Call to Order

General Session and 16th Annual Meeting of Members

www.odva.org
Flake Fatigue

If you have had enough cold and snow, please... raise your hand.
Can It Get Worse?
Yes, It Can.  Snowmaggedon Is Here Again.

Ann Arbor Forecast for Wednesday, March 12. Snow during the morning will give way to snow showers during the afternoon. Chance of snow 70%. Snow accumulating 3-5 inches (7.5-12.7cm). Cold. Morning high 27F (-3C) with temps falling to near 15F (-9C) and overnight low -3F (-20C). Windy. Winds N at 25 to 35mph (40-56kph). REALLY?
YeeHaa!

We’re gonna go do some CIPing in Arizona!
Woo-hoo! Welcome to Phoenix!
Agenda

- 8:15 AM  16th Term in Review - Report on the Activities of the Association
- 9:30 AM  Membership - Presentation of Candidates for Election
- 9:45 AM  Election and Break
- 10:15 AM User Perspective from the Field - EtherNet/IP in Packaging
- 10:45 AM Software Defined Networks - Will They be the Next Frontier in Industrial Automation?
- 11:30 AM 17th Term - Looking Ahead
- 12:00 PM Adjourn
Governance Directors

Michael Höing  
VP, Electronics Business Unit  
Weidmüller Interface

Cyril Perducat  
SVP Strategy-Technology-Solutions/CTO  
Schneider Electric

Dr. Jürgen Weinhofer  
VP, Control Technology & Architecture  
Rockwell Automation

Tony Shakib  
VP, Business Development  
IoT Vertical  
Cisco Systems

Dr. Thomas Bürger  
VP, Engineering  
Automation Systems  
Bosch Rexroth

Dr. Raimund Sommer  
Managing Director,  
Process Solutions  
Endress+Hauser

Ikuo Tateishi  
Corporate Planning Manager, OEI  
Acting CEO, STI  
Omron
Governance Officers

- Cyril Perducat, Chairman of the Board
- Katherine Voss, President & Executive Director
- Rich Harwell, Chief Technology Officer
- Christopher Lynch, Secretary
- Jürgen Weinhofer, Treasurer
16th Term in Review
Report on Activities of the Association

Katherine Voss, president & executive director

General Session and 16th Annual Meeting of Members

www.odva.org
Global Presence

Mix of Membership by Principal Place of Business

- USA & Canada: 48%
- Germany: 16%
- Japan: 14%
- Other Europe: 12%
- Other Asia: 6%
- All Other China: 2%
Global Presence

Focused Areas of Operation
Global Presence

Industry Awareness Face-to-Face Activities

- EtherNet/IP Seminars and Forums: Beijing, Seoul, Shanghai, Tokyo (2X)
- ODVA Exhibits at Tradeshows: AIMEX (Korea), Hannover Fair (Hannover), Industrial Automation Show (Shanghai), PackExpo (Las Vegas), SPS/IPC/Drives Show (Nuremberg, 2X), System Controls Fair (Tokyo)
- ODVA Media Briefing: Hannover, Nuremberg (2X)
- ODVA Participation at Industry Events: ARC Forum (Orlando, 2X), Automation Fair (Houston), Industrial Open Network Fair (Osaka, Tokyo)
Global Presence

Industry Awareness Face-to-face Activities

Germany

Japan

China

Korea
Global Presence
Vendor Adoption Face-to-Face Activities

 EtherNet/IP QuickStart: Ann Arbor, Boston, Chicago, Frankfurt (2X)
 EtherNet/IP Implementor Seminar: Tokyo (3X)
 EtherNet/IP Implementor Workshop: Ann Arbor (2X), Boston, Chicago, Frankfurt (2X)
 EtherNet/IP PlugFest: Ann Arbor, Seligenstadt
 ODVA College: Kanazawa, Nagoya, Osaka, Tokyo
Global Presence
Vendor Adoption Face-to-Face Activities

China

Japan

Europe

North America
Global Presence
ODVA in China

HQ Staff supporting China operations

ODVA Automation Technology Service (Shanghai), Ltd.
- TAG China
- TSP China (TÜV Rheinland)
- RMB bank account at Bank of America

