PROFINEWS

PROFIBUS & PROFINET news from around the world

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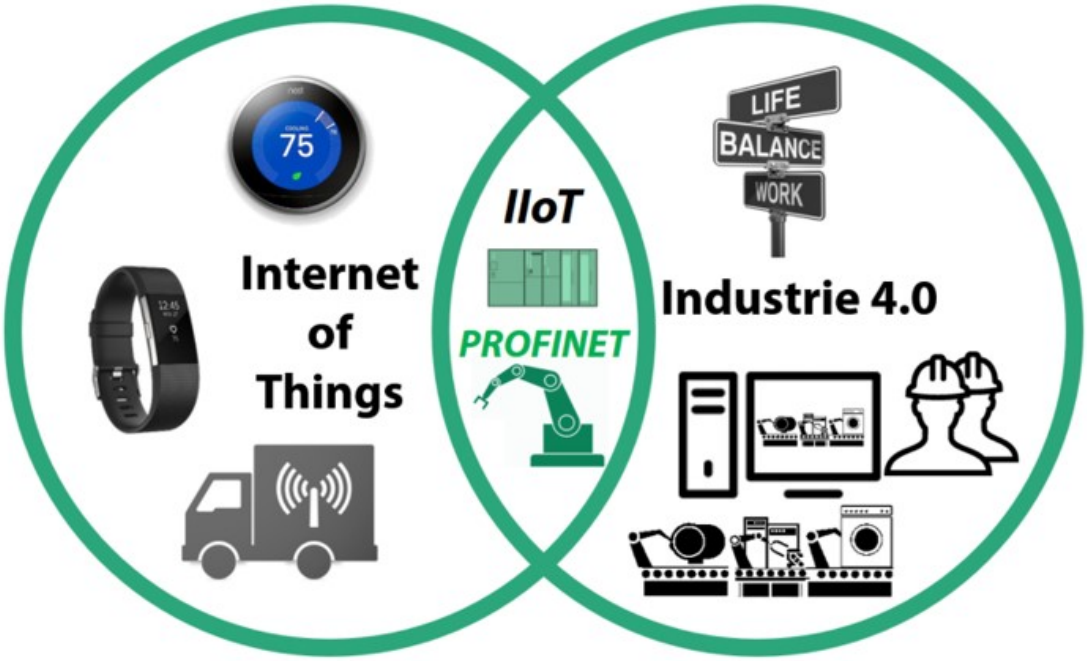
The PROFIfuture

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/the-profifuture/

At the beginning of the year it's a time to reflect a bit on the year gone by and look ahead to the new year. In 2016 we watched the continuing evolution of the concepts of Industrie 4.0 and the Industrial Internet of Things (IIoT)… and PROFINET's place in them (we call that the *PROFINET of Things*). At PI we still see PROFINET as foundational to the IIoT which is in the overlap of Industrie 4.0 and the



Internet of Things.

Users, system integrators, developers, OEMs, consultants, and academics took advantage of literally thousands of educational opportunities offered by Regional PI Associations - from web-based training and webinars to week-long certification classes. PROFINET continued to grow as did PROFIBUS although clearly PROFINET is surpassing PROFIBUS as the network of choice.

For 2017, I predict…

- PROFINET will continue to grow faster than its competitors. (Actually, market studies say that)
- Regional PI Associations will again conduct thousands of educational opportunities.
- PI North America will again host 17 free PROFINET one-day training classes in North America.
- PI Training Centers associated with PI North America will teach 10 Certified Network Engineer classes.
- PROFINET on an Advanced Physical Layer (APL) for process devices will be closer to fruition.
- Hundreds of PI-related tweets will be tweeted.
- RPA Facebook pages will gain likes.
- The PROFIblog will continue to get hundreds of views per month.
- PROFINEWS will continue to garner thousands of reads.
- There will be countless more white papers and videos.

Despite knowing these things, we will still be surprised by all the things that will happen in the PROFIfuture.

