

Newsletter from:

Real Time Automation, Inc.

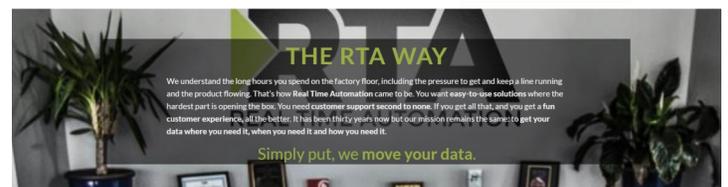
For System Integrators and Control Engineers

Inside this issue...

- *My Advice: Be Bold and Break the Rules*
- *The Elegance and Simplicity of CIP (Common Industrial Protocol)*
- *September's Exclusive "Steal of the Month"*

EXPERIENCE THE NEW RTAAUTOMATION.COM!

- More enjoyable shopping experience
- Improved navigation
- Easier to find the solution you need
- More learning resources and videos
- Mobile friendly viewing
- Sleek and clean new look and feel



Real Time Automation

Best Darn Newsletter

Industrial & Building Automation Protocol Newsletter

www.rtaautomation.com/newsletter

September 2018

My Advice: Be Bold and Break the Rules

A Column of personal opinion by John Rinaldi, Founder and Owner of Real Time Automation.

The word NO has been a frequent companion of mine.

I had a high school advisor laugh when I told him where I wanted to go to college (I was accepted). I had the Dean of Engineering tell me I should drop out of Marquette Engineering (I graduated cum laude). I had a very experienced senior engineer discourage me from starting my own company (that's going rather well). My father told me not to marry a particular woman (I did). A particularly attractive young lady once told me that she would be busy for the rest of her life (naw, no happy ending – I never saw her again).

I'm not much on rules either. If you ever visit our offices, you'll know if I'm there because my car is usually parked crosswise in one of the handicapped parking spots (Steve Jobs did that, too). I was told it's unprofessional to ship a toy in our product boxes (but we do). Someone said to me "Everyone smarter than



John Rinaldi

jrinaldi@rtaautomation.com

you emails their newsletter" (not changing). I celebrate when we get calls complaining about something I said in this newsletter (affirms it gets read!).

I think I might just have oppositional defiance syndrome. When the plane arrives, and everyone pulls out their phone to check messages, voicemail or Facebook, I pull out a real hardcover book. Most people watch TV – I like Ted Talks. Many guys have a hot, midlife crisis car – I have an old beat-up Buick with a transmission that skips when climbing tiny hills. It's not that bad but hitchhikers do seem to look in a different direction when I drive by. If I was just a little bit less lazy I'd wear a tie to work every day.

Rebels Who Succeed

I think I'm in good company. Steven Spielberg started out by sneaking into Universal Studios, taking over an unused office and introducing himself as a producer around the movie sets. Bill Gates hacked the scheduling system at his high school to get into a class that had a lot of hot girls. Warren Buffet took a tax deduction for his bicycle when he was a newspaper delivery boy. And then there's Donald Trump – is there a rule he does follow?

I read some research recently that kids who get traffic tickets, skip class, party, rebel against their parents and quit their jobs are much more likely to start and run successful businesses. Aggressive and risky actions seem to be indicators of likely successful entrepreneurs. And these traits are a more significant factor in entrepreneurship than intelligence,

Steal of the Month...



Take our quick, 5 question survey by October 26th to claim your free RTA bottle opener!

rtaautomation.com/steal

creativity and socio-economic status. You'll want to note that these entrepreneurs, while only 20% of the workforce, account for three quarters of America's millionaires.

The lesson here is to follow your head and heart. Most rules (not laws) can be stretched or outright broken in pursuit of your dreams. In fact, you'll be less likely to reach your dreams by doing what you're told and following all the rules – those people are easily forgotten and overlooked.

As we enter the Fall season, let's all agree to be bold, stand up for ourselves and fearlessly make our lives the lives of our dreams.

EtherNet/IP Fest

- Application Layer Protocol Training -

Real Time Automation

October 29-31, 2018
Pewaukee, WI



WHAT YOU'LL LEARN

Common Industrial Protocol (CIP)

- Data Modeling
- Device Profiles
- Message Types

PC Test Tools

EDS Files

CompactLogix

Conformance Test Tools

EVENT PRICE

(includes training, materials, breakfasts,
lunches and welcome reception)

\$1995



TAKE ADVANTAGE OF EARLY BIRD
& RETURNING STUDENT PRICING!

\$1795 (until Oct. 12)

Who's It For:

Suppliers needing to improve support and/or update a current offering.

Developers looking to add EtherNet/IP to their products.

System integrators needing to understand the benefits of EtherNet/IP, technical merits, and how to support devices.

