



Empowering Intelligent Energy Solutions

LONMARK[®]

magazine



JANUARY 26-28,
CHICAGO, IL
BOOTH #3843

NEWS

New Members and New Products
Best of Year Awards

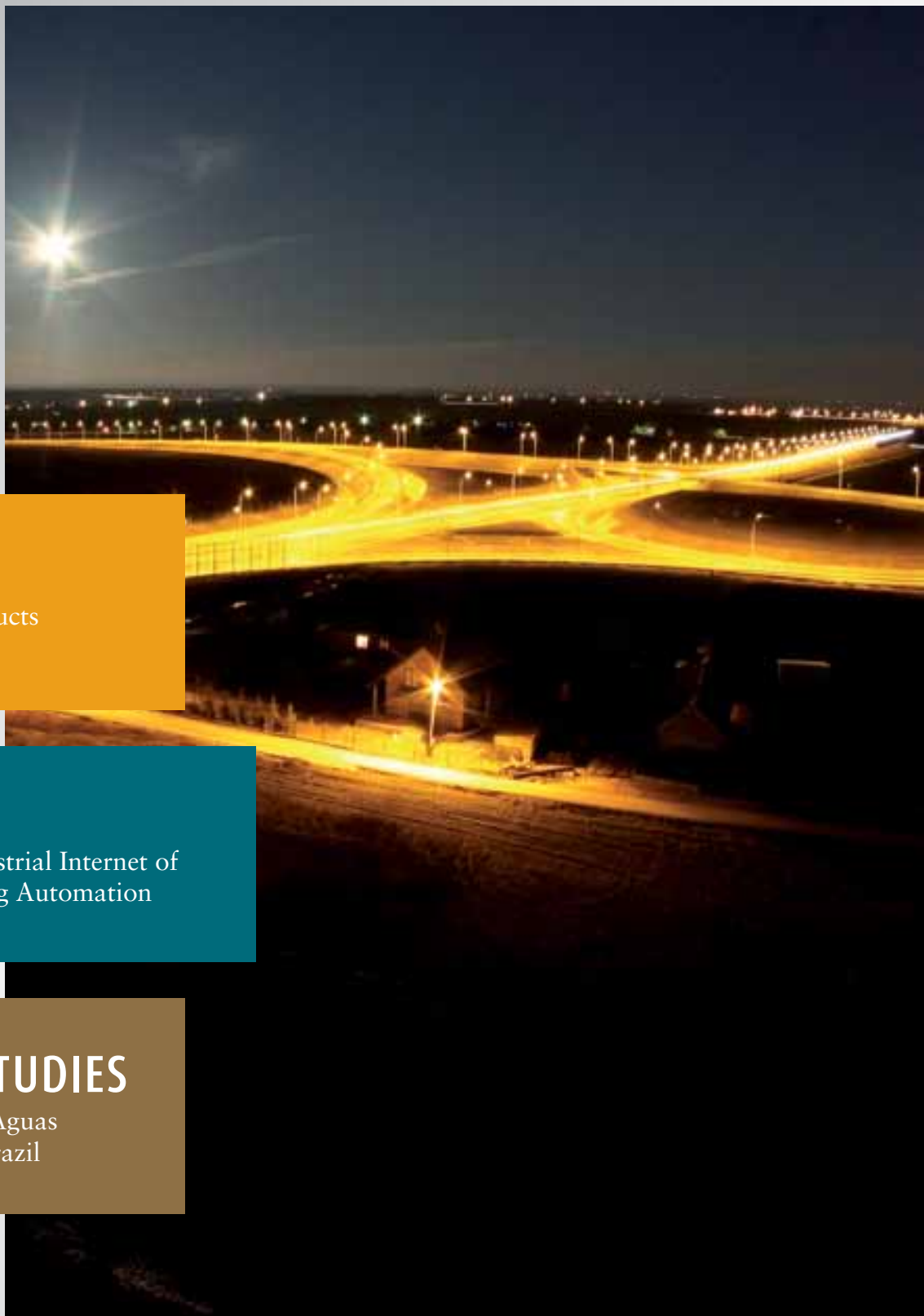
FEATURES

Getting Started with The Industrial Internet of Things in Commercial Building Automation



CASE STUDIES

Passeio das Aguas Shopping, Brazil



LONMARK® Magazine: The Official Magazine of LONMARK International

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Budimex SA

LONMARK Mission

LONMARK International is a non-profit corporation supporting the testing and certification of products, people and companies supporting the ISO/IEC 14908 body of standards and Industrial Internet of Things.

Executive Letter



Barry Haaser

» A Year in Review «

Barry Haaser, Executive Director
LONMARK International

It's been an interesting year for LONMARK® International. We entered 2014 recognizing our 20th anniversary as a member based organization and shared our new technical vision to embrace the Internet of Things (IoT). We see an interesting opportunity in the rapidly evolving IoT marketplace to fill a void regarding multi-vendor systems. You see, most of the IoT initiatives underway worldwide are focused on the lower levels of the protocol stack and lack a common interoperability framework. One of the primary strengths of the LONMARK standard involves the enablement of multi-vendor interoperability through device profiles. We are working closely with the LONMARK International Board of Directors to define a solid strategy for migrating the organization toward IoT, while proving backward compatibility with products based on LonWorks technology.

We witnessed the end of an era with the closure of one of our longtime affiliates LONMARK Denmark, which transitioned to a new organization that is protocol and technology agnostic called BUILDING-CONTROL DANMARK. On the flip side, we are very excited about the birth of a new affiliate in South America called LONMARK Cono Sur, which covers ten countries, including Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. Most of the LONMARK Certified Professionals are coming from South America and Mexico thanks to the hard work of Spanish Partner Member ISDE.

Significant progress was made in the outdoor lighting market over the past year. Five new Partner Members focused on the outdoor lighting market joined LONMARK International. These companies are now actively engaged with other LONMARK members in the Outdoor Lighting LONMARK Committee (OLLC) who work collaboratively to support project development through a variety of activities and programs.

The most significant activity sponsored by the OLLC in 2014 involved the organization of a large member-based booth at the bi-annual Light & Building show in Frankfurt, Germany. The stand included products from 14 different companies shown in a live demo with three poles and multiple luminaires. Exhibiting companies generated over 500 new contacts and 150 new project leads throughout the duration of the fair.