Carl Henning
Deputy Director
PI North America

Training in North America

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/training-in-north-america/

PI North America in cooperation with the PROFI Interface Center announces that their free PROFINET one-day training classes will be held in 17 cities in 2017.

Los Angeles, CA	January 31, 2017
Seattle, WA	February 23, 2017
Atlanta, GA	March 7, 2017
Richmond, VA	March 23, 2017
Huntsville, AL	April 4, 2017
St. Louis, MO	May 4, 2017
Chicago, IL	May 18, 2017
Raleigh, NC	June 1, 2017
Minneapolis, MN	June 15, 2017
Silicon Valley, CA	October 5, 2017

Venues without firm dates include Denver, Toronto, New Jersey, Houston, Greenville, Michigan, and Texas (Dallas or San Antonio).

For 2017, the curriculum has been tweaked to explain how PROFINET (the *PROFINET of Things*) fits into the context of the Internet of Things, the Industrial Internet of Things, and Industrie 4.0, complete with an application story. Examples of how complementary technologies like IO-Link can be integrated into PROFINET have been added. Past successes and future improvements on the use of Industrial Ethernets like PROFINET in process applications are included.

Over the last two years PI North America has been machine scoring the students' course evaluations to ensure that they are delivering the quality of instruction required. Some of those results form 2015 through 2016:

What was your overall impression of the course?

Response	Percent
Outstanding	52.54
Good	46.36
Average	1.05
Poor	0.05

How readable / well organized is the material used in the course?

Response	Percent
Outstanding	59.78
Good	39.12
Average	1.05
Poor	0.05

The time frame for the course:

Response	Percent
Way Too Long	0.26
Too Long	5.98
Just Right	91.19
Too Short	2.46
Way Too Short	0.10

Instructor Technical knowledge

Response	Percent
Outstanding	78.61
Good	21.03
Average	0.37
Poor	0.00

For updated North American cities and dates visit the website's one-day training class page.

For training in the rest of the world, visit here and filter by technology, country, and target group (manufacturer or user).

PROFIsafe Certified Designer Training

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/profisafe-certified-designer-training/

The next PROFIsafe Certified Designer Training takes place March 7-9, 2017 in Karlsruhe, Germany. The class will be conducted in the English language.

The huge dissemination of PROFIsafe technology has increased the need for correspondingly knowledgeable people. One of the general principles is the systematic training and education of those persons. Thus, PI is offering training in conjunction with TÜV-Süd. The objectives are:

- Deep insight in all aspects of the design and usage of PROFIsafe
- Learning about the PROFIsafe-Starter kit and its tools
- Overview of the development process per IEC 61508

The training requires three days. A 90-minute written test will take place at the end of each day and the attendance fee is 500.00 €, excluding VAT.

Experts that pass all tests will receive a TÜV certificate "Certified PROFIsafe Designer."

Information and registration here

Ten Go-To Resources for PROFINET

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/ten-go-to-resources-for-profinet/

There are a lot more than ten resources for PROFINET, but here is a selection to provide a good starting point.

1. Marketing Flyer: PROFINET

A brief, high-level overview of PROFINET. Topics such as Diagnostics, Safety, and Performance are briefly introduced.

2. System Description: PROFINET Technology and Application

Twenty pages of detailed introduction to PROFINET: models and engineering, basic functions, optional functions, legacy fieldbus integration, topologies, product development (for automation device makers), and the PI organization. An excellent resource, it starts at a basic level and quickly delves into important details of the technology.

3. MinutePROFINET

An ever-increasing number of minute-long videos introducing PROFINET from the foundation to the esoteric. Start with the oldest one, *"What is PROFINET?"*, and work your way through time and detail. Chronological playlist here

4. Whitepapers

You can find more detail in our series of whitepapers, including *"Time to migrate to Industrial Ethernet"* and the very-popular *"The 7 Step Industrial Ethernet Checklist."* Need to understand which switch for PROFINET? We have a whitepaper for that too.