MEET WITH OUR ENGINEERS

RTA experts are available for private meetings for your gateway or protocol related issues.

Contact 800.249.1612 or email engineering@rtaautomation.com

By Appointment Only, Additional Rates Apply

RTAAUTOMATION.COM/TRAINING - 800.249.1612

UPCOMING EVENTS

Mark your calendar! You can see Real Time Automation the following dates and locations:

- **October 4:** CBT Open House - Sidney, OH
- **October 14 -17:** PackExpo - **Lakeside Building, Lower Level, Booth # E-10735** - Chicago, IL
- **October 23 - 25:** The Assembly Show: **Booth Number: 2350** - Rosemont, IL
- **October 29-31:** EtherNet/IP Fest - Training for Developers - Real Time Automation

Interested in a private meeting?

Give us a call to set up a visit (800) 249-1612. We love to make the most of our travels. Check out our events at rtaautomation.com/events.



July Survey Results

How many PLC5s do you have or see in customer facilities?

Not Applicable	19.30%
0	28.95%
1-5%	35.96%
6-15%	9.65%
16-25%	6.14%

How many SLCs do you have or see in customer facilities?

Not Applicable	16.67%
0	12.28%
1-5%	37.72%
6-15%	22.81%
16-25%	10.53%

How many MicroLogix PLCs do you have or see in customer facilities?

Not Applicable	17.54%
0	5.26%
1-5%	28.95%
6-15%	26.32%
16-25%	21.93%

How many Siemens Simatic S5 PLCs do you have or see in customer facilities?

Not Applicable	20.18%
0	32.46%
1-5%	35.09%
6-15%	8.77%
16-25%	3.51%

How many DH+ Networks do you have or see in customer facilities?

Not Applicable	21.05%
0	33.33%
1-5%	31.58%
6-15%	12.28%
16-25%	1.75%

What are you looking forward to most?

2018 MLB World Series	13.16%
2018 - 2019 NFL Season	30.70%
2018 - 2019 NCAA Football	18.42%
2018 - 2019 NCAA Basketball	9.65%
None - Sports are lame!	28.07%

THE ELEGANCE AND SIMPLICITY OF CIP

(COMMON INDUSTRIAL PROTOCOL)

John Rinaldi

If you pay any attention to Rockwell Automation, you know that they are 100% committed to CIP, the Common Industrial Protocol. Over the last 20 years, the vast majority of their products have been CIP enabled. Everything I have heard them say and from everything I've read, they are going to continue to support CIP as their primary communications technology well into the future.

I applaud that decision. I think CIP is not only elegantly designed, it works well in practice as evidenced by the hundreds of thousands of CIP nodes in use today. There is much to like about CIP technology. It's not as plain and simple as a Modbus while not as overly complex, heavy and burdensome as PROFINET IO. It has exactly the right mix of simplicity, functionality and elegance. That's hard to achieve and the designers did a great job with it. It is very understandable why Rockwell

would remain committed to this technology.

But here's a question that many of you probably can't answer, "What is CIP?" And, even more importantly, where does CIP end and EtherNet/IP begin?

Let's start with a quick overview. CIP, the Common Industrial Protocol, is a mechanism for organizing and sharing data in industrial devices. CIP is the core technology behind CompoNet, EtherNet/IP, DeviceNet and ControlNet. CIP provides both a common data organization and a common messaging to solve various kinds of manufacturing application problems.

CIP Organization

CIP is a well-defined data representation, connection management and messaging protocol that operates over some independent transport and physical layer (Figure 1).

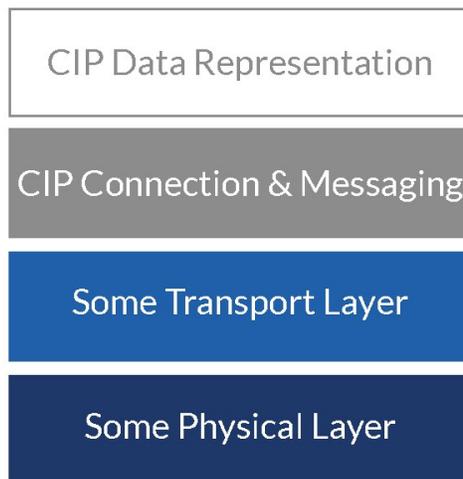


Figure 1 — CIP Overview

The **CIP Data Representation** defines how CIP devices represent data. CIP is an object-based technology; data exposed over a CIP network is presented as a collection of attribute values grouped in common categories

called objects. Common objects with common attributes and services can be defined as a Class of Objects with occurrences of that Class called Instances. For example, a four-unit pneumatic valve might be organized as a Valve Class with four instances of the Class; one for each valve. To provide commonality across similar device types, a set of application objects specific to an application should be grouped together; that is known as "application profiles."