Investment started in 2007
Global Presence
ODVA in China

Office
New Hualian Mansion
755 Middle Huai Hai Road
Shanghai
Global Presence

Chinese “GB” Standardization

Established

- EtherNet/IP
- DeviceNet
- ControlNet

In-Process

- CIP Safety
- CompoNet

Working Committee for the Chinese Standardization of CIP Safety
ODVA on Weibo

ODVA
ODVA 将参加2013工博会，展台号：W1D107，欢迎大家前来参观。

2013年8月30日 09:05 阅读(102)

ODVA
http://url.cn/F7Ow1U 欢迎收听收看EtherNet/IP在线技术讲座。

2013年7月31日 09:35 阅读(79) 全部转播和评论(2)
Global Presence
TAG China

1. Cisco Systems
2. Deutschmann
3. Hilscher
4. Panduit
5. Renesas
6. Rockwell Automation
7. Schneider Electric
8. Wago

Meet Shirley Li, managing deputy director of ODVA ATS, who is helping to build this team... including joint marketing with the Chinese Association of Automation.
Governance
Strategic Plan 2011-2020

Living Initiatives are a Central Aspect

- 2010: Growth
- 2010: Energy
- 2011: Machinery
- 2012: Process

In the 16th term, the Growth Initiative for the 17th Term and beyond has been a key work activity of the Board and ODVA staff. Working groups have made significant progress on the others. Together these initiatives reinforce one another.

More on energy, machinery and process now...stay tuned for an update on growth after the break.
Key Milestones
Release of Phase 2a, and significant progress on Phase 2b in anticipation of submittal in the next publication cycle.

On Track!
Strategic Plan
Initiative Energy

LIVE MARCH 12, 2014!
Multi-vendor interoperability demonstration of OEU.
(Base Energy Object and the Electrical Energy Object)
White paper published in February 2014 completed ODVA’s series of “optimization” white papers resulting from the formation of ODVA’s initiatives.

3. Optimization of Process Integration (OPI)
White paper published in February 2014 completed ODVA’s series of “optimization” white papers resulting from the formation of ODVA’s initiatives.

1. **Optimization of Energy Usage (OEU)**

2. **Optimization of Machine Integration (OMI)**

3. **Optimization of Process Integration (OPI)**
ODVA Expects to Announce Formation of a SIG for Process Applications in 2014
Strategic Plan
Initiative Machinery

SIG for Machinery Information Formed: Phase 1 Work is Machine-to-Supervisory Communications

SIG Participants from Members
- Bosch Rexroth
- Cisco Systems
- Omron
- Rockwell Automation
- Schneider Electric

SIG Participants as Invited Experts
Tom Burke, OPC Foundation
Peter Lutz, Sercos International
Unified Integration Model for Machine Optimization

Alliance Partnerships
Technology Milestone
CIP Safety

10th Anniversary!
Technology Milestone
CIP Safety

10th Anniversary!

Established
Special Interest Group

2003
Technology Milestone
CIP Safety

10th Anniversary!

Established
Special Interest Group

2003

Published
The CIP Safety™ Specification

2005

The CIP Safety® Specification
English Language Version
Technology Milestone

CIP Safety

10th Anniversary!

Issued First Declaration of Conformity for DeviceNet™

2003
Established Special Interest Group

2005
Published The CIP Safety™ Specification

2005
Issued First Declaration of Conformity for DeviceNet™

ODVA, Inc. — 2014 ODVA, Inc.
www.odva.org
Technology Milestone

CIP Safety

10th Anniversary!

2003
- Issued First Declaration of Conformity for DeviceNet™
- Published 1st Edition of The CIP Safety™ Specification
- Established Special Interest Group

2005
- Published 1st Edition of The CIP Safety™ Specification
- Issued First Declaration of Conformity for DeviceNet™
- Established Special Interest Group

2006
- Adoption by Sercos Int’l

SERCOS International (SI) and ODVA announced today that SI will adopt CIP Safety™ as its functional safety protocol for SERCOS.
Technology Milestone
CIP Safety

10th Anniversary!

- **2003**: Established Special Interest Group
- **2005**: Published 1st Edition of *The CIP Safety™ Specification*
- **2005**: Issued First Declaration of Conformity for DeviceNet™
- **2006**: Adoption by Sercos Int’l
- **2007**: Issued First Declaration of Conformity for EtherNet/IP™

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Technology Milestone
CIP Safety

10th Anniversary!