The Automated Food Service (AFS) Task Group created a number of profiles to support the McDonald's I-Restaurant program. This initiative is currently on-hold due to challenging business conditions in the quick service industry. In the buildings market we continue our efforts to educate and train system integrators and facility managers. We now provide two day, web-based training courses to prepare industry professionals to take the LONMARK Certified Professional exam. We continue to sponsor a full day of education sessions at AHR Expo. Join us on Tuesday, January 27th and don't forget to visit our booth (#3843) while you are there. For further details on the topics and speakers, please visit www.lonmark.org. LONMARK will also participate in the LONMARK Deutschland booth at ISH in Frankfurt, Germany in 2015.

For our members, expect a call from a staff member sometime soon to discuss the various LONMARK initiatives underway.

Sincerely yours,

Barry Haaser
Executive Director

New LONMARK[®] Members

Adic Co., Ltd.
WWW.ADICS.COM

ADIC is an R&D-oriented company that has focused not only on the AGV (Automatic Guided Vehicle), but also on the open control network technology of ISO/IEC 14908-1 (LONWORKS[®]) as main businesses.

APANET Green System Sp.z.o.o.
WWW.GREENSYS.PL

APANET Green System, using over a decade of experience in microprocessor automation and control systems industry, focuses on smart systems for power consumption reduction and electricity usage rationalization.

Devtech Pte Ltd
WWW.DEVTECH.COM.SG

Devtech Pte Ltd is a manufacturer of devices based on the ISO/IEC-14098 Protocol Standard, used in various market segments to provide Smart Street Light and Smart City solutions.

LSIS Co.Ltd
WWW.LSIS.COM

LSIS, leader in electric power and automation solutions, is expanding into more diversified businesses including electric power infrastructure, ubiquitous infrastructure and industrial infrastructure.

STV Automation
WWW.STV-AUTOMATION.DE

STV Automation is a manufacturer and provider of LONWORKS[®] components and system solutions for building automation and industrial automation.

BACnet Interest Group Europe (BIG-EU)
WWW.BIG-EU.ORG

The BACnet Interest Group Europe (BIG-EU) is the European trade association for the application of the global BACnet standard ISO 16484.5.

Certified Products:

Daikin Applied
WWW.DAIKINAPPLIED.COM/SALES.PHP

MicroTech III Centrifugal Chiller Unit – Controller
 8 00025 5028 03 04 22
 The MicroTech III centrifugal chiller unit controller supports the Daikin WTC Two-Stage Centrifugal Water Chiller.

Distech Controls
WWW.DISTECH-CONTROLS.COM

ECL-VAV-IRC
 8 00083 5502 BF 04 05
 The ECL-VAV series are microprocessor-based programmable variable air volume (VAV) controllers designed to control any variable air volume box.

ECL-PTU
WWW.DISTECH-CONTROLS.COM

8 00083 5501 BF 04 81
 The ECL-PTU Series are microprocessor-based programmable controllers designed to control powered terminal units such as powered fan coil units, heat pumps units, and chilled beams.

Echelon Corporation
WWW.ECHELON.COM/COMPANY/CONTACT

CPD3000
 8 00001 230E 04 10 04
 Echelon's Power Line based lighting controller can be used to control lights by collecting vital data such as run hours, voltage, current, equipment status, power consumption, energy usage, diagnostic alarms, and power factor.

Adic Co., Ltd.
WWW.ADICS.COM/EN/PRODUCT/OLC.ASP

ADSLC-1
 8 000A1 230C 04 10 00
 ADSLC-1 enables control of streetlights by forming streetlight network through power line communication and using internet or mobile wireless network.

ALCF-250
WWW.ADICS.COM/EN/PRODUCT/BALLAST_2.ASP

8 000A1 2200 04 10 02
 ALCF-250 is a high-efficiency electronic smart ballast, with dimming control and embedded power-line communication feature, gives a significant energy saving and effective street light controllability.

LG Electronics
KR.LGEAIRCON.COM

LON Translator (JChiller)
 8 000CC 4850 04 04 07
 The LON Translator (JChiller) is a conversion gateway between the BMS System using the LONWORKS[®] protocol and LG products (LG Turbo Chiller, LG Screw (Water) Chiller, LG Absorbed Chiller).

LON Translator (Scroll_AHU)
HTTP://WWW.LGE.COM/AIRCONDITIONER

8 000CC 4850 04 04 06
 The LON Translator (Scroll-AHU) is a conversion gateway between the BMS System using the LONWORKS[®] protocol and LG products using the US protocol.

APANET Green System Sp. z.o.o.
EN.GREENSYS.PL

GLC 100
 8 000F9 230C 04 10 20
 The GLC100 controller is intended to manage a single light source (light socket) operating within outdoor lighting (i.e. street, car park or park lighting) control systems.

LOYTEC
WWW.LOYTEC.COM

8 000D7 0501 8A 04 06
 The L-IOB I/O Module family of products consists of intelligent input/output devices featuring various I/O configurations.

Theben
WWW.THEBEN.DE/EN

8 000EF 1E00 06 04 10
 The PresenceLight 360 PLLON for ceiling mounting is well-suited for universal deployment in offices, passageways and secondary rooms and the PresenceLight 180 PLLON for wall mounting controls the lighting in corridors, entryways and garages.

ISDE
WWW.ISDE-ING.COM

INCA-100H
 8 000E1 0A00 06 04 01
 The INCA-100H is a LONMARK Certified air quality sensor, which detects carbon dioxide (CO₂), temperature and humidity.

INS-081
WWW.ISDE-ING.COM

8 000E1 2000 05 04 04
 INS-081 is a DIN-6U rail mounting device suitable for lighting and blinds applications.

Control Solutions, Inc.
WWW.CSIMN.COM

BB2-LON
 8 00017 471E 84 04 01
 Control Solutions' Babel Buster BB2-LON is a bindable LONWORKS[®] node that functions as a Modbus or BACnet client/server.

NEWS

Best of Year Awards 2014

Multi-Vendor Project of the Year (Large):

ISDE's Ferroparque Building Project in Querétaro, México. This project exemplifies the degree of openness of the system and the benefit of LON® to the customer.

Multi-Vendor Project of the Year

(Small-repeatable):

Engenuity Systems recognized for their Small Box Energy project involving the Chameleon energy management solution.