CIP Connection and Messaging

defines the connection management and messaging that all CIP protocols use. CIP defines specific objects that are used to manage connections and the connection types that specify how data moves over those connections. There are two connection types available in all CIP protocols: Explicit and Implicit. Explicit message connections are message/response oriented and are used to asynchronously access data in a device. Implicit message connections (I/O messages) are used for control. Inputs cyclically flow from a CIP Target to a CIP Message Originator. Outputs cyclically flow from the CIP Message Originator to a CIP Target device. Explicit messages, used to transfer non-control data, use a TCP connection while Implicit messages, used to transfer inputs and outputs, use a UDP connection.

Physical, Transport and Media Access

– CIP does not define how the data bytes of a message physically move from one device to another. CIP is completely independent from the Transport, Encoding, Media Access and Physical layers that are used to move messages. In principal, any

physical layer (including RS232 serial) and any transport (OPC UA) could be used to implement the communication link between two CIP devices. However, each of the CIP implementations specify a specific physical layer, media access and transport layer. DeviceNet uses CAN (Controller Area Networking). EtherNet/IP uses TCP/IP and Ethernet. ControlNet uses a custom, ControlNet specific transport and media access.

Figure 2 presents these layers in more detail. DeviceNet, ControlNet, EtherNet/IP, CompoNet all use the same CIP application layers with different transport, Media Access and Physical layers. Any other physical Layer could also be used to send CIP messages.

CIP Device types

Among CIP technology professionals, there is an unofficial way to classify CIP device types as to their overall functionality:

Messaging Server - Messaging Server devices only support Explicit Messaging operations. This kind of device might be used to move ASCII data which occurs intermittently in a barcode or RFID application.

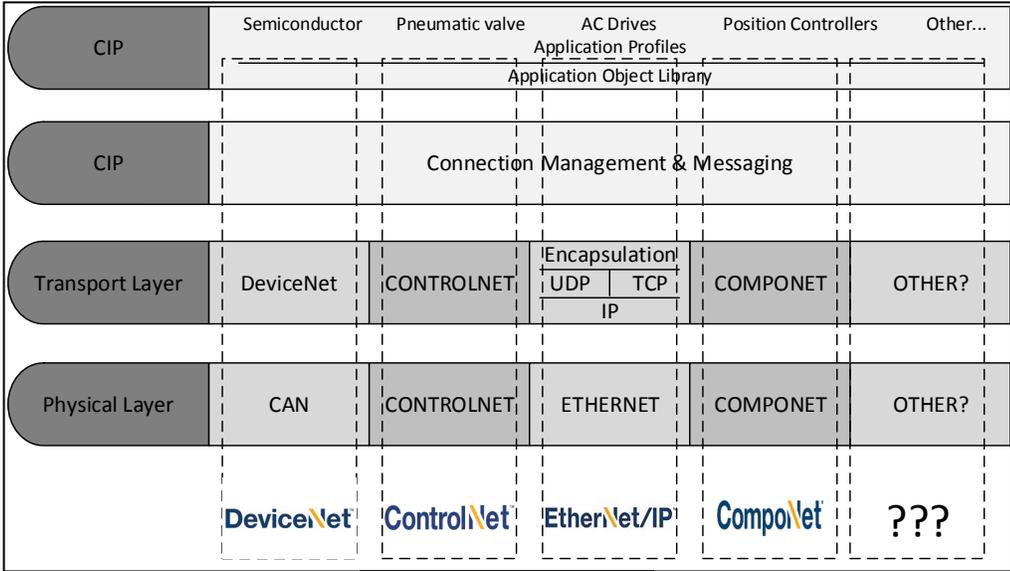


Figure 2 — CIP Protocol Layer

I/O Server – I/O Server devices support both Explicit and Implicit operations. These devices are used in simple I/O applications like I/O muxes, photoeyes and valves. Most DeviceNet and EtherNet/IP devices fit this category.

Messaging Client - Messaging Client devices only support Explicit Messaging operations, but can both initiate and respond to Explicit messages. This kind of device might be used to pull ASCII data from barcode or RFID applications using Explicit messaging.

I/O Scanner - I/O Scanner devices include everything offered in the I/O Server but adds the capabilities to open connections and initiate message transfers. It can serve as both an originator of output data and a target for devices that want to send it output data.

And that’s really all there is to this important technology. This is the elegance and simplicity of CIP. It can be explained very simply, implemented easily, and operated reliably and efficiently.

fun facts...

Six of the seven continents can grow pumpkins. Antarctica is the only continent where they are unable to grow.

Flowers from the pumpkin plant are edible.

Pumpkins are low in calories, fat, and sodium and high in fiber. They are good sources of Vitamin A, Vitamin B, potassium, protein, and iron.

Pumpkins are made up of 90% water