2003
Established Special Interest Group

2005
Published First Edition of *The CIP Safety™ Specification*

2005
Issued First Declaration of Conformity for DeviceNet™

2006
Adoption by Sercos Int'l

2007
Issued First Declaration of Conformity for EtherNet/IP™

2008
Published *The CIP Safety™ Specification* with CIP Safety on Sercos
“Building on the existing collaboration between ODVA and Sercos International in functional safety, SI has agreed to participate with ODVA as an alliance partner in its Machinery Initiative. The cooperation with ODVA and the joint support of CIP Safety has created substantial technical and market synergies for the safety network community.” Peter Lutz, Managing Director of SI
Established Special Interest Group

2005
Issued First Declaration of Conformity for DeviceNet™

2006
Adoption by Sercos Int’l

2007
Issued First Declaration of Conformity for EtherNet/IP™

2008
Published The CIP Safety™ Specification with CIP Safety on Sercos

2011
Announced The Machinery Initiative with OPC Foundation & Sercos International

2013
Established Conformance Testing for CIP Safety on Sercos III

2003
Established Special Interest Group

● TSP NA
Established Special Interest Group 2003

Issued First Declaration of Conformity for DeviceNet™ 2005

Published 1st Edition of The CIP Safety™ Specification 2005

Issued First Declaration of Conformity for EtherNet/IP™ 2006

Adoption by Sercos Int’l 2007

Issued First Declaration Of Conformity for EtherNet/IP™ 2008

2011 Announced The Machinery Initiative with OPC Foundation & Sercos International

2013 Published The CIP Safety™ Specification with CIP Safety on Sercos

2013 Established Conformance Testing for CIP Safety on Sercos III

2013 Issued First Declaration of Conformity for Sercos III

In total, 77 Declarations of Conformity have been issued for CIP Safety.
Users will be able to deploy networked motion control systems using EtherNet/IP and Sercos III in applications requiring safe motion functions such as safe torque off and safety limited positions.
Established Special Interest Group

2005

Issued First Declaration of Conformity for DeviceNet™

2007

Established Conformance Testing for CIP Safety on Sercos III

2008

Issued First Declaration of Conformity for Sercos III

2011

Announced The Machinery Initiative with OPC Foundation & Sercos International

2013

To Publish in PC2 CIP Safety™ Spec w/Safe Motion

2013

Established Conformance Testing for CIP Safety on Sercos III

In total, 30 Vendors have been authorized to date for CIP Safety.
In total, 30 Vendors have been authorized to date for CIP Safety.

2014
- Test software subscriptions available for EtherNet/IP and Sercos III

2013
- To Publish in PC2 CIP Safety™ Spec w/Safe Motion
- Issued First Declaration of Conformity for Sercos III

2013
- Established Conformance Testing for CIP Safety on Sercos III

2011
- Announced The Machinery Initiative with OPC Foundation & Sercos International

2008
- Published The CIP Safety™ Specification
- Issued First Declaration of Conformity for EtherNet/IP™

2007
- Adoption by Sercos Int’l
- Published 1st Edition of The CIP Safety™ Specification

2006
- Issued First Declaration of Conformity for DeviceNet™

2005
- Established Special Interest Group

2005
- Published 1st Edition of The CIP Safety™ Specification

2003
- Established Special Interest Group

... and more to come.
16th Term in Review
Report on Technical Activities of the Association
Rich Harwell, chief technology officer
When riding the IP wave ... 

... one should focus on keeping up.
Agenda

- Organization and process review
- Key deliverables since 15th general session
- Key work in process
Organization and Process Review

Strategic Initiatives
- Energy
- Machinery
- Process

Board of Directors and Officers

Technical Review Board

Technical Working Groups (SIGs+)