Certified Product of the Year:

ThebenHTS PlanoCentro PCLON Presence Detectors, recognized for its three directional light measurements, the PCLON allows for optimal use of daylight – and therefore maximizes energy savings.

Visionary of the Year:

Christophe Orceau, Streetlight.Vision. Christophe has been honored for his vital role in leading the LONMARK street lighting initiative and for being a longtime supporter of LONMARK International.

For more information on this year's winners please visit: www.lonmark.org



Christophe Orceau,
Streetlight.Vision.

Again this year, LONMARK® International has honored products, companies, projects and individuals that are leading the industry in innovation and accomplishment. LONMARK certified products, people and companies have served as the foundation for thousands of open, interoperable systems worldwide. These annual awards reflect the vision and innovation shared among the members of the LONMARK community. Congratulations to the 2014 Best of Year Award winners:

Upcoming Events for 2015

LONMARK International is proud to be an endorsing organization for the following industry events:

AHR EXPO – January 26 – 28, 2015
Chicago, IL
Booth #3843

The free LONMARK Educational Seminars will be delivered on Tuesday, January 27, the second day of the show from 9 am – 4 pm in room S103a. The sessions will be lead by experts active in the LON community and industry leaders from synergistic organizations that will provide their unique insight.

9 am – 9:45 am
Smart Cities Asset Monitoring and Control Using an Open Platform

10 am – 10:45 am
Open Standards for the Oil/Gas Industry: Integrating Building Automation and Process Control

11 am – 11:45 am
Profiles Powering Big Data, and Uncovering Dark Data in the Industrial Internet of Things

1 pm – 1:45 pm
LONMARK 2.0: New Advancements in Open Systems Control Networking

2 pm – 2:45 pm
Energy Management for Small Box Retail (SBR)

3 pm – 3:45 pm
Specifications for Open Interoperable Systems

ISH 2015 – Co-booth with LONMARK
Germany – March 10 – 14, 2015
Messe Frankfurt,
Frankfurt am Main, Germany
ish.messefrankfurt.com/frankfurt/de/aussteller/willkommen.html

West Coast Energy Management Congress (EMC)
June 3 – 4, 2015
Long Beach Convention Center,
Long Beach, USA
<http://www.aeeprograms.com/emc/>

To find out more about these events and to view all of LONMARK International's events for 2015 please visit: www.lonmark.org



LONMARK® International School Maximilien PERRET – LONMARK France

Maximilien PERRET, a French school located near Paris, trains students for a two-year technical degree involving building management, HVAC, refrigeration, maintenance of the building installations. Students in “Building management” are trained on LONWORKS technology and are taught how to install devices for lighting control, window blinds and HVAC systems. Students are currently working with products from Distech-Controls, Kieback&Peter, Wago or Schneider Electric.

The school has an ERASMUS charter for higher education, which allows them to send ten to fifteen students on internships abroad for between two to four months. The school is seeking partner companies interested in sponsoring a trainee. There is no need to pay the student for the internship and insurance is covered by the Maximilien Perret school.

The school is thankful to Kieback&Peter, in Germany, Apice and Casadei & Pellizzaro in Italy who have sponsored students each year.

Please contact
EDITH VAUTH
EDITH.VAUTH@AC-CRETEIL.FR

if you are interested in
sponsoring an intern.

More information is available at
WWW.BTSDOMOTIQUE-MAXP.FR



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MEMBER
NEWSOutdoor Lighting
LONMARK® Committee

Building on the success and momentum generated by the LONMARK International street lighting booth at Light+Building last year, the organization formed the Outdoor Lighting LONMARK Committee (OLLC). The OLLC meets virtually, by phone, monthly and is actively creating a number of deliverables to help promote industry awareness of networked street lighting solutions worldwide. If you are a LONMARK member and are interested in joining this active committee, please email Henny van de Bovenkamp at henny@lonmark.org.

The Smallest LONWORKS®
Street Lighting Controller on the Market

Citylone, a french company that specializes in solutions for lighting control management, launched the SL21, the smallest LONWORKS® street lighting controller on the market late last year. The SL21 controls urban lighting with streamlined functionalities. Its small footprint allows it to be integrated in the smallest junction

boxes. SL21 uses powerline technology (through existing electrical network) and communicates using open and interoperable (non proprietary) LONWORKS® protocol. Controllers from SL21 range can control electronic ballasts (DALI or 1-10V) in an ultra-compact case (electronic ballast, magnetic ballast for maintenance version

only). They can operate in autonomous, driven mode or integrated into a remote management system.

CATHERINE RAMBAUD
MARKETING MANAGER
WWW.CITYLONE.COM

LONMARK International Plans for
Continued Growth in Latin America

This summer LONMARK announced the formation of a new affiliate organization, LONMARK Cono Sur, to support LONMARK members and certified professionals in South America, including Argentina, Chile, Uruguay, Paraguay, Peru, Brazil, Colombia, Venezuela and Bolivia.

To-date, more than 700 people have passed the LONMARK Certified Professional (LCP) exam, with 25 percent coming from Spanish-speaking countries.

The LCP program establishes a proficiency standard to assure end-users that they have access to a resource pool of professionals with industry knowledge and experience. More and more end-users, project developers, specifiers, and planners are requiring LONMARK Certified Professionals for their projects because they are confident in their fundamental knowledge of LONWORKS® technology and LONMARK Open Systems. The popular LONWORKS Installation Handbook, which is used by exam candidates to prepare for the LCP

exam, is being translated into Spanish by LONMARK Spain, a LONMARK affiliate organization.

LONMARK Cono Sur's mission will be defining the courses and documentation required for professionals to incorporate the ISO/IEC 14908 standard in facilities across the region," said Hernán Fagnilli, president, LONMARK Cono Sur. "We are confident this affiliate will be a great resource for Latin American members and their customers who support the ISO/IEC 14908 standard."

AMBASSADORS'
CORNERIt has been a Great Year for the LONMARK®
Ambassador Program

It's been a very busy year for the LONMARK Ambassador program, with activities in Europe, The United States, Latin America and China – and next year is shaping up to be even busier! Under the guidance of our board of directors, LONMARK ambassadors around the world have helped promote the value and virtues of our programs, technology and industry support – in their own languages. They've presented at key industry events and technical conferences, offered articles and interviews, engaged with researchers and the media, and overall supported LONMARK certification and credentialing programs. This year we continued and created new partnerships with many industry organizations such as: Energy Central (US), Infocast (US), Energy-nautics (Germany), LightSavers (Canada), GEBT (China), ISH (UK) and more.