5. Guidelines

When you are ready to start that PROFINET automation project, you will find guidelines offering detailed assistance. There are about 500 pages of documentation here. Not all of it will apply to your project, but it would behoove you to explore the detail for the parts that are:

Planning: PROFINET Design Guideline.

This 192-page guideline covers plant design, topology, selection of components, selection of transmission medium, selection of connectors, communication relations, and estimate of data volumes to be

transmitted. Also included is the PROFINET Load Calculation Tool.

Security: PROFINET Security Guideline**.**

The security guideline reflects the latest methodologies for creating a secure network.

Installation: PROFINET Guideline for Cabling and Assembly**.**

Routing cables, installing connectors, using fiber optic cable, grounding, and more are covered.

Commissioning: PROFINET Guideline for Commissioning**.**

This includes a thorough checklist you can “check off” as you commission your project. Detailed instructions are in the guideline.

6. Webinars

A suggested sequence:

1. An Introduction to Ethernet for Control Engineers
2. An Introduction to PROFINET - Starting with “What is PROFINET?”, this webinar explains how PROFINET achieves determinism, how to use it for factory, process, and drive applications, and lists other features.
3. And for a project-oriented approach: Completing a PROFINET Project
4. There are many others for at the dedicated webinar page here; we especially recommend Diagnostics for PROFINET and Industrial Ethernet

7. Free one-day training class.

There is no substitute for in-person instruction. So if you are lucky enough to live in a city on our schedule, please register online. Similar classes are available worldwide.

8. Certified Network Engineer class.

There is no substitute for in-person instruction plus hands-on training. We offer fee-based, week-long PROFINET Certified Network Engineer classes in Johnson City, TN and other cities. This comprehensive class will get you 'into the bits and bytes' of PROFINET. We are sometimes able to offer these at a user site if the number of students warrants. These classes are also offered around the globe.

9. PROFINEWS

You are here now and there is no substitute for subscribing to stay up-to-date on new tech tips, new products, new classes, and news. The one substitute is the PROFNEWS App for iOS and Android.

10. Social Media

There is so much social media, is has its own article in this issue.

Social Media

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/social-media-3/

PI offers many different social media channels: blog, Twitter, YouTube, Facebook, and even the old standby, RSS. Here are some examples and time-saving opportunities to participate.

RSS

RSS feeds have been around for a long time (at least a long time in Internet years). The us.profinet.com and profinews.com websites prominently feature the symbol for RSS feeds. Click them and you will be presented with a choice of what application to use to subscribe to the feed. That might be Outlook or a dedicated feed reader like RSSOwl. Subscribers never miss an update.

YouTube

PI provides three different YouTube channels. You can (and should) subscribe to these too. PROFI-television provides professionally produced live and animated videos. These are educational and informative. MinutePROFINET provides one-minute videos of various PROFINET features. The newest series covers the PROFINET of Things. Finally, The PROFIblogger channel provides informal videos, often filmed at trade shows.

Facebook

PI and many Regional PI Associations have Facebook pages in the local language. Here are some in English:

- PI
- PI North America
- PI Middle East
- PI South East Asia

The PI North America Facebook page automatically shows all new PROFINEWS articles. The news appears here and in the PROFINEWS App before the PROFINEWS email is sent.

Twitter

@AllThingsPROFI is the most-followed of PI's various Twitter feeds. There are two original tweets per weekday that are repeated later with the hashtag #ICYMI (In Case You Missed It). Many tweets link to

articles in PROFINEWS, the PROFIblog, MinutePROFINET, or trade press articles about PROFINET, PROFIBUS, or IO-Link. Retweets are presented of members' information.

PROFIblog

The PROFIblog presents both news and opinion… and sometimes goes off-topic. Often the PROFIblog leads the formal news outlets. Some examples:

"Switched Ethernet Networks for PROFINET Determinism" appeared on the blog after students raised some questions in a PROFINET one-day training class. The post was so popular it was turned into a PROFINEWS Tech Tip article, "Tech Tip: PROFINET on Switched Networks." PROFIblog posts are often referenced on Twitter; the link to this item was the most popular recent tweet.

