Looking Ahead to the 19th Term
The Future of Industrial Automation
Leadership - Technical Review Board

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5. Dr. Ludwig Leurs, Bosch Rexroth
6. Shinji Murayama, Omron
7. Dave VanGompel, Rockwell Automation
8. Joakim Wiberg, HMS Industrial Networks (*)

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Turck
Strategic Technologies

Physical Manifestation of Device

Device Profiles
- CIP
- CIP Energy
- CIP Sync
- CIP Security
- CIP Motion
- CIP Safety

Features:
- Profiles, Objects, and Services
- Objects and Services
- Objects and Services
- Anti-Object
- Secure
- Secure

Connections:
- Provides TCP and UDP
- Connections
- Connections
- Connections
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- Connections
- Connections

CIP Application Layer (mapping to IPv6, optional DCs and TDI)
- Ethernet/IP (Layer 2, options for high availability: G3S with or without TDI)
- Ethernet Layer 1 (with 1 GbE)

Data Representation of Device

Device Profiles
- CIP
- CIP Energy
- CIP Sync
- CIP Security
- CIP Motion
- CIP Safety

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CIP Application Layer (mapping to IPv6, optional DCs and TDI)
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1:1 and more*

IIoT Footprint

Industrial Control Systems (ICS)

Cloud/Fog Computing Resources

ICS Integration Tools

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Building on EtherNet/IP’s leading position requires that ODVA stakeholders monitor, and work together, to adapt to opportunities and threats.

Device data is increasing in value. CIP provides a rich, context-based repository for device data and thus provides the opportunity to increase the value proposition of EtherNet/IP based on its device data. In order to capture this value, ODVA specifications must be enhanced to include a modern, robust electronic data technology to support data-driven workflows for device integration and a standard reference model for the production and consumption of digitized device data. The result will benefit vendors and users of EtherNet/IP through value-added services made possible by context-rich device data aligned with workflow needs.

Introducing “Project xDS”
What is Project xDS?

Project xDS is the name of ODVA’s collective activities to define, create and proliferate the successor to ODVA’s current electronic artifacts for device integration and conformance testing of ODVA CONFORMANT™ devices, the Electronic Data Sheet (EDS) and Statement of Conformance (STC) files.

Project xDS was approved by ODVA’s Board of Directors at its Regular Meeting on October 12 and 13, 2016.

The first phase of Project xDS proceeds with two parallel activities:
1. An Ad Hoc Committee for Project xDS shall be constituted to define and prepare the detailed work plan for Project xDS for review by, and feedback from, ODVA leadership and then for approval by ODVA’s Board of Directors.
2. ODVA’s future vision of digitized artifacts for EtherNet/IP device data, as defined by this presentation, shall be distributed for review and comments from key stakeholders in the Project including, but not limited to, ODVA’s Technical Review Board, Ad Hoc Committee for Project xDS (Ad Hoc Committee), principal members and technical staff. The Ad Hoc Committee shall review and integrate the stakeholder comments into its detailed work plan.

The business case for Project xDS, and its definition, has been developed and vetted through various means including ODVA workshops to define use cases and requirements for ODVA’s electronic artifacts for device integration and conformance testing, joint meetings with other organizations pertaining to technology and standards for ICS Integration Tools, experience of the ODVA staff with EDS and STC files, and meetings of ODVA’s Board of Directors.
Guiding Principles for Project xDS

1) EtherNet/IP shall be the ODVA network technology of primary focus.

2) The Vendor Value Proposition shall:
   • Make integration of EtherNet/IP devices in vendor ICS Integration Tools as simple and re-usable as possible;
   • Eliminate the need for different artifacts for device integration and another for ODVA conformance testing;
   • Support an approach to technical implementation by developers that is scalable from simple to complex devices and from device to system suppliers; and
   • Provide methods to simplify adoption by device vendors.

3) The User Value Proposition shall:
   • Mandate, as of a date to be determined, that the xDS artifact shall be provided for all ODVA CONFORMANT™ EtherNet/IP devices;
   • Mandate use of all data provided in the xDS artifact by scanners and by Device Integration Tools used in ICS systems with CIP sub-nets;
   • Minimize the amount of optional device data in the xDS artifact;
   • Mandate that a vendor shall obtain and maintain Declarations of Conformity for its xDS artifacts (in addition to the EtherNet/IP device whose data the xDS artifact defines); and
   • Allow one xDS artifact for a product family.
## Organizing Framework for Project xDS

### xDS Device Integration Matrix

#### Presentation Tier > Artifact of an Integration Tool
executable artifact containing application software that displays static and dynamic information about a device in the context of one or more xDS Workflows; exchanges data with Logic and Data tiers based on automated and manual inputs and outputs from xDS Workflows and other workflows supported by the device.