In addition, 2015 planning is already underway, including:

- AHR Educational Sessions – Provide speakers, create topics, and moderate panel discussions
- Various Global Trade Shows – Provide local language and event support, as needed

- New Speaking Opportunities – Enhance our global message at events focusing on IoT, smart cities, microgrids, energy efficiency, smart buildings, and adaptive control streetlighting, etc.
- ANSI/CEA – Help with the standards adoption for LONMARK application layer and profile definitions for the US market to mirror work completed through CEN in Europe
- ASHRAE – Work with several committees to promote the adoption of protocol neutral guide specifications, education, and standards
- North American Streetlighting (MSSLC) – Monitor activity, provide support, and advise
- Training Program- Support with content from industry subject matter experts and provide program review
- Web Training Program – Explore potential of a broad LONMARK education program for the controls market and the IoT market

As a reminder, the LONMARK Ambassador program began several years ago to engage with industry to help promote the value and virtues of LONMARK's programs,

technology, and support in the industry by offering local language and local support. Under the guidance of LONMARK's board of directors, the current team of ambassadors engages with event organizers, media publications, researchers, and others within the industry.

Our call to action for our readers: if you know of an event or opportunity where one of our ambassadors can support LONMARK's objectives please contact ambassadors@lonmark.org. We have a very capable and eager team available to support you. In addition, if you would like to nominate an ambassador, we are eager to add them to our very qualified team.



RON BERNSTEIN
CHIEF AMBASSADOR
LONMARK INTERNATIONAL

ECHELON

Overview

The Industrial Internet of Things (IIoT) is expected to become the largest and most financially important segment of the broader Internet of Things (IoT) – which itself is really the next big wave in computing. Accenture recently released research suggesting that the IIoT could drive trillions of dollars in economic growth worldwide in the next 15 years. Within the next decade, it's expected that there will be 50 billion connected devices, with industrial and commercial device numbers swamping their consumer counterparts.

IT + OT = IIoT

Today, hundreds of millions of commercial and industrial devices are connected with siloed legacy Operational Technology (OT) networks. To operate at optimal efficiency, these legacy OT networks need to converge smoothly and cost-effectively onto modern Information Technology (IT) infrastructures.

Melding OT and IT worlds can be challenging. Commercial buildings are filled with classic OT networks, where multiple, incompatible protocols have kept the networks separate from one another. But the promise of the IIoT – and, more to the point, the IoT – demands that building owners' investments in legacy building automation networks be leveraged through integration with modern converged IT infrastructures.

Unfortunately, the things that are easy to interconnect have already been connected. Typically this means anything to which a cellular connection or Wi-Fi ra-

then, is to find ways to interconnect the millions or billions of devices that aren't in the 'easy' category.

Many Parts, But One Goal

The IIoT is not a singular technology. Instead, it represents multiple technologies working together in synchrony. According to Bill Morelli, Director of the research analyst firm IHS: "IoT is a conceptual framework. It's about enabling connectivity and embedded intelligence in devices. Some of these devices are connected to-



RON SEGE

mation lies in converging these disparate systems onto a common platform, through which they can intercommunicate to deliver higher-level benefits, such as the overall comfort and safety of building occupants, and the optimization of energy efficiency.

A 1980's Technology Flashback?

In the 1980's and 1990's, the computer networking world saw the convergence of previously siloed systems: mainframes, minicomputers and personal computers converged with the beginnings of the Internet and World Wide Web (now called just 'the web' but remembered through the 'www' that still precedes so many website URLs).

At that time, Robert Metcalfe, legendary founder of 3Com who co-invented Ethernet, coined the term Metcalfe's Law, which states that the value of a telecommunications network is proportional to the square of the number of connected users of the system. In other words, the more connected users, the faster the network's value rises.

In the 2010s, and continuing to the 2020's, we are seeing Metcalfe's Law working for the IoT, as well. In the IoT, convergence of control systems for lighting, HVAC, security, manufacturing and so on will unlock improvements in life quality, efficiency, safety and much more.

According to Simona Jankowski of Goldman Sachs, in an October 22, 2014 article in the Harvard Business Review, the Internet of the 1990's connected approximately 1 billion personal computer users. The Internet of the 2000's connected 2 billion users via smartphones, on its way to 6 billion users. The IoT is expected to connect 28 billion 'things' to the Internet by 2020.

At Echelon, we have 25 years of experience with control networking, which we're now applying single-mindedly to the IIoT. In many ways, the IIoT is really control networking 2.0. The same expertise and skills needed to interconnect traditional industrial automation networks apply to modern IIoT networks.

Importantly, our IzoT platform for the IIoT is multi-protocol and multi-media by design, with 'IP everywhere' as our rallying cry. Many of the industrial devices we connect are built to perform for decades. The ones that have been in place for any length of time rarely are IP-enabled.

Rather than asking industrial and commercial device owners to replace their hard-working device networks with new, IP-enabled versions – or to choose either LONWORKS or BACnet protocols, but not both – it's far better to offer an easy 'on-ramp' to the IIoT. The IzoT SDK and IzoT-in-a-box EVK are ideal for getting started on IIoT initiatives in general, or building

Getting Started with the Industrial Internet of Things in Commercial Building Automation

Within the IIoT, commercial building automation is already providing a solid glimpse of the potential. Unlike the consumer aspects of the IoT, the IIoT demands impeccable reliability and security. It mixes wired and wireless connectivity, as well as multiple protocols. It means IP-enabling devices that might have been in place since before the Internet existed.

Echelon's IzoT™ SDK and IzoT-in-a-box EVK provide easy onramps to the IIoT, demonstrating how the same development effort can be applied to create building-automation applications and devices running LONWORKS or BACnet protocols, or both.

dio can be easily attached. But it's harder to connect things that can't support these interfaces – which in IIoT environments can be a long list.

For instance, lighting fixtures are not connected because the value of connecting most fixtures is less than the cost of the Wi-Fi or cellular radio. Devices that require high levels of reliability and security, which includes the majority of the IIoT world, are not suitable for radio connections. Environments with harsh physical conditions – again, common in IIoT situations – are often incompatible with Wi-Fi and radio signals. The goal,

day, but MANY are not." Automation within buildings is still very fragmented, and this fragmentation is slowing innovation. Lighting, security, HVAC, elevator and other systems each have their own networks, their own protocols, their own sets of data they're collecting and using.