This issue of PROFINEWS highlights upcoming free PROFINET one-day training classes, but blog readers got a preview on November 1st with "PROFINET Classes in New Cities in 2017."

Trade shows get formal articles in PROFINEWS. The SPS/IPC/Drives Show in November was covered in last month's PROFINEWS with an article. But the PROFIblog featured five posts with many more pictures and videos, including an off-topic look "Around Town."

To keep up-to-date with PROFINET, PROFIBUS, and IO-Link news, engage with us on these social media channels!

Tech Tip: Which Switch for PROFINET

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/tech-tip-which-switch-for-profinet/

Should you use a managed switch or an unmanaged switch with PROFINET? YES! Yes, you should use either a managed or an unmanaged Ethernet switch with PROFINET.

Unmanaged Switches

An unmanaged switch has no built-in intelligence except to send incoming Ethernet frames out the correct port – the port to which the destination device is connected. And only that port. For diagnostics it has LEDs. Each port has an LED indicating that there is Ethernet traffic. There is no way to tell

how much bandwidth is being consumed. There is no way to tell if there are lots of re-tries. You can buy such a switch at many retailers. For example, there is a 5-port Linksys switch available for $33.99. It meets the minimum requirements for PROFINET; that is, it's a 100Mbps full-duplex Ethernet switch. It also includes the QoS (Quality of Service) feature that is recommended for PROFINET. Since PROFINET frames are automatically marked with a priority higher than TCP/IP frames, a PROFINET frame gets a head start if a TCP/IP frame and PROFINET frame arrive at the same time. The PROFINET frame gets sent out first.

Managed Switches

A managed switch adds intelligence that an unmanaged switch does not have. A number of IT protocols are useful with managed switches including SNMP (Simple Network Management Protocol), LLDP (Link Layer Discovery Protocol), and IGMP (Internet Group Management Protocol). Let's dispense with IGMP right off the bat – PROFINET does not need it. Protocols that multicast their real-time IO data do need it. PROFINET unicasts. SNMP and LLDP are specialized protocols for retrieving data that switches save. For example, if you think it is important to be alerted if there are an excessive number of re-tries, SNMP can help. If you want to see what bandwidth utilization is in real-time, SNMP can help. LLDP allows software to extract the network topology. LLDP also enables one of the wow-factors of PROFINET: replacing a device with no software tools needed and no switches to set. You can see how that is done in this MinutePROFINET video and watch it being done in this video from our PROFINET one-day training classes.

There is a saying that goes:

> **"You will either use a managed switch… or wish you had."**

A managed switch provides information that can help prevent downtime and speed troubleshooting when the line does go down. The more expensive downtime is in your facility, the more important it is to invest in a managed switch. It is an investment. Managed switches cost more. But the incremental cost is trivial compared to the cost of downtime. Up to now, you probably think this topic covers standalone Ethernet switches. That is true. But managed switches are also contained within PROFINET devices. So the same kind of diagnostic information you can extract from a standalone switch can be extracted from a switch in a PROFINET device.

You can use an OPC-SNMP server to read information from a managed switch and display it and alarm it in an HMI. It's wonderful that the information can be seen in an HMI, but what if you want the controller to take some action as a result of diagnostic information? PROFINET does that.

PROFINET Switches

An Ethernet switch can also be a PROFINET device! The switch will look like IO to the PLC. This means the switch will have a GSD file just like any other PROFINET device. And the GSD file will define what diagnostic information can be read. For example, if a device is unplugged from a switch port, the PLC logic can execute an appropriate action. This is even more valuable if the switch is an MRP device (Media Redundancy Protocol). Here's a one-minute refresher on redundancy:

YouTube Video

If the switch reports a failure in the ring, the PLC can alarm it and act on it. In fact, it can pinpoint where the break in the ring is, simplifying the maintenance response. Many vendors supply Ethernet switches that are also PROFINET IO devices, including Cisco, Siemens, Moxa, Phoenix Contact, Harting, and Hirschmann.