SIG Work Plans and Spec Enhancements
# Roster of Technical Working Groups

<table>
<thead>
<tr>
<th>No.</th>
<th>Working Group</th>
<th>Chair/Co-Chair(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SIG - CIP Safety</td>
<td>P. Kucharski, Rockwell Automation</td>
</tr>
<tr>
<td>2</td>
<td>SIG - CIP System Architecture</td>
<td>D. VanGompel, Rockwell Automation</td>
</tr>
<tr>
<td>3</td>
<td>SIG - CompoNet</td>
<td>T. Li, OMRON</td>
</tr>
<tr>
<td>4</td>
<td>SIG - Conformance</td>
<td>Q. Zeng, ODVA</td>
</tr>
<tr>
<td>5</td>
<td>SIG - DeviceNet of Things</td>
<td>T. Peter, Weidmüller Interface (acting)</td>
</tr>
<tr>
<td>6</td>
<td>SIG - DeviceNet Physical Layer</td>
<td>B. Woodman, Molex</td>
</tr>
<tr>
<td>7</td>
<td>SIG - Distibution Motion</td>
<td>S. Zuponcic, Rockwell Automation</td>
</tr>
<tr>
<td>8</td>
<td>SIG - Energy Applications</td>
<td>R. Blair, Schneider Electric/R. Morgan, Rockwell Automation</td>
</tr>
<tr>
<td>9</td>
<td>SIG - EtherNet/IP Infrastructure</td>
<td>B. LaRette, Schneider Electric</td>
</tr>
<tr>
<td>10</td>
<td>SIG - EtherNet/IP Physical Layer</td>
<td>R. Lounsbury, Rockwell Automation</td>
</tr>
<tr>
<td>11</td>
<td>SIG - EtherNet/IP System Architecture</td>
<td>B. Batke, Rockwell Automation</td>
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<tr>
<td>12</td>
<td>SIG - Integration of I/O-Link</td>
<td>F. Moritz, SICK</td>
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<tr>
<td>13</td>
<td>SIG - Integration of Modbus</td>
<td>T. Snide, Schneider Electric</td>
</tr>
<tr>
<td>14</td>
<td>SIG - Machinery Information</td>
<td>R. Beudert, Schneider Electric/L. Leurs, Bosch Rexroth/S. Zuponcic, Rockwell Automation</td>
</tr>
<tr>
<td>15</td>
<td>SIG - Vertical Industry Semiconductor</td>
<td>open, election of successor pending</td>
</tr>
<tr>
<td>16</td>
<td>Workshop - EtherNet/IP Implementors EU</td>
<td>Ulrich Kaemmerer, Schneider Electric</td>
</tr>
<tr>
<td>17</td>
<td>Workshop - EtherNet/IP Implementors NA</td>
<td>Kevin Knake, HMS Industrial Networks</td>
</tr>
</tbody>
</table>

Thanks to the chairs for their organization and leadership on behalf of the greater ODVA community and technology!
Make-up of the Technical Review Board (TRB)

1. Chair **Rich Harwell** (ODVA chief technology officer, employee of Eaton)
2. Representative **Rudy Belliardi** (employee of Schneider Electric)
3. Representative **Paul Didier** (employee of Cisco Systems)
4. Representative **Jörg Hähniche** (employee of Endress+Hauser)
5. Representative **Rich Jackson** (employee of Omron)
6. Representative **Oliver Kleineberg** (employee of Belden)
7. Representative **Ludwig Leurs** (employee of Bosch Rexroth)
8. Representative **Eric Scott** (employee of Molex)
9. Representative **Dave VanGompel** (employee of Rockwell Automation)

Meeting at least 2X per month, the TRB is responsible for approval of all work plans for ODVA’s technical working groups, providing technical guidance to SIGs in their development of specification enhancements (SEs) and approval of SEs for integration into ODVA’s specifications.
ODVA Technology

The Common Industrial Protocol and its Network Adaptations
(ODVA Specifications)

Contributors
- Technical Working Groups
- TRB
- ODVA staff

ODVA Conformance Testing Practice
(test plans, testware, administration, documentation, know how)

Technical Publications
(recommendations, guidelines)
Deliverable Highlights

3 publication cycles since last meeting

69 Specification Enhancements

Highlights include:

- Safety Motion Objects
- First Cyber Security Related Updates
- IPv6 Plan (Pre-SE)
- Parallel Redundancy Protocol – PRP
- Energy Extensions
- File Object Enhancements
- EtherNet/IP CT11, DeviceNet CT25
Major Work In Process

Highlights of work in progress in SIGs

• **EtherNet/IP System Architecture** – Accommodation plan for implementation of IPv6, enhancements for cyber security