Another level of separation is in the activities and technologies that form the IIoT, which includes sensing, computing, communications, analytics and automated actions. When each of these remains separate and siloed from the others, it's not possible to have a fully functioning IIoT. The promise of the IIoT in building auto-

Just as computer networking convergence in the 1980's depended on a common infrastructure – Internet Protocol, or IP – the same thing is true of the IoT and IIoT today. IIoT convergence will be built upon:

- IP everywhere
- Coexistence of wireless and
- Ethernet networking
- Developer enablement
- Cloud computing
- Big data gathering and analytics

Spurring IIoT Convergence

People today are still struggling with how to boost interconnectivity among currently

disparate systems and networks, for benefits such as greater efficiency, cost-effectiveness, business value and overall quality-of-life improvements. As we all quickly discovered, it's not enough to stick Wi-Fi and cellular radios into various devices, collect data and call it an IIoT solution. In terms of impact, the structural changes represented by the IIoT are on par with the industrial revolution. The networks being established peer-to-peer among industrial and commercial devices; between humans and industrial devices; and with the Internet are creating entirely new ecosystems. On a technical level, what allows these networks to coalesce is IP.

automation projects in particular. They allow legacy, pre-IP devices to participate on the same networks as modern IP-native devices, and they enable applications and devices to run either LONWORKS or BACnet, or both. In the end, the focus must be on bridging and converging legacy OT with modern IT, and enabling existing industrial devices to participate in the IIoT revolution. Spurring IIoT convergence, then, is a crucial step toward realizing the full potential of the IIoT.

RON SEGE,
CEO AND CHAIRMAN,
ECHELON CORP.
WWW.ECHELON.COM

ENOCEAN

Standard-crossing Intelligence

The EnOcean Alliance, a non-profit technical organization with more than 350 members worldwide, defines standardized application profiles for batteryless wireless devices (EnOcean Equipment Profiles, EEP).

The individual disciplines of building automation have long been viewed as separate areas with optimized, isolated solutions developed for each individual one. The goal today is to break down these boundaries and combine the different aspects into one intelligent system. This type of networking is necessary to take full advantage of the opportunities for increasing comfort, security and energy efficiency. Automation should form an integrated system and not just be a sum of different applications.

A field-proven solution involves the combination of wired LON systems and self-powered wireless solutions. The two technologies are an ideal match: LON is one of the leading wired technologies for intelligent building control; while the EnOcean wireless standard is established today to bridge the last leg in an automation system with maintenance-free, self-powered sen-

sors and switches. Both technologies are supported by a strong eco-system of leading companies worldwide.

Sustainable automation

LON supports decentralized communication between all layers of automation as well as a flexible network topology. The user can directly connect devices without a dedicated network hierarchy. By defining several types of media, complex applications bridging several standards including TCP/IP can be used.

Overall coverage

A wired network is ideally suited for data transmission over 100 feet or to send control data across multiple floors. While, energy harvesting wireless components are ideally suited for signal transmission within the same floor, in a radius up to about 30 meters or enhanced via repeaters. An energy harvesting wireless module gathers the power it needs to operate from the surrounding environment, including motion, light or changes in temperature.

Ultra-low power communication

The EnOcean radio protocol uses the 902 MHz frequency band in North America, which offers fast system response and elimination of data collisions. RF reliability is assured because wireless signals are less than one millisecond in duration and are transmitted multiple times for redundancy.

Installation flexibility

Wireless technology shines when it comes to installation, building alterations and system expansion. Wireless components



can be easily fitted, for little cost, even on surfaces inaccessible for wired solutions. Speed and flexibility are advantages not only when expanding and altering at a later date but also during initial planning and final installation. The batteryless technology is advantageous of other wireless solutions since they eliminate the need to change batteries.

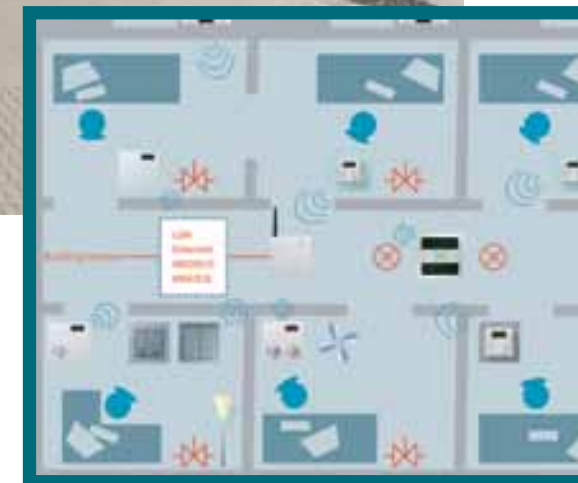
Data packages of all sizes

Batteryless and maintenance-free wireless sensors are ideal for sending small data packets and control commands. The data packets can be funneled back to monitoring stations or shared with other devices in different locations via a wired infrastructure with higher bandwidth.

A perfect pair

Another wireless benefit allows devices to share data anywhere in a room or space, allowing components to be positioned without concern for existing wires. Combining a wired LON system with EnOcean wireless components allows an installation to benefit from both technologies.

A system with self-powered sensors and relay receivers can communicate wirelessly as an intelligent sub-network in a room or area, while communication at the control or supervision level is supported through a LON backbone. This provides the flexibility of a wireless system combined with the large bandwidth and range of a wired backbone.



Batteryless meets wired in corporate headquarters

For its corporate headquarters, Thermokon installed an automation system that combines both LON and EnOcean. The company installed four EasySens/LON gateways in the corridors of the building. Each communicates with a number of offices, all featuring room temperature sensors, switches to control lighting and blinds, window contacts to

monitor the status of the balcony doors plus multisensors to detect motion and brightness. Wireless components are installed in a number of common areas and offices.

The installation illustrates the seamless interaction of wired LON sensors with EnOcean-based EasySens wireless components. The EasySens gateways are located above the drop ceiling in the corridors, while the offices are wireless.