With PROFINET you can use an unmanaged switch, a managed switch, or a switch that is also PROFINET IO. It's good to have options. But, even though you can, don't use an unmanaged switch unless you can afford… the downtime.

What’s in a (PROFINET Device) name?

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/whats-in-a-profinet-device-name/

Hunter Harrington, PROFINET Consulting Engineer, of the PROFI Interface Center in Johnson City, Tennessee discusses the importance of PROFINET device naming plus rules and caveats in today’s engineering tools.

The number one rule-of-thumb, which you should never forget when commissioning a PROFINET system: Make sure to assign the device name from your engineering tool. The tool uses PROFINET DCP (Discovery and Configuration Protocol) to communicate with the device behind the scenes.

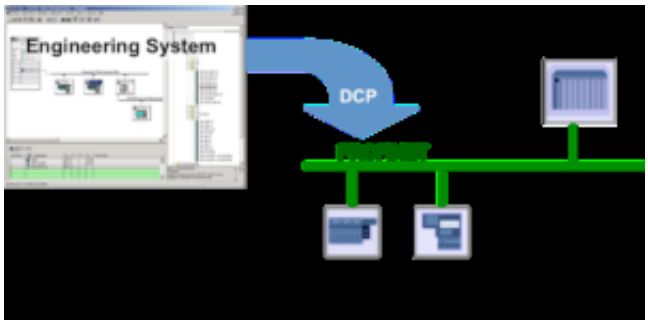
That’s because every PROFINET device must have a device name which is based on *DNS* (**D**omain **N**ame **S**ystem) and *host naming* conventions, and the name needs to be written to the device by a PROFINET tool (which can be a standalone or engineering tool) or a PLC/PC based IO Controller in order to work correctly. A PROFINET device out of the box is in a factory state with an empty string (i.e.: “ ”) set as the name by default.

Many times we find that people who are new to PROFINET do not realize the **importance of the IO device names** and **forget to initialize and assign** the device with the proper name or setup the configuration so the controller can assign the name. They simply do the engineering configuration for the PLC and download to the PLC and in this case the controller will keep looking for the device by name to startup the device, but won’t get a response and the device doesn’t come up. It should be noted here that the only device name which is set by downloading the configuration to the IO Controller (whether it’s PLC or PC Based) is typically the PLC / or PC station name itself. Assigning names to the devices either using a tool with an “Assign name” function or from the PLC options (if automatic PLC name assignment is supported) is a must.

There are also some caveats you should be aware of when assigning PROFINET device names. Number one is that all device names must be unique. According to the PROFINET specification the maximum name size can be 240 characters, but many configuration tools do not support such lengths and usually only a subset of this. Check with your configuration tool and manufacturer for details. Also you need to be careful of special characters (such as '$', '#', '/', '_') and max size labels used in the PROFINET device

name which are based on the same naming conventions from the office like from your PC host name or printer names. A label can only be 63 characters long before using a period [.] and should use characters '0-9', 'a-z', or '-' and cannot start or end with '-'.

Benefits of name assignment are that location-specific or device-specific information can be part of the name to identify a device. For example: *capper-1.cabinet-5.johnson-city-plant*. Or we could just call it *capper1* for simplicity. And it's much easier to remember this than an IP-address. Another advantage is that the name can be used if troubleshooting a device with an alarm or failure for quick diagnostic reaction and minimal downtime.



Note also that letters are lower case. Most engineering tools will still allow assignment using upper case characters, but then set the name in lower case. It's usually transparent, but keep in mind that most host names are lower case and it's best to use that just in case (no pun intended) the engineering tool has problems with an upper case assignment and won't convert it. This could cause a device to reject the name assignment.

To sum up, PROFINET device names are assigned with a protocol known as PROFINET DCP from the engineering / standalone tool or PLC. This same protocol can be used on PROFINET to discover network nodes (hence the discovery part of the name) or configure (hence the configuration part) PROFINET device names / IP addresses, Flash LEDs, reset the device to factory settings, initialize fast startup devices, and more. We'll have a future tech tip focused just on DCP features and the differences and similarities to DHCP from the office world.

