
FieldComm Group and OPC Foundation become co-owners of the FDI Cooperation, LLC to develop FDI technology.

The OPC UA Information Model (IEC 61541-100) becomes integral part of FDI (IEC 62679)

FieldComm Group and OPC Foundation sign letter of Engagement on Development and Promotion of FDI and OPC UA technology for the IIoT and Industrie 4.0

OPC Foundation joins the EDDL Cooperation team to harmonize and upgrade the technology.

FieldComm Group and OPC Foundation become co-owners of the FDI specification

FieldComm Group and OPC Foundation form a joint Working Group to develop PA-DIM
1. The need for device information (DI) models

- Real “objects” must be represented by their DI model to create a “Digital Twin”.
- OPC UA and FDI share a common “generic” model.
- Building a detailed model for PA devices puts data in context for each device class by defining standard parameters.
- Once standardized, models for specific classes of “objects” can more easily be compared and value extracted from applications and analytics.
- Classes of information models are specified as companion standards to OPCUA.
2. Standardization of DI models by device class

- Basic Elements of the information model are standardized in OPCUA DI (IEC 62541-100)
- OPCUA DI profiles are required for device classes, e.g.
  - PA devices (NAMUR core parameters)
  - Motor Controller
  - ...
- FDI (IEC 62769) is a generic approach to map device information to the information model dynamically, e.g. the information is described by EDD
- An information model can contain vendor specific proprietary information
3. Standardize independent of protocol

- Each protocol is mapped to common field of PA-DIM
- Machine to Machine data is delivered in context
- Users of advanced applications and analytics can now focus on the data rather than the device brand or protocol
- Once organized, Enterprise wide analysis and monitoring can more easily manage big data from the DI and turn it into intelligent information
PA-DIM: Protocol independent model of device class

COMPANY

INDUSTRY

EXTENSIONS

PROCESS AUTOMATION

Companion Information Models
FDI (IEC 62769), MDIS

Built-in Information Models
Device Information (IEC 62541-100)

OPC UA Meta Model
Summary

- IIoT will drive new architectures to leverage available data
- Users prefer to not “rip out” field devices rather need a way to integrate them
- FDI has been adopted as the industry standard Integration technology
  - Namur
  - OPA F
  - IEC
  - ISA100
- FDI adds a layer of standards for FCG to manage and certify against
- Users want information to be supplier and protocol independent and need data in a common process information model
- PA-DIM gives users the ultimate solution of a data standard for the PA industry
Technologies need People
Work force changes demand digitalization

BY 2025, ROUGHLY 75% OF THE GLOBAL WORKFORCE WILL BE MILLENNIALS
(Forbes magazine ©)

- Reduction of plant asset expertise requires automation
- Collaborative culture and inclusive workplace where groups solve problems together
- Flexibility expectation to work remotely or at home
- Experience and demand for modern tools
- Familiarity with IT, networking, cloud, wireless… et. al.

“Creating an attractive and sustainable workforce that looks more like the future than the past is one of the most meaningful things that organizations can do to secure the best workers of the millennial generation”
(Forbes magazine ©… Mark Hall)
Gaining more Value from people

TODAY

Analytics

Knowledge

Maintenance

Setup

Wiring Protocols

TOMORROW

Technology Shift
Value Opportunity

Technology shifts
- FDI… standardized integration
- Leverage value from existing installed base
  - Stranded data
  - Embedded apps by Suppliers (Heartbeat™ and others)
- Wireless
- Mobile device, augmented reality

Require skill set shifts
- IT skills
- Networking
- Data and information model understanding
- Analytics
- Predictive applications
Change is needed

VALUE IS ONLY GAINED WITH CHANGE

- Cross-departmental business processes
- IT/OT collaboration
- Expertise-based Monitoring and Diagnostic centers
- Training
- Adding sensors for more data points
- Employ Predictive analytics
Smart Industrial Safety by Digitalization

- Shift unplanned maintenance to planned
- Avoid catastrophic failures
- Prioritize highest severity problems
- Condition-based shift to focus maintenance resources on potential risks
- Security and Safety intelligence provided real-time for quick response
- Remove people from hazardous areas
Value opportunity for digitalization - People

PEOPLE STILL MAKE THE DECISIONS, they are simply:

... higher value decisions
... data-driven decisions
... measurable decisions
... evidence supported decisions
... collaborative decisions
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