Automated heating and lighting processes

The heating and lighting in individual offices is automated using wired LON multisensors to detect motion activating lights, varying brightness based on the level of ambient light. Heating set points are triggered by motion detectors that ramp up when the balcony doors are closed. Heating valves are controlled by LON I/O modules that communicate with EnOcean wireless room temperature sensors and window contacts. In addition, wireless I/O modules connected to a bi-directional LON gateway controls the outside blinds, lighting and heating. The headquarters project shows how seamlessly the two standards LON and EnOcean work together. The combination is an ideal solution for integrated building automation that combines the benefits of wired and wireless installations.

GRAHAM MARTIN,
CHAIRMAN OF THE ENOCEAN ALLIANCE
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FEATURES

Ron Bernstein, chief ambassador from LONMARK® International Interviews Earl Gray, senior solutions architect, Honeywell and vice chairman of LONMARK International:

The longtime LONMARK supporter shares his insights on the valuable role integration and interoperability have brought to the industry and what part both Honeywell and LONMARK (and its profiles) will play in the evolution of the Internet of Things



Interview with Earl Gray from Honeywell

every kind of system you can imagine in a building is available for me to work with. For things like networked card access and camera systems, we're dealing with digital IP camera systems that are powered by the Ethernet. For example, Honeywell bought a company called Tridium. Tridium integrates systems together, including LONWORKS. LONWORKS is a very important part of what we provide. In fact, it is a majority of what we provide as far as control systems today. It is very reliable, stable, and an adaptable environment.

RB: Let's talk about the Internet of Things. There seems to be a lot of hype and marketing dollars being spent on the IoT space. What can you tell us about Honeywell's involvement in this space?

EG: The "Internet of Things" is about things being connected and having the ability to communicate. Considering the life of buildings, things in buildings stick around for 20, 30, 50 years sometimes. Nothing is about ripped out and replaced immediately. Honeywell is moving very quickly with the Internet of Things, build-

ing products such as thermostats that are Wi-Fi connected and understand speech and your movements.

RB: How do you see the LONMARK strategy regarding profiles and IoT relate to Honeywell's strategy?

EG: From a LONMARK perspective, if you look at what's going on, LONMARK helps accelerate technology advancements and changes. IoT is a perfect example of that. The idea of IoT is that you bring all these disparate things together, collect their data, and synthesize new solutions.

RB: Are there any new products coming out that incorporate LONWORKS or are connected to your LON-based system?

EG: We have a whole new line of LONWORKS controllers called the Spyder Platform. It is a highly capable and adaptable set of systems that is a combination of LONMARK application specific certified controllers and programmable controllers. We're working hard with LONMARK to have the ability to have LONMARK certified field programmable controllers, which are a whole series of controllers with sensor and I/O options that can fit across our product line, as well as Tridium and EBI (Enterprise Building Integrator).

RB: Where do you see LonMark profiles fitting into the IoT marketplace and is it necessary to have different protocols and different systems have a common profile model?

EG: It's necessary to have profiles so that these things can understand other things that might come on the network before they are purchased and no matter who they are purchased from. That's exactly what LONMARK profiles are about. We need to adapt them to different technologies and to update them. I believe strongly in building a system where by each profile, whether a VAV box or a vacuum cleaner, needs to be able to be updated so more things can be added to it.

RB: Honeywell has been a longtime supporter of LonMark as a sponsor member. How has that relationship evolved and benefited the Honeywell team, as well as you and your job?

EG: The relationship has been very beneficial in a number of ways. In the very beginning, LONMARK was very focused on getting everyone to agree on the concept of profiles before they actually existed. They then built out those profiles so things could integrate together. LONMARK has been instrumental in doing that. We, in some ways, take it for granted now that you can take different devices from different vendors and integrate them. LONMARK has pushed forward the idea of integration and interoperability, and it has been the main factor in actually making it possible.

RB: Any closing thoughts you'd like to share with our readers?

EG: LONMARK has a really bright future ahead of it, especially in the area of profiles. They'll be able to bring together all of these separate things in a big data way. By putting together profiles, if I have a million vacuum cleaners and a million light switches, I can make sense of all of this data. I think LONMARK will lead this evolution.

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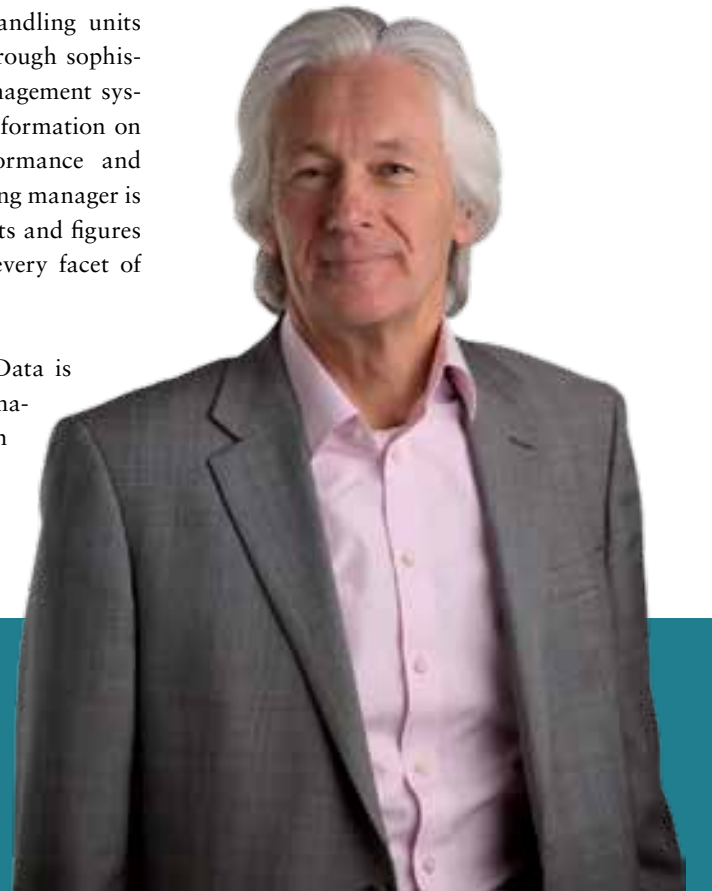
Roger Woodward discusses how the flood of information produced by today's building management systems can be the power behind usable and actionable information that saves energy and money.

Harness the Power of Big Data

The magnitude of intelligent devices and internet technologies now installed in our buildings has created a proliferation of data. Such is the increase in the volume, velocity, and variety of data produced that, Big Data is becoming the new frontier in building energy management.