• **IO-Link Integration** – enhancements to Volume 7

• **DeviceNet of Things** – Phase 1: initial enhancements to The CIP Networks Library (primarily in Volumes 1 and 3)

• **Process Initiative** – rationalization of proposed technical work, formation of new SIG

• **Energy Applications** - Phase 3: transacting energy for the best result

• **EtherNet/IP Physical Layer** – Volume 3, Chapter 8, rewrite with industrial 1G PMD interfaces

• **Machinery Information** – Phase 1: data model for logical groupings and then map the model into CIP objects and services to support exchange of the information between machines and supervisory systems

• **CIP Motion** – enhancements to support machine-to-machine synchronization
Candidates for Election

General Session and
16th Annual Meeting of Members

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Nominations

Board of Directors

- **Michael Höing**
  Weidmüller Interface

Board of Directors

- **Kent Howard**
  Balluff

Representative to the TRB

- **Eric Scott**
  Molex

Representative to the TRB

- **Joakim Wiberg**
  HMS Industrial Networks
Industry leader in primary and secondary packaging machines

- Sleevers
- Cartoners
- Case Packers
- Combination Systems

Leverage automation to create innovative solutions

- Electrical savings
- Operational savings
- Increase overall line efficiencies
Packaging Industry

Aagard’s Purpose and Values:

- Aagard will enhance people’s lives while providing unique packaging solutions that help our customers win.
- WINNING TOGETHER HONORABLY

Aagard is laser focused on maintaining a culture that fosters creativity through collaboration. We strive to bring excitement and innovative thinking to every project we work on. And we’re dedicated to forming true collaborative partnerships with our customers, which allows us to design unique, industry-leading solutions that give them a competitive advantage.
Equipment Overview

Custom Machinery
- Up to 40 or 50 axes of motion (typically 20 – 30)
- Motion coordination via CIP Sync and CIP Motion

Maksimal Pouching System
- Form, fill & seal 200 pouches/min
- Pouch film speed: >600 mm/sec
- 1 automation controller
- 17+ servos dependent on requirements
Pouching Application:

Film Registration

Task: Identify correct cutting & sealing positions on the film

- Challenge: Film speed ≈ 666mm/second but fluctuates slightly due to the nature of film
- Trending is necessary for precise cutting & sealing
- Sensor detects the registration mark & triggers the SOE module 200 times per minute
- Servo drive position is correlated with the registration mark & film feed velocity is adjusted for precise speed control
Cartoner Application:

Random Timing Infeed

Task: Adjust random product timing to match continuous machine timing

- Sensor is connected to the SOE module
- Rising edge trigger initiates timestamp
- Extrapolate actual and desired position
- Adjust the speed of product
- EtherNet/IP & CIP Sync eliminate variances of previous system
  - Product travels 1.5” in 10 ms
Carton Sealing

Task: Control Glue Gun

- Challenge: Carton Velocity
  - 105 inches / second
  - Product travels 1” in 9.5 ms
- Sensor is connected to the SOE module
- Rising edge trigger initiates timestamp
- Allows glue gun on/off timestamps to be calculated and written to a scheduled module
- Scheduled module turns glue gun on and off at required times
Network Design

Simplification:

► Electrical panels distributed throughout machine
► Capable of one network
  • Previously 3 separate networks
  • I/O, motion, safety

With EtherNet/IP:

► Everything combined into one
Common Network Topology
Additional Benefits

Design Modularity

- Simplified design
- Faster installation
- Operational savings and line efficiencies

3rd Party Device Integration

- Barcode scanners
- Cameras
- Laser printers
- Gluing systems
Troubleshooting

Challenges:

- Intermittent communication loss
- Tracing network problems could take days
- No indication of failure point
- Often difficult to repeat the problem

With EtherNet/IP:

- Problem can usually be identified within minutes
- Ring topology means built in redundancy
Data Reporting

Better monitoring, reduced downtime

- EtherNet/IP allows more data to be extracted from drives
- Continuous monitoring of status & fault information

Simplified data collection

- Data collection and performance tracking now standard
- Seamless transfer to enterprise systems
  - Machine Mode & State
  - Product counts
Conclusion

EtherNet/IP with CIP Motion & CIP Sync

- Simplified design
- Greater flexibility
- Easier integration with 3rd party devices
- Better system monitoring
- Reduced downtime
- Simplified data collection and enterprise integration
Software Defined Networks - Will They be the Next Frontier in Industrial Automation?