So, for now get out there and assign some meaningful PROFINET device names! It makes managing the network so much easier.

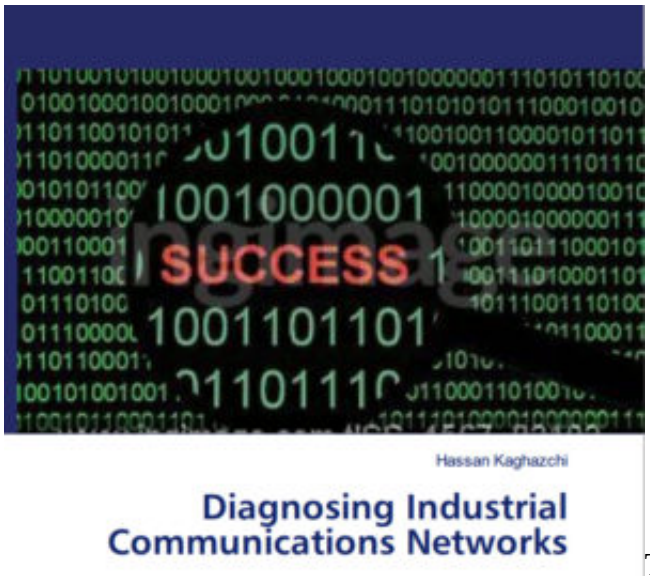
--Hunter Harrington

Network Diagnostic Book Announced

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/network-diagnostic-book-announced/

Diagnosing Industrial Communications Networks



Today industrial communications networks are part of the fabric of most manufacturing plants globally. The upkeep of these networks is crucial to smooth plant operations. The rapid diagnosis of the communications networks minimizes the plant down time, and increases efficiency and profitability. This book outlines the research conducted into diagnosing industrial communications networks with particular focus on PROFIBUS and PROFINET. Both software and hardware approaches are documented in this work.

Author: Dr. Hassan Kaghazchi, PhD, MEng, BEng, CEng, Senior Member International Society of Automation (ISA), Chairman PROFIBUS Ireland, and Director Automation Research Centre, University of Limerick

The book can be ordered ordered here**.**

Regional News - January 2017

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/regional-news-january-2017/

Regional PI Associations in Australia, China, Middle East, and the UK have news in this issue. PI Australia looks back at 2016 and ahead to 2017. PI China appeared in the exhibition of the 2016 China International Industry Fair in Shanghai. PI Middle East hosted a PROFIday and conducted a PROFIBUS class in Dubai; they are planning a design course. PI UK is supporting (and offering discounts) to Industry 4.0 Summit & Factory of the Future Expo in 2017.

PI Australia

From Chairman Rafael Koenig:

> As 2016 draws to a close, the PAA can feel justifiably proud of its recent achievements, most notably the successful hosting of the "Automation Innovation Summit" in May.
>
> Looking ahead, I predict a year of change and challenge for our members and the technologies we represent. Digitalisation and the mega trends of Industry 4.0 and IIoT are now a fundamental fact of life and Australian industry needs to adapt and be part of it.

Read his whole statement and PI Australia's full newsletter here.

PI Australia

PI China

The 18th China International Industry Fair (CIIF) was held in the National Exhibition and Convention Center (Shanghai) November 1-5, 2016. China PROFIBUS & PROFINET Association (PI China) appeared in the exhibition of CIIF-Industrial Automation Show (IAS) 5.1H. The 72 sqm booth took "Professionalization, Internationalization, Marketization and Branding" as its direction, focused on advanced hotspots. It attracted a lot of professionals.

At the beginning of booth design, the PI China booth revolved around the theme "Innovation, Intelligent and Green," divided into three special areas-- an intelligent factory software / hardware demo, a PROFINET multivendor device wall, and members' individual areas.