Buildings and their components such as lighting, chillers and air handling units now have the capability, through sophisticated building energy management systems (BEMS), to produce information on energy consumption, performance and maintenance. Today's building manager is presented with a host of facts and figures about the performance of every facet of the space he or she oversees.

By its very definition, Big Data is too large and complex to manipulate or interrogate with standard methods or tools. A recent study in the US by Forrester Research



concluded that most companies are analyzing just 12 percent of the data at their disposal.

But there is a growing recognition by building owners that data on energy use should be treated as business-critical information. Large amounts of information now flowing into the energy management field are set to give building owners and operators in-depth knowledge about building performance and the power to optimise it.

One hurdle to overcome is the challenge of linking together disparate systems from different manufacturers. Different sectors of the building services industry use different protocols, or even proprietary communications protocols, so there can be difficulty in pulling these strands together to achieve fruitful analysis of Big Data.

The challenge is equally true of new-build project or in existing properties.

Solutions such as Tridium's Niagara Framework offer an IT solution for the BEMS industry that makes the task of gathering data from pulse or smart meters and across numerous protocols much more straightforward. Reaching across all common platforms, open and proprietary, Niagara forms a bridge between energy data and the end-user. This is truly where BEMS and IT are crossing paths success-

fully to bring data that was once lodged firmly in the plant room to web-based tools with simple user interfaces.

The benefits to the business of this ability to collate and use data become clear. Each lighting fixture in a building may have within it at least 40 data and command points. This presents a host of opportunities for data analysis that previously may not have existed, and affords the building manager a level of control that can mean faster energy monitoring and reduced response times to changes that need to be made.

Similarly, in a project whereby environmental control is a critical issue, such as in data centers, a monitoring framework that can oversee the performance of chillers, air handling units and identify where server racks are beginning to rise or fall outside the optimal conditions are required. Then they must send that information directly to the BEMS to act on it. This is not only a tool that provides a safeguard against downtime issues, but also shows the route to a higher level of energy efficiency.

Such advantages are helping the industry to acknowledge Big Data not as a reservoir of unfathomable information, more as an asset to the bottom line. All it takes is the right tool to harness it.

Organizations which view this data as a business tool, in the same way that they might view market research feedback, will find that it provides a great deal of value in the long-term. Not only can Big Data identify energy savings, it can also help to introduce efficiencies across the business as a whole.

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The Industrial Internet of Things (IIoT), B2B Interoperability and Big Data

What is all the buzz about?

Throughout 2014 the industry saw the rise of a new term, IIoT. What is your IIoT strategy? Do your customer's have a strategy? Does your business model involve Big Data or just small data? The Internet of Things buzzwords include IoT, IIoT and Big Data. Is this hype or a real competitive edge? Acronyms aside, fortune 100 business leaders are stating your IIoT strategy will define your customer's experience in the coming decade.

Sorting out the marketing hype vs technology

What is exactly the Industrial Internet of Things (IIoT) and how does it differ from the Internet of Things (IoT), and why is data now Big? First IoT and IIoT both use IP connectivity technology. They both connect intelligent devices or "things" to the Internet using an IP transport. While IIoT and IoT may be used interchangeably, there are both market and technology differences.

The IoT market focus is on the consumer's products, services, and the environment they navigate through. The IoT is their personal world, of IoT wearables, music, TV's, thermostats and Android apps interacting with them. IoT communications stacks are typically IP on common MAC/PHY transports: Ethernet, WiFi, Bluetooth, and 4G/LTE mobile.

Typical Industrial Internet of Things (IIoT) devices run our factories, keep our buildings safe and comfortable, and transport people and packages. Industrial IoT devices must provide secure, reliable, and consistent network performance. Organizations purchase IIoT capable control systems to provide visibility into their assets, operations, supply chain, and distribution channels. In short it helps them manage their business.

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While the IIoT also uses IP based communications, full IP stacks are often only in edge devices providing a secure connection from the IP network to the sensors and controllers. The transport used to communicate directly to the “things” maybe IPv6, “compressed IP”, or often non-IP based stacks. Protocols such as ISO-14908 (LonTalk), CAN, MSTP, and Modbus make up the largest share of the “things” in the IIoT. The secure, reliable IP link technology between the edge device and the “things” is the primary technical difference between the IIoT and IoT.

Key IIoT Drivers – B2B Interoperability & Big Data

Key drivers of IIoT growth include B2B Interoperability and Big Data. A key technology supporting these market drivers is the application profile model. The LONMARK ecosystem has enjoyed the benefits of interoperable LONMARK profiles for over 20 years.

What is the magic of profiles? Simply put, a device profile is meta-data or information about the data. Profile meta-data defines device function, a data point list, and defined operational behavior. For example, a certified LONMARK VAV controller provides meta-data including syntactic and semantic labeling of data points such

as space temperature, set point, CO₂ level, occupied/unoccupied status, and heating/cooling mode.

The IIoT takes LONMARK profiles to the next level, B2B interoperability. Old proprietary systems obfuscated information. Systems without a profile model lack the insight of meta-data. With LONMARK profiles, organizations can create new business relationships based on the profiles supported in their products. Companies can formulate and form new business relationships based on the B2B interoperability of their product profiles.

Big Data? Yes, 10's and even 100's of terabytes. Big Data is collecting and analyzing very large amounts of data from systems (think ERP, CRM) and IIoT devices in order to find correlations that provide actionable business intelligence. Diagnostics, system optimization, preventative maintenance, risk management are just a few uses of Big Data.

Big Data applications require device meta-data to organize the inbound IIoT data stream. The better the meta-data input into the Big Data correlation engines, the lower the computing costs and the more actionable intelligence found. Meta-data supports data staging/landing strategies, smoothing out the Extract,

Transform, and Load operations that front ends platforms like Hadoop. The LONMARK profile model enhances big data analytics and shines a light on much of the “dark data” in IIoT generated Big Data.

The IIoT is here, are you ready?

As 2015 takes shape and companies begin to deploy IIoT systems with Big Data solutions, look for profile models to take a leading role. The LONMARK profile model supports Big Data, the evolution of new B2B relationships, and the alignment of interoperable business plans in the IIoT ecosystem.