#### Logic Tier > Artifact of an Integration Tool
executable artifact containing application software that processes Data to define application functionality of a device for one or more xDS Workflows and other workflows supported by the device and the tool.

#### Data Tier > The xDS Artifact
static artifact containing semantic data that describes the identity of a device, enumerates the network connections and services available to communicate with the device on the network, defines the EtherNet/IP and CIP objects, services, attributes supported by the device for the xDS Workflows and may contain attributes to support other device-specific workflows.

### Three-tier Architecture
Organizing Framework for Project xDS

- Network & Security Configuration
- Network & Security Diagnostics
- Device Configuration
- Device Diagnostics
- Device Conformance

Minimum xDS Workflows
Strategic Technologies

Organizing Framework for Project xDS

- **Vendor ICS Integration Tools (FDT Compliant, proprietary, other standards?)**
- ?Standards and workflows for digitization (e.g., AutomationML, eCI@ss)?

- ?ICS Integration Tools for a Subset of Workflows?
Organizing Framework for Project xDS

xDS Production-Consumption Model for Device Data
Strategic Technologies

Organizing Framework for Project xDS
Ad Hoc Committee is Next Step for Project xDS

1) Develop an initial set of target Use Cases and minimum requirements to refine and achieve the benefits for the Vendor and User Value Propositions.

2) Map what EDS and STC does today to the xDS concept and identify gaps in device data and workflow coverage (Recommendation from Workshop 2016Q3: As a starting point, review The CIP Annex from The FDT2 Specification and align the xDS concept).

3) Select the Data Syntax Format based on best fit for the minimum xDS Workflows and the xDS production-consumption model.

4) Develop the Reference Architecture, including separation of the data contents from the encoding method; the Reference Architecture shall be submitted for review and approval by ODVA’s Technical Review Board and Board of Directors.

5) Develop key Milestones for the Scope of Work including resource requirements and a projected timeline for completion; the Milestones shall be submitted for review and approval by ODVA Technical Review Board, officers and Board of Directors.
Looking to our Future Generation of Developers

Steep Learning Curve

EtherNet/IP Specification

Finding Help

ROUGH ROAD

Design Decisions

Reference Implementations

ROAD CLOSED AHEAD
Looking to our Future Generation of Developers

- Tutorial Documents
- Training Seminars
- Enabling Technology Partners
Looking to our Future Generation of Developers

Need For an Integrated Learning Environment

Online Community

Development Workflow

- Define Device Functionality (Click to expand)
- Select Implementation Option (Click to expand)
- Implement and Test Device (Click to expand)
- Conformance Test (Click to expand)
Looking to our Future Generation of Developers

Introducing ILE for EtherNet/IP Newbies!

- A self-guided course in EtherNet/IP
- Connects main concepts directly to the applicable content in the Specification
- Provides real-life examples

Developer's ToolBox for EtherNet/IP is Now Available!

New to EtherNet/IP?
Get the digital, Integrated Learning Environment designed to accelerate your Know-How!
Looking to our Future Generation of Developers

What’s in the Box?

- EtherNet/IP Short Course (integrated with The EtherNet/IP Specification)
- Basic stack example
- Virtual devices
- Virtual Lab
- …and Online Community Access in the Know-How Hub
Looking to our Future Generation of Developers

ToolBox Launch with New Digital Subscription Management System
- Improving the user experience for vendors and ODVA Members
- Streamline fulfillment and update process

Order ODVA Product → Delivery → Login → Deeper Know-How: in the Online Community

Product Activation Code
Role / Permission
Looking to our Future Generation of Developers

The beginning of an ODVA on-line community for developers

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• Integrated contact form | • Licenses for your current products  
• Activations to licenses  
• Integrated contact form |
Looking Ahead to the 19th Term
The Future of Industrial Automation
Leadership - YOU

ODVA must continue to drive conversation and collaboration inside ODVA at the highest level possible.

Working Groups

Technical Review Board

Board of Directors

Officers

Staff, TSPs and other ODVA Value-proposition Service Providers

Working together to make the 19th Term Great!
See YOU in October 2018 at the ODVA 2018 Industry Conference & 19th Annual Meeting of Members!

Dates TBD.