Should ODVA create specifications for configuration and operation of integrated automation networks?

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www.odva.org
What do a Data Center and Automotive Plant Have in Common?

<table>
<thead>
<tr>
<th>Facility Sq Feet</th>
<th>Physical Ethernet Ports</th>
<th>Compute (PLC vs. Server)</th>
<th>Ethernet Switches</th>
<th>Watts Consumed in operation</th>
<th>Watts Consumed in idle</th>
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</tr>
</tbody>
</table>

**Automotive Plant**

**Enterprise Data Center**
What does an Automotive Plant Have in Common with a Data Center?

Answer #1...really big Ethernet networks!
SDN enables automation and virtualization of enterprise data centers. Open standards are starting to take hold.
What does an Automotive Plant Have in Common with a Data Center?
What does an Automotive Plant Have in Common with a Data Center?

Answer #2...they have functions that manage and control the flow of data are somewhat similar!
So what is all this about?

- Software Defined Network controllers focus on controlling the flow of data across a network in a standard and programmatic way.
- PLCs control movement of devices and thus product through a manufacturing system in a standard and programmatic way.
- An SDN Controller is like a PLC.
- A switch or router is like an I/O block.
Functions are Somewhat Similar

A Network Manager is like a PLC. . .

- PLCs control movement of devices and thus product through a manufacturing system in a standard and programmatic way.

. . . and a switch or router is like an I/O block.

- Network Controllers focus on controlling the flow of data across a network in a standard and programmatic way.
What does an Automotive Plant Have in Common with a Data Center?

Their Ethernet networks all share the following embedded in all network devices

- **Management Plane**
  - Monitoring
  - Remediation

- **Control Plane**
  - Behavior
  - Characteristics

- **Data Plane**
  - Message transport

Traditionally each network device must be “touched” to configure and manage these planes - with the Control Plane being touched the most – creating complexity
SDN Helps Reduce Complexity by Automating the Configuration of Planes Today and Tomorrow

SDN Helps Reduce Complexity by Automating the Configuration of Planes Today and Tomorrow

Switch/Router/?

Management

Control

CPU

Memory

Data Plane

Switch/Router/?

API/Protocol

API

CPU

Memory

Data Plane
The Challenges of Convergence and Expertise
Today -
Separate Management of Network Assets

- IT Network Management Center
  - IT Administrator
  - Routers, Switches, Bridges, Firewalls, Desktops, Laptops, Servers, …
  - Manage, Configure, Control

- OT Network Management Center
  - Floor Operator
  - Historian
  - IEDs, RTUs, PLCs, Drives, Actuators, Sensors, Cameras, Pump Stations, …
  - Manage, Configure, Control

- Enterprise IT LAN: NMS
  - Manage, Configure, Control

- Control Network LAN
  - IT Assets
  - OT Assets
Problems and Challenges

- Two Sets of Management Systems
- No Policy Integration
- Insufficient Network Security Practices
- Hard to diagnose network problems
So where is the complexity?

- The Control Plane has five Pillars that require specific network expertise.
- Currently each Pillar must be configured separately yet each has an impact on the others.
What Resides in these Pillars?

1. Scalable High Availability
   - EIGRP, OSPF, IS-IS, BGP, MP-BGP, Spanning Tree, MC-LAG, Cluster, VSS, VPC, HSRP, VRRP, GLBP, ISSU, PFR, MPLS TE, etc.

2. Virtual Segmentation
   - VLAN, VDC, Contexts, 802.1Q, VRF, MPLS VPN, EVN, VXLAN, LISP, SXP, SGT

3. Mobility (Layer 2 extension and Host Routing)
   - OTV, VLAN 802.1Q, L2TPv3, MPLS Pseudo Wire, MPLS VPLS, MPLS EVPN, VXLAN, LISP, CAP/WAP

4. Quality of Service with Service Assurance
   - Modular QoS, WRR, DWRR, SRR, Strict Priority, MLS QoS, HQoS, WTD, Policing, Shaping, Hierarchical Shaping, Bandwidth Remaining Ratio, RED, WRED, DBL, WFQ, etc.