Looking for an IIoT strategy? Perhaps it is time to take another look at the benefits of LONMARK profiles. For more information please visit www.lonmark.org



Mike Gibson
Technical Director,
LONMARK International

CASE STUDIES

By teaming with APANET, the city of Jędrzejów experienced a 25% reduction in energy use, a decrease in light pollution and lower maintenance costs; while improving driver safety.

The Challenge

Jędrzejów, a city of approximately 17,000 people in southern Poland, wanted to save money and power by implementing a modern energy-saving street light control system on its new north beltway. The system needed to cooperate with traffic-level detectors and weather station, and to do so, the city managers needed to find a fully open and interoperable system.

This research also brought them to APANET Green System Ltd., a Polish company focused on the design and sales of power consumption reduction systems for various applications. Founded in 2010, APANET is an official member of LONMARK International. APANET's GLC 100 series controllers are certified by LONMARK International, ensuring they are compatible with a large number of similar systems supplied by other companies.

Polish Beltway gets Modern Smart Lighting Control System with LONWORKS Technology

After thorough research, Jędrzejów learned that a system built on a LONWORKS networking platform would be the best option to meet its goals because:

- Well-known status in the marketplace
- Open and interoperable standard, which integrates with a great amount of hardware and firmware available on the market (ie air conditioning, lighting)
- Reliability of the components and the entire system
- Free choice of vendors and manufacturers of products, choice of integrators, choice of service contractors

The Solution

To create the Smart Lighting Control System, APANET installed its GLC142, connected with the StreetLight.Vision control system, allowing full control of the beltway's lighting systems down to a single street lamp - on/off powering, dimming, as well as calculating electricity consumption of a single lamp. The system is able to reduce lighting parameters or completely switch off some of the lamps. Such systems allow a significant reduction in electricity consumption, and therefore, contribute to substantial savings.

Also included is Echelon's SmartServer, whose supply network (PLC technology) communicates with APANET's OLC controllers (located in the lamps) and then sends signals that define the amount of power that is needed for lamps and monitor their proper behavior. When measured traffic volume falls below the threshold set by the administrator, light power is reduced by 30 percent.

The Results

The project, completed in 2013 by the main contractor Budimex S.A, has already produced significant savings in money and energy consumption for the city.

“The system's greatest advantage over similar systems is its ability to continually survey traffic level and weather conditions, and then immediately – and automatically –

reduce the lamp's power in case of low traffic and fair weather,” said Zbigniew Cichy, general director for national roads and motorways (Kielce) for the region of Jędrzejów. “As a result, we've already reduced energy use by 25 percent, as well as significantly cut down on costs and power consumption. Even better, this immediate reaction ensures our drivers are as safe as they can be.”



All Pictures: Source Budimex SA

The system allows:

- full control over all individual lamps in the control system so that the operator can manage and control lamps through a website
- a permanent energy audit of the whole network
- immediate notification and detailed information on lamps and any network malfunctions
- the system adapts to weather and traffic conditions by automatically adjusting lamp level, if needed
- counting lamp uptime and planning lamp maintenance can result in additional savings

Contact:

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CASE STUDIES

Passeio das Aguas Shopping

LOYTEC Solution for Brazilian Shopping Mall

In the “Passeio das Aguas Shopping”, a newly built shopping center in Goiânia, Brazil, the LOYTEC systems integrator Sistavac installed HVAC, lighting, and energy metering systems, controlled and monitored by LOYTEC components.

The project

Sonae Sierra, the international shopping center specialist, is expanding the Shopping Malls portfolio in Brazil. The company is developing a new project in Goiânia, called the “Passeio das Águas Shopping”, which is one of the largest commercial centers in South America. The shopping center includes 779,000 m² of space, 259 shops, 4,000 parking places and is managed directly by the owner. The shopping mall uses the most modern eco-efficient solutions that significantly reduce waste of energy and water consumption, by fulfilling the rigid rules of the ambient management system of Sonae Sierra Brazil.

The integral solution

The installed HVAC, lighting, and energy metering systems are controlled and monitored by LOYTEC components.

The LOYTEC components control the cooling system with LON integration, the ventilation system and the entire lighting system. The system also detects and forwards alarms, measures energy and water consumption, and monitors the mechanical transportation and the water pumping system. The fire detection system is integrated via Modbus.

The system contains L-INX Automation Servers and L-IOB I/O Controllers. The SCADA system LWEB-900 gives the maintenance staff full control and efficient monitoring of the system. The building management system runs on a fully redundant IP network to ensure fast and reliable communications.

Interesting Facts

Location	Goiânia, Goiás, Brazil
Number of Nodes	390
Topology	LONWORKS FT10, BACNET MS/TPIP network via Glass Fiber, Modbus RTU, M-Bus
Companies involved	Sistavac, Sonae Sierra Brazil
LOYTEC Components	5 x LINX-220, 25 x LINX-210, 1x LINX-110, 18 x LIOB-100, 6 x LIOB-101, 12 x LIOB-102, 102 x LIOB-150, 31 x LIOB-151, 17 x LIOB152, 3 x LIOB153, 1 x LVIS-3E112, 5 x L-MBUS
LOYTEC Tools	LWEB-900



Control of the cooling system with LON Integration

The thermal center is the heart of the cooling system that refrigerates the entire building. The cold water produced is distributed to all air handling units and fan coils that refresh the ambient air of the mall and the stores.

The cooling system is a primary-only variable flow chilled water pumping system. This means that there are no secondary pumps for water distribution but only primary pumps fitted with variable speed drives (VSDs) that are responsible for adjusting the water flow in the production (chillers) and in the consumers (two-way valves at cooling coils). VSDs significantly reduce pump energy and additionally, this whole solution is very cost effective.

The control of a plant like this is very complex. Therefore, the following issues have to be considered:

- Control the differential pressure at a remote location in the system at a floating setpoint determined to be sufficient to deliver the required chilled flow through any coil.
- Control the rate of change of chilled water flow through other operating chillers when a chiller, piped in parallel, starts from zero.
- Control the bypass valve as required to maintain minimum chiller flow when there is a low demand for chilled water by coils, sensed by the flow meter.
- Control the optimum chiller staging by monitoring the power consumption in real time and selecting the most efficient operating regime.

This control demands a fully integrated control system that permits the interoperability with all devices that individually control the equipment like variable speed drivers and chillers. The integration of this equipment was done using a ISO/IEC 14908 standards-based network, once the system was equipped with LOYTEC controllers conform to the applicable LONMARK® profiles.

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