The Intelligent Factory Software / Hardware Demo was Eye-Catching

The intelligent factory software and hardware demo was designed and integrated by ITEI, where PI China's secretariat is settled. This demo used an assembled train model to simulate the overall production process from customer order, to production and processing, to logistics storage, to optional configuration,

and even customization. The whole process of the demo showed the monitoring and control to track the automation, information technology, and intelligence. In addition, all the work stations were marked with a QR code, and RFID technology is used for real time identification. An MES is used to uniformly allocate processing instructions. The production processing is conducted automatically, such as sorting materials of robots, feedstock, CNC machining, welding, assembly, and order information confirmation. It not only improves the availability of devices, but also increases the production efficiency. Of course the intelligent factory software and hardware demo platform uses the Chinese national standard GB/T25105.1~3-2014——PROFINET as its main communication platform. The demo platform also integrates PROFIBUS, AS-interface, and IO-Link technologies which are widely used in the market.

Many Highlights on the 6 meter PROFINET Multivendor Device Wall

The six-meter long PROFINET multivendor wall installed more than 70 PROFINET devices, including PROFINET controllers, frequency converters, encoders, IO modules, weighing instruments, control panels, servo-controllers, gateways, switches, and PROFINET development components. PROFINET devices from **local vendors accounted for 70%** of the total area of the PROFINET device wall! It's the first time that the number exceeded the number of PROFINET devices displayed by foreign companies. This year's participation in the PROFINET multivendor wall also had a record number of members.

In addition, the PROFINET development components area had 12 companies represented, including

Siemens, Phoenix Contact, Hilscher, Molex, HMS, D&A, Profichip, and Nanjing Chengda control. R&D audiences learned how to develop PROFINET devices and receive technical support during the development process.

PI China Members' Areas

PI China in conjunction with more than 10 member companies which provide intelligent solutions and PROFIBUS & PROFINET products and services attended the exhibition. Members included Siemens, Phoenix Contact, GE Automation & Control, Microcyber, P+F, HSM Sweden, D&A Germany, SiboTech, Nanjing Chengda control, Beijing Ving Fieldbus and more. The member companies shared PROFIBUS & PROFINET experience and technology with users based on PI China's platform, thus leveraging the real advantage of membership with the ubiquitous presence of PROFIBUS and PROFINET users.

PI China

PI Middle East

It is widely accepted that the most important decisions are made during the design stage of a project. This presentation examines the fundamental principles of good network design for PROFIBUS and PROFINET systems, discusses the main factors to be considered at the design stage of an automation system... and much more. Mr. Andy Verwer will be coming from the UK to explain this for two days. He has been working as a consultant for more than 20yrs in this field and he will be happy to give his experience to the Gulf region.

The Schedule: Monday February 6, 2017 at 10:00 AM GST to Tuesday February 7, 2017 at 4:00 PM GST

Registration

PI Middle East

PI UK

PI UK is participating in two events in Manchester, 4-5th April 2017. Registration for both events is open. Use reference **IND4PRO** to claim the discount:

Industry 4.0 Summit registration

The Future of Manufacturing Things

UK's first Industry 4.0 Summit & Factory of the Future Expo

Members of PI qualify for a 30% discount off the price of conference at the UK's first Industry 4.0 Summit, a dedicated conference & exhibition for Industry 4.0. The conference will look at key issues surrounding Industry 4.0, the Industrial Internet of Things (IIoT), smart factories & digital manufacturing, and feature government policy, strategies, business models, and a number of Industry 4.0 case studies.

PI will have a strong presence at this event, where we will be hosting a Round Table discussion featuring PI's key technologies for IIoT, PROFINET, and IO-Link.

PI UK

Product News – January 2017

by Carl Henning - Tuesday, January 03, 2017

http://profinews.com/2017/01/product-news-january-2017/

New and updated products include Belden’s micro distributed control unit, Mynah’s DeltaV VIM2 module, a Siemens PROFINET to PROFIBUS proxy, Turck IO-Link Master and RFID modules, and Wachendorff’s new compact PROFINET IRT encoder.

Click headline for details.

PROFINEWS

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