5. Single point of configuration and management
   - CLI, Cisco Prime Infrastructure, DCNM, Cisco Fabric Manager, XML/CLI Scripting, Cisco Configuration Professional, Cisco Prime Analytics, Cisco Prime Network, Cisco Prime Performance Manager, Cisco Prime Central, Cisco Prime Provisioning, Cisco ONE/XNC, OpenDaylight, CIAC, Cloupia, Openstack Nebula, Cisco WAN Manager, etc.

Each is impacted by vendor-specific characteristics requiring expertise to optimize their use.
The Benefits of Software Defined Networking Can Apply to Industrial Automation

- Lower Cost
- Faster deployment
- More dynamic
- Control the network configuration as an entity
- Eliminate device by device configuration treatment
- Provides for application control of the network
- Facilitates Network Automation for changes

Flexibility
SDN and a VLAN or 2

Today manual:
- Determine ports used
- Get/choose VLAN number
- Get/choose IP address
- Create VLAN
- Assign ports to VLAN
- Connect locally and configure via device interface

SDN programmatic:
- SDN server application finds network devices
- SDN server application finds end points connected to network
- Control program requests SDN server to connect devices
- Control Program requests ....
SDN Standards Today

- OpenDaylight: open source controller
- OpenFlow: open source protocol/API
- Both are current communities providing standards for Software Defined Networks
- Both are open and may be used together
- Overlapping vendor support
- Data center focused
- Underlying hardware provides performance differentiation only; throughput etc.

No thought to the industrial space
Can ODVA Bring SDN Concepts to Industrial Automation?

- CIP and EtherNet/IP can be used to create an Industrial Network Controller for the automation network infrastructure.

- This Controller can be used to operate switches and routers as we do I/O today.

- CIP can be extended to communicate with the network infrastructure devices with new attributes.
Controller Architecture Overview

- **SDN Controller**
  - ENG Applications
    - Visualizer
    - Manager
    - Asset Disc
    - Compliance
  - Standard ENG Services
    - Topology
    - Inventory
    - Policy
    - QoS
  - RESTFUL API
  - NIB
    - DAS
  - OT Applications
    - OT
    - DE Visualizer
    - Asset Disc
    - Security Mgr.
    - IT-OT
    - OT-IT Agent
  - OT Services
    - Prot
    - PCE
    - Policy
    - Data Model
  - CIP, Restful API, ...

- **OT Network Management Center**
  - HMI
  - Floor Operator
  - Historian

- **OT Assets**
  - OT Network Management Center
  - OT Assets

- **IT Assets**
  - IT-OT Proxy
  - OT-IT Agent
  - Security Mgr.
  - IT Assets

- **OnePK, OpenFlow, CLI, SNMP, ...**
  - CIP, Profinet, ...

- **CIP, Restful API, ...**

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The Call to Action

True Convergence
EtherNet/IP and CIP controlling a multiprotocol automation network based on standard Ethernet.

CIP Messages

EtherNet/IP™
SDN

Management Plane

Control Plane

Switch

Switch

Switch

PLC

CIP

PLC

ModBus

Data Plane

Data Plane

I/O

I/O

I/O

PLC

PROFINET

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Thank You
17th Term

Looking Ahead

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VP, Electronics Business Unit
Weidmüller Interface

Cyril Perducat
SVP Strategy-Technology
Schneider Electric

Dr. Jürgen Weinhofer
VP, Control Technology & Architecture
Rockwell Automation

Kent Howard
President, Balluff Inc.
Balluff

Tony Shakib
VP, Business Development
IoT Vertical
Cisco Systems

Dr. Thomas Bürger
VP, Engineering
Automation Systems
Bosch Rexroth

Dr. Raimund Sommer
Managing Director,
Process Solutions
Endress+Hauser

Ikuo Tateishi
Omron
The Company Officers

- Katherine Voss, President & Executive Director
- Rich Harwell, Chief Technology Officer
- Christopher Lynch, Secretary
- Jürgen Weinhofer, Treasurer
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1. Chair **Rich Harwell** (ODVA chief technology officer, employee of Eaton)
2. Representative **Rudy Belliardi** (employee of Schneider Electric)
3. Representative **Paul Didier** (employee of Cisco Systems)
4. Representative **Jörg Hähniche** (employee of Endress+Hauser)
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